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Dr. Edward Maynard, progenitor and inventor

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Dr. Edward Maynard – A Progenitor of the United States Army and Navy Dental Corps and an Inventor in the Field of Small Arms

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Acknowledgement

It is incumbent upon me, before formally beginning this study, to recognize and give credit to a previous laborer in the same field, the late Dr. William N. Hodgkin, D.D.S., of Warrenton, Virginia. In addition to being a leader in the state and national dental societies, Dr. Hodgkin was for many years actively engaged in studying and reporting the history of his profession. He was in fact collecting material for a study to be entitled "A History of Dentistry in Virginia," on a scale similiar to Dr. Wyndham B. Blanton's monumental study of medicine in Virginia. Unfortunately, his untimely death found the actual writing of this work barely begun, and the vast knowledge of the subject which Dr. Hodgkin had acquired by years of study is now lost forever.

It was Dr. Hodgkin who first interested me in the subject of this report, and it was only through his introductory work in the field that I was able to reach the primary sources and complete my work in time for the August deadline. If it had not been for his interest and effort it is quite probable that this thesis would never have been written.

I am also indebted to Dr. Harry Lyons, Dean of the Dental School of the Medical College of Virginia, for making available for my use the random collection of private papers which Dr. Hodgkin left to the College upon his death.

A word of recognition is also due to the personnel of the National Archives and the Library of Congress who aided my research and led the way through many dusty volumes which otherwise might well have escaped attention.

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Chapter 1

Introduction

I have not entered upon this study with any notion that its results will be earth shaking or will lead to any new school of history; I hope rather to unsettle for a time the dust that covers the career of a nineteenth century figure whose work was largely of a primal nature, and whose achievements are largely overshadowed by fuller accomplishments based on his probatory work. This thesis is concerned with the two most notable aspects of the career of Dr. Edward Maynard: his efforts to bring about the use of professional dentists in the U. S. armed forces; and his contributions to the development of modern firearms. He entered dental practice at a time when it was just becoming worthy of being termed a profession, and was a leader in his chosen field throughout his life, but his name is commonly passed over by dental historians in preference to the so-called "big four" among his contemporaries - Horace Hayden, Chapin Harris, Eleazar Parmly, and Solyman Brown. His discovery of numerous improvements in the means of loading and firing small arms are somewhat better known, and usually receive some brief recognition in any thorough analysis of the history of firearms, but the extent to which his inventions were used and the impact which they had on future developments is almost always ignored. It is therefore my purpose not to recreate him as a giant of the age, but simply to chronicle and comment upon his actual achievements which, while not titanic, are certainly worthy of due respect.

My research has largely been confined to the National Archives and the Library of Congress, and it is my belief that these two repositories contain most of the existing original material concerning his work. It must be

admitted that other libraries could conceivably shed even more light on the subject, but, as will be noted in the text, such inquires by Dr. Hodgkin proved fruitless, and in any event were beyond the limits of time and travel imposed by completing this work while engaged in a regular course of graduate study. I do not claim to have exhausted the subject, but I have made every effort to take advantage of all material readily available. I have for the most part declined to use technical terms from the fields of dentistry and firearms, both in deference to my readers and because of personal limitations. I can say in conclusion that this is one of the few papers which I have ever done out of personal interest, rather than as a course requirement.

Chapter 2

Biographical Sketch of Dr. Maynard

In order to fully appreciate the varied abilities of the subject of this study, it will be necessary to provide a brief sketch of his life and the diverse activities in which he engaged. Edward Maynard, A.M., M.D., D.D.S. (all honorary), was born April 26, 1813 at Madison, New York, the son of Moses and Chloe Butler Maynard. His father was a local sheriff and a former member of the New York Legislature.[1]

After a preparatory course at Hamilton Academy, he entered the United States Military Academy in 1831. Little is known of any early predilection toward firearms, but the above would certainly indicate that his later interest in military small arms was a result of an early fondness for the military. Physical disabilities caused his resignation from West Point prior to graduation, and he devoted himself to the study of architecture and civil engineering for a short time.

In the years just prior to 1835 he received dental training as an apprentice, and in 1836 he established a practice in Washington, D.C. He continued to practice there, with some interruptions for voyages abroad, until 1890. On coming to Washington he had the distinction of being one of the few trained dentists in the area and he soon succeeded the famed Dr. James S. Gunnell as the outstanding practioner in the growing capital city. Over a period of years he gradually built up a clientele which included several

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[1] Allen Johnson and Dumas Malone (eds.), Dictionary of American Biography (New York: Charles Scribner's Sons, 1931), Vol. XII, p. 457. (Hereinafter referred to as "D.A.B.").

Presidents and a host of national figures of the times.[2]

On the organization of the American Society of Dental Surgeons in 1840, Maynard was one of the group who, by invitation, became an original member and was appointed to the Committees on Seals, Diplomas, etc.[3]

In a group which included two so talented as were Solyman Brown and Eleazar Parmly, his artistic ability was obviously well known when it is noted that "The insignia, or coat of arms of the American Society of Dental Surgeons [also adopted by the British Society], designed and drawn by one of the most talented and esteemed members of the body, Dr. Maynard of Washington City, is a polyandrian column,...."[4] This seal was carried on the diplomas of the society and the title pages of the First Series of the Journal.

Beginning in 1842 Maynard served with Drs. L.S. Parmly, E. Townsend, and others on the Executive Committee of the American Society, where, as always, his work drew praise. The report of the the 1842 meeting states: "Dr. Maynard of Washington City, was the only member of the Executive Committee in attendance, consequently the whole business of that important committee devolved upon him, but it could not have fallen into better hands. But for the prompt and systematic manner in which the business of the committee was presented, its [the Society's] meeting would have continued at least a day longer."[5]

Together with Chapin Harris, Solyman Brown, and Eleazar Parmly, he

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[2] National Cyclopedia of American Biography (New York: James T. White & Co, 1926), Vol. XI, p. 340.

[3] American Journal of Dental Science, Second Series, 1:157, August, 1840. (Hereinafter referred to as "Am. J. D. Sc.").

[4] Ibid., 4:20-21, September, 1843.

[5] Ibid., 3:69, 1842-43.

served on the Committee appointed to draft resolutions "in relation to the demise of Horace Hayden."[6]

In the field of dental literature Maynard played a full part. He was made Associate Editor of the American Journal of Dental Science when the Society took over the publication in 1840.[7] In 1843 he became co-editor of the Journal, serving with Chapin Harris and Amos Westcott.

Furthermore, he was among the small group of generous dentists subscribing funds to make possible the first volume of the Journal.[8]

His published papers disclose a wide range of interests, from "diversity in form," through "situation and capacity of the antra," and a "study of dental fibrillae." He is said to have introduced the technique of filling root canals with gold foil.[9] As early as 1842 Maynard was inveighing against the use of solutions containing mineral acids for the removal of calcareous tartar.[10]

As a preceptor he was an early proponent of "aptitude testing" and held to the dictum that "the hands of the dentist should be educated as well as the head." He once wrote, "We are frequently applied to for instruction in our profession, and the first question we ask the applicant is, 'have you been accustomed to any pursuit requiring some mechanical skill, and the use of the hands?' If not, the man is dismissed as not being prepared to commence his studies - advised, perhaps to turn his attention to law, or some other

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[6] Ibid., 5:74, 1844-45.

[7] National Cyclopedia of American Biography, loc. cit.

[8] L. P. Brown, "New Lights on Dental History," Dental Cosmos, 62:945, August, 1920.

[9] D.A.B., op. cit., pp. 457-58.

[10] Am. J. D. Sc., op. cit., 4:71, September, 1843.

profession that requires the head only to be educated."[11]

He was obviously advanced and thorough in his teaching methods. In 1844 he was advising those dentists undertaking to teach students to have copies of all varieties of human teeth made in clear glass, into which were cut cavities of various types. These cavities, when cut and polished, would enable the student to observe the base and walls as well as the surface of the cavity, and to thus apply a more lasting filling.[12]

He was likely the first to practice the reproduction of rugae (folds) in dentures, and his comment on the subject is one of the few instances of any personal claim to fame: "We take some little credit (with all due modesty) for pointing out the use of rugae." He continued with the description of function and observed that "If these rugae cannot be stamped up, they should be soldered on."[13]

He was one of the eighteen distinguished dentists who comprised the first group to receive the honorary degree of Doctor of Dental Surgery from the Baltimore College of Dental Surgery, on February 18, 1842.[14] In 1847, with Drs. Amos Walcott and J. H. Foster, he was appointed delegate from the American Society of Dental Surgeons to the National Medical Society.[15] He was appointed to the chair of theory and practice at Baltimore College of Dental Surgery in 1856, and held a like position in National University in

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[11] Ibid., 3:81, 1842-43. [12] Ibid.

[13] Ibid., 4:143, December, 1843.

[14] J. B. Robinson, Foundations of Professional Dentistry (Baltimore: Waverly Press, Inc., 1940), p. 80.

[15] Am. J. D. Sc., op. cit., 3:63, September, 1847.

Washington from 1887 until his death in 1891.[16] He was an honorary member of the American Academy of Dental Science and of the European Society of American Dentists, and also a member of the International Medical Congress.

Early in 1845 Maynard undertook a European excursion, and while in St. Petersburg was employed as court dentist to Czar Nicholas I of Russia, on the reccommendation of Dr. Arndt, court physician. Following this service he was offered a post with the resounding title of "Actual Dentist to His Imperial Majesty." The post was respectfully declined, but the Czar insisted that he accept a "magnificent diamond ring."[17] Maynard's European trip appears to have been a veritable succession of honors - the Medal of Merit from the King of Sweden, seldom bestowed on a foreigner; Chevalier of the Military Order of the Red Eagle by the King of Prussia; personal compliments of the King of Belgium.[18] Except for the attentions of Czar Nicholas, these honors were due primarily to his extra-professional accomplishments in the field of small arms, but they nevertheless added to the prestiege of the advancing American Dental Profession.

Maynard's Washington office was on Pennsylvania Avenue near 11th street, which is only a stone's throw from the National Archives, where much of the information pertaining to his career is now housed. His early residence was on L street, just off Pennsylvania Avenue, which he vacated in 1866 to leave it as the premises of the British Legation during the period when Sir Frederick Bruce was Minister to the United States.[19]

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[16] D.A.B., loc. cit.

[17] Obituary in the Washington Evening Star, May 5, 1891.

[18] D.A.B., loc. cit.

[19] Letter from L. McCormic-Goodheart, Attache to the British Embassy, to Dr. W. N. Hodgkin, April 16, 1941. Hodgkin Papers.

Edward Maynard died on May 4, 1891, after 55 years of service in both the practice and the teaching of dentistry. His passing was of course noted by the newspapers, but more significant were the special resolutions of several state dental socities, for these were the product of those best able to judge as to his service to the dental profession. In the resolution of the Virginia State Dental Association, for example, he was described as that "prince of dentists."[20]

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[20] Proceedings of the Virginia Dental Association, 1878-1892, p. 81. Hodgkin Papers.

Chapter 3

The Status of Medicine and Dentistry in Dr. Maynard's Day

In order to properly appreciate Dr. Maynard's place within his profession, and especially to evaluate his attempts to foster the incorporation of scientific dentistry into the medical corps of the armed forces, it seems desirable to look briefly into the relative status of medicine and dentistry during his time.

Any survey of the progress of medicine in the 19th Century, as compared with previous scores of centuries of stagnation, soon leads one to the conclusion that never in recorded history has man achieved such momentous progress against suffering due to physical ailments in such a short period of time. Sir William Osler went so far as to judge this progress "the Promethean gift of the century to man." As far as medicine in the U. S. is concerned, the century's really progressive years can be pared down still further, for as Dr. Wyndham B. Blanton has stated, "Medicine rests its case as a science almost entirely on the accomplishments of the latter half of the nineteenth century."[1] Many of the vital discoveries which made possible this advance antedated the 19th century to be sure, but not until then were they broadly applied by even a portion of the total number of persons who attempted to minister to the sick. As Dr. Blanton said in his opening chapter, "In Virginia, until the Civil War, medicine was what it always had been, a dignified and respected profession, followed by men of good breeding and education, trained largely at the North and in Europe, but none the less wedded to antique

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[1] Wyndham B. Blanton, History of Medicine in Virginia in the Nineteenth Century (Richmond: Garrett & Massie, 1933), p. 2.

theories possessing a strange veneration for authority."[2]

In the decades prior to 1850, Southern medical practice still concentrated on the treatment of epidemics; the technique of cupping; the supposed therapeutic properties of persimmon, tartar emetic, mercurial ointment, and creosote. "For the most part they were concerned with the same old subjects, dealt with in the same old way."[3]

With the advent of Virginia's first medical journal, the Stethoscope and Virginia Medical Gazette, in 1851, that state's medical practice began to make significant gains; a tendency which was duplicated in many other regions of the South. For the most part there was clinical recognition of such scourges as typhoid fever, yellow fever, diptheria, and other epidemic diseases. Medical journals sprang up everywhere and soon were benefitted by hosts of contributors.

The surgery of this period was much the same as it had always been; limited largely to the treatment of wounds, fractures, burns, and amputations. The twin blessings of anaesthesia and antisepsis were to enter the South by the late 1840's, but there was still the seemingly interminable period of waiting while these practices evolved from curosities to general practice. Surgery was still little more than one of several talents expected of the general practioner. It received tremendous emphasis during the war, of course, at a time when most other medical science ceased to advance because of the volumn of common illness and injury. But techniques changed little until after the war, and chest and abdominal surgery were seldom performed except in hopeless cases. If there was one single significant event in the

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[2] Ibid., p. 4.

[3] Ibid., p. 133.

field of surgery it was probably the advent of a genuine attempt to preserve and render useful injured portions of the body, rather than to be immediatly rid of them forever.[4]

The age of medical specialization, which is so thoroughly upon us today, did not really begin until the decades of reconstruction. There was a decided sufficiency of quacks and charlatans who profited by the public's love of the idea of specialization, but true medical specialties were largely limited to a few experts in such fields as obstetrics and gynecology.[5]

The one thing which has distinguished American dentistry from that practiced in Europe and elsewhere, the seperation of medical and dental practice, is largely a product of the last six decades of the 19th Century. Prior to that time there was little that could be regarded as a dental profession. Teeth were neglected until they fell or were pulled out; toothache was treated by either local applications or extraction, and medical practioners commonly performed both services. A considerable portion of early dental practice fell to jacks-of-all-trades of the Paul Revere variety, and true innovators such as John Greenwood, George Washington's dentist, were rare. During the first three decades of the century, all manner of dental practioners were referred to as "surgeon-dentists," and their work was closely akin to that of the age old cut-and-cauterize surgeons.

With the advent of the fourth decade of the century the American dental profession blossomed forth with the leadership that has henceforth enabled

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[4] "Address Before the Alumni of Jefferson Medical College," (n.n.), Virginia Medical Monthly, April 4, 1887, p. 81.

[5] Blanton, op. cit., pp. 156 et segg.

it to lead the world. The banner year of 1840 saw the publication of the first true dental textbook by Solomon S. Fitch, the founding of the world's first dental school, the Baltimore College of Dental Surgery, the founding of the American Society of Dental Surgeons, and the first publication of the American Journal of Dental Science.[6] Although the progress of the dental profession was delayed somewhat by the prevalent practice of patenting individual innovations, and also to a degree by conflicts between champions of individual proprietary schools, the progress of the profession in general, and of mechanical technique in particular, was nothing short of phenomenal. The organization in 1842 and incorporation in 1845 of the Virginia Society of Surgeon Dentists marked the founding of the nation's first state dental society. The state and national societies furthered the profession by encouraging new discoveries, awarding honorary degrees to talented members, and taking the first steps to ferret out the quacks and charlatans from the growing body of recognized dentists. But the day when practioners would be examined and licensed by state boards was to wait until the 1880's.

No attempt will be made here to treat the subject of medicine in the Union and Confederate armies, since such would be little more than a repetition of material covered in detail in G. W. Adam's Doctors in Blue and H.H. Cunningham's Doctors in Grey. The subject of dental practice in the Union and Confederate forces will receive fuller treatment later in connection with the efforts of Dr. Maynard.

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[6] Ibid., p. 172.

Chapter 4

Dr. Maynard's Efforts to Establish a Dental Corps

The existence of the U. S. Army Dental Corps dates back to 1901, while that branch of the U. S. Navy saw its inception as late as 1912, and because of this it is often assumed that the ideas behind their creation were also products of the late 1890's and early 1900's. In one recognized work on the subject of medical and dental history can be found an account which gives credit for the formation of the Naval Dental Corps to Surgeon-General P. M. Rixey, in recognition of his efforts toward that end in the period 1908 - 1912.[1] It is not my intention to detract in any way from the work of Dr. Rixey and others whose efforts early in this century led to the ultimate founding of the Dental Corps. But it is my intention to investigate and document the work of Dr. Maynard in this field, work which antedates even the American Dental Association. Even those who have dug into the early records have often neglected the efforts of the good Doctor. For instance, H. H. Cunningham included as his sole comment upon the subject the following sentence: "It is also of some significance that Jefferson Davis, while Secretary of War during the Franklin Pierce administration (1853 - 57), was an early advocate of army and navy dental corps."[2] He was indeed, but chiefly as a spokesman for Maynard's ideas.

The first official action by a dental association in this regard was taken by the Western Dental Society, July 21, 1858, at a meeting in Quincy, Illinois, based on a motion which was sponsored by a leader of the society,

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[1] Richard C. Holcombe, A Century With Norfolk Naval Hospital (Portsmouth, Va: Printcraft Publishing Co., 1930), pp. 375 - 76.

[2] H. H. Cunningham, Doctors in Grey - The Confederate Medical Service (Baton Rouge, La: Louisiana State University Press, 1958), p. 19.

Dr. H. J. McKellops of St. Louis.[3] About two weeks later he was successful in promoting passage of a similar resolution before the American Dental Convention, meeting in Cincinnati. The resolution read as follows: "Resolved, that the Convention appoint a committee of five to memorialize Congress on the necessity of appointing dentists for service in the regular army, the committee to act in concert with that of the Western Dental Society."[4]

This committee was formed as suggested above, but there seem to be no records of any sort as to any success which they might have achieved.

One of the most interesting and most revealing tributes to Maynard's efforts is the following editorial comment from the American Journal of Dental Science, presumably by Chapin Harris, then serving as co-editor. It is entitled "The Importance of Army and Navy Dentists," and reads as follows:

> At the last meeting of the American Dental Convention, a Committee was appointed to memorialize Congress on the necessity of appointing dentists for the service of the army and navy. The resolutions authorizing the appointment of this committee were offered by Dr. McKellops. We are glad this subject has attracted the attention of the Convention, although to our certain knowledge the importance of it has been advocated by Dr. Maynard for those fifteen years past, at Washington City, and had so far impressed Mr. Fillmore in its favor that he brought it before the Cabinet in Council. The Secretaries of War and Navy took some action in the matter. Nothing resulted from the former, and the latter went to work so stupidly and vexatiously as to make it necessary to countermand his orders in the matter as soon as his term of office expired, which happily occurred within a few days and before his new "regulation" was issued. More recently, Mr.

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[3] Dental News-Letter, 13: 3, October, 1858.

[4] Dental Cosmos, 43: 430 - 31, April, 1901.

Davis, when serving as Secretary of War, received the propositions as of great value; and Mr. Dobbin, Secretary of the Navy, to whom he addressed a note upon the subject, at once, and heartily approved the proposition and expressed himself as under deep obligations to Dr. Maynard for humane suggestion. No official action was taken however. The time was not favorable. There had been pending before Congress for some time, a bill affecting the corps of surgeons of the army, and it was thought best not to propose anything which might defeat that bill. One of the army surgeons who favored the new proposition, visited the Surgeon General with Dr. Maynard, and so far was he successful in advocating the project that the Surgeon General was willing to advocate the establishment of a corps of army dental surgeons of six to begin with, to be entirely distinct from the corps of surgeons in their duties, examinations, promotions and rank.

Although no official action has ever yet been had in the matter the project is daily ripening. We have reason to know that Dr. Maynard misses no proper occasion to advocate and illustrate its propriety to such of his patients, from the President to the common soldier, as may have authority of place, official or legislative, or may be in any WAY affected by it.

All approve the measure; and when the most favorable time arrives for legislative action, we have no doubt that Dr. Maynard will carry it through successfully.[5] (exactly as original)

The favorable time for legislative action unfortunately did not arrive until a full decade after Maynard's death, in 1891, ~~the~~ The story as told above seems to be of sufficient interest to justify a search to determine exactly what confirmation still exists in the official records. Unfortunately, correspondence of the period between the Secretaries of War and the Surgeon-General is not available, either in the National Archives or the Libraries of

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[5] American Journal of Dental Science (n.s.), Second Series, 9:444, 1859.

the Surgeon-General and War College. Neither is such material available from the numerous Davis biographies, or from his collected papers. Dr. Hodgkin also secured the aid of Mr. Arthur F. Isham, of Buffalo, N.Y., in checking the Fillmore Papers, in the collection of the Buffalo Historical Society, with equally disappointing results. There is, however, in the Navy Department Archives ample confirmation of the initial efforts of the department, and of Maynard's role as well. Since the editorial story is thus confirmed by official correspondence in one branch of the service, it seems reasonably safe to presume it basically accurate throughout. The balance of this chapter will therefore be devoted to chronicling and analyzing this correspondence.

The series seems to have begun with the following letter from Secretary of the Navy Kennedy to Dr. Thomas Harris, Director of the Navy's Bureau of Medicine and Surgery:

Navy Department
February 16, 1853

Sir:

The President has expressed a wish that this department would inquire into the propriety of enlarging the requisitions upon candidates for admission into the Medical Corps, so far as to demand from them a more full knowledge of the science and practice of Dentistry in preparing them for the duties of the Naval service. He is impressed with the belief that more attention to this subject than is ordinarily given would be found to be usefully conducive to the health of the officers and men on ship board.

To enable the Department to satisfy the President on this question, I will be obliged to the Bureau under your control for a report, which shall state what studies in dentistry are now embraced within the general requisitions of the Bureau, and the expression of your opinion upon the value or necessity of

enlarging the studies of the Medical Corps, with a view to a more complete and practical knowledge of the character and treatment of diseases which may be supposed to have any connection with the present improved condition and research of dental science.

Very respectfully
Your obt. Svt.
John P. Kennedy[6]

This letter seems to provide the best determination of what procedure of the inept Secretary of the Navy was regarded as so "stupid and vexatious" by the Journal's editor; namely, the approach to the problem by "enlarging the requisitions upon candidates for admission into the Medical Corps, so far as to demand from them a more full knowledge of the science and practice of Dentistry...." This seems especially likely in view of the known persuasion of the dental leaders of the time for a separation of medical and dental practice.

Dr. Harris' reply to the above request embodied the negative attitude toward the proposed project which he was to display throughout the prosecution of the matter:

Bureau of Med. & Surgery
February 21, 1853

Sir:

I have the honor to acknowledge the receipt of your letter of the 16th inst. calling upon this bureau for a report, which shall state what studies in dentistry are now embraced within the general requisitions of the Bureau, upon the candidates for admission into the Medical Department of the Navy; and for an opinion

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[6]National Archives, Records of Department of Navy, Bureau of Medicine and Surgery, Letter Book 1853, Letters Received, p. 10. (Hereinafter referred to as "National Archives")

as to the value or necessity of enlarging the studies of the Medical Officers, with the view to a more complete and practical knowledge of the character and treatment of diseases, connected with the present advanced condition of dental science.

With regard to the studies in dentistry now required, I would state that they extend merely to the physiology and pathology of the teeth, and to the practice of such operations on the same, as may be considered essential to the health and comfort of the officers and men on ship board.

As to the necessity or propriety of enlarging the studies of Medical Officers, so as to embrace anything like a complete and practical knowledge of the nicer manipulations of dentistry, I have no hesitation in expressing the conviction, that it is altogether impractical without a neglect of other and much more important branches of their profession.

Dentistry is regarded as an art seperate and distinct from the profession of Medicine, and one requiring a manual dexterity, which can only be acquired by long and extensive practice.

I believe all that is essential to the health and comfort of the sailor, in this regard, is now taught and understood by the Medical Officer, and that to enlarge the scope of his studies so as to embrace the art of dentistry, as now understood, would, so far from adding to, materially detract from the usefulness and efficiency of the Medical Corps.

I would add that the instruments and appliances, necessary to the practice on board ship, would involve a large additional expense in the Medical outfit of vessels.

I am very respectfully

Your obt. Svt.
Tho. Harris
Navy Department[7]

Hon. John P. Kennedy
Secy. of the Navy

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[7] Ibid., Letter Book 12, Letters Sent, pp. 329 - 31.

Maynard took every advantage of his contacts with prominent members of the Administration to advance his project, prompting a second letter of request to Dr. Harris. It should be noted that in this case the idea of dental training for the medical corps had been largely discarded, and the actual employment of trained dental specialists was being suggested:

February 24th, 1853

Sir:

Your letter of the 21st inst., in reply to one from this department of the 16th instant, has been received.

I have to request that you will, for the information of the President, furnish a further report of the extent of dental science, considered by you as necessary to the Medical Officers of the Navy, to enable them to practice such operations as may be essential to the health and comfort of the Officers and Men of the Navy on ship board, and also to state, whether in view of the limited extent of the practical knowledge of the nicer manipulations of dentistry, acquired by the Medical Officers of the Navy, it is not essential to the health and comfort of the Officers and Men of the Navy, that there should be a skillful Dentist attached to each of the vessels of the Navy or at least one to each squadron.

I am, very respectfully
Your obedt. Servt.
John P. Kennedy [8]

The above letter is especially important in that it states the conditions of utalizing trained dentists in what was most nearly the language desired by Dr. Maynard. The illuminating answer to this request is rendered in part on the following page:

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[8] Ibid., Letter Book 1853, Letters Received, p. 18.

Navy Department
Bureau of Med. & Surgery
February 25, 1853

Sir:

...In reply to the first part of the inquiry, I would state that the Medical Officers of the Navy are required to inform themselves in regard to the anatomy fo the teeth, and the surgical treatment of the diseases and injuries to which they are subject: - they must understand the different methods adopted for the relief of pain; the best modes of extraction; the causes and treatment of disorders connected with dentition; the same in regard to the exfoliation of the alveolar processes, and the treatment of abscesses, ect. in that region.

These particulars are mentioned, to give some idea of the extent and character of the information required in regard to the diseases of the teeth and adjacent parts: - which is all that, in my opinion, is essential to the health of the officers and men on ship board.

In so far as dentistry is not embraced in the cirriculum of study now required by the Medical School of the Country, it is essentially a Mechanical art, demanding a long and laborious apprenticeship to attain the most ordinary skill.

It is taught in none of the colleges of this country, nor in Europe, so far as I am aware.

It would be no doubt conducive to the comfort and convenience of a vessel to have an experienced dentist, but I would state it as my opinion, that one for each Squadron would be amply sufficient.

I am respectfully
Your obt. st.
Thos. Harris [9]

The above letter is quite useful in shedding light on the ultimate failure of Maynard's project. First of all, it stretches to the absolute

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[9] Ibid., Letter Book 12, Letters Sent, pp. 326-27.

maximum the knowledge of dentistry required of the Medical Corps. This naturally tended to decrease the need for dentists, at least in the eyes of the layman. Secondly, Dr. Harris either ignored, or was ignorant of, the existence of the Baltimore College of Dental Surgery, which had by 1853 graduated at least one hundred twenty qualified dentists.[10] Quite naturally, this omission detracted from the prospects of the project by giving a faulty impression of the status of dental education.

For all practical purposes, the above letter ended official consideration of Maynard's project by the Navy Department. As the project came to an end, Maynard requested and received copies of the official correspondence, but was unable to rekindle the interest of the U. S. Naval authorities in the matter.[11]

Interpretation of correspondence is a hazardous business at best and I do not intend to make any sizable foray into the field. But it does appear obvious from the letters, supported by the editorial story, that interest and impetus in the proposal were most pronounced in the office of President Fillmore, diminishing and yielding in succession what minimum ground seemed necessary as communications followed official channels from top to bottom. Thus another useful project was delayed for half a century, not for lack of merit, but rather for lack of a guide through the lower echelons of the ever dense bureaucracy.

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[10] Dental Infirmary of the Baltimore College of Dental Surgery, Eighty-first Annual Catalogue, 1921 - 22, pp. 14 - 15.

[11] National Archives, op. cit., Letter Book 12, Letters Received, pp. 326-27

Chapter 5

Growth of the Dental Corps of the Confederacy

One of the chief outcomes of Dr. Maynard's efforts, as related in Chapter 4, was the increased utalization of dentists in their professional capacity by the Confederate armies, and this chapter will be devoted to a study of this facet of dental history.

The advanced and wider utalization of the dentist in his professional capacity by the Confederate Armies, as contrasted with the practice of the Union Army, in the Civil War, has been noted by several historians. H.H. Cunningham's comment in this regard has already been noted, and Dr. Wyndham B. Blanton also managed to shed some light on the subject, particularly with respect to the work of Dr. James Baxter Bean. Dental historian Charles Koch relates that: "During the Civil War an effort was made to secure dental service in the Union Army, but the idea was not received with favor by the War Department. A similian effort was made in the Confederate Army and it succeeded in so far that several dentists were regularly commissioned as members of the medical department and assigned for duty at the larger hospitals. In the Union Army the only dental service was that of lancing 'gum boils' and the extraction of teeth."[1]

Another dental authority has this brief note: "It was related that during the war between the North and the South several dentists were carried in the Army hospitals of the Southern Confederacy."[2]

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[1] Charles R. E. Koch, History of Dental Surgery (Fort Wayne, Ind: National Arts Publishing Co., 1910), Vol. I, p. 138.

[2] J. A. Taylor, History of Dentistry (Philadelphia: Lea & Febiger, 1922), p. 208.

Here again there is an unfortunate lack of official correspondence on the subject, due in considerable measure to the destruction of the four year collection of Surgeon-General's records in the burning of Richmond in April 1865. There are however, sufficient contemporary records to confirm the existence in the Confederate Army of what might almost be termed a "Confederate Dental Corps."

There are five general factors which might be said to have prompted the creation of such a body; three are of a rather general nature and require little comment, while two will be explored at some length in order to show the actual extent of dental service in the Confederate Armies.

First among the causal factors was the natural and overwhelming demand by soldiers resting near cities where dentists were available for dental service during intervals between battles.

A second and closely related factor was the inability of the private soldier to pay for his own dental care, especially in the later days of the war. Not that dentists extracted particularly exhorbitant fees, but the unbridled inflation from which the Confederacy increasingly suffered was especially potent in a profession which relied heavily on such items as gold foil and porcelain.

A third factor which contributed considerably to the incorporation of dentists into the Confederate Armies was the resourcefulness of Surgeon-General Samuel P. Moore in meeting the responsibilities for the total health care of the forces under the charge of the Medical Department. Moore's warm advocacy and support of dental service is attested by the following tribute of his contemporary W. Leigh Burton: "Dentists of every land owe a debt of gratitude to a man who gave official recognition to the importance of their profession,

and who extended to those under him every encouragement in the prosecution of their arduous duties;... they owe more to Samuel Preston Moore, Surgeon-General of the late Confederate States Army, than to any man of modern times."[3]

Burton's article also contains the following order, authorized by the Surgeon-General, which goes far in explaining the actual extent of dental service in the Confederate Armies:

Office of the Medical Director
C.S. Hospitals in Virginia
Richmond, Va., Nov. 4, 1864

Circular No. 15

I. As far as practicable in future, the operations of dentistry required in General Hospitals in Virginia, will be performed by officers, soldiers or conscripts assigned to those duties, who are dentists by profession.

II. Examinations will be made, at such times as may be fixed by the surgeon in charge, of each officer and soldier admitted into hospitals, and the necessary operation performed with the concurrence of the attending Medical officer.

III. Dentists are expected to be provided with their own instruments, but the necessary materials and files will be purchased with the hospital funds, and requisitions made for other instruments thought necessary.

IV. Dentists will have the rank, pay and prerequisites which their position in the army entitles them, and in addition, such extra duty pay for extraordinary skill and industry, as the Surgeon-General will allow, in accordance with General Order, No. 66, A.&I.G., office, current series.

V. Monthly reports of Dental operations and accompanying registers

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[3] W. Leigh Burton, "Dental Surgery as Applied in the Armies of the Late Confederate States," American Journal of Dental Science, Third Series, 1:180 - 185, August, 1867.

in accordance with forms furnished, will be forwarded through the Surgeon in charge and through this office, to the Surgeon-General by the 5th of the month succeeding.[4]

The brilliant accomplishments of James Baxter Bean in caring for maxillo-facial wounds in the battles around Atlanta, although occurring in the later part of the war, also aided greatly in leading to hightened appreciation of the scope of oral surgery. E. N. Covey, a medical inspecton of the Confederate Army, has left us a fine portrait of Bean giving gratuitously of his facile skill to those suffering from wounds of the face and jaws, following the action around Atlanta. So impressed was Covey with Bean's accomplishments with the interdental splint, especially in the face of the "frequency of this class of fractures in military surgery," and what he described as "the almost total want of success among surgeons, with the treatment usually adopted," that he took the responsibility of directing that all cases at Atlanta should be sent to one hospital for his treatment.[5] Burton relates that over one hundred cases were handled by Bean at Atlanta with invariable success.[6]

The identity of the above mentioned hospital in Atlanta was the subject of an intensive search by Dr. Hodgkin, and while he was never able to establish it precisely he did discover that with the fall of Atlanta the cases under treatment by Bean were moved to the Blind School Hospital at Macon, Ga. Thus the Blind School Hospital, although yielding in priority to the Atlanta institution, becomes the first identifiable hospital in military history

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[4] Ibid.

[5] E. N. Covey, "The Interdental Splint," Richmond Medical Journal, February 1866, pp. 81 - 91.

[6] Burton, loc. cit.

known to have had a ward devoted exclusively to maxillofacial surgery.[7]

Over and above all the above factors must be considered the continuing interest and influence of President Jefferson Davis in the advantages of dental care for the military. An interest roused by the pioneering work of Dr. Maynard and certainly increased by the stringencies of wartime.

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[7] William N. Hodgkin, "Dentistry in the Confederacy," The Journal of the American Dental Association, Vol. 50, June, 1955, pp. 647 - 55.

Chapter 6

Dr. Maynard's Work in the Field of Firearms

Varied and notable as were his contributions to his profession, Dr. Maynard was even more widely known in the military world for his achievements in the improvement of small arms. When physical disabilities forced him, at the age of eighteen, to abandon his initial interest by resigning from West Point, it seems quite probable that the United States Army lost a cadet who would have become one of the most brilliant figures in the history of the Ordance Department. Even with a brief cadetship, and a later full career in the profession to which he so greatly contributed, the records of the War Department are replete with the testimony of world-wide interest and official recognition of his contributions in the field of armament.

A full collection of Dr. Maynard's patented firearms inventions will be found in the appendix to this report, so it will suffice to state by way of introduction that his chief contributions were concerned with the priming, ammunition, and method of loading of military rifles. Although the rifle was not to replace the smoothbore musket as the chief military shoulder arm until well into the 19th century, its invention ante-dated its universal adoption by several hundred years. One standard authority dates its advent this way: "In the later half of the 15th century Augustus Kutter of Nuremberg brought out a rifle the grooves of which were in a spiral form, and to him is due the idea of this form of rifling."[1] The importance of the Pennsylvania and Kentucky Rifles to early American history is too well known to be reviewed

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[1] Major Gen. Henry T. Anbuthnot, Rifles (Philadelphia: J. B. Lippencott & Co., 1891), p. 4.

here, but these revered weapons and their successors were fired by means of a flint lock and loaded from the muzzle, providing neither the speed nor the reliability desired on the battlefield. Several types of percussion devices had replaced the flint lock by around 1830, the usual type being a hollow tube or nipple, with a cap containing a drop of fulminate of mercury fitted over it and used to ignite the charge. This too was a somewhat unreliable system, and did nothing to improve the disadvantages of muzzle loading. Dr. Maynard played a significant part in solving both problems and saw his inventions utalized by both sides during the Civil War.

Since his patents are available for reference their development will be traced individually, rather than exactly as they occurred. On January 15, 1845, Dr. Maynard dispatched the following letter to Secretary of War William Wilkins:

> Sir: The new percussion gun-lock and priming, for the purpose of trying which your department granted me the use of a number of muskets some months since, have, it is believed, been brought to such a degree of perfection as to justify me in asking for an official trial and report of their fitness for the purpose intended.
>
> Not having funds to enable me to do so, I have not secured my patents abroad, and as it is not necessary, in other countries than ours, that the patenter should be either the inventor or his legal representative, I trust you, Sir, will see and admit the propriety, as an act of simple justice, of having the proposed trial made in the presence of those only who shall be appointed to make it, and that they shall be directed to give no information of the invention, excepting such as shall be embraced in their official report; and of having the trial made at some military post within the District, at the nearest point where the government has troops.
>
> Every principle upon which my invention rests is so simple, demonstrable and self-evident that the whole range of experiments

can be made within a short time. Without this precaution as regards secrecy, time and distance making the trial and report, I should hazzard the invasion of my invention, with the loss of every benefit that I might expect from abroad.

You can, Sir, readily appreciate the importance to me of an early decision. In the first place it grows out of my desire to make the result available; and secondly, as foreign governments having large armies and navies have signified, through their ministers here, their anxiety to have the earliest possible use of the invertion, the United States government would be as anxious to have the benefits of its adoption at the earliest practicable moment. I ask your favorable consideration of any suggestions.

With great respect, your obedient servant,
Edward Maynard 2

The response was Special Order number 3, of January 21: "The Secretary of War directs that Bvt. Brig. Generals G. M. Brooke, George Gibson and Capt. A. Mordecai of the ordance be detailed ... to meet at Washington Arsenal as soon as practicable for the purpose of examining the percussion-lock for firearms recently invented by Dr. Maynard, and reporting upon its adoption to the service."[3] Likewise, "J. Y. Mason, Sec'y of Navy directs that Commodore Chas. Stewart and Commander Levin Powell meet there with those detailed by Sec'y of War for the purpose above."[4]

The joint board, after exhaustive tests, reported on January 29 the following conclusions: "With respect to Maynard's lock, the Board is of the opinion that the principles on which the lock and its priming are constructed

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[2]Brig. Gen. Stephen V. Benet, U.S. Ordance Reports and Papers (Washington: Government Printing Office, 1880), Vol. II, 1845-60, p. 19.

[3]Ibid., Special Orders No. 3, Adjutant General's Office, January 21, 1845, p. 23.

[4]Ibid., Navy Department Directive, January 23, 1845, p. 25.

may be applied with great practical utility to firearms in general; that the apparatus for the purpose is exceeding ingenious, and accomplishes most of the objects proposed by the inventor."[5]

On March 20, 1845, the War Department negotiated a contract between Secretary W. L. Marcy and Dr. Maynard, authorizing the use of the invention by the United States on a graduated royalty scale ranging from $.25 to $1.00 per weapon.[6]

On September 22, 1845, Maynard finally received letters patent for his above mentioned invention, the tape primer. This consisted of a coiled tape containing fifty fulminate caps spaced at equal distances, and a mechanism which fed the tape, a cap at a time, into position for firing.[7] The device was quite similar to that found today in children's toy "cap pistols," but in effect it superseded the old percussion cap and elicited the keen interest of military experts throughout the world. More than 100,000 arms were fitted to this new system under the terms of the first contract, and in 1853 Secretary of War Jefferson Davis negotiated with Maynard a contract whereby the government pruchased the entire right to use his lock and primer system for $50,000.[8] Ordnance Reports disclose that, by the year 1859, the improvement had been applied to more than 300,000 small arms of the U. S. Army, and that models as early as the rifled muskets of 1822 and 1842 were brought

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[5] Ibid., Report to Secretaries of the War and Navy Departments, January 29, 1845, p. 26.

[6] Ibid., Contract Authorizing U. S. to Use Percussion Lock and Priming, March 20, 1845, p. 28.

[7] See appendix, patent #4208.

[8] National Archives, Office of Secretary of War, Ordnance Bureau, Orders and Endorsements, BB4, No. 5034, p. 16. (Hereinafter referred to as "National Archives")

up to date by alteration to the Maynard principle.[9] The possibilities in thus reclaiming obsolete small arms is suggested by Secretary Davis' endorsement on "Report on subject of Dr. E. Maynard's proposition to have a trial made of his plan for altering Flint locks to his principle of Firing." The endorsement reads as follows: "The recommendation for trial is approved - and should it be deemed advisable to alter flint lock muskets by contract, according to the plan now proposed by Dr. Maynard, it will be rather desirable than objectionalbe to make a contract with the inventor, not to renumerate him for the use of an invention which has already been sold and covenanted to the United States - but to secure his zeal and intelligence in the application of his invention. In such case notice will be given and fair competition invited, so as to obtain the work at the lowest rate.[10]

Neither was interest in the improvement confined to the War Department, for the Bureau of Ordnance and Hydrography, in 1854, was granted a request for 200,000 Maynard primers for the Navy.[11]

The wide interest in the improvement is indicated by inquires from foreign officials and the courtesies of the War Department in furnishing reports of trials and other information to the Chancellor of the Belgian Legation, the Charge d'Affairs of Sweden and Norway, the Brazilian Minister, and others.[12]

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[9] Ordance Department, Reports of Experiments with Small Arms for Military Service (Washington: A.O.P. Nicholson, Public Printer, 1856), pp. 90-94

[10] National Archives, op. cit., BB5, No. 7247, p. 304.

[11] Ibid., BB4, No. 6081, p. 446.

[12] Ibid., Military Book, No. 35, pp. 35, 37, 49.

At the same time that his inventions were being so well received by the U.S. government, Dr. Maynard entered into a contract with Thomas L. Smith, of Washington, and J. Washington Tyson, of Philadelphia, giving each a third interest up to $5,000. in the proceeds from his invention "in all quarters of the world outside the United States."[13] A possible practical reason for the disposal of this part interest is to be found in the condition that "... said Smith and Tyson shall alone be responsible for the manufacture of such locks as may be required to exhibit its advantages abroad."[14] Another interesting condition of the contract, accurately anticipating foreign honors, which Maynard included reads as follows: "It is further understood and agreed by and between the parties to this agreement, that no present to the inventor from an Emperor, King, Sultan, Governor, or other ruler or potentate, is included in this agreement, but is to be retained by the said Maynard for his exclusive use and benefit."[15]

Under the partnership, most of the prominent gun-making firms of the country were employed or in some way connected with the manufacture of the improvement. Deringer, Butterfield and Nippes, Sharpe, Massachusetts Arms Co., and Remington and Sons all were so engaged from time to time.[16] Dr. Maynard's improvement was also applied to a considerable number of handguns,[17] and elicited the keen interest of Samuel Colt, although the design of his

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[13] Maynard Collection, Library of Congress, MSS Division, Contract - February 10, 1845.

[14] Ibid. [15] Ibid.

[16] Ibid., Letter from Remington and Sons to J. R. Tyson, T. L. Smith, J. W. Tyson, and Massachusetts Arms Co., October 3, 1851.

[17] Ibid., Articles of Agreement between J. W. Tyson, T. L. Smith, and Massachusetts Arms Co., November 25, 1856.

legendary revolvers did not permit its adoption.[18]

At the height of world wide interest in the improved priming system, Dr. Maynard contributed another development which was equally as significant in the military field. In 1851, he patented his "Improvement to Breach-Loading Fire-Arms,"[19] which, with subsequent improvements by him of a similar nature, "brought about the general adoption of the Maynard Rifle by governments and sportsmen throughout the world."[20] These improvements contributed greatly to the change of the old muzzleloader into the breachloader.

Maynard was not in this instance the inventor of an entirely new principle as in the priming system. The breachloading principle was well known in prior years, having been used in weapons designed by British Major Patrick Ferguson, whose troops, armed with his weapon, were wiped out at the Battle of King's Mountain. It had also been incorporated into the Hall rifle, produced at the Harper's Ferry Arsenal and issued to U. S. troops as early as 1814. However, it was not until as late as the Battle of Gettysburg that the breachloader became popular for troops of all services.[21] The Maynard Rifle was one of the earliest practical forms of breachloaders and was used extensively by both sides during the Civil War.[22] The Federal government purchased more than 20,000 during the period of the war, and it saw considerable service in the hands of Confederate "sharps-shooters," although numbers

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[18] Ibid., Letter from Dr. Maynard to Major Thomas L. Smith, June 27, 1851.

[19] See Appendix, patent # 8126.

[20] Allen Johnson and Dumas Malone (eds.), Dictionary of American Biography (New York: Charles Scribner's Sons, 1931), Vol. XII, p. 458.

[21] T. J. Treadwell, U. S. Ordance Memoranda No. 14 (Washington: Government Printing Office, 1873), p. 6.

[22] E. W. Byrn, Progress of Invention in the Nineteenth Century (New York: Mann and Co., 1900), p. 411.

are unavailable because of the devious means of aquisition.[23]

The quality of the Maynard Rifle is best attested by official sources concerned with its use. In its Annual Report to the President of December 4, 1854, Secretary Davis commented that "Experiments show that the new weapon [Maynard] ... is at least equally effective at three times the distance. The increased efficiency of these new patterns of arms will be further increased by an improved mode of priming, invented by Dr. Edward Maynard, which has been approved by the highest officers in our military and naval forces."[24]

A similiar, but somewhat less extravagent appraisal was made by Maj. Gen. Rosecrans in a letter to Secretary of War E. M. Stanton, November 30, 1863: "It [Maynard Rifle] would add not less than 50% to the force or power of the troops now in the field. In other words we should augment our Army One Half by changing the weapons."[25]

An even more convincing testimony to the efficiency of the Maynard Rifle was that expressed indirectly by Jefferson Davis at a time when superior weapons were of the upmost importance. The letter containing it runs in part as follows:

Washington, D. C.
December 26, 1860

Gov. J. J. Pettus
My dear Sir:

With this I enclose a letter form the agent of the Hazzard Powder

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[23]Letter from Major H. C. Minton, for the Chief of Ordnance, War Department, to Dr. W. N. Hodgkin, February 18, 1939. Hodgkin Papers.

[24]National Archives, Records of War Department, Letters to President, Book 5, pp. 476 - 77.

[25]William E. Dodge, Memorial (Washington: Government Printing Office, 1865), pp. 7 - 11.

Company from which you will see that you can get the powder you want at N. Orleans and I have written him that you would inform him by telegraph as to the amount of each you would take.... This morning Thompson went with me to Mr. Riggs and we closed the reserved question on the Maynard rifles. I hope however that, before this, some of them are on the way to you.

Yours [sic] Obedient Servant,
Jefferson Davis [26]

The priming system and the Maynard Rifle were the most conspicuous of Maynard's achievements in the development of small arms, but his genius provided many other important improvements. Among the most notable of these was the development of a self-contained metallic cartridge described in Patent # 15141, issued June 17, 1856.[27] This invention, together with its subsequent improvements, was instrumental in making possible the large scale use of the breechloader without danger to the user. It was also a necessary prerequisite to the use of smokeless powder, which was introduced around the TURN of the century.

Some idea of the scope and significance of Dr. Maynard's contributions may be gained today by a visit to the Smithsonain Institution, where will be found no less than seven items credited to Maynard in the exhibit depecting the evolution of small arms, listed as follows:

No. 1406 - U.S. Army Musket (1863) Muzzle-loader converted to breech-loader by Edw. Maynard's invention (2 specimens).
No. 152653 - Dr. Edward Maynard's Tape Primer Lock.
No. 168165 - Dr. Maynard's Target and Hunting Gun.

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[26] Dunbar Rowland, "Jefferson Davis, Constitutionalist, His Letters, Papers and Speeches (Jackson, Miss: Printed for the Mississippi Department of Archives and History, 1923), Vol. IV, p. 559.

[27] See appendix, patent # 15141.

No. 251160 – Refinement of Tape Primer Lock.
No. 252570 – Springfield Musket (1841), Equipped with Maynard Lock.
No. 252580 – Springfield Musket (1863), showing Maynard's invention of bolt-lock mechanism.

Chapter 7
Conclusions

The story of Dr. Edward Maynard is really several stories woven together, for he combined the rather dissimilar vocations of dentist and firearms inventor. It may be that this explains why he has quite often been ignored by the historians of both fields, for his career does not seem to fit neatly into either. It is understandable that those dedicated to the healing of the sick might reject one who derived a considerable portion of his income from the firearms industry, a "merchant of death." By the same token, those specializing in arms and munitions might well regard an inventive dentist as an alien voice. But this does not explain his lack of success in promoting the dental corps idea, which must still be laid either to official apathy or to that all inclusive "the time was not favorable." In either event, the prologVE if not the first chapter of the history of the dental corps of the U. S. armed forces is woven about his efforts. As to his inventions, it can simply be said that they made possible the development of today's modern firearms, and that it is these that are noticed and remembered. Dr. Maynard did not die a broken or forgotten man, he was a recognized and respected member of his society, and if his achievements are forgotten the results of them will be with us for years to come.

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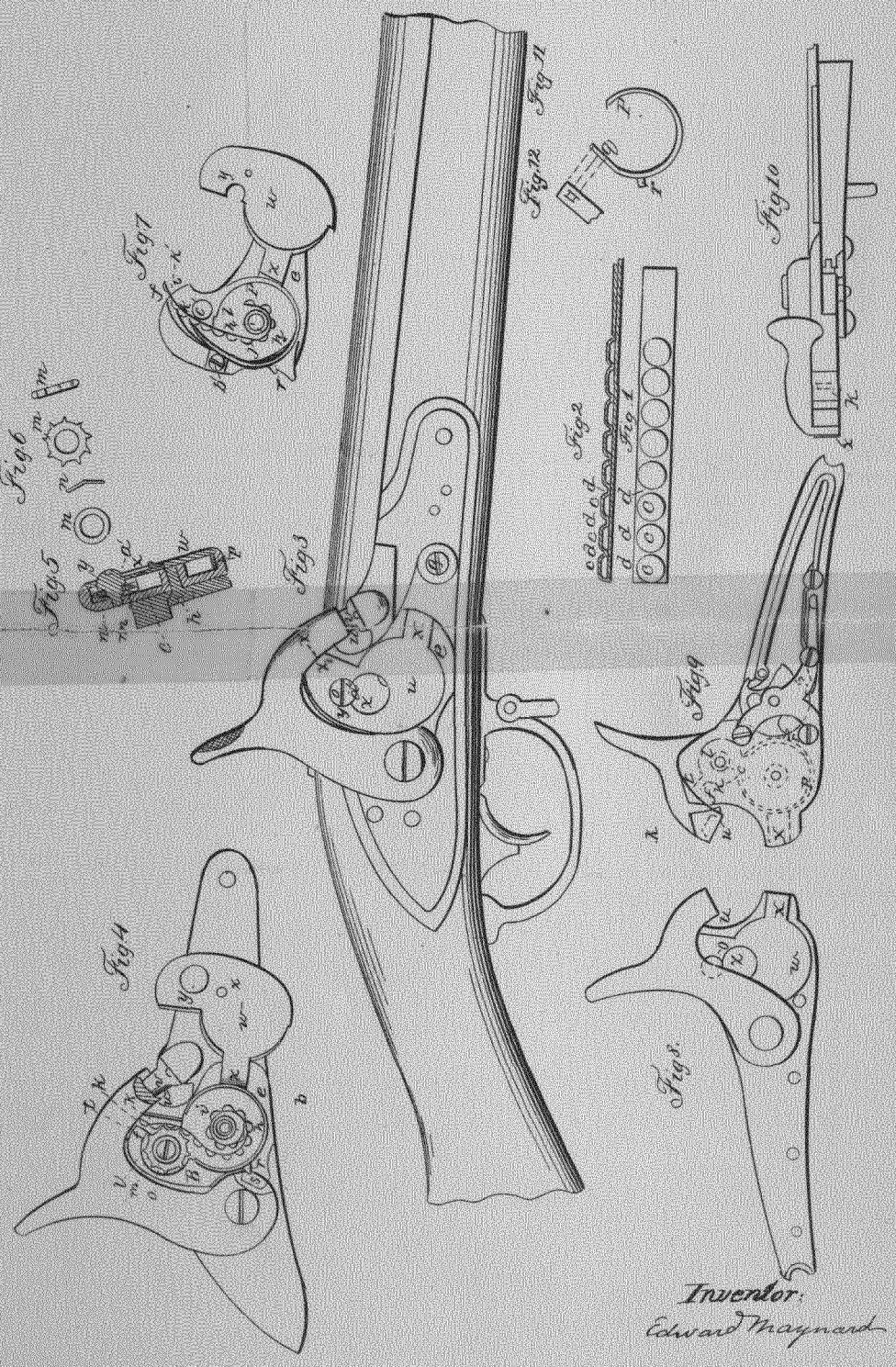
Appendix

This appendix consists of a collection of Dr. Maynard's patents pertaining to firearms. Each patent includes an illustration and one or more pages of explanation, and they are included to reduce the need for technical explanation in the body of the text. They are arranged in chronological order and each is self-identifying.

E. MAYNARD.

Priming-Cock.

No 4,208. Patented Sept. 22, 1845.



Inventor:
Edward Maynard

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

PERCUSSION-PRIMER AND GUN-LOCK THEREFOR.

Specification of Letters Patent No. 4,208, dated September 22, 1845; Antedated March 22, 1845.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city of Washington, District of Columbia, have invented a new method of making percussion-primers, connected together in a series, but having the fulminating or percussion matter of each primer separated from the others in the series, and also a method of applying the same to all kinds of firearms, and that the following is a full, clear, and exact description of the principle, manner of making, and modes of using the same.

The nature of the first part of my invention consists in so making primers of fulminating mixtures, or such compounds as ignite by percussion, as to have a series of any number of primers in a continuous strip, but each separated from the others, to prevent the communication of fire from the one exploded to the others, by means of which a magazine of such primers can be carried in connection with the gun, or other firearm, and each primer exploded without any danger of communicating the fire to the rest in the series. And, the second part of my invention consists, in connecting with all kinds of fire arms such as cannon, guns, pistols, &c., a magazine for containing primers made in accordance with the first part of my invention from which the primers, may or can be fed forward to the place where they are to be cut off preparatory to being exploded, or directly to the place of explosion, this magazine being so connected with the hammer or other moving part of the lock as to push forward the primer by the movement of the lock.

Having thus described the chief characteristics I will, to enable any one skilled in the art to make and use my invention, minutely describe its various parts, essential modifications, and manner of using the same, making reference to the accompanying drawings that make part of this specification, in which—

Figure 1, is a plan of the series of primers, Fig. 2, a longitudinal section of the same showing one manner of making them with the separations between the primers, Fig. 3, an outside representation of the flint lock altered to receive my improved magazine and primers, Fig. 4, the same with the magazine opened to show the location of the series of primers, and the manner of feeding by means of the cock or hammer. Fig. 5, a transverse section of the same taken at the line A—B, of Fig. 4. Fig. 6, a plan and section of the wheel of cogs which moves forward the primers, and a spring washer placed under it. Fig. 7, a modification of the magazine in which the primers are moved forward without the wheel. And Figs. 8, 9 and 10 outside, inside and top views of a back action lock in which the magazine is let into the lock plate and the primers moved out by means of the tumbler.

In all these figures the same letters indicate corresponding parts.

The mode of making the series of primers, under the first part of my invention, which I prefer, is that represented in the accompanying drawings, and is as follows, viz: A strip of paper, either in a moist or dry state is, by means of appropriate instruments and by the application of pressure, forced out into cup forms, as at *c*, *c*, *c*, the spaces *d*, between the cups being sufficient to prevent the communication of fire from one to the other. These cups are filled with the percussion or fulminating mixture, even with the original surface of the strip, it is then coated with a varnish of gum lack dissolved in alcohol, and covered with a thin strip of paper, and the whole is then varnished over, which renders it imperviable to moisture. It is important that the two strips of paper be made to adhere in the spaces between the several cups containing the fulminating compound, and that none of the mixture be deposited or left on the spaces or divisions. The method which I have pursued in making these primers is to form the cups, in the paper by forcing in the mixture, the one operation being sufficient instead of two, and it will be evident that this can be done by placing the strip of paper on a bed, having a counter sink of the form intended to be given to the cup and laying the paper thereon, and the mixture forced into it by a piston working in a hole in a plate placed above the paper to keep it in place and to hold the mixture, and form a guide for the piston. The fulminating mixture which I employ is composed of 100 parts of fulminating mercury and 60 of gun powder, but any of the fulminating or percussion mixtures may be substituted as it makes no part of my invention.

I have above stated that strips of paper

are used to form the shell of the series of primers, but other substances may be substituted such as cloth, parchment and many other substances not necessary to enumerate, as I deem good paper the best and cheapest. And although I have described what I deem to be the best mode of making these primers, I by no means confine myself to it, but may vary it as for instance the fulminating mixture may be put on the strip of paper without the cups and the covering be made to conform thereto. Or the mixture may be made into a paste, the primers modeled and then secured at proper distances apart on a strip of paper or other substance by glue or other mastic and the whole coated with varnish. Or the primers may be separated from each other by some incombustible substance. Or the mixture may be put in a soft metal tube, and the separation be formed by flattening the tube at proper intervals to interpose between each two primers the contact of the inner surface of the tube. In short the principle of making primers in a connected strip and each separated from the others may be applied in a variety of ways and yet retain this essential character which renders it more safe and convenient than any other mode of making primers, with which I am acquainted. And although I deem it important that the separation between the primers be a depression, as affording facilities in feeding or moving them out preparatory to explosion as will be fully explained hereafter, yet the great end of safety against communicating fire from one to another of the series, and protection against moisture fully attained. Under the second part of my invention, as indicated above, the primers are coiled, and put in a magazine *e*, and pushed through an aperture *f*, to be cut off by a cutter on the hammer preparatory to explosion.

In Figs. 3, 4 and 5 this magazine is represented as applied to the common flint lock, which, when thus altered, I denominate the magazine percussion lock. The magazine is represented as attached to the lock plate by two screws, *g*, and *h*, in manner fully represented in the figures. The cavity *i*, for the reception of the coil of primers, *j*, has a channel, *k*, leading therefrom for the delivery of the primers and an enlargement, *l*, in which turns a feeding wheel, *m*, with cogs in its periphery so formed and at such distances apart as to fit in the spaces between the primers in the series, which are thus held between this feeding wheel and the under part of the channel, *k*. This feeding wheel turns on a cylindrical pin projecting from the under plate of the magazine and rests on a spring washer, *n*, (represented in plan and profile at Fig. 6) which is bent to give it the requisite elasticity, to press the wheel up against the head of a screw, *o*, that fits accurately in a hole in the cylindrical pin, and tapped into the lower plate. The object of this spring washer is to prevent the return of the wheel by the return action of the mechanism which operates it, and which consists of a hoop spring *p*, that fits accurately and without much binding in the case or magazine, *e*. This spring hoop is represented in section at Figs. 11 and 12, the end, *q*, which acts against the teeth of the feeding wheel is for a short distance tangential to the circle, and that part of the periphery of the magazine corresponding thereto, is of the same form as it will be seen on inspection of the drawings, that if these two parts were in the direction of the circle the end *q*, in pushing around the feeding wheel would escape from the cog, which is effectually prevented by giving them the direction of a tangent—this is not however indispensably necessary. The mortise in the end, *q*, shown in Fig. 12, is to receive the tooth of the feeding wheel next to the one acted upon by the end of the hoop spring for the reason given in describing the necessity of making this end tangential.

The spring hoop receives the movement which it transmits to the feeding wheel from the cock or hammer by a projection, *r*, that lies in a mortise, *s*, in the body of the cock or hammer, as fully shown at Fig. 4 in which a part of the cock is represented as cut off to exhibit this connection. The mortise, *s*, in the cock is of such length as not to act on the projection, *r*, in bringing it to the half cock, and then from the half to the full cock, the spring hoop is carried around sufficiently to turn the feeding wheel the distance of one cog, and thus feed out one primer. There is an opening made in the side of the magazine of sufficient length for the play of the projection, *r*.

The outer face, *t*, of the magazine is a segment of a circle of which the axis of the hammer is the center, and the under and lower faces of the channel *k*, should be such that the upper part of the strip of primers in being forced out by the feeding wheel will strike the upper face and by its elasticity cause the under side to bear on the lower face, *k'*, which is made sharp to form a bed cutter, in conjunction with which the knife edge, *a*, of the hammer acts to constitute shears by which the primer is severed from the strip and carried down by the motion of the hammer to be exploded on the nipple or cone, *v*, made in the usual form, and which is therefore in a condition to receive the common percussion cap, should it be desired to make use of this as a percussion cap lock. That portion of the lower face, *k'*, of the channel on which the strip of primers lies preparatory to being cut off should be so inclined as to deliver the primers in the direction of the dotted line *x*—*x*

of Fig. 3 or nearly so to insure the carrying of the primer after it is severed from the strip to the cone or nipple.

The screw, *h*, which aids in fastening the magazine to the lock plate is tapped into a cylindrical projection within the magazine around which the strip of primers is coiled. The magazine is closed by a cap *w*, hinged at *x*, and pierced at *y*, to shut over the head of the screw *s*, and is latched down by a turning latch plate, *z*, riveted to the cap, the circle of the latch plate, and that of the screw head intersecting each other, the former being cut out as shown at *a'*, to pass the head of the screw so that it may be turned into a notch cut in the head of the screw to latch and secure the cap, the latch being provided with a thumb or nail piece by which to turn it.

At Fig. 7, will be seen a modification of this magazine separate from the lock to show the mode of feeding without the feeding wheel, by extending the end *q*, of the hoop spring *p*, some distance into the channel *k*, (which is altered in form as represented in the drawing) and so curved as to fit into the recesses between the primers to feed them forward instead of acting on the teeth of the feeding wheel, as in the first example, and to prevent the back movement of the feeding hoop spring from drawing back the primers, they are retained by a spring *b'*, placed above them and attached to the upper face of the channel, *k*, and as the screw, *o*, in this modification is not employed, a projection *c'*, is substituted to receive the edge of the rotating latch for securing the cap.

Another modification is represented in Figs. 8, 9, and 10, in which the magazine is let into the lock plate, and the projection, *r*, of the hoop spring is embraced and operated by the tumbler, the same amount of play being given to admit of bringing the hammer to the half cock without moving the hoop spring and primer as in the other example. The location of the magazine, hoop spring, feeding wheel, &c., are all indicated in Fig. 9, by dotted lines.

From the foregoing the manner of applying the first and second parts, of my invention to cannon, and pistols and other fire arms, and various modifications of locks will be obvious to all persons versed in the art of making fire arms, and it will also be evident that the first part of my invention may be applied without the second, and that the second part or magazine may be applied without connecting it with the lock, and that I have only given the above as examples of what I deem to be the most efficient modes of application; but these may be variously changed without affecting the principle or character of my invention as fully expressed above. And

Having thus fully explained the character of my invention, the essential modes of application, and the manner of making and using the same; what I claim as my invention and as distinguished from all other things before known, is—

1. Making primers of fulminating mixtures or such compounds as ignite by percussion in a continuous series, each primer, or any two, or greater number, being separated from the others by a substance which is non- or less combustible than the fulminating mixture by which one or more may be exploded without communicating fire to the others.

2. The mode herein described of moving and measuring out the primers by the movement of the lock, substantially as described.

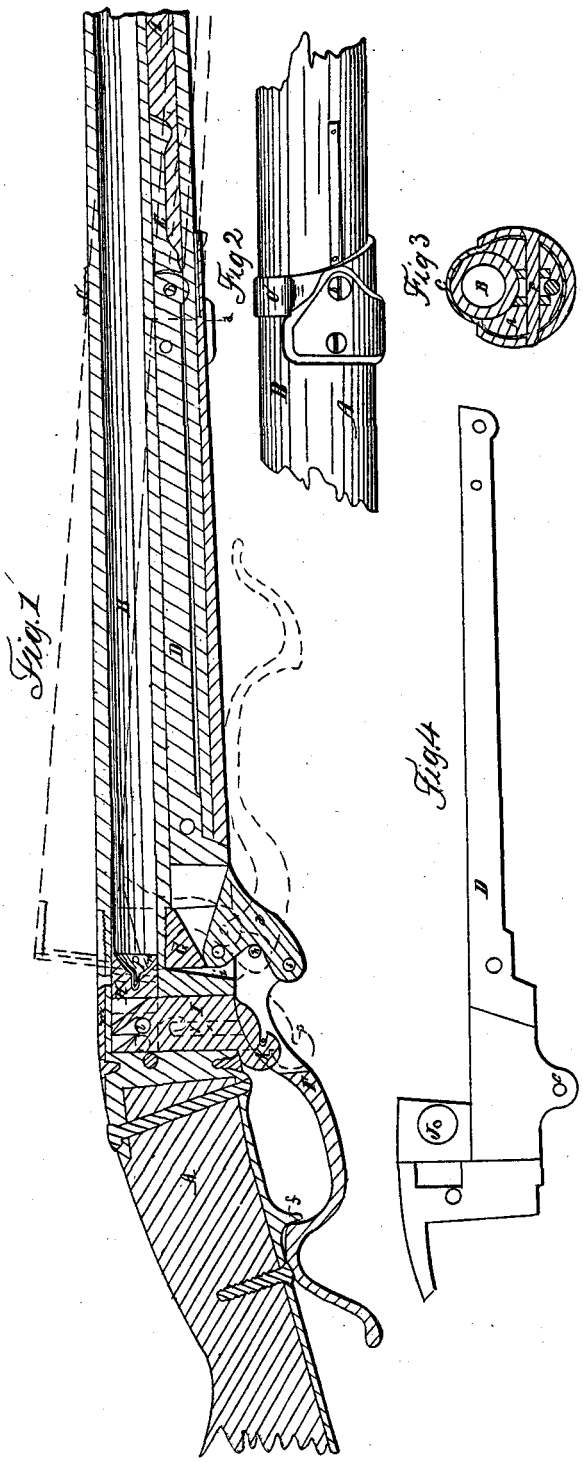
EDWARD MAYNARD.

Witnesses:
E. OWEN,
WM. F. BAYLY.

E. MAYNARD.

Breech-Loading Fire-Arm.

No. 8,126. Patented May 27, 1851.



Inventor:

Edward Maynard

UNITED STATES PATENT OFFICE.

E. MAYNARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. **8,126**, dated May 27, 1851.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of Washington city, in the District of Columbia, have invented certain new and useful Improvements in Fire-Arms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 is a vertical longitudinal section of a musket constructed according to the principles of my invention; and Figs. 2, 3, 4, and 5 are views of detached or fragmentary portions of the same.

My invention relates to that class of fire-arms which are loaded at the breech of the barrel; and it consists of several distinct parts, which are not necessarily used in connection, but which, when so used, unite in forming a breech-loading fire-arm containing certain valuable qualities not heretofore embodied in such an implement.

The first part of my invention consists in combining, with a musket or other fire-arm whose barrel is disconnected from its breech and is pivoted to the stock at some point intermediate between its butt and its muzzle, a lever beneath the stock, by means of which the barrel is turned upon its pivot to raise and to depress its butt, which lever also locks the barrel to its breech when the butt is depressed and unlocks it therefrom to allow the butt to be raised.

The second part of my invention consists in combining with the improvement above specified a piston breech-pin, which, by the movement of the lever in depressing the butt of the barrel and locking it in place, is made to move the cartridge forward in the barrel and to close the opening at the butt, which also, by the movement of the same lever in unlocking the barrel, is made to open the butt before the latter rises under the action of the lever.

The remaining parts of my invention relate to the construction and arrangement of the severel parts of fire-arms, and are designed to add to their efficiency, while they at the same time enable me to alter and modify fire-arms already constructed, and particularly the United States Government musket, in such manner as to embody the improvements above specified with an increase in strength and durability.

The fire-arm represented at Figs. 1, 2, 3, 4, and 5 is an example of a musket so modified. It contains the ordinary stock, A, and the barrel B. The barrel B has its breech sawed off, leaving a straight tube open at both extremities. The stock A is sawed in two pieces or sections at the hinder edge of the band C, and a thin wedge-shaped piece is removed, as shown at *a*. The hinder section is slotted to admit a strap, D, which is more fully represented in elevation and plan at Figs. 4 and 5, and which extends from that part of the stock usually occupied by the breech of the gun in a forward direction to the middle of the band C. The hinder extremity of the front section of the stock is also slotted to admit a short strap, E, which is forked at its hinder extremity to embrace the front end of the hinder strap, D, and extends forward into the front section to strengthen it. The adjoining extremities of the two straps are perforated transversely to admit a screw, *b*, which passes through the band C, the forward portion of the stock, and the holes in the straps, as shown in section at Figs. 1 and 3, thus forming a pivot on which the forward section of the stock and the barrel secured thereto can be turned to raise or depress the butt of the barrel, at the same time firmly securing the band C to the stock and connecting the whole with the strap D. The hinder part of this strap is enlarged, as shown at Figs. 4 and 5, to form the breech of the musket, to contain the piston breech-pin, and to afford means for hanging and moving the lever and connecting it with the movable members upon which it operates. This lever F is bent, its two arms being nearly at right angles with each other. It is pivoted at the intersection of its two arms to ears *c*, which depend from the lower side of the strap D. Its longer arm, when the butt of the barrel is depressed, extends backward in a direction parallel with the lower side of the stock, and is of such form that it constitutes the trigger-guard. The shorter arm of the lever F, which, when the butt of the barrel is depressed, extends downward from the strap D, is forked at its lower extremity, and is connected, by means of a link, *d*, with the lower forked extremity of a stirrup, G, to which the butt of the barrel is firmly screwed. The link *d* extends upward through a slot in the strap D,

which is of the proper size and form, as shown at Fig. 5, to receive the lower extremity of the stirrup G, whose front side, when the butt of the barrel is depressed, bears firmly against the shoulders *e* of the slot, and thus prevents the barrel from being moved forward from the breech by the explosion of the charge. When the butt of the barrel is depressed, the lever, link, stirrup, barrel, and strap occupy the positions in which they are respectively represented in Fig. 1, and when the butt of the barrel is to be raised the lever is moved downward and forward until the parts of the musket before mentioned occupy the positions in which they are represented in red lines in Fig. 1. On inspecting this figure it will be seen that when the butt of the barrel is depressed, the pivot *g*, which connects the lever F with the link *d*, occupies a position a little behind the straight line which passes through the centers of the pivots *h* and *i*. In this position, therefore, any force applied to raise the butt of the barrel will tend to draw the longer arm of the lever upward against the stock or to hold it more firmly in its place. Consequently the lever is made to act as a lock to hold down the barrel, and thus keep the latter in its place. In order to prevent the hinder extremity of the leather from accidentally dropping, it is constructed to spring and catch upon a snug, *f*, projected from the stock. The link *d* is bent to allow the pivot *h*, which connects the lever F with the ears of the strap D, to pass through from side to side. This bent form of the link requires a corresponding increase in the length of the slot in which it moves, and, as it is an important requisite in fire-arms that no place should be left for the entrance and accumulation of dirt, the link is of such shape that its front extremity, when depressed, closes the mouth of the slot.

That portion of the strap D which forms the breech of the gun has a cylindrical socket formed in it to admit a piston breech-pin, H. The latter is of such diameter that it will just enter and close the open butt of the barrel, as shown at Fig. 1, and the socket in which it is inserted is so situated with respect to the barrel that when the butt is depressed the socket forms a continuation of the bore. The hinder extremity of this piston breech-pin is slotted vertically, to admit the upper extremity of a flat bolt, I, which slides vertically in a corresponding slot in the strap, and extends downward into the hinder arm of the lever, which is slotted to admit it. The lower extremity of this sliding bolt is formed into a hook, *k*, which engages upon a pin, *o*, passed transversely through the lever. The upper extremity of the sliding bolt has a slot formed in it to admit a pin, *l*, which passes transversely through the piston breech-pin, and is secured thereto. This slot is of such shape that when the bolt is moved upward its hinder edge, bearing upon the pin *l*, forces the piston-breech forward into the butt of the barrel and locks it in that position, while by reversing the movement of the sliding bolt the forward edge of the slot bearing against the pin moves the piston-breech backward in its socket, and thus draws its front extremity out of the barrel. This downward and upward movement of the sliding bolt is effected by the movement of the lever. As the hinder arm of the latter is depressed, the pin *o*, acting upon the hook *k*, draws the bolt downward until the pin, which in its movement describes the arc of a circle of which the lever-pivot *h* is the center, is drawn out of the hook and occupies the position in which it is represented in red lines in Fig. 1, thus leaving the sliding bolt and the piston breech-pin at rest. As this movement of the pin is effected while the link-pivot *g* is moving almost horizontally, or nearly parallel with the barrel, the latter is not appreciably moved until the piston breech-pin is withdrawn from the butt, after which the continued forward movement of the lever will raise the butt of the barrel. When the lever F is turned back to depress the butt of the barrel, the pin *o* re-engages with the hook *k*, and thus returns the sliding bolt to its place, by which operation the piston-breech is moved forward and caused to enter the butt of the barrel. The sliding bolt I is prevented from being accidentally withdrawn from the strap D by a screw, *x*, which passes transversely through a vertical slot, *y*, in the sliding bolt. The butt of the barrel is raised in order that the cartridge may be inserted into it. To facilitate this operation, that portion of the butt which receives the cartridge is bored out somewhat larger than the rest of the barrel. This enlargement of the butt permits the insertion of a larger ball than could be inserted in the muzzle, so that the ball, when the charge is fired, is slugged or caused to pack tightly in the bore. The shoulder formed at the junction of the chamber with the bore also serves to prevent the cartridge from being thrust too far into the barrel.

Cartridges for a gun of this construction should be made slightly longer than the chamber in the butt, so that the tail of the cartridge when in place will project a little beyond the butt of the barrel; hence, when the butt of the barrel is depressed, the projecting extremity of the cartridge will be cut off by the combined action of the edge of the butt of the barrel and the upper edge of the breech, which act upon it like shears. In order to facilitate this operation, and at the same time to provide for wear, the upper portion of the breech is faced with a tempered steel plate, *m*, which is screwed down to the breech, and can be moved forward as its front edge wears away.

The piston breech-pin H is perforated to permit the passage of fire from the nipple on which the percussion-cap or primer is exploded by the hammer of the lock. This perforation *n* extends backward a short distance through the center of the breech-pin until it meets a hole bored transversely into the side thereof.

This latter hole, when the breech-pin is in its most forward position, exactly corresponds with the hole in the tube J, to which the nipple is secured. When, therefore, the piston breech-pin is moved backward in its socket in the operation of raising the butt of the barrel for loading, the transverse hole in it no longer corresponds with that in the nipple-tube, the communication from the nipple to the barrel is broken, and is not re-formed until the breech-pin is moved forward. As this is the last movement which is made in depressing the butt, it is evident that the charge cannot be fired from the nipple before all parts of the gun are in their proper positions. In order to facilitate the firing of the charge, the central perforation of the breech-pin is widened out, as at *p*, Fig. 1, to allow the tail of the cartridge to open, and the powder from the opened tail to distribute itself loosely therein, which distribution insures its more thorough combustion and renders the firing of the charge more certain. In order to prevent the smoke formed in firing from passing backward and clogging the socket of the breech by forming soot therein, a ring-channel, *s*, is formed half in the butt of the barrel and half in the periphery of the piston breech-pin. Suitable openings are also made to allow the gases collected in this ring-channel to pass out into the air.

The foregoing description is deemed by me sufficiently explicit to enable a mechanic skilled in the art of constructing fire-arms to apply my improvements. It is evident that the construction and arrangement of the several parts of such an implement, and the manner of operating them by the lever, may be modified to a very great extent without departing from the principles of my invention.

What I desire to secure by Letters Patent and claim as my invention in that class of breech-loading fire-arms in which the barrel is disconnected from the breech, and is pivoted at some point intermediate between its butt and its muzzle to the stock, is—

1. A lever beneath the stock, by means of which the barrel is turned upon its pivot to raise and to depress its butt, and is locked to its breech when the butt is depressed, and is unlocked therefrom to allow the butt to be raised, the several members of the implement being arranged and operating substantially as herein set forth.

2. In combination with the above-claimed device, a piston breech-pin which, by the movement of the lever to depress the butt of the barrel and to lock it in place is made to move the cartridge forward in the barrel and to close the butt thereof, and which by the movement of the lever to unlock and raise the barrel is made to unclose or open the butt of the barrel before the latter rises under the action of the lever.

3. The sliding bolt I, constructed with slot and hook, or their equivalents, and arranged as herein set forth, in combination with a lever-handle, for the purpose of imparting motion to the piston breech-pin from the lever beneath.

In testimony whereof I have hereunto subscribed my name.

EDWARD MAYNARD.

Witnesses:

ANTHY. HYDE,

THO. R. SUTER.

E. MAYNARD.

Cartridge.

No. 15,141.

Patented June 17, 1856.

Fig. 1.

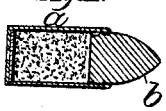


Fig. 2.

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN CARTRIDGES.

Specification forming part of Letters Patent No. 15,141, *dated June* 17, 1856.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city and county of Washington, in the District of Columbia, have invented and constructed a new manufacture in the shape of an Improved Article of Fixed Ammunition for Breech-Loading Fire-Arms; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification—

Figure 1 being a longitudinal section in a line passing through the center of a piece of my improved fixed ammunition, and Fig. 2 a rear-end view of a piece of said ammunition.

Each piece or cartridge of my said improved fixed ammunition consists of a cylindrical-shaped shell, *a*, of brass, or some other tough and stiff metal, having a centrally-perforated bottom, rendered impervious to air and water by internal packing, then charged with powder, and then combined with a projectile, *b*, of the shape and in the manner substantially as hereinafter set forth.

The exposed portion of the projectile *b* is of a pointed or semi-oval shape, and the portion of said projectile that enters the shell is of a cylindrical shape, of such a size as to closely fit within the shell, and having a sufficient length of bearing-surface to insure the point of the projectile being retained in a line with the axis of the shell. To insure a perfectly tight joint between the outer periphery of the projectile and the inner periphery of the shell, annular grooves are formed in the cylindrical portion of the projectile, and filled with any suitable greasy composition. The peripheries of the ledges between the grooves in the cylindrical portion of the projectile, fitting closely against the inner periphery of the shell, will prevent the grease working inwardly to injure the powder, or outwardly to soil anything that the ammunition may be brought in contact with. The said greasy composition serves the purpose of rendering the joint between the projectile and the shell perfectly tight while the ammunition is in a fixed state; and when the ammunition is discharged, the said greasy composition serves to lubricate the bore of the gun.

The perforated back end of the shell may be closed and made perfectly impervious to air or water by placing one or more disks of waxed or gummed paper against its inner surface before placing the powder within the shell.

The projectile should be pressed into the shell with a sufficient degree of force to insure close contact between the inner end of the projectile and the powder, care being taken in so doing not to turn the point of the projectile out of line with the axis of the shell.

After a cartridge has been discharged, the shell *a* should be removed from the chamber of the gun.

In using my improved fixed ammunition, the projectile is set more accurately within the chamber of the fire-arm than it is possible to set it in the best muzzle-loading target-rifles. The cartridges may be exposed with impunity in any weather, and may be handled roughly with less liability to injury or accident than would be likely to occur from such usage of any other fixed ammunition for small-arms known to me.

The shells may be charged a great number of times, with less apparatus and at less cost than that of the ordinary cartridges, and the expense of the shells is so small as to be quite insignificant when taking into account the great advantages possessed by this ammunition.

As a matter of course, the shells of my improved cartridges must be of such a size as to fit accurately within the chamber of the gun the said cartridges are prepared for.

I am aware that cartridge-cases of a tapering shape have been made of sheet-copper or other hard metal, combined with soft-metal rings, as described and represented in a patent granted to A. E. Burnside, March 25, 1856; and I am also aware that the said cartridge can only be used in a movable breech-piece, and that it does not possess in other particulars the peculiar advantages which distinguish my improved cartridge for breech-loading fire-arms; therefore,

What I claim as my invention, and desire to secure by Letters Patent, as a new manufacture, is—

My improved cartridge for breech-loading fire-arms, composed of a hard-metal cylindrical case, charged with powder and combined with

a projectile of such a shape that, whether the case receive a large or a small charge of powder, the said projectile is self-retained in contact with the powder, in such a position that its point must be coincident with the axis of said case, and a perfectly tight joint formed between said projectile and case, by filling the grooves in the former with greasy matter, substantially as herein set forth.

The above specification of my improved fixed ammunition for breech-loading fire-arms signed this 16th day of April, 1856.

EDWARD MAYNARD.

Witnesses:
Z. C. ROBBINS,
M. H. MANSFIELD.

E. MAYNARD.

Cartridge.

No. 22,565. Patented Jan. 11, 1859.

Fig. 1.

Fig. 3.

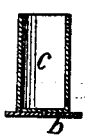
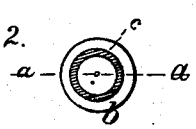


Fig 2.



UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN METALLIC CARTRIDGE-CASES.

Specification forming part of Letters Patent No. 22,565, dated January 11, 1859.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city and county of Washington and District of Columbia, have invented an Improved Metallic Cartridge for Breech-Loading Fire-Arms; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification—

Figure 1 being a bottom view of said cartridge; Fig. 2, a top view of the same; and Fig. 3, a section in the line *a a* of Fig. 2.

My improved metallic cartridge is produced by soldering a steel disk to the exterior surface of the bottom of a brass cup, which is of less diameter than the said disk, and then drilling a small central aperture through the combined brass and steel bottom of said cartridge.

Brass is of such a nature that it is not injured by contact with powder, and it is also of such a nature that when a cartridge made of said metal is loaded and placed in the chamber of a gun it will expand, at the instant of discharging the same, to such a degree as to fill the said chamber and prevent the rearward escape of the gases, and it will almost as instantly resume its normal size again; consequently, the said cartridge can be loaded and discharged a very great number of times without injury to its shape or strength; and the said cartridge may also remain loaded for any length of time without being chemically or mechanically injured by the action of the powder.

The steel disk *b* I shall generally bring to a pretty high temper, and then combine it with the bottom of the brass cup *c* by the process of soldering, which method of procedure will impart to the said disk a spring temper of the proper degree of elasticity. I do not, however, intend to limit myself to the particular temper of the steel disk nor to the manner of combining the same with the brass cup. The projecting periphery of the disk *b* forms a flange which enables the cartridge to be readily taken hold of by the thumb and finger for the purpose of withdrawing it from the chamber of a gun after it has been discharged, and the said flange also serves the purpose of guarding the bottom of the cartridge against being bruised or indented by rough handling when a large number of the cartridges are transported in boxes or barrels. Another useful quality possessed by the steel portion of my improved cartridge is its power of preserving the small size of the vent-hole after a great number of discharges, which enables said vent-hole to be closed perfectly water-tight by simply pressing a little wax into the same with the finger, either before or after charging the cartridge. And again, when one of my improved cartridges has been placed in the opened chamber of the Maynard breech-loading fire arm, the movement which brings the barrel thereof to its proper position for firing produces a severe friction between the bottom of the cartridge and the solid breech-piece of said fire-arm, which friction and pressure is not uniform over the entire surface of the bottom of the cartridge, and, therefore, it will readily be perceived that the said strain would distort and destroy either the barrel or the bottom of a soft metal cartridge thus situated, while it produces no injury upon any portion of my improved cartridge.

The composition of the brass and the temper of the steel portion of my improved cartridge, and also the method of combining the one with the other, I shall vary to suit the requirements of practical experience.

What I claim as my invention, and desire to secure by Letters Patent as a new manufacture, is—

An improved metallic cartridge composed of a brass cup combined with an exterior steel disk, substantially as herein set forth.

EDWARD MAYNARD.

Witnesses:

J. H. H. DOLY,

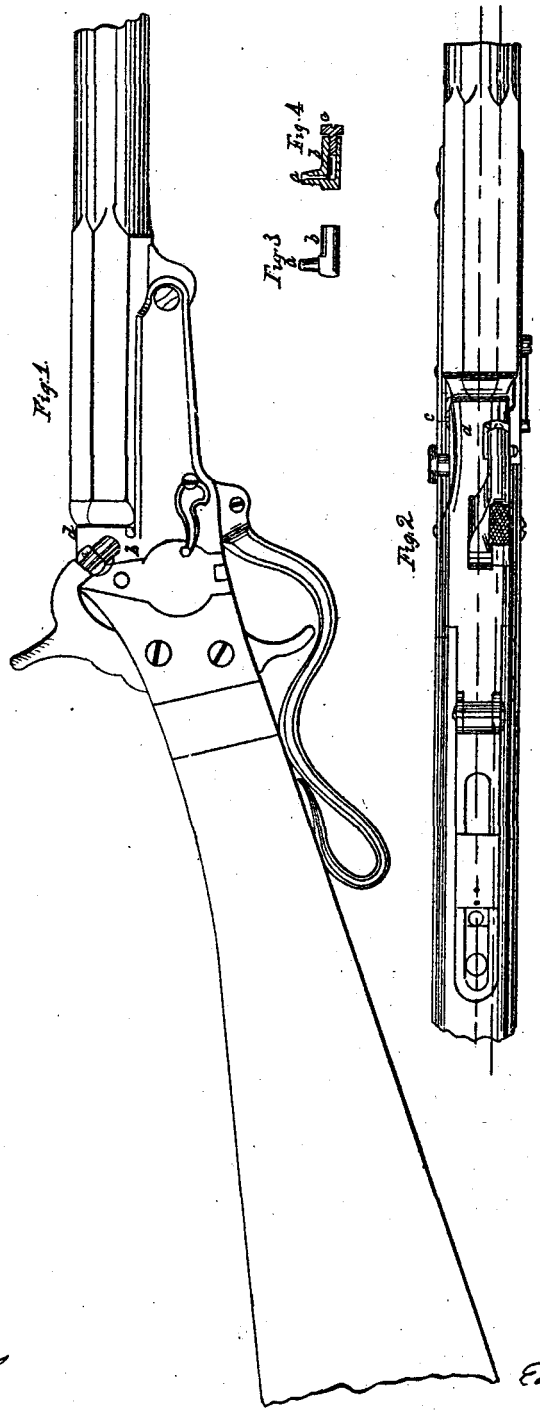
SAML. DRURY.

E. MAYNARD.

Nipple for Fire-Arms.

No. 25,664

Patented Oct. 4. 1859.



Witnesses

Z. C. Robbins
Edm. F. Brown

Inventor

Edward Maynard

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF WASHINGTON CITY, DISTRICT OF COLUMBIA.

IMPROVEMENT IN THE NIPPLES OF FIRE-ARMS.

Specification forming part of Letters Patent No. **25,664**, dated October 4, 1859.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city of Washington, in the District of Columbia, have invented a new and useful Improvement in Fire-Arms; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making apart of this specification.

Figure 1 is a side view, and Fig. 2 a top view, of the breech portion of a fire-arm which embodies the above-mentioned improvement; and Fig. 3 is a side view, and Fig. 4 a section, of my said improvement detached from a fire-arm.

The particular improvement in fire-arms which I now desire to secure by Letters Patent consists in constructing the nipple *a* in one piece with the closed end of a tube, *b*, whose open end has screw-threads formed within it, by which I am enabled to insert the said tubular nipple-seat into a transverse perforation in the abutment *d* of the breech-piece of a fire-arm, and retain it in that position by means of a nick-headed screw, *c*, which is inserted into the left-hand end of said perforation and takes into the threads in the open end of the said tubular nipple-seat, as represented in the drawings. This improved manner of combining the cap-nipple with the breech-piece of a fire-arm enables a nipple to be tightened in its position by the aid of no other instrument than a pocket-knife or a piece of small coin, and the same simple article (one of which is almost always to be found in every man's pocket) enables a damaged nipple to be readily removed from its position and a perfect one to be inserted in its place.

What I claim as my invention, and desire to secure by Letters Patent, is—

The permanent union of a cap-nipple, *a*, with the closed end of a tube, *b*, whose open end has screw-threads formed within it, by which I am enabled to combine the said nipple and its tubular seat with the abutment *d* of the breech piece of a fire-arm by means of a transverse perforation in said abutment for the reception of the tubular nipple seat, and a nick-headed screw, *c*, inserted into the left-hand end of said perforation and working into the screw-threads in the open end of said tubular nipple-seat, substantially as herein set forth.

EDWARD MAYNARD.

Witnesses:

EDM. F. BROWN,

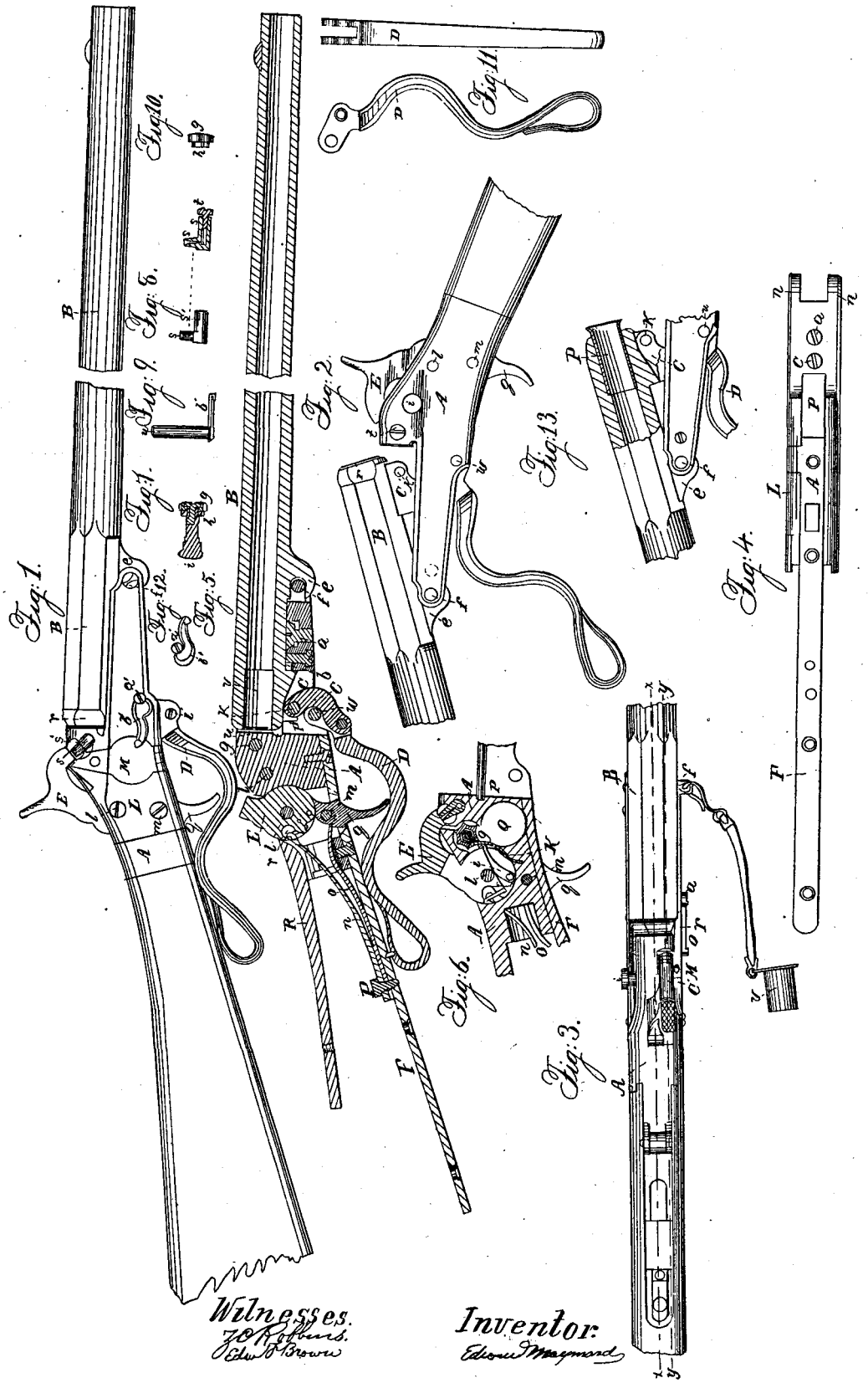
Z. C. ROBBINS.

E. MAYNARD.

Breech-Loading Fire-Arm.

No 26.364.

Patented Dec. 6, 1859



UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF WASHINGTON CITY, DISTRICT OF COLUMBIA.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. **26,364**, dated December 6, 1859.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city of Washington and District of Columbia, have invented an Improved Breech-Loading Fire-Arm; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

Figure 1 is a view of the main features of my improved fire-arm as seen from the right-hand side; Fig. 2, a view of a portion of the same as seen from the left-hand side. Fig. 3, a top view of the breech-piece and some of the other parts of the fire-arm, which are either combined with or are contiguous to the breech-piece; Fig. 4, a view of the under side of the breech-piece and some of the parts which are combined therewith; Fig. 5, a section in the line *x x* of Fig. 3; Fig. 6, a section in the line *y y* of Fig. 3; and the remaining drawings represent by plan and sectional views various parts of the fire-arm in detail.

Similar letters indicate like parts in each of the drawings.

The form of the breech-piece A and the manner of connecting the same with the barrel B of my improved fire-arm are clearly represented in the drawings. The fulcrum-pin *f*, which forms a portion of the jointed connection between the barrel and the breech-piece, is received into apertures in a pair of ears, *n' n'*, at the extremity of the projecting front portion of the breech-piece; and a hook, *e*, on the under side of the barrel fits accurately within the said ears at the same time that it closely embraces the said fulcrum-pin, as shown in Figs. 4 and 5.

The connection of the breech-piece A, the barrel B, and the actuating-lever D with each other is clearly represented in Fig. 5, and may be described as follows: At its fulcrum end the lever D has two parallel projections, which are doubly perforated, as shown in Fig. 11. The fulcrum end of said lever is received into the slot *p'* in the projecting front portion of the breech-piece, and is securely jointed to the sides thereof by means of the pin *w*, which passes through the perforations nearest to the end of the lever. One end of the curved link C is received into the space between the ears *c' c'*, which descend from the under side of the butt of the barrel, and is jointed to said ears by the pin *k'*. The other end of the said curved link passes between the parallel parts of the double fulcrum end of the lever D, and is jointed thereto by means of the pin *l'*, which passes through the perforations near the inner extremities of the said portions of the head of the lever. A shoulder, *d*, descends from the under side of the barrel, between the front ends of the ears *c' c'*, which shoulder, when the barrel is thrown into the position shown in Fig. 5, bears against an adjustable block, *b*, that is fitted into a groove in the inner surface of the projecting front portion of the breech-piece, immediately in front of the slot *p'*, and in such a manner that by means of the set-screw *a* the butt-end of the barrel can be brought against the face of the abutment of the breech-piece with any desired degree of tightness. The aforesaid adjustable bearing-block *b* is prevented from being thrown out of its place by the screw *c*, which passes to the said block through an aperture in the aforesaid portion of the breech-piece, which aperture is enough larger than the shank and head of said screw to allow the said block to be moved toward the front or rear to any necessary extent. The beveled front end of the block *b* fits accurately against the beveled head of the adjusting-screw *a*, whose screw-shank passes outwardly through a screw-aperture in the aforesaid portion of the breech-piece, and there presents a rounded and finished appearance, which may be nicked for the purpose of enabling the said screw to be turned from the outer side of the breech-piece. By turning the screw *a* in the proper direction it will readily be perceived that the face of the butt of the barrel can be brought up against the face of the abutment of the breech-piece with a sufficient degree of force to form a close joint between the two, the hook *e* being of such a length as to allow the requisite and necessary longitudinal movement of the barrel upon the fulcrum-pin *f*; but for the purpose of insuring a perfectly tight joint between the abutment of the breech-piece and the butt of the barrel, I insert a flange-bottomed metallic cup, *v*, into the chamber of the barrel, and then so adjust the position of the block *b* as to cause the radiating flange of said cup to be closely embraced between the face of the abutment of the breech-

piece and the annular face of the butt of the barrel when the barrel is brought to the position shown in Fig. 5. The aforesaid metallic cup *v* may be connected to the perforated head of the fulcrum-screw *f* by means of a strap or a chain, to be used with loose ammunition; or any number of flange-bottomed metallic cups of the proper size may be charged with powder and projectiles and be carried to the field by the soldier or sportsman for ready and rapid firing. Each of the aforesaid metallic cups must have a small aperture formed in the center of its bottom to receive the priming-fire, which passes through the central perforation in the abutment of the breech-piece; and I have ascertained by practical experience that the filling of the small apertures in the bottoms of the aforesaid metallic cups with some greasy composition renders them, when charged, perfectly water-proof, while it does not in the slightest degree impede the entrance of the priming-fire. I give the actuating-lever D such a shape that when the barrel is in the position for firing shown by Fig. 1 the said lever will form a guard for the trigger. The link C must be slightly elastic, and should be made of the toughest and strongest metal. The shape of this link is such that the pivots *m' l'*, which serve to combine it with the barrel and with the actuating-lever, will be in such positions with relation to the pivot-pin *w* that when the said parts are in the positions shown in Fig. 5 a line projected through the center of the pins *k'* and *w* will be tangential to the front side of the pin *l'*. This arrangement causes the greatest amount of leverage to be exerted upon the barrel just before the actuating-lever is brought home to its closed position, and therefore the link C exerts a considerable degree of retaining force upon the lever D after it has reached its closed position. The said lever is protected against lateral strains when it is in its closed position, and it is also held more securely in said position by a short pin, which descends from the under strap, F, and enters an aperture in the portion of the lever which bears against said strap, as shown in Fig. 5. The under strap, F, projects rearwardly from its connection with the under side of the body of the breech-piece, and is secured to the under side of the stock. The lever D can easily be thrown into the position shown in Fig. 2, and when in said position the butt of the barrel is elevated a sufficient distance above the abutment of the breech-piece to entirely uncover the opening to the chamber of the bore for the withdrawal or the reception of the metallic cup *v*. The pin *w*, which connects the extremity of the lever D with the breech-piece, is retained in its position therein by the overlapping head of the screw *a'*, whose shank is received into a screw-aperture within the breech-piece; but by turning the pin *w* into the position represented by Fig. 12 a groove, *z*, in a portion of the length of one side of the same receives a portion of the projecting head of the retaining-screw *a'*, and thereby allows the said pin to be drawn out far enough and only far enough to detach it from its hold upon the lever D, and as soon as this has been done the barrel can be readily detached from the breech-piece by unhooking it from the pin *f*, and then drawing the lever D up through the slot *p'* in the projecting front portion of the breech-piece.

The above-mentioned pivot-pin *w* carries a right-angular arm, *b'*, upon its front end, which enables the said pin to be easily turned upon its axis, and then withdrawn to the desired extent without the aid of instruments.

To facilitate the removal of the flange-bottomed metallic cup from the chamber of the barrel, I form on opposite sides of the butt of the same rearwardly-tapering and slightly-concave faces *r' r'*, of sufficient depth at their after extremities to enable the flange of the cup to be readily taken hold of by the thumb and finger of the user when the barrel is thrown into the position shown in Fig. 2. Within that portion of the breech-piece which is covered by the plate L a recess is formed for the reception of the circular-shaped body of the hammer E. The hammer is combined with the mainspring *n* by means of the link *r* and the requisite recesses in the body of the hammer, as shown in Figs. 5 and 6. The sear-spring O and the mainspring *n* are both combined with the under strap, F, by means of the screw *p*, and from that point the said springs pass forward to the hammer and to the trigger through a notch in the stock and an aperture in the breech-piece. The aforesaid plate L is secured in its position upon the breech-piece by the pins *l* and *m*, as shown in the drawings, the former pin also serving as a pivot for the hammer. A perforation in the left-hand side of the breech-piece, which opens into the delivery-throat of the primer-magazine, receives the shank of the burr-headed pin *i*, upon whose inner extremity the ratchet-wheel *h* and the feeding-wheel *g* are placed, and are securely combined therewith by means of a screw, as shown in Fig. 7.

The pawl *j*, which communicates motion from the lower portion of the body of the hammer to the ratchet-wheel *h*, is jointed to the said portion of the body of the hammer, and is always kept in a working position by means of a guiding projection from the breech-piece near the outer extremity of said pawl, and by a spring which projects from its upper side and bears against a projecting pin from the body of the hammer, all as shown in Fig. 6.

For the purpose of preventing the abrasion of the mouth of the chamber during the operation of cleaning out the barrel of my improved fire-arm, I shall insert therein, preliminary to said operation, an open flaring tube, P, substantially as represented in Fig. 13.

Having thus fully described my improved

breech-loading fire-arm, what I claim therein as my invention, and desire to secure by Letters Patent, is—

1. The peculiar manner of connecting the barrel to the breech-piece—viz., the hook *e* on the under side of the barrel taking hold of the pin *f* (or the equivalent thereof) at the front end of the breech-piece, while the link C, the lever D, and the joint-pins of said link and lever are arranged in such a manner with relation to the slot in the breech-piece and the ears on the under side of the butt of the barrel as to form a treble-jointed and compound leverage connection between the breech-piece and the butt of the barrel of such a character that the barrel can be instantly thrown from a firing position to a loading position, and vice versa, and also of such a character that the barrel can be easily and quickly detached from the breech-piece, or be securely united thereto, substantially in the manner herein set forth.

2. The combination of the metallic block *b*, the screw *c*, and the screw *a* with each other and with the front portion of the breech-piece in such a manner with relation to the shoulder *d* on the under side of the barrel that the joint between the butt of the barrel and the abutment of the breech-piece can be tightened or loosened, substantially in the manner herein set forth.

3. The retaining of the pivot-pin *w* in its position within the breech-piece by means of the overlapping head of the screw *a'*, but this only when the longitudinal groove *z* in one side of a portion of the length of said pivot-pin is so located that when the pin is turned to the position shown in Fig. 12 (or any other previously-determined position) it may be drawn out far enough and only far enough to detach the said pin from its hold upon the lever D, and thereby allow the barrel to be separated from the breech-piece, substantially in the manner herein set forth.

4. When the pivot-pin *w* is retained in its position within the breech-piece by the overlapping head of the screw *a'* in such a manner that it can be loosened by partially turning the same upon its axis, the arm *b'* upon the outer end of said pin, which enables it to be readily turned upon its axis, and partially withdrawn from its place without any mechanical assistance, substantially as herein set forth.

5. When the barrel is connected to the breech-piece in the within-described manner, the producing of a tight joint between the butt of the barrel and the abutment of the breech-piece by combining therewith a flange-bottomed metallic cup, substantially as herein set forth.

6. Giving the opposite faces *r r* of the butt of the barrel such a shape that the flange-bottomed metallic cup *v* can be easily taken hold of by the thumb and finger of the free hand of the user when the barrel is thrown into the loading position, substantially as herein set forth.

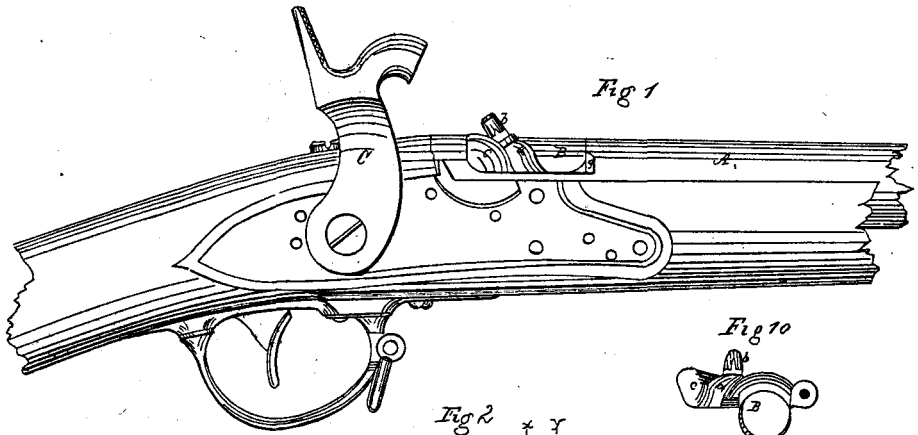
EDWARD MAYNARD.

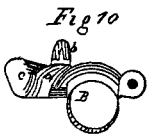
Witnesses:
Z. C. ROBBINS,
EDM. F. BROWN.

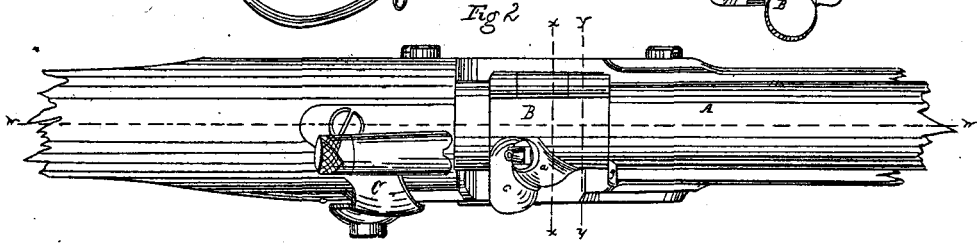
E. MAYNARD.

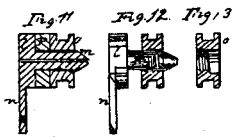
Breech-Loading Fire-Arm.

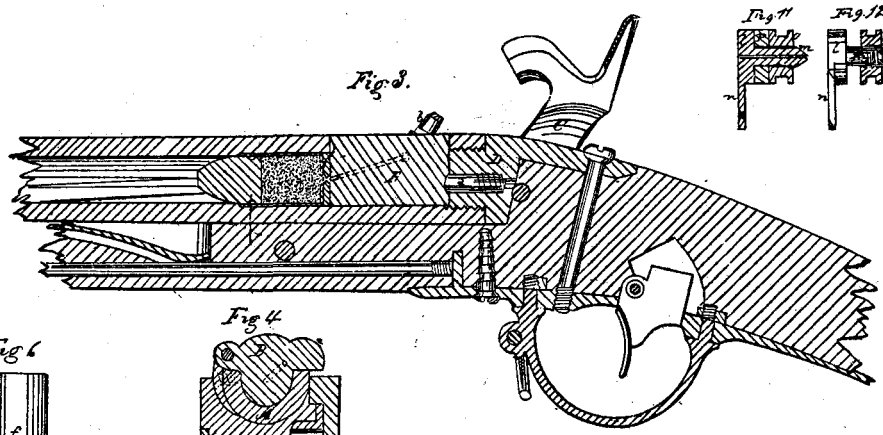
No. 30,537 Patented Oct. 30, 1860.

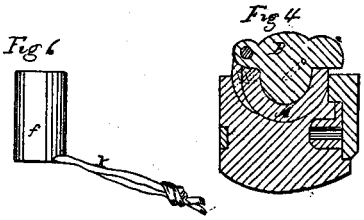


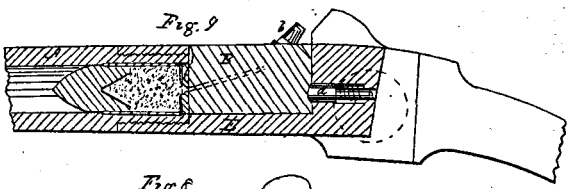


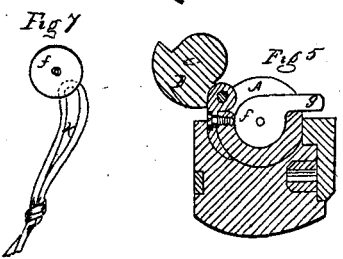


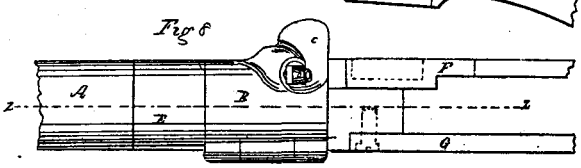












Witnesses:
J. C. Robbins
H. Candee Hinds

Inventor:
Edward Maynard

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVFMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. **30,537**, dated October 30, 1860.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city of Washington, and District of Columbia, have invented a new and Improved Breech-Loading Fire-Arm; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 is a side view of the principal portions of my improved fire-arm; Fig. 2, a top view of the same; Fig. 3, a section in the line *w w* of Fig. 1; Fig. 4, a section in the line *x x* of Fig. 2; Fig. 5, a section in the line *y y* of Fig. 2; Fig. 6, a side view of the removable metallic chamber-cup of my improved fire-arm, and Fig. 7 a bottom view of the same. Fig. 8 is a modified form of the principal portions of my improved fire-arm, and Fig. 9 is a section in the line *z z* of Fig. 8.

The same letters indicate like parts in each of the drawings.

Access is had to the chamber of my improved fire-arm by cutting out the upper half of a small portion of the barrel thereof immediately in front of the front end of the breech-pin D, and the open space thus formed in said barrel is closed by a hinged cone-seat, B, which is of such a shape that its solid front end forms a firm and reliable support for the bottom of the metallic chamber-cup *f*, which carries the ammunition into the chamber of the barrel, the said cup also serving the purpose of shutting off all connection between the ammunition of a loaded fire-arm and the hinged cone-seat B thereof, save and except the small vent in the center of said chamber-cup, which is brought immediately opposite the outlet of the priming-vent of the cone-seat, as shown in the drawings. The wing *c*, which projects to the right from the after end of the hinged cone-seat B, enables the said cone-seat to be more readily thrown into the open and closed positions represented in the drawings.

The chamber-cup *f* may be removed from the chamber of the barrel A by means of a laterally-projecting arm, *g*, from the bottom of said cup, or by means of any suitable flexible attachment, *k*, Figs. 6 and 7, which may be made of leather, or of some fibrous cord, or of wire. A notch must be formed in the right-hand side of the extreme after end of the chamber of the barrel, of such a size and shape that the handle of the cup *f* can pass out freely through the same from the said chamber.

The hinged cone-seat B may be retained in its closed position by any suitable contrivance; but I prefer a spring friction-holder, *d*, such as is represented in the accompanying drawings. I would, however, remark that the perforation for the reception of the friction-holder *d* may be formed within the cone-seat B, and the cavity for the reception of the oval head of said holder may be formed in the face of the breech-pin D, should such an arrangement of the parts be preferred.

The method of constructing my improved fire-arm represented in Figs. 1, 2, 3, 4, and 5 of the accompanying drawings is one by which I am enabled at a small expense to convert muzzle-loading fire-arms into highly-efficient breech-loading arms. In some cases it will be preferable to combine the cone-seat B with a breech-piece, E, and then combine the said breech-piece with the butt of the barrel of the fire-arm by means of matching-screws, in the manner represented in Figs. 8 and 9. When thus constructed, it will sometimes be advisable to forge a lock-plate, F, onto the right-hand side of the breech-piece E, and to screw a side plate, G, onto the opposite side of the same.

In Fig. 9 the chamber-cup *f* is represented as being charged with powder, and with what is generally denominated the "minie-ball;" but the chamber-cup represented in Fig. 3 is charged with the form of projectile which I prefer above all others for breech-loading fire-arms. The chamber-cup *f* must have a bottom of sufficient thickness to give the requisite support to the arm, or other attachment by which it is withdrawn from the chamber of a gun after its ammunition has been discharged. This extra thickness may be given to the bottom of the cup by soldering a disk of metal of the requisite thickness on the original thin bottom of the cup.

By securing an empty metallic cup, *f*, within the chamber of my improved fire-arm, it

can be safely loaded from the muzzle in the ordinary manner of loading muzzle-loading arms.

The cone-seat B and the hinge which connects the same to the barrel or to the breech-piece of my improved fire-arm are so proportioned that a slight degree of longitudinal play of said cone-seat is permitted within the opening to the chamber of the barrel that is closed thereby. The object of thus proportioning the said cone-seat and its hinge is, first, to allow the cone-seat to be opened and closed with ease and freedom; and, second, to prevent the recoil of the cone-seat from injuriously straining the hinge thereof at the moment of firing the arm, the said recoil being received entirely upon the breech-pin.

The front end of the nearly semi-cylindrical portion of the cone-seat, which shuts down into the concavity at the bottom of the opening which communicates with the chamber of the barrel, has its angles rounded off; and a semicircular channel whose outer periphery corresponds with the outer periphery of the upper half the chamber of the fire-arm is formed in the front end of the outer semi-cylindrical portion of said cone-seat, as represented in Fig. 10. The object of giving the aforesaid shape to the front end of the cone-seat, is to form a small internal channel around the periphery of the bottom of the cup *f*, when it is placed within the chamber of the fire-arm and the cone-seat is closed upon it, for the purpose of serving as a receptable for the accumulation of the dirt produced by repeated discharges of the fire-arm, which would otherwise obstruct the movements of the cone-seat. If deemed advisable, a slight prominence may be given to that portion of front end of the cone-seat which comes opposite to the chamber of the barrel, as an additional protection against the rigid adhesion of said cone-seat to its closed position after many discharges, or from the effects of oxidation.

Ammunition fixed in paper cartidges, or in other cartridges of a similar character, or loose ammunition, can be used in my said improved fire-arm by inserting an expansible stopper within the chamber of the barrel immediately after the opened after end of said cartridge, or after a charge of loose ammunition.

Figs. 11, 12, and 13 of the drawings represent an expansible stopper that may be used for the above-mentioned purpose. Fig. 11 is a longitudinal section of said stopper; Fig. 12, a side view of the main portion *l m n* of the stopper detached from the other parts thereof; and Fig. 13, a detached section of the screw-nut *o*, which also forms a portion of said stopper. The screw-thread formed within the nut *o* passes from the inner end of the perforations in said nut only half-way through the same, and the remaining portion of said perforation is somewhat enlarged. The screw-threads on the end of the perforated shank *m* radiate entirely above the smooth surface of the remaining portion of said shank, and consequently it will be perceived that when the nut *o* has been screwed onto the shank *m* far enough to carry the threads of the latter entirely beyond the reach of the screw-threads within the former (or to the position shown by the red lines in Fig. 12) the said nut will have free play upon the smooth portion of the shank *m*. The elastic gasket *p* is held tightly in its position between the head of the stopper and the nut *o* when the latter is in the position shown in Fig. 11. When the gun is fired, the nut *o* will be forced back against the gasket *p*, and as the head *l* of the stopper is prevented from giving back by the abutting face of the cone-seat it follows, from the elastic nature of the gasket, that the instantaneous pressure thereupon at the moment of firing will increase its diameter, and thereby cause it, for the moment, to tightly pack the joint between the mouth of the chamber of the barrel and the face of the cone-seat. As an additional protection, the periphery of the nut *o* may be furnished with a lubricated packing; or the groove in said nut may be filled with some lubricating substance. The small perforation which extends from the face of the head of the stopper to the point of the shank *m* conveys the priming-fire from the outlet of the vent within the cone-seat to the powder within the chamber of the barrel.

Having thus fully described my improved breech-loading fire-arm, what I claim therein as my invention, and desire to secure by Letters Patent, is—

1. The employment of a solid-headed hinged cone-seat, B, for closing the lateral opening between the mouth of the chamber of the barrel and the solid head at the after end of said opening, when the proportions of the said cone-seat and the lateral opening which receives the same are such that a thin-sided metallic cartridge (either loaded or unloaded) can be readily placed within the chamber of the barrel when the cone-seat is in its open position, and then be securely retained in said chamber by throwing the cone-seat into its closed position, substantially as herein set forth.

2. When the mouth of the chamber of a breech-loading fire-arm is closed by the head of a hinged block, B, which forms the cone-seat of said arm, I also claim the placing of a thin-sided metallic cup within the said chamber for the purpose of forming a tight joint between it and the said hinged block, substantially as herein set forth.

3. Giving the bottom of the thin-sided chamber-cup *f* of my improved fire-arm such a degree of thickness and strength that either a laterally-projecting arm or a looped thong or cord may be combined therewith, of such a size and shape as shall enable the said cup to

be readily withdrawn from the chamber of the barrel, substantially as herein set forth.

4. When the lateral opening between the mouth of the chamber of the barrel and the solid head at the after end of said opening is closed by a properly-proportioned hinged cone-seat, I also claim so proportioning the hinges of said cone-seat that the recoil thereof at the instant of firing the arm will be wholly exerted against the solid head opposite the after end of said cone-seat.

EDWARD MAYNARD.

Witnesses:
HARRY A. ROBBINS,
Z. C. ROBBINS.

E. MAYNARD.

Cartridge.

No. 40,111. Patented Sept. 29, 1863.

Fig. 1.

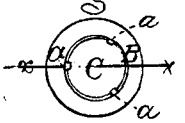
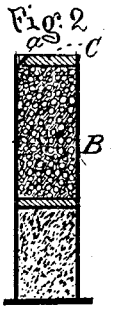


Fig. 2



Witnesses
Randolph Kingsley
Thos. Adams

Edward Maynard
By Rotting & Burr
Atty's.

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN CARTRIDGES.

Specification forming part of Letters Patent No. 40,111, *dated September* 29, 1863.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city of Washington and District of Columbia, have invented a new and useful Improvement in the Manufacture of Fixed Ammunition for Shot-Guns; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a top view of a metallic cartridge in which the charge is secured by means of my invention, and Fig. 2 is a vertical section of the same in the line *x x* ot Fig. 1.

Similar letters indicate like parts in each of the drawings.

My invention relates to metallic cartridges for shot-guns, and has for its object fastening and retaining the charge in such cartridges cheaply, permanently, and securely, without in the least affecting the facility of their discharge in the gun.

It consists of a series of tongues, *a a a*, which are formed in the upper end of a metallic cartridge, B, by simply cutting slits of any desirable length on either side of the tongue to be formed.

When the cartridge is properly loaded, as illustrated in Fig. 2, and a suitable wad, *c*, placed upon the charge of shot, the tongues *a a a* may be bent over upon it, and will thus securely retain the load within the cartridge, and enable it to be carried or jolted about in any position without danger of its becoming loose or unfixed. When, however, the cartridge is fired, the explosion of the charge will straighten out the tongues *a a a* into their original position without breaking them, so that the cartridge may be again reloaded and secured with facility.

Having thus fully described my improvement, what I claim therein as new, and desire to secure by Letters Patent, is—

The formation of one or more clasping or retaining tongues in the upper rim of a metallic cartridge by slitting the edge of the same, substantially in the manner and for the purpose herein set forth.

This specification of my new and useful improvement in fixed ammunition for shot-guns, signed by me this 28th day of May, A. D. 1863.

EDWARD MAYNARD.

In presence of—
RANDOLPH COYLE, Jr.,
DAVID A. BURR.

E. MAYNARD.

Cartridge.

No. 42,388.

Patented Apr. 19, 1864.

Fig. 1.

Fig. 2.

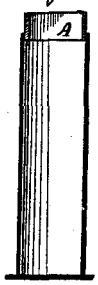


Fig. 3.

Fig. 4.

Fig. 6

Fig. 5.

Witnesses: Randolph Bayliss, Thomas Adams

Edward Maynard

By Potting & Burr atty's.

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN METALLIC WAD FOR CARTRIDGES.

Specification forming part of Letters Patent No. 42,388, *dated April* 19, 1864.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city of Washington and District of Columbia, have invented a new and useful Improvement in Metallic Wads for Shot-Guns or Cartridges; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings which form a part of this specification, and in which—

Figure 3 is a side elevation, and Fig. 5 a bottom view, of my improved metallic wad for shot-guns; Fig. 1, a side elevation, and Fig. 2 a vertical section, of the same, in combination with a metallic shot-cartridge, *c*, for a breech-loading gun, represented as partially pushed down to its proper position. Fig. 4 represents one of my improved wads with slitted sides; showing also another mode of combination with a cartridge, viz., with the open end thereof forward. Fig. 6 is a detached view of my improved wad when slitted.

Similar letters indicate like parts in each of the drawings.

The object of my invention is to provide a wad for shot-guns which shall economize space, confine the explosive and impelling gas produced by firing the charge in such a manner as to prevent its escape in advance of the shot, and, in combination with loaded metallic cartridges, afford them protection from dampness.

To attain this end, I have invented a cup-shaped wad, A, made of thin metal, by simply "striking up" cylindrical sides from a disk in the customary manner. The length of the sides of the wad should be so proportioned as that, when placed in the barrel of a gun, it shall occupy space enough longitudinally to prevent its turning therein when shot forward, as is usual with ordinary wads, and may properly be equal to at least half its diameter.

The cylindrical sides or rim of the wad not only serve as guides and stays to keep it exactly in a plane at right angles to the bore of the gun, but will, by their expansion when the gun is fired, prevent completely the escape of gas in advance of the shot, and thus insure their perfect and regular expulsion.

This expansion of the sides of the wad, which causes them to fit with the utmost nicety the bore of the gun, is attained, if the open end of the wad be placed outward when dropped in the gun (as shown in Fig. 4) by the resistance or inertia of the air confined in the barrel, as it is acted upon by the explosive force of the charge, a force which will itself cause their expansion when the wad is placed in the gun or cartridge with its open end or mouth inward, as in Fig. 1.

In order to accommodate a given wad in shot-guns of varying calibers, the rim thereof may be slitted (as is shown in the wad B of Figs. 4 and 6 of the accompanying drawings) to allow its greater expansion.

My improved wad, from its thin metallic structure, is peculiarly useful for combination with metallic or other shot-cartridges. Its novel form permits it to be securely fitted to the cartridge in such a way as to render it completely water-proof and secure from dampness, rendering it at the same time more neat and compact, but it is also most valuable in all cases where great accuracy and projectile force are required.

Having thus fully described my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

My improved gun-wad, formed of a circular disk, with a projecting cylindrical edge or rim, substantially in the manner and for the purpose herein set forth.

This specification of my new and useful improvement in metallic wads for shot-guns, signed by me this 28th day of May, A. D. 1863.

EDWARD MAYNARD.

In the presence of—
RANDOLPH COYLE, Jr.,
DAVID A. BURR.

E. MAYNARD.

Cartridge.

No 45,420.

Patented Dec. 13, 1864.

Fig: 1.

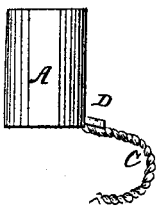


Fig: 2.

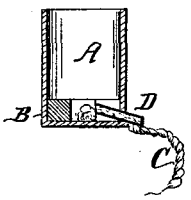
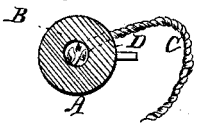


Fig: 3.



Witnesses

Chas. H. Anderson

Randolph Eggleston

Edward Maynard.

By Robbins & Burr.

Attorneys

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN PRIMING METALLIC CARTRIDGES.

Specification forming part of Letters Patent No. **45,420**, dated December 13, 1864.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city of Washington, in the District of Columbia, have invented a new and useful Improvement in Primed Cartridges; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, and in which—

Figure 1 is an elevation of my improved cartridge; Fig. 2, a vertical central section of the same; and Fig. 3, a cross-section in the line *x x* of Fig. 1. (See thin drawing.)

Similar letters indicate corresponding parts in each of the figures.

The object of my invention is to produce cheaply a reliable cartridge primed at one point only, and which shall be peculiarly adapted for use in the United States muskets so altered as to become breech-loading guns, in the manner described in my patent of October 30, 1860, and in the specification of an improvement thereon, herewith filed, in a separate application for Letters Patent.

To accomplish my object, I combine a simple percussion tube or primer, D, with a metallic cartridge by passing it through an aperture in the side thereof, as seen in Figs. 1, 2, and 3 of the drawings. This combination is not in itself novel, but my invention consists in a novel mode of confining and supporting the inner end of the priming-tube D, by causing it to pass through an annular wad, B, of papier-maché, or other suitable material, fixed in the bottom of the cartridge.

This wad B is made in the shape of a ring, so that the knotted end of the retracting-cord used in connection with all cartridges to be fired from my improved breech-loading gun, as patented October 30, 1860, may be inclosed in the center thereof. To receive this cord, an aperture is pierced through the wad from its inner to its outer periphery, and the outer end of the cord extending from the wad is then passed through an aperture in the side of the cartridge and depends therefrom, as seen in Figs. 1 and 2. The wad, when slipped into its place in the interior of the cartridge, thus incloses the knotted end of the cord, which is thereby prevented from slipping out. When the wad is thus fixed in the bottom of the cartridge and held by the retracting-cord, it forms a solid support for the inner end of the long, slim percussion-tube or hollow wire D, Fig. 2, which contains the fulminate. This priming-tube is driven into an aperture pierced in the side of the cartridge-case, and through the wad to its inner central cavity, until its inner end reaches this cavity. Its outer end will then project slightly beyond the exterior surface of the cartridge, as seen in the drawings, to receive the blow of the gun-hammer or hammer-rod. By dipping the tube D in a varnish or cement before driving it into place, the joint between the tube and cartridge may be made water-proof.

I contemplate the use of a thick annular layer of cement in place of the wad B, the cement to be so molded as to have substantially the form of said wad B, as described. In this case the percussion-tube D is to be placed in the cartridge and pressed through the cement before the latter has become fully hardened.

Having thus fully described my improvement in primed metallic cartridges, what I claim therein as new, and desire to secure by Letters Patent, is—

The combination of a wad, B, of any suitable material, with the interior of a cartridge, A, so as to form a firm support for the inner end of a priming-tube, D, passing out through the side of said cartridge, substantially in the manner herein set forth.

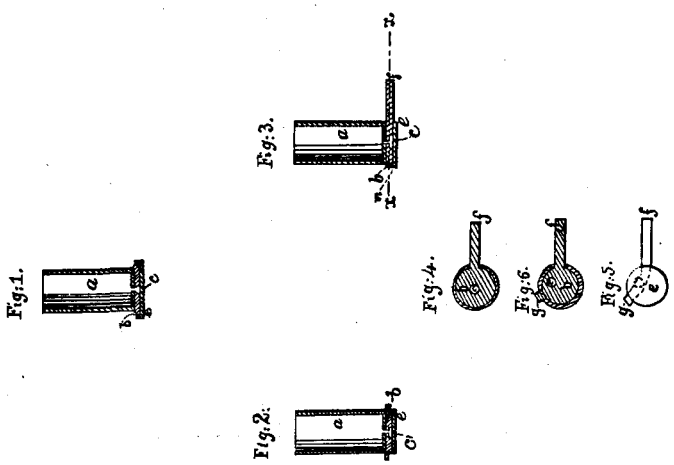
EDWARD MAYNARD.

Signed in presence of—
GEO. W. MAYNARD,
J. H. H. DOTY.

E. MAYNARD.

Cartridge.

No. 59,044. Patented Oct. 23, 1866.



Witnesses.

W. Burns

Melleck W. Burns

Edward Maynard

Inventor.

David A. Burr

Atty.

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF TARRYTOWN, NEW YORK.

IMPROVEMENT IN PRIMING METALLIC CARTRIDGES.

Specification forming part of Letters Patent No. **59,044**, dated October 23, 1866; antedated October 3, 1866.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of Tarrytown, in the county of Westchester and State of New York, have invented a new and useful Improvement in Primed Cartridges; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a central longitudinal section of the simple form of my improved primed cartridges; Figs. 2 and 3, similar sections, respectively, of modifications thereof; Fig. 4, a transverse section through the base of the cartridge illustrated by Fig. 3, in the line *x x* thereof; Fig. 5, a bottom view of a second form of retracting-arm cartridge as improved by my invention; and Fig. 6, a transverse section through the bottom thereof, showing the position of the priming-cavity therein with reference to the arm and supporting-lug.

Similar letters indicate like parts in all of the figures.

The nature of my invention consists in the combination of an outer cap or cover of thin metal with a priming-recess formed exteriorly in the base of a cartridge, when said base is provided with a projecting rim or flange, or with pins or arms, so as to be firmly supported when placed in the gun, and is made of such strength as to afford proper resistance to the blow of the hammer in firing the charge.

Fig. 1 illustrates my invention as applied to the metallic cartridges for which I obtained Letters Patent on the 28th day of May, 1861. These cartridges are constructed of a thin metallic cap, *a*, secured by solder or otherwise upon a solid disk, *b*, of a diameter so far greater than that of the cup as to project and form a supporting-flange around the bottom thereof, as seen in the drawings.

In the center of the thick double bottom of this cartridge I form a small priming-cavity, *c*, of any suitable form, having a vent communicating therefrom with the interior of the cartridge. When this cavity has been filled with fulminate I protect it by a cap, *e*, of thin metal, made to fit closely over the entire disk forming the base of the cartridge. This cap *e* shields completely the fulminate from exposure, and, as it extends to the outer circumference of the rim of the cartridge, will, when it is discharged, protect the firing-pin and the lock from the gases leaking back from the charge, by conveying them outwardly. This metallic cap may be combined with the base of any cartridge where said base is firmly supported in the gun either by means of a projecting flange, as in Figs. 1, 2, and 3, or by supporting lugs or pins, as seen in Figs. 5 and 6, and to any cartridge having such a solid supported base, whatever the composition of the cup or casing may be, whether of papier-maché, metal, or otherwise.

In Fig. 2 a modification of the base is illustrated, in which, although a sufficiently solid supporting-flange is retained, the central part only of the disk is covered by the shielding-cap *e*.

In Fig. 3 its application to such forms of cartridges as are provided with a solid retracting-arm, as set forth in my Letters Patent of September 8, 1863, is shown.

In applying my improvement to these cartridges, the solid base must be either slightly enlarged, (see *m* in Fig. 3,) to provide a supporting-flange thereto, or a projecting lug, *g*, must be formed, (as seen in Figs. 5 and 6,) in addition to the arm, for the same purpose.

When a lug is formed upon the base of the cartridge in relation to the retracting-arm it becomes necessary in such cartridges as are to be used in my improved fire-arms having a hinged breech-block, or others of a similar pattern, to place such lug *g* at the end of the chord of an arc less than a semicircle; and in order to obtain proper resistance to the blow of the hammer upon the base when thus supported, I place the priming-recess in such cartridges in a line between the arm *f* and lug *g*, as illustrated in Figs. 5 and 6, rather than in the center thereof.

In fitting the shielding-cap *e* over and upon the base *b* of such cartridges, I cause its rim to embrace the retracting-arm and the lug by cutting away said rim at these points.

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF TARRYTOWN, NEW YORK.

IMPROVEMENT IN PRIMING METALLIC CARTRIDGES.

Specification forming part of Letters Patent No. **59,044**, dated October 23, 1866; antedated October 3, 1866.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of Tarrytown, in the county of Westchester and State of New York, have invented a new and useful Improvement in Primed Cartridges; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a central longitudinal section of the simple form of my improved primed cartridges; Figs. 2 and 3, similar sections, respectively, of modifications thereof; Fig. 4, a transverse section through the base of the cartridge illustrated by Fig. 3, in the line *x x* thereof; Fig. 5, a bottom view of a second form of retracting-arm cartridge as improved by my invention; and Fig. 6, a transverse section through the bottom thereof, showing the position of the priming-cavity therein with reference to the arm and supporting-lug.

Similar letters indicate like parts in all of the figures.

The nature of my invention consists in the combination of an outer cap or cover of thin metal with a priming-recess formed exteriorly in the base of a cartridge, when said base is provided with a projecting rim or flange, or with pins or arms, so as to be firmly supported when placed in the gun, and is made of such strength as to afford proper resistance to the blow of the hammer in firing the charge.

Fig. 1 illustrates my invention as applied to the metallic cartridges for which I obtained Letters Patent on the 28th day of May, 1861. These cartridges are constructed of a thin metallic cap, *a*, secured by solder or otherwise upon a solid disk, *b*, of a diameter so far greater than that of the cup as to project and form a supporting-flange around the bottom thereof, as seen in the drawings.

In the center of the thick double bottom of this cartridge I form a small priming-cavity, *c*, of any suitable form, having a vent communicating therefrom with the interior of the cartridge. When this cavity has been filled with fulminate I protect it by a cap, *e*, of thin metal, made to fit closely over the entire disk forming the base of the cartridge. This cap *e* shields completely the fulminate from exposure, and, as it extends to the outer circumference of the rim of the cartridge, will, when it is discharged, protect the firing-pin and the lock from the gases leaking back from the charge, by conveying them outwardly. This metallic cap may be combined with the base of any cartridge where said base is firmly supported in the gun either by means of a projecting flange, as in Figs. 1, 2, and 3, or by supporting lugs or pins, as seen in Figs. 5 and 6, and to any cartridge having such a solid supported base, whatever the composition of the cup or casing may be, whether of papier-maché, metal, or otherwise.

In Fig. 2 a modification of the base is illustrated, in which, although a sufficiently solid supporting-flange is retained, the central part only of the disk is covered by the shielding-cap *e*.

In Fig. 3 its application to such forms of cartridges as are provided with a solid retracting-arm, as set forth in my Letters Patent of September 8, 1863, is shown.

In applying my improvement to these cartridges, the solid base must be either slightly enlarged, (see *m* in Fig. 3,) to provide a supporting-flange thereto, or a projecting lug, *g*, must be formed, (as seen in Figs. 5 and 6,) in addition to the arm, for the same purpose.

When a lug is formed upon the base of the cartridge in relation to the retracting-arm it becomes necessary in such cartridges as are to be used in my improved fire-arms having a hinged breech-block, or others of a similar pattern, to place such lug *g* at the end of the chord of an arc less than a semicircle; and in order to obtain proper resistance to the blow of the hammer upon the base when thus supported, I place the priming-recess in such cartridges in a line between the arm *f* and lug *g*, as illustrated in Figs. 5 and 6, rather than in the center thereof.

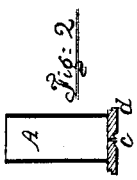
In fitting the shielding-cap *e* over and upon the base *b* of such cartridges, I cause its rim to embrace the retracting-arm and the lug by cutting away said rim at these points.

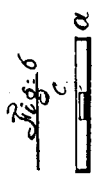
E. MAYNARD.

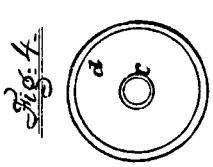
Cartridge.

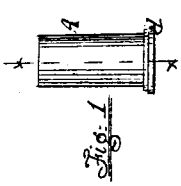
No 61,225

Patented Jan. 15, 1867









Witnesses

David A Burr

E. H. Young

Inventor

Edward Maynard

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF TARRYTOWN, NEW YORK.

IMPROVEMENT IN PRIMING METALLIC CARTRIDGES.

Specification forming part of Letters Patent No. 61,225, *dated January* 15, 1867; *antedated December* 5, 1866.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of Tarrytown, in the county of Westchester and State of New York, have invented a new and useful Improvement in Metallic Cartridge-Caps; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is an elevation of a metallic cartridge primed in accordance with my invention by the combination therewith of a primed detachable base-cap. Fig. 2 is a central vertical section in the line *x x* of Fig. 1. Fig. 3 is a similar section on an enlarged scale of the detachable primed base-cap; Fig. 4, an enlarged top or inner view of the same; and Figs. 5 and 6, similar enlarged sectional views of the detachable base-cap, illustrating modes of combining additional priming-receptacles therewith by riveting and soldering.

Similar letters indicate like parts in all of the figures.

The nature of my invention consists in priming a metallic cartridge, or a cartridge having a metallic bottom, with fulminate placed upon the inner side of a detachable cap, made to cover the base of the cartridge or a portion thereof.

The detachable cap may be carried apart from the cartridge already primed, or the fulminate may itself be carried separately from either cartridge or cap, and be placed in the cap as occasion may require, a receptacle being formed upon the inner side of the cap to receive and secure the fulminate.

When a cap so formed is placed upon the cartridge the fulminate will be thereby confined against a suitable vent in the bottom of the cartridge, and also perfectly protected from moisture or dampness.

The object of my invention is to provide such ready means of priming loaded metallic cartridges as that they may be transported for security without such priming, free from the liability of accidental explosion, and yet be with perfect ease and dispatch at any moment made ready for firing.

The thin metallic cup or cap *a* which I use is made to fit closely over and upon the base of a cartridge having a metallic bottom, as seen in the drawings, or over a projection therefrom, as illustrated in the specification of improvements in metallic cartridges which I filed in the Patent Office on the 30th day of March, 1866, preparatory to obtaining Letters Patent thereon. With this cap I combine a charge of fulminate by placing it at such a point as shall correspond and coincide with a vent in the base of the cartridge, but which I prefer to make central, as illustrated in the drawings.

To secure, confine, and protect the fulminate when placed upon the inner side of the cap or base-cup *a*, I form a small receptacle, *c*, therefor. This receptacle may be formed in many ways. I contemplate all of them, provided that the receptacle shall not project externally beyond the base of the cap, but prefer to make it either by striking or stamping up an annular crease or encircling projection from the outer side to project from the inner side and inclose a small space for the fulminate, as illustrated in Figs. 3 and 4 of the drawings, or by fastening upon the inner side of said base-cup *a* a small, distinct priming-cup, riveted as illustrated in Fig. 5, or soldered in place, as seen in Fig. 6.

Instead of forming the receptacle in the manner indicated, the fulminate may be attached at a single point on the interior of the metallic base-cap by means of adhesive cement, glue, or varnish; or a film of fine gauze (either of metal wire or of linen or other fiber) or of any thin fabric or material which will allow the spark from the fulminate to pass freely through it may be employed for the purpose of retaining the fulminate in place, either of these methods being regarded as equivalents for the receptacle above described.

The cap or base-cups *a*, furnished with a priming-receptacle upon their inner side, may be provided and sold as a distinct article of manufacture apart from the cartridges with which they are to be used.

Having thus fully described my invention, I claim as a new article of manufacture, and desire to secure by Letters Patent—

A primed metallic cap for the base of a car-

tridge, when the fulminate is secured at a single point on the inner side of said cap, and the priming point or receptacle does not project externally therefrom beyond its base, all substantially in the manner and for the purpose herein set forth.

The foregoing specification of my improvement in metallic cartridge-caps signed by me, this 2d day of May, A. D. 1866.

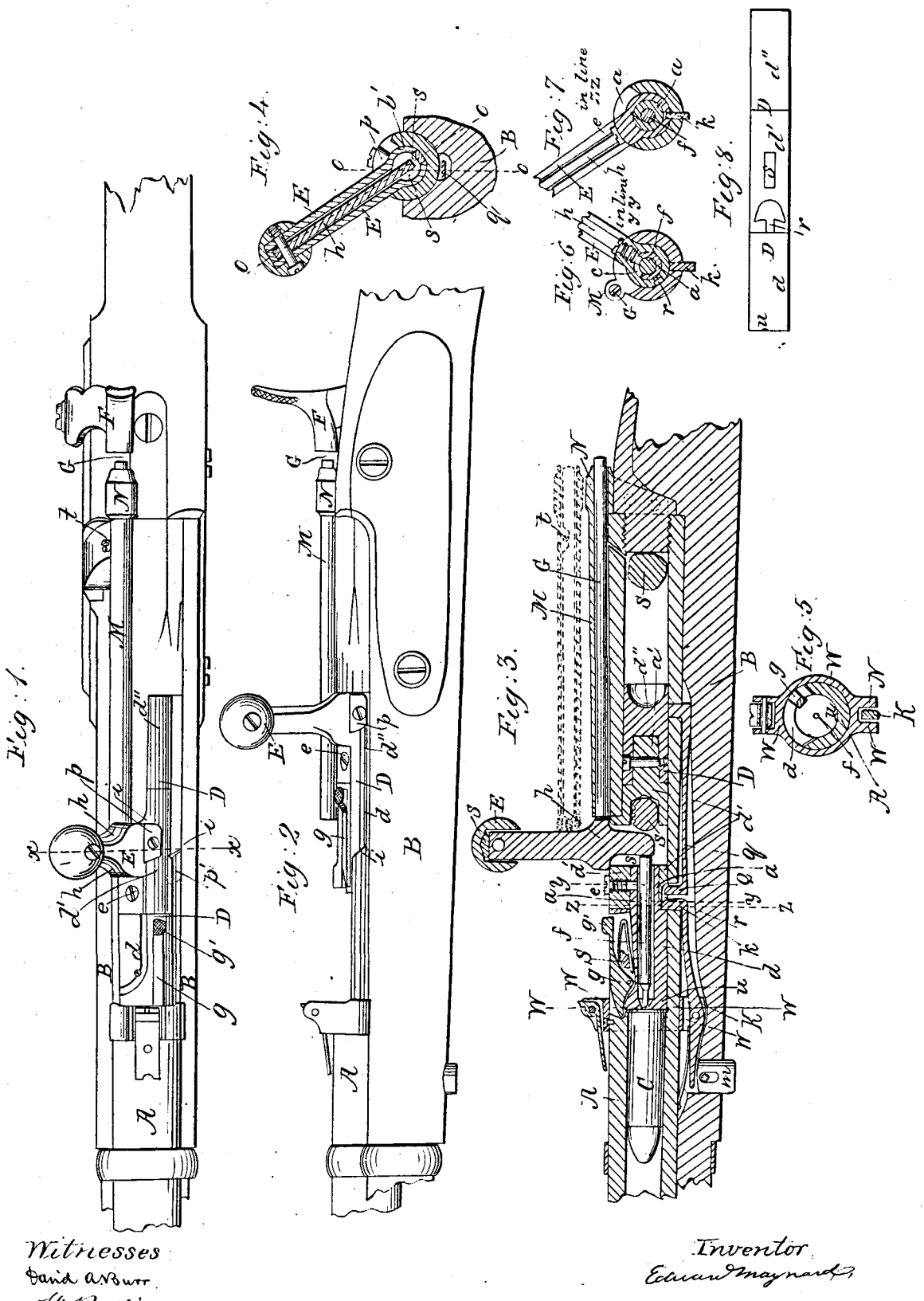
EDWARD MAYNARD.

In the presence of—
DAVID A. BURR,
H. H. YOUNG.

E. MAYNARD.

Breech-Loading Fire-Arm.

No. 86,566. Patented Feb. 2, 1869.



Witnesses
David A. Burr
W. Burris

Inventor
Edward Maynard

United States Patent Office.

EDWARD MAYNARD, OF WASHINGTON, DISTRICT OF COLUMBIA.

Letters Patent No. 86,566, *dated February* 2, 1869.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city of Washington, in the District of Columbia, have invented a new and improved Breech-Loading Fire-Arm; and I hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan view of my improved gun;

Figure 2, a side elevation thereof;

Figure 3, an irregular longitudinal section of the gun, following the lines indicated at *o o o o* of fig. 4;

Figure 4 being a transverse section in the line *x x* of fig. 1;

Figure 5, a transverse section in the line *w w* of fig. 3;

Figure 6, a transverse section in the line *y y;* and

Figure 7, a similar section in the line *z z* of fig. 3; the former illustrating the sliding bolt, when turned for withdrawal and disengaged from its locking-catch, and the latter the bolt, when it is closed for firing and locked by its catch.

Figure 8, a detached bottom view of the bolt, showing the forms of the slot and recesses cut therein to receive and permit a play of its locking-catch and of the spring-detent.

A top or plan view of the hammer-pin, in the position indicated by the section thereof in fig. 3, but illustrating the same driven forward against the swinging lever of the bolt-handle, is given in red lines over the fig. 3.

Similar letters of reference indicate like parts in all of the views.

My invention relates to improvements in breech-loading fire-arms which are closed by a sliding bolt, said improvements being of such nature as to admit of being readily combined with the ordinary muzzle-loading Springfield rifles, so as to convert them into breech-loaders adapted to the use of the regulation-cartridges of the United States service.

The object of said invention is to avoid weakening the attachment of the barrel to the stock, or of the lock to the stock and barrel, and also any alteration whatever in the locks of the fire-arms, adopted in the United States service, and to obtain a breech-loader as strong and secure in the breech and lock as any of the old forms of improved muzzle-loading guns, and which shall possess therewith advantages, in respect to rapidity and accuracy of fire, range, simplicity of parts, and facility of operation, superior to those of any of the breech-loading arms now in use.

The nature thereof consists—

First, in the use of a divided sliding bolt, made in two or more pieces, so as to allow the bolt to be put into place within a suitable aperture in the upper side of the barrel, near the breech of the gun, without displacing or taking out the breech-pin, or in any manner changing the attachment of the barrel to its stock, or the combination of the lock therewith.

Second, in so combining the first or foremost section of the divided sliding bolt, closing the chamber of the gun and containing the firing-pin, with the second and remaining sections in the rear thereof, as that, whilst the whole bolt may slide longitudinally, without separation, the sections in the rear of the first may unitedly revolve upon their longitudinal axis independently of said first section, so far as may be required to bring the handle from the plane, in which it moves longitudinally to open the chamber of the gun, over to a position in line with the hammer and hammer-pin, when said chamber is closed.

Third, placing within the handle of the sliding bolt, slotted for this purpose, a bar arranged to swing in line with the axis of the gun, (its upper end being pivoted in the outer end of the handle, and its lower end left free in contact with the firing-pin in the front section of the sliding bolt,) so that when, upon closing the gun, the handle of the bolt is turned into line with the hammer, the front end of the hammer-pin shall be in line with the swinging bar, and impart thereto the blow of the hammer to be communicated thereby to the firing-pin. By this arrangement of the mechanism of the sliding bolt, a blow from the hammer can be communicated to the firing-pin only when the bolt is in a proper and safe position for firing.

Fourth, imparting such an inclination to the opposite edges of the opening in the gun, against which the base of the handle of the sliding bolt must bear, when turning in and out of line with the hammer, as that, when the handle is being turned into a position for its longitudinal-sliding movement, the inclined edge on one side shall act as a wedge to start back the bolt and disengage the cartridge from the chamber of the gun, and when turned into line with the hammer, the opposite inclined edge shall force the cartridge forward closely and tightly into said chamber.

Fifth, the disengagement of the lock-catch, or device which locks the recoil-bolt or block, closing the rear end of the cartridge-chamber of a breech-loading fire-arm, by means of a lever or other equivalent device, to be operated by the simple weight of the fire-arm, when it lies in the hand for support in opening or closing the said chamber, or by its weight in connection with the grip of the hand supporting the gun in such position.

Sixth, the attachment of a tubular shield to the outside of the barrel, in front of the hammer, for the purpose of guiding and protecting the hammer-pin, and the combination of a hammer-block with the rear end of said shield and pin, to protect the shield from the blow of the hammer in striking the pin.

Seventh, the combination of sponge or other absorbing-material, saturated with any proper lubricant, with receptacles, formed for the purpose in the sliding bolt, the barrel behind it, or both, and in other of the working-parts of the fire-arm, so that the action of the mechanism, or the heat of the gun, or both causes combined, shall cause the said sponge or other material to keep the mechanism constantly lubricated.

Eighth, the combination of a spring-detent with the

bottom of the sliding-bolt recess, for the purpose of tripping the cartridge, and to serve as a brake to the sliding bolt, to prevent accidental slipping thereof; and also in combining a retractor upon the sliding bolt with said detent, in such manner as that, when an empty cartridge is withdrawn by the retractor in the movement of the sliding bolt, it shall trip against the detent, and be thrown out from the gun, whilst a loaded cartridge would remain in position, the retractor being so arranged as that a loaded cartridge may be readily released therefrom, and received into the hand, independently of the ejecting-device.

Ninth, in the combination of supports for the back-sight and the locking-lever of the bolt upon a single band encircling the barrel.

In the accompanying drawings—

A represents the barrel of my improved fire-arm, secured to the stock B in the usual manner, and provided with the ordinary lock, or with any improved description of lock which may be preferred, secured in the same manner and in the same position, relatively to the barrel and stock, as in the ordinary Springfield rifles.

In the upper side of the barrel A, an aperture or slot is cut down to the bore, commencing immediately over the rear end of the cartridge-chamber C of the gun, and extending back toward the breech.

The rear portion of the aperture is but little larger in width than the handle of the sliding bolt, so as to allow simply a longitudinal movement thereof in the direction of the bore of the gun, but it is enlarged in front sufficiently to allow a lateral rotary movement of the handle, when the chamber is closed sufficient to bring the handle in line with the hammer of the gun.

Through this aperture the sliding bolt, closing the cartridge-chamber C, is inserted into the cylindrical bore of the breech-end of the barrel in the rear of said chamber, the bore being slightly enlarged, as illustrated in fig. 3.

In the alteration of the Springfield rifles, or other muzzle-loading guns, a very slight enlargement of the bore, in the rear of the cartridge-chamber, is required, the bore of the barrel proper being reduced in diameter by inserting a reinforce therein.

The sliding bolt D is made in three solid pieces or sections, *d d' d''*.

These sections of the bolt are united by means of tongues *a a'*, projecting centrally from the rear ends of the two foremost sections, *d d'*, fitting into counterpart sockets in the front ends of the two rear sections, *d' d''*, as illustrated in fig. 3.

The tongues *a a'* are secured within their sockets by means of screws *e e'*.

The second and third sections of the bolt are rigidly united by the screw *e'*, which passes entirely through the tongue *a'* of the second section *d'*, as shown in fig. 3.

The end of the screw *e*, which secures the first and second sections *d* and *d'* together, passes, however, into a slot, *c*, fig. 6, cut circumferentially about the tongue *a* of the front or first section *d*, so that the second section, *d'*, may partially revolve about its axis independently of the first section.

A firing-pin, *f*, fig. 3, is inserted centrally through the first section, *d*, of the bolt and its tongue *a*, and plays loosely therein. The pin is made somewhat longer than the section *d* and the tongue *a*, so as to project slightly rearwardly therefrom into a slot in the second section. A shoulder in the front end of the aperture in which the pin plays, prevents it from passing too far forward.

A retracting-lever, *g*, is pivoted within a slot cut in the upper side of said front section *d*, as seen in fig. 3. The forward end of this retracting-lever is hooked, to engage the flange of the cartridge. This engagement is secured by means of a spring placed beneath its rear arm, its rear end being fitted with a thumb-piece, *g'*, projecting slightly above the outer surface of the section, for the purpose of depressing the lever, and releasing its hook, when desired.

The hooked end of the retractor, projecting slightly beyond the flange of the cartridge when the gun is loaded and the bolt closed, passes into a recess in the end of that part of the gun-barrel immediately forward of the loading-aperture, as shown in fig. 3 of the drawings.

The handle E of the bolt D is formed upon its central section, *d'*, and projects therefrom at right angles thereto.

A central longitudinal slot, *s*, is cut down entirely through this handle E, in a right line with the axis of the bolt, and is continued down through the central section.

The rear end of the firing-pin *f* projects therein beyond the end of the tongue of the first section, enclosing it.

Within this slot *s* is fitted a lever, *h*, pivoted by means of a pivot-screw passing through the head of the handle and the upper end of the lever, as seen in fig. 3.

The lower end of the lever *h* extends down, through the central section D' of the bolt, to a point below the end of the firing-pin *f*, so as to come fairly in contact therewith.

The hammer F of the gun is combined with the stock in the usual manner, but the end of the hammer is cut down, in the form indicated in the drawings, to strike fairly the end of a firing-pin, G, secured upon the barrel by means of a tubular shield, M, enclosing the same, as illustrated in the drawings, and which extends in a right line from the hammer to a plane coincident with the rear face of the handle E of the bolt.

The hammer-pin G is confined within the shield M by means of a screw, *t*, whose inner end passes into a recess cut in the side of the pin, and extended sufficiently to allow the desired longitudinal movement of the pin, as shown in the red lines of fig. 3.

The rear end of the tubular shield terminates at the rear end of the barrel, and is protected by a hammer-block, N, passing down in the rear of the breech-pin, and secured to the breech-plate by screws, as illustrated by dotted lines in fig. 3

This hammer-block is pierced with an aperture, coinciding with that of the shield M, and the hammer-pin G extends through the same, as shown in the drawings, fig. 3, and see red lines therein.

The handle E, with the central and rear sections of the bolt A, is left, by the form of the aperture cut in the barrel, free to revolve sufficiently far, when the gun is closed, to bring the lever *h*, pivoted centrally therein, in line with the hammer-pin G.

The edges *i i'* of the bolt-aperture, at the point of its enlargement forward, to permit the turning of the bolt, are so bevelled and inclined as that the rear face of the handle, bearing against the bevelled face *i*, will force the bolt forward, when its handle is turned into line with the hammer-pin, (and thus secure a close joint of the flange of the cartridge with the end of the barrel of the gun,) and the anterior face of a projecting piece, *p*, secured upon the upper side of the bolt, working against the bevelled face *i'*, will start the bolt back, when the handle is turned back, to open the gun.

A piece of hardened steel, *p'*, is screwed down upon the barrel A, fig. 1, so that its rear end shall form the bevelled face *i'*, receiving the blow of the projecting piece *p* on the bolt, and protect the soft metal of the barrel at this point from the battering effect incident to the shooting forward of the bolt in its slot, in closing the gun.

The handle is thus made to work as a lever, where-

with to overcome, in the latter case, the adhesion of the cartridge within the gun-chamber after it has been fired, and, in the former, to close securely the joint between the cartridge and the gun-barrel.

Upon the under side of the bolt D, at the front end of the second or middle section, *d'*, a recess, *r*, fig. 8, is cut out in its forward end, terminating at the rear face of the first section, *d*, of the bolt, which thus serves to form a square shoulder at that point. (See fig. 3.)

A catch, *k*, figs. 3, 6, and 7, upon the rearward longer arm of a lever, K, which is pivoted between ears *w w*, projecting from the under side of a band, W, fig. 5, encircling the barrel over the mouth of its cartridge-chamber, C, passes into this recess *r*, (see fig. 7,) when the bolt is shot forward, to close the gun, and is turned into position for firing, as seen in figs. 1, 3, 4, and 7.

A spring is placed under the rear end of the lever K, which causes the catch *k* to bear constantly against the bolt D, and to fall into the recess *r*, so soon as it attains a proper position therefor.

A button, *m*, is, however, inserted through the stock B, to bear upon this arm of the lever, so that a pressure on the button shall overcome the force of the spring, and move the lever sufficiently to disengage its catch *k* from the bolt, and permit a partial revolution of the bolt, as seen in fig. 6, and its withdrawal from the chamber of the gun.

The button *m* is so situated upon the under side of the stock B as that, when the gun is laid naturally in the left hand for support, to be opened with the right, the button shall rest on the palm of the hand, and the weight of the gun, thus brought to bear on the lever by means of the button, will suffice to disengage the catch, and unlock the bolt, so that it may be turned and drawn back, as above described.

A detent, Q, upon the end of a spring, *q*, secured on the under side of the barrel, passes into the rear part of the recess, *r*, on the under side of the bolt, as illustrated in fig. 3.

The portion of the recess in which the detent plays is enlarged laterally, as illustrated clearly in fig. 8, to permit the partial revolution of the bolt, as heretofore described, the enlargement being of such form as to act as a cam, in the partial revolution of the bolt, in the act of opening the same, to force down the detent out of the recess, leaving it free to bear up, with the entire force of its spring, against the under side of the bolt, whilst it is drawn back. The detent will thus act as a brake therefor, to prevent any loose or accidental movement thereof.

A small notch, *u*, is cut at a point in the angle of the front face of the bolt, with the under side thereof in line with the detent, (see figs. 3 and 5;) and the relative position of the detent and bolt is so adjusted as that, so soon as the bolt is drawn back far enough to bring the front end of an empty cartridge out of the gun-chamber, and clear of the barrel at the front end of the loading-aperture, the notch will reach the detent, which will fly up therein, immediately in the rear of the flange of the cartridge.

As the bolt is drawn still further back, the lower portion of the cartridge-case, striking the detent, will be arrested, whilst the retractor, still acting upon the flange on the upper side, to draw it back, will cause the cartridge-case to trip and fly up, and, if the bolt be drawn back with ordinary force, will cause it to be thrown out wholly from the gun.

The detent, projecting upward in front of the bolt, when it is thus wholly withdrawn, will prevent any accidental slipping forward thereof, when the muzzle of the gun is depressed.

The rear end of the bolt D is concaved, as illustrated in fig. 3, and a piece of sponge, S, or other absorbing-material, saturated with glycerine, or other lubricant, is placed in the rear end of the bore, so that, when the bolt is drawn back against the same, it may gently compress the sponge, and thereby lubricate the bolt, this use of sponge, or its equivalent, as a fountain, or reservoir, of lubricating-material, in combination with the moving parts of a machine, being an invention for which I am about to make a separate application for Letters Patent.

The sponge not only operates to lubricate the parts, but also collects and holds all abraded particles, and any dirt which may work thereinto.

A small aperture, *e*, is pierced through the barrel, to communicate, from this sponge-seat, with the shield, M, of the hammer-pin, so that the pin may also be lubricated by the sponge S.

A recess is also formed in the rear portion of the central section of the bolt D, and a piece of sponge placed therein, so that the lever *h*, striking the sponge, will be lubricated thereby in every movement.

I place also smaller pieces of saturated sponge, or its equivalent, over the upper end of the lever in the head of the handle E, and under the springs actuating the retractor and the locking-levers, and the lock of the gun.

The back sight of the gun is hinged between ears on the upper side of the band W, fig. 5, to the under side of which the lever K is pivoted, to lock the bolt D, as shown in figs. 3 and 5.

When my improved fire-arm is supported upon the left hand, in the usual manner for loading, the palm of the hand, bearing naturally against the button *m*, will operate to disengage the catch Q, and unlock the bolt D, so that its handle E may be turned, and the bolt withdrawn from the cartridge-chamber C.

If the metallic cartridge therein be unloaded, so soon as its front rim has passed out from the chamber, its lower rear end will strike the detent, so that the retractor, acting against its upper rear rim, will operate to throw it entirely out from the loading-aperture.

If, however, the cartridge be still loaded, the presence of the projectile will prevent the cartridge from being thrown out when it trips against the detent, and it will remain in the loading-aperture.

To remove the loaded cartridge, the retractor must be disengaged therefrom by pressure upon its thumb-piece, and the gun turned over, or reversed, when the cartridge will drop out into the hand.

After the bolt has been withdrawn, and the loading-aperture thus opened, a loaded cartridge is inserted therein in the usual manner, the bolt shot home, and its handle turned into line with the hammer-pin, when it is ready for firing.

In the act of turning the handle, the inclined edges of the aperture in the handle, and of the handle, force the bolt closely up against the cartridge in closing the gun, and, in the reverse movement, starts the cartridge from its chamber.

So soon as the handle is turned into position for firing, it is locked, and held by the catch in that position.

The blow of the hammer upon the hammer-pin is communicated to the lever in the handle, and thence to the firing-pin, to strike the fulminate-point on the cartridge, and explode the same.

As is evident, the gun cannot be discharged by a blow from the hammer until the bolt is properly and safely secured.

I contemplate the use of a simple sliding catch, actuated by a spring, and disengaged by pressure upon its outer end, as an equivalent substitute for the pivoted lever K, in locking and unlocking the sliding bolt D; and I contemplate the application of a locking-catch, so arranged and combined with the gun and bolt as that it may be operated, and disengaged from the

bolt, by the weight of the gun, when resting in the hand, as herein described, to all forms of revolving or sliding bolts for closing the cartridge-chamber.

Having thus fully described my improvements in breech-loading fire-arms,

What I claim therein as new, and desire to secure by Letters Patent, is—

1. A divided sliding bolt, D, made in two or more sections, one of which is so extended as to form a handle, containing and carrying a pivoted lever, *h*, to transmit motion from the hammer to the firing-pin of the gun, substantially in the manner herein set forth.

2. The combination of a pivoted lever, *h*, with the handle E of a sliding bolt, and with a firing-pin, *f*, on one side, and a hammer-pin, G, on the other side thereof, substantially in the manner and for the purpose herein set forth.

3. The combination of a pivoted lever, K, and catch, *k*, substantially as herein described, or any equivalent therefor, with the sliding or revolving bolt, D, of a breech-loading fire-arm, to lock the same, when so arranged and combined with the stock B thereof as that it may be actuated, to unlock the bolt, by the weight of the gun resting upon the hand in loading, all substantially in the manner and for the purpose herein set forth.

4. The combination of lubricating-sponge, or other absorbent material, with the working-parts of a fire-arm, substantially in the manner and for the purpose herein set forth.

5. The lubricating-aperture *v*, in combination with the tubular shield M, and the lubricating-recess in the bore, in the rear of the sliding bolt D, substantially as and for the purpose herein set forth.

EDWARD MAYNARD.

Witnesses:

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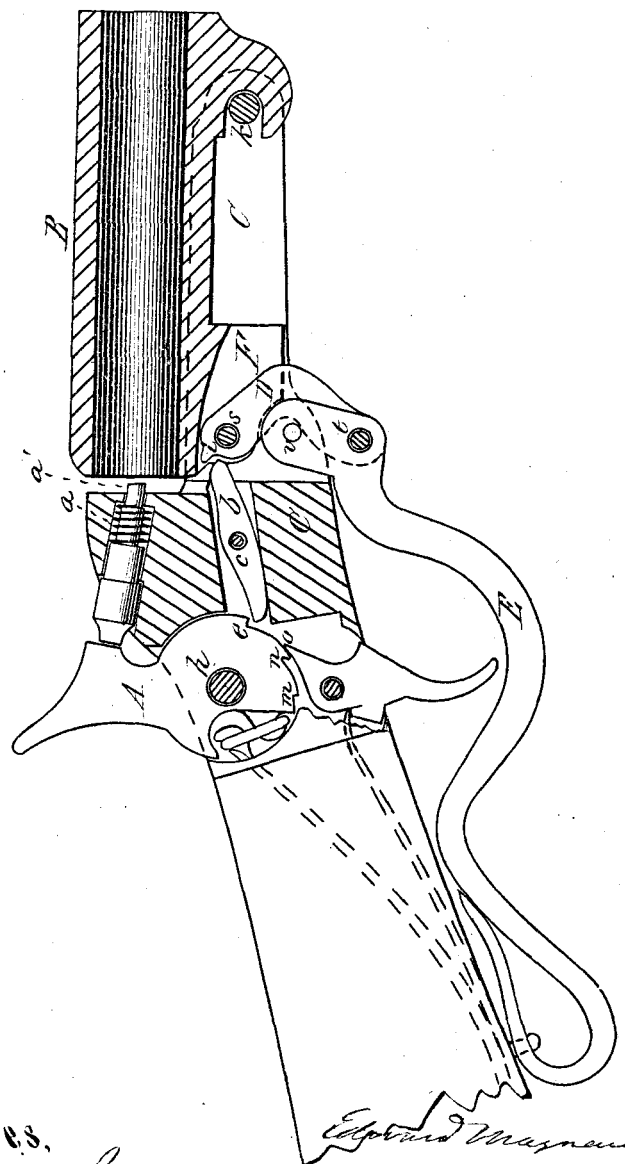
Breech-Loading Fire-Arms.

No. 135,928. Patented Feb. 18, 1873.



Witnesses,
Jesse Wright
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Edward Maynard Inventor.

UNITED STATES PATENT OFFICE.

EDWARD MAYNARD, OF NEW YORK, N. Y.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. **135,928**, dated February 18, 1873.

To all whom it may concern:

Be it known that I, EDWARD MAYNARD, of the city, county, and State of New York, have invented a new and useful Improvement in Breech-Loading Fire-Arms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 is a vertical section of so much of a breech-loading gun as is necessary to show my invention as applied to the same.

My invention relates to a breech-loading gun in which the breech is opened by forcing down a lever which is located beneath the frame and forms the trigger-guard; and it consists of a lever, pivoted to the frame of the gun in front of the hammer, one end of which lever is forced down by the impingement against it of a piece or projection actuated by the downward movement of the breech-lever, while the other end of the pivoted lever is forced upward against a shoulder upon the tumbler or lower part of the hammer, and operating to force the hammer back to allow the fire-pin spring to push back the fire-pin, so that there may be no possibility of explosion by the end of the fire-pin coming in contact with the head of the shell prematurely. When the hammer has thus been moved back sufficiently the sear drops into a notch in the tumbler, by which means the hammer is held in its backward position until the piece is ready to be discharged.

That others skilled in the art may be able to make and use my invention, I will proceed to describe its construction and its operation.

In the drawing, Fig. 1 represents a breech-loading fire-arm known as the "Maynard gun," in which C is the frame of the gun, to which, at *v*, is pivoted the lever E, which opens the breech. To this lever, at *t*, is pivoted another bent lever or elbow, D, the other end of said elbow being pivoted to the barrel at *s*, and upon this end of the elbow is made the slight protuberance or projection *i*. To the frame C, and in the rear of the elbow D, is pivoted, at *c*, the lever *b*, and in the tumbler of the hammer is made a shoulder, *e*, as also the notch *n* and cock-notch *m*. The fire-pin *a* is located in the frame in front of the hammer, and is pressed out by a spring, *a*, and limited in its movement by a stop, in the usual manner.

The operation of my invention is as follows: As the lever E is forced down, moving upon its pivot *v*, the lower part of the elbow D is moved forward, being connected to the said lever at *t*, and the elbow is thus made to partially revolve upon the pivot *s*, by which the elbow is connected to the rear end of the barrel B. As the elbow thus rotates the small point or part *i* moves down and, impinging against the lever *b*, forces its forward end down, and its rear end in passing up strikes against the shoulder *e* and causes the hammer to rotate upon its pivot *h* until the sear *o* drops into the notch *n*. As the nose of the hammer is thus moved away from the fire-pin the latter is free to be forced out or back by the spring *a*, and the forward end of the fire-pin is drawn into the frame and out of a position where it could by any means come in contact with the head of the cartridge to explode it. After the hammer has been thus moved sufficiently by the action of the part *i* in pressing down upon the forward end of the lever *b*, the lever E and its elbow D operate to elevate the rear end of the barrel B, the latter moving in a vertical direction upon the pivot *k*. The rear end of the barrel is then elevated above the frame sufficiently to insert the cartridge, and, the lever E being brought back to its place, the rear end of the barrel is thereby depressed and secured in its place for firing, the sear remaining in the notch *n* until it is desired to discharge the gun, when the hammer is brought back to a full-cock in the usual manner.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination of the breech-lever E, elbow D, and lever *b* with the tumbler or lower part of the hammer, substantially as and for the purpose described.

EDWARD MAYNARD.

Witnesses:

JESSE WEST, Jr.,

J. S. CASE.