Sept. 27, 1949. J. R. OLIVER 2,482,865

GUN PRIMER MECHANISM

Filed July 20, 1945 2 Sheets-Sheet 1

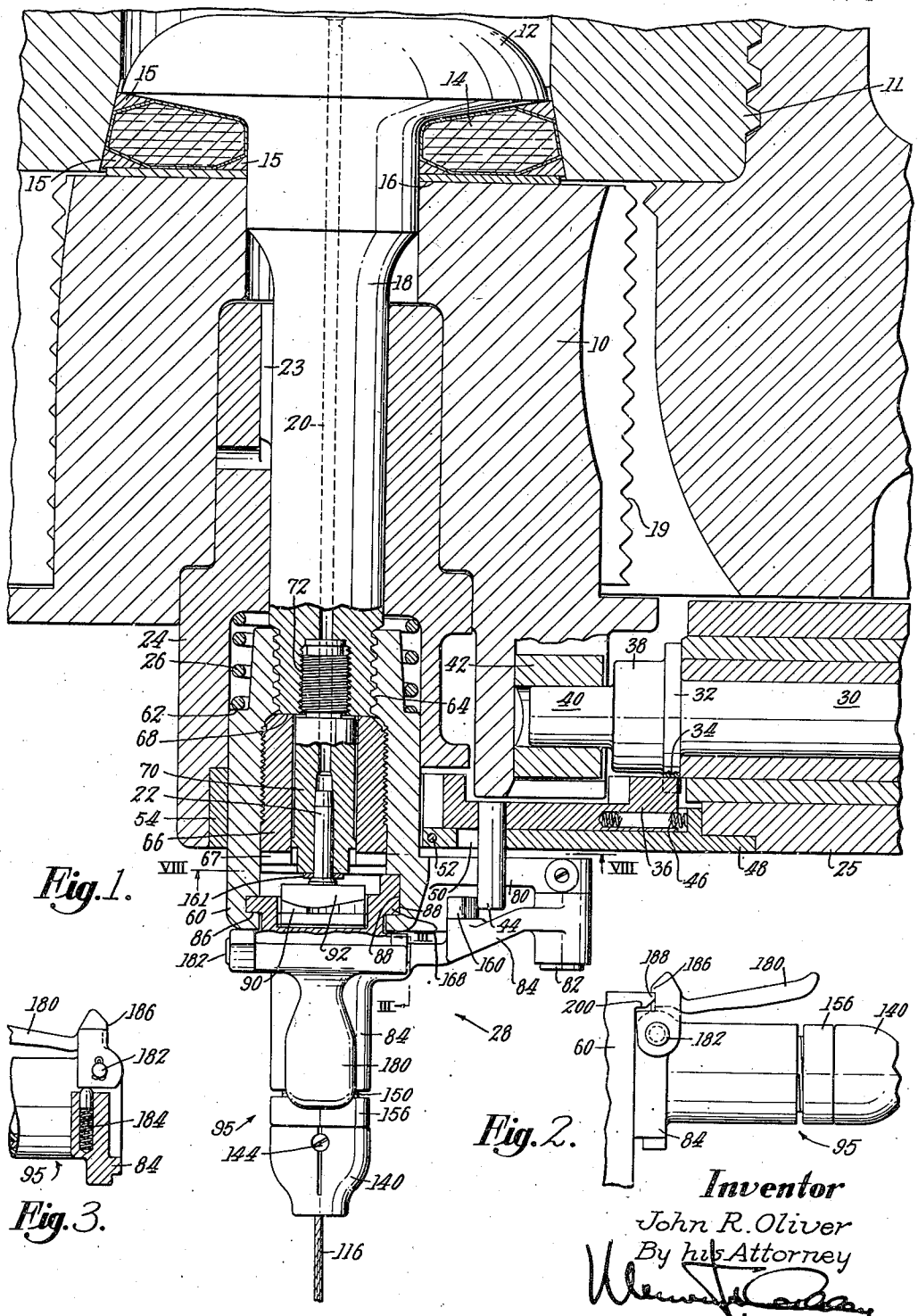


Fig. 1.

Fig. 3.

Fig. 2.

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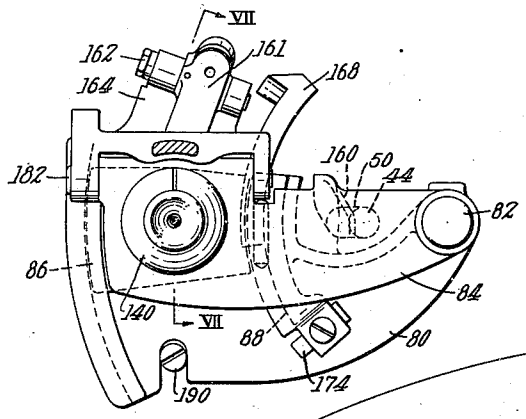


Fig. 4.

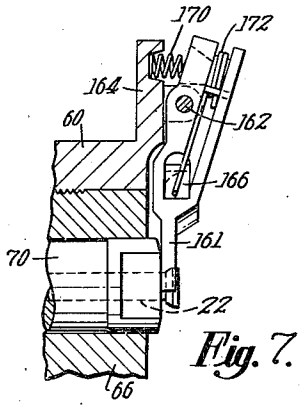
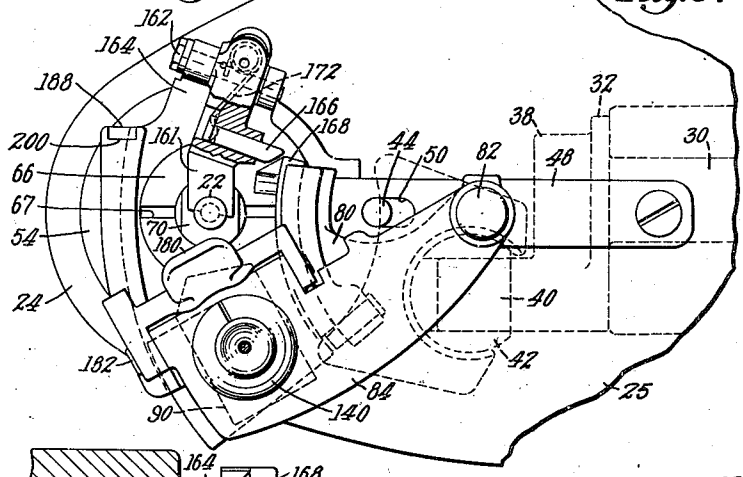


Fig. 7.

Fig. 5.



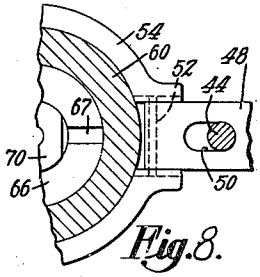


Fig. 8.

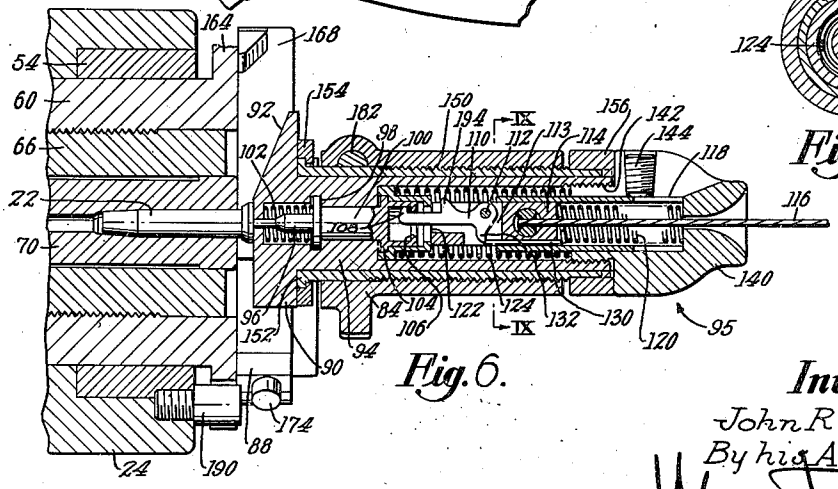


Fig. 6.

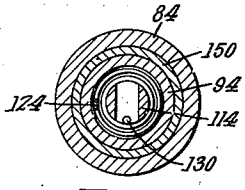


Fig. 9.

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Patented Sept. 27, 1949

2,482,865

UNITED STATES PATENT OFFICE

2,482,865

GUN PRIMER MECHANISM

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Application July 20, 1945, Serial No. 606,049

8 Claims. (Cl. 89—27)

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This invention relates to primer mechanisms of ordnance in which projectiles are separate from the powder charge as distinct from ordnance using fixed ammunition.

With medium or larger size guns using separate loading ammunition, the breech member must be provided with some means of preventing powder gases from passing to the rear into the threads and other accurately made parts of the breech mechanism. The erosive power of such gases is such that a gun would soon be rendered useless if a sealing means were not made effective. However, such sealing means must afford a passage for the flame of the primer to pass through to the powder charge of the gun. The invention is more especially although not exclusively intended for use as a primer mechanism to be mounted upon a breechblock carrier, the latter being adapted to support the breechblock in both swinging and rotative motion during opening and closing of the breech. In such an installation, the breechblock is provided with an obturator (of the de Bange type) having an axial vent for the primer flame and the rear portion of the obturator vent necessarily has associated therewith a primer mechanism which is as reliable, convenient and close-fitting as possible in operation. In an ordnance installation of this character a considerable force is required to urge a primer shell tightly into the tapered chamber of the supporting plug thus assuring no gas leakage. A considerable force is also required to withdraw or eject a spent primer shell.

It is an object of the present invention to provide an improved primer mechanism mounted on a breechblock carrier in which mechanism a single swing of an operating handle will positively and firmly enclose a primer in position for firing without gas leakage.

Another object is to provide an outstanding control handle for conveniently operating a swinging wedge whereby a primer may be tightly inserted into cooperative relation with a breech mechanism and which handle may be latched to maintain the relation.

Still another object is to provide a simple and positive ejector for use with a swinging primer mechanism attachable to a breechblock carrier.

Another object is to provide a safety mechanism whereby the primer mechanism will be in firing position only when the breech is properly closed.

Still another object is to provide ordnance with a breechblock, obturator and primer mechanism mounted upon a carrier in which carrier a locking means is incorporated to lock the primer mechanism from its firing position unless the breech is fully closed.

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For the purposes in view, and in accordance with various features of the invention, the illustrated mechanism is shown in assembled association with an obturator and breechblock carrier of conventional type. A feature of the invention consists in a wedge-like member swingingly mounted into and away from a latched operative position on the breechblock carrier by means of an outstanding handle carrying the firing mechanism. Another feature is an ejector which is mounted on the breechblock carrier and which is cam operated by movement of an outstanding handle containing the firing mechanism. Still another feature of the invention comprises a stop member on the primer mechanism arranged to cooperate with a member on the breechblock carrier whereby the primer mechanism is prevented from entering its operative position on the breechblock carrier when the breech is open.

The above and other features of the invention including novel details of construction and combinations of parts will now be more particularly described in connection with the accompanying drawings and pointed out in the claims.

In the drawings,

Fig. 1 is a plan view, partially in section, of the primer mechanism as installed on a gun with a conventional breechblock obturator;

Fig. 2 is a side elevational view of the primer mechanism handle;

Fig. 3 is a sectional view along the line III—III of Fig. 1;

Fig. 4 is an elevational view of the primer mechanism shown in Fig. 1 with one part in section for purposes of clarity and with the primer mechanism in operative or firing position;

Fig. 5 is a view similar to Fig. 4 but with the primer mechanism in an inoperative or non-firing position and showing more of the breechblock carrier mechanism;

Fig. 6 is a vertical sectional view through the primer mechanism of Fig. 1 with the ejector mechanism omitted;

Fig. 7 is a sectional view along the line VII—VII of Fig. 4;

Fig. 8 is a sectional view along the line VIII—VIII of Fig. 1; and

Fig. 9 is a sectional view along the line IX—IX of Fig. 6.

In medium or large size guns it is well known to use an obturator with a breechblock 10 and a

gun tube 11, as shown in Fig. 1, which obturator comprises a steel mushroom head 12 against which the force of the explosion longitudinally of the gun is exerted, a resilient or elastic pad 14, split rings 15, a steel disk 16, and a spindle 18. An obturator of this type is fitted within the breechblock 10 and pressure of the gases against the mushroom head 12, upon firing, compresses the elastic pad 14 and also presses the split rings 15 surrounding the spindle against the walls of the bore and spindle, thus effectually preventing leakage. Breechblocks are conventionally mounted to rotate independently of the obturator parts and, because of this, any sticking of an obturator to its seat in the gun tube 11 will not interfere with the rotation of the block 10 when opening the breech. After proper rotation of a breechblock 10 to disengage the usual interrupted threads 19, the block 10 and obturator may be readily withdrawn from the gun tube 11. An obturator spindle 18 of this type is provided with a vent 20 passing through its full length, permitting passage of a flame from a primer 22 to the powder charge of the gun. A sleeve 24 forms a pintle upon which the breechblock may rotate and this sleeve 24 forms a part of the breechblock carrier 25 which supports the breechblock for movement into and away from the gun. The spindle 18 is keyed at 23 to the sleeve 24 preventing the spindle's rotation with respect thereto. A helical spring 26 serves to hold the obturator firmly in place within the breechblock 10 and is located in a recess of the sleeve 24 surrounding the spindle 18 and bearing against an inserted primer mechanism generally indicated as 28 in Fig. 1. The primer mechanism 28 here spoken of presents the subject matter of this invention. The breechblock operating mechanism herein disclosed is of conventional form and utilizes a shaft 30 rotatively mounted in the breechblock carrier 25 and provided with a flange 32 notched at one portion 34 of its circumference for engagement with a sliding block 36. The flange 32 is integral with the shaft 30 and also with an eccentric member 38 having a crank pin 40 rotatable in a cylindrical member 42 inserted within the breechblock 10. The sliding block 36 carries a pin or stop means 44 and is urged toward the axis of the breechblock by a spring 46. A plate 48 is attached to the carrier 25 and is provided with a slot 50, permitting motion of the pin 44. The plate 48 is pinned at 52 (Figs. 1 and 8) to a split ring 54 surrounding the primer mechanism. It is to be understood that the carrier 25, including the shaft 30, block 36, plate 48 and ring 54 are all conventional details of a modern breech mechanism. A pin shorter than the pin 44 is usually used and the longer pin 44 has been substituted to serve a purpose hereinafter to be described.

The primer mechanism 28, constituting the subject matter of the present invention, comprises a cylindrical member 60 which may be easily mounted or demounted from the obturator spindle 18. The demountable member 60 is adapted to extend coaxially with the obturator and in close fitting relation within the recess of sleeve or pintle 24 and has a shoulder 62 against which the spring 26 may bear. Interrupted nonhelical elements 64 (with no lead) are provided within the cylindrical portion 60 to directly engage with and disengage from cooperating interrupted elements on the end of the spindle 18. A hollow exteriorly threaded nut 66 is slotted at 67 whereby it may be turned within the portion 60, one end 68 of the nut being adapted to abut the end of the spindle 18 as a positive stop. As the elements 64 have no lead, the end 68 serves as a stop determining the innermost position of the primer mechanism both before and after the elements 64 are engaged. The nut 66 also serves as a supporting means for a cylindrical member, plug or nipple 70 which is bored to serve as a holding means (suitably tapered) for the primer 22 and is threaded upon a reduced portion at 72 for attachment to the spindle 18. The cylindrical portion 60 has an arm 80 integral therewith, extending laterally and pivotally supporting a bracket 84 on a pin 82. Within the cylindrical portion 60 are formed grooves or guiding means 86, 88 (Fig. 1) by means of which a block or wedge portion 90 is guided in an arcuate path upon being moved with the bracket 84 about the pin 82. The flanges guided within the grooves 86 and 88 are parts of the bracket 84 and are adapted to swing therewith. The wedge portion 90 is in alinement with the breechblock and the primer when in firing position and has a slanting surface 92 (Fig. 6) designed to exert a wedge-like action upon the primer 22 to urge the primer into firing position upon an upward movement of the block 90. The block 90 also has a cylindrical portion 94 (Fig. 6) extending therefrom which is recessed to contain the firing mechanism. This portion 94, the bracket 84 and the parts surrounding the portion 94 may be called the operating handle for the primer mechanism and this handle is generally indicated at 95. The handle 95 is in alinement with the primer when in firing position and as it is pivotally supported in the cylindrical member 60 (pin 82 is the pivot) it may be seen that it is always in parallel relation with the latter member. The firing mechanism comprises a firing pin 96 having a flanged end 98 against which a hammer 100 is adapted to strike. The firing pin 96 is biased away from the primer 22 by a spring 102. It can be seen from Fig. 6 that the firing pin 96 has a very slight range of movement. The hammer 100 has a flange 104 which determines one limit of its range of movement and also has a cylindrical lip portion 106 adapted to be caught on a finger 108 of a sear 110. The sear 110 is pivoted at 112 within a slot 113 of a sliding block 114 to which is attached a lanyard 116. The block 114 is slidable within a cylinder 118 and is biased to the left in Fig. 6 by a spring 120 under compression. A cylindrical member 122 serves as a stop for the block 114 and is provided with a flange against which a spring 124 bears. A pin 130 is slidably mounted in the block 114, as shown in Fig. 6, and is biased toward the left by contact with one side of the spring 120. The left end of the pin 130 engages a toe 132 on the sear 110, tending to keep the finger 108 in latched engagement with the lipped member 106. The spring 120 bears at its right end in Fig. 6 against a tubular end piece 140 which is threaded at 142 into the cylindrical extension 94 of the block 90. The end piece 140 bears a saw cut as shown in Figs. 1 and 6 and a tapered screw 144 is utilized to expand the end piece 140 within the cylindrical portion 94. Surrounding the extension 94 is a sleeve 150 which is in threaded engagement with the bracket 84 and which bears a flange 152 retained by a ring 154 attached to the block 90 by screws or welding material. A ring 156 is tightly joined by swaging or otherwise to the sleeve 150. It may be seen that by loosening the tapered screw 144, the end piece 140 and sleeve 150 may be turned relative to each other. The axial position of the block 90 may be adjusted by turning the sleeve

150 within the bracket 84. The adjustment may be maintained by turning the end piece 140 up against the ring 156 and expanding it by means of the screw 144. The bracket 84 has stop means with a slanting surface 160 arranged to engage the pin 44 as will be hereinafter explained.

The ejector is shown in Figs. 4, 5 and 7 and includes an arm 161 pronged to engage the flange on the primer 22 and pivoted on a pin 162 attached to a flange 164 of the cylindrical member 60. The arm 161 is provided with a laterally slidable pin 166 (Figs. 5 and 7) and the inner side of this pin is arranged to be engaged by a cam surface on the front of a lug 168 attached to the arm 84 when in the downward movement of the handle 95 the primer shell is to be ejected. On the return or upward movement of the handle 95 this pin 166 is pushed aside by the lateral surface of the lug 168. A spring 170 is mounted to bias the ejector lever 161 in clockwise direction, as shown in Fig. 7, and a second spring 172 is mounted, as shown in Figs. 5 and 7, to urge the pin 166 toward the lug 168. At the bottom of the guideway 88 on the arm 80 of the cylindrical member 60 is located a stop pin 174 which serves as a limit or stop for the downward movement of the bracket 84 and the handle 95. The bracket 84 or the handle 95 of which the bracket is a part is provided with a latch or lever 180 pivoted at 182 and biased by a spring member 184 (Fig. 3) to bring a lip 186 into latching engagement with a lip 188 (Fig. 2) of the cylindrical member 60 when the handle 95 is in its raised or operative position with respect to the breechblock carrier 25.

In installing the primer mechanism upon a breechblock carrier the cylindrical member 60 is inserted within the split ring 54 and the recess of the pintle 24 until stopped by the shoulder 68 (the nut 66 is considered a part of the primer mechanism) and is then rotated to complete interlocking of the elements 64 and is fixed in that position by insertion of a stud 190 (Figs. 4 and 6) threaded into the pintle 24.

When the parts are in the position shown in Fig. 6 a pull on the lanyard 116 will cause the sear 110 to pull the hammer 100 to the right, because of the finger 108, with a resulting compression of the spring 124. After a given distance has been traveled by the hammer a toe 194 on the sear 110 will strike the cylinder 118 and release the hammer 100 from the finger 108, resulting in the firing of the primer 22. Release of the lanyard 116 again drops the finger 108 behind the lip 106 of the hammer 100. To eject the spent primer shell the handle 95 is lowered about the pin 82 an amount determined by the stop 174 and the action of the lug 168 through the pin 166 causes the lever 161 to throw the spent primer shell away from the piece. A new primer shell is then inserted within the plug 70 and the handle 95 of the bracket 84 is then brought up to the firing position as determined by a shoulder on the lever 180 striking against a stop 200 (Fig. 2) which is part of the cylindrical member 60. It is to be noted that the handle 95 cannot be brought up into firing position unless the pin 44 has passed to the right, as viewed in Fig. 1. The pin 44 can only pass to the right when the sliding block 36 and flange 32 are in interlocking relation and such relation exists only when the breechblock 10 is closed and the gun is ready for firing. The block 36 comprises a means for locking the breechblock closed when the handle 95 is in firing position. If the breechblock 10 is not completely closed the pin 44 will be positioned toward the left with the result that the surface 160 will strike the pin 44 and stop the rise of the bracket 84 or handle 95 into operative position. This safety feature prevents untimely operation of the primer mechanism such as accidental firing of the primer with possible explosion of the main charge while the breechblock is open or not fully and tightly closed.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A primer mechanism for ordnance including a demountable cylindrical member with means for attaching the same directly to and in axial alinement with an obturator spindle, primer holding means enclosed within said member, a handle pivotally supported on said cylindrical member and a major portion of the handle extending from and in parallel relation with the cylindrical member, primer firing means enclosed within the handle, and a wedge portion carried by the handle for pressing a primer into said holding means upon swinging the handle.

2. A primer mechanism for ordnance including a demountable cylindrical member with means for directly and coaxially attaching the same to a breechblock obturator, a handle pivotally supported on an arm extending from said cylindrical member for movement into and out from alinement with said attaching means, primer firing means enclosed within said handle, an ejector for the primer mounted on said member, and means attached to the handle for actuating the ejector, the major portion of said handle extending from said cylindrical member.

3. In ordnance, the combination with a carrier, of a breechblock mounted thereon, an obturator spindle extending through the breechblock, a primer mechanism including a demountable cylindrical member supporting a primer holder and having means of direct attachment to said obturator spindle, a handle pivotally supported on said cylindrical member, a firing pin and hammer mechanism within said handle, a wedge portion on said handle for pressing a primer into said holder when the handle is swung on its pivot toward the holder, a stop means on said handle, and means on the carrier movable into the path of said stop means when said breechblock is swung away from firing position, the stop means preventing untimely operation of the primer mechanism.

4. In ordnance, the combination with a carrier, of a breechblock mounted thereon, an obturator spindle extending through the breechblock, a primer mechanism including a demountable cylindrical member with means for directly attaching the same to said obturator spindle, an ejector lever mounted on said cylindrical member, a handle pivotally supported on said member including a firing pin and hammer mechanism and carrying a wedge portion for pressing a primer into firing position when the handle is swung in one direction on its pivot, means attached to the handle for actuating the ejector lever to eject the primer when the handle is swung in the other direction, stop means on said handle, and a projecting means on the carrier which projecting means is movable into the path of said stop means by movement of the carrier mechanism from closed breech position thereby preventing untimely operation of the primer mechanism.

5. A primer mechanism, breechblock and obturator mounted upon a carrier arranged to move

said breechblock and primer mechanism into firing position upon ordnance, said carrier being provided with means for locking the breechblock in closed breech position, the said primer mechanism including a cylindrical member directly attached to the obturator and in alinement therewith, a handle pivotally supported on said cylindrical member, primer firing means enclosed within said handle, a wedge portion on said handle for pressing a primer into firing position, and means on the handle for releasing the locking means when said handle is swung away from its firing position.

6. Ordnance including a breechblock and an obturator mounted upon a carrier adapted to move them into firing position and said carrier having shiftable means for locking the breechblock in firing position, a primer mechanism including a cylindrical member directly attached to the obturator, a handle pivotally supported on said member, primer firing means enclosed by said handle, and a wedge portion carried by said handle for pressing a primer into firing position, the handle having a stop means which is arranged to be intercepted in its pivotal movement by the shiftable means when the breechblock is not in firing position thereby preventing untimely operation of the primer mechanism.

7. A primer mechanism for ordnance including a demountable cylindrical member with means for directly attaching the same to a breechblock obturator, means within said cylindrical member for holding a primer, a handle carrying firing mechanism and a wedge portion, said handle being affixed to the end of an arm pivotally supported on an integral portion of said cylindrical

member and said arm being arranged to carry said firing mechanism and wedge portion into alinement with a primer opening on the primer holding means, and a latching means for holding the handle in firing position.

8. A primer mechanism for ordnance including a cylindrical member enclosing primer holding means and having interrupted nonhelical elements for direct attachment of said member to an obturator spindle, an arm extending from one side of said cylindrical member, a handle pivotally supported on said arm for motion into and away from a position of alinement with said holding means, said handle extending outwardly from said cylindrical member affording a hand-hold, primer firing mechanism enclosed in said handle, and a wedge portion carried by said handle positioned to move adjacent the primer holding means.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
90,323	Vavasseur	May 18, 1869
417,693	Wiegand	Dec. 17, 1889
620,259	Stockett	Feb. 28, 1899
699,256	Stockett	May 6, 1902

FOREIGN PATENTS

Number	Country	Date
23,904	Norway	Oct. 20, 1913