

W. D. SMITH.
 ORDNANCE.
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1,007,809.

Patented Nov. 7, 1911.

Fig. 1.

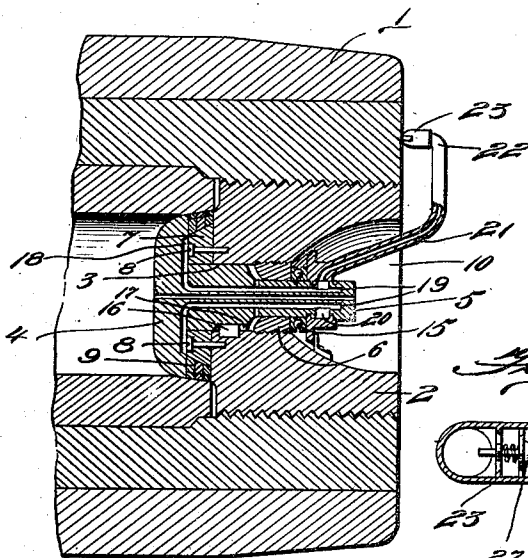


Fig. 5.

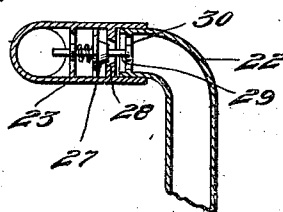
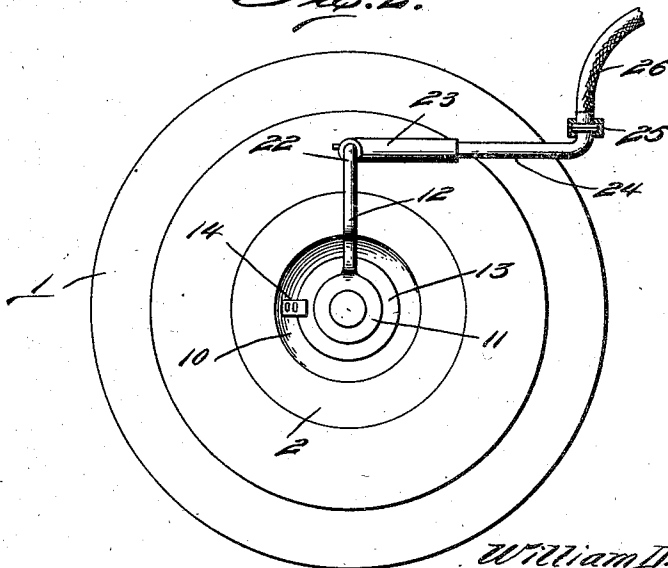


Fig. 2.



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WILLIAM D. SMITH, OF DENVER, COLORADO, ASSIGNOR TO AUTOMATIC FLAREBACK PREVENTION COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

ORDNANCE.

1,007,809.

Specification of Letters Patent.

Patented Nov. 7, 1911.

Original application filed May 11, 1906, Serial No. 316,357. Divided and this application filed January 4, 1909. Serial No. 470,673.

To all whom it may concern:

Be it known that I, WILLIAM D. SMITH, of the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Ordnance, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal sectional view taken through the breech of a gun equipped with the improvements of the present invention. Fig. 2 is a rear elevation thereof, and Fig. 3 is an enlarged detail sectional view.

Like characters of reference indicate corresponding parts in each of the several figures of the drawings.

This invention relates to ordnance of the breech loading type, wherein it is customary to provide the breech block with a gas check to prevent the escape of gases rearwardly through the breech of the gun.

It is an important object of the present invention to provide certain new and useful improvements in the manner of setting the gas check, and also to effect cleansing of the bore of the gun and the expelling of any gases which may be in the gun at the time of the removal of the breech block, thereby effectually avoiding a "flare back".

A very important feature of the invention resides in the fact that these improvements may be applied to a gun without requiring any material change or alteration in the breech block and the manner of opening and closing the same.

With these and other objects in view, the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawing and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size and minor details may be made, within the scope of the claims, without departing from the spirit or sacrificing any of the advantages of the invention.

For an adequate understanding of the application and operation of the present invention, I have shown in the accompanying drawings a portion of the breech 1 of a gun which may be of the built-up type or of any

other type. The breech-block 2 is of any ordinary or approved type. This breech-block is pierced by a central bore or opening 3 for the accommodation of the shank of a mushroom head and a firing pin, as in common practice. The mushroom head 4 is of any approved form having the usual shank 5 extending rearwardly through the opening 3, and capable of sliding endwise therein. The rear portion of the shank is reduced externally and threaded, and slides through the bore of a bushing 6 which fits in and closes the rear end of the bore or opening 3, and has been shown as threaded into such opening in the accompanying drawings. Between the back of the mushroom head and the front of the breech-block there is a substantially conical member 7 which is in the form of a ring surrounding the shank or stem 5 and rigidly secured to the breech-block in any suitable manner to form a part thereof, for instance, by means of fastenings 8 or may be formed integral therewith. Interposed between the periphery of the member 7 and the bore of the gun is the gas check, which is made up of a plurality of split rings 9 successively decreasing in diameter from the rear ring to the front ring. When the mushroom head is moved rearwardly, the rings 9 will be forced rearwardly therewith, and in their travel rearwardly across the conical periphery of the member 7, the rings will be expanded and thereby form a gas tight joint at the front end of the breech-block.

For the purpose of moving the mushroom head endwise, the rear end of the mushroom shank is extended into a socket or recess 10 in the rear end of the breech-block. This rear threaded end of the shank or stem fits in a nut 11 having a crank handle 12 which extends rearwardly out of the socket 10 and thence radially across the breech end of the gun. The nut is provided at its inner end with an annular flange 13 which lies between the back of the socket 10 and a lug or projection 14 provided upon one wall of the socket. Interposed between the nut 11 and the bushing 6 is a suitable anti-friction bearing 15.

When the breech-block is swung into the breech of the gun and then turned to engage the threads of the block with the

threads of the gun, and the nut is held stationary through the medium of the crank handle 12, the action of the threads of the nut 11 upon the threaded portion of the shank 5 causes the latter to move rearwardly, whereby the mushroom head 4 will be drawn rearwardly and pressed against the rings of check 9, the latter being expanded under the influence of the conical expander 7 and consequently set against the latter and the bore of the gun to effect a gas tight joint at this point.

It will here be explained that the mushroom head is held against independent rotation by means of a pin or key 16 fixed in the opening 3 of the breech-block and engaging a longitudinal slot or keyway 17 in the shank 5, whereby the latter must rotate with the breech-block but is capable of sliding endwise thereon.

From the foregoing description, it will be understood that the gas check is automatically set by the closing of the breech-block prior to the firing of the gun. Provision is also made to permit of rearward movement of the mushroom head under the influence of the explosion of the gun, thereby to effect a further and tighter setting of the check. This action is made possible by providing the rear face of the mushroom head with an annular-chamber 18 to permit of the rearward movement of the head across the expander 7. The threaded engagement between the shank 5 and nut 11 is very coarse, that is to say, the pitch of the threads is long, so as to obtain a quick and powerful setting of the check by the rotation of the breech-block as hereinbefore described. Moreover, there is sufficient looseness in this threaded engagement to permit of the relatively slight rearward movement of the mushroom head and shank under the action of the explosion.

To prevent damaging the threaded engagement between the shank and the bushing under the action of the explosion, the mushroom head is cushioned by means of a fluid, such as air, or water, contained in the cushioning chamber 18 between the expander 7 and the head. Fluid under pressure is introduced into this chamber through one or more longitudinal passages 19 extending through the shank or stem 5 and communicating with an annular groove 20 formed externally in the rear projecting end of the shank, said groove being located within the nut 11. The crank-handle 12 is provided with a longitudinal passage 21 communicating with the bore of the nut and the annular groove 20. This passage 21 opens out through a transverse arm or elbow 22 upon the free end of the crank handle. Said elbow removably fits within another elbow upon a telescopic tube 23 telescoping with another tube 24, the latter

having a swiveled connection 25 with a hose or flexible pipe 26, the latter being in communication with any suitable source of fluid under pressure, not shown.

When the crank handle 12 is not in engagement with the tube 23, the open end of the latter is closed by a spring-pressed valve 27 engaging a valve-seat 28 in the tube. The stem portion 29 of the valve projects beyond the valve seat and is adapted to engage the cross-bar 30 or other suitable trip within the elbow 22 on the crank handle, whereby the valve is automatically opened when the crank handle is thrust into the tube 23. It will now be explained that the crank handle is engaged with the fluid supply pipe when the breech-block is swung into the breech of the gun, and therefore the handle is held stationary when the breech-block is afterward rotated to lock it in the gun, whereby the nut 11 is held stationary during the rotation of the breech-block, and consequently the mushroom stem and head will be drawn rearwardly by the action of the nut 11 upon the threaded part of the stem, thereby to set the check 9 under the action of the mushroom head.

When the crank-handle is engaged with the fluid supply tube, the valve is automatically opened, and, therefore, the fluid under pressure will pass through the tubular handle, the annular groove 20, the passages 19 and into the chamber 18. When the explosion takes place, the mushroom head will be driven rearwardly under the action of the explosion, as hereinbefore described, and the gas check further expanded or set. The fluid cushion in the chamber 18 permits of the desired rearward movement of the mushroom head under the influence of the explosion, but prevents too great a rearward movement as might injure the threaded-connection between the shank and the nut 11.

As the mushroom head is moved rearwardly when the breech-block is turned to lock it in the breech of the gun, it is of course apparent that, upon reversing the rotating movement of the breech-block to release the same from the breech, the mushroom head will be moved forwardly away from the gas check, and, therefore, the check will be released because the rings will spring back into their normal position when not under pressure. Should the check rings stick in the bore of the gun and thereby fail to return to their contracted condition, they will of course be pulled out of the breech by the mushroom head when the breech-block is swung out of the breech. It is therefore apparent that there is always a positive and effective releasing of the check automatically by the opening of the breech block.

As hereinbefore stated, it is proposed to effectually avoid "flare backs," by having

all of the gases entirely expelled from the bore of the gun before the breech block is opened, and this is automatically accomplished when the mushroom head is initially loosened under the rotating movement of the breech block preparatory to withdrawing the same from the breech, because the fluid under pressure in the cushioning chamber at the back of the mushroom head is forced forwardly in a cylindrical stream across the peripheral edge of the head and into the bore of the gun, thereby driving the gases before it out through the muzzle of the gun before the breech block is withdrawn and the breech exposed to the atmosphere.

This is a divisional application from my application, Serial No. 316,357, "Guns," filed May 11, 1906.

20 What is claimed is:—

1. In a gun, a mushroom head, a breech block a fluid chamber between the mushroom head and the breech block, and means for supplying fluid under pressure to said fluid chamber to cushion the rearward movement of the mushroom head; substantially as described.

2. In a gun, a mushroom head, a fluid chamber behind the mushroom head, and means for automatically supplying fluid to said chamber by closing the breech of the gun to cushion the rearward movement of the mushroom head when the explosion takes place; substantially as described.

3. In a gun, a breech block, a mushroom head, a fluid chamber between the breech block and the mushroom head, and means for automatically supplying fluid to said chamber by the closing of the breech block; substantially as described.

4. In a gun, a breech block, a mushroom head, a fluid chamber adapted to be closed by the mushroom head, means for supplying fluid under pressure to said chamber to cushion the rearward movement of the mushroom head, and means operated by the movement of the breech block for loosening the mushroom head and permitting the fluid to flow into the gun; substantially as described.

5. In a gun, a breech block, a mushroom head, a fluid chamber between the breech block and the mushroom head, a longitudinal passage communicating with the fluid chamber, and an operating lever having a threaded engagement with the mushroom head and provided with a fluid passage communicating with the passage in the mushroom head; substantially as described.

6. In a gun, a breech block, a mushroom head splined to the breech block, a fluid chamber between the breech block and the mushroom head, a longitudinal passage in the mushroom head communicating with the fluid chamber, and an operating lever hav-

ing a threaded engagement with the mushroom head and provided with a fluid passage communicating with the passage in the mushroom head; substantially as described.

7. In a gun, a breech block, a mushroom head splined in the breech block and having a fluid chamber, fluid passages communicating with said chamber, an expanding cone secured to the forward end of the breech block, the gas check surrounding the expanding cone, an operating lever having a threaded connection with the mushroom head and provided with a fluid passage communicating with the fluid chamber of the mushroom head, and means for automatically supplying fluid to the passage in the operating lever; substantially as described.

8. In a gun, a breech block, a mushroom head, a fluid chamber between the breech block and the mushroom head, a threaded connection between the breech block and the gun, a fluid passage connecting the pressure chamber with a source of pressure supply, the fluid chamber being arranged to cushion the rearward movement of the mushroom head caused by the explosion, and means to advance the mushroom head during the rotation of the breech block to allow fluid pressure to pass out through the bore of the gun; substantially as described.

9. In a gun, a breech block, a mushroom head, a fluid chamber between the breech block and the mushroom head to cushion the rearward movement of the mushroom head, a pressure pipe connected to a source of pressure supply and to the fluid chamber, and a valve in the pressure pipe arranged to be opened when the breech block is inserted into the gun; substantially as described.

10. In a gun, a breech block, a mushroom head, a fluid chamber, a pressure pipe connected to a source of pressure supply and connected to the fluid chamber, a spring pressed valve in the pressure pipe arranged to shut off the pressure supply when the breech block is removed from the gun, and means to open said valve to supply pressure to the fluid chamber when the breech block is inserted into the gun; substantially as described.

11. In a gun, a breech block, a mushroom head, a fluid inlet controlled by the mushroom head arranged to be opened when the mushroom head is advanced, and means to supply fluid under pressure to said inlet; substantially as described.

12. In a gun, a breech block, a mushroom head, a fluid inlet controlled by the mushroom head, means to supply fluid under pressure to the said inlet, and means to advance the mushroom head to open the inlet to flush the gun; substantially as described.

13. In a gun, a breech block, a mushroom

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- head movable longitudinally in said breech block, a fluid inlet normally closed by the mushroom head, means to supply fluid under pressure to said inlet, a valve to control said pressure, means to close said valve when the breech block is withdrawn, and means to advance the mushroom head to open the inlet to flush the gun; substantially as described.
14. In a gun, a breech block, a mushroom head, a gas check, a fluid inlet controlled by the mushroom head, means to supply fluid under pressure to the said inlet and means to advance the mushroom head to open the inlet to pass fluid between the back of the mushroom head and the gas check to flush the gun; substantially as described.
15. A gun having a breech block, a mushroom head, means to advance the mushroom head before the breech block is removed, and means for supplying fluid to the bore of the gun forwardly across the mushroom head when the mushroom head is advanced; substantially as described.
16. A gun having a mushroom head, means to advance the mushroom head, and means controlled by the advance of the mushroom head for injecting fluid into the gun; substantially as described.
17. A gun having a mushroom head, means to advance the mushroom head, and means for supplying a cylindrical body of fluid into the bore of the gun forwardly across the mushroom head when it is advanced; substantially as described.
18. In a gun, a breech block having an opening therethrough, a gas check, a valve having a head and stem, said stem extending through the opening in the breech block and engaging the wall thereof, the head of the valve engaging the gas check when in its rearward position, a fluid inlet port arranged to be opened and closed by the movement of the valve, a fluid pressure supply leading to said inlet, and valve-actuating means arranged to shift the valve to allow the fluid pressure to enter the gun to flush and cool the same; substantially as described.
19. In a gun, a breech block, a valve having a head within the breech of the gun, a gas check between the valve and breech block, a fluid inlet port arranged to be opened and closed by the movement of the valve, the valve being arranged to compress the gas check when the gun is fired, and means to advance the valve in the bore of the gun to open the port; substantially as described.

In testimony whereof, I have hereunto set my hand.

WILLIAM D. SMITH.

Witnesses:

JOHN D. ALCOCK,
W. J. McPHERSON,
S. M. GODDARD.