W. D. SMITH.

ORDNANCE.

APPLICATION FILED JUNE 27, 1913.

1,111,039.

Patented Sept. 22, 1914.

2 SHEETS—SHEET 1.

FIG. 1.

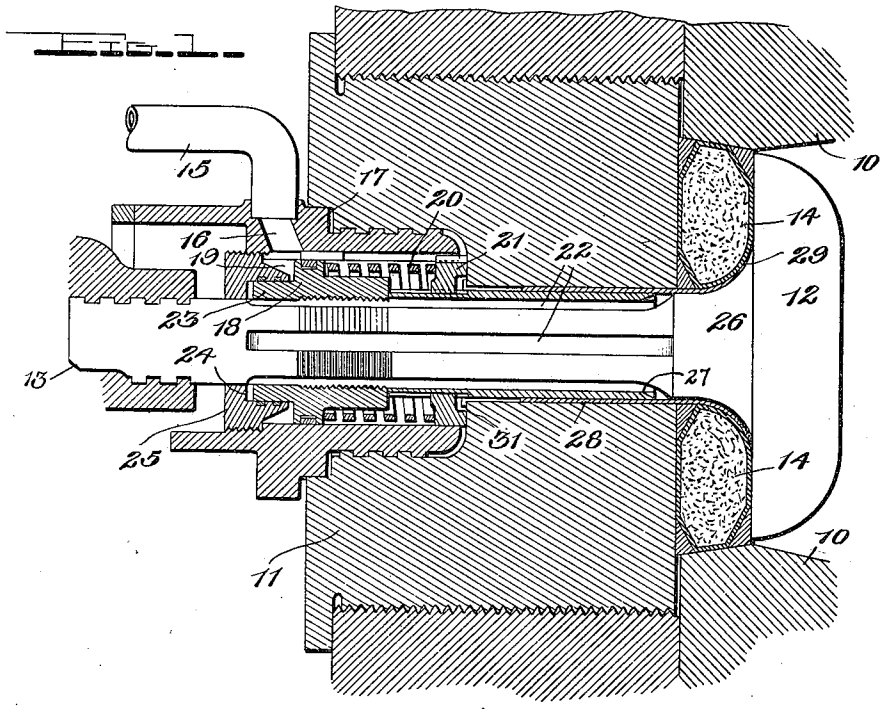


FIG. 2.

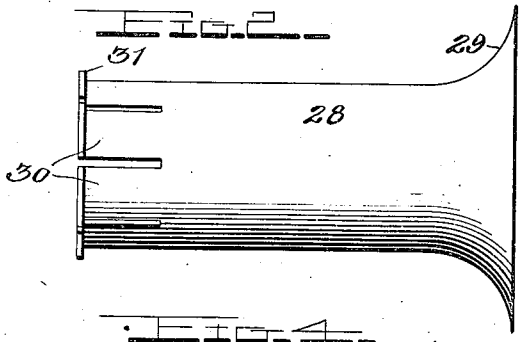


FIG. 3.

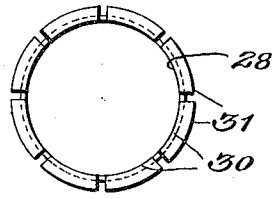


FIG. 4.

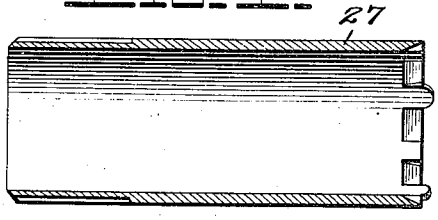
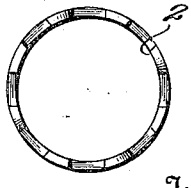


FIG. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

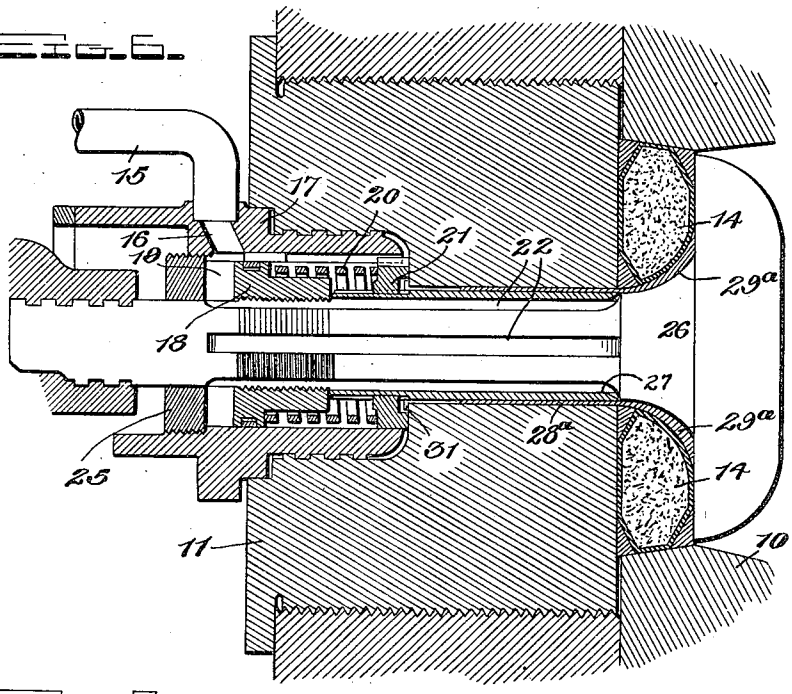


Fig. 7.

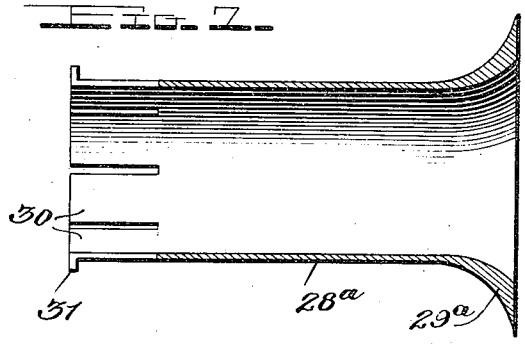


Fig. 8.

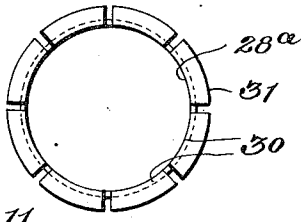


Fig. 9.

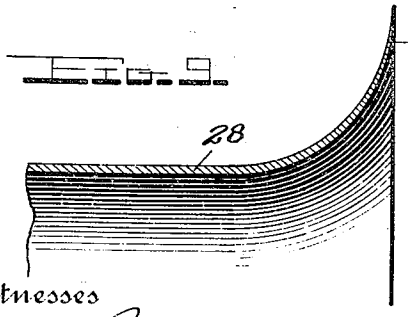
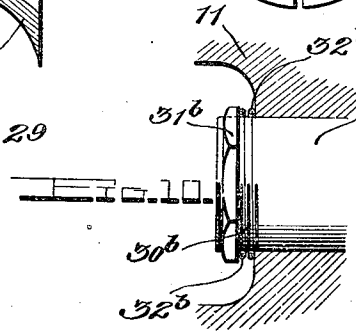


Fig. 10.



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UNITED STATES PATENT OFFICE.

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ORDNANCE.

1,111,039. Specification of Letters Patent. Patented Sept. 22, 1914.

Application filed June 27, 1913. Serial No. 776,142.

To all whom it may concern:

Be it known that I, WILLIAM D. SMITH, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Ordnance, of which the following is a specification.

The present invention relates to breech-loading ordnance, and is more especially related to ordnance of the character employing a mushroom and a gas check, together with means for supplying a fluid under pressure or a lubricant, such as graphite, which is introduced past the mushroom head.

The primary object is to provide a structure of this kind, with novel, simple and effective means for preventing the introduction of such fluid or lubricant between the gas check and the breech block, and which if thus allowed to enter, would be apt to effect the forward movement of the gas check with the mushroom and "dish" the check.

Two embodiments of the invention are illustrated in the accompanying drawings, but it will be obvious from an inspection of the claims that the invention is not necessarily limited to the two forms of the invention disclosed.

In the drawings:—Figure 1 is a longitudinal sectional view through a breech block, showing the improved mechanism. Fig. 2 is a side elevation of the guard sleeve. Fig. 3 is an elevation of the left hand end thereof. Fig. 4 is a longitudinal sectional view through the mushroom spindle sleeve. Fig. 5 is an end elevation of the latter sleeve. Fig. 6 is a sectional view through a slightly different form of structure. Fig. 7 is a longitudinal sectional view of the sleeve employed in the structure shown in Fig. 6. Fig. 8 is an elevation of the left-hand end thereof. Fig. 9 is a longitudinal sectional view of a portion of the sleeve shown in Fig. 2. Fig. 10 is a detail view of a modified form of locking means for the guard sleeve.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment disclosed in Figs. 1–5 inclusive and Fig. 9, a part of the breech portion of a gun is illustrated in Fig. 1, and is designated 10, and removably mounted therein, is a breech block 11 carrying any well known type of mushroom, the same comprising a head 12 and a spindle 13 that is slidably mounted in the breech block 11. The mushroom is capable of a limited longitudinal movement in the breech block, as is well understood, and interposed between its head 12 and the block 11 is a gas check pad 14, which may be of any desired or well known construction.

In the present embodiment, the mushroom is advanced by fluid under pressure, which is delivered from any suitable source of supply through a conduit 15 into a port 16 formed in the carrier sleeve 17. Mounted on the rear or outer portion of the spindle 13 is a piston 18 that operates in a suitable air chamber 19 formed in the carrier sleeve 17. A spring 20, interposed between the usual keyed ring, as 21, and the piston 18, serves to normally urge the piston, and therefore the mushroom, rearwardly. It will be noted, however, that the port 16 opens into the chamber 19 in rear of said piston, and therefore if fluid under pressure is introduced into said chamber 19 through said port, it will move the piston forwardly against the action of the spring 20, and thus advance the mushroom.

For the purpose of delivering the fluid into the bore of the gun, suitable conducting channels 22 are formed longitudinally in the spindle 13, their rear ends opening just in rear of an extension 23 formed upon the piston 18 and movable into a pocket 24 that is formed in a nut 25 that constitutes the rear wall of the fluid pressure chamber 19. These channels 22 terminate at their inner ends directly adjacent to the neck 26 of the spindle 13. The channels 22 have their outer sides, with the exception of their end ports, covered by the piston 18 and a sleeve 27 that is fixed upon the spindle and moves therewith.

The operation of the structure, as thus far described, may be briefly set forth as follows: Whenever the fluid pressure in the chamber 19 is able to overcome the spring pressure 20 and the rear pressure against the mushroom head due to the firing of the charge, it will be evident that the piston 18 with the spindle 13 and the mushroom head 12 will advance until the rear end of the extension 23 passes beyond the inner end of the nut 25, whereupon the fluid under pressure will pass through the channels 22, for at this time, the inner ends of said channels will open into the space left by the advance of

the mushroom head from the gas check. Consequently this fluid under pressure will enter the bore of the gun in a very considerable volume.

The structure as thus far described is, however, open to possible objection, inasmuch as there is some liability of this fluid under pressure entering between the gas check 14 and the inner end of the breech block, in which case, the gas check might be advanced with the mushroom head. Improved means for overcoming this objection is preferably constructed as follows: A thin tube or sleeve 28 of copper or other suitable material surrounds the spindle 13 and sleeve 27, and its outer end is flared, as shown at 29 to correspond to the flared or tapered construction of the neck 26 of the spindle. This inner flared end is interposed between the mushroom head 12 and the gas check 14, thus not only bridging the joint between the gas check 14 and the breech block, but extending well over said gas check. It is inserted and removed through the inner end of the breech block, and preferably suitable means are employed for holding it in position against accidental displacement. This means, in the present embodiment, consists of spring fingers 30 formed by longitudinally slitting the outer end of the sleeve 28 and the terminals are outturned, as illustrated at 31, producing an annular flange which will spring into place over the breech block, and the spindle when inserted locks it so that it cannot be withdrawn without removing the spindle from the bore, as clearly shown in Fig. 1. A guard sleeve is thus provided, which will effectively prevent the introduction of the fluid between the gas pad and the breech block, and furthermore this sleeve constitutes in effect, means for positively holding the gas check in place against the breech block.

The structure shown in Fig. 6 is very similar to that already described, and therefore corresponding parts have been given the same reference numerals. The principal distinction is in the guard sleeve, which in this modification, is designated 28^a. In the first described structure, it will be noted that the flared end 29 of the guard sleeve is gradually reduced in thickness, whereas in the structure illustrated in Figs. 6 and 7, this flared end is thickened, as shown at 29^a. The neck 26 of the mushroom is thus on a different radius from the outer face of the adjacent curved portion of the gas check 14. It will also be noted that the inner ends of the channels 22 terminate at substantially the beginning of the curve of said neck 26. They furthermore stop at the inner end of the breech block, being thus out of the pressure zone of the mushroom head. Thus a slight inward movement or advance of the mushroom will cause the channels 22 to be opened and permit the escape of the fluid into the bore of the gun. In this form, the extension 23 is eliminated from the piston.

In Fig. 10, there is illustrated a slightly modified form of holding means for the guard tube. In this embodiment, said tube is designated 28^b, and its outer or rear end is threaded, as shown at 30^b to receive a nut 31^b screwed thereupon. Interposed between the nut and the adjacent wall of the breech block is a coiled spring or other yielding element 32^b, which serves to permit a slight play of the tube due to the compression of the gas check.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In a breech loading gun of the character described, the combination with a breech block, of a mushroom head movably mounted thereon, a gas check interposed between the mushroom head and the breech block, and a sleeve extending into the breech block and having an enlarged inner end interposed between the mushroom head and the gas check.

2. In a breech-loading gun of the character described, the combination with a breech block, of a mushroom head located at the inner end of the breech block and having a spindle slidably mounted in said breech block, a gas check interposed between the mushroom head and the breech block, and a sleeve surrounding the spindle and having an enlarged inner end interposed between the mushroom head and the gas check.

3. In a breech-loading gun of the character described, the combination with a breech block, of a mushroom head having a spindle extending into the breech block, a sleeve surrounding the spindle and movable therewith, a gas check interposed between the mushroom head and the breech block, and another sleeve surrounding the first sleeve and bridging the joint between the gas check and breech block.

4. In a breech-loading gun of the character described, the combination with a breech block, of a mushroom head having a spindle extending into the breech block, a sleeve surrounding the spindle and movable therewith, a gas check interposed between the mushroom head and the breech block, and another sleeve surrounding the first sleeve and bridging the joint between

the gas check and the breech block, said latter sleeve having an inner flared end that is interposed between the mushroom head and the gas check.

5. In a breech-loading gun of the character described, the combination with a breech block, of a mushroom head having a spindle slidably mounted in the breech block, said spindle being provided with fluid-conducting channels, a sleeve surrounding the spindle and extending over the channels, said sleeve being movable with the spindle, a gas check interposed between the mushroom head and the breech block, and another sleeve surrounding the first sleeve and bridging the joint between the gas check and the breech block, said latter sleeve being held against forward movement.

6. In a breech-loading gun of the character described, the combination with a breech block having a bore, of a mushroom having a head at the inner end of the breech block and a spindle slidable in said breech block bore, a gas check interposed between the head and breech block, and means for preventing fluid pressure entering between the gas check and breech block, said means having a part located in the breech block bore and surrounding the spindle and having an enlargement at its inner end that prevents its outward passage through the bore of the breech block, said means being removable only through the inner end of the breech block.

7. In a breech-loading gun of the character described, the combination with a breech block, of a mushroom having a head at the inner end of the breech block and a spindle slidable in said breech block, a gas check interposed between the mushroom head and breech block, means for preventing fluid under pressure entering between the gas check and breech block, said means having an enlarged portion at its inner end that overlies the gas check and said means being removable through the inner end of the breech block, and a locking device associated with the outer end of said means for normally preventing the movement of the same toward the inner end of the breech block.

8. In a breech-loading gun of the character described, the combination with a breech block, of a mushroom having a head at the inner end of the breech block, and a spindle slidable in said breech block, a gas check interposed between the head and breech block, means for preventing fluid pressure entering between the gas check and breech block, said means having a portion mounted in the breech block and being removable through the inner end of the said breech block and having an enlarged portion at its inner end that overlies the front portion of the gas check, and locking devices carried by the outer end of said means and detachably engaging the breech block for normally preventing the inward movement of the same.

9. In a breech-loading gun of the character described, the combination with a breech block, of a mushroom having a head at the inner end of the breech block and a spindle slidable in said breech block, a gas check interposed between the head and breech block, and a sleeve surrounding the spindle and having spring locking means engaging the breech block to normally prevent the detachment of the sleeve.

10. In a breech-loading gun of the character described, the combination with a breech block, of a mushroom having a head at the inner end of the breech block and a spindle slidably mounted in said breech block, a gas check pad interposed between the mushroom head and breech block, a sleeve surrounding the spindle and having a flared inner end that is interposed between the mushroom head and gas check pad, the outer end of said sleeve being longitudinally slotted forming spring fingers having outturned terminals that engage the breech block.

11. In a breech loading gun of the character described, the combination with a breech block, of a mushroom head movably mounted on the inner end thereof, a gas check interposed between the mushroom head and the breech block, and means engaging the breech block and check for positively holding the latter against separation from the breech block when the head is advanced.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM D. SMITH.

Witnesses:
B. G. FOSTER,
P. H. ROSS.