

W. D. SMITH.

ORDNANCE.

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Patented Mar. 11, 1913.

1,055,819.

2 SHEETS—SHEET 1.

Fig. 1.

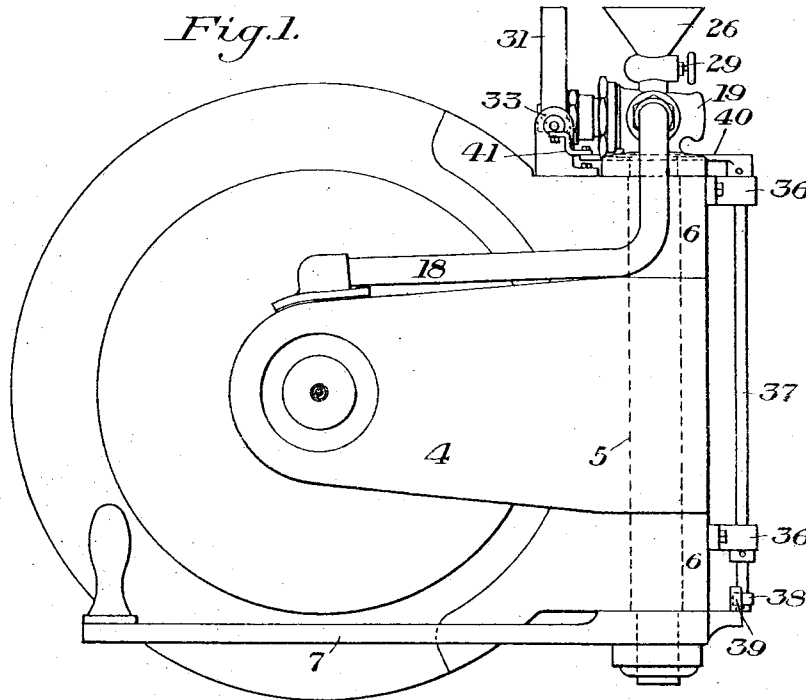
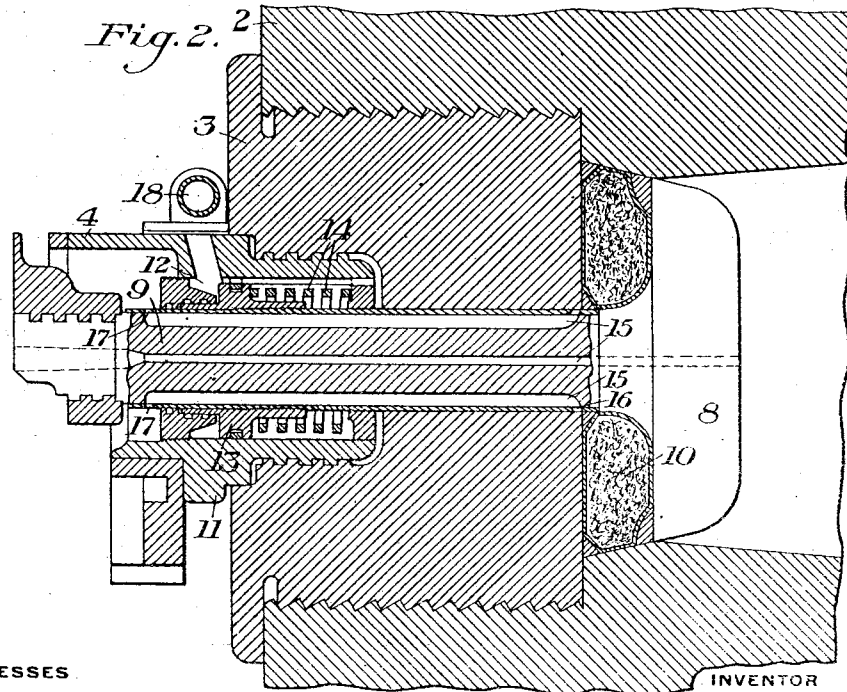


Fig. 2.



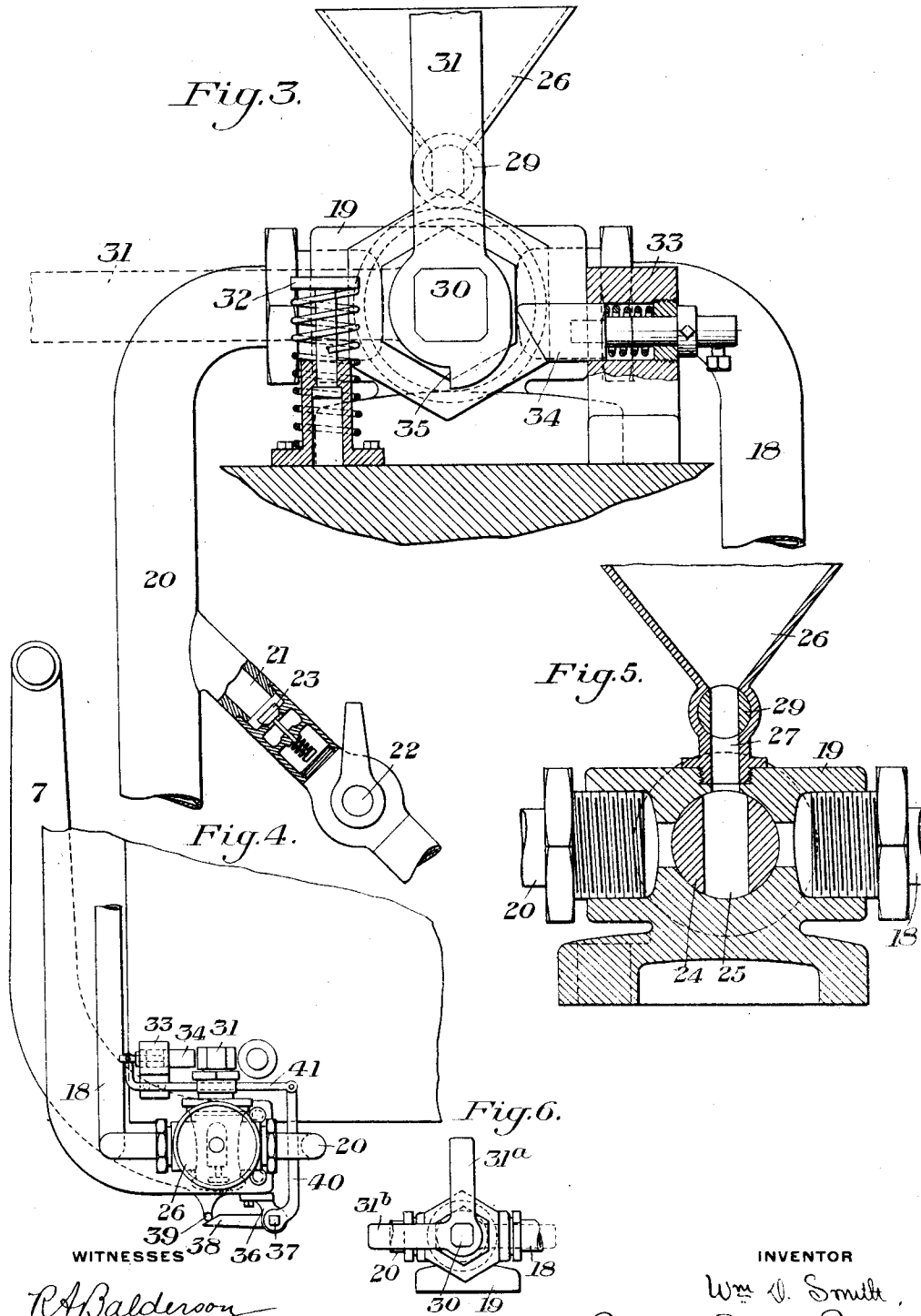
WITNESSES

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1,055,819.



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UNITED STATES PATENT OFFICE.

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ORDNANCE.

1,055,819.

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To all whom it may concern:

Be it known that I, WILLIAM D. SMITH, a citizen of the United States, and a resident of Washington, in the District of Columbia, have invented a new and useful Improvement in Ordnance, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to ordnance and is designed to provide an efficient device for injecting powdered graphite or other dry material into the bore of the gun with the flushing fluid to coat the surface of the bore to protect it from the action of the hot gases, and also so as to form a dry lubricant which will not be affected by the heat of the gun, and thereby further protect the bore from the cutting action of the projectile when forced through the bore by the explosion.

A further object of my invention is to provide a cheap and simple device for placing the powdered graphite in the fluid pressure pipe, or the port leading from the fluid-pressure supply to the bore of the gun.

A still further object of my invention is to provide a cheap and simple valve, together with valve actuating mechanism which will be actuated by the recoil of the gun. Also in providing means for latching the valve in its open position, together with means for releasing said latch when the breech block is opened.

In the accompanying drawings, I have illustrated one form of apparatus in accordance with my invention, in which:

Figure 1 illustrates a rear view of a gun with my improvement attached. Fig. 2 is a partial sectional view of Fig. 1 showing the interior of the breech of the gun. Fig. 3 is a detail side elevation partially in section illustrating my improved valve and mechanism for opening and closing the same. Fig. 4 is a plan view of the valve and its actuating connections. Fig. 5 is a sectional view of the valve shown in Fig. 4, and Fig. 6 is a side elevation of the valve showing a modified form of the operating lever.

The precise nature of my invention will be best understood by reference to the accompanying drawings, which will now be described, it being premised, however, that various changes may be made in the details of construction and general arrangement of the parts, without departing from the spirit

and scope of my invention, as defined in the appended claims.

In the drawings, the numeral 2 designates the breech of the gun, and 3 the breech block which is secured to the breech of the gun by means of the usual screw threaded engagement.

4 is the breech block carrier which is connected to the pivot pin 5 mounted in projections 6 extending from the breech of the gun.

7 is the usual unlocking lever which is arranged to actuate the carrier and translate the breech block when the breech block has been released from the breech of the gun.

8 is the mushroom head having a spindle 9 extending through the breech block, and which is arranged to be moved longitudinally through the breech block in any desired manner for the purpose hereinafter set forth.

Interposed between the mushroom head and the breech block is a gas check 10 of the usual type, which is arranged to be compressed by means of the explosion to seal the opening between the breech block and the breech of the gun.

11 is the breech block carrier sleeve about which the breech block 3 is adapted to rotate, during its locking and unlocking movement with the breech of the gun. Within the carrier sleeve 11 is a pressure chamber 12, and connected to the stem of the mushroom head is a piston 13 which is arranged to move the mushroom head inwardly when pressure is supplied to said chamber.

14 is a spring interposed between the piston 13 and a stationary portion of the carrier sleeve, and is adapted to return the mushroom head to its rearward position when pressure has been cut off from the chamber 12.

15 are ducts in the stem of the mushroom head having outlet ports 16 to permit the fluid pressure to pass from the ducts to the bore of the gun, and also having ports 17 adapted to admit fluid from the pressure chamber 12 to said ducts when the mushroom head has been advanced.

18 is a supply pipe, one end of which is connected to the chamber 12, the other end being connected to one side of a valve casing 19 which is also connected to the pivot pin 5 and is arranged to move with the breech block carrier. 20 is a pressure supply pipe connected to the other end of the valve casing 19 and which extends from any suitable

source of pressure supply. Leading into the pressure supply 20 is a pipe 21 extending from any suitable source of oil or other liquid supply, and which is controlled by means of the hand operated valve 22 and check valve 23. The check valve 23 is arranged to prevent fluid pressure from being blown back through the pipe 21.

Rotatably mounted in the valve casing 19 is a valve 24, having a through port 25 which is adapted to open communication between the pipes 18 and 20 when the valve is rotated 90° from the position shown in the drawings. Mounted on the upper portion of the valve casing 19 is a hopper 26 having an opening 27 which is arranged to communicate with the port 25 when the valve is in the position shown in Fig. 5, and 29 is a valve for closing communication between the opening 27 and the hopper 26.

The hopper 26 is arranged to receive powdered graphite or other material in powdered form which is adaptable for coating the bore of the gun to protect the surface thereof from heat and when the valve is in the position shown in Fig. 5, the powdered material will fill the port 25 and when the valve 24 is rotated to open communication between the pipes 18 and 20, the fluid pressure will blow the powdered material into the gun at the same time that the residue from the explosion is blown from the gun by means of the fluid pressure.

30 is the valve stem of the valve 24 which extends outwardly through the casing 19, and connected to this valve stem is a lever 31 which is arranged to be held in a vertical position, as shown in Fig. 3, when the gun is in position to be fired. Mounted on any stationary portion of the gun, and in line of movement of the lever 31 is a spring actuated plunger 32, which is adapted to be struck by the lever and its spring compressed to cushion said lever and also to return the lever to its vertical position, as shown in Fig. 3. Slidably mounted in a bracket 33 on any portion of the gun and adjacent to the lever 31 is a spring pressed latch member 34, which is arranged to engage a catch 35 on the lever 31 and hold the lever in its downward position when thrown, as hereinafter described, to retain the valve 24 so that communication is open between the pipes 18 and 20. Pivottally mounted in brackets 36 on the side of the gun is a rock shaft 37, and connected to the lower end of this rock shaft is a lever 38, which is in line of movement of a pin 39 on the end of the unlocking lever 7. Connected to the upper end of this rock shaft 37 is a lever 40, and 41 is a link connected to the lever 40 and the spring pressed latch 34.

The operation of the device is as follows: Assuming the parts to be in the position shown in the drawings in which the pipe 20

is in connection with a suitable source of pressure supply and that the port 25 of the valve 24 has been filled with powdered graphite, the firing of the charge will cause the gun to recoil and the valve lever 31 will be thrown downwardly as shown in dotted lines in Fig. 3. The recoil movement will throw the lever downward to the left as shown in dotted lines in Fig. 3 compressing the spring plunger 32 and rotating the valve 90° to open communication between pipes 18 and 20, and as soon as the projection 35 passes the latch member 34, the lever 31 will be held from return movement. This opening of communication between pipes 18 and 20 will admit pressure to the chamber 12 which will advance the mushroom head a sufficient distance to open communication between the ports 17 and the chamber 12, and permit the fluid pressure to pass into the bore of the gun through the ports 16, carrying with it the powdered graphite which was held in the port 25 of the valve, the fluid pressure blowing out all of the residue left after the explosion and the gun will be coated with the graphite to protect the surface of the interior of the gun. The unlocking lever is now actuated to remove the breech block, and the first movement of this lever will actuate the rock shaft 37 and through the medium of the lever connections withdraw the spring latch 34 and release the lever 31, the spring pressed plunger 32 will then throw the lever to the position shown in Fig. 3 of the drawings, closing communication between the pipes 18 and 20 and permitting the port 25 to be filled with graphite from the hopper 26, for the next operation. It will also be understood that since pressure is cut off from the pressure chamber 12, the spring 14 will return the mushroom head to its initial position. If desired the valve 22 may be opened to supply any other lubricant or liquid to the pipe 20 which will be injected into the gun when the gun is flushed as hereinbefore described.

In Fig. 6 I have shown a valve similar to that shown in Fig. 3, but in which I have shown a modified form of operating lever. In this figure the operating lever is in the form of a bell crank, the arm 31^a being the same as the lever 31 and the arm 31^b extending at right angles thereto, is adapted to throw the valve in the opposite direction to close the valve when the gun returns to battery. In this arrangement it is not necessary to provide a spring pressed plunger to return the valve to its closed position, as the arm 31^a will be moved to the right by its inertia during the recoil of the gun, and the arm 31^b will be moved to the left during the inertia of said arm when the gun returns to battery.

The advantages of my invention result

from the provision of means for supplying powdered graphite to the fluid pressure supply so that the graphite will be blown into the gun when the pressure supply is turned on to flush the gun, to coat the bore of the gun and protect it from the gases caused by the combustion of the powder, and thereby lessen or prevent abrasion or pitting of the surface of the bore. A further advantage results from the provision of means for opening the valve without engaging any stationary portion of the gun and thereby prevent breakage of parts caused by the impact between the moving and stationary portions. Further advantage results from the provision of means for measuring and depositing a predetermined portion of powdered material into the fluid pressure supply.

I claim:

1. A device for coating the interior of guns to prevent erosion, comprising a fluid pressure supply pipe leading to the gun, a valve in said pipe, means for automatically feeding non-combustible dry powdered material into the supply pipe, and means for opening the valve to admit fluid pressure feeding non-combustible dry powdered material into the bore of the gun; substantially as described.
2. An apparatus for injecting powdered graphite into the bore of a gun to prevent erosion by the hot gases from the explosion of the powder charge, comprising a fluid pressure supply pipe leading to the gun, a valve in said pipe, automatically controlled means for placing powdered graphite within the pipe and automatically controlled mechanism for opening the valve to admit fluid pressure to said pipe to blow the graphite into the gun; substantially as described.
3. A device for coating the interior of a gun with powdered graphite to prevent erosion, comprising a fluid pressure supply pipe leading to the gun, a valve in said pipe, an automatically controlled mechanism for delivering the powdered graphite to the supply pipe and simultaneously opening said valve to admit fluid pressure to said pipe to blow the graphite into the gun; substantially as described.
4. A device for coating the interior of guns to prevent erosion, a fluid pressure supply pipe leading to the gun, a valve in said pipe, means for feeding a predetermined amount of powdered graphite into said pipe, and means for opening the valve to admit fluid pressure to said pipe to blow the graphite into the gun; substantially as described.
5. In a flushing device for guns, a fluid pressure supply pipe, a valve casing in said pipe, a valve in said casing having a through port arranged to open communication

through said pipe, and means to feed graphite to said port when the valve is closed; substantially as described.

6. In a flushing device for guns, a fluid pressure supply, a valve controlling said pressure supply, and a lever connected to said valve, said lever being arranged to be thrown by its inertia during the recoil movement of the gun to open the valve, and means to lock the valve in its open position; substantially as described.

7. In a flushing device for guns, a fluid pressure supply pipe, a valve in said pipe, a lever connected to said valve, said lever being arranged to be thrown by inertia during the movement of the gun to open the valve, a spring pressed plunger adapted to be moved by said lever, and a latch adapted to retain the lever in its thrown position; substantially as described.

8. In a flushing device for guns, having a breech block, a carrier for said breech block, an unlocking lever for opening the breech block, a fluid pressure supply pipe leading to the breech of the gun for flushing the gun, a valve in said pipe for controlling the fluid pressure, a lever connected to the valve, the lever being arranged to be thrown by its inertia during the recoil movement of the gun, a spring pressed plunger arranged to be moved by the lever, a catch arranged to retain the lever in its shifted position, and a connection between the catch and the unlocking lever arranged to actuate the catch to release the lever when the unlocking lever is shifted; substantially as described.

9. A device for coating the interior of guns to prevent erosion, comprising a fluid pressure supply pipe leading to the gun, a valve in said pipe for controlling the fluid pressure supply, means for feeding non-combustible dry powdered material into the supply pipe, and means for opening the valve to admit fluid pressure to said pipe and to cut off the feed of the non-combustible dry powder; substantially as described.

10. A device for coating the interior of guns to prevent erosion, comprising a fluid pressure supply pipe leading to the gun, a valve in said pipe, a graphite container connected to said pipe, means for feeding a predetermined amount of graphite from the container to said pipe, and automatic mechanism for opening the valve to admit fluid pressure to said pipe and to blow the dry powdered graphite into the bore of the gun; substantially as described.

In testimony whereof, I have hereunto set my hand.

WILLIAM D. SMITH.

Witnesses:

GEO. W. WHITE,
J. WEBSTER MANNING.