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BREECH LUBRICATION.

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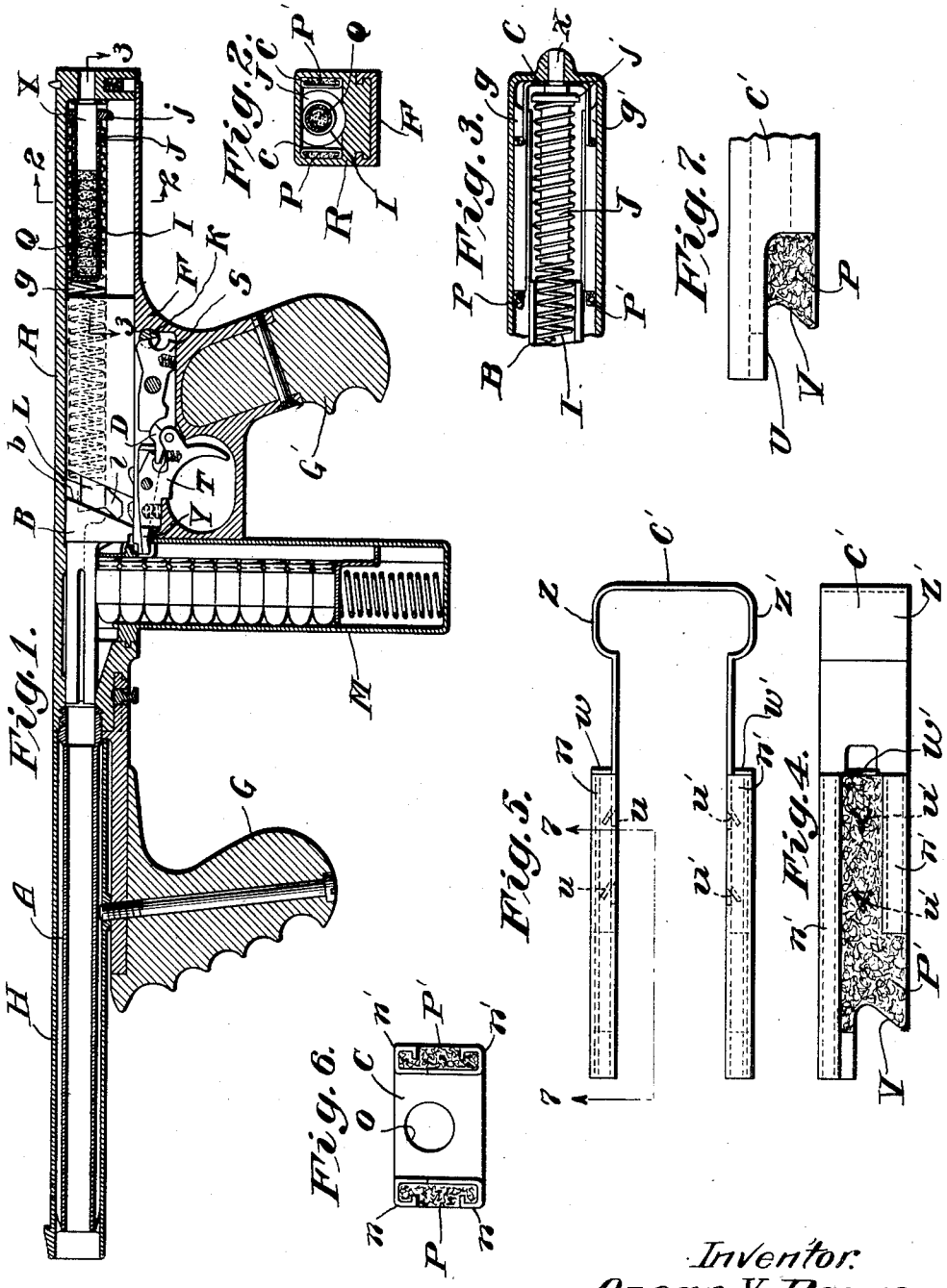

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UNITED STATES PATENT OFFICE.

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BREECH LUBRICATION.

1,352,414. Specification of Letters Patent. Patented Sept. 7, 1920.

Original applications filed March 14, 1919, Serial No. 282,642, and May 15, 1919, Serial No. 297,283. Divided and this application filed August 18, 1919. Serial No. 318,203.

To all whom it may concern:

Be it known that I, OSCAR V. PAYNE, a citizen of the United States, and resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Breech Lubrication, of which the following is a specification.

This invention relates to the breech action of guns and more particularly to means for automatically lubricating the breech closing mechanism, this application being a division of my prior applications Sr. No. 282,642, filed March 14, 1919 and Serial No. 297,283, filed May 15, 1919.

In guns having a breech closure movable into and out of breech closing position, either by a reciprocatory or rotary or a combined reciprocatory and rotary motion and sometimes having a plurality of parts movable relatively to each other as well as relatively to the receiver or frame, it is highly desirable that the surfaces sliding over each other be supplied with an ample but not too abundant supply of lubricant, especially in rapid fire guns such as machine guns and the like. And in automatic guns where the breech closure is automatically opened after firing, *e. g.* as disclosed in the applications above referred to, it is also important that the lubricant be supplied uniformly in order to render the automatic action uniform and reliable.

The principal objects of the present invention are to render the action of breech closures free and uniform, to render uniform and reliable the action of mechanisms for locking breech closures in closed position, and more particularly to apply lubricant automatically and uniformly to the sliding surfaces of the various parts of breech actions.

Other objects will be apparent from the specific embodiment of the invention illustrated in the accompanying drawings in which,—

Figure 1 is a central vertical longitudinal section of a gun embodying the present invention;

Fig. 2 is a vertical transverse section on line 2—2 of Fig. 1;

Fig. 3 is a horizontal longitudinal section on line 3—3 of Fig. 1;

Fig. 4 is a side elevation of one embodiment of the lubricating device;

Fig. 5 is a plan view of the same device;

Fig. 6 is a front end elevation of the device; and

Fig. 7 is a detail view on line 7—7 of Fig. 5.

The particular embodiment of the invention chosen for the purpose of illustration comprises in general a frame R constituting a receiver, a frame member F, slidably fitted into guides on the bottom of the receiver R, a barrel threaded into the forward end of the receiver, a cooling tube H surrounding the barrel, a fore grip G mounted below the barrel, a rear grip G′ mounted on the frame member F, a magazine M adjustably fitted to the receiver, a yoke Y, a trigger T, a disconnector D, a sear S, a safety catch K, a bolt B slidable longitudinally in the receiver R, a lock L slidable transversely of the bolt in a guideway *b*, a lock L having lugs *l* extending laterally from opposite sides thereof into guideways *g* and *g′* in opposite sides of the receiver chamber, a spring I for advancing the bolt and absorbing the recoil of the bolt, and a buffer J for absorbing the excess recoil of the bolt. This construction is disclosed and claimed in my prior applications Sr. No. 282,642, filed March 14, 1919, Sr. No. 297,282, filed May 15, 1919, Sr. No. 297,283, filed May 15, 1919 and Serial No. 297,284, filed May 15, 1919, and further description thereof is unnecessary for the purpose of disclosing the present invention.

Mounted in the rear end of the receiver chamber is a U-shaped clip C which, as shown in Figs. 1, 2 and 3 comprises a base portion abutting against the rearward end of the receiver chamber and two forwardly projecting arms which lie in the grooves or guideways *g* and *g′* in the opposite sides of the receiver chamber. Mounted in the spaces between the arms of the spring clip and the walls of the receiver chamber are lubricant carrying pads P and P′, the upper and lower edges of the arms of the spring clip being bent outwardly over the upper and lower edges of the pads to secure the pads to the clip. As shown in Fig. 3 the forward ends of the pads project beyond the forward ends of the clip arms and the

clip is of such length that these projecting ends contact with the lugs *l* and *l'* when the bolt is in rearmost position, the lugs *l* and *l'* sliding in the guideways in which the lubricating pads are disposed. Inasmuch as the arms of the clip C do not extend inwardly outside of the grooves *g* and *g'* the bolt B may pass therebetween on the recoil as will be clear from Fig. 3. The lubricating means is preferably yielding to accommodate the slight variations in the maximum recoil of the bolt due to the different degrees of compression of the buffer and in the illustrated embodiment this yieldingness is afforded by the elastic character of the pads themselves.

The buffer J is disposed between the arms of the spring clip and fits over a plunger X having a portion extending rearwardly through an opening in the face of the clip and thence into an opening in the rear of the receiver. The spaces between the forward end of the plunger X and the forward end of the tubular buffer J is filled with disks Q of leather or other suitable shock absorbing material so that when the rear end of the bolt B engages the shoulder *j* on the buffer the tubular member J slides rearwardly on the plunger, thereby compressing the disk Q and absorbing the recoil of the bolt. The recoil spring I fits over the buffer J with its rear end abutting against the shoulder *j*.

In Figs. 4 to 7 is shown a slightly modified form of lubricating clip. The arms of this clip are bowed outwardly at Z and Z' so as to engage the bottoms of the guideways *g* and *g'*, thereby more accurately to position the clip in the receiver. This clip is provided with an opening O in its base, as in the first embodiment, to receive the plunger of the buffer. The upper and lower edges of the arms are bent over as shown at *n*—*n* and *n'*—*n'* to secure the lubricating pads P and P' in position. The arms are cut away at the forward ends as illustrated at U in Fig. 7 and the forward ends of the pads P and P' terminate intermediate the ends of these cut away portions along oblique faces V which are inclined at the same angles as the rear faces of the locking lugs *l* and *l'* so as to contact with the lugs throughout their entire rearward faces.

Lips W and W' are struck up from the arms of the clip immediately in the rear of the lubricating pads to assist the bent edges *n*—*n* and *n'*—*n'* in holding the pads in position. Spurs *u* and *u'* are also struck up from the arms to assist in holding the pads in position.

The operation of the gun, so far as the present invention is concerned is as follows: Upon firing the gun the bolt B is automatically locked in closed position by the locking device L until the breech pressure diminishes to a safe value, the locking device then slides upwardly in the guideway *b* upon the bolt until the locking lugs *l* and *l'* come into alinement with the longitudinal guideways *g* and *g'* in the opposite sides of the receiver chamber, and the bolt is then recoiled by the residual breech pressure. Most if not all of this recoil is taken up by the compression spring I but if there is any excess it is absorbed by the buffer J when the rear end of the bolt strikes the shoulder *j*. When the bolt is in this rearmost position the rearward faces of the lugs *l* and *l'* engage the forward ends of the lubricating pads and thereby pick up a small amount of lubricant. On the forward motion of the bolt the lubricant applied to the lugs *l* and *l'* is transmitted to the abutment against which the rear faces of the lugs contact when the lock *l* is in locked position.

This transmission of lubricant to the lock is repeated each time the bolt recoils and in the forward and rearward movement of the bolt and lock relative to the receiver and in the transverse movement of the lock relative to the bolt and receiver the lubricant applied to the lugs is distributed over all of the sliding surfaces of the bolt lock and receiver. In this way a uniform and reliable lubrication of all of the sliding surfaces of the breech action is gained. The lubricating pads may be replenished with oil from time to time either through oil holes provided in the receiver or by sliding the frame F rearwardly off the receiver, but I have found that many thousands of shots may be fired without replenishing the pads with oil.

I claim:

1. A gun comprising a receiver having a bolt chamber, a bolt movable in said chamber, and a device having a lubricant-carrying body removably disposed in said chamber in position to contact with the bolt when retracted.

2. A gun comprising a receiver having a bolt chamber, a bolt movable in said chamber, a lubricant-pad, and a holder for said pad fitted into but unattached to the bolt chamber to position the pad so as to contact with the bolt when retracted.

3. A gun comprising a receiver having a breech chamber, a breech closure movable in said chamber, the breech closure having a locking lug movable in a groove in said chamber, and a lubricant-carrying body mounted in said groove to contact with said lug when the closure is retracted.

4. A gun comprising a frame, a breech closure movably mounted in said frame, and a lubricant carrying body mounted on the frame along the path of travel of the closure so as to contact with the closure when opened and thereby to transmit lubricant thereto.

5. A gun comprising a frame having a

breech chamber therein, a breech closure movable in said chamber, and means in said chamber for applying lubricant to said closure each time the closure is actuated.

6. A gun comprising a frame having a breech chamber therein, a breech closure movable in said chamber, and means for applying lubricant to said closure each time the closure is actuated, said means being entirely inclosed in said chamber.

7. A gun comprising a frame, a breech closure movably mounted in said frame, and means on the gun for lubricating the breech closure, said means comprising a lubricant-carrying body arranged to contact with the closure when wide open.

8. A gun comprising a frame, a breech closure mounted in said frame to reciprocate forwardly and rearwardly between open and closed position, and a lubricant carrying body disposed behind said closure to contact therewith when the closure is in open position.

9. A gun comprising a frame, a breech closure mounted in the frame to move into and out of closed position, the frame and breech closure having coöperating abutments for locking the closure in closed position, and means for applying lubricant to said abutments each time the closure is actuated.

10. A gun comprising a frame, a breech closure mounted in the frame to move into and out of closed position, the frame and breech closure having coöperating abutments for locking the closure in closed position, and means disposed along the path of said closure for applying lubricant to the abutment thereto each time the closure is actuated.

11. A gun comprising a frame, a breech closure mounted in the frame to move into and out of closed position, the frame and breech closure having coöperating abutments for locking the closure in closed position, and a lubricant carrying body disposed in the path of the abutments on the closure so as to contact therewith and apply lubricant thereto each time the closure is opened.

12. A gun comprising a frame, a breech closure mounted in the frame to reciprocate forwardly and rearwardly between open and closed positions, the frame and closure having forwardly and rearwardly directed abutments respectively for locking the closure in closed position, and a lubricant carrying body disposed directly across the path of the abutment on the closure at the rear end of its path of movement so that the rearwardly directed face of the abutment engages said body each time the closure is opened.

13. A gun comprising a frame, a breech closing bolt mounted in the frame to reciprocate forwardly and rearwardly between open and closed positions, locking lugs carried by the bolt in its longitudinal central region for locking the bolt in closed position, and means for applying lubricant to said lugs from whence the lubricant may be distributed forwardly and rearwardly from said longitudinal central region along the sliding surfaces of the bolt.

14. A gun comprising a frame, a breech closing bolt mounted in the frame to reciprocate forwardly and rearwardly between open and closed positions, a lock movable transversely of the bolt to lock the bolt in closed position, and means for automatically applying lubricant to said lock.

15. A gun comprising a frame, a breech closure movable in said frame into and out of breech closing position, a U-shaped clip straddling the path of said closure, and lubricant carrying bodies mounted on the arms of said clip in position to apply lubricant to opposite sides of said closure.

16. A gun comprising a U-shaped lubricator clip adapted to carry lubricant pads, the edges of the arms of said clip being bent over to clasp the lubricant pads.

17. A gun comprising a frame having a breech chamber therein, a breech closure mounted in said chamber to reciprocate forwardly and rearwardly between open and closed positions, a U-shaped lubricator clip disposed in the rearward end of said chamber with its arms extending forwardly along opposite sides of said chamber so as to straddle the closure when in open position, and lubricating means mounted on said arms to apply lubricant to opposite sides of the closure each time it is opened.

18. A gun comprising a frame having a breech chamber therein, a breech closure mounted in said chamber to reciprocate forwardly and rearwardly between open and closed position, a U-shaped lubricator clip disposed in the rearward end of said chamber with its arms extending forwardly along opposite sides of said chamber so as to straddle the closure when in open position, lubricating means mounted on said arms to apply lubricant to opposite sides of the closure each time it is opened, and a recoil buffer for the closure extending through the base of said clip into said frame so as to hold the clip in position.

19. A gun comprising a frame having a breech chamber therein, a breech closure mounted in said chamber to reciprocate forwardly and rearwardly between open and closed positions, said chamber having longitudinal grooves in the wall thereof, locking lugs associated with said closure to reciprocate in said grooves, and lubricant carrying bodies extending into said grooves to contact with said lugs when the closure is opened.

20. A gun comprising a frame, a breech closure movable in said frame into and out of breech closing position, and lubricant-carrying bodies in position to apply lubricant to opposite sides of said closure.

21. A gun comprising a frame, a breech closure movable in said frame into and out of breech closing position, and lubricant-carrying bodies in position to apply lubricant to opposite sides of said closure when the latter moves to breech-opening position.

Signed by me at New York, N. Y., this seventh day of August, 1919.

OSCAR V. PAYNE.