

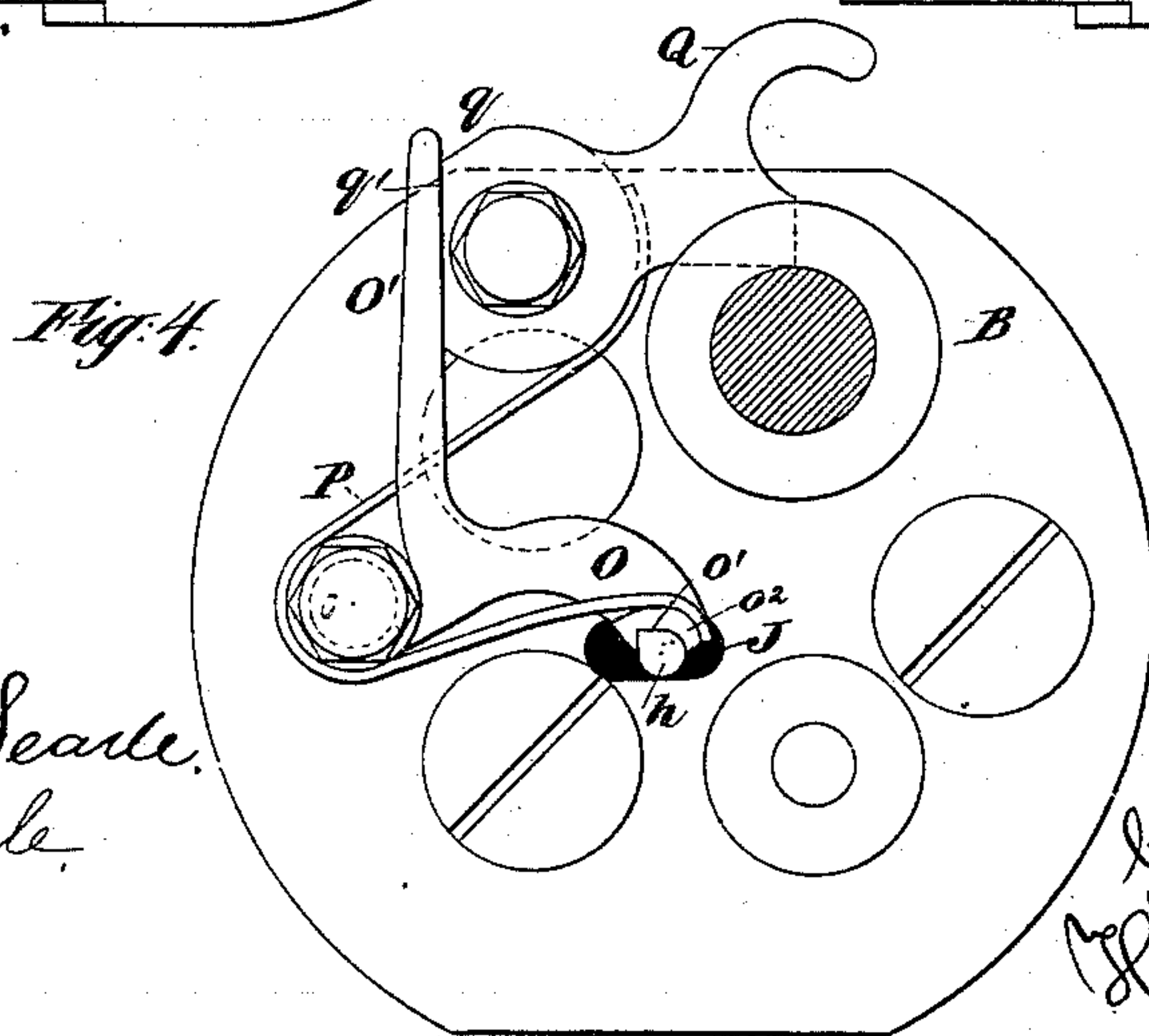
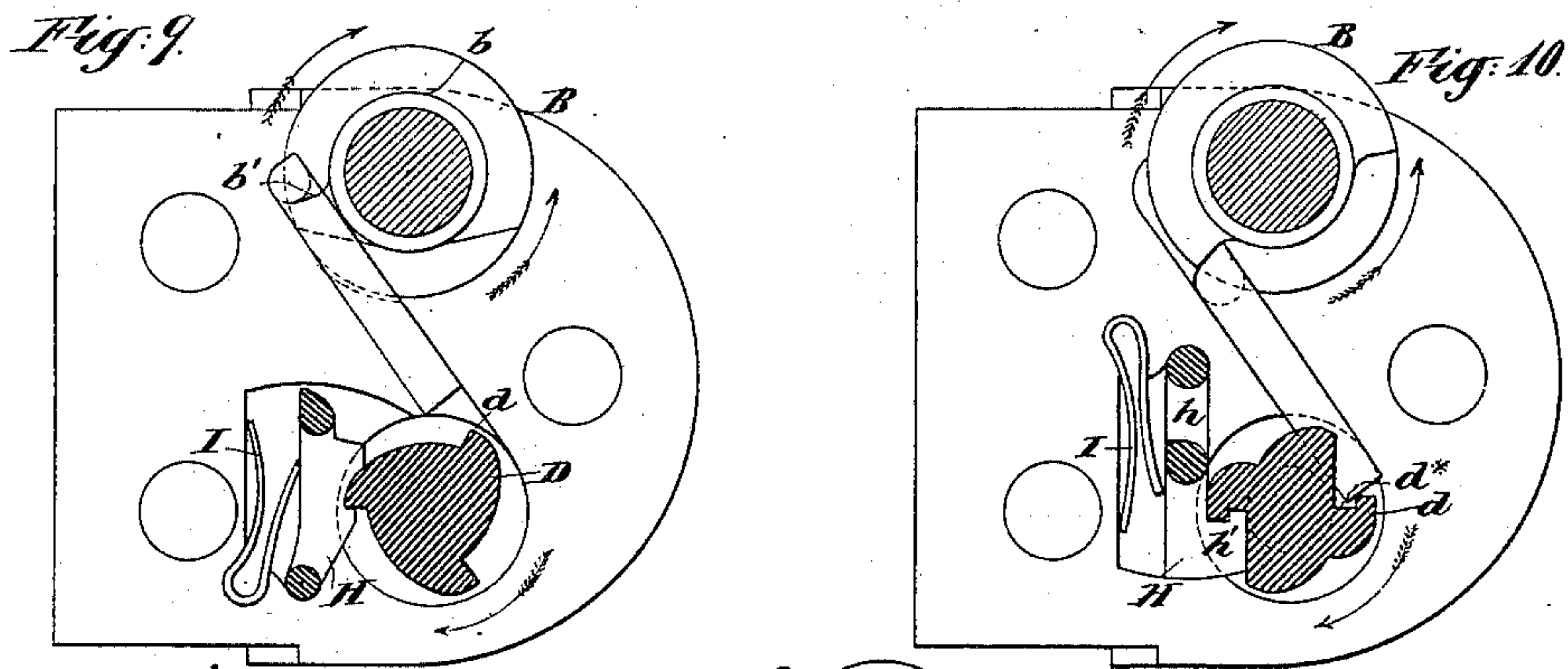
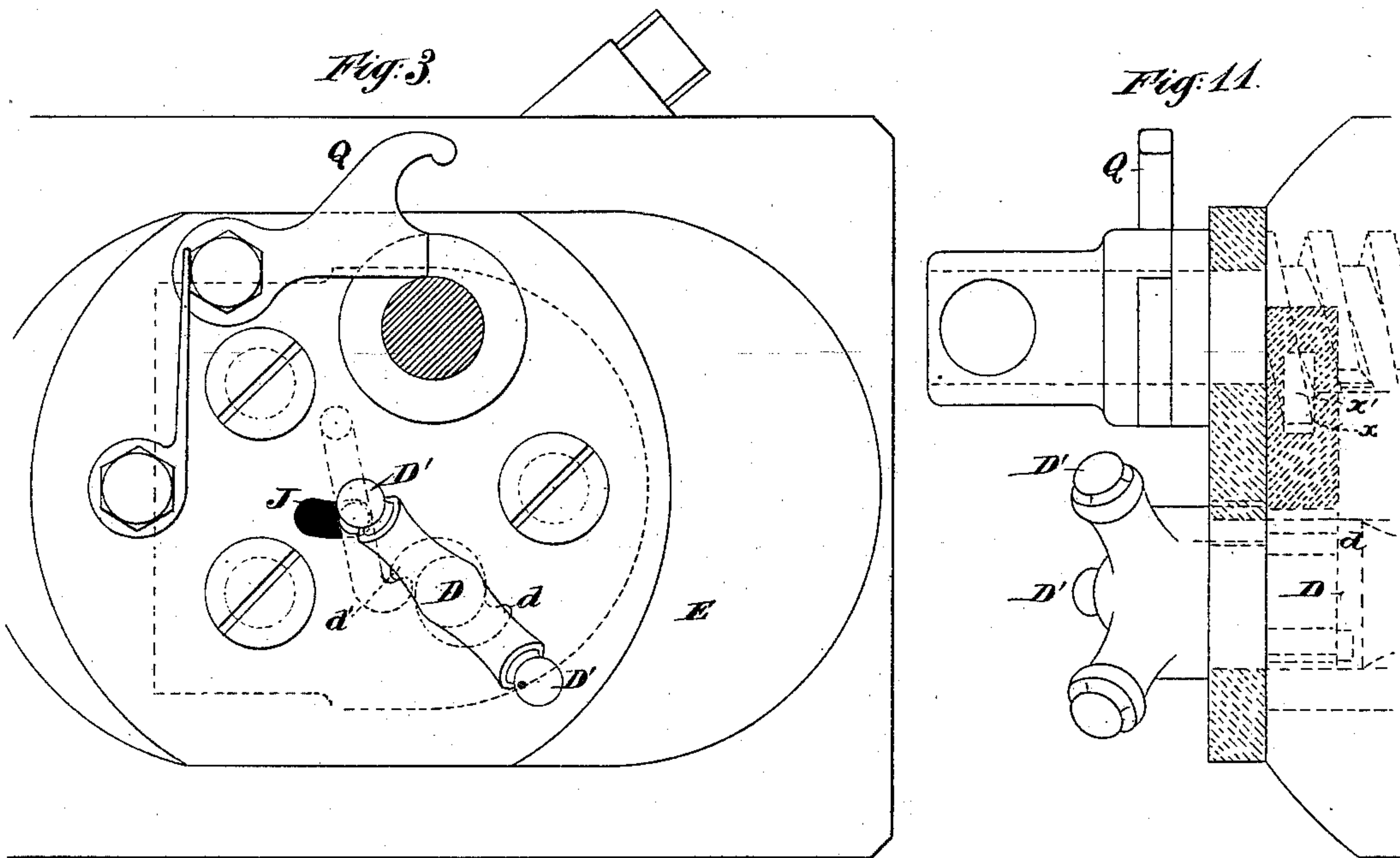
(No Model.)

2 Sheets—Sheet 2.

W. LORENZ.
LOCK FOR ORDNANCE.

No. 318,765.

Patented May 26, 1885.



Witnesses:
Charles R. Searle.
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UNITED STATES PATENT OFFICE.

WILHELM LORENZ, OF CARLSRUHE, BADEN, GERMANY.

LOCK FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 318,765, dated May 26, 1885.

Application filed December 9, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILHELM LORENZ, of Carlsruhe, Germany, have invented certain new and useful Improvements in Breech-Loading Cannon, of which the following is a specification.

This invention relates to breech-loading ordnance of that class in which a hinged breech-piece is opened or closed for loading or firing by a breech-screw; and the novelty consists in a peculiar construction, arrangement, and adaptation of parts which constitute the firing devices in their relation to such breech-screw, as will be more fully hereinafter set forth, and specifically pointed out in the claims.

In this invention the firing-pin has a movement in a line with the longitudinal center of the bore, and is operated by a firing-shaft arranged at right angles thereto. The firing-shaft has such relations to the firing-pin that when the shaft is oscillated in one direction the pin is withdrawn from contact with the cartridge-shell. The firing-shaft is arranged parallel with the breech-screw which closes and locks or releases the breech-piece, and between these two parts—namely, the firing-shaft and the breech-locking screw—I provide such connections that when the said screw is turned to unlock the breech-piece in order to introduce a cartridge into the gun the firing-shaft will be partially rotated to withdraw the firing-pin to a position of half-cock. I provide for not only holding the firing-pin in such position of half-cock automatically obtained, but I also provide for conveniently locking it in such position against accidental displacement, as in passing over rough roads, or other sudden shock. The breech-screw may be part threaded, so that a part revolution will unlock the breech-piece and throw the firing-pin at half-cock, and a part revolution in the opposite direction will lock the breech-piece and at the same time replace the connections between the breech-screw and the firing-shaft in such position that a subsequent manipulation to open the breech after firing will again automatically set the firing-pin at half-cock.

The invention is illustrated in the accompanying drawings, in which Figure 1 is a rear elevation of a breech-loading cannon having a hinged breech-piece, showing in

dotted lines the arrangement of the breech-screw which locks or unlocks the breech-piece at will, and showing also in dotted lines the firing-shaft arranged parallel with the breech-screw and connections between the two. Fig. 2 is a view of the breech-piece, taken at right angles to the position shown in Fig. 1, and showing the breech-screw and firing-shaft in cross-section. Fig. 3 is a similar view showing means for withdrawing the holding-pawl of the firing-shaft. Fig. 4 is a similar view showing means for locking said pawl into contact with the firing-shaft. Fig. 5 is a longitudinal section showing the firing-pin in elevation and at rest. Fig. 6 is a similar view showing the firing-pin in central longitudinal section and at half-cock. Fig. 7 is a section showing the relation of parts before the firing-pin reaches a half-cock. Fig. 8 shows a modification. It is a face view of the breech-plate with some of the parts in section. Figs. 9 and 10 are similar views showing modified firing mechanism. Fig. 11 is a detail view showing a slight modification.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

Referring to the drawings, A designates the ordinary breech-piece hinged in any known and proper manner at *a*, and secured to the gun upon the opposite side by a breech-screw, B. These parts and the gun may be of any approved construction for breech-loading.

In the hinged breech-piece is formed a channel, *A*³, which is arranged in the longitudinal center of the gun as a whole, and extends entirely through the breech-piece. It is adapted to hold the firing-pin, has its outer end securely plugged by a screw, M, and has a small aperture at its inner extremity, through which the point of the firing-pin F projects. This firing-pin F is hollow, as seen in Fig. 6, and into the interior *f*' projects an arm, *m*', of the screw-plug M, a spring, G, being arranged around said arm and bearing against both pin and plug to exert a constant force upon the firing-pin in the direction of the opening *a*⁴.

In the lower portion of the channel *A*³ is formed a longitudinal recess, *a*⁵, in which operate lugs *f*, which not only serve to prevent the firing-pin from rotating in its seat, but also serve as means for engaging projections

or teeth d^3 rigid upon the firing-shaft D. The firing-shaft D operates loosely in a channel, A^2 , formed in the breech-piece, which connects with the channel A' , and lies at a right angle thereto and parallel with the breech-screw B. The teeth d^3 are arranged upon opposite sides of the shaft D, or in such other positions that a part rotation of said shaft will withdraw the firing-pin sufficiently to place the same at half-cock, while a further rotation will carry the teeth d^3 and f out of engagement and allow the spring G to project the firing-pin against the cartridge to effect the firing. This firing-shaft extends through the breech-piece E, and is provided upon its outer end with two or more arms, D' , to which the firing-cord is to be attached.

Upon opposite sides of the firing-shaft D are formed hook projections d and d' , which are engaged alternately by the end of a slide, C, which, passing up through a proper channel, has a cross-head or projection, c , which engages any suitable abutting surface, as b or b' , formed on the threads of the breech-screw B. These abutting surfaces should face in such opposite directions, as seen in Figs. 2, 8, 9, and 10, that while one will force the slide forward to turn the firing-shaft as the breech-screw is turned to unlock the breech-piece, the other will serve with a reverse movement of said breech-screw to carry the slide back for a similar subsequent operation.

In Fig. 11 I show a recess, x , in the slide C, which is adapted to engage a proper projection, x' , upon the breech-screw.

H designates a pivoted pawl having a hook end, and held in the direction of the firing-shaft by the constant force of a spring, I. Upon one side is formed a stud, h , which projects through a slot, J, formed in the breech-plate E.

As thus far described the main features of the invention will be apparent. It being desired to charge the cannon it is first necessary to open the breech, and this necessitates a proper manipulation of the breech-screw B. This screw being turned in the direction of arrow I (see Fig. 2) the shoulder b comes in contact with the slide C and forces said slide forward. The other end of slide being engaged with hook projection d the slide rotates the firing-shaft until the shaft assumes the position shown in dotted lines, Fig. 2, when the spring I forces the pawl H under the projection d' . Meanwhile the partial rotation of the firing-shaft has engaged its teeth d^3 with the tooth or teeth f of the firing-pin and withdrawn the same, as seen in Fig. 6, and the gun is securely at half-cock. Thus it will be seen that the act of opening the breech-piece insures that the firing apparatus will be surely placed at half-cock, and as the gun cannot be charged without such an action it follows that no possible carelessness can result in leaving the firing-pin in contact with a cartridge. A cartridge having been placed in the gun and the breech-piece closed, the turning of the

breech-screw B in the direction of arrow 11 to lock the gun closed brings the shoulder b' into contact with the cross-head c , and the act of locking the breech-piece serves to place the slide C in such position that it will engage the projection d' when the gun has been fired. When it is desired to fire the gun, the firing-cord is attached to one of the arms D' , and as the cord is pulled the shaft D turns until the teeth d^3 and f disengage, when the spring G forces the firing-pin F violently against the cartridge, and the required explosion occurs. This action has brought the projection d' into such position that it will be engaged by the slide C as soon as it is attempted to again open the gun.

In Fig. 10 I show the pawl H as having a hook, h^2 , and the teeth d having recesses, as d^* . This construction gives greater security against the possibility of the gun escaping from a half-cock.

In Fig. 8 I show the lever C as provided with a hook, the lever C then serving to draw the projections over to turn the firing-shaft.

In some of the figures I show more than two teeth upon the shaft D; but such modifications do not affect the principle of the invention.

In passing rapidly over rough ground, should the gun be charged, there is danger that the contact of the firing-pin with the cartridge might cause a premature or accidental discharge, and it is very necessary that under such circumstances the firing-needle should not escape from its position of half-cock.

I provide for locking the pawl H. Upon the outer face of the breech-plate E is pivoted at o an elbow-lever, O, having a recess, o' , in one arm adapted to embrace the arm h of the pawl H, and a ledge, o^2 , upon which bears a spring, P. The vertical arm O' of this lever by the action of said spring P at all times rests upon one or the other of two bearings, q or q' , on a pivoted arm, Q, against which arm the spring P also bears. The face or bearing q' is nearer to the axis of the arm Q than the bearing q , and hence when the face q' is in contact with arm O' recess o' embraces the arm h and prevents movement of the pawl H, as seen in Fig. 4. By turning the arm Q until the face or bearing q is in contact with the arm O' the pawl H is released.

Various features of advantage will be observed, which are due to the invention. I prevent the firing-pin from coming into contact with the percussion-cap of the cartridge, except when it is desired to explode the same. I do not depend upon the men for this service, but render the withdrawal of the firing-pin consequent upon the opening of the breech to insert the cartridge. I thus provide against accidental explosion of the cartridge by shocks when by carelessness or other cause the firing-pin is left in contact with an unexploded cartridge. While the act of opening the breech to insert the charge is made to withdraw the firing-pin to a half-cock, the breech may be

subsequently opened any number of times without affecting the firing apparatus. The firing-pin may also be released from half-cock and brought to a position of rest, as in case of the gun being empty, without opening the breech. The half-cock position may be locked without either opening the breech or manipulating the firing apparatus.

What I claim as new is—

1. In a breech-loading gun, the combination, with a firing-pin having its bearings in the movable breech-piece, of the locking bolt or screw which holds the breech-piece in position, and intermediate mechanism, as described, whereby the manipulation of said screw to allow the opening of the breech will automatically place the firing-pin at half-cock, as set forth.

2. The combination, with the movable breech-piece, the firing-pin having its bearings in said breech-piece, and the breech-screw, of a firing-shaft having projections which engage with projections upon said firing-pin and mechanism, as C, arranged between and engaging both the firing-shaft and the breech-screw, as and for the purposes set forth.

3. In breech-loading ordnance, the combination, with the firing-pin having its bearings in the movable breech-piece, and provided with teeth or projections, of a firing-shaft having its bearings also in the breech-piece, and teeth which engage with the teeth on the firing-pin, and a slide engaging projections upon the firing-shaft and connecting the same with the breech-screw or other device for locking the breech-piece, as set forth.

4. In combination with a movable breech-piece and securing device, as B, a firing-pin, F, arranged centrally in the breech-piece, and having teeth *f*, a spring, G, bearing against said firing-pin and serving to hold it with a constant force in the direction of the cartridge, a firing-shaft, D, having teeth *d*³, which engage the teeth *f*, and having projections *d* *d'*, and a slide, C, having a hook which engages the projection *d* or *d'* upon the firing-shaft and connects the same with the breech-securing device B, as and for the purpose set forth.

5. The combination, with the firing-pin and firing-shaft, as described, having projections *d* and *d'*, of the breech-screw B, having opposing faces *b* *b'*, the hook-slide C, connecting said breech-screw with the firing-shaft, and a spring-pawl, H, arranged to engage one of the projections *d* or *d'* and hold the firing-shaft, as and for the purposes set forth.

6. The combination, with the breech-screw B and firing-shaft D, as described, and the pawl H, engaging said shaft, and having arm *h*, which projects through the slot J of the breech-piece, of the elbow-lever O, the spring P, operating against said lever O to hold it in contact with the said arm *h*, and the arm Q, having faces *q* *q'*, which alternately engage the arm O' of the lever O, as and for the purposes set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

WILHELM LORENZ.

Witnesses:

FRIEDRICH LORCH.

ADOLF LEHNE.