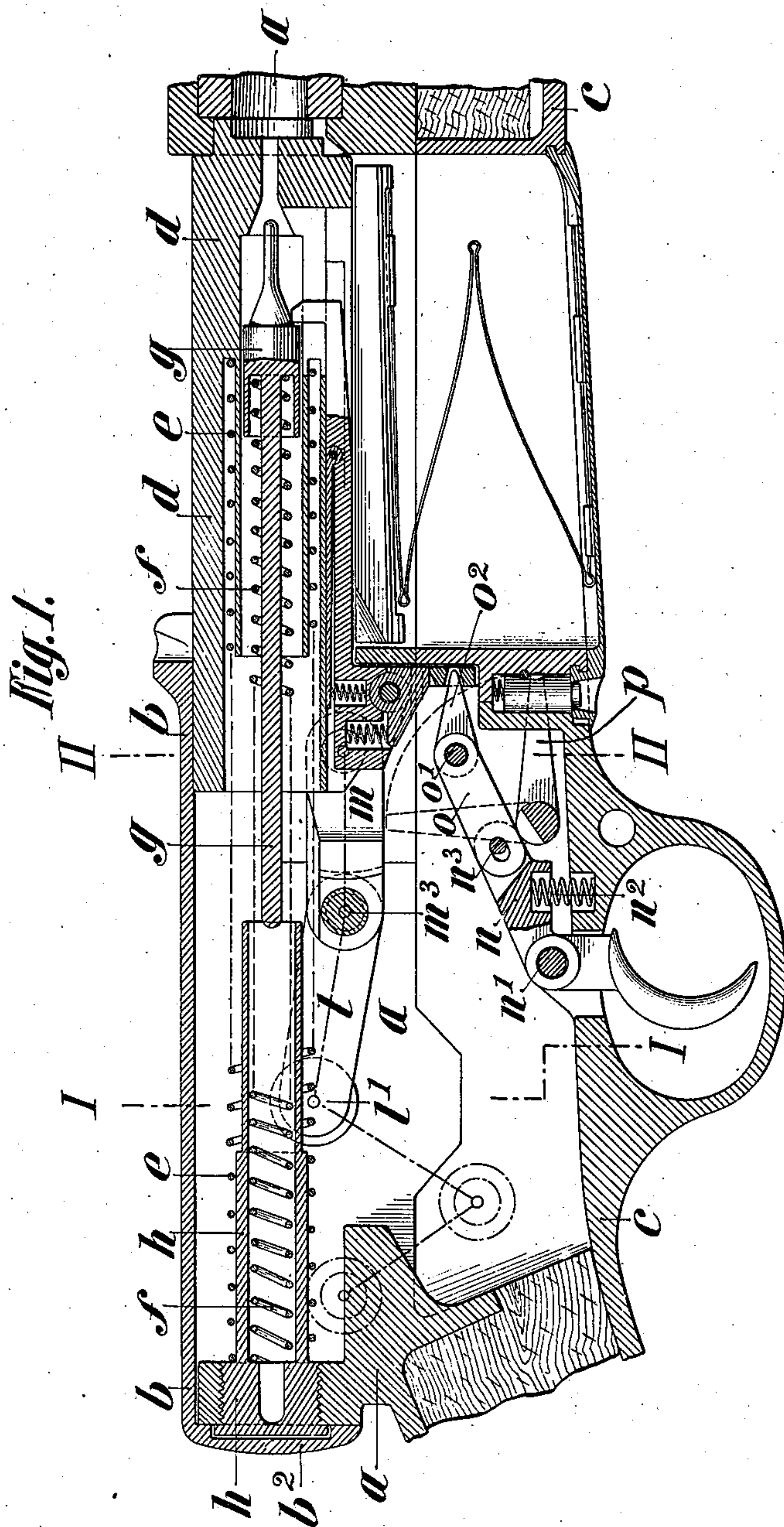


K. J. EBERT.  
BREECH MECHANISM FOR SMALL ARMS.  
APPLICATION FILED JUNE 4, 1907.

924,224.

Patented June 8, 1909.  
4 SHEETS—SHEET 1.



WITNESSES:

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INVENTOR:

*Karl Josef Ebert,*  
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# BREECH MECHANISM FOR SMALL ARMS.

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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 4.

Fig. 10.

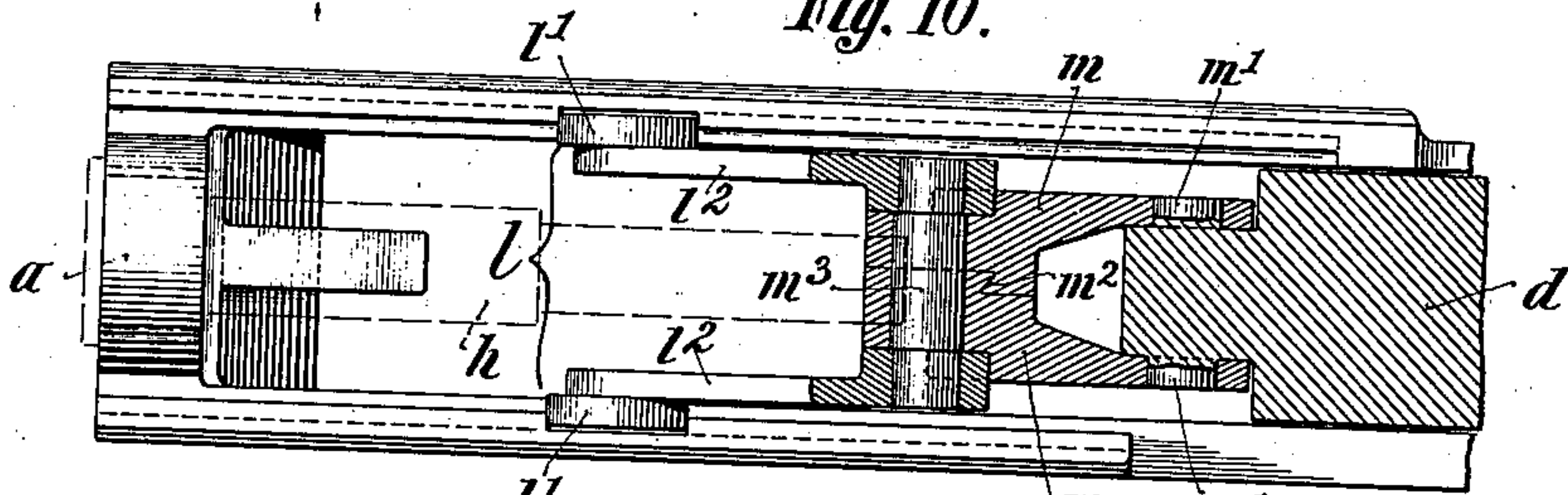


Fig. 11.

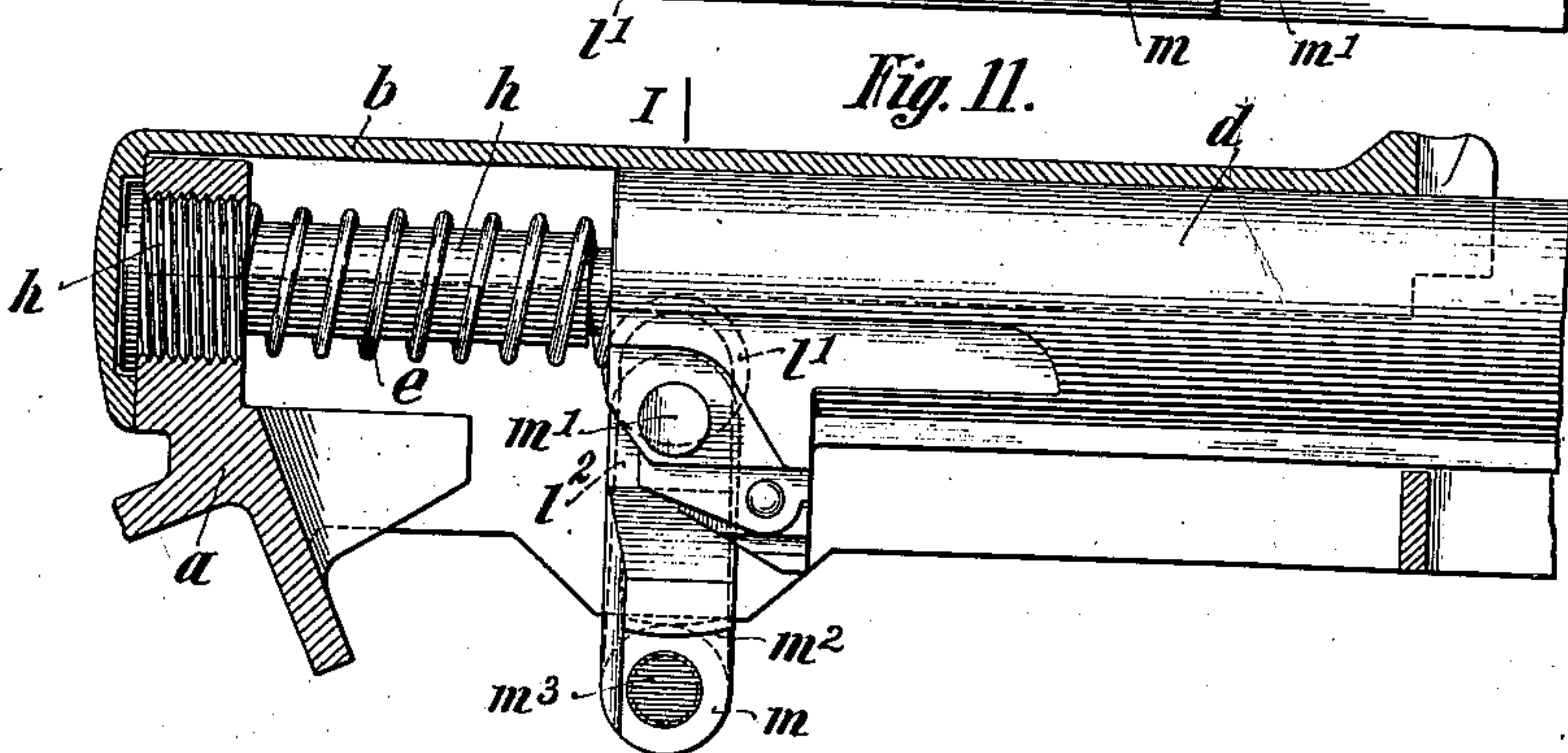


Fig. 12.

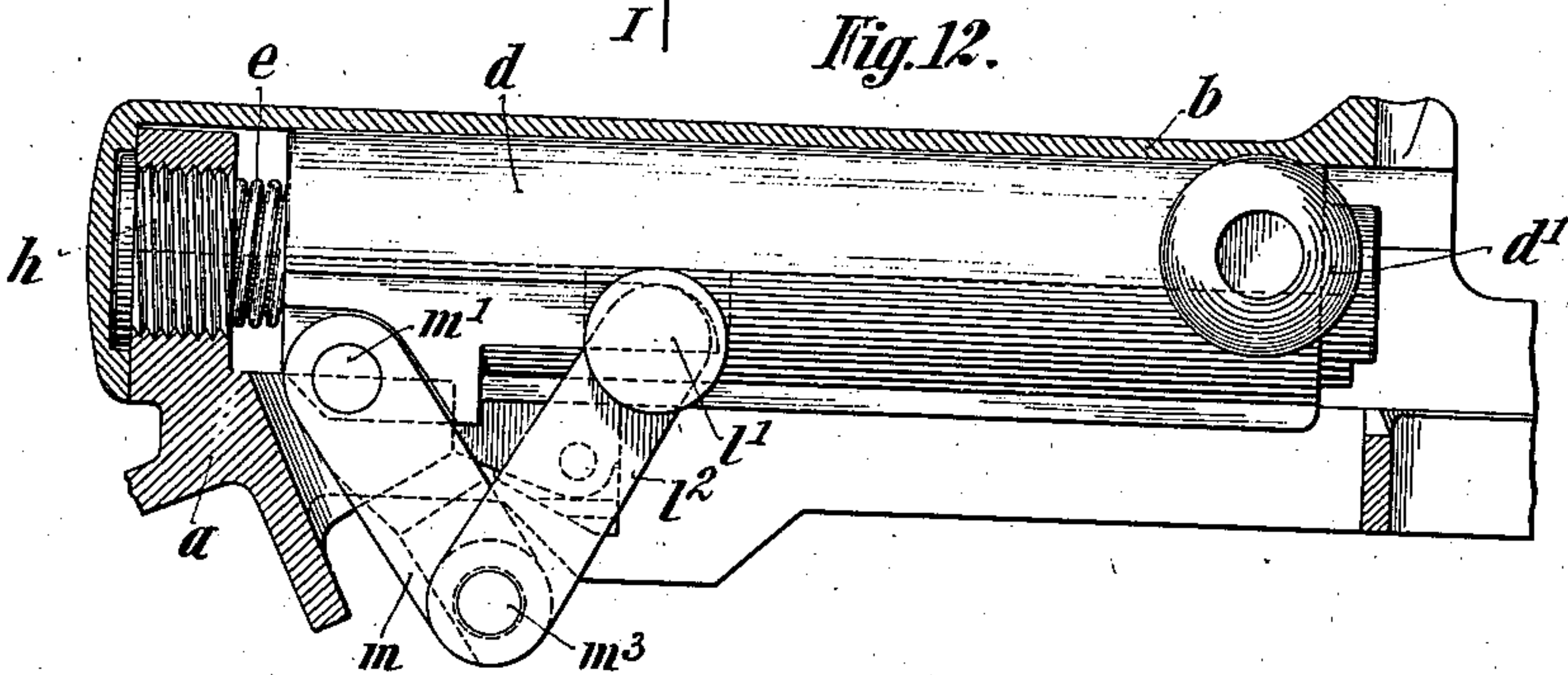
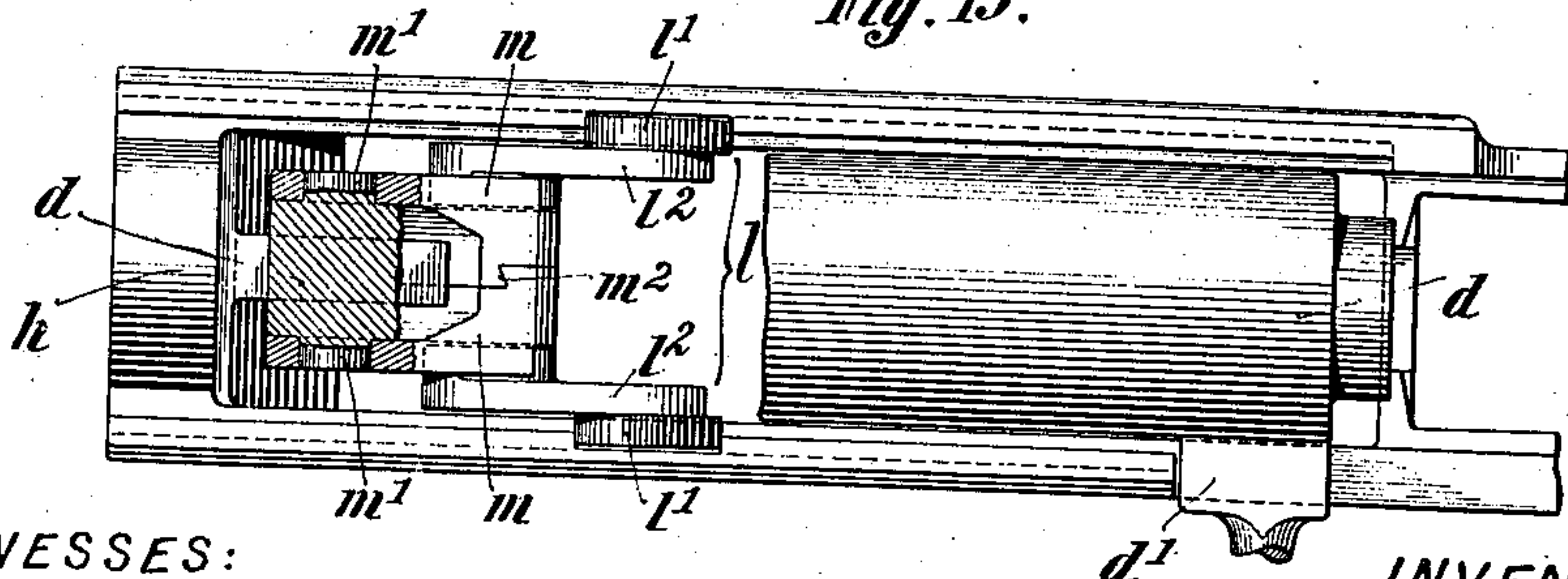


Fig. 13.



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# UNITED STATES PATENT OFFICE.

KARL JOSEF EBERT, OF COLOGNE, GERMANY.

## BREECH MECHANISM FOR SMALL-ARMS.

No. 924,224.

Specification of Letters Patent.

Patented June 8, 1909.

Application filed June 4, 1907. Serial No. 377,189.

*To all whom it may concern:*

Be it known that I, KARL JOSEF EBERT, merchant, a subject of the German Emperor, residing at Cologne-on-the-Rhine, No. 3 Frankfurter street, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements Relating to Improvements in or Connected with Breech Mechanism for Small-Arms, of which the following is a full, clear, and exact description.

The known knee or toggle link arrangements, irrespective of their purely constructive differential characteristics, are all so limited in their method of working, that the maximum stroke of the breech part effected by them can in no case be greater than the actual length of both members of the link taken together. This renders their application, to most weapons, and particularly to those which must have a certain shape dimensions and weight, impossible, because the ordinary very long cartridges necessitate lengths of link or lever which cannot be arranged in any weapon.

By means of the present invention it is possible to employ the knee or toggle link locking mechanism, which has been recognized as the ideal system, even with transportable weapons, and either with those having a fixed barrel or with those provided with a movable barrel without it being necessary to exceed the permissible dimensions of the same. In this connection it is to be noted that with weapons having movable barrels the knee or toggle link can be brought right up to its fully extended position, and opened in the usual manner by the barrel on its sliding back, thus forming a so called positive locking means. In the case, however, of weapons having fixed barrels in which the opening impulse (produced by the barrel as it slides back) is absent, it is ordinarily not possible to completely extend the knee or toggle link. It usually remains bent within certain limits (about 5°) in order that it can be opened merely by the pressure of the gas without the use of any other means. In this position the locking mechanism in the case of abnormally high gas pressures would probably not offer sufficient security against a premature opening. Therefore in weapons provided with fixed barrels and having knee or toggle link locking mechanism, the provision of suitable parts for giving the link at least a slight breaking movement after firing is generally

of the greatest advantage. In the case of the present link locking mechanism which turns right through, such parts are practically indispensable. Such parts which form a feature of my invention are also adapted to increase to any required degree the resistance of the locking mechanism in its locking position when this is desirable, as in sharp shooting. On the other hand, this resistance may be correspondingly reduced when the breech is opened by hand or when shooting with blank cartridges.

One form of construction of the present invention, as applied to a weapon having a fixed barrel, is shown in the accompanying drawings and illustrates by what means the fundamental object of the invention, namely, the increase or extension of the length of a knee or toggle link without prolonging the members of the link, is effected.

In the accompanying drawings, Figure 1 shows in vertical longitudinal section the breech mechanism with the new knee or toggle link arrangement, the breech or locking mechanism being closed and the firing pin or hammer cocked ready for firing. Fig. 2 shows the position of the knee or toggle link, as regards the parts of the breech mechanism affected by it in the locking or closed position. Fig. 3 is a transverse section through the gun taken on the line 1—1 of Fig. 1 showing the arrangement and disposition of the pair of knee or toggle levers in the breech of the gun with relation to the breech bolt or cylinder *d*. In this figure the link is shown as partly broken. Fig. 4 is a diagrammatic view of the new knee or toggle link in its extreme extended position and Figs. 5 to 9 are detail views. Fig. 10 is a horizontal view partly in section of the link mechanism in its forwardly extended position; Fig. 11 is a longitudinal sectional view showing the link mechanism and breech cylinder in elevation and the breech cylinder moved backward to approximately the middle position; Figs. 12 and 13 are respectively a side elevation and plan partly in section of the same parts moved back to their released position.

Referring to the drawings, the mechanism illustrated constitutes a straight pull locking mechanism the breech locking bolt or cylinder *d* of which is exposed to the constant pressure of a spring *e* tending to close the same, which latter also receives or absorbs the recoil, and further, by pushing forward



the breech cylinder into its closed position and introducing a fresh cartridge into the barrel, brings the weapon again into the condition ready for firing.

5 In order to render the action of the spring *e* uniform and independent as to whether the firing pin or hammer is cocked or not, a special hammer spring *f* is so arranged that in the unlocked or open position, the action  
10 of the spring *e* is still further increased. Both springs *e* and *f* are guided by a tube or socket *h* which is either screwed into the rear part of the breech casing *a* of the  
15 weapon or inserted by means of a bayonet joint and after removal of the casing *a* of the weapon, can be taken out of the same.

The breech *a* of the weapon is at its top covered over and the socket *h* is secured in position by means of a half circular cover *b*.  
20 which as may be seen from Fig. 3 is mounted and slides into and out of position in guides *b*<sup>1</sup> and in a similar manner the accidental displacement thereof is prevented.

After removing the cover *b* from the  
25 breech *a* the breech cylinder *d* together with the firing pin or hammer *g* and the knee or toggle link *l*—*m* can be drawn upward out of said breech.

All the other parts effecting the discharg-  
30 ing and securing of the weapon as may be seen from Figs. 1 and 5 to 8 of the drawings are arranged on the trigger guard *c* which also forms the lower part of the magazine and receives one end of the cover for the  
35 under side of the same and its means of fastening.

The knee or toggle link as shown preferably comprises a member *l* formed of two side pieces *l*<sup>2</sup> *l*<sup>2</sup> each of which is pivoted in  
40 the breech at *l*<sup>1</sup> (Fig. 3) and a U-shaped member *m* having legs pivoted at *m*<sup>1</sup> on each side of the breech cylinder *d*. The pieces *l*<sup>2</sup> *l*<sup>2</sup> are arranged on opposite sides of the member *m* and pivoted to the latter at its  
45 free end at *m*<sup>3</sup> as clearly shown in Fig. 3. It will be seen that the members *l* and *m* are mounted in different parallel planes which extend at right angles to the pivotal axes of the members. The result of this construc-  
50 tion is that as the breech cylinder moves backwardly the member *m* passes between the side pieces *l*<sup>2</sup> *l*<sup>2</sup> completely through the member *l* to the rear of the same. This action will be clear from the diagram Fig.  
55 4. In this diagram the point *c* corresponds to the pivot *l*<sup>1</sup> of the member *l*, which point remains fixed during the movements of the cylinder. The point *b* which corresponds to the pivot *m*<sup>3</sup> travels in the circular shaded  
60 path. The point *a* which corresponds to the pivotal connection *m*<sup>1</sup> travels in a straight line to a position in the same vertical plane as the point *c* and then an equal distance to the rear of such point, so that it reaches the  
65 position *a*<sup>1</sup>. The links *l* and *m* swing rear-

wardly during these movements, from full line to dotted line positions. It will be seen that by my invention it is possible to provide a movement of the breech cylinder  
70 equal to twice the combined length of the links, so that a given movement may be provided for with a very small and compact link mechanism. It will be understood, how-  
75 ever, that my improved mechanism is of great importance even though its full capacity of movement is not utilized, and I desire to claim it broadly whether or not it is so  
80 used. In the construction shown the full capabilities of the mechanism are not used, but even in this construction the length of travel of the cylinder *d* is about one half longer than the combined lengths of the links.

The position which the various parts of the new breech system take up with regard  
85 to each other when locked or closed may be seen from Figs. 1 and 2. In the form of construction shown in these figures the discharge of the weapon is effected as may be  
90 seen from Fig. 1 by the movement of the trigger rod or sear *n* which is pivoted to the fixed point *n*<sup>1</sup> and is in loose connection by means of a spring *n*<sup>2</sup> and a bolt *n*<sup>3</sup> with the  
95 trigger lever *o* which latter is pivoted to the fixed point *o*<sup>1</sup> and acts on the necessary detent parts in a suitable manner.

The securing of the loaded weapon from being accidentally discharged is effected in the usual known manner by displacing a  
100 rotary body *p* through about 90° which rotary body *p* is in the present case formed as an angle lever and is moved by the safety catch *q*<sup>1</sup>. The rotary body *p* passes with the solid part of its half removed shaft beneath  
105 the lever *o* and with its free lever end beneath the part *m* of the knee or toggle link whereby both are rendered immovable. Thus the knee or toggle link cannot effect  
110 any opening movement of the breech and the firing parts also are prevented from any movement.

In Figs. 5 to 9 I have shown the parts for giving an initial breaking movement to the link in connection with a weapon having a  
115 fixed barrel. The parts *r* (Fig. 9) provided for this purpose preferably take the form of suitably shaped plates which by means of pivots *r*<sup>1</sup> are arranged loosely in the interior of the socket or breech of the weapon close  
120 to the back magazine wall (Fig. 8) (one at the left and one at the right) and at their lower reinforced ends *r*<sup>2</sup> are exposed to the pressure of a spring *s* which is supported by the back wall of the magazine. Each of the  
125 plates *r* is formed with a nose *r*<sup>3</sup> which overlies the joint of the link, and which is adapted to press down such joint to give an initial breaking movement to the link when the plates are tilted downwardly around their  
130 pivots. Such parts are also adapted to lock



the link in its forward position or at least increase its resistance to opening. For this purpose the parts  $r$  are each provided with an inwardly projecting catch  $w$  which comes into contact at  $v$  with the lower edge of the front member  $m$  of the knee or toggle link when in the cocking position, and owing to the action of the spring  $s$  exerts a pressure tending to extend the link. The strength of this pressure is principally determined by the length of the lever arm  $l-v$ , but can be regulated within very wide limits by the use of springs  $s$  of different strengths. The locking effected in this manner offers every security against a premature opening when sharp shooting. It also prevents the opening by hand, for bringing into condition for firing by loading the magazine, and excludes the use of blank ammunition, unless the locking action of the parts  $r$  is previously wholly or partially annulled. The latter is preferably effected indirectly by the rotary body  $p$  effecting the safety of the loaded weapon, that is by both the catches  $p^1 p^1$  arranged on the same and by corresponding displacement of the safety catch  $q^1$ . This safety catch engages by means of teeth with the rotary body  $p$  and, as may be seen from Figs. 5 to 8, is so arranged with its boss  $q$  in the trigger guard bar that it can be moved from its normal position I when sharp shooting into the position III when the loaded weapon has to be secured, or into the position II when it is required to annul the locking action of the parts  $r$  and also if necessary to effect the initial breaking of the knee or toggle link by means of the same.

Figs. 7 and 8 show how the safety catch  $q^1$  with its boss  $q$  is arranged in the trigger guard bar  $c$ ; it is inserted in a pocket open at the top formed in the same and is held and centered by a part  $u$  in the bar  $c$  exposed to the pressure of a spring  $t$ . It is arranged so as to be axially displaceable but is prevented from rotating by a feather  $u^1$  and enters with its pivot  $u^2$  into the bore of the boss  $q$  of the safety catch, whereby the safety catch can be fixed in its three positions I, II, III, by projections  $u^3$  which are provided on the front surface of the part  $u$  and engage in corresponding grooves formed on the surface of the boss  $q$ .

Fig. 5 shows the relation of all the locking parts to each other when sharp shooting, with the safety catch in its fundamental position I. Now if the safety catch is moved from I to II then the various parts assume the position shown in Fig. 6 as the rotary body with its catches  $p^1 p^1$ , sliding along the profile curve  $r^4$  on the lower end of the parts  $r$  turns the same so far by overcoming the action of the spring  $s$  that  $w$  is released from  $v$  and the nose  $r^3$  presses on the end of the link  $l$  and thus somewhat opens or breaks the knee link. Now if at the end of the first

loading movement or of the shooting with blank ammunition, the safety catch is turned back into its fundamental position I, then the weapon is again ready for sharp shooting and for the self loading working connected thereto.

What I claim as my invention, and desire to secure by patent is:

1. In a breech mechanism for firearms, a link mechanism comprising a plurality of members one of which has a pivotal connection with a fixed part of the gun, and another of which has a pivotal connection with a movable part of the gun, said last named member being adapted to move rearwardly to a point in which its pivotal connection passes that of the first member.

2. In a breech mechanism for firearms, a breech cylinder, a locking link mechanism connected with such cylinder and a pivoted member having a portion on one side of said link mechanism adapted to give an initial breaking movement to said mechanism, and having on the other side of said link mechanism a stop adapted to engage said mechanism and cause it to resist the breaking movement, and a spring tending normally to move said stop against said mechanism.

3. In a breech mechanism for firearms, a breech cylinder, a locking link mechanism connected with such cylinder and a pivoted member having a portion on one side of said link mechanism adapted to give an initial breaking movement to said mechanism, and having on the other side of said link mechanism a stop adapted to engage said mechanism and cause it to resist the breaking movement, and a controlling device adapted to control the operation of said pivoted member.

4. In a breech mechanism for firearms, a breech cylinder, a locking link mechanism connected with such cylinder and a pivoted member having a portion on one side of said link mechanism adapted to give an initial breaking movement to said mechanism, and having on the other side of said link mechanism a stop adapted to engage said mechanism and cause it to resist the breaking movement, and a spring tending normally to move said stop against said mechanism, and a controlling mechanism having two positions, in one of which said spring is adapted to operate said pivoted member to force said stop against said mechanism, and in the other of which said pivoted member is moved to effect the initial breaking movement of said mechanism.

5. In a breech mechanism for firearms, a breech cylinder, a locking link mechanism connected with such cylinder, and a part having a portion adapted to effect an initial breaking movement of such mechanism, and a portion adapted to resist such breaking movement, a rotary body  $p$  having catches  $p^1 p^1$ , one of which is adapted to control said



pivoted member *r* and the other of which is adapted to lock the firing pin or striking part of the breech mechanism.

5 6. In an automatic firearm, the combination of a breech cylinder movable in a straight line forward and backward, of a link mechanism consisting of a plurality of members the rear one of which is pivoted to the casing of the gun and the forward one  
10 of which is pivoted to said breech cylinder, the parts being arranged with an open path for said forward link and said breech cylinder backward past the pivotal connection of said rear member with the casing and  
15 past said rear member.

7. In an automatic firearm, the combination of a breech cylinder movable in a straight line forward and backward, of a link mechanism consisting of a plurality of  
20 members the rear one of which is pivoted to the casing of the gun and the forward one of which is pivoted to said breech cylinder, said rear member being a forked arm between

the prongs of which the forward member is adapted to move backward toward its rear- 25  
wardly extended position and past the pivotal connection of said rear member to the casing.

8. In an automatic firearm, the combination of a breech cylinder movable in a 30  
straight line forward and backward, of a link mechanism consisting of a plurality of members, and means for supporting the same in the locking position and thus strengthening the locking effect, said means comprising 35  
a plate within the range of movement of and having a portion adapted to engage one of said members, and a spring pressing said plate toward said member.

In witness whereof, I have hereunto signed 40  
my name in the presence of two subscribing witnesses.

KARL JOSEF EBERT.

Witnesses:

BESSIE T. DUNLAP,  
LOUIS VANDORN.