

No. 734,416.

PATENTED JULY 21, 1903.

C. HOLMSTRÖM & A. E. MASCALL.
BREECH MECHANISM FOR ORDNANCE.

APPLICATION FILED JULY 28, 1902.

NO MODEL.

4 SHEETS---SHEET 1.

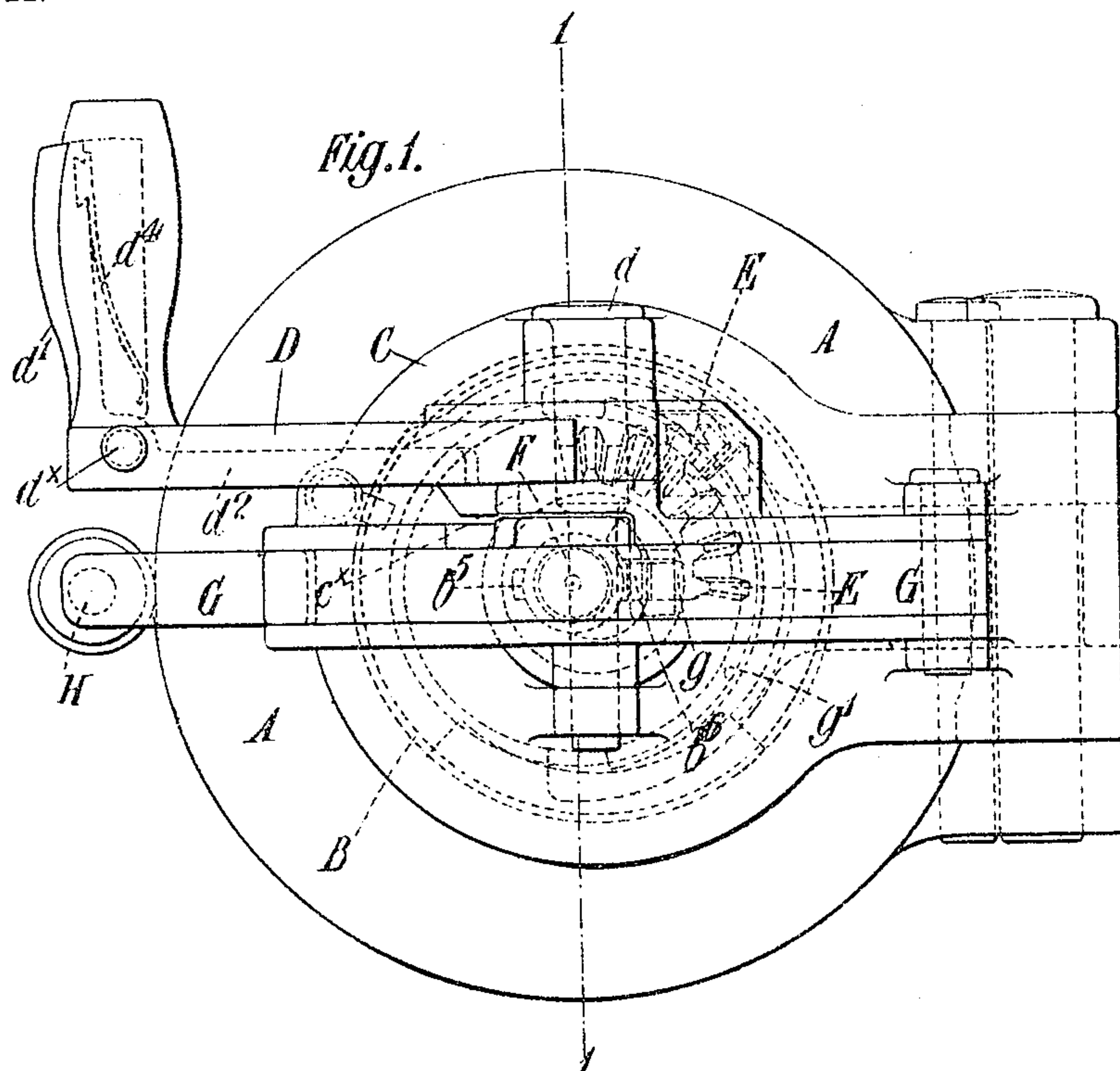
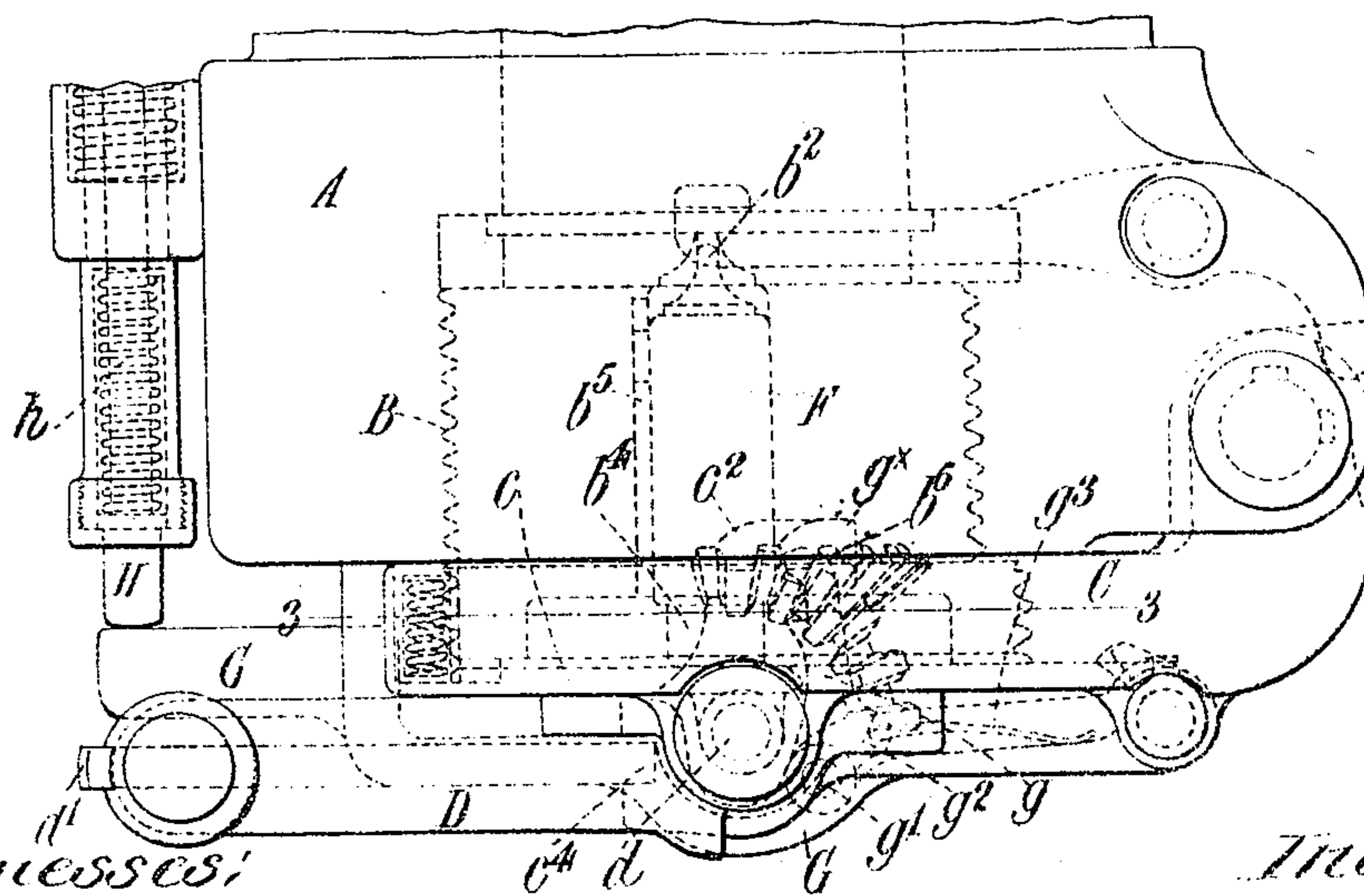


Fig. 2.



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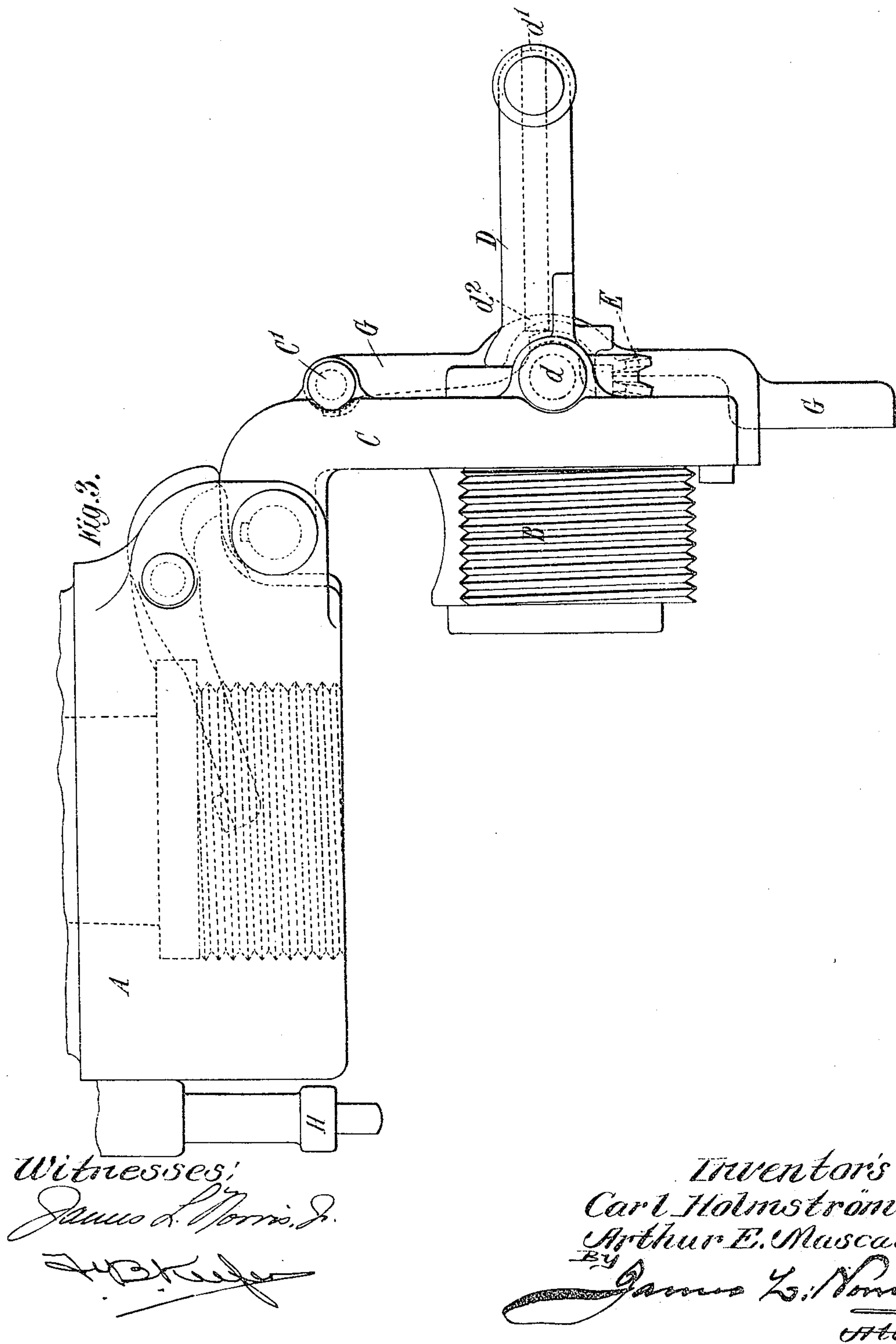
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3

Fig. 4.

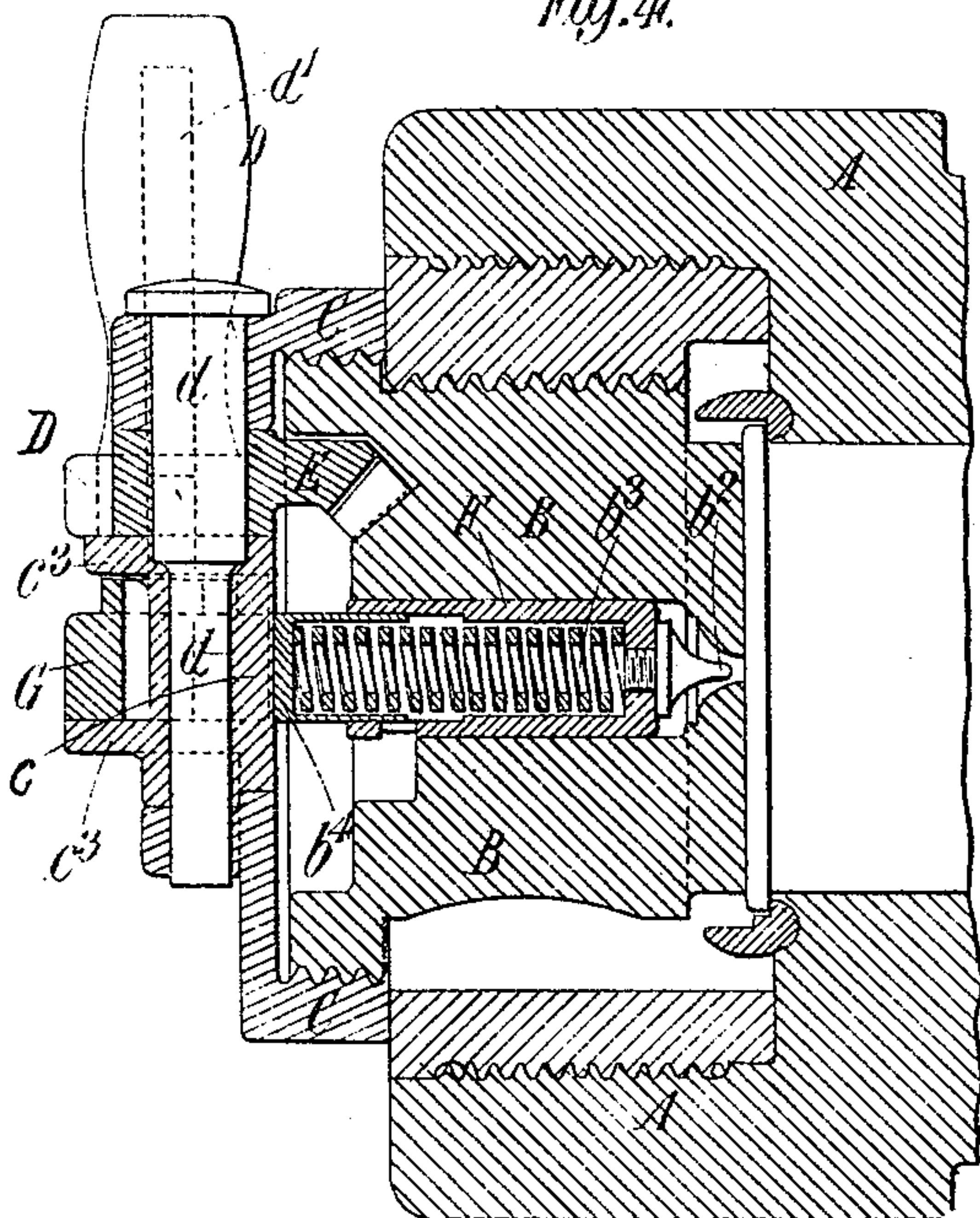


Fig. 8.

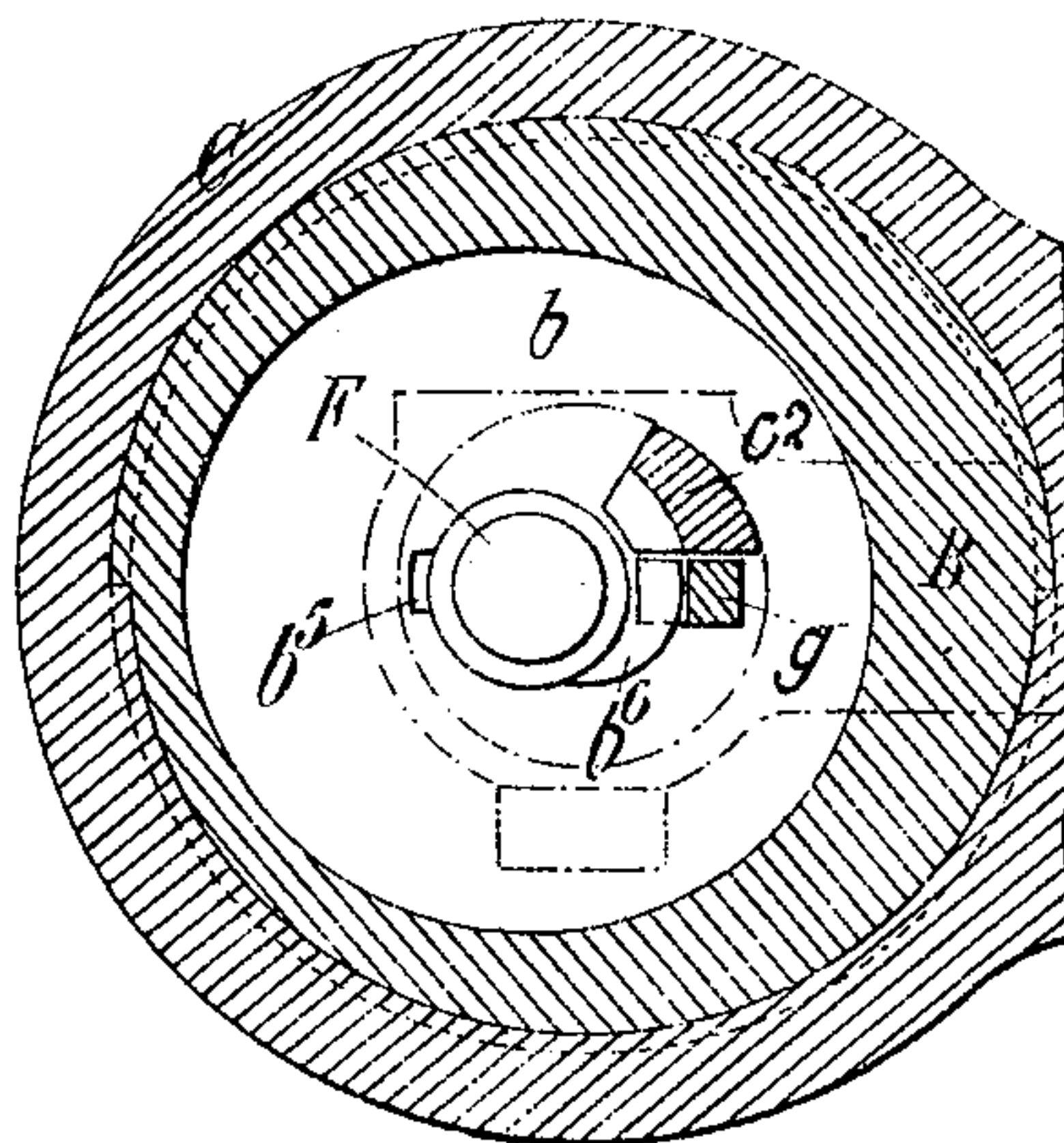


Fig. 9.

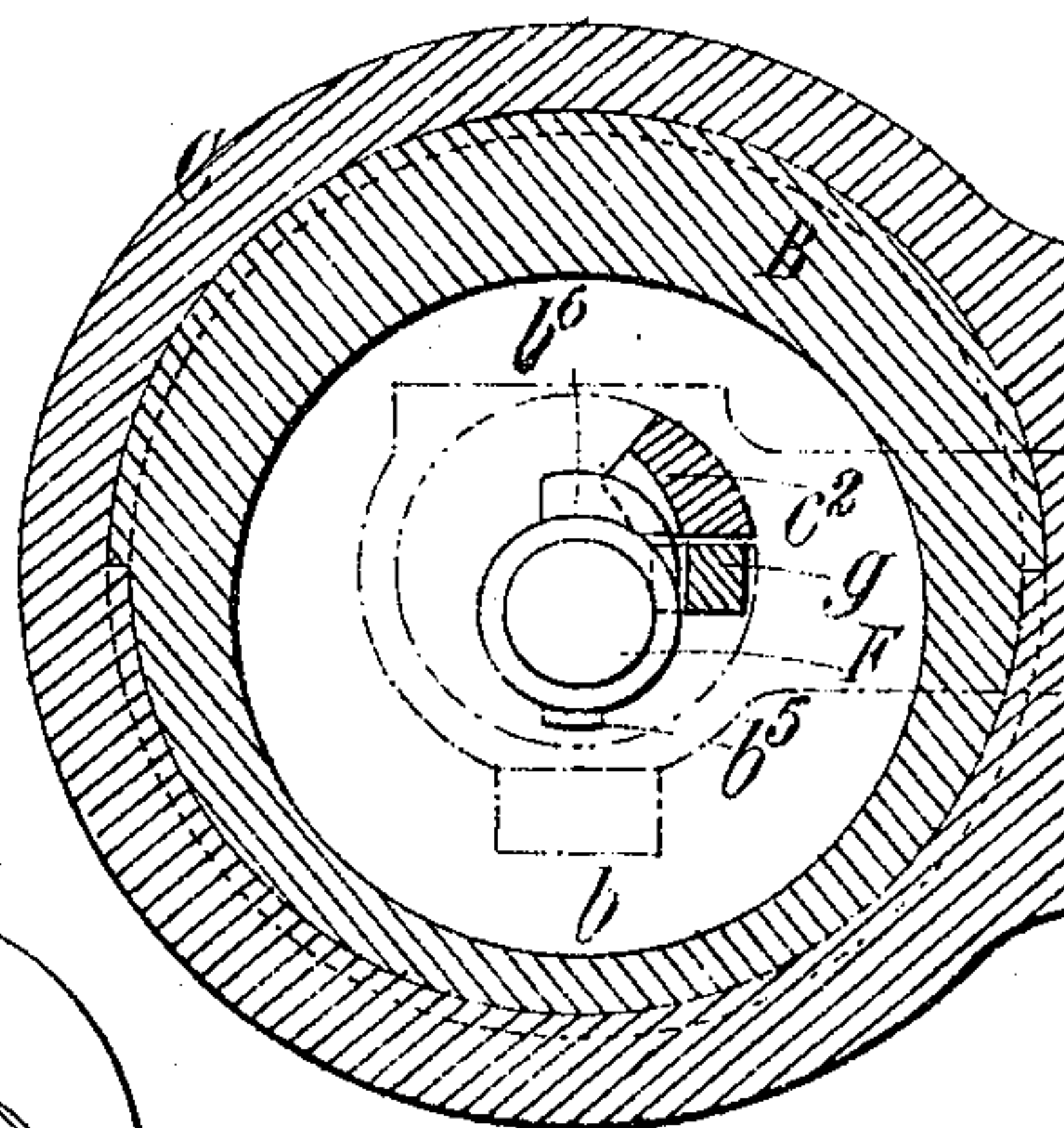


Fig. 10.

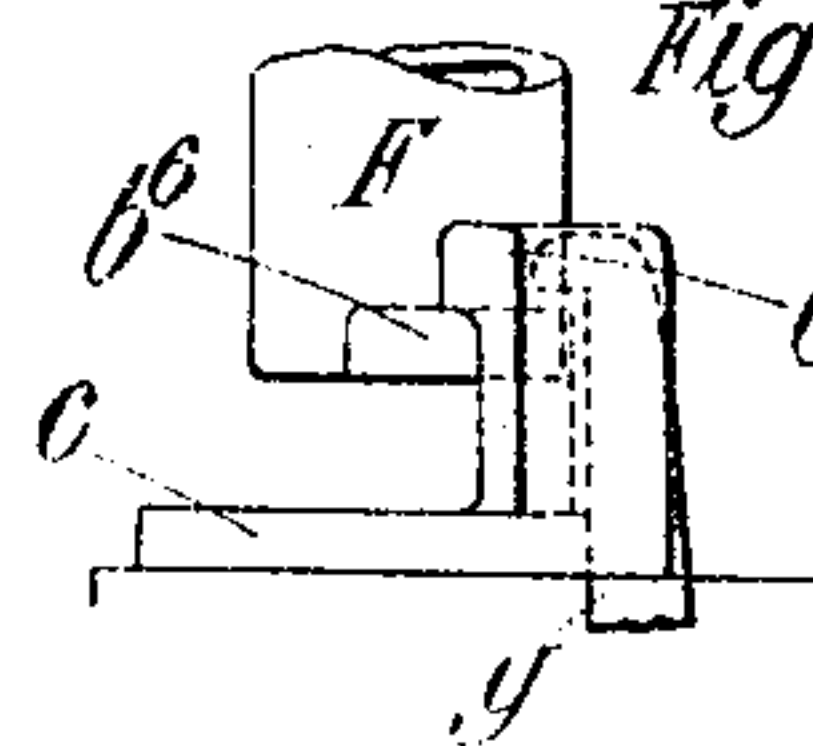
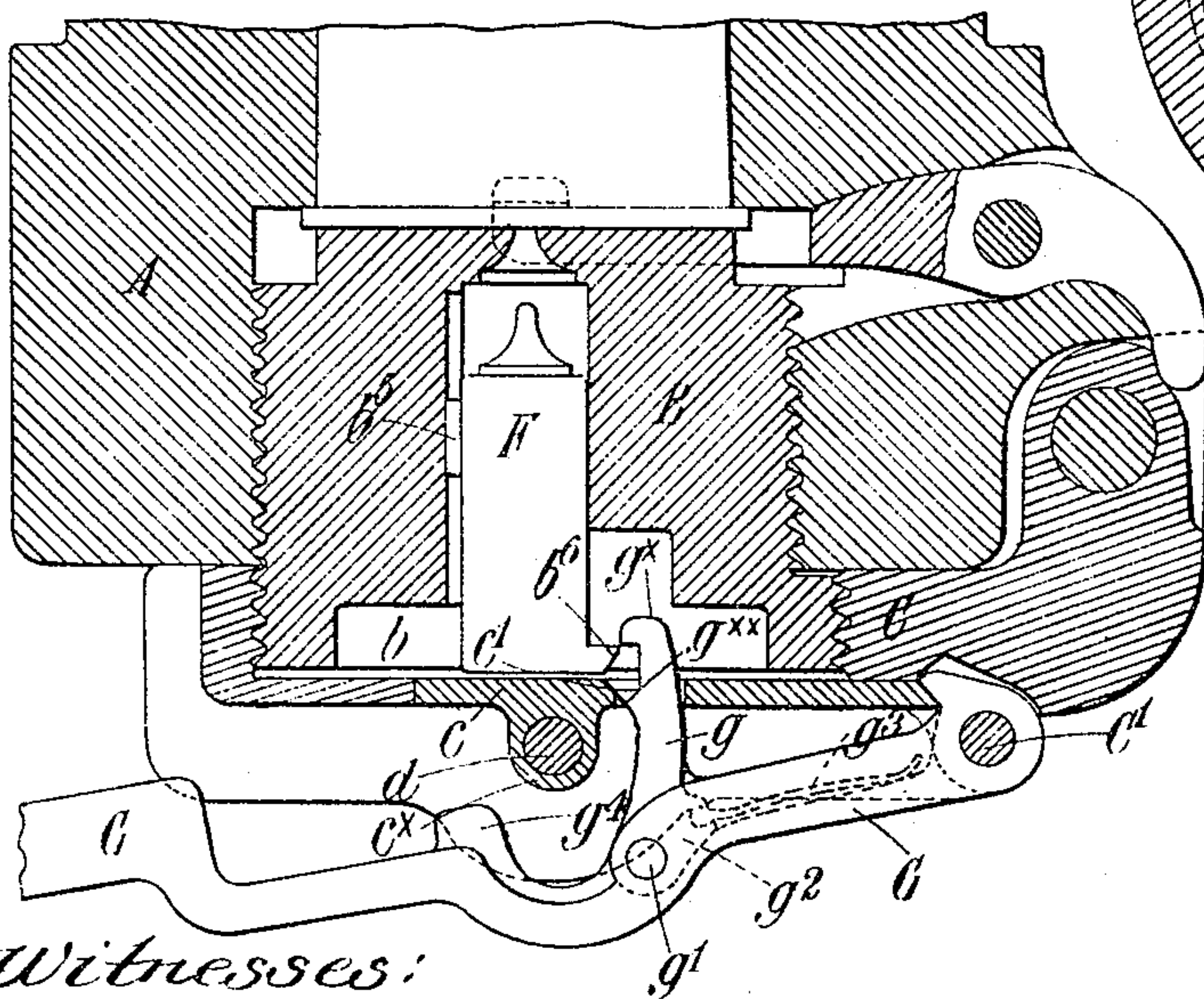


Fig. 5.



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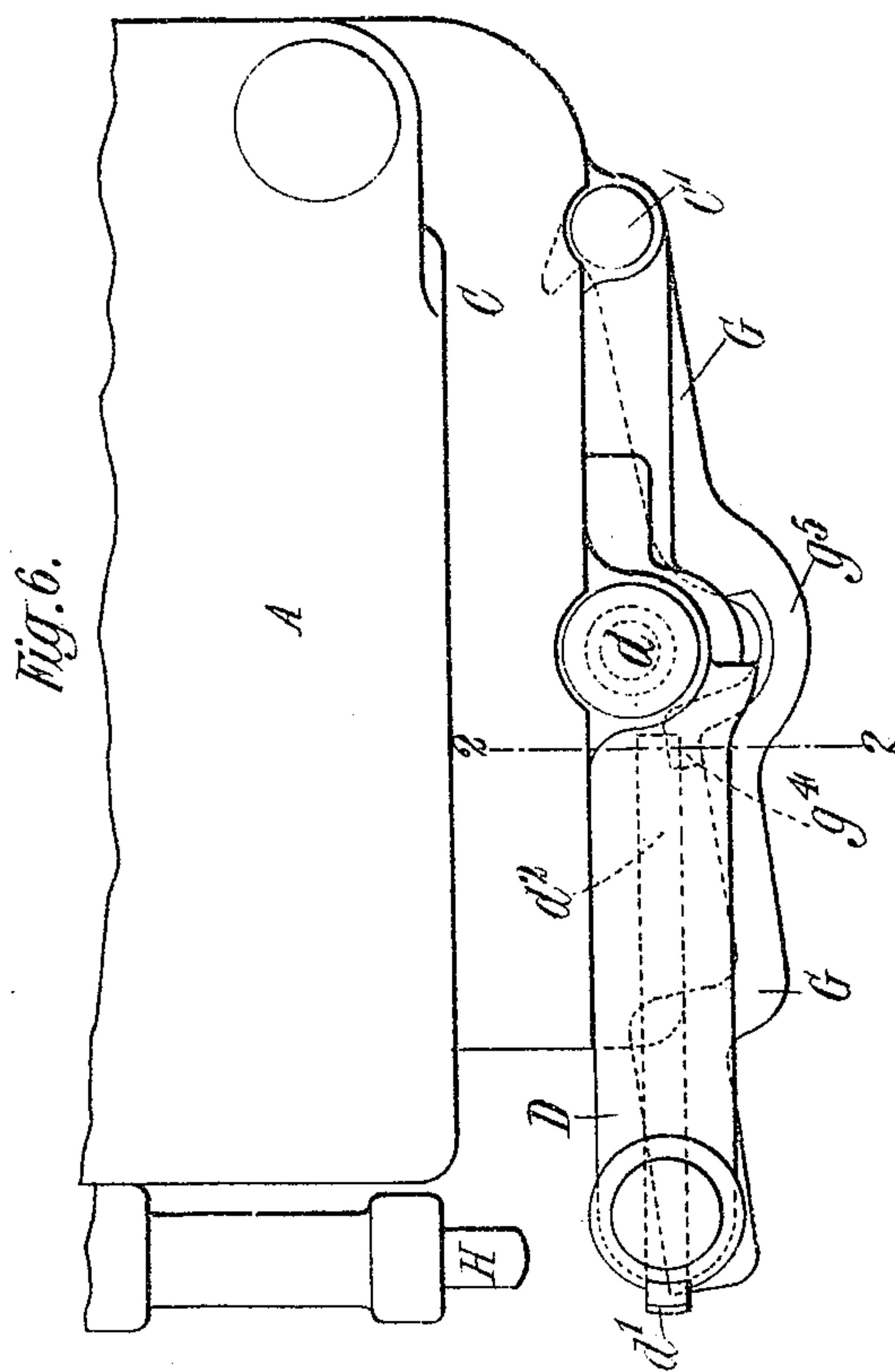
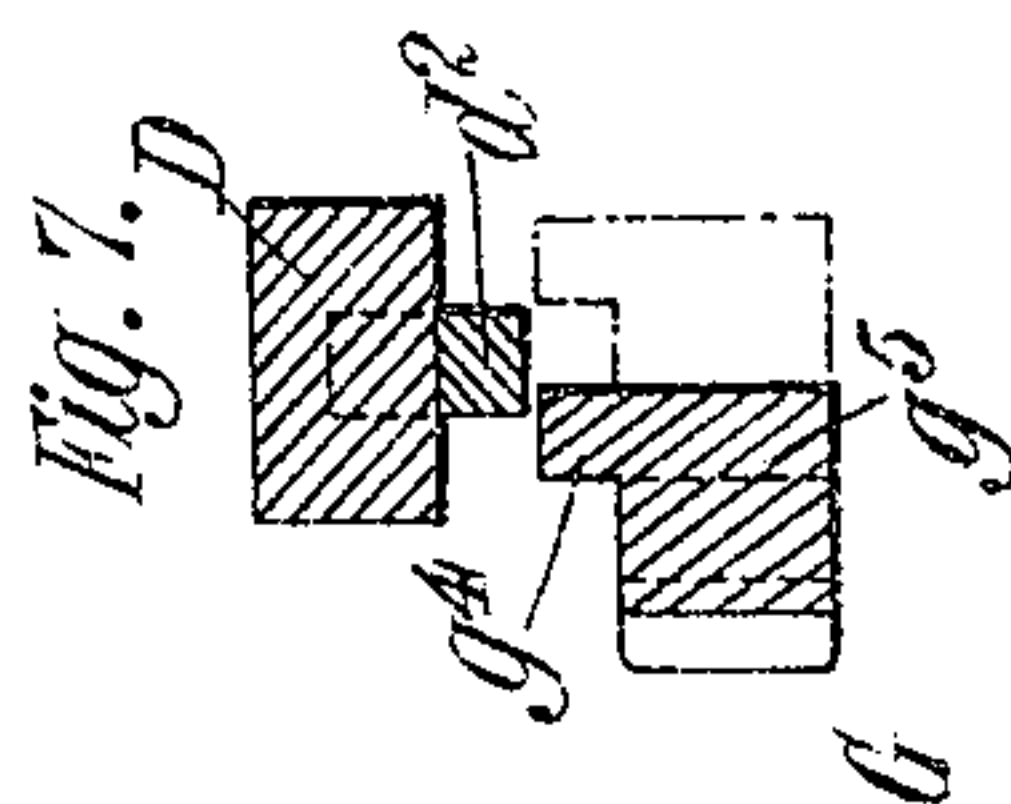
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

CARL HOLMSTRÖM AND ARTHUR EDWARD MASCALL, OF GLASGOW,
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BREECH MECHANISM FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 734,416, dated July 21, 1903.

Application filed July 28, 1902. Serial No. 117,406. (No model.)

To all whom it may concern:

Be it known that we, CARL HOLMSTRÖM, engineer, a subject of the King of Sweden and Norway, S. M. T., and ARTHUR EDWARD MASCALL, engineer, a subject of the King of Great Britain, S. M. T., both residing at Parkhead Forge, Rolling Mills and Steel Works, Glasgow, Scotland, have invented certain new and useful Improvements in Breech Mechanism for Ordnance, of which the following is a specification.

Our invention relates to improvements in the breech mechanism of ordnance using fixed ammunition, and has for its object to construct very efficient and simple mechanism which without any specially constructed or applied safety devices affords the means for preventing premature or untimely discharge and accidents from "long fire" or "hang fire."

The breech mechanism to which our improvements are more particularly applicable is of the kind in which the breech of the gun is closed by the angular movement of a plug or block having interrupted screw-threads, said plug or block being mounted on a swinging carrier hinged to one side of the gun-breech and moved by a suitable hand-lever arrangement.

An important feature of our invention is the combination of a loosely-pivoted arm or lever (which we term a "cocking and firing" lever) with other parts of the mechanism in such a manner that if the gun is properly discharged and recoils the cocking and firing lever will, by reason of its inertia during the recoil or the shock of discharge, cause the mechanism to be placed in such a position that the breech block can be unscrewed; but if there has been a long fire or hang fire the said cocking and firing lever does not have the aforesaid effect and the breech-block cannot be unscrewed until the said lever has been adjusted by hand.

In order that our said invention may be clearly understood and readily carried into practice, we will describe the same more fully with reference to the accompanying drawings, in which—

Figure 1 is a rear end elevation of a gun with our improved breech mechanism applied thereto. Fig. 2 is a plan showing the breech

closed, and Fig. 3 a plan showing the breech open. Fig. 4 is a longitudinal section taken approximately on the line 1 1 of Fig. 1. Fig. 5 is a central horizontal section showing the position of the cocking and firing lever and its pawl when the firing-pin has been released to fire the gun. Fig. 6 is a plan showing the position of the cocking and firing lever when it has been actuated to fire the gun but the gun has failed to be discharged owing to a hang fire or long fire. Fig. 7 is a detail cross-section taken on the line 2 2 of Fig. 6. Figs. 8 and 9 are vertical sections taken approximately on the line 3 3 of Fig. 2 and showing, respectively, the position of the firing-pin after and before the block is locked in the breech. Fig. 10 is a detail plan of the rear portion of the firing-pin and parts immediately connected therewith in the position shown in Fig. 9.

A is the wall of the gun; B, the breech-block; C, the swinging carrier; D, the hand-lever, and E the toothed gearing, through which the movements of the hand-lever impart an angular movement to the block to lock and unlock the same.

F is the firing-pin, and G is the cocking and firing lever.

Extending forward from an eccentric recess b in the rear end of the block is a chamber b' , wherein we place the firing-pin, which is fitted to slide longitudinally in said chamber. The firing-pin we prefer to use is hollow or tubular and has a steel point or nose b^2 at its forward end. It contains the mainspring b^3 , by which it is driven forward to fire the gun. At the rear end of the firing-pin there is a socket b^4 , against which the rear end of the said spring b^3 abuts and keeps said socket pressed against a guide-piece c , which is secured to the carrier by the pin d of the hand-lever D, passing through a bearing c^x on the guide-piece, said guide-piece serving to support the aforesaid cocking and firing lever G. The firing-pin is formed with a key or feather b^5 , which enters a groove in the block and serves to permit the firing-pin to slide without turning. The said firing-pin is also formed with a lug or projection b^6 , arranged to engage with the nose g^x of a pawl g . This pawl is pivoted at g' to the aforesaid cocking and

firing lever G and has a tailpiece g^2 , which is acted on by a spring g^3 , that tends to keep said pawl in engagement with the lug or projection b^6 of the firing-pin. The said pawl has a projection g^{xx} , which is so situated relatively to a projection c' on the guide-piece c that when the cocking and firing lever G is actuated to cause the pawl to draw back the firing-pin the pawl will be disengaged to liberate the firing-pin as the latter completes its rearward movement, Fig. 5, and will thereby permit it to fly forward under the action of its spring to fire the gun. It will thus be seen that the firing-pin is not cocked until the moment of firing the gun. On the aforesaid guide-piece there is a hook-shaped piece c^3 , with which the lug or shoulder b^6 of the firing-pin engages as the block is angularly displaced in its unlocking movement. The said lug or shoulder is inclined on its forward surface, as clearly seen in Fig. 10, so that as said angular movement of the block takes place this inclined surface of the lug or shoulder will slide on the hook-shaped piece, whereby the firing-pin will be further retracted to an extent sufficient to relieve the nose of the pawl from the pressure of the firing-pin under the action of its spring until the block is again screwed into its locked position. The pawl will then reengage with the said lug or projection on the firing-pin and be ready to disengage said firing-pin when the pawl is released, as above described, to fire the gun.

The aforesaid cocking and firing lever G is pivoted to the carrier at C' adjacent to the hinge of said carrier, and said lever extends transversely across the breech between flanges c^3 c^3 on the guide-piece c of the swinging carrier, the free end of said lever lying contiguous to the firing-rod II, which is carried by the gun-cradle and is of the ordinary well-known construction. When the gun is fired and recoils, the position of the said cocking and firing lever G, by reason of its inertia, is so changed relatively to the gun that the pawl g can engage with the firing-pin, as represented in Fig. 2. Then as the gun completes its return or running-out movement said lever strikes the end of the said firing-rod II, carried by the cradle, and is caused to move outward, thereby slightly retracting the firing-pin, Fig. 2, to bring its nose b^2 within the front face of the block, so that the latter can be turned about its axis (when the breech is to be opened) without impediment from the nose of the firing-pin.

The hand-lever D for operating the breech-block is mounted on a vertical pivot-pin d and is provided with a spring-catch comprising a two-armed lever d' d^2 , hinged to the hand-lever at d^x . One arm—viz., the arm d' —lies partly in a groove d^3 in the handle of said lever, so that it can be pressed inwardly against the resistance of a spring d^1 by grasping said handle to operate the mechanism. The other arm—viz., the arm d^2 —serves as a latch which under the action of said spring

d^1 enters a notch c^1 in the guide-piece when the breech is closed and which must be disengaged from said notch by grasping the handle, as aforesaid, in order to turn the lever to open the breech. The cocking and firing lever G also has a notch or shoulder g^1 , which is formed on a curved portion g^5 thereof. When the said lever G has been actuated to fire the gun, it lies in such a position that if there is a long fire or hang fire the latch of the arm D lies above the aforesaid shoulder g^1 , (see Figs. 6 and 7,) so that the said hand-lever D cannot be actuated by reason of the inability of the latch to move. If, however, there is no hang fire and the gun recoils, the said cocking and firing lever G will assume (owing to its inertia) such a position that the aforesaid shoulder lies out of the path of the latch, as shown by the dotted lines in Fig. 7, and as a consequence the hand-lever D will be capable of being actuated, because the said latch will be disengaged from said shoulder. When the latch is thus disengaged and the handle of the lever D is grasped, the said latch projects onto the curved exterior of the said shoulder g^6 of the cocking and firing lever and travels along such curved portion during the actuation of the said lever. This position of the latch therefore prevents the movement of the cocking and firing lever while the breech-block is being turned or swung about the hinge of the carrier.

Any suitable extractor may be employed; but we prefer to pivot the same near the hinge of the carrier, the said extractor having a short arm which is arranged to be struck by the carrier to actuate the extractor just before the full opening of the breech.

The working of the mechanism is as follows: The gun having been charged and the breech closed and locked, the parts lie in the position represented in Figs. 1, 2, and 4. On pulling the firing-rod or the cocking and firing lever G (which operation has the effect of cocking and releasing the firing-pin F, as already described) the gun is fired and recoils without, however, immediately overcoming the inertia of the cocking and firing lever G, which lever therefore has its position changed relatively to the other recoiling parts—i. e., it will occupy a position approximately that represented in Fig. 2. Consequently the pawl g is able to reengage with the firing-pin F, and as the gun returns to its firing position the said pawl moves the firing-pin backward into the position represented in Fig. 2—i. e., with the nose b^2 lying within the breech-block—and the cocking and firing lever will have assumed a position in which the shoulder g^1 is out of the path of the latch of the lever D. By grasping the handle of the lever D the latch will therefore be free to move and will permit the said lever to be turned in the direction necessary for unlocking the block. The block having been unlocked, the carrier will swing open by the further movement of the said hand-lever, and the breech be thereby

opened and the empty cartridge-case ejected. In the event, however, of the cartridge failing to be fired when the firing-pin is released and flies forward to strike the detonator the gun will of course not recoil, and as a consequence the position assumed by the cocking and firing lever G, after having been pulled, will not be changed relatively to the other parts of the mechanism, but will remain substantially in the position represented in Fig. 5. Therefore the shoulder g^1 will not permit the latch to come out of engagement with the notch c^1 when the handle of the lever D is grasped, so that it will not be possible to thereby actuate the mechanism to open the breech. The recocking and release of the firing-pin can, however, be effected by pushing forwardly the cocking and firing lever G and again pulling it or the firing-rod. For enabling the said lever to be thus pushed forwardly the adjacent end of the firing-rod is furnished with a spring-controlled plunger or extension h , whose spring is a light one, to enable it to readily permit the said plunger to move to a limited extent. If the cartridge still fails to be fired, then after awaiting the prescribed time limit for a hang fire the breech can be opened by moving the cocking and firing lever into a position to bring the said shoulder g^1 out of the path of the latch, whereby the lever D is liberated and can be actuated to open the breech, as aforesaid.

What we claim, and desire to secure by Letters Patent of the United States, is—

1. In gun-breech mechanism, the combination with a rotary block, a swinging carrier for same and means for actuating the block and the carrier; of a swinging inertia-controlled cocking and firing lever extending transversely across the rear face of the block, a pawl on said lever, a firing-pin with which said pawl is adapted to engage when the gun recoils and means for preventing the breech-actuating hand-lever from being operated until said pawl engages with said firing-pin substantially as described.

2. In gun-breech mechanism the combination with a rotary block, a swinging carrier for same and means for actuating the block and the carrier; of a swinging inertia-controlled cocking and firing lever extending transversely across the rear face of the block, a spring-pawl on said lever, a firing-pin with which said pawl is adapted to engage by the relative movement between said lever and said firing-pin due to the inertia of the lever when the gun recoils and a latch on the breech-actuating hand-lever controlled by said cocking and firing lever substantially as described.

3. In gun-breech mechanism, the combination with a rotary block, a swinging carrier for same and means for actuating the block and the carrier, of a swinging inertia-controlled cocking and firing lever extending transversely across the rear face of the block and pivoted to the carrier at the end adjacent

to the carrier-hinge, a spring-pawl on said lever, a firing-pin with which said pawl is adapted to engage when the gun recoils, means for causing said lever to retract the nose of the firing-pin into the face of the block as the gun assumes its forward position after firing and a latch on the breech-actuating hand-lever controlled by said cocking and firing lever substantially as described.

4. In gun-breech mechanism, the combination with a rotary block, a swinging carrier for same and means for actuating the block and the carrier; of a swinging inertia-controlled firing and cocking lever pivoted to the carrier near its hinge, a spring-pawl on said lever, a firing-pin with which said pawl is adapted to engage when the gun recoils, means for causing the lever to retract the nose of the firing-pin into the face of the block as the gun assumes its forward position after firing, means for actuating said lever to fire the gun and a latch on the breech-actuating hand-lever controlled by said cocking and firing lever substantially as described.

5. In gun-breech mechanism, the combination with a rotary block, a swinging carrier for same and means for actuating the block and the carrier; of a swinging inertia-controlled firing and cocking lever pivoted to the carrier near its hinge, a spring-pawl on said lever, a firing-pin with which said pawl is adapted to engage when the gun recoils, a resilient device for causing the lever to retract the nose of the firing-pin into the face of the block as the gun assumes its forward position after firing, and means for actuating said lever to fire the gun, substantially as described.

6. In gun-breech mechanism, the combination with a rotary block, a swinging carrier for same and means for actuating the block and the carrier; of a swinging inertia-controlled firing and cocking lever pivoted to the carrier near its hinge, a spring-pawl on said lever, a firing-pin, a lug on said firing-pin for the pawl to engage when the gun recoils, a resilient device for causing the lever to retract the nose of the firing-pin into the face of the block, a projection on the pawl, a projection on the carrier with which said projection of the pawl engages to release the latter when the swinging lever is actuated to fire the gun, and means for actuating said lever substantially as described.

7. In gun-breech mechanism, the combination with a rotary block, a swinging carrier for same and means for actuating the block and the carrier, of a swinging inertia-controlled firing and cocking lever pivoted to the carrier near its hinge, a spring-pawl on said lever, a firing-pin, a lug on said firing-pin for the pawl to engage with when the gun recoils, a trigger-rod for actuating the swinging lever to fire the gun, a light spring at the end of said rod adjacent to the swinging lever and normally tending to cause the said lever to retract the nose of the firing-pin into the face

of the block, a projection on the pawl, a projection on the carrier with which said projection of the pawl engages to release the latter when the swinging lever is actuated to fire the gun, substantially as described.

8. In gun-breech mechanism, the combination with a rotary block and means for actuating the same to open and close the breech, of a swinging inertia-controlled cocking and firing lever, a pawl on said lever, a firing-pin adapted to be engaged by said pawl when the gun recoils, means for actuating said swinging inertia-controlled lever, a latch on the breech-actuating hand-lever controlled by said cocking and firing lever and means for relieving the pressure of the firing-pin on the pawl until the block is angularly shifted in being locked to the breech for the purpose specified.

9. In gun-breech mechanism, the combination with a rotary block and means for actuating the same to open and close the breech, of a swinging inertia-controlled cocking and firing lever, a pawl on said lever, a firing-pin having a lug adapted to be engaged by said pawl when the gun recoils, means for actuating said swinging lever, and a fixed hook-shaped piece mounted on a piece that does not move with the block and with which the aforesaid lug is adapted to engage as the block is angularly displaced in the unlocking and opening of the breech for relieving the pressure of the firing-pin on the pawl substantially as and for the purpose specified.

10. In gun-breech mechanism, the combi-

nation with a rotary block, a swinging carrier for same and means for actuating the block and the carrier, of a swinging inertia-controlled cocking and firing lever, a pawl on said lever, a firing-pin with which said pawl is adapted to engage when the gun recoils, a hand-lever and gearing for turning the block and swinging the carrier, a latch on said hand-lever and means for preventing said latch from being operated unless the swinging inertia-controlled lever has shifted relatively to the block substantially as and for the purpose specified.

11. In gun-breech mechanism, the combination with a rotary block, a swinging carrier for same, and means for actuating the block and the carrier, of a swinging inertia-controlled cocking and firing lever, a pawl on said lever, a firing-pin with which said pawl is adapted to engage when the gun recoils, a hand-lever and gearing for turning the block and swinging the carrier, a latch on said hand-lever, and a curved shoulder on said swinging lever which shoulder in accordance with its position relatively to said latch operates to lock or release the same substantially as and for the purpose specified.

In testimony whereof we have hereunto set our hands, in presence of two subscribing witnesses, this 14th day of July, 1902.

CARL HOLMSTRÖM.

ARTHUR EDWARD MASCALL.

Witnesses:

JNO. MCFADZLAN,

ROBT. THOMSON.