

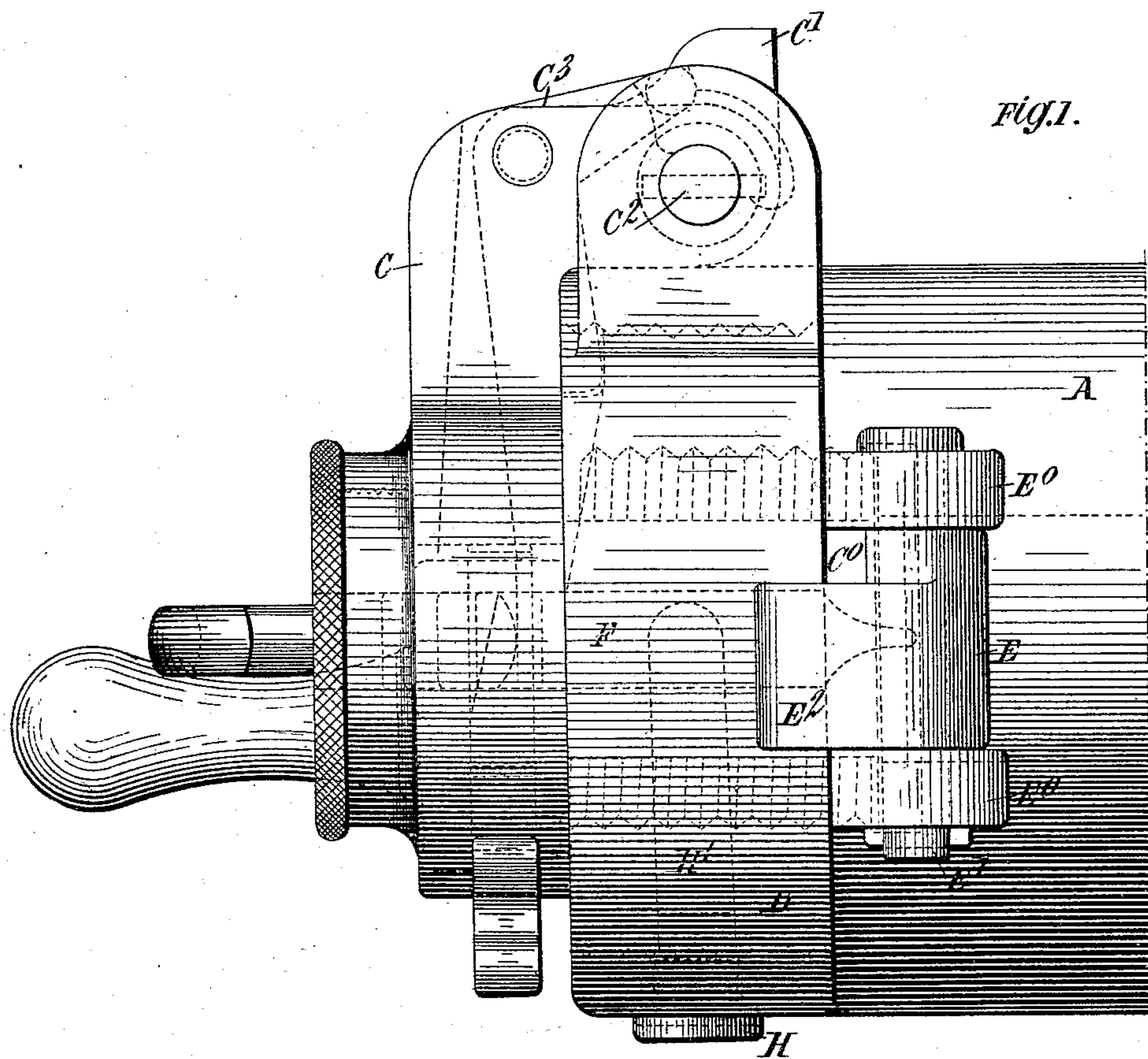
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10 Sheets—Sheet 1.

S. V. DARDIER & C. G. MELLSTROM.  
BREECH MECHANISM FOR ORDNANCE.

No. 538,014.

Patented Apr. 23, 1895.



Witnesses:  
Raphaël Kitter  
James M. Catlow

Inventors  
Samuel V. Dardier  
and Charles G. Mellstrom  
by Duncan & Page  
Attorneys.

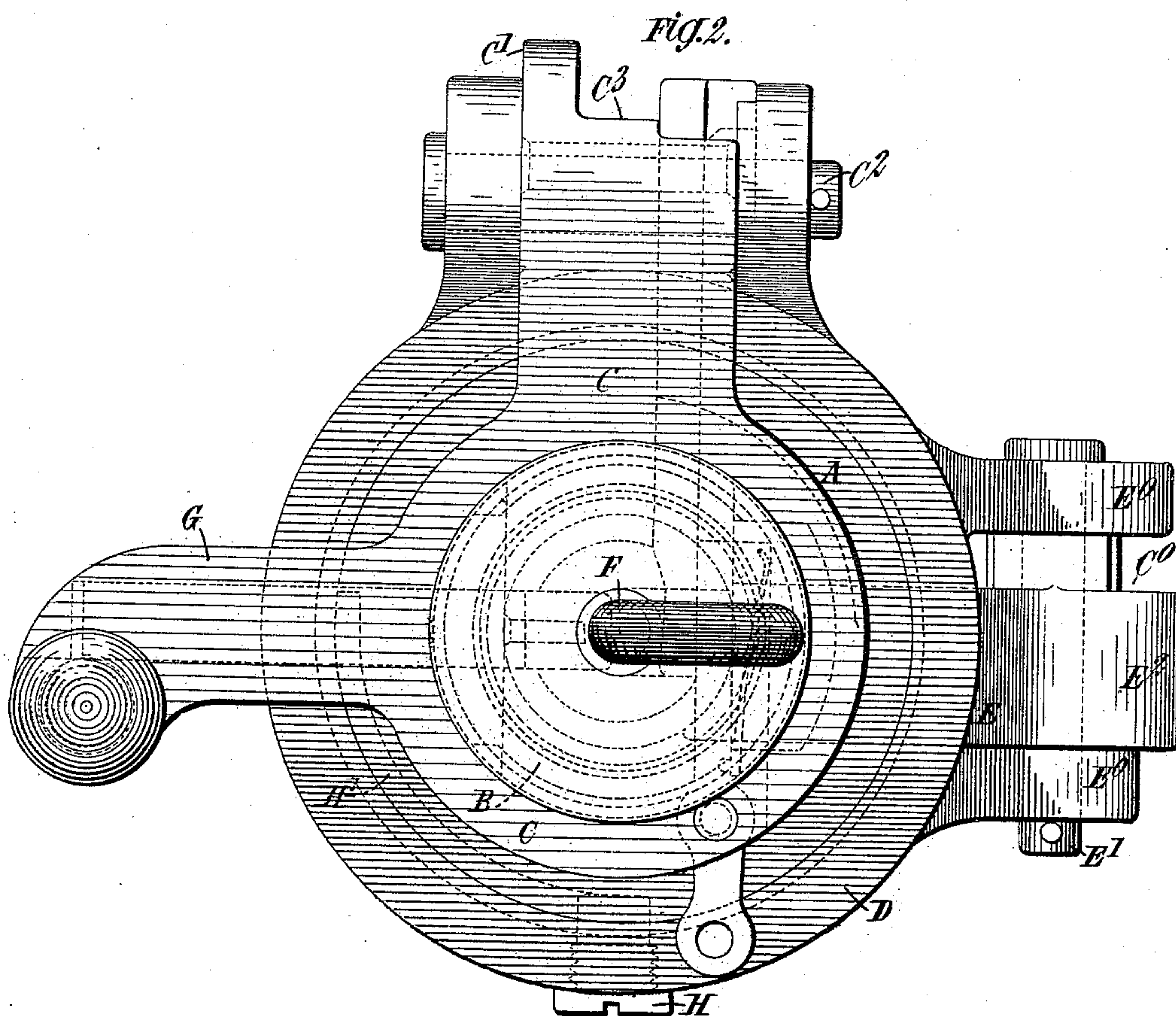
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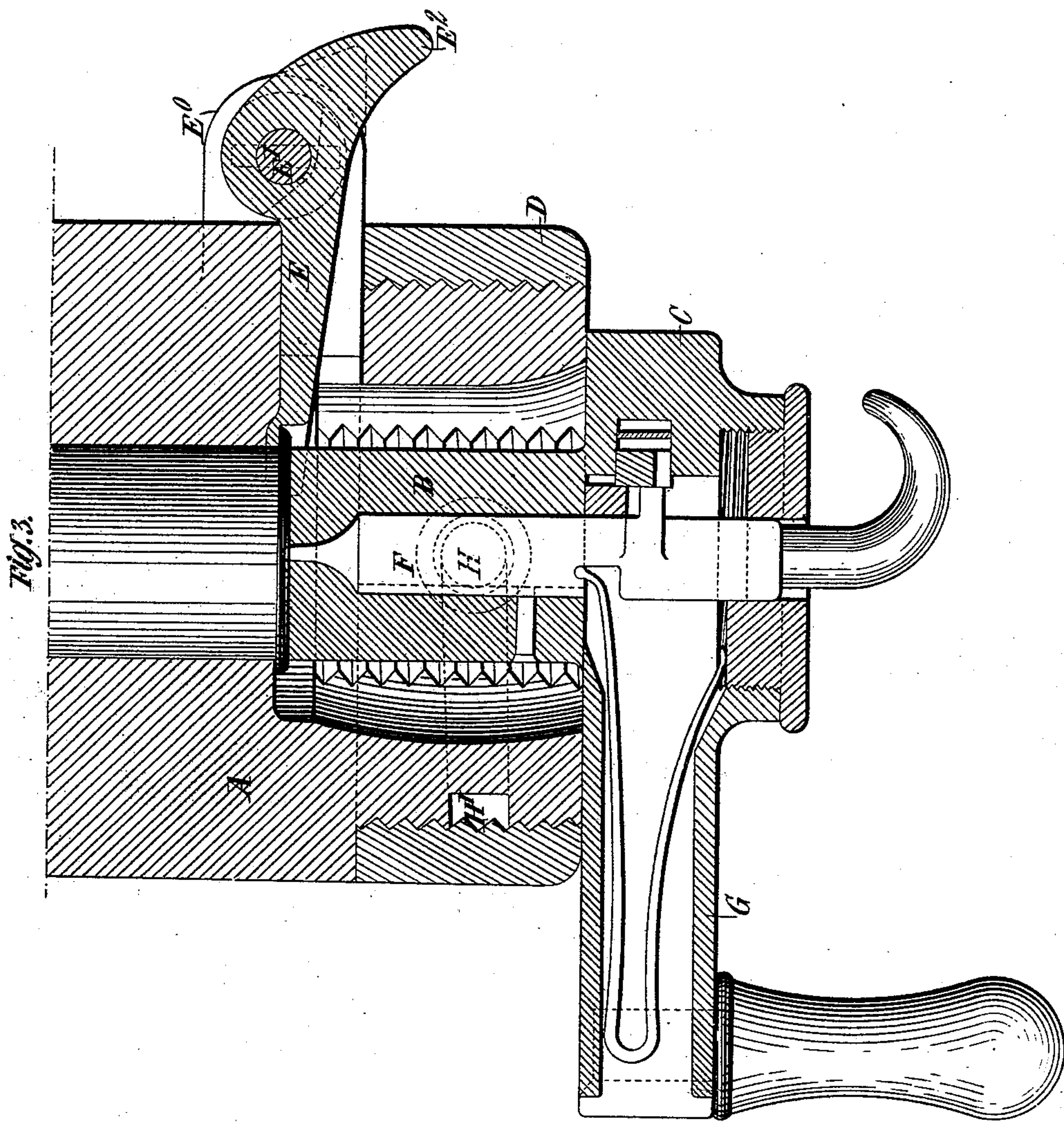
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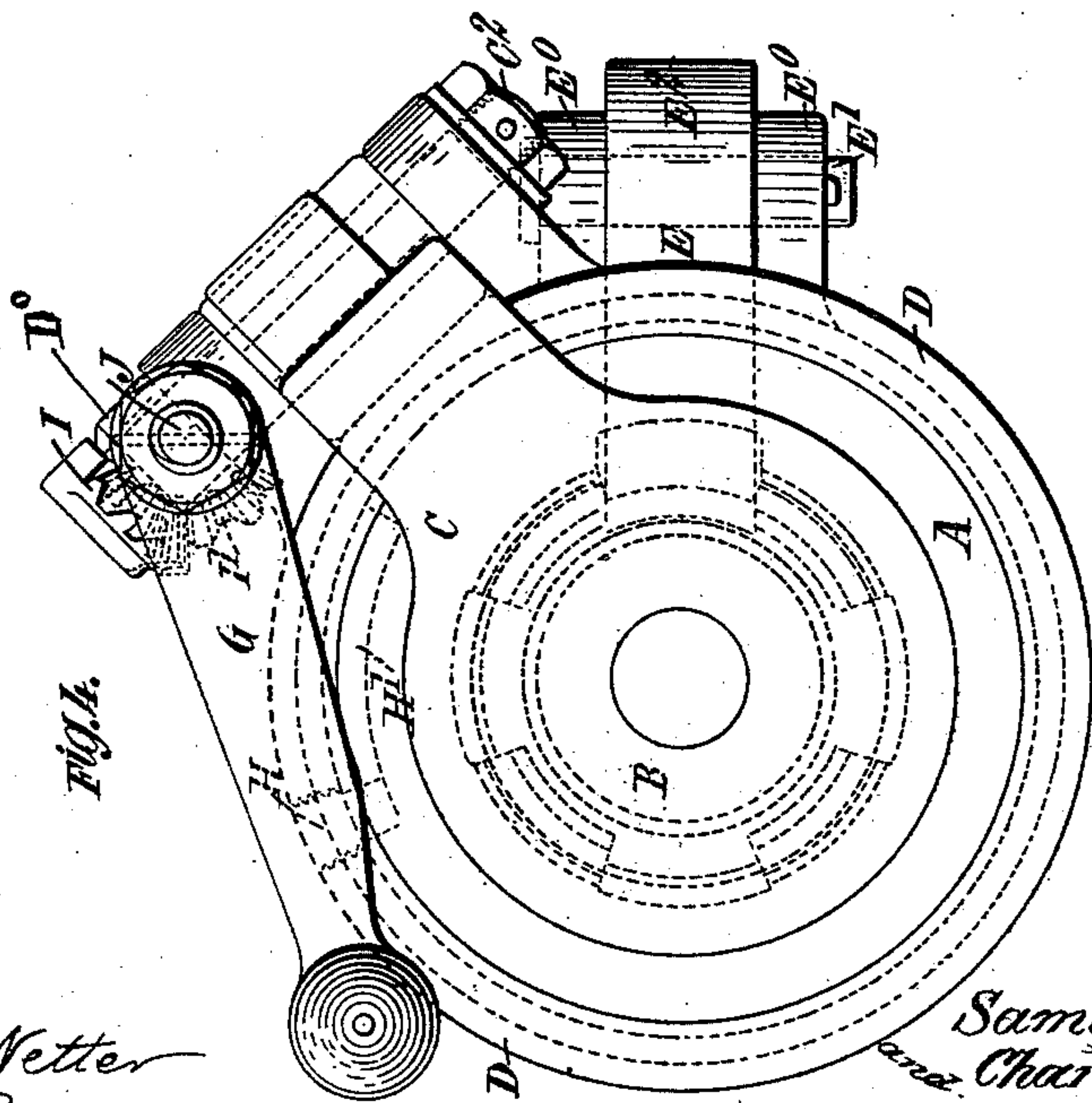
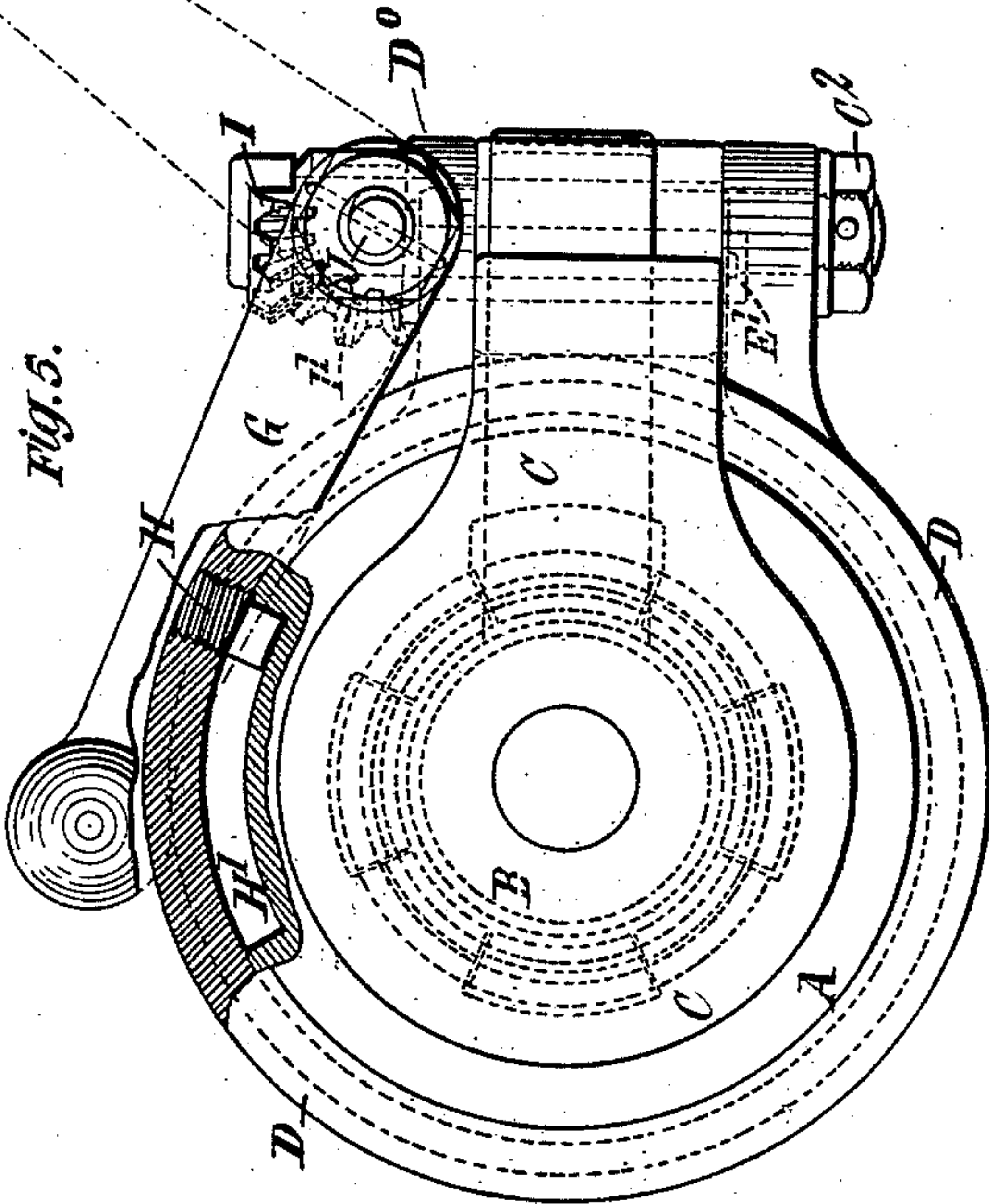
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Patented Apr. 23, 1895.



Witnesses:  
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(No Model.)

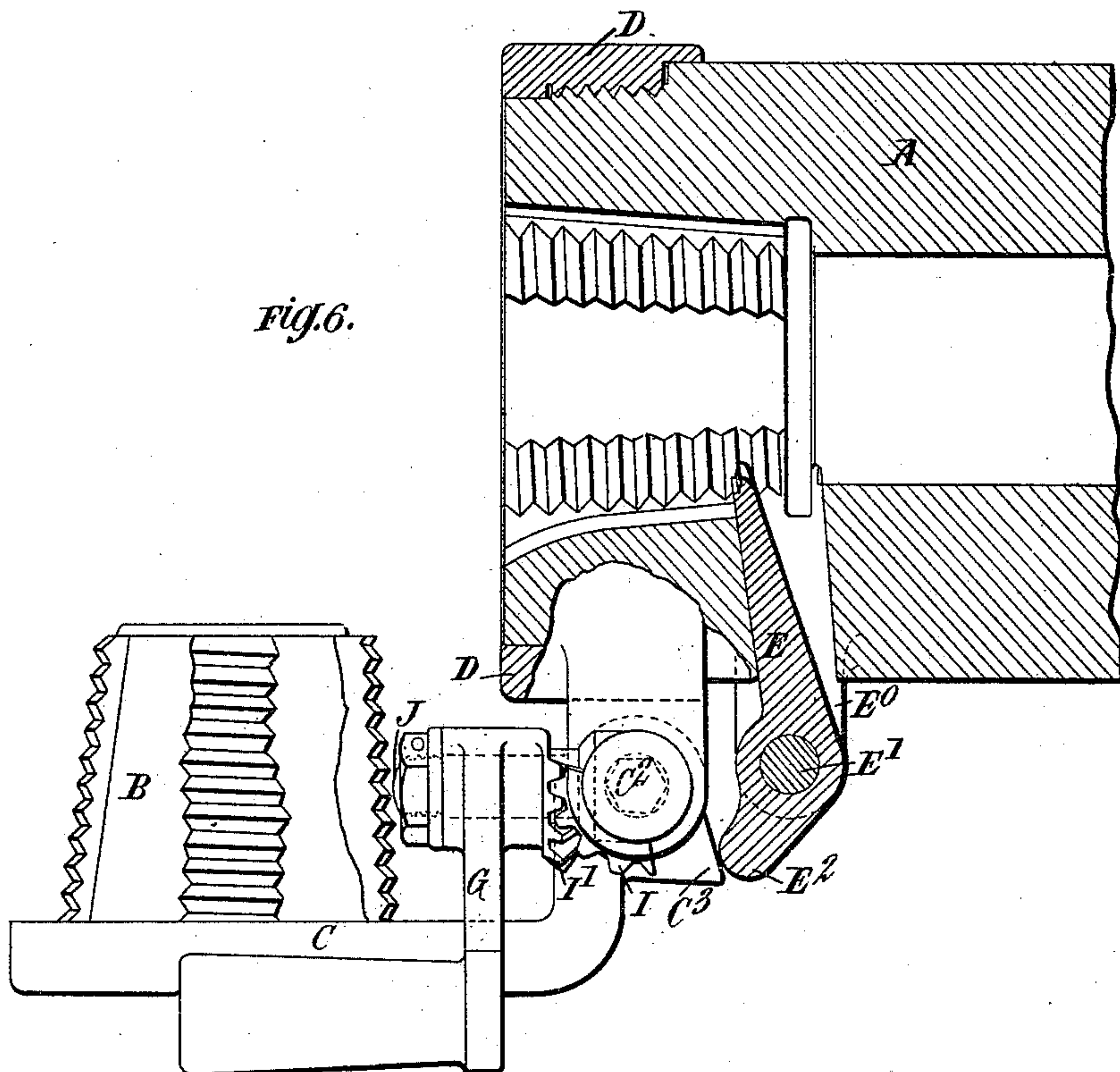
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S. V. DARDIER & C. G. MELLSTROM.

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Witnesses:  
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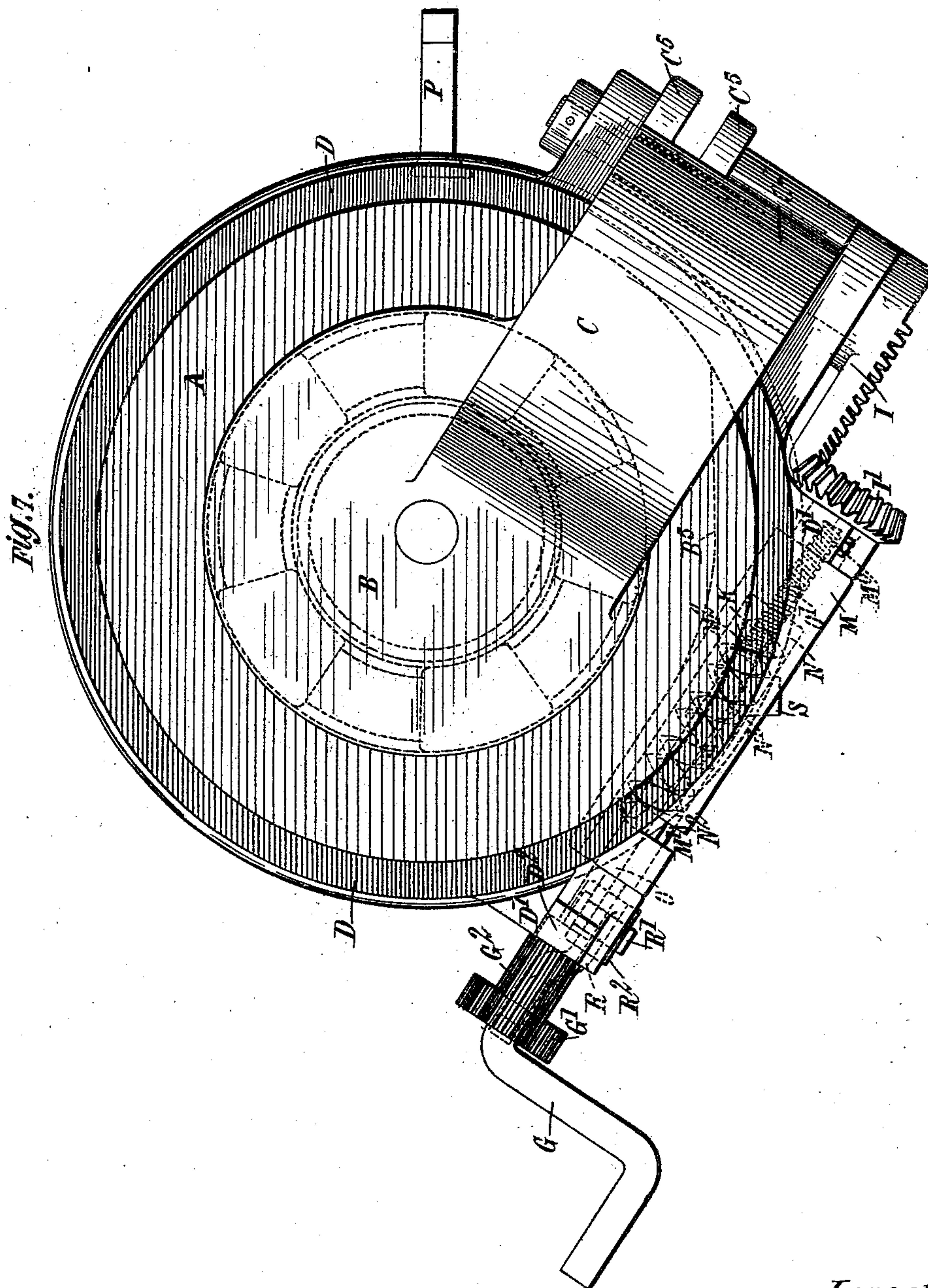
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No. 538,014.

Patented Apr. 23, 1895.



Witnesses:  
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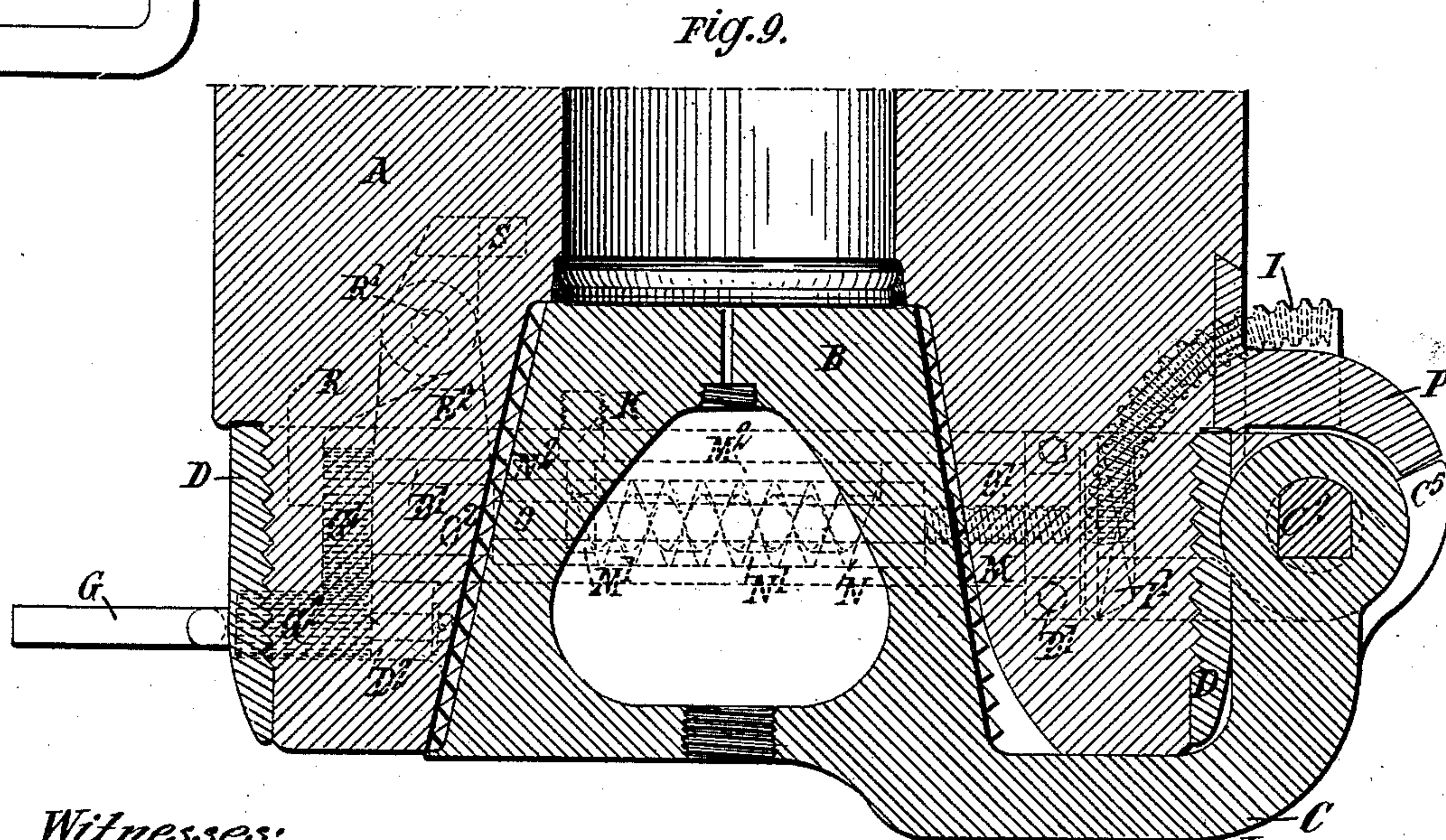
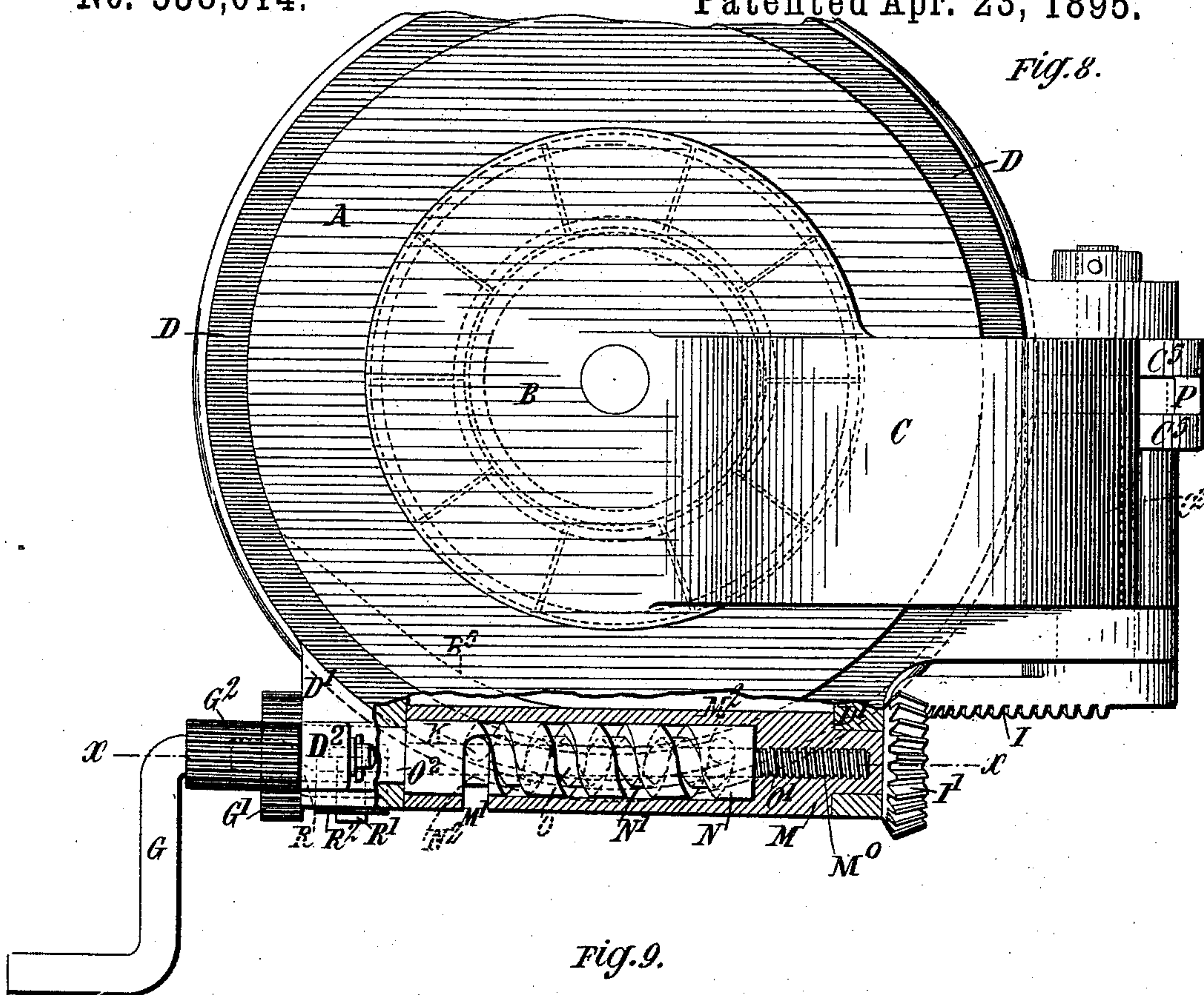
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S. V. DARDIER & C. G. MELLSTROM.  
BREECH MECHANISM FOR ORDNANCE.

No. 538,014.

Patented Apr. 23, 1895.



Witnesses:  
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(No Model.)

10 Sheets—Sheet 8.

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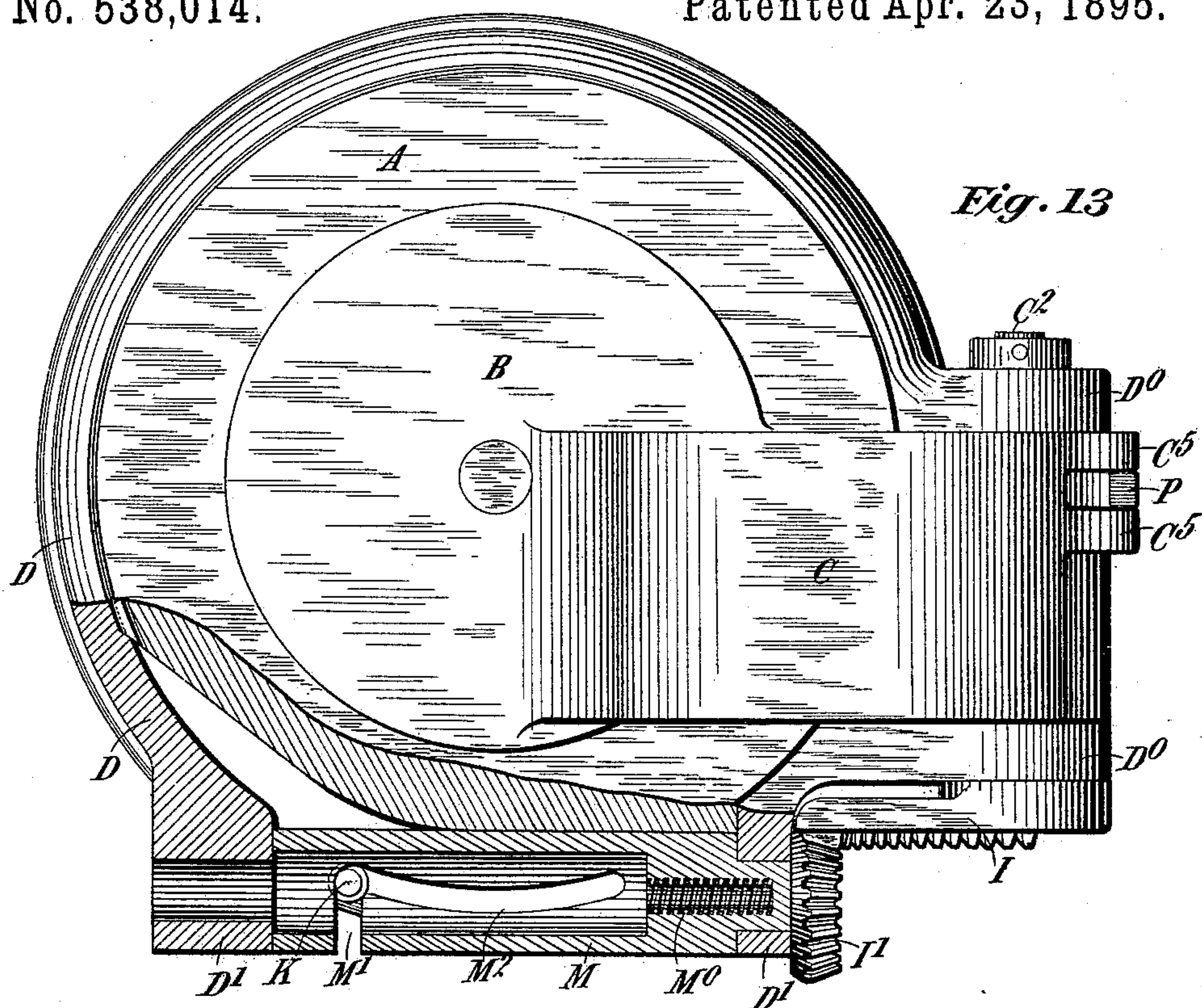


Fig. 14

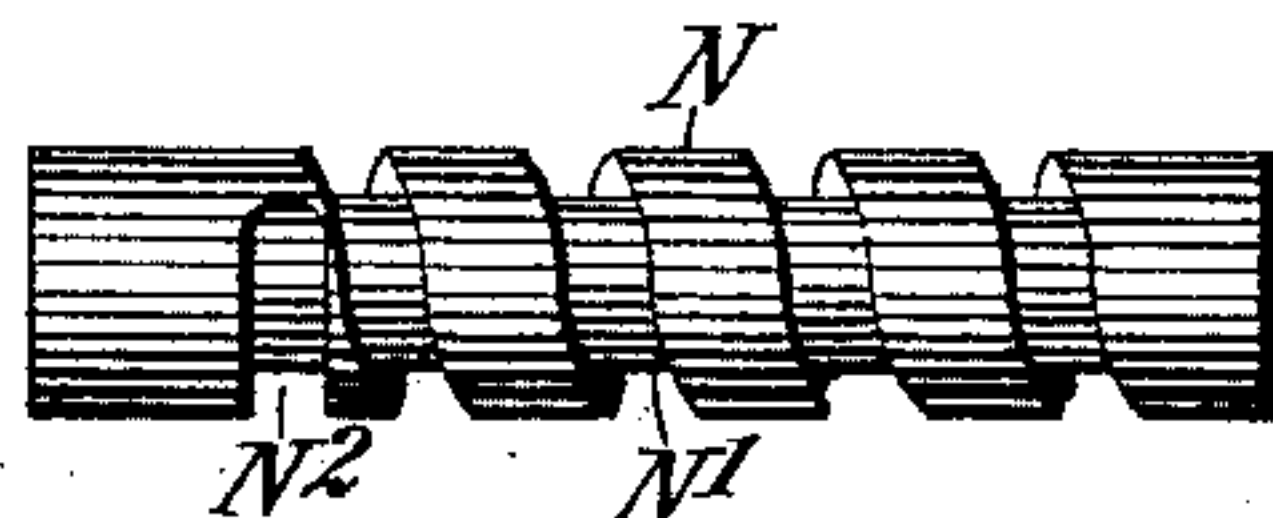
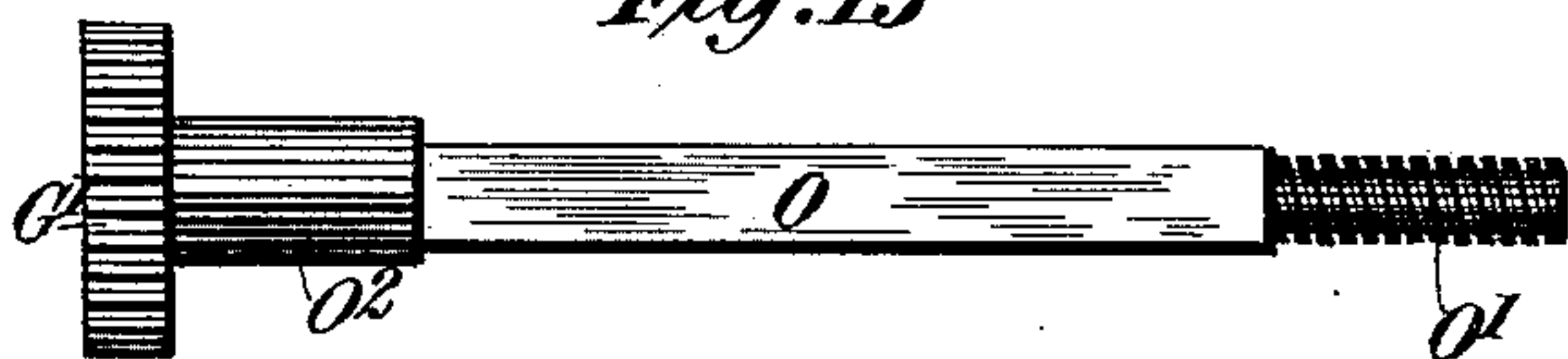


Fig. 15



Witnesses:

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(No Model.)

10 Sheets—Sheet 10.

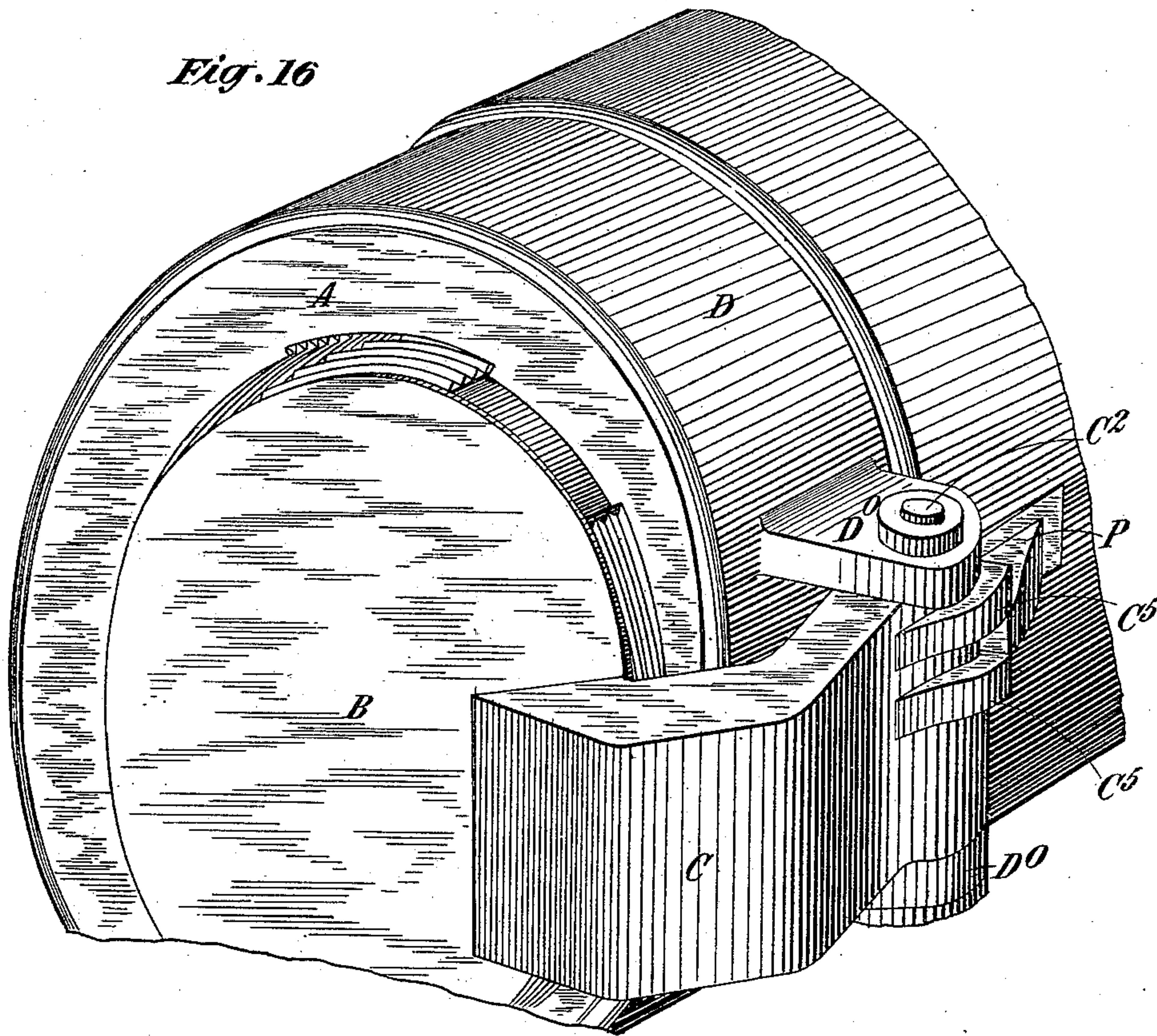
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*Fig. 16*



*Witnesses:*

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*Raphael Netter*

*Inventors*

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# UNITED STATES PATENT OFFICE.

SAMUEL VICTOR DARDIER AND CHARLES GUSTAV MELLSTROM, OF LONDON,  
ENGLAND.

## BREECH MECHANISM FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 538,014, dated April 23, 1895.

Application filed January 15, 1894. Serial No. 496,883. (No model.)

*To all whom it may concern:*

Be it known that we, SAMUEL VICTOR DARDIER, engineer, a subject of the Queen of Great Britain, and CHARLES GUSTAV MELLSTROM, civil engineer, a subject of the King of Sweden and Norway, both residing at Victoria Mansions, 32 Victoria Street, London, England, have invented certain new and useful Improvements in Breech Mechanism for Quick-Firing and other Breech-Loading Ordnance, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to breech-mechanism for quick-firing and other breech-loading guns.

The chief novel feature of the said invention is that the breech-block and carrier-bracket which are formed in one piece, or are firmly secured together, are carried by an external ring mounted on the gun in such a manner that when the breech-block is turned about its axis to lock or unlock the same, the carrier-bracket, the hinge pin, and the before-mentioned external ring turn simultaneously therewith. We thus avoid the use of locking rings such as have been heretofore used in combination with a breech-block and carrier-bracket rigidly connected together, and we also secure other advantages not heretofore obtainable in this form of breech-mechanism.

Our said invention is applicable to all the ordinary or well-known shapes of screw breech-blocks whether cylindrical, conical, conoidal, or stepped on their screw-threaded surfaces.

In carrying our invention into effect we place on the gun, at or near the rear end thereof, a ring of suitable strength and furnished at one side with a hinge-pin to which the carrier-bracket is hinged. The breech-block is preferably made whole, or in one piece with the carrier-bracket, but if not so made it is rigidly secured to the said bracket. The aforesaid ring is so mounted that it can turn on the gun through a limited angle, determined by a fixed stop, and does so turn with the carrier bracket and breech-block when the last-named is rotated to lock and unlock the same to and from the breech. The said ring is

moreover so arranged that when it is turned it has a slight axial movement, the same in direction and degree as the movement of the breech-block, so that the ring and breech-block always maintain during such movement the same relative positions. A simple mode of insuring this fixity of relative positions is by screwing the ring on the gun, the pitch of the screw-threads of the ring being the same as those of the breech block. Other modes of effecting the same result may be employed. For example, the ring may be held in position by radial pins, which are secured in the ring by preference, and project into spiral grooves formed in the gun, the inclination of said grooves being the same as that of the screw-threads of the breech-block.

In the accompanying drawings we have shown our invention applied to three guns.

Figure 1 is a side elevation of the breech end of a quick-firing gun of small caliber. Fig. 2 is a rear end elevation, and Fig. 3 is a central horizontal transverse section, of the same. Fig. 4 is a rear end elevation showing the improvements applied to a gun of larger caliber, but drawn to a smaller scale, the breech being closed. Fig. 5 is a similar view partly in section, but showing the breech-block unlocked and ready to be withdrawn from the breech. Fig. 6 is a horizontal central longitudinal section of the same showing the breech open. Fig. 7 is a rear elevation of a still larger gun having the present improvements applied thereto, the breech-block being locked in position. Fig. 8 is a similar view but partly in section and showing the breech-block unlocked ready to be withdrawn. Fig. 9 is a horizontal central section with the parts in the same position as in Fig. 8. Fig. 10 is a side elevation of the left side of the breech-end of the gun. Fig. 11 is a horizontal section taken on the line  $x, x$ , Fig. 8; and Fig. 12 is a transverse section taken on the line  $y, y$ , Fig. 11. Fig. 13 is an end view of the gun of Fig. 8, with parts shown in section and parts removed. Figs. 14 and 15 are views of the parts detached from Fig. 13. Fig. 16 is a perspective view of a portion of the end of the gun shown in Fig. 8.



Like letters indicate corresponding parts throughout the drawings.

A is the gun.

B is the breech block.

5 C is the carrier-bracket.

D is the external ring.

E is the extractor.

F is the firing pin in the breech-block.

G is the operating lever.

10 Referring first to Figs. 1 to 3, to insure, when closing the breech, that the external ring D shall not be turned about its axis until the breech-block is inserted in the gun we form a projection or lug C' on the hinge of  
15 the carrier-bracket C and a corresponding recess C<sup>0</sup> between the extractor and one of the lugs E<sup>0</sup> to which the extractor is pivoted, in such a position that the said lug or projection C' on the hinge is opposite the said recess C<sup>0</sup>  
20 when the breech-block is unscrewed, but not at any other time. The carrier-bracket C can be turned on its hinge only when the lug or projection C' is opposite the recess C<sup>0</sup>, by reason of the screw-threads of the block being  
25 locked with those of the breech and when the bracket is so turned the said lug or projection C' enters the recess. In so doing it locks the external ring D to the gun for the time being, that is to say, it prevents the rotation of the  
30 ring on the gun until the breech-block has been pushed forward again into the gun, and the lug or projection C' thereby withdrawn from the recess C<sup>0</sup>. The ring can therefore be turned about its axis only when the breech-  
35 block is in the gun.

The extractor E is a lever pivoted at E' to lugs E<sup>0</sup>, E<sup>0</sup> formed with or secured to the gun, and is formed with a tail E<sup>2</sup> projecting outward from the hinge. We provide on the ro-  
40 tatable carrier-bracket near the hinge, a cam-like projection or tappet C<sup>3</sup> which when the said bracket has been adjusted with the ring about the axis of the gun to unlock the breech-block is opposite to or is in contact with the  
45 tail E<sup>2</sup>. Then if the bracket is turned on its hinge pin C<sup>2</sup> it strikes the said tail end E<sup>2</sup> of the extractor E and operates the said extractor to withdraw the spent cartridge from the gun. The said cam-like part of the carrier  
50 is so constructed and arranged as to act first gradually on the tail of the extractor until the cartridge is loosened, and then more rapidly to jerk the cartridge out of the gun in a well-known manner.

55 In guns of small caliber such as that shown in Figs. 1, 2 and 3, wherein the breech-mechanism is light and easily movable we provide for operating the breech-mechanism as follows—that is to say, we form or fix on the car-  
60 rier-bracket a hand lever or handle G by which the said bracket can be turned about the axis of the gun to unlock the breech-block and can then be pulled outward to turn it about its hinge to withdraw the breech-block,  
65 and can be moved in the reverse order and direction when closing the breech.

H is a screw plug secured in the ring D and working in a helical groove H' formed in the breech. Said plug and groove serve to limit the rotary movement of the breech-block in 70 both directions.

For guns of somewhat larger caliber such as that shown in Figs. 4, 5 and 6 we provide for facilitating the opening and closing of the breech as follows—that is to say, the carrier- 75 bracket C is firmly fixed on the hinge pin C<sup>2</sup> on which is also fixed a toothed wheel, preferably a bevel wheel or a segment of such a wheel, as shown at I. This wheel or segment I gears with another wheel or segment I' 80 which is attached to the boss of the operating lever G which turns upon a strong stud or pin J that projects rearwardly from the upper bearing D<sup>0</sup> of the hinge pin C<sup>2</sup>. In opening this breech-mechanism the gunner first uses 85 the handle or lever G for turning the external ring D and breech-block B about the axis of the gun to unlock the breech-block, during which operation the gear wheels I, I' cannot be rotated because the block is not freed from 90 the screw threads of the breech, and then by the continued movement of the handle in the same direction (when the carrier-bracket C can turn no farther about the axis of the gun by reason of the stop H arriving at the end 95 of the groove H' but is free to turn on its hinge) he rotates the gear wheels and hinge-pin thereby moving the carrier about the hinge and withdrawing the breech-block from the gun. By moving the handle in the con- 100 trary direction the breech-block can be first pushed into the gun and then locked.

For still heavier guns, we use the mechanism now to be described with reference to Figs. 7 to 16. The carrier-bracket C is se- 105 cured to the hinge-pin as in the modification last described, and the hinge pin is geared by toothed wheels I, I' to a transverse hollow shaft M which is supported directly at one end and indirectly at the other in bear- 110 ings D', D' on the external ring D without capability of endwise movement in said bearings. Within the shaft M is mounted a sleeve N which fills the interior of said shaft M and when in place is incapable of endwise 115 or axial movement therein. Passing axially through the shaft M and sleeve N is a spindle O one end of which is screw threaded as shown at O' and screws into a female screw thread M<sup>0</sup> formed in the shaft M. The said 120 female screw thread does not extend completely through to the end of the shaft M but terminates some little distance from the end so that when the spindle O has been screwed into the female thread as far as it will go the 125 continued rotation of the spindle in the same direction will cause the shaft M to rotate. On the outer end of said spindle O is fixed a toothed wheel G'. The said spindle is square in section and passes through a square hole 130 in the sleeve N or is provided with a feather key or otherwise connected to the sleeve N



so that the sleeve and spindle must turn together when the latter is rotated while the spindle is permitted to slide axially through the sleeve. The handle G is supported by a bearing D<sup>2</sup> formed on the bearing D' and on its axis is mounted a wide toothed wheel G<sup>2</sup> which gears with the aforementioned wheel G' so that by turning the handle G the spindle O can be rotated in either direction. The wheel G<sup>2</sup> is made very wide to allow for the axial movement of the wheel G' while maintaining the two wheels in gear. The spindle O has a collar O<sup>2</sup> at the outer end which is supported in the bearing D'. Said spindle forms at this end the support for the shaft M and sleeve N. On the circumference of the sleeve N is formed a spiral or helical groove N' which merges at one end into a circular groove N<sup>2</sup> that makes something less than a whole turn round the sleeve. This circular groove coincides in position with a corresponding circular slot M' extending partially around the shaft M. Said groove N' is preferably rectangular in cross section. In the shaft M is also formed a long slot M<sup>2</sup> which extends in the direction of the length of the shaft. Said slot M<sup>2</sup> is however not straight but is curved, the radius of its curvature being equal to the distance of the slot from the axis of the gun. The said curved slot terminates at one end in the circular slot M'.

K is a pin or stud which is secured in the breech and projects through the slot M<sup>2</sup> of the shaft M into the spiral groove N' of the sleeve N. A part of the breech indicated by B<sup>5</sup> is hollowed out to admit the shaft M and its contained parts above described. The action of this mechanism is as follows—that is to say, assuming the breech to be closed and the breech-block locked as shown in Fig. 7, then by turning the handle G the spindle O and sleeve N are rotated in the direction which causes the spindle to screw into the shaft M and the spiral groove N' to travel along the fixed stud K. Since the sleeve N cannot move endwise in the shaft M the result of the rotation of the said sleeve is that the shaft M is forced to travel endwise, and in so doing it carries its bearings D' and consequently the external ring D with it thus unlocking the breech-block. By the time the stud K has arrived at the end of the spiral groove N' the breech-block has become fully disengaged from the screw threads of the breech, and the spindle O has become screwed into the shaft M as far as it will go. The continued rotation of the spindle O now causes the shaft M to rotate, which it can do since the stud K has now entered the circular slot M' of the said shaft. Moreover there is now no further turning effort on the external ring D since the stud K has also passed into the circular groove N<sup>2</sup> in the sleeve N. The rotation of the shaft M acts through the wheels I, I' to turn the hinge-pin C<sup>2</sup> and so withdraw

the breech-block from the breech. By turning the handle G in the reverse direction, the breech-block is first caused to enter the breech, and then it is turned to lock the same, the operations above described taking place in reverse direction and order. While the ring D is being rotated, the stud K is traversing the curved slot M<sup>2</sup>.

To insure that the external ring shall not commence turning before the breech-block is properly inserted in the breech when closing the latter, which it might otherwise do at the moment when the pin K is passing from the circular slot M' to the longitudinal slot M<sup>2</sup>, we provide a lever R pivoted at R' to a bracket R<sup>2</sup> carried by the external ring D. One end of said lever is adapted to bear against the side of the wheel G' when the breech-block is unlocked and the other end bears at the same time against a lug or stop S formed on or fixed to the gun. The lever is caused to bear against the stop S by the turning of the external ring in the unlocking of the breech. It will be obvious that when the lever R is in this position, the wheel G' cannot move axially unless the said lever R can turn on its pivot and so move out of the path of the said wheel G'. Such turning movement of the lever cannot take place by reason of the stop S unless the external ring D rotates and carries the lever away from the stop, and hence it follows that the wheel G' cannot move axially until the pin K enters the spiral groove N' and so begins to turn the ring D and lock the breech.

To further insure that the external ring D shall not be rotated while the block is out of the breech we provide a stop P dovetailed in or otherwise secured to the side of the gun in combination with two heel pieces C<sup>5</sup>, C<sup>5</sup> formed on the hinge of the carrier. When the breech-block is unlocked, the said stop is opposite the space between the said heel pieces C<sup>5</sup>, C<sup>5</sup> and in this position the carrier C can be turned about its hinge, and when so turned the heel pieces C<sup>5</sup>, C<sup>5</sup> pass one on each side the stop P and thereby prevent any rotation of the external ring D so long as the breech is open. On the closure of the breech, the heel pieces are withdrawn clear of the stop, and the ring D can then be turned to lock the block. The faces of the heel pieces C<sup>5</sup>, C<sup>5</sup> are constructed to just clear the end of the stop P when and only when the breech-block is completely inserted in the breech, and it follows that the carrier cannot begin to turn on its hinge until the external ring has turned sufficiently to bring the space between the heel pieces C<sup>5</sup>, C<sup>5</sup>, exactly opposite the stop.

What we claim is—

1. The combination with a gun, of a breech-block, a carrier bracket and an external ring fitted to turn on the gun, the said breech-block, carrier bracket and ring being connected so as to be capable of simultaneous movement, as set forth.



2. The combination with a gun, of an external ring movable circumferentially and axially with respect to the gun, a breech-block and a carrier bracket therefor hinged to the said ring, as set forth.

3. The combination with a gun, of a ring fitted thereto, and movable circumferentially thereon, a breech-block hinged to said ring and formed or provided with a projecting part adapted to enter a recess in such position in the gun that the said projection is opposite the recess only when the breech-block has been turned to position to be disengaged from the breech as set forth.

4. The combination with a gun, of an external ring movable circumferentially thereon, a breech-block and carrier bracket hinged thereto, an extractor mounted or supported on the gun, and adapted to be encountered and operated by a tappet or projection on the carrier bracket when the ring and carrier bracket are turned to a given position, as set forth.

5. The combination with a gun, of an external ring movable circumferentially thereon, a breech-block and carrier hinged to the ring, a lever geared with the said carrier and adapted when turned to swing said breech-block and carrier, as set forth.

6. The combination with a gun, of an external ring movable circumferentially thereon, a breech-block and carrier hinged to the ring, a transverse shaft and sleeve carried in bearings on the ring and geared with the hinge pin of the carrier, and arranged to encounter a pin or projection on the gun so that when the ring has been turned about the gun the carrier will be turned about its hinge, as set forth.

In testimony whereof we have hereunto set our hands this 29th day of December, 1893.

SAMUEL VICTOR DARDIER.

CHARLES GUSTAV MELLSTROM.

Witnesses:

CHAS. ROCHE,

HARRY PETER VENN.