

No. 682,100.

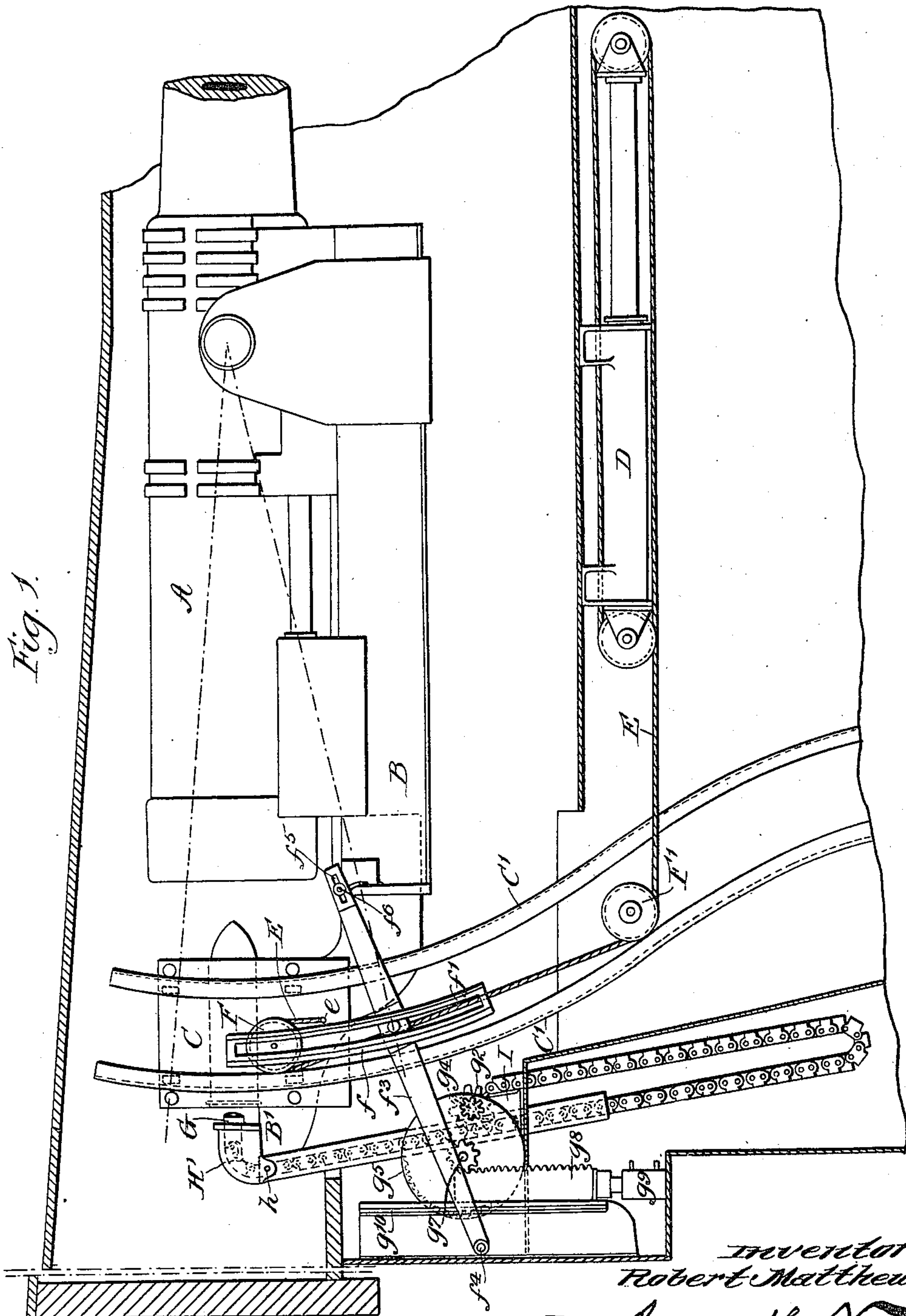
Patented Sept. 3, 1901.

R. MATTHEWS.
MECHANICAL RAMMER.

(Application filed Nov. 20, 1900.)

(No Model.)

6 Sheets—Sheet 1.



Witnesses:
J. L. Helms
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6 Sheets—Sheet 2.

Fig. 3.

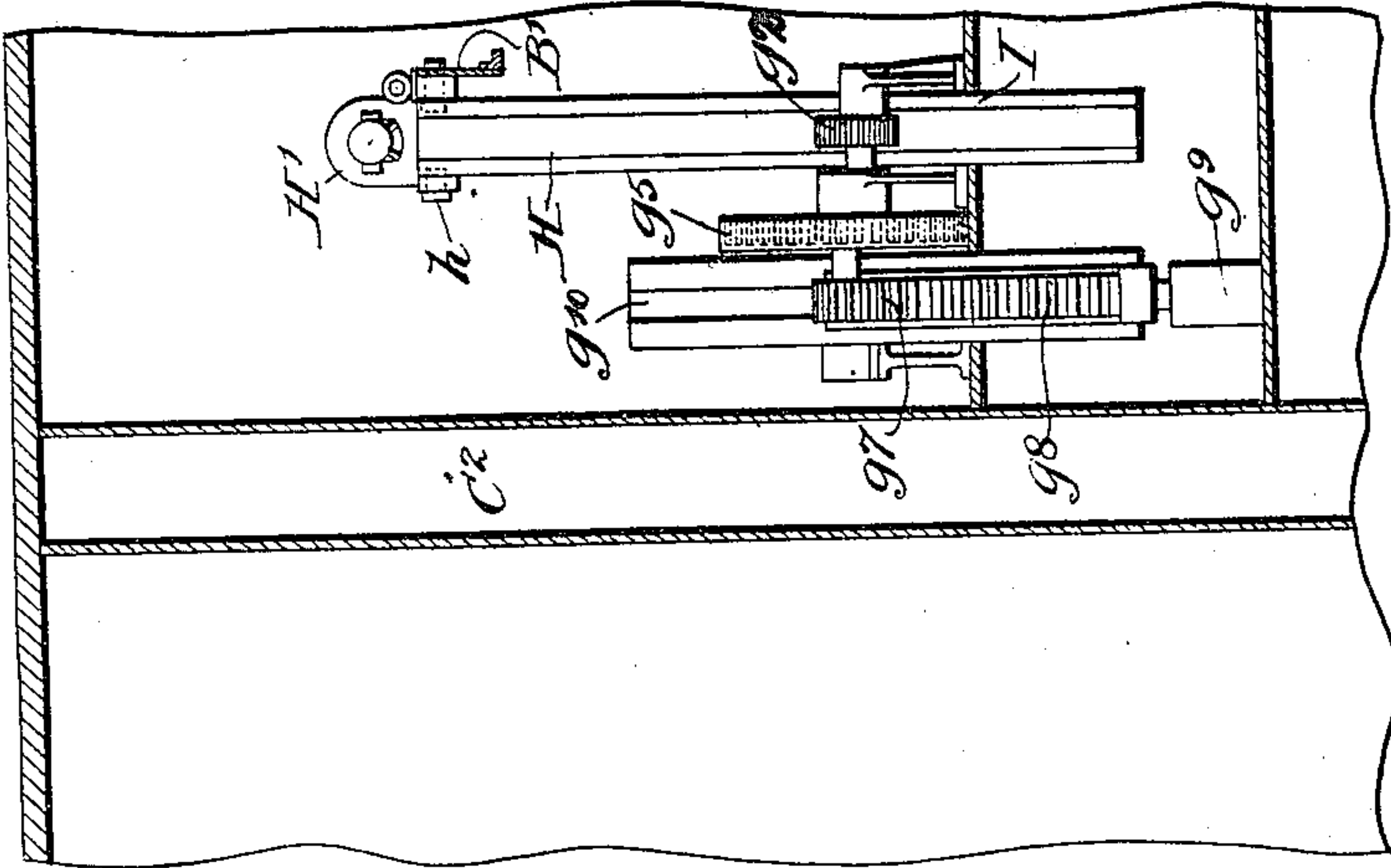
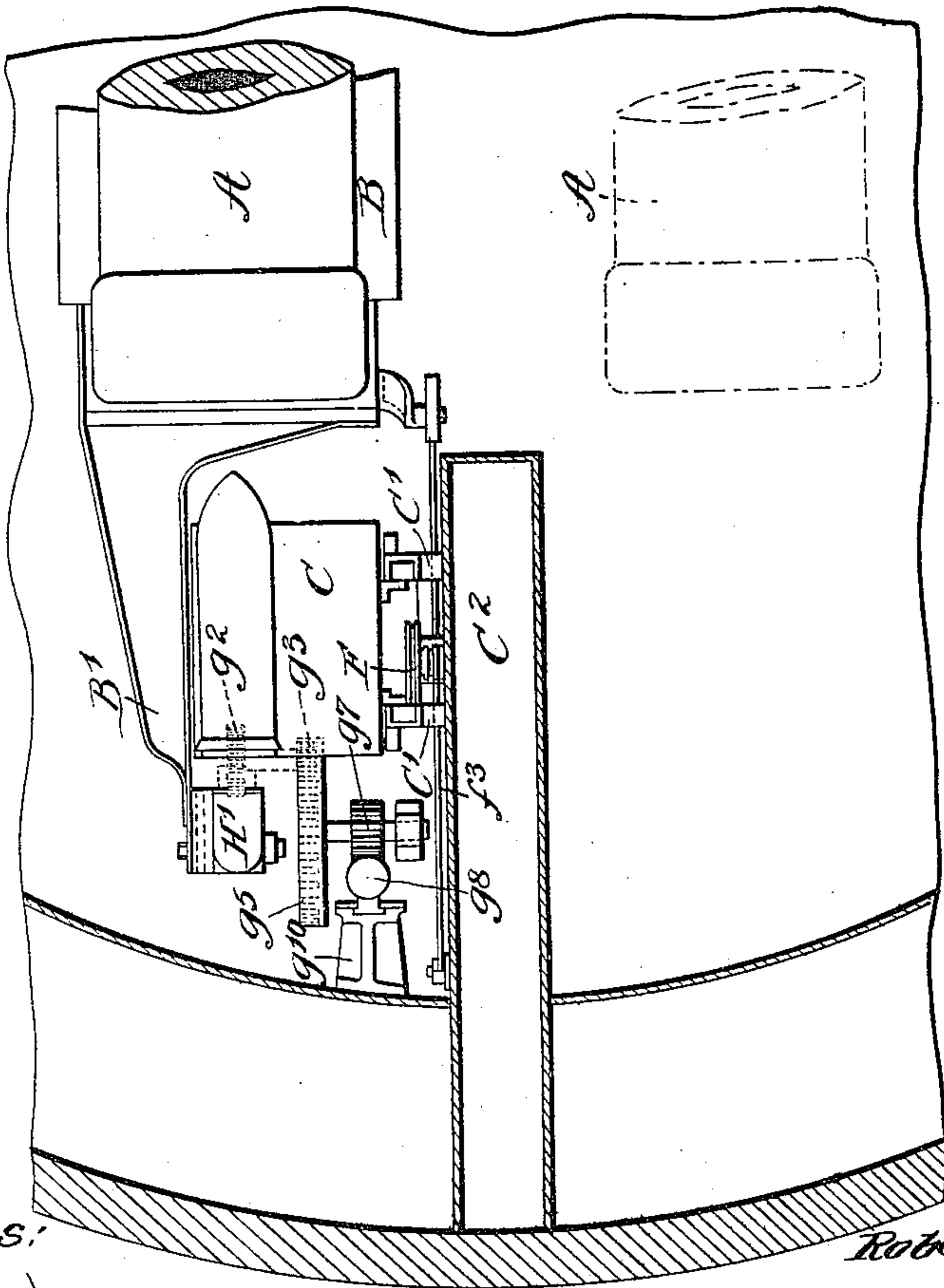


Fig. 2.



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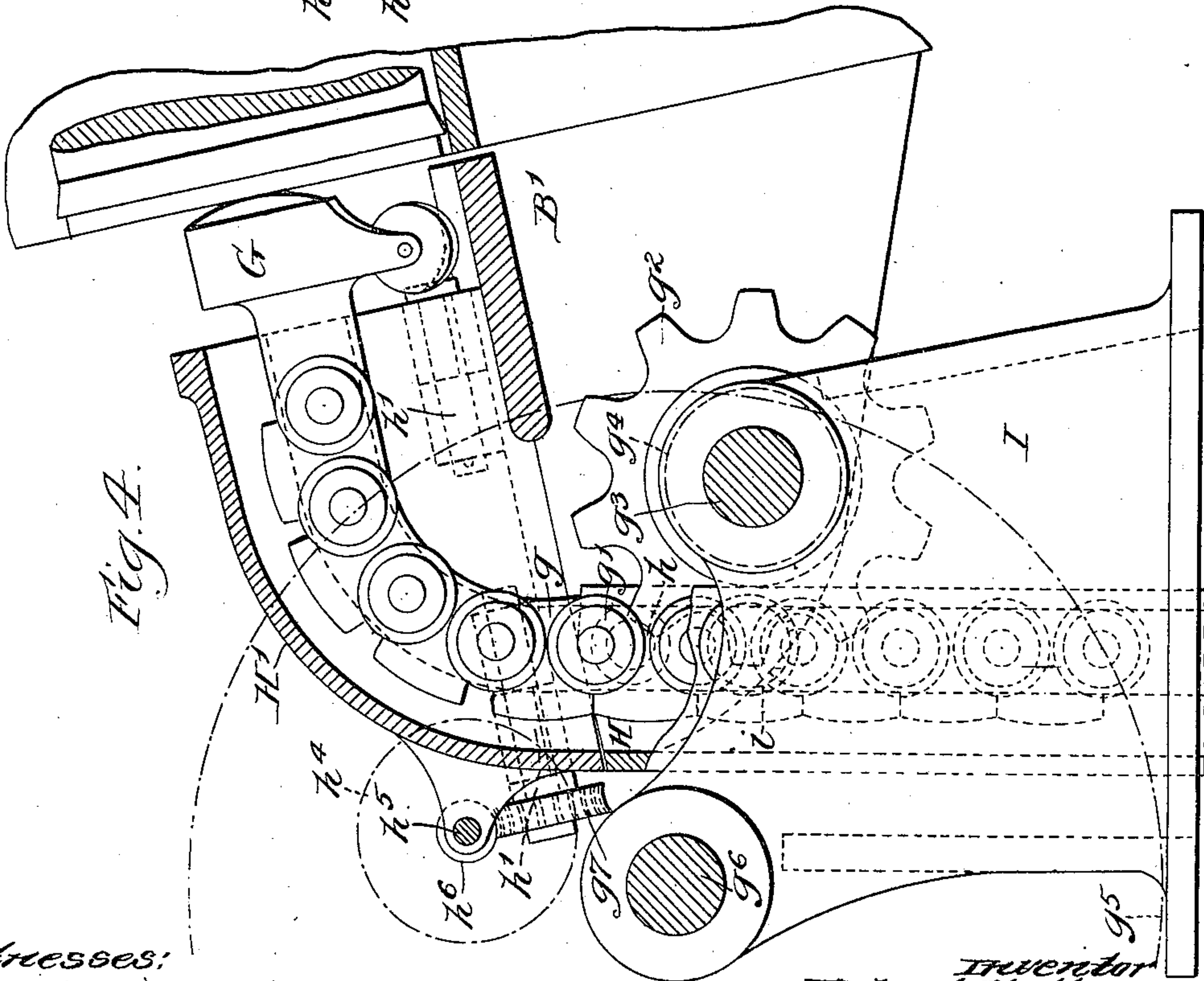
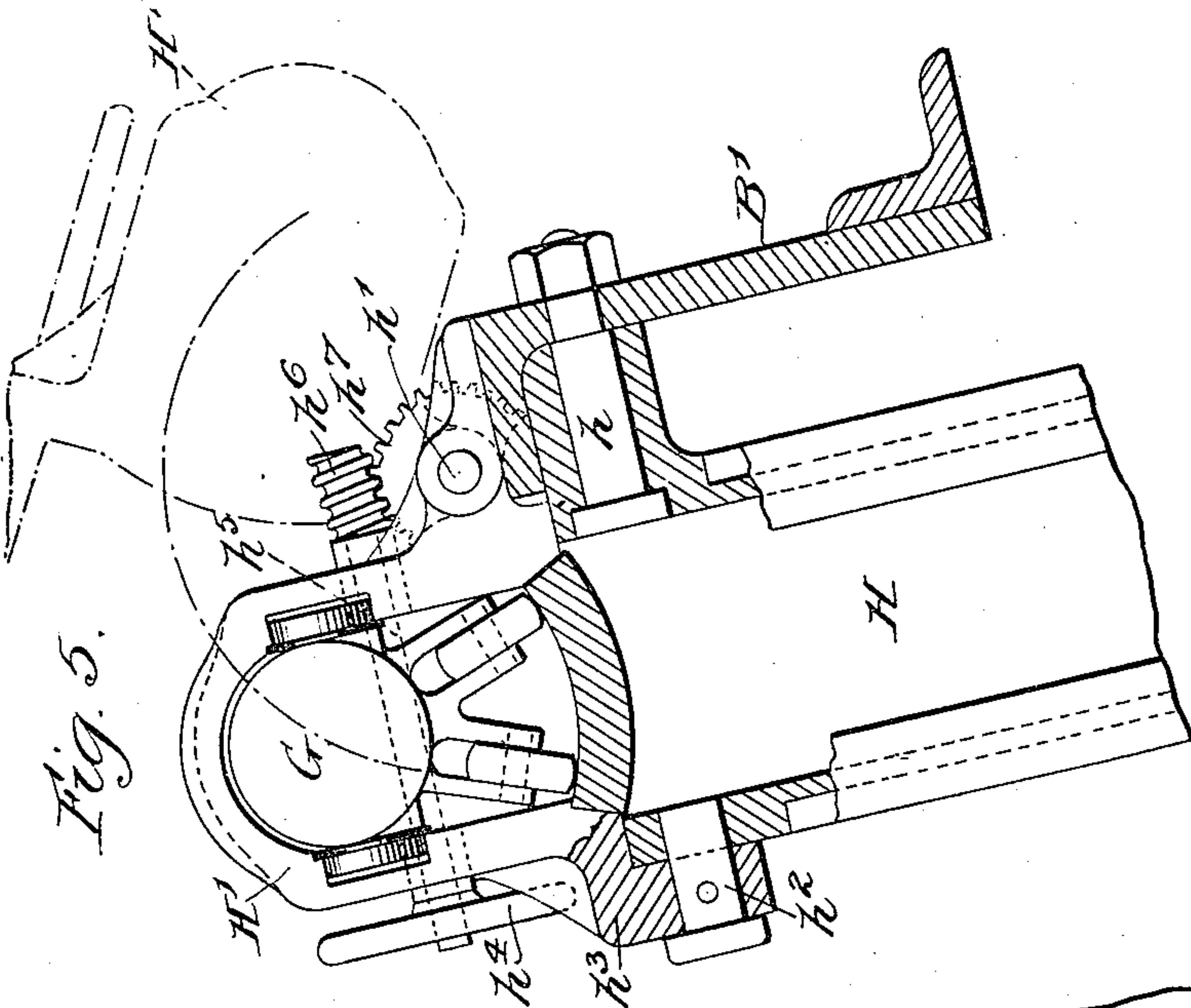
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6 Sheets—Sheet 3.



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1901

No. 682,100.

Patented Sept. 3, 1901.

R. MATTHEWS.
MECHANICAL RAMMER.

(Application filed Nov. 20, 1900.)

(No Model.)

6 Sheets—Sheet 4.

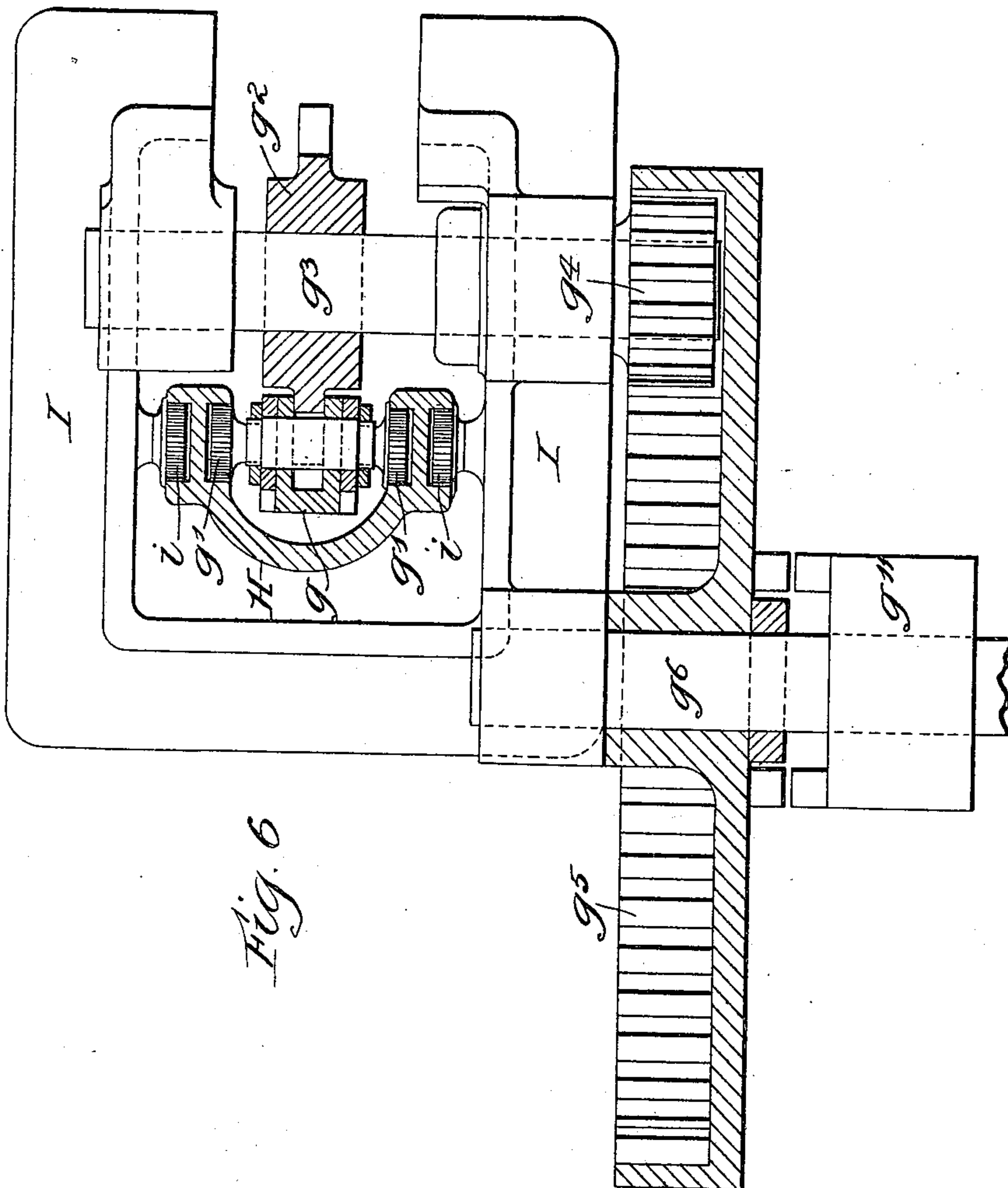


Fig. 6

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Patented Sept. 3, 1901.

R. MATTHEWS.
MECHANICAL RAMMER.

(Application filed Nov. 20, 1900.)

(No Model.)

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Fig. 8.

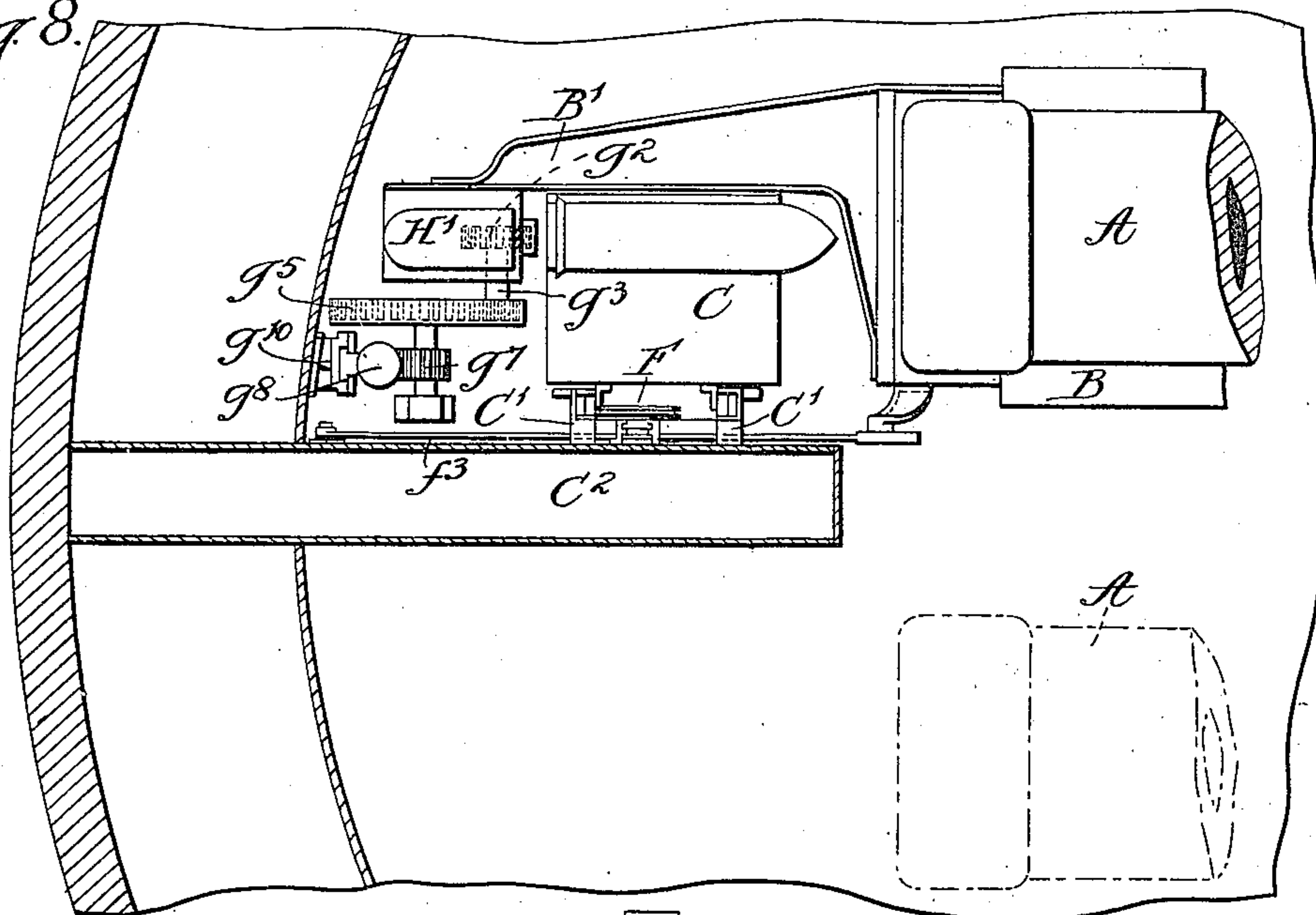
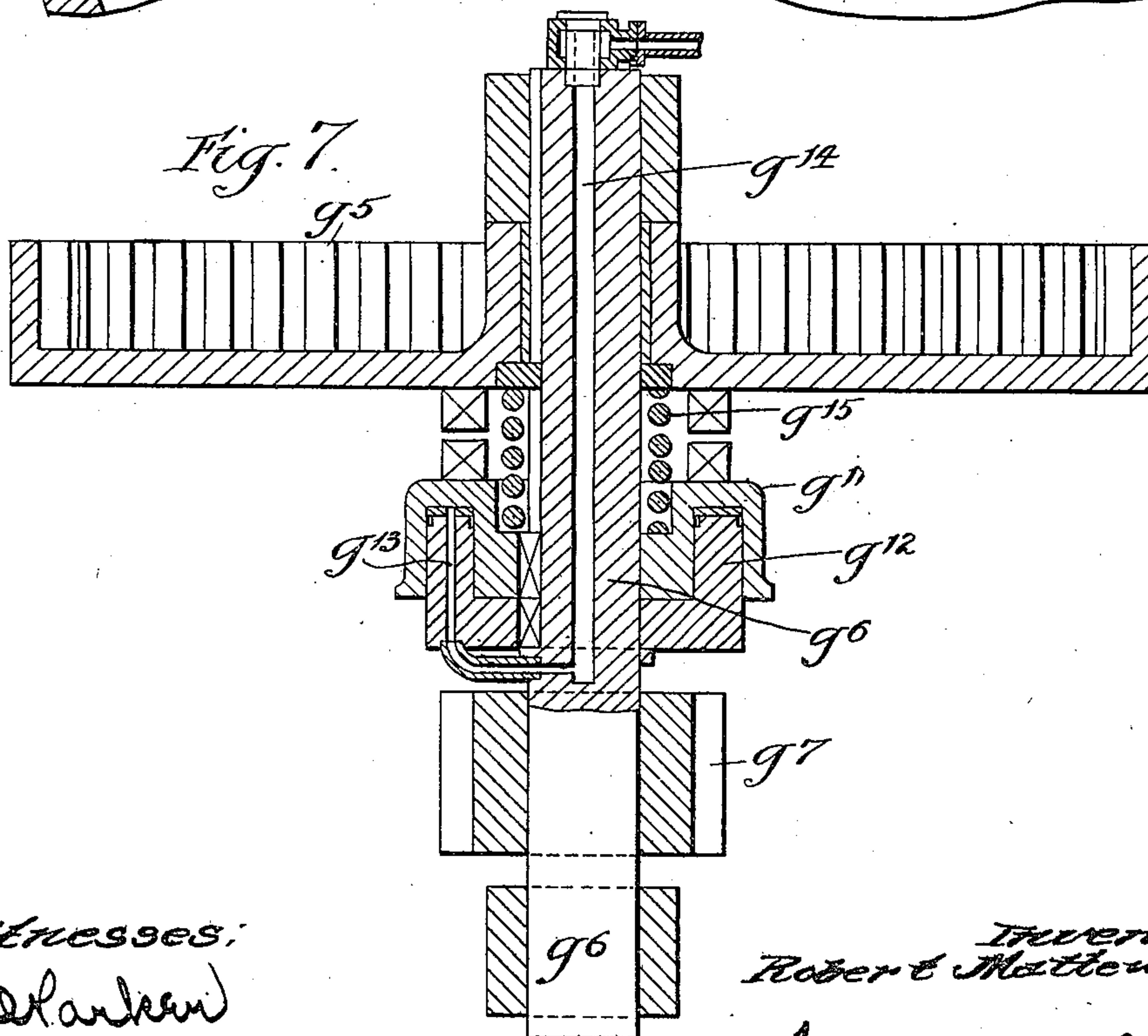


Fig. 7.



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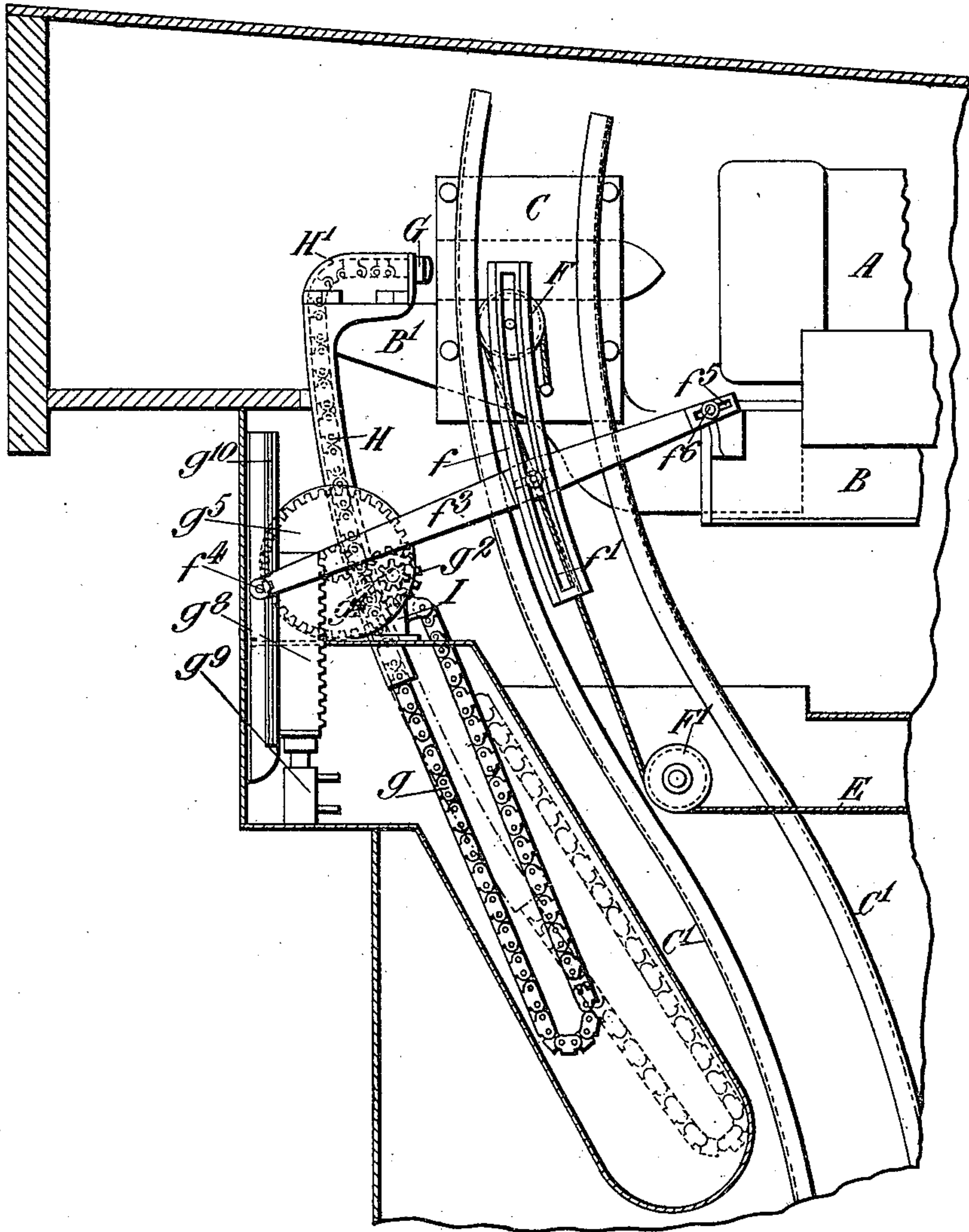
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MECHANICAL RAMMER.

(Application filed Nov. 20, 1900.)

(No Model.)

6 Sheets—Sheet 6.

Fig. 9.



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UNITED STATES PATENT OFFICE.

ROBERT MATTHEWS, OF MANCHESTER, ENGLAND.

MECHANICAL RAMMER.

SPECIFICATION forming part of Letters Patent No. 682,100, dated September 3, 1901.

Application filed November 20, 1900. Serial No. 37,174. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MATTHEWS, engineer, a subject of the Queen of Great Britain, residing at Openshaw, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Mechanical Rammers, of which the following is a specification.

This invention relates to apparatus for loading ordnance, and has reference particularly to the chain-rammers by which the ammunition conveyed to the gun from the magazine is thrust into the breech of the gun.

The chief object of my invention consists in providing the chain-rammer with a guide which is so arranged that it follows the movements of the gun in the elevation or depression of the same, the said chain-rammer being operated through suitable gearing by a hydraulic or other motor, which does not participate in the movement of the gun when the latter is elevated or depressed. By such an arrangement I avoid the use of flexible or jointed pipes or connections for conveying the motive power to the motor and also avoid the inconvenience and danger arising from the employment thereof.

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

Figures 1, 2, and 3 are respectively a side elevation, a plan, and a rear elevation of a pair of guns mounted in a rotating turret and provided with my improved chain-rammer. Figs. 4, 5, and 6 are respectively a sectional elevation, a sectional end view, and a sectional plan of the upper portion of the chain-rammer and the parts in immediate connection therewith, these figures being drawn on a larger scale. Fig. 7 is a horizontal section showing a clutch hereinafter more fully referred to. Fig. 8 is a similar view to Figs. 1, 2, and 3, showing a modified form of the chain-rammer guide. Fig. 9 is a side elevation, partly in section, of the form of apparatus in which the curved guide is employed.

Like letters of reference indicate similar parts in all the figures.

A A are the guns, and B B the frames in which they recoil.

B^x is the rotary turret.

C is one of the ammunition-hoisting cages or carriers, and C' C' are the rails along which such carrier travels. D is one of the hydraulic cylinders for actuating said cage or carrier, and E is the chain or rope which is acted upon by the ram of the cylinder and connected with the cage or carrier at c after passing around guide-pulleys F F'. The opposite end of said chain or rope is connected to the cylinder D.

G is the rammer.

Referring more particularly to Figs. 1 to 7, g is the chain of the rammer G, and H is the guide for the said chain. The guide is pivotally connected at h to the arm or bracket B' of the gun-frame B, so as to participate in the movement of the said frame. The said guide works in a socket or bracket I, fixed to the turret of the gun or to some other part that does not change its position when the gun is elevated or depressed. The said socket is provided with antifriction-rollers i i, which enter grooves formed in the exterior of the guide, Figs. 4 and 6, and the said chain g is also provided with antifriction-rollers g' g', which enter grooves formed on the inside of the guide. The guide can therefore move freely up and down with the chain in said socket I, and the chain can move with equal freedom in the guide when the latter is stationary and the rammer is being operated. Gearing with the said chain is a pinion g², mounted on a shaft g³, carried by bearings in the socket I, the said shaft being furnished with another pinion g⁴, that gears with an internally-toothed wheel g⁵, loosely mounted on a shaft g⁶, which is also carried by bearings in the socket I. This shaft g⁶ is furnished with a pinion g⁷, that gears with a rack g⁸, forming part of the ram of a hydraulic cylinder g⁹, by which the chain is actuated, this cylinder being secured to some part which does not change its position when the gun is elevated or depressed. In the present example it is attached to the rotating turret of the gun. The said ram and its rack g⁸ work in a vertical guide g¹⁰, secured to the turret. g¹¹ is a clutch mounted on the said shaft g⁶ and

adapted to engage with projections on the toothed wheel g^5 , this clutch being so arranged that the act of permitting the motive power to reach the motor employed for actuating the rack g^8 automatically brings said clutch into gear with the said toothed wheel g^5 . At other times the said clutch remains in the inoperative position in which it is represented in Figs. 6 and 7, so that the gearing will not offer any material impediment to the movement of the chain with the guide H when an alteration is made in the elevation of the gun. In Fig. 7 I have shown one form in which the clutch can be constructed in order to effect its automatic movement when hydraulic power is employed for working the motor. For this purpose the clutch g^{11} is made with an annular cavity to fit around an annular flange g^{12} , fixed to the said shaft g^6 . This annular flange is formed with a passage g^{13} , communicating with a passage g^{14} in the shaft g^6 , this last-mentioned passage being in communication with the liquid under pressure by which the motor g^9 is actuated. Therefore when the said liquid is admitted to said motor g^9 it simultaneously passes along the passages g^{14} g^{13} , and thereby reaches the space between the clutch and the annular flange. The said clutch is consequently forced toward the projections on the toothed wheel g^5 and engages therewith and in so doing overcomes the resistance of a spring g^{15} . On the supply of the liquid under pressure being stopped the said spring g^{15} by reacting returns the clutch to its disengaged position. The upper curved portion or cowl H' of the guide by which the rammer G is directed into the ammunition-cage to push the ammunition into the breech of the gun is hinged at h' h' to the arm B' of the gun-mounting, so as to enable said curved portion H' to be turned to one side to permit of hand-ramming, if such becomes necessary. The said curved portion or cowl is held in its operative position—i. e., the position in which it is represented by the full lines in the drawings—by a pin h^2 , Fig. 5, passing through a lug h^3 on the said curved portion. h^4 is a hand-wheel mounted on a spindle h^5 , provided with a worm h^6 , gearing with a worm-wheel or segment h^7 , carried by one of the hinge-pins h' . By revolving this hand-wheel the said curved portion or cowl can be turned laterally into its inoperative position (represented by the dotted lines in Fig. 5) when, as aforesaid, hand-ramming is to be effected. By the use of the said movable guide H and the gearing by which the chain-rammer is actuated I avoid the necessity of mounting the hydraulic cylinder or other motor by which the rammer is operated upon the arm B' to move with the gun in its elevation or depression, and consequently I am able to dispense with the usual flexible pipes or couplings for supplying the motive power to said motor, as the latter according to my invention does not move when the elevation of the gun is changed.

I wish it to be clearly understood that I do

not confine myself to the use of a hydraulic cylinder and ram for actuating the chain-rammer, as any other suitable form of motor worked hydraulically, electrically, or otherwise may be employed.

In the modified arrangement illustrated by Fig. 8 the said guide H is curved instead of straight, as in the previous example, the curvature of the guide being approximately concentric with the gun-trunnions. In this case it is therefore unnecessary to pivot the upper end of the guide to the arm B'. In other respects the arrangement is similar to that described with reference to Figs. 1 to 7.

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

1. In apparatus for loading ordnance, the combination with a chain-rammer carried by the gun-mounting, of a motor which is fixed to a part of the mounting that does not participate in the movement of elevation or depression of the gun, of a guide for the chain-rammer which guide is carried by the gun-mounting so as to move therewith, of gearing connecting said chain with a shaft driven by the motor, of a clutch device interposed between said shaft and gearing and normally remaining in an inoperative condition to permit the said chain and guide to freely move with the mounting independently of the said motor, and of means for throwing said clutch device into action when the chain and rammer are to be operated by the motor.

2. In apparatus for loading ordnance, the combination with a chain-rammer carried by the gun-mounting, of a motor which is fixed to a part of the mounting that does not participate in the movement of elevation or depression of the gun, of a guide for the chain-rammer connected with an arm on the gun-mounting, of gearing connecting said chain with a shaft driven by the motor, of a clutch device interposed between said shaft and gearing and normally remaining in an inoperative condition to permit the said chain and guide to freely move with the mounting independently of the said motor, of means for throwing said clutch device into action when the chain and rammer are to be operated by the motor, and of means for enabling the upper portion of said guide to be turned on one side to permit of hand-ramming, substantially as described.

3. In apparatus for loading ordnance, the combination with a chain-rammer carried by the gun-mounting of a motor which is fixed to a part of the mounting that does not participate in the movement of elevation or depression of the gun, of a guide for the chain-rammer connected with an arm on the gun-mounting, of gearing connecting said chain with a shaft driven by the motor, of a clutch device inserted between said shaft and gearing and normally remaining in an inoperative condition to permit the said chain and guide to freely move with the mounting independently of the said motor, of means for throwing said

clutch device into action when the chain and rammer are to be operated by the motor, of a laterally-hinged upper portion to said guide, and of means for turning said portion about its hinge, substantially as and for the purpose specified.

4. In apparatus for loading ordnance, the combination with a chain-rammer carried by the gun-mounting, of a motor which is fixed to a part of the mounting that does not participate in the movement of elevation or depression of the gun, of a guide for the chain-rammer connected with an arm on the gun-mounting, of gearing connecting said chain with a shaft driven by the motor, of a clutch device interposed between said shaft and gearing and normally remaining in an inoperative condition to permit the said chain and guide to freely move with the mounting independently of the said motor, and of means for automatically throwing said clutch device into action simultaneously with the admission of the motive power to the motor, substantially as and for the purpose specified.

5. In apparatus for loading ordnance, the combination with a chain-rammer carried by the gun-mounting, of a motor fixed to a part of the mounting that does not participate in the movement of elevation or depression of the gun, of a guide for the chain-rammer pivotally connected with a rearwardly-projecting arm on the gun-mounting, of means for enabling the upper portion of said guide to be turned laterally on one side, of a socket in which the said guide and chain move, of a pinion mounted on a shaft carried by the socket and adapted to be operated by said motor, of a toothed wheel mounted loosely on said shaft and gearing with a toothed pinion mounted on a second shaft carried by the said socket, of a clutch carried by the first-mentioned shaft and normally remaining out of gear with the loose toothed wheel thereon, of means for automatically shifting said clutch into engagement with said loose toothed wheel simultaneously with the admission of motive power to the motor, of a toothed wheel mounted on said second shaft and gearing with the ram-chain, and of antifriction-rollers located between the said ram-chain and the guide and between the guide and the said socket all substantially as and for the purpose specified.

6. In apparatus for loading ordnance, the combination with a chain-rammer carried by the gun-mounting, of a hydraulic cylinder and ram carried by a part of the mounting that does not participate in the movement of elevation or depression of the gun, of a curved guide for the chain-rammer pivotally connected with a rearwardly-projecting arm on

the gun-mounting, of means for enabling the upper portion of said guide to be turned laterally on one side, of a socket in which the said guide and chain move, of a toothed rack on the ram of the hydraulic cylinder, of a toothed pinion mounted on a shaft carried by the socket and engaging with said ram, of a toothed wheel mounted loosely on said shaft and gearing with a toothed pinion mounted on a second shaft carried by the said socket, of a clutch carried by the first-mentioned shaft and normally remaining out of gear with the loose toothed wheel thereon, of means for automatically shifting said clutch into engagement with said loose toothed wheel simultaneously with the admission of the motive power to the hydraulic cylinder, of a toothed wheel mounted on said second shaft and gearing with the ram-chain, and of antifriction-rollers located between the said ram-chain and the guide and between the guide and the said socket all substantially as and for the purpose specified.

7. In apparatus for loading ordnance, the combination with a chain-rammer carried by the gun-mounting, of a hydraulic cylinder and ram carried by a part of the mounting that does not participate in the movement of elevation or depression of the gun, of a curved guide for the chain-rammer connected with a rearwardly-projecting arm on the gun-mounting, of means for enabling the upper portion of said guide to be turned laterally on one side, of a socket in which the said guide and chain move, of a toothed rack on the arm of the hydraulic cylinder, of a toothed pinion mounted on a shaft carried by the socket and engaging with said rack, of a toothed wheel mounted loosely on said shaft and gearing with a toothed pinion mounted on a second shaft carried by the said socket, of a clutch carried by the first-mentioned shaft and normally remaining out of gear with the loose toothed wheel thereon, of means for automatically shifting said clutch into engagement with said loose toothed wheel simultaneously with the admission of the motive power to the hydraulic cylinder, of a toothed wheel mounted on said socket-shaft and gearing with the ram-chain, and of antifriction-rollers located between the said ram-chain and the guide and between the guide and the said socket all substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 6th day of November, 1900.

ROBERT MATTHEWS.

Witnesses:

ALBERT EDW. KAY,
SAMUEL GUEST.