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H. G. COLMER.  
VALVE MECHANISM.  
APPLICATION FILED OCT. 31, 1904.

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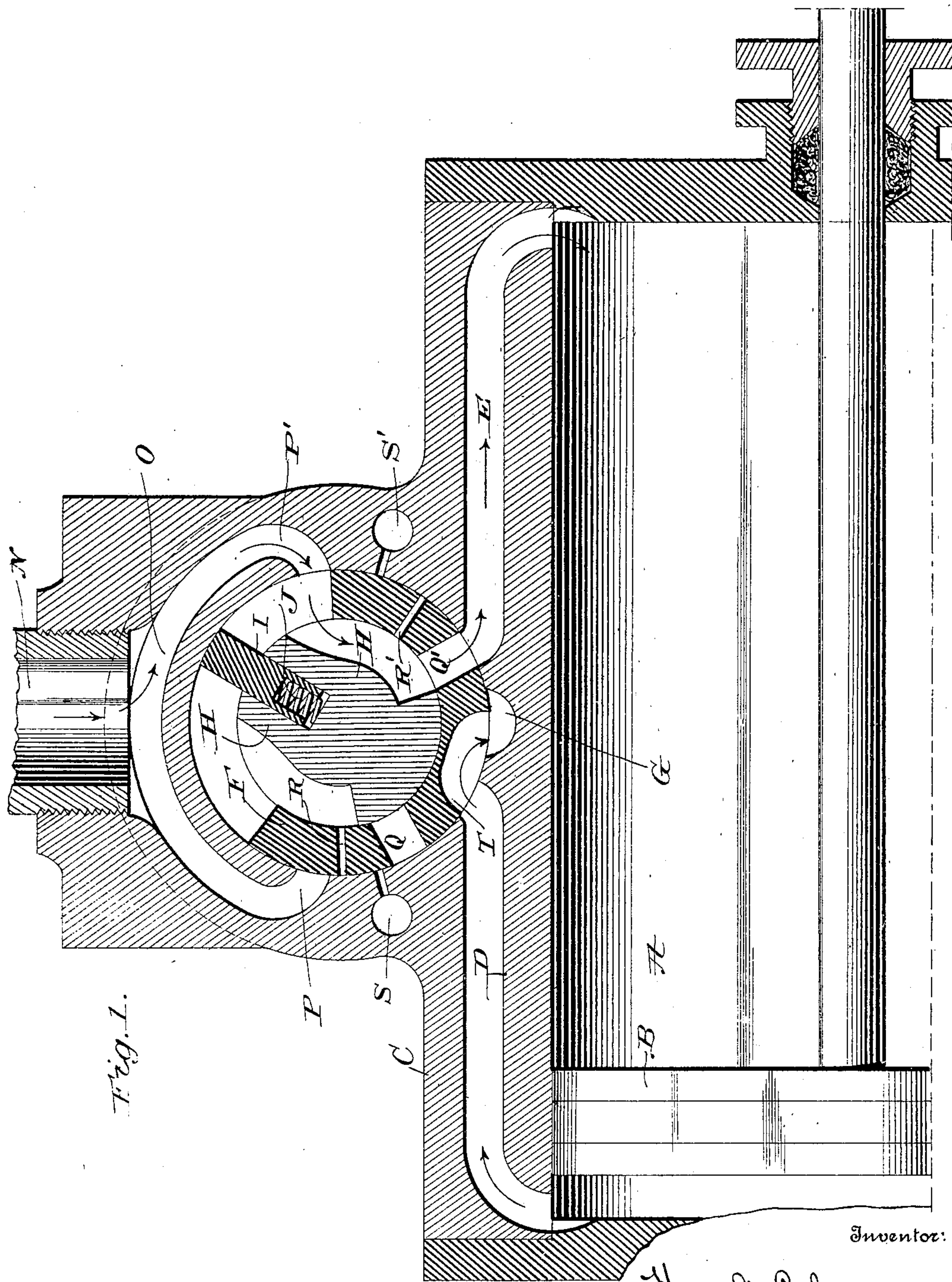


Fig. 1.

Inventor:

Witnesses  
C. H. Rader.  
Stewart Rice.

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Henry S. Colmer,  
Sodage and Sons  
Attorneys







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4 SHEETS—SHEET 3.

Fig. 4.

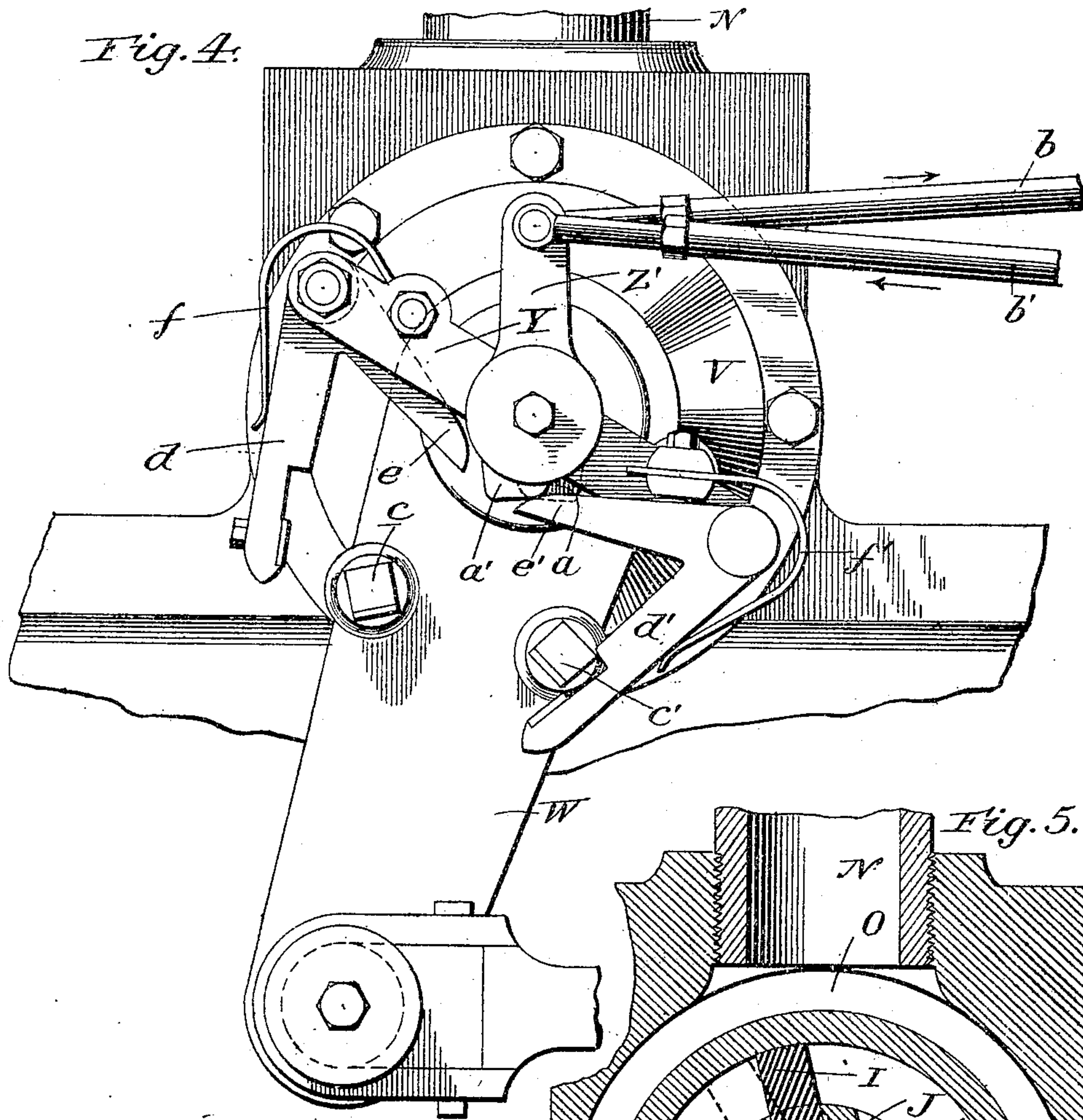
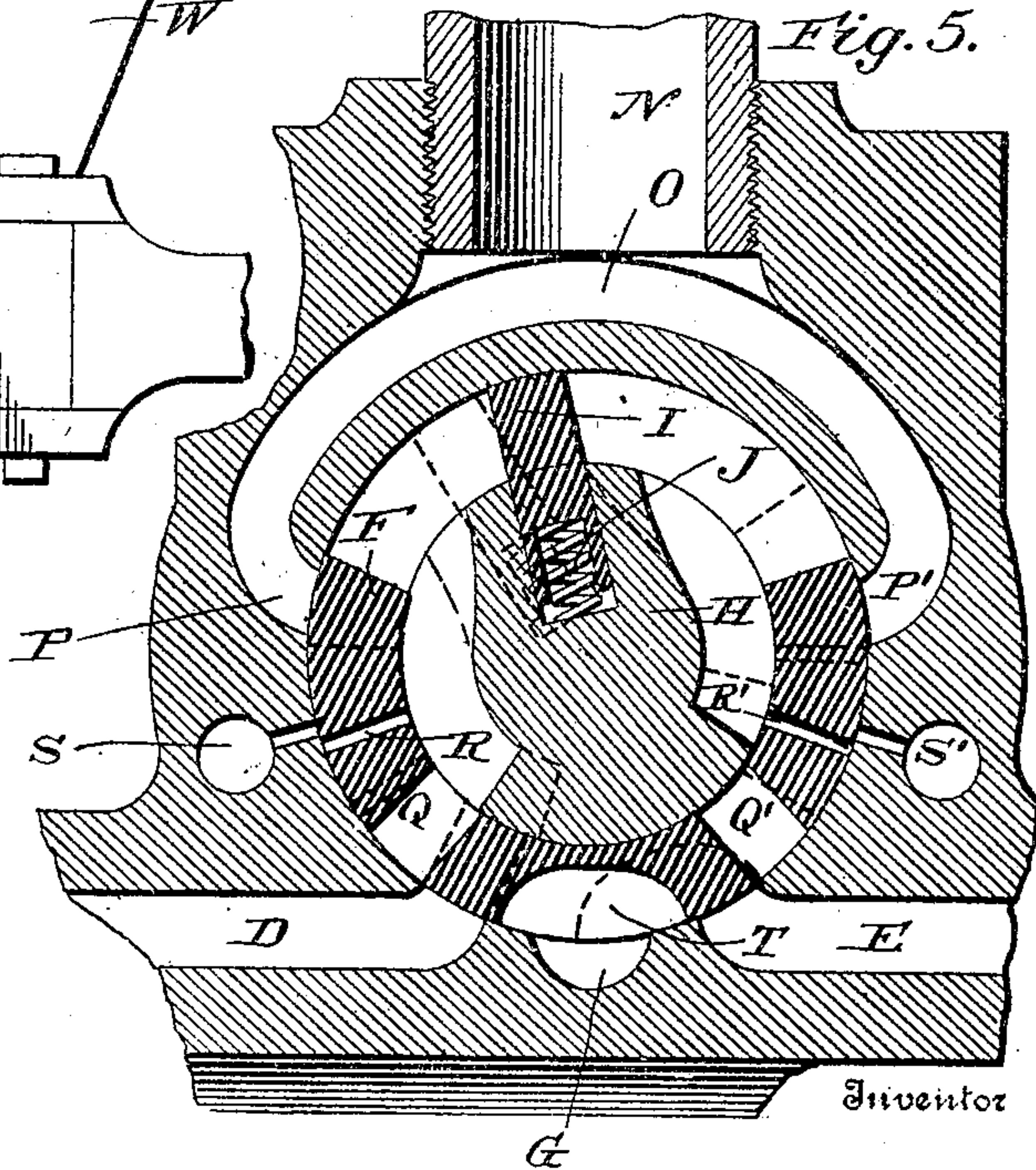


Fig. 5.



Witnesses  
C. Raeder  
Stewart Rice.

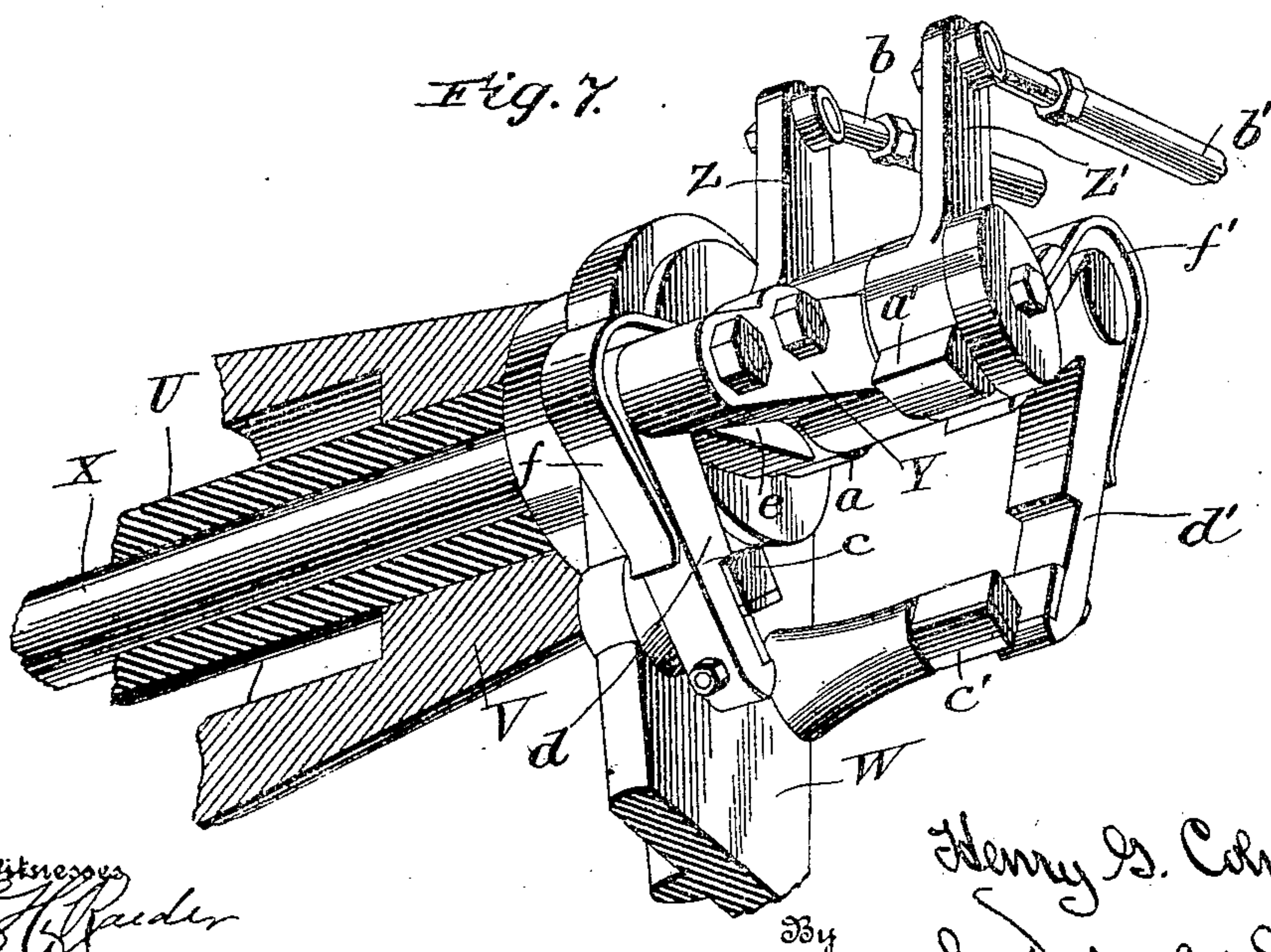
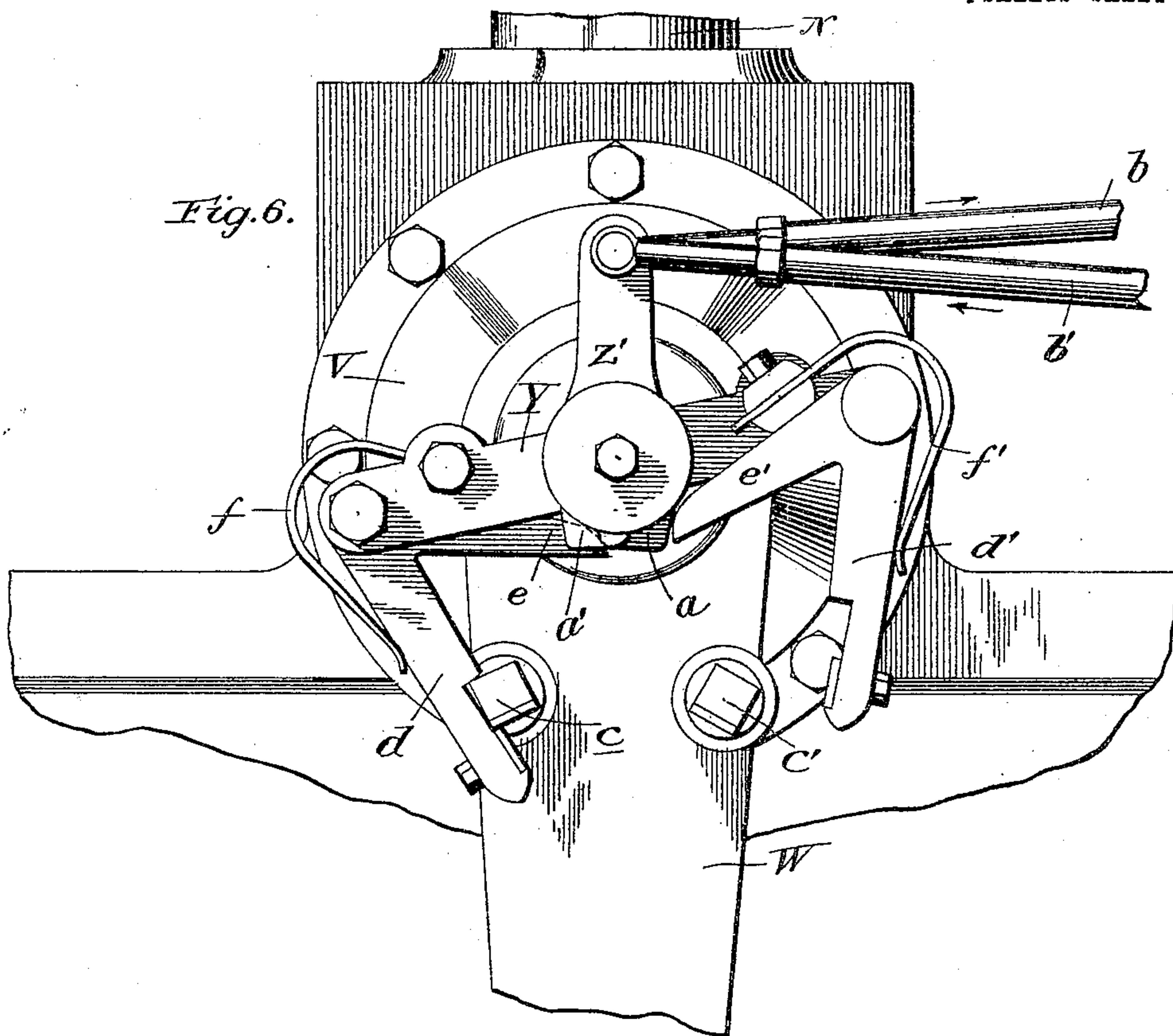
By

Henry G. Colmer,  
Dodge and Sons, Attorney at Law.



H. G. COLMER.  
VALVE MECHANISM.  
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4 SHEETS—SHEET 4.



Witnesses  
*E. A. Rader*  
*Stewart Rice.*

Inventor  
*Henry G. Colmer,*  
*by Dodge and Sons,*  
Attorneys.



# UNITED STATES PATENT OFFICE.

HENRY G. COLMER, OF BIRMINGHAM, ALABAMA.

## VALVE MECHANISM.

No. 795,485.

Specification of Letters Patent.

Patented July 25, 1905.

Application filed October 31, 1904. Serial No. 230,713.

*To all whom it may concern:*

Be it known that I, HENRY G. COLMER, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Valve Mechanisms, of which the following is a specification.

My present invention pertains to improvements in valve mechanism for steam engines or appliances, and relates more particularly to the cut-off mechanism, the construction and advantages of which will be hereinafter set forth, reference being had to the annexed drawings, wherein—

Figure 1 is a transverse vertical sectional view of the valves—the main supply and controlling valve and the steam-controlled cut-off valve; Fig. 2, a longitudinal sectional view, portions of the valves being shown in elevation; Fig. 3, a perspective view of a portion of the cut-off valve; Fig. 4, an end elevation of the valve-controlling mechanism, the parts corresponding in position to the position of the valves shown in Fig. 1; Fig. 5, a transverse sectional view showing the valves in the positions they occupy between the closing of one inlet-port to the cylinder and the opening of the other; Fig. 6, an end elevation similar to Fig. 4, the parts occupying a position similar to the dotted-line position of Fig. 5; and Fig. 7, a perspective view of the valve-controlling mechanism.

The main object of the present invention is to provide a simple and efficient cut-off valve which will act immediately when released by the governor, the movement being effected by steam-pressure. The action of the valve is rapid, and it moves immediately the governor demands it without waiting for the piston to complete its stroke.

Referring to the drawings, A denotes a steam-cylinder, B the piston working therein, and C the valve housing or casing surmounting the same. The housing is provided with ports D E, which open into the opposite ends of the cylinder and likewise lead to and terminate in line with the inlet-valve F.

G denotes the exhaust-port, formed in the housing intermediate the ports or passages D and E.

The housing is provided with a cylindrical bore or chamber, in which is mounted the inlet-valve F, said valve being semicylindrical in shape, the inner face thereof forming the seat for the cut-off valve H. Said cut-off valve is provided with a wing I, which is

pressed outwardly by springs J against the upper wall of the cylindrical chamber, similar spring-pressed blocks K being mounted in the ends of the wing, as shown in Figs. 2 and 3, to effect a tight joint with the end walls of the valve-chamber.

Valve H, as will be seen upon reference to Fig. 2, is provided with a cylindrical head L at each end, each head being provided with a packing-ring M, which effects a tight joint between the two valves at these points.

N denotes the steam-inlet, opening into a steam-cylinder O, ports P P' extending from opposite sides thereof to the valve F. Said valve is provided with main ports Q Q' and auxiliary exhaust-ports R R', which latter work in conjunction with exhaust-ports S S', formed in the valve housing or casing C.

T denotes an exhaust-port formed in valve F, said port serving to alternately throw ports D and E into communication with exhaust-port G as the valve is oscillated.

To effect a proper movement of the valves, I employ the mechanism shown in Figs. 2, 4, 6, and 7. Valve F is formed or provided with a hollow sleeve or stem U, which extends outwardly through a bonnet V, the end of the sleeve carrying a rocker-arm W, which is actuated by the eccentric in the usual manner. A stem X is secured to valve H, said stem passing through the hollow stem U and carrying at its outer end a rocker arm or lever Y, which is keyed or otherwise made fast thereto, and two arms Z Z', said arms being loose thereon, so that the stem and rocker arm or lever Y may move independently thereof. Arm Z is provided with a cam *a* and is connected to a rod *b*, leading to and controlled by the governor, as usual. Arm Z' is likewise provided with a cam *a'* and is connected at its outer end with a second governor-rod *b'*. Rocker-arm W is provided with two outwardly-extending posts *c c'*, post *c* being relatively short and standing in line with a hook *d*, pivoted upon one end of rocker-arm Y. The hook is provided with an inwardly-extending wiper-arm *e*, which stands in line with cam *a*, the hook being normally pressed toward post *c* by a spring *f*, secured at one end to arm Y. A second hook *d'* is pivoted upon the opposite end of rocker arm or lever Y, said hook being likewise provided with an arm *e'*, which stands in line with cam *a'*, a spring *f'* serving normally to throw the hook toward post *c'*.

As will be noted upon reference to Fig. 5,



wherein the valves are shown in the medial position in full lines, as the valve F is being shifted to the right, a chamber or pocket is formed upon each side of the wing I of valve H, and in operation the steam is pocketed therein when the ports Q and Q' of the main valve F are closed.

In operation reciprocatory movement is imparted to the rocker-arm W through connection with the eccentric, and valve F is oscillated from the extreme position shown in Fig. 1 to the extreme position shown in dotted lines in Fig. 5. In moving from one to the other side the hooks or latches *d* and *d'* will alternately be released by coming into contact with the cams *a* and *a'*, the release being effected just prior to the extreme movement of the rocker-arm to the right or to the left, as the case may be. The release of these hooks or latches will permit valve H to be thrown to one or the other side, closing port Q or Q', as the case may be, owing to the preponderance of pressure in one or the other pocket formed, as above noted, at each side of the valve H—that is to say, the steam in the left-hand pocket, Fig. 5, will expand and throw the valve H to the right, owing to the fact that the right-hand pocket is vented through the ports R' and S'. In other words, as the valve F rotates to the right and partially opens the ports P and Q the ports R' and S' are brought into direct communication, and the pressure in the right-hand pocket is reduced, thereby allowing the initial pressure passing through the port P to act directly on the wing I and rotate the valve H to close the port Q if the speed of the governor so demands. If the engine be running at the proper speed the valve H will not be released, so that the excess steam-pressure in the left-hand pocket can act as just noted; but the valve H will move with the valve F and permit a full opening of the port Q into the port or passage D. It will thus be seen that the cut-off valve is directly actuated by steam-pressure and that the point of cut-off is regulated by the position of the cams *a* and *a'*, which coact with the arms *e* and *e'*, the cams being made to throw the hooks or latches off earlier if they are shifted through the action of the governor upon the rods *b* and *b'*. So long as the engine is running at the proper speed and is obtaining the proper supply of steam cams *a* and *a'* remain practically stationary. If, however, the engine exceed the proper speed, the governor, acting through the rods *b* and *b'*, will shift the cams *a* and *a'* so as to bring them into such position that the arms *e* and *e'* will come into contact therewith earlier than they do when the engine is running at normal speed, and as a consequence the latches will be moved from the posts *c* and *c'*, thus permitting the valve H to be shifted directly by the steam-pressure. This movement of the cut-off valve H may be effected

during the first part of the movement of the piston in either direction.

Having thus described my invention, what I claim is—

1. In combination with a valve housing or casing provided with a cylindrical bore or chamber; an oscillating valve mounted therein, said valve having ports communicating alternately with the steam-ports leading to an engine-cylinder; a cut-off valve mounted in said bore or chamber and working over the ports in the main valve, said cut-off valve being subject to steam-pressure upon its opposite sides; means for oscillating the main valve; means for moving the cut-off valve with the main valve throughout a portion of its movement; and means controlled by the governor for releasing the cut-off valve, whereby said cut-off valve may be moved independently of the main valve by the steam-pressure exerted upon said cut-off valve, substantially as described.

2. In combination with a valve housing or casing provided with a cylindrical bore or chamber; a valve mounted therein; means for oscillating said valve to bring the ports formed therein in conjunction with the steam-supply ports and the exhaust-ports formed in the housing; a cut-off valve mounted in the bore and working over the delivery-ports of the main valve; means for venting steam alternately from opposite sides of said cut-off valve; connections intermediate said cut-off valve and the means for oscillating the main valve to move said cut-off valve; and means controlled by the speed of the engine for releasing said connections.

3. In combination with a valve housing or casing having a cylindrical bore; an oscillating valve mounted therein, said valve being provided with delivery-ports Q, Q', exhaust-port T, and auxiliary exhaust-ports R, R', the latter coming into conjunction at stated intervals with exhaust-ports S, S'; a cut-off valve mounted in said housing and working over the ports in the main valve, said cut-off valve being of such construction that pockets or recesses are formed upon each side thereof when the main valve is in its medial position; means for oscillating the main valve; connections intermediate said means and the cut-off valve for moving the cut-off valve a predetermined distance in either direction; and means for releasing said connections, said means being controlled by the speed of the engine, whereby the connections will be released earlier when the engine exceeds a predetermined speed.

4. In combination with a valve housing or casing provided with a steam-inlet, exhaust-ports S and S', delivery-ports D and E, and exhaust-port G; a main controlling-valve F mounted in said housing or casing, said valve being provided with an exhaust-port T, delivery-ports Q, Q', and auxiliary exhaust-ports



R, R'; a rocker connected to said main valve for imparting an oscillating movement thereto; a cut-off valve mounted in the housing or casing and working over the main delivery-ports Q and Q'; a rocker-arm connected to the outer end of said valve; latches mounted upon said rocker-arm; posts extending outwardly from the rocker in line with the latches; means for normally pressing said latches toward the posts; and cams standing in line with the latches to release the same, the position of said cams being controlled by the speed of the engine, substantially as described.

5. In combination with a valve housing or casing provided with a steam-supply port; delivery-ports D and E, and main exhaust-port with auxiliary exhaust-ports; a main valve mounted in said housing or casing; means for oscillating the same; a cut-off valve working in conjunction with said main valve and being subject to steam-pressure upon opposite sides, substantially as described; means for moving the cut-off valve with the main valve; and means for releasing said cut-off valve at an early period in its movement when the engine is exceeding its normal speed, whereby the cut-off valve will be shifted by the action of the steam thereon and the supply of steam to the engine thereby cut off, substantially as described.

6. In combination with a valve housing or casing provided with a cylindrical bore or chamber and with steam-passages extending to opposite sides thereof; a main supply-valve mounted in the lower portion of said chamber,

said valve being provided with delivery-ports Q and Q' which register alternately with delivery-ports D and E formed in the housing, and likewise provided with an exhaust-port T which registers with a corresponding port G formed in the housing, and with auxiliary ports R, R' which register alternately during the movement of the valve with exhaust-ports S and S' formed in the housing; a cut-off valve H mounted in the cylindrical bore and working over the curved upper face of the lower portion of the main supply-valve; a spring-pressed wing I mounted in said cut-off valve and working against the upper inner face of the cylindrical bore or chamber; a rocker W connected to the main supply-valve; a stem X extending outwardly from the cut-off valve; a rocker-arm Y secured upon said stem; a pair of spring-pressed latches mounted upon opposite ends of said rocker-arm; posts extending outwardly from the rocker in line with the latches; arms Z, Z' loosely mounted upon the stem; a cam carried by each of said arms, said cams standing in line with the latches; and means for shifting said arms and consequently the cams as the speed of the engine varies, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY G. COLMER.

Witnesses:

P. G. AULT,  
H. I. DAVIS.