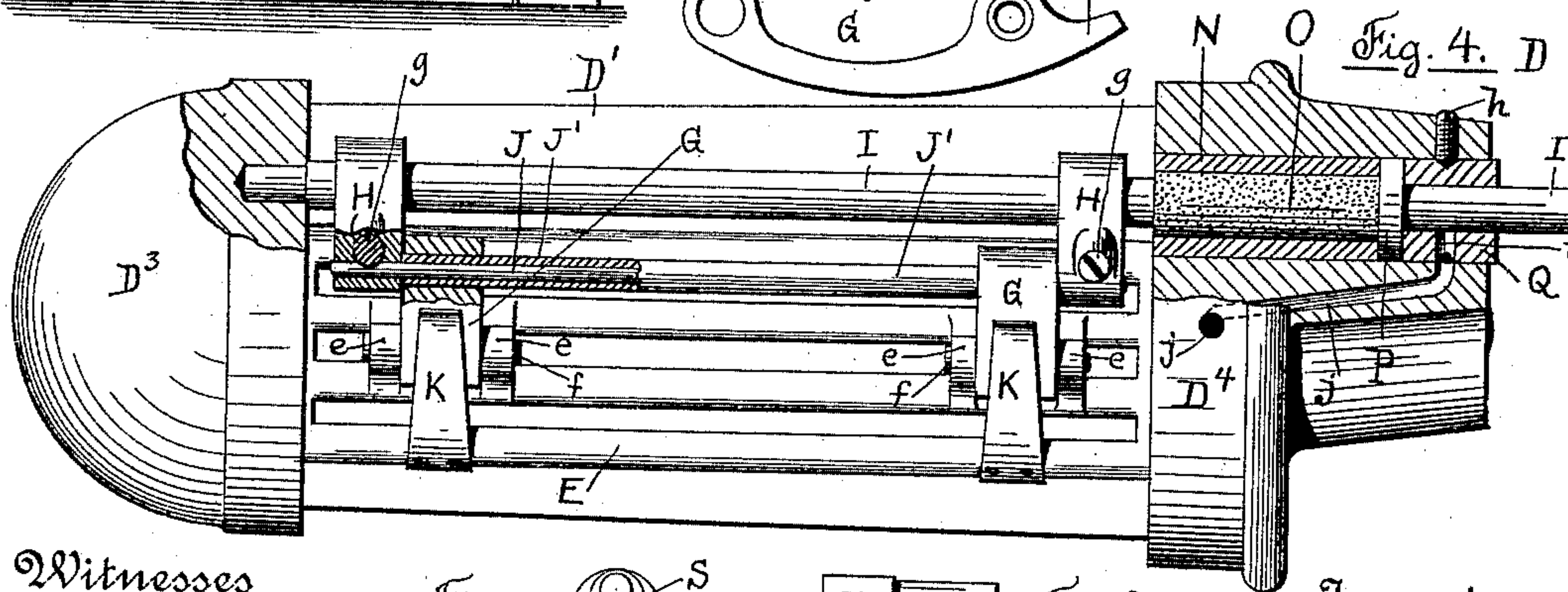
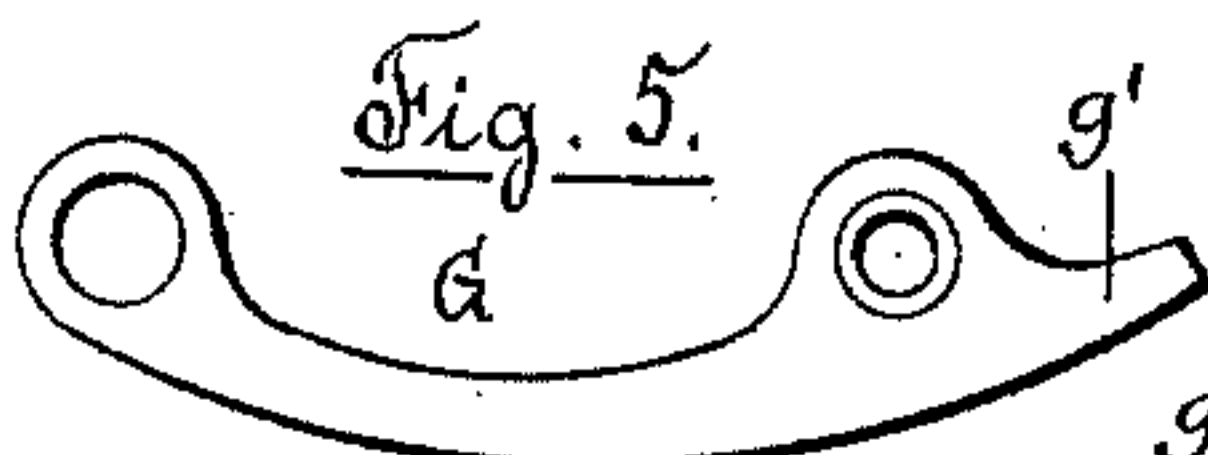
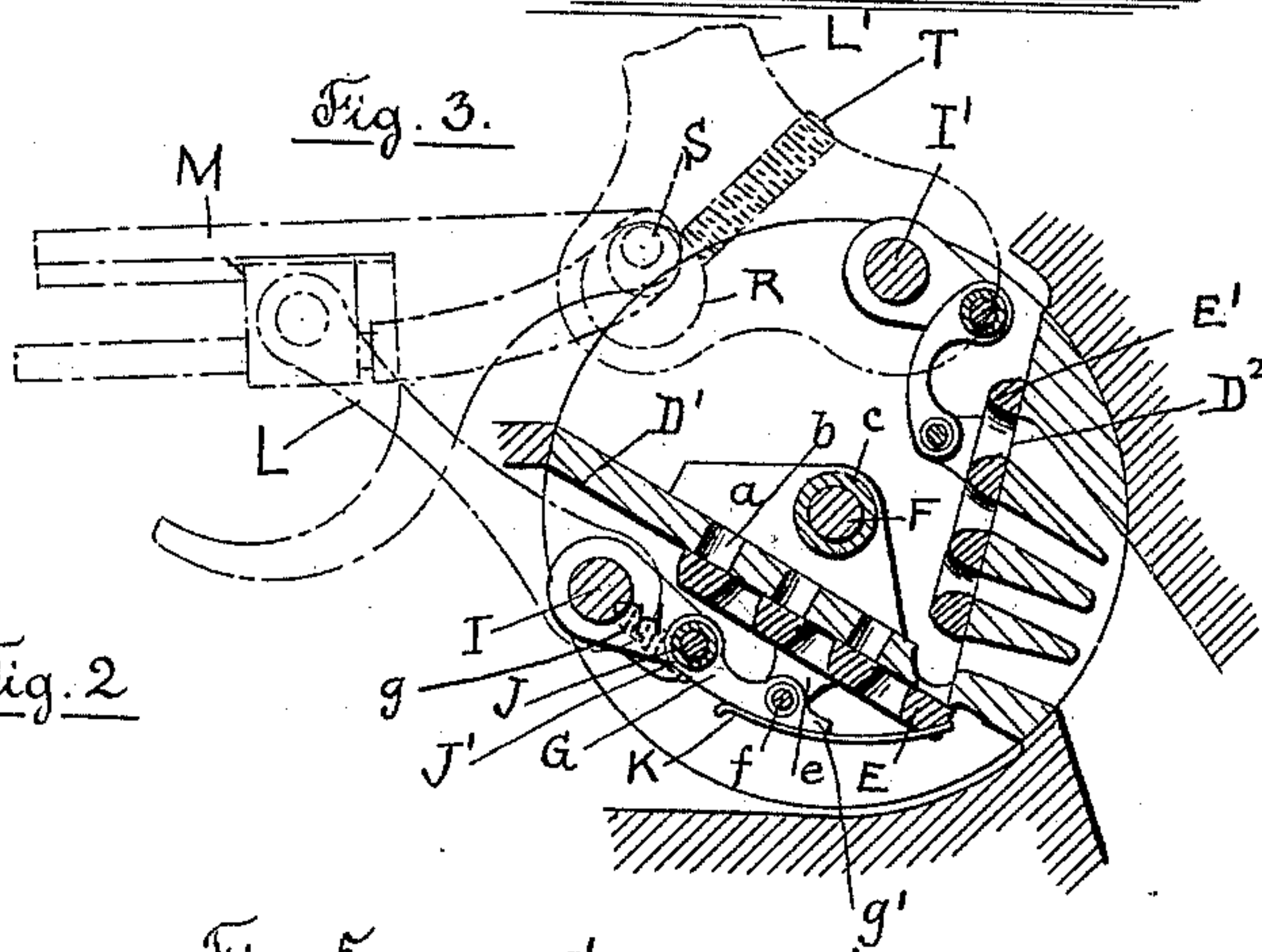
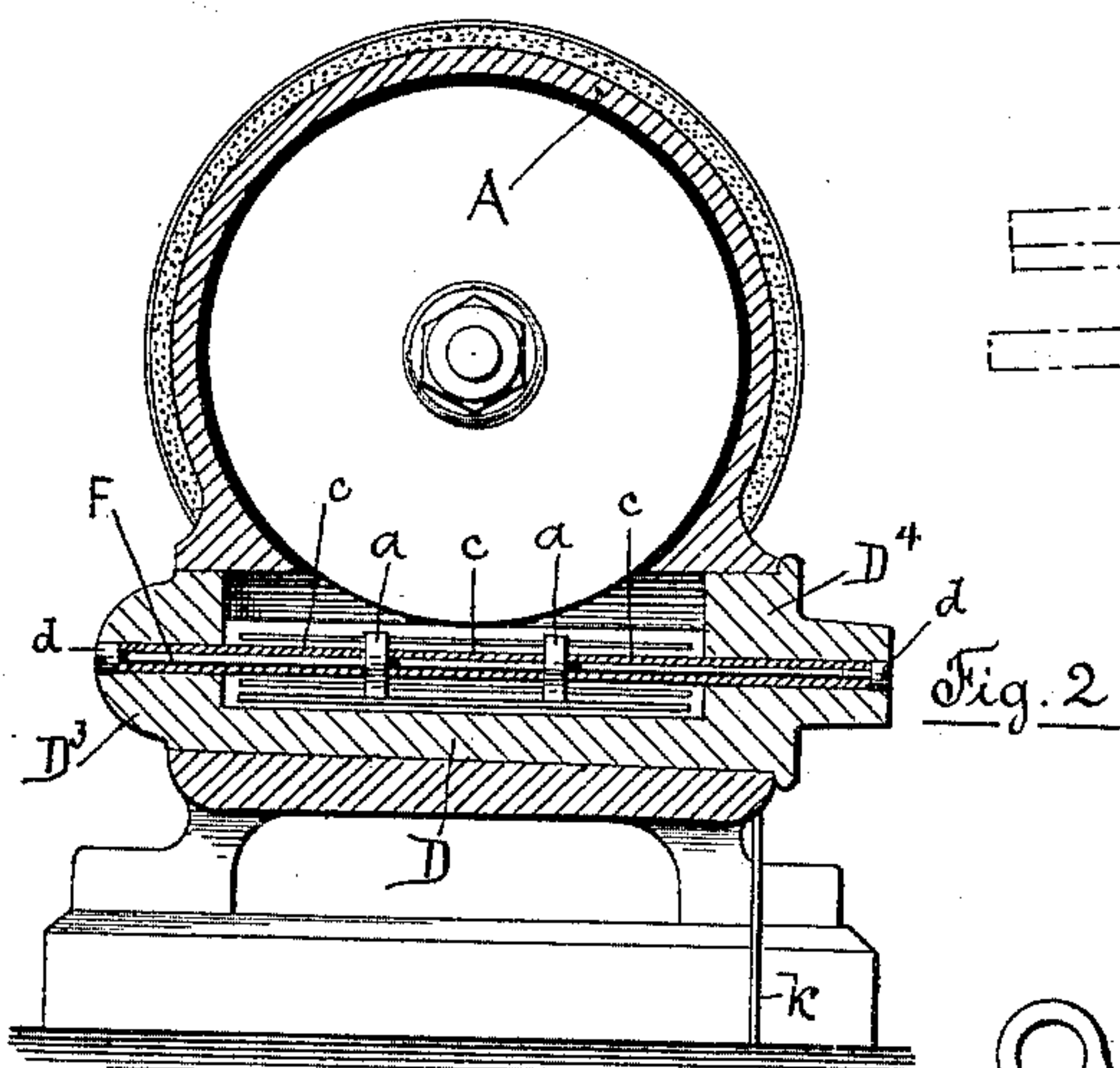
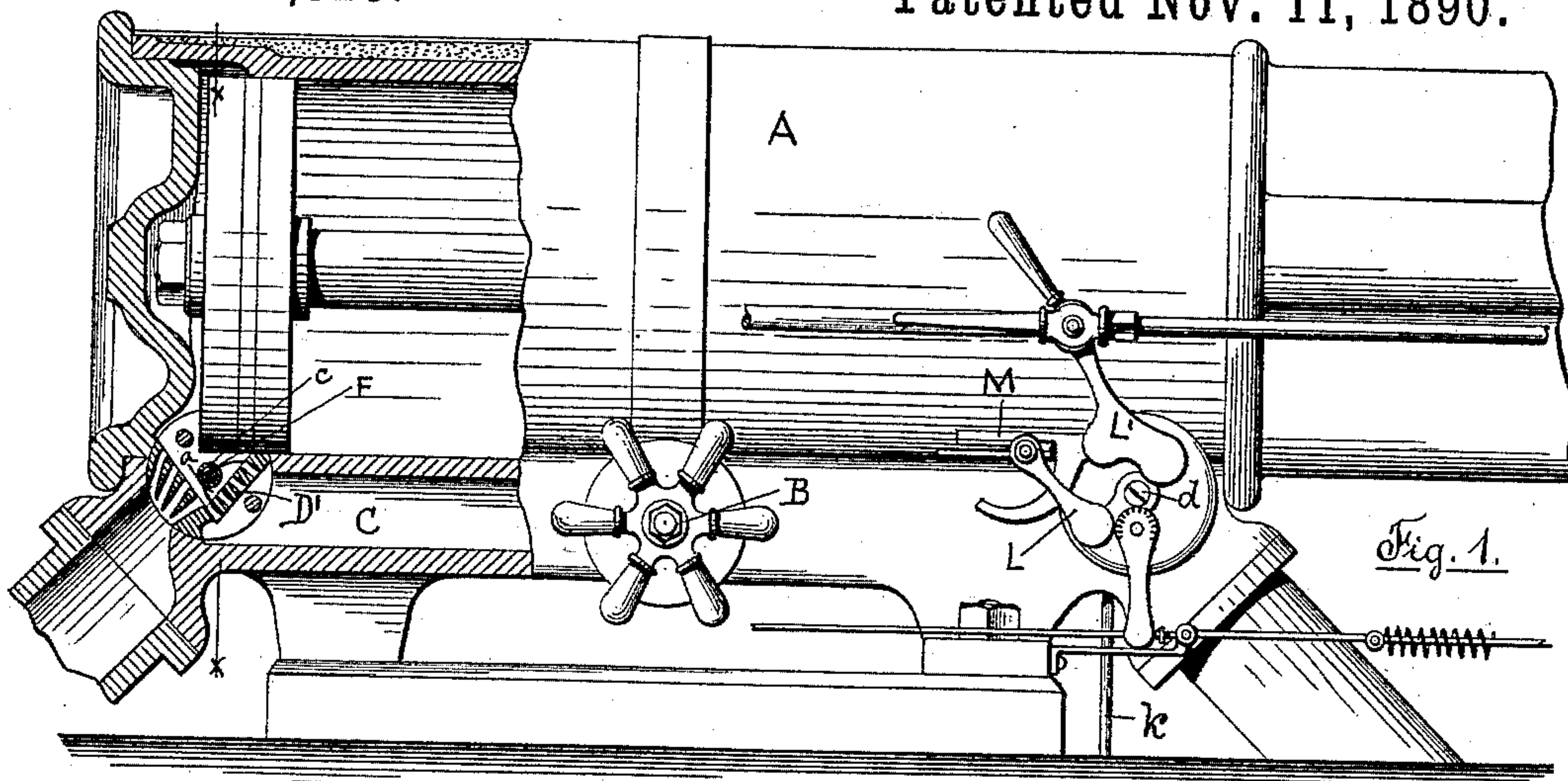


(No Model.)

J. WHEELOCK.
VALVE SYSTEM FOR ENGINES.

No. 440,523.

Patented Nov. 11, 1890.



Witnesses
Chas. F. Schmeltz
F. L. Robinson.

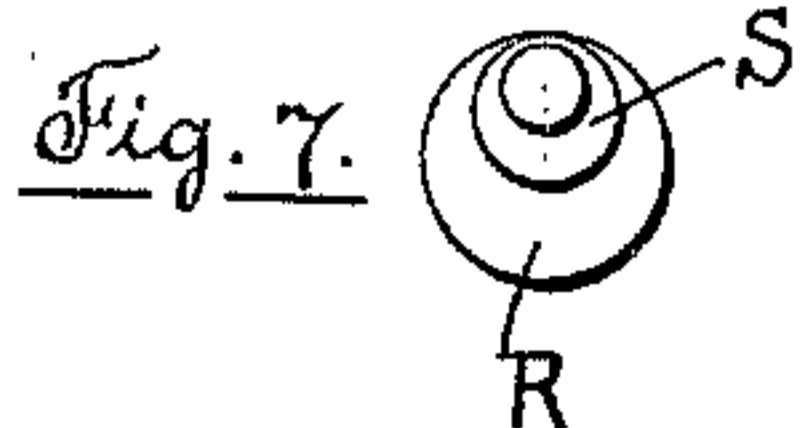


Fig. 6

Inventor

25/ Aug. 6 1897 Inventor James M. Hubert

UNITED STATES PATENT OFFICE.

JEROME WHEELOCK, OF WORCESTER, MASSACHUSETTS.

VALVE SYSTEM FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 440,523, dated November 11, 1890.

Application filed October 30, 1889. Serial No. 328,738. (No model.)

To all whom it may concern:

Be it known that I, JEROME WHEELOCK, a citizen of the United States, residing in Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Valve System for Steam-Engines, of which the following, in connection with the accompanying drawings, is a specification sufficiently clear and descriptive to enable those skilled in the art to which my invention belongs to make and use the same.

My invention relates to steam-engines such as are generally known as the "releasing-valve-gear type," and has for its objects, first, to reduce the number of bores in the cylinder to one at each end; second, to provide a set of steam and exhaust valves, both of which are contained in one shell, and, third, to obviate the use of dash-pots employed for the purpose of closing the cut-off valve.

To this end my invention consists in the improved construction of the shell containing both valve-seats, and also in several new features of construction, as will be fully described later on, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side view of a steam-engine cylinder, partly broken away to show the interior. Fig. 2 is a cross-section through the cylinder and shell on line *x x*, Fig. 1. Fig. 3 shows a vertical section of the shell, containing the valve-seats. Fig. 4 represents a detail of the valve-shell, looking at the cut-off valve. Fig. 5 is a side view of the link connecting the cut-off valve with its driving-crank within the shell. Fig. 6 is a side view of the eccentric-bolt employed in the outside arms for operating the cut-off valve, and Fig. 7 is an end view of the eccentric sleeve adapted to receive the bolt shown in Fig. 6.

Similar letters refer to similar parts.

In the accompanying drawings, A is the steam-engine cylinder having a throttle-valve B and steam-chest C, from which the steam is supplied to the cut-off valves contained within the shell D. Both the cut-off and exhaust valves are of what is generally known as the "gridiron" variety, the cut-off valve E sliding on its seat D', which is made integral with the heads D³ and D⁴ of the shell. The seat D' is

made comparatively thin, so as to afford ample room for finishing the exhaust-valve seat, and is strengthened by means of bars *a*, which are placed directly under the bridges *b* of the seat, so that steam may pass through the parts of the seat without difficulty.

The bars *a* are held on the re-enforcing bolt F, upon which are also placed bushings *c*, which serve to retain the bars in proper distance, while at the end of the bolt F is placed the nut *d*, which serves to draw all the bushings *c* and bars *a* together to a great degree of compactness, whereby the desired result as to stability is produced.

The cut-off valve E is provided at its free surface and near the middle of its width with lugs *e e*, to which are secured, by means of pins *f*, the ends of links G, which connect the cut-off valve E with cranks H, secured upon the driving-shaft I as follows: A set-screw *g* is driven into the crank H, so as to cut away a small portion of the rod J, (see Fig. 4,) which passes through both cranks and supports a bushing J' for the purpose of retaining the cranks H in proper distance, after which the said set-screw *g* enters a counterbore in the shaft I. It will thus be seen that an absolutely stiff and rigid driving mechanism is obtained.

To the valve E, and at a point centrally opposite the driving-shaft, is secured a flat spring K, the free end of which presses against the back of the link G, thus tending to return the crank to its normal position, or, in other words, to close the valve.

Mechanism of any kind—such as dash-pots and other similar means—may therefore be dispensed with altogether, inasmuch as not only the valve is closed quickly, but, furthermore, the operating-arm L on the outside is returned to its proper position ready to be re-engaged by the latch-link M, all such mechanism having been fully shown and described in Letters Patent No. 413,695, dated October 29, 1889.

By referring to Figs. 3 and 5 it will be seen that the link G is provided at its rear end with a spur or projection *g'*, which serves to return the crank-arm L to its proper position in case the movement when the valve is being closed should be so as to cause an excess of travel, whereby the arm L would be be-

yond its normal position, so that the latch-link M could not engage the same. It will therefore be readily understood that any such excess of movement would cause the spur g' to lift the spring, which upon its return will bring link G, and therefore the operating-arm, back to its proper position.

Referring to Fig. 4, it will be seen that the driving-shaft rests at one end in a bushing N, which may also serve as a check-pin to prevent any rotation on part of the shell D in the cylinder-casting.

The shaft I is provided with a mantle of Babbitt metal O, which is cast onto the shaft I and serves as its support within the bushing N.

A collar P is driven onto the shaft I until it brings up against the end of a sleeve Q, placed over the shaft and secured in the head D^4 of the shell by means of a set-screw h and ground to a joint with collar P, said sleeve having an annular chamber and a series of holes i running from the bore of the sleeve to its periphery, so that any leakage of steam or condensed steam may find an exit through the channel j , and from there into the drip-pipe k .

As the outlet of the channel j and the end of the drip-pipe K must register, on account of the shell always assuming the same position in the cylinder-casting when replaced, I attach the drip-pipe k directly to the latter, so that the piping can remain intact and will not interfere with the shell whenever it is desired to remove the same out of the cylinder-casting, this feature being of a very great merit on account of saving in time and expense.

The driving-shaft I' , which operates the exhaust-valve E' on its seat D^2 , is made of the same construction relative to its bearings as the shaft I, the spring in this instance not being necessary, since a positive connection with the engine-eccentric exists, so that the motion of the exhaust is at all times positive.

I make the links G in bent form, (see Figs. 3 and 5,) as by this construction I am enabled to properly and readily adjust the distance between the ends of the driving-cranks and the lugs on the valves, since more or less distance may be obtained by either straightening or curving the link.

It is well known to those skilled in the art that it is a matter of great importance and difficulty to adjust the latch-link so that at the commencement of the stroke the cut-off valve shall be opened to the proper amount, and as the motion of the exhaust is positive and also controls the movement of the cut-off valve, a close and accurate adjustment in the connection is necessary, the cut-off valve remaining closed until the exhaust-valve has been closed a sufficient length of time to produce proper compression. It has been the practice, therefore, to provide the exhaust-valve arm with an eccentric-pin, on which the latch-link

was pivoted, so that a limited adjustment could be made. Under certain circumstances such adjustment was not sufficient, and the consequence was that the said eccentric-bolt had to be made so large or else set over to such an extent as to exclude practicability.

Another objection to this construction was the fact that the necessary amount of "rest" in the cut-off valve could not be obtained, and I therefore provide the following construction to obviate all these difficulties.

Into the arm L' is set an eccentric bushing R, which is split (see Fig. 7) and receives the eccentric-bolt S, the latter touching with its periphery the outside of the above-mentioned bushing R, and one set-screw T, passing into the arm L' , will thus serve to tightly retain bushing and bolt.

It will be readily understood that the range of adjustment is very great, and that by these means the latch-link may connect with the arm L, allowing a great amount of rest, if so desired.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a steam-engine, a removable shell provided with seats for steam and exhaust valves, substantially as shown and described.
2. In valves for steam-engines, the combination of a sliding valve with driving-cranks and a bent link whereby the "valve-lap" may be adjusted, substantially as described.
3. The combination, with the cut-off valve and its connecting-link, of a spring attached to the valve and acting on said link, substantially as and for the purpose set forth.
4. In valves for steam-engines, the combination, with the shell having both cut-off and exhaust valves and seats, of a re-enforcing rod, substantially as described.
5. The combination, with the sliding valve, driving-shaft, and crank supported on said shaft, of a stiffening-rod joining the two driving-cranks, substantially as shown and described.
6. The combination, with a shell containing a sliding valve and its driving-shaft and crank, of a bushing supporting said shaft within the head of the shell and a collar on said shaft, whereby an air-tight joint is formed between collar and bushing, substantially as described, and for the purpose set forth.
7. The combination of the driving-shaft and stiffening-rod, two cranks, and the set-screw for retaining the cranks in proper position, substantially as shown and described.
8. The combination of a shell containing seats for cut-off and exhaust valves, with a channel formed within the head of said shell and registering at its outlet with the end of a drip-pipe, substantially as described.
9. The combination, with a shell containing the cut-off and exhaust valves, of shafts for operating such valves, said shafts being provided in the bearings with a mantle of Babbitt or other anti-friction metal, substan-

tially as described, and for the purpose set forth.

10. The combination, with the exhaust-
valve arm and a latch-link for operating the
5 cut-off-valve arm, of an eccentric bolt supported within an eccentric bushing, which is adapted to be firmly held in the exhaust-

valve arm, substantially as described, and for the purpose set forth.

JEROME WHEELLOCK.

Witnesses:

H. L. WHEELLOCK,
F. L. ROBINSON.