

(No Model.)

2 Sheets—Sheet 1.

J. WHEELLOCK.
VALVE SYSTEM FOR STEAM ENGINES.

No. 413,695.

Patented Oct. 29, 1889.

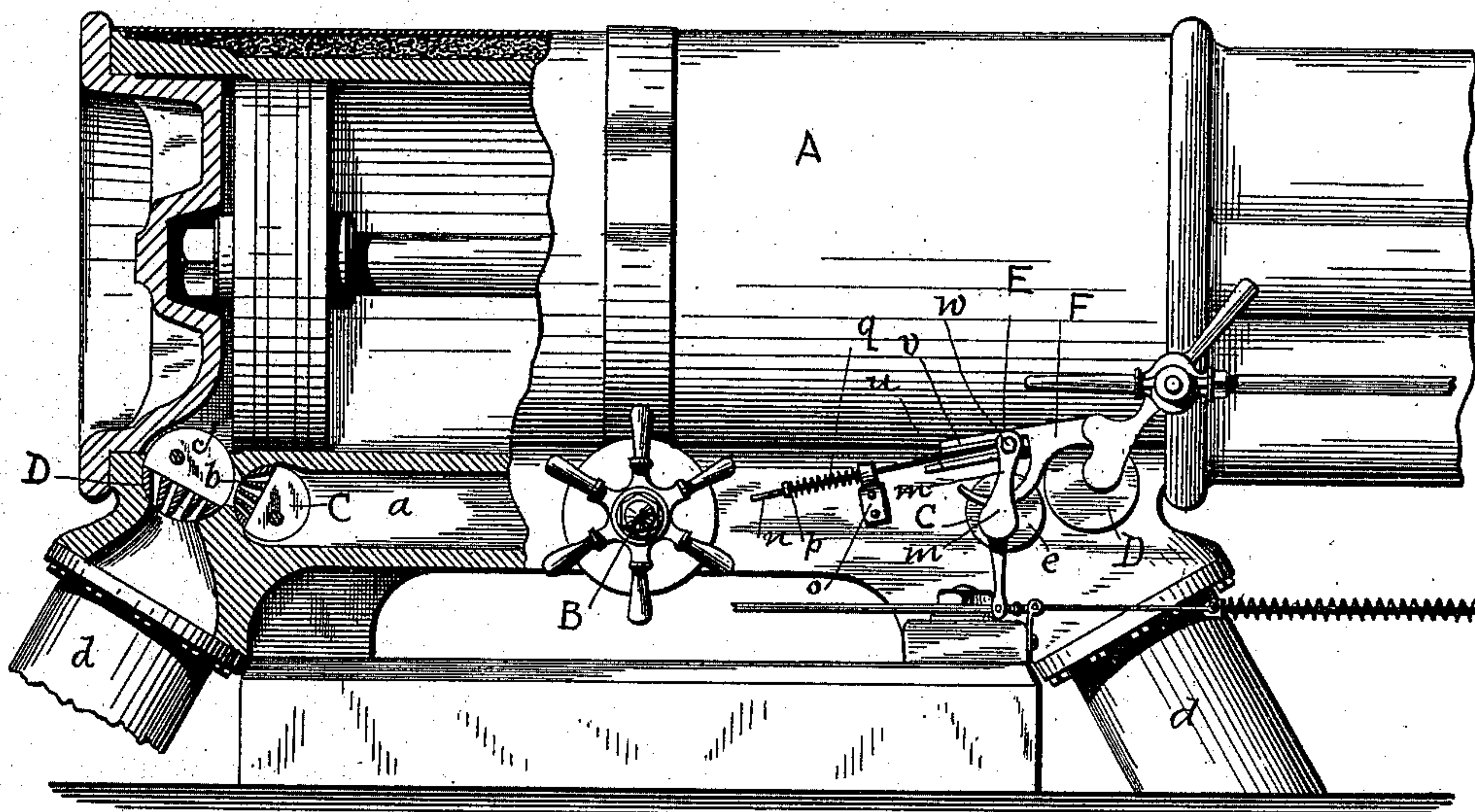


Fig. 1.

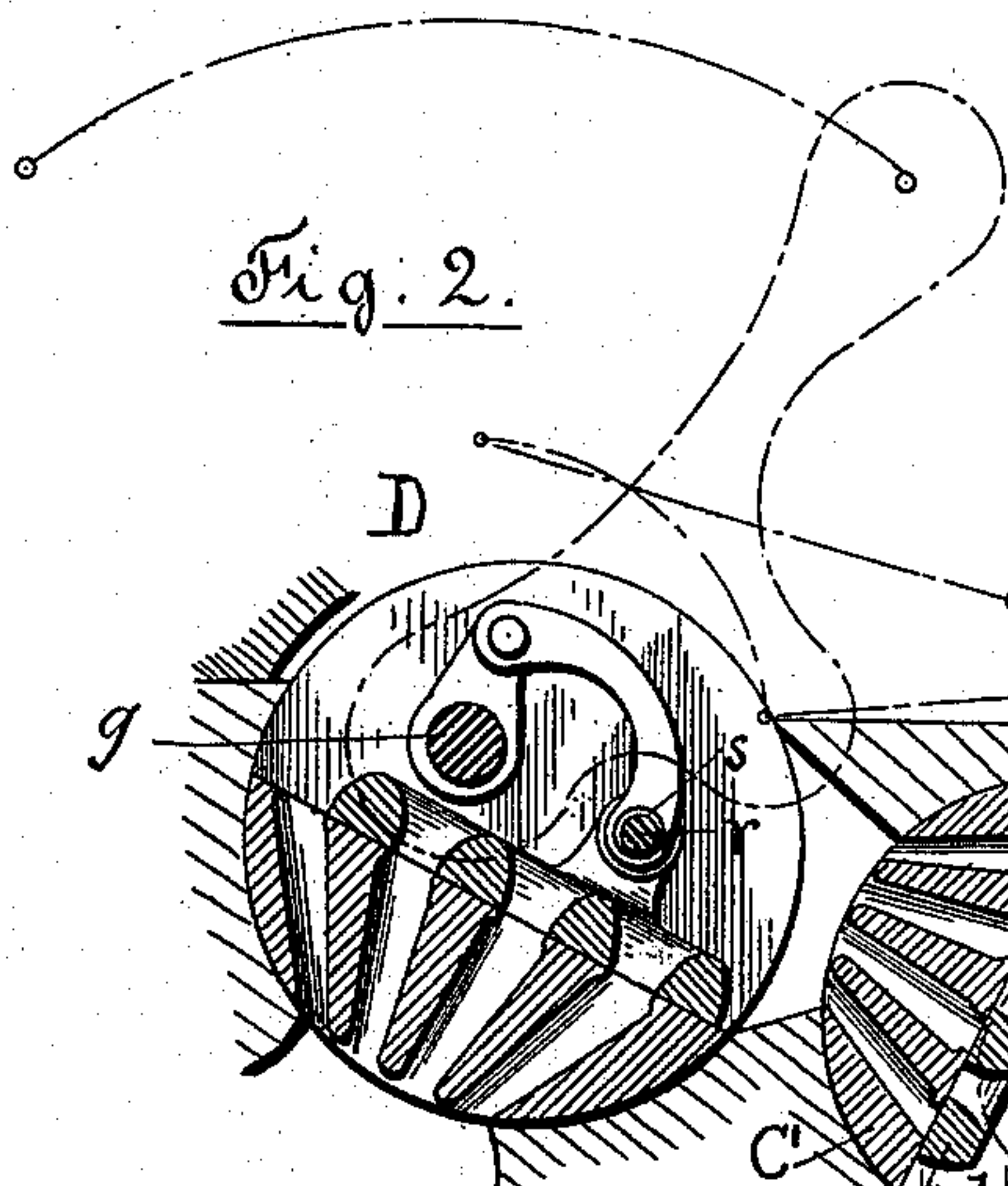


Fig. 2.

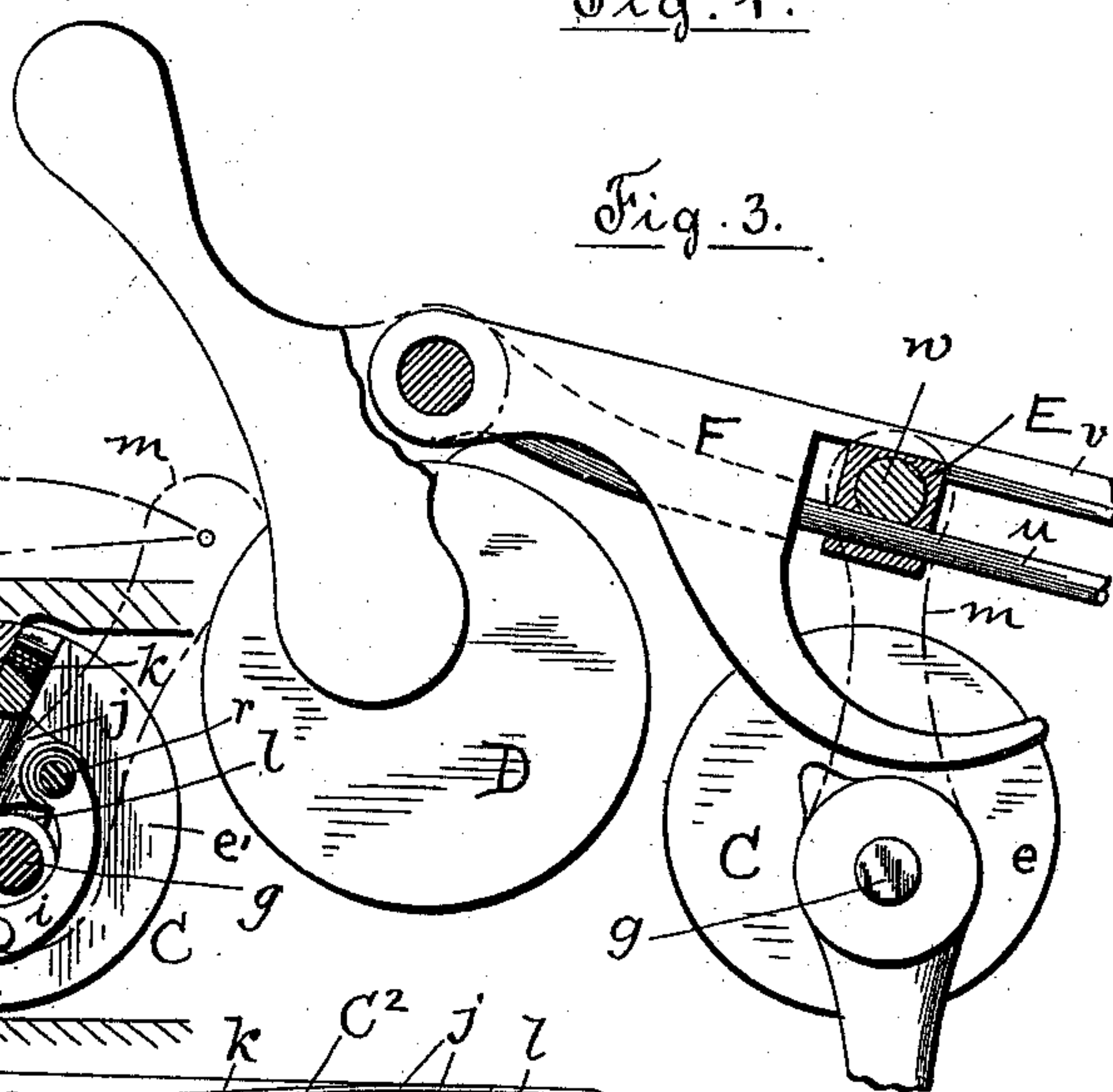


Fig. 3.

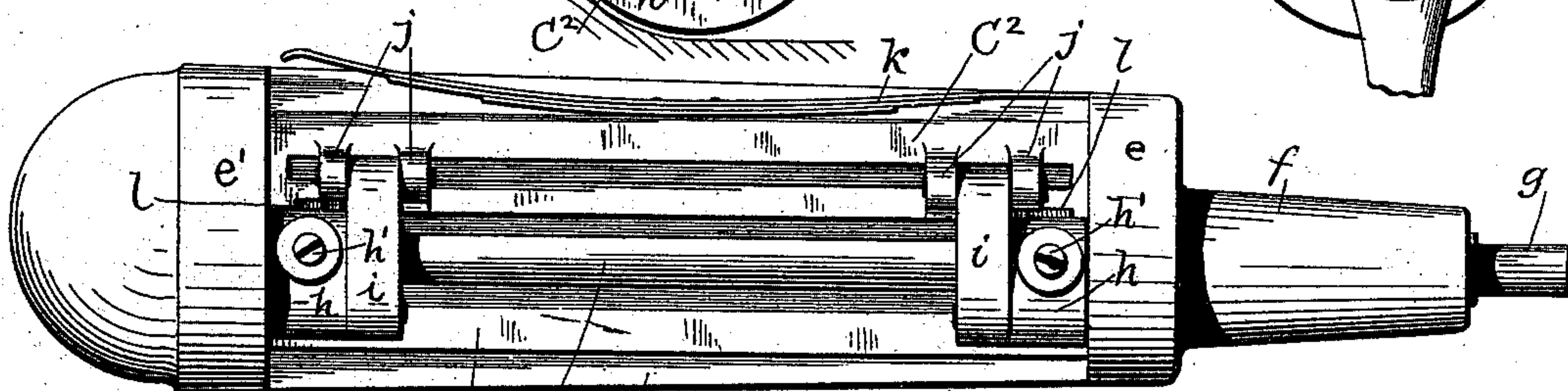


Fig. 4.

Witnesses
Chas. F. Schmeltz,
Irving H. Fay.

Inventor
J. Wheellock

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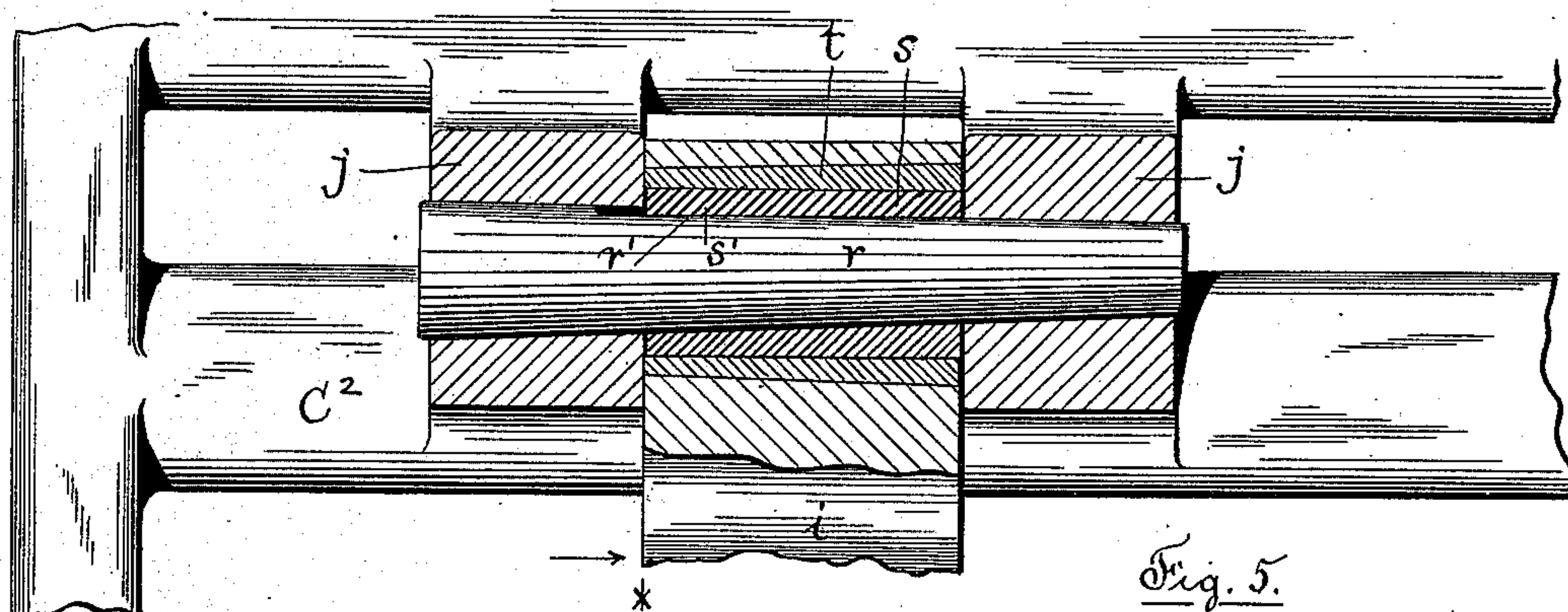


Fig. 5.

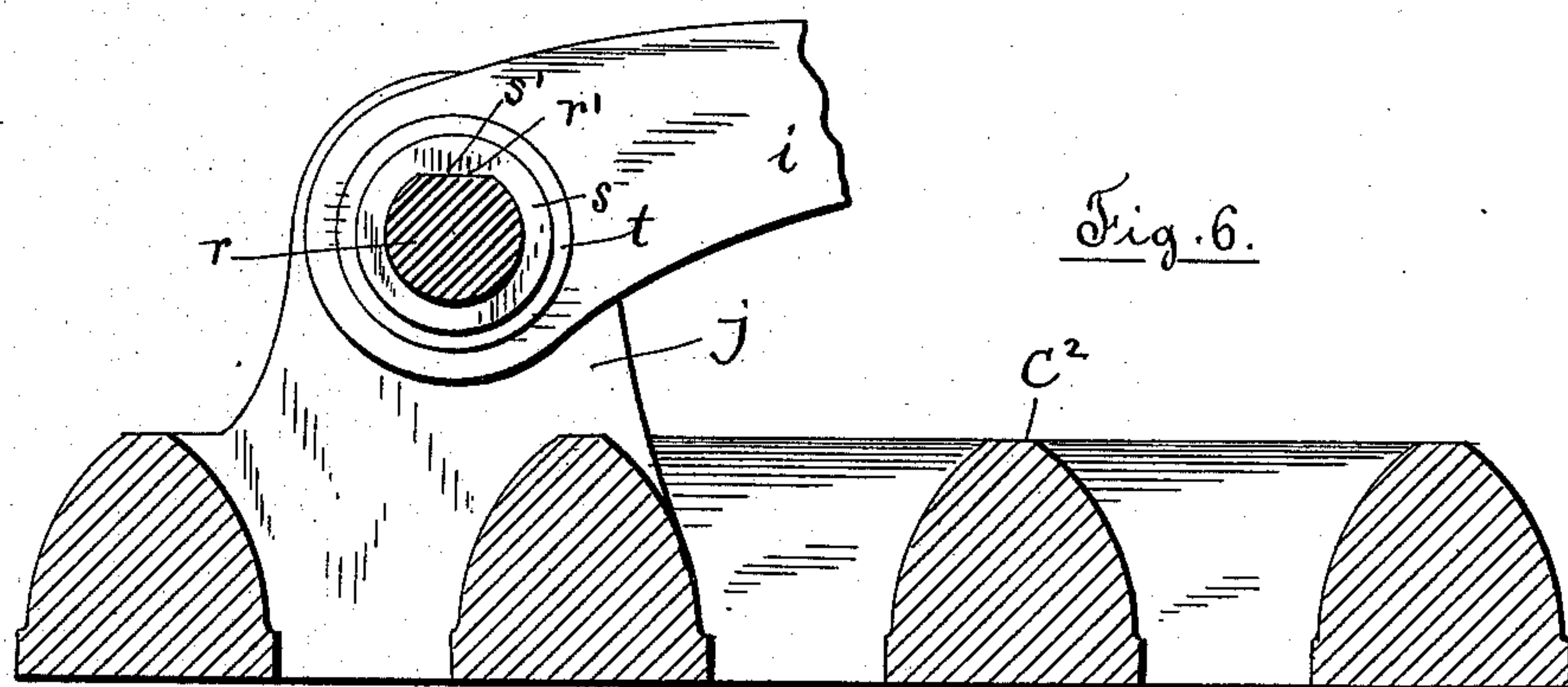


Fig. 6.

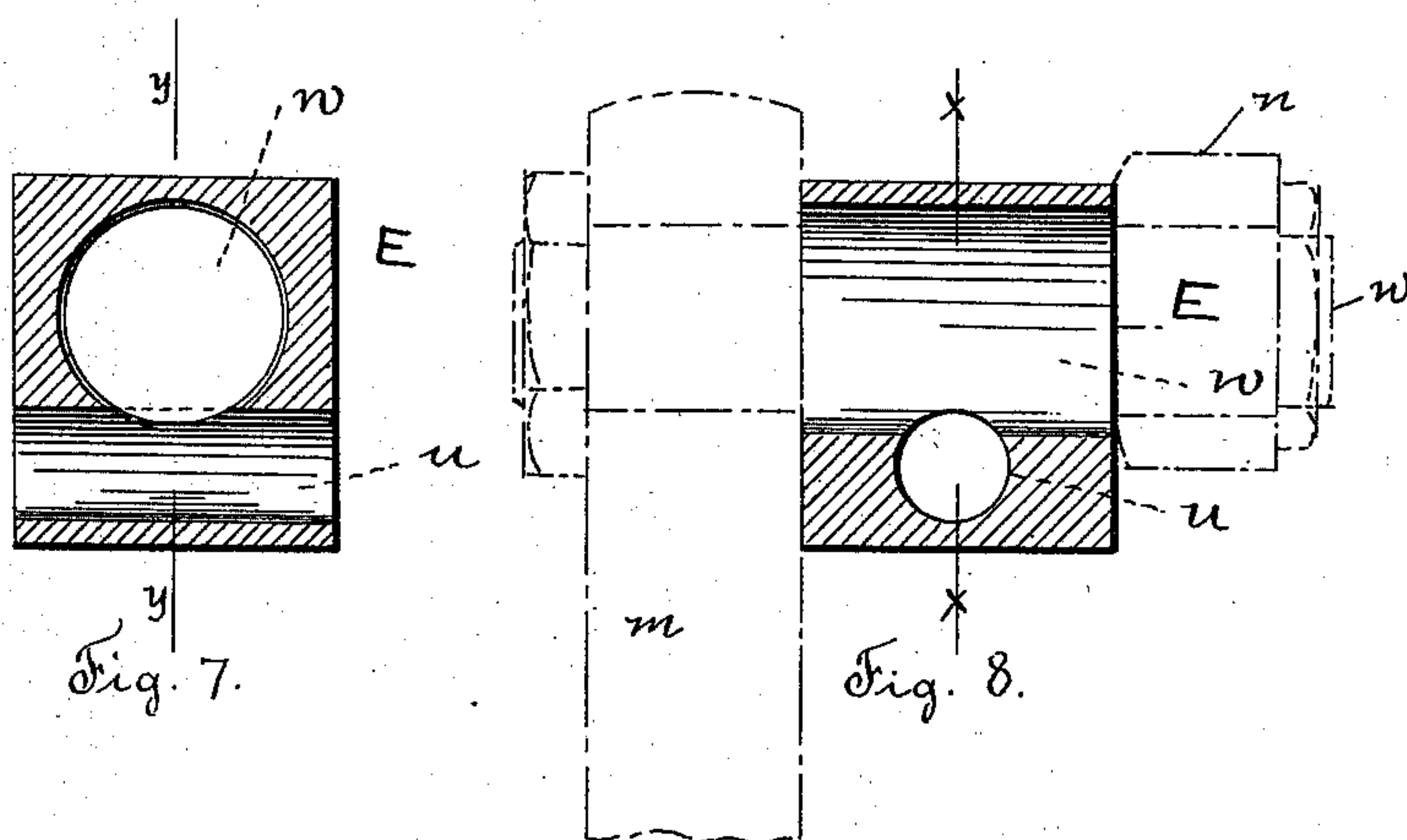


Fig. 7.

Fig. 8.

Witnesses
Chas. F. Schmeltz,
Irving H. Fay.

Inventor

Inventor
James M. Kellogg

UNITED STATES PATENT OFFICE.

JEROME WHEELOCK, OF WORCESTER, MASSACHUSETTS.

VALVE SYSTEM FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 413,695, dated October 29, 1889.

Application filed March 20, 1889. Serial No. 304,039. (No model.)

To all whom it may concern:

Be it known that I, JEROME WHEELOCK, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Valve Systems 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 automatic cut-off engines, and more especially to that type which is ordinarily known as the "Wheelock engine," for which Letters Patent No. 326,820 were granted to me on the 22d day of September, 1885, and has for its object to provide simple and efficient means for operating the valves in the cylinder; and my invention consists in the improved construction of such mechanism, as will be fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side view of the steam-cylinder partially broken away to illustrate the relative position of the valve-seats within the cylinder-casting. Fig. 2 is an enlarged cross-section of the valves and valve-seats contained in one end of the cylinder. Fig. 3 shows the levers and link, whereby said valves are operated. Fig. 4 represents a shell and valve as taken out of its bearings in the cylinder. Fig. 5 is an enlarged top view of the cut-off valve, the lugs and link whereby said valve is operated being shown in section. Fig. 6 is a cross-section on line *x*, Fig. 5. Fig. 7 is a central section of the "link-block" on line *x*, Fig. 8; and Fig. 8 represents a section on line *y*, Fig. 7.

Similar letters refer to similar parts.

In the drawings, A represents the steam-cylinder casting having the valve B, through which steam is admitted into the chamber *a*, at both ends of which are provided the cut-off valves C, through which steam passes by the passages *b c* into the cylinder proper. When the steam has performed its duty, the exhaust-valve D will allow the former to pass out of the cylinder and into the exhaust-pipe

d, such construction being essentially the same as shown and described in the patent above referred to, No. 326,820.

The construction of the cut-off valve C and its seat may be seen by referring to Figs. 2, 4, and 5, in which C' is the shell, having at its ends the heads *e e'*, the former of which is provided with a nose *f*, through which the valve-operating shaft *g* passes and finds another bearing in the head *e'*. To the shaft *g*, and close to the heads *e e'*, I attach by means of set-screws *h'* the cranks *h*, by which the valve C² is reciprocated through the link *i*, which is pivoted to the valve C² between the lugs *j*. It will be readily understood that an oscillating motion on part of the shaft *g* will cause a reciprocating motion on part of the valve C².

It has been deemed heretofore an impossibility to operate the cut-off valve without the aid of a dash-pot; but practice has demonstrated the fact that the valve as constructed by me may readily be closed without such dash-pot, whereby the movement of the valve is also checked. To that end I provide a spring K, (see Figs. 2 and 4,) one end of which is secured to the smaller head *e* of the tapering shell C', while its other and loose end will find a bearing against the inside of the valve-bore in the cylinder when the shell is put into its proper place in the casting. If the valve is then opened and subsequently released, the spring K will cause a quick sliding motion on part of the valve C², which will be checked by the lugs *j* striking against a projection or cam *l*, provided on the under side of the crank *h*, so that the valve will always close rapidly and fully and come to the same position—a result which cannot always be obtained by the action of the dash-pot, on account of the air-cushion in the cup of the latter.

In Fig. 1 I have illustrated a modification of the spring K as follows: To the end of the arm *m* is attached the rod *n*, the loose end of which projects through the lug *o*, secured to the cylinder, and carries a collar *p*, against which the spiral spring *q* rests with one end while its other end bears against the lug *p*. More or less tension can thus be put onto the

spring q by simply slipping the collar p along on the rod n in the necessary direction, and either of the springs K or q , or both in combination, may be used, as desired.

5 As it is of vital importance to preserve a snug fit of all the parts connected with the valve operating the mechanism, and more especially concerning the link i , I provide the lugs j with a tapered hole, (see Figs. 5 and 6,) to receive the tapering pin r , which is driven
10 into place, and thus prevented from rotating. The pin r is flattened or cut away at r' to correspond with the inside of a steel bushing s , made tapering and having a projection s' ,
15 which matches the cut-away portion of the pin r at r' , to prevent the bushing from rotating. Likewise I provide in the link i the steel taper bushing t , which is driven into the link, and thus forms a solid connection with
20 the same. As the outside of the bushing s and the inside of the bushing t are turned straight and of the same diameter, a snug running fit is obtained, and in case of wear either of the bushings, or both, may be removed
25 and replaced by new substitutes without rendering the wasting of either valve or link necessary for that reason.

In Fig. 3 is illustrated the manner of operating the valves, and it will be seen that in
30 the arrangement of the several parts no deviation from my former patent above referred to has taken place; but it will also be noticed that the latch-block is differently constructed, as is more fully shown in Figs. 7 and 8.

35 E is the latch-block, held by means of the bolt u in sliding contact with the under surface of the projection v of the link F. Transversely through the block E is laid the bolt w , to one end of which is attached the arm
40 m of the cut-off valve, while its other end supports one end of the spring-rod n , (see Fig. 1,) so that the strain on the bolt is practically equalized, and the fault of a one-side pull, which has been objectionable on my
45 valve of previous construction, is thus remedied.

The operation of the valves being well known, and fully described in my former patent, I do not deem it necessary to specify the
50 details; but the difference between my former and present inventions may be seen in the latch-block itself, in which I drill the holes for the bolts u and w , so that they intersect each other. (See Figs. 7 and 8.) For this reason I cut away a portion of the bolt w to allow
55 the link-bolt u to pass through the block, whereby lateral and rotary movements on part of the bolt w are prevented, as will be readily understood, so that a locked combination of latch-block, valve-arm, and spring
60 is obtained.

Another point in my present invention is shown in Fig. 2, where it will be seen that the link i is bent in order to pass over the
65 shaft g when the valve is closed.

The arrangement of crank and link requires an amount of room which is in some instances difficult to obtain, and in order to cause a full travel of the valve the crank must necessarily be long, so that the link is hardly
70 longer between centers than the crank itself, and the action of drawing the valve open often results in too close proximity between shaft and lugs, so that on the return travel of the valve the latter is crowded down upon its
75 seat, and breakages occur in consequence. By causing the crank h to travel toward that side of the center which is away from the lugs j this difficulty is removed, as I can employ a
80 link i of a length double that of the crank, so that an easy motion on part of the valve C^2 is obtained, and all parts may be put within the room of the shell C' without crowding. Furthermore, the lugs on the valve may be
85 placed centrally in relation to its width, so that a lifting of the rear of the valve, which has been due to the overhanging of the lug beyond the valve, is rendered impossible.

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

1. The combination of a slide-valve with a removable seat, and a spring acting directly against said valve, whereby the valve is closed upon the release of tripping mechanism, substantially as and for the purpose set
95 forth.

2. The combination of a slide-valve, a rocker-shaft provided with a crank, and a link connecting said crank and link with a cam on said rock-shaft, whereby the motion
100 of the slide-valve is checked, substantially as described.

3. The combination of a slide-valve and a spring acting directly against said valve with a positive stop to check the movement of said
105 valve, said stop and spring being within the valve-casing, substantially as described.

4. The combination of a slide-valve, a rocker-shaft provided with a crank, and a link connecting said crank and link, with a
110 tapering pin flattened upon one side firmly secured within the lugs of the valve and the bushings, substantially as and for the purpose set forth.

5. The combination of a slide-valve, a
115 rocker-shaft provided with a crank, and a link connecting said crank and link, and a pin firmly secured within the lugs of the valve with a removable bushing, constructed substantially as described, and held upon
120 said pin, as and for the purpose set forth.

6. In a slide-valve as above described, the combination of a link having tapering bushing with another bushing held stationary by means of a pin and the lug upon the valve,
125 as described, and adapted to be removed therefrom, as and for the purpose set forth.

7. A latch-block with two holes through it at right angles, in combination with a bolt firmly fastened to the operating-arm of the
130

cut-off valve, the block swiveling on said bolt when actuated by the link-bolt, substantially as shown and described.

5 8. The combination of a slide-valve, link, and rocker-arm with a crank the travel of which is on the side opposite the lugs on the valve, substantially down to a line passing

through the rock-shaft and center of lugs, substantially as and for the purpose set forth.

JEROME WHEELLOCK.

Witnesses:

IRVING H. FAY,
CHAS. F. SCHMELZ.