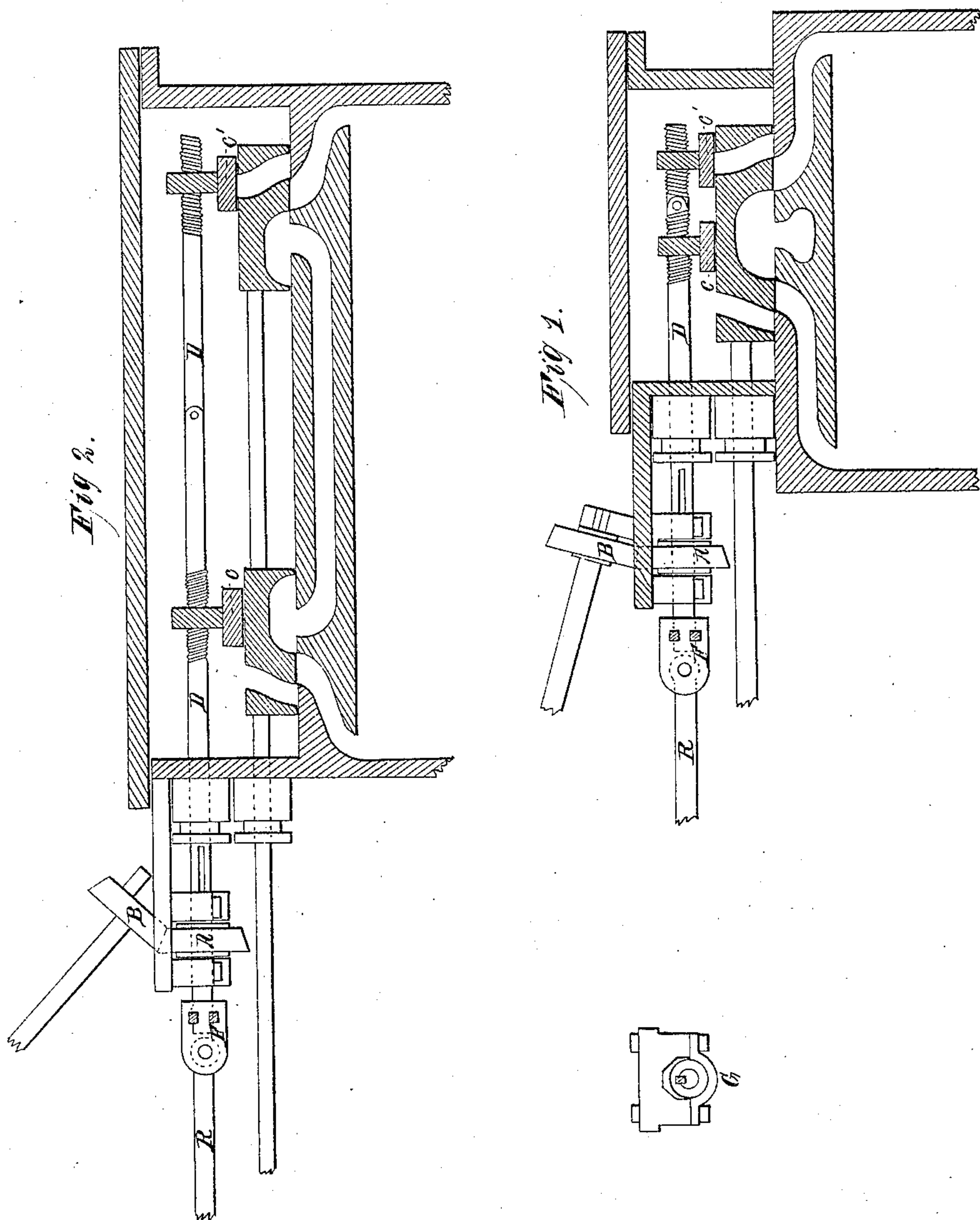


4 Sheets-Sheet 1.

H. Allen,
Steam Cut-Off.

No 2,227.

Patented Aug. 21, 1841.



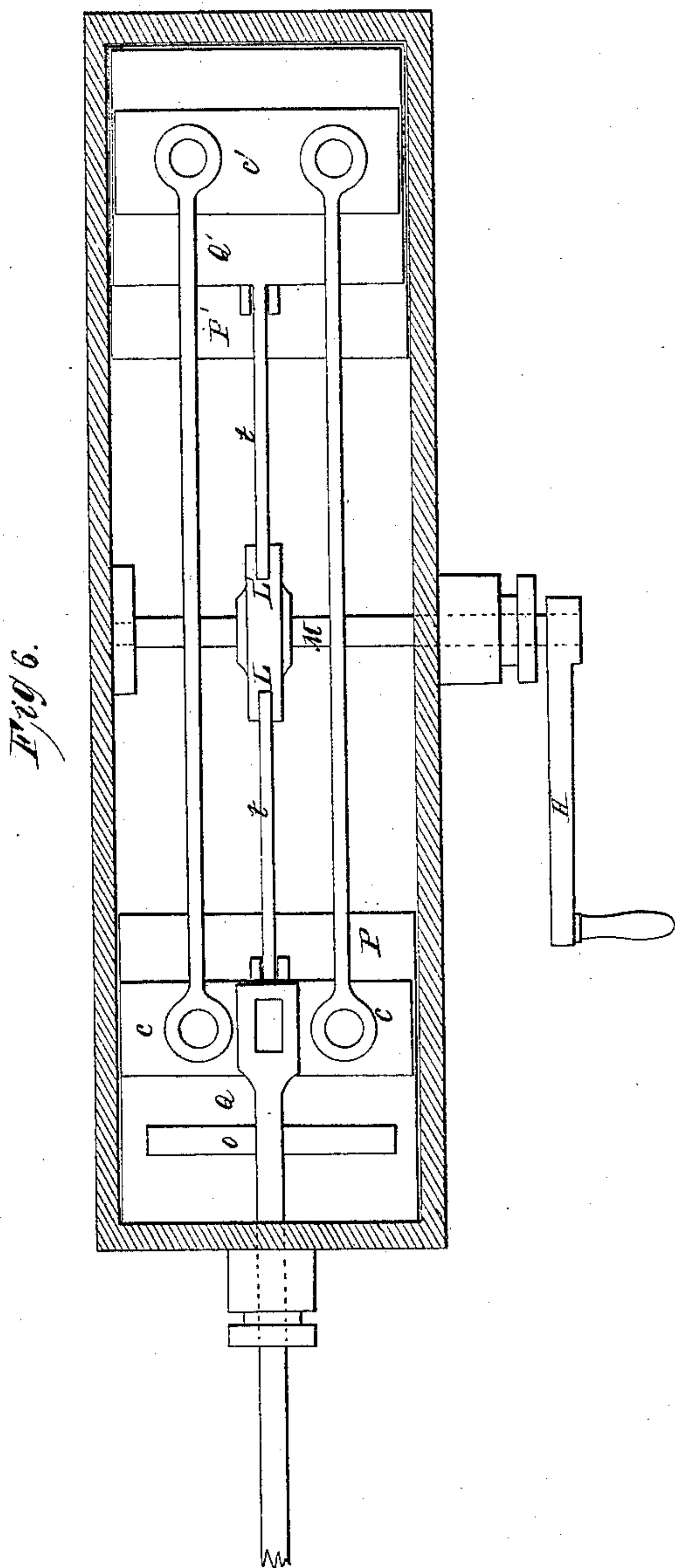
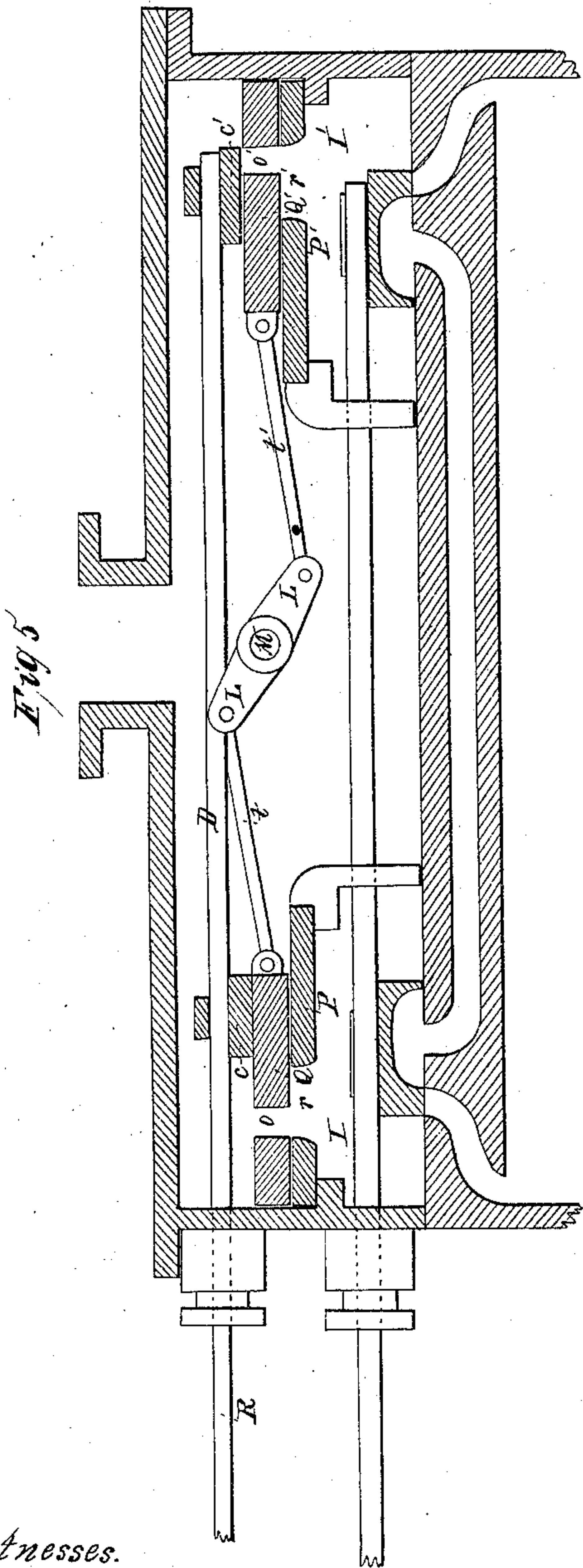
Witnesses.

Gro J. Allen
H. Clarke

Inventor.
H. Allen

4 Sheets-Sheet 3.

H. Allen,
Steam Cut-Off.
No 2,227. *Patented Aug. 21, 1841.*



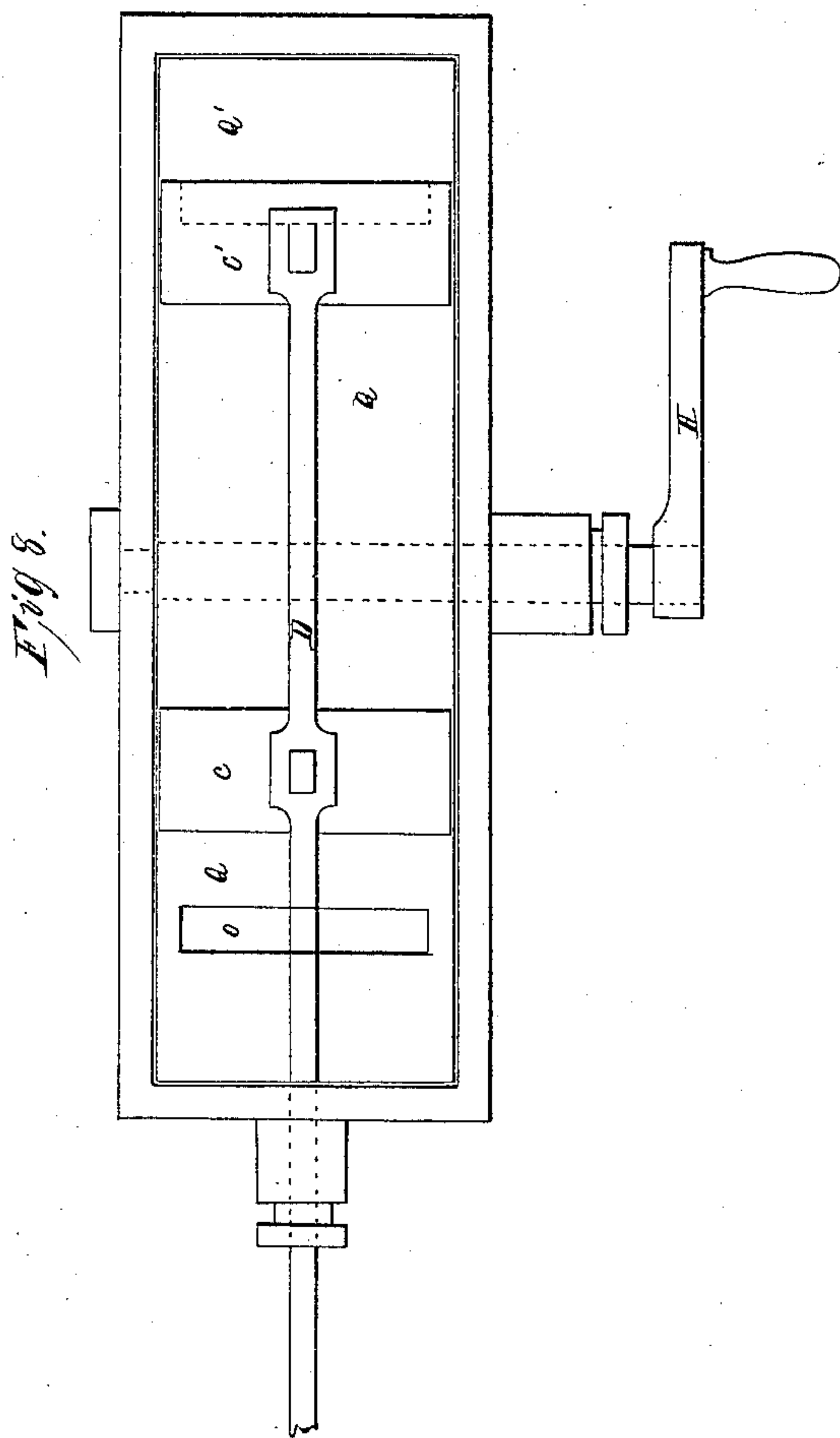
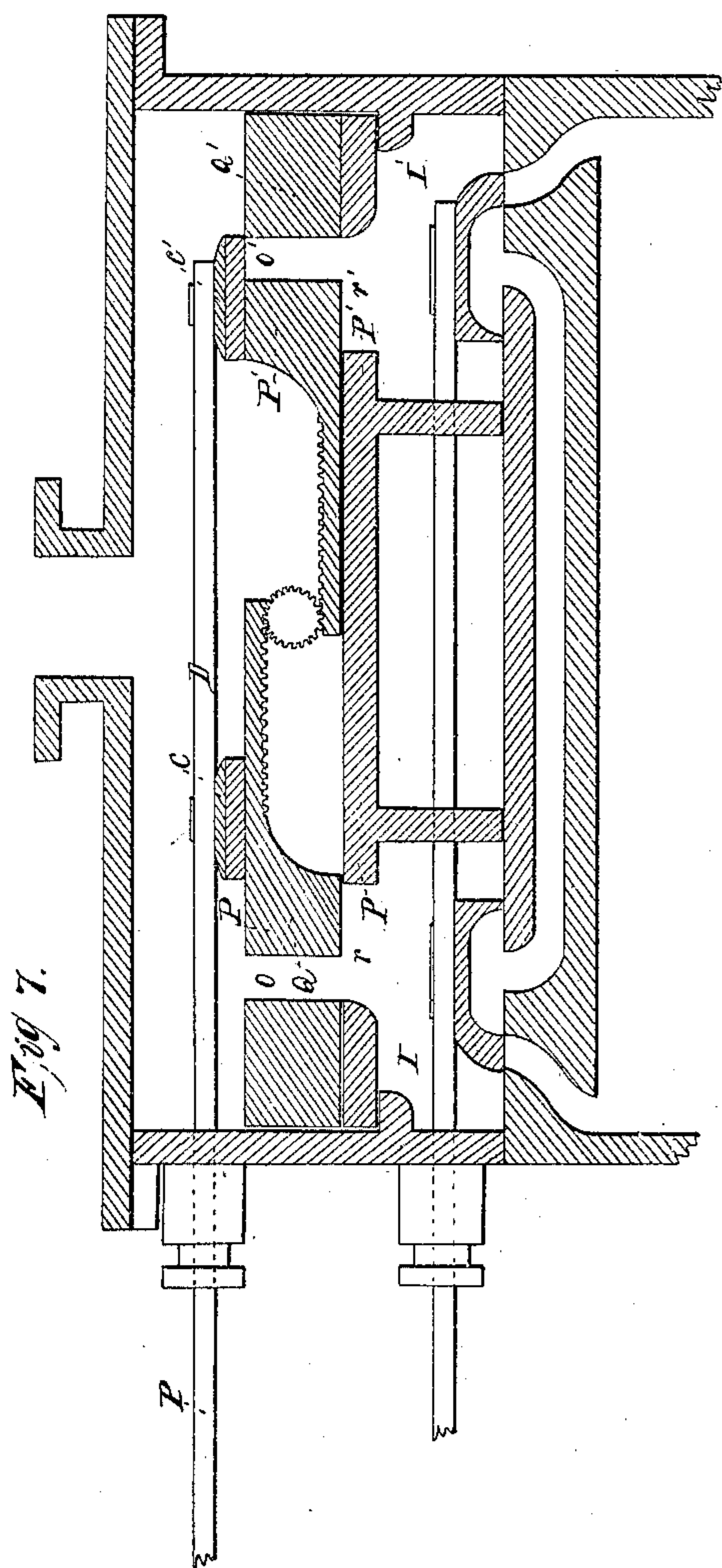
Witnesses.
Geo F Allen
Clarke Smith

Inventor.
Horatio Allen

No 2,227.

H. Allen,
Steam-Cut-Off.
Patented Aug. 21, 1841.

4 Sheets-Sheet 4.



Witnesses.

G. F. Allen
Charles Smith

Inventor.

Horatio Allen

UNITED STATES PATENT OFFICE.

HORATIO ALLEN, OF NEW YORK, N. Y.

CUT-OFF VALVE FOR STEAM-ENGINES.

Specification of Letters Patent No. 2,227, dated August 21, 1841.

To all whom it may concern:

Be it known that I, HORATIO ALLEN, of the city and county of New York, have invented a new and useful improvement 5 called "Allen's Adjustable Cut-Off for Steam-Engines," of which the following is a full and exact description.

As one of the combinations, which I have devised to obtain an adjustable cut-off, I 10 have made an improvement on "the cut-off for steam engines" patented by Isaac Adams May 1838. I propose to substitute for his single cut-off slide, two cut-off slides, carried by the same rod, but so attached to the 15 rod that they may be fixed on it in positions nearer together, or more remote from each other. This arrangement renders the cut-off an adjustable one, without making any change in the eccentric which drives the 20 cut-off slides. Thus, if the cut-off slides be fixed on the rod, to cut off the steam at any given proportion, it is evident, that when the cut-off slides are separated by an equal movement in each slide, the steam will be 25 cut off at a less proportion, and if equally brought together, the steam will be cut off at a greater proportion. To produce this equal movement in the two slides, while the engine is in motion, I further propose to 30 attach the two cut-off slides, to the rod carrying them, by means of right and left hand screws on the same rod, the right hand screw, passing through and carrying one slide, and the left hand screw passing 35 through and carrying the other slide. It is evident that if the rod on which these screws are, be turned in one direction the slides will be brought together, and if turned in the other direction they will be separated. 40 To turn the rod carrying the two slides, I propose the following combination and arrangement, which will be more intelligently, and more concisely explained by reference to the drawing herewith.

45 Plate 1, Figure 1 and Fig. 2, exhibit the combination and arrangement proposed, as an improvement on the cut-off valve of Isaac Adams.

50 C and C', are the two cut-off slides, carried by the same rod D, but fastened on it only by making that part of the rod, which passes through C, a right hand screw, and that through C' a left hand screw. The rod D is connected with the eccentric rod R, by 55 the coupling F, into which the rod D en-

ters, and in which it is free to turn, but is prevented from coming out, by suitable circular grooves in the rod D, and keys passing through the coupling F. The rod D passes 60 lengthwise through the shaft or axle of the cog wheel A, which by suitable journals and boxes, supported by an extension from the steam chamber, is kept in position, while it is free to turn in its bearings. That part of 65 the rod D which passes through the axle is either not round or if round, there is a groove cut in it lengthwise, into which a pin fixed in the axle enters, this pin will not obstruct the alternating motion of the rod, but will compel the rod to turn when the 70 wheel is turned. The cog wheel B gears into the cog wheel A, and is added to turn A more readily.

In Figs. 1, and 2 as in the case with Figs. 3, 4, 5 and 6 referred to hereafter, the piston 75 is supposed to be commencing its down stroke, the cut-off eccentric to have been so adjusted on the shaft, and the cut-off slides so situated on the rod carrying them, that at 80 the beginning of a stroke in either direction, the steam passage may be full open, and as the piston makes its stroke, the cut-off slide approaches the opening which it is to cover, and at the point for which the cut-off slides 85 have been adjusted, will close the opening, and thus cut off the steam. On the return stroke the other cut-off slide will cut off the steam at the other end at a corresponding point. If the proportion of cut off is to be 90 changed, the wheel A must be turned by which means the rod D will be turned, and by means of the right and left hand screws on the rod, the cut-off slides will be made either to approach or recede from each other, and consequently cause a change in the pro- 95 portion of stroke at which the steam is cut off.

As another method of obtaining an adjustable cut off, I propose that each end of the cylinder shall have its own steam cham- 100 ber, which I call "inner steam chamber." The top or one of the sides of each of these inner steam chambers is prepared as a seat for a cut-off slide, and has an opening through which the steam must pass. In the 105 case of using the single slide valve, the valve will move through the partition which separates the inner steam chambers; and in case of using the double slide valve, the rod which connects them will pass through the 110

separating partitions as shown in the drawings.

Plate 2, Figs. 3, and 4, exhibit this arrangement. I and I' are the inner steam chambers, P and P' the fixed seats, containing the openings O and O'. C and C' are the cut-off slides. The connection of the cut-off slides with the rod carrying them, the mode of turning the rod, and adjustment are the same as above described in section 2, to which section therefore a reference is made as a part of this combination.

A third method of producing an adjustable cut off which I have contrived, consists in combining cut-off slides permanently attached to the rod carrying them, with adjustable seats one for each end of the cylinder, and each seat having an opening through which the steam must pass into one of the inner steam chambers as described in section 3.

Plate 3, Figs. 5 and 6 and Figs. 7 and 8, exhibits the arrangement and combination proposed. Fig. 5 is a vertical longitudinal section, and Fig. 6 is a horizontal view of the interior of the steam chamber. P and P' are the fixed seats of the adjustable seats Q, Q'. r and r' are the openings in the fixed seats, O and O' the openings in the adjustable seats. The extent of the openings r and r' must be such, as to allow the steam to pass in all the positions of the seats Q, Q' in which the steam is allowed to pass through the openings O and O'. C and C' are the cut off walls permanently attached to the rod D. To produce simultaneous movement of the adjustable seats, they are connected by the rods t and t' to the levers I and I', which being on the same shaft M receive their motion from the handle H. The range of the adjustment of the seats Q and Q' is such, that in one extreme, (that represented in the drawing) the cut off slide will not close the opening, until the stroke is complete, and in the other extreme the openings O and O' are brought entirely beyond the openings r and r', and consequently the steam will have no passage in any part of the stroke, and thus the adjustable seat, performs the part of a throttle valve. If the seats are adjusted to any intermediate position, the cut off slides will cut off the steam at a point corresponding with that portion. The seats Q and Q' admit of simultaneous adjustment in several ways other than that described, as by a single rod running through them with right and left hand screws or by a central pinion acting on racks from each seat as shown in Plate 4, Fig. 7 and Fig. 8.

In Figs. 1, 2, 3, 5 and 6, the cut-off arrangements are shown as being immediately adjacent the slide valves; they are not however necessarily confined to that position,

but may be placed in any more remote position. If separated, there must be provided suitable communications between the openings in the seats, and the inner steam chambers, at each end of the cylinder.

In many cases it will be practicable and advisable to dispense with the cut-off eccentric, and to use the reciprocating movement of the cross head of piston suitably reduced for the required movement of the cut-off slides.

What I claim is a patent for an adjustable cut off as follows:

1. I claim the combination of two independent cut off slides adjustable on the same rod, to be used instead of the single cut off slide as employed in the combination patented by Isaac Adams May 1838, the two acting on top of the slide valve with apertures as described in said patent, but I do not claim the slide valve with apertures; and consequently this part of my claim for an adjustable cut-off is for an improvement on Adams's cut off whereby his cut off is made an adjustable cut-off.

2. I claim the arrangement herein denominated "cut-off with fixed seats and adjustable slides," wherein two independent cut-off slides are combined with two fixed seats, one for each end of the cylinder, and each containing an opening for the passage of steam to its respective ends; said slides being adjustable on the rod carrying them, and driven by an eccentric or cam on the engine shaft, or by the reciprocating motion of the cross head suitably reduced all of which is more fully described herein.

3. I claim the manner in which the two cut off slides are made simultaneously adjustable by means of right and left hand screws on the rod carrying them as herein more fully described.

4. I claim the arrangement and combination for turning the rod carrying the slides, by means of a nut or cogwheel through the axle of which the rod passes, and is free to have a reciprocating motion lengthwise, but with which the rod must turn when the nut or wheel is turned as more fully described herein.

5. I claim the arrangement herein denominated "cut off with adjustable seats" wherein a cut off slide or two cut off slides on the same rod are combined with two adjustable seats, one for each end of the cylinder, and each containing an opening for the passage of steam to its respective ends. The cut slide or slides being permanently attached to the rod carrying them, and driven by a cam or eccentric on the engine shaft, or by the reciprocating motion of the cross head of the piston, suitably reduced for the required movement of the slides, and the seats being simultaneously adjusted by levers from a common shaft, or by a pinion

acting on a rack from each seat or by the action of right and left handed screws on a rod passing through and carrying both seats, as more fully described herein.

5 In testimony whereof I the said HORATIO ALLEN hereto subscribe my name in the presence of the witnesses whose names are

hereto subscribed on the twentieth day of July A. D. 1841.

HORATIO ALLEN.

Witnesses:

GEO. F. ALLEN,
JNO. S. WOODWARD.