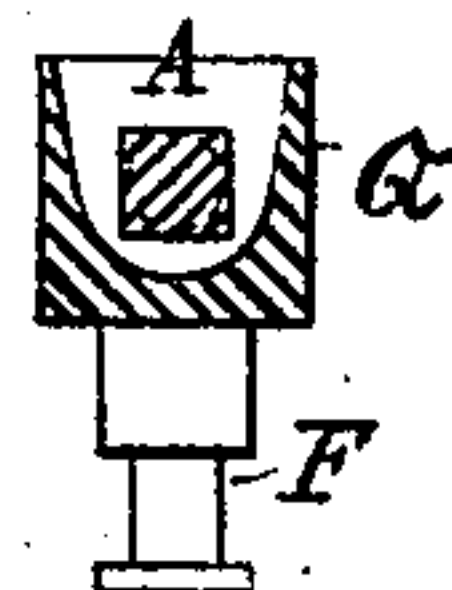
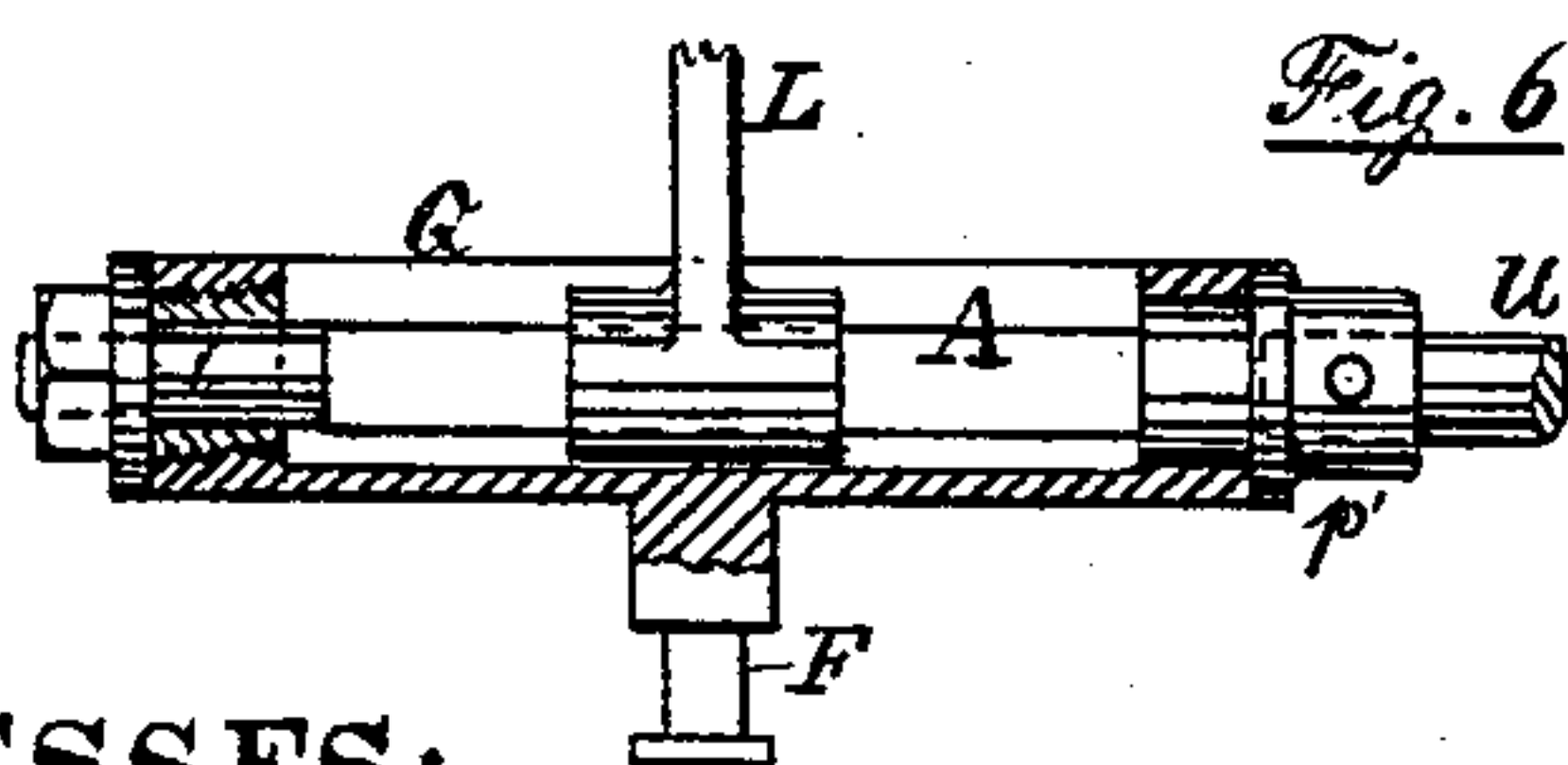
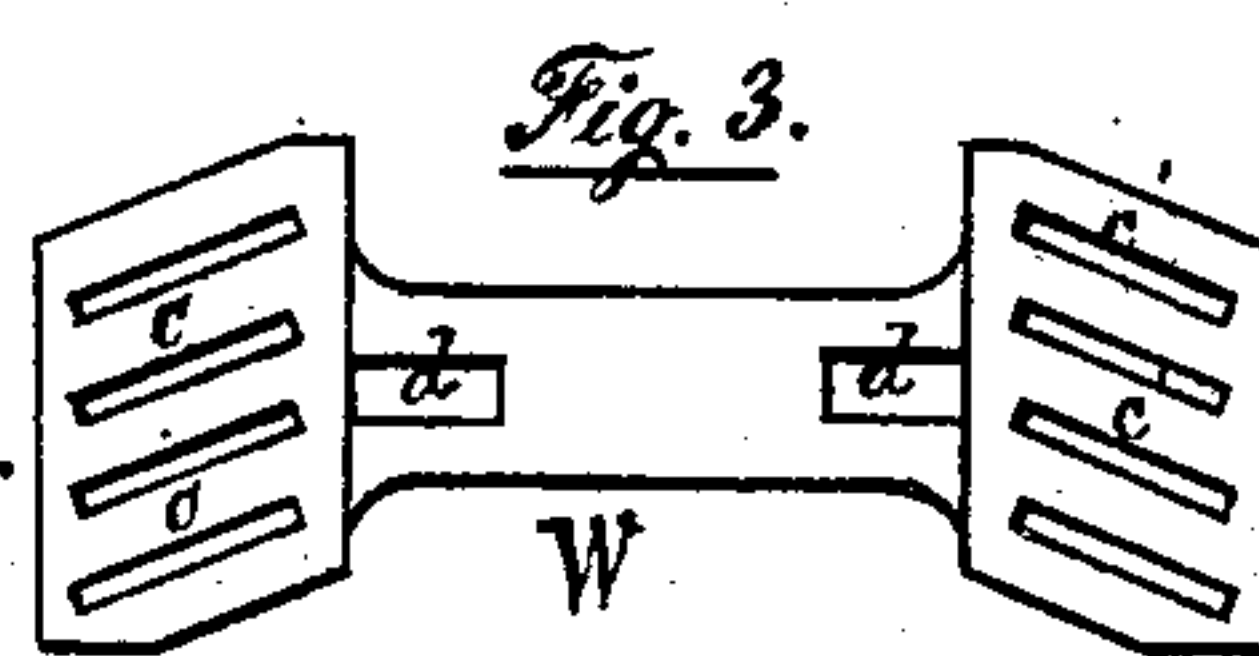
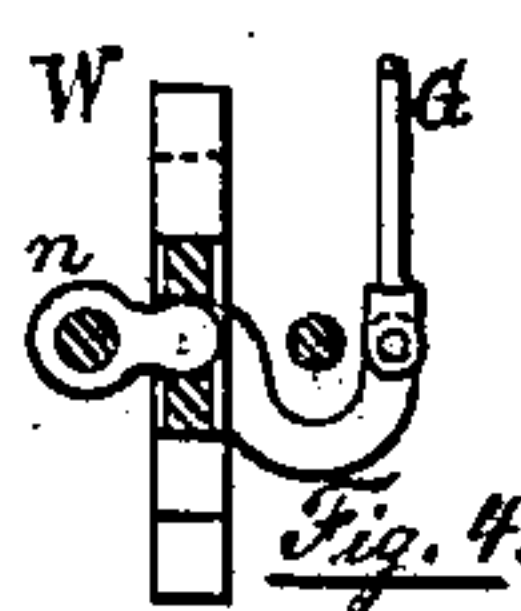
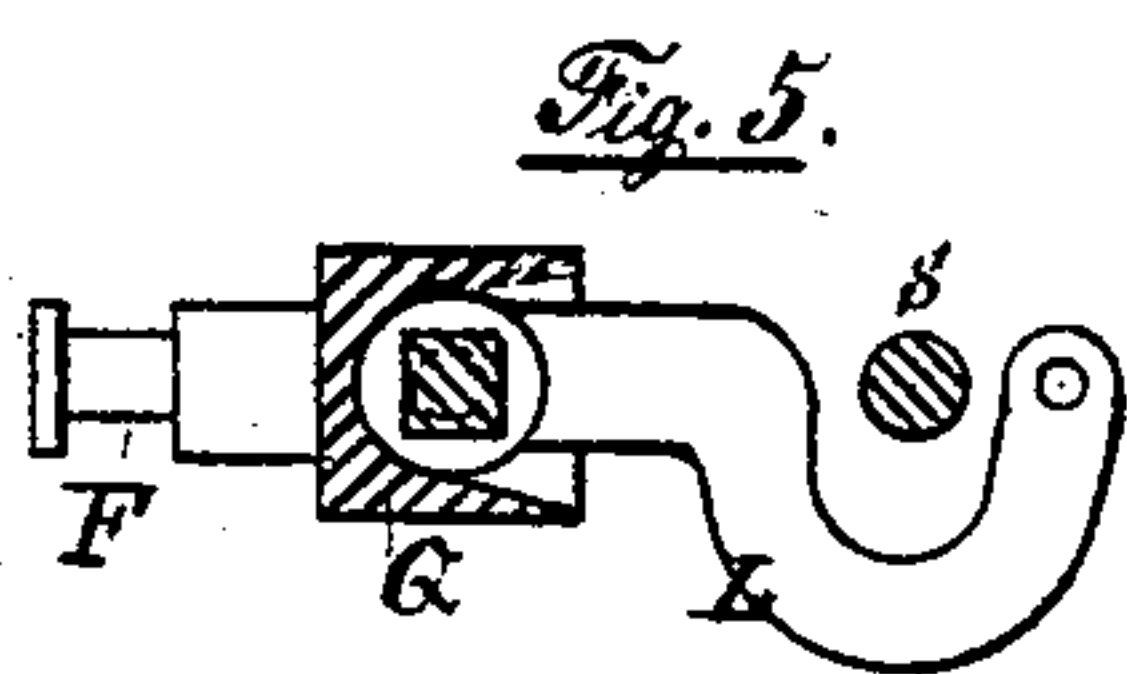
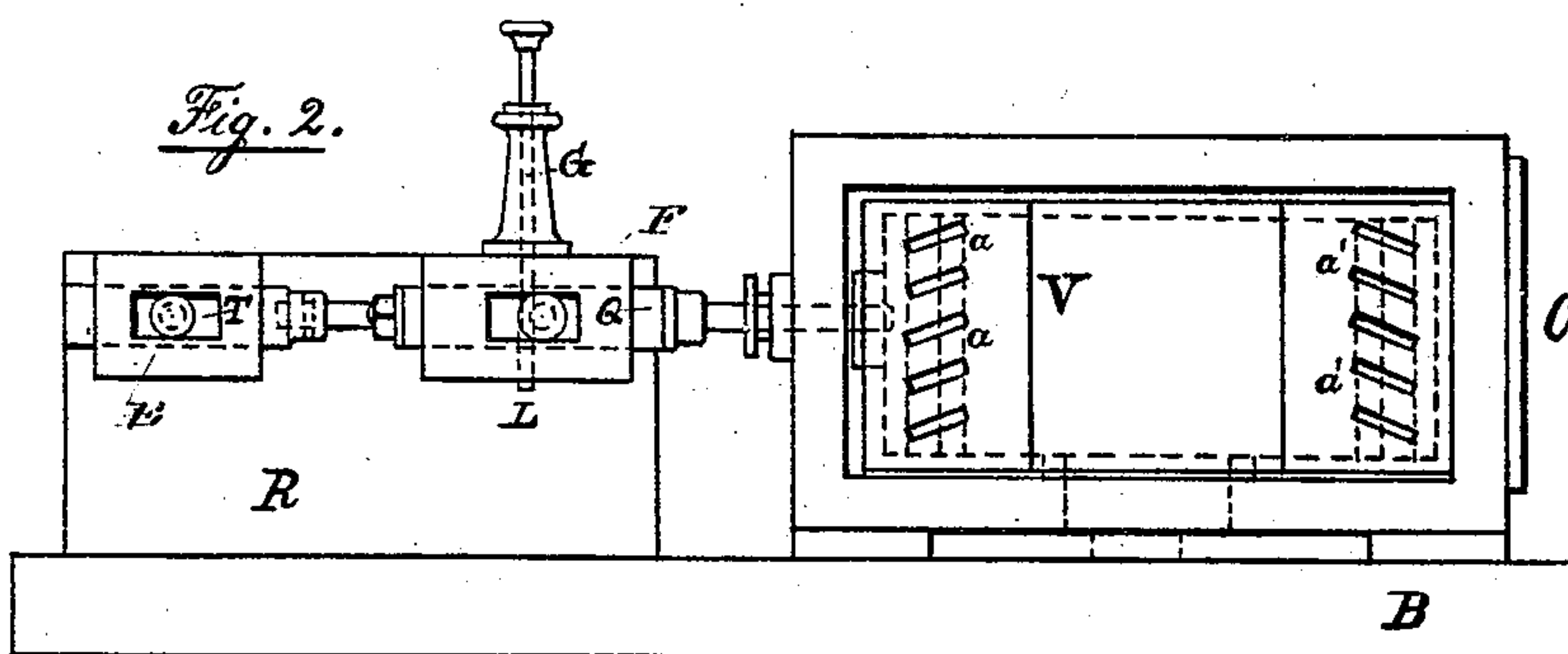
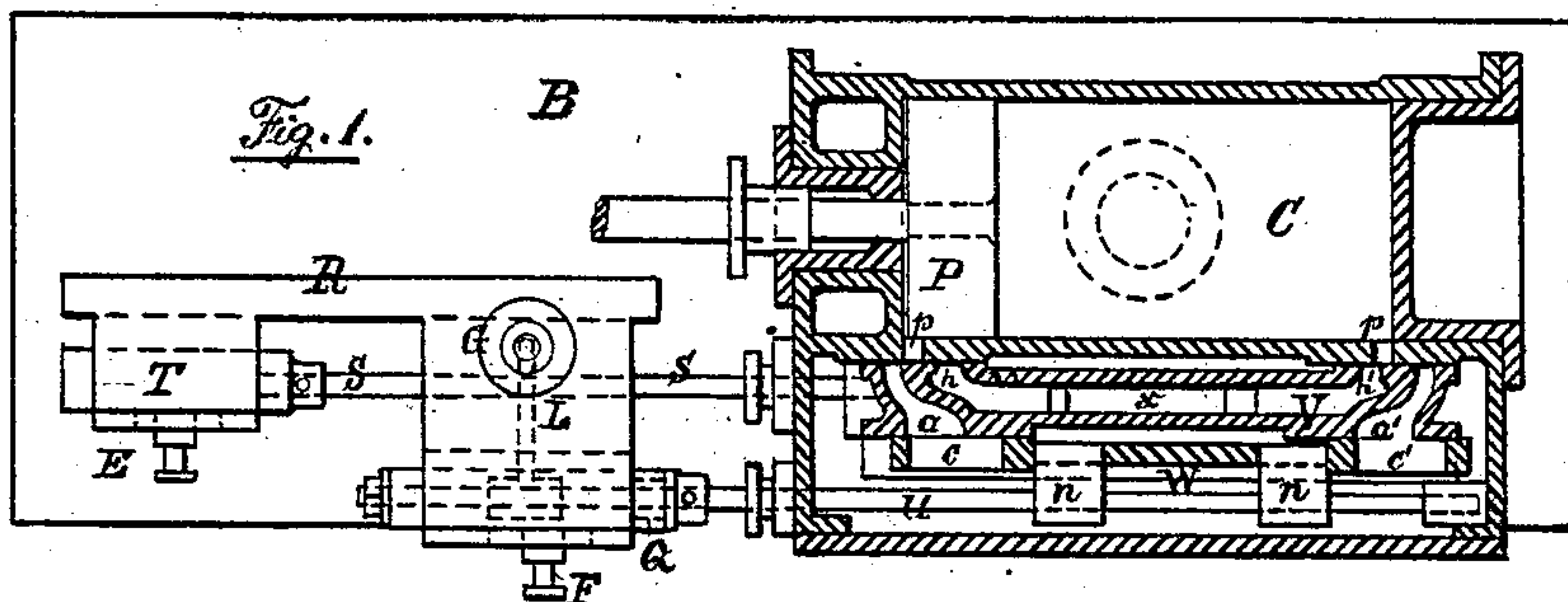


W. WRIGHT.
Cut-off Valve for Steam-Engines.

No. 227,144.

Patented May 4, 1880.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM WRIGHT, OF NEWBURG, NEW YORK.

CUT-OFF VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 227,144, dated May 4, 1880.

Application filed March 6, 1880. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM WRIGHT, of Newburg, in the county of Orange and State of New York, have invented an Improvement in Cut-Off-Valve Gears on Slide-Valve Steam-Engines, of which the following is a specification.

This invention relates to that class of cut-offs in which the cut-off valve is placed on the back of the main slide-valve, through which the steam is admitted to each end of the cylinder. In this case the main valve has on its back two or more ports of equal size at each end, which join each other into one port on the face of the valve next to the cylinder.

The ports on the back of the valve are parallel with each other, but placed at an angle to the line of movement of the valve.

On the face of the main valve next to the cylinder there are two ports at each end, one for the induction of steam, the other for exhaust. The valve itself is hollow, with a large port through the bottom to let the exhaust into the exhaust-passage cast on the bottom of the cylinder.

The cut-off valve is a flat plate with ports at each end, placed at an angle and coinciding with the ports on the back of the main valve. It is worked in the same reciprocating way as the main valve by an eccentric. At the same time it can be raised or lowered by levers connected to the governor in a vertical direction to its movement by the eccentric without interfering with its regular reciprocating motion, and in this way the ports in the main valve may be left open longer or shut off sooner to the admission of steam by the bars of the cut-off valve moving over the ports of the main valve.

The ports and bars between the ports are arranged in such a way that the point of cut-off can be varied throughout the length of stroke of the piston by the transverse movement of the cut-off valve by the action of the governor.

To describe the construction more complete, I refer to the annexed drawings, in which Figure 1 is a horizontal section through the cylinder and the valves and a plan of the guides of the valve-stems. Fig. 2 is a front view of the same with the steam-chest cover and cut-off valve removed. Fig. 3 is a front view of

the cut-off valve. Fig. 4 is a side view of the levers and section of the cut-off valve as arranged to move the valve vertically by the governor. Fig. 5 is the guide of the cut-off valve stem and lever in larger scale. Fig. 6 represents a horizontal section and transverse section of the guide and pin for cut-off valve in larger scale.

B is a part of the bed-plate, carrying the cylinder and valve-stem guides. C is the cylinder; P, the piston; *p p*, the ports in the cylinder through which steam is admitted and exhausted. V is the main valve, with the passages *a a'* for live steam and *h h'* for the exhaust-steam, which escapes through the hollow valve and the opening *x* in the bottom of the valve.

The ports *a a'*, which form one oblong port at each end of the valve on the face next to the cylinder, are divided up in a number of equal openings, *a a a* and *a' a' a'*, on the opposite side of the valve. In Fig. 2 these ports are shown placed parallel with each other, but at an oblique angle to the line of movement of the valve.

W is the cut-off valve. At each end are located the ports, one less in number at each end than there are ports in the main valve, the upper edge, being cut off under the same oblique angle, acting as the closing edge of the missing port.

The ports *c c c'* in the cut-off valve are longer and wider than the ports *a a a'*, to allow the ports in the main valve to be open in their full length in whatever elevated position the cut-off valve may be placed by the action of the governor.

In the narrow neck connecting the two ends of the valve are two slots, *d d*, to receive the rounded ends of the two levers *n n*, which are fastened on the cut-off-valve stem, and which lift the valve or lower it when the valve-stem *u* is turned around on its axis in a transverse direction from its regular longitudinal movement, and the ports *c c* and *c' c'* will cover the corresponding ports *a a* and *a' a'* sooner or later during their regular movement, which is given them by the eccentrics.

S is the valve-stem for the main valve. It passes behind the guide for the cut-off-valve stem and has a square guide-block, T, attached,

which is moved by the wrist-pin E from the main eccentric, and which is guided in a special slide fastened to the engine-frame in any suitable way.

5 The valve-stem *u* of the cut-off valve does not take hold of the valve W direct, but by means of the levers *nn* acting in the slots *dd* in the valve. The stem *u* is fastened to a rod, A, and is square in cross-section, except
10 at the ends. At one end there is a collar, and at the other end a round bearing with washer and nut. The square part is fitted to the hub of a lever, L, and slides through the same. The hub is held in a certain position in the
15 guiding-frame. Between the collar and the washer is fitted a square block, Q, with pin F, by which this block is moved by a second eccentric on the crank-shaft. The block Q acts as the cross-head for the valve-stem *u*, while
20 the lever L is the means by which the rod A and the valve-stem *u* are turned around on their axes, while the valve-stem at the same time is making its regular longitudinal motion.

The end of the lever L is attached to the
25 rod G, attached to the governor, which is placed over the end of the lever L, or in any other suitable place where the lever L can be moved by the action of the governor-rod. This lever L is curved so as to clear the valve-
30 stem *s* of the main valve, and the block Q is cut out and shaped in such a way as to allow the hub of lever L sufficient movement through the block Q.

In the operation of the engine the main
35 slide-valve V is moved back and forth by the action of the main eccentric, admitting steam alternately at each end of the cylinder through the ports *aa'* in the usual way. The cut-off valve W is moved back and forth by the action
40 of the second eccentric in a similar way; but, owing to the advanced position of the eccentric on the crank-shaft, it opens the ports *aa'* of the main valve in turn before the said ports commence opening to their respective
45 cylinder-ports *pp* as the piston arrives at the end of its stroke; but the cut-off valve has now reversed its motion and commences to close the ports *aa'* or *a'a'*. This closing of the
50 ports *aa'* or *a'a'*, and the consequent cutting off of the steam, is effected at an earlier or later point of the stroke of the piston, according as the cut-off valve is lifted or lowered on the face of the main valve by the action of the governor. The higher the cut-off valve is lifted
55 the sooner will the ports *aa'* be closed, as the closing edges of the cut-off valve are thereby advanced to the closing edges of the main valve; or if the cut-off valve is lowered, the closing edges of the cut-off valve are drawn
60 away and the ports are left open longer to the admission of steam in the cylinder.

The governor is so connected that by an increased speed of the engine the rod G is lifted

up, and by this motion the rod A and valve-stem *u* are turned and the cut-off valve W
65 lifted higher, so that the steam is cut off sooner, and by a slower speed the valve is dropped lower, so that the steam can enter in larger quantity in the cylinder, or vice versa, if the ports in the valves are inclined in the
70 opposite direction, as shown in drawings.

I am aware of the construction of the cut-off valve patented by A. K. Rider, of Hyde-
ville, Vermont, dated May 6, 1862, No. 35,176. In his case the cut-off valve has no ports, the
75 main valve only one long oblique port at each end, and the cut-off valve has only the edges cut under the same oblique angle as the ports of the main valve.

In my arrangement both valves are gridiron-
80 valves, with two or more openings grouped at each end, and so arranged that all the ports open and close at each end at the same time, giving at once a large port to the admission of steam into the cylinder and cut off the steam
85 quick, and the cut-off valve has to move but little transversely to effect all the changes of the points of cut-off during the stroke of the piston, which allows a more sensitive regulation of speed by the governor than the Rider
90 arrangement.

If it should not be desirable to have the cut-off automatically adjustable by the governor, the rod G may be held by set-screws in
95 the column or otherwise, so that the cut-off valve can be held in any desired position for any length of time and could be changed at will.

What I claim as my invention, and desire to secure by Letters Patent, is— 100

1. The main valve V, having on the face next to the cut-off valve two or more ports, *aa'*, at each end, oblique to the direction of the movement of the valve, but combining
105 into one port at each end on the face next to the cylinder for induction of steam, in combination with the cut-off valve W, having corresponding oblique ports *ee'e'*, and being connected directly with a regulator which causes it to move transversely across the face
110 of the main valve while it is making its regular longitudinal motion by the action of the eccentric, substantially as specified.

2. The cross-head Q, with the pin F, and the valve-stem *u* and rod A, in combination with
115 the levers *nn* and slots *dd* in the cut-off valve W, and lever L, attached to the governor-rod G, to move the cut-off valve W transversely to the main valve V while making its regular longitudinal movement, substantially as specified. 120

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Witnesses:

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