

(No Model.)

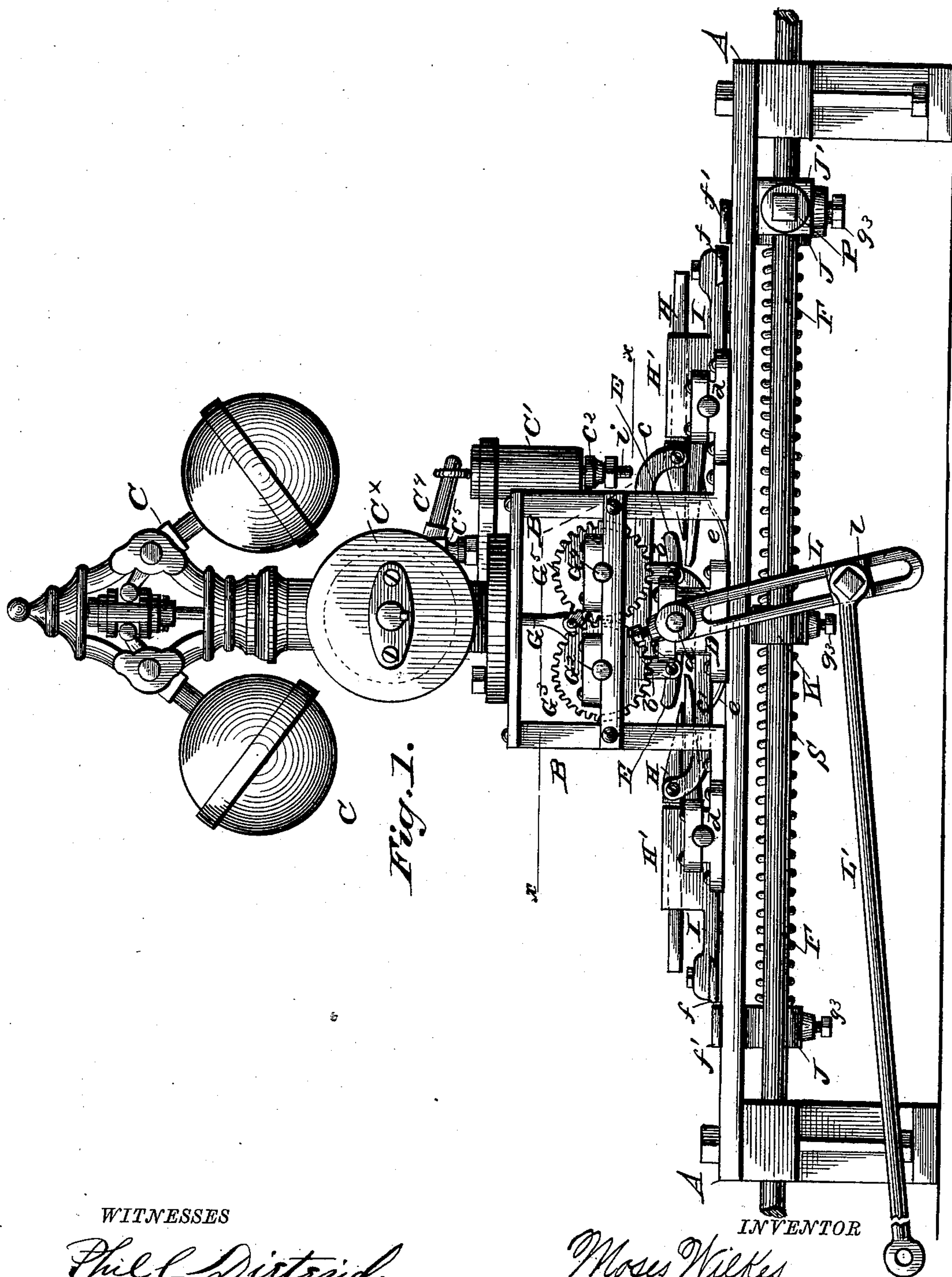
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M. WILKES.

AUTOMATIC SLIDE VALVE CUT-OFF MECHANISM.

No. 358,318.

Patented Feb. 22, 1887.



WITNESSES

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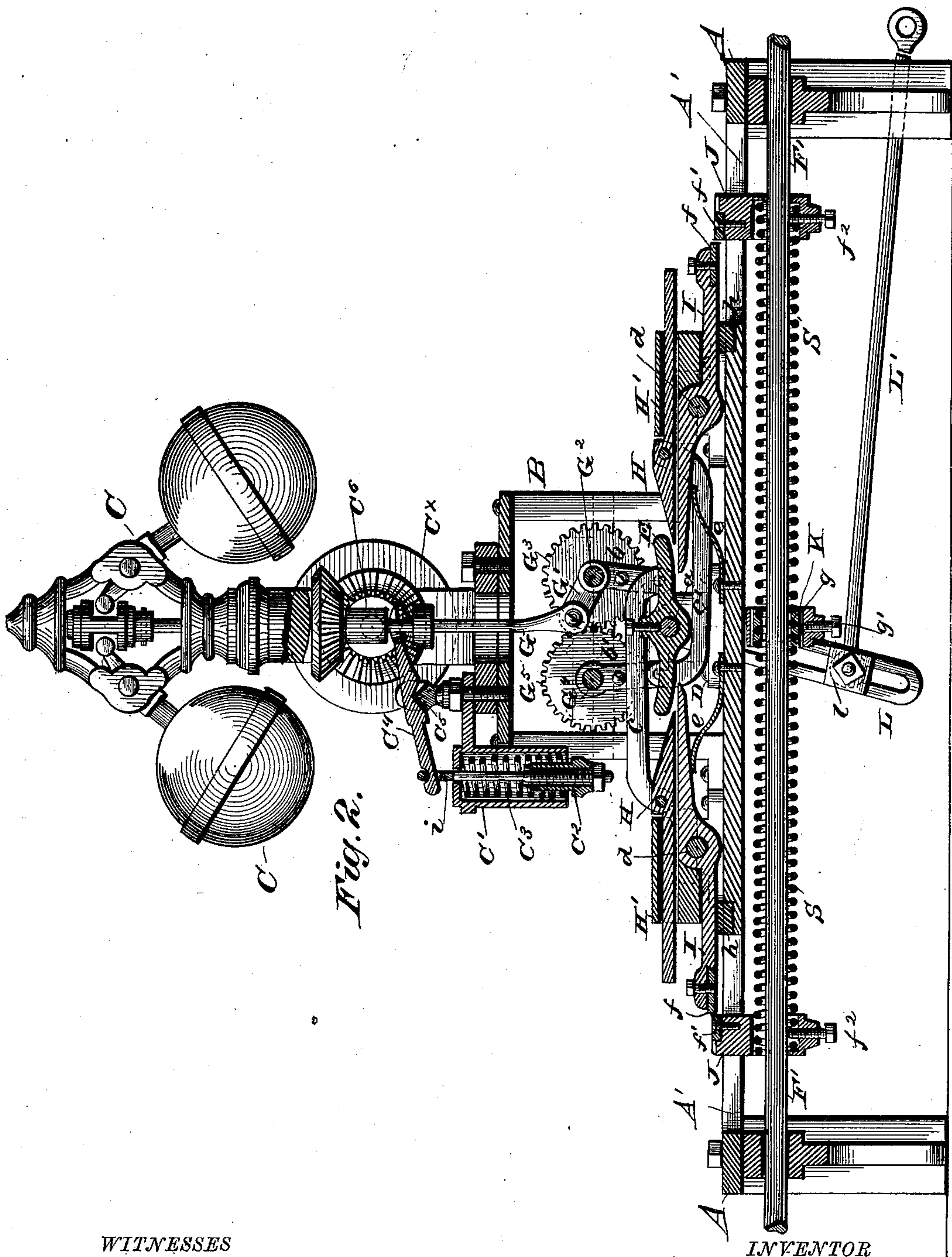


Fig. 2.

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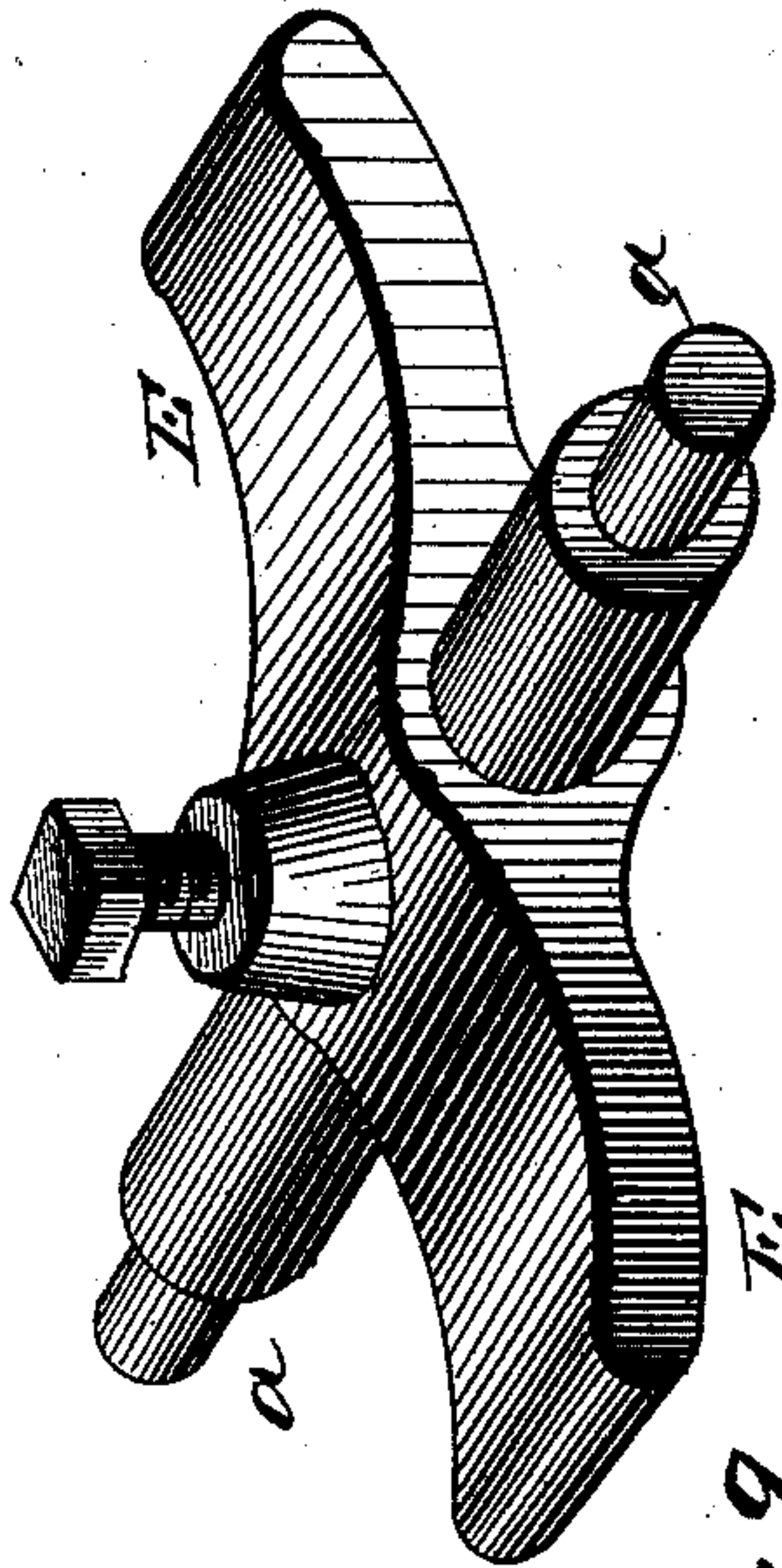
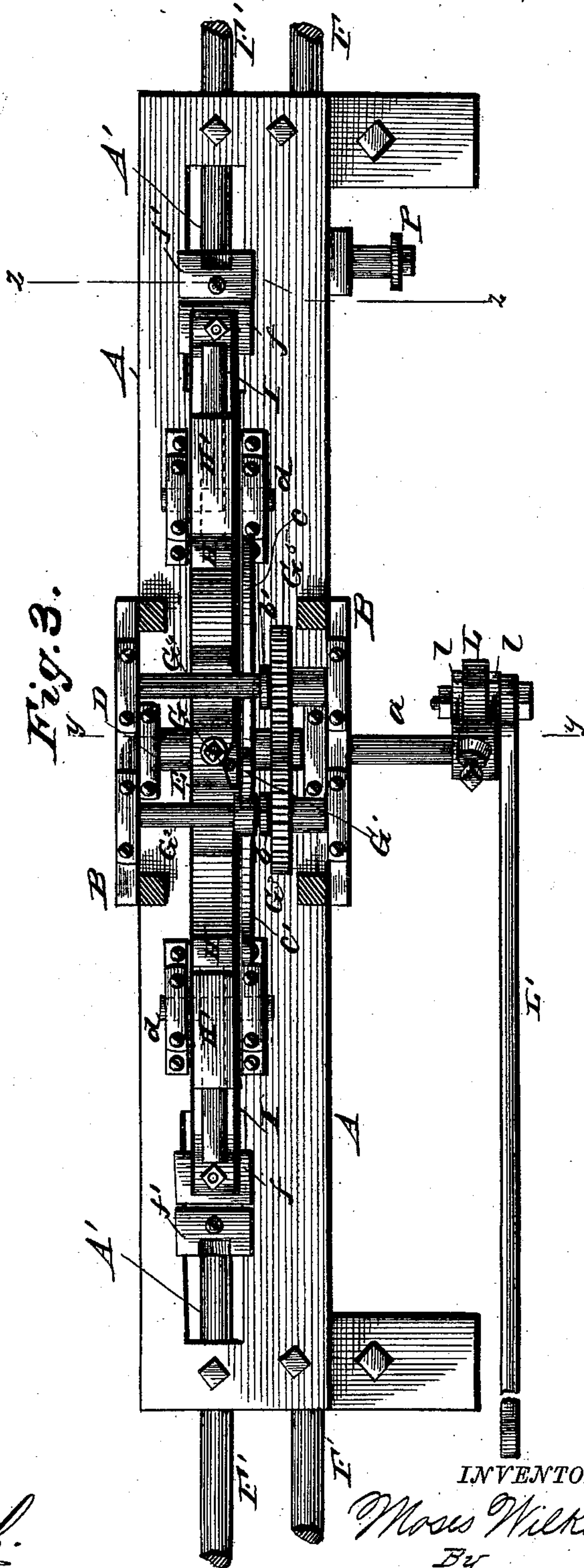


Fig. 9.



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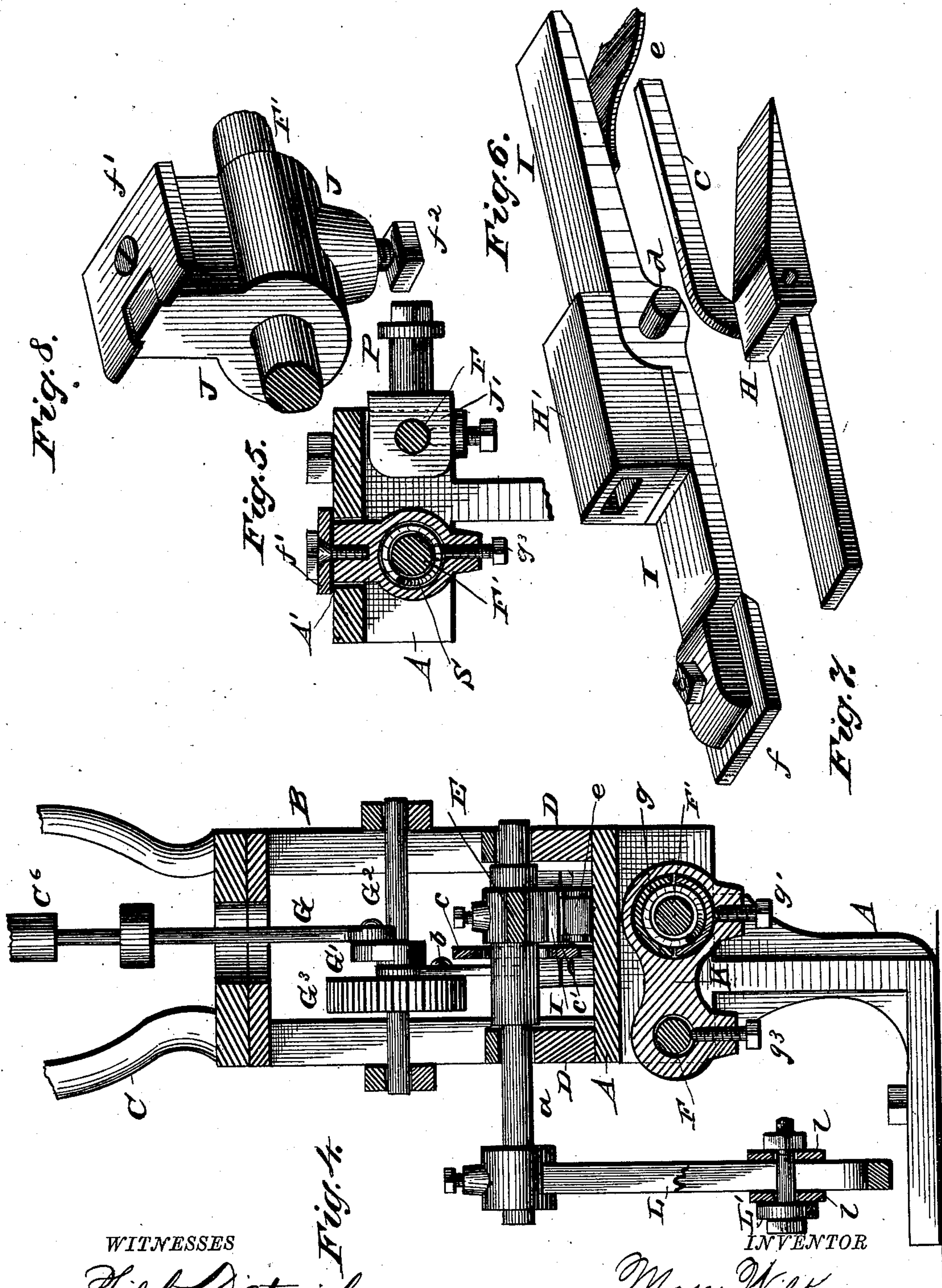
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# UNITED STATES PATENT OFFICE.

MOSES WILKES, OF TRENTON, NEW JERSEY.

## AUTOMATIC SLIDE-VALVE CUT-OFF MECHANISM.

SPECIFICATION forming part of Letters Patent No. 358,318, dated February 22, 1887.

Application filed June 18, 1886. Serial No. 205,533. (No model.)

*To all whom it may concern:*

Be it known that I, MOSES WILKES, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented new and useful Improvements in Automatic Slide-Valve Cut-Off Mechanism, of which the following is a specification.

Figure 1 is an elevation of one side of my improved automatic slide-valve cut-off and regulator, the parts being represented when the governor is at rest. Fig. 2 is a section taken vertically, longitudinally, and centrally through those parts which are below the governor, a side view of which latter is represented. Fig. 3 is a top plan view of all those parts of the valve-motion below the horizontal planes indicated by the course of dotted lines *xx* on Fig. 1. Fig. 4 is a vertical section transversely through the valve-motion, taken in the plane indicated by dotted line *yy* on Fig. 3. Fig. 5 is a vertical sectional detail through Fig. 3 in the course of the dotted line *zz*. Fig. 6 is an enlarged perspective view of one of the vibrating levers which at times engage with stop-blocks adjustably secured to the cut-off-valve stem. Fig. 7 is a perspective view of one of the reciprocating tripping-wedges. Fig. 8 is a perspective view of one of the stop-blocks and its reversible steel wear-plate. Fig. 9 is a perspective view of the rocking toe.

This invention relates to slide-valve motions and to novel improvements in mechanism for cutting off at any desired point during the strokes of the piston and automatically regulating the cut-off motion, as will be fully understood from the following description, when taken in connection with the annexed drawings.

Having reference to the annexed drawings by letters, A designates the horizontal frame or bed adapted to support the several parts of the device, and B is a frame mounted upon this bed and rigidly secured to it, which frame affords bearings for the governor C, while D D are pillow-blocks for the horizontal transverse shaft *a* of the rocker E.

F designates the endwise-reciprocating stem for actuating the main slide-valve, and F' is the endwise-movable stem of the cut-off slide-

valve, which stems have their bearings in the ends of frame A. As the main and cut-off slide-valves are or may be constructed in the usual well-known manner, I have not represented them in the annexed drawings, and as the governor C is of the well-known construction it is not deemed necessary to particularize it. It receives rotation from the belt-drum C', acting through the medium of miter-wheels, and the stem G is raised and depressed by the action of the governor-balls.

On the stem G is applied a collar, C<sup>6</sup>, against which bears upwardly one end of a balance-lever, C<sup>4</sup>, mounted on a knife-edge bearing, C<sup>5</sup>, the other end of which has depending from it a rod, *i*, which receives loosely on its lower threaded portion a collar, C<sup>2</sup>, and an adjusting-nut therefor. The rod and collar are surrounded by a helical spring, C<sup>3</sup>, inclosed in an open-bottom barrel, C', rigidly secured to the frame B, as shown clearly in Fig. 2. By turning the nut on the rod *i* the tension of the spring C<sup>3</sup> can be nicely adjusted and the governor-balls properly balanced. The lower end of the vertically-movable stem G is pivoted to a short arm, G', keyed on a horizontal transverse shaft, G<sup>2</sup>, on which is also keyed a spur-wheel, G<sup>3</sup>, having secured on one side an arm, *b*, that is pivoted to a connecting-rod, *c*. The wheel G<sup>3</sup> engages with a similar wheel, G<sup>5</sup>, keyed on a horizontal transverse shaft, G<sup>4</sup>, and provided on one side with an arm, *b'*, that is pivoted to a connecting rod, *c'*, similar to the rod *c*, above referred to.

Below the horizontal plane of the shafts G<sup>2</sup> G<sup>4</sup> is a horizontal transverse shaft, *a*, having its bearings in the pillow-blocks D D, above referred to, and keyed on this shaft is a double-toed rocker, E, and a slotted arm, L. The toes of the rocker are designed to act on and alternately depress the inner ends of levers I I, which have their fulcra at *d d* on the bed A, as shown in Figs. 1, 2, and 3. The slotted arm E has applied to it an adjustable set-slide, *l*, to which is pivoted one end of a pitman-rod, L', the other end of which is designed to be attached to an eccentric on the engine-shaft in the usual manner, the throw of which arm can be regulated by adjusting the slide *l*.

Both levers I I are exactly alike, and are



aligned in the same vertical and horizontal planes. The inner limbs of these levers are held up in the positions indicated in Figs. 1 and 2 by means of springs *e e*, secured on the bed A. The outer limbs of levers I I rest, when in the position last named, upon fixed blocks *h h*, and the outer ends of these levers have removably secured to them reversible hardened steel plates or toes *f f*, which are designed to act at times against similar plates, *f'*, which are secured to the tops of stop-blocks J J, free to play through slots A' A' in the bed A, and adjustably secured by binding-screws *f<sup>2</sup> f<sup>2</sup>* to the stem F', of a cut-off slide-valve. (Not shown in the drawings for the reason above stated.) These blocks J J are socketed, as shown in Fig. 2, and receive the ends of a long helical spring, S, which surrounds the valve-stem F'. On the elevated surfaces of the inner limbs of the vibrating levers I I are the endwise reciprocating wedges H H, to the sides of which the outer ends of the connecting-rods *c c* are pivoted. The flat tails of these wedges pass freely through guides H' H', which are secured upon or formed integral with the vibrating levers I I.

It will be observed that by the rising and falling movements of the governor-balls and the stem G rectilinear endwise movements are imparted to the wedges, they being connected by the curved rods *c c* to arms secured to the twin spur-wheels, both wedges being so moved simultaneously. It will also be observed that by the oscillating movements of the rocker E the inner limbs of the levers I I are depressed and the outer ends thereof are raised out of alignment with the blocks J J.

K designates a yoke, which is clearly shown in Fig. 4. This yoke is rigidly but adjustably secured by a ring, *g*, on the stem F of the main slide-valve by a screw, *g<sup>3</sup>*. It also receives freely through it the stem F' of the cut-off slide-valve; but the helical spring S, which surrounds this valve-stem, is gripped by means of a split ring, *g*, in the yoke, against which ring a set-screw, *g'*, impinges, as shown in Figs. 2 and 4. The ring *g* is internally helically grooved, so as to receive several of the coils of the spring S, and thereby enable this ring to clasp the spring firmly without crushing it upon the valve-stem F'. A wrist-pin, P, on one of the blocks J', connects this block with a strap on an eccentric keyed on the fly-wheel shaft of the engine, which thus transmits endwise movements to the stem F' of the cut-off valve, and as this valve-stem is keyed to the yoke K endwise movements are transmitted to the stem of the main slide-valve through the medium of the long helical spring S, gripped to this spring by the split ring and set-screw, as above described.

When the engine is running, the sliding wedges H H act through the medium of the governor and the rocker E, which receives its vibration from the governor, as above de-

scribed, to disengage the outer ends of the levers I I from the stop-blocks J J, keyed on the cut-off-valve stem F'. The levers I I, by their engagement with the blocks J J, serve to hold the cut-off valve stationary until, by the action of the governor C and the rocker E, said levers are disengaged from the blocks J J, at which moment the action of the spring S will instantly close the cut-off valve. Should the speed be such that no movement of the cut-off valve takes place, the spring S merely closes and opens the main slide-valve, and thus allows admission of steam into the cylinder the full length of the stroke of the piston.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic cut-off and regulator for engine slide-valves, the combination, with a governor and its vertically-movable stem adapted to oscillate twin spur-wheels, of sliding wedges applied to vibrating tripping-levers and connected to said wheels, as described, stop-blocks keyed on the cut-off-valve stem at the ends of a spring on this stem, a rocker arranged and operated as described, a reciprocating yoke adjustably secured on the main-valve stem and clamped to said spring, substantially as described.

2. In a cut-off-valve regulator, the combination of the rocker, the sliding wedges, and vibrating levers actuated substantially as specified, with the stop-blocks keyed on a cut-off-valve stem actuated by a yoke, a spring on this stem, and a main slide-valve stem, substantially as described.

3. The combination, with the spring-actuated tripping-levers provided with guides H and wear-plates and the sliding wedges, of a rocker for acting on said levers, substantially as described.

4. The combination, with the governor, its adjustable spring-balance, and vertically-movable stem G, of the arm connecting it to the shaft of the wheel G<sup>3</sup>, the sliding wedges, the rods *c c*, connecting these wedges to the arms on said wheels, the spring-actuated tripping-levers supporting the wedges, the rocker between the latter, the cut-off and main-valve stems, the blocks keyed on the cut-off-valve stem, and the yoke keyed to the main-valve stem and clamped to the spring on the cut-off-valve stem, substantially as described.

5. The combination, with the cut-off-valve stem F', of the surrounding spring S, confined between the adjustable blocks J J, the yoke K, keyed to the main-valve stem and clamped by means of a split ring and set-screw to the said spring, substantially as described.

6. The combination of sliding wedges controlled by the action of a governor with a rocker adapted to be controlled by the action of an eccentric on the engine-shaft, vibrating

tripping-levers actuated by springs and said  
rocker, a cut-off-valve stem adapted to also  
receive reciprocation from the engine-shaft  
and bearing stop-blocks and a helical spring,  
5 and the yoke fast on the main valve-stem and  
helical spring, substantially as and for the  
purposes described.

In testimony whereof I have hereunto set  
my hand in the presence of two subscribing  
witnesses.

MOSES WILKES.

Witnesses:

PETER WILKES,  
A. W. MAINS.