

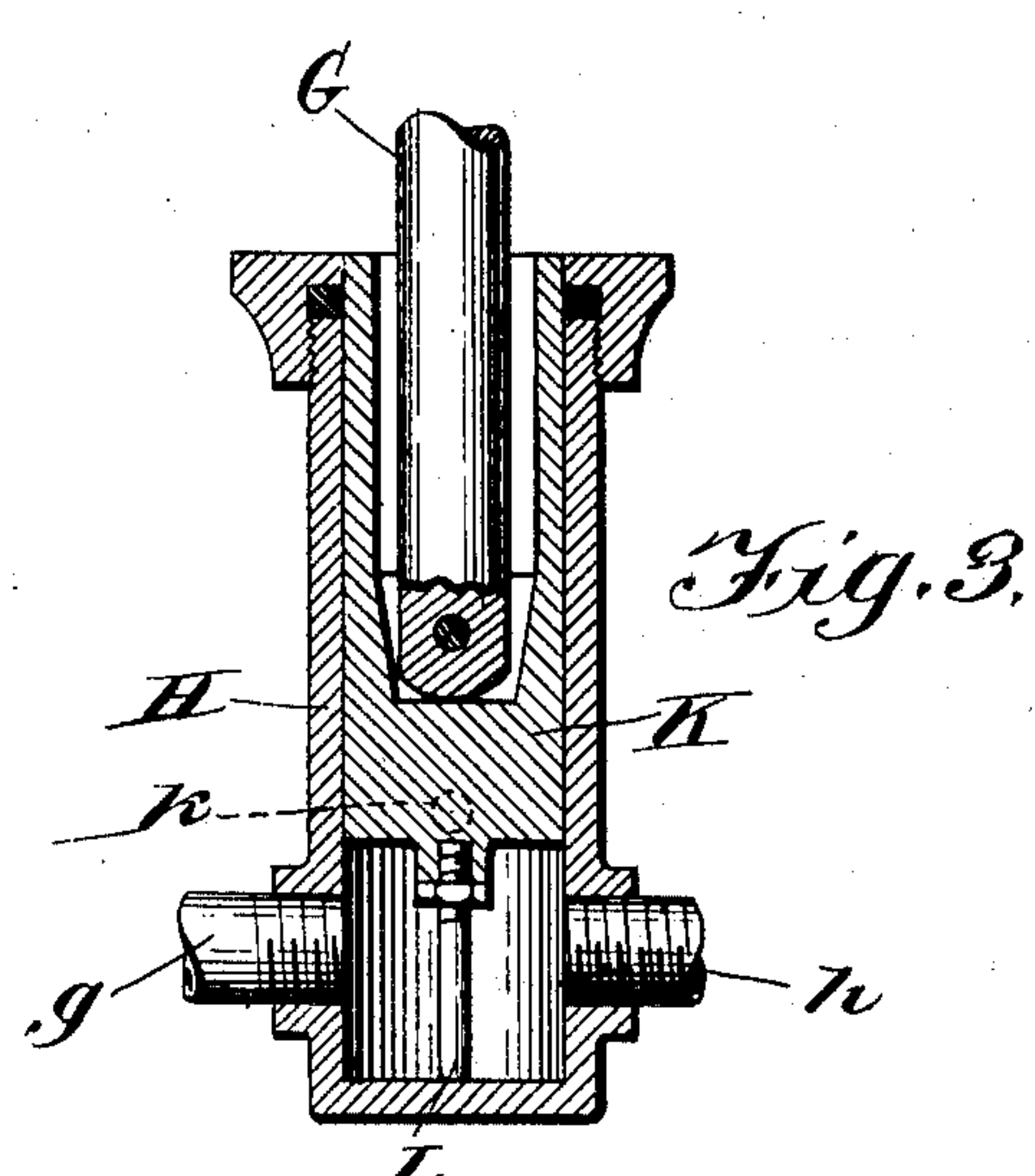
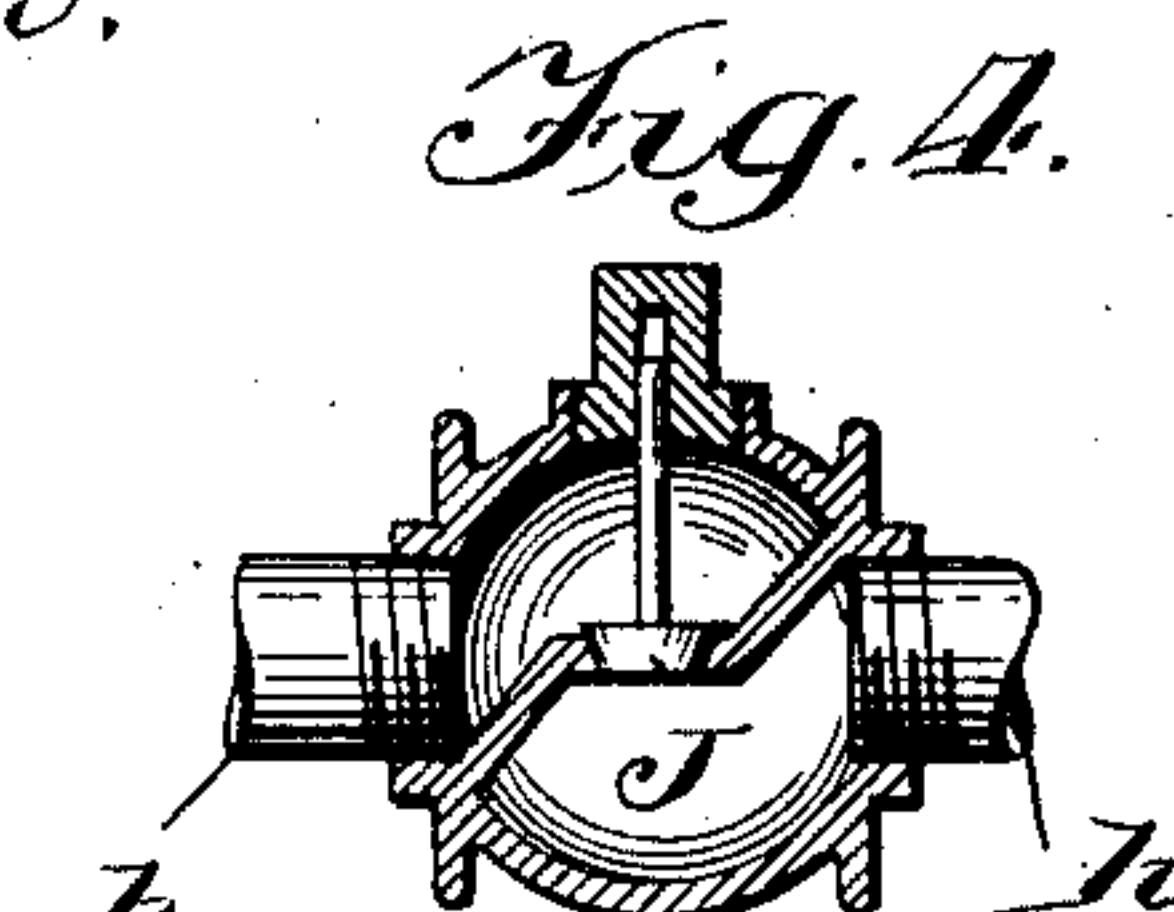
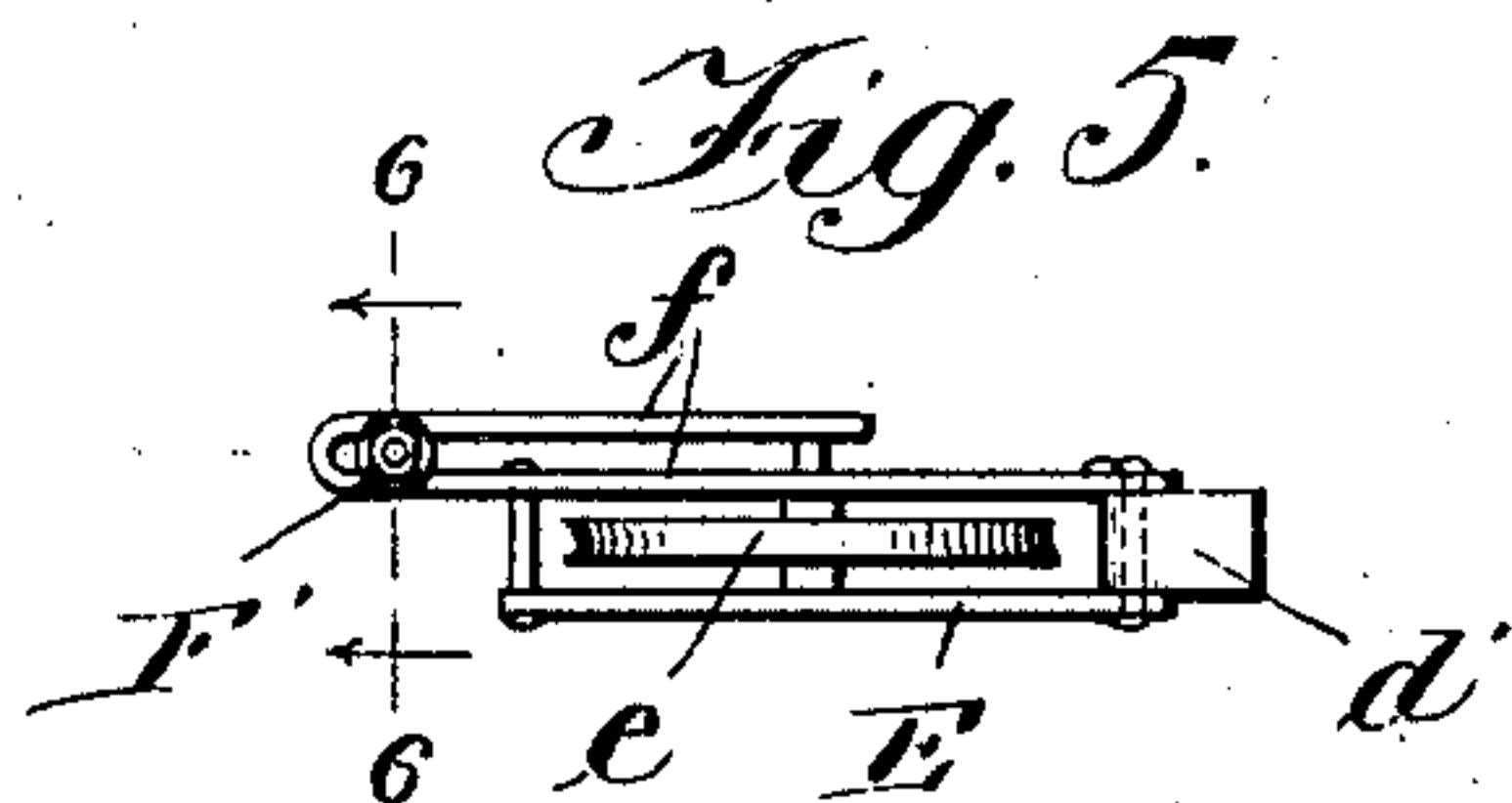
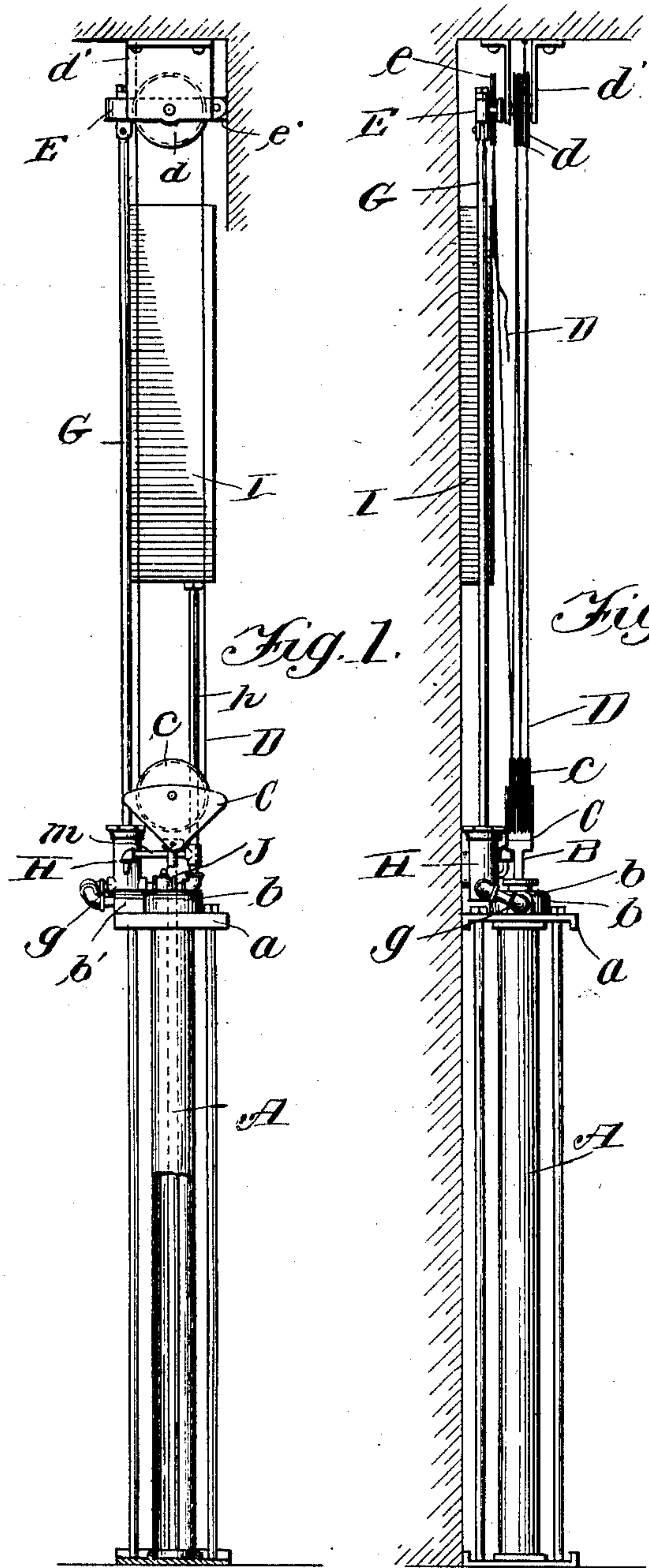
No. 737,547.

PATENTED AUG. 25, 1903.

M. C. YOUNG.
FIRE ESCAPE.

APPLICATION FILED JAN. 9, 1903.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

MATHIAS C. YOUNG, OF MUSKEGON, MICHIGAN.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 737,547, dated August 25, 1903.

Application filed January 9, 1903. Serial No. 138,375. (No model.)

To all whom it may concern:

Be it known that I, MATHIAS C. YOUNG, a citizen of the United States, and a resident of Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Fire-Escapes, of which the following is a full, clear, and exact description.

The object of my invention is to provide a fire-escape by means of which a person can without further manual effort than is required to obtain a good hold or attach oneself to the lowering rope or cable and dropping from the window descend to the ground at a moderate and safe speed, which automatically rewinds or restores the rope or cable to its original position when the weight is removed therefrom, and which automatically accommodates itself to loads of different weight without change of its regulated speed. This I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a front elevation of my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical central section of the automatic controlling-cylinder of my invention, drawn to a larger scale. Fig. 4 is a vertical central section through the check-valve used in connection therewith, drawn to a larger scale. Fig. 5 is a plan view of the fulcrumed lever-frame in which one of the sheaves for the rope or cable system of my invention is journaled, drawn to a larger scale. Fig. 6 is a transverse section through said frame, taken on dotted line 6-6, looking in the direction indicated by the arrows.

The general scheme of my invention comprehends the idea of forcing a liquid from a lower cylinder up through an intermediate cylinder or chamber, from which it has a regulated escape, up into a superimposed tank in smaller or larger quantity, according to the weight on the rope or cable of the person being lowered to the ground, and also comprehends the quick automatic restoration of the rope or cable to its original position when said weight is removed therefrom by reason of the vacuum created by the paying out of said rope and the weight of the liquid and mechanism returning to their original positions.

Referring to the drawings, A represents a

vertical cylinder of suitable dimensions, the lower head of which rests on the floor and the upper head *a* of which is of rectangular or other suitable shape, so as to provide a platform upon which is built a central circular dome *b*, which is concentric with and preferably greater in diameter than the cylinder and has a lateral offset *b'*.

A piston B extends down through a suitable stuffing-box in the top of the dome *b* into cylinder A, and it is of such length that in its normal position and while not in use its piston-head, which fits snugly the bore of said cylinder, will rest in the bottom thereof. The upper end of the piston B is provided with a block C, in which three concave sheaves *c* are journaled, and terminates when in its original position a short distance above dome *b*. A rope D connects these sheaves with two sheaves *d*, having stationary bearings in a suitable hanger *d'*, secured to and depending from the ceiling immediately above the cylinder, and also to a sheave *e*, journaled in a lever E of the second class. This lever comprises two parallel metal bars which are fulcrumed to a suitable lug *e'*, projecting from the side wall of the room in the corner of which I prefer to locate my fire-escape or projecting from the sides of the housing when the apparatus is inclosed within one, and the sheave *e* is journaled between said bars. The free end of one of these bars *f* is extended and bent back parallel to its length to provide an elongated slot, in which the pivotal devices for the upper end of the plunger G can be adjusted longitudinally. The means for thus adjustably connecting the upper end of the plunger to the lever E comprises a block F, fitting up against and in between the edges of the parallel branches of bar *f*, and a bolt F', tapped into said block and extending up from the same between said branches to and through a suitable washer resting on the upper edge of said branches. The upper end of plunger G is pivoted between suitable lugs depending from block F, and in order to adjust it nearer to or farther from the bearings of sheave *e* all that has to be done is to loosen and after it is satisfactorily adjusted tighten bolt F. When weight is applied to the end of the rope D hanging down from the sheave *e*, it causes piston B

to move upward. This movement is resisted by the liquid (preferably oil or water) with which the cylinder is filled above the piston-head. When the piston moves upward, this liquid is forced upward through a suitable pipe *g*, connected to offset *b'*, into the lower end of a smaller controlling chamber or cylinder H. Pipe *g* connects with cylinder H near its lower end, and in about the same horizontal plane this cylinder has a pipe *h* of about the same capacity leading laterally and then upward therefrom to a superimposed tank I, which latter is of any suitable construction and is supported above the controlling-cylinder H in any suitable manner. In the horizontal portion of pipe *h* is a check-valve J of a common design, which will permit the liquid to flow therethrough back into cylinder H, but prevents the flow therethrough in the opposite direction. The result of this action of the check-valve is to cause the liquid entering said controlling-cylinder from cylinder A to accumulate therein until it rises to or above the level of the restricted opening *k* of the discharge-pipe *m*, which is located a suitable distance above the plane of pipes *g* and *h*. Discharge-pipe *m* connects cylinder H with the vertical portion of pipe *h*. As this liquid rises in cylinder H before it reaches opening *k* it comes in contact with and forces upward a piston K, which is secured to the lower end of plunger G. This piston is of such length and diameter that it practically fills the upper portion of cylinder H, and the plunger enters the bore of its upper portion and is pivoted and is permitted a limited pitman movement therein, substantially as shown.

The operation of my invention is as follows: When the weight of the person is attached to the end of the rope depending from sheave *e*, it immediately, through the medium of the lever E, in which said sheave is journaled, and plunger G, causes the piston K to move to the limit of its downward stroke, which is regulated, as shown, by the lower end of the longitudinal gage-bolt L, which is tapped into its lower end, coming in contact with the bottom of cylinder H. At the same time the piston B commences to rise in the main cylinder *a*, and thus forces the liquid up into cylinder H, and owing to the increase of power obtained through the system of pulleys the pressure of this liquid forces piston K upward until the opening *k* is uncovered. The liquid discharges under considerable pressure through this opening *k* and is forced up through pipe *h* into tank I. Now the moment the weight is released from rope D the weight of piston B, and particularly the suction of the rarefied air formed under the piston-head in said cylinder A, moves the said piston downward and restores the same to its original position again. As the piston moves downward the liquid in cylinder H flows therefrom into cylinder A, and the pressure being removed from check-valve J the liquid in tank

I and pipe *h* passes therethrough and through the lower part of cylinder H in transit to cylinder A again. Piston B when moving back to its original position carries with it sheave *e*, and this, assisted by the removal of the resistance under piston K, causes it and the lever E and plunger to move downward to their original positions. If my improved fire-escape occupies a position on an upper floor, the rope can be grasped and the person lowered from any lower point and operated just as well as if everything in connection with it had been restored to its original position. It will be noticed that by opposing the weight of the person through the medium of the piston K by the liquid-pressure created by the application of that weight, be it great or small, under given conditions the speed with which the rope will pay out will be the same. This speed can be regulated by adjusting the pivotal point of the upper end of the plunger longitudinally on lever E, as hereinbefore set forth, and the downward movement of piston K in cylinder H by manipulating gage-bolt L.

It will be apparent that the number of sheaves, both stationary and movable, which I use in connection with my invention can be increased or decreased, according to the power it is desired to apply to the raising of the piston B in cylinder A, and it will also be apparent that the construction and arrangement of the parts of my improved fire-escape can be modified and changed to adapt them to the different conditions and environments in connection with which they may be used. All such changes, modifications, and substitutions I desire to be understood as contemplating within the scope of my invention.

What I claim as new is—

1. A fire-escape comprising a lowering rope or cable, a system of stationary and movable sheaves having respectively stationary and movable bearings, a piston to which the movable sheaves are attached, a cylinder in which said piston moves, a regulating-cylinder into which the liquid from said first-mentioned cylinder flows during the outward movement of said piston, which regulating-cylinder has an automatically-controlled discharge-opening, and a tank adapted to receive the discharge from said regulating-cylinder during said movement of said piston and automatically permitting the escape of said liquid back to said first-mentioned cylinder during the inward movement of the piston.

2. A fire-escape comprising a lowering rope or cable, a system of stationary and movable sheaves having respectively stationary and movable bearings, a lever, a sheave journaled in said lever, a plunger connected to said lever, a regulating-cylinder having suitable inlet near one end and a discharge-opening mediate its ends, and a piston connected to said plunger and entering the end of said cylinder opposite said inlet, substantially as and for the purpose set forth.

3. A fire-escape comprising a lowering rope

or cable, a system of stationary and movable sheaves having respectively stationary and movable bearings, a lever, a sheave journaled in said lever, a plunger adjustably connected
5 to said lever, a regulating-cylinder having suitable inlet near one end and a discharge-opening mediate its ends, and a piston connected to said plunger and entering the end of said cylinder opposite said inlet, substantially as and for the purpose set forth.
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4. A fire-escape comprising a rope or cable, a system of stationary and movable sheaves therefor having respectively stationary and movable blocks, a lever, a sheave journaled
15 therein around which the last bight of said rope passes, a cylinder, a piston reciprocal therein, a regulating-cylinder, a pipe con-

necting one end of the same with said first-mentioned cylinder, a superimposed tank, a pipe connecting the same with said regulat- 20 ing-cylinder, a check-valve in said last-mentioned pipe, a discharge-pipe connecting said regulating-cylinder at a point mediate its ends with said last-mentioned pipe between said check-valve and said tank, a plunger pivot- 25 ally connected at one end to said lever, and a piston in said regulating-cylinder attached to said plunger.

In testimony whereof I have hereunto set my hand this 2d day of January, 1903.

MATHIAS C. YOUNG.

Witnesses:

CLARENCE W. SESSIONS,
GEORGE D. VANDERWERP.