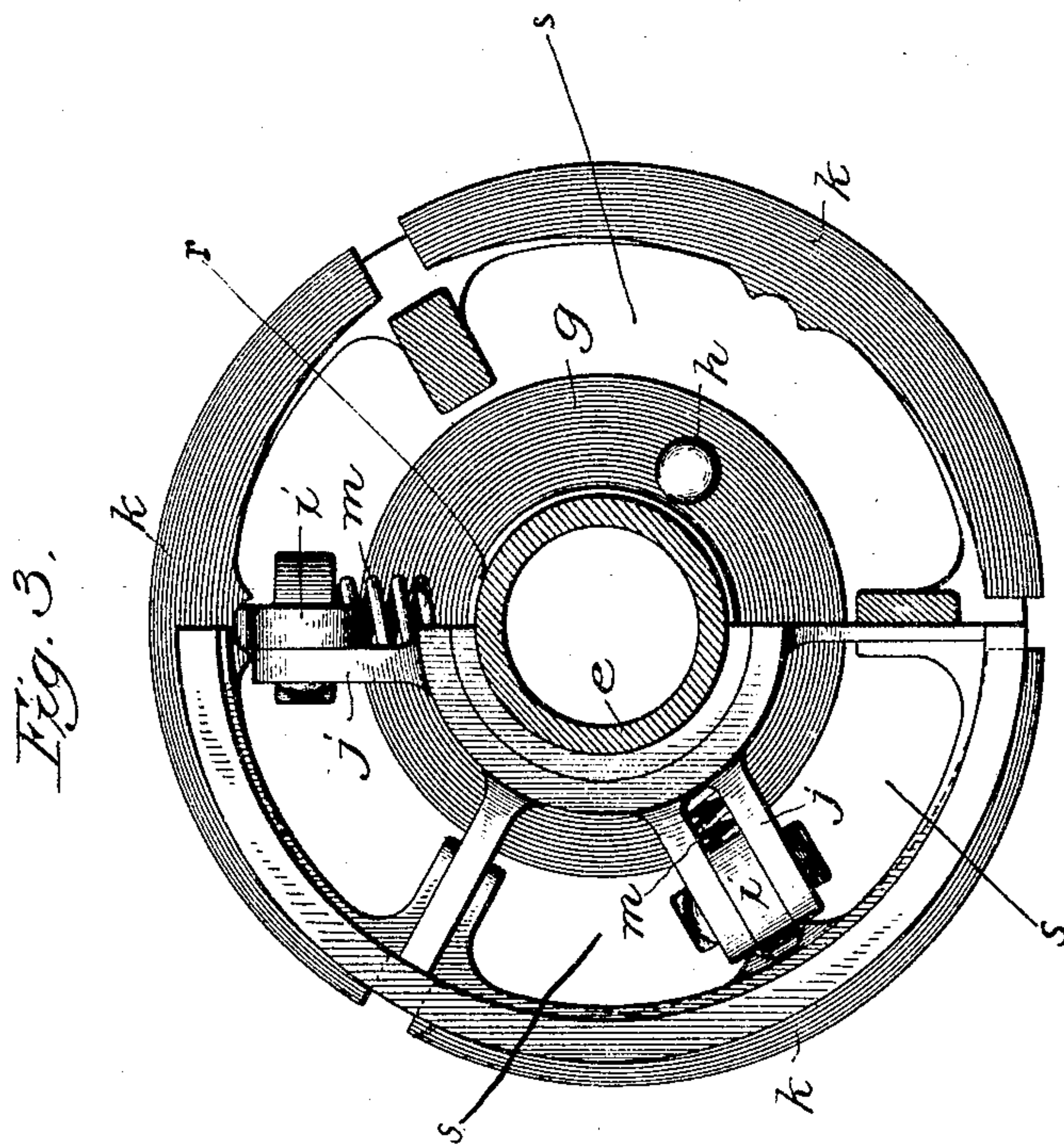
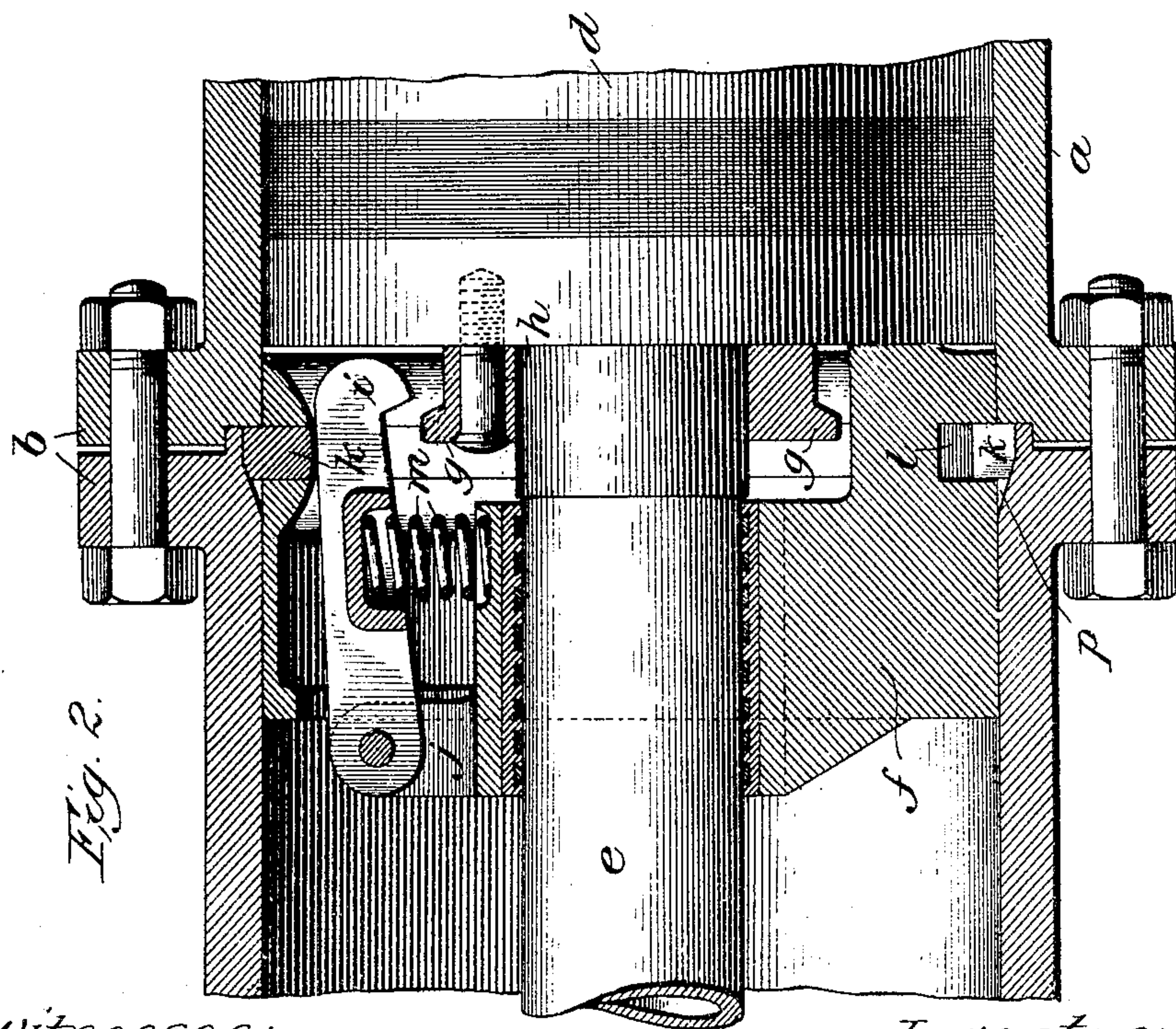
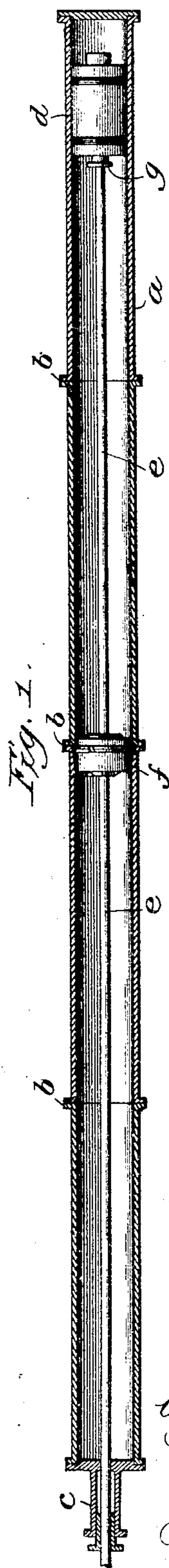


W. C. TROUT.
PISTON ROD SUPPORT.
APPLICATION FILED JUNE 11, 1902.

NO MODEL.



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UNITED STATES PATENT OFFICE.

WALTER C. TROUT, OF MILWAUKEE, WISCONSIN.

PISTON-ROD SUPPORT.

SPECIFICATION forming part of Letters Patent No. 774,213, dated November 8, 1904.

Application filed June 11, 1902. Serial No. 111,123. (No model.)

To all whom it may concern:

Be it known that I, WALTER C. TROUT, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Piston-Rod Supports, of which the following is a specification.

This invention relates to that class of mechanisms which is adapted to be used in connection with unusually-long piston-rods to support the same and prevent their sagging, as will more fully hereinafter appear.

The principal object of the invention is to provide a long piston-rod with a simple and efficient movable support.

A further object of the invention is to provide a long piston-rod with an independent movable bushing for supporting it during a portion of its stroke.

Further objects of the invention will appear from an examination of the accompanying drawings and the following description and claims.

The invention consists principally in piston-rod-supporting mechanism in which there are combined a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured thereto, an independent supporting-bushing for such piston-rod movably mounted in the cylinder, means for moving it with the piston-rod, and means for stopping it at a predetermined point.

The invention consists, further, in piston-rod-supporting mechanism in which there are combined a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured thereto, an independent supporting-bushing for the piston-rod movably mounted in the cylinder, means for securing the bushing to the piston-head so as to move it simultaneously therewith during a portion of the head stroke, and means for releasing it at a predetermined point or points.

The invention consists, further and finally, in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a long fluid-pressure cylinder provided with a movable piston-head and other parts constructed in ac-

cordance with these improvements; Fig. 2, an enlarged longitudinal sectional detail of a portion of the cylinder, piston-head, piston-rod, and its support constructed in accordance with these improvements; and Fig. 3, a cross-sectional view showing the piston-rod with its movable supporting-bushing, partly in section and partly in elevation.

In the art to which this invention relates it is well known that where long fluid-pressure cylinders and long piston-rods are used, particularly in connection with the so-called "steam-feed" mechanisms of sawmills, there is considerable danger of buckling of the piston-rod in such mechanisms, due to the end thrust on the same, owing to the fact that the piston-rod is not supported at any point intermediate the piston-head and the end of the fluid-pressure cylinder. In these mechanisms the cylinders are anywhere from thirty to seventy feet long, with piston-rods from two and a half to four inches in diameter. In use, although these piston-rods are supported by long stuffing-boxes and piston-heads, they generally "sag," so as to wear a groove in the bottom of the bore and correspondingly injure or bend the rod. The continual binding or cramping of the piston-head in the bore owing to the sagging of the rod causes a large amount of unnecessary friction and a correspondingly uneven wear of the bore, piston-rings, and other parts.

The principal object of this invention, therefore, is to provide a fluid-pressure cylinder and piston-rod of the class alluded to with one or more movable supports arranged between the forward end of the piston-head and the cylinder and so combined with other mechanisms that the support or supports will have a limited amount of travel and be stopped at predetermined points, all of which is arranged to furnish an economical and efficient support for the piston-rod, as will be hereinafter more fully set forth.

In constructing mechanisms in accordance with these improvements a long fluid-pressure cylinder *a* is provided of the desired size, shape, and strength to sustain the parts and resist the stress and strains incident to use. As shown in the drawings, this cylinder is

composed of a plurality of sections arranged in alinement with each other and secured together at their flanged meeting-points *b* by bolts, rivets, or other desired mechanisms.

5 One end of this cylinder is provided with a long stuffing-box *c*, through which the piston-rod hereinafter described projects. Movably mounted in the fluid-pressure chamber of the cylinder is a piston-head *d* of the desired size,

10 shape, and strength, and secured thereto is a piston-rod *e*, extending out through the stuffing-box on one end of the cylinder. An examination of the drawings will show that the cylinder is an unusually long one and that the

15 piston-rod is necessarily also unusually long and as a consequence that there is great liability of such piston-rod sagging or bending downwardly and correspondingly cramping the piston-head, thereby causing considerable damage to the head and cylinder as well as other

20 parts. In order to prevent such sagging or bending of the piston-rod, I provide an independent supporting-bushing *f*, surrounding the piston-rod and arranged to move backwardly and forwardly in the bore of the fluid-pressure cylinder a limited or predetermined

25 amount. This supporting-bushing is provided with a central opening *r* and openings *s* between such central opening and the periphery of the bushing, making an open supporting-bushing which permits the passage of fluid

30 therethrough and is designed to be nominally free or loose from both the piston-rod and piston-head, so that when it is moved to its supporting position it is about midway of the cylinder, as shown particularly in Fig. 1. During

35 the forward movement of the piston-head—that is, to the left—it contacts the bushing and moves it to the opposite end of the cylinder, thereby supporting the piston-rod during such

40 movement. It is necessary, however, to provide means by which the piston-head and bushing may become locked with each other, so that they travel together during a portion of the

45 backward movement or stroke of the piston-head. In order to accomplish this result, I provide the forward end of the piston-head with a flanged locking-ring *g*, which is preferably bolted thereto by means of bolts or screws *h*.

50 It will be understood, however, that this flanged locking-ring, if desirable or necessary, can be cast integral with the follower-plate of the piston-head or some portion thereof, though I prefer to make such parts in two

55 pieces secured together by bolt mechanisms, as above suggested. The bushing is provided with three pivotal locking-latches *i*, the forward free ends of which are adapted to engage with the locking-flange on the flanged

60 locking-ring, as shown particularly in Fig. 1, while the rear ends of such latches are pivoted to upwardly-extending arms *j* on the supporting-bushing. To keep these locking-latches in locking engagement with the piston-head,

65 each locking-latch is provided with a locking-

segment *k*, arranged in an annular groove *l* in the periphery of the bushing. These segments have their outer surface or surfaces arranged to bear against the inner bore of the cylinder, and when in such position they move

70 the latches against the tension of the unlocking-springs *m* into their locking engagement, so that as the piston-head moves backward it carries with it the supporting-bushing.

To permit of the unlocking of the parts at

75 a predetermined point, the inner bore of the cylinder is provided with an unlocking annular groove *p*, the front wall of which is arranged at a taper and the back wall substantially at right angles with the motion of the

80 piston-head. When the locking-segments reach this unlocking-groove, the tension-springs *m* force the latches, with their respective locking-segments, out into the annular unlocking-groove, the right-angular wall of

85 which prevents a further backward movement of such supporting-bushing, while permitting the piston-head, with its rod, to continue their backward movements. When the piston-head is again moved forwardly, it contacts with the

90 forward end of the bushing, as shown in Fig. 2, and continuing its motion moves the locking-segments forwardly over the tapered wall of the locking-groove, compressing such segments and swinging the free ends of the latches

95 into locking reengagement with the flanged locking-ring. These operations continue in an automatic manner as long as the piston-head, with its piston-rod, reciprocates, needing

100 no attention whatever from the operator unless some injury occurs to the mechanism or it is desired to inspect or lubricate the same.

I claim—

1. In mechanisms of the class described, the combination of a fluid-pressure cylinder, a

105 piston-head movably mounted therein, a piston-rod secured thereto, an independent supporting-bushing for the piston-rod movably mounted in the cylinder, means for moving it forward and backward with the piston-rod,

110 and means for stopping it at a predetermined point and holding it stationary while permitting the rod to move therethrough in either direction, substantially as described.

2. In mechanisms of the class described, the

115 combination of a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured thereto, an independent supporting-bushing for the piston-rod movably

120 mounted in the cylinder, means for securing the bushing to the piston-head so as to move it simultaneously therewith during a portion of the head stroke, and means for releasing and stopping it at a predetermined point, substantially as described.

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3. In mechanisms of the class described, the combination of a fluid-pressure cylinder, a

130 piston-head movably mounted therein, a piston-rod secured thereto and extending out of one end of the cylinder, an independent bush-

ing surrounding the piston-rod and movably mounted in the fluid-pressure cylinder, latch mechanism for securing the bushing to the piston-head so that it may travel therewith, and means for releasing the latch mechanism and stopping the bushing at a predetermined point, substantially as described.

4. In mechanisms of the class described, the combination of a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured thereto extending out of one end of the cylinder, an independent supporting-bushing surrounding the piston-rod and movably mounted in the fluid-pressure cylinder, latch mechanism pivotally secured to such bushing and adapted to lock with the piston-head, locking-segments for keeping such spring mechanism in engagement with the piston-head during a portion of its stroke, spring mechanism bearing against such latch mechanism, and means for releasing the spring mechanism at a predetermined point, substantially as described.

5. In mechanisms of the class described, the combination of a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured thereto and extending out of one end of the fluid-pressure cylinder, an independent supporting-bushing surrounding such piston-rod and movably mounted in the fluid-pressure cylinder, latch mechanism pivotally secured to the bushing adapted to interlock with the piston-head, locking-segment mechanism movably mounted in the bushing for keeping the mechanism in interlocking engagement with the piston-head during a predetermined portion of its stroke, stop mechanism in the fluid-pressure cylinder for releasing the locking-segment mechanism at a predetermined point, and spring mechanism for throwing the latch mechanism out of engagement with the head, substantially as described.

6. In mechanisms of the class described, the combination of a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured thereto and extending out of one end of the fluid-pressure cylinder, an independent supporting-bushing surrounding the piston-rod and movably mounted in the fluid-pressure cylinder, latch mechanism pivotally secured to the bushing mechanism and adapted to interlock with the piston-head so as to have the head and bushing move together during a portion of the stroke of the head, a locking-segment for each latch movably mounted in the bushing and bearing against the inner bore of the fluid-pressure cylinder to hold the latch mechanism in engagement with the piston-head, an annular unlocking-groove in the bore of the fluid-pressure cylinder to permit the locking-segments to expand and unlock the parts, and spring mechanism interposed between the piv-

oted latches and the bushing to unlock such pivoted latches, substantially as described.

7. In mechanisms of the class described, the combination of a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured thereto and extending out of one end of the cylinder, a forwardly-projecting flanged locking-ring on the piston-head, an independent supporting-bushing surrounding the piston-rod and movably mounted in the fluid-pressure cylinder, pivoted latch mechanism secured to the bushing and engaging with the flanged locking-ring on the piston-head, a locking-segment for each latch movably mounted in the bushing and arranged to contact the inner bore of the cylinder to hold its pivoted latch in locking engagement with the flanged locking-ring, an annular locking-groove in the inner bore of the cylinder to permit each locking-segment to expand, and spring mechanism interposed between the pivoted locking-latches and the bushing for unlocking such latches when the locking-segments have expanded, substantially as described.

8. In mechanisms of the class described, the combination of a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured thereto and extending out of one end of the cylinder, an independent supporting-bushing surrounding the piston-rod and movably mounted in the fluid-pressure cylinder, a forwardly-projecting flanged locking-ring secured to the piston-head, a plurality of locking-latches pivotally secured to the movable bushing and adapted to engage or interlock with the flanged locking-ring on the piston-head, an annular groove in the periphery of the bushing, locking-segments movably mounted in such annular groove and provided with a tapered and cylindrical periphery bearing against the inner bore of the cylinder to hold the locking-latches in locking engagement with the flanged locking-ring of the piston-head, an annular stop-groove in the bore of the cylinder having one tapered end and one right-angular wall in which the locking-segments are expanded and stopped to unlock the pivoted latches and stop the bushing, and helical spring mechanism interposed between the pivoted locking-latches and bushing to unlock such latches, substantially as described.

9. In mechanisms of the class described, the combination of a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured to such piston-head, an independent supporting-bushing movably mounted in the cylinder in sliding engagement with such piston-rod, means for moving it forward and backward with the piston-rod, and means for stopping and holding it stationary while permitting the piston-rod to move there-through in either direction, substantially as described.

10. In mechanisms of the class described, the combination of a fluid-pressure cylinder, a piston-head movably mounted therein, a piston-rod secured thereto, an independent supporting-bushing movably mounted in the cylinder in sliding engagement with the piston-rod provided with a central opening there-through for the admission of the piston-rod and with openings intermediate such central

opening and the periphery of the bushing, and means for moving such bushing backward and forward with the piston-rod throughout a portion of its stroke, substantially as described. 10

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Witnesses:

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