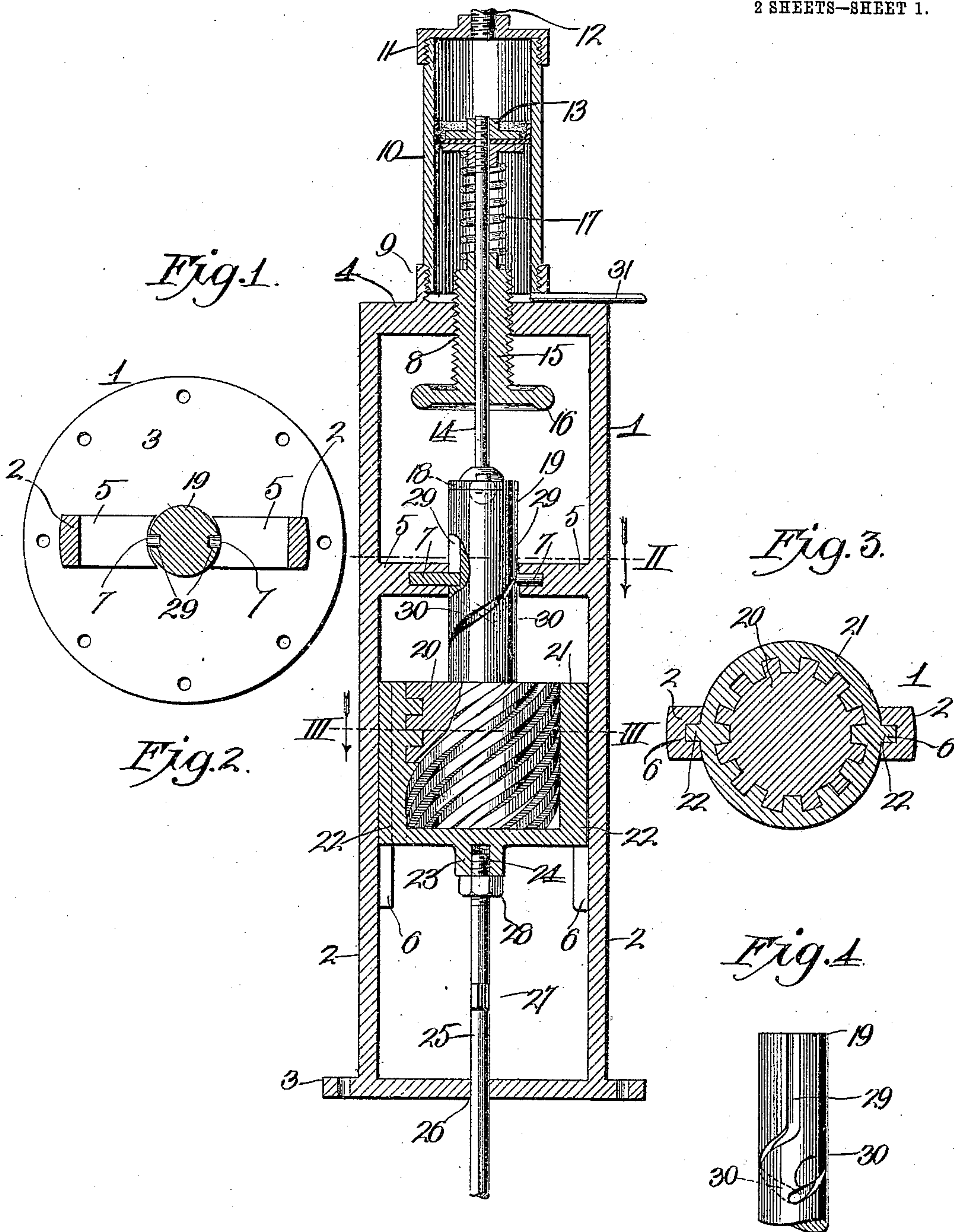


L. KJERULFF.  
PUMP GOVERNOR.  
APPLICATION FILED JAN. 11, 1909.

951,318.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.



Witnesses  
Frank R. Gore  
H. C. Rodgers.

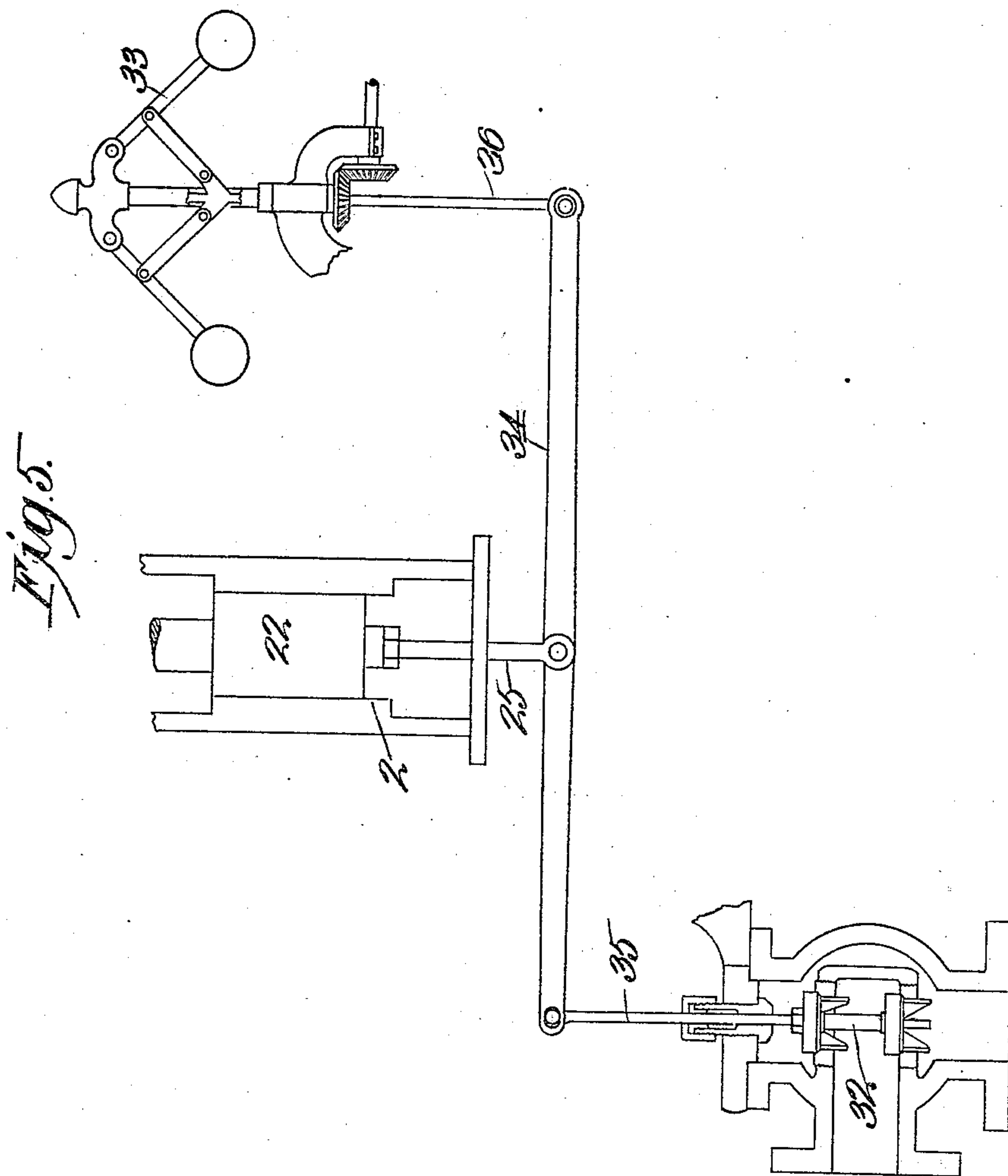
Inventor  
Lawrence Kjerulff  
By George S. Sharp, Atty.

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Witnesses  
Frank R. Glon  
M. A. O'Donnell.

Inventor  
Lawrence Kjerulff  
By *George E. Thorpe* Atty.



# UNITED STATES PATENT OFFICE.

LAWRENCE KJERULFF, OF KANSAS CITY, MISSOURI.

PUMP-GOVERNOR.

951,318.

Specification of Letters Patent.

Patented Mar. 8, 1910.

Application filed January 11, 1909. Serial No. 471,800.

*To all whom it may concern:*

Be it known that I, LAWRENCE KJERULFF, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Pump-Governors, of which the following is a specification.

This invention relates to pressure-governors for pumps, compressors, and the like, and my object is to produce a governor which acts directly in connection with the water or other fluid pumped or compressed, and which, in response to a decrease in the pressure of such fluid, will effect a proportionate increase in the power developed by the pump, engine or equivalent machine, and which automatically effects a decrease in the power developed by or the complete closing down of the engine or its equivalent, in the event the fluid-pressure falls below a predetermined minimum.

A further object is to produce an attachment of the character outlined, of simple, strong, durable and inexpensive construction and which can be easily, expeditiously and economically secured in operative relation to a pump or other machine.

With these objects in view the invention consists in certain novel and peculiar features of construction and organization hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which:

Figure 1, is a central vertical section of a pressure-governor attachment for pumps. Fig. 2, is a horizontal section taken on the dotted line II— of Fig. 1. Fig. 3, is a horizontal section taken on the line III—III of Fig. 1. Fig. 4, is a side elevation of a part of the attachment. Fig. 5, is a diagrammatic view showing a valve and a ball-governor operatively connected to my pressure-governor attachment.

In the said drawing, 1 indicates a vertical frame, consisting by preference, of a pair of parallel sides 2, a perforated base-plate 3, a top-portion 4 and a pair of inwardly-projecting lugs 5. The sides are provided with parallel grooves 6, and the lugs 5 are provided with a pair of inwardly-projecting and oppositely-disposed guide-pins 7, and the top with a threaded opening 8 and an upwardly - projecting internally - threaded collar 9.

10 indicates a cylinder screwed at its

lower end into collar 9 and provided at its opposite end with a head 11 with which connects the pressure-pipe 12, which is connected to the delivery pipe of a pumping apparatus, not shown, which supplies water to the cylinder. The piston 15 of the cylinder is provided with a stem 14 extending slidably through a threaded plug 15 engaging opening 8. The threaded plug is provided at its lower end with a circular enlargement or head 16 by which it may be conveniently turned to adjust it toward or from the piston, for the purpose of increasing or diminishing the tension of the helical spring 17 bearing at its opposite ends against said plug and the piston and surrounding the stem of the latter. The lower end of the piston stem is connected preferably by a ball-and-socket joint as at 18, to the upper end of the cylindrical stem 19 of an externally-threaded plug 20 screwed into a cup 21 provided with outwardly-projecting ribs 22 engaging grooves 6. The cup is equipped centrally with a depending portion 23 having a threaded socket 24 engaged by the threaded upper end of a rod 25 extending slidably through an opening 26 in the base and adapted when moved downward to impart closing movement to a throttle-valve or its equivalent, and when moved upward to impart opening movement to such valve, the said valve and the machine of which it forms a part being omitted as forming no part of the invention. In order to effect longitudinal adjustment of the cup and hence of the piston, the rod 25 is adapted to be turned in one direction or the other, and for convenience in effecting such adjustment the said rod is provided with a rigid angular enlargement or collar 27 for engagement by a wrench; the rod being also provided with a lock-nut 28 adapted to bear against the lower end of the depending socket-portion 23 to guard against accidental turning movement.

The stem 19 is provided with a pair of oppositely-disposed vertical guide-grooves 29 normally engaged by guide-pins 7 and terminating at their lower ends in spiral grooves 30 which extend in the same direction as the threads of plug 20, for a distance of about one hundred and eighty degrees, by preference.

Assuming that, with the parts in the positions shown, the pump is in operation, with the throttle-valve open and normal pressure



of water in the upper end of the cylinder, it will be seen that any slight increase of pressure of the water will cause the piston to descend and force downward stem 19 and cup 20 and thus impart closing movement to the valve, any decrease in the pressure of the water on the piston being instantly followed by upward movement of the latter and the stem and cup through the instrumentality of spring 17, this upward movement of course being accompanied by opening movement of the valve. The parts are so proportioned that the usual slight fluctuations of pressure resulting in reciprocatory movement of the piston are accommodated by the vertical grooves 29. Should the pressure fall dangerously low through escape of water or from any other cause and thus relieve the pump of a part of its load, it is prevented from racing because the instant the pressure falls the spring forces the piston upward beyond its usual limit of upward travel and thus causes the spiral continuations 30 of grooves 29 to engage guide-pins 7, the result of this being a turning movement which causes the threaded-plug to turn in cup 21 and force the latter downward to impart closing movement to the valve, it being further noticed that as the plug is of greater diameter than its stem 19, the former imparts a downward movement to the cup of greater extent than the upward movement imparted by the piston to the stem 19. It will thus be seen that a fall in the pressure of the water on the piston results in closing movement of the valve and that the supply of steam to the cylinder is reduced for the purpose of preventing the engine from racing. The parts are so proportioned that it is possible for the piston to travel upward a sufficient distance to effect the complete closure of the valve and thus stop the pump. If this occurs the engine cannot be started again until the valve is reopened, and to effect this operation quickly and easily the attendant unscrews plug 15 so as to cause the same to engage the upper end of stem 19 and force the same downward, the stem turning at the same time because of the engagement of its grooves 30 with pins 7, this turning movement obviously resulting in upward movement of the cup and hence opening movement of the valve. In the event that it is desirable to vary the relation or adjustment of the cup with respect to rod 25, the latter is turned to cause it to advance farther into or be partially withdrawn from the threaded socket, and to drain the cylinder of any water which may pass the piston, said cylinder is provided at its lower end with a drain-tube 31.

The diagrammatic view shown by Fig. 5 illustrates one method of connecting the pressure-governor rod 25 with the valve, numbered 32, and with a ball-governor 33,

the connection being a floating lever 34 pivotally connecting rod 25 with the stem 35 of the valve and the slidable stem 36 of the governor. From this diagram it will be seen that downward movement of rod 25 imparts closing movement to the valve and that upward movement of rod 25 imparts opening movement to the valve, the stem 36 forming a fulcrum for such movements of the lever, or it may be otherwise fulcrumed. It will also be seen that if the engine begins to race the governor will rock lever 34 on rod 25 as the fulcrum, and thus impart downward or closing movement to valve 32. If the speed of the engine diminishes unduly, lever 34 rocks in the opposite direction and opens the valve.

From the above description it will be apparent that I have produced an attachment embodying the features of advantage enumerated as desirable, and which obviously is susceptible of modification in various particulars without departing from the spirit and scope of the appended claims.

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

1. An attachment of the character described, comprising a suitable frame, a part bearing a slidable relation thereto, a second part bearing a threaded relation to the first-named part, means for imparting longitudinal reciprocatory movement to said second part and means for rotating it alternately in opposite directions if its longitudinal movement is greater than normal.

2. An attachment of the character described, comprising a suitable frame, a cylinder, a piston therein having a stem, a cup bearing a reciprocatory relation to the frame, a rod connected to said cup, a plug bearing a threaded-relation to the cup and provided centrally with a stem connected to the stem of the piston so as to reciprocate therewith and be capable of turning independently thereof, means for opposing the movement of the piston in the direction in which it is urged by pressure thereon under all conditions, and means whereby said stem and plug shall be turned in the event the travel of the piston is increased, to cause the cup to slide in the opposite direction to the movement of the piston and as the travel of the piston is reversed, to reverse the sliding movement of the cup.

3. An attachment of the character described, comprising a suitable frame, a cylinder, a piston therein having a stem, a cup bearing a reciprocatory relation to the frame, a rod connected to said cup, a plug bearing a threaded-relation to the cup and provided centrally with a stem connected to the stem of the piston so as to reciprocate therewith and be capable of turning independently thereof, a spring to oppose the



movement of the piston in the direction in which it is urged by pressure thereon under all conditions, and means whereby said stem and plug shall be turned in the event the travel of the piston is increased, to cause the cup to slide in the opposite direction to the movement of the piston and as the travel of the latter is reversed, to reverse the sliding movement of the cup.

4. An attachment of the character described, comprising a suitable frame, a cylinder, a piston therein having a stem, a cup bearing a reciprocatory relation to the frame, a plug bearing a threaded relation to the cup and provided centrally with a stem connected to the stem of the piston so as to reciprocate therewith and be capable of turning independently thereof, means for opposing the movement of the piston in the direction in which it is urged by pressure thereon under all conditions, and means whereby said stem and plug shall be turned in the event the travel of the piston is increased to cause the cup to slide in the opposite direction and to be turned in the opposite direction as the movement of the piston is reversed to reverse the sliding movement of the cup.

5. An attachment of the character described, comprising a suitable frame, a cup slidable thereon, guide-pins rigid with the frame, and above the cup, a plug fitting in and bearing a threaded-relation to the cup and provided with a stem having vertical grooves terminating at their lower ends in spiral grooves, the vertical grooves being normally engaged by the said pins of the frame, a cylinder carried by the frame

above and in line with said grooved stem of the plug, a pipe communicating with the upper end of the cylinder, a piston in the cylinder provided with a stem connected and bearing a journaled relation to said stem, a spring tending to move the piston upwardly in the cylinder, and a rod connected to and depending from the cup.

6. An attachment of the character described, comprising a suitable frame, a cup slidable thereon, guide-pins rigid with the frame, and above the cup, a plug fitting in and bearing a threaded relation to the cup and provided with a stem having vertical grooves terminating at their lower ends in spiral grooves, the vertical grooves being normally engaged by said pins of the frame, a cylinder carried by the frame above and in line with said grooved stem of the plug, a pipe communicating with the upper end of the cylinder, a piston in the cylinder provided with a stem connected and bearing a journaled relation to said stem, a spring tending to move the piston upwardly in the cylinder, a rod connected to and depending from the cup, and an adjustable plug carried by the said frame and surrounding the piston-stem and engaging one end of said spring and adapted when turned in one direction or the other to increase or diminish the pressure of said spring upon the piston.

In testimony whereof I affix my signature, in the presence of two witnesses.

LAWRENCE KJERULFF.

Witnesses:

H. C. RODGERS,  
G. Y. THORPE.