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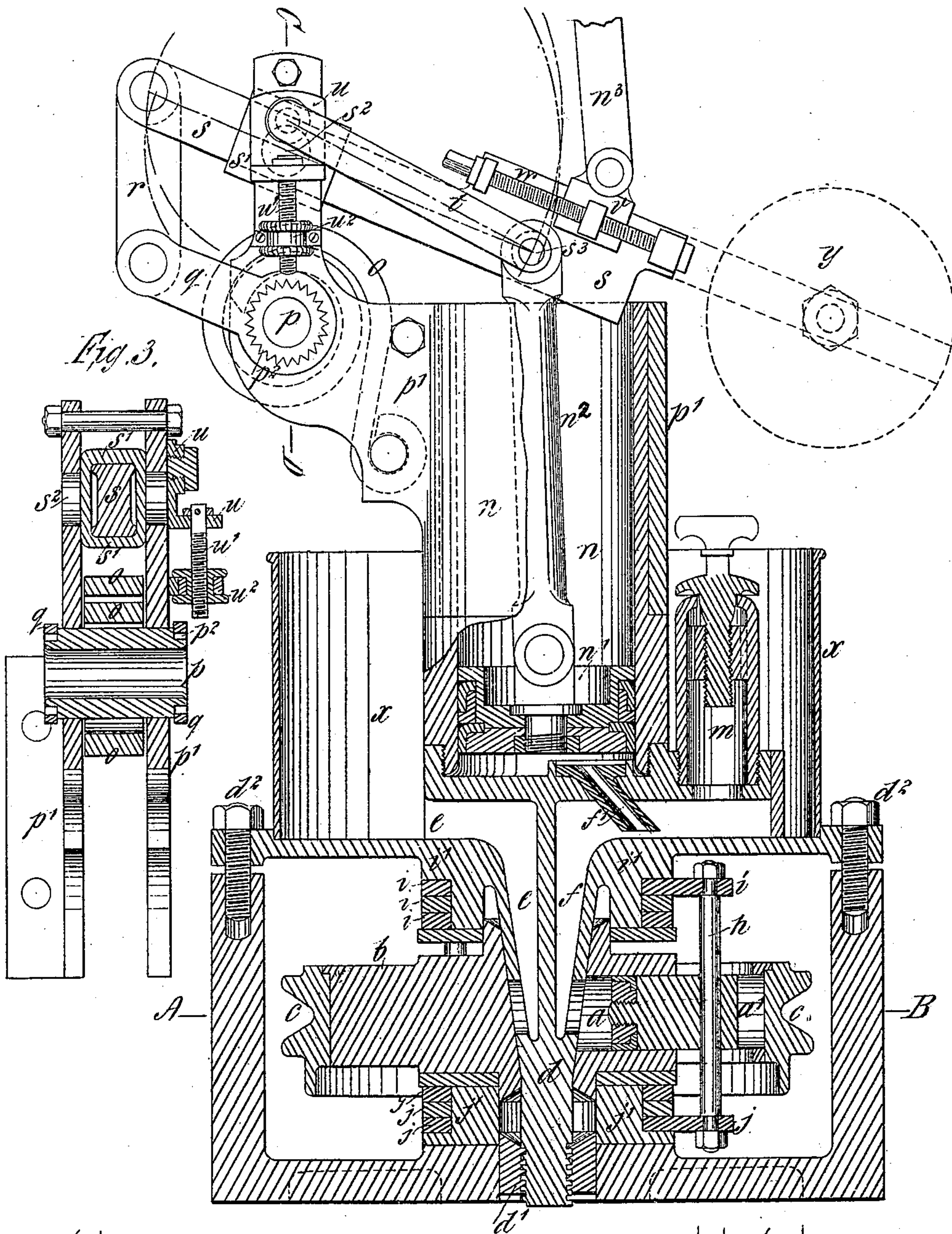
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R. S. WEROTTE.  
GOVERNOR.

No. 246,580.

Patented Aug. 30, 1881.

Fig. 1.



WITNESSES  
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Thomas S. Eaton

(No Model.)

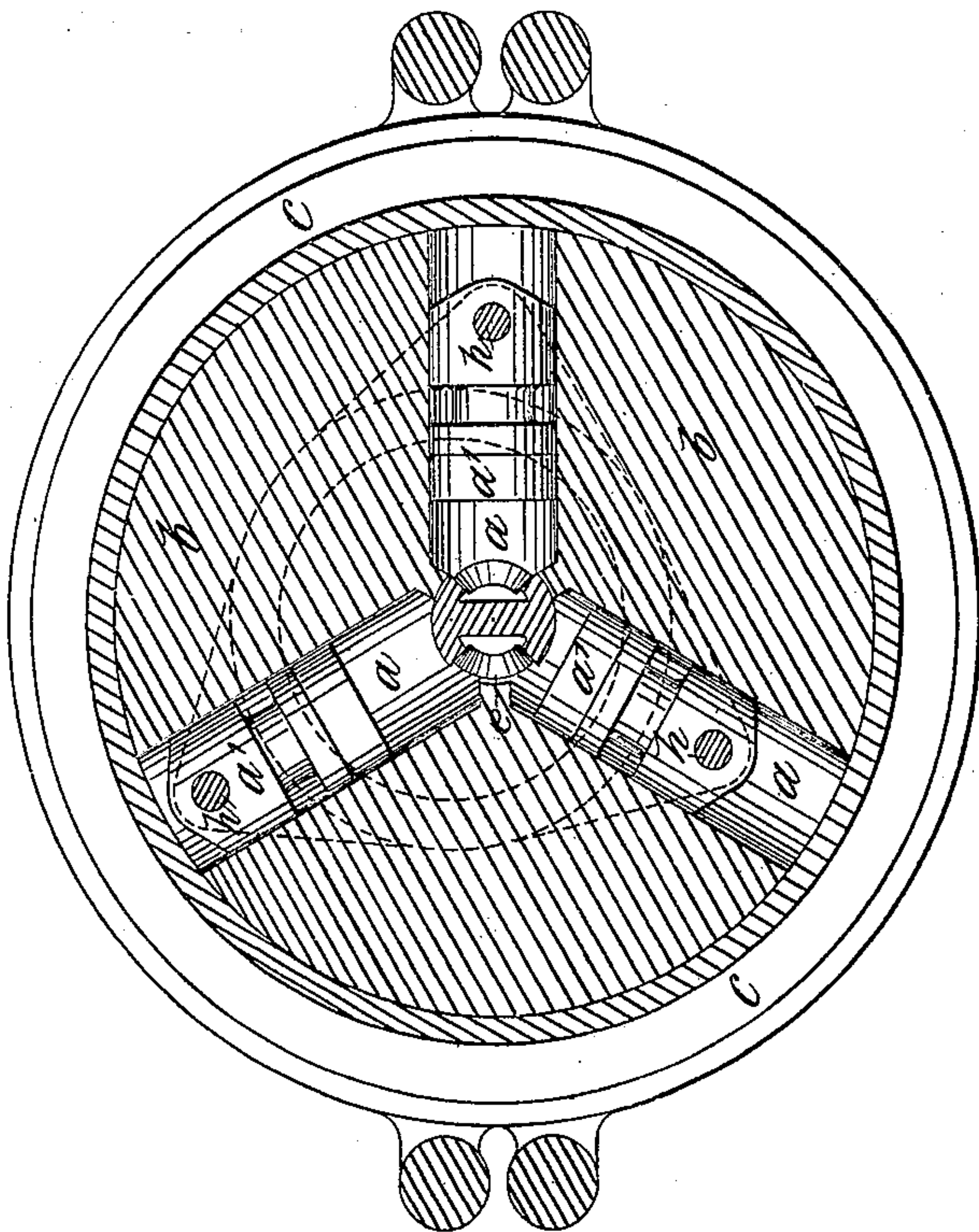
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Fig. 2.—



WITNESSES

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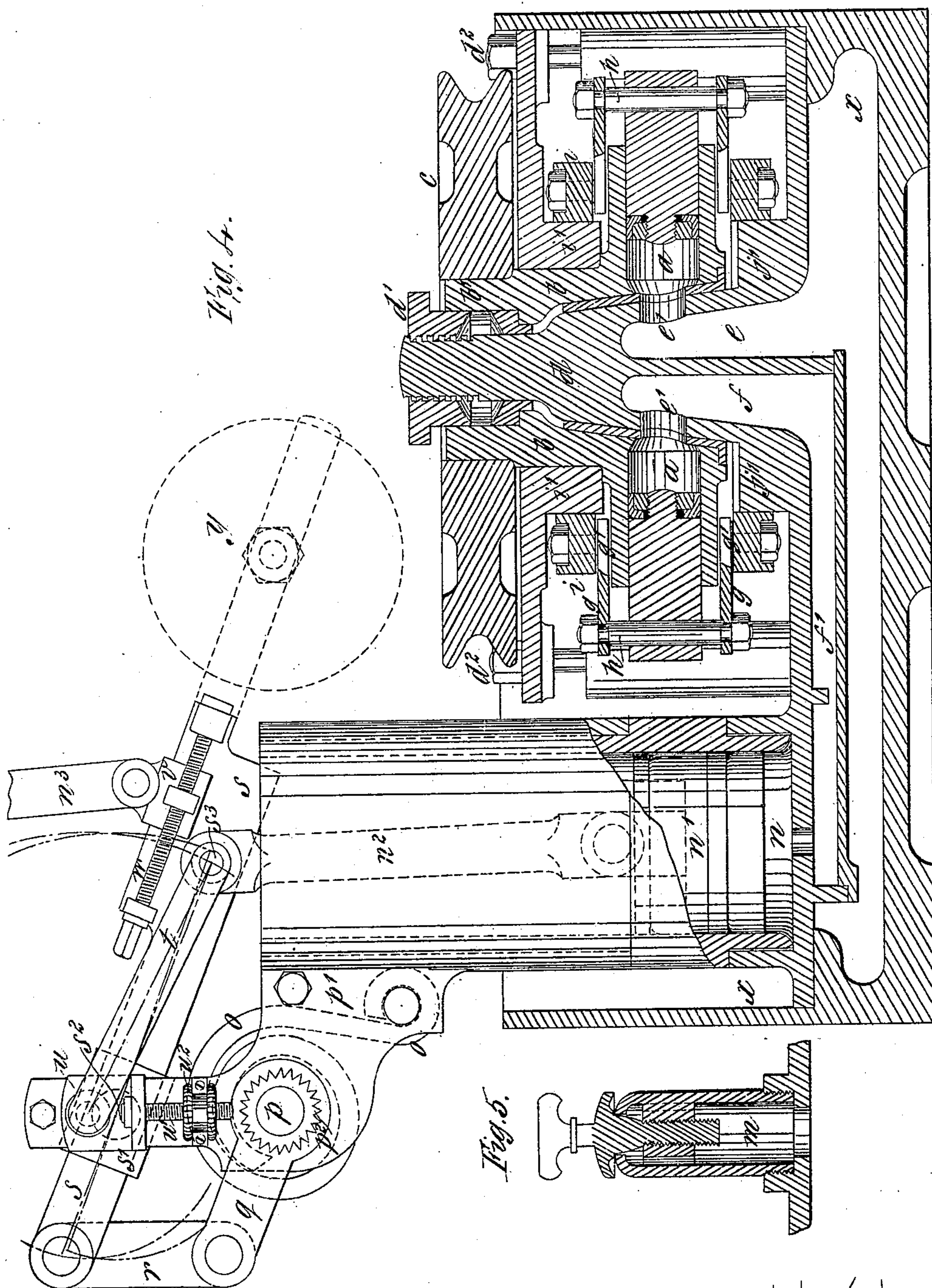
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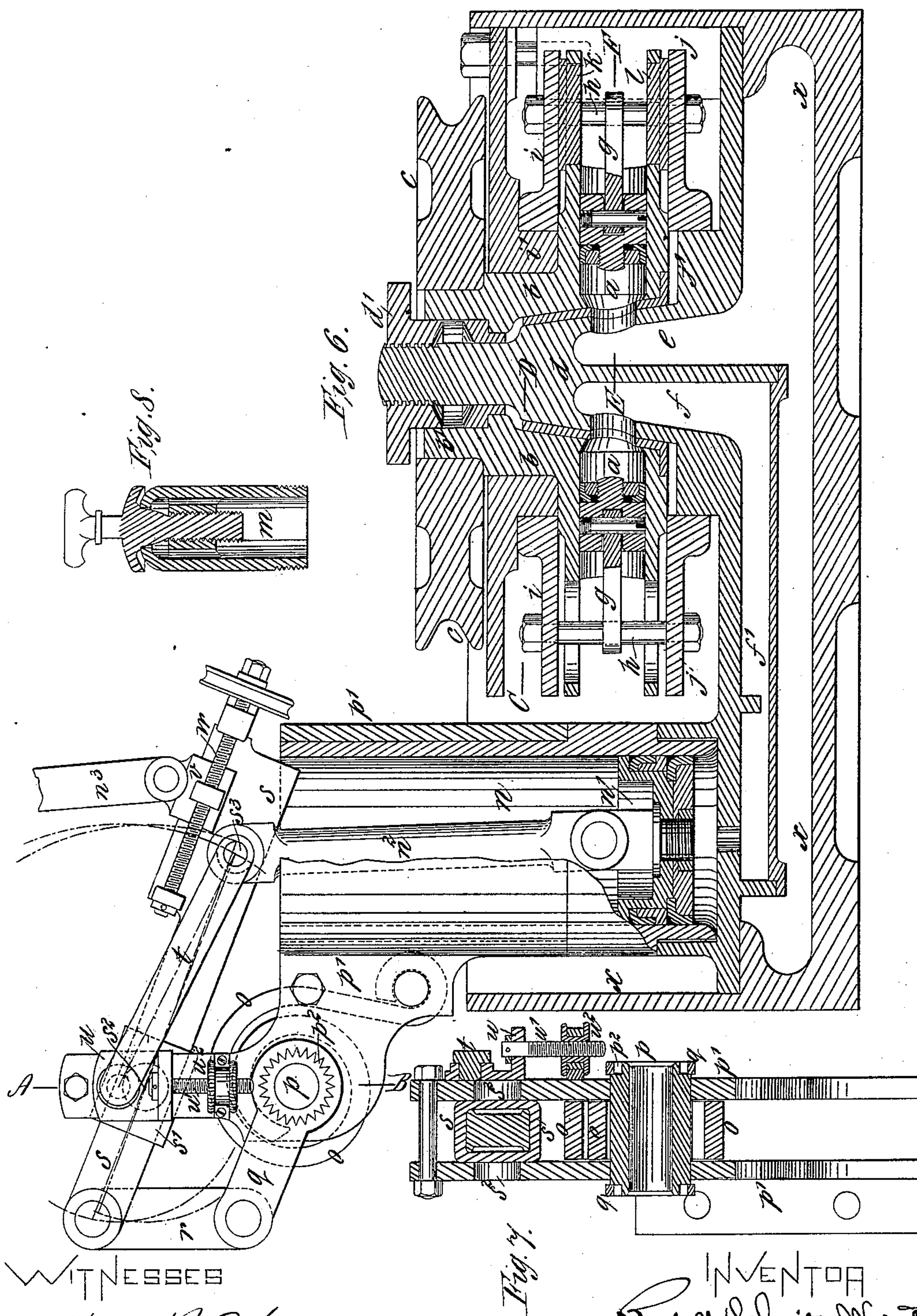
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WITNESSES

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Fig. 1.

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(No Model.)

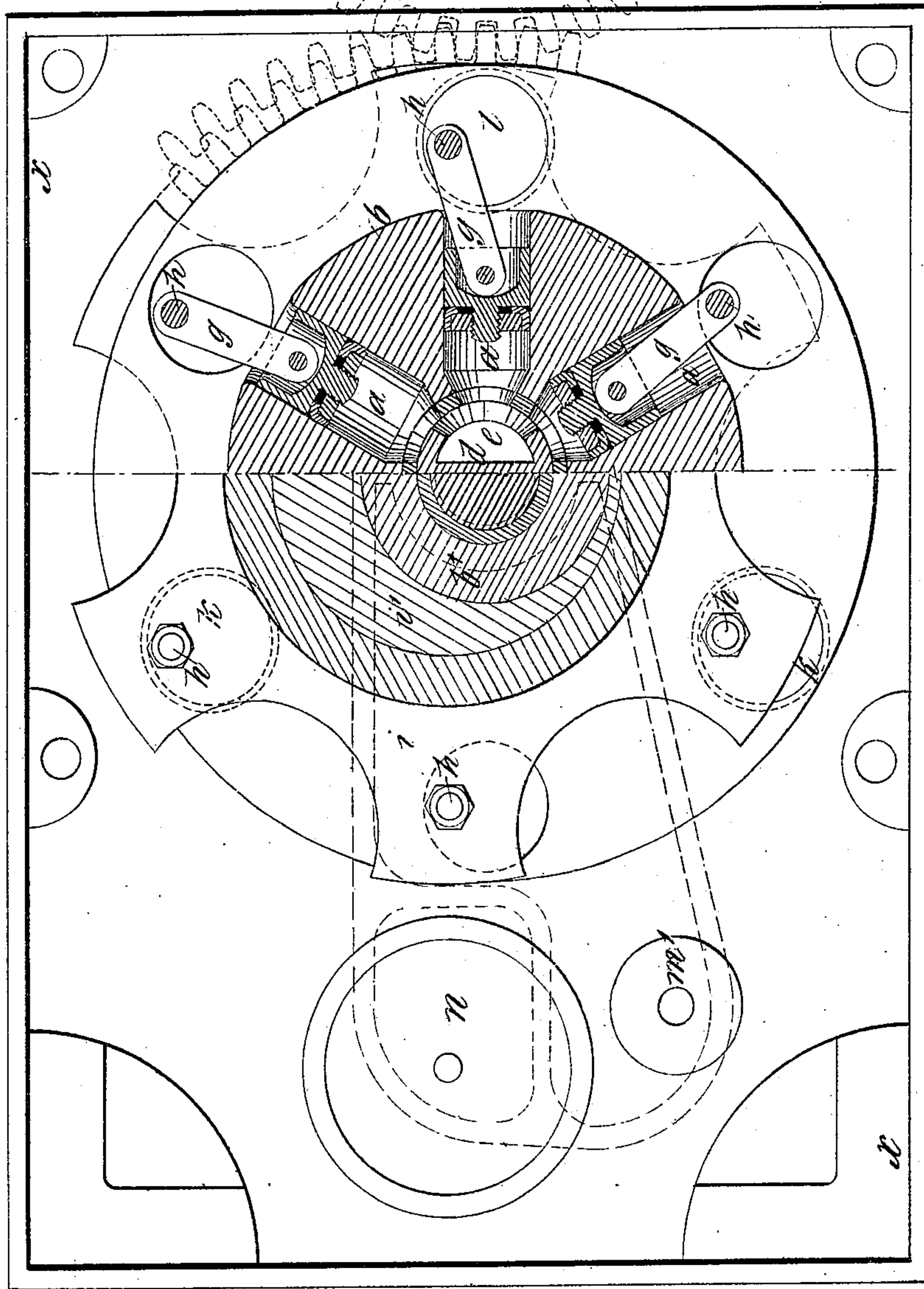
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Fig. 9.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

RUDOLF SCHMITZ WEROTTE, OF WEST BROMPTON, COUNTY OF MIDDLESEX,  
ENGLAND.

## GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 246,580, dated August 30, 1881.

Application filed May 10, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, RUDOLF SCHMITZ WEROTTE, a subject of the Queen of Great Britain and Ireland, residing at West Brompton, in the county of Middlesex, Kingdom of Great Britain and Ireland, have invented new and useful Improvements in Governors, partly applicable for other purposes, of which the following is a specification.

10 This invention is for improvements in "cataract-governors" on the principle of that described in the specification of Letters Patent granted to me the 6th day of April, 1880, No. 226,257.

15 According to my present invention, with a chamber furnished with an overflow-aperture for a cataract and regulated by a valve, and which chamber communicates also with a cylinder containing a ram or plungers suitably loaded, 20 I combine a multiple pump in which the pump chambers or barrels are arranged with their axes radial to a center around which they revolve. These pump chambers or barrels are formed in a metal disk or body I will call the 25 "pump-disk." It is driven by a pulley or by other suitable means from the prime mover to be controlled, and thus caused to rotate about a fixed coned center, in which are formed the suction and delivery chambers. The arrangement of the pump may be substantially such 30 as described in the specification of another application for Letters Patent bearing even date herewith and entered by me, and of which pump the arrangement I will now describe is a modification.

35 The pistons of the pumps are each connected by a pin or bolt to two of a group (or series) of independent eccentric straps, rings, or annular plates or disks. These eccentric straps, 40 rings, annular plates, or disks rotate about a common axis eccentric to the pump-disk axis, but are free to rotate, together with the pump-disk, by means of their connection with the pistons through the said pins or bolts.

45 The delivery-chamber is in communication with an adjustable regulating-valve, also with a cylinder fitted with a piston suitably loaded, so that the variations in the supply of liquid to such cylinder, acting upon the piston through 50 it, control the prime mover. A convenient

mode of loading the piston, when springs are used, is as follows: The spring acts on a shaft connected by means of levers and links to the piston-rod, and for varying the pressure the spring may be tightened up or loosened, as required. The amount of leverage acting upon 55 the spring through the motion of the piston-rod may also be varied by means of a radius rod or link connected to the piston-rod at one end and centered at its other end to a shifting carriage or bracket, which, when shifted, alters the path of the piston-rod's top end, and through it causes the fulcrum of the lever acting upon the spring to be shifted.

The apparatus is contained in a tank filled 65 with liquid; but the pump may be placed below, as shown in Fig. 1, and as the revolving parts wear they may be screwed up to the coned fixed center.

Figure 1 of the drawings is a longitudinal vertical section of my improved governor made 70 with three pump barrels or chambers. Fig. 2 is a sectional plan of the same, taken in the line A B of Fig. 1; and Fig. 3 is a vertical section of the compensated spring loading apparatus in the line C D of Fig. 1. 75

Similar letters of reference indicate corresponding parts wherever they occur.

*a a* are the pump chambers or barrels, formed in the pump-disk *b* with their axes radial to 80 its center.

*c* is a grooved pulley, formed or fitted around the pump-disk *b*, whereby the same is revolved by a belt (not shown) from the prime mover to be controlled. 85

*d* is a fixed coned center, formed with a suction-chamber, *e*, and a delivery-chamber, *f*, in communication with the pumps *a a*. The suction-chamber *e* opens into a tank, *x*, containing liquid, while the delivery-chamber *f* leads to 90 an adjustable regulating-valve, *m*, and is also in connection, by means of a pipe, *f'*, with a cylinder, *n*, fitted with a piston, *n'*, whose rod *n<sup>2</sup>* is connected to a lever, *s*, which operates the throttle-valve or other regulating apparatus of 95 the engine or prime mover to be controlled.

The pistons *a'* of the pumps *a* are each connected to a pair of eccentric-straps, *i j*, by bolts *h* passing through them. The straps *i j* revolve on similar eccentric parts, *i' j'*, on each 100



side of the pump-disk, and as the eccentric-straps and pump-disk revolve together the pistons of the pumps are caused to reciprocate, and so draw and force liquid through the holes  $e'$  and chambers  $e f$  in quantities according to the speed at which the pump-disk is driven. As the pump-disk  $b$  wears it may be screwed up to the coned fixed center  $d$  by the tightening-nut  $d'$ .

The piston  $n'$  is acted upon by the varying supply of liquid from the delivery-chamber  $f$ , and by means of its rod  $n^2$ , in connection with the link  $n^3$ , controls the prime mover. The piston is suitably loaded by means of a spring,  $o$ , which is connected to and acts upon a shaft,  $p$ , carried by a bracket,  $p'$ , fitted to the cylinder  $n$ , as shown, so that it may be fixed at any angle required. Each end of the shaft  $p$  is formed with teeth  $p^2$ , similar teeth being formed in two arms or levers,  $q q$ , into which the other teeth fit, so as to fix the arms or levers to any angle required. Links  $r r$  connect the arms or levers  $q q$  to a lever,  $s$ , carried by a collar or supporting-piece,  $s'$ , pivoted at  $s^2$  to the bracket  $p'$ . The lever  $s$  is connected to the piston-rod at  $s^3$ , and the amount of leverage acting upon the spring  $o$  through the motion of the piston-rod may be varied by means of a radius rod or link,  $t$ , connected to the piston-rod and to a shifting carriage,  $u$ , carried by the bracket  $p'$ . This carriage  $u$  is shifted by means of the screw  $u'$  and nut  $u^2$ , and thereby alters the path taken by the piston-rod's top end and shifts the fulcrum of the lever  $s$  acting upon the spring.

The link  $n^3$  is connected to the throttle-valve or other controlling apparatus of the engine to be controlled, and is carried by a shifting bracket,  $v$ , whereby the movement of the said lever may also be varied by means of the screw  $w$ .

The tank  $x$  is filled with liquid.

As the revolving pump-disk  $b$  wears it may be screwed up to the coned fixed center  $d$  by nuts  $d^2$ .

Instead of the compensated spring loading apparatus, as described, being used, a simple weight,  $y$ , may be substituted at one end of the lever  $s$ , as shown in dotted lines.

Fig. 4 shows a modification of my improved governor as operated by a revolving pump, with the position of the cone-center inverted and the grooved pulley above the framing. The mode of operating this arrangement of governor is similar to that described with reference to Figs. 1 to 3, similar letters of reference indicating like parts, the only difference being, besides the form of pump, that in this case the apex of the coned center points upward instead of downward.

Fig. 5 is a section of the adjustable regulating-valve, which is placed in communication with the delivery-chamber  $f$  through the passage  $f'$ .

Figs. 6 to 9 show another modification of my improved governor, Fig. 6 being a longitudinal vertical section, Fig. 7 a vertical section in the

line A B of Fig. 6, and Fig. 8 a section of the adjustable regulating-valve.

Fig. 9 shows a double sectional plan taken in the lines C D and E F of Fig. 6. The mode of operating this modification of apparatus is similar to that described in the former arrangements, with the exception that the connecting-disks  $k$  and  $l$  are arranged with their axes in a plane common to the axis of a pump-barrel, instead of between the pump-barrels, thereby affording a lesser number of working parts to be used. The adjustable regulating-valve  $m$  is screwed to a seating,  $m'$ , Fig. 9, in communication with the delivery-passage  $f'$ .

By reason of my delivery-chamber  $f$ , with its overflow-aperture provided with the regulating-valve  $m$ , in combination with the cylinder  $n$ , with its movable plunger or piston  $n'$ , subject to the influence of the fluid in  $f$ , by means of the communicating pipe  $f'$  and the multiple pumps  $a$ , having suitable pistons arranged with their axes radial to the center around which they revolve, I am able by simple mechanism to obtain a nearly-continuous pumping action and to raise and lower the plunger  $n'$  immediately on a change in the velocity of the motor.

By reason of my fixed cone-center  $d$ , in combination with the above, in which center are formed the suction and delivery chambers  $e f$ , I am able to provide for adjustment as the parts wear.

What I claim is—

1. In a governor, the combination of a chamber, an overflow-aperture thereto, a regulating-valve to said aperture, a cylinder containing a ram or plunger communicating with said chamber, a series of pump chambers or barrels arranged radially, a fixed coned center containing suction and delivery chambers, about which said pump chambers or barrels are caused to revolve, pistons or plungers in said chambers or barrels, and eccentric straps, rings, or plates, to which said pistons or plungers are connected, substantially as and for the purposes specified.

2. The combination of a pump disk or body,  $b$ , having radial chambers or barrels  $a$ , pistons or plungers  $a'$ , a fixed center,  $d$ , on which said disk works, and straps, rings, or annular plates  $i$  and  $j$  on centers  $i'$   $j'$ , eccentric to  $d$ , and to which straps, rings, or annular plates said pistons or plungers are connected, so as to be thereby operated, substantially as and for the purpose specified.

3. In a governor, the combination of the radial revolving pump chambers or barrels, their pistons or plungers, and operating straps, rings, or plates on fixed eccentrics, and a fixed coned center, on which said pump chambers or barrels revolve, said center forming a suction-chamber opening into a tank or reservoir of liquid, also a delivery-chamber in communication with a cylinder fitted with a piston or plunger for controlling a prime mover, and with an adjustable overflow, all substantially as described, and for the purposes specified.



4. In a governor, in combination with a revolving valveless pump comprising a hollow conical axis containing suction and delivery chambers, a disk-shaped pump-body revolving  
5 on said axis and containing radial cylindrical barrels fitted with pistons and eccentric straps, rings, or disks, connected to and operating said pistons, an adjustable overflow to return liquid to the tank or cistern the pump has  
10 drawn it from, and an overflow by a branch passage, with a hydraulic ram loaded by a weight or springs fitted with an adjustable compensating arrangement for keeping the load on said ram uniform at all points of the  
15 stroke, through the intervention of a shifting fulcrum operated by a radial rod, substantially as described.

5. In a governor of the kind above described, a screwed bar to transmit the movement of the hydraulic ram at any desirable ratio to the  
20 valves, expansion-gear, damper, fire-door, or other mechanism for checking the speed of the prime mover to be controlled, in combination with the lever working the plunger having an adjustable radius-arm and loaded with a spring,  
25 substantially as described.

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