

T. F. KELLY.
ELECTRIC AND PNEUMATIC GOVERNOR.

APPLICATION FILED NOV. 11, 1904.

3 SHEETS—SHEET 1.

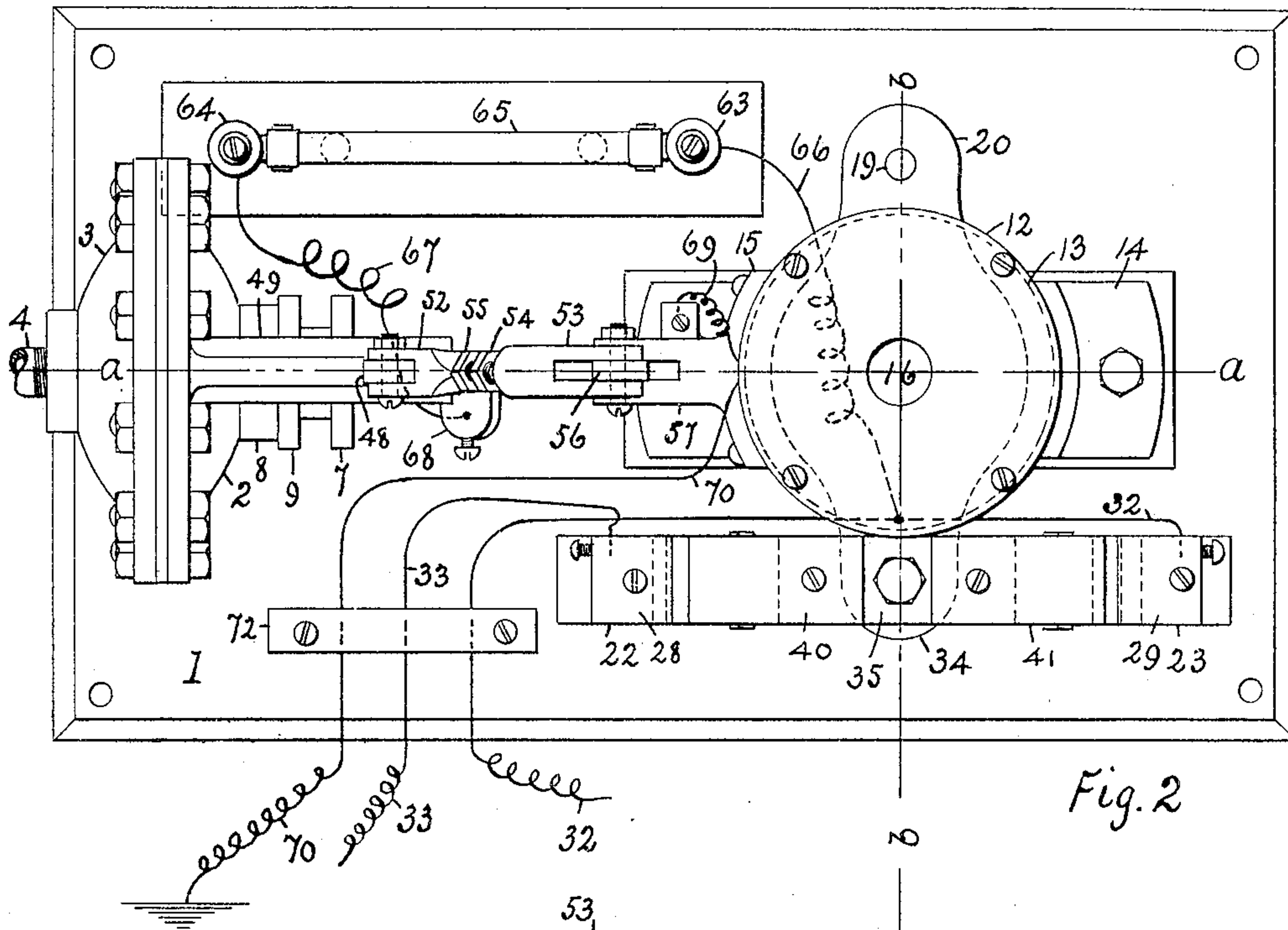


Fig. 2

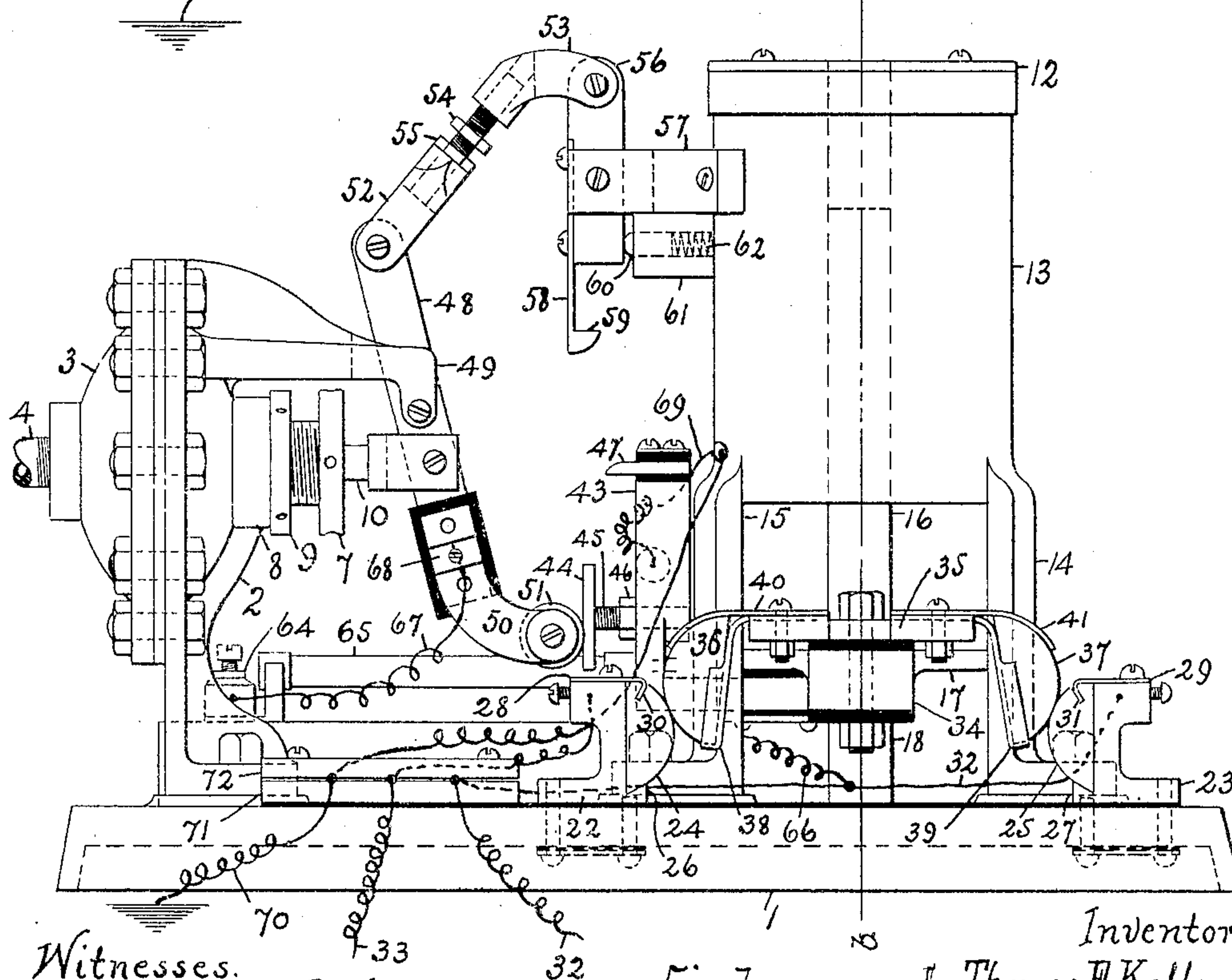


Fig. 1

Witnesses.

John P. Casey
and W. J. Smith.

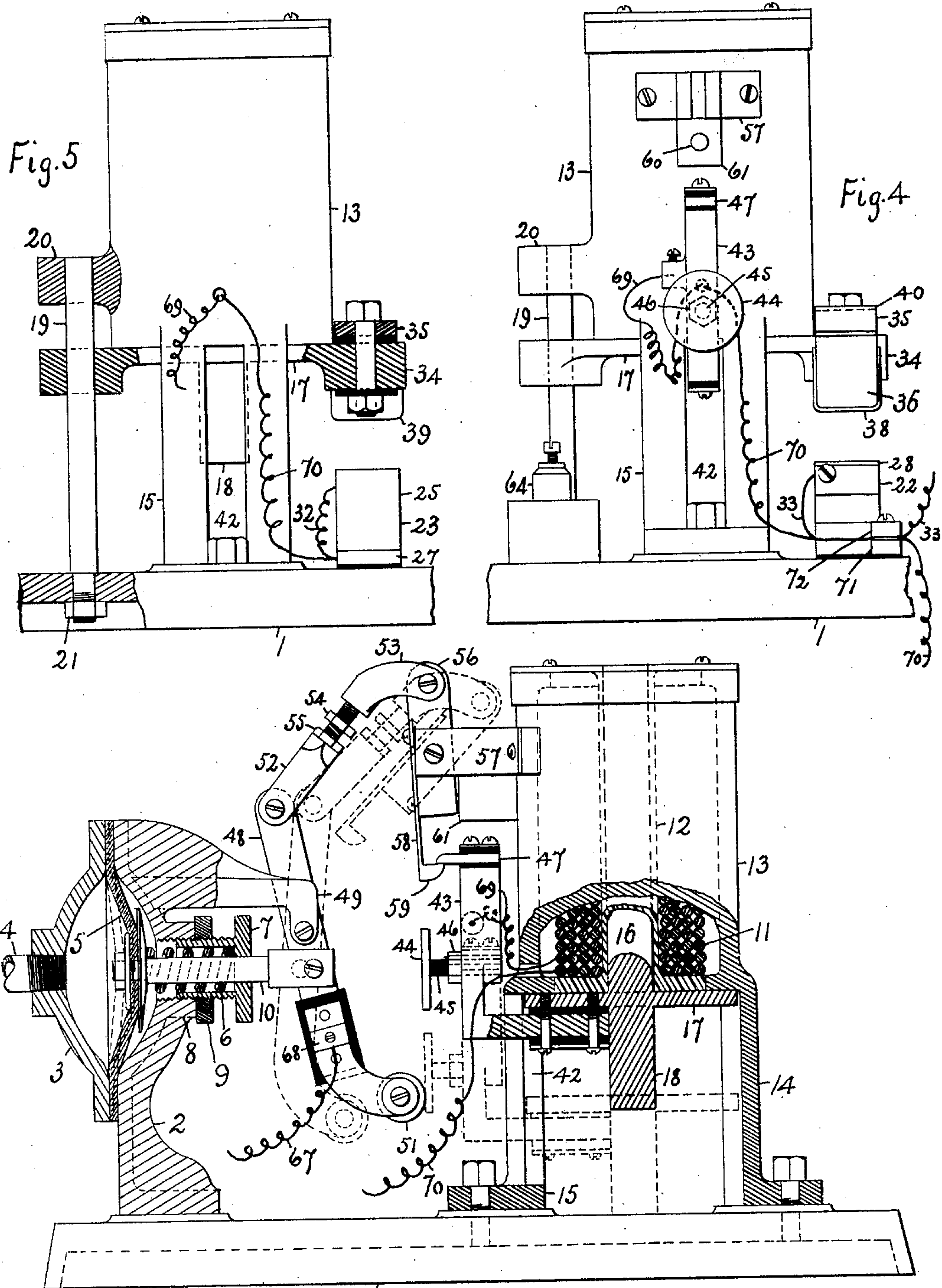
Inventor.

Thomas F. Kelly
By R. L. Wright.
Atty.

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3 SHEETS—SHEET 2.



Witnesses.
W. H. Nightingale

Fig. 3

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No. 806,150.

PATENTED DEC. 5, 1905.

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3 SHEETS--SHEET 3.

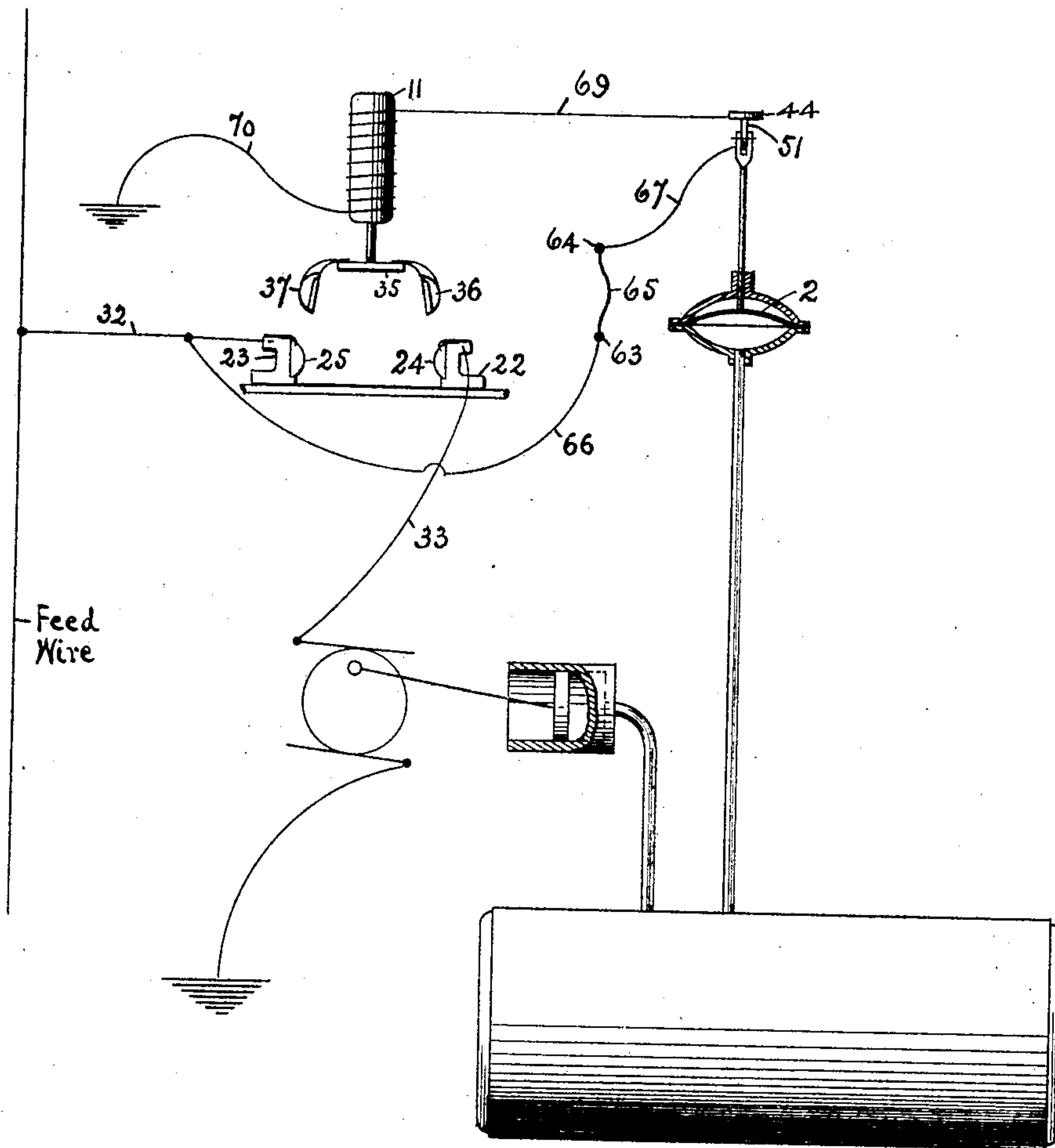


Fig. 6

Witnesses.

John P. Case
and family.

Inventor

Thomas F. Kelly

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UNITED STATES PATENT OFFICE.

THOMAS F. KELLY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
JOHN E. REYBURN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC AND PNEUMATIC GOVERNOR.

No. 806,150.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed November 11, 1904. Serial No. 232,300.

To all whom it may concern:

Be it known that I, THOMAS F. KELLY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric and Pneumatic Governors, of which the following is a specification.

This invention relates to means for governing the minimum and maximum air-pressure in a reservoir produced by an electric compressor, and especially to the means employed whereby a pneumatically-operated diaphragm forms the electrical connection to a solenoid and breaks the connection thereto. The solenoid and diaphragm have heretofore been employed for the same purpose, but with connected mechanism which was not as sensitive as desired for slight variations between minimum and maximum pneumatic pressures.

The accompanying drawings fully illustrate the new and sensitive connecting features, combined with the previously-employed diaphragm and solenoid, and wherein similar figures of reference indicate like parts, and in which—

Figure 1 is a side elevation. Fig. 2 is a plan or top view. Fig. 3 is an elevation view with the carbons removed and some parts in section on line *a a*, Fig. 2. Fig. 4 is a front elevation with the diaphragm-case and connections removed. Fig. 5 is a front view of the solenoid-case with some parts in section on line *b b*, Figs. 1, 2. Fig. 6 is a diagrammatic view.

Upon a base-plate 1 is mounted a diaphragm-case 2, having a removable cover 3, into which enters pipe 4 from the reservoir, permitting air-pressure to act upon diaphragm 5. Upon the opposite side of the diaphragm a spring 6 is seated, its opposite end being held by a follower 7, screw-threaded for producing tension on the spring in a boss 8 and provided with a lock-nut 9. A stem 10 is attached to the diaphragm at one end and passes outward through the follower 7. A solenoid 11 is wound on a spool 12, secured in a case 13, with legs 14 15, which support it on base-plate 1. Within spool 12 is a stem 16 of pole-plate 17, and below the pole-plate is a stop 18, which abuts base-plate 1 when the pole-plate is down. Pole-plate 17 is also

guided by a rod 19 in a lug 20 of case 13, the rod being secured at its lower end to base-plate 1 by a nut 21. At the near side of case 13 and secured to base-plate 1 are stands 22 23, insulated from the base-plate, to which are secured fixed carbons 24 25 in angular notches 26 27 at their lower ends and by clips 28 29, fitting in notches 30 31 at their upper ends. Stand 23 receives the incoming conductor 32 from the source of power, and stand 22 has thereto attached the outgoing conductor 33 to the motor. Pole-plate 17 has a hub 34 passing between carbons 24 25, and thereto is insularly secured a bar 35, to which are secured the movable carbons 36 37 by means of spring-holders 38 39 and spring-clips 40 41, so that when these parts are in the position shown in Fig. 1 connection is formed between conductors 32 33 to operate the motor.

Insularly secured to pole-plate 17 and passing through slot 42 is a bracket 43, which reaches upward in front of case 13, to which is adjustably secured a contact-plate 44 by a screw 45 and a lock-nut 46, and insularly mounted at the top of the bracket is a latch-plate 47. Attached to stem 10 of the diaphragm 5 is a lever 48, fulcrumed on a bracket 49, reaching out from case 2. The lower end of lever 48 has thereto insularly attached on opposite sides of the lever curved brackets 50, between which contact-wheel 51 is rotatably supported. Above its fulcrum lever 48 is attached to an adjustable connection comprising end members 52 53, joined by a right-and-left screw 54, provided with a lock-nut 55, so that the connection can be lengthened and shortened, end 53 of the connection being attached to the upper end of a vertically-disposed lever 56, which is fulcrumed on a bracket 57, secured to case 13, and to the lower front end of the lever 56 is attached a spring-latch 58, having a hooked end 59 adapted to engage with latch-plate 47, as seen in full lines in Fig. 3, when maximum pressure is reached and the current to the motor is cut off. A pin 60 in block 61 under bracket 57 is seated on a spring 62 to assist lever 56 to disengage hooked end 59 from latch-plate 47.

Mounted on the opposite side of base-plate 1 from the carbons are terminals 63 64 on a porcelain block and carrying a fuse 65. Con-

ductor 66 leads from conductor 32 to terminal 63, conductor 67 from terminal 64 to lug 68 on bracket 50 to contact-wheel 51, conductor 69 from contact-plate 44 and bracket 43 to solenoid 11, and conductor 70 from the solenoid to the ground. Wires 32 33 70 are secured between clamps 71 72, insulated from bed-plate 1.

When the pressure in the air-reservoir is at maximum, wheel 51 will contact with plate 44 and the solenoid will be energized to lift pole-plate 17 and the attached movable carbons 36 37, the connection between conductors 32 33 broken, and the motor stopped and latch-plate 47 and hook 59 engaged, as seen in full lines in Fig. 3. As pressure decreases lever 48 will move to the dotted lines seen in Fig. 3, and the pole-plate and movable carbons will descend and establish communication between conductors 32 33 and start the motor. The connection formed of members 52 53 54 55 permits an adjustment which is extremely sensitive and finely graduated between minimum and maximum accumulation of the pneumatic pressure.

I am aware that a diaphragm and a solenoid have heretofore been employed for the same purpose that I have herein employed them, but with different means for their cooperation and coaction, which were not adapted to act as quickly and be as sensitive as is necessary for slight variations of pressure, which tend to a means of safety and strict economy in wear and tear of the machinery and the expenditure of electrical energy.

I claim—

1. In an electric and pneumatic governor, the combination with a pneumatically-actuated diaphragm, a solenoid and a pole-plate for the solenoid, of a bracket carried by the pole-plate and having an adjustable contact-plate and a latch-plate, a stem and a lever operative by the diaphragm, a contact-wheel carried by the lever and adapted to engage the contact-plate, a spring-latch adapted to engage the latch-plate upon the accumulation of maximum pressure when the solenoid is energized and raises the pole-plate, and to be disengaged therefrom upon a reduction to minimum pressure, an adjustable connection from the spring-latch to the diaphragm-lever,

and electrical connections substantially as described.

2. In an electric and pneumatic governor, a base-plate, a diaphragm and a solenoid mounted thereon, a pole-plate carrying movable carbons and a bracket with an adjustable contact-plate and a latch-plate, fixed carbons on brackets attached to the base-plate, a contact-wheel operative by the diaphragm, and an adjustable connection from the diaphragm and contact-wheel mechanism to a spring-latch adapted to engage the latch-plate upon the action of the solenoid, which lifts and holds up the pole-plate and the movable carbons until a minimum decrease of pressure is obtained.

3. In a pneumatic and electric governor, a diaphragm and a solenoid, pneumatic connections to the diaphragm and electrical connections to the solenoid, a pole-plate for the solenoid, a bracket on the pole-plate which upwardly reaches and carries at one side an adjustable contact-plate, and at its top a latch-plate, a lever for the diaphragm having at its lower end a rotatable contact-wheel and at its upper end a connection adjustable as to length which forms a connection to a center fulcrumed lever carrying a spring-latch at its lower end so that upon an accumulation of pressure the contact-wheel will be moved to energize the solenoid, which will lift the pole-plate and cause the latch-plate to engage the latch adapted to engage the latch-plate aforesaid.

4. In an electric and pneumatic governor, a diaphragm and a solenoid, a stem and a lever operative by the diaphragm, a contact-wheel carried by the lever, a pole-plate having a contact-plate and a latch-plate carried by the pole-plate, a latch-lever fulcrumed on the solenoid-case and carrying a spring-latch adapted to engage the latch-plate aforesaid, and a connection from the diaphragm-lever to the latch-lever having means for its longitudinal expansion and contraction.

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

THOMAS F. KELLY.

Witnesses:

LEWIS H. REDNER,
RANSOM C. WRIGHT.