No. 883,284. PATENTED MAR. 31, 1908.

F. H. BROWN.

AUTOMATIC GOVERNING MECHANISM.

APPLICATION FILED JUNE 18, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

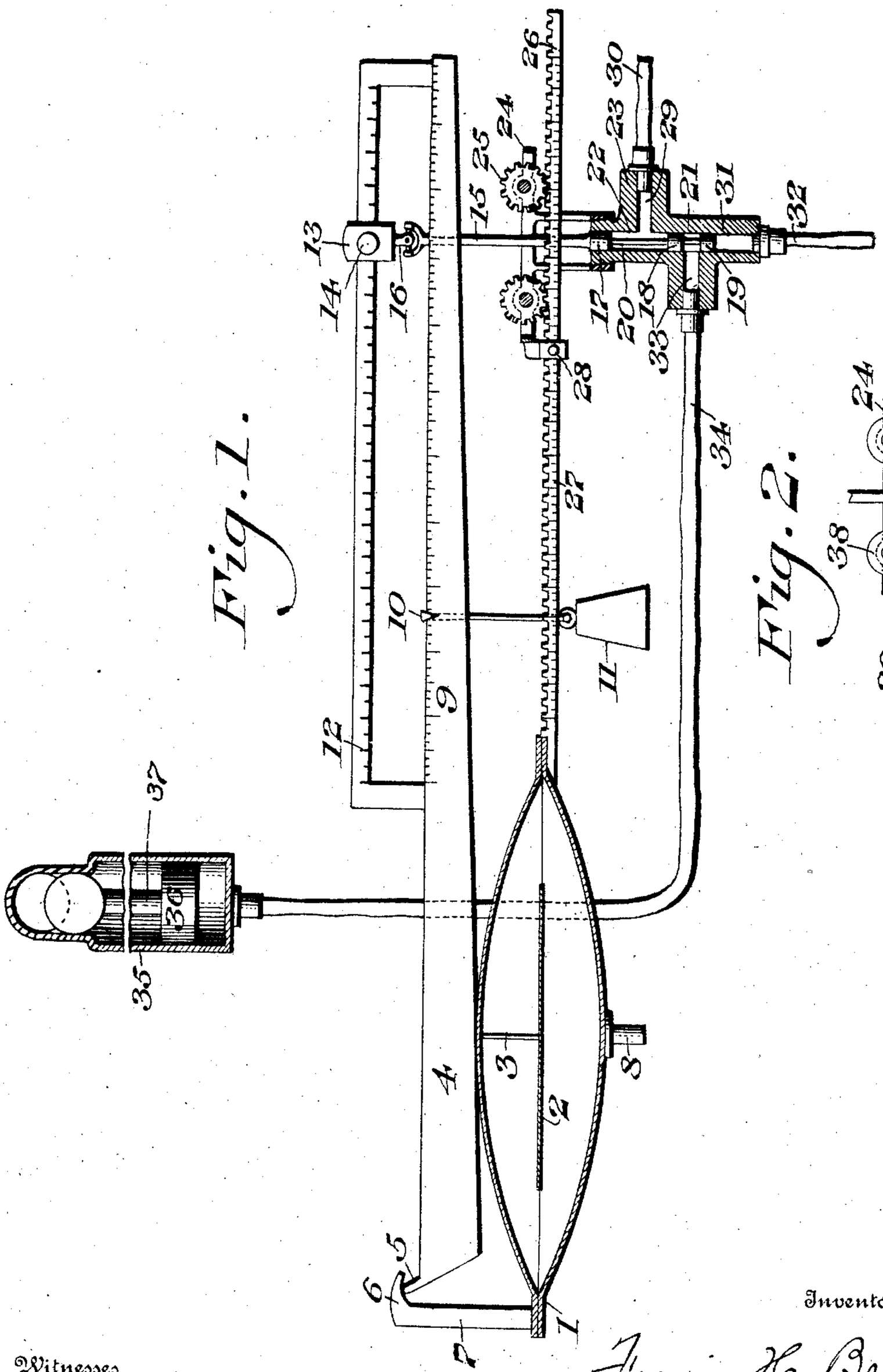
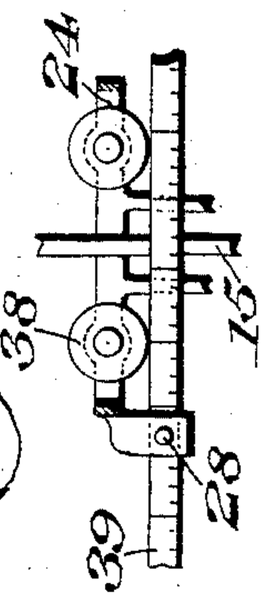


Fig. 2.



Witnesses

P. F. Nagle.

L. Bonville.

Inventor

Francis H. Brown

By Dieterich & Fairbanks.

Attorneys

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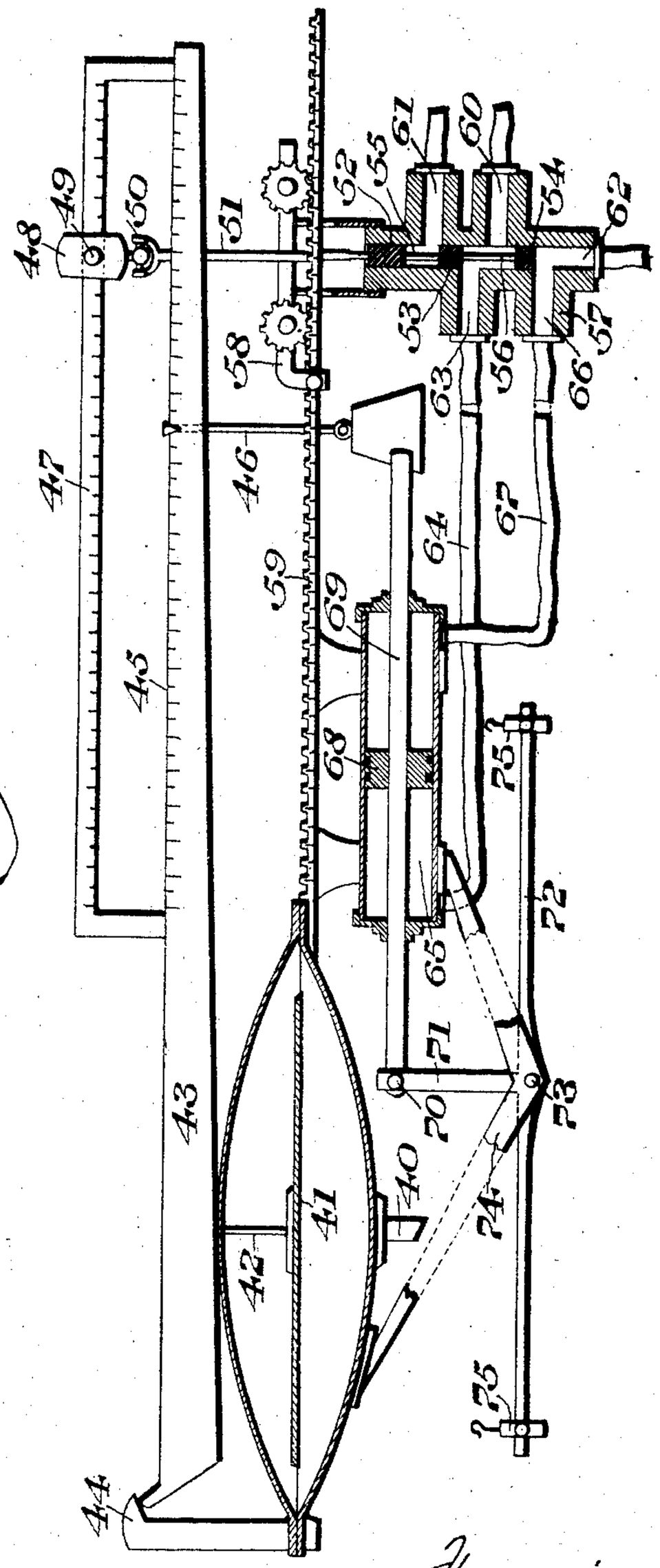
2 SHEETS—SHEET 2.

Fig. 3.



Witnesses

P. F. Nagle.

L. Douville.

Inventor

Francis H. Brown.

By Wiedenheim & Fairbanks.

Attorneys

UNITED STATES PATENT OFFICE.

FRANCIS H. BROWN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO COMBUSTION ENGINEERING COMPANY, A CORPORATION OF DELAWARE.

AUTOMATIC GOVERNING MECHANISM.

No. 883,284. Specification of Letters Patent. Patented March 31, 1908.

Application filed June 18, 1907. Serial No. 379,554.

To all whom it may concern:

Be it known that I, FRANCIS H. BROWN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Automatic Governing Mechanism, of which the following is a specification.

My present invention consists of a novel and useful construction of an automatic governing mechanism which may be quickly and accurately adjusted for any predetermined pressure and which may be very cheaply constructed and is not liable to get out of order.

To the above ends my invention consists broadly in a novel construction and combination with a fluid pressure actuated diaphragm of a scale beam by which a valve stem is adjustably carried, said valve stem controlling ports in a valve casing, in order to control motive fluid passing therefrom to a suitable piston or other motor, means being provided for adjusting the throw of the valve and in my preferred form I have shown an embodiment in which this is accomplished by laterally adjusting the valve casing.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

For the purpose of illustrating my invention, I have shown in the accompanying drawings those forms thereof at present preferred by me, since these embodiments best illustrate the principle of the invention and give in practice satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that it is not limited to the exact arrangement and organization of these instrumentalities, as herein shown.

Figure 1 represents a sectional elevation of an automatic governing mechanism embodying my invention. Fig. 2 represents a sectional elevation of a modified form of carriage and track which may be employed if desired. Fig. 3 represents a sectional elevation of another embodiment of my invention.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates a casing adapted to be supported in any suitable manner and in which is mounted a diaphragm 2 from which extends a rod or connection 3 which extends through a side of the casing and abuts against a scale beam 4 one end of which has an extension 5 projecting angularly therefrom, the outer end of which is rounded and engages the cam face 6 of the stationary support 7. The casing 1 is provided with an inlet or supply conduit 8 for fluid pressure which communicates preferably with the interior of the furnace. The scale bar 4 is calibrated, as at 9, in order that the arm 10 of the counterbalance 11 may be set for a predetermined pressure.

12 designates a longitudinally extending arm carried by the scale bar 4, on which is movably mounted a block 13, the position of which may be fixed by means of the set screw or equivalent device 14.

15 designates a valve stem the upper end of which is secured to the block 14 by means of a universal joint 16. The valve stem 15 is provided in the present instance with the heads 17, 18 and 19 joined by the necks 20 and 21, said heads having a working fit in the bore 22 of the valve casing 23 which is supported by a carriage 24 having mounted therein pinions 25 which coact with a track 26 supported in any suitable manner in the present instance by the casing 1. This track is provided with suitable calibrations 27, in order that the location of the carriage on the track 26 may be readily adjusted.

28 designates a set screw or equivalent device for adjustably locking the carriage in a desired position.

29 designates the inlet port of the valve casing 23 which is connected by means of a flexible hose or conduit 30 to a suitable motive fluid supply.

31 designates the discharge outlet to which a flexible conduit 32 is secured which leads to any desired point.

33 designates a port leading from the casing 23 and communicating by means of a flexible conduit 34 with any desired type of motor mechanism, in the present instance with the piston motor 35, in order to actuate the piston 36, which is provided with a stem 37 adapted to be operatively connected with the device to be governed such as for example a valve or damper.

In the embodiment seen in Fig. 2, I have shown the carriage 24 as having rollers 38 mounted therein which travel on the track 39, it being apparent that in the broad scope of my invention it is immaterial whether a

rack and pinion or rollers and a smooth track are employed.

In the embodiment seen in Fig. 3, I have shown a governing mechanism in which a modified form of valve mechanism is employed and in which a double acting piston is employed, it being apparent that the broad principle of my invention is the same in both embodiments, although I have found in practice that the embodiment seen in Fig. 3 is more reliable under certain conditions than that shown in Fig. 1. 40 designates a conduit communicating with the fluid pressure of the furnace, the steam boiler or other mechanism which is used as a governing factor to actuate the diaphragm 41 and acting through the plunger 42 to raise or lower the scale beam 43, one end of which coacts with the coacting face on the support 44 in a manner similar to that already described with respect to Fig. 1. The scale beam is calibrated as seen at 45, in order that the position of the counterbalance mechanism 46 may be accurately determined for any desired pressure. 47 designates a bar or rod carried by the scale beam 43 having adjustably mounted thereon a sliding block 48 provided with a set screw 49. 50 designates a universal joint by means of which the valve stem 51 is secured to the shoe 48, said stem carrying at its lower end the valve heads 52, 53 and 54 joined together by the necks 55 and 56. 57 designates a valve casing supported by the carriage 58 which is adapted to be adjusted to any desired position on the track 59. 60 designates an inlet port for the motive fluid which is adapted to be connected with any suitable source of fluid supply. 61 and 62 designate outlet ports which communicate by means of suitable flexible conduits with a discharge conduit. 63 designates a port communicating by means of a suitable conduit 64 with one end of the piston chamber 65. 66 designates a port in the valve casing which communicates by means of a flexible conduit 67 with the opposite end of the piston chamber 65 in which is mounted the piston 68 of any suitable or conventional type to which is secured the piston rod 69. The piston rod 69 has secured thereto at 70 a lever 71 which is secured to the lever 72 pivoted at 73 to any suitable fixed point such as the brace or support 74, secured in the present instance to the piston casing and the diaphragm casing. The lever 72 is provided on each side of its fulcrum with adjustable hooks 75 which may be connected in any suitable manner with the valve or damper mechanism which it is desired to govern. It will be apparent that both the bar 59 and the bar 47 may be calibrated if desired.

The operation of the embodiment seen in Fig. 1 can now be readily understood and is as follows:—As the fluid pressure entering the casing 1 through the inlet 8 varies, the diaphragm 2 is raised or lowered and thereby the rod 3 which latter causes the scale beam 4 to be rocked, it being understood that the counter-balance 11 has first been adjusted so that the pointer or arm 10 is located relatively to the beam 9 so as to indicate a predetermined pressure at which such movement of said scale beam will take place. The rise or fall of the scale beam will cause the valve stem 15 to be raised or lowered. If the valve stem is lowered, motive fluid may pass from the inlet 29 around the neck 20 thence through port 33 and flexible conduit 34 to the motor casing 35 and acting on the piston 36 will cause the latter to be raised and thereby actuate the mechanism operatively connected with the piston stem 37. When the scale beam is raised the admission of the motive fluid to the conduit 34 is prevented by the head 18 and the motive fluid in the motor 35 may escape therefrom through conduit 34, port 33, port 31 and discharge conduit 32.

Owing to the provision of the universal joint 16 the valve stem 15 is free to rotate or to swing in any direction. Since the position of both the block 13 and the carriage 24 may be adjusted as desired, the sensitiveness of the valve movement may be correspondingly varied, it being apparent that the nearer the carriage is located to the free end of the scale beam the greater will be the valve movement.

The operation of the embodiment seen in Fig. 3 is similar to that already described with reference to Fig. 1 with the exception of the valve mechanism and the motor mechanism. In this embodiment, assuming that the parts are in the position indicated in Fig. 3, the motive fluid enters through the inlet 60, passes around the neck 56 of the valve through the port 63, flexible connection 64 and into the piston chamber 65, wherein it exerts a pressure against the piston 68 and causes the same to move toward the right. The motive fluid in the rear of the piston 68 passes through the flexible conduit 67, port 66 and port 62 to a suitable point of discharge. When the scale beam 43 is lowered, owing to the decrease in pressure of the fluid pressure entering the conduit 40 and acting against the diaphragm 41, thereby lowering the valve the motive fluid will pass through the inlet port 60 around the neck 56 of the valve through port 66 and flexible conduit 67 into the piston casing 65 and acting upon the piston head 68 will cause said piston to move towards the left, the motive fluid in said piston chamber 65 exhausting through the flexible conduit 64, port 63 around the neck 55 of the valve and through port 61 to a suitable point of discharge.

My novel construction of governing mech-

anism is especially adapted to be employed in conjunction with a furnace in which the conduit 8 or 40 is in communication with the interior of the furnace or these conduits may be connected with a steam boiler so that any auxiliary valves or dampers in any of the flues may be automatically controlled by the variation in pressure within the furnace or within the boiler and it will be apparent that my invention can be readily employed in conjunction with a furnace for controlling any auxiliary valve mechanism or its equivalent. It will be further apparent that I obtain a very large range of movement, since I may locate the valve casing and valve mechanism at any desired point along the scale beam so that the throw of the valve will be correspondingly increased or diminished and in illustrating my invention I have preferred to show this as being accomplished by the employment of a valve casing and valve which are laterally adjustable, although other means within the scope of the invention may be employed for obtaining this variation in the length of stroke of the valve.

So far as I am aware, I am the first in the art to employ in combination with a stationary track, a movable carriage supporting a valve casing and mounted on said track and a valve movable relatively to the scale beam and controlling ports in said casing and my claims to these features are to be interpreted with corresponding scope.

It will now be apparent from the foregoing that I have devised a novel and useful construction of automatic governing mechanism which embodies the features of advantage enumerated as desirable in the statement of invention and the above description and while I have in the present instance shown and described the preferred embodiments thereof which give in practice satisfactory and reliable results, it is to be understood that they are susceptible of modification in various particulars without departing from the spirit and scope of the invention or sacrificing any of its advantages.

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

1. In a device of the character described, the combination with a fluid actuated scale beam, of a valve mechanism including a valve member and a casing member, one of said members being carried by said beam and longitudinally movable thereon, a motor controlled by said valve mechanism and a governing mechanism controlled by said motor.

2. In a device of the character described, the combination with a fluid actuated scale beam, of a valve mechanism including a valve member and a casing member, one of said members being longitudinally adjustable on said beam, a motor controlled by said valve mechanism, a lever actuated by said motor, and a governing mechanism controlled by said lever.

3. In a device of the character described, the combination with a fluid actuated scale beam, including a valve member, and a casing member, one of said members being carried by said beam and longitudinally adjustable thereon, means for fixing said adjustable member in position on said beam, a motor controlled by said valve mechanism, and a governing mechanism controlled by said motor.

4. In a device of the character described, the combination with a fluid actuated scale beam, of a valve adjustably carried by said beam, a stationary track, a carriage longitudinally movable thereon, a valve casing supported by said carriage and having ports controlled by said valve, a motor in communication with said valve casing and controlled by said valve, and a governing mechanism controlled by said motor.

5. In a device of the character described, the combination with a fluid actuated scale beam, of a block carried thereby and longitudinally adjustable with respect thereto, a valve stem connected by a universal joint with said block, a stationary track, a carriage movable thereon, a valve casing carried by said carriage and having inlet and outlet ports controlled by said valve, a motor in communication with said valve casing and controlled by said valve, and a governing mechanism controlled by said motor.

6. In a device of the character described, the combination with a scale beam, of fluid actuated means for automatically controlling said beam, a bar carried by said beam, a block adjustably mounted on said bar, a valve connected by a universal joint with said block, a stationary track, a carriage thereon, a valve casing supported by said carriage and having ports controlled by said valve, a motor in communication with said casing and controlled by said valve, and a governing mechanism controlled by said motor.

7. In a device of the character described, the combination with a scale beam, of fluid actuated means for automatically controlling said beam, a bar carried by said beam, a block adjustably mounted on said bar, a valve connected by a universal joint with said block, a stationary track, a carriage thereon, a valve casing supported by said carriage and having ports controlled by said valve, a motor in communication with said casing and controlled by said valve, means for locking said carriage in position and a governing mechanism controlled by said motor.

8. In a device of the character described, the combination with a scale beam, of means for automatically actuating said beam, a valve adjustably carried by said beam, a lon-

gitudinally adjustable valve casing having ports controlled by said valve, a motor controlled by said valve, means for varying the amount of movement imparted to said valve by longitudinally moving the same, and a governing mechanism controlled by said motor.

9. In a device of the character described, the combination with a scale beam, of means for automatically actuating said beam, valve mechanism including a valve adjustably carried by said beam and a longitudinally adjustable valve casing having inlet and exhaust ports controlled by said valve, a motor, a flexible connection between said motor and valve casing and a governing mechanism controlled by said motor.

10. In a device of the character described, the combination with a scale beam of fluid actuating means for controlling said beam, a counterbalance for said beam, a bar carried by said beam, a block longitudinally adjustable on said bar, a valve connected by a universal joint with said block, a stationary track, a carriage thereon, a valve casing supported by said carriage and having ports controlled by said valve, a motor, a flexible connection between said motor and said valve casing and a governing mechanism controlled by said motor.

11. In a governing mechanism, the combination with a fluid actuated member, of a longitudinally movable valve mechanism including a valve actuated by said member, a motor controlled by said valve mechanism, means for varying the stroke of said valve by longitudinally moving the same, and a governing mechanism controlled by said motor.

12. In a device of the character described, the combination with a fluid actuated scale beam, of a valve mechanism including a valve carried by said beam and longitudinally movable thereon, a counterbalance engaging said beam, a motor controlled by said valve mechanism, a flexible connection between said motor and valve mechanism, and governing mechanism controlled by said motor.

13. In a device of the character described, the combination with a fluid actuated scale beam, of a valve member and its fitting member, means movable along said beam for actuating one of said members, a motor controlled by said valve mechanism, and a governing mechanism controlled by said motor.

14. In a device of the character described, the combination with a fluid actuated scale beam, of a valve member and fitting member, means movable along said beam for controlling the relative relation of said members, a motor controlled by said members, and a governing mechanism controlled by said motor.

FRANCIS H. BROWN.

Witnesses:
HERBERT S. FAIRBANKS,
CHARLES BROWN.