

No. 701,701.

Patented June 3, 1902.

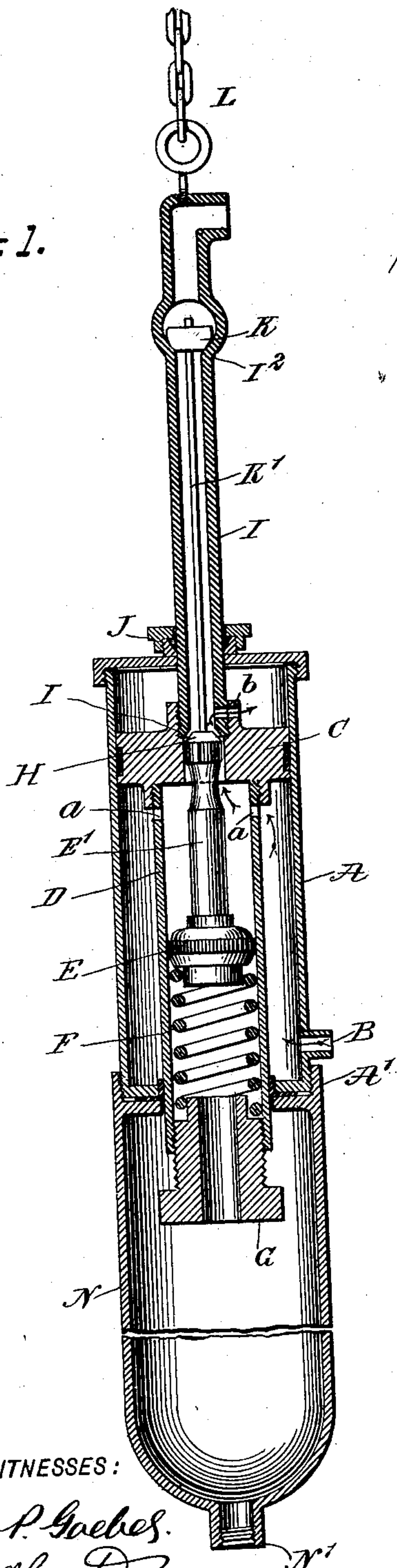
T. P. FORD.
CONTROLLING DEVICE.

(Application filed Feb. 5, 1902.)

2 Sheets—Sheet 1.

(No Model.)

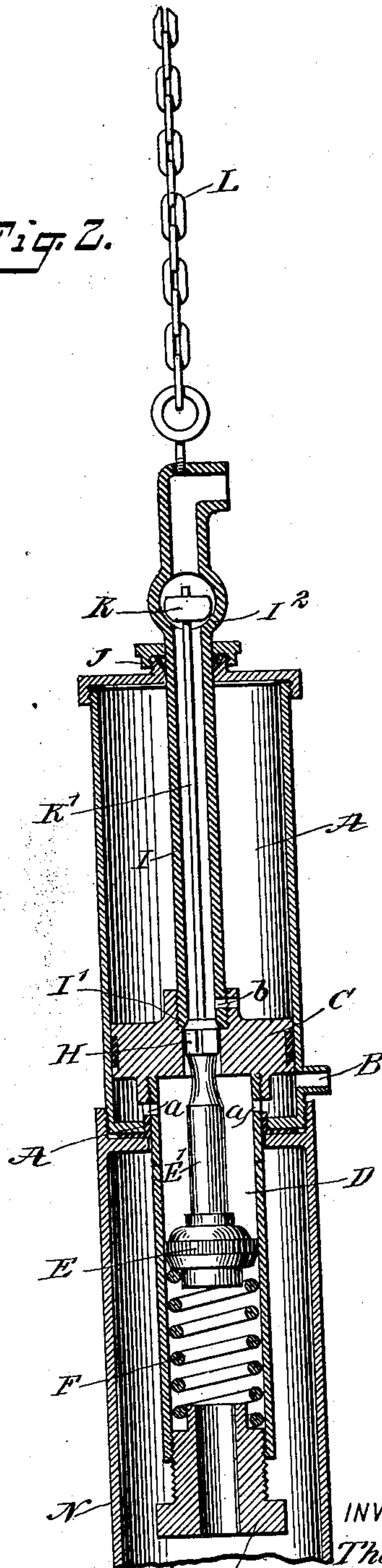
Fig. 1.



WITNESSES:

William P. Goebel.
Geo. J. Horsting.

Fig. 2.



INVENTOR

Thomas P. Ford

BY

Mull

ATTORNEYS

No. 701,701.

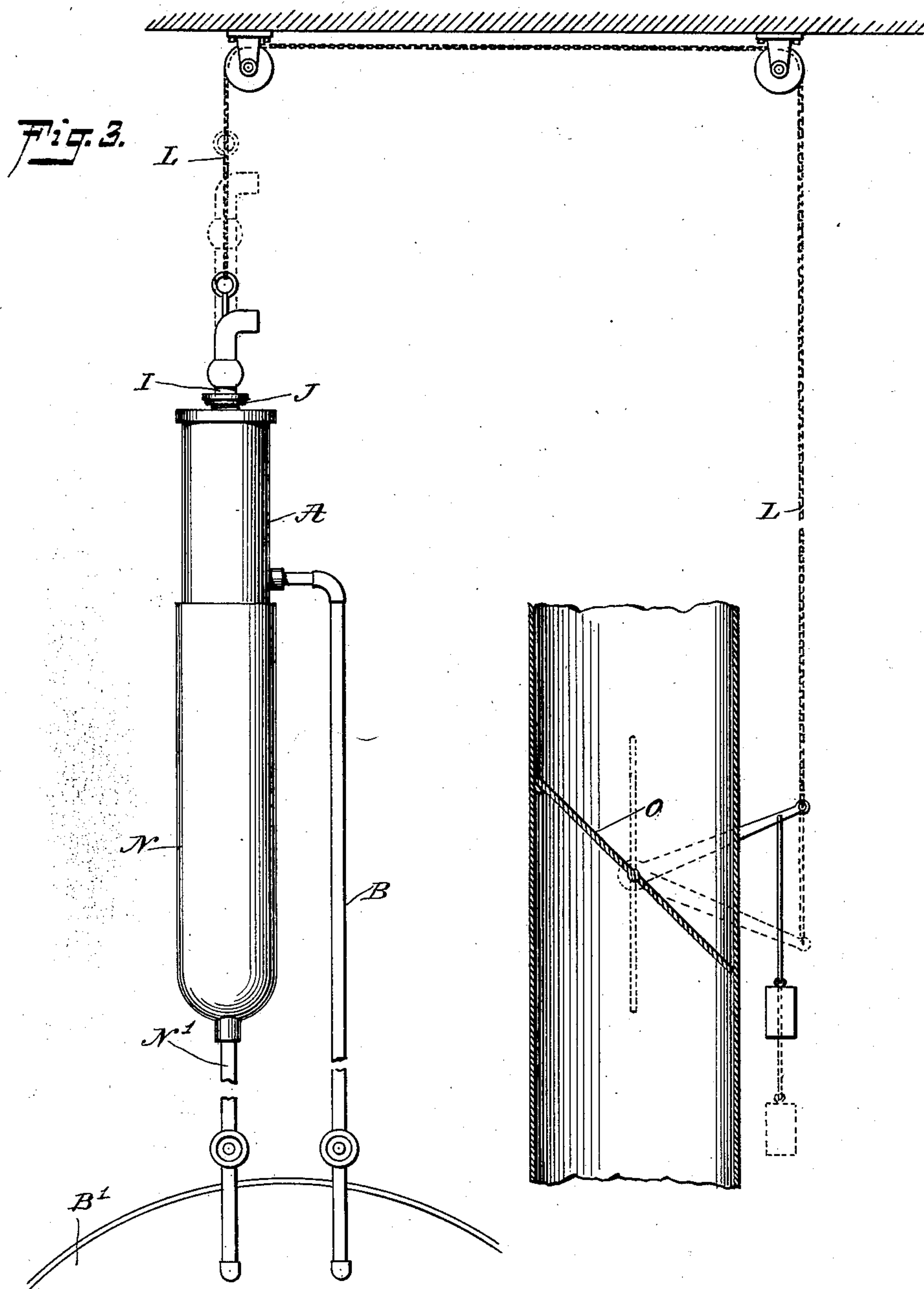
Patented June 3, 1902.

T. P. FORD.
CONTROLLING DEVICE.

(Application filed Feb. 5, 1902.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

William P. Goebel.
Theo. G. Foster.

INVENTOR

Thomas P. Ford

BY *Munn & Co.*

ATTORNEYS

UNITED STATES PATENT OFFICE.

THOMAS P. FORD, OF HACKENSACK, NEW JERSEY.

CONTROLLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 701,701, dated June 3, 1902.

Application filed February 5, 1902. Serial No. 92,649. (No model.)

To all whom it may concern:

Be it known that I, THOMAS P. FORD, a citizen of the United States, and a resident of Hackensack, in the county of Bergen and State of New Jersey, have invented a new and Improved Controlling Device, of which the following is a full, clear, and exact description.

The invention relates to dampers and other mechanisms controlled by a fluid under pressure; and its object is to provide a new and improved controlling device which is simple and durable in construction and very effective and exceedingly sensitive in operation to insure proper working of the mechanism with which the controlling device is connected.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a similar view of the same, parts being in a different position; and Fig. 3 is a side elevation of the improvement as applied to a damper and smoke-stack shown in section.

The cylinder A of the controlling device is provided with an inlet-pipe B, connected with a boiler or other suitable source of pressure-supply B', and in the said cylinder A is mounted to reciprocate a piston C, from which depends an auxiliary cylinder D, mounted to slide in a suitable bearing A', arranged in the bottom of the cylinder A. In the auxiliary cylinder D is mounted to reciprocate an auxiliary piston E, pressed on at its under face by a spring F, the tension of which is regulated by an apertured screw-plug G, screwing in the lower end of the said auxiliary cylinder D.

The auxiliary piston E is provided with an upwardly-extending piston-rod E', carrying a valve H, adapted to be seated on a valve-seat I', formed on the lower end of a pipe or tube I, secured to the top of the piston C so as to

move with the same, the said tube or pipe extending through a stuffing-box J, held on the upper end of the cylinder A.

The auxiliary cylinder D is provided near its upper end with the inlet-port a, and a similar port b connects the pipe or tube I with the interior of the cylinder A above the piston C, as plainly indicated in the drawings. In the pipe I is arranged a second valve-seat I², adapted to be engaged by a valve K, held on a valve-stem K', attached to the piston-rod E'. The discharge or outer end of the pipe I is connected by a chain L or other suitable device with the damper O or other mechanism to be controlled.

The operation is as follows: In case the controlling device is used to control the damper O of a boiler-furnace, for instance, as shown in Fig. 3, then the pipe B is connected with the steam-compartment of the boiler, so that live steam passes from the boiler through the pipe B into the lower end of the cylinder A to move the piston C therein in an upward direction and to hold the piston in an uppermost position until the steam exceeds a normal pressure. For instance, if the normal pressure is fifty pounds, then the spring F is set to the same amount, and when the pressure in the boiler exceeds fifty pounds then the steam in the cylinder A passes through the port a into the auxiliary cylinder D and exerts a downward pressure on the piston E to move the same downward against the tension of the spring F, so that the valve H is moved off its seat I', while the valve K is moved to its seat I². Steam now passes from the cylinder D past the seat I' into the tube I and through the port b into the upper end of the cylinder A, so that the preponderance of pressure against the upper face of the piston C to force the same downward, carrying along the auxiliary cylinder D, piston E, and connected parts, so that the chain L moves the damper O into a closed position. As soon as the pressure in the boiler falls below normal pressure—that is, fifty pounds—then the spring F overcomes the fluid-pressure against the auxiliary piston E, so that the latter is moved upward in the auxiliary cylinder D, and in doing so moves the valve H to its seat

I' and the valve K off its seat I². When this takes place, the steam in the upper end of the cylinder A can escape through the port b, pipe I, and valve-seat I² to the open air, so that the preponderance of pressure is now
 5 against the under side of the piston C and the latter is moved back to an uppermost position. During this return movement of the piston C and parts carried thereby the damper
 10 is free to move into an open position, and when the steam-pressure is increased to fifty pounds then the piston E is again forced downward against the tension of the spring F to cause the valve H to open and the valve K to
 15 close.

Now from the foregoing it will be seen that the varying pressure in the boiler causes a corresponding action of the controlling device, so that the damper or other mechanism
 20 with which the controlling device is connected is actuated to produce the desired result—that is, the fluid-pressure controls the generation thereof.

The controlling device is very sensitive in
 25 its action and is composed of comparatively few parts not liable to easily get out of order.

When it is desired to move the piston C into an uppermost position and to close the valve H by other means than those described,
 30 then the cylinder A is provided with a depending casing N, into which extends the lower end of the auxiliary cylinder D, and this casing N is connected with a valved pipe N', leading to a fluid-pressure supply—say a
 35 boiler B' (see Fig. 3) and under the control of the operator. Now when pressure is allowed to pass into the casing N, then it passes through the apertured plug G into the lower end of the auxiliary cylinder D to exert its
 40 force against the under side of the piston E, so as to move the latter upward to close the valve H, as previously explained.

It is understood that the auxiliary piston has independent movement of the main piston, but moves bodily with the main piston,
 45 and the admission of the fluid-pressure to the upper end of the main cylinder and the exhaust of the fluid-pressure from this end of the cylinder is completely controlled by the
 50 movement of the said auxiliary piston.

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

1. A controlling device for dampers and
 55 other mechanisms, comprising a main cylinder, connected at one end with a fluid-pressure supply, a main piston reciprocating in the said main cylinder and connected with the mechanism to be controlled, an auxiliary
 60 cylinder carried by the said main piston and extending within the inlet end of the said main cylinder and in communication therewith, and a spring-pressed auxiliary piston in the said auxiliary cylinder, controlling a
 65 passage from the inlet end of the main cylinder to the other end thereof, as set forth.

2. A controlling device for dampers and other mechanisms, comprising a main cylinder connected at one end with a fluid-pressure supply, and a piston reciprocating in the
 70 said main cylinder, carrying an auxiliary cylinder having a port connection with the said main cylinder, an auxiliary piston in the said auxiliary cylinder, pressed on at one side by a spring and at its other side by the fluid-
 75 pressure passing into the main cylinder and means controlled by the said auxiliary piston to govern the passage of the fluid-pressure from the inlet end of the main cylinder to the other end thereof, as set forth. 80

3. A controlling device for dampers and other mechanisms, comprising a main cylinder connected at one end with a fluid-pressure supply, and a piston reciprocating in the
 85 said main cylinder, carrying an auxiliary cylinder having a port connection with the said main cylinder, and an auxiliary piston in the said auxiliary cylinder, pressed on at one side by a spring and at its other side by the fluid-
 90 pressure passing into the main cylinder, the said auxiliary piston carrying means controlling the admission of the fluid-pressure to the other end of the main cylinder, as set forth.

4. A controlling device for dampers and other mechanisms, comprising a main cylinder
 95 connected at one end with a fluid-pressure supply, a piston reciprocating in the said main cylinder, carrying an auxiliary cylinder having a port connection with the said main
 100 cylinder, and an auxiliary piston in the said auxiliary cylinder, pressed on at one side by a spring and at its other side by the fluid-pressure passing into the main cylinder, and the said auxiliary piston carrying means controlling the exhaust of the motive agent from
 105 the main cylinder, as set forth.

5. A controlling device for dampers and other mechanisms, comprising a main cylinder connected at one end with a fluid-pressure supply, and a piston reciprocating in the
 110 said main cylinder, carrying an auxiliary cylinder having a port connection with the said main cylinder, and an auxiliary piston in the said auxiliary cylinder, pressed on at one side by a spring and at its other side by the fluid-
 115 pressure passing into the main cylinder, the said auxiliary piston carrying means controlling the admission and exhaust of the fluid-pressure to and from the other end of the cylinder, as set forth. 120

6. A controlling device for dampers and other mechanisms, comprising a main cylinder connected at one end with a motive-agent supply, a main piston reciprocating in the
 125 said cylinder and supporting an auxiliary cylinder having a port connection with the said main cylinder, an auxiliary piston in the auxiliary cylinder, a spring pressing one side of the said auxiliary piston, the other side being pressed on by fluid-pressure passing from
 130 the main cylinder into the auxiliary cylinder, and a valve carried by the said auxiliary piston

ton and controlling the connection between the auxiliary cylinder and the other end of the main cylinder, as set forth.

7. A controlling device for dampers and
5 other mechanisms, comprising a main cylinder connected at one end with a motive-agent supply, a main piston reciprocating in the said cylinder and supporting an auxiliary cylinder having a port connection with the said
10 main cylinder, an auxiliary piston in the auxiliary cylinder, a spring pressing one side of the said auxiliary piston, the other side being pressed on by fluid-pressure passing from the main cylinder into the auxiliary cylinder,
15 a valve carried by the said auxiliary piston and controlling the connection between the auxiliary cylinder and the other end of the main cylinder, and a second valve controlled by the said auxiliary piston for controlling
20 the exhaust from the main cylinder, as set forth.

8. A controlling device comprising a main piston, an auxiliary piston, the auxiliary piston moving bodily with the main piston and
25 having movement independent thereof, the auxiliary piston being spring-pressed at one side and pressed on at the other side by the fluid-pressure controlling the main piston,

and a fluid-pressure connection with the said auxiliary piston to reinforce its spring, as set forth. 30

9. A controlling device for dampers and other mechanisms, comprising a main cylinder connected at one end with a fluid-pressure supply, a piston reciprocating in the
35 said cylinder and carrying an auxiliary cylinder having a port connection with the said main cylinder, an auxiliary piston in the said auxiliary cylinder, pressed on at one side by a spring and at its other side by the fluid-
40 pressure passing into the main cylinder, and means controlled by the said auxiliary piston to govern the passage of the steam from the inlet end of the main cylinder to the other
end thereof, the said means also controlling
45 the exhaust of the fluid-pressure from the exhaust end of the said main cylinder, as set forth.

In testimony whereof I have signed my name to this specification in the presence of
50 two subscribing witnesses.

THOMAS P. FORD.

Witnesses:

THEO. G. HOSTER,
EVERARD BOLTON MARSHALL.