

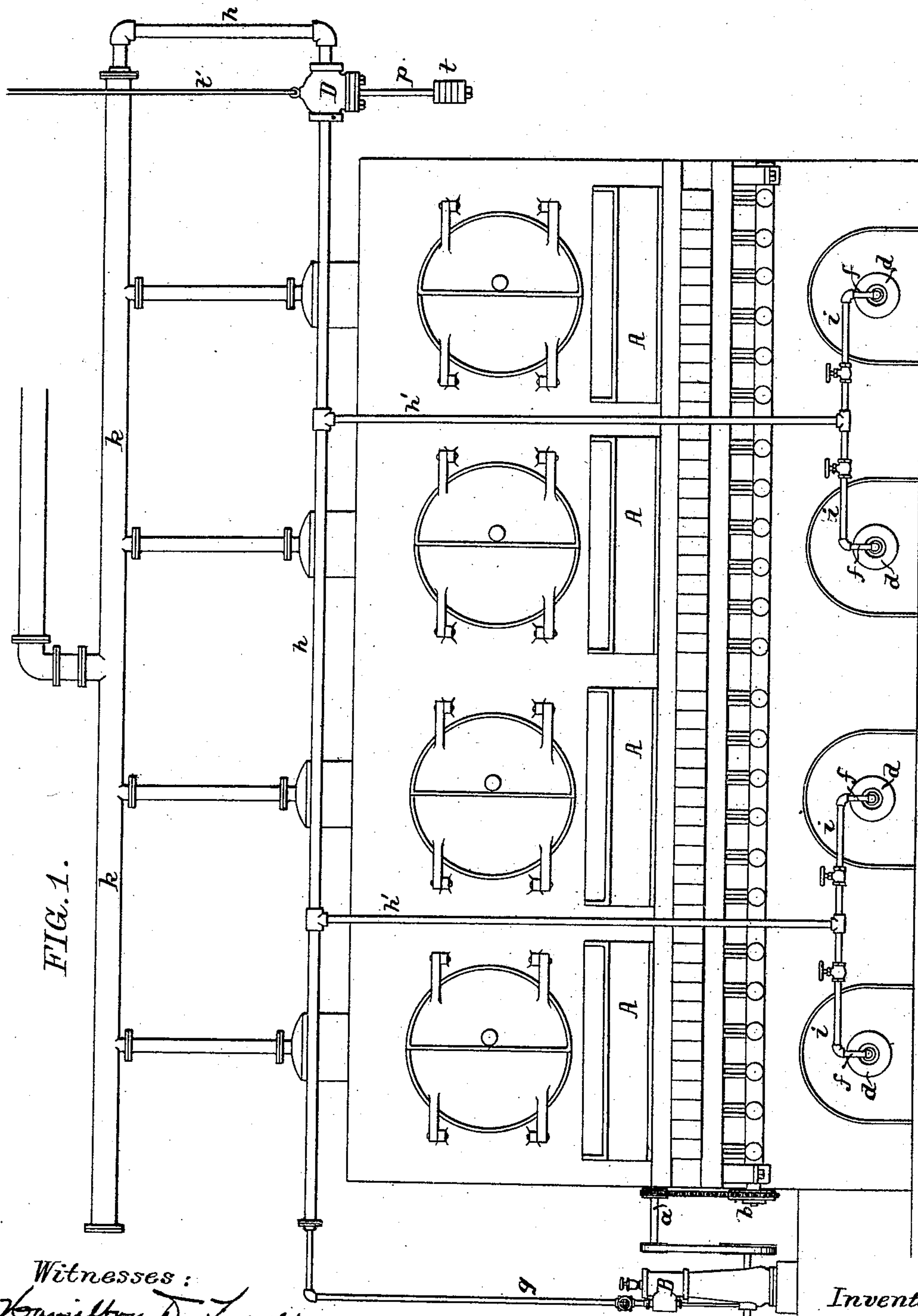
(No Model.)

2 Sheets—Sheet 1.

A. WILKINSON.
STEAM BOILER FURNACE.

No. 486,747.

Patented Nov. 22, 1892.



Witnesses:
Hamilton D. Turner
F. D. Goodwin

Inventor
Alfred Wilkinson
By his Attorneys
Hanson & Hanson

(No Model.)

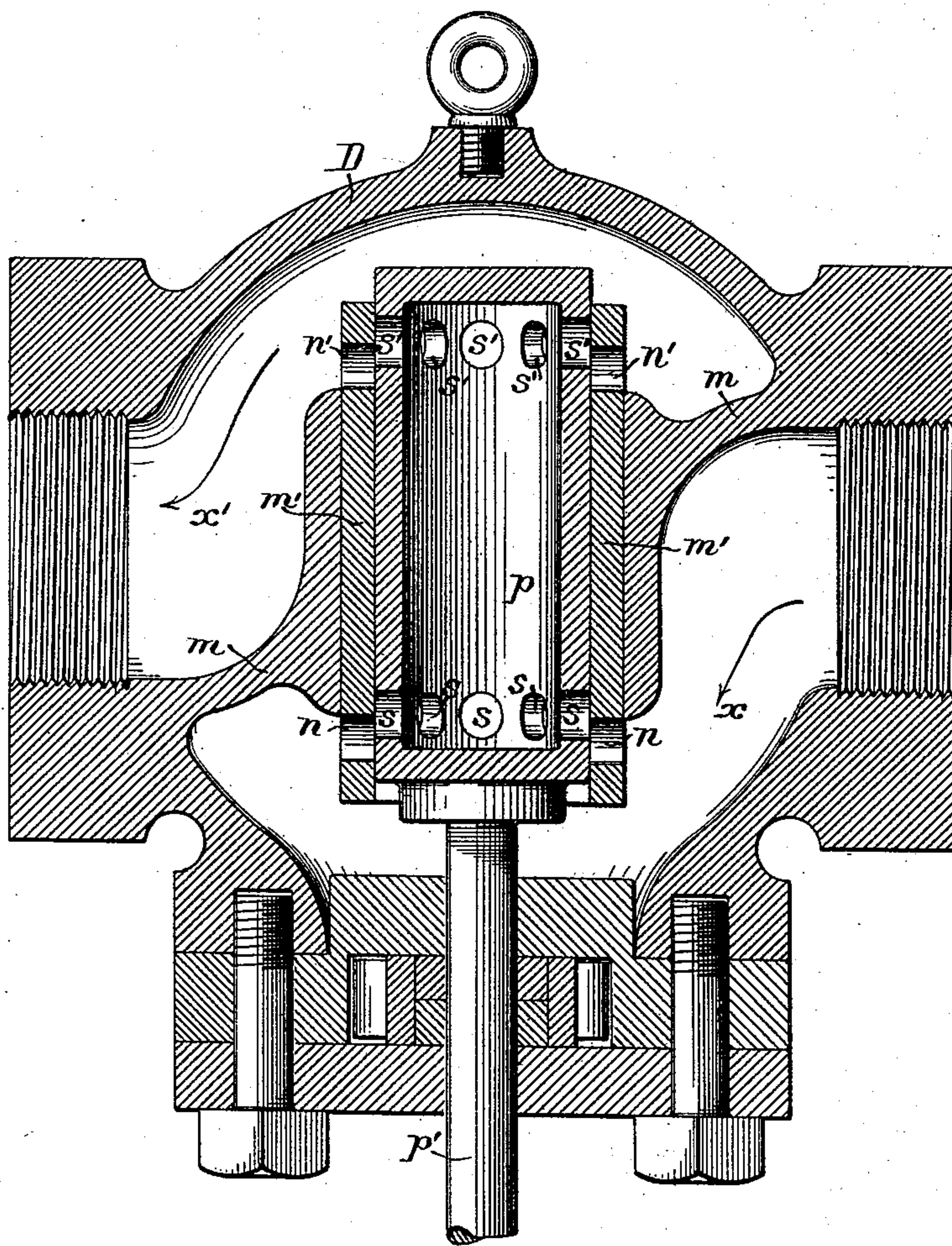
2 Sheets—Sheet 2.

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FIG. 2.



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Inventor:
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By his Attorneys
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UNITED STATES PATENT OFFICE.

ALFRED WILKINSON, OF BRIDGEPORT, PENNSYLVANIA, ASSIGNOR TO THE
WILKINSON MANUFACTURING COMPANY, OF PENNSYLVANIA.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 486,747, dated November 22, 1892.

Application filed July 25, 1892. Serial No. 441,127. (No model.)

To all whom it may concern:

Be it known that I, ALFRED WILKINSON, a citizen of the United States, and a resident of Bridgeport, Montgomery county, Pennsylvania, have invented certain Improvements in Steam-Boiler Furnaces, of which the following is a specification.

The object of my invention is to so construct furnace feeding and draft apparatus for steam-boilers that a substantially-uniform predetermined pressure may at all times be maintained in the boiler; and this object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a front view of a stack of boilers with furnace-feeding and draft-regulating devices in accordance with my invention, and Fig. 2 is an enlarged view of a regulating or governing valve forming part of the device.

In Fig. 1 is represented a series of four boilers, which is provided with automatic stokers and with furnace-grates of the character set forth in my application for patent, filed February 29, 1892, Serial No. 423,257, although it should be understood that my invention is not limited in its application to furnaces having grates of the character described, but is applicable to any furnace having an automatic stoker or draft apparatus operated by a steam-blast, and also to single furnaces as well as to multiple furnaces.

In the drawings, A represents the hoppers of the series of automatic stokers; *a*, a shaft which carries the feed-wheels in said hoppers; *b*, a shaft which carries the grate-bar-operating devices, as set forth in my application for patent before alluded to; *d*, an air-pipe in the ash-pit of the furnace, and *f* a pipe for supplying steam to an injector-head in said air-pipe, the air from the latter pipe being delivered into the hollow bars of the grate. My invention is, however, applicable to furnaces having ash-pit blast operated by a steam-jet or to furnaces in which a steam-jet is located in the uptake for the purpose of increasing the draft. The shafts *a* and *b* are in the present instance connected for joint operation, and the shaft *a* is driven by an engine B, which receives steam through a pipe *g* from a main *h*, the latter having, also, branch pipes

h', from which extend valved branches *i* for supplying the injector-pipes *f*. The main *h* is connected to the main *k*, which communicates with the steam-domes of the stack of boilers, and in said main *h* is located a governing or regulating valve D of peculiar construction, as illustrated in Fig. 2 of the drawings. That chamber *x* of the valve which communicates with the main steam-pipe of the boilers is separated from the chamber *x'*, communicating with the main *h* by means of a cross-partition *m*, which carries a cylinder *m'* with two sets of ports *n n'*, the ports *n* being located in the chamber *x* of the valve and the ports *n'* in the opposite chamber *x'* of the same. Fitting snugly in the ported cylindrical chest *m'* is a cylindrical valve *p*, closed at both ends, but having ports *s s'* similar to the ports *n n'*, said valve *p* having a depending stem *p'*, which passes through a suitable stuffing-box at the bottom of the valve-casing and carries a series of weights *t*, as shown in Fig. 1, the valve-casing being suspended by a rod *t'* from a ceiling-joint or other suitable support, so that the weight of the valve and its appurtenances does not exert any strain upon the pipe *h*. The normal position of the valve *p* is about that represented in Fig. 2 of the drawings, on reference to which it will be observed that the ports *s s'* of the valve only partially uncover the ports *n n'* of the cylinder *m'*.

When the normal or predetermined pressure of steam is maintained in the boiler, the pressure beneath the valve *p* counterbalances the pressure above the same plus the downward influence exerted by the weight *t*, and the valve is maintained in the position shown in Fig. 2, the flow of steam through the valve in this case being sufficient to run the engine B at a rate of speed sufficient to effect the normal operation of the stokers and to provide for the normal operation of the injectors in the blast-pipes which govern the draft. If there should, however, be any decrease in the pressure in the boiler-main *k* there will be a downward movement of the valve *p* and a further opening of the ports *n n'*, so as to provide for an increased flow of steam to the engine and injectors with consequent quickening of the feed of the stok-

ers and augmenting of the blast in the draft apparatus, while, on the other hand, should the pressure in the boilers rise above the normal there will be a raising of the valve p and a further closing of the ports $n n'$, thus limiting the flow of steam through the valve with the effect of decreasing the speed of the engine, lessening the feed of the stokers and decreasing the force of the blast in the draft apparatus. In other words, the tendency on the lowering of pressure in the boiler is to quicken the fire in the furnace and on the raising of pressure in the boiler to restrain the fire, so that the action of the furnace is directly dependent upon the pressure in the boiler and the fires are so regulated as to maintain said pressure practically uniform.

Although I prefer in carrying out my invention to provide the cylinder m' and valve p with ports both at top and bottom, in order to insure the desired accuracy in the operation of the valve, yet a reasonably-accurate valve could be made even if one or other of the sets of ports were dispensed with. For instance, the valve may be constructed with the lower set of ports only and may be open at the top, or on the other hand the cylinder m' and valve p may be ported at the top only, the valve being open at the bottom with the exception of an open frame or spider for the connection of the stem p' , or the ported valve may be used in connection with a cylinder m' , having straight edges instead of ports.

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

1. The combination, in furnaces for steam-boilers, of a mechanical stoker, a motor for operating the same, a pipe for conveying steam from the boiler to said motor, and an

automatic regulating valve in said pipe opening against the pressure in the boiler, substantially as specified.

2. The combination, in steam-boiler furnaces, of draft apparatus operated by an injector, a pipe for conveying steam from the boiler to said injector, and an automatic regulating-valve in said pipe opening against the pressure in the boiler, substantially as specified.

3. The combination, in a steam-boiler furnace, of a mechanical stoker, a motor for driving the same, draft apparatus operated by an injector, a pipe for conveying steam to said motor and injector, and an automatic-regulating-valve in said pipe opening against the pressure in the boiler, substantially as specified.

4. The combination of the valve-casing, its fixed cylinder and moving valve, one or both ported, as described, said valve being acted on by the boiler-pressure to close the ports, and by pressure in the delivery-pipe to open the ports, substantially as specified.

5. The combination of the valve-casing, its fixed cylinder, and the movable valve, one or both ported, as described, said valve having a projecting weighted stem and being actuated by boiler-pressure to close the ports and by pressure in the delivery-pipe added to the weight upon the stem to open the ports, substantially as specified.

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

ALFRED WILKINSON.

Witnesses:

WILLIAM D. CONNER,
HARRY SMITH.