No. 887,086. PATENTED MAY 12, 1908.

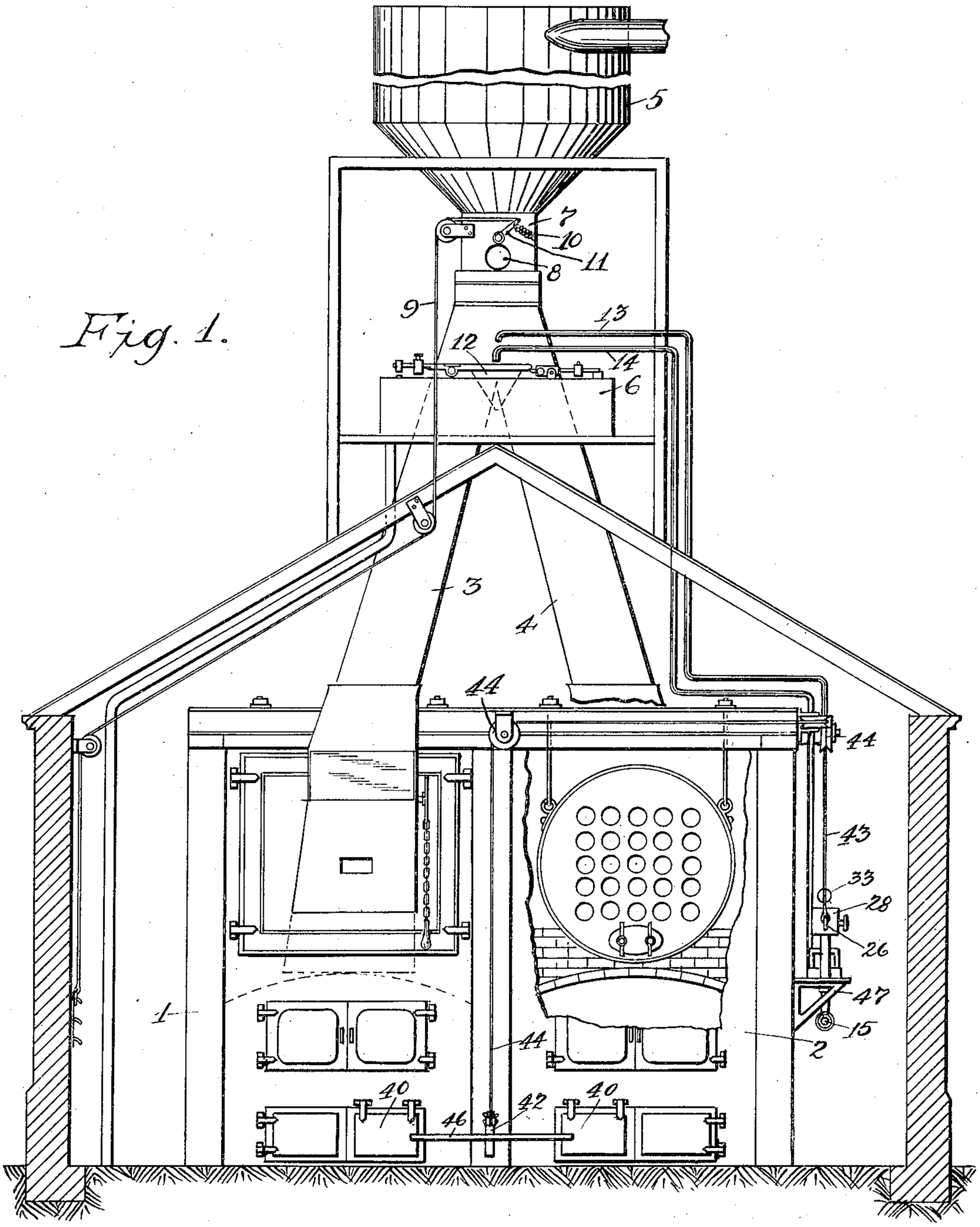
G. W. GARDNER.

REGULATOR FOR BOILER FEEDERS.

APPLICATION FILED MAR. 22, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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3 SHEETS—SHEET 2.

Fig. 3.

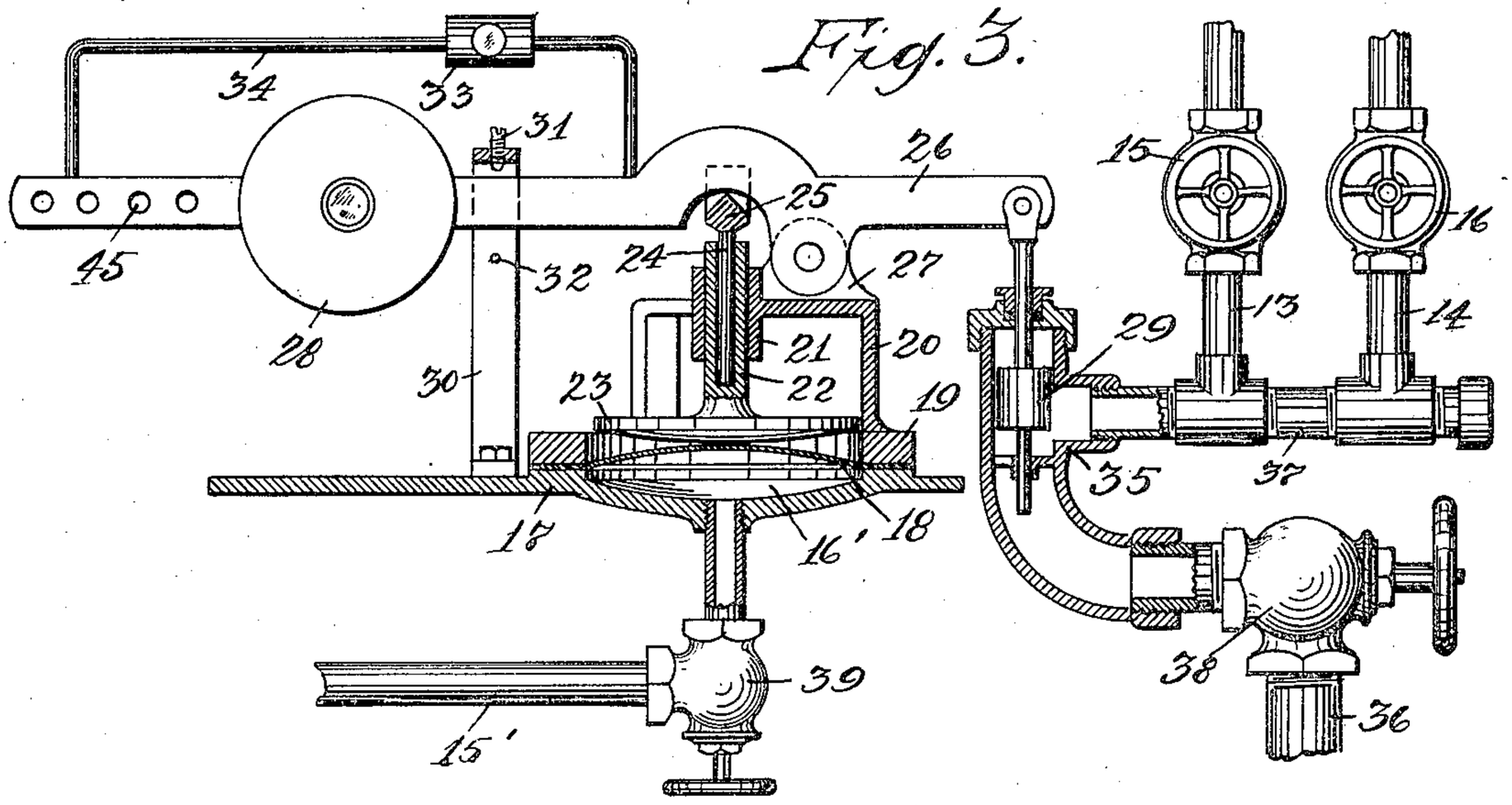
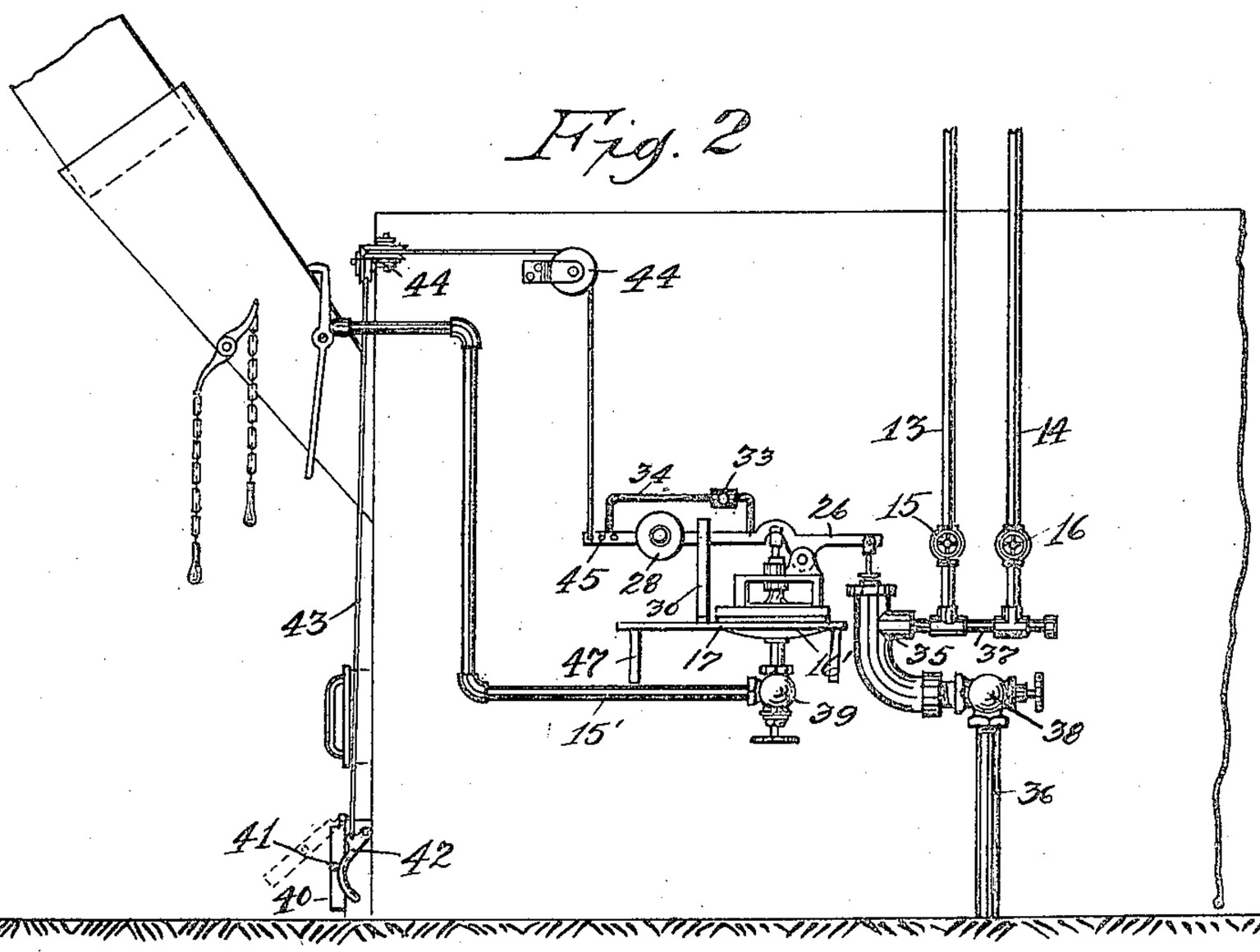


Fig. 2



WITNESSES:

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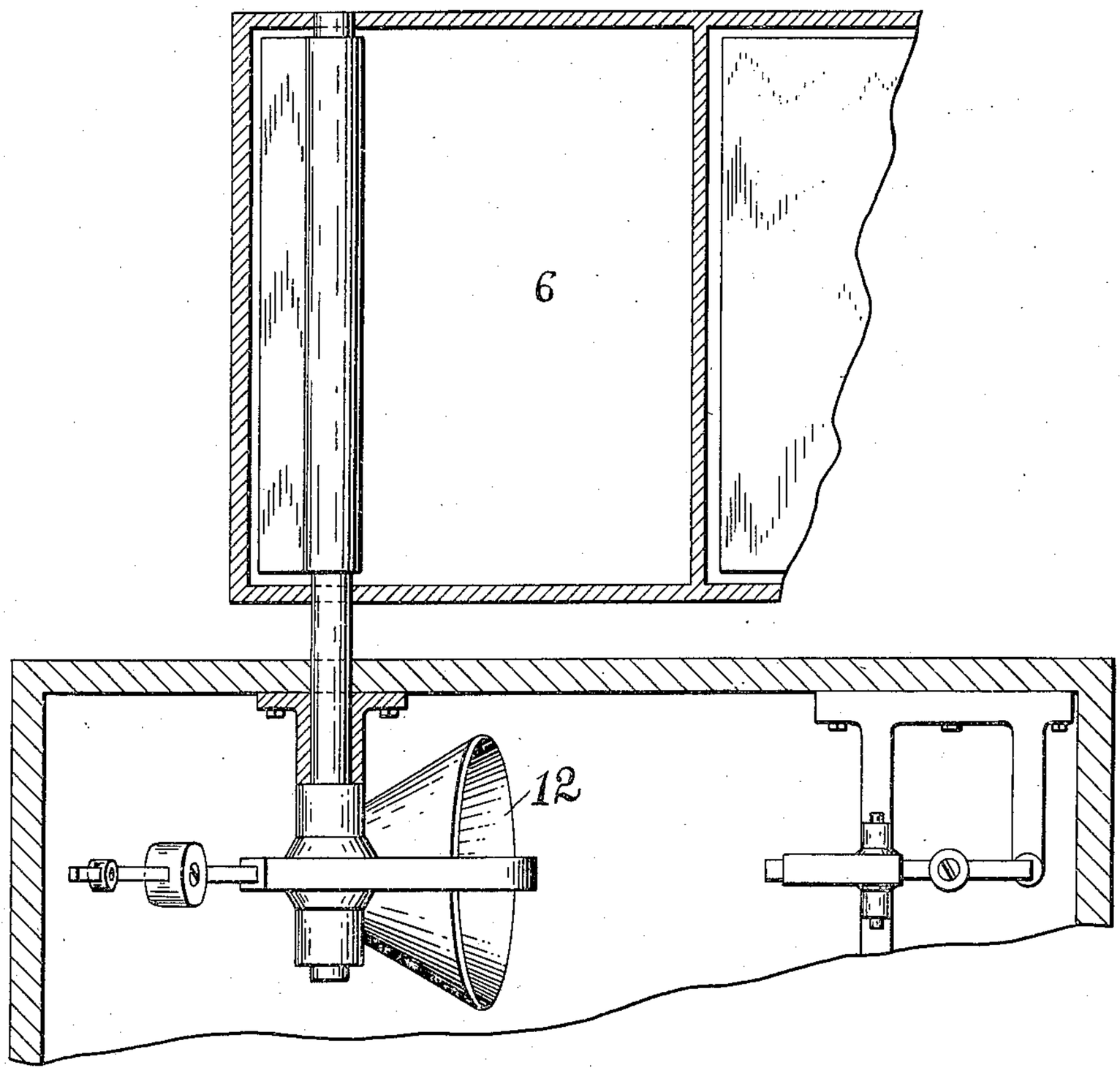
Fig. 4.



Attest:

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UNITED STATES PATENT OFFICE.

GEORGE W. GARDNER, OF SAN FRANCISCO, CALIFORNIA.

REGULATOR FOR BOILER-FEEDERS.

No. 887,086. Specification of Letters Patent. Patented May 12, 1908.

Application filed March 22, 1906. Serial No. 307,477.

To all whom it may concern:

Be it known that I, GEORGE W. GARDNER, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Regulators for Boiler-Feeders, of which the following is a specification.

My invention relates to regulators for automatic or self feeding furnaces, and more particularly to such devices when applied to furnaces that use the refuse, as shavings etc. from wood working machinery as fuel.

In utilizing the waste from planing mills for fuel, it is necessary that it be fed intermittently through chutes to prevent the liability of fire passing to the source of supply, as might occur it the fuel were fed in a constant stream. It is also necessary that the operation of the feeding apparatus be automatic and preferably be controlled by the pressure of the steam in the boiler.

As water must be provided for generating the steam, I utilize it for controlling the operation of the feeding mechanism and then control the flow or movement of the water by suitable means, one form of which is shown in the accompanying drawings, in which,

Figure 1 is a front elevation of a battery of two boilers provided with my apparatus. Fig. 2 is a side elevation of the forward end of one of the boilers. Fig. 3 is a sectional elevation ot the regulator. Fig. 4 is a sectional view of the feeding apparatus.

Referring more particularly to the drawings, 1 and 2 indicate the boilers and their respective furnaces and are supplied with fuel through chutes 3 and 4. The fuel is fed to the chutes from the ordinary separator 5 through charging mechanism 6 as more fully described in my application Serial Number 307,476 filed March 22, 1906.

When the fuel is supplied from the machinery of a planing mill, it enters the separator through the pipe 7 and the surplus is discharged into a bin or other receptacle, not shown, through the outlet 8. A regulator or valve for deflecting the fuel to one chute or the other is controlled by a cord 9 and spring 10 engaging with an arm 11.

The discharge of the fuel into the chutes is controlled by a tilting bucket 12, one for each chute, only one being shown in dotted lines in Fig. 1.

The particular construction of mechanism for operating the same is not shown in detail as it forms no part of the present invention.

The buckets are adapted to be filled with water from pipes 13 and 14, and the flow is controlled manually by valves 15 and 16, and automatically by the steam pressure of the boiler through a pipe 15′. Connected with the pipe 15′ is a chamber 16′, preferably as a depression or concavity in a base 17, over which a diaphragm 18 is secured by an annular plate 19. Angular standards or brackets 20 project upward from the plate and support a sleeve 21 above the diaphragm with its axis preferably directly in line with the center of the diaphragm.

Reciprocally mounted in the sleeve is the hollow stem 22 of a disk or piston 23, which rests upon the diaphragm and is adapted to be moved vertically thereby, the bottom of the disk being preferably rounded to correspond with the concavity. A stem 24 fits in the hollow of the stem 22 and has a head 25 at its upper end which forms a bearing, preferably as a knife edge, upon which rests a lever 26, the lever being preferably curved or recessed at that point to form a seat. The lever is pivoted between ears 27 on one of the brackets 20 and is provided with a movable weight 28 on its free end and is connected with a valve 29 at the other. The free end preferably extends through a slotted standard 30 and its downward movement is limited by a cross piece 32. An auxiliary weight or counterbalance 33 is preferably provided for fine adjustments and is mounted on a bracket 34 which is connected at its ends with the lever.

The valve 29 fits within a T 35 at the upper end of the water supply pipe 36 and controls the passage of water into a branch pipe 37, with which branch the pipes 13 and 14 are connected in the usual manner. The entrance of water to the T is controlled by a valve 38 in the pipe 36 and the entrance of steam to the diaphragm chamber 16′ is controlled by a valve 39.

The valves 38 and 39 having been opened to pass water and steam respectively from pipes 36 and 15^1, the regulation of the flow of water and consequently of the fuel feed, is thereafter automatic and results from varying steam pressure. If the steam pressure falls, calling for more fuel, the weight 28,

acting on lever 26, and thence upon the water valve 29, causes the water passage leading to pipes 13, 14 to be enlarged, more water to be supplied, and charges of fuel to be admitted with greater frequency because of the more frequent tilting of the buckets 12. As the steam pressure increases, its action on the diaphragm 18 tends to overcome counterweight 28; and when this has taken place, water valve 29 is moved so as to reduce the size of the water passage and the supply of water to the buckets 12, thus lessening the fuel supply.

In addition to the foregoing means for controlling the furnace fires by the admission of fuel, means are preferably provided for controlling them by means of the draft, as through doors 40, preferably in front of and below the grates. The doors are preferably hinged each at its upper edge so as to close by gravity, and is provided with a projection 41 upon one of its ends against which a curved arm 42 is adapted to engage and swing the door upward. The arm is pivoted to the front of the furnace and is adapted to be swung outward by a cord 43 which passes over pulleys 44 and is connected with the free end of the lever 26, said end being provided with a series of perforations 45 for permitting the cord to be secured at different points to secure the desired amount of movement of the damper from the movements of the lever. When two furnaces are being used, as in the present instance, the doors 40 are preferably connected by a bar 46, against which the arm 42 engages and thereby controls the movements of the doors simultaneously. If the steam pressure falls, the weight 28 causes lever 26 to pull upon cord 43, so as to open the damper and to increase the draft. As steam pressure rises, its action on diaphragm 18 tends to overcome weight 28, to slacken cord 43 and to permit the damper to close, partially or wholly, by its own gravity.

The regulator is preferably located at some point convenient to the engineer, as upon a bracket 47 at one side of one of the boilers, for, although it is entirely automatic in its operation after it has been adjusted, the attendant must regulate the flow of water and the opening of the dampers at the beginning of operations and occasionally during its operations to compensate for the variations of conditions that naturally arise.

Although I have shown and described my invention as applicable to feeding refuse it could be utilized for feeding coal or other fuel as well.

In operation the fuel is fed into the charge chamber and the water flows into the bucket until it exceeds the counterbalance when the chamber will be opened and its contents discharged into the chute from whence it passes to the furnace. At any time that the operation of the automatic mechanism fails to properly control the fire to keep the steam at the desired pressure, the attendant can vary the flow of water and the opening of the damper accordingly, after which the automatic mechanism will properly control both without further care or attention from the attendant.

What I claim is:

In a regulator for boiler feeders, a charge chamber, water controlled means for emptying the same, a damper for the furnace, and means for simultaneously controlling said means and the damper by the steam pressure.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 12th day of March 1906.

GEORGE W. GARDNER.

Witnesses:

F. M. BARTEL,

W. S. BOYD.