

(No Model.)

2 Sheets—Sheet 1.

B. A. HAWKINS.
AUTOMATIC REGULATOR.

No 462,005.

Patented Oct. 27, 1891.

Fig. 1.

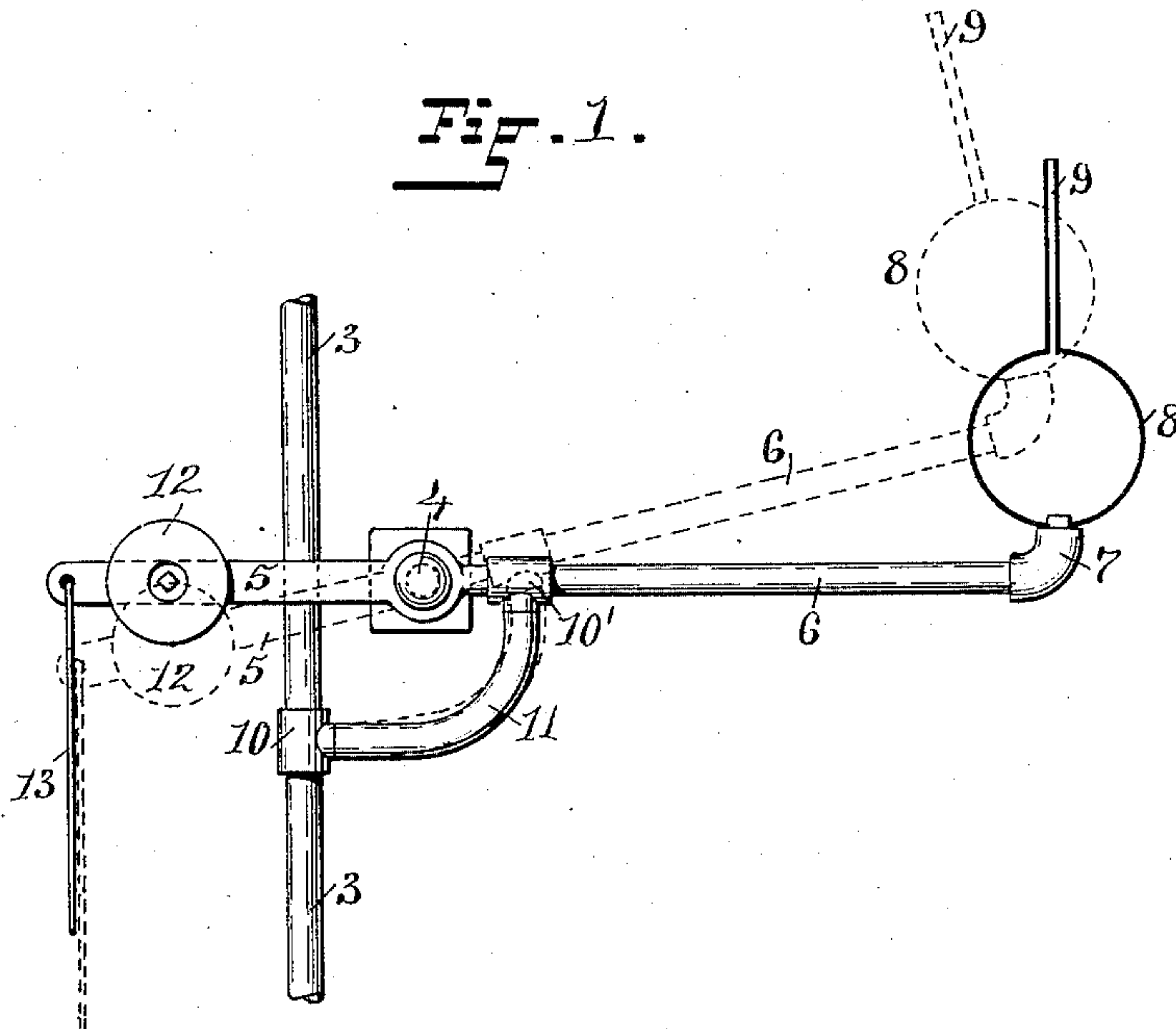


Fig. 2.

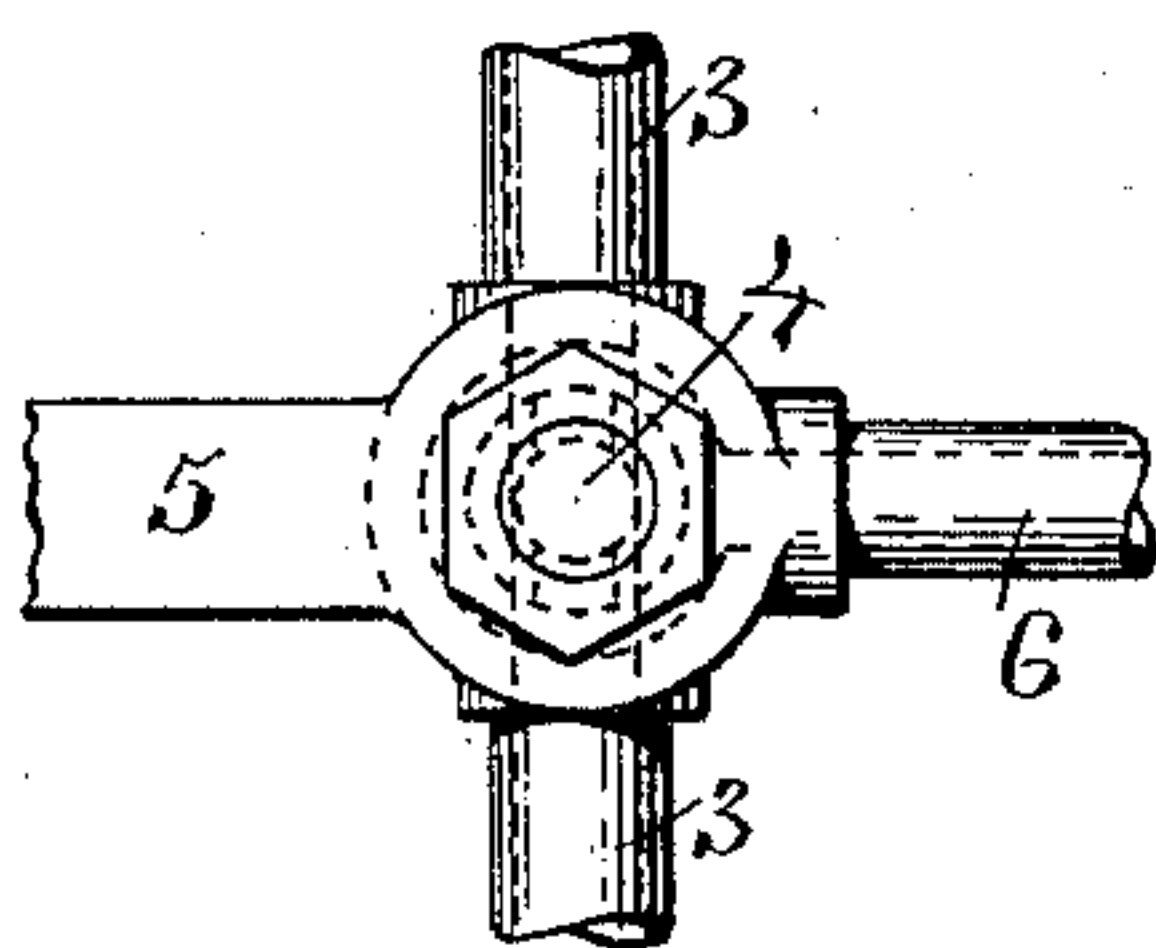
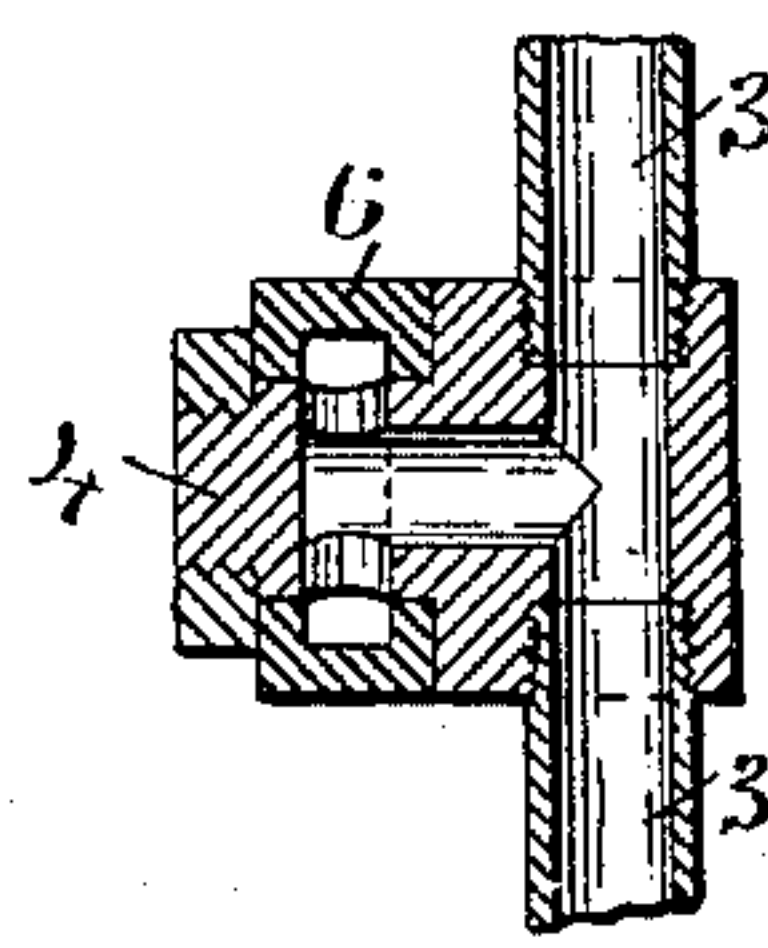


Fig. 3.



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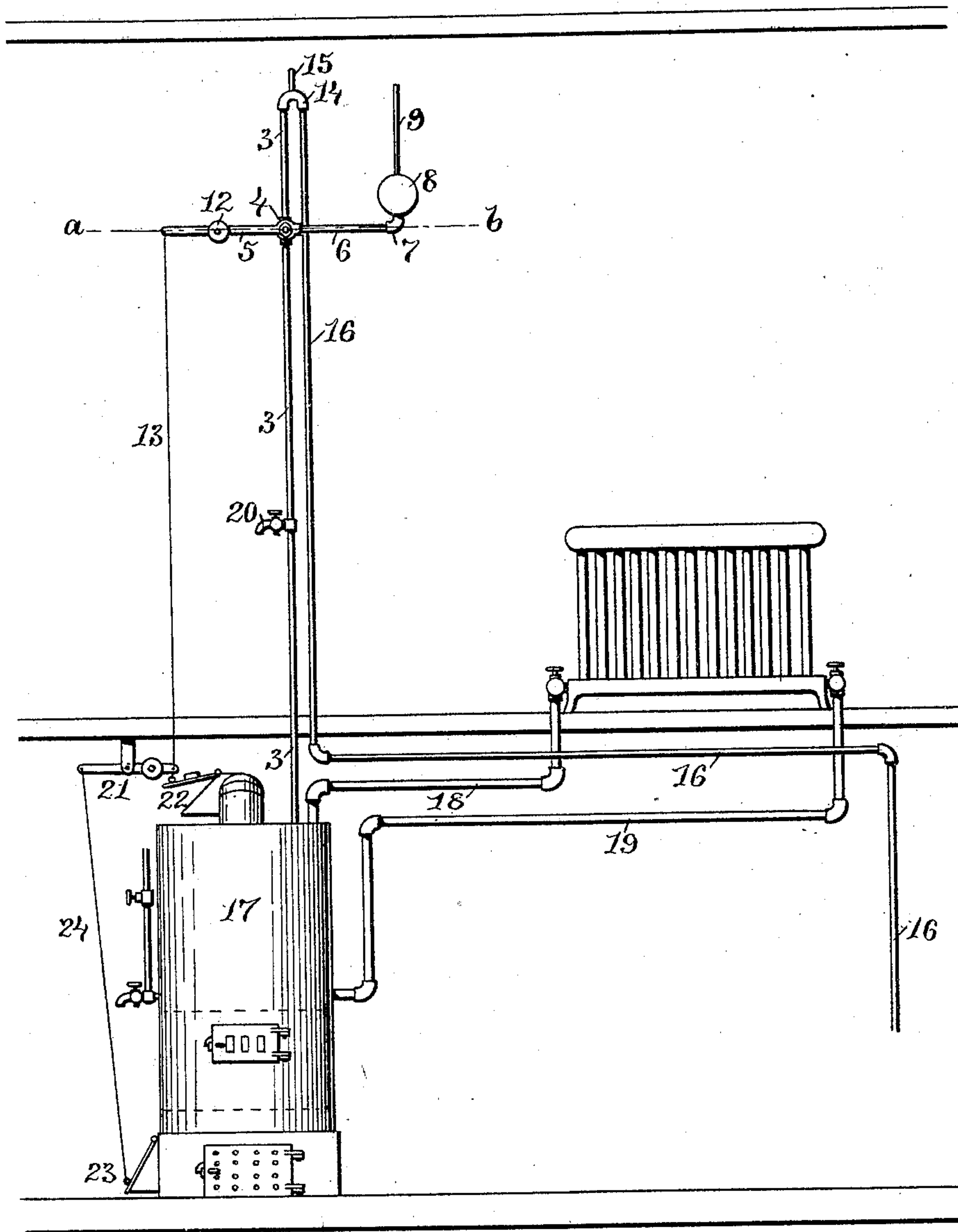
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2 Sheets—Sheet 2.

No. 462,005.

Patented Oct. 27, 1891.

Fig. 4.



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UNITED STATES PATENT OFFICE.

BENJAMIN A. HAWKINS, OF SAYLESVILLE, RHODE ISLAND.

AUTOMATIC REGULATOR.

SPECIFICATION forming part of Letters Patent No. 462,005, dated October 27, 1891.

Application filed December 17, 1890. Serial No. 375,024. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN A. HAWKINS, of Saylesville, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Automatic Regulators; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in automatic regulators for hot-water systems.

The object of this invention is to produce an automatic regulator which will be simple in construction and which will operate automatically to regulate the draft supplied to the fire-box of the boiler. To attain this end, I have invented certain novel features of construction and peculiar combination of parts, which will be more fully described hereinafter, and pointed out in the claims.

Figure 1 is a view of the improved regulator, showing one method of connecting the hollow arm of the lever with the pipe extending from the boiler to the expansion-tank. Fig. 2 is a view of a swivel connection, which may be used to connect the hollow arm of the regulator-lever directly with the rising pipe; and Fig. 3 is a sectional view of the same. Fig. 4 represents a view of a hot-water-heating system with the improved regulator pivoted to the expansion or rising pipe.

In the drawings, 3 indicates a perpendicular pipe, which extends from the boiler upward to a point above the level of the highest radiator of the heating system, and has an air-inlet and an outlet at the top. At a point on this pipe at or nearly at the normal water-level and represented in the drawings by the broken line *a b*, a lever is pivotally secured to a bracket by the pivot 4. This lever is formed of a short solid arm 5, and a longer hollow arm 6, which is connected by the elbow 7 with the hollow metal ball 8, provided with the air-tube 9. The rising pipe 3 is provided with a T-connection 10, to which the flexible hose 11 is secured, and extends to a similar T-connection 10' in the hollow arm 6 of the lever, thus providing a passage for water from the rising pipe 3 to

the hollow arm 6. In place of pivoting the lever to a bracket the lever may be pivoted directly to the rising pipe 3, and the pivot 4 may be constructed, as shown in Figs. 2 and 3, to serve as a connection between the rising pipe 3 and hollow arm 6, through which water may pass from one to the other. The arm 5 of the lever is provided with a sliding weight 12, which may be moved along the arm 5 to overbalance the weight of the hollow ball 8. To the end of the arm 5 a wire or chain 13 is secured, which connects with and operates the draft-damper of the boiler.

In Fig. 4 the improved automatic regulator is shown in connection with a hot-water-heating system, and the lever 6 is pivoted directly to the expansion or rising pipe at about the ordinary water-level *a b*. This expansion or rising pipe 3 has a return-bend 14, provided with an air-inlet 15, and connected with the drip-pipe 16, extending to the basement or to any accessible sink where the slight drippings which may be carried over the bend 14 may be deposited. In actual practice these drippings have been so slight that it is not necessary to provide a receptacle for them. The expansion-pipe 3 is connected directly with the boiler 17 and extends upward therefrom, while the circulating-pipe 18 conveys heated water to the radiators, this water being returned to the boiler 17 by the pipe 19. At a convenient height I sometimes secure a faucet 20 to the pipe 3, and by this means am able to reduce the water-line in this pipe below the broken line *a b*. The wire or chain 13 is connected with the weighted end of the lever 21, this end of the lever being also secured to the back-draft 22, the opening of which creates a draft from the cellar to the flue, while the draft 23, connected by the wire or chain 24 with the unweighted end of the lever 21 regulates the draft through the fire-box of the boiler. It will be apparent that when the water rises in the hollow ball 8 and overbalances the weighted end of the lever 6, the chain 13 will be drawn upward, opening the draft 22 and closing that marked 23. After the water has run out of the ball the weight 12 will tend to depress the end of the lever 6 on which it is carried, partially opening the lower draft 23 and

at the same time partially closing that marked 22.

The operation of the improved automatic regulator is as follows: When the fire under
5 the boiler is started, the draft will be open and the position of the regulator-lever and apparatus will be that indicated by dotted lines in Fig. 1. As the water in the boiler becomes heated it expands and rises in the
10 pipe 3 until it reaches and passes through the flexible hose 11, or through the pivotal connection 4, when that is used, and hollow arm 6, and enters the hollow ball 8, filling the same, the weight of the water added to that
15 of the ball will overbalance the weighted arm 5 and will move downward, thus moving the end of the arm 5 upward, drawing the chain or wire in that direction and closing the damper and reducing the draft on the fire.
20 As the temperature of the water in the boiler is reduced the water runs back from the ball 8 through the arm 6 and hose 11 or pivotal connection 4 into the pipe 3. As the weight on the arm 5 is greater than that of the
25 empty ball 8, the arm 5 now moves downward, slacking the chain or wire 13 and allowing the damper to open and admit draft to the boiler-furnace. By supplying the ball 8 with the air-tube 9 the air in the ball can
30 be forced out when water enters the ball and is again admitted when the water runs back into the pipe 3.

My improved automatic regulator may be used with or without an expansion-tank, and the ball 8 may be of such a size as will serve
35 as an expansion-tank, if desirable.

When an expansion-tank is used in combination with my improved regulator, it is placed above the level of the ball 8, so that
40 it will only receive the surplus water after the ball is filled and before the expansion of the water has ceased.

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

1. In an automatic regulator, a counterbalanced lever having a hollow arm connected with the rising pipe of a hot-water system through which water is forced into a hollow
50 ball or vessel to overbalance the weighted arm of the lever and operate the damper, as described.

2. In an automatic regulator, the combination, with the rising pipe 3, of a pivot-supported lever having a weighted arm 5, a hol-
55 low arm 6, connected with the pipe 3 by the hose 11, and the hollow ball 8, supplied with the air-tube 9, as and for the purpose described.

BENJAMIN A. HAWKINS.

Witnesses:

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