

(No Model.)

2 Sheets—Sheet 1.

J. E. BECKMAN.

APPARATUS FOR AUTOMATICALLY CONTROLLING MOTIVE POWER FOR
SUPPLYING AIR TO FURNACES:

No. 537,264.

Patented Apr. 9, 1895.

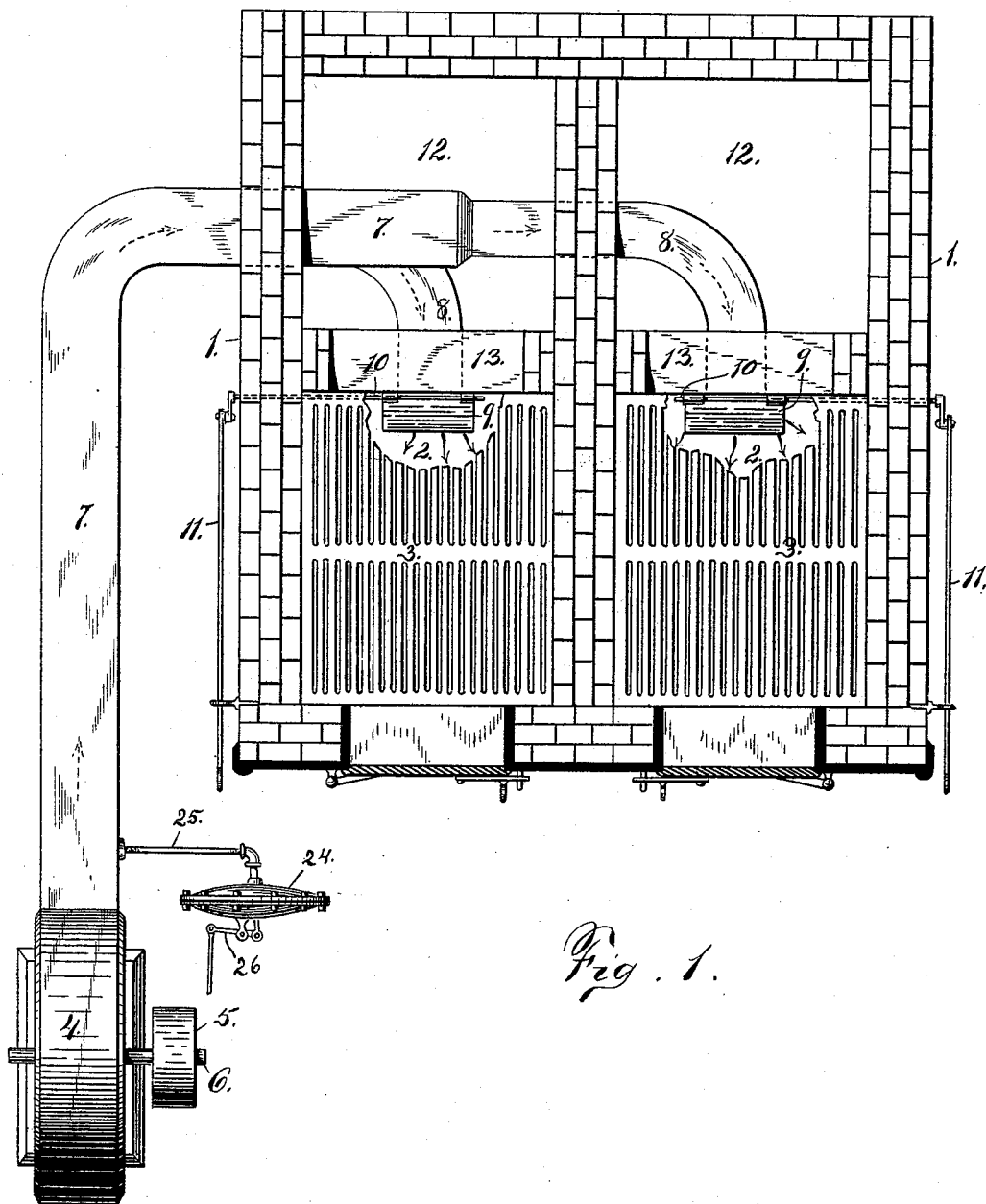


Fig. 1.

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(No Model.)

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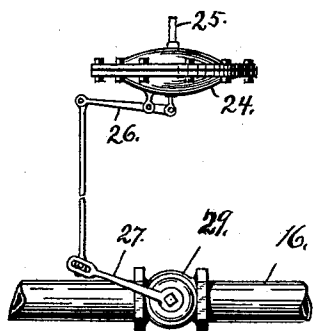
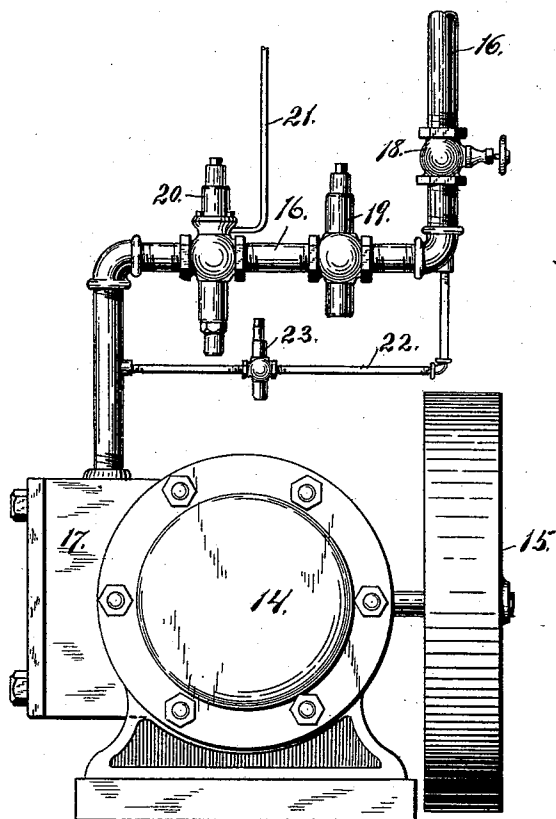


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN E. BECKMAN, OF BUFFALO, NEW YORK, ASSIGNOR OF THREE-FOURTHS
TO WILLIAM E. WOOLLEY, HENRY M. GERRANS, AND GEORGE H. WOOL-
LEY, OF SAME PLACE.

APPARATUS FOR AUTOMATICALLY CONTROLLING MOTIVE POWER FOR SUPPLYING AIR TO FURNACES.

SPECIFICATION forming part of Letters Patent No. 537,264, dated April 9, 1895.

Application filed January 27, 1894. Serial No. 498,170. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. BECKMAN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Apparatus for Automatically Controlling the Motive Power that Supplies Air to Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in the feeding of a forced draft to furnaces and more particularly to the automatic regulation of said forced draft.

The object of my present invention is to automatically regulate this blast of air to the furnace by the pressure of the steam in the boiler and to that end it consists in a novel arrangement of parts connected directly to the boiler and to the steam supply pipe leading from the boiler to the motor employed for operating the fan, by means of which its speed is automatically regulated by the pressure of the steam in the boiler.

I will now proceed to definitely describe the manner in which I have carried out my invention and then claim what I believe to be novel.

In the drawings, Figure 1 is a plan view showing the settings of a battery of two boilers taken just above the bridge-wall and showing the arrangement of forced blast passages leading from a fan or blower. Fig. 2 is an end view of the steam engine employed for operating the blower, showing the automatic regulating apparatus connected to the steam supply pipe; and Fig. 3 is a top-plan view of the regulating valve upon the supply-pipe with automatic attachment for limiting the pressure supply by means of the blast pressure.

Referring to the drawings, 1 is the setting of the boiler in which are arranged the ash pits 2, fire boxes 3 and combustion chambers 12.

4 is a fan or blower for generating the artificial blast, which is carried through the pas-

sage 7 to the furnace where it passes into the ash pits 2 through the reduced passages 8. 8. which pass through the bridge walls 13. 13. At the mouths of these passages 8. 8. are arranged the dampers 9. 9. hinged to the rods 10. 10 and operated by the connecting rods 11. 11.

The motive power is imparted to the blower 4, through the belt pulley 5, mounted upon the shaft 6, with the fan.

The construction thus far described is of old and well known form and to this arrangement of parts I apply the motor for operating the fan which is regulated automatically by the pressure from the boiler and the pressure of air in the blast passage. (See Fig. 2.)

14 is the engine for operating the blower to which it is connected by belt (not shown) passing over the pulleys 15 and 5.

16 is the supply pipe leading to the steam-box 17. In this pipe 16 are arranged the throttle valve 18, and the regulating valves 19 and 20. Leading into the regulating valve 20 is the pipe 21 which is connected directly with the boiler pressure.

22 is an auxiliary passage or by-pass provided with the valve 23 so as to permit sufficient steam to pass into the cylinder to keep the engine in motion when the steam is entirely shut off by the regulating-valve 20. Instead of the pipe 22 a by-pass could be made in the regulating valve 20.

The regulating valve 19 as represented in Fig. 2, is adapted to be regulated by hand, but in Figs. 1 and 3 I have shown an improved attachment by means of which the valve 19 substituted for the valve 19 in Fig. 2 may, if deemed desirable, be automatically regulated from the blast pressure. In such figures 24 is a chamber one side of which is connected by pipe 25 with the blast passage 7. The diaphragm is connected with a pivoted lever 26 which latter is loosely connected with the arm 27 rigidly secured to the valve 19. The action of the blast pressure, through pipe 25, upon the diaphragm in chamber 24 serves to automatically regulate the action of this valve, and in this manner the speed of the motor is automatically controlled direct from the blast pressure. The diaphragm employed should

necessarily be of large size and of such a sensitive nature as to quickly respond to the variations in the blast pressure.

In operation the regulating valve 19 is first set so as to permit sufficient steam to pass through it to give the highest rate of speed desired to the fan, and the valve 23 in the auxiliary passage or by-pass 22 is set to give the lowest rate of speed desired or just sufficient to generate enough blast to keep the grate-bars from burning and keep the crank arm of the engine off its center. The engine is started by opening the throttle 18, and as the pressure in the boilers is increased it is communicated through the pipe 21, to the pressure regulator 20 causing it to close, thus reducing the speed of the engine which is now being fed through the auxiliary passage or by-pass 22. As the pressure of the boilers is reduced the regulating valve 20 is opened thus increasing the speed of the engine and likewise the force of the blast, up to the established pressure. In this manner a steady blast of air is maintained at all times.

The valves 19, 20 and 23 are individually of well known form and therefore not shown in detail as others might be substituted.

While my invention is herein shown as applied to stationary boilers it can equally well be applied to all other classes of boilers such as locomotive, marine, &c.

The primary object of this invention is to automatically regulate the motive power which produces the artificial blast by the pressure of the boilers and the blast pressure and should it be found desirable to arrange an automatic regulator to manipulate rheostats connected to an electric motor for operating the blower the same result may be effected.

I claim—

1. An automatic apparatus for regulating the motive power for supplying an artificial draft under furnaces consisting of a fan or blower, an engine for driving the fan, a valve in the supply pipe of the engine, a separate pipe connected with the pressure of the boiler and adapted to close this valve in the supply pipe completely at a certain boiler pressure, and a by-pass valve for permitting a small flow of pressure through or by said regulating valve, as and for the purpose set forth.

2. An automatic apparatus for regulating the motive power for supplying an artificial

draft under furnaces consisting of a fan or blower, an engine for driving the fan, a valve in the supply pipe of the engine, and a separate pipe connected with the pressure of the boiler and adapted to close this valve in the supply pipe completely at a certain boiler pressure, as and for the purpose set forth.

3. An automatic apparatus for regulating the motive power for supplying an artificial draft under furnaces consisting of a fan or blower, a motor for driving the fan, a regulating valve in the supply pipe of the motor connected with and adapted to be operated by the pressure of the boiler, a by-pass for permitting a small flow of pressure through or by said regulating valve, a second regulating valve in the supply pipe, a diaphragm chamber one side of which is connected with the blast pressure and the diaphragm of which controls a lever, and connections between said lever and second valve for automatically operating the latter by the blast pressure, as and for the purpose set forth.

4. An automatic apparatus for regulating the motive power for supplying an artificial draft under furnaces consisting of a fan or blower, an engine for driving the fan, a regulating valve in the supply pipe of the engine connected with and adapted to be operated by the pressure of the boiler, a second regulating valve in the supply pipe of the engine, and means for automatically operating this valve by blast pressure, as and for the purpose set forth.

5. An automatic apparatus for regulating the motive power for supplying an artificial draft under furnaces consisting of a fan or blower, a motor for driving the fan, a regulating valve in the supply pipe of the motor connected with the pressure of the boiler and adapted to close completely at a certain steam pressure, a by-pass and valve for permitting a small flow of pressure through or by said regulating valve, and a second automatically-operated reducing valve in the supply pipe of the engine, as and for the purpose set forth.

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

JOHN E. BECKMAN.

Witnesses:

W. T. MILLER,
O. E. HODDICK.