

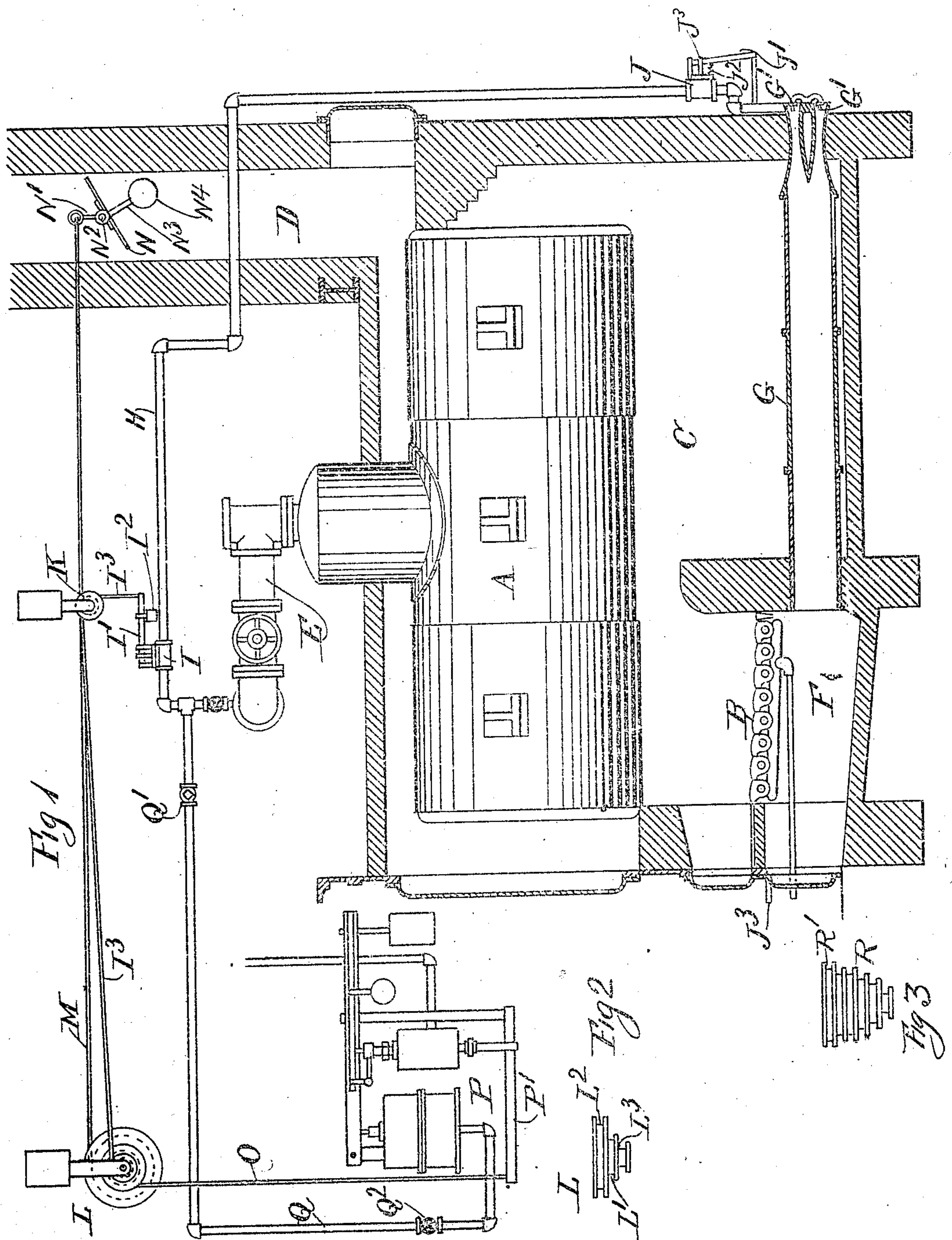
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C. T. COE.

BALANCED DRAFT APPARATUS FOR FURNACES.

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BALANCED DRAFT APPARATUS FOR FURNACES.

No. 837,609.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES T. COE, a citizen of the United States, and a resident of Kearney, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Balanced Draft Apparatus for Furnaces, of which the following is a specification.

This invention relates to improvements in a balanced draft apparatus applicable to furnaces. Its organization comprises a regulator controlling a damper and a blower, either with the same or different amounts of movement, the regulator being operated by a fluid-like steam, the pressure of which is dependent upon the heat of the furnace.

The invention is specifically applicable to steam-boilers where a balanced forced draft is to be maintained. The air supplied to the furnace is practically maintained at atmospheric pressure in the fire-chamber. The position of the damper in the chimney or flue of a boiler with this invention prevents all suction in said chimney or flue, and the blower acting in conjunction with said damper allows just a sufficient quantity of air to pass through the furnace at the requisite rate of speed to supply air for the combustion of the fuel in an efficient manner. The temperature of the furnace is not reduced by an influx of too great a quantity of air, and the velocity of the burning gases is maintained at a speed which yields a greater number of heat units than with the ordinary appliances of a furnace and whether the latter is burning fuel with or without forced draft.

The mechanical elements of the invention are exemplified in the accompanying drawings, in which—

Figure 1 shows a boiler with its furnace and chimney in section and the appurtenances of the invention connected therewith. Fig. 2 shows a plan view of a stepped or cone pulley shown in elevation in Fig. 1. Fig. 3 shows a plan view of a modification of the stepped pulley.

A boiler A is shown with its grates B, fire-chamber C, chimney D, steam-outlet piping E, and ash-pit F. A blower-pipe G extends through the lower portion of the boiler-setting, with its outlet terminating in the ash-pit F. Steam-supply piping H is fitted with the automatically-controlled inlet-valve I and hand-controlled valve J, the latter valve

having connected thereto the handle J'. The valve I has the lever I' with the weight I², and the chain or cord I³ passes over a guide-pulley K and then leads to one of the steps L' of the stepped pulley L. The valve J has the lever J', spring J² to keep the valve open, and the valve-rod J³. From the step L² of the pulley L extends the chain or cord M, that leads over the double-grooved pulley K and is secured to the arm N' of the damper N, the latter being fulcrumed on the spindle N² and having the arm N³ with the counterweight N⁴. From the step L³ of the pulley L extends the chain or cord O, that is fastened to the lever P' of the regulator P. Piping Q with the valves Q' and Q² connects the piping E with the regulator P.

To operate the invention, the inlet-valve I is set so that the normal pressure to be used will keep it off of its seat to allow sufficient steam to issue from the jets G' of the blower to maintain a normal draft and balanced air-pressure through the fire on the grates B and into and through the fire-chamber C and chimney D. The damper at the same time is maintained at an inclination by means of the chain M to preserve this condition of the pressure of the air and allow the escape of the products of combustion. Should the steam-pressure in the boiler fall below the normal pressure, the said lower pressure of steam acting with the regulator P increases the opening through the valve I and increases the jets of steam forced through the blower-pipe G, thereby increasing the draft and at the same time the chain M will move the damper N, so as to obtain a greater area of opening through the chimney D. The chains M and I³ are moved by the rotation of the stepped pulley L, which latter is operated by means of the chain O and lever P' of the regulator. Should the pressure rise, the reverse operations will take place by reason of the pulley L being turned in an opposite direction, thereby tending to close the valve I and the damper N.

It will be noted that with the pulley having the steps or cones of different diameters the stroke of the lever P' of the regulator is transmitted to the same, and from the pulley different strokes are obtained for the valve I and damper N. The pulley could have more steps than shown, so as to give a greater or less movement to either the said valve I or the damper N. The stepped pulley could

be made, as shown in Fig. 3, with some of the steps R' of the pulley R of the same diameter.

Having described my invention, I claim—

5 1. In a balanced draft apparatus the combination of a boiler, a furnace for the boiler, a flue for the furnace, a damper in said flue, a blower for the furnace, a valve for the blower, a regulator operated by the steam-
10 pressure of the boiler, an element between the regulator and the said valve and the said damper, with which the two latter elements can be given different amounts of move-
15 ments with variations of the said steam-pressure.

2. In a balanced draft apparatus the combination of a boiler, a furnace for the boiler, a flue for the furnace, a damper in said flue, a blower connected with the furnace, a regu-
20 lator connected with the boiler, a valve for the blower, a pulley with steps of different diameters journaled between the regulator and said damper and said valve, a connection between the regulator and one of the steps of
25 the pulley, a connection between another step of the pulley and the damper, a connection between a third step of the pulley and the said valve to enable the said blower and said valve to be operated simultaneously.

30 3. In a balanced draft apparatus the combination of a furnace, a flue for the furnace, a damper in said flue, a blower for the furnace, an inlet-valve for the blower, a regulator, a

pulley with steps of different diameters journaled between the regulator and the damper 35 and the inlet-valve of the blower, a chain extending from the regulator to one of the steps of the pulley, a chain extending from a step of the pulley to the damper, and a chain extending from one of the steps of the pulley 40 to the inlet-valve of the blower, to enable the blower and the valve to be operated simultaneously.

4. In a balanced draft apparatus the combination of a steam-boiler, a furnace for the 45 boiler, a flue for the furnace, a damper in said flue, a jet-blower connected up with the furnace, a regulator connected with the boiler, a steam-inlet valve connected with the blower, a pulley with steps of different diameters 50 journaled between the regulator and the said damper and said inlet-valve for the blower, a chain extending from the regulator to one of the steps of the pulley, a chain extending from a step of the pulley to the damper, and 55 a chain extending from one of the steps of the pulley to the inlet-valve of the blower, to enable the blower and the valve to be operated simultaneously.

Signed at New York, in the county of New 60 York and State of New York, this 19th day of December, A. D. 1905.

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