No. 670,739.

Patented Mar. 26, 1901.

J. A. SELPH.

DRAFT REGULATOR.

(Application filed Nov. 5, 1900.)

(No Model.)

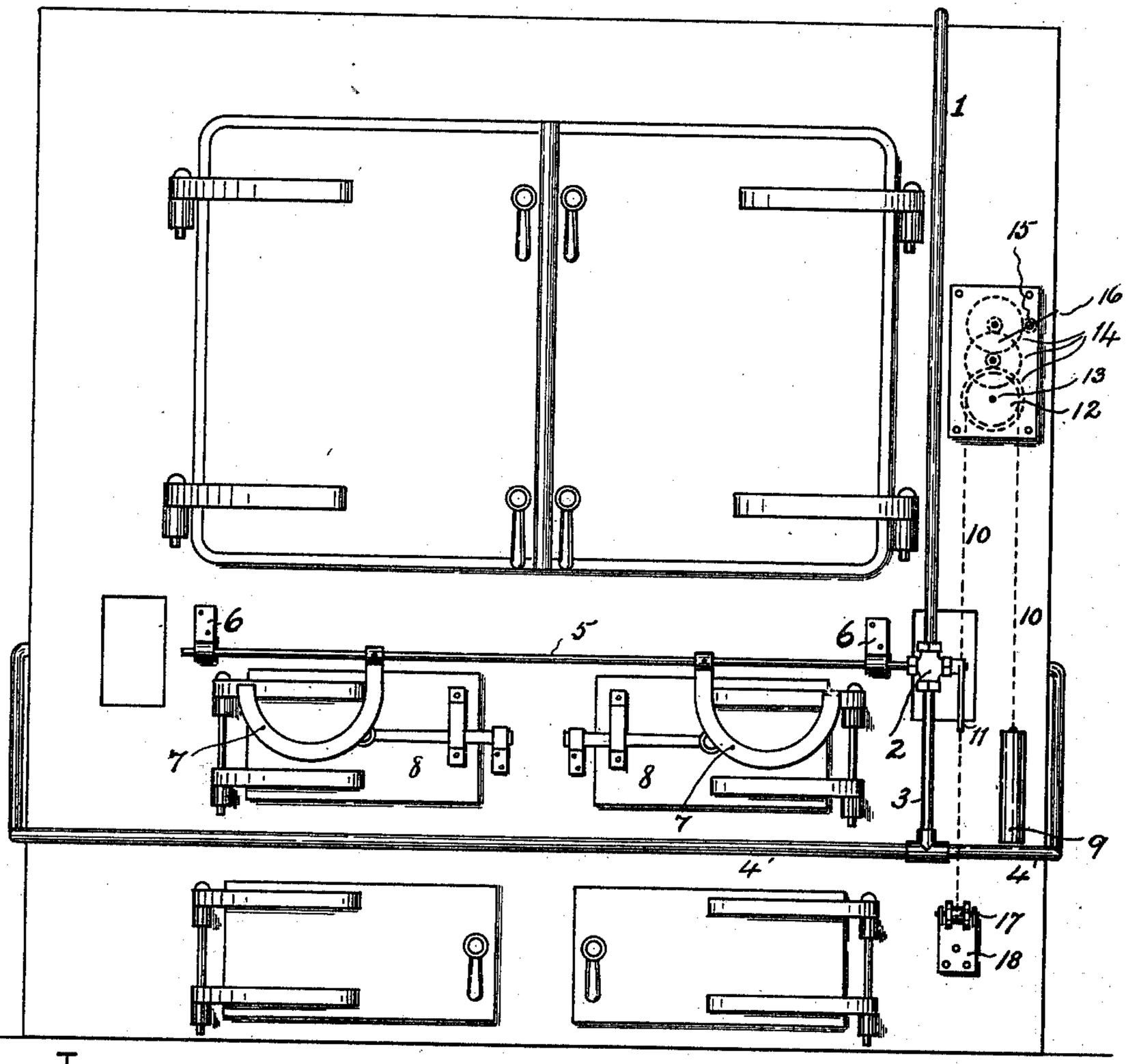

FIG. I.

FIG. IV.

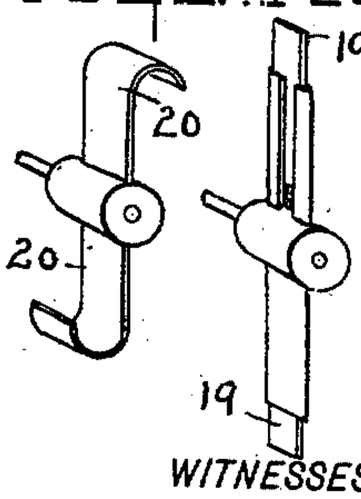

FIG. III.

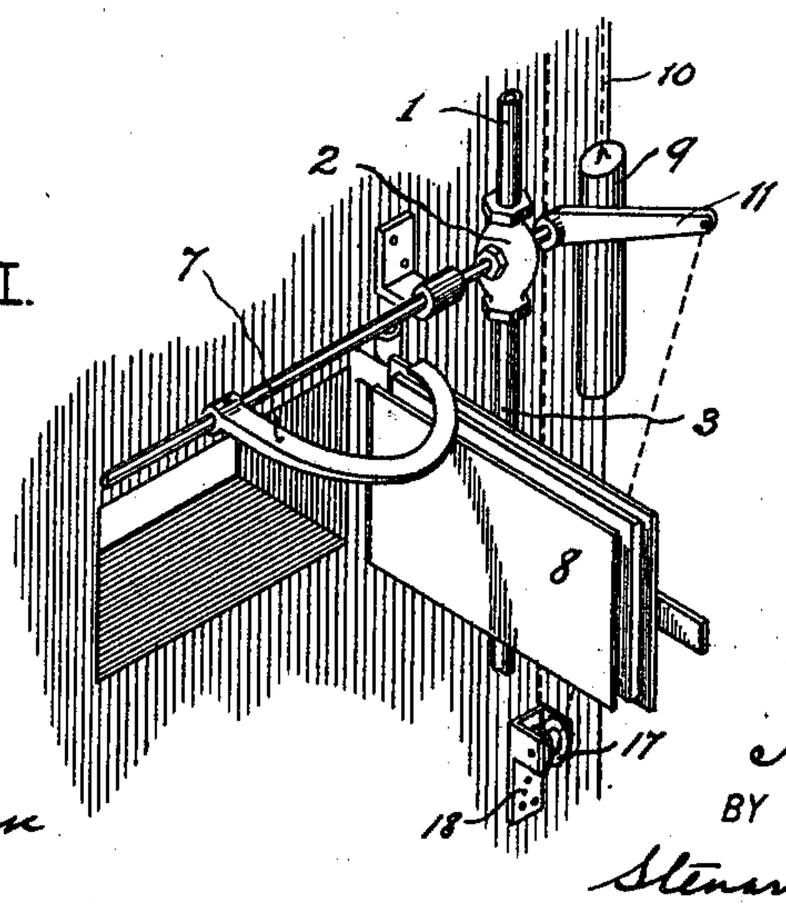

FIG. II.

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UNITED STATES PATENT OFFICE.

JOHN A. SELPH, OF RICHMOND, VIRGINIA, ASSIGNOR TO ELMER M. CRUTCHFIELD, OF SAME PLACE.

DRAFT-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 670,739, dated March 26, 1901.

Application filed November 5, 1900. Serial No. 35,488. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. SELPH, a citizen of the United States, and a resident of Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Draft-Regulators, of which the following is a specification.

My invention relates to devices for increasing the draft in boiler-furnaces by the introduction of steam or air, or both, to the furnaces when necessary in order to obtain a more complete combustion of the fuel, and particularly to devices for increasing and controlling the increase of the draft to boiler-furnaces whenever fresh fuel is added to the fire; and it has for its object the provision of simple and effective means which may be attached to any boiler and whereby steam or air, or both, may be admitted to the boiler-furnace when desired, the operation of the said means being under perfect control.

Devices have heretofore been constructed for controlling the increase of draft in boiler-furnaces, but with many of them the control of the increase of the draft has been but imperfectly effected, while with others, though the draft may be successfully increased, the control of that increase has not been obtained at all. It is essential when steam or air, or both, has been admitted to a boiler-furnace for the purpose of assisting in the complete combustion of the gases and carbon rising from freshly-fired fuel that the admitted steam or air should be positively shut off after the furnace-doors are closed. It is also essential that this shutting off should be gradual and that the speed with which it is accomplished should be under control. These essentials to successful operation are provided for in my device.

In the drawings which accompany and form a part of this specification, and in which like numerals refer to like parts in the different views, Figure I is a front elevation of a boiler with my device attached. Fig. II is a detail in broken perspective, showing the valve and the method of operating the same. Figs. III and IV are details showing forms of the adjustable fan.

In Figs. I and II, 1 is a steam-pipe leading from the dome of the boiler and connected by the cock 2 with the pipes 3 and 4 4, the latter being arranged so that they may deliver steam to inject air to the furnaces or so that they may deliver steam or steam and air below the fires. The principal object of my invention being to supply air above the fires whenever fresh fuel is added to the latter, in the drawings I have shown the pipes 4 4 arranged so that the steam may force air into the furnaces. To the plug of the cock 2 there is directly attached a rod 5, which rod is carried in brackets 6 6, attached to the boiler-front, the rod being free to turn in the brackets 6 to turn the plug of the cock 2. Fixed on the rod 5 are arms 7 7, which are so arranged that when either of the furnace-doors 8 8 is opened the corresponding arm 7 being lifted (see Fig. II) will turn the rod 5, and consequently the plug of the cock 2, and so allow steam to pass through the latter to the pipes 3 and 4 4.

In the drawings the parts are shown arranged so that when either furnace-door is opened steam will be turned on at both sides of the boiler. Such an arrangement may not always be desirable. If it is desired that steam shall only be admitted on that side of the furnace which has been fired—supposing only one side has been fired—all that is necessary is to duplicate the system, connecting one with each fire-door, instead of having both fire-doors connected with one system. The closing of the cock 2 is effected by means of a falling weight 9, which may be assisted by the weight of the arms 7 7, the latter being made heavy for that purpose. The weight 9 is attached to one end of the chain 10, the other end of which is attached to a lever 11, fixed on one end of the plug of the cock 2.

Referring again to Fig. II, it will be seen that so long as the fire-door 8 is kept open the cock 2 cannot close, for the arm 7 rests upon the top of the door 8, and therefore cannot fall, nor can the lever 11 fall until the door 8 is closed, since it is rigidly connected through the plug of the cock 2 and the rod 5 with the arm 7; and it will also be seen that as soon as the door 8 is closed the arm 7 and weight 9 will be free to act, respectively, upon the rod

5 and lever 11 to close the plug in the cock 2; but it is essential to the successful operation of the device that the cock 2 should be closed very gradually. This of course could not be done if the weight 9 were allowed to act directly upon the lever 11. Therefore the chain 10, which connects the weight 9 with the lever 11, is passed over a sprocket or chain wheel 12, which is mounted on the shaft 13 of one of a train of wheels 14. The last wheel of the train is made to gear with a pinion which is mounted on a shaft 15, in the outer end of which shaft there is cut a slot to receive a fan-blade 16. The fan-blade is not fixed rigidly in the slot in the shaft—that is to say, it is held in position by the grip of the sides of the slot. This method of attaching the fan-blade enables one to readily change it for a longer or a shorter one, as desired, or, instead of having fan-blades of different lengths and attaching them in the manner described above, an adjustable fan-blade can be rigidly fixed to the shaft 15, the blade being adjustable as to its length by having adjustable sliding pieces 19, Fig. III, attached to its ends, or, preferably, by making it of some pliable metal, such as sheet-copper, so that its ends may be turned up (see 20, Fig. IV) or straightened out to respectively shorten or lengthen it.

The object of making the fan-blade adjustable as to its length is as follows: The longer the fan-blade the slower will the weight 9 be in falling, and consequently the longer will be the time during which steam is allowed to pass through the cock 2. With some classes of fuel it is necessary to have the extra draft turned on for a longer time than with others, and, again, given one class of fuel the firing may be heavy or light, according to circumstances. When heavy, the extra draft must be turned on for a longer time than when the firing is light, because in the former case gases are given off for a longer time than in the latter case.

In order that the chain 10 may exert a pull on the lever 11 in the proper direction after passing from the weight 9 over the chain-wheel 12, it is led around a pulley 17, mounted in a bracket 18, which is attached to the boiler-front below the lever 11, and thence to the lever.

One advantageous feature of my device is (as will be seen from Fig. II) that no matter how long the fire-door is kept open the cock 2 will be full open for that length of time. Another feature is that when the fire-door has been opened it will remain open, for no part of my device acts upon it in such a manner as to close it, a grave fault to be found in many similar devices; another is that the closing of the cock 2, and consequently the time in which steam is shut off from the draft-openings, is fully under control and may be easily regulated to suit different classes of fuel or different methods of firing; yet another is that owing to the fact that the furnace-door is not connected in any way with the arms 7 7 the steam may be turned on at any time and to any amount by simply raising either of the arms 7 by hand. Thus I can, if I wish, keep on a certain amount of blast all the time by raising the arms 7 the proper distance and securing them in position by any suitable means, such as a suspended chain. This would not interfere in any way with the operation of the device when a fire-door was opened, for the opening door would strike the partly-raised arm and raise it still farther, thus opening the valve fully, and as soon as the door was closed the arm would gradually drop again until its fall was arrested by the chain.

Though I prefer to construct my device as above described and as shown in the drawings, its arrangement admits of some modifications. For instance, as I have stated hereinbefore, each door may be arranged to operate independent and separate blast devices. Also the lever 11 instead of being attached directly to the plug of the valve may be attached to the rod 5 at any convenient point, preferably at a point between the valve and the nearer one of the brackets 6.

Having now described my invention, what I claim, and desire to protect by Letters Patent of the United States, is—

1. The combination with a furnace and a hinged door therefor, of blast-jets, a valve for controlling the blast, a rod rotatably mounted in bearings and connected with the plug of the valve, an arm attached to the rod and so arranged that when the door is opened it will be operated by the door to rotate the rod and so turn the plug of the valve to open the latter, and also so that it will keep the valve full open so long as the door is open, a lever connected to the plug of the valve, a weight connected with the lever to gradually close the valve, a train of wheels located between the lever and the weight and arranged to be operated by the means connecting the lever and weight, and a rotatable fan-blade adjustable as to its length to adjustably control the movement of the train of wheels and the operation of the weight, substantially as described.

2. The combination with a furnace, a hinged door therefor, of blast-jets, a valve for controlling the blast, a rod rotatably mounted in bearings and connected with the valve in such a manner that when the rod is rotated in one direction the valve will be opened, an arm attached to the rod and lying in the path of the door and adapted to be lifted by the opening door to rotate the rod to open the valve and adapted to hold the rod to keep the valve open as long as the door is open, a lever attached to the rod, a weight connected with the lever and adapted to operate the lever to slowly turn the rod to gradually close the valve after the door is closed, a train of

wheels located between the lever and the weight and arranged to be operated by the means connecting the lever and the weight, and rotatable fan-blades adjustable as to their length to adjustably control the movement of the train of wheels to control the operation of the weight.

Signed at Washington, District of Columbia, this 29th day of October, A. D. 1900.

JOHN A. SELPH.

Witnesses:
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