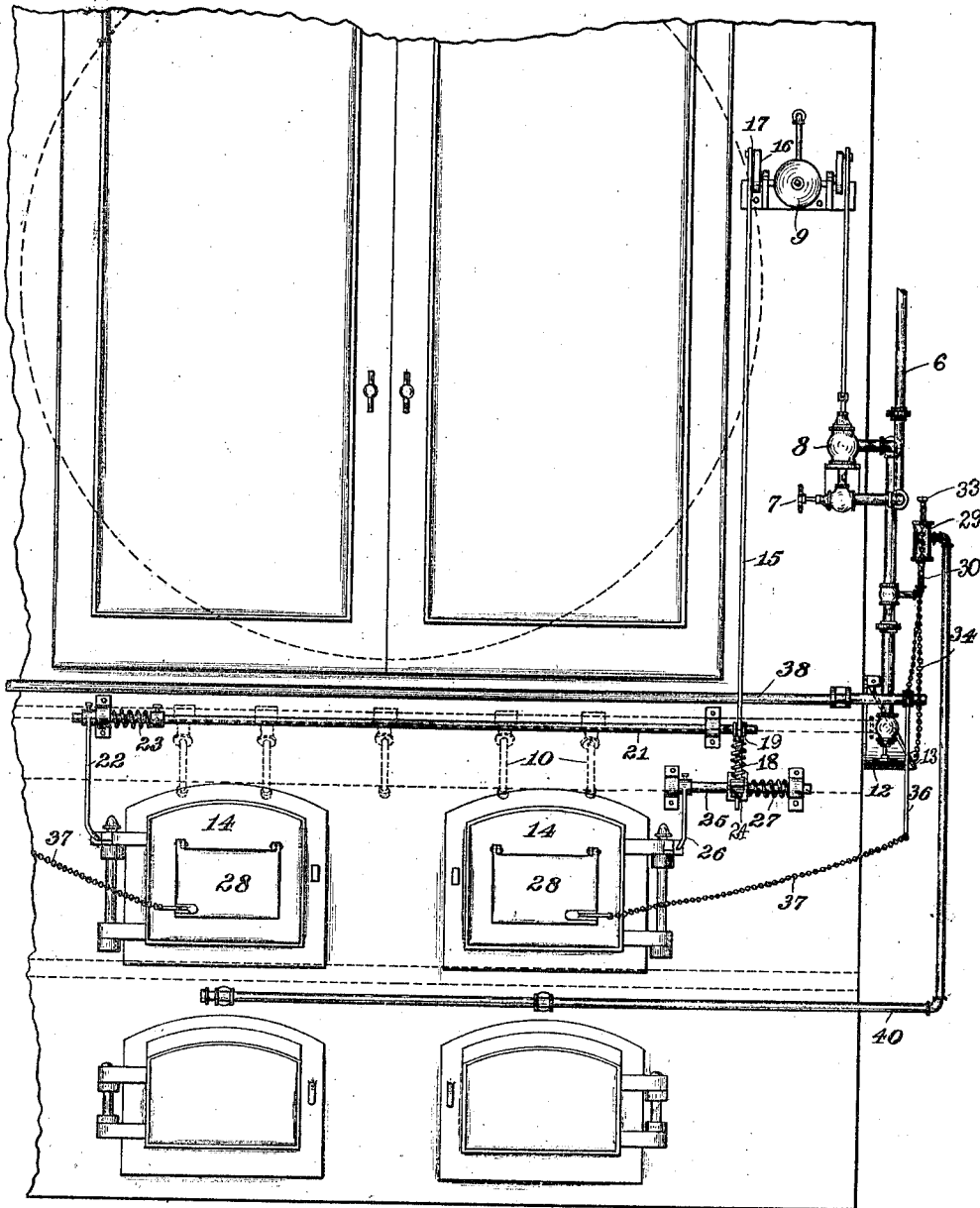


G. A. GUSTAFSON.
 STEAM AND AIR FEEDING DEVICE FOR FURNACES.
 APPLICATION FILED MAR. 7, 1911.

1,029,680.

Patented June 18, 1912.

2 SHEETS—SHEET 1.



WITNESSES:

Edith Smith

FIG. 1.

INVENTOR

Gustaf A. Gustafson.

BY

W. E. Jew

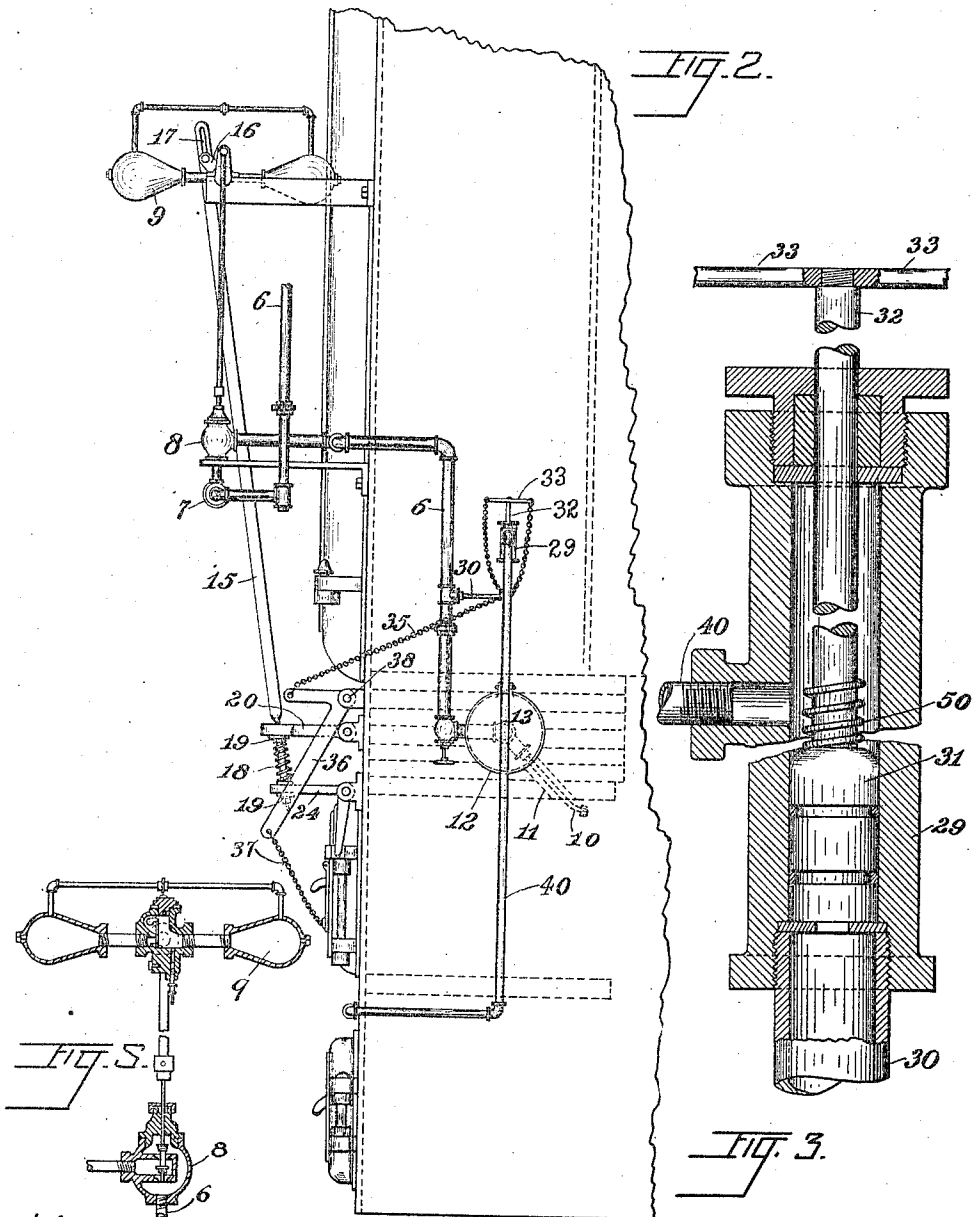
ATTORNEY

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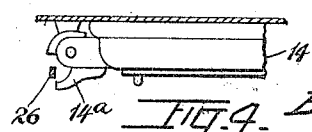


FIG. 4.

INVENTOR
 Gustaf A. Gustafson.

BY *[Signature]*
 ATTORNEY

UNITED STATES PATENT OFFICE.

GUSTAF A. GUSTAFSON, OF CHICAGO, ILLINOIS.

STEAM AND AIR FEEDING DEVICE FOR FURNACES.

1,029,680.

Specification of Letters Patent.

Patented June 18, 1912.

Application filed March 7, 1911. Serial No. 612,967.

To all whom it may concern:

Be it known that I, GUSTAF A. GUSTAFSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam and Air Feeding Devices for Furnaces, of which the following is a specification.

This invention relates to devices for feeding air or steam, or both, to furnaces, and especially to that class thereof known as "time limit" devices which usually operate just after new fuel is supplied, and having means for automatically shutting off the supply of air or steam after a limited time.

This invention is especially an improvement on the devices of the type referred to, shown in my U. S. Patents 839,134 and 880,656, in which the flow of a fluid from one end to the other of a rocking vessel controls the time during which the steam and air feeding devices are in operation.

The present invention has certain advantages with respect to ease of operation and control, as well as certain advantages with respect to mechanical construction.

One feature of the invention is that the device can be operated by hand as well as automatically, for the intended purpose.

A further feature is the provision of a device for opening the air damper in the fire door, for a limited time.

The invention is illustrated in the accompanying drawings in which—

Figure 1 is a front elevation of a furnace provided with the invention. Fig. 2 is a side elevation. Fig. 3 is a detail of a cylinder and piston for opening the air damper in the fire door. Fig. 4 is a detail in top view of one of the fire doors. Fig. 5 is a vertical section of the controlling valve and the tilting vessel which operates the same.

Referring specifically to the drawings, 6 indicates a steam supply pipe provided with a hand valve 7 and also with the automatic valve 8, the latter being connected to and operated by a tilting vessel 9 which in construction and operation is substantially the same as that shown in my U. S. Patent 880,656, above referred to. This device acts to close the valve after a certain interval of time, and the operation of such devices is well understood. The steam pipe leads from the valve 8 to jet nozzles 10, which discharge into the furnace above the fuel bed, and these nozzles extend through

air supply passages 11 leading from an air trunk 12 extending across within the front of the furnace, so that the air is drawn in with the steam when the device is active, the inlet of air being controlled by a flap valve 13 at the mouth of the trunk 12. The above described parts are old and well known.

When a fire door 14 is opened the vessel 8 is tilted by means of a rod 15, which is connected at its upper end to the crank 16 of the tilting vessel by means of a pin and a slot at 17. The lower end of the rod 15 is threaded for a suitable length to hold a spiral spring 18 between two nuts 19 on the rod. A forked lever 20 projecting from a rock shaft 21 presses on top of the upper nut, or on a washer placed thereon. The shaft is rocked when the left hand door 14 is opened, by a lug 14 on said door striking an arm 22 projecting from the rock shaft 21. A spring 23 tends to return the rock shaft to position. A slotted lever 24 presses on the lower nut 19 on the rod 15, said lever arm projecting from a rock shaft 24 which has an arm 26 extending downwardly in position to be struck by the right hand door 14 when it is swung open. A spring 27 tends to return this rock shaft to original position. Therefore when either door is opened the rod 15 will be pulled down and the vessel 9 will be tilted and the valve 8 will be held open for the predetermined time.

The slotted connection between the arms 20 and 24 and the rod 15 permits said rod to be pulled down by hand whenever desired to open the steam valve without opening the fire doors. This will compress the spring 18 and rock the tilting vessel 9, with the same result as if the device were operated by the doors. Or if the fireman so desires he can, after the vessel is tilted, hold the valve open for a longer period of time, by holding down on the rod 15, after the fire doors are closed. Also the steam valve can be closed by hand in a shorter time, if desired, by lifting up on the rod 15, thereby tilting up the vessel 9 in the closing direction.

For opening the air dampers or flaps in the fire doors, as well as for opening the flap valve 13 to the air trunk, I connect a cylinder 29 to the steam pipe 6 by means of a branch 30 opening into the lower end of the cylinder under a piston 31, which slides up and down in said cylinder and has a rod 32 which extends through a stuffing box in

the top of the cylinder and is provided with two arms 33 connected by a chain 34 to the flap valve 13 and by a chain 35 to the upper arm of a bell crank lever 36 the lower long arm of which is connected by a chain 37 to one of the dampers 28. Said bell crank is fastened to a rock shaft 38 which extends across the boiler front and which will have at its opposite end an arm similar to 36 connected by another chain 37 to the air valve 28 in the other fire door. Obviously the number of such connections may be increased or decreased according to the number of valves to be operated.

15 Near the upper end of the cylinder 29 a pipe 40 is connected, leading to the ash pit, for the purpose of feeding steam into the ash pit. When the piston 31 reaches the limit of its upward stroke in consequence of the steam pressure entering through the pipe 20 30, the pipe 40 will be uncovered, and so steam will flow therefrom into the ash pit until the piston descends. The lift of the piston will open the air valves 13 and 28.

25 When the controlling valve 8 is opened either by hand or automatically with the fire doors steam will be discharged through the nozzles 10 as above described and will also lift the piston 31, thereby opening the 30 air valves 13 and 28 and also uncovering the pipe 40 and admitting steam to the ash pit. When the valve 8 closes the pressure is relieved and the piston 31 will drop, thereby closing the air valves and cutting off the 35 flow of steam to the ash pit. A spring 50 is coiled around the piston rod above the piston, to cushion the impact of the piston against the cylinder head and also to start the same down after the steam is shut off, 40 and thus prevent sticking of the piston in the upper end of the cylinder.

The device has the known advantages incident to giving an increased supply of air and steam to the fire at the time of adding 45 fresh fuel, for the purpose of preventing smoke, and inasmuch as hand operation is possible the same result can be effected whenever conditions make it advisable.

Having thus described my invention, what

I claim as new and desire to secure by Letters Patent is:—

1. In a steam and air feeding device for furnaces, the combination of steam and air pipes, leading to the combustion chamber of the furnace, a controlling valve in the steam 55 pipe, a valve in the air pipe, a cylinder communicating with the said steam pipe, beyond said controlling valve, whereby said valve controls the steam supply to the combustion chamber and also the steam supply 60 to the cylinder, and a piston in the cylinder connected to the valve in the air pipe and adapted to open the same when steam pressure is admitted through said controlling valve. 65

2. In a steam and air feeding device for furnaces, the combination of steam and air pipes leading to the combustion chamber of the furnace, controlling valves in said pipes, a cylinder communicating with said steam 70 pipe between the valve and the furnace, a piston in the cylinder, connected to the air valve and adapted to be advanced by admission of steam pressure through said steam valve, and an outlet leading from the 75 cylinder to the ash pit of the furnace, said piston being normally between the inlet to the cylinder and the said outlet pipe and adapted to be advanced beyond said outlet pipe and to admit steam thereto from the 80 cylinder.

3. In a steam feeding device for furnaces, the combination of a valve controlling the flow of steam to the furnace, a tilting vessel connected to the valve and adapted to delay 85 the closure thereof, an operating rod connected to said tilting vessel, levers located in position to be struck by respective fire doors of the furnace, each lever being loosely connected to the operating rod, and a spring 90 coiled around said rod between said levers.

In testimony whereof, I affix my signature in presence of two witnesses.

GUSTAF A. GUSTAFSON.

Witnesses:

D. D. DUSEN,
B. R. CRAMPTON.