

(No Model.)

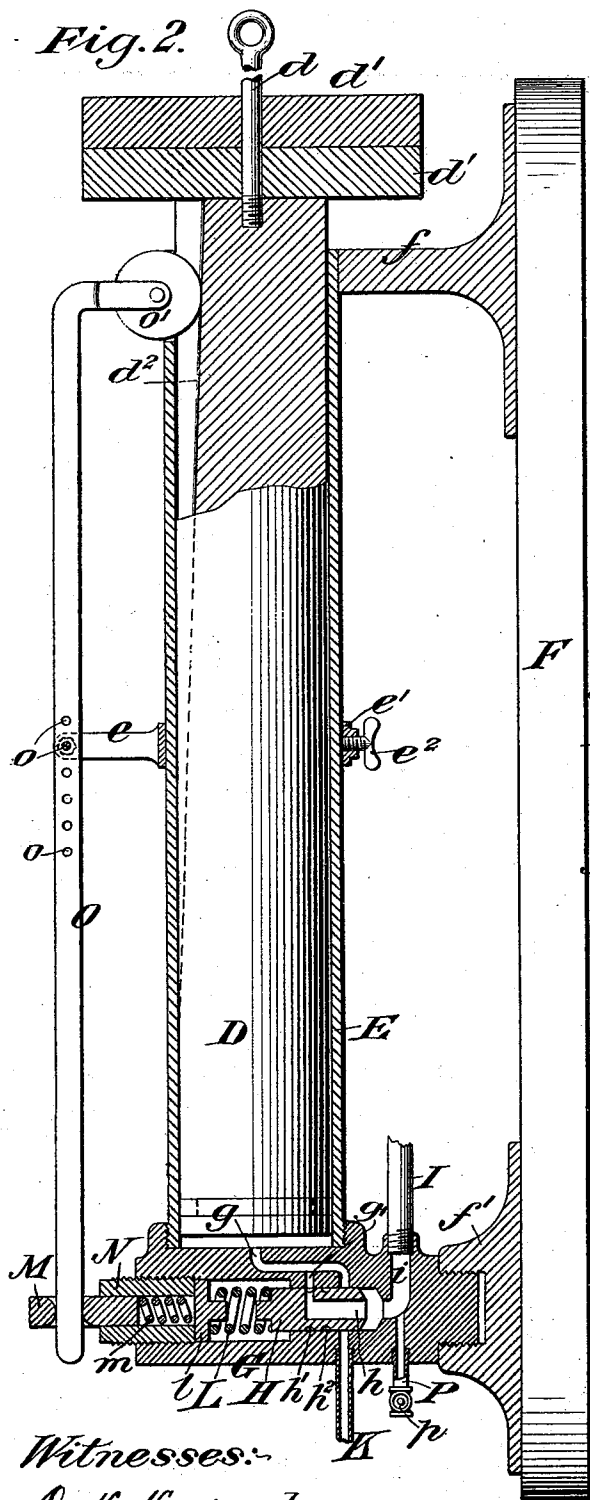
E. J. WOOD.

DAMPER REGULATOR FOR STEAM BOILER FURNACES.

No. 505,932.

Patented Oct. 3, 1893.

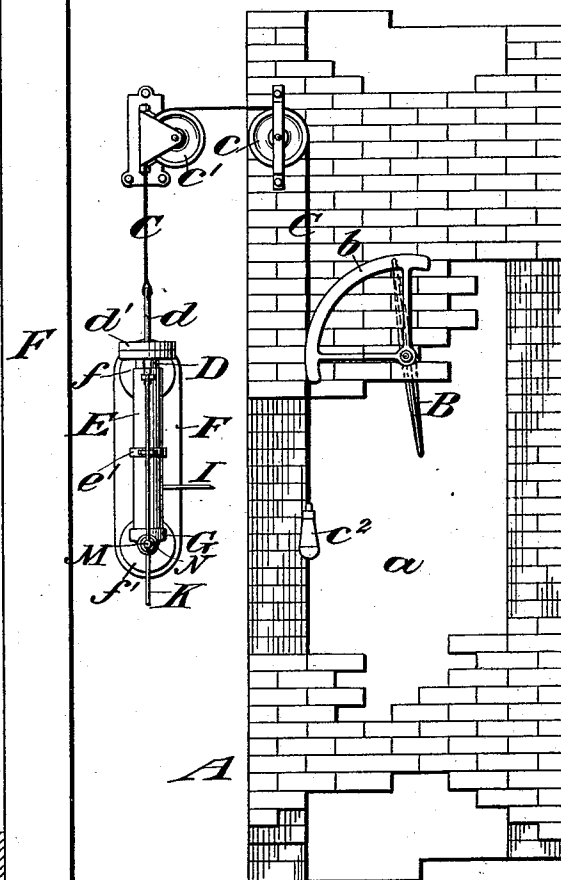
Fig. 2.



Witnesses:-

D. H. Kaymood
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Fig.1.



Inventor:-

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UNITED STATES PATENT OFFICE.

EDGAR J. WOOD, OF BROOKLYN, NEW YORK.

DAMPER-REGULATOR FOR STEAM-BOILER FURNACES.

SPECIFICATION forming part of Letters Patent No. 505,932, dated October 3, 1893.

Application filed August 26, 1892. Serial No. 444,156. (No model.)

To all whom it may concern:

Be it known that I, EDGAR J. WOOD, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Damper-Regulators for Steam-Boiler Furnaces, of which the following is a specification.

My invention relates to an improvement in damper regulators for steam boiler furnaces in which the varying pressures of steam within the boiler serve to open and close a damper to vary the intensity of the heat.

A practical embodiment of my invention is represented in the accompanying drawings in which—

Figure 1 is a view of the regulator shown in connection with the damper of a furnace, the latter being partially broken away to show the flue, and Fig. 2 is an enlarged view in detail taken in vertical section of the damper regulating device and parts adjacent thereto.

The furnace is denoted by A and may be of any well known or approved construction. It is here shown as provided with a flue *a* adapted to be closed by a swinging damper B to the journal of which there is secured a quadrant *b* for operating the damper. A flexible connection C leads from the face of the quadrant *b*, to which it is secured, over a guide pulley *c* at the furnace wall, thence over a second guide pulley *c'* and thence down to the rod *d* of the damper regulating piston D. The piston D is fitted to slide vertically within a suitable casing E, the latter being secured to a suitable support F by an arm *f* at its upper end and by a base G attached to a boss *f'* at its lower end. The piston D is provided with one or more weights *d'*, in the present instance two are shown, for the purpose of determining the pressure under which it shall be allowed to operate to close the damper. The base G is made hollow and has seated therein a piston valve H, to one end of which steam is admitted from the boiler through a pipe I in connection with a port *i* leading to the end of the chamber in which the piston valve H is seated. The piston valve H is provided with a port *h* extending from its end in communication with the port *i* through to the side of the valve where it communicates with a branch port *g'* in communication with a main port *g* leading from

the damper in which the valve H is seated through to and communicating with the interior of the casing E below the piston D. The valve H is provided with two annular grooves, the one *h'* being in communication with the port *h* extending through the valve and the other *h²* being in such position that when the valve is thrown back to its seat by the reduction of pressure in the inlet pipe I, the said groove *h²* will form open communication between the port *g* and an outlet or escape pipe K by means of which any accumulation of steam or water which may exist beneath the piston D within the casing E will be permitted to freely escape and permit the piston D to fall within the casing E to its lowermost position. The relation of the groove *h²* to the groove *h'* is such however that when the valve H is forced from its seat by pressure from the boiler through the pipe I, it will cut off escape through the groove *h²*, as hereinbefore described, and will open communication through the port *h*, branch port *g'* and port *g* to the interior of the casing E and will thereby permit the pressure of the steam to act upon the piston D to raise it.

The valve H is pressed toward its seat by a spring L engaged with its end opposite the inlet port *i*, the opposite end of the spring being engaged with a follower *l*. The plunger M is permitted a longitudinally sliding movement within a hollow plug N in the end of the hollow base G and is permitted to exert a pressure upon the follower *l* through a spring cushion *m* inserted between the end of the plunger and the follower. The inward pressure of the plunger M is in direct opposition to the pressure of the steam against the end of the valve H.

A plunger operating lever O is pivoted to an arm *e* carried by a strap *e'* adapted to wholly or partially surround the casing E, said strap being made adjustable up and down along the casing E by means of a set screw *e²*. The lever O is provided with a plurality of perforations *o* for the purpose of increasing or diminishing its effect upon the plunger at pleasure. The upper end of the lever O is provided with a roller *o'* arranged to bear against an inclined surface *d²* along the side of the piston D.

The arrangement of the piston D and lever

O is such that when the piston D is raised under steam pressure, it will tend to rock the upper end of the lever O outwardly and thereby force the plunger M inwardly, exerting a pressure upon the valve H in opposition to the steam pressure thereon and thereby tend to cut off the admission of steam to the piston D.

There is in connection with the inlet port *i* an escape pipe P provided with a cock *p* for permitting the steam to escape directly from the inlet port *i* for cleaning or other purposes. A weight *c*², of sufficient power, is attached to the flexible connection C so that when the latter is slackened by the lifting of the piston D, the weight *c*² will tend to rock the damper B to close it.

The operation of the whole may be briefly described as follows: When the steam within the boiler reaches a pressure exceeding that which it is intended to carry, it will slide the valve H, thereby admitting steam pressure underneath the piston D and raising the latter, slackening the connection C and permitting the damper B to close and thereby reduce the heat in the furnace. The upward movement of the piston D will rock the lever O and thereby, through the plunger M and its connections with the valve H, overcome the steam pressure upon the opposite end of the valve H to return it sufficiently to cut off the entrance of the steam to the piston D. As the pressure in the boiler falls below what is intended, the valve *h* will gradually move toward its seat and permit the steam beneath the piston D to escape thereby lowering the piston D and through its connection with the damper again open the damper and allow the heat in the furnace to increase.

What I claim is—

1. The damper regulator, comprising a piston adapted to be connected with the damper,

a piston valve adapted to be placed under the control of the fluid in a boiler, a conduit through the valve and valve seat to one end only of the piston a lever under the control of the said piston to return the said piston valve and a yielding connection between the lever and the piston valve, substantially as set forth.

2. The damper regulator, comprising a reciprocating piston provided with an inclined face, a reciprocating valve, a conduit through the valve and valve seat to the reciprocating piston, a plunger having a yielding connection with the valve and a lever one arm of which is adapted to engage the inclined face on the piston and the other arm of which is adapted to engage the plunger, substantially as set forth.

3. The damper regulator, comprising the reciprocating piston having an inclined face, a reciprocating valve provided with a port therethrough, an inlet conduit leading to one end of the valve, conduits for the entrance and escape of the motor fluid leading from the valve to the reciprocating piston, a plunger having a yielding connection with the valve at the end opposite that to which the inlet conduit leads and a plunger operating lever engaged with the inclined face of the reciprocating piston, substantially as set forth.

4. The combination with the inclined faced reciprocating piston and the valve for admitting the motor fluid thereto, of a lever under the control of the piston to operate the valve in one direction, and an adjustable support for the lever to vary its effect upon the valve, substantially as set forth.

EDGAR J. WOOD.

Witnesses:

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