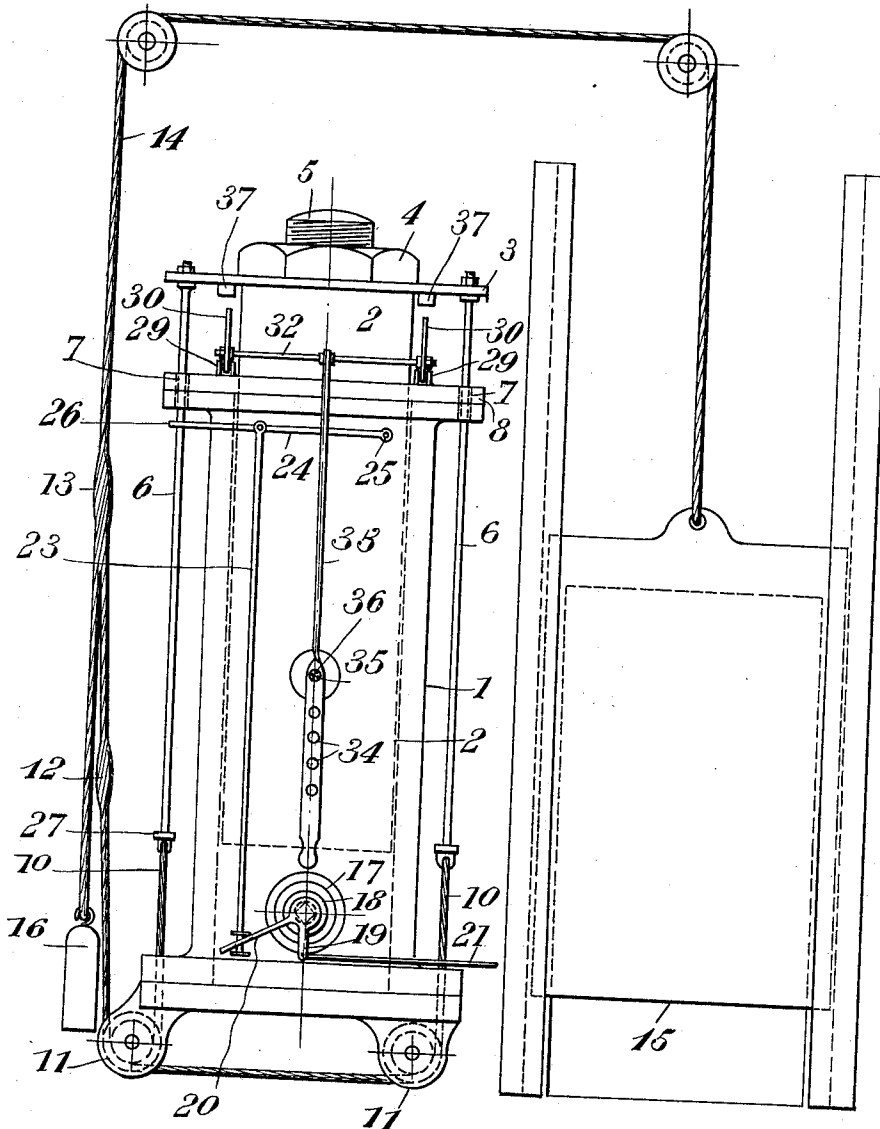


Fig. 1.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

ELIE JULES LÉON BROUX, OF ROUBAIX, FRANCE.

AUTOMATICALLY-WORKING HYDRAULIC DRAFT AND COMBUSTION REGULATING DEVICE.

1,055,868.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed July 15, 1912. Serial No. 709,487.

To all whom it may concern:

Be it known that I, ELIE JULES LÉON BROUX, a citizen of the French Republic, and resident of Roubaix, France, have invented certain new and useful Improvements in Automatically-Working Hydraulic Draft and Combustion Regulating Devices, of which the following is a specification.

The present invention relates to a hydraulic draft and combustion regulator which automatically produces the sliding motion of the chimney damper in proportion as the burning of the introduced fuel progresses.

The novelty of the device consists in that a piston, which operates the chimney damper, rises quickly in a cylinder and opens said damper, the upward motion of the piston being produced by introducing into the cylinder, underneath the piston, by means of a relatively large cock, a certain amount of water under pressure while closing the furnace door after having fed the furnace with fuel, said piston, when in its uppermost position, closing the water inlet cock and the water contained in the cylinder flowing out through a relatively small, normally open cock which has been previously adjusted according to the combustion period of the average quantity of fuel corresponding to each firing.

The invention is shown in the accompanying drawing, in which:

Figure 1 is a front view of the whole device, showing one constructive form of the regulator. Fig. 2 is a corresponding lateral view. Fig. 3 is a corresponding top view. Fig. 4 is a corresponding underside view.

Within a cylinder 1, provided with a solid bottom, moves to and fro a plunger piston 2 on top of which is secured a cross bar 3 by means of a nut 4 which engages a threaded pin 5 made integral with the piston 2. Onto the cross bar 3 are secured the rods 6 which extend through holes 7 provided on the upper flange of the cylinder 1 and on the tension ring 8. Onto the lower ends of the rods 6 are provided ropes 10 which pass over rollers 11 secured underneath the cylinder bottom and which are brazed together at 12 before they become connected at 13 with the rope 14 of the chimney damper 15, which is nearly counter balanced by a weight 16.

The cylinder 1 is provided at its lower

end with a cock 17 of a relatively high output, the plug 18 of which is provided with two arms 19 and 20. The arm 19 is connected by means of a rod 21 with a furnace door (which is not shown in the drawing). The cock arm 20 is suitably connected with the lower end of a rod 23, the upper end of which is connected by a link with a lever 24 which is pivoted onto the cylinder 1 at 25 and through the free, ring shaped end 26 of which passes one of the rods 6. The leverage 20, 23, 24, 26 controls the plug 18 in such a manner that the flowing of water under pressure toward the cylinder 1 is stopped when the piston 2 reaches its uppermost position. With this object in view a stop 27, provided on the rod 6 at the level of the piston bottom strikes in this instance the ring 26. The raising of the piston causes the opening of the chimney damper 15, the course of said piston corresponding to the useful trajectory of the damper. The chimney damper 15 ought not to close wholly the duct which it controls, and with this object in view the regulator is provided with a device which limits the motion of the damper and which may be adjusted at will.

Onto the pressing ring 8 of the joint packing are secured two bearings 29 through each of which passes an arm 30 provided with slots 31. Both arms 30 are connected by means of a cross bar 32 to which the upper end of a hand lever 33 is pivoted. Said lever 33 is provided with a row of holes 34 through which is engaged a pin 35 which enters a corresponding hollow 36 provided in a block of the cylinder 1. According to the adjusting of the hand lever 33, one of the pairs of slots 31 provided at the arms 30 is vertically placed below both projections 37 of the cross bar 3 and prevent the damper from sliding down, as shown in dotted lines (Fig. 2).

Suppose the regulating device has been put in position ready for work by adjusting the output of the small cock 28 and the extent to which the chimney damper is intended to be closed. When the furnace door is closed after charging fuel, the cock 17 is opened by means of the rod 21 and the arm 19 and water under pressure flows into the cylinder 1. The piston 2 quickly rises, the damper is wholly opened and the strongest draft, necessary at the beginning

of the combustion, is produced. When the piston reaches the upper end of its course, the cock 17 is closed through the interposition of the parts 6, 27, 24, 23 and 20. After the above preliminary operation, which is very quickly performed, the regulator begins to gradually close the damper 15, owing to the slow downward motion of the piston 2, according to the out flow, through a smaller cock 28, of the water filling the cylinder 1, and such downward motion will last until the damper has reached its lowest position, that is to say until the projections 37 rest in the corresponding slots 31 of the supporting device 30. The charged fuel is now burned and the furnace is again charged with fuel. If the furnace door, after charging, is again closed, the regulator moves back in its initial position and the above described working occurs again.

Having now fully described my said invention, what I claim and desire to secure by Letters Patent, is:

1. Automatically working hydraulic draft and combustion regulator comprising a cylinder, a plunger piston moving to and fro within said cylinder, rods secured onto said piston for guiding said piston, a sliding chimney damper, ropes secured at the lower ends of said guiding rods and fastened onto said chimney damper in order to transmit the motion of said piston to said damper, rollers for conveniently guiding said ropes, a counterweight freely hanging onto said ropes in order to counterbalance the weight of said damper, a large cock provided at the bottom of said cylinder, a pipe for forwarding water under pressure to said cock in order to quickly fill said cylinder and to push upward said piston and consequently said chimney damper, a door operating connection attached to said cock, means for automatically closing said cock when the piston has reached its uppermost position, said means comprising an arm on the plug of said cock, an upwardly extending rod controlling said arm, a lever hingedly connected with said rod, and pivoted at one end on said cylinder, and formed at the opposite end with an eye, through which extends one of said guiding rods of said piston, a stop provided on said guiding rod, said stop being at a level with the bottom of said piston and when the piston reaches its uppermost position, thus raising said lever which operates said arm by the interposition of said upward extending controlling rod, a smaller, normally open discharging cock on said cylinder for gradually discharging said water and causing the piston to move gradually downward with said cylinder and consequently causing the damper to move accordingly.

2. Automatically working hydraulic draft and combustion regulator comprising a cyl-

inder, a plunger piston moving to and fro within said cylinder, means for guiding the piston during said motions, a sliding chimney damper, means for connecting said piston to said damper in order to transmit the motion of said piston to said damper, a large cock provided at the bottom of said cylinder, a duct forwarding water under pressure to said cock for quickly filling said cylinder with water and pushing upward said piston, door operating means for opening said cock, means for closing said cock when said piston has reached its uppermost position within said cylinder and a smaller, normally open discharging cock on said cylinder for gradually discharging said water and causing the piston to move gradually downward within said cylinder and the damper to move accordingly, said means comprising a central, threaded projection on top of said piston, a cross bar engaged over said threaded projection and resting on said piston, a nut for firmly securing said cross bar onto said piston, two projections provided at the lower face of said cross bar and symmetrically disposed with respect to the center of said piston, a pressing ring on top of said cylinder, two bearings provided on top of said ring, two parallel rods hingedly secured by one of their ends to said bearings, each of said rods being in a vertical plane with one of the above said projections, and each rod having a series of transverse open slots on its upper edge with which the projections on the cross bar engage to stop the downward motion of said piston and means for adjusting both said rods, according to the extent of the downward motion of said piston, said adjusting means comprising a cross bar connecting the outwardly projecting ends of both said rods, a hand lever having a series of openings and pivoted at the middle of said cross bar, a corresponding hollow provided on a projecting block of said cylinder, and a pin passing through one of the openings of the series and secured to the cylinder, whereby to hold the lever in adjusted position.

3. In an apparatus of the class described, the combination of a cylinder, a fluid inlet valve at the bottom of the cylinder, means for supplying fluid under pressure to said valve and cylinder, a door operating connection extending from the valve, a piston mounted in the cylinder, a normally open outlet valve in the cylinder, a damper, means connecting the piston to the damper, levers connected to the fluid inlet valve, a projection on the connection between the piston and damper to operate the levers when the piston rises, projections on the piston, a pair of pivoted notched levers mounted on the cylinder, the projections engaging the notches to regulate the downward movement of the piston in the cylinder, a handle on

the pivoted levers, and adjustable means for locking the handle in position.

4. In an apparatus of the class described, the combination of a cylinder formed with
5 a fluid outlet, a piston operating in the cylinder, a fluid inlet valve having a door operating connection to admit fluid to the cylinder, automatic means operated by the piston to close the fluid inlet valve, a damper operated by the piston, projections on the piston,
10 a pair of notched pivoted levers mounted on

the cylinder, the projections engaging the notches to regulate the downward movement of the piston in the cylinder, a handle on the pivoted levers, and adjustable means for
15 locking the handle in position.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

ELIE JULES LÉON BROUX.

Witnesses:

ARTHUR MEURITTE,
ALFRED ABBERT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
