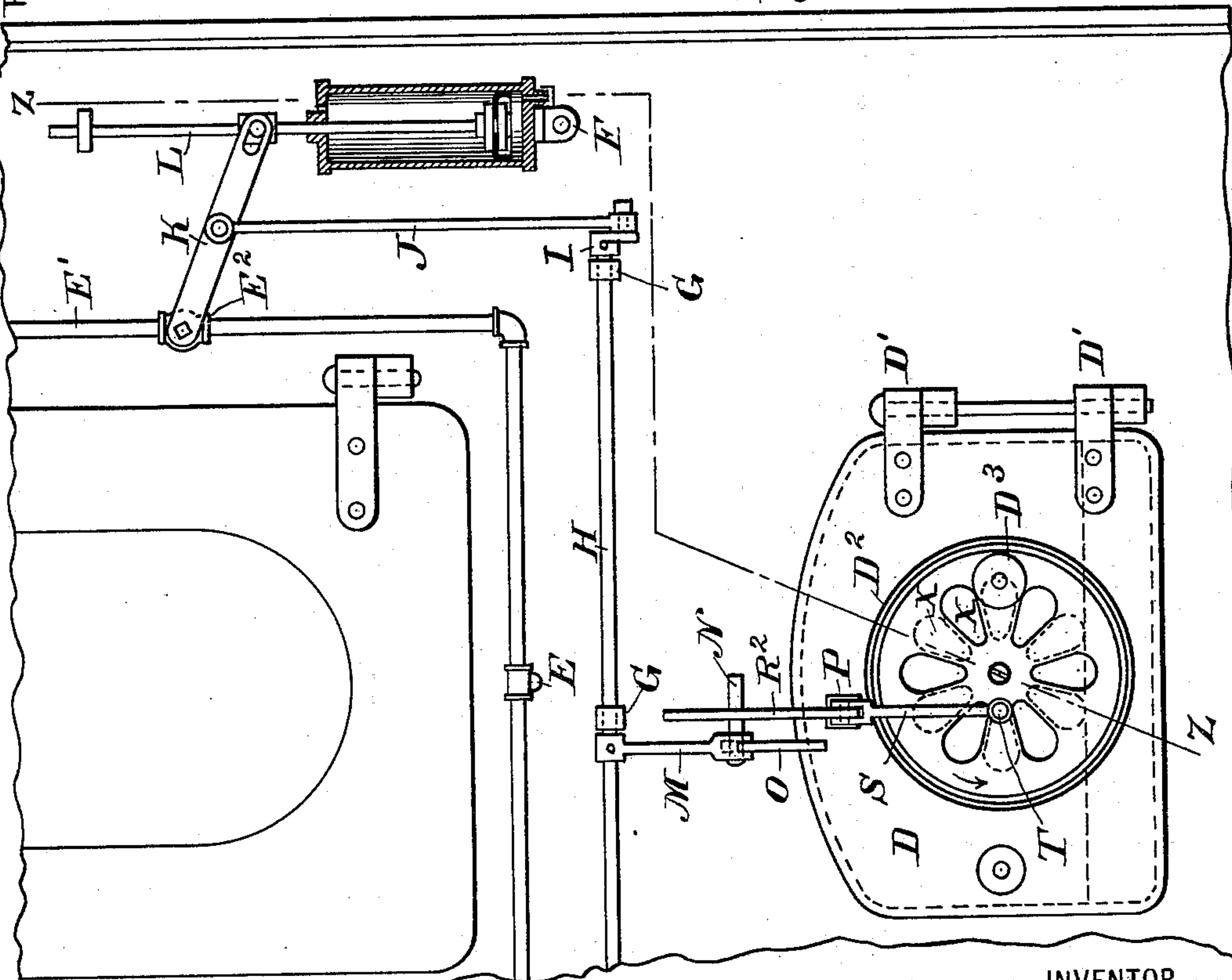
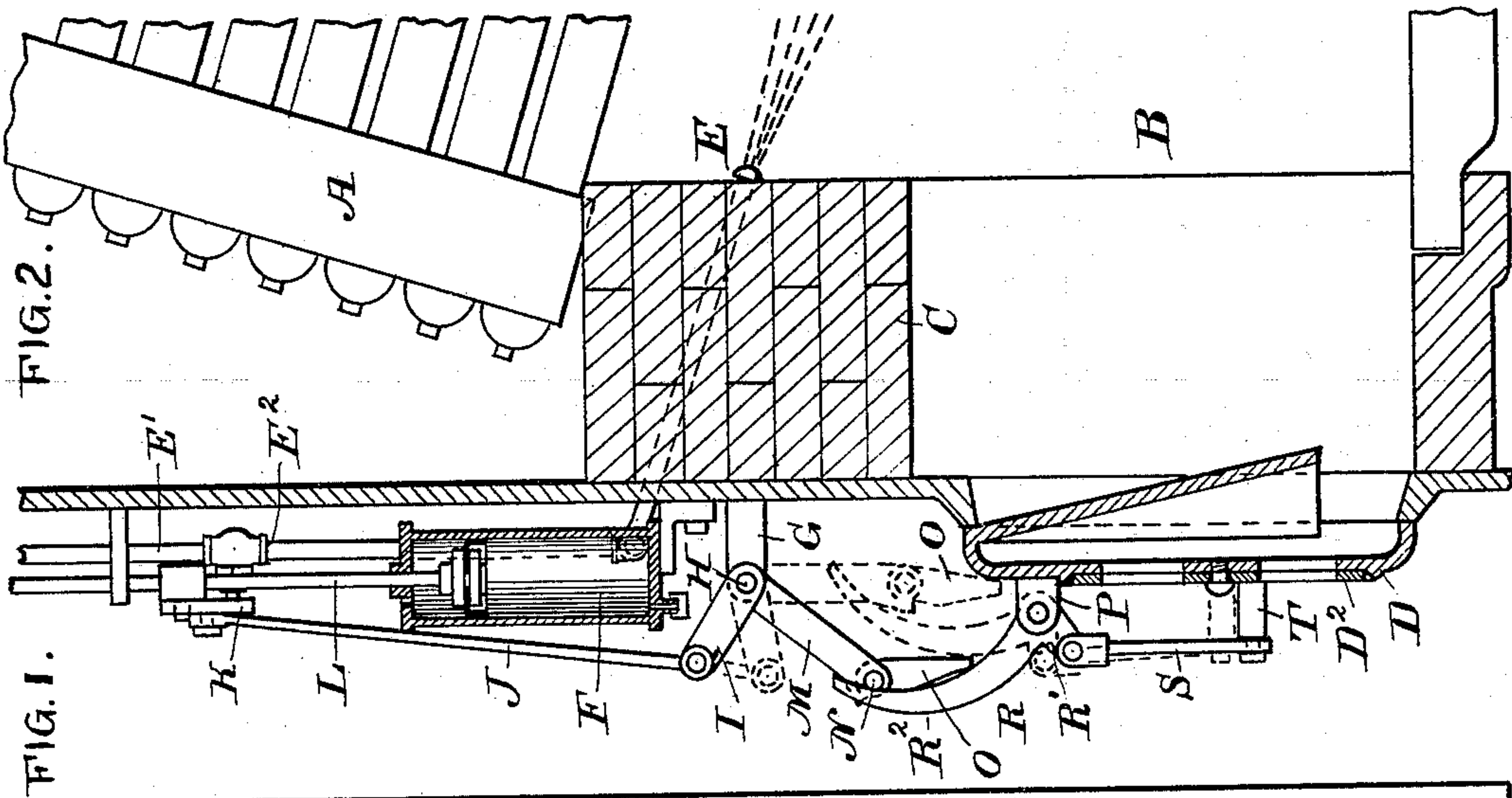


(No Model.)

H. L. THOMAS.  
SMOKE CONSUMER.

No. 604,240.

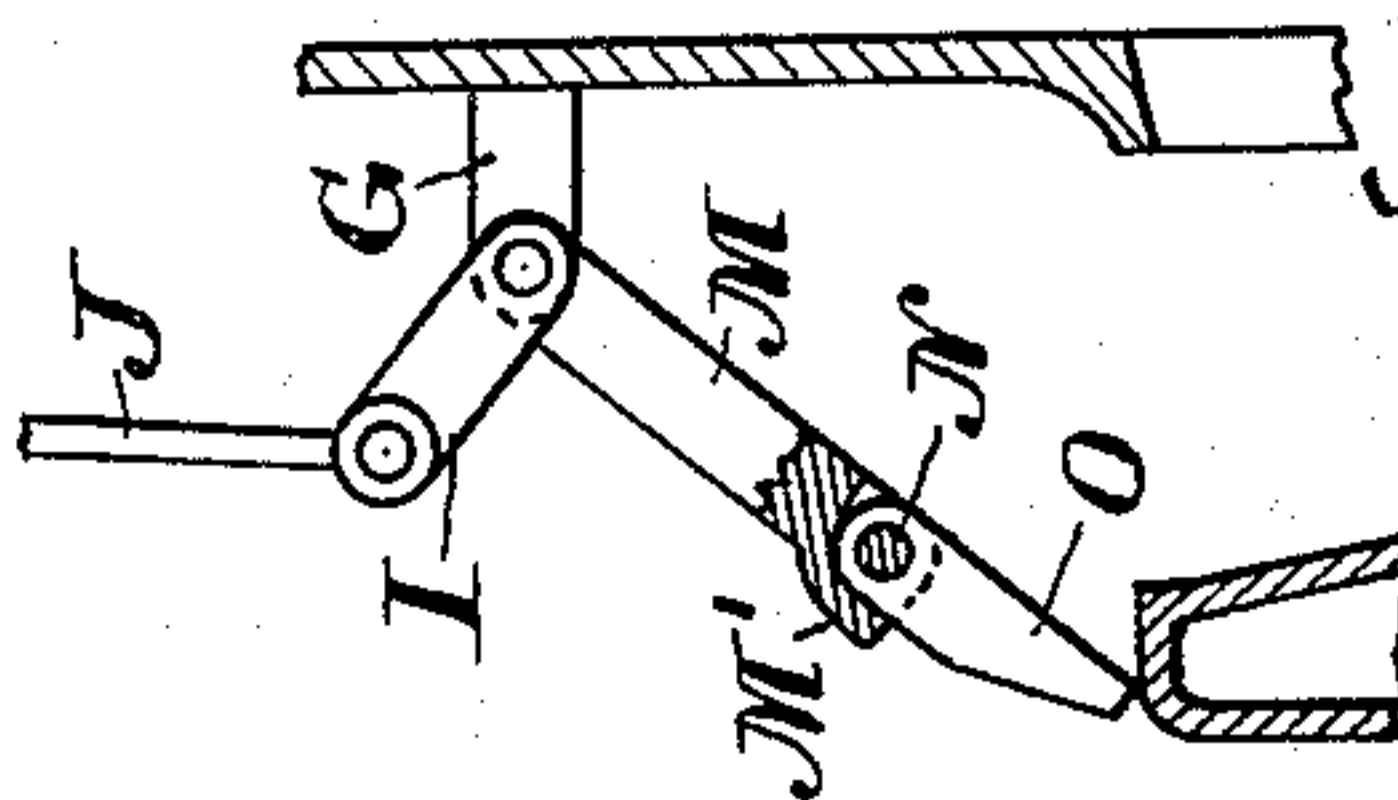
Patented May 17, 1898.



WITNESSES:

L. E. Pearson  
Amos B. Hall

FIG. 3.



INVENTOR

Harold Lars Thomas

BY

Geot. W. Benjamin  
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# UNITED STATES PATENT OFFICE.

HAROLD LARS THOMAS, OF BROOKLYN, NEW YORK, ASSIGNOR TO SUMNER  
T. DUNHAM, OF NEW YORK.

## SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 604,240, dated May 17, 1898.

Application filed May 15, 1897. Serial No. 636,657. (No model.)

*To all whom it may concern:*

Be it known that I, HAROLD LARS THOMAS, a citizen of the United States, residing at Brooklyn, State of New York, have invented  
5 new and useful Improvements in Smoke-Consumers, of which the following is a specification.

My invention relates to improvements in that type of smoke consumers or preventers  
10 which is described in United States Letters Patent granted to Charles Smith, numbered and dated, respectively, 480,630, August 9, 1892, and 535,740, March 12, 1895. In the construction described in the said Letters Patent  
15 there is provided a furnace-door having a valve so arranged as to deflect and regulate the admission of air into the combustion-chamber of the furnace. In other words, a deflecting-plate is hinged upon the inner side  
20 of the upper part of the door and connected at its lower end to a hand-lever, whereby the angle formed by the deflecting-plate may be increased or decreased and the amount of air permitted to enter the furnace correspond-  
25 ingly altered. In making use of the construction described in the aforesaid patents, as well as that described in the present application, it is necessary when charging a fresh supply of fuel to put the steam-jet in operation and  
30 open the air-supply. The effect is to produce an increased combustion in the furnace and a consequent consumption of the smoke. As soon as charging is completed it is usual to gradually cut off the steam-supply to the jet  
35 and to reduce the amount of air fed to the furnace.

In the construction set forth in the former patents the turning on and off of the steam-supply to the jet, as well as the regulation of  
40 the air-supply, depends upon the faithfulness and intelligence of the fireman, and in practice it has been found that neither of these requisites can be relied upon. Frequently the fireman will omit to open the steam-supply to the jet, or to close the air-supply, after the smoke has been fully consumed, or  
45 otherwise will omit to do something which he ought to have done at a proper time, with the effect of deranging the prescribed operation  
50 of the apparatus. In order to overcome the objections stated, I have devised the present

construction, in which human intelligence is not necessary in the control of the apparatus.

My present invention to that end consists in a construction by means of which the steam-  
55 supply and air-supply are controlled automatically.

My present invention further consists in a construction by means of which the steam-supply and air-supply are automatically  
60 opened and gradually cut off.

In the accompanying drawings, which illustrate my invention, similar letters of reference indicate like parts.

Figure 1 is a front view. Fig. 2 is a partial  
65 elevation and longitudinal section on the line Z Z of Fig. 1. Fig. 3 is an enlarged view illustrating the position of the parts with the door partially open.

In the drawings, A represents the boiler, 70 which may be of any type; B, fire-box; C, front furnace-wall; D, fire-door mounted on the hinges D'; D<sup>2</sup>, rotary valve in furnace-door; D<sup>3</sup>, counterbalanced weight; E, steam-jet, which projects through the front furnace-  
75 wall; E', steam-supply pipe from boiler; E<sup>2</sup>, valve in steam-pipe; F, air dash-pot.

Projecting from the front of the furnace horizontally are the arms G G, which serve as points of support for a horizontal rod H. To  
80 the right-hand end of this arm is fixedly secured a crank I, which carries a vertical rod J, loosely pivoted at or about the center of the link K. The link K is connected at one end to the steam-valve E<sup>2</sup> and at the other  
85 end loosely to the plunger L of the dash-pot F.

Secured to the rod H about opposite the furnace-door is a depending arm M, the end of which is formed as a fork and carries a  
90 horizontal pin N and pivoted dog O. The parts M and O together form what might be termed a "knuckle-lever." The arrangement of the dog is such that it is free to swing inwardly, but has its outward movement lim-  
95 ited by striking against the offset M' of the arm M, Fig. 3.

Projecting from the face of the door D is an arm P, which carries a bell-crank R. To the lower arm R' of the bell-crank is connected  
100 a rod S, attached at its lower end to a stud T on the face of the rotating valve D<sup>2</sup> of the



door D. The upper arm  $R^2$  of the bell-crank is curved, so as to lie over the horizontal pin N.

The operation of the device is as follows:

5 The rotating valve  $D^2$  in the door D is maintained closed by reason of the counterweight  $D^3$ . Hence no air can enter through this valve with the door closed. Upon swinging the door outwardly the upper edge of the door strikes the dog O and moves the dog and the arm M outwardly and upwardly, and which arm, being rigidly secured to the rod H, rotates the rod, which in turn rotates the crank I, which lifts the rod J, which, through the link K, lifts the plunger L and also rotates and opens wide the steam-valve  $E^2$  to the jet E. The parts K, J, I, and H, I term the "valve-operating apparatus." When the furnace-door is closed after charging, the dog O of the knuckle-lever is thrown backward or knuckles under, permitting the door to pass without actuating the valve-operating apparatus. At this moment the plunger of the dash-pot is in the position shown in Fig. 2. The curved bell-crank arm  $R^2$  is intercepted by and strikes the pin N as the door is slammed to, and its upper end is retarded thereby, and in consequence the bell-crank R is turned in such direction as to force down the arm  $R'$  and connecting-rods, opening the air-valve  $D^2$  against the opposition of the counterweight  $D^3$ . This counterweight I term a "pressure device," and evidently any other form of pressure device, such as a spring or small steel cylinder, might be employed. While  $D^3$  is in a sense a counterbalance-weight for the bell-crank lever R, yet its excess of weight is sufficient to act as a driving force through the pin N upon the valve-actuating apparatus, and I prefer to so construct the apparatus that there will be little or no tendency of the steam-valve  $E^2$  to close until the furnace-door has been closed and the pressure of the arm  $R^2$  is transmitted to the valve-operating apparatus in the manner above described in sufficient force to overpower the resistance of the dash-pot F and cause the beginning of the gradual closure of the steam-jet valve. As the air escapes from the dash-pot the plunger L moves downward and through the link K gradually closes the steam-valve E and through rod J rotates rod H, which latter allows pin N to move away from contact with the arm  $R^2$  of bell-crank R, thereby permitting the counterbalance-weight  $D^3$  to act and gradually rotate the rotary valve  $D^2$  in a direction opposite to that of the arrow and to close the air-port X. This closes the cycle of operation and restores the parts to their original position.

65 The dotted lines, Fig. 2, indicate the position of the parts before the door is opened, the full lines in Fig. 3 when the door is partially open, and the full lines in Fig. 2 when the door has been opened and closed and before the operating parts return to their original position.

The particular advantage of my construction lies in the fact that there is no tendency of the steam-jet and air valve operating apparatus to close the furnace-door, which would require the same to be held open by the fireman or otherwise latched or chocked to retain it in an open position. The motive power for the valve-actuating apparatus is not called into action until the furnace-door has been shut and latched, and consequently the furnace-door can be thrown open and left open at any time when it is necessary to charge or deaden the fires.

I wish it understood that I do not limit myself to the precise construction herein shown and described.

Many modifications may be made in the parts considered separately and collectively without departing from the intent of my invention, which concisely stated is a construction whereby the steam-supply or the air-supply, or both, are automatically controlled.

Having thus described my invention, I claim—

1. In a smoke-consumer embodying the furnace-door, steam-jet valve, dash-pot which opposes the steam-jet-valve-closing apparatus, and a knuckle-lever mounted in front of the door upon a rod having a crank connection with the dash-pot and valve and which is operated by the opening of the furnace-door to open the steam-jet valve but knuckles under without operating to close the valve when said door is shut; a weighted pressure device mounted on said door which operates mechanism adapted to close said steam-jet valve against the resistance of the dash-pot when the furnace-door is shut, substantially as shown and described.

2. In a smoke-consumer, the combination of the furnace-door, steam-jet valve, dash-pot which opposes the steam-jet-valve-closing apparatus, and a knuckle-lever which is connected to a rod journaled in the front of the furnace and said rod having a crank carrying a vertical rod pivoted to a link connected to the steam-valve and said dash-pot plunger, and is operated by the opening of the furnace-door to open the steam-jet valve but knuckles under without closing the valve when said door is shut, together with a curved bell-crank arm mounted on said door and engaging the valve-actuating apparatus when the door is shut and a weight tending to turn said bell-crank in a direction to close said valve, substantially as described.

3. In a smoke-consumer, the combination of the furnace-door, steam-jet valve, dash-pot which opposes the steam-jet-valve-closing apparatus and a knuckle-lever projecting in front of the said lever which is operated by the opening of the furnace-door to open the steam-jet valve but knuckles under without closing the valve when said door is shut, means for operating the said lever with relation to the steam-jet valve and dash-pot and with a curved bell-crank arm mounted on



said door and engaging the valve-actuating  
apparatus when the door is shut, and a weight  
tending to turn said bell-crank in a direction  
to close said valve, together with an air-valve  
5 and connections whereby the closure thereof  
is controlled by said bell-crank, substantially  
as described.

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

HAROLD LARS THOMAS.

Witnesses:

GEO. H. BENJAMIN,  
J. E. PEARSON.