

No. 629,447.

Patented July 25, 1899.

J. A. JENSEN.

HINGE FOR DOORS OF HEATING FURNACES.

(Application filed Apr. 22, 1898.)

(No Model.)

Fig. I. Fig. II. Fig. III. Fig. IV. Fig. V.

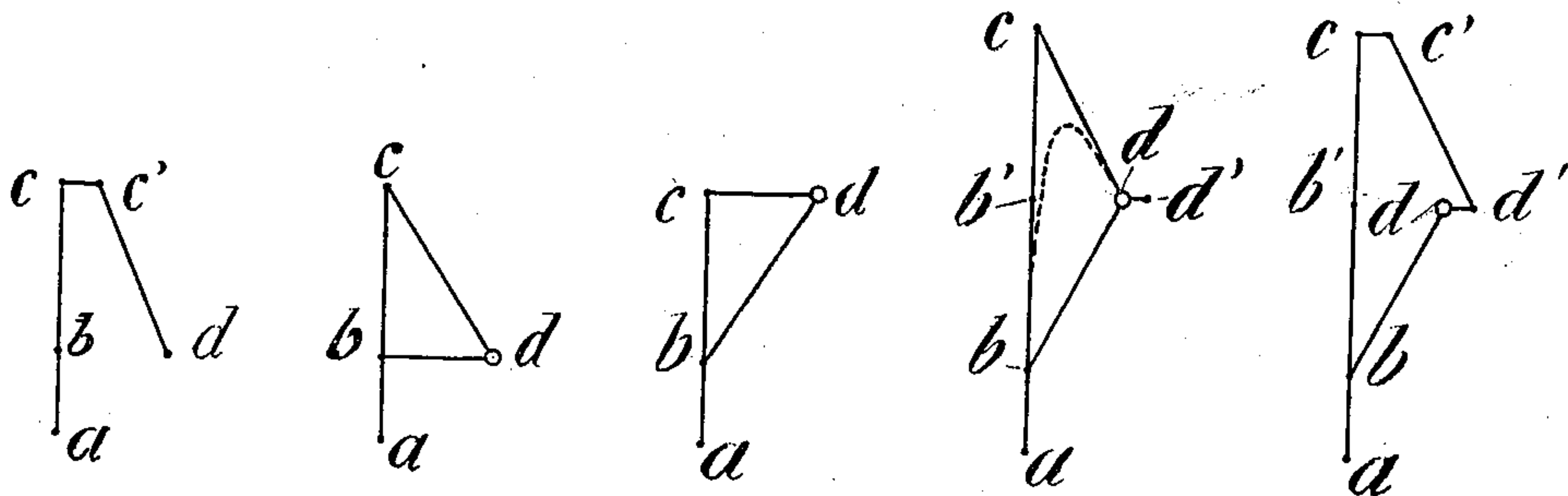


Fig. VI.

Fig. VIII.

Fig. IX.

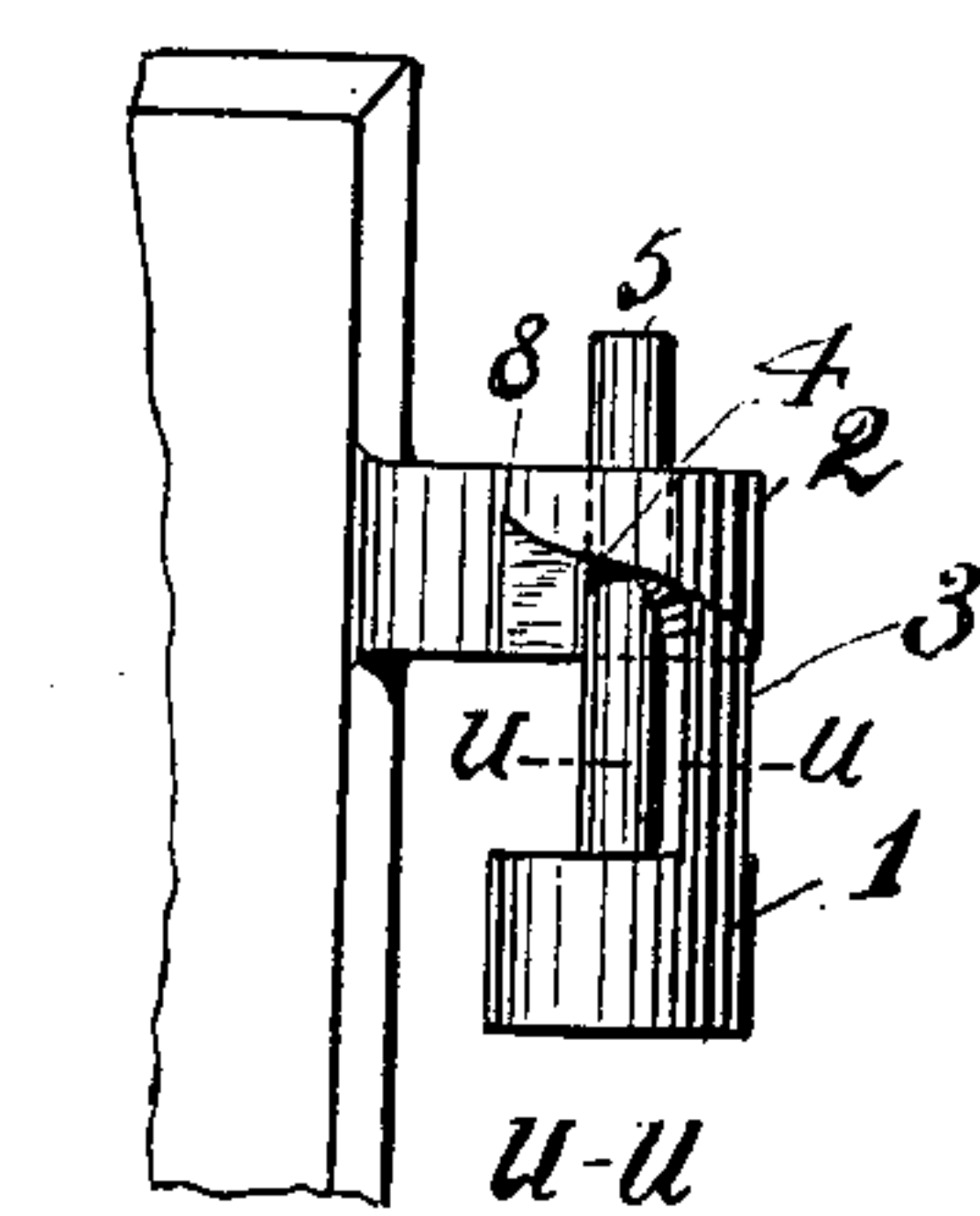


Fig. VII.

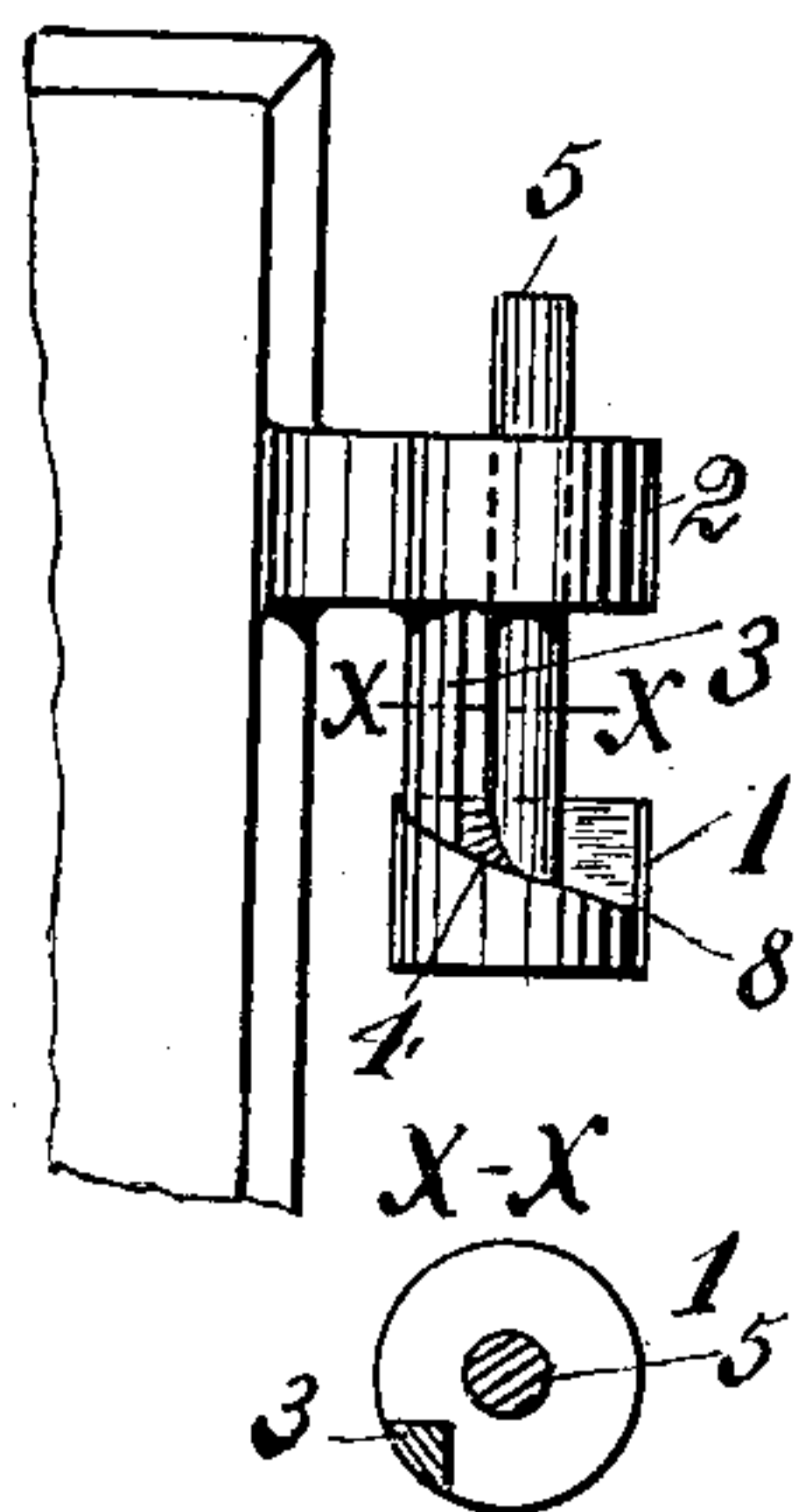


Fig. X.

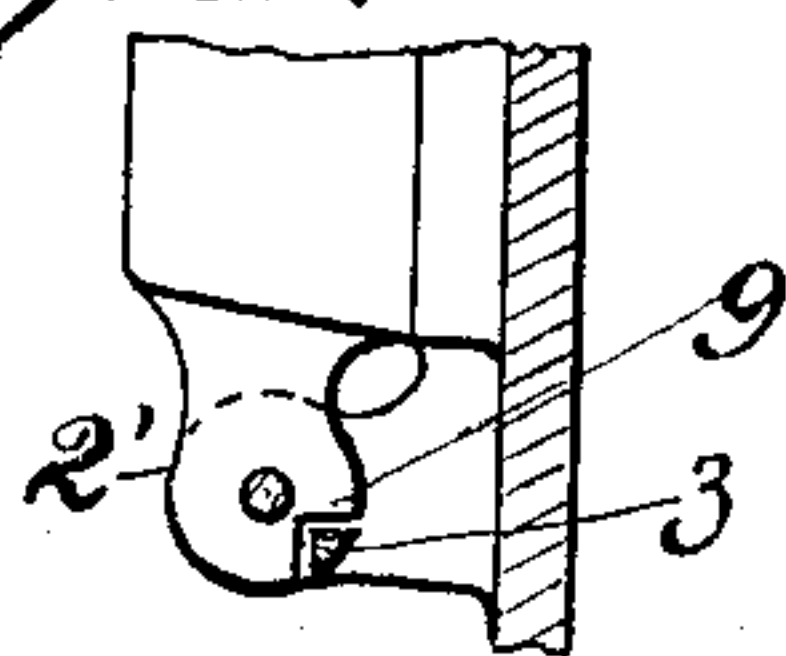
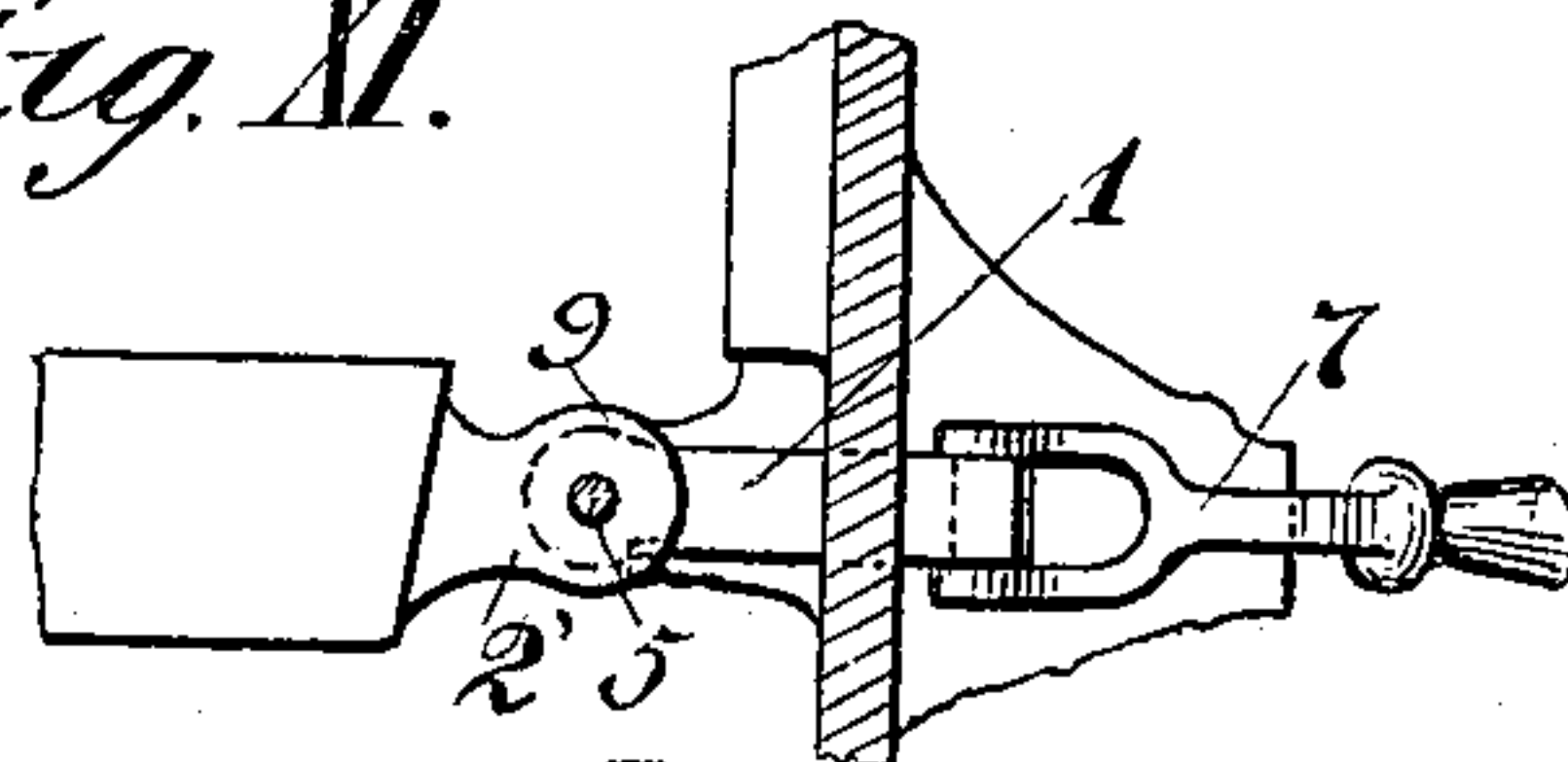


Fig. XI.



Witnesses.

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HINGE FOR DOORS OF HEATING-FURNACES.

SPECIFICATION forming part of Letters Patent No. 629,447, dated July 25, 1899.

Application filed April 22, 1898. Serial No. 678,480. (No model.)

To all whom it may concern:

Be it known that I, JESS ADOLPH JENSEN, a subject of the King of Denmark, residing at 3 Colbjornsensgade, Copenhagen, in the Kingdom of Denmark, have invented certain new and useful Improvements in or Connected with Hinges for Automatically Opening or Closing the Doors of Heating-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention for improvements in or connected with hinges for automatically opening or closing the doors of heating-furnaces relates to a device for automatically opening or closing the doors of heating-furnaces or to a combined opening and closing device; and it consists in the arrangement of appropriate screw-surfaces upon the hinge mechanism of the door, which surfaces are under normal conditions interrupted at suitable places by catches or projections or by short horizontal surfaces. In all cases the weight of the door is utilized for effecting its turning movement.

The fixed point which as the door slides down serves as its fulcrum or point of support is during the turning movement of the door either constantly the same or changes, as hereinafter described.

In the accompanying drawings, Figures 1 to 5 represent diagrammatical views of the paths traversed by the movable fulcrum of the door, the rotary movements being supposed to be developed in straight lines. Fig. 1 illustrates the only case in which the fulcrum remains unchanged as the door is turned. According to Figs. 2 to 5 the fulcrum changes. Figs. 6 and 7 represent two constructional forms of the hinge in which the fulcrum is unaltered, and Figs. 8 and 9 represent in two positions a constructional form in which the fulcrum is altered. Figs. 10 and 11 are plans of the top and bottom hinges, respectively shown in Figs. 8 and 9.

In opening the door it must first be lifted out of the wedge-lock 10. The part forming this wedge-lock is represented in Figs. 1 to 5 and marked *a b*. According to Fig. 1 the operation is as follows: First, as in all other cases, the door is lifted to the extent of the portion *a b*. Thereupon a further lifting

through the portion *b c* is effected, this being the portion through which the door must subsequently slide down in order to open. After the path *b c* has been traversed by the door it is arranged that by slightly turning the door through the path *c c'* a pin 3, which either, as in Fig. 7, is arranged on the hinge of the door, or, as in Fig. 6, is arranged on the rigid tappet 1, slides down along the helical or screw surface 4, as in Fig. 7, or that the helical surface 4 passes along over the pin 3, rigid with the tappet 1, Fig. 6. In either case the effect is the same—that is to say, the door is turned and simultaneously lowered. Thus in the diagram the door moves to the point *d*, in which the door is completely fixed in its position. According to the form of device represented in Figs. 6 and 7, a reclosing of the door can only be effected in such a manner that the door is again lifted by hand and moved back through the path *d c' c*, whereupon it descends from the point *c* along *b* down to the point *a*. If, however, the tappet 1 is movably arranged and is after the lifting of the door again moved down, the pin 3 then no longer prevents the door from turning. The door then can be moved by hand from *d* to *b*, Fig. 2, so that the relifting of the door is dispensed with. The lifting and lowering of the tappet 1 has, however, a still more important purpose. The tappet itself may be used for lifting the door, and, moreover, after its having been lowered the operator is enabled to automatically reclose the door, as represented in Figs. 4 and 5. In this case the door is to be further lifted to the extent of the portion *b' c*. The door then opens under the action of its fulcrum, which moves along the path *c d*. This down movement may, however, be already commenced during the lifting of the door as soon as the pin 3', Fig. 8, has left the recess 9. The diagram of motion in this case becomes altered, as shown in Fig. 4 in dotted lines. At the point *d* the prior fulcrum—that is to say, the pin 3—is again moved downward. Consequently the door must find another fulcrum or point of support, which is found in the pin 3'. If the helical surface presents an interruption in the hinge member 2', such as represented by the portion *d' d* in Fig. 5, the door will first remain in open position. A small push, how-

ever, given in the direction of d' toward d will instantly cause the new fulcrum to move along the path db , whereby the closing of the door is effected. The change of fulcrum thus
 5 always takes place at the point d , which is marked by a small circle. It readily suggests itself to so effect the change of pressure as to cause in the first case the top hinge and in the second case the bottom hinge to receive
 10 the pressure resulting from the weight of the door. The constructional form is represented in Figs. 8 and 9, in which at the same time the arrangement is shown by which the fulcrum is transmitted from the one hinge to
 15 the other. The tappet 1 in this case is made movable and presents the shape of an angular piece guided, on the one hand, upon the pivot 5 and, on the other hand, within the rib 6. By means of a handle 7 the angular piece
 20 or tappet 1 can be lifted or lowered or fixed in its extreme positions. When the arm 7 occupies the position shown in Fig. 9, the door is free to open. If, however, the sliding pin 3 has entered the angle 8, the turning motion ceases. In order to effect the closing, the fulcrum must be changed. This is
 25 effected by passing the lever 7 into the position represented in Fig. 8. The bottom hinge 2' then bears against the pin 3', arranged on the tappet 1', whereupon a turning movement corresponding to the closing of the door takes place. At the moment of closing the pin 3' enters a recess provided in the hinge 2', whereupon the door is enabled to slide down into
 30 the wedge-lock device 10. After this movement the pin 3' occupies the position shown in Fig. 8.

Instead of the pin 3 being arranged on the movable tappet 1 it may also be provided on
 40 a disk fixed on the pivot 5, and the said pivot may be so arranged as to be either movable only at its upper part or throughout its length. The lifting and lowering of the pivot then produces the same effect as the analogous
 45 movement of the loose tappet 1.

Fig. 3 represents a diagram according to which the opening is effected by hand, while the closing takes place automatically.

What I claim, and desire to secure by Letters Patent, is—

1. The combination with a furnace-door, a hinge member carried thereby, a stationary support, and a pivot carried by the latter upon which pivot said hinge member is adapted for vertical as well as a turning movement, of
 55 means for effecting the automatic turning of the door after the same and its hinge member have been lifted vertically upon the pivot, comprising a helical surface and a pin carried by the hinge member and the stationary
 60 support and so arranged relatively to each other and to the hinge member as to coact only after the door has been lifted whereby the weight of the door is adapted to effect the turning thereof.

2. The combination with a furnace-door, of two hinge members carried thereby, a stationary support, pivots carried by the latter upon which pivots said hinge members are adapted for vertical as well as turning movements
 70 in opposite directions, and means for effecting the automatic turning movements of the door to open and close the same, comprising two helical surfaces of opposite pitch and two pins carried by the hinge members and their
 75 support, and so arranged relatively to each other that one of said helical surfaces and its coacting pin is adapted under the weight of the door after the latter has been lifted, to effect the opening thereof, and that the other
 80 helical surface and its coacting pin are adapted, after the door has been opened, under the weight of said door to effect the closing thereof in the manner specified.

In testimony whereof I have affixed my signature in presence of two witnesses.

JESS ADOLPH JENSEN.

Witnesses:

C. L. MENGELBERG,
 JULES BLOM.