

(No Model.)

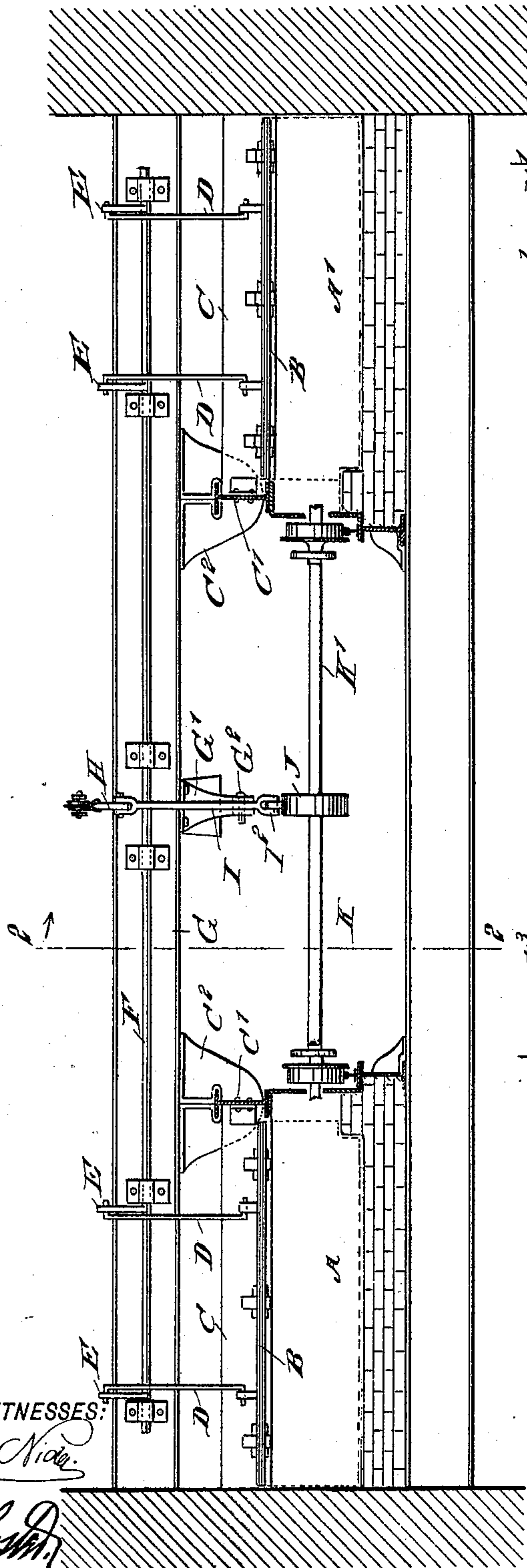
A. H. WETHEY.

DEVICE FOR AUTOMATICALLY OPENING OR CLOSING DOORS OF FURNACES.

No. 565,311.

Patented Aug. 4, 1896.

Fig. 1.

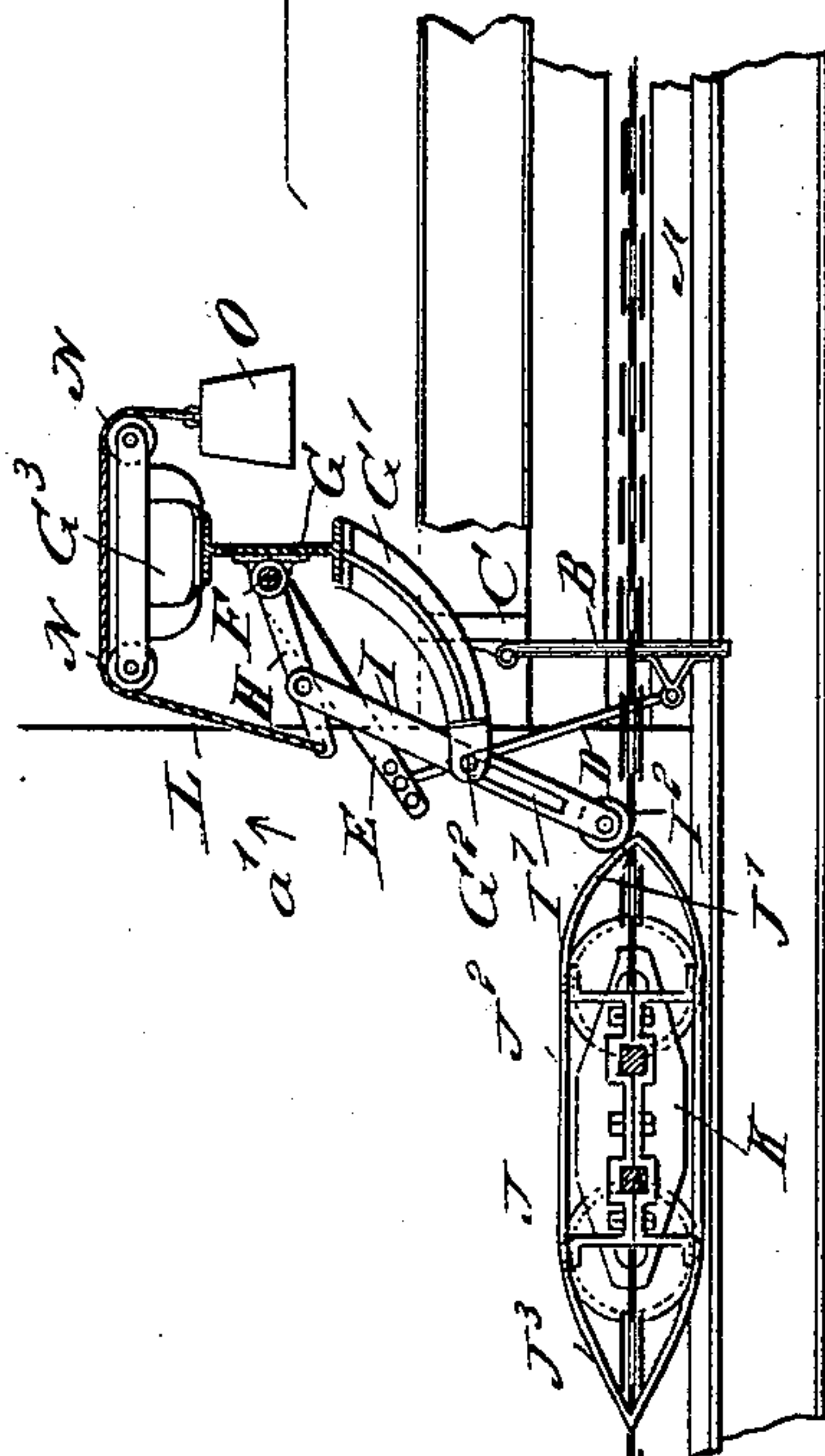
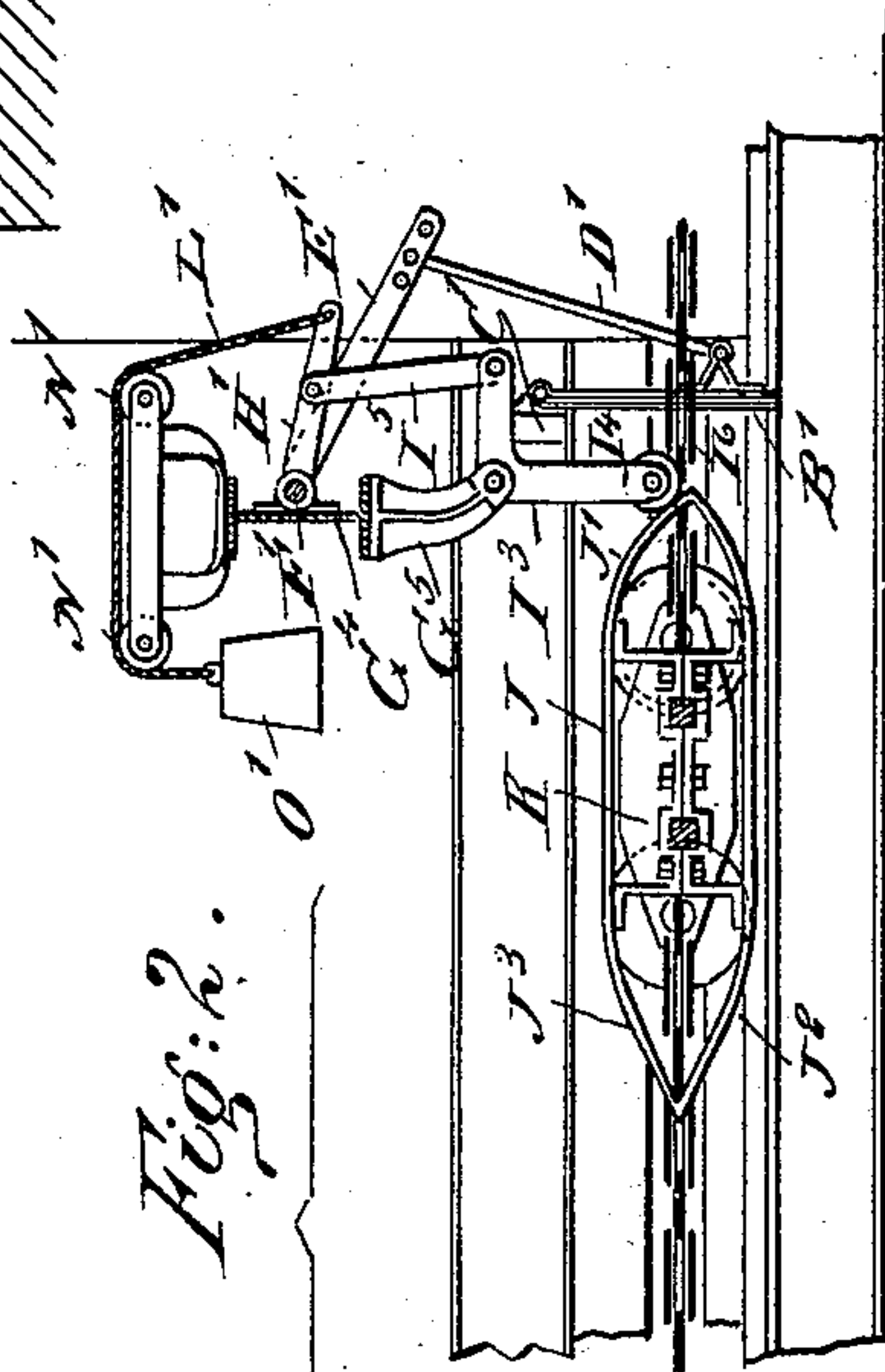


WITNESSES:

Chas. N. Noyes

Wm. J. K. K. K.

Fig. 2.



INVENTOR

A. H. Wethey

BY

Munn & Co.

ATTORNEYS.



# UNITED STATES PATENT OFFICE.

ARTHUR HARVEY WETHEY, OF BUTTE, MONTANA.

DEVICE FOR AUTOMATICALLY OPENING OR CLOSING DOORS OF FURNACES.

SPECIFICATION forming part of Letters Patent No. 565,311, dated August 4, 1896.

Application filed February 15, 1895. Serial No. 538,506. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR HARVEY WETHEY, of Butte, in the county of Silver Bow and State of Montana, have invented  
5 a new and Improved Device for Automatically Opening or Closing the Doors of Furnaces, of which the following is a full, clear, and exact description.

The object of the invention is to provide a  
10 new and improved device for automatically opening the end doors of such calcining-furnaces to permit the rakes or plows to enter or leave the hearth of the furnaces and to permit the doors to automatically close as soon  
15 as the rakes or plows have left the door-openings.

The invention consists principally of a traveling shoe adapted to actuate a lever mechanism connected with the door to be opened,  
20 so that the shoe, upon approaching the door, causes the latter to swing open to permit the passage of the rakes or plows.

The invention consists of certain parts and details and combinations of the same, as  
25 will be fully described hereinafter, and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate  
30 corresponding parts in both the figures.

Figure 1 is an end elevation of the improvement, and Fig. 2 is a side elevation of the same with parts in section.

The calcining-furnaces on which the improvement is applied are preferably built in pairs, with two furnaces A and A' located opposite each other, as indicated in Fig. 1. Each furnace A and A' is provided with a series of longitudinally-extending hearths or  
40 compartments, as more fully described in the application above referred to, and each compartment is adapted to be closed at its ends by doors B and B', of which the door B is located at the front end of the compartment  
45 and the door B' at the rear end thereof, as is plainly illustrated in Fig. 2.

The front door B of each compartment of the furnaces is hinged at its upper end on the arch-plate C, forming part of the structure of  
50 the furnaces, and the lower free end of each door is pivotally connected with an upwardly and outwardly extending rod D, pivotally

connected with an arm E, secured on a shaft F, extending transversely from one furnace to the other, as is plainly shown in Fig. 1, the  
55 said shaft being journaled in suitable bearings attached to the upper main beam G. By this arrangement the shaft F carries two sets of arms E, one set for each compartment of the furnace A and A'; that is, such compartments as are located at the same horizontal plane. At or near the middle of the shaft F and between the furnaces A A' is secured a forwardly or downwardly projecting arm H,  
60 pivotally connected with a rod I, formed near its lower end with a slot I', engaged by a pin G<sup>2</sup>, held in a bracket G', projecting from or secured to the main beam G, as is plainly shown in Figs. 1 and 2. On the extreme lower  
65 end of this rod I is journaled a friction-roller I<sup>2</sup>, adapted to be engaged by a shoe J, secured on the framework forming part of the carriage K, carrying the plows, rakes, or other stirring devices, which pass through the compartments of the two furnaces to stir and move the  
70 contents thereof, the carriage being moved forward by endless chains I<sup>6</sup> in the manner described in the application above referred to.

The shoe J is formed at its front end at the top with the curved surface J', adapted to engage and lift the roller I<sup>2</sup> to impart an upward  
80 sliding of the rod I to push the arm H in a similar direction, as indicated by the arrow  $\alpha'$  in Fig. 2, to impart a turning motion to the shaft F. The latter, by its sets of arms E,  
85 causes a pull on the links D, so that the doors B of the corresponding compartments of the furnaces A and A' are simultaneously swung upwardly and outwardly into a horizontal position to permit the immediately-following  
90 rakes or plows held on the carriage, of which the shaft K' is a part, to pass into the compartments to agitate the contents thereof.

The front curved surface J' of each shoe J terminates in the top horizontal surface J<sup>2</sup>,  
95 which latter terminates at its end in the curved rear surface J<sup>3</sup>, extending downwardly, so that the roller I<sup>2</sup> in traveling over the horizontal surface J<sup>2</sup> holds the door B open until the stirring device has passed into the corresponding compartment. When this has been  
100 done, then the roller I<sup>2</sup> travels down the curved surface J<sup>3</sup>, so that the door B, by its own weight, swings downward into a closed



position. The bottom or lower half of the shoe is similar to the top or upper half and is used in a like manner in the next lower compartment.

5 In order to nearly counterbalance the door B and parts connected therewith to insure an easy opening of the door by the shoe J, I connect the outer end of the arm H with one end of a rope L, extending upwardly and passing  
10 over the pulleys N, journaled in a bracket G<sup>3</sup>, supported on the top of the main beam G. The inner end of the rope L carries a weight O, serving to nearly counterbalance the door B and parts connected therewith, so that the  
15 door will readily open at the time the friction-roller I<sup>2</sup> travels up the surface J', but will not retard the downward-swinging motion of the door B at the time the friction-roller I<sup>2</sup> travels down the curved surface J<sup>3</sup>.

20 The door B', on the opposite end of each compartment, is hinged at its upper end to the arch-plate C' and is pivotally connected by a link D' with arms E' on a shaft F', similar to the shaft F, and journaled in bearings  
25 attached to the main beam G<sup>4</sup>. The shaft F' is provided with an arm H', similar to the arm H, and connected by a link I<sup>5</sup> with the bell-crank lever I<sup>3</sup>, carrying at its lower member a friction-roller I<sup>4</sup>, adapted to be engaged by the  
30 shoe J. Now it will be seen that this friction-roller I<sup>4</sup> is located in a vertical plane, somewhat to the rear of the door B', and consequently the shoe J strikes and acts on the said friction-roller I<sup>4</sup> to impart a swinging  
35 motion to the bell-crank lever I<sup>3</sup> previous to the stirring device of this particular shoe reaching the door B' on its passage through the corresponding compartment. The shoe J, in striking the friction-roller I<sup>4</sup>, causes the  
40 bell-crank lever I<sup>3</sup> to push the link I<sup>5</sup> upward, to cause the arm H' to swing in a like direction and turn the shaft F', so that the sets

of arms E' pull on the links D' to cause the doors B B' of the two corresponding compartments of the furnaces A and A' to swing upwardly and outwardly. The stirring device  
45 supported on the carriage K, carrying this particular shoe J, can now pass out of the compartments as the doors B B' are opened. The same construction applies to each of the  
50 compartments; that is, the doors B and B' are arranged successively in the line of travel of the shoe J.

The door B' is counterbalanced, similar to the door B, and for this purpose the outer  
55 end of the arm H' is connected with a rope L', passing over the pulleys N' and carrying a weight O'.

It will be seen that this device is very simple and durable in construction, and causes  
60 an automatic opening of the end doors of the furnace, to permit the rakes, plows, or similar stirring devices to enter or leave the compartments of the furnaces, and to cause a self-closing of the doors as soon as the stirring de-  
65 vices have left the door-openings.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

The combination with the furnace having  
70 two spaced compartments, and doors for closing said compartments, of a carriage held to travel between the compartments, a transverse shaft extending into the compartments and the space between them, an operating-rod  
75 projecting from the central portion of the shaft and adapted to be actuated by the carriage, and operative connections between the end portions of the shaft and the doors, substantially as described.

ARTHUR HARVEY WETHEY.

Witnesses:

WILLIAM H. HENRY,  
ADAM UNDERWOOD.