L. A. SHERMAN.

FURNACE COVER.

APPLICATION FILED MAY 28, 1912.

1,096,323. Patented May 12, 1914.

Fig. 1.

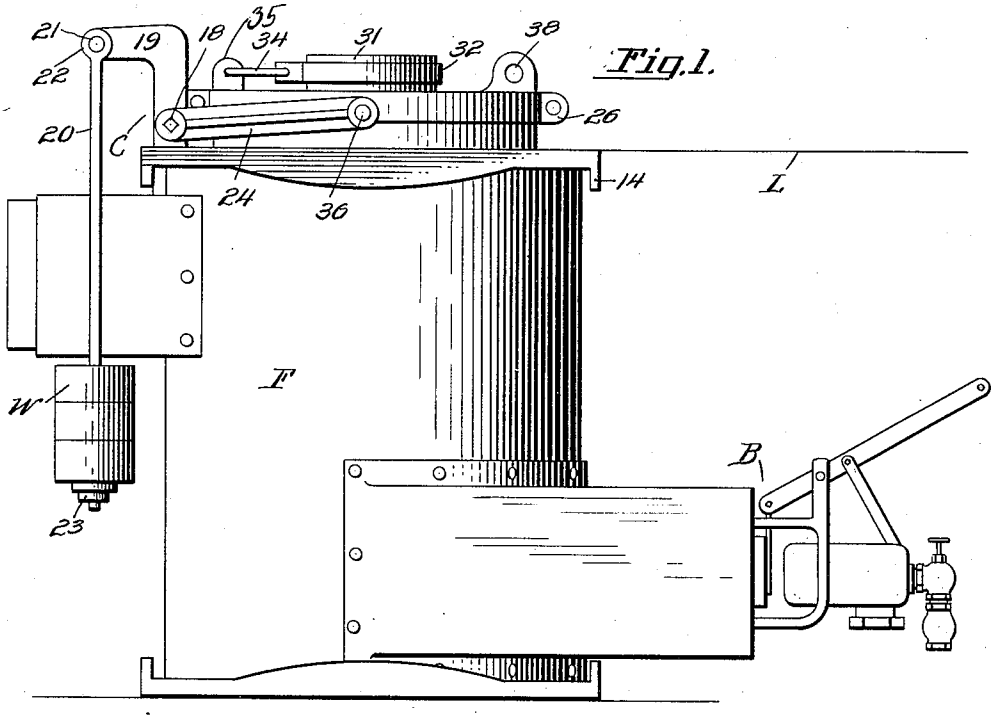


Fig. 3.

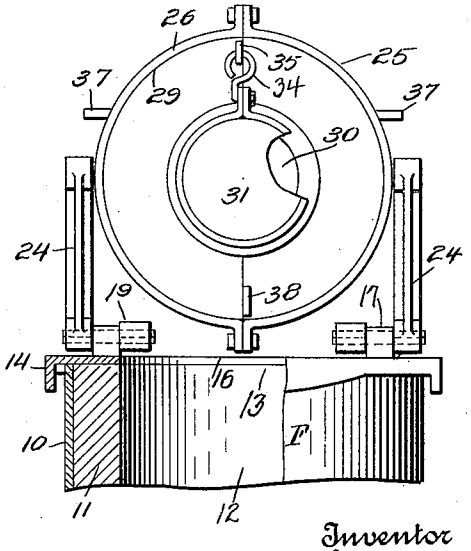
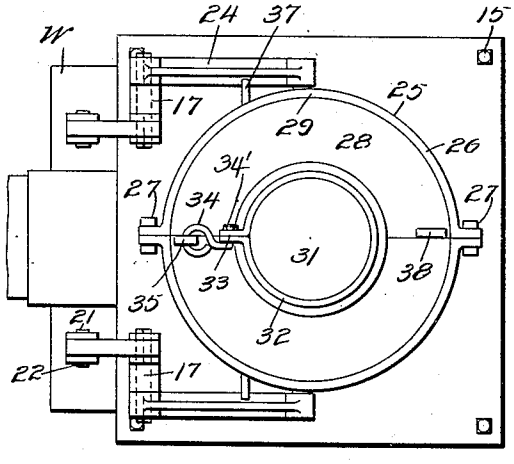


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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FURNACE-COVER.

1,096,323. Specification of Letters Patent. Patented May 12, 1914.

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To all whom it may concern:

Be it known that I, LOUIS A. SHERMAN, a citizen of the United States, and resident of Montclair, Essex county, State of New Jersey, have invented certain new and useful Improvements in Furnace-Covers, of which the following is a specification.

This invention relates to furnaces and more particularly to a cover for a crucible furnace of the pit type though it is to be understood that the improved cover may be applied to furnaces generally.

One of the objects of the invention is to provide a cover which is simple in construction, counterbalanced so as to be readily lifted from its seat and one which will when lifted always present the top or cooler side to the operator.

Other objects and the novel features of the invention will be apparent from the following description, taken in connection with the drawings, in which—

Figure 1 is a side elevation of a furnace embodying my invention; Fig. 2 is a plan view of the furnace top and cover mounted thereon; Fig. 3 is a front elevation of the upper end of the furnace, parts thereon being in section, showing the cover in open position.

Referring to the drawing the invention is shown as applied to a crucible furnace F of the pit type located below the floor line L. The said furnace is adapted to utilize fluid fuel such as oil, gas and the like and for this purpose is provided with the hydrocarbon burner designated as a whole by B, connected with the lower end thereof.

The disclosure is merely illustrative, it being obvious that the cover construction may be applied to furnaces generally and therefore it is not intended to confine the invention to a particular type of furnace.

The furnace F consists of a sheet metal or cast shell 10 lined with fire brick or other refractory material 11, which incloses a heating and melting chamber 12. The chamber 12 is open at its lower end to receive the combustible mixture for heating the contents thereof and also has an opening 13 at the top through which access may be had to the interior thereof. The said chamber is provided with a furnace top comprising a cast metal plate 14 which is secured to the shell 10, by bolts 15, and has an opening 16 therein in alinement with the opening 13 in the upper end of the chamber 12.

Bearing lugs 17 cast integral with the top 14 are located along one side of the top. The said lugs or ears 17 each constitute a bearing for a sectional bell crank lever designated as a whole by the character C. Each bell crank lever C comprises a pivot shaft 18 which is of angular cross section at its ends and is of circular cross section intermediate its ends where it is journaled in the lug 17. On the inner ends of said pivot shafts are mounted upwardly and rearwardly extending L-shaped arms 19. Rods 20, forked at one end and threaded at the other end depend from the rear ends of said arms 19. The rods are loosely or flexibly connected at their upper ends to said arms 19 by means of the bolts 21 which extend through the forked ends 22 of said rods and the rearwardly extending arms of levers 19. The flexible connection thus allows the said rods 20 to at all times depend vertically from the ends of the levers 19 and exert a maximum downward pull thereon. The rods 20 at their lower ends pass through apertures in a plurality of counter weights W which extend between the suspended rods. The said weights are secured to the rods by nuts 23 and constitute a counter balancing means to assist in raising the furnace cover from its seat on the furnace top and to hold the said door in raised position. Forwardly extending arms 24 of the bell crank levers are mounted on the outer ends of the pivot shafts 18 and constitute the cover raising and supporting arms. The square ended pivot shafts 18, having the arms 19 and 24 mounted thereon constitute a rockable bell crank lever and provide a connection between the cover and the counter weight.

The furnace cover 25 is of sufficient size to cover the opening 13 in the furnace top and, when closed, of its own weight, rests solidly in place on the furnace top 14. The furnace cover 25 comprises a sheet metal of cast rim of two substantially similar sections 26 bolted together by bolts 27. The said cover also has a two piece annular plate portion 28 which is supported by said rim sections 26. The cover may be lined with refractory material and has a central opening 30 therein which is concentric with the rim 26. The

opening 30 is covered by an auxiliary or smaller cover 31 which may also be of refractory material and has a rim band 32 secured thereto. The rim band 32 has two cooperating lugs 33 thereon having holes drilled therethrough into which one end of an eyebolt 34 extends. A nut 34′ on the end of said bolt 34 prevents the cover 31 from becoming detached. The eye of the eyebolt 34 is passed through a hole in an upstanding lug 35 on one of the annular sections 30 of the top of the furnace cover 25. The small top cover 31 is thus flexibly attached to the main cover 25 by said eyebolt 34 so that the said cover 31 may be pushed from side to side by the operator for the purpose of "feeling" the metal or adding to the charge without shutting off the fire. The eye bolt connection 34 also prevents the cover 31 from falling into the furnace as the main cover 25 lifts and turns, the small cover being then disposed directly over the opening in the furnace.

The rim members 26 of the cover 25 are provided with trunnions 36 and stops 37 on the outer side thereof. The trunnions 36 are on a line slightly to one side and back of the center line of the furnace cover and the stops 37 are to the rear of the trunnions 36, and are long enough to engage the upper faces of the arms 24. The outer ends of the arms 24 have bearing openings therein to receive the trunnions 36 and thereby support the cover in open position. It will be noticed that by thus mounting the cover slightly back of its center of gravity or on a chord shorter than the diameter, the front of the same will overbalance the rear and when sufficiently raised the cover will be suspended vertically from the ends of the arms 24.

To open the cover the operator inserts a hook into an eye 38, which like the eye 35 is integral with one of the two similar sections 30 of the cover, and lifts slightly until the levers 19 reach a position that allows gravity operating through the counter weights W to overbalance the weight of the cover and complete the operation of raising the same. The levers 19 and 24 are connected to move together by reason of the angular portions of the pivot shafts 16. The front of the cover drops of its own weight since it is hinged slightly back of its horizontal center line and is prevented from turning the hot side thereof toward the operator as he lifts at 38, by the stops 37 which extend over the arms 24. The said stops 37 engage the arms 24 when the operator first lifts the cover, and thus give steady leverage to the lift. The arms 24 are so pivoted and of such a length as to raise the cover 25 sufficiently high to suspend the same clear of the top plate 14, and entirely to one side of the opening therein to allow unobstructed access to the interior of the furnace. The cover may be replaced by moving the same forwardly over the opening.

It will be obvious that there may be substituted instead of two independent bell crank levers a single pivoted lever having a forwardly extending forked member to cooperate with the trunnions 36 on the cover 25, and that a single rearwardly extending member may carry the weights W.

It will be seen that I have provided a simple and efficient counter-weighted cover which when open reverses its natural position by its own weight and is prevented from presenting the heated side thereof to the operator. There is also provided a secondary or auxiliary cover attached to the main cover in such a manner that the same may be moved from side to side or raised without breaking the attachment.

It is obvious that numerous changes may be made in the construction without departing from the spirit of the invention, therefore I do not wish to limit myself to the exact details as shown and described.

Having described my invention what I claim and desire to secure by Letters-Patent is,

1. In a furnace, the combination with an inclosing shell having an opening therein, of a closure for said opening, and means rendered active immediately after the closure is slightly moved to unseat said closure and expose the opening.

2. In a furnace, the combination with an inclosing casing having an opening in a wall thereof, of a cover supported so that it is held in closed position by gravity, and means rendered active immediately after the cover is slightly moved thereby to complete the raising of the said cover from its seat to expose the opening.

3. In a furnace, the combination with a furnace inclosing shell having an opening therein communicating with the interior of the furnace, of a cover supported near said opening and held in closed position by gravity only, and means connected to the cover for completely unseating the same to expose said opening, said means being set in operation when the cover is slightly raised.

4. In a device of the class described, the combination with a receptacle, of a lever pivoted thereon, a closure supported at one end of said lever, and means connected to the other end of said lever for operating said closure upon a change of the position of the latter.

5. In a device of the class described, the combination with a furnace casing having an opening therein, of a lever pivoted on the casing, a closure normally disposed over the opening and pivotally connected to the lever, and gravity actuated means also connected to said lever adapted to overbalance

said cover when the cover is slightly raised and complete the raising of the same.

6. In a device of the class described, the combination with a furnace casing having an opening therein, of a bell crank lever pivoted on said casing adjacent the opening, a closure normally covering said opening and pivoted on one arm of said lever, a weight connected to the other arm of said lever, said weight being normally inactive and adapted when the cover is slightly raised to overbalance the latter and move the same completely of its seat on the furnace casing, the closure being supported so as to turn its cooler side toward the opening as it is raised.

7. A closure for a furnace, comprising in combination a main cover section pivoted adjacent an opening in said furnace and adapted when disposed over said opening to rest substantially in a horizontal position and when in open position being disposed at an angle to the horizontal, said cover section having an opening therethrough, an auxiliary cover normally disposed over the opening in the main cover section at all positions of the latter and a flexible connection between the covers whereby the auxiliary cover may be moved from side to side or raised without breaking the connection.

8. A closure for a metal furnace comprising in combination, a pair of pivotally mounted parallel bell crank levers, a cover, trunnions on said cover disposed in a line not passing through the center of gravity of said cover, said trunnions engaging arms of said levers, and gravity actuated means connected to the other arms of said levers adapted to oscillate said levers when the cover has been moved.

9. A closure for a metal furnace comprising in combination, a pivoted lever having oppositely extending arms, a cover pivoted on one arm thereof, means on the cover engaging said cover arm to prevent the rotation of said cover about its pivot, and means connected to another arm of said lever adapted to overbalance said cover and raise the same from its seat after the cover has been slightly raised.

10. In a device of the class described, the combination with a furnace having an opening at the top thereof, of a main cover adapted to close said opening, said cover having an opening therein in line with said opening in the furnace, an auxiliary cover loosely connected to said main cover and normally disposed over the opening therein, parallel bell crank levers pivotally mounted adjacent said opening in the furnace, trunnions on said main cover at opposite sides thereof and being disposed in a line not passing through the center of gravity of said covers, weights suspended from the other arms of said levers adapted to oscillate said levers when the main cover has been slightly raised from its seat, and a stop on the main cover to prevent the rotation of the same.

11. The combination with a furnace having an opening therein, of a cover for said opening, and means tending normally to open said cover but not sufficient to move it when closed, the said means and cover being so connected that the means will overbalance the weight of the cover and continue the opening operation when the cover is slightly raised from its seat.

12. The combination with a furnace casing having an opening therein, of a cover for said opening, and a counter weight so connected to said cover as to tend to open but insufficient to unseat the cover, when closed, the parts being so related that the said counterweight will overbalance the cover when it is raised slightly from its seat and move it away from said opening.

13. In a device of the class described, the combination with a closure for an opening in a furnace, of means for supporting the closure so that as it is raised it will present the outer side thereof to said opening, and means tending normally to open said closure but not sufficient to move it when closed, the said means and closure being so connected that the means will overbalance the weight of the closure and continue the opening operation immediately after the closure is slightly raised from its seat.

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

LOUIS A. SHERMAN.

Witnesses:
J. BENNETT HUNTER,
ARTHUR LIVINGSTON.

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