

April 19, 1932.

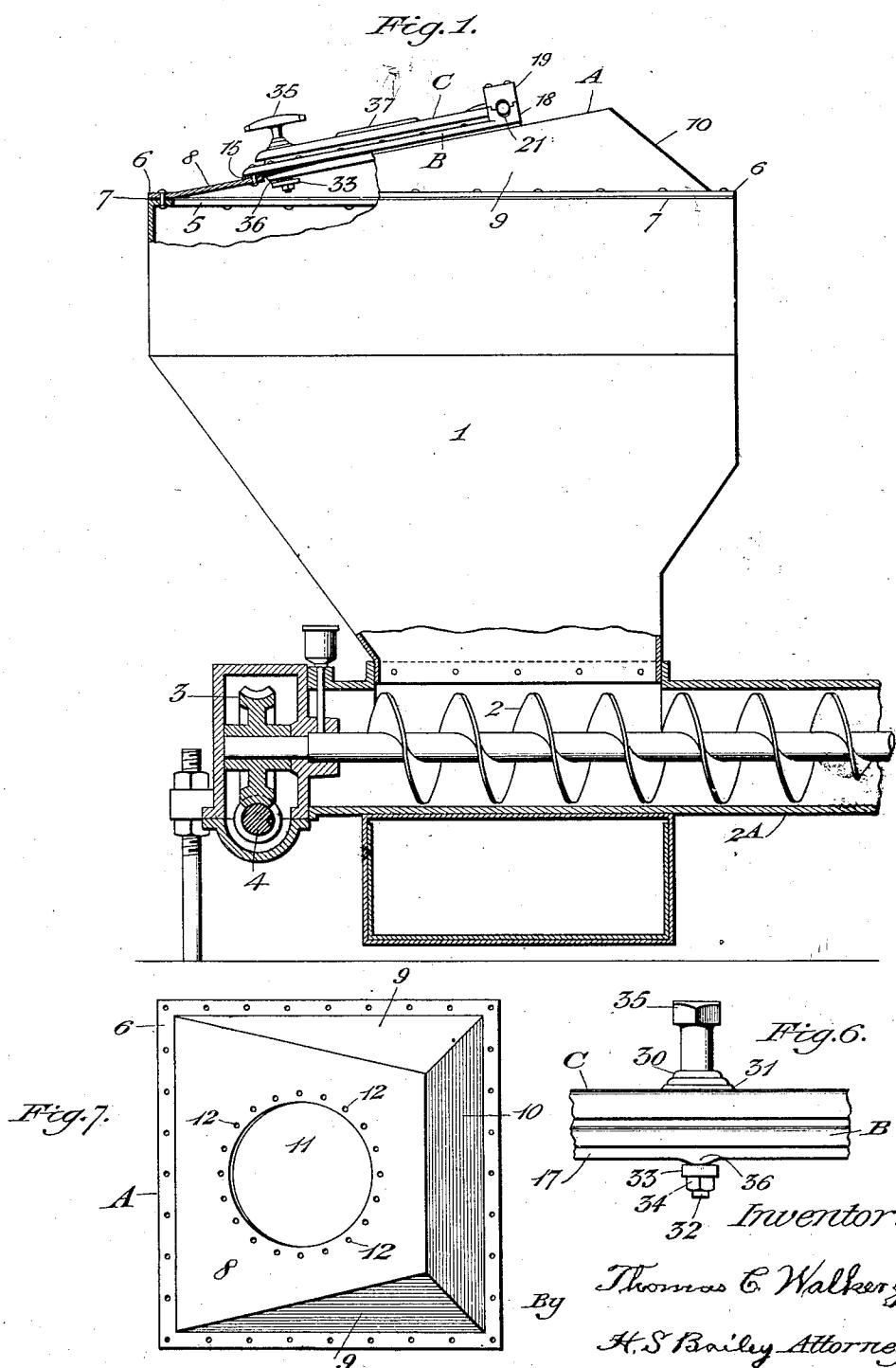
T. C. WALKER, JR.

1,854,680

DOOR FOR FURNACE COAL HOPPERS

Filed Feb. 16, 1931

2 Sheets-Sheet 1



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Fig. 2.

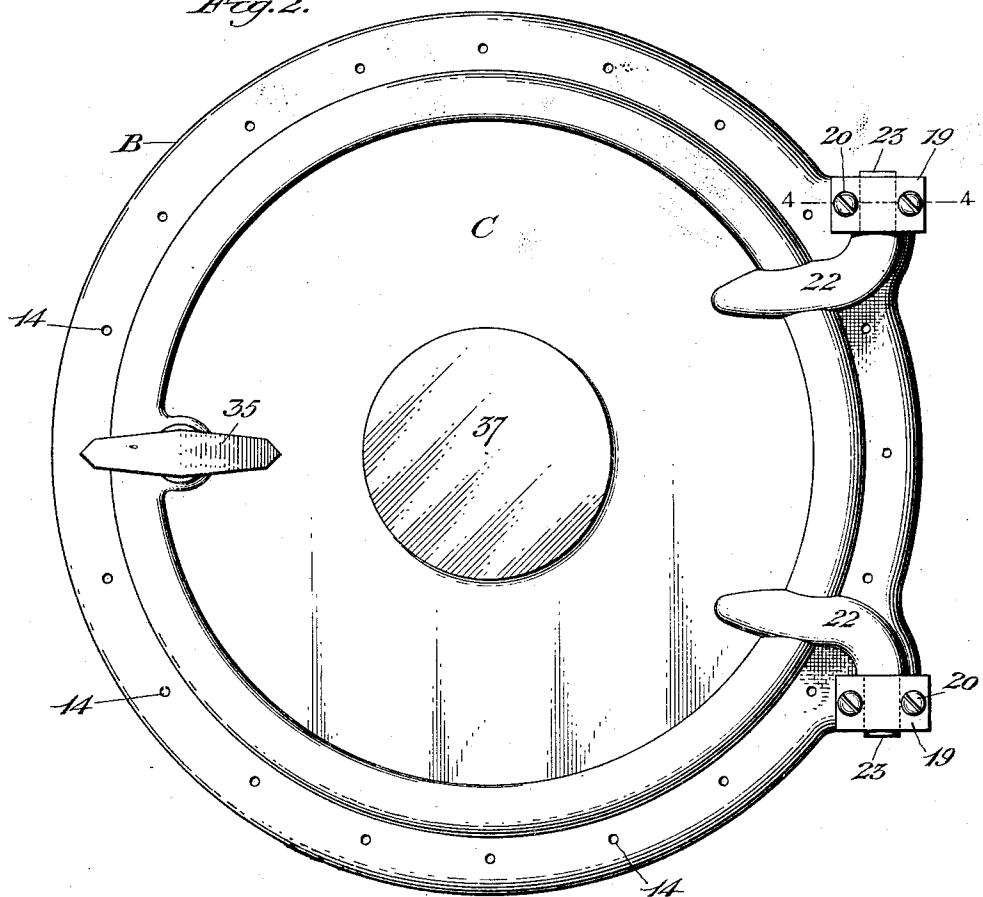


Fig. 3.

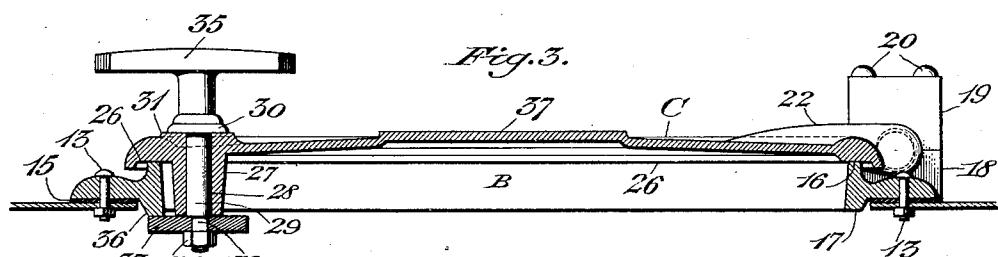


Fig. 5.

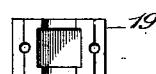
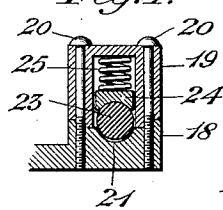


Fig. 4.



By

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## UNITED STATES PATENT OFFICE

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## DOOR FOR FURNACE COAL HOPPERS

Application filed February 16, 1931. Serial No. 516,128.

My invention relates to improvements in doors for furnace coal hoppers.

The primary object of the invention is to provide a smoke tight door for the coal hoppers of furnaces having mechanical stokers, such as shown and described in my pending application, Serial No. 444,552, filed April 15, 1930.

Further, to provide a combined door and frame having a spring pressure hinge connection, said door having a latch for clamping it in closed relation with respect to the frame; said spring pressure hinge cooperating with said latch in clamping the door against the frame with a uniform pressure, thereby to make a tight joint between the parts, the engaging surfaces of the door and frame being ground for that purpose, whereby, when the frame is affixed to a coal hopper, and the door is latched in closed relation, it will prevent smoke from entering the furnace room, due to back pressure of air through the coal hopper, or air passing into the furnace through the hopper.

These objects are accomplished by the mechanism illustrated in the accompanying drawings in which:

Fig. 1 is a sectional view partly in elevation showing the manner of connecting the improved door to a coal hopper, the said hopper being shown in connection with the coal feeding screw conveyor of a mechanical stoker.

Fig. 2 is a plan view—enlarged—of the door and frame.

Fig. 3 is a central vertical sectional view of Fig. 2.

Fig. 4 is a sectional view through one of the hinges, on the line 4—4 of Fig. 2.

Fig. 5 is a bottom plan view of one of the hinge bearing caps.

Fig. 6 is a front view of a portion of the door and frame, showing the curved projection on the frame, which is engaged by the door latch, thereby to clamp the door against the frame, and

Fig. 7 is a plan view of the hood which is secured to the hoppers and to which the door frame is secured.

Referring to the accompanying drawings: The numeral 1 designates a coal hopper, and

2 a screw conveyor which is supported beneath the hopper within a tube 2A to receive coal from the hopper and supply the same to a furnace—not shown. The conveyor shaft has secured thereon a worm gear 3 in mesh with an operating worm pinion 4 by which rotation is imparted to the conveyor. These parts are shown and described in the pending application above referred to, and are embodied in the present application simply to show the relation between the hopper and a mechanical stoker, and to make clear the purpose of the improved coal door on the hopper.

The hopper is provided at its upper end, 65 with an introverted flange 5, to which is secured a hood or cap A of the character shown in Figures 1 and 7. This cap is of a shape to conform to the shape of the hopper, which, in the present instance is square. The cap comprises a marginal flange 6 which is riveted to the hopper flange 5, a felt or other suitable gasket 7 being interposed between the flanges to make a tight connection; and a cover plate 8, which inclines upward at 75 a slight angle from the front edge of the cap to a point near the back edge thereof and also decreases in width, as shown in Figure 7, thus forming inclined side and back walls 9 and 10 respectively.

The cover plate 8 is provided with a central hole 11, which is about fourteen inches in diameter, and is surrounded by a circular row of bolt holes 12. A circular ring-like frame B is bolted to the cover plate, by bolts 13 which pass through holes 14 in the frame and through the holes 12 in the cover plate, a gasket 15 of suitable material being interposed between the parts to form a tight connection.

A circular rim or lip 16, of less diameter than the frame is formed on its upper side and projects a slight distance above the frame, and a circular projecting portion 17 of a corresponding diameter with the rim 16, extends through the circular hole 11, in the cover plate and thus centers the frame upon the plate. The frame is provided upon its rear portion, with spaced integral bearing blocks 18 having socketed caps 19 which are

secured to the blocks by screws 20, the blocks and caps having matching semicircular recesses, which together form bearing holes 21, which are oblong in vertical diameter, as shown in Figure 1.

A circular door C of slightly less diameter than the frame B is hinged thereto in the following manner: The door is formed on its rear edge with spaced lugs 22 which are outwardly curved and terminate in oppositely projecting alined trunnions or hinge pins 23, which extend through the hinge bearings on the frame, the caps 19 being first removed to permit the pins to lie in the blocks 18. Saddle blocks 24 rest upon the pins, their underfaces being formed with semicircular recesses for that purpose, and coil springs 25 are interposed between the tops of the saddle blocks and the end walls of the sockets in the caps, as shown in Figure 4, and when the caps are screwed down upon the blocks the springs 25 are compressed, thus forcing the saddle blocks down against the hinge pins. The under side of the door is provided with a circular flat surface 26, which rests upon the rim 16 of the frame, and the surface 26 and rim 16 are ground so as to make a tight connection. On the under side of the front portion of the door is formed a depending lug 27 having an axial hole 28, which extends out through the top of the door. A latch pin 29 passes through the hole 28, and is formed with a shoulder 30 which rests upon a flat raised portion 31 on the top of the door. The pin extends a short distance below the end of the lug 27, the extended portion being square and reduced in diameter as shown at 32, and a latch 33, in the form of a short flat bar having a square central hole, is placed on the reduced end 32 and clamped against the shoulder of the pin, formed by the reduced end, by a nut 34.

A handle 35 is formed on an upwardly extending portion of the pin 29. The latch 33 engages a curved projection 36 on the lower edge 17 of the frame B, as shown in Figures 3 and 6, and as the latch engages and passes under the said projection, the door is drawn down tightly against the rim 16 of the frame at this point, while, at the same time, the springs 25, in the hinge caps, exert a downward pressure on the saddle blocks, which in turn are forced down upon the hinge trunnions, thus acting in cooperation with the latch, in seating the door firmly upon the rim of the door frame. As the engaging faces of the door and rim are ground, a tight joint is formed which prevents the escape of smoke which may be forced back through the conveyor tube 2A and into the coal hopper. As the latch 33 is a double ended latch, it will engage the curved projection 36, when given a quarter turn in either direction. The door is formed with a slightly raised central circular boss 37 which is intended for use as

a name plate. The oblong bearing holes 21 in the hinge blocks and caps, permit the door to freely engage the rim 16 under the pressure of the springs 25, as the hinge trunnions do not contact with either the upper or lower ends of the said bearing holes, as will be seen by reference to Figure 1. The saddle blocks 24 are aluminum, and under the pressure of the springs 25 engage the hinge pins with sufficient frictional pressure to hold the door open at any angle to which it may be swung.

After the hopper is filled with coal, the door is closed and clamped to its frame, as above described, and need not be opened again, until the hopper requires replenishing, thus preventing either the escape of smoke into the furnace room or the entrance of air into the furnace through the screw conveyor.

Having described my invention, what I claim as new, and desire to secure by Letters Patent is:—

1. In a device of the character described, the combination with a hopper, of a cap thereon having a circular opening, a ring-like frame surrounding said opening and secured to said cap, bearings on said frame having socketed caps, a door on said frame having hinge pins which extend loosely through said bearings, saddle blocks in said caps which rest on said hinge pins, and springs under compression between the saddle blocks and the top walls of the caps, a curved projection on the under edge of the frame and a rotatable latch in said door having a member to engage said curved projection, and thus cooperate with said springs in forcibly closing said door upon said frame.

2. In a door for the hoppers of furnaces having mechanical stokers, the combination with a hopper, of a cap thereon having a circular opening therein, a ring-like frame surrounding said opening and secured to said cap and having an upwardly projecting ground rim, bearings on said frame having socketed caps, a door on said frame having a ground surface which is adapted to rest upon said rim, and oppositely extending hinge pins which pass loosely through said bearings, saddle blocks in said caps which rest upon the hinge pins, and springs under compression between the saddle blocks and top walls of the caps, a latch rotatably mounted in the door and having a latch bar thereon, and a projection on the under edge of the frame having a cam face adapted to be engaged by the latch bar and thus cooperate with said springs in forcibly closing said door upon the rim of the frame.

3. The combination with a ring-like frame having hinge bearings including socketed caps, and a ground rim; of a door on said frame having oppositely extending integral hinge pins which pass loosely through said bearings, saddle blocks in said caps which

rest upon said hinge pins, and coil springs under compression between said saddle blocks and the top walls of the caps, a latch rotatably mounted in said door and having a 5 latch bar on its lower end, and a projection on the lower side of said frame having a cam face adapted to be engaged by said latch bar, thereby to cooperate with said springs in forcibly closing the door upon the rim of the 10 frame.

4. In a door of the character described, a ring like frame having hinge bearings with holes which are oblong on their vertical diameters, said bearings including socketed caps, a 15 door on said frame having hinge pins which extend loosely through said bearings, soft metal saddle blocks in said caps which rest upon said hinge pins, and coil springs interposed between the saddle blocks and the 20 end walls of the cap sockets, a latch on said door for engaging the frame, thereby to cooperate with the springs in forcibly closing the door upon the frame, said hinge blocks engaging the hinge pins with sufficient frictional pressure to hold the door open at any 25 angle to which it may be swung.

In testimony whereof, I affix my signature.

THOMAS C. WALKER, JR.

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