Nov. 14, 1933. C. A. WARG 1,935,492

CLOSURE FASTENER

Filed Dec. 26, 1929

FIG. 1.

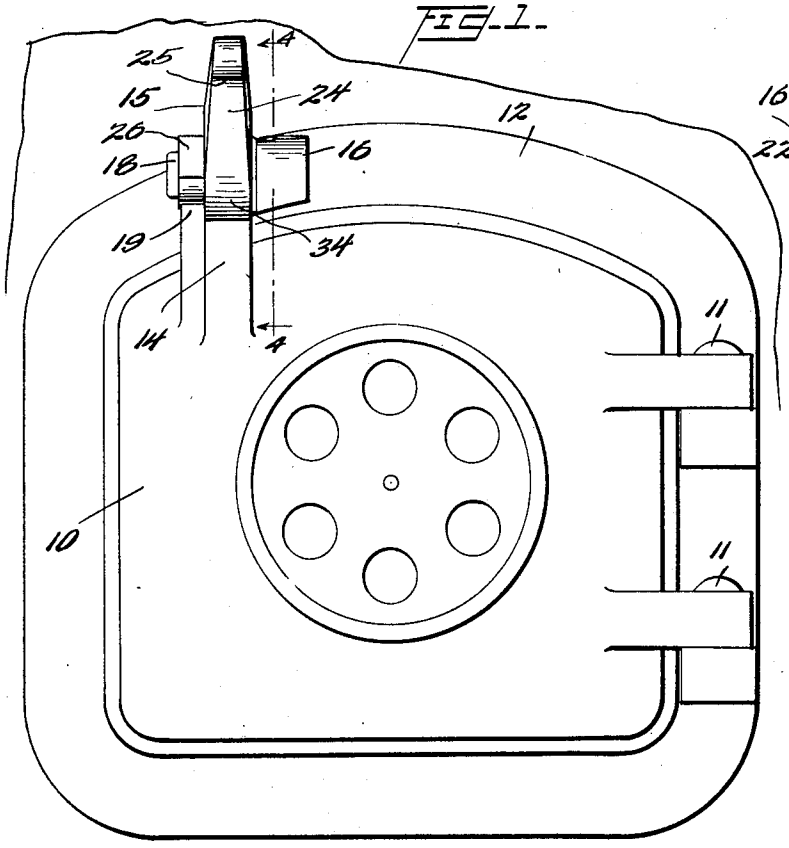


FIG. 2.

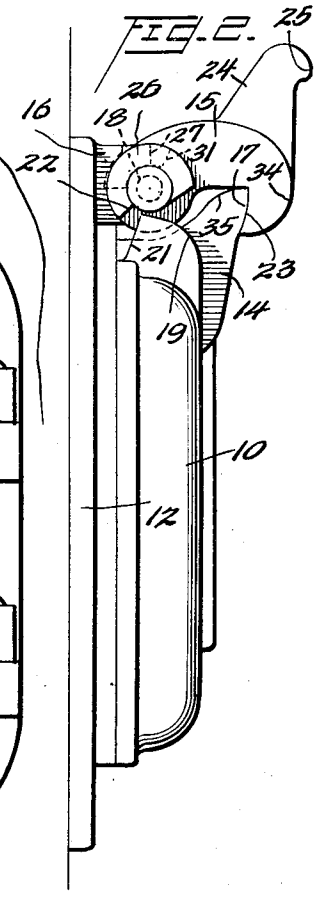


FIG. 3.

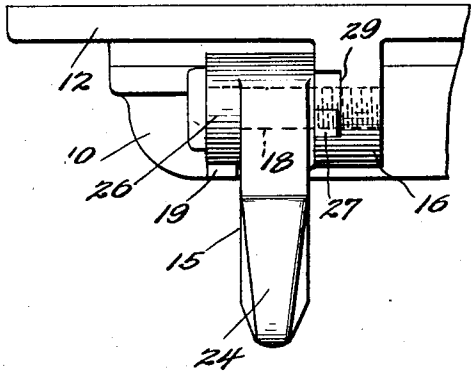
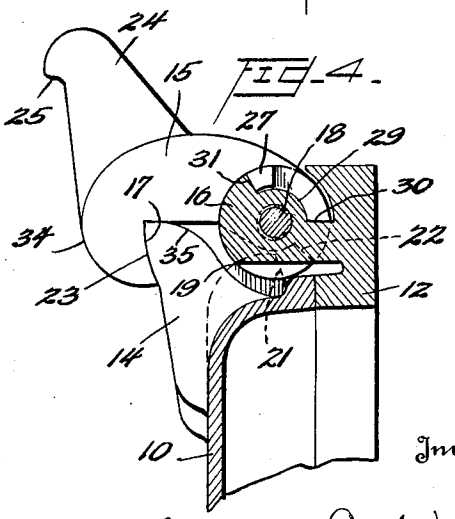


FIG. 4.



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CLOSURE FASTENER

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Serial No. 416,725

9 Claims. (Cl. 292—99)

This invention relates to furnace fire doors or other similar closure members and has for its principal object the provision of simple and efficient means combining in one unit a safety latch which will automatically secure the door in closed position when the latter is swung shut and a door opener which will open the door when pressure is applied to the upper end of the latch handle or more frequently when this element is struck with a fire tool.

A further object of the present invention is to provide a safety latch particularly applicable to fire doors for furnaces in which the latch has lost motion prior to initiating the opening movement of the fire door whereby a much less powerful blow is required to release and open the door than would be the case if the door started to open as the latch started to release.

While various opening devices have been suggested and even used on doors of general application, furnace fire doors are not so provided because the devices available are not altogether satisfactory, some of them requiring the furnace man to lay down his tool and operate some release mechanism by hand sometimes in addition to seizing the handle of the door to complete the movement. In the present invention a single assembly, simple and rugged in construction, forms a safety latch which remains in such position that upon slamming the door, the door is effectively closed and latched, and in addition a very simple upwardly directed blow will open the door with sufficient force to swing it about its pivot to open it wide, requiring no further act to gain convenient access to the fire.

In the drawing:

Figure 1 is a front elevation of a fire door embodying my invention.

Figure 2 is a side elevation.

Figure 3 is a top plan view.

Figure 4 is a side elevation of the safety latch.

The fire door 10 is hinged as at 11 to the frame 12 and these two elements carry coacting means for latching the door closed and for opening it, such means including a projection or keeper 14 on the door and a safety latch 15 pivoted in a forwardly extending bracket 16 on the fire door frame 12.

That portion of the integral extension on the fire door which serves as the keeper for the latch has a cylindrical surface 17, the center of which is the axis of the pivot of the safety latch 15, that is, the bolt 18 which has threaded engagement with the bracket 16. Adjacent this keeper projection or lug, toward the handle side of the door, is an upwardly and rearwardly extending curved surface 19 which ends at the rear or wall side of the furnace in an abrupt shoulder 21 which is adapted to be engaged, in door opening movement, by a shoulder 22 on the latch 15.

The central portion of the member 15 is the latch portion, its holding face 23 being cylindrical and of the same radius as the surface 17. From the central and outward portion of the main body of the latch rises a handle portion 24 having a rounded forwardly extending hook portion 25 to arrest the edge of the rake, scraper, or hoe or whatever implement the fireman happens to be using. This safety latch may naturally be operated by hand but in practice it will generally be operated by a light blow or tap from whatever instrument happens to be handy. The shoulder 22, previously mentioned, extends from a lateral boss 26 against which the head of the bolt 18 engages, and on the opposite side of the latch is a small laterally extending retaining member or stop 27 which rides in a slot 29 in the bracket lug 16 and engages the stop surface 30 to limit upward movement of the latch and engages a sloping stop surface 31 to hold the latch in position to be engaged by the door as it closes.

Assuming the door to be closed, the workman strikes or presses against the upper portion of the handle 24 which rotates the safety latch about its pivoting bolt 18. During the first thirty degrees or so of movement the arcuate surface 23 on the interior of the hook of the latch slides smoothly on the similar arcuate surface 17 on the outside of the lug 14 on the door, both cylindrical surfaces being of the same radius and struck from the same center. The latch, therefore; has some little inertia at the time the shoulder 22 on its boss 26 strikes against the rear face 21 of the door opening member which is integral with the fire door. At the moment of contact the surfaces 22 and 21 lie in the same plane and further movement of the latch cams the door open, the lost motion between the latch and the keeper being sufficient to insure that with a reasonably moderate blow the door will open wide. In closing the door is merely struck or pushed by its free edge, or by its handle, and in such closing movement the rounded outward edge 34 of the hook end of the latch is held by the lug 27 in position to be engaged by the smoothly curved upper portion 35 of the keeper 14. The latch, therefore, rises gently until the edge of the hook passes the edge of the keeper. At this time the shoulder 21 on the door strikes the shoulder 22 on the latch and this causes the

latch to descend into latching position, the movement being positive and therefore there is no possible chance of the door rebounding or not being caught in closed position.

What I claim is:

1. A keeper for a firedoor pivoted to a furnace front, said keeper consisting of a lug projecting upwardly and outwardly from the door adjacent the upper edge thereof, away from the hinged side, and extending in part above the upper level of the door, said keeper lug having its upper surface near its top portion smoothly curved to lift a latch in its path with a constantly diminishing cam action and having its lower surface near its top portion oppositely curved on an arc to engage an arcuate surface on a latch.

2. The device of claim 1 in which the two surfaces mentioned meet in a cusp at which cusp the upper surface is tangent to horizontal and the lower surface is tangent to vertical.

3. A latch for a fire-door pivoted to a furnace front and adapted in one position to engage a keeper on the door and in another position to engage a shoulder on the door, comprising a body portion pivoted at its rear to the furnace front, means on the body of the latch near the pivot adapted to engage an element on the furnace front to limit the swinging of the latch on its pivot so the latch cannot fall below said one position which is a substantially horizontal position, and a hooked end on the body having two arcuate surfaces meeting in a downwardly and inwardly directed cusp, an upwardly and outwardly directed arm extending from the body and ending in a short forwardly extending portion to engage a tool so that an upward blow of the tool will lift the latch and cause it to release the door and to engage said shoulder to open the door.

4. In a closure fastener, a latch having a main body portion pivoted at one end, a laterally extending boss integral with the pivoted end of said body portion, a shoulder on said boss, a keeper engaging member at the free end of said body portion, an arm rising from said body portion adjacent said member, and a forwardly extending hook on said arm adapted to be struck by a tool to raise the latch thereby to release the keeper and instantly after release to bring said shoulder against the door to open the door, the upward length of the arm being a plurality of times greater than the forward extent of the hook whereby to minimize the distance the latch extends from the member on which the closure is mounted.

5. A door opening latching device of the type wherein a keeper on the door lifts the latch as the door closes about its hinges, and the door is given initial opening movement by a movement of the pivoted latch; a latch and a keeper characterized by the provision of two cooperating, engaging curved surfaces on the latch and keeper, said surfaces being cylindrical, having the same radius, and having their axes in the axis of the pivot of the latch whereby the latch may move thru an appreciable angle while holding the door firmly closed just before freeing and moving the door to open position.

6. In a device for latching a hinged fire door to a furnace front, a bracket extending forwardly from the furnace front, a latch pivoted to the bracket, means for yieldingly holding the latch body in substantially horizontal position, a keeper on the door in position to lift the latch in the door closing movement, and cooperating means on the latch and keeper, located entirely in front of the plane of the opening closed by the door, for opening the door when the free end of the latch is raised.

7. In a door fastener, a pivoted latch, a keeper on the door extending above the top level of the door, the upper surface of the keeper sloping to gently raise the latch as the door is moved to closed position, said slope rising at a constantly decreasing rate and becoming tangent to horizontal at its forward end, and the lower outer surface of the latch being cylindrical with its axis at the end of the keeper when the door is latched, additional means on the door adjacent to the keeper and adapted to engage the pivoted end of the latch to thereby drive down the latch into initial holding position at the end of the closing movement of the door.

8. A latch for a fire-door pivoted to a furnace front and adapted to engage a keeper on the door, comprising a body portion pivoted at its rear to the furnace front, means to limit the swinging of the latch on its pivot so that the latch can not fall below a substantially horizontal position, a hooked end on the body having two arcuate surfaces meeting in a downwardly and inwardly directed cusp.

9. In a closure fastener for furnace doors, a latch pivoted to the furnace front adjacent the furnace door opening and having a stop shoulder radial with the pivotal axis and a cylindrical holding face coaxial with said axis, said latch being intended for use with a keeper on the door having a cooperating cylindrical surface coaxial with the holding face when the door is latched and having a radial shoulder spaced from the latch shoulder when the door is closed but in contact therewith at the moment the latch is moved to release position.

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