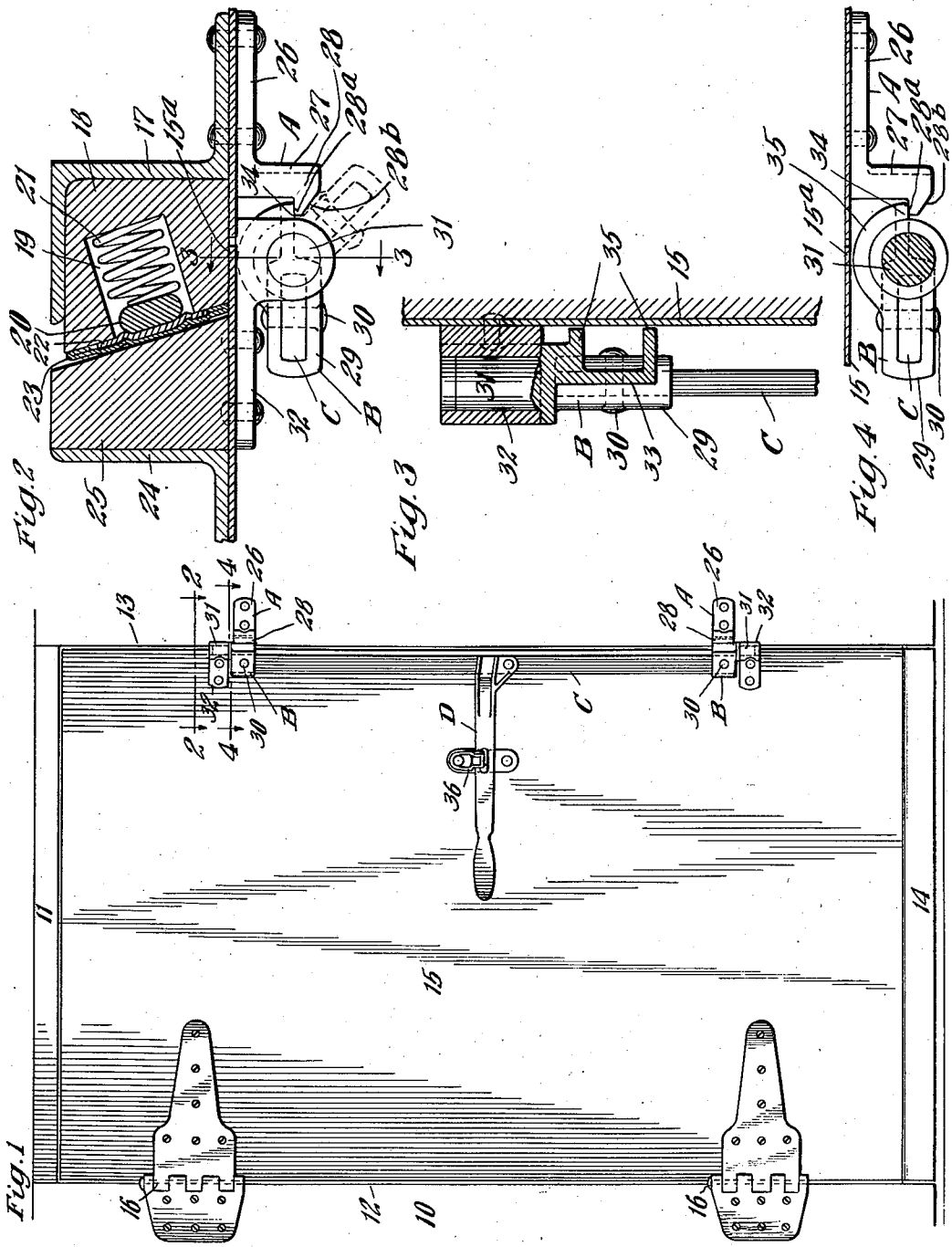
Feb. 8, 1927. 1,616,755

J. F. O'CONNOR

DOOR OPERATOR

Original Filed March 20, 1922



Witnesses
Wm. Geiger

Inventor
John F. O'Connor
By Geo. I. Haight
His Atty.

Patented Feb. 8, 1927. 1,616,755

UNITED STATES PATENT OFFICE.

JOHN F. O'CONNOR, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO W. H. MINER, INC., A CORPORATION OF DELAWARE.

DOOR OPERATOR.

Application filed March 20, 1922, Serial No. 545,020. Renewed June 3, 1926.

This invention relates to improvements in door operators.

On certain railroads, the practice has been adopted of employing what are known as "containers" for the transporting of mail and high-grade freight, the shippers loading said containers and the containers then being trucked to a special car and a number of such containers placed on each car, the mail or goods being delivered to the proper consignee in the said containers. Such containers, in order to avoid excessive weight, are preferably made of sheet steel to resist the service conditions and each container is provided with a relatively large door to permit loading and unloading of comparatively large packages. Obviously, such containers which are exposed to the weather on the special flat bottom car, must be weatherproof around the door joints as well as elsewhere and to accomplish this result, it is necessary to employ insulation at the joints, such as used for instance in refrigerator cars for a similar purpose. To obtain an effective insulated joint, considerable pressure must be exerted in forcing the door to fully closed position to overcome the resistance offered by the insulation to the closing movement. The doors of the containers referred to, being of sheet metal and of comparatively large size, are necessarily subject to considerable bending strains tending to warp them while being moved to fully closed position and also while being opened, on account of the resistance afforded by the insulation around the joints, above referred to.

An object of my invention is to provide an arrangement which is especially adapted for the closing of the doors of such containers or other relatively large doors of light construction, requiring considerable pressure in forcing the door to fully closed position and in opening the same, my improvements being designed to eliminate warping or buckling of the doors during the closing and opening movements thereof.

In the drawing forming a part of this specification, Figure 1 is an elevational view of a portion of a container such as herein referred to, and showing my improvements in connection with the door thereof. Figure 2 is an enlarged horizontal sectional view, corresponding substantially to the section line 2—2 of Figure 1. Figure 3 is an enlarged, vertical, sectional view, correponding substantially to the section line 3—3 of Figure 2. And Figure 4 is a detail horizontal, sectional view, corresponding to the section line 4—4 of Figure 1.

In said drawing, the main body of the container is indicated at 10, the same having a door opening defined by lintel 11, jambs 12 and 13 and threshold 14. The door opening is adapted to be closed by a relatively large preferably sheet metal door 15 pivoted along one vertical edge as indicated at 16—16. As will be understood by those skilled in the art, the joints around the door are insulated, details of such insulation being illustrated in Figure 2, where it will be noted that the door jamb 13 has secured to the inner side thereof a Z-bar 17 on which is secured a longitudinally extending block of wood 18. The latter is provided with a longitudinally extending recess 19 on its free face within which is mounted a backing strip 20 yieldingly forced outwardly by a plurality of longitudinally spaced coil springs 21. The backing strip 20 is covered by felt 22 and over the latter is placed a strip of canvas 23. The free edge of the door has secured on the inner side thereof an angle bar 24 forming a backing for a longitudinally extending block of wood 25 having a beveled edge on the door jamb. To protect the joint at the free edge of the door against the weather, the free edge of the sheet metal of the door is extended over the joint as indicated at 15^a.

For operating the door 15, I preferably employ the following arrangement. Secured to the door jamb 13 and suitably vertically spaced are two keepers A—A. Each of said keepers has a main flange 26 riveted or otherwise rigidly secured to the door jamb, an outwardly extended flange 27 and a narrow flange 28 at the outer end of the flange 27, said flange 28 being spaced from the wall of the container and providing an inwardly facing shoulder 28^a for the purpose hereinafter described, and also an outer shoulder or fulcrum 28^b, for the purpose hereinafter described.

Mounted on the door is the operating shaft proper, the same consisting preferably of two end castings B—B, an intermediate bar

section C, and a lever or handle D pivoted to the bar section C.

Each of the end castings B, as shown, preferably consists of a hollow rectangular section 29 within which is received and riveted thereto a corresponding end of the bar section C as by the rivets 30—30. Each end casting B is formed also with a journal section 31 laterally offset from the rectangular securing section, as well as being offset endwise. The journal bearings 31 are rotatably mounted in bearing brackets 32—32 secured to the door 15. Beneath the journal section 31 of the upper casting and above the journal section 31 of the lower casting B, each casting B is formed with a radially extended flange 33 approximately diametrically opposite the rectangular section 29. Said flanges 33 provide radial shoulders 34 adapted to engage under the corresponding shoulders 28^a of the keepers A. The flanges 33 are preferably suitably braced as by integral arcuate ribs 35—35 of such radius that they will not interfere with the turning of the shaft on the door.

The handle D is adapted to be locked, as shown in Figure 1, by any suitable latching device, as indicated at 36 and sealed in any suitable manner as customary on railroad cars.

In the drawings, the full lines indicate the position of the parts when the door is fully closed. To open the door, the lever D is released from the latch 36 and is then pulled outwardly or away from the door so as to rotate the operating shaft in a counter-clockwise direction, as viewed in Figure 2. While the shaft is rotating through an arc of somewhat less than 180°, it is evident that the flanges 33 of the castings B will be moved a sufficient distance as to clear the edges of the keepers A when the door is opened. During this portion of the rotation of the operating shaft, however, the door is not forcibly opened. After the operating shaft is rotated as above indicated, the rivets 30 will engage the outer shoulders 28^b of the keepers A, as indicated by dotted lines in Figure 2 and thereafter, as the operating shaft is rotated, the keepers A act as fulcrums and the door is forcibly pulled outwardly against the resistance afforded by the insulation. As indicated by the dotted lines in Figure 2, there is ample space left, after the rivets engage the keepers A, to permit the continued swinging of the lever D sufficient to disengage the door from the insulation and after which the door may, of course, be freely opened to its fullest extent.

In closing the door, the latter is moved towards closed position as far as possible and the shaft is then rotated in a clockwise direction, as viewed in Figure 2, with the flanges 33 and shoulders 34 thereof engaging under the shoulders 28^a. As the rotation continues, it is evident that the keepers A again act as fulcrums, and the door may be forcibly moved to fully closed position.

By employing an intermediate section of bar material, as shown, it is evident that the length of the operating shaft may be varied as desired without increase of expense for different castings or tools. Furthermore, by locating the keepers and cooperating parts of the operating shaft as shown in Figure 1, I am enabled to apply the pressure for closing and opening in such a way as to substantially eliminate any tendency of the door to warp or buckle while at the same time leaving the operating handle D sufficiently low to be convenient to the operator.

I have herein shown and described what I now consider the preferred manner of carrying out the invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a member having a door opening and a door to close said opening the combination with an operating shaft arranged parallel to an edge of the door and provided with a shoulder extending approximately radially; of bearing brackets within which the ends of said shaft are rotatably mounted; and a keeper having an opposed shoulder providing an abutment to hold the keeper engaging the end of the shoulder on said shaft against swinging movement when said shaft is rotated in a direction to force the door to closed position.

2. In a member having a door opening and a pivoted door to close said opening, the combination with an operating shaft extending parallel to the free edge of the door and rotatably mounted thereon, said shaft having an operating handle and a shoulder projecting substantially radially therefrom; of a cooperating keeper mounted on the corresponding door jamb between the top and bottom edges of the door, said keeper having a shoulder outwardly spaced from the door jamb and beneath which said shoulder on the shaft is adapted to engage and be held against swinging movement in moving the door to closed position.

3. In a member having a door opening and a pivotally mounted door to close the opening, the combination with a shaft rotatably journaled at its top and bottom ends of said door, remote from the top and bottom edges of the latter and extending parallel to and adjacent the free edge thereof, said shaft having inwardly of said journaled ends, longitudinally spaced shoulders substantially radially extending therefrom on one side of the axis of the shaft; and cooperating keepers secured to the corresponding adjacent door jamb, said keepers hav-

ing inwardly facing shoulders beneath which the outer end portions of said shoulders on the shaft are adapted to engage and be held against movement when the door is moved to closed position.

4. In a member having a door opening and a pivotally mounted door to close said opening, the combination with an operating shaft rotatably mounted on said door, said shaft extending parallel to and adjacent the free edge thereof, said shaft comprising two end castings and an intermediate connecting bar section, each of said end castings being formed with a substantially radially projecting shoulder and a journal projecting beyond said shoulder, said journal being coaxial with said bar; of keepers secured to the corresponding adjacent door jamb, each of said keepers having an inwardly facing shoulder cooperable with the corresponding shoulder of the operating shaft to arrest the movement of the outer ends of said shoulders on said shaft and provide a fulcrum therefor.

5. In a member having a door opening and a door to close said opening, the combination with an operating shaft arranged parallel to an edge of the door, said shaft being provided with shoulders extending from the opposite sides of the axis of rotation thereof; and a cooperating keeper having inner and outer shoulders, said inner shoulder of the keeper cooperating with one of the shoulders of the operating shaft to provide a stationary fulcrum in forcing the door to closed position, and the outer shoulder of the keeper cooperating with the other shouldered portion of the shaft when opening the door.

6. In combination with a member having a door opening and a pivotally mounted door, an operating mechanism for the door comprising: an operating shaft extending parallel to and adjacent the free edge of the door and rotatably mounted on the door, said operating shaft having shouldered portions extending from opposite sides of the axis of rotation of the shaft; and a keeper secured to the corresponding adjacent door jamb, said keeper having an inwardly facing shoulder spaced from the door jamb and an outwardly facing shoulder cooperable respectively with the shoulders of the shaft.

7. In a container having a pivotally mounted door, the combination with a pair of keepers mounted on the door jamb adjacent the free edge of the door, each of said keepers having an inwardly facing shoulder spaced from the jamb and an outwardly facing shoulder; of an operating shaft extending parallel to and adjacent the free edge of the door, said shaft comprising end castings and an intermediate connecting section, each of said end castings having a substantially radially extending shoulder on one side of the axis of the shaft and a shouldered portion on the opposite side of said axis, the former being adapted to engage beneath the inwardly facing shoulder of the corresponding keeper, and the latter to engage with the outwardly facing shoulder on the corresponding keeper, when the shaft is rotated to close and open the door, respectively.

8. In a member having a door opening and a pivotally mounted door to close said opening, the combination with a rotary shaft mounted on said door adjacent the free edge thereof, said shaft having its opposite ends disposed inwardly of the top and bottom edges of said door; of operating means for said shaft; a plurality of keepers supported independently of said door and disposed between the top and bottom boundaries of said door opening; and means on said shaft also disposed between the top and bottom edges of said door adapted to engage said keepers, said keepers and said means being arranged in co-acting relation to effect movement of said door upon said shaft being rotated.

9. In an operating mechainsm having a pivoted door member adapted to close against another door member, the combination with a rotary shaft mounted on one of said members; of a plurality of keepers fixed to the other member; a lever for operating said shaft; and means on said shaft, rotatable therewith, adapted to engage said keepers said means and said keepers having co-acting parts arranged to forcibly effect movements of said doors, said shaft, keepers and means being disposed entirely above the bottom margin of the door and door opening.

10. In a member having a door opening and a pivotally mounted door, the combination with a rotary shaft mounted on said door adjacent the free edge thereof, said shaft having opposite end portions, one of which is disposed inwardly of the top and bottom edges of said door; of operating means for said shaft; a plurality of spaced keepers supported independently of said door, one of said keepers being arranged between the top and bottom boundaries of said door opening; and spaced means on said shaft, one of which is disposed between the top and bottom edges of said door, said means being adapted to engage said keepers to effect movement of said door upon rotation of said shaft.

In witness that I claim the foregoing I have hereunto subscribed my name this 10th day of March, 1922.

JOHN F. O'CONNOR.