Nov. 20, 1923. 1,475,015

W. E. HUBER

DOOR CLOSING MECHANISM

Filed Nov. 13, 1922 2 Sheets-Sheet 1

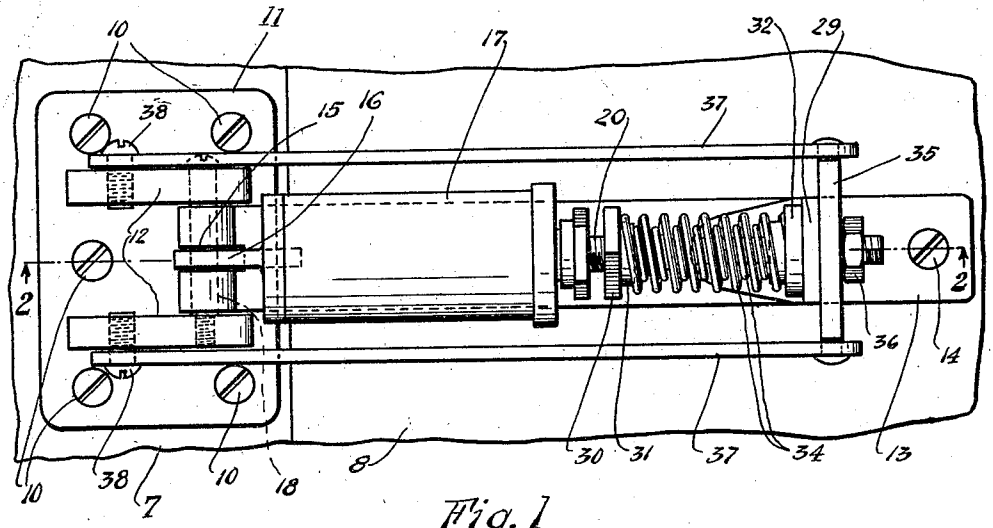
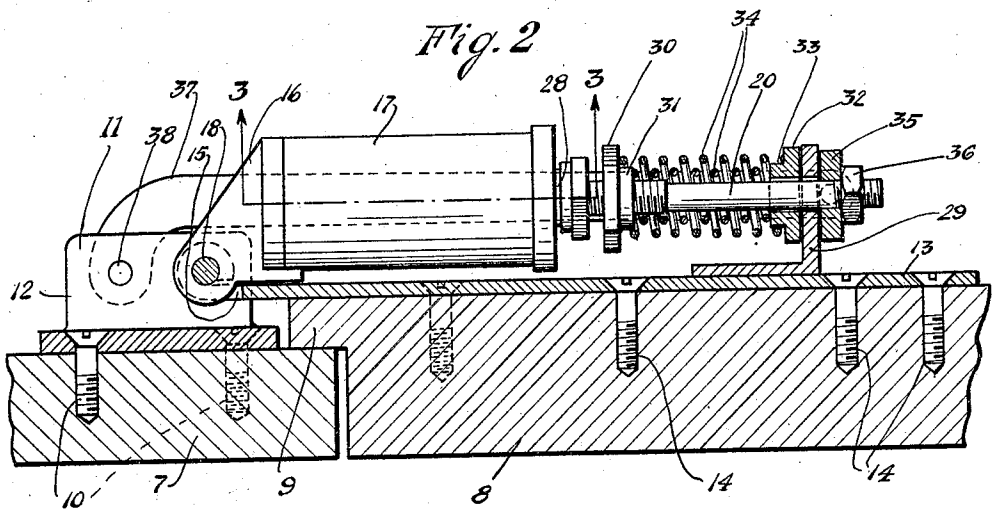


Fig. 1

Fig. 2



Witnesses:

W. Schmellhardt

N. S. Readmen

Inventor:

William E. Huber

By Joshua R. H. Potts

His Attorney

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W. E. HUBER

DOOR CLOSING MECHANISM

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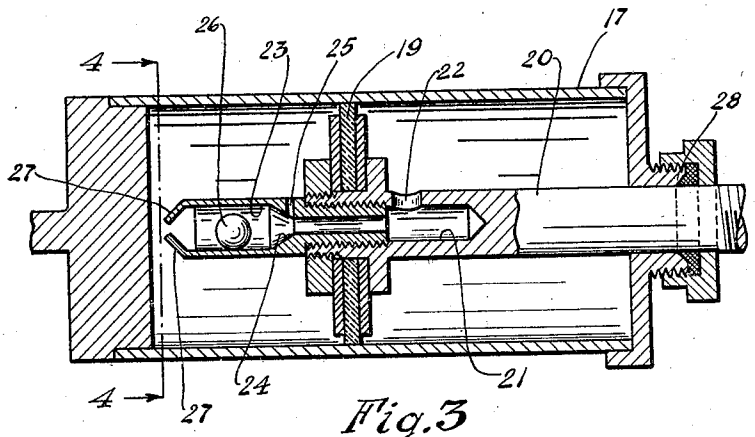


Fig. 3

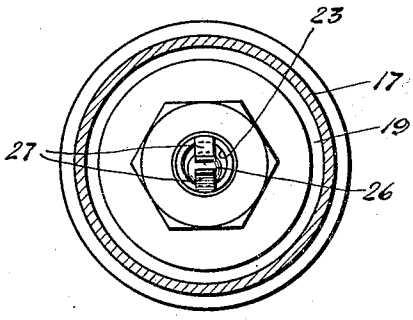


Fig. 4

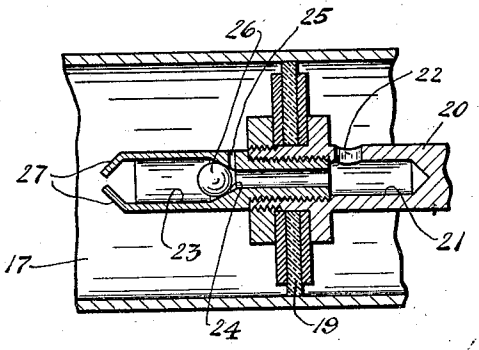


Fig. 5

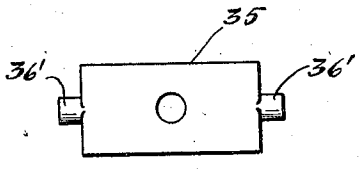


Fig. 6

Witnesses:
W. Schmidbauer
H. S. Neidman

Inventor:
William E. Huber
By Joshua R. H. Potts
His Attorney

Patented Nov. 20, 1923. 1,475,015

UNITED STATES PATENT OFFICE.

WILLIAM E. HUBER, OF CHICAGO, ILLINOIS.

DOOR-CLOSING MECHANISM.

Application filed November 13, 1922. Serial No. 600,630.

To all whom it may concern:

Be it known that I, WILLIAM E. HUBER, a citizen of the United States, and a resident of the city of Chicago, county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Closing Mechanism, of which the following is a specification.

This invention relates to door closing mechanism and more particularly to a device of this character adapted for application to heavy doors, such as those of refrigerating plants, or the like, which provides a combined hinge, means for closing a door, and means for uniformly retarding the closing movement of such door, all of said means being arranged in compact form so as to be capable of highly efficient operation.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

This invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which,

Fig. 1, is a top plan view of the invention;

Fig. 2, is a sectional view of the invention on the line 2—2 of Fig. 1;

Fig. 3, is an enlarged detail sectional view upon the line 3—3 of Fig. 2, showing the valve mechanism in inoperative position;

Fig. 4, is a sectional view of the invention on the line 4—4 of Fig. 3;

Fig. 5, is a fragmentary sectional view similar to Fig. 3, showing the valve in operative position, and

Fig. 6, is an enlarged detail view of a bearing connection between the piston rod and the means for operating the same.

Referring to the drawings, 7 represents a fragment of a door frame, and 8 represents a fragment of a door associated therewith. The door shown is of the type used in connection with refrigerating or similar plants, being provided with a sealing flange 9. Mounted upon the frame 7, by means of screws 10, or other suitable securing means, is a base member 11, such base member preferably being provided with spaced ears 12, between which projects the curled end of a member 13, which is secured to the door 8 by screws 14 or other suitable fastening means. The curled end of the member 13, is preferably provided with a central slot 15, adapted to receive a projection 16 mounted upon a cylinder 17 the pintle 18 extending through the ears 12, pivotally securing the member 13 and the projection 16 to the base 11.

Mounted in the cylinder is a piston head 19, the rod 20 of which is preferably provided with a chamber 21 communicating with a relatively large opening 22, such chamber extending through the piston head and communicating with a chamber 23 at the opposite side thereof, the chamber 23 preferably having a conical valve seat 24 at its inner end, there being a relatively small duct 25 communicating with said chamber adjacent the inner end of the conical valve seat 24. Mounted for free movement in the chamber 23 is a preferably spherical valve 26, adapted in operative position to engage the conical seat 24, such valve being prevented from leaving the chamber 23 by means of the turned ends 27 at the outer end of said chamber. The cylinder 17 is adapted to contain a liquid such as oil or the like, which is transferred from one side of the piston to the other during operation of the device.

The piston rod 20 extends outwardly from the cylinder 17, through a suitable stuffing box arrangement 28, and through the bracket 29 mounted upon the member 13 preferably adjacent the end thereof. Preferably threaded upon the rod 20 is an adjusting member 30 having a boss 31 on its inner side, and loosely mounted upon the rod 20 adjacent the bracket 29 is a bearing member 32 having an inwardly disposed boss 33 thereon, and disposed upon the rod 20 between said adjusting member and said bearing member are concentrically mounted expansible springs 34. Preferably mounted upon the rod 20 at the outer side of the bracket 29 is a transverse bar 35, and threaded on the outer end of the rod 20 is a nut 36 against which the bar 35 abuts. The ends of the bar 35 are provided with trunnions 36′ adapted to be pivotally held in the outer ends of a pair of rearwardly extending reach rods or levers 37, the rear ends of which are pivotally mounted upon the ears 12, by means of suitable pins 38, at some distance in the rear of the pintle 18 as clearly shown in Fig. 1.

In operation, when the door is swung open, due to the different lengths of the levers formed by the member 13 and the

reach rods 37, the piston rod 20 and the piston head 19 are drawn outwardly, permitting the oil in the cylinder to flow through the large duct 22 into the chamber 23, past the ball 26 into the inner end of the cylinder. When the door is released due to the pressure exerted by the springs 34 the door is urged to closed position, the fluid in the inner end of the cylinder causing the valve to engage the conical seat 24 so as to necessitate the return of the fluid to the outer end of the cylinder through the comparatively small duct 25 thereby uniformly retarding the closing movement of the door and causing the same to close gently but firmly. An important feature of the invention lies in the fact that the closing movement is smooth and positive, and uniform in speed at all points of its travel, as distinguished from doors which are urged rapidly toward closed position and checked suddenly just previous to the point of complete closing.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. The combination with a door; of a chamber mounted thereon adapted to contain fluid; a piston mounted in said chamber adapted for free movement in one direction but having means for retarding the movement thereof in the opposite direction; an extension on said piston; means for slidably mounting the outer end of said extension; resilient means disposed on said extension and adapted to be compressed by the outward movement thereof; and means mounted adjacent said door and being connected to said extension for operating the same.

2. The combination with a door, of a hinge comprising a stationary member, and a movable member pivotally connected thereto; a chamber mounted on said movable member; a piston in said chamber having an extension thereon; means for slidably mounting said extension; an abutment on said extension; resilient means mounted between said abutment and said mounting means; and reach rods pivotally mounted on said stationary member at a distance from the pivot of said movable member and connected with said extension to actuate the same when said door is opened.

3. Retarding mechanism comprising a chamber adapted to contain fluid, a piston mounted for operation in said chamber, said piston being provided with a relatively large opening at one side thereof, communicating with a relatively large chamber at the opposite side of said piston, there being a relatively small opening communicating with said chamber, said chamber being provided with a valve seat adjacent the smaller opening; and a valve in said chamber permitting the free flow of fluid there past when the piston moves in one direction, and being forced to its seat so as to obstruct said chamber and necessitate the return of said fluid through said smaller opening during the movement of said piston in the opposite direction.

4. The combination with a door, including a stationary member, and a movable member pivotally connected thereto; a casing mounted on said movable member and being pivotally connected to said stationary member, said casing being adapted to contain fluid; a piston slidably mounted in said casing, said piston having an extension projecting outside of said casing; a bracket mounted on said movable member at a distance from said casing, and arranged to slidably accommodate said extension; an abutment adjustably mounted on said extension; resilient means mounted between said abutment and said bracket; and reach rods pivotally connected to the end of said extension beyond said bracket, and pivotally mounted on said stationary member at a distance from the pivot of said movable member.

5. The combination with a door, of a hinge comprising a stationary member and a movable member pivotally connected thereto; a casing mounted on said movable member; a piston fitting said casing having an extension projecting outside of said casing, said piston being provided with a relatively large opening at one side thereof, communicating with a relatively large chamber at the opposite side of said piston, said chamber being open at its outer end and provided with turned portions and a conical valve seat, there being a small opening communicating with said chamber adjacent the inner end of said valve seat; a stop valve operatively held in said chamber; a bracket for slidably mounting the outer end of said extension; an abutment on said extension; resilient means mounted on said extension between said abutment and said bracket; and reach rods pivotally mounted on said stationary member at a distance from the pivot of said movable member and connected with said extension to actuate the same when the door is opened.

6. Retarding mechanism comprising a casing adapted to contain fluid, a piston mounted for operation in said casing, said piston being provided with a relatively large

opening at one side thereof, communicating with a chamber at the opposite side of said piston, said chamber having a conical valve seat at its inner end, and an opening at its outer end, said opening being provided with turned retaining portions, there being a small opening communicating with said chamber adjacent the inner end of said valve seat; and a ball valve disposed in said chamber.

7. The combination with a door, including a stationary member and a movable member pivotally connected thereto; a fluid casing mounted on said movable member and pivotally connected to said stationary member adapted to accommodate a piston having an extended portion exterior of the casing and with a portion having a chamber confined within the casing and provided with an aperture opening communication between the chamber and the casing; a member having a chamber in communication with the chamber of the extended portion and the casing and having selective means controlling communication therebetween, means on the movable member slidably supporting the exterior portion of the extension, and concentrically arranged resilient members mounted on the exterior extended portion to the rear of said supporting means adapted to retard movement of the piston.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM E. HUBER.

Witnesses:

JOSHUA R. H. POTTS,

MARGARET AUER.