

R. M. ZIMMERMAN.

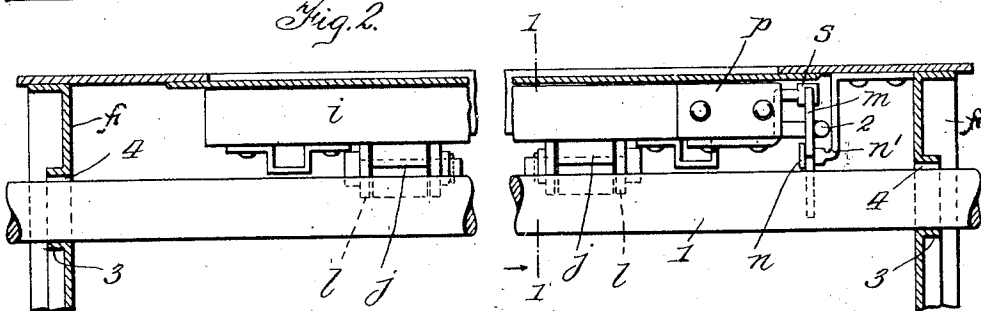
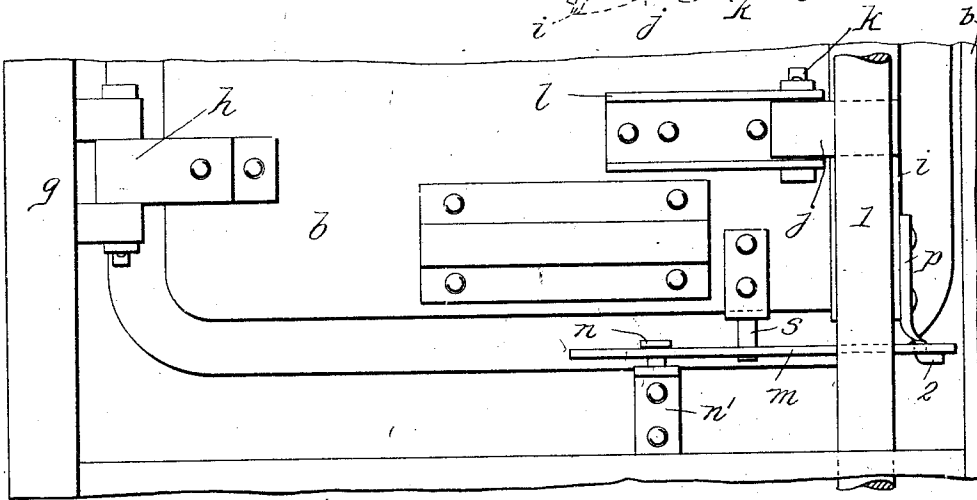
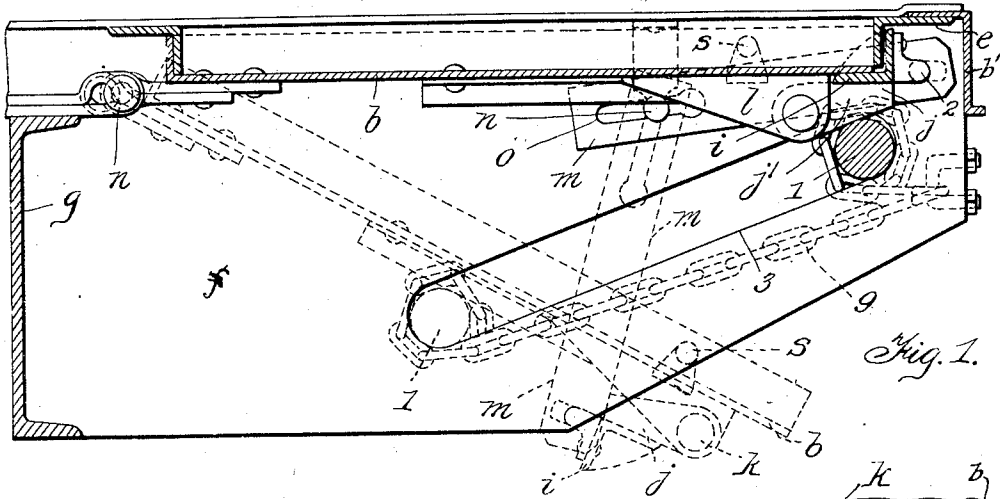
DOOR.

APPLICATION FILED NOV. 26, 1910.

Patented Sept. 10, 1912.

2 SHEETS—SHEET 1.

1,038,058.



Witnesses

W. L. Brown
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Fig. 3.

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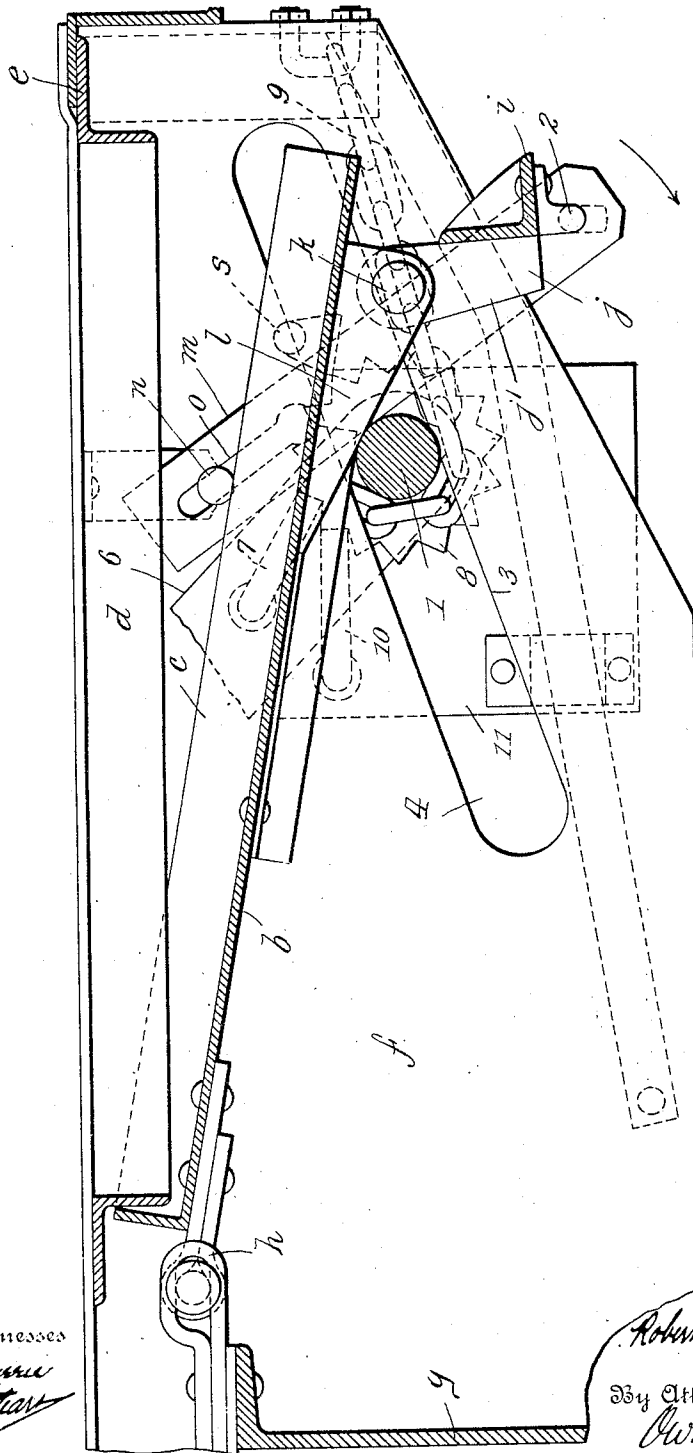


Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

ROBERT MONTAGUE ZIMMERMAN, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR TO NATIONAL DUMP CAR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF MAINE.

DOOR.

1,038,058.

Specification of Letters Patent.

Patented Sept. 10, 1912.

Application filed November 26, 1910. Serial No. 594,316.

To all whom it may concern:

Be it known that I, ROBERT MONTAGUE ZIMMERMAN, a citizen of the United States of America, now residing in the city of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Doors; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to doors having valvular members closing the free ends thereof and which are especially adapted to be used to close the discharge openings of dump cars, although it will be understood that the invention is applicable to this type of door whenever used, the invention relating particularly to mechanism for operating such valvular members.

My invention has for its object to provide simple and efficient means for swinging the valvular member away from the free end of the door and to a position underneath the latter when it opens, and further to cause such means to act automatically.

For full comprehension, however, of my invention, reference must be had to the accompanying drawings forming a part of this specification and wherein:

Figure 1 is a transverse vertical sectional view of a door constructed according to my invention, as used in connection with a dump car a portion of the underframe of which is indicated, this view being taken on line 1-1 Fig. 3; Fig. 2 is an underside plan view thereof; one side only of the door being shown; Fig. 3 is a front elevation, parts of the car underframe being shown in section; and Fig. 4 is a similar view to Fig. 1 but on a slightly larger scale and with the door shown in different position.

Referring now to the drawings, the door proper is shown at *b*, such door being preferably trough-shaped with flanges *c* extending upwardly around three of its sides to inclose downwardly projecting flanges *d* which form the sides of a dump car discharge opening. These flanges form part of a door frame *e* which as here shown is supported in any suitable manner by lateral arms *f* projecting from a center sill a portion of which is indicated at *g* and to which the door is hinged as at *h*, such lateral arms and center sill forming part of a car underframe.

The open, or free, end of the door is closed by an angular valvular member *i* and the means for operating this valvular member preferably comprises a pair of pivoted door rail arms *j* to the free ends of which the valvular member is secured near its opposite ends, the other ends of the arms being pivoted as at *k* to a pair of fixed door-rails *l* secured by rivets or other suitable means on the underside of the door near opposite sides thereof.

The arms *j* are caused to turn on their pivots *k* to swing the members *i* under the door by means of a link *m* located adjacent to one side of the door and which is preferably slidably and pivotally connected at one end to one of the lateral arms *f* by means of a stud *n* projecting from a bracket *n'* secured to such arms, this stud passing through a slot *o* in the link. The opposite end of the link is pivotally connected to member *i* which connection may be effected by means of a stud *2* projecting from a plate *p* riveted to the member *i* and passing through a perforation in the link.

In order to insure the proper movement of the valvular member when the door opens I prefer to provide on one side of the door a member which may be in the form of a lug *s*, and which is adapted as will be pointed out later, to bear upon the link and cause the valvular member to be swung away from the free end of the door and under the latter as it opens in the event of the valvular member failing to move thus through the action of gravity.

The door operating means which I prefer to use in conjunction with the above described mechanism comprises a laterally movable horizontal shaft 1 extending parallel to the center sill beneath the door and which is adapted to support the door both in open and closed positions, this shaft in turn resting on and being adapted to roll or travel on transverse rails 3 inclined upwardly toward the outer end of the door and preferably formed by the lower walls of inclined slots 4 in the lateral arms *f*.

Any suitable operating means, such as the lever 6 carrying the pawl 7 which engages the ratchet wheel 8 rigid on the shaft 1 and which is adapted to rotate the latter to wind the chain 9 thereon may be provided to operate the shaft 1, which may be

locked by a locking pawl 10 carried by a floating plate 11 and engaging a second ratchet wheel (not shown) on the shaft 1.

When the door is being operated the shaft 1 travels under the fixed door-rails *l* and the arms *j*, the rails *l* inclining upwardly toward the inner edge of the door.

As shown in Figs. 1 and 4 the door rail arms *j* are preferably tapered to cause their rail surfaces *j'* to be inclined upwardly toward the outer ends of the doors to present a diminished angle of convergence to the rails 3 so that the shafts may be wedged between the latter and the arms *j* when the doors are closed in which position the shafts act both to keep the doors tightly closed and to hold the valvular members in position closing the open ends of the doors.

Operation: To open the door (considering the latter to be in closed position as shown in full lines in Fig. 1) lever 6 is operated, the shaft rolling down the inclined rails 3, and the weight of the door and material which may be piled thereon causing it to swing open, the opening of the door causing the valvular member to be swung thereunder as follows:—As the shaft in its travel down the rails moves from under the arms *j* the latter are released and the valvular member will fall by gravity until the link rests on the shaft, and as the latter continues its movement and the door opens the valvular member will continue to swing downwardly until the position shown in Fig. 4 is reached, the further movement of the door causing (through the action of the link *m*) the arms and valvular members to swing in the direction indicated by the arrow to the position shown in dotted lines in Fig. 1 in which position the doors are fully open, the valvular member being thus protected by the door from rain, sleet or the like, while any chance of material discharged remaining lodged therein is prevented. The links may also be as will be readily seen by referring to Fig. 1, used if desired to support the door from the car frame wheel the door is opened. The difference in distance between the stud 2 and the valvular member and the stud *n* carried by the lateral arm *f* as the member and the door swing from closed to open position or vice versa is accommodated by the slot *o* in the link *m*, the slotted connection being preferably, as shown, between the link and the stud *n* in order that the outer end of the former may clear the side stiffener *b'* when the door is closed.

In case the valvular member when released should fail to swing away from the end of the door by reason of ice forming on the parts or because of undue friction between the arms *j* and the parts on which they are pivoted, or if after reaching approximately the position shown in Fig. 4 it

should tend to swing in the wrong direction, the lug *s* on the side of the door will bear upon the link and cause it to swing the arms and valvular members in the proper direction.

To close the door the shaft is caused to roll up the rails 3, bearing in its travel successively against the fixed rails *l* and the arms *j*, between which latter and the rails 3 it is finally wedged, thus holding the valvular member firmly in position closing the free end of the door, the shaft in its movement up the rails bearing against the links, as seen in Fig. 4, and causing them to swing the valvular member upward.

What I claim is as follows:—

1. The combination with a door and a valvular member for closing one side of said door, an arm pivoted at one end to the door and having the valvular member mounted on its other end, and a link pivotally connected at one end to a fixed part and at the other end to the valvular member.

2. The combination with a door, of a valvular member hinged to the door, a link connecting the valvular member and a fixed part, and means co-acting with such link to operate the valvular member.

3. The combination with a door, of a valvular member hinged to the door, a link connecting the valvular member and a fixed part, and a member carried by the door and co-acting with such link to operate the valvular member.

4. In combination, a door, operating mechanism for such door, a valvular member for closing one side of said door, an arm on one end of which the valvular member is mounted, said arm being pivotally secured at its opposite end to the door, a link secured near one end to a fixed part by a sliding pivotal connection, said link secured near its opposite end by a pivotal connection to the valvular member, and a lug rigidly secured to the door, and projecting into the plane of such link, for the purpose set forth.

5. In combination, a hinged door, operating mechanism for such door, a valvular member for closing the free end of the door, an arm on which said valvular member is mounted such arm being pivotally connected to the door, a link, means effecting a slidable and pivotal connection between one end of a stationary part and the link, and means effecting a pivotal connection between the opposite end of the link and the valvular member, for the purpose set forth.

6. In combination, a hinged door, a valvular member for closing the free end of such door, a pair of door-rail arms on which said valvular member is mounted, a pair of fixed door rails to which such arms are pivotally connected, a link slotted at one end, a rigid stud to which the said slotted end is

connected, a stud carried by the valvular member and projecting into a perforation in the opposite end of the link, a pair of inclined rails, a shaft, and means for causing such shaft to travel under the said fixed door rails and door-rail arms, substantially as and for the purpose set forth.

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

ROBERT MONTAGUE ZIMMERMAN.

Witnesses:

WINFIELD H. YOST,
H. A. HATFIELD.