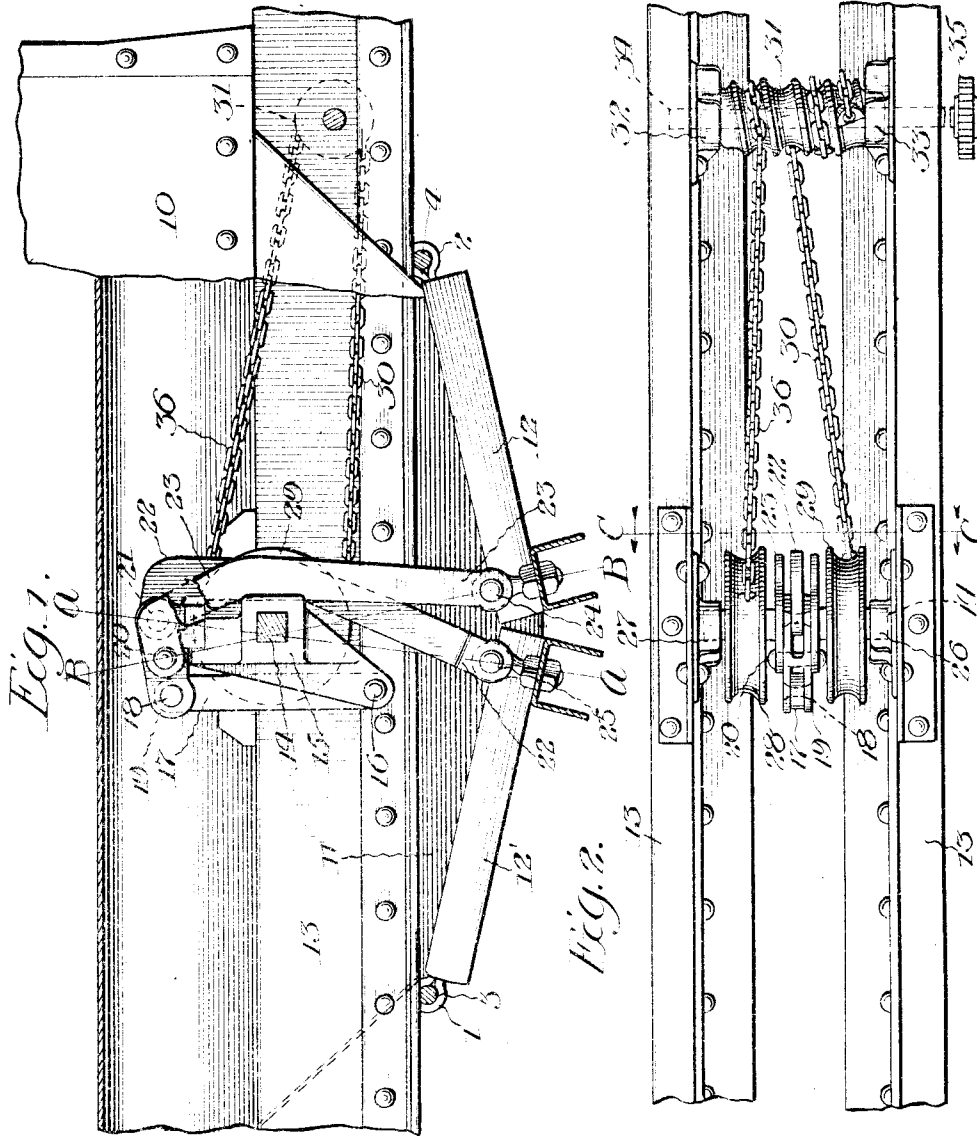


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DOOR MECHANISM FOR HOPPER DOORS.
APPLICATION FILED JUNE 12, 1911.

1,065,328.

Patented June 17, 1913.

2 SHEETS-SHEET 1.

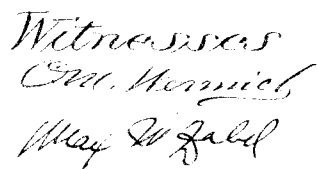


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2 SHEETS--SHEET 2.



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UNITED STATES PATENT OFFICE.

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DOOR MECHANISM FOR HOPPER-DOORS.

1,065,328.

Specification of Letters Patent. Patented June 17, 1913.

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To all whom it may concern:

Be it known that I, ALBERT EDWARD ZIMMER, a subject of the King of Norway, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Door Mechanism for Hopper-Doors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to hopper bottom cars and is more particularly concerned with improvements in the door operating mechanism thereof, particularly of the type known as twin hopper doors.

An object of my invention is to provide a door operating mechanism by means of which the load carried, or placed upon, or dropped upon the door or doors may be mechanically transmitted to the framework of the car, and in which undue strains are removed from those parts less qualified to bear them.

The prime object of my invention is to provide means for opening and closing the doors which are of such character that when the doors are closed the weight of the doors tends to lock the closing mechanism against opening, and this locking tendency is further assisted and augmented by any weight which may be placed upon the doors. My invention further contemplates that this locking tendency is not confined to one or the other of the doors in case two doors are used, but both doors if desirably equipped assist in this locking action. Thus if weight is unequally distributed and one door, as it might happen, receive all of the weight, this particular door tends to lock the mechanism and the same is true of the other door.

A feature of my invention is what might be called independent locking of each door and the means which cause both doors to be securely locked.

It will of course be understood that in what has gone before and in the further detailed description that will follow, I am merely setting forth what I at present conceive to be the preferred embodiment of my invention, and I wish it understood that I do not limit myself to such embodiment as it is readily apparent that the broad features of my invention may be applicable

to a variety of uses and many different forms of apparatus. I will, however, describe herein a specific form which my invention would take in connection with the accompanying drawings, in which:

Figure 1 is a side view of a portion of a car equipped in accordance with my invention, portions thereof being broken away more clearly to reveal features of construction; Fig. 2 is a top view thereof; Fig. 3 is a sectional view of lines *c-c* of Fig. 2; Fig. 4 is a detail view of some of the parts set forth in Fig. 1 in their alternative position, and: Figs. 5 and 6 are details of construction revealing two of the novel parts used in carrying out my invention. Fig. 7 shows a detailed view of some of the parts set forth in Fig. 1.

My improved car 10 is provided with a hopper 11 closed at its under surface by the doors 12 and 12'. The car 10 is provided with sills 13 which carry the operating mechanism to be described presently for opening and closing the doors 12 and 12'. This operating mechanism consists primarily of a shaft 14 which is rounded at its extremities, but squared in the middle, the rounded extremities being supported in bearings 26 and 27. This shaft 14 carries pulleys 28 and 29 to which are fastened respectively chains indicated at 36 and 30, which chains are at their opposite extremities fastened to extensions provided upon a worm wheel 31, and which chains are wrapped around said worm wheels in opposite directions so that when said worm wheel rotates, for instance, in a clockwise direction, the chain 36 will be unwound from the pulley 28 and will be wound upon the pulley 29. When the worm wheel 31 is rotated in the opposite direction the reverse is true. The worm wheel 31 has a suitable shaft 34 supported in bearings 32 and 33 and suitably operated by a ratchet wheel 35, as will be readily understood. The rotation of the pulley 29 rotates the shaft 14, and this in turn by the operation of suitable mechanism effects an opening and closing of the doors 12 and 12', as will now be set forth.

The shaft 14 carries what I might call a hub casting or locking block 15 of novel construction, which is shown more clearly in Fig. 5, and which by means of pins 16 is fastened to links 17. The hub casting 15 being mounted on the squared portion of the

shaft 14 rotates with the said shaft. The hub casting 15 has a grooved portion, as indicated by the dotted lines in Fig. 4, and as shown by the position occupied by the link 17 in Fig. 1, into which the said link 17 fits when the doors are in their closed position, as indicated in Fig. 1. The link 17 by means of the pin 18 is pivotally associated with what I might term a terminal hook link 19 whose function will presently appear. This hook link by means of pins 20 and 21 is pivotally associated with door connecting links 22 and 23 pivotally associated by means of pins 25 and 24 respectively with the doors 12' and 12 respectively. The doors by means of the hangers 1 and 2 are of course suitably held in the car framework by means of bolts 3 and 4, as is well understood.

The mechanism just described beginning with the hub casting 15 serves to open and close the doors when the shaft 14 is rotated and is of such a construction that either door when in a closed position will lock this mechanism against spontaneous opening of the doors. When the shaft 14 is rotated to close the doors, which in the illustration shown would be in a contra-clockwise direction, then the hub casting 15 is rotated with said shaft and draws the link 17 finally into the groove provided therefor in the casting 15, and at the same time locks the hook link 19 in the position shown in Fig. 1, in which position the substantially rectangular extensions of the links 22 and 23 rest upon the protruding end portions 5 of said hook link, which hook link in turn rests upon the upper flat surface 6 of the casting 15. The parts are thus all adequately supported independently of the pins, the only parts under considerable stress being the links 22 and 23, the parts 15 and 19 being for the most part under compression. The great important feature of my invention will now be apparent when Fig. 1 is inspected and it is indicated that the tendency of the weight of the doors 12 and 12' to draw downwardly is exerted respectively along lines A A and also B B. These lines it will be seen pass to the left of the center of the shaft 14 and thus the weight of each individual door and the weight placed thereon tends rather to rotate the shaft 14 in a contra-clockwise direction, which would be the particular direction tending to maintain the doors in a

closed position; as in order to open the doors it is necessary to rotate shaft 14 in a clockwise direction.

The great advantages of my improved structure will thus be apparent in that parts less likely to withstand great strain are relieved from such strain, and that the doors or the weight thereon have a tendency by such weight to lock the mechanism or hold the mechanism against operation.

I have thus described a specific form of carrying out my invention from which I believe the broad nature of the same will be apparent, and

What I now desire to claim and secure by Letters Patent is:

1. The combination of a hopper, a pair of twin doors, a bearing shaft above the doors, a lever arm thereon, a locking block, link mechanism associated with said locking block, connecting rods leading from said locking block to both doors, said connecting rods transferring the load of the doors to the shaft so that the load is carried on said shaft without tendency to rotate said shaft toward its unlocked position, said twin doors being individually locked through said locking block.

2. The combination of a hopper, a pair of twin doors, a bearing shaft above the doors, a lever arm thereon, a locking block, link mechanism associated with said locking block, connecting rods leading from said locking block to both doors, said connecting rods transferring the load to the shaft in such a manner that the shaft tends to rotate in its door closing direction when said doors are closed, said twin doors being independently locked through said locking block.

3. The combination of a hopper, a door, a bar connected therewith, a locking block to which said bar is attached, a link to which said locking block is attached, a lever to which said link is pivoted, a bearing shaft above said door, a pivotal point of the locking block being rotated around the bearing shaft to a point beyond the lines of force through the center of the bearing shaft for the said door.

In witness whereof, I hereunto subscribe my name this 10th day of June, A. D. 1911.

ALBERT EDWARD ZIMMER.

Witnesses:

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