(No Model.)

2 Sheets—Sheet 1.

G. A. McARTHUR.

REFRIGERATOR DOOR.

No. 313,876. Patented Mar. 17, 1885.

Fig. 1.

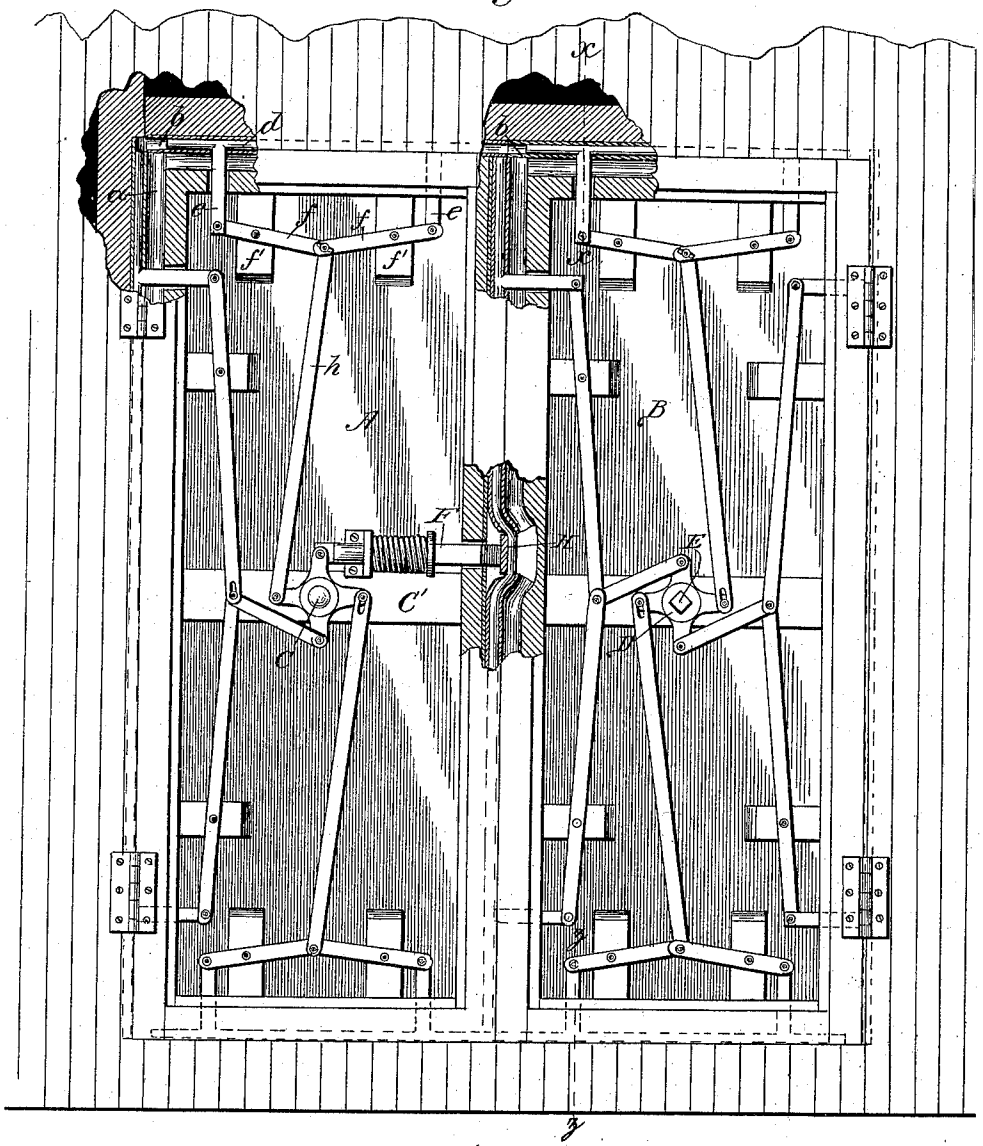
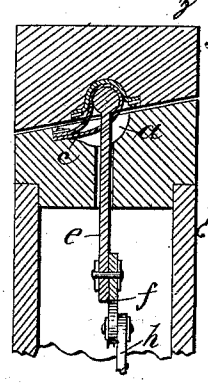


Fig. 2.



Witnesses.
Will R Cruikshanks.
W. W. Elliott

Inventor.
George A McArthur
By, Jno G. Elliott
Atty.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

G. A. McARTHUR.

REFRIGERATOR DOOR.

No. 313,876. Patented Mar. 17, 1885.

Fig. 3.

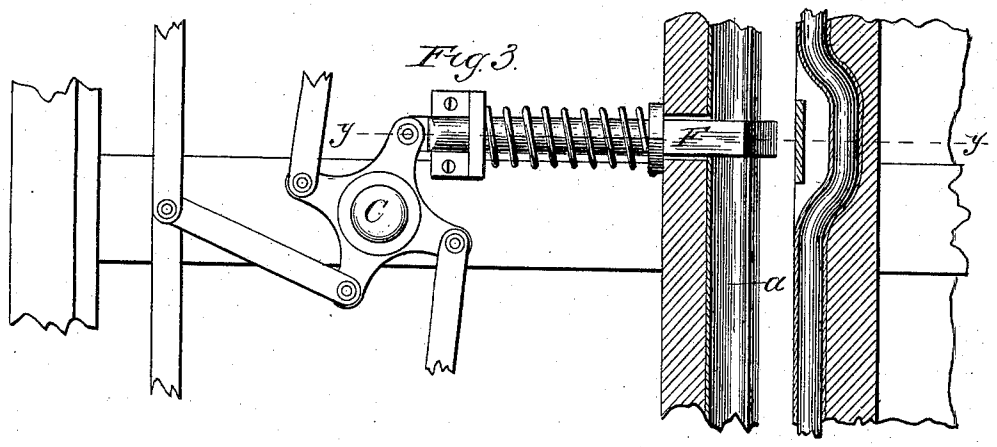


Fig. 4.

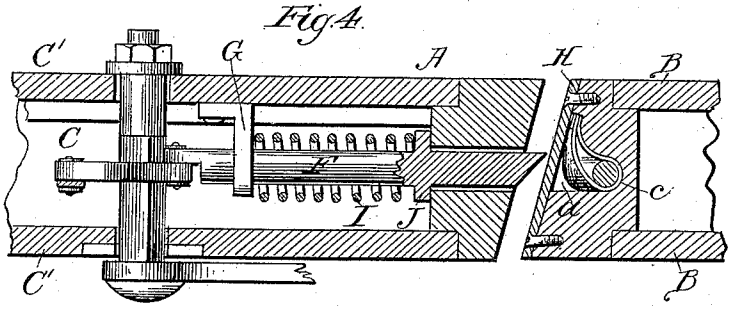


Fig. 5.

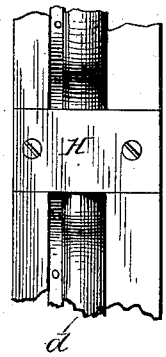


Fig. 6.

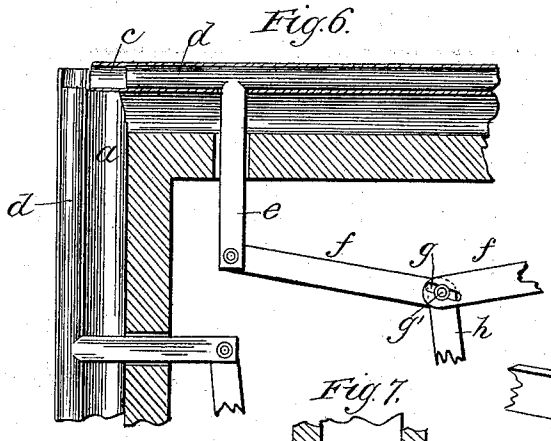


Fig. 7.

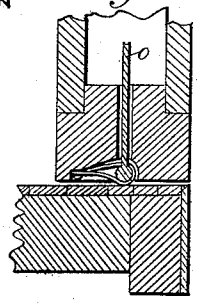
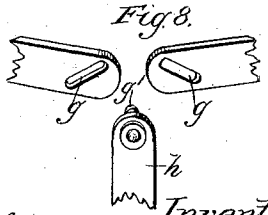


Fig. 8.



Witnesses.
Will R. Quohundro.
W. W. Elliott

Inventor.
George A. McArthur
By Jno. G. Elliott
Atty.

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

GEORGE A. McARTHUR, OF PULLMAN, ILLINOIS.

REFRIGERATOR-DOOR.

SPECIFICATION forming part of Letters Patent No. 313,876, dated March 17, 1885.

Application filed December 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. McARTHUR, a citizen of the United States, residing at Pullman, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Refrigerator-Doors, of which the following is a specification.

This invention relates to improvements in refrigerator-doors providing access to a refrigerating-chamber, and having a packing or angular joints for sealing the refrigerating-chamber when closed.

Refrigerator structures of large size, and more especially refrigerator railroad-cars, in time become twisted or sagged in the center at the point where the doorways are located, and as a result an even and tight joint of the door is destroyed, which not only renders the refrigerator inoperative, but frequently requires the mutilation of the door in opening it. In all refrigerators there is also a liability of the door binding by reason of swelling due to moisture absorbed from both the inside and outside of the refrigerating-chamber, which swelling renders it difficult to open as well as close the door. The binding-edges of refrigerator-doors have been faced with leather, and in many cases with rubber, to overcome these difficulties, but have failed because of the necessarily-restricted expansion of these substances consistent with a tight joint, and because they had no adjustment adapted to conform to irregularities such as occur when the door-opening is twisted or sagged.

The essential object of this invention is to obviate these defects by providing the binding-edges of a refrigerator or other tight door with a mechanically-adjustable packing made in sections, adapted to be adjusted so as to seal the door uniformly around its edges, and which will enable such a reduction in the area of the door proper as to preclude any possibility of an undue binding action between said door and its surrounding frame. Further objects are to simultaneously adjust with uniform pressure the several sections of packing around a single door, and to have such a connection between double doors that the closing of one upon the other will automatically adjust the packing of the door first closed, and maintain it so adjusted until the other door is again opened. Further objects are to provide a mechanically-adjustable packing of such form and character that the mechanical devices for adjusting it serve to lock the door or doors in their frame and in such a manner that a single locking device will maintain all and the several sections of packing and sides of the doors in a locked condition with the surrounding frame; and, finally, to provide certain details of construction, hereinafter described, for rendering a door of the character referred to practically operative. I attain these objects by devices illustrated in the accompanying drawings, in which—

Figure 1 represents a front elevation of refrigerator-doors embodying my invention, designed for use in a refrigerator-car or other structure in which it is desirable to employ double doors; Fig. 2, a detail section on the line *x x*, Fig. 1; Fig. 3, an enlarged detail, partly in section, showing the position of the spring-actuated locking-bolt when one of the doors is partly open; Fig. 4, a detail section on the line *y y*, Fig. 3; Fig. 5, a detail elevation of the edge of one of the doors provided with an impinging plate for the spring-actuated bolt; Fig. 6, a detail in section of a corner portion of one of the doors; Fig. 7, a detail section on the line *z z*, Fig. 1; Fig. 8, a detail of the jointure of the actuating-levers.

Similar letters of reference indicate the same parts in the several figures of the drawings.

All of the edges of both doors, A B, are provided with channels or grooves *a*, and all of the binding edges or faces of the door-frame, except the sill, (see Fig. 7,) with similar and opposing grooves, *b*, (see Fig. 1,) which may be of any depth for the desired purpose.

Secured by tacks or other suitable means in the grooves *a* of the doors, except the edge of the door A, adjacent the door B, is a fabric, *c*, doubled upon itself to form a sleeve in cross-section, having the form of a loop, which fabric is preferably composed of rubber, but may be of leather or other material suitable for packing purposes, and made in sections corresponding, respectively, with substantially the length and breadth of each door. Fitting in this loop or tubular-like packing at the top and bottom of the door A are rods *d*, having rigid therewith arms *t*, projecting in a line parallel with the plane and side edges of the door, which arms are in turn and respectively pivoted

to levers *f*, pivoted to blocks *f'* on the door, and having their ends overlapping each other, and provided with elongated oblique slots *g*, (see Fig. 8,) through which passes a pivot-bolt, *g'*, from a lever, *h*, extending downwardly and pivoted to one of several radial arms on a rotating head, C, journaled between transverse bars C' C' and at a point centrally of the door. (See Figs. 1, 3, and 4.) The relative arrangment of the radial arm of the rotating head and the pivotal connections between the head and the arms *e* is such that, when the parts are in the position shown in Fig. 1, the rod *d* is pushed upwardly, carrying with it and forcing the tubular packing in the groove in that portion of the door-frame of the door, and thereby effectually sealing the joint at that point, as well as locking the door to the frame. A rotation of the head elevating the rod *h* has the effect of withdrawing the rod *d* and packing from the groove in the door-frame into the groove of the door, and the elongated oblique slots *g* in the levers *f* permit said levers to take up the lost motion and avoid straining the pivots of said levers. The connections between the packing at the side and bottom of the door A with the rotating head C are identically the same as those just described, as are also the connections between the packings which extend entirely around the door B with the rotary head D, which head, unlike the head C, is provided with a staff, E so that it may be rotated by a key or crank to actuate the packings. The meeting edges of the doors A B are preferably beveled, as shown in Figs. 2 and 4, so that both doors cannot be closed until the door A is first swung to; and in order to have the door B automatically actuate the mechanical devices for adjusting the packings of the door A, and said packings to be automatically released from the grooves in and unlocked from the door-frame, a bolt, F, is employed. This bolt projects through the edge of the door A, in which it may have a bearing, but has its principal bearing in a bracket, G, toward its inner end, and is pivoted to one of the radial arms of the rotary head C. The outer end of bolt F is beveled, and when both doors are closed impinges against a plate, H, (see Figs. 4 and 5,) on the edge of door B, so that when the bolt is projected the contact thereof will force the bolt inwardly, and cause a partial rotation of the head C, resulting in forcing the packings into the groove of the door-frame at three sides of the door A. To automatically actuate this bolt for releasing the packings after the door B is opened, an expansion-spring, I, is coiled about the bolt and confined between the bracket G and a collar or flange, J, on the bolt, which collar also serves as a stop to limit the outward thrust of the bolt by reason of the engagement of said collar with the door, as shown in Fig. 4.

To preserve the continuity of the packing and rod on the door B, the groove therein, and also the rod, and bent at a point opposite and in the rear of the plate H; but instead of this bend the rod and packing may be severed, so as to pass on each side of the plate, for the break in this point of the packing would reduce its result to such an infinitesimal degree as to make no material difference. The purpose in beveling the bolt is merely to reduce its impinging force with the plate, as in latch-bolts operating with keepers.

As shown in Fig. 7, it is preferred not to have the door-sills grooved, for the reason that such a groove would be a receptacle for dirt, and especially water-drippings from the inside of the refrigerating-chamber, liable to freeze and prevent the doors from being readily opened, and besides, in practice it is found that the door is sufficiently sealed without using a groove at this point.

For refrigerators in which but a single door is employed, such door is constructed substantially like door B—that is to say, with the adjustable packing on all edges, with the top and both sides of the frame grooved to receive such packing, and in either case a lock upon the rotary head D will serve to hold and secure the packings in their adjustment against accidental detachment.

By the construction and arrangement of the lever-connections between the packing and head, it will be observed that there is such a distribution of force against the packing that one end of a packing-section may be moved farther out from the door than the other, and this is principally owing to the provisions made by the elongated slots for taking up lost motion at the point where the levers *f* join the lever *h*, and as a result the packing is rendered effective when the door or frame, or both, are sagged, and, besides, the strain upon the packing is equalized throughout its length.

As the essential feature of my invention is a mechanically-adjustable packing for a refrigerator-door, it is obvious that it would be no substantial departure therefrom to curve and extend the arms of the rotary head so as to bear against the arms of the packing-rods, after the manner of an eccentric or cam, or to extend the arms themselves toward the heads, and in either case dispense with the lever-connections between the packing-rods and the rotary head; and in this connection it may also be stated that instead of the rods and packing sleeved thereon and fastened to the door, the packing may be wholly upon a flat slide working between slots running out the edges of the door at the points where the grooves are now located; in other words, the grooves may be deepened to receive a flat bar having the fabric packing attached thereto to form when pushed out a close joint, as is now formed by the packing, and actuated in the manner described for actuating the rods and packing, as shown in the drawings.

By mechanically adjusting in the manner described a packing seated in the edges of the door, a range of adjustment is provided which

enables the main body of the door to be made so much smaller than the surrounding frame that the ordinary sagging or swelling of one or both of them cannot cause the door to bind, and yet the means for adjusting the packing are such that when the doors are closed the joints between the door and frame are not only sealed, but the door is firmly locked in the frame.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A refrigerator-door having grooves in its edge and a packing arranged in said grooves, in combination with mechanism, substantially as described, for adjusting said packing, as and for the purpose set forth.

2. A refrigerator-door having grooves in its edges and a packing secured to said door and arranged in the grooved edges thereof, in combination with rods or bars supporting said packing, a rotary head provided with radial arms, and a connection between said head and the rods or bars, substantially as described.

3. The combination, with the door provided with grooves in its edges, the rods *d*, the packing sleeved thereon and secured to the door, of the rotary head and the lever-connections between said head and rod, substantially as described.

4. A refrigerator-door provided with grooves in the edges thereof, and the door-frame provided with opposing grooves, in combination with a packing secured to the door, and means for actuating said packing to project it into the grooves of the frame, so as to close the joints between the frame and door, substantially as described.

5. The combination, with the doors A B, their respective packings, the rotary head C, and the connections between said head and the packing of the door A, of the spring-actuated bolt pivoted to the rotary head, and the plate H upon the door B, substantially as described.

GEORGE A. McARTHUR.

Witnesses:
W. W. ELLIOTT,
JNO. G. ELLIOTT.