

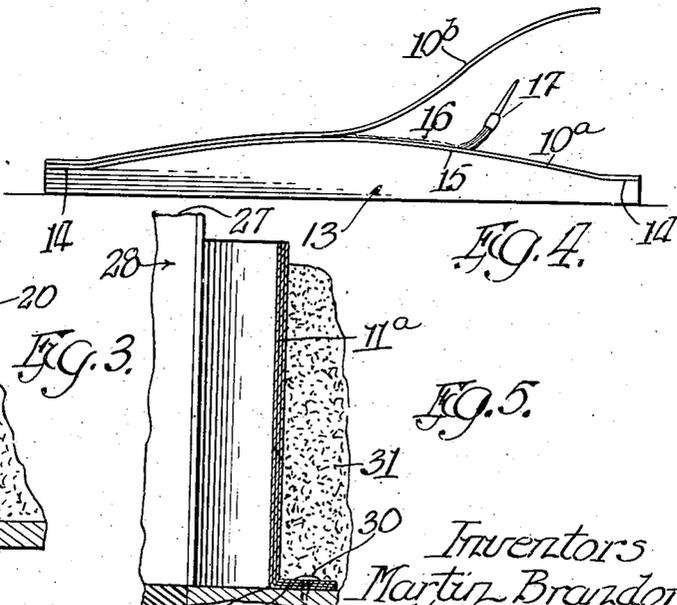
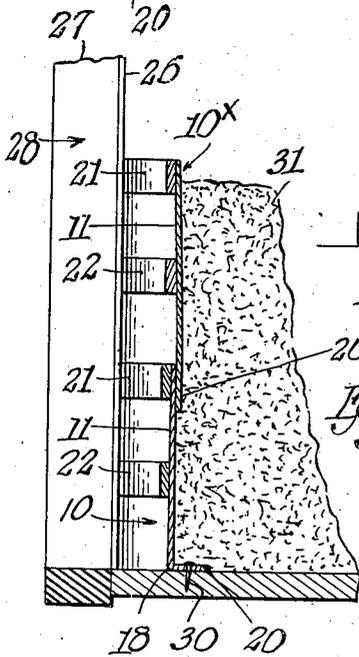
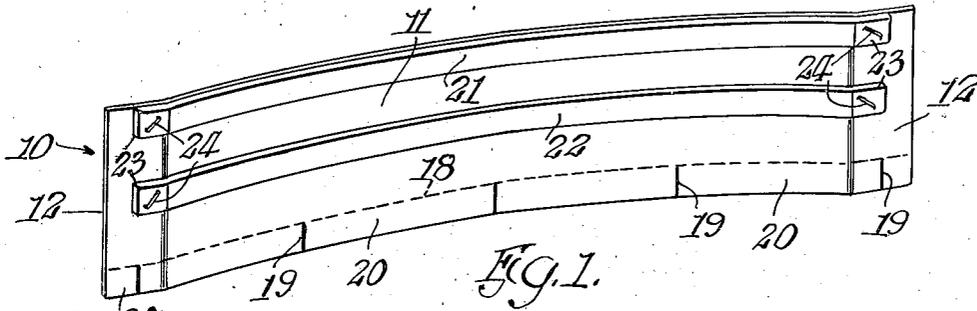
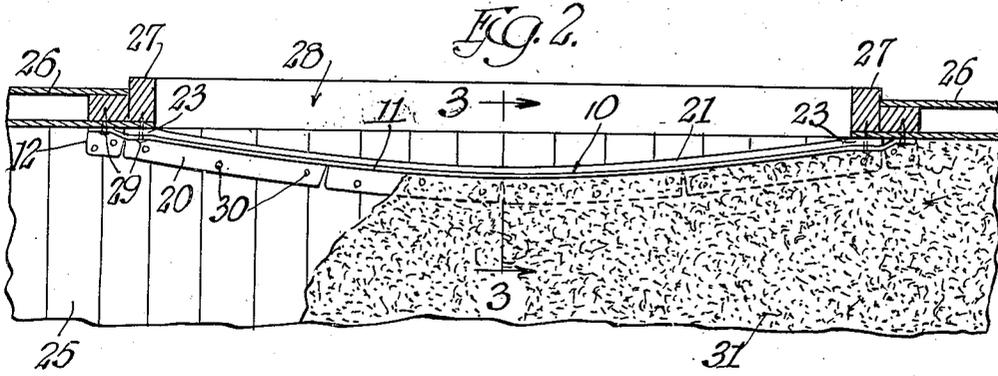
Oct. 4, 1949.

M. BRANDON ET AL.

2,483,523

DOOR FOR BULK COMMODITY RAILROAD CARS

Filed May 19, 1944



Inventors
Martin Brandon
Franklin P. Robinson
by Arthur M. Nelson, Atty.

UNITED STATES PATENT OFFICE

2,483,523

DOOR FOR BULK COMMODITY RAILROAD CARS

Martin, Brandon, Villa Park, and Franklin P. Robinson, Glenview, Ill., assignors to The Branco Corporation, Chicago, Ill., a corporation of Illinois

Application May 19, 1944, Serial No. 536,333

5 Claims. (Cl. 160-368)

1

This invention relates to improvements in doors for bulk commodity railroad cars and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

One of the objects of the invention is to provide a door of simple, though efficient, construction for low single use cost and which may be readily applied to the door openings of railroad cars that carry bulk commodities such as grain, salt, roofing granules and the like and will withstand the bulging pressure of the commodity without a leakage thereof.

Another object of the invention is to provide a door of this kind which does not rely upon weight and rigidity for its strength but which is so constructed of light weight material that the bulging pressure of the commodity increases its resistance to such pressure while retaining that flexibility that permits it to accommodate the racking imparted to a loaded car to which it has been applied, in its stopping and starting, as well as when under way.

A further object of the invention is to provide a door of this kind that requires no supporting wire ties, thus providing an unobstructed interior for the car, in which the workmen are more free to move about when manually distributing the commodity being loaded into the car.

A further object of the invention is to provide a door of this kind that includes a panel of fibrous material having a set camber or arch between its end margins that are adapted to be secured to those parts of the car body defining the sides of the door opening.

Furthermore, it is an object of the invention to provide a door of this kind that includes a set cambered or arched panel of fibrous material having parts at the bottom which may be bent into a right angle position for attachment to the floor of the car or may be left in the original condition to form a flange for a sealed overlap with the top marginal part of the panel below when more than one of such doors are used in a door opening.

Again, it is an object of the invention to provide a door of this kind that includes a panel built up from a number of adhesively united plies or layers of fibrous material, upon a form which imparts a set camber or arch to the panel which has great resistance to compression pressures of the commodity imposed thereagainst from its convex side.

The above mentioned objects of the invention,

2

as well as others, along with the advantages thereof, will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a perspective view of the improved door from the concave side thereof, better to show the bracing therefor.

Fig. 2 is a horizontal fragmentary sectional view through portions of a bulk commodity car adjacent the door opening thereof and illustrates the improved door in position to close a lower part of said opening.

Fig. 3 is a vertical sectional view through the improved door and associated parts of the car as taken on the line 3-3 of Fig. 2.

Fig. 4 is a schematic elevational view of a form, upon which the panel of the door may be constructed and receive a permanent set camber or arch by adhesively uniting superposed layers, one upon the other.

Fig. 5 is a fragmentary vertical sectional view similar to Fig. 3, but on an enlarged scale, and which will be later referred to in more detail.

In general the improved door embodies therein an elongated rectangular sheet-like panel or body having a major dimension greater than the width of the door opening in the side of a bulk commodity railroad car and having a minor dimension considerably less than the height of said door opening. The number of such sheet-like panels or bodies used for each opening is dependent upon the kind of commodity the car is to carry. With heavy commodities, such as bulk roofing granules, only one of such doors is used for and at the bottom of each opening. With lighter commodities, such as talc, two or even three of such doors may be used, one arranged vertically above and in overlapping sealing engagement with the other.

The panel or body of the door is preferably constituted by a piece of fibrous sheet material rather than sheet metal and such a piece has a longitudinally cambered mid portion for the greater part of its length and flat or straight end portions. The panel or body may be made either from a plurality of adhesively united layers of paper, on the shaped surface of a form block so as to take a set camber corresponding to said surface, or it may be made from flat fibrous stock and applied to rigid bracing elements having a set camber so as to take the shape of said bracing elements.

When the panel is made of laminated, adhesively united layers on said form block, 14 point and preferably kraft stock is used for said layers.

When the panel is made from a sheet of flat stock, 80 point or better solid fibre board is preferred but other stock may be used in its place. In either instance, a longitudinal score line is formed parallel with and somewhat adjacent the bottom longitudinal edge of the panel to provide a margin that is slit at longitudinally spaced points to form sealing flanges that may be bent into a plane at a right angle to the body, for attachment to the floor of the car.

Referring now in detail to that embodiment of the invention illustrated in the drawings and especially to Fig. 1, the improved door shown therein includes a rectangular elongated panel 10 of weatherproof solid fibre board or the equal thereof. A panel for use with a car door 72 inches wide has an overall horizontal dimension of 84 inches for a 6 inch overlap at each side of the opening and a vertical dimension of 24 inches.

Preferably the panel mentioned has a set cambered or arched intermediate portion 11 and flat end portions 12—12 and is built up upon a form 13 (see Fig. 4) in superposed adhesively united layers or sheets of kraft paper. Fourdrinier kraft paper with a basis of weight of about 40 pounds is a preferred material. Such a paper stock has no "grain" and therefore its compression strength is substantially equal in all directions. A panel built up from twelve to fifteen sheets of such paper, when attached to the car body as will later appear, will support a grain load side pressure of approximately three pounds per square inch and provide a load factor of safety of 3 to 1 for the heaviest bulk commodity weighing 125 pounds per cubic foot.

The form 13, above mentioned, has flat top end surfaces 14—14 and an arched or cambered top surface 15 intermediate said end surfaces. In building up the panel 10, a single sheet of kraft paper 10a, as mentioned, is laid upon the top surface portions 14—15 and 14 of the form and then a coating of a good bonding adhesive 16 may be applied to the exposed top surface of the paper sheet thereon, as by means of the brush 17 appearing in Fig. 4. Thereafter another sheet of kraft paper 10b is superposed upon and takes the form of the first one to be bonded thereto by said adhesive. Other sheets of kraft paper are superposed upon and bonded to the first mentioned ones until the desired thickness of panel is produced. The panel is then "set" to take permanently the approximate shape of the surfaces. This setting may, if desired, be accelerated by heat and pressure, depending upon the type of adhesive or bonding agent 16 used.

After the panel has set, a score line 18 is made in the panel about 4 inches from what is thereafter the lower body edge of the panel and the margin thus defined is transversely slit at longitudinally spaced points 19 to form flanges 20—20 that may be bent, when desired, into a right angle to the remainder of the panel.

On the concave face of the panel we provide one or more longitudinally extending bracing or reinforcing cleats 21 and 22 respectively, one being disposed along the top edge of the panel and the other about midway between said edge and the score line 18. Preferably these cleats are made either from strips of solid wood or from laminated resin, animal glue or casein bonded wood veneer strips, 78 inches long by 3 inches wide and ½ inch thick, that are thermal pressure machine bent to conform to that surface (the concave side) of the panel with which they are associated. Said cleats each have straight ends

23 that are 3 inches long so that at each end of the panel, its flat portions 12—12 extend 3 inches beyond the end edges of the cleats. The cleats may be attached to the panel as by the staples 24 that pass through the straight end parts 23 of the cleats and those portions of the straight ends of the panel with which said end parts of the cleats engage.

The use of the cleats mentioned is advantageous with flat sheet stock. Under such circumstances the sheet is placed upon the convexed side of the preformed cleats and bent to conform to and then secured to said cleats, as before mentioned. As the cleats are more rigid than the panel, the panel will take the cambered form of said cleats.

In Fig. 5 is illustrated a construction wherein the panel, which is indicated at 11a is built up of such a number of superposed adhesively united plies as to make the use of the cleats 21 and 22 unnecessary, the other parts remaining the same as before.

In Fig. 2 is illustrated a part of a bulk commodity railroad car body including a floor 25, side wall sheathing 26 and upright posts 27—27 one at each side of a door opening 28. When the improved door is in position with respect to said door opening, its arched or cambered mid portion extends inwardly into the car body with the straight parts 23 of the cleats 21—22 overlapping the inner part of the sheathing at the posts 27 and with the straight parts of the end margins of the panel extending beyond the ends of the cleats and also overlapping said sheathing parts and to which they are attached by the nails 29. Also, when the door is in the position mentioned, the flanges 20—20 of the panel will have been bent into a right angle position with respect to the panels so as to engage the floor 25 and to which they are attached as by the nails 30.

If it is desired to increase the effective height of the door, for use with lighter bulk commodity 31 such as talc, a second panel 10c is attached in place above the first one, with the flanges 20—20 disposed without right angle bending to overlap the top marginal part of the first one, as shown in Fig. 3.

When the door is in place, as above described, a tight seal is afforded against commodity leakage at the lateral ends and at the bottom of the door.

When the car is loaded with a bulk commodity, this commodity will exert a pressure against the convexed side of the door and place it under compression because of the attachment the ends of the panel have with the car body, as before mentioned. This pressure tends to straighten out the arched or cambered part of the panel and the greater this pressure, the greater the resistance to such pressure is built up in the door. In the stopping and the starting of the car a considerable racking action may be set up in the car, which is transmitted endwise to the door. However, due to its construction, the improved door will flex endwise to a degree sufficient to accommodate such action without tearing or breaking and without pulling away from those parts of the car body to which it is nailed.

From the above, it is to be noted that the door has a preformed arched construction which is capable of withstanding the bulging pressure of the commodity load without the use of wire ties and the like so that a free unobstructed space is provided in the car for workmen who might have to spread the commodity evenly in the car.

By forming the panel with a set camber or

5

arch, as before described, it possesses a pressure resistance with a good safety factor for its intended purpose. Therefore, it may be made lighter in weight without a sacrifice in strength. Also, it may be readily applied to the car and removed therefrom for unloading the commodity.

In Figs. 1, 2 and 3, the cambered fibrous sheet material appears as if constituted of a single layer, but it will be understood that because of the small scale, it is not feasible to illustrate the several layers of which the same is actually composed. Reference to Fig. 4 and the descriptive matter relative thereto discloses the preferred laminated structure used in practice. In Fig. 5, which is shown on a larger scale, the lamination feature is better illustrated.

While in describing the invention we have referred in detail to the form, arrangement and construction of the parts involved, the same is to be considered only in an illustrative sense so that we do not wish to be limited thereto except as may be specifically set forth in the appended claims.

We claim as our invention:

1. A door of the kind described, embodying therein a generally rectangular panel of fibrous sheet material of uniform thickness wider than the door opening of the car for which it is designed and cambered inwardly of the car and including lateral margins for attachment to parts of the car at the sides of said door opening, and at least one laterally extending bracing element having the camber of and attached to one of the faces of the panel, the braced door flexibly resisting compression imposed upon its convexed face by any commodity in the car pressing there-against.

2. A door of the kind described, embodying therein a generally rectangular panel of fibrous sheet material of uniform thickness wider than the door opening of the car for which it is designed and cambered inwardly of the car and including lateral margins for attachment to parts of the car at the sides of said door opening, a sealing flange at the bottom of said panel and at least one laterally extending bracing element having the camber of and attached to one of the faces of said panel, the braced door flexibly resisting compression imposed upon its convexed face by any commodity in the car pressing there-against.

3. A door of the kind described, embodying

6

therein a generally rectangular panel of fibrous sheet material of uniform thickness wider than the door opening of the car for which it is designed and cambered inwardly of the car and including lateral margins for attachment to parts of the car at the sides of said door opening, and at least one laterally extending bracing element having the camber of and attached to one of said faces of said panel and terminating at said margins, the braced door flexibly resisting compression imposed upon its convexed face by any commodity in the car pressing thereagainst.

4. In combination with a railroad car having a floor and opposed side walls, each with a door opening therein, an appliance for closing at least the bottom part of one door opening and embodying therein a panel of relatively thin fibrous sheet material wider than said door opening and cambered inwardly of the car and including lateral margins attached to parts of the side of the car at each side of the door opening therein and further including a bent integral sealing flange at the bottom attached to the floor of the car, and rigid bracing means having the camber of and attached to one of the faces of said panel.

5. In combination with the body of a railroad car, a panel of relatively thin fibrous sheet material cambered inwardly of the car and provided with a bottom portion engaged with the floor of the car body and lateral margins fixed to side wall portions of the car body, and laterally extending bracing elements having the camber of and attached to the concaved face of the panel.

MARTIN BRANDON,

FRANKLIN P. ROBINSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
532,774	Fallis	Jan. 22, 1895
1,181,785	Maroney	May 2, 1916
1,744,561	Marckworth	Jan. 21, 1930
1,895,625	Hummel et al.	Jan. 31, 1933
2,116,260	Corkran	May 3, 1938
2,310,860	Moon	Feb. 9, 1943

FOREIGN PATENTS

Number	Country	Date
830,617	France	1938