ABSTRACT OF THE DISCLOSURE

A self-sealing railway car hopper door assembly combining an intimated marginal flange on a door and a sealing flange on a frame overlapped by the marginal flange in the door's closed position, with a rubber sealing gasket on the frame surrounding and spaced rearwardly from a front end of the sealing flange and engaged and deformed by a rear end of the marginal flange when the door is closed.

This invention relates to hopper door assemblies for the discharge openings of railway hopper cars and has for its primary object the provision of an improved self-sealing hopper door assembly which, when closed, will effectively seal a discharge opening against escape of finely divided bulk lading.

Another object of the invention is to provide a hopper door assembly for a downwardly opening discharge opening of a hopper car, which, for any type of bulk lading, is both self-sealing and protects its sealing means against physical damage.

Other objects and advantages of the invention will appear hereinafter in the detailed description, particularly pointed out in the appended claims and be illustrated in the accompanying drawings, in which:

FIGURE 1 is a side elevational view of a preferred embodiment of the hopper door assembly of the present invention mounted on a hopper of a railway hopper car;

FIGURE 2 is a fragmentary front elevational view of the structure of FIGURE 1;

FIGURE 3 is a front view of the door frame of the assembly of the preceding figures, taken parallel to the plane of the discharge opening;

FIGURE 4 is a fragmentary sectional view on an enlarged scale, taken along lines 4--4 of FIGURE 3; and

FIGURE 5 is a fragmentary sectional view on the scale and section of FIGURE 4, taken along lines 5--5 of FIGURE 2.

Referring now in detail to the drawings in which like reference characters designate like parts, the improved self-sealing hopper door assembly of the present invention is preferably also conventional in having a generally rectangular discharge opening 5, the assembly preferably is also conventional in having a forwardly projecting sealing flange 10 on the frame about or around the opening and a rearwardly projecting marginal flange 11 on the door which overlaps and surrounds or contains the sealing flange in the door's closed position.

In the preferred assembly, a downwardly and rearwardly sloping or inclined front or forward edge or edge 12 of the sealing or frame flange 18 is flat or planar and confronted on closing of the door 6 by a correspondingly sloping and flat rear face 13 of the door's main part or body 14 inside the rearwardly projecting marginal or door flange 11. While confronting and substantially parallel to the sealing flange's front end 12 in the door's closed position, the rear face 13 of the door 6 preferably is spaced forwardly or away from that end and the outer side or surface 15 of the sealing flange and confronting inner side or surface 16 of the marginal flange 11 are generally parallel and flare or diverge rearwardly, respectively, from the sealing flange's front end and the door's inner face.

This spacing and flaring enables the sealing flange 10 to exert a wedging action on the marginal flange 11, when necessary during installation to compensate for manufacturing tolerances which otherwise might prevent the door 6 from closing. However, in the improved assembly 1 of the present invention neither the front end 12 of the sealing flange 10 and confronting rear face 13 of the door 6 nor the confronting outer and inner sides 15 and 16 of the sealing and marginal flanges 10 and 11 are depended on to seal the discharge opening 5 against the escape of finely divided bulk lading. Instead, the preferred end spacing between the door 6 and the frame 2 preferably is attended or accompanied by side or lateral spacing between their marginal and sealing flanges 12 and 11, with the clearances between them such as to prevent the passage of particles of substantial size.

Despite the above preferred clearances and consequent lack of metal-to-metal contact between the door 6 and the frame 2, except through their hinged connection 7 and 8, the improved assembly 1 is fully effective in sealing against the escape of bulk lading of any particle size. This is accomplished by attaching or securing to the frame 2 outside its sealing flange 10 a continuous or endless elastic seal or sealing gasket 17 made of suitable rubber or rubberlike elastomer, hereinafter generally termed "rubber." To mount the gasket 17, the frame 2 has surrounding and or about the outside of the sealing flange 10, rearwardly of and substantially parallel to the latter's front end 12, a laterally outward or projecting forwardly facing front or face plate 18 interrupted inwardly of its periphery by a correspondingly facing continuous groove 19 in which the gasket seats. Surrounding or encircling the sealing flange 10 and so located or positioned by its seating in the groove 19, the sealing gasket 17 is bonded or otherwise suitably fixed or secured therein. The preferred gasket 17 both completely fills and is substantially fully contained in the groove 19 and presents for engagement by the door 6 a front surface 20 which normally is forwardly bulged and projects forwardly from the face plate 18.

For engaging the sealing gasket 17 when closed, the door 6 has at the rear end of or extremity of its marginal flange 11 an integral, laterally out-turned or projecting, rearwardly facing lip 21. Having as the inner end of the marginal flange 11 a conveniently substantially flat rear face 22 engageable with the front surface 20 of the gasket 17 intermediate the latter's sides and preferably narrower than and containable laterally within the groove 19, the lip 21, when the door is closed, depresses or deforms the gasket by the pressure applied through that face and so prevents escape of even finely divided bulk lading. For protecting the gasket 17 against possible cutting by the lip 21, the latter preferably is rounded or chamfered at
the sides of its rear face 22. However, this is the only protection the gasket needs, since it is fully protected by the interposed sealing flange 10 against direct impingement by and damage from lading of whatever particle size during both loading and unloading of the car. Too, the preferred substantial containment of the gasket 17 in the groove 19 with only its front surface 20 normally projecting therefrom, enables the surrounding rim 23 of the face plate 18 to protect it against damage from external sources, without interfering with the ability of the gasket to seal the opening 5.

From the above detailed description it will be apparent that there has been provided an improved self-sealing hopper door assembly which not only can seal against escape of bulk lading of any particle size, but protects its sealing means against damage. It should be understood that the described and disclosed embodiment is merely exemplary of the invention and that all modifications are intended to be included that do not depart from the spirit of the invention and the scope of the appended claims.

Having described my invention, I claim:

1. A self-sealing door assembly for a gravity discharging hopper of a railway hopper car, comprising a frame fixed to said hopper and having a sealing flange bounding a discharge opening thereof, a drop bottom door hinged at the top to said frame, said door in a closed position thereof having a rear face confronting a front end of said sealing flange, a marginal flange on said door about and projecting rearwardly from said rear face and in said closed position overlapping said sealing flange, and a forwardly facing overlapping said sealing flange, and a forwardly facing overlapping said sealing flange and spaced rearwardly from said front end thereof and engaged and deformed by a rear end of said marginal flange on closing of said door for sealing said discharge opening.

2. A self-sealing door assembly according to claim 1, wherein the door in closed position is spaced from the sealing flange.

3. A self-sealing door assembly according to claim 2, wherein the gasket seats and is substantially fully contained in a groove in a forwardly facing face plate on the frame about the sealing flange.

4. A self-sealing door assembly according to claim 3, wherein the rear end of the marginal flange is narrower than and in the door's closed position contained laterally by the groove.

5. A self-sealing door assembly according to claim 4, wherein the rear end of the marginal flange is a rear face of a laterally out-turned lip on the flange.

6. A self-sealing door assembly according to claim 5 wherein the lip is chamfered at opposite sides of the rear face thereof.

7. A self-sealing door assembly according to claim 1, wherein the gasket seats and is substantially fully contained in a groove in a forwardly facing face plate on the frame about the sealing flange.

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