Feb. 3, 1959 J. E. OTT ET AL 2,871,936

GRAIN CAR DOOR

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Fig. 1.

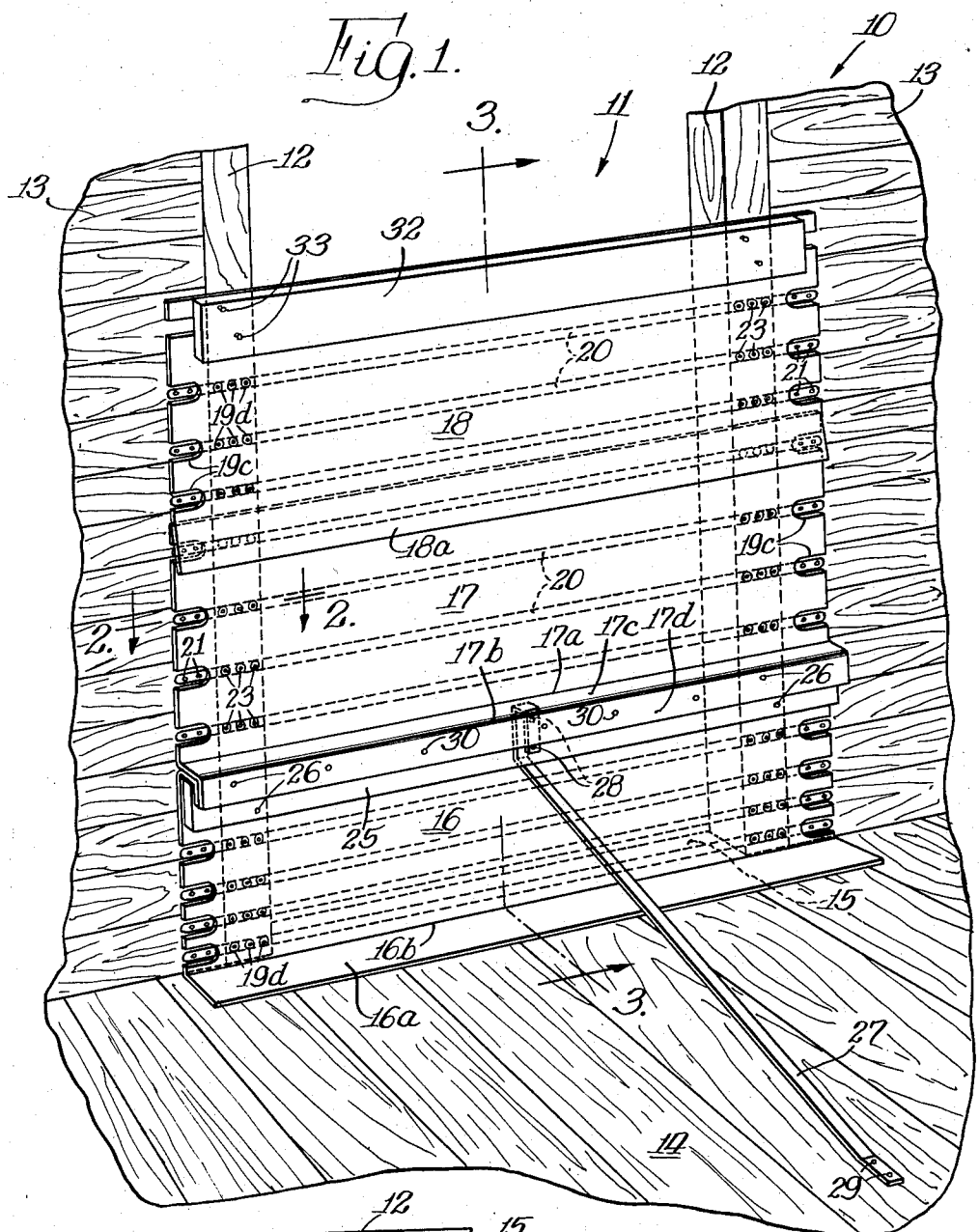

Fig. 2.

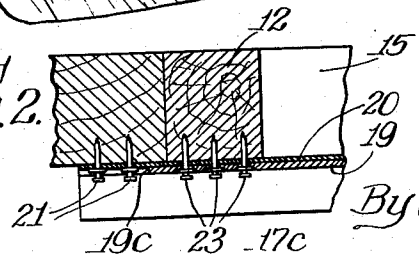

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Fig. 4.

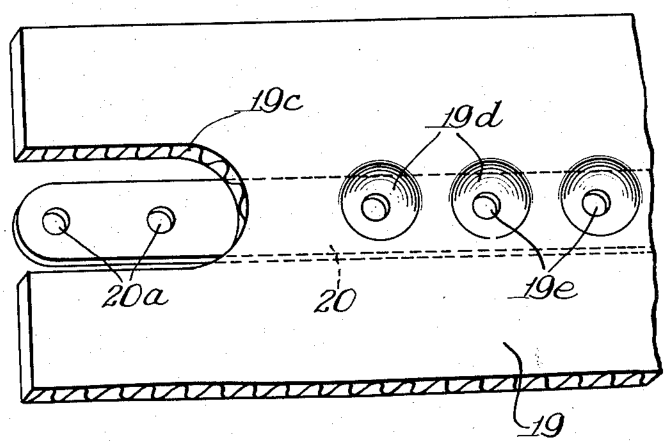


Fig. 3.

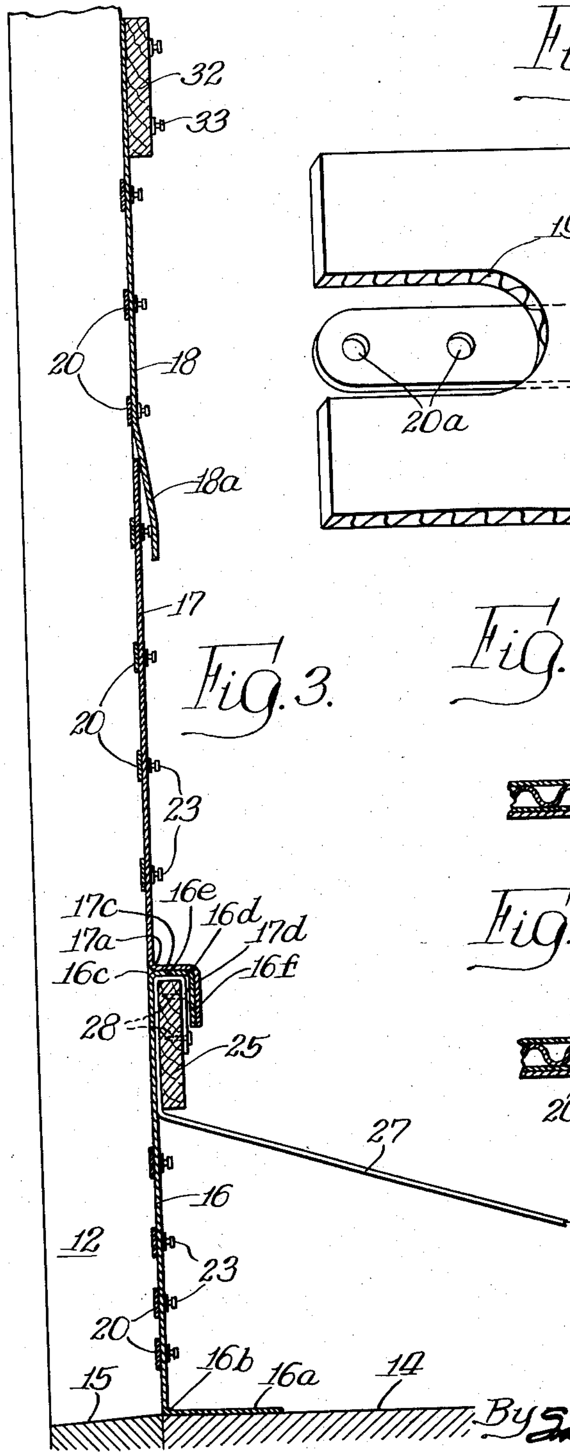


Fig. 5.

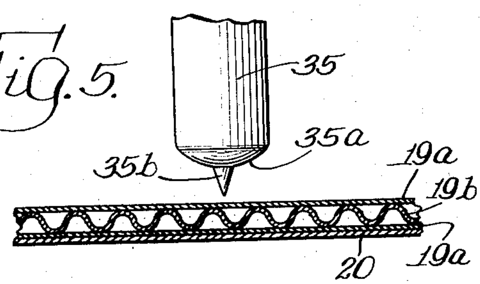
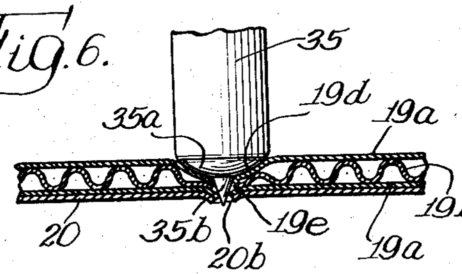


Fig. 6.



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GRAIN CAR DOOR

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Application July 14, 1953, Serial No. 367,869

2 Claims. (Cl. 160—368)

This invention relates to improvements in grain doors for railway cars and the like and its purpose is to provide means, in addition to the usual car doors, which may be readily applied to a freight car of standard construction to form grain tight closures for the door openings.

It has heretofore been the practice to provide freight cars with auxiliary grain closures of various forms. Those grain doors of a more or less permanent nature, capable of reuse, have been expensive to install and use and they have been largely replaced by expendable grain doors formed of sheets of paper or the like, sometimes reinforced by metal straps extended across the door openings. However, the paper grain doors heretofore used have had certain disadvantages including their tendency to fail under load and the time consumed and difficulty encountered in applying them to the car.

The principal object of the present invention is to provide an improved grain door of the paper type which is reinforced in a manner to provide insurance against failure with the additional advantage that it may be readily applied and removed. A further object is to provide an improved grain door comprising a plurality of complementary paperboard sections which are reinforced by attached metal straps adapted to be nailed to the car. A further object of the invention is to provide a grain door made up of sections reinforced by metal straps and also supported by additional reinforcing means without the necessity of penetrating the door sections opposite the door openings. Still another object of the invention is to provide an expendable grain door which may be destroyed after a single use and which is so formed that it may be readily packed and shipped to the place of use. Other objects of the invention relate to various features of construction and arrangement which will appear more fully hereinafter.

The nature of the invention will be understood from the following specification taken with the accompanying drawings in which one embodiment is illustrated.

In the drawings,

Figure 1 shows a perspective view of a grain door embodying the present invention and applied to the inside of a railway freight car across the door opening thereof;

Fig. 2 shows a horizontal section taken on the line 2—2 of Fig. 1;

Figure 3 shows an enlarged vertical section taken on the line 3—3 of Fig. 1;

Fig. 4 shows an enlarged perspective view of an end portion of a door section and its reinforcing metal strap illustrating the construction for facilitating the driving of nails into the car walls and door posts;

Fig. 5 shows a sectional view taken longitudinally through a car door section with a side elevation of a punch which may be employed for punching holes through the paperboard and attached metal strap of the section to provide the nail holes as well as dimples in the paperboard which facilitate the location of the holes; and

Fig. 6 is a view similar to that of Fig. 5 showing the relation of the parts after the punch has been operated to form holes through the paperboard and the metal strap and to provide a dimple or depression in the paperboard.

As illustrated in the drawings, the invention is shown as applied to a railway car **10** having a door opening **11** bounded by vertical door posts **12** from which the walls of the car, including the inside wooden sheathing **13**, extend toward the opposite ends of the car. The car **10** also has a floor **14** and a door sill **15** extending across the bottom of the door opening.

The present invention comprises a grain door applied to the inside of the car wall across the door opening and made up of three complementary sections **16**, **17** and **18** each formed of a sheet **19** of stiff paper fiberboard made up of two outer layers **19***a* of stiff paper connected by an intervening corrugated layer **19***b*, as shown particularly in Figs. 5 and 6. The fiberboard sheet **19** of each section is reinforced by a plurality of thin flexible metal straps **20** formed preferably of steel or the like, which are glued to the fiberboard **19** on the sides of the sections which are directed toward the outside of the car. The metal straps **20** are provided at their ends with nail holes **20***a* and nails **21** are adapted to be driven through these holes into the sheathing **13** of the car. To facilitate the driving of the nails through the holes **20***a* when the door sections are in position against the door posts, the ends of the fiberboard portions **19** of each section are preferably provided with longitudinal slots **19***c* extending inwardly from the ends of the door sections sufficiently to expose all of the nail holes at the end of the strap through which the nails **21** are driven so that these holes may be thus readily located by the workman when driving the nails which are preferably of the double headed type so that they may be readily withdrawn after the grain door has served its purpose and reached its destination. In addition to the nail holes **20***a* and the slots **19***c* each door section is preferably provided with a plurality of dimples **19***d* which are formed in the fiberboard **19** of each of the door sections **16**, **17** and **18** in registry with those portions of the metal straps **20** which overlap the door posts **12**. Each dimple **19***d* forms a tapering indentation terminating at its center in a hole **19***e* which extends through the fiberboard **19** in registry with a punched hole **20***b* formed in the registering strap. In the embodiment illustrated, there are three dimples **19***d* and three of the punched holes **19***e* and **20***b* for each portion of a strap **20** which is positioned opposite to a door post **12** when the door has been applied to the car.

Further features of the grain door construction will be described in connection with the disclosure of the procedure which is preferably followed in applying the grain door to the car. According to this method, the lower section **16** is first put in place across the lower part of the door opening and this section has a flap **16***a* formed by providing a fold line **16***b* in the fiberboard **19** so that the flap may be folded inwardly to rest on the car floor **14** while the portion of the section **16** which is reinforced by straps **20** extends upwardly in contact with the door posts **12** and the wooden sheathing **13**. Having put the section **16** in place, the straps **20** are first nailed to the sheathing **13** by driving the nails **21** through the nail holes **20***a* at one side of the door opening **11** and then driving the nails through the holes **20***a* at the opposite side of the door opening with the last mentioned nails inclined so that they create tension in the straps **20** as they are driven, thus creating a taut condition of the straps **20** across the door opening. The reinforcing straps **20** are preferably placed relatively close together in the lower section **16** since this section has to resist a

greater pressure of the weight of the grain or other finely divided or granular material which is contained within the car. After the nails 21 have been driven through the holes 20*a* at both sides of the door, other nails 23, also preferably of the double headed variety, are driven through the holes 19*e* and 20*b* into the door posts 12, the dimples 19*d* in the faces of the fiberboard 19 which are directed toward the inside of the car serving to facilitate the location of the registering holes 19*e* and 20*b* for nail driving purposes. Although several nail holes 20*a* and 20*b* are shown at each end of each strap 20, it is not usually necessary to drive nails through all of these holes, depending upon the condition of the door posts and the sheathing. The driving of the nails 21 through holes 20*a* at opposite ends of a strap will ordinarily be sufficient to create the desired tension in the strap. If desired, the dimples 19*d* and registering holes 19*e* and 20*b* may be formed in the extreme end portions of the door sections instead of providing the holes 20*a* in the straps and the slots 19*c* in the fiberboard sheets 19. The thin metal straps 20, being glued to the outer faces of the fiberboard sheets 19 of the door sections are held in a flat condition and seat firmly against the door posts 12 and the sheathing 13 so that a tight closure is made along the vertical edges of the door opening 11.

The lower door section 16 is provided along its top margin with a longitudinal fold line 16*c* and with another parallel fold line 16*d* so that the upper edge of the door section may be bent around the top edge of a reinforcing wooden board 25 which is placed across the door opening adjacent the upper margin of the door section 16 with its end portions secured to the door posts 12 by nails 26. The door 16 thus has a flange 16*e* which extends forwardly along the top edge of the board 25 and another flange 16*f* which extends downwardly on the inside of the board 25. Before these flaps are bent to the positions just referred to, the board 25 is preferably reinforced at its middle portion by a metal strap 27 which has its extremities secured by nails 28 on the inner side of the board. The strap then extends over the top edge of the board and downwardly at the outer side of the board from which point it is inclined downwardly and inwardly to the car floor 14 at a point spaced substantially from the side wall of the car where it is secured in place while being held under tension by means of nails 29.

After the lower door section 16, the board 25 and the brace 27 have been put in place and attached to the car, the next upper door section 17 is applied to the car, following the same procedure with respect to driving the nails 21 and 23 through the straps 20 as was followed in securing the door section 16. At its lower portion, the door section 17 is provided with fold lines 17*a* and 17*b* which provide two flaps or flanges 17*c* and 17*d*, the flap 17*c* extending horizontally toward the inside of the car in contact with the upper side of the flange 16*e* of the lower door section, while the flap or flange 17*d* extends vertically downward adjacent the flange 16*f* on the inner side of the board 25. If desired, nails 30 may then be driven through the overlapping flanges or flaps 16*f* and 17*d* to secure them to the board 25 but a grain tight closure between the two door sections 16 and 17 is provided by the overlapping flaps without this additional mailing.

After the door section 17 has been secured in place, the upper section 18 is applied by driving nails 21 and 23 through the holes in the straps 20 in the manner previously described in connection with the description of the application of section 16. The upper door section 18 is reinforced across its top by a horizontal wooden board 32 which is nailed to the door posts 12 by nails 33, thus providing a rigid reinforcement for the top edge of the grain door over which the workman may climb out of the car after he has secured the door sections in place. The upper section has a flap 18*a* along its lower edge which extends downwardly on the inner side of the top portion of the section 17 to provide a grain tight closure. Since the reinforcing member 32 ordinarily provides a sufficient reinforcement for the upper door section independently of the reinforcing metal straps, the upper strap 20 may be removed, if desired, from the top edge portion of the section 18 and used as the metal strap for providing the brace 27, thus making it unnecessary to ship a loose strap 27 from the place of manufacture to the place of use.

It will be observed that the three door sections 16, 17 and 18 are generally similar in size and construction which facilitates the formation of a package into which the door may be formed for shipment. Ordinarily, it is desirable to package the door sections for both doors of a railway car in a single bundle for shipment. After the doors have been applied and the shipment has been made, the door sections may be readily removed by withdrawing the double headed nails and prying loose the boards 25 and 32. Inasmuch as the cost of these grain doors is relatively low, they may then be discarded instead of being returned for reuse.

In Figs. 4, 5 and 6 there is illustrated in detail the construction of the end portions of the door sections 16, 17 and 18 whereby slots 19*c* are formed in the end portions of the fiberboard sheets 19 to facilitate access to the nail holes 20*a*, as well as the method of forming the dimples or indentations 19*d* and the registering punched holes 19*e* and 20*b*. These indentations and the communicating registering holes may be formed by a punch 35 having a convex lower end portion 35*a* adapted to depress the upper sheet 19*a* of the fiberboard to form the dimple 19*d*. This part 35*a* terminates in a sharp projection 35*b* which is adapted to form a punch to provide the registering holes 19*e* and 20*b* adapted to receive the nails. These features do not in themselves constitute a part of the present invention but are described and claimed in the copending application of Walter F. Hinkle and William Schroeder, Serial No. 367,870, filed July 14, 1953.

Although one form of the invention has been shown and described by way of illustration, it will be understood that it may be constructed in various other embodiments which come within the scope of the appended claims. The claims are to be construed as covering the application of the invention to grain doors for trucks, storage bins and the like as well as to railway cars.

We claim:

1. A grain door for closing a car door opening, said door comprising a pair of sections located one above the other, a reinforcing member secured to the car wall and extending across the door opening on the inner side of the lower section, the upper edge of said lower section being wrapped around said member and being overlapped by said upper section on the inner side of said member.

2. A grain door for closing a car door opening, said door comprising a pair of sections located one above the other, a reinforcing member secured to the car wall and extending across the door opening on the inner side of the lower section, the upper edge of said lower section being wrapped around said member and being overlapped by said upper section on the inner side of said member, said overlappnig portions of said sections being secured to said member.

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