May 1, 1951 F. X. OUELLET ET AL 2,550,856

GRAIN CAR CLOSURE

Filed Oct. 13, 1944 3 Sheets-Sheet 1

Fig. 1

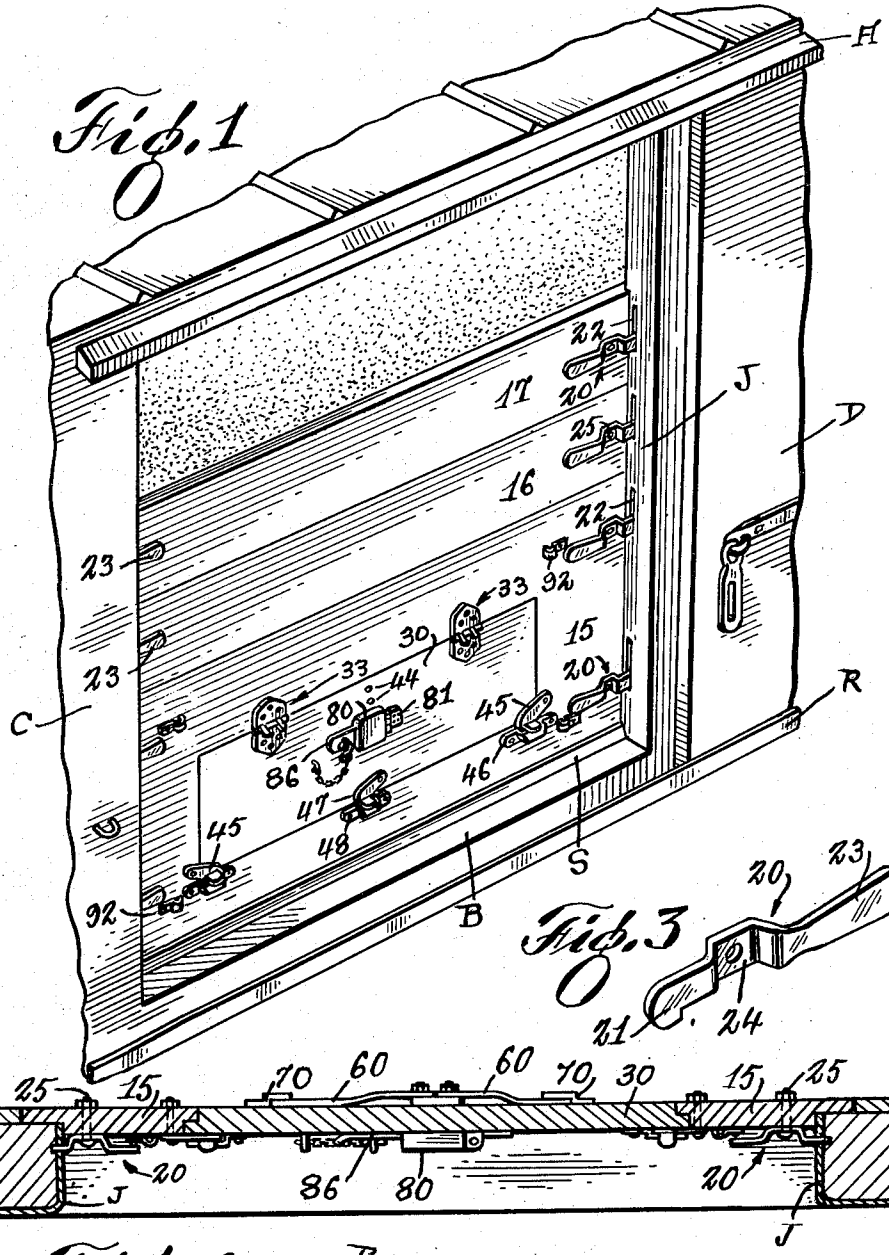


Fig. 3

Fig. 2

B

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GRAIN CAR CLOSURE

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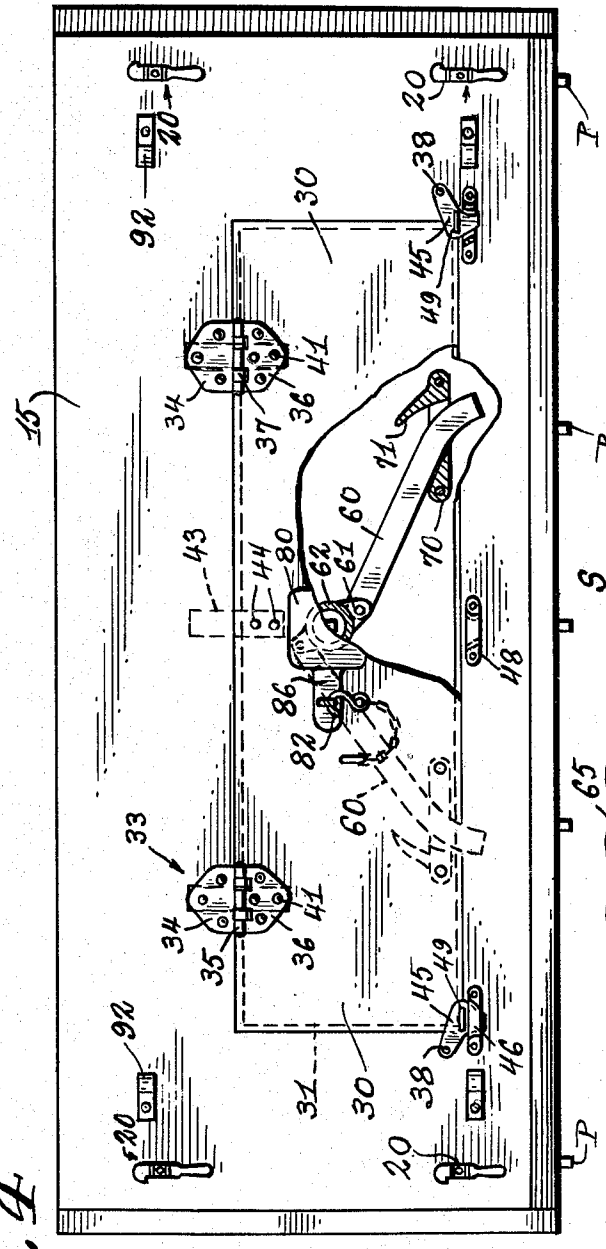


Fig. 4

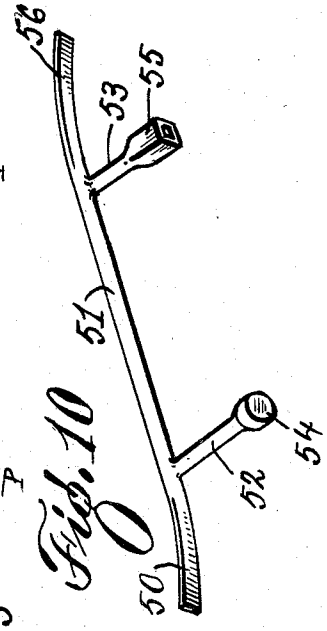


Fig. 10

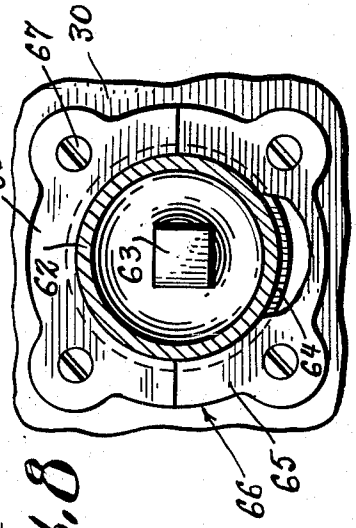


Fig. 8

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Fig. 7

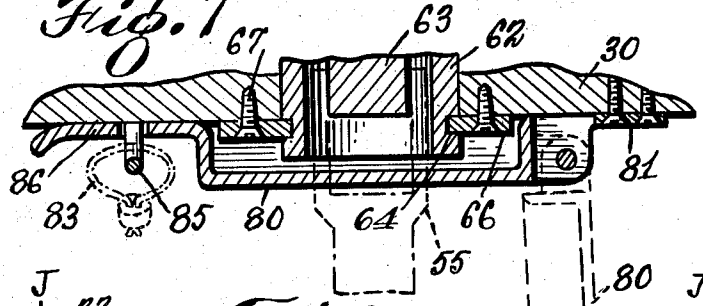


Fig. 9

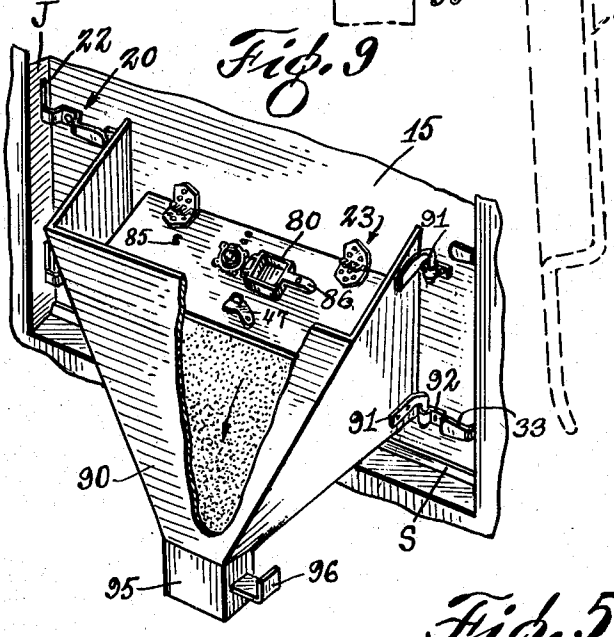


Fig. 5

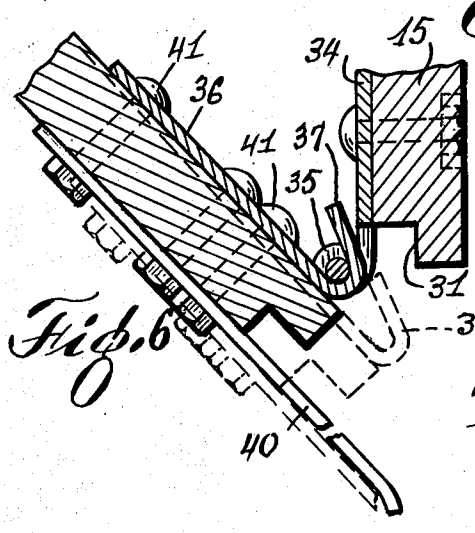
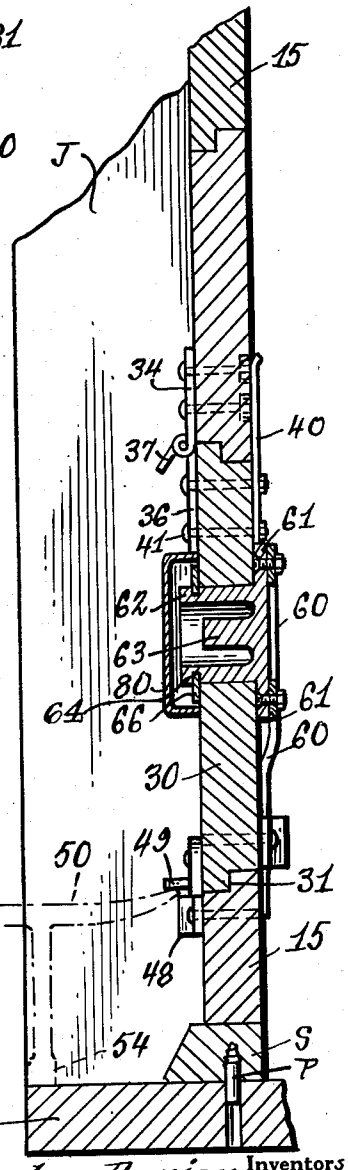


Fig. 6



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Patented May 1, 1951

2,550,856

UNITED STATES PATENT OFFICE

2,550,856

GRAIN CAR CLOSURE

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Application October 13, 1944, Serial No. 558,523

1 Claim. (Cl. 292—6)

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The present invention relates to grain cars, and more particularly, to a demountable closure therefor.

According to current practice, cereal grains, when shipped by rail, are simply loaded in box cars provided with boarded door openings rendered grain-tight by paper and the like.

Due to the well-known fluidity of said grains, when in bulk, the pressure exerted on the door boards is exceedingly high: it has been calculated that said pressure is of the order of:

60 pounds per bushel for wheat
56 pounds per bushel for corn
34 pounds per bushel for oat
48 pounds per bushel for barley, etc.

When it is considered that a car may contain up to 2000 bushels of grain, the lateral tension exerted on the door will be readily apparent. Consequently, the emptying of a boarded and loaded grain car is always a problem and represents a procedure fraught with dangers. As a matter of fact, the individual boards, when sledged loose, are very apt to be dislodged with explosive violence to constitute a distinct cause of injuries to the workers near-by. Again, the unloading operators, conscious of their personal safety, generally remove the boards in such a manner that destruction thereof is only a secondary consideration; as a result, the destroyed boards are no longer useful for their original purpose.

The present invention has been conceived to avoid, among others, the disadvantages noted above. Consequently, the primary object of the invention may be stated to reside in the provision of a closure of improved character for grain cars.

Another object is the provision of a door for grain cars which is capable of expediting and facilitating unloading and adaptable to be safely opened with a simple hand implement as the only tool needed.

A further object concerns a door of the character described, the component parts of which are adapted to be used over and over again.

Still another object relates to a grain car door of simple character and of relatively inexpensive construction adaptable easily to existing cars without major alterations.

A still further object provides for a grain car closure which does not interfere with the car sliding doors, is easily put up and removed and which is adaptable to the unloading of the grain contents either in bulk or in bags.

Other objects and advantages of the invention

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will be described, or further pointed out, during the description to follow.

As an example, and for purposes of illustration only, an embodiment of the invention is shown in the annexed drawings, wherein:

Figure 1 is a front view of the closure according to the invention and installed in the door opening of a conventional freight box car, only a portion of which is shown,

Figure 2 is a plan sectional view taken approximately above the middle of the closure,

Figure 3 is a detailed perspective of the closure locking members shown in Figure 1,

Figure 4 is an enlarged elevational view of the trap door embodied in the closure shown in Figure 1 and depicting more particularly the hinging and locking means for said trap door,

Figure 5 is a vertical section taken through the centre of the closure lower panel shown in Figure 4,

Figure 6 is a partial section through the hinge means of the trap door showing, in enlarged detail, the construction of said hinge,

Figure 7 is an horizontal section taken through the operating means for the trap door lock showing the sealing cover in place,

Figure 8 is a front view of the means shown in Figure 7 with the sealing cover removed,

Figure 9 is a perspective view showing a special hopper in place over the trap door for bag-filling purposes, and

Figure 10 is a perspective view of a special hand tool for operating the locking means, and lifting the trap door securing members as shown in dotted lines in Figure 5.

Referring to the drawings, wherein similar reference characters represent corresponding parts throughout, the letter "B" indicates generally a box car having a door opening on both sides thereof, said opening being adapted to be normally closed by the sliding door "D" movable on the rail "R" at the bottom thereof, and suspended on another rail at the top, under the canopy "A." As is usual, said door opening extends between the roof and floor of the car and is bounded on both sides by jamb plates "J."

As shown to advantage in Figure 1, the closure of the invention adapting an ordinary box car to serve as a grain-carrier, consists essentially of a main lower panel 15 and a number of narrower separate panels or boards, such as 16 and 17, disposed above the main panel and extending upwardly across the car door opening, the number of said smaller panels or boards being calculated so that a space is left therebetween and the roof

of the car for convenience in filling said car by means of the modern grain-conveyor compressed-air pipe; in order to reinforce the bottom of the main panel and locate the same accurately against displacement, a bottom sill "S" is secured to the lower edge of said panel and provided with locating pins "P" adapted to enter corresponding apertures formed in the floor boarding "B."

The panels 15, 16 and 17 are preferably made of wood and of dimensions such as to resist effectively the pressure of the grain loaded in the car. Furthermore, they are disposed from the inside of the car, against the door jambs, so as to be tightly pressed thereagainst by the material loaded behind said boards. The retaining members, shown in Figure 3 and indicated generally by the numeral 20, consist of latch members 21 adapted to engage slots 22 formed on the side of the door jambs, said members being operated by a lever 23 formed thereon, both said lever and latch being off set outwardly from a portion 24 which is pivoted to the outer end of the board by means of a rivet or bolt 25.

For the purpose of removing from immediately behind the closure enough grain to cause a reduction of pressure behind the boards and panels, a trap door 30 is provided in the approximate centre of the main panel 15, said door being lockable and removably hinged on said panel through the intermediary of means to be presently described.

The trap door is preferably of elongated rectangular form and adapted to fit snugly in a corresponding aperture of the main panel 15, which aperture is provided with a marginal rabbet 31. The said trap door is normally hinged at the top thereof and swingable outwardly from the main panel 15; as shown to advantage in Figure 5, the door hinges 33 are so designed that the door may be entirely removed and disconnected from the main panel. For that purpose, the upper strap 34 of the hinges 33 is secured to the panel and provided, in the usual manner, with a knuckle 35 carrying the hinge pin. The lower strap 36 of the hinge, which strap is secured to the upper margin of the trap door 30, is formed with hooks 37 instead of the complementary knuckle, so that the lower strap of the hinge may be disconnected from the upper one, or slid away therefrom when the door is angularly elevated, as shown in Figure 5. Consequently, the door can be entirely removed and set aside during unloading operation, if desired. Inasmuch as the hinge just described might not be strong enough to resist the pressure exerted on the door by the grain, a reinforcing plate 40 is provided on the inside of said door, opposite each hinge, said strap being preferably retained to the upper edge of the trap door, and projecting upwardly therefrom, by means of the carriage bolt or the like 41 securing the strap 36 to said door. As an added precaution against bulging of the door in the upper middle thereof, a third strap 43 is similarly disposed at the upper centre of said door and secured by the bolts 44 (see Fig. 4).

The hinged trap door is normally held in closed position by means of wedge cleats 45 pivoted at 38 on the panel 15 and adjacent the lower corners of said trap door. As shown to advantage in Figure 4, the lower end of the wedge cleats is adapted to be received in sockets 46 also secured to the panel 15 and so disposed that when the wedges are engaged in the sockets, the said cleats

shall overlap the lower corners of the door to retain the same in closed position. An additional cleat 47 is also pivoted to the lower centre of the trap door and adapted to enter its corresponding socket 48 on the panel 15. All the wedge cleats mentioned above are provided with right angularly projecting lugs 49 extending outwardly from said cleats and the purpose of which is to facilitate the disengagement thereof from their sockets, this disengagement being preferably effectuated by means of the tool shown in Figure 10, and which comprises a thin bar-like extension 50 projecting outwardly from the body 51. Lateral extensions 52 and 53 are terminated respectively by a hammer-forming enlargement 54 and a socket wrench 55, the purpose of which last will be described later. Referring to Figure 5, it will be seen that the extension 50 being inserted under the lug 49 and the enlargement 54 rested on the floor of the car, downward pressure on the outer end 56 of the tool shown in Figure 10 shall readily lift the cleats from their sockets, without effort, due to the leverage of the said tool.

To prevent unauthorized opening of the trap door, as when a loaded grain car is in transit, locking and sealing means are provided, the lock consisting of elongated bars 60 disposed on the inside of the door and acting as bolts, the ends of which extend below the lower edge of the door, over the lower margin of the trap door opening, so as to effectively prevent the outward displacement of the trap door. The inner end of each bolt bar 60 is secured to a crank-like extension 61, said extension being formed at the inner end of a barrel 62 hollowed-out in the middle and in the centre of which is a square projection 63 extending outwardly, just short of the outer end of said barrel. As shown to advantage in Figures 5 and 7, the barrel is provided with an outer peripheral annular channel 64 into which the halves 65 of a split collar plate 66 are adapted to enter. Inasmuch as the said collar plate is secured to the trap door by the screws 67, the barrel is therefore rotatably retained in place in approximately the centre of the trap door.

The foregoing, taken in conjunction with the showing of Figure 4, should make apparent the fact that whenever the barrel 62 is rotated, the bolt bars 60 will be correspondingly actuated. In order to guide the outer end of said bars properly, guide members 70 are provided on the inside of the trap door, said guides being apertured to receive the outer end of said bolt and provided with outwardly projecting spurs 71 preventing the disengagement of the bolts from the guides. Therefore, the trap door may be locked or unlocked by the simple expedient of rotating the barrel 62, the socket head 55 of the tool 51 being especially adapted for this purpose since the square socket formed at the end of head 55 is calculated to fit exactly over the square projection 63.

The sealing means already mentioned are essentially composed of a shallow square cover 80 pivoted to a strap 81 secured to the door, which cover is adapted to be swung over the outer end of the barrel 62 so as to conceal the same, the said cover being retained in closed position by means of a hook 82 or the wire-seal 83 shown in dotted lines in Figure 7; both said hook and seal being insertable under a staple 85 which is adapted to project through a slot formed in an extension 86 of the cover.

From the foregoing description, the unloading of a grain car equipped with the present closure should be evident: assuming that the car is fully loaded and the closure sealed as usual, the first step is the breaking of the seal and the opening of the cover 80 in order to permit operation of the trap door lock by means of the special tool. Once the bolt bars 60 have been retracted, the door may be opened, as shown in Figure 5, by means of the tool 51 used to remove the wedge cleats from their respective sockets. Thereafter, the door will open of its own accord, due to the pressure of the grain, but in such a manner that physical injury resulting from this opening is very unlikely. The trap door being opened, enough of the grain should be removed from the car, immediately behind the closure, so that after a very short time the upper panel 17 may be removed easily by hand, as well as the lower panel 16, as soon as said panels are free from internal pressure. The main panel 15 may be removed later on and access to the rest of the grain in the car gained very shortly for unloading purposes by hand or with mechanical apparatus.

The closure of the invention is easily adaptable to the filling of grain bags, as shown in Figure 9, wherein a conical hopper 90, open on one side, is adapted to be removably secured against the main panel by means of hooks 91 adapted to enter the eyes 92 bolted to the panel. As illustrated, said hopper is of a size conforming very substantially to that of the door, so that said door, when in open position, may constitute the top of the hopper to prevent loss of grain. Furthermore, the hopper itself is open at the top, so that the trap door 30 may be operated easily even after the hopper has been installed on the panel 15. Finally, the hopper is terminated at the bottom by a square pipe or the like 95 in which a sliding valve 96 is disposed for regulating, or entirely interrupting, the flow of grain therethrough. In use, the bags are simply disposed below the pipe 95 and the valve 96 operated until said bags have been filled. Thus, according to the invention, it would be a simple and economical matter to empty a load of valuable grain, for instance, into bags or other containers, for distribution of said load in small quantities. Obviously, with the hopper described above, the filling of said bags can be quickly effectuated with the minimum loss of material being loaded.

From the foregoing, it will be evident that the present invention is an advance of the art in that it permits transforming an ordinary box-car into a carrier for grain, said transformation being effectuated by means of an improved closure for the door opening of the car, said closure having pressure releasing means at the bottom thereof rendering unnecessary the prying or otherwise loosening of the closing panels, as is the usual custom. Due to the fact that the grain is released from a small area, the pressures encountered are consequently reduced and the operation

of the pressure releasing means can be effectuated without danger to operator and damage to the constituent elements of the closure. Furthermore, according to the invention, it is contemplated to use special means for securing the closure in place and for locking and sealing the pressure releasing means. Again, an hopper device is adaptable to the releasing means for conveying the released material in such a way that it may be quickly, conveniently and economically loaded into bags or like small containers.

As material advantages resulting from the above, may be stated:

1. The overlapping joints prevent loss of grain and should cause a reduction of insurance rates;

2. The closure being easily removable and usable again will prevent broken panels and boards on every car handled, while the saving in time and labour represents less delay in unloading cars and a faster release of said cars.

It must be understood that various changes as to the size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claim.

Having thus described our invention, we claim:

Trap door locking means comprising guide members adapted to be fastened on the inside of said door, elongated bars slidable through said guide members to project at their outer end from the edge of said door, a crank-like member to which said bars are pivotally secured at their inner end, a barrel secured to said crank-like member and extending through said door, said barrel hollowed out in the middle and forming in said hollow a central square projection, said barrel further provided with an outer peripheral channel, and a split collar plate engaging said channel and adapted to be secured to said trap door.

FRANCOIS XAVIER OUELLET.
ALEXANDRE DORION.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
197,552	Hinck	Nov. 27, 1877
309,601	Broughton	Dec. 23, 1884
596,050	Byrnes	Dec. 28, 1897
678,701	Tuor	July 16, 1901
695,165	Miller	Mar. 11, 1902
720,289	Scott et al.	Feb. 10, 1903
875,047	Bursik	Dec. 31, 1907
942,551	Driskell	Dec. 7, 1909
991,344	Minor	May 2, 1911
1,172,320	Tholstrop	Feb. 22, 1916
1,566,236	Skurdal	Dec. 15, 1925
1,707,064	Martin et al.	Mar. 26, 1929
1,721,112	Hake	July 16, 1929