

C. MOORE.
GRAIN CAR DOOR.

APPLICATION FILED MAR. 3, 1911.

Patented Jan. 9, 1912.

2 SHEETS—SHEET 1.

1,014,246.

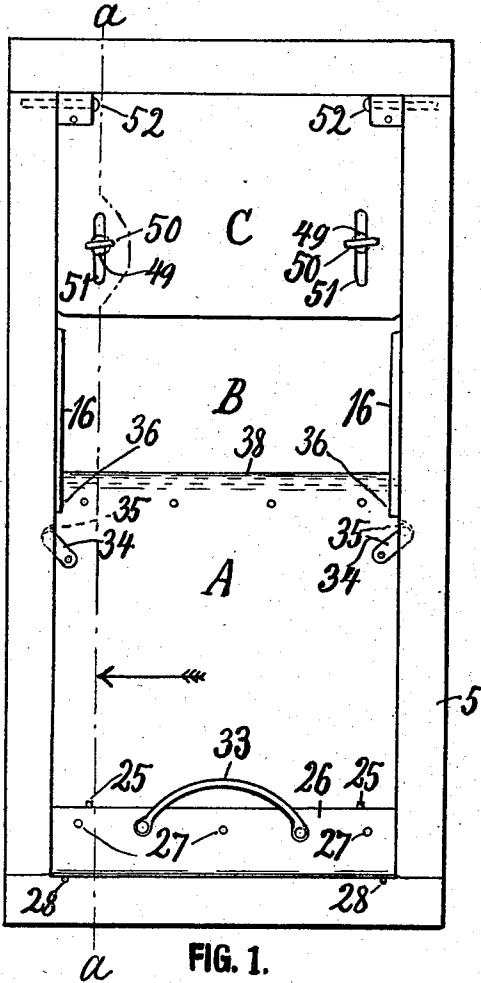


FIG. 1.

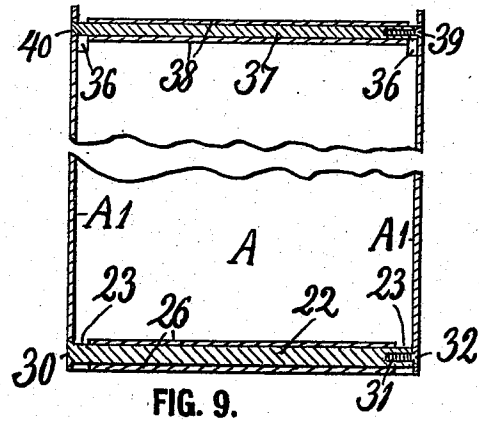


FIG. 9.

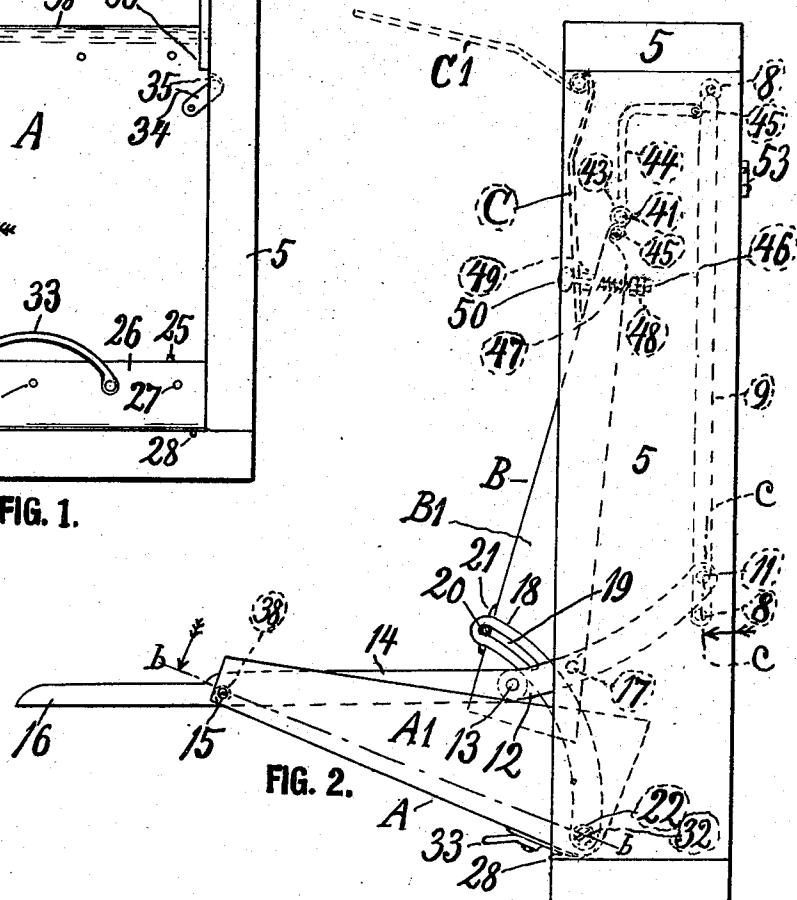


FIG. 2.

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Calvin Moore.
BY his ATTORNEY:
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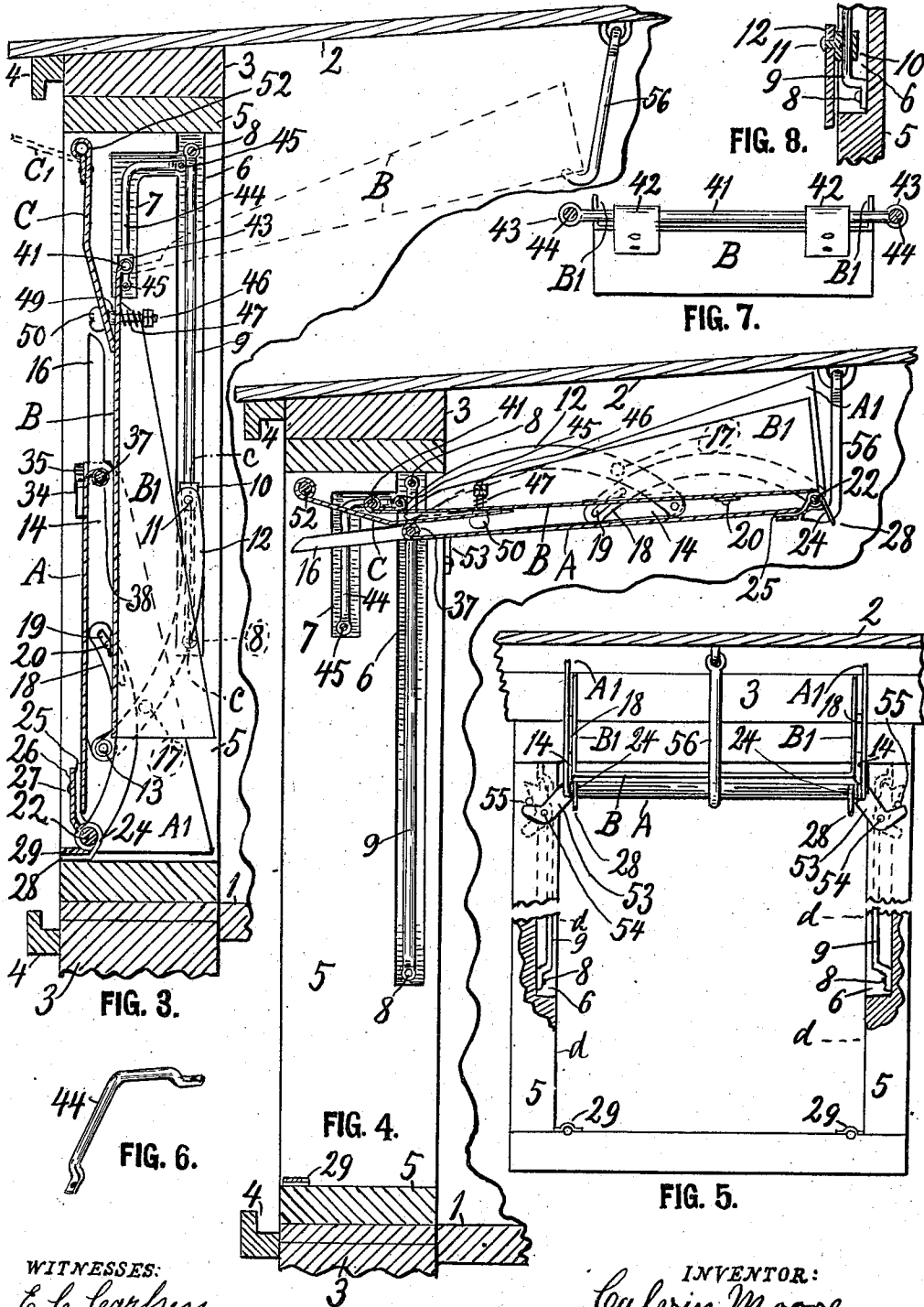
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WITNESSES:
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A. C. Carlsen

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UNITED STATES PATENT OFFICE.

CALVIN MOORE, OF PROVIDENCE, IOWA.

GRAIN-CAR DOOR.

1,014,246.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed March 3, 1911. Serial No. 612,154.

To all whom it may concern:

Be it known that I, CALVIN MOORE, a citizen of the United States, residing at Providence, in the county of Harden and State of Iowa, have invented a new and useful Grain-Car Door, of which the following is a specification.

My invention relates to grain-doors for railway cars, and the object is to so improve the grain door described in my United States Patent No. 879,976, that the same will become more efficient and easier to operate and cheaper to make.

In this as in said former patent the general object is to provide an efficient inner door for cars hauling grain, and to make such door foldable out of the way when not needed, and also convertible into a chute for loading and unloading stock. The door is made in three sections, an upper, a lower and a middle section, all hinged in the door frame to normally overlap each other.

In the accompanying drawing,—Figure 1 is an outside elevation of my improved grain door in closed position in the door frame of a car. Fig. 2 is an edge view of the door and frame shown in Fig. 1 with the lower section of the door folded outward and the middle section held partly outward with its lower end. Fig. 3 is a sectional view on the line *a—c* Fig. 1, and the adjacent portion of a grain car also in section. Fig. 4 is about the same as Fig. 3 only that the door sections are folded away in idle position in under the roof of the car. Fig. 5 is a vertically shortened and partly sectional inside elevation of the door frame and portion of the car above it and the door in idle position the same as in Fig. 4. Fig. 6 is a perspective detail view of one of the guides 4 4 in Figs. 2, 3 and 4. Fig. 7 is a top end view of the middle section of the door and the guides 4 4 in cross section. Fig. 8 is a section on line *c—c* Figs. 2 and 3, looking from right to left; the frame portion to the right in Fig. 8 representing the frame portion *d—d* in either the right or left side of Fig. 5. Fig. 9 is a section on the line *b—b* Fig. 2.

Referring to the drawings by reference numerals and letters, 1 designates the floor, 2 the roof and 3 the side of a grain car, which may have guides 4 or other means for holding the regular outer door, (not shown).

In the door opening of the car my improved door is mounted in the door frame 5, which may represent either the regular door

frame or a special frame provided for the purpose. In either case the upright posts or members of the frame are each provided with a long vertical groove 6 and a shorter curved groove 7 (see Figs. 3 and 4). In each groove 6 are secured at 8 the ends of a guide-rod 9, which near its ends is offset from the bottom of the groove, so that on said rods may slide freely two short sleeves 10 (see Figs. 3 and 8), to each of which is pivoted at 11 one end of a segmental link 12; the other end of the link is pivoted at 13 to the end of a flat lever bar 14, so termed because it is fulcrumed at 15 to the upper corner of the lower door section A, and although acting as a link, it is also sometimes used as a lever, it having a portion 16 extending beyond the fulcrum and serving as a handle. The inner end of the pivot 13 forms a stud, between which and another stud 17, fixed in the link 12, is loosely guided a curved link 18, whose upper end has a slot 19, engaging a lateral stud 20, that has a flat portion 21 secured upon the outer side of a middle section, B, of the door (see Fig. 2). The lower ends of the links 18 are pivotally placed upon the ends of a shaft 22, in the notches 23 in Fig. 9. In said notches are also placed upon the shaft wire springs 24 (see Figs. 3 and 4), having their upper ends secured between the sheet metallic door section A and the overbent end 26 of same (see Figs. 1 and 3), which after being taken around the shaft 22 is riveted at 27 to the section. The lower ends 28 of the springs are removably inserted in sockets 29 fixed on the sill of the frame. The slotted links 18 may also be detached from the studs 20 by springing them outward beyond the ends of the studs.

As shown in Fig. 9, the shaft 22 is formed with a head 30, countersunk into one of the angular flanges *A*¹ of the section A, and the other end has a screw 31 with a head 32 countersunk into the other flange *A*¹, so that the section A is free to swing in and out in the frame opening as soon as the springs 24 are detached from the sockets 29; but when in said sockets the springs assist in raising the section A from the outwardly inclined position to the vertical or closed position shown in Figs. 1 and 3. The springs also, in combination with the bar or shaft 22 give the section A a hinged connection with the door sill.

33 is a hand-hold on the section A for

taking hold of when the springs are to be inserted in or pushed out of the sockets 29. In Fig. 1 said section A is also shown as provided with pivoted catches 34 adapted to lean into side pockets 35 in the frame, as an extra precaution against accidental opening of the door, other means holding it closed, as will presently be more fully described.

In Figs. 1 and 9 the notches 36 in the section A are for the reception of the levers 14 upon the shaft 37; said shaft is secured by a screw 39 in one end and a countersunk head 40 of a screw in the other end of the shaft, and the sheet metal taken around it at 38, so that this shaft, like the shaft 22 in said section, may be readily removed for repair of same, or of any part mounted thereon.

The middle section B is also made of sheet iron, with angular side flanges B¹. The upper end of this section is journaled on a shaft 41, (see Figs. 1, 2 and 7), by journals 42; the ends of the shaft is formed with eyes 43, which are loosely fitted on the curved guide bars 44, (best shown in Fig. 6), having their ends secured at 45 in the grooves 7. Near the upper end of said section B are loosely inserted two bolts 46, each of which is encircled by a partly compressed coil spring 47, which is held between the door section and one or two nuts 48, secured tightly on the bolt; the outer end of each bolt has a shoulder or collar 49, bearing against the outer side of the section and provided with a flat thumb-head 50, which, as shown in Fig. 1, is adapted to pass through a slot 51 in the door section C, and when turned across said slot will connect sections B and C, together. Said section C consists of a curved sheet of metal having its upper end hinged by pintles 52 in the upper corners of the frame.

Within the car are pivoted at 54 on the door frame two L-shaped catches 53 (see Fig. 5), which when their short arms rest against pins 55 will support on their long arms the outer end of the section A when all the sections are folded away inward to the idle position shown in Fig. 4, with the inner end of section A supported by a hook 56, suspended from the roof of the car. In said view it will be noted that the shaft 41 of section B is moved with its ends upon the upper and horizontal portions of guides 44; the lever 18 having their slots 19 removed from studs 20, and the sleeves 10 being moved as high as possible on the guide bars 9, the links 12 and the lever bars 14 will hold section A so far into the car that the handles 16 will clear the passage of the outer car door (not shown) in the guides 4. It will also be noted that with the sections A and B in the position just described, the section B rests on section A, and section C fits snugly between them, es-

pecially as the yielding of the springs 47 favors the adjustment of the sections in the folding. When the door is removed from said folded position for use, and the car is to be filled with grain, the sections A and B are placed in the position shown in full lines in Fig. 3, and section C is swung outward as indicated in dotted lines C¹ in Figs. 2 and 3, and the spout or chute of the grain elevator is inserted in the portion of the door opening above section B. When the car is full enough, the section C is closed and secured by the thumb pieces 50. When the car is to be unloaded, the catches 34 are disengaged from the frame, and by pulling outward on the handles 16, the section A is brought to the outward position shown in Fig. 2, and the section B is by the pressure of the grain, and the stud 17 pressing on the link 18, swung outward with its lower end to the inclined position shown in Fig. 2, where it is held by the links 18 and studs 13 and 20. The grain is then shoveled or scooped from the section A until the grain gets so low in the car that it has to be shoveled out to and upon said section A; then, to get more light into the car and to give more room for such shoveling, the section B is detached from the studs 20 and supported by the hook 56, as shown in dotted lines B in Fig. 3, with or without moving the shaft 41 upon the horizontal arms of the guides 44. If moved upon said arms, the section C may remain connected with section B, but otherwise not. When the car is fully unloaded, and thus no grain rests on section A, the springs 24 will raise the section to vertical position, especially if slightly assisted by a touch of the hand. If the car is soon to be loaded again with grain, the sections B and C may be brought to their downward position and the links 18 placed on the studs 20 before section A is closed. The peculiar arrangement of the levers 14 and links 12 and 18 is such that the pressure of the grain against the door has little or no tendency to open it, because the section B, which sustains the greatest pressure, is resisted by the studs 20 and links 18, and the latter bear against the studs 13 and levers 14, and said studs 13, when the sections are closed, are so near down to the hinged end of the section A that the outward swinging tendency on the latter is counterbalanced by the inward tendency of the springs 24; still the catches 34 may be used for greater safety. The counterbalancing of the pressure stated is however a great advantage in rendering it easy to turn the catches and open the door. The studs 17 in links 12 also serve to hold the section B in the proper proximity to section A, and to prevent section B from swinging to and from section A when the car is swaying while in motion.

What I claim is:

1. The combination with a car body having a door opening, of a door frame in the opening and provided with a vertical groove in each of its upright members, a guide bar in each of said grooves and having its ends offset toward and secured to the bottom of the groove, a sleeve sliding on each guide, the two segmental links 12, having each one end pivoted to one of the sleeves; the door section A hinged to the bottom end of the frame and having angular side flanges extending inward in the frame, a lever pivotally mounted in each upper corner of the door section to fold within the side flanges, said levers having each one end pivotally connected with the outer ends of said segmental links.

2. The combination with a car body having a door opening, of a door frame in the opening and provided with a vertical groove in each of its upright members, a guide bar fixed at its ends in the ends of the groove, a sleeve sliding on each guide bar, the two curved links 12, having each one end pivoted to one of the sleeves; the door section A hinged to the bottom end of the frame and having angular side flanges directed into the frame opening, a lever pivoted in each upper corner of the door section and foldable at the inner side of each side flange, said levers having each one end pivotally connected with the outer end of one of the links; said door section being detachably hinged to the frame, means for suspending the hinged end of the section from the roof of the car when it is detached from the frame, and means on the frame for supporting the other end of the section in the upper end of the frame, the sliding sleeves permitting the latter position of the section in the frame.

3. The combination with a car body having a door opening, of a door frame in the opening and provided with a long vertical groove in each of its upright members, a guide bar fixed at its ends in the ends of the groove, a sleeve sliding on each guide bar, the two curved links 12, having each one end pivoted to one of the sleeves; the door section A hinged to the bottom of the frame and having angular side flanges directed into the frame opening, a lever pivoted in each upper corner of the section and foldable at the inner side of each side flange, said levers having each one end pivoted to the outer end of one of the curved links;

said door section being detachably hinged to the frame, means for suspending the hinged end of the section from the roof of the car when it is detached from the frame, and means on the frame for supporting the other end of the section in the upper end of the frame, the sliding sleeves permitting the latter position of the section in the frame; said grooved members of the frame having also shorter grooves with the short angular guides 44 secured therein, the horizontal shaft 41 having at its ends eyes slidable on said angular guides, the second door section, B, normally suspended in overlapping position at the inner side of section A and having its upper end journaled to the shaft 41, said section B having the angular side flanges B¹ and the studs 20 at the outer edges thereof, the curved links 18, having each in its upper end a slot detachably engaged with said studs and the lower ends pivotally connected with the lower corners of the section A, two studs on each link 12 arranged to guide the links 18 when the latter are engaged with the studs 20, said detachable hinging of the lower end of section A involving springs tending to raise said section from an inclined to an upright position when hinged.

4. The combination with a car body having a door opening, of a door frame in the opening, a door hung in the frame and comprising three partly overlapping sections, one section being hinged at its lower end in the lower end of the frame, the second section hinged with its upper end more than half way up in the frame, and the third section hinged with its upper end in the upper end of the frame and having two vertical slots; two bolts loosely inserted in holes in the second section and having at the inner ends nuts, and between said nuts and the section partly compressed springs, the outer ends of the bolts having each a shoulder bearing against the section and forming necks adapted to turn in the slots of the top section, said necks having each a flat thumb head adapted to slip through the slot and to engage the outer side of the top section when turned across the slot, substantially as and for the purposes set forth.

In testimony whereof I affix my signature, in presence of two witnesses.

CALVIN MOORE.

Witnesses:

I. E. SEWARD,
P. M. BROWN.