V. S. BAUDER.

SILO AND DOOR THEREFOR.

APPLICATION FILED NOV. 10, 1915.

1,243,129.

Patented Oct. 16, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

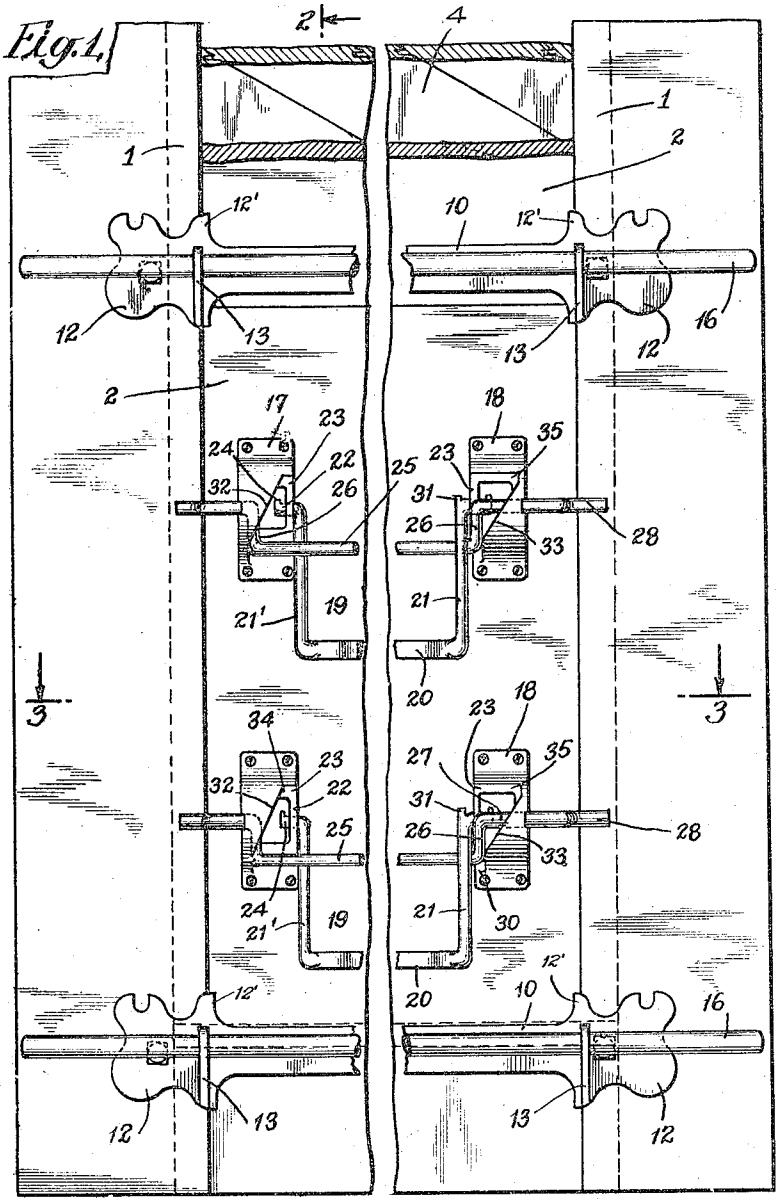


Fig. 2.

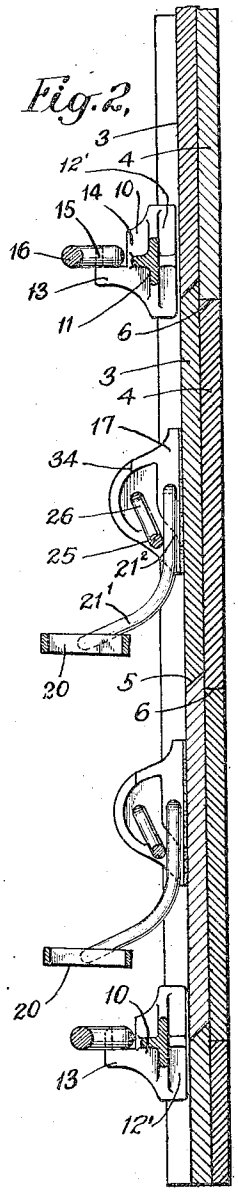
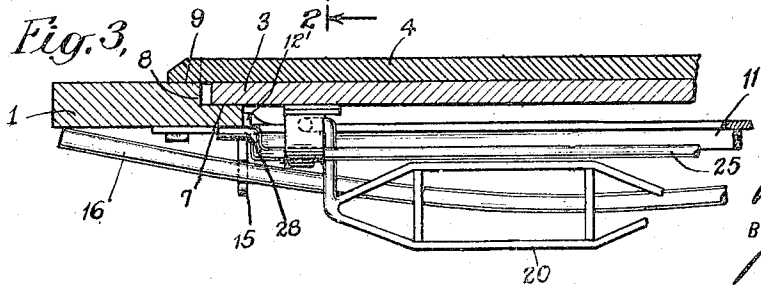


Fig. 3.



INVENTOR

V. S. Bauder

BY

J. C. Edwards

ATTORNEY

V. S. BAUDER.

SILO AND DOOR THEREFOR.

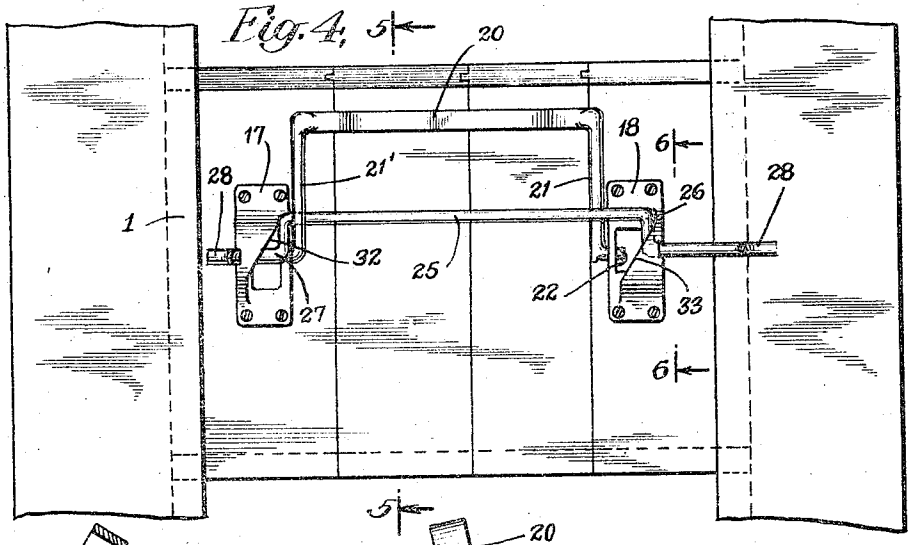
APPLICATION FILED NOV. 10, 1915.

1,243,129.

Patented Oct. 16, 1917.

2 SHEETS—SHEET 2.

Fig. 4.



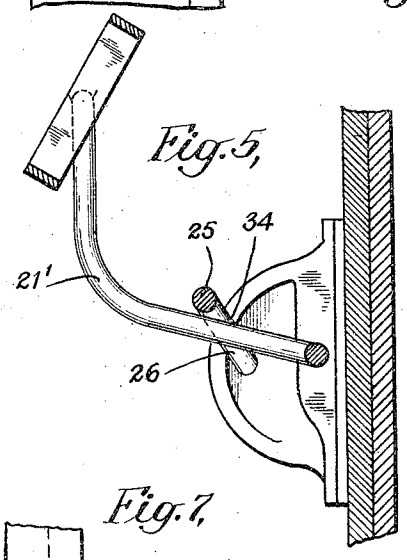


Fig. 5.

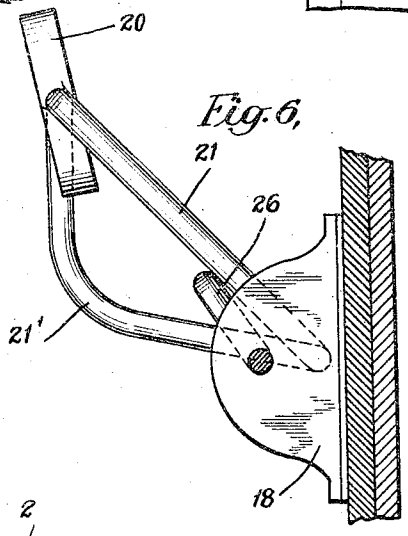
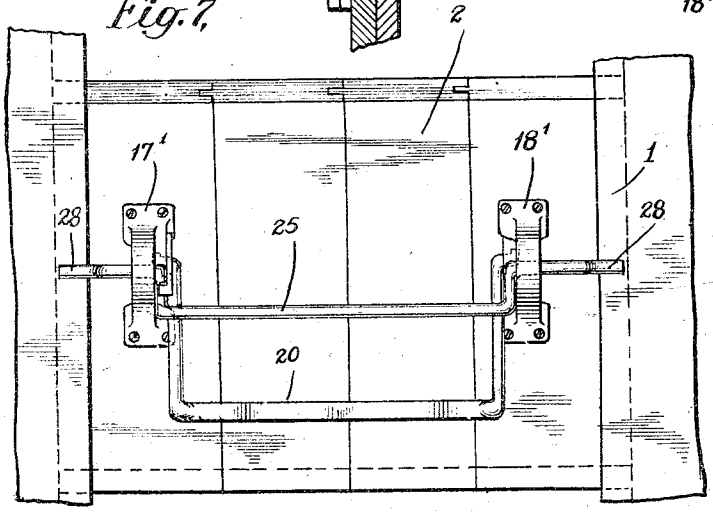


Fig. 6.

Fig. 7.



INVENTOR

V. S. Bauder

BY

J. C. Edmunds

ATTORNEY

UNITED STATES PATENT OFFICE.

VICTOR S. BAUDER, OF FORT PLAIN, NEW YORK.

SILO AND DOOR THEREFOR.

1,243,129. Specification of Letters Patent. Patented Oct. 16, 1917.

Application filed November 10, 1915. Serial No. 60,644.

To all whom it may concern:

Be it known that I, VICTOR S. BAUDER, a citizen of the United States, residing at Fort Plain, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Silos and Doors Therefor, of which the following is a specification.

My invention relates to an improved construction for silos, the doors therefor and devices for securing the doors in position, and furnishing steps for a ladder by which the silo can be ascended when the doors are secured in position.

Among the features of my invention may be mentioned the construction of the brace members and hoops, whereby inward and outward strains on the frame members are resisted by the hoops, and the formation of the doors and manner of seating the same to provide a two-surface bearing. A main feature also consists in the means for securing the doors in position and forming steps, the step members being separate from, and arranged to actuate, the door-securing members.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings forming part of this application and illustrating certain embodiments of my invention. In the drawings, Figure 1 represents a partial front elevation of a silo doorway and doors therein, Fig. 2 represents a vertical cross-section taken on line 2—2 of Fig. 1, Fig. 3 represents a horizontal cross-section taken on line 3—3 of Fig. 1, Fig. 4 represents an enlarged front elevation of one of the doors, the step member being raised and the door securing member laterally retracted out of operative position, Figs. 5 and 6 are vertical cross-sections taken respectively on lines 5—5 and 6—6 of Fig. 4, to an enlarged scale and Fig. 7 is a front elevation similar to Fig. 4, of a modified construction, with the parts shown in lower or operative position.

Referring to the drawings, the silo is represented as having door frame or jamb members 1, 1, the doors 2, 2 being mounted vertically in the doorway opening. Each door is formed of a front portion 3 and a rear portion 4, the front portion being formed of boards having vertical grain and the rear portion of boards having grain at an angle to that of the front portion, preferably diagonally to the grain of the front portion. Preferably, the upper and lower edges of the front portions are beveled, as is shown at 5, and the upper and lower edges of the rear portions of the doors are square cut, as is indicated at 6. At the top of each door, the beveled front portion extends above the horizontal upper edge of the rear portion to form a shoulder, the lower edge of the next door above being correspondingly formed to seat therein, with the lower edge of the rear portion extending somewhat below the beveled lower edge of the front portion.

The door frame or jamb members 1 are provided at the rear edges thereof adjacent the door opening with square cut vertical slideways or cut-outs, having front surfaces 7 and side surfaces 8, as is indicated in Fig. 3. The front portions 3 of each door rest in the vertical cut-outs with their front surfaces at the sides thereof contacting the surfaces 7 of the cut-outs, while the rear portions 4 of the doors are of greater width than the front portions, so as to overlap the same at the edges, and rest in contact with the rear surfaces 9 of the door frame members. Space is preferably left between the side edges of the front portions 3 of the doors and the edges 8 of the cut-outs, to provide for any swelling of the planks which may take place.

By the arrangement described, a double bearing is provided for each door, as is indicated at 7 and 9, whereby the strains in the frame and door members are distributed, while at the same time extremely rigid doors are provided. For greater rigidity also, as stated, the grain of the rear portion of the door should be at an angle to the grain of the front portion. By making the rear graining diagonal, instead of horizontal, the likelihood of the lower edge of the rear portion of each door splitting or breaking, because of the outward pressure against the beveled upper edge of the front portion of the next lower door, is diminished. The diagonal arrangement of the planking in the rear door member is shown at the top in Fig. 1, the front portion of the door at this point being broken away. The grain of the front members of the doors is preferably vertical to prevent splitting of the same at the top and bottom edges.

I position a number of brace members across the doorway opening to form a rigid door frame, each brace member preferably

comprising a metallic casting or frame 10, having for the sake of rigidity, a T-shaped or angular portion 11 extending outwardly from the plane of the front faces of the door frames. The web portions 12 of the braces are secured to the door frame members at each side of the door opening.

Lugs 13 are formed integral with each brace member 10 at each side of the door opening, extending outwardly in front of the spider or angular construction 11 of the brace. Each lug 13 is formed with a recess, open at the top, the inner and outer walls of each recess being formed of upwardly directed shoulders 14 and 15. The metallic hoops 16 extend around the silo and are supported in the recesses referred to between the inner and outer shoulders 14 and 15, the upper surfaces of the hoops thus supported being in substantially horizontal alinement with the top outwardly extending surface of flange 11. The hoops fit closely between shoulders 14 and 15 and resist inward or outward strains on the door frame members as either the shoulders 15 or 14 press against the hoops. Each hoop may be connected together by turnbuckles or other known construction.

The ladder and door securing devices will now be described. A pair of lugs or metallic castings 17 and 18 are secured in alinement on the face of each door. The step member 19 is approximately U-shaped, having its bottom horizontal portion 20 formed with a wide, flat construction, to form a tread. This is preferably of spider construction, as is shown in Fig. 3. The vertical arms 21 of the step member are bent horizontally outward at their upper ends, as is shown at 22, and are journaled in lugs 17 and 18. Preferably these lugs are made hollow as is shown and the horizontal portions 22 of the step member extend through alined horizontal openings in the inner flanges 23, 23 of lugs 17 and 18. The horizontal end portions 22 of the step member are preferably formed with upset or offset ends 24 on the outer sides of flanges 23 to prevent the same being sprung from their bearings.

Each door securing member comprises a rod bent to what may be termed a flattened U-shape having central horizontal portion 25, vertical portions 26 at the ends of portion 25, and horizontally directed portions 27 extending outwardly from the ends of vertical portions 26. Portions 27 extend through horizontal openings in the outer portions of lugs 17 and 18, which openings constitute journal bearings for arms 27. The outer ends of horizontal portions 27 are bent or offset, as is shown at 28, to form what may be termed cranks or cam portions. When step member 19 and door securing member 25 are in their lower positions, the cranks 28 press tightly against the front faces of the door jamb members 1 to hold the door closely seated against surfaces 7 and 9 of the door frames, as is shown in Fig. 3. When, however, members 19 and 25 are swung upwardly, cranks or cam portions 28 are swung away from the faces of the door frames, so that the doors may be moved or taken out as will be described.

Step member 19 is arranged to move securing member 25 with it both upwardly and downwardly when the step member is swung about its journal bearings. To attain this object the vertical arms of the step member are offset in relation to each other, the right hand arm 21, referring to Figs. 1 and 4, passing over the horizontal portion of securing member 25, when the members are in their lower position, and the left hand vertical arm 21′ passing under the horizontal portion of member 25. To accomplish this, the arm 21 is made straight, while arm 21′ is curved, as shown in Figs. 5 and 6, arm 21 resting upon the horizontal portion of member 25 which latter rests upon the arm 21′ when the parts are in lower position. When the members are thus arranged, the cranks, or offset or cam portions 28 of the securing device, are held closely pressed against the door jambs, the throw of the cranks being so chosen in relation to the distance between the journal bearings of the securing member 25, and the face of the door, as to insure the door being held firmly against its seat when cranks 28 are directly in line with the door jambs. In this position, the arm 21′ of the step member has a vertically disposed portion 21^2 bearing directly against the face of the door, while the right hand vertical arm 26 of member 25 is supported on a slanting surface 30 of the right hand lug 18. The door is thus held in locked position by the pressure of arm 21 of the step member upon the securing device. This pressure is due to the weight of the step member and is increased when step 20 is trod upon by one climbing the ladder.

When it is desired to unlock the door, step member 19 is swung into the raised position shown in Fig. 4, arm 21′ pressing against the horizontal portion of member 25 to carry the same into raised position likewise. The end of arm 21, adjacent its journal bearing, may be provided with a rounded heel or projection 31 to roll upon the face of the door and relieve the strain upon the journal bearing of the step member during such pivotal movement of the step member. When the parts are in this raised position, in which they are held by gravity, cranks 28 are swung away from the door jambs, so that the door may be moved or opened.

In the preferred form of my device illustrated in Figs. 1 to 6 of the drawings, means are provided for automatically shifting the

door securing member laterally when the same is raised into unlocking position, so as to enable the crank 28 at one side to clear the adjacent edge of the door opening. Such lateral moving means comprise vertical cam surfaces 32 and 33 formed on lugs 17 and 18 respectively. When the step member and securing member are swung upwardly, the left hand vertical arm 26 on member 25 moves in contact with cam surface 32, moving member 25 laterally in its journal bearings into the position shown in Fig. 4, in which the left hand crank 28 clears the edge of the adjacent door frame 1. In this position, the securing member is seated at the junction of horizontal portion 25 and the left hand vertical portion 26, against the slanting shoulder 34, on the left hand lug 17, while the right hand arm 26 may rest upon a corresponding inclined seat 35 on the casting 18. When the members are again swung into lower or locking position, cam 33 on lug 18 engages the right hand vertical portion 26 of the door locking member to move the latter laterally to the left into the engaging position shown in Fig. 1.

When the parts are in the position shown in Fig. 1, the door may readily be removed from its seat by moving the left hand edge of the same rearwardly until the rear of the adjacent frame member 1 is cleared, when the door may be moved to the left sufficiently to enable the right hand crank 28 to clear the adjacent door frame member 1.

The modification shown in Fig. 7 of the drawings is the same as that described above, except that no provision is made for shifting the door securing device laterally. The lugs 17′ and 18′ secured to the door are therefore not provided with the cam surfaces 32 and 33, and neither crank 28 clears the edge of the adjacent door frame when the parts are in raised position. In this instance, the door may be removed from its seat because of the fact that the throw of crank 28 is greater than the depth of the vertical cut-outs in which the front portion 3 of the door is adapted to seat. In this case, it is also necessary that the distance between one of the lugs 17′ and 18′ from the adjacent edge of the door is greater than the distance by which the crank on the opposite side extends over the adjacent door frame member. The parts being in raised position, one edge of the door, for example, the left edge, is pressed rearwardly until the adjacent crank 28 contacts the front of the door frame member, when the adjacent edge of the front portion 3 of the door will be to the rear of the rear surface 9 of the frame member. The door may then be moved to the left, with the left hand edge of portion 3 of the door moving behind the portion 9 of the door frame and the left hand crank 28 moving in front of the door frame until the end of the right hand crank 28 clears the inner edge of the adjacent frame member 1, whereupon the right hand edge of the door is moved rearwardly until the right hand crank 28 is to the rear of the right hand door frame, upon which the whole door may be moved to the right behind the right hand door frame until the left hand crank 28 clears the front edge of the adjacent frame member 1.

A feature of my invention, in addition to those previously noted, is found in the fact that the hoops and braces are so arranged as to serve as step means, in addition to the members 19. Thus if some of the doors are moved out of position, or are removed, a brace 10 together with the hoop 16 carried thereby will serve as a step, a broad foothold being provided by the horizontal flange of spider 11, and the hoop 16 in front of, and in alinement with, the same. Or, if all the doors are taken out, the distance between braces 10 is not too great to prevent the same being used as a ladder. By the means described, the weight and cost of braces 10 is reduced, in comparison with braces adapted to act alone as footholds, while the combination of the braces with the hoops forms an exceedingly rigid structure, which is also adapted to serve as step means, as stated. It should also be noted that shoulders 12′ on braces 10, which shoulders engage the inner surfaces of the door jambs, as shown in Figs. 1 and 3, resist strains tending to collapse the frame members 1 in the direction of the door opening, if the hoops should be adjusted too tight.

Having now particularly described my invention, what I claim and desire to protect by Letters Patent is as follows:

1. In a silo, the combination of door frame members, having a door opening between the same, a series of doors fitting in said opening, and step and door-securing instrumentalities carried by each door, comprising a pair of alined lugs, having two pairs of horizontal openings therein, a U-shaped step member, having upper ends bent outwardly and journaled in one pair of said openings, and a second U-shaped member, the upper ends of which are bent outward to extend through and be journaled in said second pair of openings, the horizontal central portion of said member extending under and over the vertical arms, respectively, of said step member, when the latter is in lower position, and the outer horizontal arms of said second member having offset portions positioned to tightly engage the faces of said frame members, when said step member is in lower position, substantially as set forth.

2. In a silo, the combination of door frame members, having a door opening between the same, a series of doors fitting in

said opening, and step and door-securing instrumentalities carried by each door, comprising a pair of alined lugs, having two pairs of horizontal openings therein, a U-shaped step member, having upper ends bent outwardly and journaled in one pair of said openings, and a second U-shaped member, the upper ends of which are bent outwardly to extend through and be journaled in said second pair of openings, said second member having an offset portion positioned to engage one of said door frame members when said second member is in lower position, and one of the arms of said first member being positioned to bear inwardly and downwardly on said second member, when said first member is in lower position, substantially as set forth.

3. In a silo, the combination of door frame members, having a door opening between the same, a series of doors fitting in said opening, and step and door-securing instrumentalities carried by each door, comprising a pair of alined lugs having horizontal openings therein, and oppositely directed cam surfaces thereon; a substantially U-shaped bent rod having ends extending through and journaled in said openings, shoulders, and an offset central portion; and a pivoted U-shaped step device, positioned to contact and swing said rod about its journals as it moves up and down about its pivot; said cam surfaces being positioned to coact with said shoulders, to shift said rod laterally toward and away from one of said door frame members as said step device swings said rod about its journal, substantially as set forth.

4. In a silo, the combination of frame members, having a door opening between the same, a door fitting in said opening, lugs carried by the door, having horizontal openings therein and cam surfaces thereon, and a pair of U-shaped members having horizontal ends journaled in said openings, one of said members having its central portion adapted to form a step, and the other having its horizontal end portions adapted to press against the fronts of the frame members, when it is in operative position, to secure said door in position; said members being so positioned that pivotal movement of said step member up or down swings said door-securing member up or down, out of or into operative position, and said cam surfaces being positioned to coact with portions of said securing member, to shift the same to one side, when it is swung upwardly, to cause one horizontal end thereof to clear a frame member, and to return the same, when it is swung downwardly, to carry said end over the frame member, substantially as set forth.

This specification signed and witnessed this 8th day of November, 1915.

VICTOR S. BAUDER.

Witnesses:
BYRON E. FOKE,
JOHN L. COSMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."