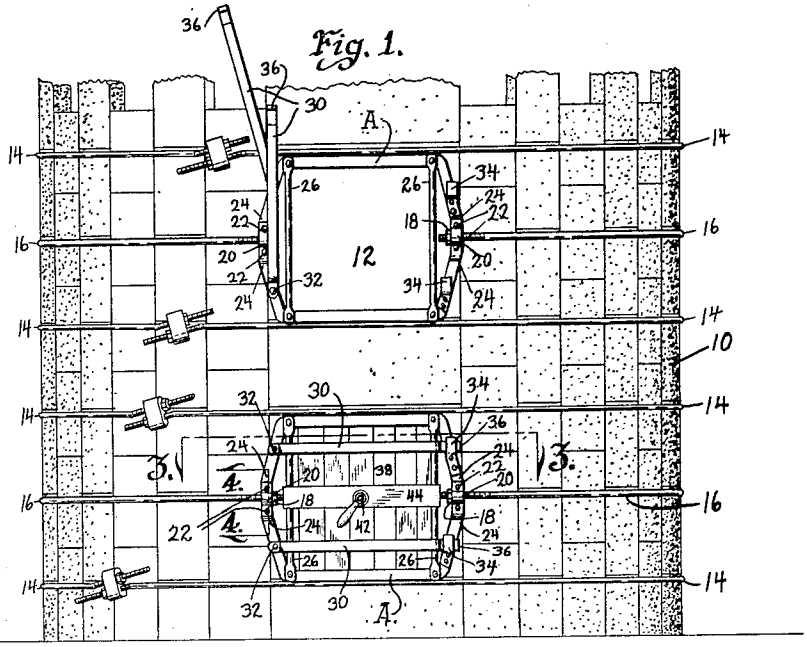
June 23, 1931. S. E. ANDERSON 1,811,486

SILO DOOR FRAME AND LADDER CONSTRUCTION

Filed Dec. 18, 1929

Fig. 1.



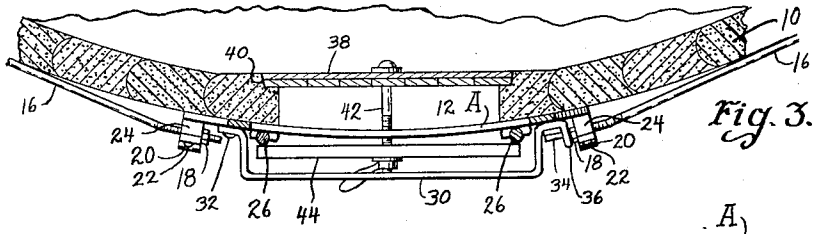
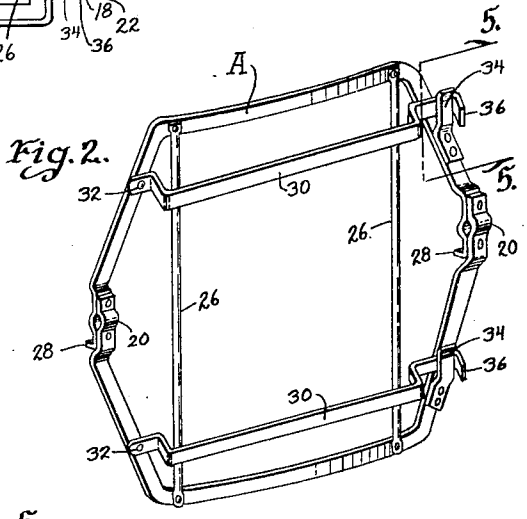


Fig. 3.

Fig. 2.



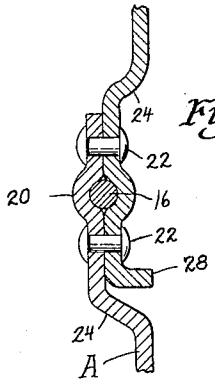


Fig. 4.

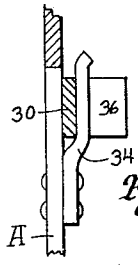


Fig. 5.

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UNITED STATES PATENT OFFICE

SIGURD E. ANDERSON, OF DES MOINES, IOWA

SILO DOOR FRAME AND LADDER CONSTRUCTION

Application filed December 18, 1929. Serial No. 414,963.

The object of my invention is to provide a silo door frame and ladder construction of simple, durable and comparatively inexpensive construction.

Another object of my invention is to provide a door frame for silos consisting of a substantially rectangular frame member with eyelets at the sides thereof to which the ends of a silo rod may be connected, a pair of thrust bars extending vertically from the bottom of the frame member to the top thereof.

Another object is to provide the frame member of flat bar material with the eyelets formed by riveting the ends of the bars together with portions of the contacting parts of the bars being bent away from each other for forming the eyelets, the bars being bent so that the eyelets are slightly spaced from the silo and a small thrust member in the form of an ear being bent from the ends of one bar to prevent the eyelets from being drawn toward the silo when the silo rods are tightened.

Another object is to provide ladder step members pivoted to the frame member so that they can be swung to position where they do not obstruct the opening defined by the frame member, whereby the operation of removing ensilage from the silo is facilitated.

Another object is to provide the ladder step members on the door frame so that they will not have to be either supported on the doors themselves or other means provided for anchoring them to the silo wall.

Another object is to provide the ladder step members pivoted at one end and latched at their opposite end in such a manner as to serve as tie bars to prevent sidewise spreading of the silo door frame when the tie rods are tightened.

With these and other objects in view my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings. Although the invention is susceptible of a variety of embodiments, it is unnecessary to fully describe and illustrate more than one in order to give a full understanding of the invention both from its structural and functional standpoints. Accordingly, I have illustrated a preferred and desirable embodiment of the invention in the accompanying drawings in which:

Figure 1 is a side elevation of the lower portion of the silo showing a pair of my improved door frame and ladder constructions applied thereto.

Figure 2 is a perspective view of the frame and ladder construction.

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 1.

Figure 4 is an enlarged sectional view on the line 4—4 of Figure 1.

Figure 5 is an enlarged sectional view on the line 5—5 of Figure 2.

On the accompanying drawings, I have used the reference numeral 10 to indicate generally a silo which may be formed of concrete or wood staves or any other suitable material. Door openings 12 are provided in the silo 10 at spaced vertical intervals. The staves of the silo 10 are ordinarily held in assembled position by silo rods 14.

My door frame and ladder construction is indicated generally by the reference character A and is of substantially rectangular construction. One of the frames A is adapted to be placed around each door opening 12 and is held in such position by silo rods 16 and nuts 18. The ends of the rods 16 extend through eyelets 20 formed in the frames A. Each frame is made of a pair of flat bars bent in substantially U shapes with their ends riveted together as indicated at 22. The eye 20 is formed by bending the bars outwardly between the rivets as clearly illustrated in Figure 4.

The bars forming the frame member A are bent as indicated at 24 to space the eyelets 20 from the wall of the silo 10. When the nuts 18 on the silo rod 16 are tightened, there is a tendency to spread the sides of the frame A and contract the top and bottom thereof. This contracting action is counteracted by thrust rods 26. The tension of the rods 16 also has a tendency to straighten the bends 24 and this is counteracted by an ear-like thrust member 28 engaging the silo wall.

The ladder step members are indicated at 30 and are formed of flat bar material bent as clearly shown in the drawings. Each step member 30 is pivoted at 32 and its opposite end engages behind a latch member 34. The free end of the member 30 is hooked at 36 to engage the side of the latch member 34. All points of such side are equi-distant from the pivot center 32 so that the step members 30 may be conveniently moved from the operative position to an inoperative position illustrated at the top of Figure 1. When in the inoperative position they do not obstruct the door opening 12 and thus a ladder is provided which can be easily adjusted to a position for convenience in removing ensilage from the silo.

The step members 30 act as tie rods between the sides of the frame A and thus aid in preventing the spreading of the frame members in conjunction with the thrust rods 36.

The silo door 38 is adapted to contact with shoulders 40 on the inside of the silo and a sealing medium such as a coating of clay or tar paper can be inserted between the door and the shoulder. The door is then tightened by means of a clamping bolt 32 and cross bar 44. While the operator is standing on the ladder step elements of one door frame, he may move the steps of the next frame thereabove to a position where the door can be removed and the door can also be easily replaced while standing on the ladder.

I consider the combination of door frame and ladder, the ladder being fixed to and carried by the frame, as being one of the primary advantages of my construction. Heretofore, when the ladder step elements have been mounted on the door, itself, there is a tendency to break the seal between the silo, the sealing medium and the door whenever the step is used. By making the step independent of the door this disadvantage is entirely eliminated. It may be mentioned that when the seal is broken between the silo and the door, spoilage of the ensilage adjacent the break immediately occurs and gradually spreads through the remainder of the ensilage. Thus mounting the ladder step elements on the door frame becomes important and my construction is advantageous in having the door step elements movable to a position where they do not obstruct the door opening.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. In a silo door frame and ladder construction a frame member, means for attaching the sides of said frame member to the ends of a pair of spaced silo rods and ladder step members extending across said door frame from side to side thereof.

2. In a silo door frame and ladder construction a frame member, means for attaching the sides of said frame member to the ends of a silo rod and a pair of ladder step members spaced from each other and pivotally connected with one side of said door frame and latchingly connected with the other side thereof.

3. In a silo door frame and ladder construction a frame member, means for attaching the sides of said frame member to the ends of a silo rod and a pair of ladder step members extending across said door frame from side to side thereof and movable relative to the frame member for assuming a position offering no obstruction to the door opening defined by the door frame.

4. In a silo door frame and ladder construction a frame member, means for attaching the sides of said frame member to the ends of a silo rod and a ladder step member pivotally connected with one side of said door frame and latchingly connected with the other side thereof whereby when the ladder step member is in latched position it acts as a tie rod between the sides of the frame member.

5. In a silo door frame and ladder construction a frame member, means for attaching the sides of said frame member to the ends of a silo rod with the frame member positioned against the outer wall of the silo and a ladder step member extending across said door frame from side to side thereof, the central portion of said ladder step members being spaced outwardly from the frame member.

6. In a silo door frame, a frame member having eyelets raised above the surface of the frame which contacts with a silo, a silo rod having its ends received in said eyelets and thrust members adjacent said eyelets to prevent them from being drawn toward the silo when said silo rod is tightened.

7. In a silo door frame and ladder structure, a frame member adapted to define a door opening, means for supporting the same on a silo wall and ladder step elements carried by said frame whereby a plurality of said structures arranged from bottom to top

of a silo constitute the sole means for providing a ladder for mounting the silo.

8. In a silo door frame and ladder construction, a frame member adapted to define a door opening, means for supporting the same on a silo wall and ladder step elements carried by said frame said step elements being pivoted to the frame for movement to a position offering no obstruction to such door opening.

Des Moines, Iowa, October 17, 1929.

SIGURD E. ANDERSON.