

F. J. McARTHUR.

SILLO.

APPLICATION FILED MAR. 8, 1912.

1,056,289.

Patented Mar. 18, 1913.

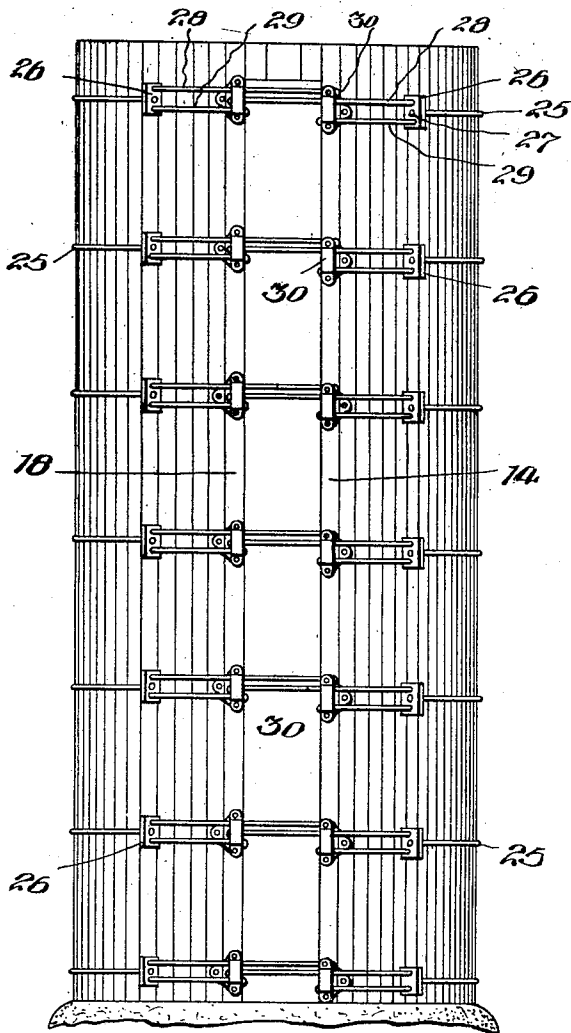


Fig. 1.

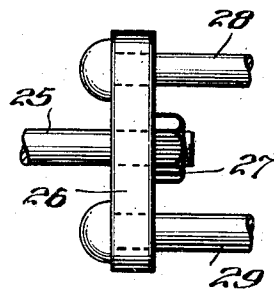


Fig. 2.

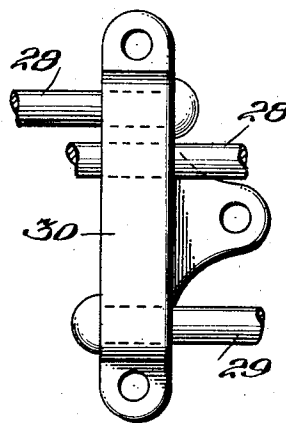


Fig. 3.

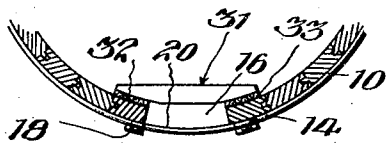


Fig. 4.

Witnesses:

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UNITED STATES PATENT OFFICE.

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SILO.

1.056,289.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed March 8, 1912. Serial No. 682,441.

To all whom it may concern:

Be it known that I, FRED J. McARTHUR, a citizen of the United States, residing at Aberdeen, in the county of Brown and State of South Dakota, have invented certain new and useful Improvements in Silos, of which the following is a specification.

My invention relates to silos and more especially to that feature of silo construction which involves the use of a continuous door opening and reinforcing members for holding the silo in position and taking up the shrinkage when necessary.

In silos of the type to which my improvements are applied, it generally happens that after the silo is constructed, perhaps after being emptied the first time, there will be a considerable amount of shrinkage of the staves which will have to be taken up by means of the circumferential reinforcing rods or the silo may become so loose as to collapse. Also after filling, on account of swelling, the reinforcing bands may need to be loosened to permit expansion of the circular silo walls or said bands might be broken. In connection with this reinforcement various devices have been employed for preventing collapsing of the silo at the door opening and retaining said door opening in normal position, a common device for this purpose being to provide a special reinforced door frame with cross braces extending between the frame members, the reinforcing hoops being extended over said frame members so that when the hoops are drawn up the frame members will be forced against the cross bars. This form of silo necessitates a special door frame which is expensive and difficult to assemble. It is the object of my invention to provide a reinforcement in connection with a continuous door opening which shall do away with the special door frame and also the cross braces, and yet will hold the said members of the door opening in proper relative position.

The full objects and advantages of my invention will appear in connection with the detailed description thereof and are particularly pointed out in the claims.

In the drawings, illustrating the application of my invention in one form, Figure 1 is an elevation view of a silo embodying my invention. Figs. 2 and 3, inclusive, are detail views of securing lugs to be used in connection with the reinforcement em-

ployed. Fig. 4 is a fragmentary sectional plan illustrating the door structure.

In the view shown in Fig. 1 is represented a silo composed of staves 10 of the ordinary type, that is, tongue and groove staves, which may be set upon end on a foundation of usual construction.

Reinforcing rods 25 extend centrally into two eye pieces 26 to which they are secured by means of nuts 27, as most clearly shown in Fig. 2. The eye pieces 26 are provided with three apertures, and extending through the two terminal apertures are short rod connections 28 and 29 which may be headed at the ends, as shown. The short sections 28 each extend from eye pieces 26 entirely across the door opening 15, being secured through eye pieces 30, the headed ends of these sections preventing the same from slipping out of the apertures in either eye pieces 26 or 30. The reinforcing sections 29 extend from the eye pieces 26 to the eye pieces 30 without crossing the door opening 15. It follows, therefore, that when, by means of nuts 27 or other tightening lugs 19 of usual construction on the same, the rods 25 are drawn up their action will be to pull the staves 10 together, but since the marginal staves 14 and 18 have this pull exerted upon them equally at the same time in opposite directions through the rod sections 28 and 29, this will result in holding the marginal staves 14 and 18 in fixed relative positions quite as effectively as if a special door frame structure and cross braces were employed in combination with the usual hoop reinforcement.

It will be obvious that my silo can be constructed much more cheaply than the frame type of silo and will not require any specially skilled labor in setting it up. The door structure employed by me is illustrated in Fig. 4, in which the doors 31 are simply formed with curved engaging portions adjacent the margins so that when said doors are set one upon the other within the silo the said curved portions 32 will come against the inside of the marginal staves 14 and 18 and the pressure of the silage against the door will seal the same. If desired, a strip 33 of rubber, felt or other fabric may be employed between the surfaces 32 and the terminal staves 14 and 18.

The reinforcing bands 25 may each be formed of as many rod sections as is desirable with tightening lugs connecting said

sections so that the same may be tightened as necessity may require, from all sides of the silo. The tightening lugs may all be secured to staves of the silo, in which case it will probably be found to be expedient to secure the tightening lugs of different reinforcing bands to different staves so that the tightening lugs away from the door opening will extend in a spiral line about the silo. Any locking means of approved construction can be employed for initially drawing the door sections tightly into position before the silo is filled.

It will be noted that I have shown the reinforcing bands which cross the door opening as being secured to the marginal staves at the sides of the door opening. It is not, however, necessary that these reinforcing members should be secured to the marginal staves at the ends of the members, since practically the same results would follow if the ends of the reinforcing members were carried to a point several staves beyond the marginal staves and there secured. I do not, therefore, wish to be limited in the application of my invention to securing the rods which cross the openings to the marginal staves. Also, in using the term continuous door opening as applied to my invention I refer to any door opening in the silo wall which will need to have some means to hold the marginal members thereof in fixed relative position. If, for example, several different openings were employed in a silo, having independent tops and bottoms, but each requiring such reinforcement, these openings although not related to each other, would fall within the scope of my invention.

I claim:

1. A silo the walls of which are formed entirely of matched staves and provided with a continuous door opening up one side thereof, in combination with circumferential reinforcing members, there being secured to each end of each of said reinforcing members separate portions having independent connections with the adjacent marginal stave and the marginal stave across the door opening, respectively, whereby tightening of the reinforcing members will operate to draw the staves of the silo together while pulling the marginal members equally in both directions and holding them in fixed relative position.

2. A silo the walls of which are formed of matched staves and provided with a door opening extending between a pair of said staves of normal thickness, a series of lugs secured to the staves at the margins of the door opening, each of said lugs being formed with a plurality of horizontally disposed apertures, cross lugs and reinforcing bands secured at their ends by means of a threaded nut thereto, and a plurality of short band sections extending

through each of said cross lugs and secured at the ends thereto, a part of said sections passing through apertures in both of the sets of marginal lugs and being secured to the marginal lug across the door opening from its cross lug, the remainder of said sections passing through apertures in and being secured directly to the adjacent marginal lug only.

3. A silo the walls of which are formed of matched staves and provided with a door opening extending between a pair of said staves of normal thickness, a series of lugs secured to the staves at the margins of the door opening, each of said lugs being formed with a plurality of horizontally disposed apertures, cross lugs and reinforcing bands secured at their ends by means of a threaded nut thereto, and a pair of short band sections extending through each of said cross lugs and secured at the ends thereto, a part of said sections passing through apertures in both of the sets of marginal lugs and being secured to the marginal lugs across the door opening from its cross lug, the remainder of said sections passing through apertures in and being secured directly to the adjacent marginal lug only, said pair of crossing bands passing through closely adjacent apertures in the marginal lugs so as to extend in close parallel relation across the said opening.

4. A silo the walls of which are formed of shrinkable material and provided with a door opening, in combination with circumferential reinforcing members comprising a single band extending to a point near the marginal members at the sides of the door opening, and a pair of band sections extending from the ends of said single band, a section from each end being secured to the adjacent side member of said opening and another section from each end extending across and being secured to a wall member of the side beyond the door opening, so that tightening of the single band will operate to pull the marginal members equally in both directions and hold them in fixed relative position.

5. A silo the walls of which are formed of shrinkable material and provided with a door opening, in combination with circumferential reinforcing members comprising a single band extending to a point near the marginal members at the sides of the door opening, and a pair of band sections extending from the ends of said single band, apertured plates through which the single band and the band sections extend, restraining means on the ends of said single band and band sections engaging said plates on opposite sides to secure the single band to the band sections, at least part of said restraining means comprising nuts threaded on the ends of the band and sections, each

pair of band sections including one member fastened to the adjacent side member of said opening and the other member extending across and being secured to a wall member of the side beyond the door opening, whereby operating said nuts will serve to tighten the silo and at the same time to pull the marginal members equally in both direc-

tions and hold them in fixed relative position.

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

FRED J. McARTHUR.

Witnesses:

H. A. BOWMAN,

F. A. WHITELEY.

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