March 12, 1929. S. T. PLAYFORD 1,705,338

SILO AND STAVE THEREFOR

Filed Dec. 30, 1927

Fig. 1.

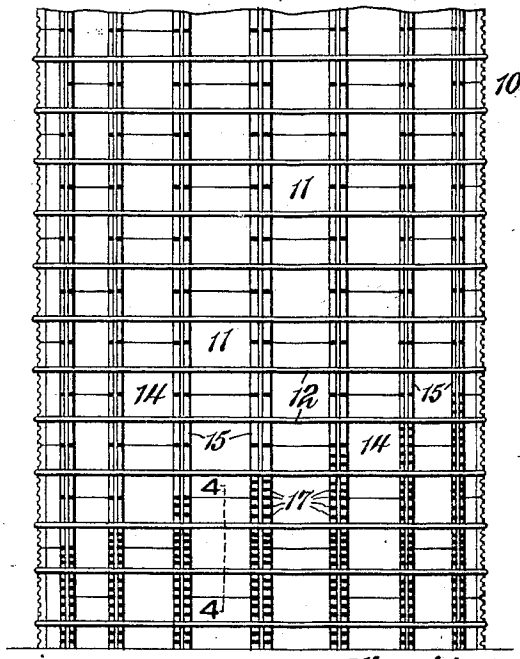


Fig. 4.

Fig. 2.

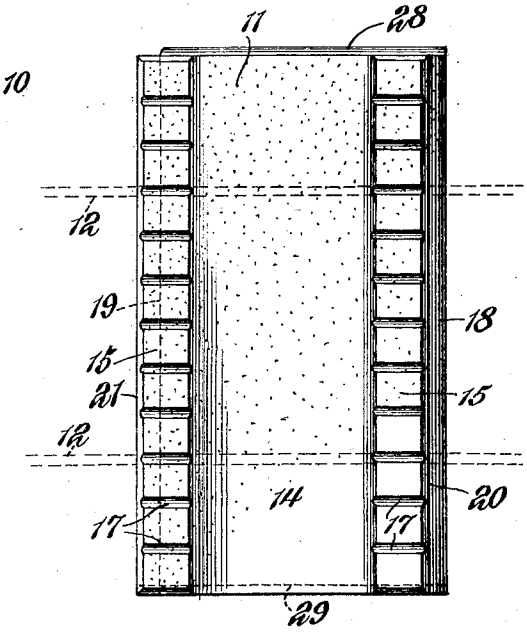


Fig. 5.

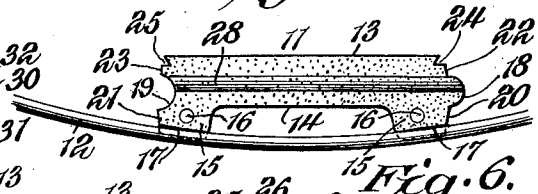


Fig. 3.

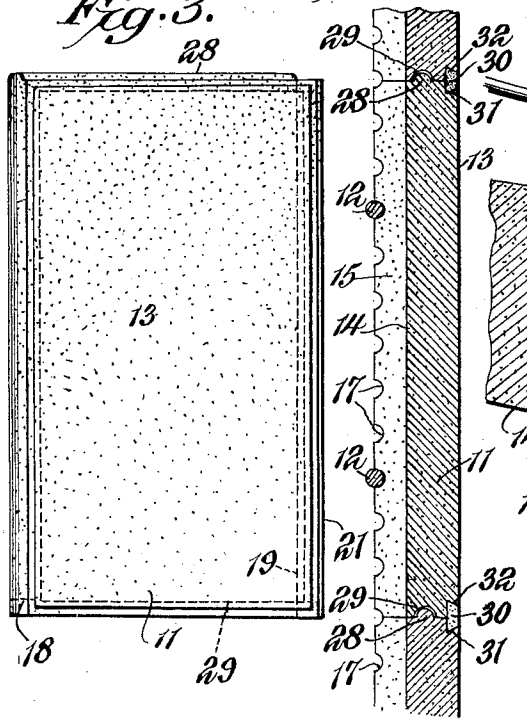
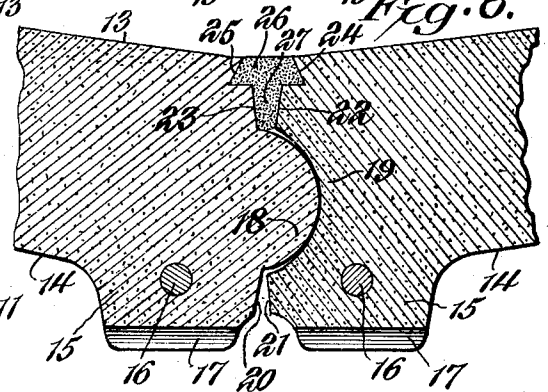


Fig. 6.



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UNITED STATES PATENT OFFICE.

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SILO AND STAVE THEREFOR.

Application filed December 30, 1927. Serial No. 243,619.

This invention relates to bins or silos and aims, among other objects, to provide an improved slab or stave.

Other objects and advantages will be apparent during the course of the following detailed description.

In the drawing showing the preferred embodiment of the invention:

Fig. 1 is an elevation of the lower portion of a bin or silo embodying the invention;

Fig. 2 is a front elevation of one of the staves drawn on a larger scale;

Fig. 3 is a rear elevation of the same;

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 1 and shown on the scale of Figs. 2 and 3;

Fig. 5 is a top plan view of one of the staves and showing a portion of the hoop; and

Fig. 6 is an enlarged horizontal sectional view of one of the vertical joints.

Referring particularly to the drawing, there is shown a bin or silo 10 constructed of staves 11 and surrounded by the conventional hoops 12, which may be tightened by turnbuckles (not shown). The bin is approximately cylindrical and the staves are herein shown as being placed end to end to form vertical columns, the horizontal joints in each column being preferably staggered with those in the adjacent columns to give greater strength and rigidity to the silo.

Each stave 11 is shown as having a flat or plane inside face 13 and a parallel outside face 14 presenting longitudinal reinforcing ribs 15 adjacent to the side edges. In the present example, the ribs are reinforced by rods or bars 16. These ribs are traversed by a series of spaced horizontal grooves 17, preferably semi-cylindrical in cross section to form seats for the hoops 12. As shown in Figs. 5 and 6 the face of each rib and the bottoms of the grooves are inclined inwardly to such an extent as to cause the hoops 12 to bear only on the inner portions of the ribs thereby giving better support and, consequently, greater strength to the structure. Moreover, the inclination of the grooves serves to relieve the outer edges of the ribs of compression stresses which might otherwise break the outer edges thereof.

One side edge of each stave is provided with a rib or tongue 18 extending the length of the stave and the other side edge is formed with a complementary groove 19 and also extending the full length to receive the tongue of the adjacent stave or staves when assembled. Both the tongue and the groove of each stave are spaced from the outer faces of the same complementary bevelled walls 20 and 21 being made on adjacent staves to permit outward hinging of the staves. Herein the tongue and groove are semi-cylindrical in cross section and the radius of the tongue is less than that of the groove so that the tongue will seat itself against the bottom of the groove (Fig. 6) and the bevelled edges will permit a substantial hinging movement so that the same staves may be used for building bins of different diameters. Further, as shown in Fig. 6, the outer edges of the staves are thus relieved of breaking compression stresses.

On the inner side of each tongue there is a tapered wall 22 and on the corresponding side of each groove is a similarly tapered wall 23, said walls 22 and 23 each terminating in undercut grooves 24 and 25 respectively, located at the inner edges of each stave. When the staves are assembled the undercut grooves 24 and 25 form a complete dove-tailed seat into which cement mortar 26 is adapted to be applied, said mortar being forced into the space between the aforesaid tapered walls 22 and 23 to form a tongue 27 of substantial thickness which rests against the tongue 18. When the pressure is applied by the hoops 12, the tendency is to hinge all of the staves inwardly and the strain is taken between the aligned tongues and grooves 18 and 19 and partly by the walls 22 and 23.

The joint between the top and bottom of adjacent staves preferably comprises a tongue 28 formed on the top edge of each lower stave and a groove 29 in the bottom edge of the upper stave. These tongues and grooves are necessarily smaller than those on the sides because of the restricted width of the top and bottom, and the groove is larger than the tongue so that the tongue will not touch the bottom of the groove thereby relieving all of the tongues of destructive compressive stresses. Similar abutting and bearing faces are formed on the inside and outside of the tongue and groove to receive the whole weight of the staves above and mortar 30 is held in place in grooves 31 and 32 as in the vertical joint. In this instance the full bearing surfaces are on the inside and outside of the tongues and grooves.

From the foregoing description and a study

of the drawing, it will be seen that an improved stave has been provided whereby bins or silos of various diameters and heights may be made without changing the shape or size of the staves. The dove-tailed mortar joints on the inside of the silo not only serve to take the compression stresses but also increase the strength and rigidity of the entire structure both horizontally and vertically. Moreover, the staves can easily be cast in open molds and, hence, can be manufactured very cheaply.

Obviously the present invention is not restricted to the particular embodiment thereof herein shown and described. Moreover, it is not indispensable that all the features of the invention be used conjointly, since they may be employed advantageously in various combinations and subcombinations.

What is claimed is:—

1. A stave for silos and the like comprising, in combination, a body portion; longitudinal ribs adjacent to the ends of the body and projecting outwardly from said body; and aligned, inwardly inclined horizontal grooves in the faces of the ribs providing two spaced bearing portions for each of the hoops at the opposite ends of the grooves of adjacent staves.

2. A stave of the class described comprising, in combination, a body portion; reinforced longitudinal ribs on one face; aligned transverse grooves in the faces of the ribs inclined inwardly whereby a hoop exerts pressure against the inner edges only of the ribs; a convex tongue on one side edge; a concave groove in the other side edge providing a hinge seat for the tongue of an adjacent stave when assembled; and bearing faces of substantial area on the inside of each tongue and groove to receive the stresses.

3. A stave of the class described comprising, in combination, a body portion; reinforced longitudinal ribs on one face; aligned transverse grooves in the faces of the ribs inclined inwardly whereby a hoop exerts pressure against the inner edges only of the ribs; a convex tongue on one side edge; a concave groove in the other side edge providing a seat for the tongue of an adjacent stave when assembled; bearing faces of substantial area on the inside of each tongue and groove to receive the stresses; and an undercut groove around the entire edge of the inner face to form dovetailed seats with the adjacent staves when assembled.

4. A stave of the class described comprising, in combination, a body portion; reinforced longitudinal ribs on one face; aligned transverse grooves in the faces of the ribs; a convex tongue on one side edge; a smaller convex tongue on the top edge; a concave groove in the other side edge and of larger diameter than the first mentioned tongue; and a concave groove in the bottom edge and of larger diameter than the last-mentioned tongue, the side tongue being seated in the side groove and the end tongue being spaced from the bottom of the end groove of the adjacent staves when assembled.

5. A stave of the class described comprising, in combination, a body portion; reinforced longitudinal ribs on one face; aligned transverse grooves in the faces of the ribs; a convex tongue on one side edge; a smaller convex tongue on the top edge; a concave groove in the other side edge and of larger diameter than the first mentioned tongue; a concave groove in the bottom edge and of larger diameter than the last-mentioned tongue; and an undercut groove around the entire edge of the inner face to form dovetailed seats with the adjacent staves when assembled.

6. A stave of the class described comprising, in combination, a body portion; reinforced longitudinal ribs on one face; aligned transverse grooves in the faces of the ribs; a convex tongue on one side edge; a smaller convex tongue on the top edge; a concave groove in the other side edge and of larger diameter than the first-mentioned tongue; a concave groove in the bottom edge and of larger diameter than the last-mentioned tongue; an undercut groove around the entire edge of the inner face to form dovetailed seats with the adjacent staves when assembled; and bearing surfaces of substantial area on each side of each end tongue and groove; the bearing faces on the inner side edges being inclined inwardly to provide a mortar receiving space between adjacent staves when assembled.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature.

STERLING T. PLAYFORD.