April 21, 1953 J. W. DENNING 2,635,302

GRAIN BIN

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FIG. 1.

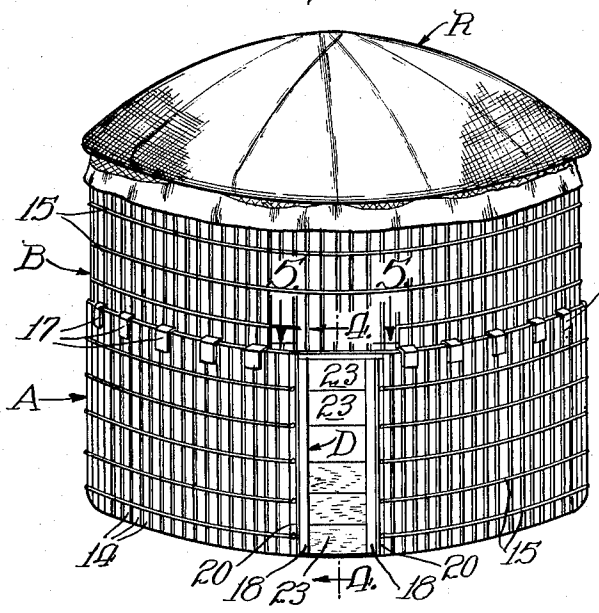


FIG. 3.

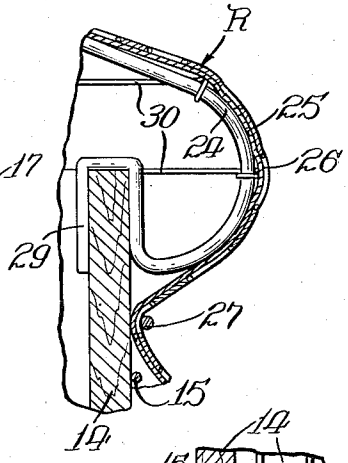


FIG. 2.

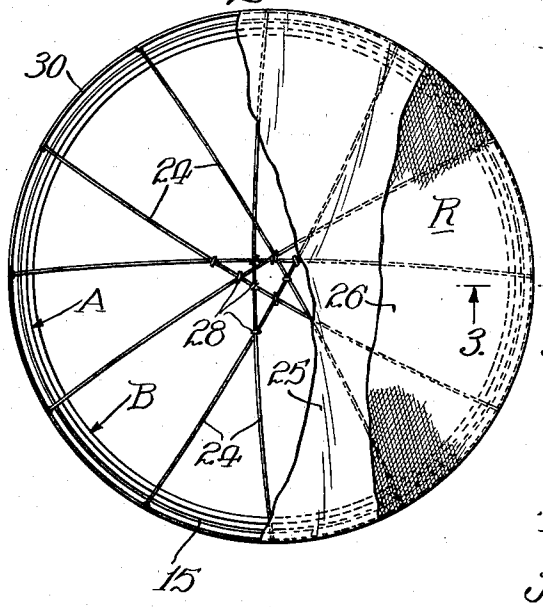


FIG. 4.

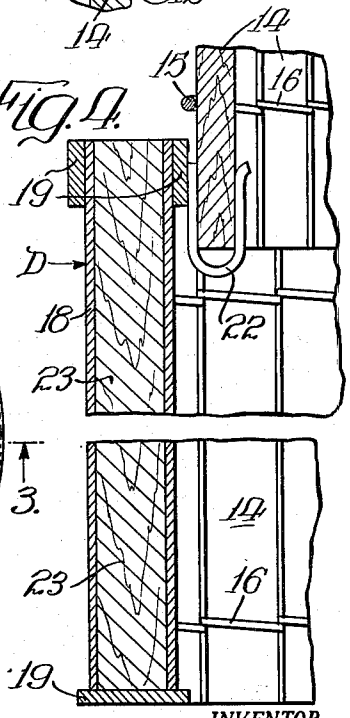


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Fig. 5.

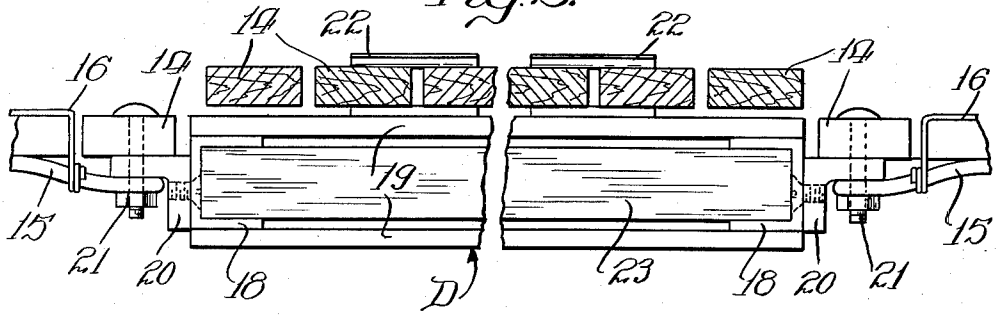



Fig. 6.

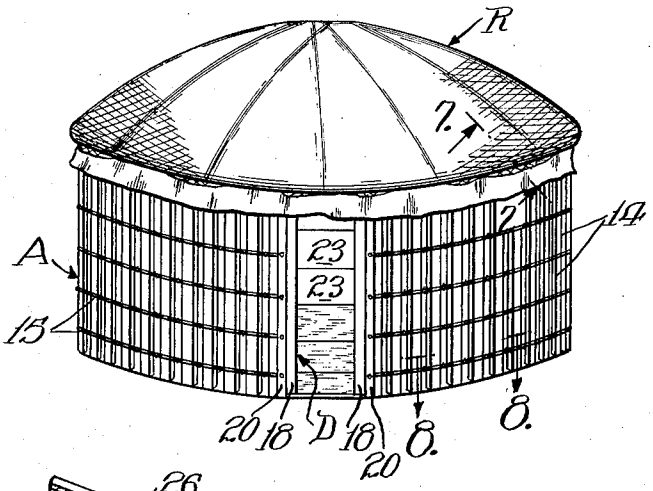



Fig. 7.

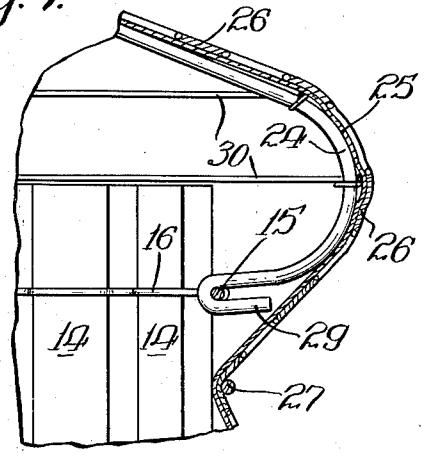
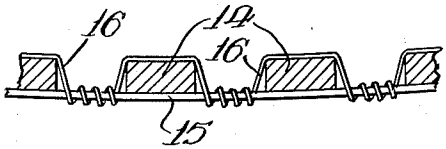



Fig. 8.

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## GRAIN BIN

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9 Claims. (Cl. 20—1.2)

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The farmer who raises large quantities of grain is often confronted at harvest time with the problem of storage. The need for such storage may not continue indefinitely, so it is desirable to hold to a minimum the expense of providing bins or cribs for such purpose. The use of temporary and inexpensive storage facilities for surplus grain is an acceptable solution of the difficulty. Bins or cribs, to be satisfactory, must have sufficient rigidity to withstand the excessive pressures of large quantities of grain. Also, structures of this character must afford the maximum protection from weather in order to minimize grain deterioration.

The main objects of this invention, therefore, are to provide an improved form of rigid, weather-protecting storage structure in the nature of a bin or crib that especially is adapted for the protection of grain; to provide an improved structure of this kind which utilizes advantageously a fabricated stave construction which, when not erected, occupies but little space and is readily transportable from place to place; to provide an improved form and arrangement of a weather-protecting roof for grain bins or cribs of the kind noted; to provide an improved construction and arrangement of a door for such a bin or crib; and to provide a storage structure of this kind which is easily assembled and disassembled, as occasion may require, and which when disassembled is very compact and requires a very limited amount of space for its accommodation.

In the accompanying drawings:

Figure 1 is a perspective view of a two-section storage structure in the form of a bin made according to this invention;

Fig. 2 is a plan view thereof with parts of the roof covering successively cut away to more clearly indicate its complete formation;

Fig. 3 is an enlarged fragmentary cross-sectional view of the eave construction, showing one form of hook for anchoring the roof supports to the wall, the view being taken on line 3—3 of Fig. 2;

Fig. 4 is an enlarged, vertical, cross-sectional view of the doorway, taken on line 4—4 of Fig. 1;

Fig. 5 is an enlarged fragmentary detail in section, taken on line 5—5 of Fig. 1, showing the ends of the lower wall section of staves anchored to the doorway frame and the upper wall section of staves supported over the doorway frame;

Fig. 6 which is a perspective view similar to Fig. 1 shows a single section storage structure in the form of a crib;

Fig. 7 is an enlarged fragmentary cross-sectional view of the eave construction in which a modified form of hook is used to anchor the roof supports to the wall, the view being taken on line 7—7 of Fig. 6; and

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Fig. 8 is an enlarged fragmentary detail in section, taken on line 8—8 of Fig. 6.

The improved form of storage structure herein shown, and embodying this invention, is made up either of one or two sections A and B having annular walls comprising strips of wire-connected staves. The ends of the upper section B are directly connected together (see Fig. 1), or they may be anchored to a doorway frame D, as in the case of the lower wall section A where side ingress into and egress from the enclosure is desired. Over the top of one or the other of the wall sections A or B, depending upon whether the structure consists of one or two tiers, is spread and anchored a weather-protecting roof R.

Each wall section comprises a plurality of staves 14 held in parallel relationship by transverse supporting wire bands 15 to which the staves are secured by attaching wires 16. As will be noted from Figs. 1–5, the staves in the bin structure are disposed closely adjacent each other, separated only by a thickness sufficient to accommodate easily a single convolution of the attaching wire 16 around the supporting wire 15 (Figs. 1 and 4); in the crib structure of Figs. 6–8 the spacing is somewhat greater to accommodate several convolutions of the attaching wire 16 for winding around the supporting wire 15. When the storage structure comprises two wall sections, as shown in Fig. 1, the upper section B may be supported on the lower section A as by means of S-hooks 17.

The doorway frame D comprises a pair of opposed channel bars 18 connected together top and bottom by cross pieces 19 and supporting angle brackets 20 whereto are connected the ends of the fencing section forming the wall A. As shown in Fig. 5, the ends of this section of fencing are secured to angle brackets 20 by having bolts extend through the end staves 14 and having the supporting wire 15 wound therearound. U-shaped hooks 22 are bonded to the inner upper cross piece 19 (see Fig. 4) to receive the ends of the staves of the upper wall section B and coact with the S-hooks 17 for effectively supporting the upper wall section on the lower wall section A. A plurality of panels 23 of wood or the like slide in and out of the channel bars 19 to provide a closure for the doorway frame D.

The roof R comprises a plurality of truss rods 24 over which is laid a covering of weather-

proofed fabric or paper material 25 and a wire netting 26 the perimetrical portion of which is secured to the wall section A (or B) by a bonding wire 27. The truss rods 24 which may be arcuate shaped are disposed across the wall section A (or B) slightly off-center and extended therebeyond to be doubled back and hooked thereto to form an eave around the supporting wall section. Near the center of the structure there are numerous points of crossing of the truss rods where tie wires 28 may be applied thereto. The hooked ends 29 may be either vertically disposed and downwardly open, as shown in Fig. 3, or horizontally disposed and outwardly open, as shown in Fig. 7. In the one case (the bin) the rods 24 rest upon the upper ends of the staves 14, and in the other (the crib) the rods are anchored to the supporting wire 15 at points between the staves.

At least two tie wires 30 may be employed to hold the truss rods 24 is proper spaced relationship at their eave ends and provide support for the roof covering 25 between the rods 24. The roof covering may comprise either a treated paper or fabric 25 over which is laid a wire netting 26. When paper is used it is preferably a heavy kraft paper treated with asphalt; if fabric, it is preferably a mildew-resisting duck treated with a water-proofing compound and formed with reinforcing grommets.

The wire netting 26, of course, may be of almost any light construction. However, what is commonly known as "chicken" wire fencing has been found most suitable. It is light, open mesh, and forms a sufficient protection to the layer of material beneath it, particularly if it is paper.

As shown, the roof covering 25 may extend down below the eaves formed by the doubling back of the the truss rods 24. The perimetrical portion of the roof covering is drawn in under the eaves and bound by a wire 27 to the wall section A (or B).

With equipment of this kind a grain storage bin or crib may be quickly set up with the expenditure of very little time and labor. Moreover, it may be set up at almost any point, where the grain is harvested or near a shipping point. When the structure has served its purpose it may be disassembled and removed with equal facility. The fencing and the roof covering may be rolled up and the truss rods stacked. Thus a minimum space is required for storing the equipment until it is again needed for forming a storage bin or crib.

Various other modifications in the details of the structure and arrangement of the parts thereof may be resorted to within the spirit and coverage of the appended claims.

I claim:

1. A grain bin comprising an annular enclosing wall, a plurality of arched rods spanning the annular wall and slightly offset from diametrical positions, means interconnecting the rods at their points of crossing, a hook at each rod end in engagement with the upper portion of the wall, whereby the several rods constitute a roof support for the bin, a covering of flexible material dimensioned to overlie the roof support with the perimetrical portion of the covering extending therebeyond, and means anchoring the perimetrical portion of the covering to the wall at a point below the attachment of the rods thereto.

2. A grain bin comprising an annular enclosing wall, a plurality of arched rods spanning the annular wall and slightly offset from diametrical positions, means interconnecting the rods at their points of crossing, each rod having its ends doubled back upon itself to form an eave and formed with a downwardly opening hook in engagement with the upper portion of the wall, whereby the several rods constitute a roof support for the bin, a covering of flexible material dimensioned to overlie the roof support with the perimetrical portion of the covering extending therebeyond and over the eaves thereof, and means anchoring the perimetrical portion of the covering to the wall at a point below the attachment of the rods thereto.

3. A grain bin comprising an annular enclosing wall, a plurality of arched rods spanning the annular wall and slightly offset from diametrical positions, means interconnecting the rods at their points of crossing, each rod having its ends formed with hooks in engagement with the upper portion of the wall, whereby the several rods constitute a roof support for the bin, a covering of flexible material dimensioned to overlie the roof support with the perimetrical portion of the covering extending therebeyond, a sheet of wire fabric of substantially the same dimension as the covering arranged thereover, and means anchoring the perimetrical portion of the covering and the wire fabric to the wall at a point below the attachment of the rods thereto.

4. A grain bin comprising an annular enclosing wall, a plurality of arched rods spanning the annular wall and slightly offset from diametrical positions, means interconnecting the rods at their points of crossing, each end of each rod formed with a hook in engagement with the upper portion of the wall, whereby the several rods constitute a roof support for the bin, a covering of flexible material dimensioned to overlie the roof support with the perimetrical portion of the covering extending therebeyond, a sheet of wire fabric of substantially the same dimension as the covering arranged thereover, and a wire closely embracing the covering and fabric sheet at a point below the attachment of the rod to the wall for anchoring the covering and fabric sheet thereto.

5. A grain bin comprising an annular enclosing wall, a plurality of arched rods spanning the annular wall and slightly offset from diametrical positions, means interconnecting the rods at their points of crossing, a hook at each rod end in engagement with the upper portion of said wall, whereby the several rods constitute a roof support for the bin, one or more wires fixedly interconnecting the rods adjacent their outer ends, a covering of flexible material dimensioned to overlie the roof support with the perimetrical portion of the covering extending therebeyond, and means anchoring the perimetrical portion of the covering to the wall at a point below the attachment of the rods thereto.

6. A grain bin comprising a strip of wire-connected upright staves arranged to provide a horizontally-flexible annular enclosing wall, a plurality of arched rods slightly offset from diametrical positions with the rods crossing each other and spanning the annular wall to constitute a roof support therefor, a wire closely surrounding the upright staves of the wall near its top and secured thereto, a hook at the end of each rod in engagement with the wire, thereby to rigidify the annular wall of the bin, a covering of flexible material overlying the roof support and extending therebeyond and downwardly to the outside of the hooked ends of the rods and therebelow, and means anchoring the cov-

ering to the wall at a point below the roof support.

7. A grain bin comprising a strip of wire-connected upright staves arranged to provide a horizontally-flexible annular enclosing wall, a plurality of arched rods slightly offset from diametrical positions with the rods crossing each other and spanning the annular wall to provide a roof support therefor, means at opposite ends of each rod in engagement with one face of the annular wall thereby to rigidify its structure in a horizontal plane, a covering of flexible material overlying the roof support and extending therebeyond and downwardly to the outside of the ends of the rods and therebelow, and means anchoring the covering to the wall at a point below the roof support.

8. A grain bin comprising a strip of wire-connected upright staves arranged to provide a horizontally-flexible annular enclosing wall, a plurality of arched rods slightly offset from diametrical positions with the rods crossing each other and spanning the annular wall to provide a roof support therefor, a downwardly facing hook at each end of each rod in engagement with inner and outer faces of the annular wall, thereby to rigidify its structure in a horizontal plane, a covering of flexible material overlying the roof support and extending therebeyond and downwardly to the outside of the ends of the rods and therebelow, and means anchoring the covering to the wall at a point below the roof support.



9. A grain bin comprising an annular enclosing wall, a plurality of arched rods spaced around and spanning the annular wall, the rods crossing each other at points adjacent to the center of the grain bin with each point spaced from the other points over a relatively large area, means interconnecting the rods at their points of crossing, a hook at each rod end in engagement with the upper portion of the wall, whereby the several rods constitute a roof support for the bin, a covering of flexible material dimensioned to overlie the roof support with the perimetrical portion ofthe covering extending therebeyond, and means anchoring the perimetrical portion of the covering to the wall at a point below the attachment of the rods thereto.

J. WAYNE DENNING.

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