J. E. ALLSTEADT.

ROOF STRUCTURE FOR STORAGE BINS.

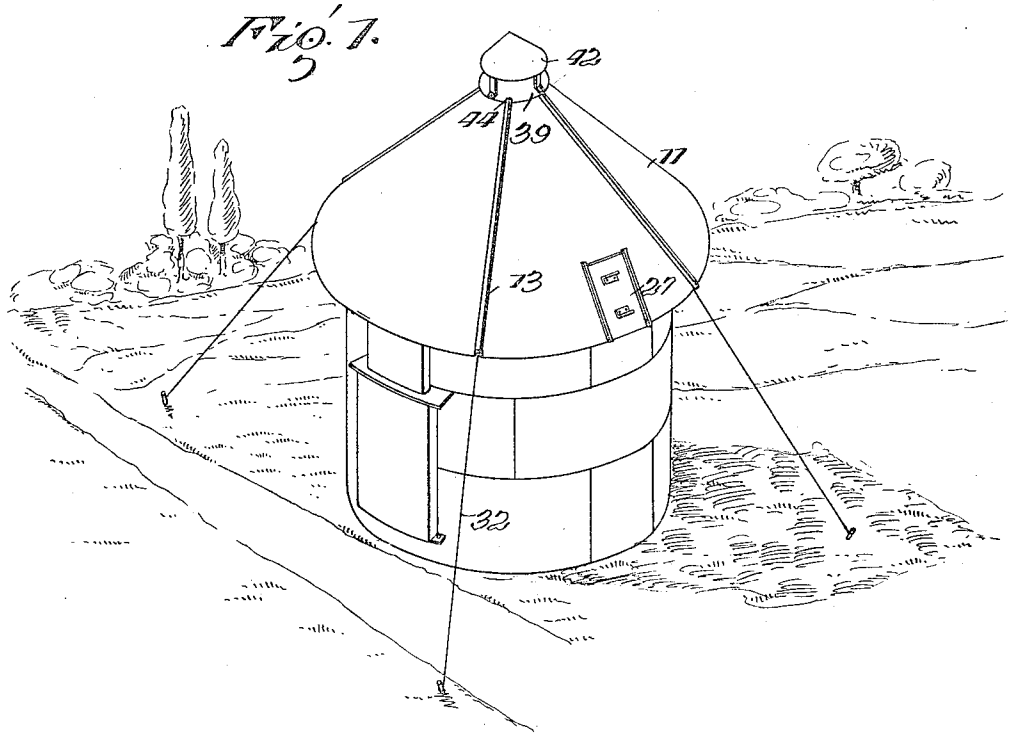
APPLICATION FILED JULY 17, 1914.

1,137,689.

Patented Apr. 27, 1915.

2 SHEETS—SHEET 1.

Fig. 1.



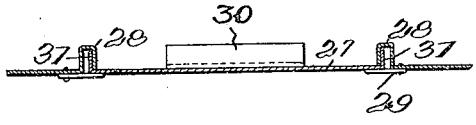


Fig. 4.

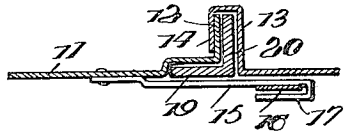


Fig. 5.

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2 SHEETS—SHEET 2.

FIG. 3.

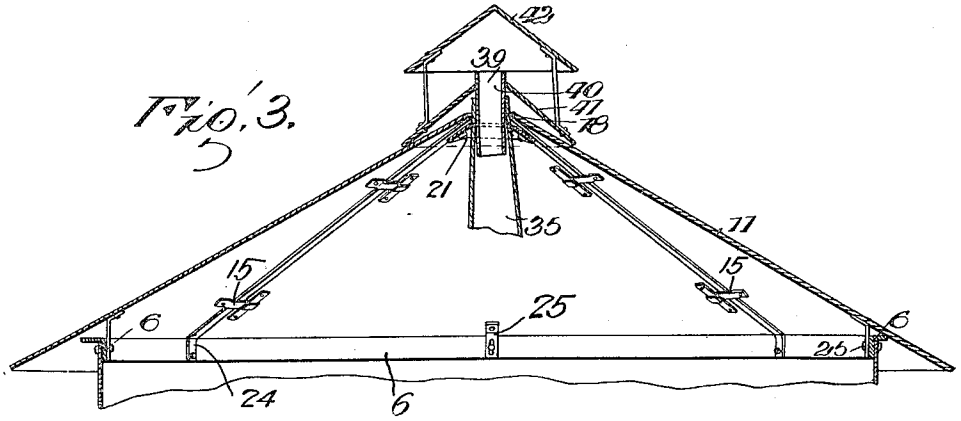
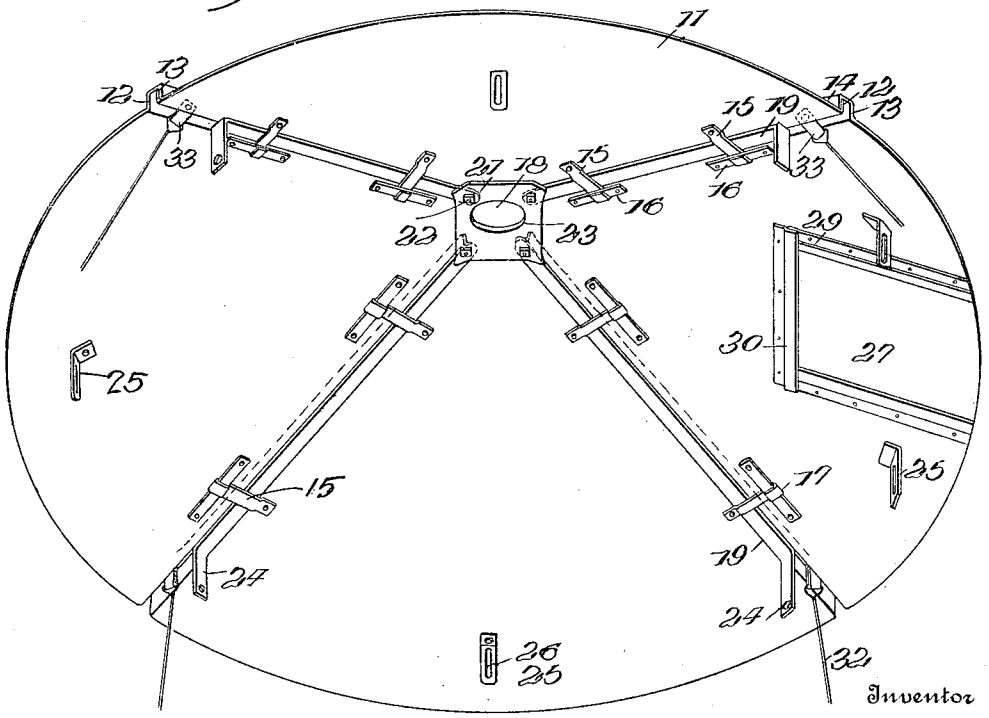


FIG. 2.



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ROOF STRUCTURE FOR STORAGE-BINS.

1,137,689. Specification of Letters Patent. Patented Apr. 27, 1915.

Original application filed January 28, 1914, Serial No. 814,959. Divided and this application filed July 17, 1914. Serial No. 851,620.

To all whom it may concern:

Be it known that I, JOHN E. ALLSTEADT, citizen of the United States, residing at Hastings, in the county of Adams and State of Nebraska, have invented certain new and useful Improvements in Roof Structures for Storage-Bins, of which the following is a specification.

My invention relates to metallic structures, and particularly to metallic storage bins, such as form the subject of my pending application, Serial No. 814,959, filed January 28, 1914, of which case this is a division.

The primary object of my invention is to provide a storage bin having a roof of such construction that the grain may be kept in good condition and protected from the inroads of mice and rats and to provide for ventilation of the grain so that any moisture in the grain may be dissipated.

A further object of the invention is to construct a roof for metallic storage bins of sections readily attachable to each other and to provide means for firmly supporting the roof sections in engagement with each other and upon the sides of the bin.

Still another object of the invention is to so construct the roof sections that they shall have interlocking water-proof engagement with each other and that they may house the rafters and like structural elements which support the roof.

A still further object is to provide particularly strong and rigid means for connecting these rafters to each other and to the roof sections.

Still another object is to so construct the roof as to accommodate the upper end of a ventilating flue passing vertically through the bin, thus providing for a ventilation of the grain within the bin.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a perspective view of a metallic storage bin constructed in accordance with my invention, this figure showing the roof in position. Fig. 2 is a perspective view looking toward the inside of the roof of the bin, the roof being shown as detached from the walls. Fig. 3 is a transverse section through a portion of the walls of the bin and the roof. Fig. 4 is a detail cross sectional view across the sliding door in the roof. Fig. 5 is an enlarged fragmentary sectional view on the line 5—5 of Fig. 2.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

By reference to Fig. 1 it will be seen that the bin to which my roof is particularly adapted is circular in form and comprises upstanding side walls and a conical roof. The sides of the bin are formed of sheets of metal fastened to each other in the manner stated in my pending application, above referred to. Inasmuch as the particular construction of the body of the bin itself has nothing to do with the roof which forms the subject-matter of the present invention it is not necessary to describe the construction of the side walls of the bin, except to say that the sheet metal wall of the bin is braced at its upper end by means of an angle iron 6 having an outwardly projecting upper flange.

As illustrated in the drawings the roof is substantially conical in form and is formed with a plurality of segmental sections, the sections being detachably connected or jointed to each other. Each section may be formed of a plurality of plates or sheets of sheet metal riveted or jointed to each other. The sections of the roof are designated 11 and as illustrated are four in number, though of course, more or less of the sections may be used. Each section is formed on one side with an upwardly projecting flange 12 and upon the opposite side edge with an upwardly extending bead 13 approximately rectangular in cross section, the upwardly extending flange 12 of one section being adapted to hook under the downwardly extending margin 14 of this bead, as illustrated clearly in Fig. 5. The sections are further connected to each other by means of latching members 15 disposed on one section adjacent the joint thereof, extending across said joint and engaging beneath straps 16 riveted to the adjacent margin of the section, the middle of the strap 16 being open so as to permit the insertion of the end of the latching member beneath the strap 16. The extremity of the latching member 15 is then turned over as at 17 upon the strap 16, thus holding one section firmly locked to the

next adjacent section and preventing any disengagement of the joint between the sections.

At the center of the roof the sections 11 are cut away to provide an opening 18 for a ventilating flue. Extending radially from the central opening are a plurality of rafters 19, each rafter, as shown in Fig. 5, being angular in cross section. These rafters may be made of relatively heavy sheet metal or of relatively heavy angle iron. Each rafter has an upwardly projecting flange and a horizontally projecting flange. Each rafter is disposed in the joint between two adjacent sections 11, the horizontal flange of the rafter being disposed beneath the margin of the section 11 which is provided with the upwardly extending flange 12, while the vertical flange 20 of the rafter is disposed between the flange 12 and the side of the bead 13, as shown clearly in Fig. 5. The inner end of each rafter is bolted or otherwise attached to a cap-plate 21, as shown clearly in Fig. 2, bolts 22 passing through the horizontal flanges of the rafters and through said cap plate. The cap plate is square in plan and concavo convex and is formed with a central opening 23. The cap-plate is so arranged that the corners of the plate are in line with the rafters so that the bolts 22 will pass through relatively wide portions of the plate and thus not weaken the plate. Furthermore, by making the plate many-sided and so arranging the rafters with relation to the plate that the rafters are disposed at the projecting corners of the plate, a larger bearing will be secured for the rafters on the plate than if the plate were round or circular. Each rafter adjacent its outer end is formed with a downwardly projecting perforated ear 24, preferably formed by slitting the rafter at its outer end at the junction of the vertical flange with the horizontal flange and bending down the extremity of the horizontal flange. The latches 15, previously referred to, each pass beneath the horizontal flange of the corresponding rafter, as shown clearly in Fig. 2, thus not only locking the roof sections to each other at the joints but locking the roof sections and rafters together. It will be seen that this construction provides for a very easily assembling of the rafters with the roof sections and an easy means of fastening the roof sections together to form a complete roof. Furthermore, this arrangement permits the ready removal of the roof sections from the rafters where repairs or replacement are required. Each roof section is provided at one or more points with downwardly extending ears 25, these ears being vertically slotted as at 26 and these ears 25 with the downwardly turned ears 24 on the rafters are adapted to be bolted or otherwise secured to the reinforcing angle iron 6 at the top of the side wall of the bin, as shown clearly in Fig. 3. Preferably, this engagement of the lugs 24 and 26 to the angle iron will be secured by means of bolts passing through the angle iron and through the perforations or slots in the ears 24 or 25. By slotting the ears 25 provision is made for any buckling or distortion of the metal plates forming the roof sections.

The roof section is preferably provided with an opening closed by a sliding door 27, this opening being used for the purpose of filling the bin. To this end one of the sections is cut away to form the door-opening and the metal at the side edges of the door opening is bent upward and then downward to form the beads 28, as shown in Fig. 4. Strips 29 are attached to the inner face of the roof section along the side edges of the door opening and projecting slightly beyond the beads 28. A transverse strip 30 is also attached to the inner face of the section and extends across the top of the door opening and projects slightly beyond the edge of the same. The door 27 slides in the guides thus formed. This door is provided with the upwardly projecting flanges 31 which engage beneath the overturned beads 28 and the side margins of the door rest upon the strips 29. It will thus be seen that a perfectly weather proof joint is provided between the roof section and the sliding door and that when the door is closed it is entirely protected from the entrance of water around the edges of the door, the upper end of the door projecting into the space between the strip 30 and the superposed margin of the door opening. The door may be provided with any suitable handle whereby it may be opened and with any suitable locking means.

In order to brace the structure against overturning by high winds I connect thereto the guy-wires 32, as shown in Fig. 1. Preferably, these guy-wires are attached to the rafters 19 and to this end the outer ends of the rafters are provided with pivoted loops 33, as shown in Fig. 2 to which the inner ends of the guy wires are connected. These loops being pivoted may be shifted into any desired angular relation to the rafters, thus permitting the guy-wires to take any desired angular relation and be attached at any suitable distance from the bin, as circumstances may require.

It is to be noted that these loops 33 are disposed exteriorly of the lugs 24 and 25 so that the loops will be exterior to the side wall of the bin. It will also be noted from Fig. 3 that the outer margin of the roof projects a considerable distance beyond the side walls, thus preventing the entrance of rain. The lugs 24 and 25 support the roof sections and permit the roof sections to be

so adjusted that a ventilating space may be left between the angle iron 6 and the roof for the free admission of air into the upper portion of the bin.

In order to provide for a proper ventilation of grain contained within the bin so that any moisture in the grain may be carried off, I provide the ventilating flue designated 35, as shown in Fig. 3. At its upper end the flue projects through the opening 23 in the plate 21 and through the opening 18 in the roof. The lower end of the flue opens to the air beneath the floor of the bin. The upper end of the flue projects slightly above the roof and is closed by a ventilating cap or cowl 39 comprising a central tube section 40 which is inserted into the upper end of the flue. From the upper end of this section 40 extends downward and outward the disk 41 and supported above this disk 41 on brackets 43 and in spaced relation thereto is the conical cap 42. Preferably, the lower disk, as illustrated in Fig. 1, is cut away as at 44 at a plurality of points to permit the disk to fit down over the beads 13 of the roof joints. The angle of the disk 41 is more acute than the angle of the roof and hence the margin of the disk 40 will rest on and fit snugly against the roof and thus prevent the entrance of rain into the opening 18.

It will be seen that the roof projects beyond the side wall of the bin so as to prevent any possible entrance of the rain and yet that the roof may be so adjusted as to permit air to enter beneath the eaves and pass into the bin. It will further be seen that no rain can enter around the ventilating flue because of the close contact between the margin of the plate 41 and the roof sections, and further that moisture cannot possibly enter between the joints of the roof sections, or through the joints between the roof sections and the sliding door.

The roof sections are so formed that they may be readily engaged with each other and with the rafters, or disengaged therefrom, without the use of skilled labor. They may be thus readily shipped, handled and set up when desired, and inasmuch as the roof sections may be readily taken apart (which is also true of the bin structure) it will be plain that the structure as a whole may be readily taken apart and as readily set up again.

Having thus described the invention what is claimed as new is:—

1. In a roof structure of the character described, adjacent roof sections, one of which is provided with an upwardly extending flange, along one margin, and the other with an upwardly, laterally and downwardly extending flange along its adjacent margin adapted to lap over the first-named flange, a rafter having a horizontal and a vertical flange, the vertical flange being disposed between the interlocked flanges of the roof sections, a looped member disposed parallel to the margin of one section, and a tongue member attached to the other section extending transveresly of the joint between the two and the joint between the rafters and having its extremity disposed between the first-named member and the section and bent over upon the outside of the first-named member to thereby detachably hold the roof sections in engagement with each other and in engagement with the rafter.

2. In a structure of the character described, a sheet metal roof having a door opening, the metal at the lateral margins of the door opening being upwardly bent and then downwardly bent to form lateral parallel beads, a strip disposed at the end of the door opening on the under side of the roof and overlapping the door opening, strips disposed on each side of the door opening and extending beneath said beads, and a sliding door having upturned flanges engaging within said beads, said door resting on the lateral strips and the end of the door being adapted to engage between the end-strips and the material of the roof.

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

JOHN E. ALLSTEADT. [L. S.]

Witnesses:
ERNEST HOEPPNER,
JASON J. DUMAS.

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