J. E. ALLSTEADT.

METALLIC STORAGE BIN.

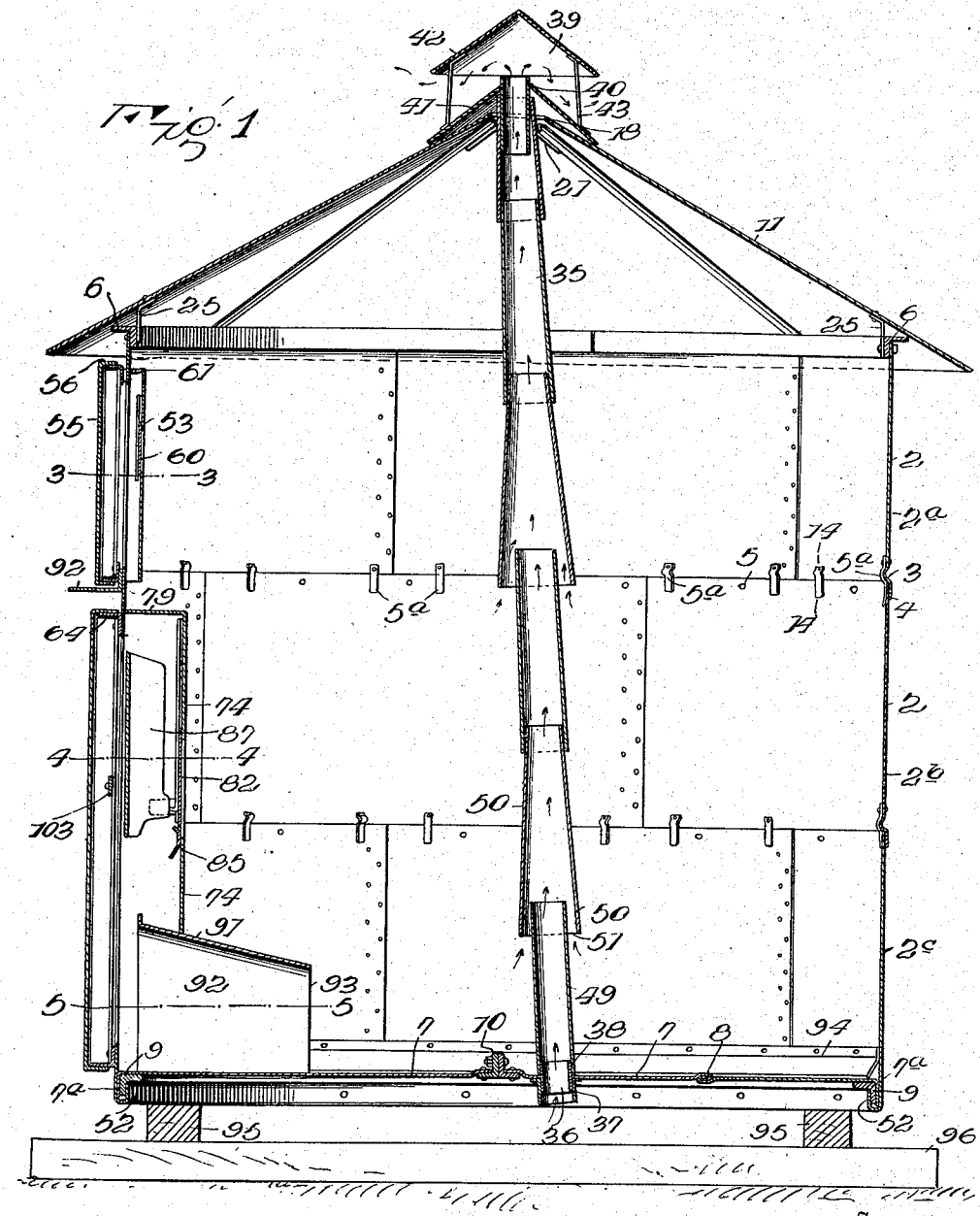
APPLICATION FILED JAN. 28, 1914.

1,191,141.

Patented July 18, 1916.

2 SHEETS—SHEET 1.

FIG. 1



Inventor

J. E. Allsteadt

Witnesses

W. T. Woodson

By

Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO. WASHINGTON, D. C.

J. E. ALLSTEADT.

METALLIC STORAGE BIN.

APPLICATION FILED JAN. 28, 1914.

1,191,141.

Patented July 18, 1916.

2 SHEETS—SHEET 2.

Fig. 2.

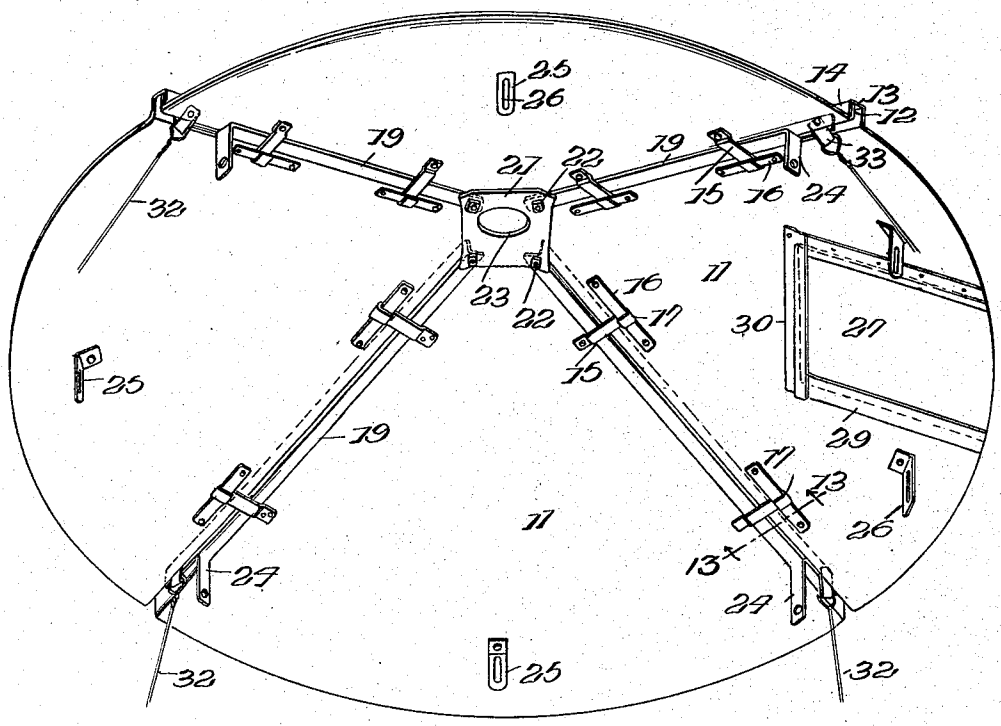


Fig. 3.

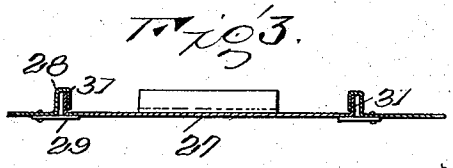


Fig. 4.

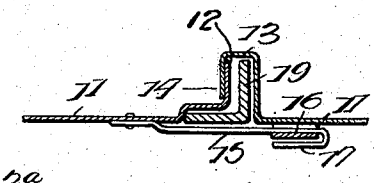


Fig. 5.

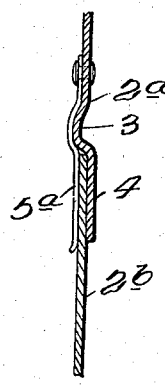
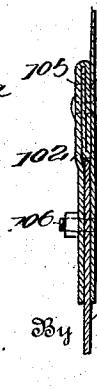


Fig. 6.



Witnesses

W. T. Woodson

Inventor

J. E. Allsteadt

By

Attorneys.

UNITED STATES PATENT OFFICE.

JOHN E. ALLSTEADT, OF HASTINGS, NEBRASKA.

METALLIC STORAGE-BIN.

1,191,141. Specification of Letters Patent. Patented July 18, 1916.

Application filed January 28, 1914. Serial No. 814,959.

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 Metallic Storage-Bins, of which the following is a specification.

My invention relates to metallic structures, and particularly to metallic storage bins.

The primary object of my invention is to provide a storage bin, particularly adapted to contain grain, of such construction that the grain may be kept in perfect condition and protected from the inroads of mice and rats and constantly ventilated so that any moisture in the grain may be dissipated and the grain thus kept from rotting.

A further object of the invention is to so construct the storage bin that it may be formed in readily transportable sections easily connected to each other and easily set up at any desired location and without the necessity of the services of an expert metal-worker.

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

A further 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 or 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 the provision of a ventilating flue passing vertically through the bin so arranged as to cause an upward draft of air at all times through the flue and so formed as to provide for carrying away any moisture which may be in the grain.

A further object is to provide a bin with an upper receiving-door, a lower door-closed opening from which the grain may be shoveled, and an intermediate opening likewise closed by a door and provided with a grain spout so that the greater portion of the grain contained within the bin may be readily discharged into wagons.

A further object is to so construct the bin and doors that when the door is closed any entrance by mice or rats will be prevented and the chute will be supported against accidental dislodgment by animals.

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

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

Figure 1 is a vertical central section of a bin constructed in accordance with my invention. Fig. 2 is a perspective looking toward the inside of the top of the bin detached. Fig. 3 is a detail cross sectional view across the sliding door at the top of the bin. Fig. 4 is an enlarged fragmentary sectional view on the line 13—13 of Fig. 2. Fig. 5 is a fragmentary section on the line 14—14 of Fig. 1. Fig. 6 is a vertical section on the same line as Fig. 5 but showing a modified form of joint.

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.

Referring to Figs. 1 and 2 it will be seen that the bin is circular in cross-section and comprises upstanding side walls, a conical roof, made in sections, and a bottom made in sections. The sides of the bin are formed of sheets of metal 2, the sheets being fastened to each other by bolts at the vertical joints so as to form bands of metal extending around the bin. The vertical joints between the sections are formed as illustrated in Figs. 1 and 5. Preferably, the lower edge of each section, as illustrated in Fig. 5, is formed with an inwardly extending bead 3, the metal below the bead being extended outward and then downward as at 4 so as to lap over the upper edge of the next adjacent section 2. As shown, the bin is constructed of three tiers of metallic sections, the upper tier being designated 2^a, the next tier below being designated 2^b and the third or lowest tier being designated 2^c. It will, of course, be understood that any number of sections or tiers may be used, depending upon the height of the structure. The overlapping margin 4 of one section or tier is held to the upper margin of the next

adjacent section by means of bolts or rivets 5, disposed at suitable intervals and for the purpose of supporting one tier upon another until the sections have been riveted or bolted to each other by the bolts 5, I provide upon the inside face of the upper section at the lower margin thereof the downwardly projecting cleats 5^a which are preferably made of metal. These cleats extend downward below the lower edge of the upper section and are slightly curved to conform to the bead 3 of the upper section and then extend downward and outward. When an upper section is placed upon the lower sections these cleats act to support the superjacent section while the rivets or bolts are being put in place. This permits one man to place the sections one upon another and to rivet or bolt them together without the necessity of having the sheets otherwise supported while the rivets or bolts are being put in place. This construction adds very much to the ease with which the parts may be assembled. The uppermost tier of sections designated 2^a, is braced, and held rigidly to a circular form by a sectional angle iron 6, the vertical flange of each angle iron extending downward on the inside of the sheet metal side section and horizontal flange extending outward over the top edge of the section. There may be as many sections of the angle-iron 6 as required, but preferably there are two, each semi-circular in form and of such size that the adjacent extremities of the angle irons overlap so that the angle irons may be bolted or riveted to each other as well as to the upper margin of the wall of the bin. The bottom of the bin is made in a plurality of sections, preferably two sections, each of these sections being segmental in form, each section being designated 7. Each section of the floor or bottom may be made of as many pieces or sheets of metal as may be necessary, the sheets being riveted to each other and preferably formed with interlocking joints as at 8. The outer margin of each section 7 is reinforced by a semicircular angle iron section designated 9 which is riveted or bolted to the metal of the section 7 and the inner or diametrical margins of each section 7 are reinforced by means of angle irons 10 riveted or bolted to the sections. The angle irons 9 have a horizontal flange and a downwardly extending vertical flange and the angle irons 10 have their vertical flanges extending upward. When the sections of the bottom or floor are placed together the vertical flanges of the angle irons 10 abut against each other and the sections are held to each other by means of bolts passing through these vertical flanges. A packing may be disposed between these vertical flanges, if desired. These angle irons 10 therefore not only act to provide means whereby the two sections of the floor may be connected to each other but also act as reinforcing means, strengthening the floor or bottom against downward depression under the weight of the grain contained within the bin.

As illustrated in Figs. 1 and 2, the roof is substantially conical in form and is formed of 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 edge 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. 4. 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 the ventilating flue. Extending radially from this central opening are a plurality of rafters 19, each rafter, as shown in Fig. 4, 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. 4. 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 rafters and roof sections together. It will be seen that this construction provides for a very easy 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. 1. 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.

One of the roof sections 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. 3. 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 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. 2. 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. 1 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. 1. At its upper end the flue projects through the opening 23 in the plate 21 and through the opening 18 in the roof, this opening being central. As illustrated in Fig. 1, an open ended thimble 37 is riveted or otherwise attached to the sheet metal forming the floor sections 7, this thimble having a flange to permit of this attachment. A sleeve 36 extends partly into this thimble and partly into the lower end of the lower section of the flue 35 and holds the lower end of the flue in registry with the opening and securely but detachably connected to the thimble 37. I do not wish to be limited to this manner of connecting the lower end of the flue 35 to the floor or bottom section 7 as it will be obvious that other means might be arranged for supporting the lower end of the flue and making a close joint between the floor section and the flue and preventing ingress of mice or rats into the bin. The upper end of the flue, as before stated, passes up through the opening 18 and projects slightly above the roof. The

upper end of the flue is closed by a ventilating cap or cowl designated 39. This cap comprises a central tube section 40 which is inserted into the upper end of the flue. From the upper end of this flue section 40 extends downward and outward a disk 41, and supported above this disk 41 on brackets 43, and in spaced relation thereto is the conical cap 42. It will be seen that the angle of the disk 41 is more acute than the angle of the roof and hence that the margin of the disk 41 will rest on and fit snugly against the roof and thus prevent the entrance of rain into the opening 18.

The ventilating flue 35 is constructed of sheet metal and may be in one piece or in sections, as desired. It is provided along its length with openings permitting the outward passage of air but so arranged as to prevent the passage of grain.

In order to connect the side wall of the bin to the bottom thereof, the lower margin of the lowest tier 2^c of the metallic sections forming the wall is bent underneath the vertical flange of the angle-iron 9 and then bent upward inside this flange as at 52. By this construction it will be seen that the lower edge of the side wall is caused to overlap the downwardly turned margin 7^a of the metal forming the floor section 7, thus entirely closing the joint between the metal of the floor section and the angle iron and forming a joint which will not permit the entrance of insects or small animals of any kind. Of course, the inwardly turned lower margin of the side wall may be riveted or bolted to the vertical flange or angle iron 9, but I have not found that this is necessary in practice.

While the door 27 is for the purpose of loading the bin or permitting access to the upper portion thereof I also provide a loading door opening 53, as shown in Fig. 1. The margin of this door opening is strengthened by angle irons 54 having outwardly extending flanges forming the door frame. The outwardly extending flanges of the upper and lower angle irons 54^a are laterally extended at one side to form a support for the pivots upon which the door 55 is hung. This door 55 may be made of sheet metal provided at its margins with inwardly turned flanges 56 which are so disposed that when the door is closed the flanges will fit over and have snug engagement with the outwardly projecting flanges of the angle irons 54 and 54^a. The upper and lower flanges 56 are extended beyond the inside margin of the door for engagement with the ears formed by the extensions of the flanges 54^a and are pivoted to these extensions by means of bolts 57 or other suitable pintles. The door is provided with any suitable hasp 58 engaging with the keeper 59 on the body of the bin and permitting the door to be locked when closed. Interiorly of the door opening 53 there is attached to the wall of the bin the plate 60 having inwardly inclined side edges riveted to the wall of the bin, this plate being provided with the central opening 60^a closed by a sliding door 60^b, and having an integral grain cap 61, as shown in Fig. 1. Below the opening 53 the side wall of the bin is formed with a discharge opening closed by a door 62. The door opening is relatively long and as illustrated, extends across the two tiers 2^b and 2^c, the lower portion of the door opening being disposed only about two inches above the floor section 7. This door opening is framed on the exterior by angle irons 63 and 64 which are riveted to the sheet metal forming the wall of the bin, these angle irons having outwardly projecting flanges. The angle irons 64 are extended laterally at one end to form ears 65. The door 62 is also framed by outwardly projecting flanges 66 and 67 so disposed that when the door is closed the flanges will have snug engagement with the outwardly projecting flanges of the angle irons 63 and 64 and the angle irons 63 are extended laterally to form ears 68 through which pintle bolts 69 pass. The door is provided with a hasp 70 adapted to engage with the keeper 71 whereby the door may be locked to its closed position. Above the door frame is a weather cap 72 which projects out far enough to extend entirely beyond the upper angle iron 64 and beyond the door when the door is closed, thus preventing rain from dripping down upon the door and possibly entering the bin in this manner.

In order to provide for the removal of grain from the bin by means of a spout so that when sufficient grain is in the bin the grain may be conducted to a wagon and allowed to run by gravity thereinto, I mount upon the inside face of the bin the casing 73, as illustrated in Fig. 4. This casing consists of a sheet of metal 74 extending approximately parallel to the wall of the bin, the side margins of the sheet being inwardly bent as at 75 and then laterally bent as at 76 and riveted to the wall 2 by rivets 77. The sheet metal 74 forming the back of the casing 73 is formed with a central opening 78 and on each side of this opening there are provided guides 81 between which slides a door 82 having a handle 83 whereby it may be readily raised and lowered. This door 82 constitutes a cut-off which permits a regulated quantity of grain to pass through the opening 78. The lower edge of this cut-off when the cut-off is closed, abuts against a strip 85 (see Fig. 1) which extends across the outer face of the plate 74 at the bottom of the door opening. This strip 85 is outwardly flared along its upper edge so as to permit the slide or cut-off when closed to pass into the space between the upper mar-

gin of the strip and the plate 74, and the lower margin of the strip is outwardly bent to extend beneath a pivoted chute or spout 86, when the latter is open. This chute or spout is also made of sheet metal and has upwardly extending sides 87 formed at their upper ends with laterally deflected ears 88, these ears being pierced for the reception of the pivot pins 89 projecting inwardly from brackets 90 riveted or otherwise secured to the outer face of the plate 74, as shown clearly in Figs. 2 and 4. The space between the plate 74 and the outer wall of the bin is of sufficient depth to permit the spout to be turned up so as to lie entirely within this space, as illustrated in Fig. 1. When, however, the spout is turned down, it will project beyond the outer walls of the bin in position to discharge grain either directly into a wagon or into a chute leading to a wagon or other receptacle. The upper end of the casing 73 is closed by a grain cap 79, as seen in Fig. 1, the outer edge of this cap being convexly rounded to conform to and rest against the inner face of the bin wall. The grain cap is preferably formed integral with the plate 74.

Immediately beneath the lower edge of the plate 74 there is disposed a downwardly and inwardly extending plate 91 which forms the top of a passage 92. This plate 91 is downwardly bent at the sides as at 93 and rests upon the bottom or floor 7 of the bin. The downwardly and inwardly inclined top 91 of this passage 92 will cause any grain which may be resting upon this top to slide off into the bottom of the bin, when the level of the grain in the bin is reduced below the level of this wall 91. At the same time the passage 92 permits the grain in the lower portion of the bin to be shoveled out and discharged through this passage 92 after the level of the grain has fallen below the level of the discharge opening which is closed by the slide 82. While ordinarily, when the bin is full, grain will be discharged through the opening closed by the slide 82 or cut-off, yet it is always possible to enter the passage 92 and shovel the grain out from the bottom of the bin, as the roof of this passage will support any grain and prevent the filling up of this passage with grain. The strip 85 is for the purpose of preventing grain from leaking through the joint between the upper rear end of the spout 86 or chute and the outer face of the plate 74 and thus preventing the lodgment of grain upon the outer projecting end of the roof 91 of the passage.

In order to prevent the possible lodgment of grain in the joint between the side wall of the bin and the floor in a position where it is difficult to remove the grain I preferably attach to the inner face of the side wall a downwardly and inwardly extending strip 94, as illustrated in Fig. 1, which strip extends over the joint between the bottom or floor of the bin and the side wall thereof. The bin may, of course, be supported on any suitable foundation, and this foundation may be so constructed as to permit the ingress of air beneath the bin so that the air may pass up through the central ventilating flue. I have shown for this purpose transversely extending wooden sills 95 upon which the bin rests, these sills being in turn supported upon suitable foundation sills 96 or other suitable foundation, it being designed to lift the structure sufficiently from the ground to permit air to freely pass beneath the structure.

While I have shown in Fig. 1, a joint which I have found to be particularly practical and sufficient for the purpose of connecting one tier of the sections forming the side wall to the next tier, I do not wish to be limited to this as other forms of joint might be used.

In Fig. 6 I show another manner of connecting the adjacent sheets. In this figure the sheet 2^a is lapped over the sheet 2^b and a batten 102 is attached to the sheet 2^a by a rivet 103. This batten is formed with a folded margin 104 so as to form the batten of three thicknesses at one end. The rivet 103 is passed through these three thicknesses. A socket is thus formed between the downwardly extending portion of the batten 102 and the adjacent face of the plate 2^a within which the upper margin of the plate 2^b is inserted. A bolt 106 is passed through the plates 2^a, 2^b and the downwardly extending margin of the batten 102.

The angle irons 63 are perforated at intervals to permit a brace 103 to be transversely positioned across the opening through which the spout 86 operates and thus hold the spout in its raised position and prevent any unauthorized tampering with the cut-off slide 82.

As before remarked, this device is particularly intended to be shipped in sections and set up by the purchaser at any desired location. It is for this reason that the parts are made of sheet metal so as to be light, and so formed as to be conveniently connected to each other. The bin may be set up in any suitable location and is readily transportable to some other location whenever desired. When set up it is thoroughly strong and is proof against the inroads of rats, mice and insects. The grain is ordinarily discharged either into the receiving door in the roof of the bin or into the upper door 53. The upper door 53 is found particularly convenient for "spouting" the grain into the bin directly from a threshing machine. As the bin is filled, boards are disposed across the opening so as to prevent pressure of the grain from forcing the doors of the bin.

When the bin is filled to capacity there will be a draft of air passing up through the center of the mass of grain at all times and any moisture which may be contained within the grain will be thereby dissipated, thus preventing the grain from "sweating" and rotting.

When it is desired to remove the contents of the bin the grain may be discharged either through the opening controlled by the cut-off 82 or through the passage 92, as desired. I have found the cut-off and spout of great convenience in filling wagons from the bin and also for using the grain for feeding purposes, it being possible to allow a very small quantity of grain to pass out from the bin and then to close the slide again. It will be noted that when the door 62 is closed it is impossible for stock to accidentally open the door and thus get at the grain within.

With reference to Fig. 1 it will be seen that the roof projects sufficiently beyond the side wall to prevent any possible entrance of rain and yet that the roof may be so adjusted as to permit air to enter beneath the eaves and pass into the bin, as desired. 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. The same care has been taken in forming the joints of the roof sections and the joints between the roof sections and the doors to prevent any possible entrance of moisture or prevent the entrance of animals, and it is also obvious that insects or small animals cannot enter the bin through the ventilating flue inasmuch as the lower end of this flue is raised above the ground and further, inasmuch as the flue is made of sheet metal.

My improved storage structure is simple, easily assembled, easily transportable, and has been found thoroughly effective in practice.

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

1. A sheet metal structure comprising a body, a bottom having a depending rim arranged in contact with the lower edge portion of the body and an angle iron disposed beneath the bottom with its horizontal flange in contact with said bottom and its vertical flange in contact with the depending rim thereof, said body having its lower edge portion bent inward beneath the said depending rim and the vertical flange of the angle iron, thence upward and against the inner face of the said vertical flange, with its upper edge in contact with the horizontal flange of the angle iron.

2. A sheet metal structure comprising a body, a bottom having a depending rim arranged in contact with the lower edge portion of the body, an angle iron disposed beneath the bottom with its horizontal flange in contact with said rim thereof, said body having its lower edge portion bent inward beneath the said depending rim and the vertical flange of the angle iron, thence upward and against the inner face of the said vertical flange, with its upper edge in contact with the horizontal flange of the angle iron, and a metal strip attached at its upper edge to the body and having its lower edge portion bent inward to overhang the outer portion of the bottom and in contact therewith to confine the same upon the horizontal flange of the angle iron.

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

JOHN E. ALLSTEADT. [L. S.]

Witnesses:
J. H. UERLING,
JASON J. DUMAS.

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