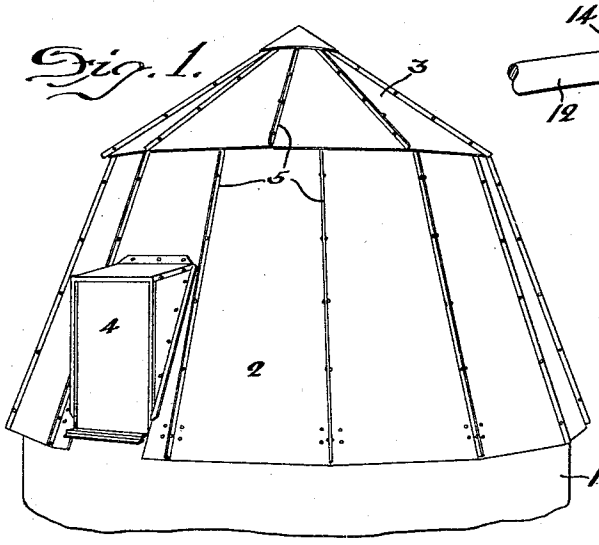
Oct. 6, 1931. W. D. BAYLEY 1,826,378

SILO TOP

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Fig. 1.



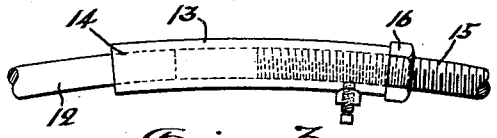


Fig. 3.

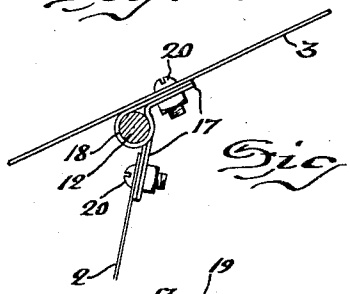


Fig. 4.

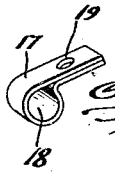


Fig. 5.

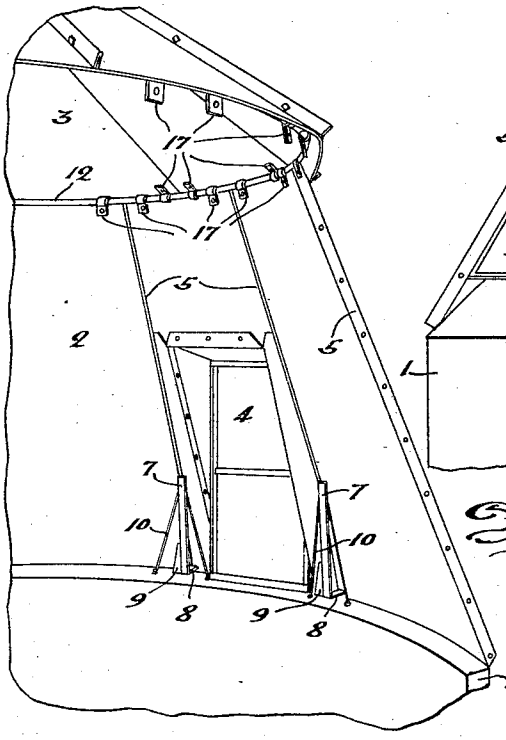


Fig. 2.

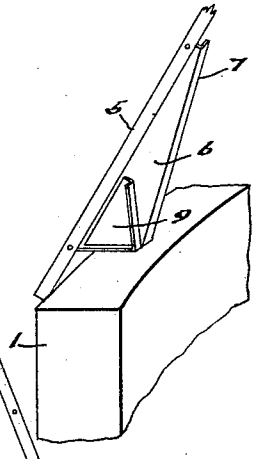


Fig. 6.

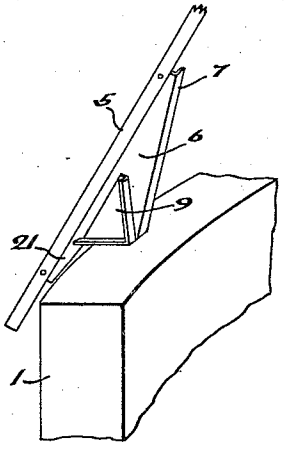


Fig. 7.

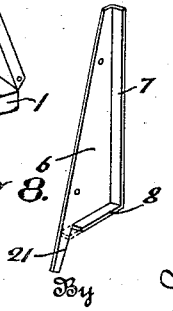


Fig. 8.



Fig. 9.

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SILO TOP

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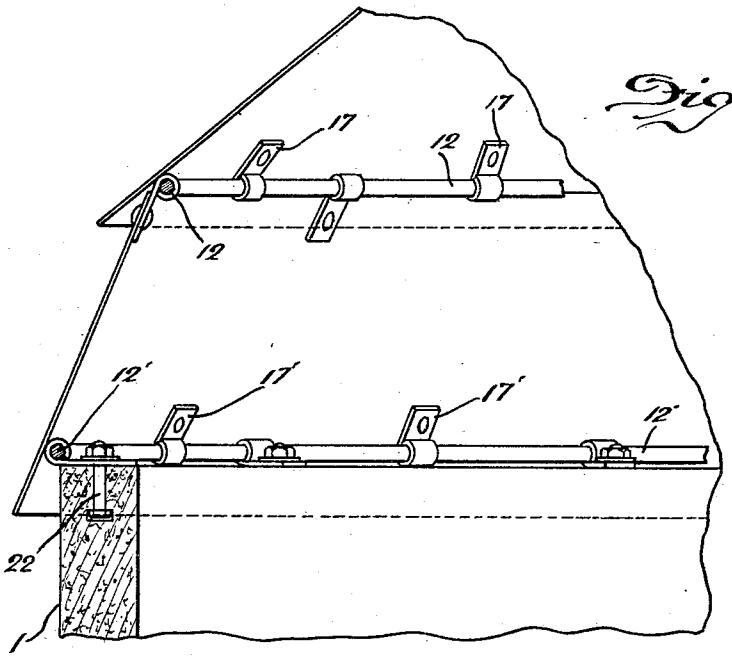


Fig. 10.

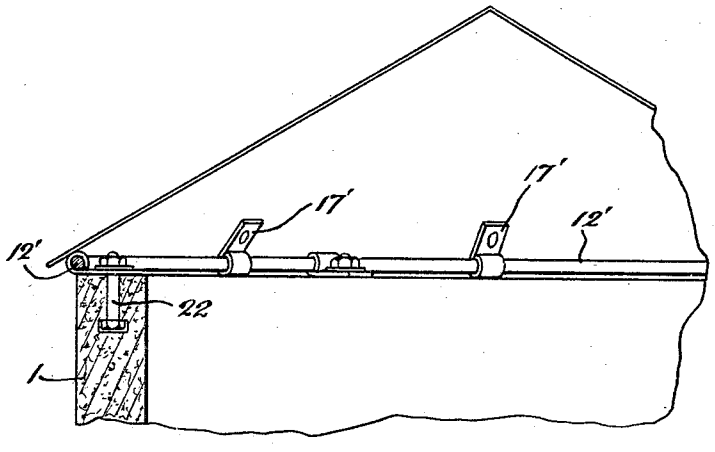


Fig. 11.

Inventor

William D. Bayley

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Attorney

Patented Oct. 6, 1931

1,826,378

UNITED STATES PATENT OFFICE

WILLIAM D. BAYLEY, OF SPRINGFIELD, OHIO

SILO TOP

Application filed June 15, 1928. Serial No. 285,604.

My invention relates to silos, and more particularly to the silo roof and the method and means for assembling the parts of the roof structure and attaching the roof to the side walls. Whether the walls of the silo structure be of wood, metal, concrete or tile the roof or top section is usually of sheet metal. Such sheet metal roof or top structure is ordinarily shipped "knocked down" or in separate sections to be assembled at the place of erection of the silo. Silo structures are frequently erected by farm labor unskilled in building construction practice and hence more or less difficulty is sometimes encountered in securing proper registry of bolt holes and alignment of connections, the relative relation of which is necessarily predetermined.

Silo roof structures are ordinarily of the mansard type, including a truncated conical lower section and a conical cap of low altitude superposed thereon. The present invention embodies an improved form of coupling between the cap portion and sub section of the top which will compensate for inequalities and inaccuracies of assembly, and to further provide improved means for supporting such roof structure upon the main body or side walls of the silo.

It is a common and usual practice to provide annular angle bar flanges upon the cap and sub sections of the roof structure which flanges have registering holes through which bolts are to be inserted upon erection of the structure. It is found that unskilled farm labor, who are unfamiliar with building construction frequently get such parts out of true, or bent more or less into elliptical form so that the flanges of the respective sections will not properly match. To overcome this difficulty there is provided in the present instance a hoop or ring formed of round rod stock with compensating means by which the rod may be expanded or contracted to meet the requirement of the roof structure after erection. Both of the roof sections are provided with eyed straps which encircle the hoop or coupling ring, and are slidingly adjustable thereon to compensate for irregularities or necessary relative adjustment of the roof parts. The structure is supported upon the side walls of the silo by rests or feet, located interiorly of the sub-section of the roof and formed from sheet metal, the margins of which are inserted in standing seams by which successive sections of the roof structure are interconnected. Such rests or feet are laterally flanged on their inner and bottom margins and reinforced by flanged sheet metal sections welded thereto. Such construction affords a staunch stable connection of the roof structure parts one with another and with the silo walls, which will permit a limited range of variation in the assembly.

The object of the invention is to simplify the structure, as well as the means and mode of assembly of silo tops or roofs whereby they will not only be cheapened in construction, but will be more efficient in use, easily assembled, strong, durable, and unlikely to get out of repair.

A further object of the invention is to provide a roof structure wherein the parts may be fixedly and securely coupled one to the other and which will permit a limited range of compensating adjustment in the assembly.

A further object of the invention is to provide an expansible and contractible coupling hoop or ring and relatively adjustable connections between such ring and the respective roof sections.

A further object of the invention is to provide improved supports or rests for the roof structure by which it is connected to the side walls of the silo.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists to the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the accompanying drawings, wherein is shown the preferred, but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a perspective view of the assembled silo top or roof to which the present invention applies. Fig. 2 is a perspective interior view of a

portion of such roof structure, thus illustrating the supporting and attachment features forming the subject matter of the present invention. Fig. 3 is a detail view of the adjusting connections for the expansible and contractible coupling ring or hoop. Fig. 4 is a detail sectional view of the coupling connection between the cap and sub sections of the roof structure. Fig. 5 is a detail perspective view of one of the coupling straps. Fig. 6 is a detail view of one of the supporting seats or rests for the roof. Fig. 7 is a similar view of a modification of such foot or rest by which the top is adjustable to silo structures of different size. Fig. 8 is a detail perspective view of one of the supporting feet or rests detached from the roof structure. Fig. 9 is a detail view of the reinforcement member for the supporting foot.

Figs. 10 and 11 illustrate modifications of the roof anchoring means employing the adjustable coupling ring.

Like parts are indicated by similar characters of reference throughout the several views.

Referring to the drawings, 1 is the main structure or side walls of the silo upon which is mounted the roof structure which is of the mansard type, comprising a sub section 2 and a cap portion 3. The sub section 2 is of truncated conical form inclined inwardly but slightly from vertical, while the cap 3 is of conical form of a very much lower altitude. The sub section 2 is provided with a dormer door 4 for filling purposes. Both the sub section 2 and cap 3 are formed from sheet metal and consist of a succession of tapered gores interconnected by standing seams 5.

The roof structure is supported upon the top of the side walls 1 by a series of triangular rests or feet 6. These rests or feet 6 comprise sections of sheet metal shown in detail in Figs. 6, 7 and 8, which are flanged along their inner margins as at 7 and on their base margins as at 8. The inclined margins of such rests or seats 6 are inserted within the standing seams 5 of the sub section of the roof where they are secured by the same bolts or rivets employed to unite the successive gores of the roof structure. The flanges 7 and 8 serve to stiffen such supporting rests or seats. However, to further strengthen and stiffen such rests triangular flanged reinforcement plates 9 are attached to the rests or supports 6 by spot welding. These reinforcement plates are disposed with their lateral marginal flanges and base flanges turned in a direction opposite to those of the supports or rests 6 and with their base flanges registering with those of the supports. The base flanges of the supports or rests 6 and their reinforcement plates 9 bear upon the top margin of the side walls 1 of the silo and afford a comparatively broad bearing surface. The roof structure is further anchored to the side walls by diagonally inclined brace rods or wires 10—10 secured to the upper ends of the rests or supports 6 and attached to the walls 1 of the silo structure in spaced relation at opposite sides of such support as shown in Fig. 2.

In erecting such roof structure it is not unusual for the unskilled farm laborer to distort the sub section 2 out of true circular form so that the prelocated bolts or rivet holes ordinarily provided will not properly register with each other. To compensate for such distortion or inaccuracy of assembly there is provided in the present instance a compensating coupling connection. To this end there is provided an annular hoop or coupling ring 12 formed from round rod stock. For convenience of shipping and storing this ring is preferably, though not necessarily, formed in two or more sections to be interconnected with each other by an ordinary pipe coupling or any other suitable form of connection. This hoop or coupling ring 12 is further provided with an expansible and contractible coupling by which the ring may be adjusted to agree with the sub section 2 of the roof structure after erection. A simple and economical form of adjustable coupling is illustrated in Fig. 3 wherein there is shown a short length of pipe or tubing 13 welded or otherwise secured at 14 to the end of the rods 12 comprising the coupling hoop or ring. The opposite end of the split hoop or ring 12, although screw-threaded as indicated at 15, is free for longitudinal sliding adjustment to and fro within the sleeve 13. A nut 16 screw-threaded upon such portion 15 by its adjustment serves to withdraw the threaded end of the rods 12 from the sleeve 13 thereby expanding the hoop or ring. Upon reverse adjustment of the nut 16 the rod 12 is permitted to enter to greater extent within such sleeve, thereby permitting a contraction of such coupling ring or hoop. Secured to the cap 3 and also to the sub section 2 of the roof structure at spaced intervals are eyed straps 17, one of which is shown in detail in Fig. 5. These coupling straps 17 may be merely strips of sheet metal bent upon themselves to form loops or eyes 18 with their ends overlapping and having therein registering perforations 19 to receive attachment bolts 20. These straps 17 may be initially secured to the roof sections 2 and 3 and the coupling ring 12 passed therethrough. However, a more convenient mode of assembly is to string the straps 17 upon the coupling hoop or ring 12, and subsequently attach such tie straps 17 to the respective sections. These eyed straps 17 are slidingly adjustable upon the coupling rings 12 to permit their to and fro

adjustment thereon to bring the holes 19 into registry with the corresponding holes in the roof sections to receive the bolts 20. Obviously the ring 12 may be distorted out of true circular form to such degree to conform to the erected shape of the sub section 2. Likewise, after assembly of the roof sections and their interconnection by such coupling ring the coupling ring may be expanded by adjustment of the nut 16 to afford sufficient tension to render the structure rigid and to take up any play and looseness and thus increase the bracing and stiffening effect to be produced by the expansion or contraction of the coupling ring 12, as may be necessary after the completion of the erection of the silo top. It is quite desirable and effective in preventing rattle or clatter of the sections under influence of wind and such bracing or stiffening effect better enables the silo top to withstand high wind pressure. The structure as a whole is rigid and durable and is capable of being easily and quickly assembled. By shifting the rests or seats 6 to different positions longitudinally of the standing seams 5 by registering their holes with different holes in the standing seams the top is readily applicable to silo walls of different diameter. The same effect may be achieved by making the rests or seats of less length as shown in Fig. 7 and providing thereon a tail portion 21 to extend downwardly beyond the top of the silo wall to accommodate such foot or rest to the same bolts or rivet holes as are employed in Fig. 6 in adapting the top structure to a silo of greater diameter. By this means a few standardized sizes of top or roof structures can be easily accommodated to a considerable range of diameters.

The roof construction herein described is especially designed for use upon silo walls of wood, tile or concrete, but it may also be applied to metal silo walls. The supporting feet 6 are employed when the silo is constructed of material other than sheet metal. While the brace wires 10 are shown in Fig. 2 connected to the supporting brackets or sheets it will be understood that they may be attached anywhere upon the roof structure and secured to bolts or anchor attachments in the top of the silo wall or to the hoop, or otherwise secured as may be found desirable or necessary. The elliptical condition above referred to is most likely to be found in the wall of the silo construction rather than in the lower section of the roof. The difficulty encountered in attempting to fit a round roof to an elliptical silo wall is minimized by the present construction which can be easily and readily adapted to any reasonable degree of wall distortion. This adjustment is facilitated by the use of the coupling hoop or ring which obviates the necessity of matching or registering bolt holes to make the connection of the upper and lower roof sections. The use of this coupling means makes the connection sufficiently flexible as to the location and registry of parts to easily accommodate the roof structure to silo walls which vary through a considerable range of distortion from accurate circular formation. While several methods of assembly of the members 17 and ring 12 have been described, a quite practical and convenient method is to separate the arms of the members 17 sufficiently to permit them to be pushed over the ring or hoop 12 at the desired places where they may be brought into easy registry with the holes for the connecting bolts 20.

Instead of shifting the supporting feet 6 upon the roof structure to accommodate the roof to silos of different diameter, as a practical alternative the manufacturer will carry in stock a limited number of such feet or supporting brackets of different sizes to meet the requirements of standard sizes of silos and can easily supply supporting brackets or feet 6 of special dimensions to meet the requirements for odd sizes of silos. It is regarded as easier and commercially more practical to manufacture and carry in stock these comparatively small duplicate parts by which a standard size top can be accommodated to silos of different dimensions throughout a considerable range than it would be to make the tops themselves special.

While the roof construction has been described as comprising two sections interconnected by means of the coupling ring or hoop 12 and attached to the silo walls by brackets or feet 6, it is to be understood that the hoop or ring coupling employed for connecting the roof sections may also be applied to connection of the roof structure with the silo walls. Such a construction is shown in Fig. 10 wherein a hoop or ring 12′ similar to the ring 12 before described is located at the base of the roof structure and interconnected with the roof and with the top of the silo walls 1 by spaced eyed straps 17′ similar to the straps 17 before described. One lot of eyed straps 17′ is secured to the side walls 1 of the silo structure by bolts 22 embedded therein while a second lot of eyed straps engaging the said coupling ring or hoop 12′ is bolted to the sheet metal panel of the roof structure as before described. It is not necessary that the roof structure shall be of the double section or mansard type. This construction is equally applicable to a single pitch roof as is shown in Fig. 11. The use of this ring 12′ for coupling the roof structure to the silo walls not only affords secure anchorage, but as before mentioned, it permits the roof structure to be readily accommodated to silo walls of varying diameters and especially to walls of more or less irregular or elliptical outline.

From the above description it will be apparent that there is thus provided a con-

struction of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions and arrangement of parts, without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention is described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific details shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. A silo top of the mansard type comprising a truncated conical subsection formed from sheet metal and having standing seams, and triangular foot rest members interposed in said seams at the lower interior portion of the section to support the roof section upon the side walls of the silo.

2. A silo top comprising a sub section and a cap section superposed thereon, said sub section being formed of a plurality of sheet metal gores united by standing seams, inwardly projecting vanes forming supporting feet for the structure fixedly secured within the standing seams and adapted to rest upon the side walls of the silo structure.

3. A silo top comprising a section formed of a plurality of sheet metal gores united by perpendicular seams, and supporting feet therefor comprising sections of sheet metal having their inner and bottom margins laterally flanged, and having their outer unflanged margins extended within the standing seams of the section and connected therewith in inwardly extending radial positions adjacent to the lower margin of the section.

4. A silo top comprising a section formed of a plurality of sheet metal gores united by perpendicular seams, and supporting feet therefor comprising inwardly projecting pieces of sheet metal having their outer margins projected within the standing seams of the section and reinforcement means attached to said pieces to stiffen them against lateral bending.

5. A silo top of the mansard type comprising a cap and a sub-section, eye pieces secured to said cap and sub section, and an adjustable coupling ring having engagement with said eye-pieces and by its adjustment subjecting the roof portions to circumferential tension independently of the tensioning of the walls of the silo structure.

6. The combination with a circular sheet metal silo top, of an expansible and contractible ring attached thereto, and means for adjusting the ring to tension the silo top independently of adjustment of the silo walls.

7. The combination with a sheet metal silo top of tensioning means therefor carried by said top, including an expansible and contractible ring, by the adjustment of which the silo top is expansively tensioned.

8. In a silo top, a substantially circular roof section, a plurality of spaced loops carried interiorly thereby, an expansible and contractible ring located interiorly of the silo top and extending through the loops, and means for expanding the ring to tension the roof section.

9. In a silo top, the combination with a roof section, of an annular split ring located interiorly thereof and connected with the roof section, one end of the ring having therein a bore in which the other end is telescopically engaged, means for adjusting the relation of the telescopically engaged ends to expand the diameter of the ring and locking means for securing the ends of the ring in their adjusted relation.

10. In a silo top, the combination with a roof section, of an annular split ring associated therewith, a sleeve forming one terminal of the split ring, the opposite end of the ring being screw-threaded and slidingly adjustable within the free end of said sleeve, a nut threaded upon said screw threaded end and abutting on the said free end of the sleeve to limit the entrance of said screw threaded end thereinto and means for locking the screw threaded end of the split ring and said sleeve in their adjusted position.

11. In a silo top, a sub-section and a cap section superposed thereon, an annular coupling ring common to both sections, connections between the ring and the respective sections, said ring being expansible and contractible and means for expanding the ring to place said sections under tension.

12. The combination with a substantially circular silo wall and a conical sheet metal roof structure, and a plurality of sheet metal and supporting feet comprising vertical sheet metal plates fixedly connected to the conical roof section adjacent to the periphery thereof, and resting upon the silo wall in radially disposed circumferentially spaced relation.

13. A silo comprising an enclosing wall supporting a top of the mansard type including a truncated conical section and a cap section superposed upon the truncated section, and an expansible and contractible coupling ring common to said truncated conical and cap sections, the roof sections having sliding engagement with the ring relative to each other to compensate for variations of assembly.

In testimony whereof, I have hereunto set my hand this 8th day of May, A. D. 1928.

WILLIAM D. BAYLEY.