Oct. 17, 1939. N. B. HANSON 2,176,712

SILO DOME

Filed July 11, 1938 2 Sheets-Sheet 1

Fig. 2

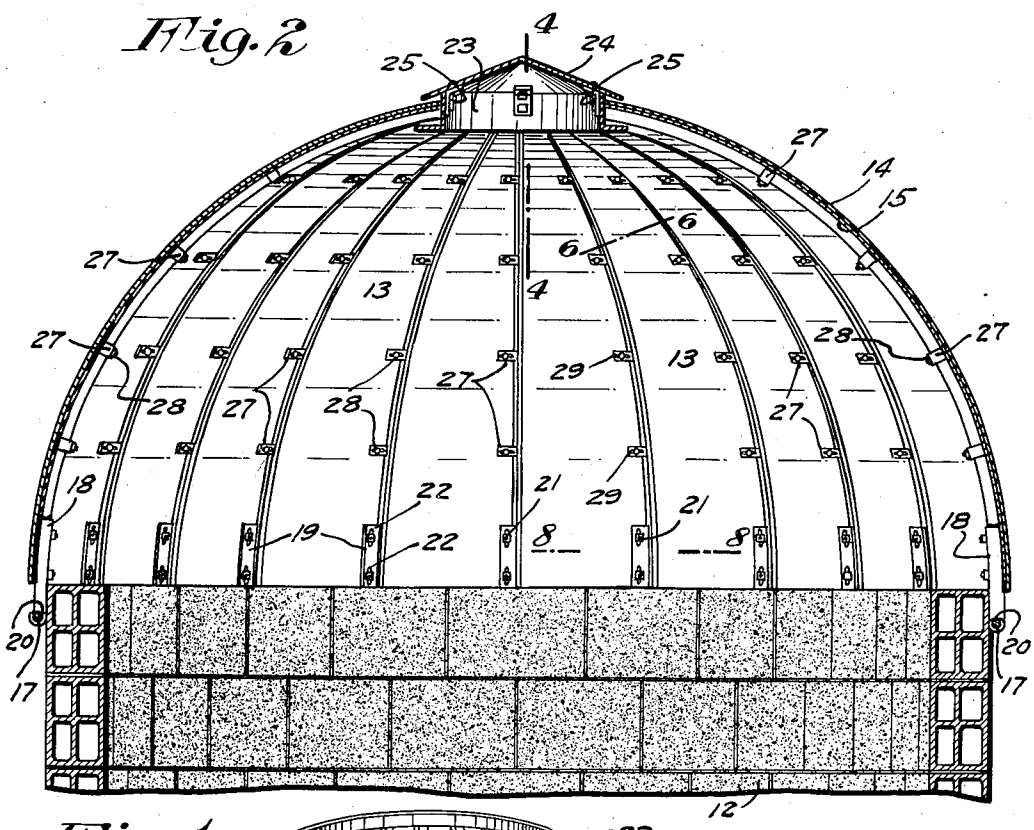


Fig. 1

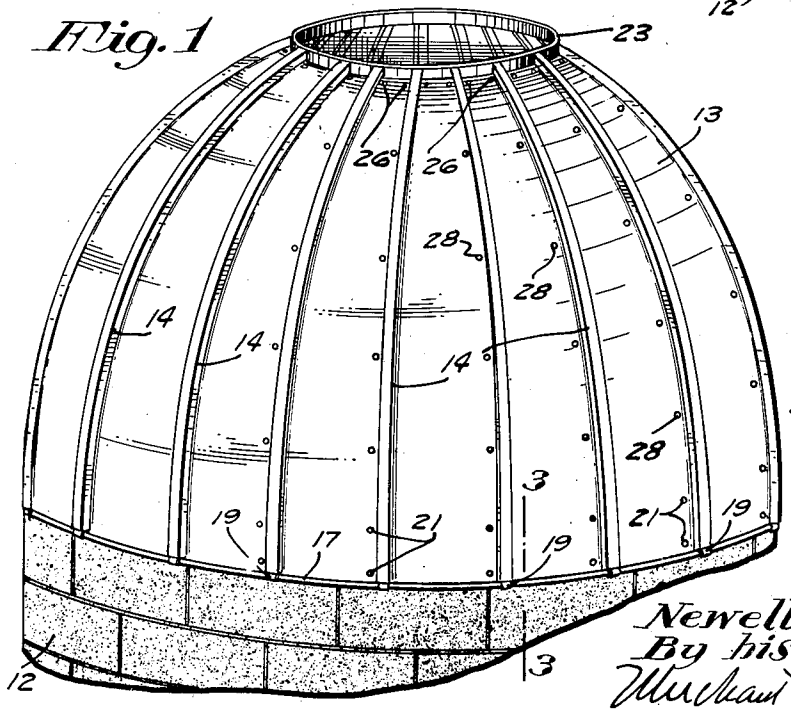
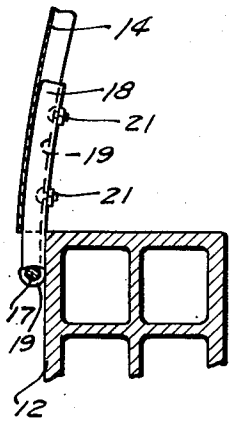


Fig. 3



Inventor
Newell Hanson
By his Attorneys
Marshall & Marshall

Oct. 17, 1939. N. B. HANSON 2,176,712

SILO DOME

Filed July 11, 1938 2 Sheets-Sheet 2

Fig. 5

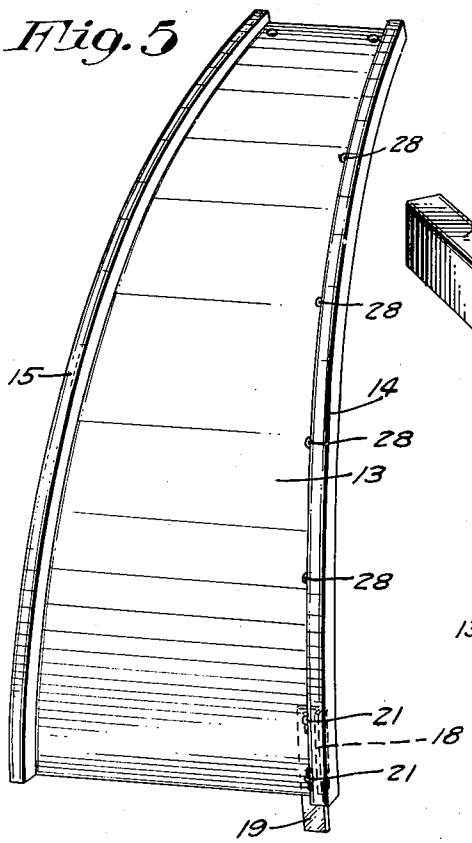


Fig. 6

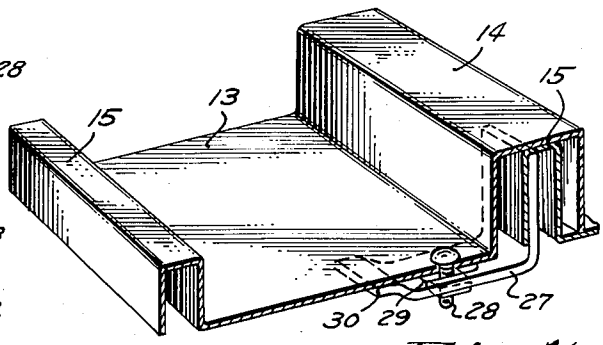


Fig. 7

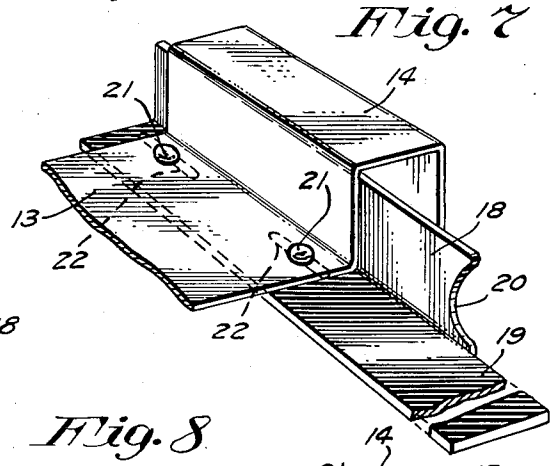


Fig. 8

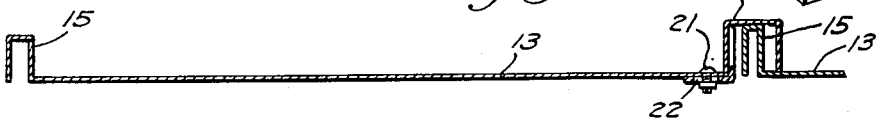


Fig. 4

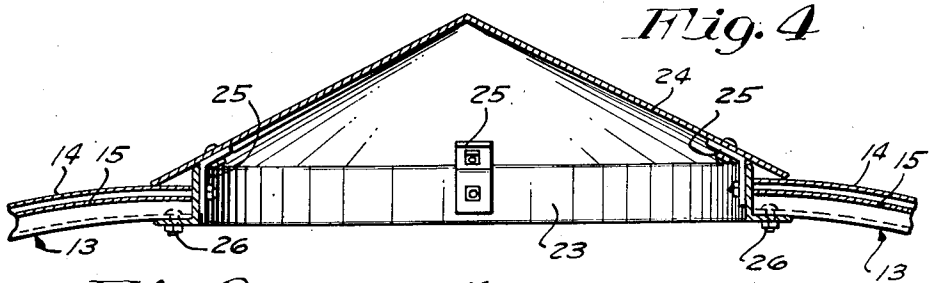
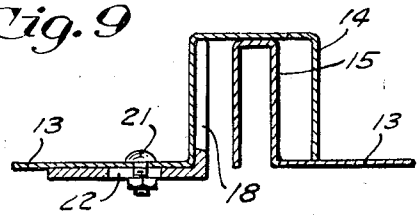


Fig. 9



Inventor
Newell Hanson
By his Attorneys
Murchant & Murchant

Patented Oct. 17, 1939

2,176,712

UNITED STATES PATENT OFFICE

2,176,712

SILO DOME

Newell B. Hanson, Lake Lillian, Minn.

Application July 11, 1938, Serial No. 218,502

8 Claims. (Cl. 108—32)

My invention relates to silos and provides an improved dome therefor. The invention consists of the novel devices, combinations of devices and arrangement of parts hereinafter described and defined in the claims.

Silos, as is well known, are commonly built of concrete blocks, tile bricks or wood and are usually of cylindrical form. My invention provides a dome structure which can be cheaply made of sheet metal, easily and quickly erected and when erected is highly efficient for the purposes had in view in that it is strong, durable and will shed water and protect the contents of the silo against the elements.

The improved dome, which includes a dome body and a dome cap is illustrated in the accompanying drawings wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a perspective showing the portion of the silo body with the improved dome applied thereto, the cap of the dome being removed;

Fig. 2 is a vertical axial section of the parts shown in Fig. 1 and including also the dome cap in working position;

Fig. 3 is a fragmentary section taken on the line 3—3 of Fig. 1;

Fig. 4 is a section taken approximately on the line 4—4 of Fig. 2, some parts being broken away;

Fig. 5 is a perspective showing one of the spherical sections of the dome;

Fig. 6 is a detail in perspective, some some parts being sectioned on the line 6—6 of Fig. 2;

Fig. 7 is a perspective showing several parts shown in Fig. 6, some parts being broken away and the anchoring member being in normal condition before it is bent to perform its anchoring function;

Fig. 8 is a section taken on the line 8—8 of Fig. 2; and

Fig. 9 is a section taken on the same line as the section of Fig. 8 but showing the right-hand joint on a larger scale than in Fig. 8.

The silo body, as indicated, is of cylindrical form and as shown is made up of concrete blocks or tile 12. The body of the dome is made up of a multiplicity of spherical segments 13 that are connected by intermeshing or interlapping marginal lock channels. Each segment 13 is provided at one side with a relatively wide marginal channel-shaped lock flange 14, and at its opposite side with a similar, but relatively narrow lock flange 15.

When the segments 13 are assembled to form the conical dome, the relatively narrow lock flanges 15 of the one segment will be within the relatively wide channels or flanges 14 of adjacent segments; and when thus assembled there will be freedom for lateral spreading and contracting of the segments so that their lower ends thereof may be tightly clamped around the upper outer edge of the silo body. These so-called lock flanges or channels of course very greatly stiffen and reinforce the edges of the segments.

To anchor the lower ends of the segments to the top of the silo body, a strong anchoring hoop or annular rod 17 is provided, and this hoop or anchoring band, by the well known means, such as turn buckles, is adapted to be tightly clamped around the silo body. The lower ends of the segments 13 are directly anchored to the hoop or anchoring rod 17 by means of anchoring members or brackets 18, the bodies of which are preferably of angular form and are riveted, bolted or otherwise rigidly secured to the lower ends of the several segments 13. These anchoring brackets or members 18 are provided with depending flat anchoring lugs 19, that are normally straight but are adapted to be bent around the hoop 17, as best shown in Fig. 3.

These anchoring brackets 18 are made L-shaped in cross section, and the lower ends of the outstanding flanges thereof are preferably formed concave, as indicated at 20, to fit against the anchoring hoop 17 when the ends 19 are bent around said hoops, as best shown in Figs. 1 and 3.

As best shown in Figs. 8 and 9, the outstanding flanges of the anchoring brackets 18 closely engage the inner walls of the channel-shaped lock flanges 14 of the segments 13. Said anchoring brackets 18 are made vertically adjustable by nut-equipped bolts 21 that work in vertical slots 22 and the inner flanges of the brackets 18, see particularly Figs. 8 and 9.

At their upper ends, the segments 13 are terminated considerably short of the axis of the dome and silo and at their interlocked upper ends are placed over the horizontal flange and against the vertical flange of a crown ring 23 that is preferably made from an endless angle bar. The opening through the crown ring 23 is closed by a cap or cover plate 24 that is preferably conical. This cap 24 is rigidly secured to the crown ring 23 by angle brackets 25 that are riveted to the said elements 23 and 24. The edges of the cap 24 project over the upper ends of the segments, forming projecting eaves that hold the upper ends of the segments vertically interlocked between the same and the horizontal flange of said crown ring.

As has been noted, the interlocked upper ends of the segments 13 are quite securely held in the annular channel formed between the horizontal flange of the crown ring 23 and the overlying eave of the cap 24. However, to further anchor the upper ends of the segments, I have shown nut-equipped bolts 26 passed through the upper ends of the segments and the lower flange of the crown ring 23, see particularly Fig. 4.

To hold the interlapped or inter-nested lock flanges 14 and 15 in properly adjusted rigid formation, I provide a multiplicity of spacing brackets that are distributed or spaced vertically along the edges of the segments 13. These spacing brackets 27 are preferably angular or L-shaped in cross section, see particularly Figs. 2 and 6, and are secured to the bodies of the segments 13 by nut-equipped bolts 28 passed therethrough and through slots 29 in said spacing brackets. When the brackets are applied, they closely engage the walls of the narrow lock flanges 15 and not only hold the same properly spaced or in proper lateral adjustment, but press the tops of the said flanges 15 against the tops of the flanges 14. This latter noted action is insured by the fact that the brackets 27 have fulcrum-acting ends 30 that directly engage the under surfaces of the segments 13 and insure pressing of the outstanding flanges of the spacing brackets tightly against the crowns of the flanges 15.

In the drawings I have shown a preferred form of the invention illustrating a complete silo dome such as I have constructed and actually used, but it will be understood that the same is capable of modifications within the scope of the invention herein disclosed and claimed.

In the above described structure not only is the dome made up of the segments circumferentially expansible due to the use of channel-shaped marginal flanges with clearance, but the walls of the nested channels are kept out of contact for the circulation of air and this eliminates or reduces sweating due to the different temperatures of the interior and exterior of the dome elements.

Further advantages of the described structure are that the dome is directly self-supporting on the anchoring rod or hook and independently of the silo wall. The peculiar shape of the bracket 27 with its fulcrum at 30 acts as a combined lock and support and binds together the nested flanges 14 and 15. Also the structure described will free the sheets from capillary action of condensed moisture and the joints positively prevent access of water from the exterior to the interior of the dome.

What I claim is:

1. A dome of the kind described made up of spherical segments having interlocking marginal channel-like flanges, the flanges at the one edge being relatively narrow, and the flanges at the opposite edges being relatively wide, the relatively narrow channel-shaped flanges being nested within the relatively wide channel-shaped flanges thereby permitting circumferential expansion and contraction of the assembled segments, and lock elements attached to the segments adjacent their relatively wide channel-shaped flanges and engaging within the relatively narrow channel-shaped flanges of adjacent segments.

2. A dome of the kind described made up of spherical segments having interlocking marginal channel-like flanges, the flanges at the one edge being relatively narrow, and the flanges at the opposite edges being relatively wide, the relatively narrow channel-shaped flanges being nested within the relatively wide channel-shaped flanges thereby permitting circumferential expansion and contraction of the assembled segments, and angular spacing brackets secured to the segments adjacent their relatively wide channel-shaped flanges and engaged within the relatively narrow channel-shaped flanges of the adjacent segments.

3. The structure defined in claim 2 in which said spacing brackets are rigidly secured to the respective segments with freedom for lateral adjustments.

4. The structure defined in claim 2 in which said spacing brackets are rigidly secured to the respective segments with freedom for lateral adjustments, said spacing brackets being L-shaped in cross section, and their lateral adjustment being permitted by nut-equipped bolts passed through said segments and through transverse slots in the base flanges of said spacing brackets.

5. The structure defined in claim 1 in which said spacing brackets have anchored fulcrum-acting ends remote from their outstanding flanges, the flanges of said brackets engaging the tops of the channel forming flanges of adjacent segments.

6. The structure defined in claim 1 in which said spacing brackets have anchored fulcrum-acting ends remote from their outstanding flanges, the flanges of said brackets engaging the tops of the channel forming flanges of adjacent segments, and nut-equipped bolts securing the said spacing brackets to their respective segments and serving to rock the latter on their fulcrum-acting ends and cause the interlapped channel-shaped flanges of the segments to be pressed together at their crowns.

7. A dome of the kind described made up of tapered segments having interlocking relatively wide and relatively narrow channel-shaped marginal flanges, and angular spacing brackets secured to said segments adjacent the relatively wide marginal flanges and engaging within the adjacent relatively narrow marginal flanges.

8. A dome of the kind described, made up of spherical segments having interlocking channel-shaped flanges and provided at the lower ends with depending brackets, and an endless anchoring hoop surrounding the ends of said brackets, the latter having integral lower ends looped about said hoop, said anchoring brackets having lateral flanges interlapped with the flanges of said segments, and terminating short of and resting upon said hoop.

NEWELL B. HANSON.