Oct. 14, 1930. R. V. PROCTOR 1,778,606

METALLIC STRUCTURE

Original Filed March 19, 1928

Fig. 1.

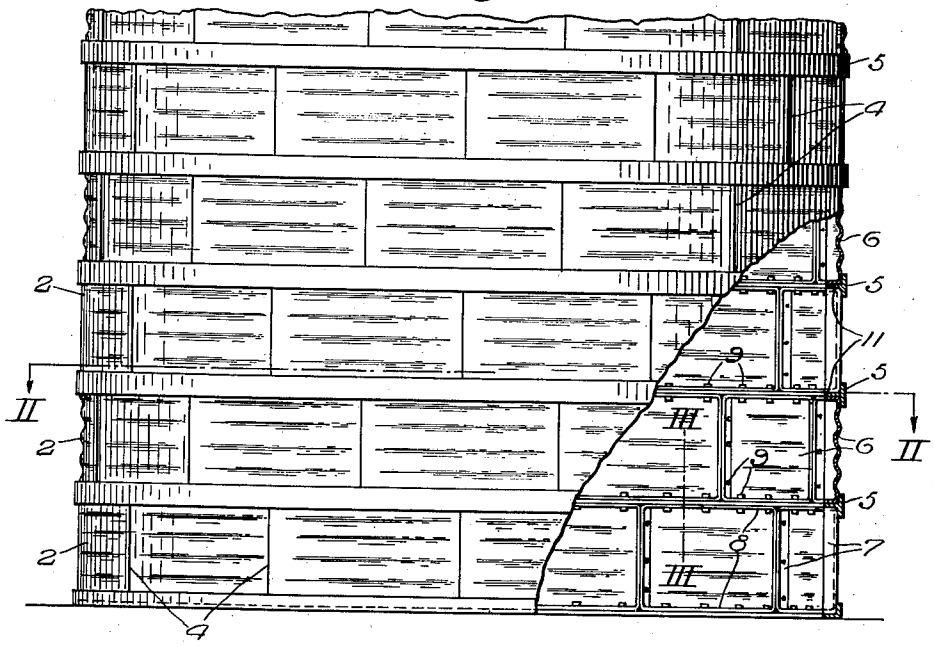


Fig. 2.

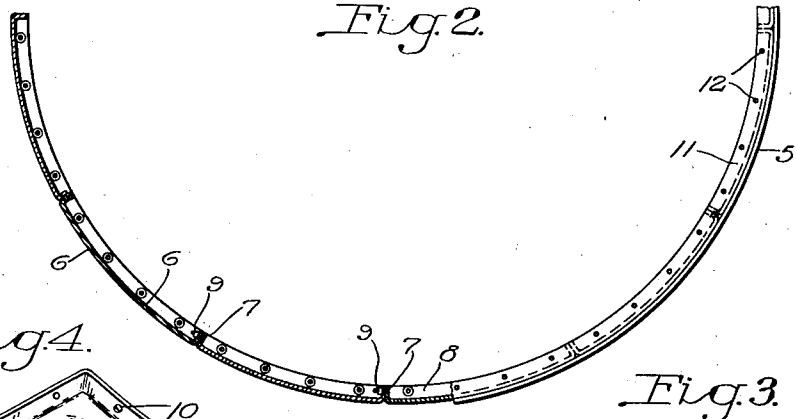


Fig. 4.

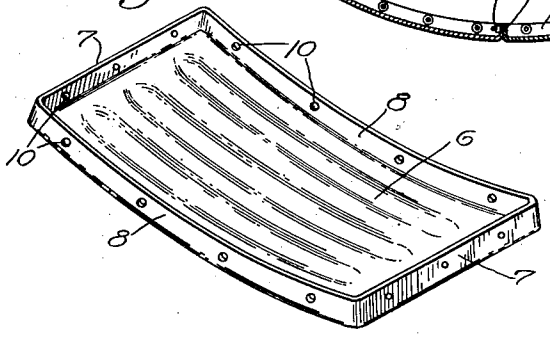
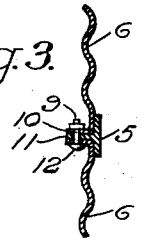


Fig. 3.



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1,778,606

UNITED STATES PATENT OFFICE

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METALLIC STRUCTURE

Continuation of application Serial No. 262,744, filed March 19, 1928. This application filed February 16, 1929. Serial No. 340,592.

This invention relates to metallic structures and more particularly to metallic structures made from a plurality of courses of similar plates and bracing means.

In the manufacture of metallic structures, particularly cylindrical structures such as silos, conduits, tunnel liners and the like, it has heretofore been customary to make the structure in sections or courses that are assembled in side-by-side relation and secured together. The courses are assembled one against the other with the joints in the courses staggered. In such structures stresses of considerable magnitude are exerted circumferentially of the structure, and require circumferentially extending reinforcing bands or hoops that are generally placed entirely externally of the structure. Such reinforcing bands when placed externally of the structures are unsightly when the structure is in the form of a building such as a silo.

If the structure is disposed on one end as is the case of a silo, the bands are liable to slip longitudinally of the structure. Where the structure rests on its side the application of external bands to completed courses after they are assembled offers considerable difficulty. This is especially true where the structure is utilized as a tunnel liner and an attempt is made to work a completely external band over a finished course. In many tunnels such an operation is impossible by reason of the pressure exerted by the earth against the external surfaces of the tunnel liner.

I provide a metallic structure, preferably of cylindrical shape, for use as buildings, tunnel liners, conduits and the like, which comprises a plurality of courses or sections that are placed in side-by-side relation or, in the case of a structure standing on one end, the courses are placed in a super-imposed position, with their joints staggered. Each section or course is made up of a plurality of plate units having securing flanges directed inwardly of the structure at substantially right angles. The flanges of adjacent units are provided with alined openings through which bolts are passed.

This construction presents a neat outer appearance to the different courses and to the entire structure without the presence of projecting edges which increase the over-all dimensions of the structure. Adjacent courses are secured together by similar fastening bolts. To meet the circumferential stresses to which the structure is subjected, I provide bracing bands secured between certain of the courses.

A preferred form of bracing band is a shaped beam of conventional shape, here illustrated as a T-iron, the flange of which is inserted between the flanges of different courses with the securing bolts extending through the flanges of the different courses and the flange of the reinforcing band.

The accompanying drawings illustrate the present preferred embodiment of the invention.

Figure 1 is a fragmentary elevational view, partially in section, of a metallic structure, in the form of a silo, embodying my invention;

Figure 2 is a fragmentary sectional view thereof taken along the section line II—II of Figure 1;

Figure 3 is a detail sectional view taken along the line III—III of Figure 1; and

Figure 4 is a perspective view of one of the wall units.

Referring to Figure 1, there is shown a metallic structure, in the form of a cylinder resting on one end, comprising a plurality of courses or sections 2 super-imposed one upon each other with their joints 4 in staggered relation. Reinforcing bands 5 are inserted between certain of the courses for strengthening the structure against circumferential strains which are caused by either external or internal forces as where the structure is imbedded in the earth, or where the structure is filled with material such as in a silo.

Each of the courses comprises a plurality of corrugated plates 6 shown in Figure 4, having end flanges 7 and longitudinally extending side flanges 8. These flanges 7 and 8 extend outwardly at substantially right angles to the body portion 6. For improving the appearance of the structure, for providing engaging surfaces for the bands 5 and for

keeping the dimensions of the structure as defined by the bands 5 close to the dimensions of the plate courses, the flanges 7 and 8 extend inwardly of the structure.

The end flanges 7 and the side flanges 8 of adjacent units are fastened together by bolts 9 extending through holes 10 in the flanges 7 and 8. With this construction a single row of bolts serve to secure each joint. The bands 5 are constituted by metallic bands disposed circumferentially of and overlapping adjacent courses 2 and having a flange 11 extending between the courses.

The flange 11 is provided with openings 12 for the bolts 9. While a number of metallic shapes of standard form can be used for the reinforcing band, I have illustrated a commercial T-iron having the stem of the T inserted between the courses and the head of the T engaging the corners of adjacent wall units 6. By having the flanges 7 and 8 on the plates 6 extend inwardly of the structure and by supporting the bands 5 between adjacent courses in close engagement with the outer surface of the plates 6 a very rigid, neat and compact structure is obtained.

While the embodiment of the invention illustrated in the present application is mounted on one end, as in a silo or other building structure, the structure may be laid on its side and used for a wide variety of purposes such as for conduits and tunnel liners.

While I have illustrated and described a preferred form of my invention, it will be understood that it may be otherwise embodied within the scope of the following claims.

I claim:

1. A metallic silo, comprising a plurality of courses each made up of a series of plates having flanges thereon, and means for securing adjacent courses comprising a circumferentially arranged band disposed in part between adacent flanges and in part externally of the plates for engaging and supporting the outer faces of adjacent plates.

2. A metallic silo comprising a plurality of courses each made up of a series of connected plates having flanges thereon directed inwardly of the structure, means for securing adjacent flanges of different courses, and a circumferentially disposed band of T-shape having its flange inserted between a pair of adjacent courses and its head disposed outwardly of said inwardly directed flanges and cooperating with the securing means.

3. A metallic structure comprising a plurality of courses each made up of a series of plates having flanges thereon, and means for securing adjacent courses comprising a circumferentially arranged band disposed in part between adjacent flanges and in part externally of the plates for engaging the outer edges thereof.

4. A metallic structure comprising a plurality of courses each made up of a series of connected plates having flanges thereon, means for securing adjacent flanges of different courses, and a circumferentially disposed band of T-shape having its flange inserted between a pair of adjacent courses and cooperating with the securing means and its head engaging the external courses of adjacent plates.

5. A metallic structure comprising a plurality of courses, each made up of a series of connected plates having flanges thereon and a circumferentially disposed band of T-shape having its flange inserted between a pair of adjacent courses and its head engaging the external corners of adjacent plates.

In testimony whereof I have hereunto set my hand.

ROBERT V. PROCTOR.