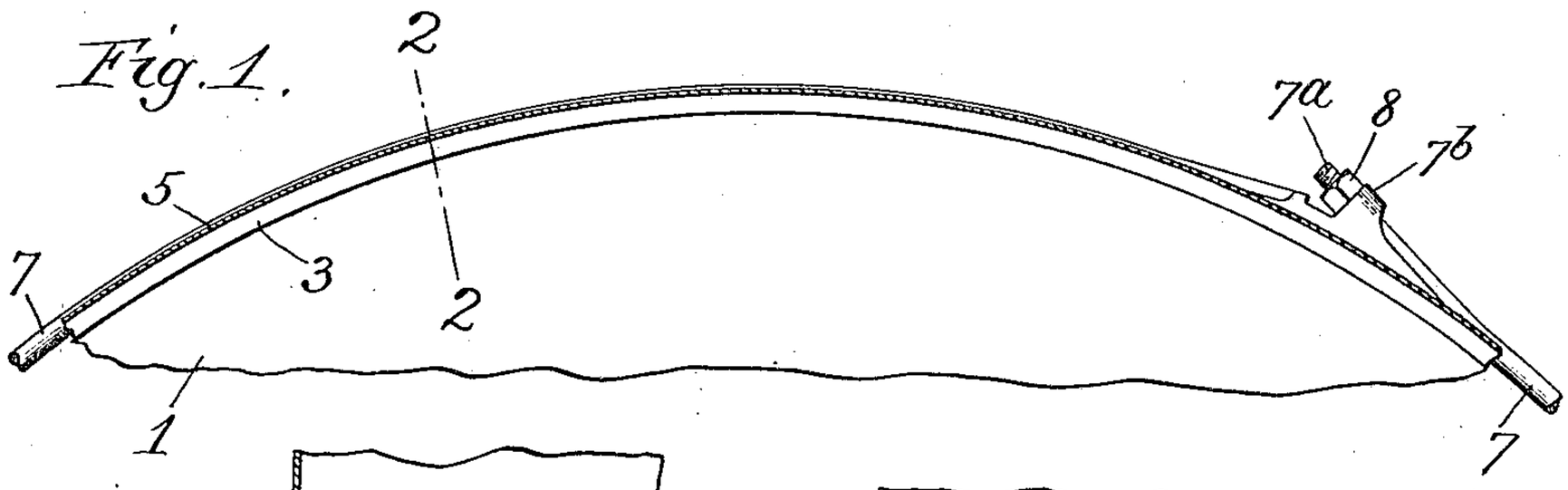
No. 831,719. PATENTED SEPT. 25, 1906.

A. HAHN.

SHEET METAL TANK.

APPLICATION FILED MAR. 28, 1904.

Fig. 1.



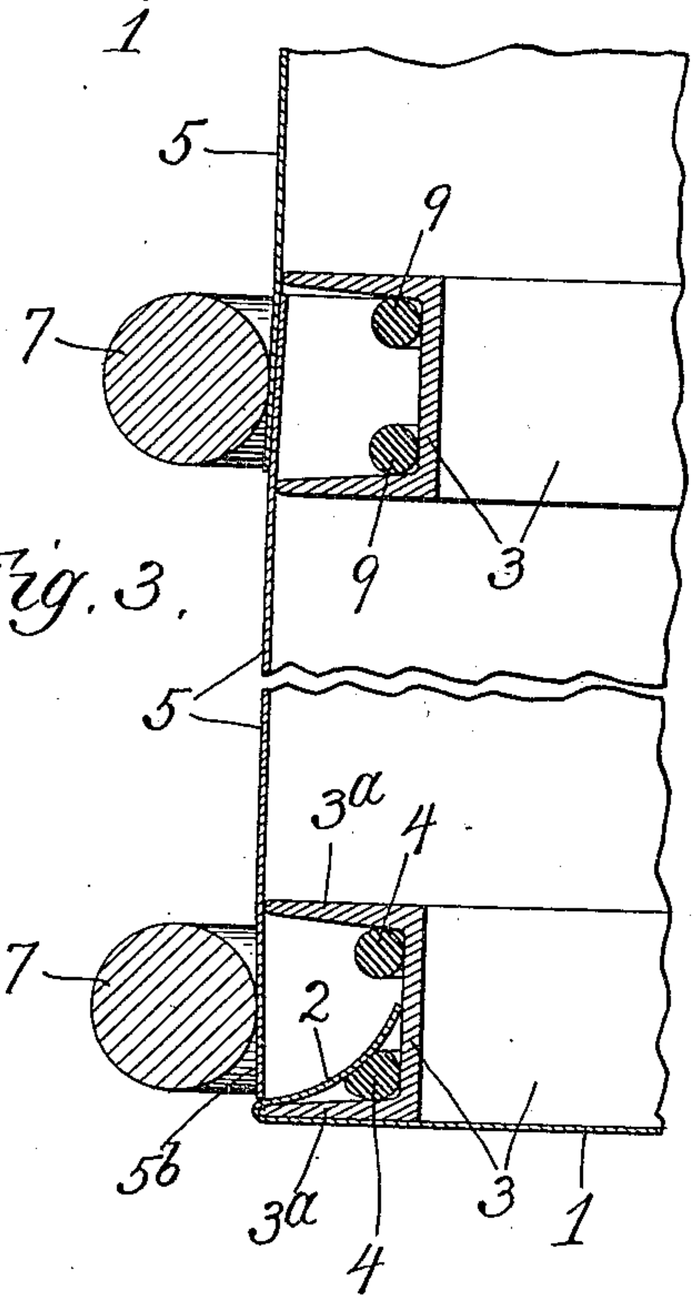


Fig. 3.

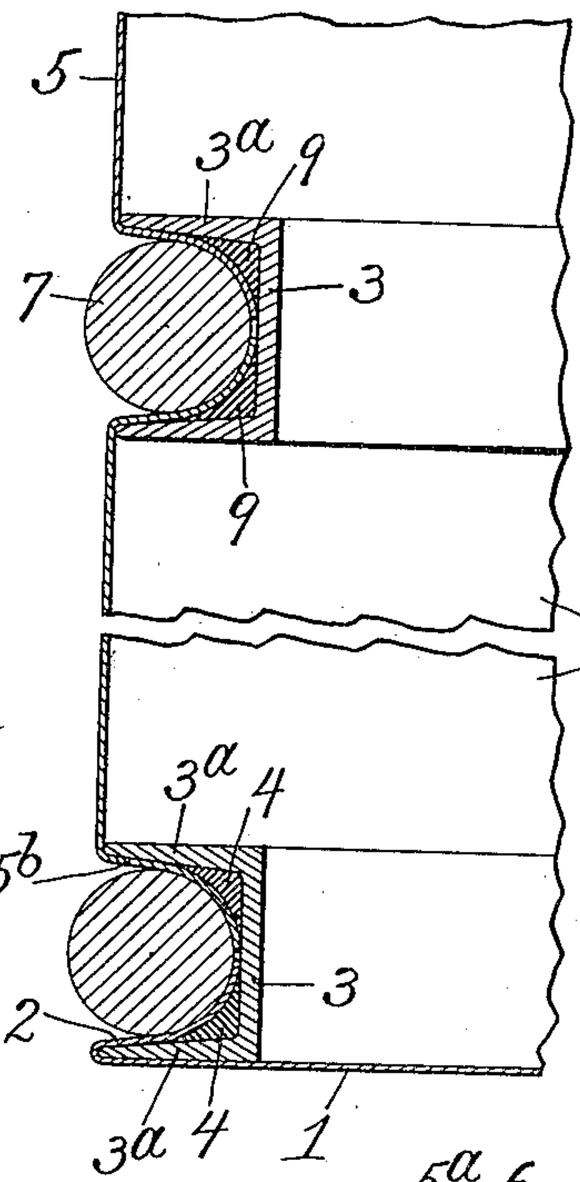


Fig. 2.

Fig. 4.

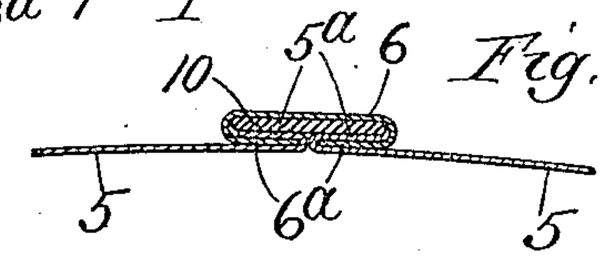
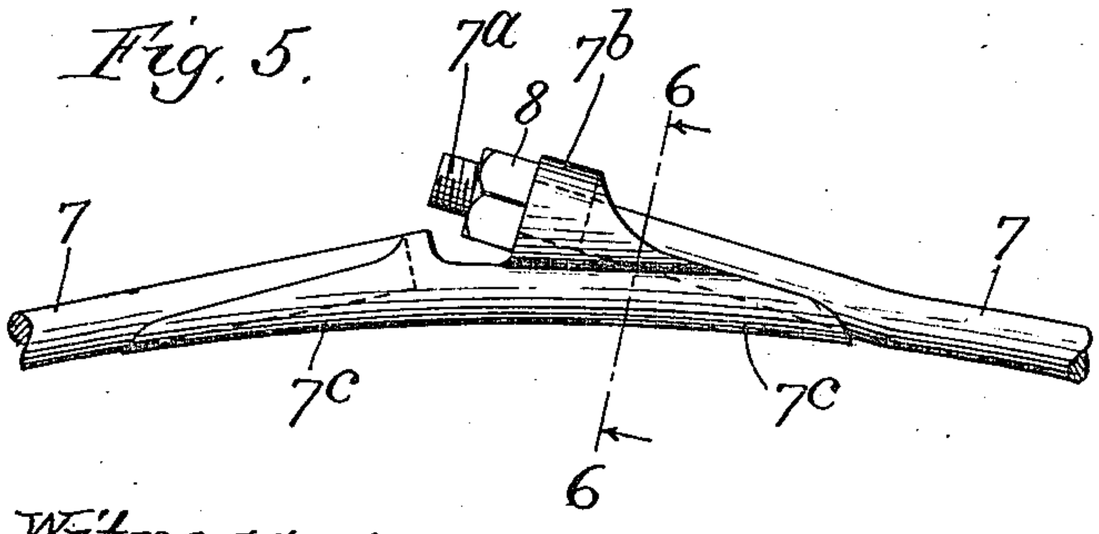


Fig. 5.



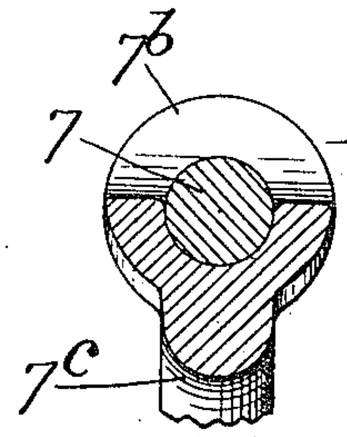


Fig. 6.

Witnesses,
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Inventor,
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UNITED STATES PATENT OFFICE.

ANDREW HAHN, OF CHICAGO, ILLINOIS.

SHEET-METAL TANK.

No. 831,719. Specification of Letters Patent. Patented Sept. 25, 1906.

Application filed March 28, 1904. Serial No. 200,295.

To all whom it may concern:

Be it known that I, ANDREW HAHN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Sheet-Metal Tanks, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved structure for sheet-metal tanks, troughs, and like devices adapted to be shipped "knocked down" and adapted to be assembled and completed by the user without special tools or expertness in the sheet-metal workers' art.

It consists in the features of construction set out in the claims.

In the drawings, Figure 1 is a transaxial section of a segment of a cylindrical tank embodying my invention. Fig. 2 is an axial section at the line 2 2 on Fig. 1, showing the parts full size as to thickness of the metal and diameter of the binding rod or hoop, broken away between the joints which are shown in the section. Fig. 3 is a similar view showing the parts of the joints before the same have been closed up by tightening the outer clamp or hoop. Fig. 4 is a section across a longitudinal seam of the body. Fig. 5 is a detail side elevation showing the junction of the two ends of the outer clamp. Fig. 6 is a section at the line 6 6 on Fig. 5.

In constructing my improved knockdown tank as shown in the drawings the ends or heads 1, of which only one is shown in the drawings, are made with a peripheral flange 2, which as the parts are prepared for shipment is partly clenched over one of the flanges 3^a of the exteriorly-channeled ring 3, which is designed to operate as an inner clamp or reinforce of the seam by which the bottom is joined to the side or body, a packing-strip 4, preferably of the form known as "rope" packing or wicking, being interposed between the inturned flange 2 and the corresponding flange of the channeled ring, as seen in Fig. 3, if the tank is to be watertight. In this form the heads will occupy the minimum space in shipping. The side or body portion 5 is designed to be shipped flat or snugly rolled or coiled, and for the purpose of being readily joined up in the proper cylindrical form when the tank is to be cylindrically inclosed the lateral edges are provided with outwardly-reflexed flanges 5^a 5^a, adapted to be engaged by the clasp 6, which is formed with inwardly-reflexed flanges 6^a 6^a and have room for a packing-strip 10, which may be encompassed between the outer surfaces of the flanges 5^a and the inner surface of the clasp 6, as may be understood from Fig. 4. This longitudinal seam is not claimed in this application, being fully presented and claimed in my pending application, Serial No. 182,053, filed November 21, 1903. When the user has folded up the body and joined the edges at the longitudinal seam, it forms a cylinder of proper diameter to receive its exteriorly-channeled ring or reinforcing-clamp 3, in whose otherwise unoccupied angle there is lodged a rope-packing 4. The exterior groove or channel in the ring is tapered, narrowing from the outer circumference of the ring inward, so that the inner sides of the flanges 3^a are inclined, converging inward, and preferably the width of the groove or channel at the outer circumference of the ring is more than the width of the slant face of the flanges 3^a, so that the portion of the end of the body 5 extending beyond the inner edge of the flange 3^a, which it embraces, as seen in Fig. 3, to the surface of the inturned or partly-clenched flange 2 of the bottom, which stops it, is substantially equal to the width of the slant face of the flange plus half the width of the bottom of the channel after allowing for the presence and thickness of the packing 4. The outer hoop or clamping-ring 7 may now be passed on outside the portion of the body which thus overhangs the channel or groove of the interior ring, and suitable means being applied, as hereinafter described, for tightening up the hoop it easily sinks the overhanging metal of the body into the channel and clamps it and the partly-clenched flange 2 tightly against the packing or against the side and the bottom of the channel if the packing is not present, and by reason of the taper of the groove and converging of the sides of the channel the hoop when in suitable form—as, for example, a round rod, as illustrated in the drawings—binds both the flange 2 and the flange 5^b, which results from the tightening of the clamp and sinking of the metal of the body into the groove, against the opposite sides of the channel in the interior

clamping-ring and also against the bottom of the channel.

For the purpose of tightening the outer clamping-ring or hoop 7 one end of it is threaded, as seen at 7^a, and the opposite end is finished with a forging welded to it comprising a lug 7^b, apertured to admit the threaded end, and a shoe or extended seat 7^c beyond the lug, said shoe being shaped exteriorly so as to fit in a groove or channel of substantially the same form as that which the hoop itself at the remainder of its extent will produce or in which it would fit, and the outer surface is formed to afford a similar seat for the end of the hoop extending over it to enter the eye. This shoe or seat, therefore, tapers from the eye outward to a vanishing-point, so that where it is lapped by the hoop extending to the lug it performs the function of sinking the metal into the body and binding it into the groove of the interior clamp or reinforcing-ring precisely as in the other portion of the hoop. A nut 8, applied on the threaded end after it has been inserted through the lug 7^b, serves to draw up the hoop for tightening it to any extent necessary to sink it and the sheet metal within it into the groove or channel of the interior reinforcing or clamping ring. The process may be assisted if the metal is heavy by tapping the hoop with a hammer throughout the whole circumference as it is tightened up. Preferably the hoop is connected up, the threaded end being inserted through an eye in the lug at the other end and the nut being applied outside the lug, and run on far enough to make the hoop a tight fit around the body before the hoop is applied, and such hoop being then driven on it will be slightly stretched in passing over the inner flange 3^a of the inner reinforcing-ring and will react by contracting slightly after passing said flange, thereby starting the sinking of the sheet metal into the channel, and thus seating itself in the channel ready to be further closed up to complete the sinking and clamping of the sheet metal thereinto. A similar seam is formed at all transverse junctions in the body. Such seam is illustrated in Figs. 2 and 3, the interior clamping or reinforcing ring exteriorly channeled being precisely the same form as that used for making the bottom seam. The proximate edges of the two body elements which are to be connected at such transverse junction are extended, respectively, over the opposite flanges of the ring 3, lapping one outside the other, so that there will be metal enough of each part overhanging the channel to reach substantially to the middle of the bottom thereof when sunken thereinto by the clamping-hoop, and said hoop being applied in the same manner as for closing the bottom seam both edges of the body which thus overhang the groove are sunken thereinto, being drawn out from under and over each other, so that they do not overlap as they are forced down or inward in the groove in which they are tightly clamped upon the packing rings or strips 9 9, previously lodged in the angles of the channel.

An important feature of the present invention is found in the relation of the two marginal portions of the body which are connected at any transverse junction, whether it be the junction of a side element with the bottom or the junction of the two side elements, said relation being such that each of the elements thus joined extends over only one of the flanges of the channeled reinforcing element, so that in sinking these marginal portions into the channel the metal is not longitudinally stretched and circumferentially compressed, as would be the case in sinking by similar means into a similar channel a cylindrical element which extended entirely across the channel, being lodged upon the edge of both. On the contrary, it will be noticed that the flange of the channeled element on which the body element to be joined at the seam in question is lodged at the commencement of the process affords lodgment for the same point or circumferential line of said body element when the sinking process is completed and that the marginal portion of said body element thus sunken in the process of sinking has its terminal edge withdrawn from the opposite flange of the channeled element, so that no longitudinal stretching of the metal occurs, but only the circumferential compression due to the fact that the bottom of the channel is the circumference of a smaller circle than the outer edge of the flange. The depth of the channel will be in all cases quite small relatively to the diameter of the tank, so that the circumferential contraction of the sunken edge is too slight to produce a perceptible crimp; but even if a slight crimp should result the packing lodged between the flange of the body formed by thus sinking it into the channel and the wall of the channel makes the joint tight, notwithstanding the slight irregularity which may result from such crimping.

The characteristic above pointed out involves in the best form of construction avoidance of any lapping of the two joined elements upon each other when the seam is completed, and the tightness of the joint is due to the binding of the inturned flanges of the body elements connected at the seam laterally against the inner wall of the channeled inner reinforcing element by the outer contractile clamping-ring, whose diameter should be such that it will thus bind said inturned flanges laterally by the time they are bound by the same contractile element against the bottom of the channel. The drawings show said contractile element thus sunken to the limit, and this condition would be reached in some cases; but ordinarily the

amount of packing interposed will be sufficient to cause the contractile ring to become sufficiently tight and the parts to be sufficiently clamped together in the first instance before the limit is reached, so that there will be a little margin for further tightening the joint as the packing becomes set or loses its elastic reaction, which might tend to loosen the joint and require further contraction of the ring to tighten it.

It will be evident that the force necessary to sink the marginal portions of the connected elements in the manner described is very much less than would be required to similarly sink even one of the elements if it extended across both flanges of the channeled element, so that longitudinal stretching of the metal would be necessary to effect the sinking, and in this respect my invention is distinguished from all joints in sheet-metal structures in which the two joined elements are lapped and clamped one upon the other.

I claim—

1. In a sheet-metal tank in combination with an interior reinforcing element peripherally channeled, the adjacent portions of the body to be joined by transverse seam having their marginal portions contractible and encircling such peripheral channel; an outer contractile ring encompassing said marginal portions and adapted to be contracted into the channel of the reinforcing element and provided with means for so contracting it to sink said contractible marginal portions also into the channel, said marginal portions being free from overlap with each other when so sunken.

2. In a sheet-metal tank in combination with an interior reinforcing element peripherally channeled, adjacent body portions which are to be joined by a transverse seam having contractible marginal portions encircling such reinforcing element; an outer contractile ring encompassing the tank in the zone of said channel and contained wholly within the width thereof, and encompassing also and intervening between said marginal portions which encircle the reinforcing element, said contractile ring being provided with means for contracting it to contract said marginal portions and sink them in the channel, said marginal portions being free from overlap when so sunken.

3. In a sheet-metal tank in combination with an interior reinforcing element peripherally channeled, the adjacent portions of the body to be joined by a transverse seam having their marginal portions encircling such peripheral channel; an outer contractile ring and means connecting its ends, said ring and connecting means together completely encompassing said marginal portions; means for drawing together said ends in the direction in which they respectively extend to contract it for contracting said marginal portions and sinking them into the channel, said marginal portions being free from overlap with each other when so sunken.

4. In a sheet-metal tank in combination with an interior reinforcing element peripherally channeled; adjacent body portions which are to be joined by a transverse seam having contractible marginal portions encircling such reinforcing element; an outer contractile ring and means connecting its ends, said ring and connecting means together completely encompassing the tank in the zone of said channel and contained wholly within the width thereof and encompassing also and intervening between said marginal portions which encircle the channel, and means for drawing said ends in the directions in which they respectively extend to contract the ring for contracting said marginal portions and sinking them in the channel, said marginal portions being free from overlap when so sunken.

5. In a tank, in combination with an inner reinforcing element peripherally channeled, adjacent elements of the body of the tank having the marginal portions to be connected at the transverse junction encircling such channel; packing-strips lodged in the channel interposed between the lateral walls thereof and said encircling marginal portions respectively, and an outer contractile ring encompassing the tank in the zone of the reinforcing element in the plane of its channel, and intervening therein between the said encircling marginal portions of the adjacent elements of the body, and provided with means for contracting it to sink it in the channel and spread said marginal portions respectively toward the opposite side walls of the latter.

6. In a tank in combination with an inner reinforcing element peripherally channeled, the channel having its lateral walls converging from the bottom, the marginal portions of adjacent elements of the body of the tank to be connected at a transverse junction encircling such channel, and an outer contractile ring encompassing said marginal portion and provided with means for contracting it to sink the latter into the channel, the same when so sunken being clamped respectively against the opposite converging sides of the channel by the ring contracted thereinto.

7. In a tank, a transverse junction comprising an inner reinforcing element having a peripheral channel angular in cross-section and having its opposite side walls converging from the bottom, the adjacent portions of the body joined at such junction having marginal portions encircling such channel; packing-strips lodged in the angles of such channel within the encircling marginal portions respectively, and an outer contractile ring encompassing said marginal portions and means for contracting it to sink the latter into the channel, the same when so sunken

being free from overlap and clamping the packing within them respectively into the corresponding angles of the channel.

8. A tank comprising, in combination, a bottom having a marginal flange; an interior reinforcing element having a peripheral channel, one flange of the channel being engaged by the marginal flange of the bottom; the body having its marginal portion which is to be joined to the bottom encircling the channel; an exterior contractile ring encompassing said marginal portion of the body and means for contracting it to sink the same into the channel against the other flange thereof, the bottom flange and the sunken marginal portion of the body being free from overlap within the channel of the reinforce.

9. In a tank in combination with the body elements connected at a transverse junction; means for effecting such junction comprising an interior reinforcing element and an exterior contractile ring, said ring having one end threaded and having at the other end a lug apertured to receive the threaded end, and beyond said lug an extension or shoe exteriorly channeled to accommodate the threaded end and interiorly shaped substantially conforming to the inner surface of the ring and adapted thereby to seat in the channel which accommodates the ring.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 17th day of March, 1904.

ANDREW HAHN.

In presence of—
CHAS. S. BURTON,
FREDK. G. FISCHER.