Jan. 17, 1933. J. D. SEILER 1,894,642

MEANS FOR FORMING TANK DOMES

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Fig. 1.

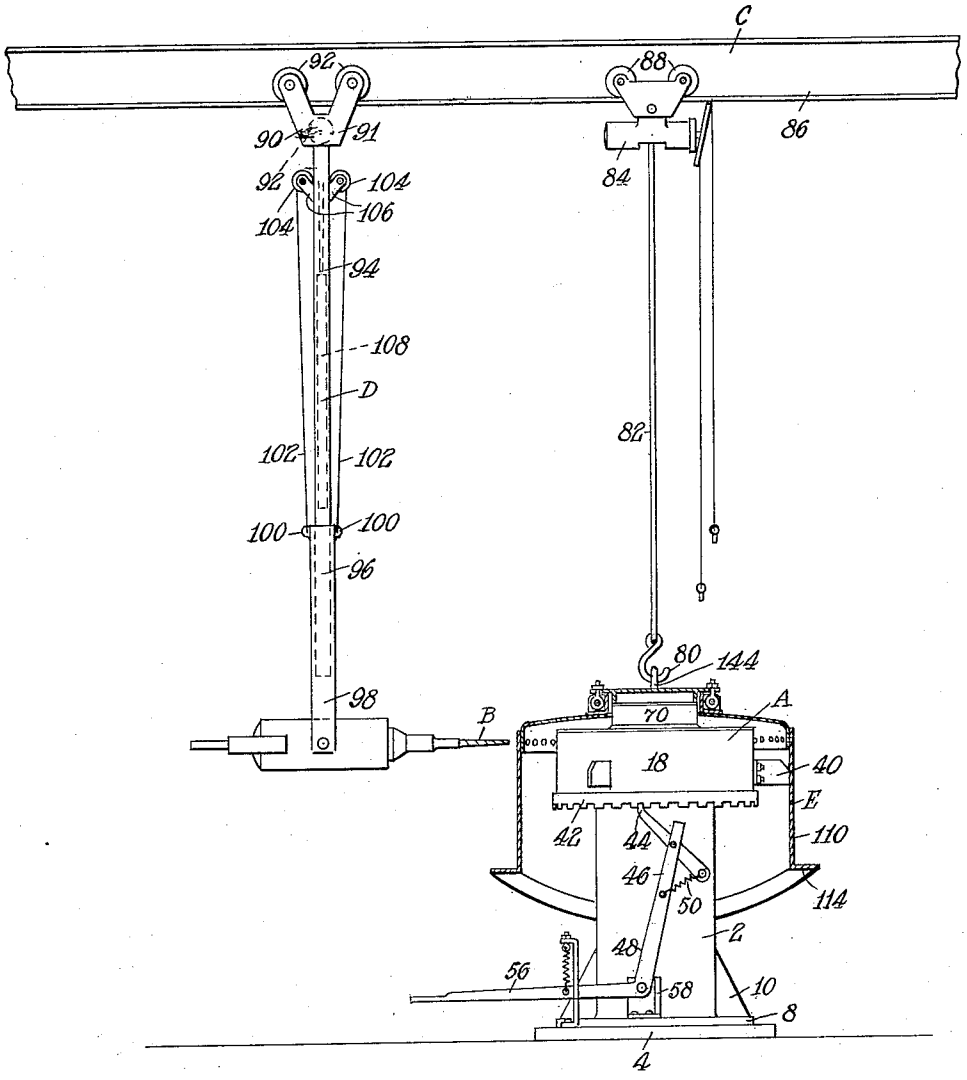

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Fig. 2.

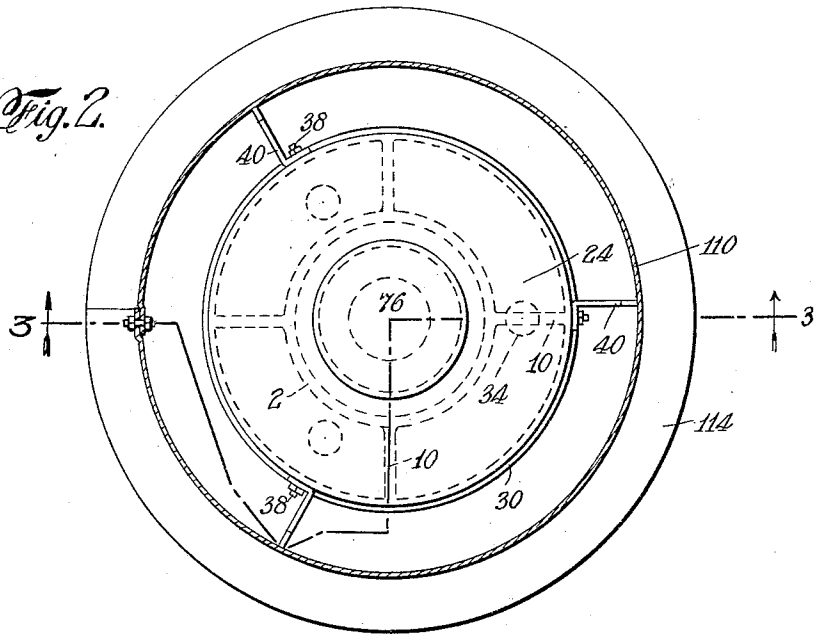
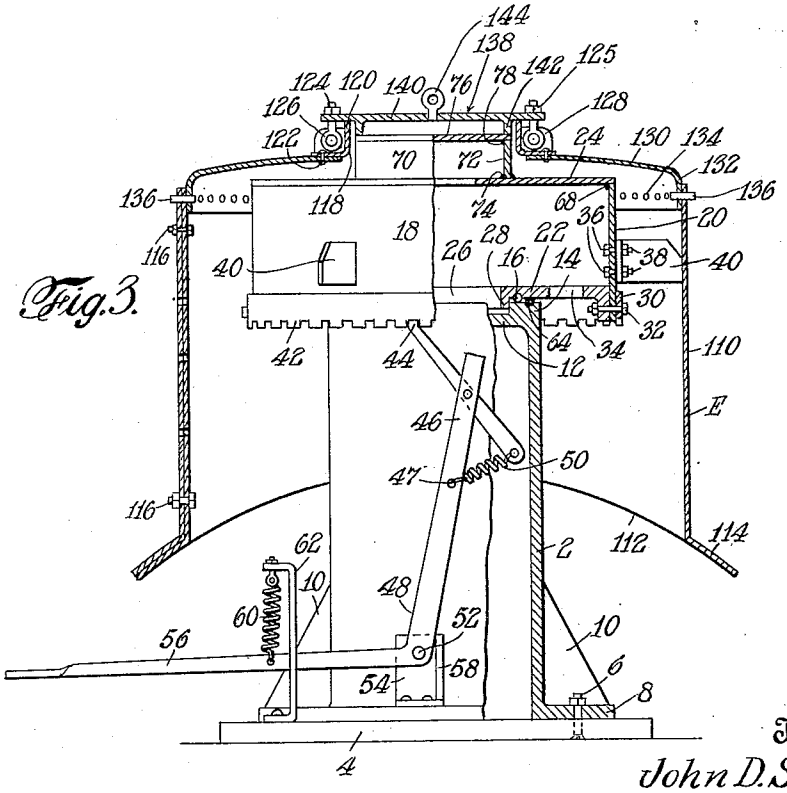


Fig. 3.



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UNITED STATES PATENT OFFICE

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MEANS FOR FORMING TANK DOMES

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This invention relates generally to apparatus for making domes for tanks, such as car tanks, and has particular reference to a dome rotating and reaming device.

One object of this invention is to provide a dome supporting table or pedestal which may be rotated in a step by step manner to successively expose or position different portions of the dome to the action of a reaming tool.

Another object of the invention is the provision of means whereby the rivet holes for connecting the dome head and dome sheet will be formed in true circumferential relation with respect to the dome center.

Still another object of the invention is the provision of means whereby rivet holes are reamed accurately and in alignment.

A further object of the invention is the provision of a device for reaming previously punched rivet holes in a temporarily assembled tank dome in a quicker and easier manner than heretofore known.

Other objects and advantages of this invention will be apparent from the following description taken in conjunction with the accompanying drawings in which:

Figure 1 is a front elevation of the device of the present invention;

Fig. 2 is an enlarged detail view of the dome supporting table or pedestal and a dome thereon, certain parts being shown in section; and

Fig. 3 is a view on the line 3—3 of Fig. 2.

In the manufacture of domes for car tanks it is usual to rivet the overlapping edges of a dome sheet and to rivet a dome head to the sheet. In practice, a sheet of suitable material is preferably punched along its upper edge to a predetermined spacing to define rivet holes, and the side edges of this sheet are also punched to the same predetermined spacing to also provide rivet holes, and the sheet is then folded to annular shape and, due to the predetermined spacing of the rivet holes in the side edges, the holes in said edges should align to receive the rivets which connect the overlapping edges of the sheet. Sometimes the holes do not correctly aline and it becomes necessary to ream these previously punched rivet holes in order that the rivets which connect the overlapping edges of the tank sheet and which connect a dome head with the tank sheet may be in shear and not subject to bending stresses. It is also desirable to have the rivet holes in true right angle relation to the material of the sheet and head in order that strains or expansion and contraction of the dome will not tend to bend the rivets with respect to the dome.

To accomplish the results aforesaid, the present invention has been designed and the same comprises generally a pedestal or a table for supporting a dome, which table may be rotated step by step to successively expose different areas to the action of an adjacent suspended reaming tool. Broadly, the invention comprises a pedestal or work supporting table A, a reaming tool B suspended from a track C by a suspension device D.

Referring now more specifically to the drawings, in which similar characters of reference designate similar parts in the several views, the table A comprises a base 2 which in the instance shown is tubular but which obviously may be otherwise, if desired; the table being secured to a base support 4 by bolts 6 or the like which extend through an attaching flange 8. For reinforcing purposes the base is provided with external stiffening ribs 10. The lower end of the base is open, but this is merely by way of example, and the upper end is closed by a cover 12 having a circumferential flange 14 provided with a raceway for bearing elements, such as balls 16, which latter furnish an anti-friction mounting for a head designated generally at 18.

The head 18 is preferably of the form shown clearly in Fig. 2 and comprises an annular side plate 20, a bottom plate 22 and a cap plate 24. The bottom plate 22 is provided with a central opening 26 and the edge of said plate adjacent the opening is downwardly flanged as at 28 to provide a centering means for the head 18; the pedestal and head thus being interfitted whereby sidewise shifting of the head relative to the pedestal is prevented. The outer edge of the plate is

provided with a depending annular flange 30 and said plate is of such size that the flange 30 will rest against the inner surface of the side plate 20; bolts 32 serving to connect the bottom and side plates as will be apparent.

The bottom plate is provided with handholes 34 to permit the insertion of a wrench or other suitable tool to engage bolt heads 36 of bolts 38 which serve to secure angle-shaped racks 40 to the side plate; these racks serving as backing plates as hereinafter described. Secured to the side plate 20 along the lower edge thereof by means of the before mentioned bolts 32 is a circular rack 42, the teeth of which are engaged by a pawl 44 pivoted to the arm 46 of a bell crank lever 48, the pawl normally being retained in engagement with the rack teeth by a spring 50 secured to the end thereof and to the arm 46 as shown at 47. The bell crank lever 48 is pivoted at 52 to a support 54 secured to flange 8 of the pedestal base, and the other or free arm 56 extends outwardly from the base of the pedestal to a position where it may be conveniently operated to actuate the lever. The support 54 is provided with a stop element 58 for limiting the rearward movement of the arm in response to the tension of a spring 60 connected to the arm 56 and to the upper end of a bracket 62 secured to the base support 4. Obviously, the bearing elements 16 which support the head 18 require lubrication and to retain lubricant a packing 64 is interposed between the bottom plate 22 and the flange 14 of the cover 12.

The head 18, as before mentioned, includes a cap plate 24 which is connected to the side plate 20 by being welded thereto as shown at 68. The table A, of course, is the work supporting element generally, and for directly supporting the work the rotatable head 18 is provided with a supporting element 70, the same comprising a circular base sheet 72 welded to the cap plate 24 as shown at 74 and a work rest 76 connected to the upper edge of sheet 72 by being externally welded thereto as shown at 78.

The description just above pertains specifically to the pedestal for supporting work to be acted upon by a reaming tool B; the work in the instance shown being a tank dome E which is adapted to be lifted from the floor or other place of temporary assembly by a hook 80 at the end of a cable 82 connected to a hoisting mechanism 84 which travels on a rail 86 by means of rollers 88. The rail 86 also mounts a carriage 90 on rollers 92 to which is secured the reamer suspension means D, heretofore mentioned.

As clearly shown in Figure 1, the carriage 90 is provided with a socketed lower portion 91 arranged below the rail 86 and in which is a ball member 92 to which a tube 94 is secured. Telescoping the lower end of the tube 94 is a yoke 96 in the form of a tube, the lower end of which is bifurcated to define spaced arms 98 between which the reaming tool B is pivotally supported. The upper end of the tube 96 is provided with oppositely disposed lugs 100 to which cables 102 are secured, the latter extending upwardly and engaging over pulleys 104 secured in ears 106 attached to or formed integral with the tube 94, said cables extending through suitable openings in the tube 94 and being connected to a counterweight 108 slidable in said tube.

In forming a tank dome, a dome sheet 110 is provided, the same first being cut to shape along its bottom edge, arcuate in the instance disclosed herein and indicated at 112, and the lower edge is then outwardly bent to provide the usual attaching flange 114. Either at this time or prior to the flanging and cutting just described, the sheet adjacent the upper edge is provided with a row of rivet openings which are punched by any suitable means, the rivet holes being spaced a predetermined distance from each other. The side edges of the sheet 110 are then punched by any suitable means to define rivet holes which are also spaced a predetermined distance from each other. The sheet 110 is then bent to circular form with the side edges overlapping each other and when in such position and due to the predetermined spacing of the ring holes, it is apparent that the holes in the overlapping edges of the sheet 110 should align or should be substantially aligned. The overlapping edges of this sheet 110 are then temporarily secured together by means of service bolts 116. In practice, preferably only two of these bolts are necessary; one adjacent the upper portion of the sheet and the other adjacent the flange 114. The dome head is next formed to the desired shape; Fig. 2 illustrating the form of the dome head, and said head is provided with the usual manhole opening 118 and a dome ring 120 is riveted to the dome head as shown at 122; the dome ring carrying the locking elements 124, which in the instance shown are bolts pivoted at 126 to the ears 128. The dome head comprises a sheet 130 having its marginal edge downwardly flanged as shown at 132 and this marginal flange 132 is preferably punched to provide rivet holes 134 spaced apart from each other a predetermined distance and in accordance with the spacing of the rivet holes in the upper edge of the sheet 110. The dome head is then inserted in the end of the circular dome sheet 110 to a position illustrated in Fig. 2, and it will be apparent that the rivet holes 134 should align or substantially align with the rivet holes in the upper edge of the sheet 110. The dome head 130 is then temporarily secured to the sheet 110 by means of spaced drift pins 136 which extend through the aligning rivet holes of the dome head and the dome sheet. These parts being assembled as just described, a lid 138 is then

secured to the dome head as shown in Fig. 2. This lid 138 comprises a plate 140 provided with a plurality of slots in its edge which receive the bolts 124; nuts 125 serving to secure the lid to the dome ring as will be apparent. The plate 140 is provided with a depending annular flange 142 which is adapted to rest on the work rest 76. When the dome has been assembled as just described, and the lid 138 has been attached thereto, the dome is elevated by means of the hoisting mechanism 84, heretofore mentioned, the latter having a hook 80 which is engaged in an eye 144 secured in the lid 138. The dome is then elevated and placed on the pedestal A, the dome being supported by means of the flange 142 which rests on the work rest 76. The angle-shaped racks 40 are detachably secured to the side plate 20 of the head 18 and a predetermined size of rack is attached to the side plate 20 to accord with the size of the dome to be worked upon; the outer edge of the rack engaging the inner surface of the sheet 110 as clearly shown in Fig. 2. It will be obvious that for domes of varying sizes, various sized racks may be employed to accord with the particular size of dome. It will also be apparent that the rack 42, being detachably secured to the head, may be removed and a different rack substituted therefor when desired in order to provide racks of varying tooth spacing to vary the distance of rotation when the head is rotated in a step by step manner by the foot lever 56 and the pawl 44. The dome being assembled on the pedestal as just described, the reaming tool is then brought into play to ream the rivet holes which have been previously punched thereby effecting a true formation and alinement of the rivet holes; and after such reaming, the dome sheet and the dome head may then be riveted together to complete the dome.

From the above description, it is believed that the construction and operation of the device of the present invention will be fully apparent to those skilled in the art to which it appertains, but I desire it understood that the drawings herein are merely by way of example and that various changes in the form and proportions of the device and the method outlined herein may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

1. In the fabrication of tank domes, a support for temporarily assembled dome elements comprising a base, an upright pedestal fixedly secured to the base and having a recessed upper end portion, a head supported by said pedestal and provided with a portion extended into the recess, said head being maintained on said pedestal by gravity and being freely removable from said pedestal, anti-friction bearing elements between the pedestal and head, manually operated means for rotating the head step by step, a supporting element secured to and forming part of said head, said element projecting vertically upward from the head and being adapted to be engaged by a temporary dome cover whereby to support a tank dome in a position such that the tank dome sheet surrounds said head, and backing plates secured to the head and projecting radially therefrom to engage the dome sheet.

2. A work support of the character described comprising a base, a pedestal fixedly secured to the base and having its longer axis vertically arranged, a head interfitted with the upper end portion of the pedestal, said head being freely removable from the pedestal and resting on the latter by gravity, anti-friction bearing elements on the pedestal on which the head is rotatably supported, an annular rack secured to the head, a lever actuated pawl in engagement with the rack and adapted to be operated to rotate the head step by step, means forming part of the head and projecting vertically upward therefrom for supporting a tank dome with the dome sheet surrounding said head, and backing plates detachably secured to the dome head and projecting radially therefrom into engagement with the dome sheet.

In witness whereof I have hereunto set my hand.

JOHN D. SEILER.