

V. MAUCK.
 BILGE BARREL FORMING MECHANISM.
 APPLICATION FILED DEC. 9, 1912.

1,176,232.

Patented Mar. 21, 1916.

FIG. I.

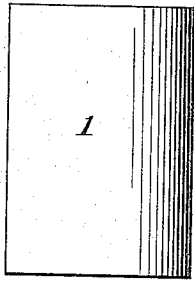


FIG. II.

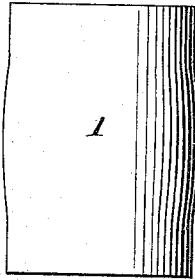


FIG. III.

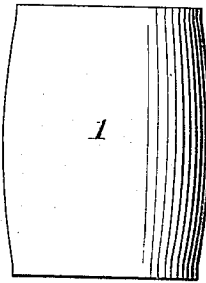


FIG. IV.

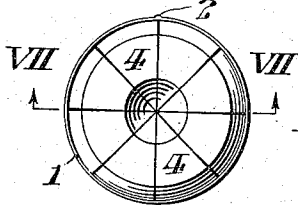


FIG. V.

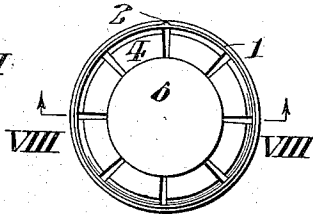


FIG. VI.

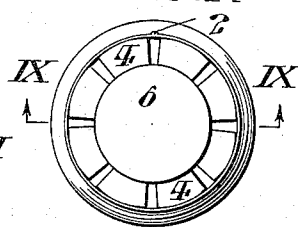


FIG. VIII.

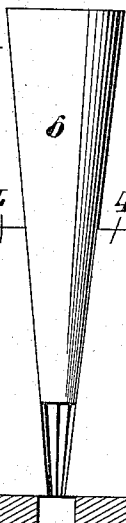


FIG. VII.

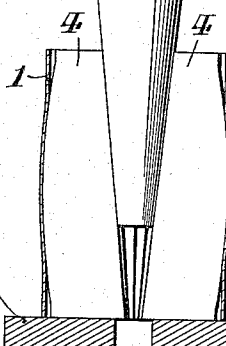
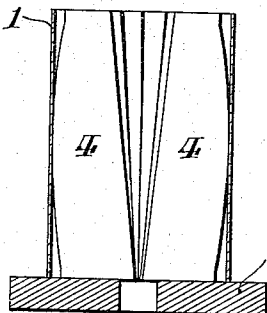


FIG. IX.

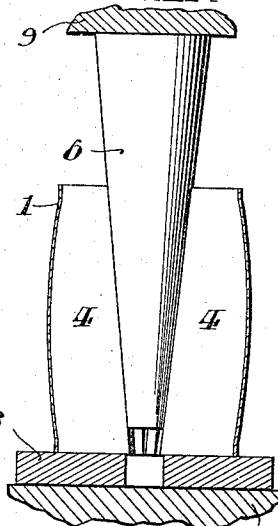


FIG. X.

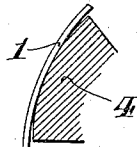
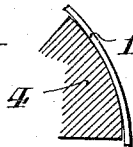


FIG. XI.

WITNESSES:

Philip W. Vessey,
James M. Colby

INVENTOR:

Victor Mauck,
by Arthur E. Paigg,
Att'y.

UNITED STATES PATENT OFFICE.

VICTOR MAUCK, OF CONSHOHOCKEN, PENNSYLVANIA.

BILGE-BARREL-FORMING MECHANISM.

1,176,232.

Specification of Letters Patent. Patented Mar. 21, 1916.

Application filed December 9, 1912. Serial No. 735,675.

To all whom it may concern:

Be it known that I, VICTOR MAUCK, of Conshohocken, in the State of Pennsylvania, have invented a certain new and useful Improvement in Bilge-Barrel-Forming Mechanism, whereof the following is a specification, reference being had to the accompanying drawings.

The invention herein claimed is disclosed in Letters Patent of the United States #1,095,014 granted to myself and Jacob E. Wentling April 28, 1914, for an improvement in processes of making metallic barrels.

As hereinafter described my improved barrel is formed of three primarily plane sheets of metal pressed to the required shape and having their edges welded so as to form a unitary shell; one of said sheets being first bent to form a cylindrical tube, and then expanded to the desired bilge form, constituting the barrel body, and the other two being pressed to form the respectively opposite barrel heads.

My invention includes the various novel features of construction and arrangement of mechanism hereinafter more definitely specified.

In the drawings:—Figure I is a side view of the cylindrical tube from which the barrel body is to be formed. Fig. II is a side view of said tube showing the initial effect of the expanding operation. Fig. III is a side view of said tube completely expanded to the desired barrel shape. Fig. IV is a plan view of said tube shown in Fig. I, inclosing an expansible die. Fig. V is a plan view similar to Fig. IV, but showing said die expanded to produce the effect indicated in Fig. II. Fig. VI is a plan view similar to Fig. V but showing said die and tube completely expanded to produce the effect indicated in Fig. III. Fig. VII is a vertical sectional view taken on the line VII—VII in Fig. IV. Fig. VIII is a vertical sectional view taken on the line VIII—VIII in Fig. V. Fig. IX is a vertical sectional view taken on the line IX—IX in Fig. VI. Figs. X and XI are fragmentary horizontal sectional views of the expansible die and barrel body, respectively before and after expansion as in Figs. VII and IX.

A rectangular sheet metal blank is bent to form a cylindrical tube 1, and, its meeting edges being electrically welded as they are pressed together, a slight ridge 2 is

formed upon the outer side of the tube as indicated in Fig. IV. Said cylindrical tube 1 is then fitted over the expansible die comprising the circular series of sectors 4 while the latter are arranged in radially retracted position as shown in Figs. IV and VII. The conical wedge 6, being then inserted as shown in Figs. V and VIII, is pressed into the expanding die comprising said sectors 4, thus expanding said tube 1, initially as indicated in Figs. II, V and VIII, and finally as indicated in Figs. III, VI and IX. If the outer faces of said sectors 4 conformed to arcs of the circumference of the tube when completely expanded; said faces would be less convex than the initially cylindrical tube 1 shown in Figs. I, IV and VII, and when expanded as above described, would engage said tube only at the longitudinal edges of said outer faces of the sectors, and the expansion of said tube consequent upon the insertion of the cone 6 as above described, would take place only at the junctions of the sectors, and, exceeding the limit of expansion of the metal, would rupture said tube before it reached the required bilge shape. Therefore, we make the outer faces of said sectors conform to arcs having radii slightly less than the radii of the expanded tube shown in Figs. III, VI and IX, so that said sectors initially engage the cylindrical tube, shown in Figs. I, IV and VII, only at the medial, longitudinal regions of their outer faces. In other words, the expansion of the sheet metal begins at the center of the outer face of each sector 4, as indicated in Figs. V and VIII, and is continued with substantially uniform distribution of the stresses in the sheet metal until the final bilge form of said tube indicated in Figs. III, VI and IX is produced.

I find it convenient to effect the above described expansion of the die including the sectors 4, by mounting the latter upon the bed plate 8, and forcing said wedge 6 toward said bed plate in a hydraulic press 9, in cooperation with the centripetally inclined inner surfaces of all of said sectors, to separate the latter radially from a common center.

The opposite end heads (not shown) of the completed barrel may be conveniently formed of primarily plane circular sheet-metal blanks which are pressed so as to be outwardly convexed to approximate the spherical form affording the greatest resist-

ance to distortion by internal pressure, and to form outwardly turned rims. Said heads being fitted with their rims flush with the chimes of the barrel body shown in Figs. III and IX, may be welded in unitary relation therewith, conveniently by means of an oxy-hydrogen blow-pipe, thus forming a unitary shell.

I do not desire to limit myself to the precise details of construction and arrangement herein set forth as it is obvious that various modifications may be made therein without departing from the essential features of my invention as defined in the appended claims.

I claim:—

1. In metal bilge-barrel forming mechanism, an expansible die comprising a plurality of separate sectors, each having an outer face longitudinally curved to the bilge shape of the barrel body to be formed, and transversely curved with radii slightly less than the radii of the internal circumference of said body; each of said sectors having an inner centripetally inclined surface; a conical wedge common to all of said sectors and cooperating with said inclined surfaces thereof to separate said sectors radially from a common center to expand said die, means arranged to support said sectors in assembled relation, including a base plate upon which they are fitted to radially slide; and means arranged to shift said wedge axially with respect to said die.

2. In metal bilge-barrel forming mechanism, an expansible die comprising a plurality of separate sectors, each having an outer face longitudinally curved to the bilge shape of the barrel body to be formed, and transversely curved with radii slightly less than the radii of the internal circumference of said body; each of said sectors having an inner inclined surface; a wedge common to all of said sectors and cooperating with said inclined surfaces thereof to separate said sectors radially from a common center to expand said die; means arranged to support said sectors in assembled relation, including a base plate upon which they are fitted to radially slide; and means arranged to shift said wedge axially with respect to said die.

3. In metal bilge-barrel forming mechanism, an expansible die comprising a plurality of separate sectors, each having an outer face longitudinally curved to the bilge shape of the barrel body to be formed, and transversely curved with radii slightly less than the radii of the internal circumference of said body; each of said sectors having an inner inclined surface; wedge means cooperating with said inclined surfaces to separate said sectors radially from a common center to expand said die; and means arranged to support said sectors in assembled relation, including a base plate upon which they are fitted to radially slide.

4. In metal bilge-barrel forming mechanism, an expansible die comprising a plurality of separate sectors, each having an outer face transversely curved with radii slightly less than the radii of the internal circumference of the barrel body to be formed; a wedge common to all of said sectors and cooperating therewith to separate said sectors radially from a common center to expand said die; and means arranged to support said sectors in assembled relation, including a base plate upon which they are fitted to radially slide.

5. In metal bilge-barrel forming mechanism, an expansible die comprising a plurality of separate sectors, each having an outer face transversely curved with radii slightly less than the radii of the internal circumference of the barrel body to be formed; means common to all of said sectors and cooperating therewith to separate said sectors radially from a common center to expand said die; and means arranged to support said sectors in assembled relation, including a base plate upon which they are fitted to radially slide.

6. In metal bilge-barrel forming mechanism, an expansible die comprising a plurality of separate sectors, each having an outer face transversely curved with radii slightly less than the radii of the internal circumference of the barrel body to be formed; and means common to all of said sectors and cooperating therewith to separate said sectors radially from a common center to expand said die.

7. In metal barrel forming mechanism, an expansible die including a circular series of sectors, the outer faces of which conform to arcs having radii slightly less than the radius of said die when expanded; whereby, said sectors initially engage a cylindrical tube only at the medial longitudinal regions of their outer faces, and the expansion of the metal of such a tube begins at the center of the outer face of each sector and is continued with substantially uniform distribution of the stresses in the sheet metal until the final barrel form of said tube is produced.

8. Mechanism for expanding an annular metallic body, including an expansible die having a circular series of elements each having its outer face shaped to initially engage said body only at a line extending parallel with the axis thereof; whereby the expansion of the metal begins at said lines and is continued with substantially uniform distribution of the stresses in the metal until the final form of said body is produced.

9. Mechanism constructed and arranged to form a bilge barrel body by expansion of a primarily cylindrical tube; including an expansible die comprising a circular series of separate sectors, each having an outer

face transversely curved with radii not only less than the corresponding radii of the inner surface of the barrel body to be formed, but less than the radius of the internal circumference of said cylindrical tube, and longitudinally curved in conformity with said inner surface of the barrel body; and means common to all of said sectors and cooperative therewith to separate them radially from a common center to expand said die; whereby said sectors initially engage said tube only at respectively single points, intermediate of the outer faces of said sectors both transversely and longitudinally; so that the expansion of said tube begins at said points and is continued with substantially uniform distribution of the stresses in said tube until it is expanded to the final barrel form.

10. Mechanism constructed and arranged to form a bilge barrel body by expansion of a primarily cylindrical tube; including an expandible die comprising a circular series of separate sectors, each having an outer face transversely curved with radii not only less than the corresponding radii of the inner surface of the barrel body to be formed, but less than the radius of the internal circumference of said cylindrical tube; and means common to all of said sectors and cooperative therewith to separate them radially from a common center to expand said die; whereby said sectors initially engage said tube only at respectively single points, intermediate of the outer faces of said sectors

both transversely and longitudinally; so that the expansion of said tube begins at said points and is continued with substantially uniform distribution of the stresses in said tube until it is expanded to the final barrel form.

11. Mechanism constructed and arranged to form a hollow metal body which is larger at its middle than at its ends, by expansion of a cylindrical tube; including an expandible die comprising an annular series of sectors, each having an outer face of greater radius at its middle than at its longitudinal edges, and longitudinally shaped in conformity with the inner surface of said body; and means common to all of said sectors and cooperative therewith to separate them radially from a common center to expand said die; whereby said sectors initially engage said tube only at respectively single points, intermediate of the outer faces of said sectors both transversely and longitudinally; so that the expansion of said tube begins at said points and is continued with substantially uniform distribution of the stresses in said tube until it is expanded to the final form of said body.

In testimony whereof, I have hereunto signed my name at Conshohocken, Pennsylvania, this fourth day of December, 1912.

VICTOR MAUCK.

Witnesses:

EDITH C. FRICK,
HERBERT F. LEWIS.