

V. MAUCK & J. E. WENTLING.
 PROCESS OF MAKING METALLIC BARRELS.
 APPLICATION FILED OCT. 22, 1909.

1,095,014.

Patented Apr. 28, 1914.

3 SHEETS—SHEET 1.

FIG. I.

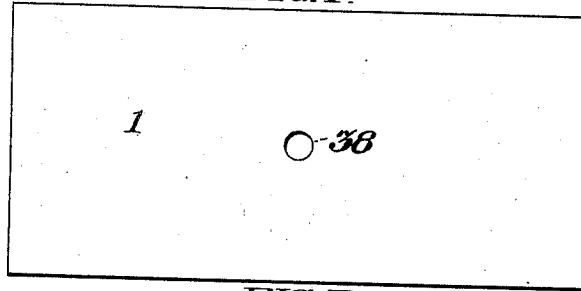
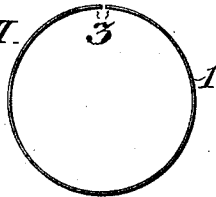


FIG. II.

1.

FIG. III.



13.

FIG. IV.

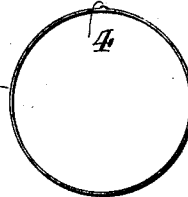


FIG. V.

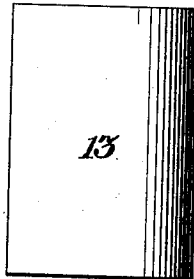


FIG. VI.

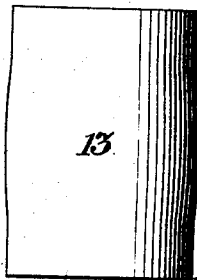


FIG. VII.

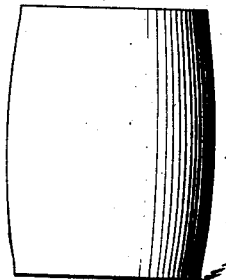


FIG. VIII.

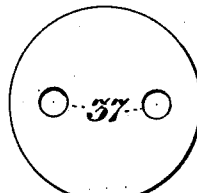


FIG. IX.

FIG. X.

20

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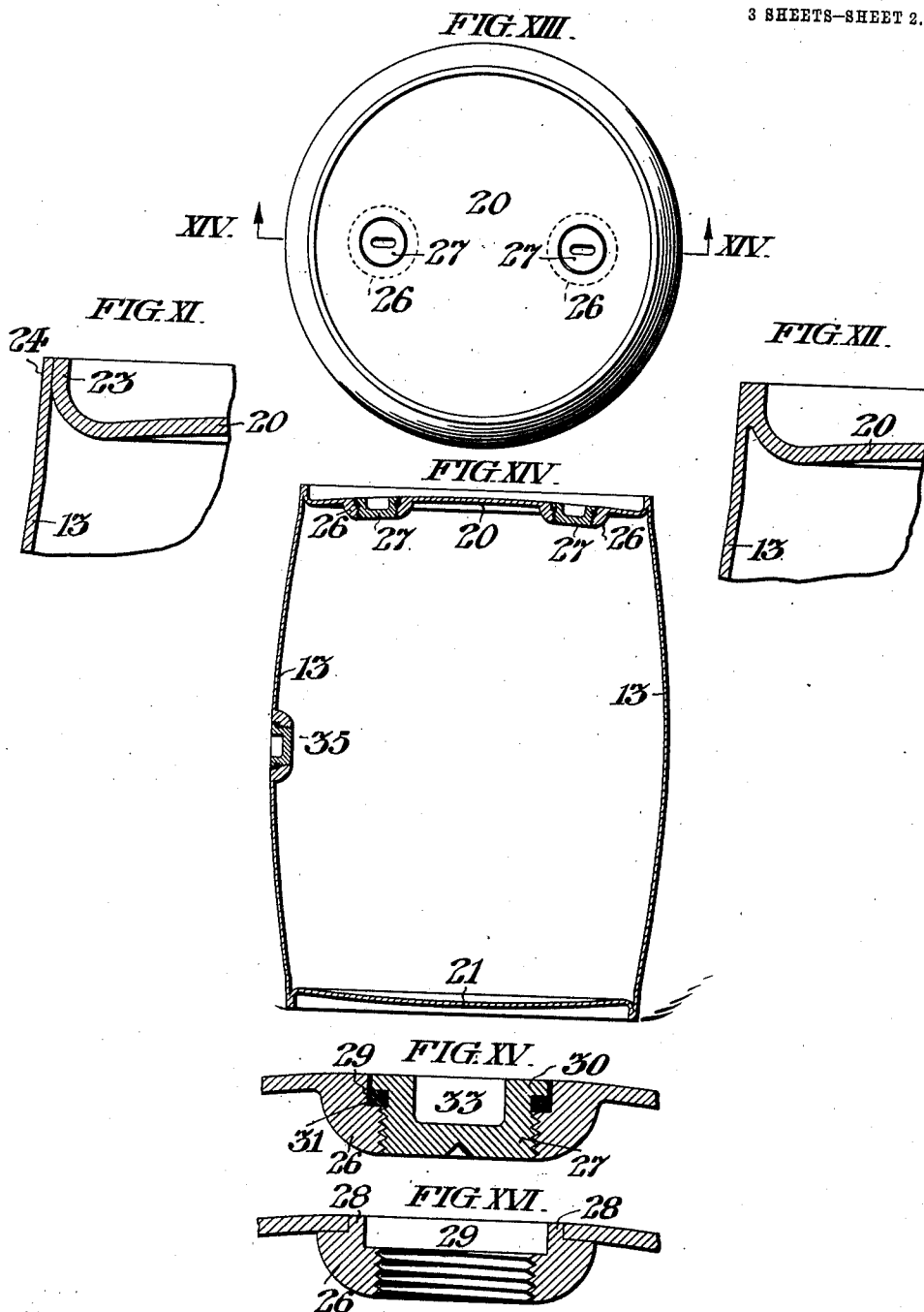
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3 SHEETS-SHEET 2.



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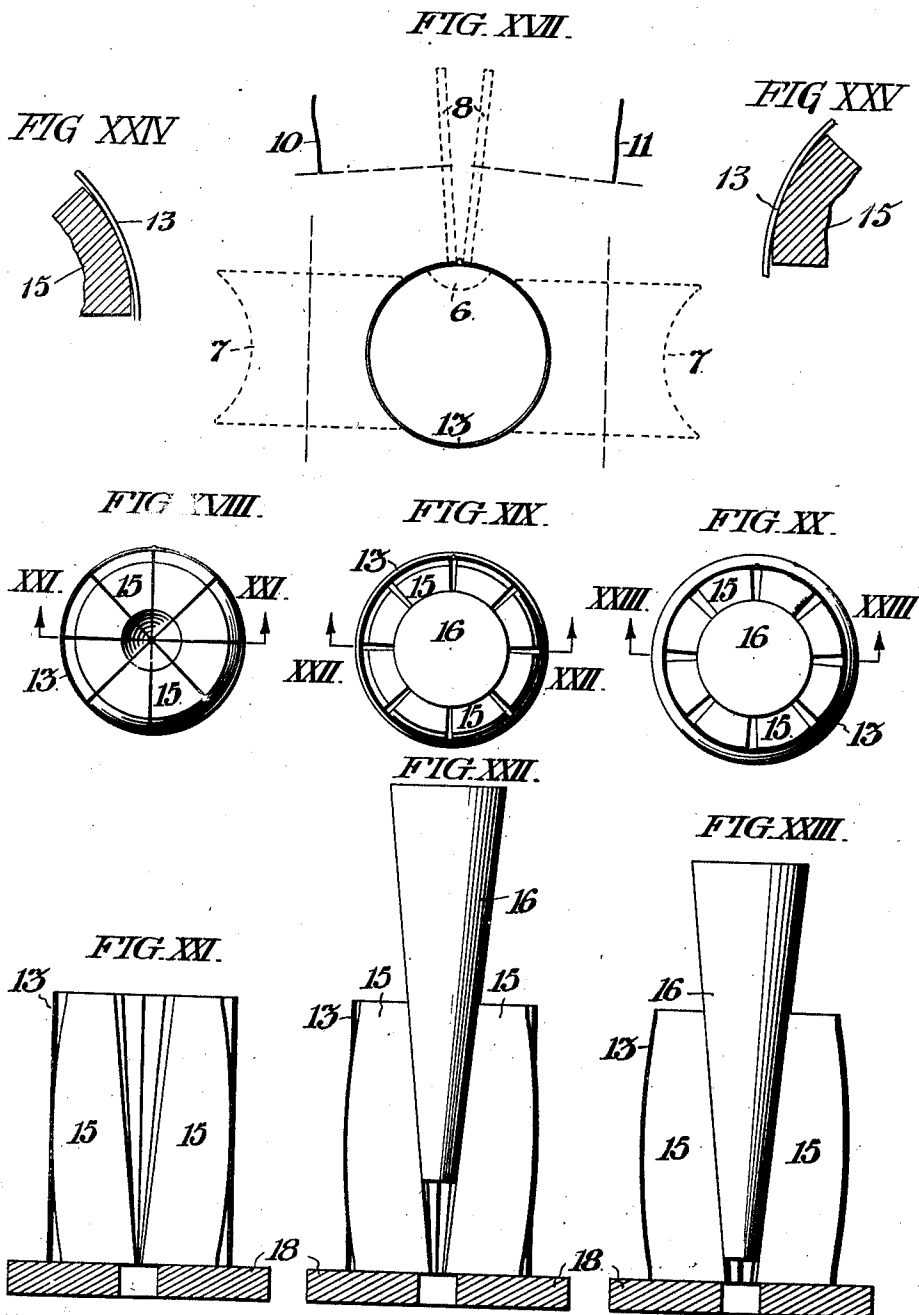
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PROCESS OF MAKING METALLIC BARRELS.

1,095,014.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, VICTOR MAUCK and JACOB EDWARD WENTLING, of Conshohocken, in the State of Pennsylvania, have invented a certain new and useful Improvement in Processes of Making Metallic Barrels, whereof the following is a specification, reference being had to the accompanying drawings.

It is the object of our invention to make a seamless metallic vessel, more durable and capable of retaining fluids at higher pressure than an ordinary barrel, but having the shape of the latter and affording the advantages incident to that shape; being readily turned end for end or rocked upon its convex side to facilitate its erection, whereas, a cylindrical vessel could not be thus readily manipulated.

As hereinafter described our 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 oblate form, constituting the barrel body, and the other two being pressed to form the respectively opposite barrel heads.

A convenient adjunctive feature of our invention is the provision of a bung or bungs in unitary relation with the head or body wall of such a barrel, and our invention includes the various novel features hereinafter more definitely specified.

In the drawings:—Figure I, is a plan view of a plane sheet metal blank from which the body of the barrel is formed. Fig. II, is an edge view of said blank. Fig. III, shows said blank bent cylindrically preparatory to welding its longitudinal edges to form a seamless tube. Fig. IV, is an end view of said seamless tube. Fig. V, is a side view of said seamless tube. Fig. VI, is a side view of said seamless tube showing the initial effect of the expanding operation. Fig. VII, is a side view of said seamless tube completely expanded to the desired barrel shape. Fig. VIII, is a plan view of a plane sheet metal blank adapted to form one of the barrel heads. Fig. IX, is an edge view of said blank. Fig. X, is a sectional view of one of the barrel heads formed from a blank such as is shown in Figs. VIII and IX. Fig. XI,

is a fragmentary sectional view of said body and a head before being welded. Fig. XII, is a fragmentary sectional view of said barrel, at the welded joint between said body and head. Fig. XIII, is a plan view of a complete barrel. Fig. XIV, is a vertical sectional view taken on the line XIV, XIV in Fig. XIII. Fig. XV, is a fragmentary sectional view on a larger scale than Fig. XIV, showing a bung as welded in unitary relation with the barrel wall. Fig. XVI, is a fragmentary sectional view similar to Fig. XV, but showing only the bung socket member and barrel wall before they are welded. Fig. XVII, is a diagram indicating convenient means for welding the cylindrical tube indicated in Figs. IV and V. Fig. XVIII, is a plan view of said tube inclosing an expansible die whereby said tube is expanded from the form shown in Fig. V, to the form shown in Fig. VII. Fig. XIX, is a plan view similar to Fig. XVIII, but showing said die expanded to produce the effect indicated in Fig. VI. Fig. XX, is a plan view similar to Fig. XIX, but showing said die and tube completely expanded to produce the effect indicated in Fig. VII. Fig. XXI, is a vertical sectional view taken on the line XXI, XXI, in Fig. XVIII. Fig. XXII, is a vertical sectional view taken on the line XXII, XXII, in Fig. XIX. Fig. XXIII, is a vertical sectional view taken on the line XXIII, XXIII, in Fig. XX. Figs. XXIV and XXV are fragmentary horizontal sectional views of the expansible die and barrel body respectively before and after expansion, as in Figs. XXI and XXIII, but with the differences in curvature exaggerated.

The rectangular sheet metal blank 1, shown in Fig. I, which is plane as indicated in Fig. II, is bent to form a cylindrical tube with its edges 3 in opposition to each other as indicated in Fig. III, and is then electrically welded as said edges are pressed together, incidentally forming a slight ridge 4, upon the outer side of said tube. Said welding operation is conveniently effected by the means indicated in Fig. XVII, including the mandrel 6 supporting the opposed edges 3 of said blank 1, the rollers 7 which press the edges of said blank together while maintaining it in cylindrical form, and, the rotary disks 8, which hold said edges in proper relation with each other

and the mandrel 6 and constitute terminals of the welding circuit including the electrical conductors 10 and 11.

The cylindrical tube 13 formed as above described is then fitted over the expansible die comprising the circular series of sectors 15, while the latter are arranged in radially retracted position as shown in Fig. XVIII. The die cone 16 being then inserted as shown in Fig. XXII is pressed into the expanding die comprising said sectors 15, thus expanding said tube 13, initially as indicated in Fig. XXII, and finally as indicated in Fig. XXIII. If the outer faces of said sectors 15 conformed to arcs of the circumference of the tube when completely expanded said faces would be less convex than the initially cylindrical tube 13 shown in Fig. XVIII, 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 16 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 barrel shape. Therefore, we make the outer faces of said sectors conform to arcs having radii slightly less than the radius of the expanded tube shown in Figs. XX and XXIII, so that said sectors initially engage the cylindrical tube shown in Figs. XVIII and XXI 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 15, as indicated in Figs. XIX and XXII, and is continued with substantially uniform distribution of the stresses in the sheet metal until the final oblate form of said tube indicated in Figs. XX and XXIII is produced.

We find it convenient to effect the above described expansion of the die including the sectors 15, by mounting the latter upon the bed plate 18, and forcing said cone 16 toward said bed plate in a hydraulic press.

The opposite end heads 20 and 21 of the completed barrel are formed of plane circular sheet metal blanks such as are indicated in Figs. VIII and IX, which are pressed to the form shown in Fig. X; having outwardly turned rims 23 and being outwardly convexed to approximate the spherical form affording the greatest resistance to distortion by internal pressure. Said heads being fitted with their rims 23 flush with the chimes 24 of said barrel body as indicated in Fig. XI, are welded in unitary relation therewith, as indicated in Fig. XII, conveniently by means of an oxy-hydrogen blow pipe, thus forming a unitary shell.

We find it convenient to provide our improved barrel with a plurality of bungs, one

in unitary relation with the barrel wall, and preferably two in the head 20, although one of said head bungs may be omitted when a bung is included in the body as shown in Fig. XIV, and each including a socket member 26 and a closure member 27 having corresponding screw threads. Each socket member 26 is provided with an annular flange 28, which being fitted in a corresponding opening in the barrel wall as shown in Fig. XVI, is welded in unitary connection therewith as shown in Fig. XV; conveniently by means of an oxy-hydrogen blow pipe. Each socket member has a countersunk recess 29 adapted to receive the head 30 of its closure member, and a gasket 31, conveniently formed of leather, seals the joint between said members. Each closure member 27 has a recess 33 constituting a wrench hold by which it may be rotated, but may be otherwise shaped to afford a wrench hold. A barrel made as above described may be provided with a body bung 35, conveniently of the form above described, and in such case one of the head bungs may be omitted. Of course, when it is desired to provide the barrel with bungs in the head 20, as shown in Fig. XIV, suitable openings 37 are punched in said head as indicated in Fig. VIII, before said head is welded in connection with the barrel body. Similarly, when it is desired to provide said body with a bung, a suitable opening 38 is punched in the wall of said body as indicated in Fig. I, and, the bung socket members are welded in connection with the barrel wall, before the heads are welded in the barrel.

Although in the process of making a barrel provided with bungs as described, the operation of inserting and welding a bung socket member is an essential feature; it is to be understood that we do not desire to limit ourselves to such a step in the process of making a seamless vessel, nor to the precise details of construction and arrangement above described, as it is obvious that various modifications may be made therein without departing from the essential features of our invention as defined in the appended claims.

We claim:—

1. The process of making a metallic barrel from primarily plane sheet metal, which consists in forming the barrel body by bending a rectangular plane sheet metal blank to form a cylindrical tube with edges opposed parallel with the axis of said tube; welding said edges while pressing them together; and, pressing said tube with an expanding die until it is larger in diameter intermediate of its length than at its chimes; said die including a circular series of sectors the outer faces of which conform to arcs having radii slightly less than the radius of the expanded tube, so that said sec-

tors initially engage the cylindrical tube only at the medial, longitudinal regions of their outer faces, and the expansion of the sheet metal 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 form of said tube is produced.

2. The step in making a metallic barrel body of bilge shape, which consists in outwardly bulging a primarily cylindrical tube by simultaneously expanding it at a circular series of lines extending parallel with the axis of said cylinder, 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 the barrel body is produced.

In testimony whereof, we have hereunto signed our names at Conshohocken, Pennsylvania, this 11th day of October, 1909.

VICTOR MAUCK.

JACOB EDWARD WENTLING.

Witnesses:

WM. WRIGHT,

HOWARD S. WERSTER.