March 12, 1963 H. G. ABBOTT ETAL 3,080,843

APPARATUS FOR CONSTRUCTING TANKS

Filed April 16, 1958

3 Sheets-Sheet 1

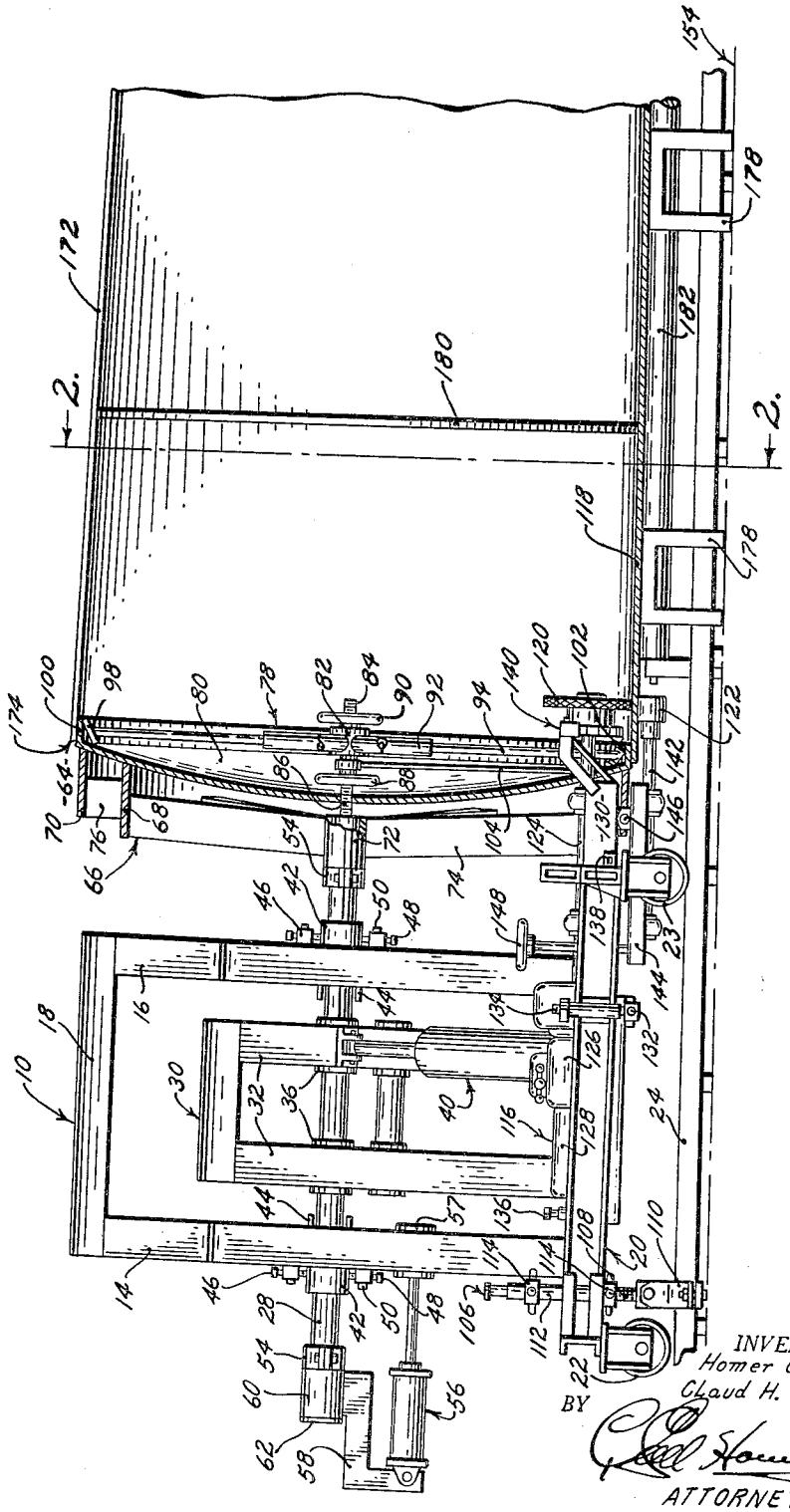


Fig. 1a.

INVENTORS
Homer G. Abbott
Claud H. McIntyre
BY
Hall Young
ATTORNEY

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3 Sheets-Sheet 2

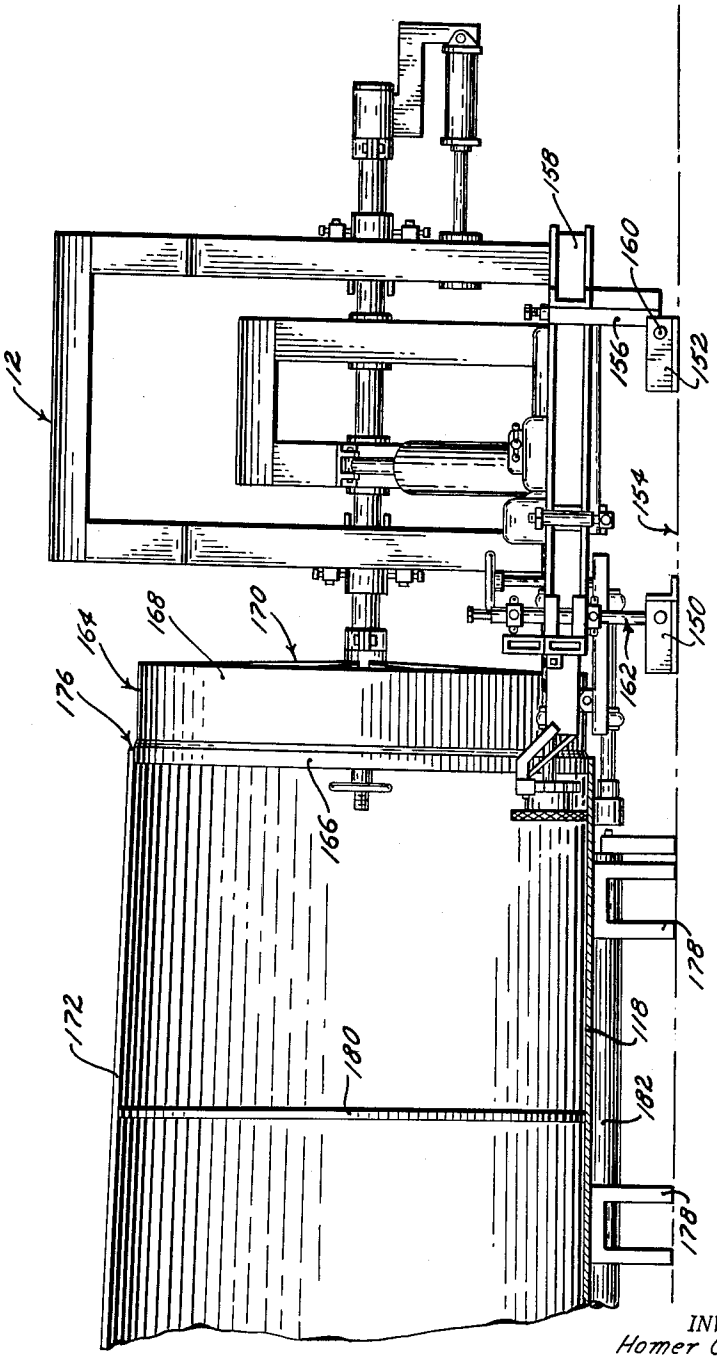


Fig. 1b.

INVENTORS
Homer G. Abbott
Claud H. McIntyre

BY

ATTORNEY

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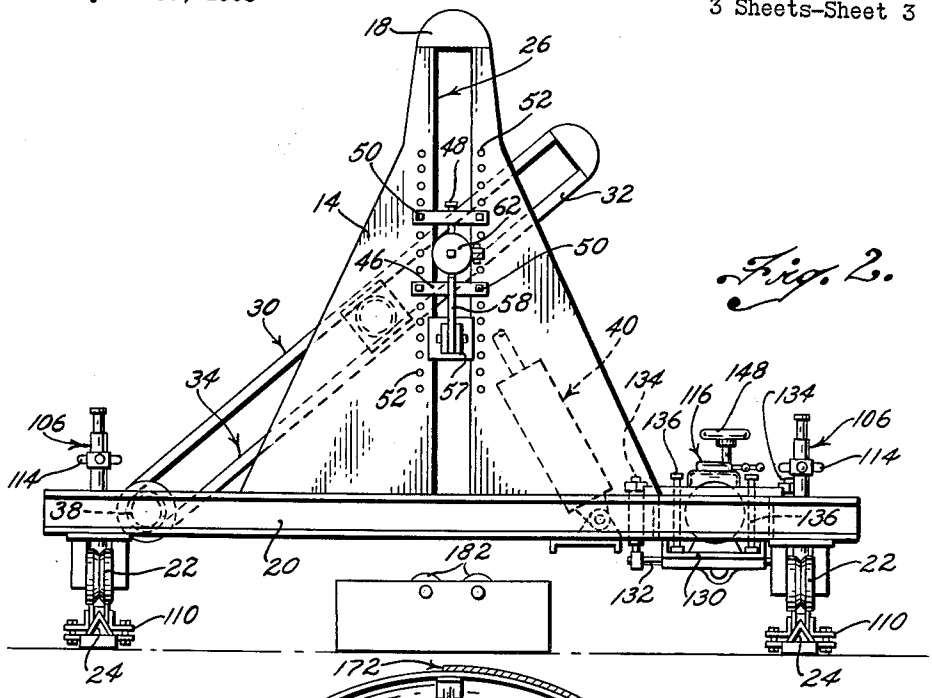


Fig. 2.

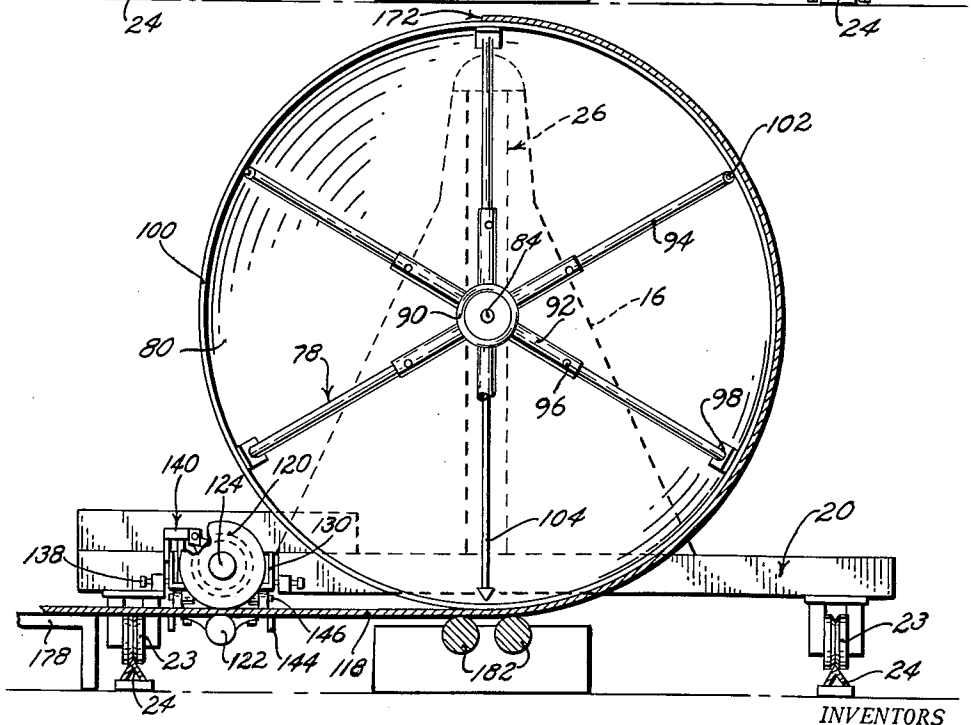


Fig. 3.

INVENTORS
Homer G. Abbott
Claud H. McIntyre
BY
ATTORNEY

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3,080,843

APPARATUS FOR CONSTRUCTING TANKS

Homer G. Abbott, Kansas City, Kans., and Claude H. McIntyre, Parkville, Mo., assignors to Standard Steel Works, Inc., North Kansas City, Mo., a corporation of Missouri

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8 Claims. (Cl. 113—130)

This invention relates to the art of tank construction and particularly to that class of hollow vessels for transporting or storing liquid or other materials and including as a part thereof, a shell surrounding end walls and/or internal bulkheads or other reinforcing members to present an elongated, tubular structure ordinarily disposed horizontally when mounted on mobile vehicles such as trucks and semi-trailers.

Heretofore it has been the common practice, utilizing conventional fabrication methods and apparatus, to follow a time-consuming, expensive procedure of cutting a plurality of sections into preselected shapes, bending or otherwise forming such sections into proper arcuate contours and thereupon attaching the sections one by one into place to the bulkheads and to each other, usually by welding but oftentimes through use of rivets or other fasteners.

It is the most important object of the instant invention, therefore, to eliminate the aforementioned steps and to provide a construction method, as well as apparatus therefore, which permits the use of a single unitary, initially flat panel to form the shell of the tank and made from stock material, i.e., sheet sections that are ordinarily rectangular in shape and welded together in a flat condition without need for cutting or forming prior to mounting of the panel on the heads or ends of the tank.

Another important object of the present invention is to provide a method of the aforementioned character which is advantageous from the standpoint of saving in time, inasmuch as the method contemplates the rolling of the panel or the wrapping of the same around the tank ends and/or around the false internal bulkheads, which rolling not only forms the panels into the tubular configuration of the shell, but permits workmen to quickly and easily attach the panel, as by welding, to the various bulkheads and other supports while the rolling step is performed, to the end that the tank is virtually completed by the time the longitudinal edges of the panel are brought into juxtaposition.

Another extremely important object of the instant invention is to incorporate within the apparatus for carrying out the novel method, a rather large number of various rearrangement factors, permitting the method to be used irrespective of the length of the tank, its diameter or transverse configuration so that, for example, the tank may be made transversely circular, elliptical or other shape, and so that the tank may either be truly cylindrical, frusto-conical, or any number of modifications of such design characteristics.

Still another important object of the instant invention is to provide apparatus which will permit carrying out the method in a minimum amount of time by virtue of the fact that the ends of the tank are used as rotatable supports during the carrying out of the method, and such ends subsequently become an integral part of the finished tank after the latter is removed from the forming apparatus. In this respect, therefore, rotatably supported wheels or the like in conjunction with chuck means, are employed to mount and support the ends of the tank and thereupon the panel itself is advanced to wrap the same around the tank ends as the latter are caused to freely rotate with the supporting wheels and chuck means therefor.

Many important details of construction constitute additional objects of the present invention, all of which will be made clear or become apparent as the following specification progresses.

In the drawings:

FIG. 1*a* is a fragmentary, side elevational view of one end of one form of novel apparatus forming the subject matter of the instant invention and capable of carrying out the method above analyzed, showing in vertical section a portion of a tank partially completed.

FIG. 1*b* is a fragmentary view similar to FIG. 1*a* showing the opposite end of the apparatus.

FIG. 2 is a view showing that end of the apparatus illustrated in FIG. 1*a*; and

FIG. 3 is a fragmentary, vertical, cross-sectional view taken on line 2—2 of FIG. 1*a*.

The apparatus illustrated in FIGS. 1*a* and *1b* includes a pair of spaced, substantially identical supporting assemblies **10** and **12**. The assembly **10** includes a pair of spaced, substantially triangular uprights **14** and **16** interconnected at the upper ends thereof by a crossbeam **18** and mounted rigidly on a chassis broadly designated by the numeral **20**. The chassis **20** is in turn provided with grooved wheels **22** and **23** normally supported by V-shaped tracks **24** for bodily movement of the entire assembly **10** toward and away from the assembly **12**.

Each upright **14** and **16** is provided with an elongated slot **26** (see FIGS. 2 and 3) traversed by an elongated, rotatable shaft **28** that has its longitudinal axis substantially horizontal.

Shaft **28** is in turn supported by an open, rectangular frame **30** angularly disposed as shown in FIG. 2, and embraced by the uprights **14** and **16** as seen in FIG. 1*a*. Sides **32** of the frame **30** are likewise provided with longitudinal slots **34** which receive bearings **36** for the shaft **28**. Bearings **36** are freely slidable in the slots **34** longitudinally thereof, but are flanged as seen in FIG. 1*a*, to hold the latter against displacement from the sides **32** in a direction longitudinally of the shaft **28**.

Chassis **20** is provided with a stub shaft **38** (FIG. 2) parallel with shaft **28**, journaling the lower end of the frame **30** for swinging movement about the substantially horizontal axis of the stub shaft **38**. Power means for swinging the frame **30** takes the form of a hydraulic piston and cylinder assembly **40**, pivotally connecting the chassis **20** with one of the sides **32** of the frame **30**.

Bearings **42** for the shaft **28** are provided with spaced plates **44** embracing the shaft **28** and slidable longitudinally of the slots **26**. Elongated bars **46** embracing each bearing **42** respectively, and attached thereto by bolts **48** threaded through the bars **46** and into the bearings **42**, are releasably attached to the uprights **14** and **16** by bolts **50**. Note in FIG. 2 that the uprights **14** and **16** are provided with two rows of tapped openings **52** alongside the slot **26** for receiving the bolts **50**.

Shaft **28** is longitudinally slidable within the bearings **36** and **42**, and its extent of reciprocation is limited by clamps **54** on the shaft **28** alternately engageable with the proximal bearings **42**. Reciprocation of the shaft **28** is effected through use of a hydraulic piston and cylinder unit **56** pivotally interconnecting the upright **14** and a bracket **58** attached to a collar **60** on shaft **28** confined between the proximal clamp **54** and end plate **62** on shaft **28**. A sliding follower **57**, receiving the inner end of unit **56**, may be connected with the proximal bearing **42** in any suitable manner for reciprocation therewith in the slot **26** of upright **14**.

A mounting unit, broadly designated by the numeral **64**, includes a wheel **66** having an inner rim **68** and an outer rim **70** concentric with the rim **68** and axially offset with respect thereto. Rim **68** is attached to hub **72**

(rigidly mounted on shaft 28) by spokes 74, and stub spokes 76 interconnect the rims 68 and 70 therebetween.

The mounting unit 64 is provided with chuck means 78 for securing an end or bulkhead 80 thereon with the outermost convex face thereof engaging the proximal annular edges of the rims 68 and 70. The chuck means 78 is in the nature of a spider having a hub 82 tapped to receive a screw 84 that in turn extends through an opening 86 in the bulkhead 80 and is threaded into the proximal end of the shaft 28.

A hand wheel 88 is rigidly secured to the screw 84 to permit removal of the latter from the shaft 28, and a hand wheel 90 on the opposite side of hub 82 is threaded on the screw 84 and serves as a means for shifting the chuck means 78 toward the tank end 80 to clamp the latter tightly against the rims 68 and 70.

A plurality of tubes 92 radiating from the hub 82, slidably receive elongated rods 94 (see also FIG. 3) releasably held in place by setbolts or the like 96 in the tubes 92. Certain of the rods 94 are provided with shoes or pads 98 that bear against the concave face of the tank end 80, as well as against the annular inturned flange 100 thereon in the manner best seen in FIG. 1*a*. The remaining alternate rods 94 have transverse studs 102 adjustably threaded therein and which also bear against the tank end 80. A plumb rod 104, freely swingable on the screw 84 between the hand wheel 88 and the hub 82, is employed for aligning purposes hereinafter explained.

Chassis 20 may be tilted about the axles of the wheels 23 as a fulcrum, raising the wheels 22 off the tracks 24 and attaching the chassis 20 to the tracks 24 to hold it against movement along such tracks 24 through use of a pair of jacks. Each jack 106 includes a screw 108 pivotally attached to a clamp 110 on track 24 and extending through a sleeve 112 rigid to chassis 20. Opposed nuts 114 bearing against opposite ends of the sleeve 112 are threaded on the screw 108.

A power unit broadly designated by the numeral 116, is carried by the chassis 20 for advancing a panel 118 that is initially flat and horizontally disposed, as best seen in FIG. 3. Unit 116 includes opposed rollers 120 and 122 receiving the panel 118 therebetween, roller 120 being preferably in the nature of a peripherally knurled disc, and roller 122 desirably being made from somewhat resilient antifriction material such as hard rubber.

Roller 120 is mounted on one end of a drive shaft 124 which constitutes the output shaft of an adjustable speed reducer 126 that is in turn coupled with an electric motor 128. The bearings for shaft 124, the speed reducer 126 and the motor 128, are all mounted within the bight of an elongated, upwardly facing, transversely U-shaped channel 130 carried by the chassis 20 for vertical swinging movement about a fulcrum pin 132 intermediate the ends of the channel 130 therebeneath. Pin 132 is suspended from the chassis 20 and may, therefore, be raised and lowered through use of a pair of bolts 134, one on each side of the channel 130, as seen in FIG. 2.

Tipping of the channel 130 is accomplished by a pair of bolts 136 connecting the chassis 20 with that end of the channel 130 opposite to roller 120. That end of the channel 130 which projects beyond the chassis 20 toward the roller 120, as seen in FIG. 1*a*, is adjustably clamped between opposed studs 138 mounted on the chassis 20. Retrograde rotation of the roller 120 is prevented through use of any suitable pawl and ratchet mechanism broadly designated 140.

Roller 122 is mounted on an idler shaft 142 whose bearings are suspended from an inverted channel 144 swingable vertically about a fulcrum pin 146 carried by the extended end of channel 130 therebeneath. A hand wheel 148 operably interconnecting the chassis 20 and the channel 144 permits swinging of the latter and therefore, the roller 122 to releasably clamp the panel 118 tightly between the rollers 120 and 122.

As above indicated, virtually all of the above described components of the assembly 10, are also included in the assembly 12. One difference is elimination of tracks 24 and wheels 22 and 23 in the assembly 12. In lieu thereof, the assembly 12 is supported by pads 150 and 152 that are preferably rigidly mounted to horizontal supporting surface 154. Legs 156, depending from chassis 158, are pivotally secured to the pads 152 for vertical tilting movement of the assembly 12. Noteworthy at this juncture is that the assembly 12 tilts about trunnions 160 at the outer end of assembly 12, whereas the assembly 10 tilts about the axles of wheels 23 adjacent the inner end of assembly 10.

Jack means 162, which may be identical in nature to the jacks 106, are provided adjacent the inner end of the assembly 12 for raising and lowering the latter, and are pivotally connected with the pads 150. Mounting unit 164 for tank end 166, is essentially the same as the unit 64, but since the tank chosen for illustration is frustoconical and, therefore, the end 166 is appreciably smaller in diameter than the tank end 80, it is necessary to use but a single annular rim 168 for wheel 170 forming a part of the unit 164.

The tank constructing method of the instant invention employing the apparatus above described, is particularly advantageous in the production of tanks made from metallic materials such as relatively heavy gauge steel or other metals. The metallic sheets for making the panel 118 are ordinarily manufactured in a rectangular form and, therefore, it is but necessary to lay out the panel 118 by welding such rectangular sheets together prior to placing the apparatus illustrated in the drawings, in use. In the manufacture of a cylindrical tank, such panel 118 may be rectangular and right-angular throughout. When a frusto-conical tank is to be produced, as illustrated in the drawings, the trailing longitudinal edge of panel 118 (not shown) is manifestly cut at an angle, but it is to be preferred that the leading longitudinal edge 172 of panel 118, be perpendicular to end edges 174 and 176 of panel 118.

Panel 118 is thereupon laid horizontally upon a number of suitable pedestals 178 and threaded between the rollers 120 and 122 of each assembly 10 and 12, whereupon the leading edge 172 is moved to a point aligned with the lowermost pointed ends of the plumbs 104 of the two assemblies 10 and 12. This assures that the edge 172 is in parallelism with an imaginary line spanning the distance between the shafts 28 of assemblies 10 and 12, assuming, of course, that both assemblies have been adjusted so that their shafts 28 are in precise alignment.

Thereupon, the hand wheels 148 are manipulated to clamp the rollers 120 and 122 to the panel 118 and the latter is attached rigidly to the flange 100 of tank end 80, as well as to the corresponding flange of end 166, as by welding. Similarly, tanks of this nature are ordinarily provided with a series of internal members 180, serving various purposes such as to compartment the tank or, merely as reinforcements. Accordingly, such false bulkheads 180 may either be ring-shaped or in the nature of disc-like partitions having annular peripheries or otherwise conforming in shape to the transverse configuration of the tank. The panel 118 is also welded to the peripheries of such members 180 at the inner face of panel 118 adjacent the leading edge 172. Any suitable temporary bracing (not shown), may be provided for the member 180 during the initial stages of the use of the apparatus to hold members 180 in proper relationship to the panel 118 and to the ends 80 and 166.

The motors 116 are thereupon energized to drive the rollers 120 and thereby advance the panel 118 transversely of the latter toward underlying support and guide rollers 182, panel 118 sliding horizontally along the pedestals 178 and taking the form of the peripheries of the ends 80 and 166, as well as the members 180 as the panel 118 is wrapped or rolled around such components 80, 166 and

180 of the tank. Panel 118 is shown partially formed into the arcuate configuration of the tank in FIGS. 1*a*, 1*b* and 3.

During the rolling or wrapping step of the method, it is to be preferred that the inner face of the panel 118 be attached from time to time, or continuously as by welding, to the heads 80 and 166, as well as to the members 180. In this respect, tank welding is usually sufficient, but conceivably, automatic, continuous welding without interruption of the rolling or wrapping procedure, may be employed to an advantage. And, of course, the method of the instant invention contemplates other means of attachment such as through use of rivets or other fasteners.

After the panel 118 has been completely wrapped around the internal structure of the tank, the trailing edge (not shown) of the panel 118, will meet with the leading edge 172 and such joint between the juxtaposed edges is thereupon closed, such as by welding. Excess material in the panel 118, now in the form of a shell and extending outwardly beyond the ends 80 and 166, may be removed through use of a cutting torch or other means of severance.

Tanks of this nature are ordinarily provided with one or more manholes, permitting workmen to gain access to the two chuck assemblies 78. These assemblies are released by removing the hand wheels 90 and thereupon, releasing the setbolts 96 to permit collapsing of the arms 94, whereupon the hub 82 may be removed from screw 84. Thereupon, through use of hand wheel 88, the screw 84 is removed from the shaft 28 and all of the parts, including plumb 104, may be removed from within the tank piece by piece. Subsequently, the openings 86 may be closed and if the members 180 are to serve as partitions, access openings provided therein, may likewise be closed by workmen operating within the tank.

After removal of the chuck means 78, the wheels 66 and 170 may be retracted to permit removal of the tank from the supporting rollers 182 by actuation of the units 56 to shift the shafts 28 until the innermost clamp 54 engage the proximal bearings 42.

The two motors 128 should be synchronized for simultaneous operation and the relative speeds of rotation of the drive rollers 120 may be adjusted by altering the corresponding speed reducers 126. Here again, it is seen that such relative speeds depend upon the relative diameters of the ends 80 and 166 of the tank. Manifestly, any automatic synchronization between the two power units 116, should be arranged to assure that leading edge 172 remains parallel with the longitudinal axis of the tank throughout the time such edge moves through its 360 degree cycle.

Obviously, the heights of the shafts 28 which may be adjusted through use of the power assemblies 40, depends upon the diameters of the two ends 80 and 166 whether such diameters are to be identical or differing as shown. Similarly, the longitudinal axes of the shafts 28 must be in precise alignment whether horizontal in the case of a cylindrical tank, or tilted in the case of the frusto-conical tank illustrated. Such adjustment is effected through use of the four jacks 106, 162, and the length of the tank determines the distance between the assemblies 10 and 12 which may be varied by removal of the clamps 110, permitting all four wheels 22 and 23 to travel along the tracks 24.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. Apparatus for making tanks from an elongated, initially flat, unitary panel, said apparatus comprising a supporting chasis; a pair of spaced, supporting assemblies carried by the chassis, each having a mounting unit and normally horizontally disposed shaft structure for attaching said unit thereto for rotation about the axis of the shaft structure, the axes of rotation of the units being aligned, each assembly having mechanism including a shiftable frame supporting said structure thereof for movement transversely of said axes to shift said shaft structure with respect to said chassis to thereby vary the diameter of the tank, each unit having chuck means for securing a tank end thereto with the tank ends joined at their peripheries to one face of the panel adjacent one longitudinal edge of the latter; and means including a pair of pinch rollers carried by said chassis in laterally spaced relationship to a corresponding unit, below the corresponding structure and drivingly engageable with said panel for advancing the latter with respect to said chassis, said rollers being rotatable to rotate said units in the same direction, there being backing means adjacent the chassis and below the panel for engaging the panel as the same is advanced to wrap the panel around the peripheries of said ends to present a tubular shell closed by the tank ends.

2. Apparatus for making tanks from an elongated, initially flat, unitary panel, said apparatus comprising a supporting chassis; a pair of spaced, supporting assemblies carried by the chassis, each having a mounting unit and normally horizontally disposed shaft structure for attaching said unit thereto for rotation about the axis of the shaft structure, the axes of rotation of the units being aligned, each unit having chuck means for securing a tank end thereto with the tank ends joined at their peripheries to one face of the panel adjacent one longitudinal edge of the latter; and means including a pair of pinch rollers carried by said chassis in laterally spaced relationship to a corresponding unit, below the corresponding structure and drivingly engageable with said panel for advancing the latter with respect to said chassis, said rollers being rotatable to rotate said units in the same direction, there being backing means adjacent the chassis and below the panel for engaging the panel as the same is advanced to wrap the panel around the peripheries of said ends to present a tubular shell closed by the tank ends, the chassis including elongated portions supporting said assemblies respectively, each portion being tiltable with respect to the other portion, whereby the shaft structure may be tilted, permitting the aligning of said axes for making tanks having ends of differing diameters.

3. Apparatus for making tanks from an elongated, initially flat, unitary panel, said apparatus comprising a supporting chassis; a pair of spaced, supporting assemblies carried by the chassis, each assembly including a slotted upright and provided with a substantially horizontal shaft in the slot thereof, means including a shiftable frame for mounting the shaft for vertical reciprocation within the corresponding slot and reciprocation along its longitudinal axis through said slot, power means coupled with the shaft for reciprocating the same along said longitudinal axis thereof, and power means coupled with the shaft for reciprocating the same vertically, each shaft carrying a mounting unit rotatable about an axis coincident with said longitudinal axis of the shaft, the axes of rotation of the units being aligned, each unit having chuck means for securing a tank end thereto with the tank ends joined at their peripheries to one face of the panel adjacent one longitudinal edge of the latter; and means including a pair of pinch rollers carried by said chassis in laterally spaced relationship to a corresponding unit, below the corresponding structure and drivingly engageable with said panel for advancing the latter with respect to said chassis, said rollers being rotatable to rotate said units in the same direction, there being backing means adjacent the chassis and below the panel for engaging the panel as the same is advanced to wrap the panel around the peripheries of said ends to present a tubular shell closed by the tank ends.

4. Apparatus for making tanks from an elongated, initially flat, unitary panel, said apparatus comprising a supporting chassis; a pair of spaced, supporting assemblies carried by the chassis, each having a mounting unit and normally horizontally disposed shaft structure for attaching said unit thereto for rotation about the axis of the

shaft structure, the axes of rotation of the units being aligned, each unit having chuck means for securing a tank end thereto with the tank ends joined at their peripheries to one face of the panel adjacent one longitudinal edge of the latter; and means including a pair of pinch rollers carried by said chassis in latterally spaced relationship to a corresponding unit, below the corresponding structure and drivingly engageable with said panel for advancing the latter with respect to said chassis, said rollers being rotatable to rotate said units in the same direction, there being backing means adjacent the chassis and below the panel for engaging the panel as the same is advanced to wrap the panel around the peripheries of said ends to present a tubular shell closed by the tank ends, each assembly having an outermost and an innermost end, the chassis including elongated portions supporting said assemblies respectively, each portion being tiltable with respect to the other portion, whereby the shaft structure may be tilted the outermost end of one assembly and the innermost end of the other assembly respectively, said portions being fulcrumed intermediate the ends thereof for vertical tilting movement, there being means on the chassis for tilting the portions and thereby said structures.

5. Apparatus for making tanks from an elongated, initially flat, unitary panel, said apparatus comprising a supporting chassis; a pair of spaced, supporting assemblies carried by the chassis, each having a mounting unit and normally horizontally disposed shaft structure for attaching said unit thereto for rotation about the axis of the shaft structure, the axes of rotation of the units being aligned, each unit having chuck means for securing a tank end thereto with the tank ends joined at their peripheries to one face of the panel adjacent one longitudinal edge of the latter, each assembly having a pair of rollers tightly receiving the panel therebetween and in driving engagement with the panel for advancing the latter with respect to said chassis, said rollers being rotatable to rotate said units in the same direction, there being backing means adjacent the chassis and below the panel for engaging the panel as the same is advanced to wrap the panel around the peripheries of said ends to present a tubular shell closed by the tank ends, there being means on said chassis and coupled with one of the rollers thereof for driving the same, said chassis being shiftable for moving one of the assemblies and thereby the corresponding shaft and the corresponding pair of rollers away from the other assembly, whereby tanks of varying lengths may be constructed thereby.

6. Apparatus for making tanks from an elongated, initially flat, unitary panel, said apparatus comprising a supporting chassis; a pair of spaced, supporting assemblies carried by the chassis, each having a mounting unit and normally horizontally disposed shaft structure for attaching said unit thereto for rotation about the axis of the shaft structure, the axes of rotation of the units being aligned, each unit having chuck means for securing a tank end thereto with the tank ends joined at their peripheries to one face of the panel adjacent one longitudinal edge of the latter, each assembly having a pair of rollers receiving the panel therebetween and in driving engagement with the panel for advancing the latter with respect to said chassis, said rollers being rotatable to rotate said units in the same direction, there being backing means adjacent the chassis and below the panel for engaging the panel as the same is advanced to wrap the panel around the peripheries of said ends to present a tubular shell closed by the tank ends, each assembly having means coupled with one of the rollers thereof for driving the same, and means including a shaft pivotally mounted intermediate the ends thereof on said chassis and operably coupled with the other roller, said shaft being swingable in opposed directions to shift the other of the rollers toward and away from said one roller.

7. Apparatus for making tanks from an elongated, initially flat, unitary panel, said apparatus comprising a supporting chassis; a pair of spaced, supporting assemblies carried by the chassis, each having a mounting unit and normally horizontally disposed shaft structure for attaching said unit thereto for rotation about the axis of the shaft structure, the axes of rotation of the units being aligned, each unit having chuck means for securing a tank end thereto with the tank ends joined at their peripheries to one face of the panel adjacent one longitudinal edge of the latter, said chassis having a pair of rollers thereon adjacent each assembly and below the corresponding shaft structure, said rollers being disposed for receiving the panel therebetween and in driving engagement with the panel for advancing the latter with respect to said chassis, said rollers being rotatable to rotate said units in the same direction, there being backing means adjacent the chassis and below the panel for engaging the panel as the same is advanced to wrap the panel around the peripheries of said ends to present a tubular shell closed by the tank ends, each assembly having means coupled with one of the rollers thereof for driving the same, and means including a shaft pivotally mounted intermediate the ends thereof on said chassis and operably coupled with the other roller, said shaft being swingable in opposed directions to shift the other of the rollers toward and away from said one roller, each assembly having an outermost and an innermost end, the chassis including elongated portions supporting said assemblies respectively, each portion being tiltable with respect to the other portion, whereby the shaft structure may be tilted the outermost end of one assembly and the innermost end of the other assembly respectively, said portions being fulcrumed intermediate the ends thereof for vertical tilting movement, there being means on the chassis for tilting the portions and thereby said structures.

8. Apparatus for making tanks from an elongated, initially flat, unitary panel, said apparatus comprising a supporting chassis; a pair of spaced, supporting assemblies carried by the chassis, each having a mounting unit and normally horizontally disposed shaft structure for attaching said unit thereto for rotation about the axis of the shaft structure, the axes of rotation of the units being aligned, each unit having chuck means for securing a tank end thereto with the tank ends joined at their peripheries to one face of the panel adjacent one longitudinal edge of the latter, said chassis having a pair of rollers thereon adjacent each assembly and below the corresponding shaft structure, said rollers being disposed for receiving the panel therebetween and in driving engagement with the panel for advancing the latter with respect to said chassis, said rollers being rotatable to rotate said units in the same direction, there being backing means adjacent the chassis and below the panel for engaging the panel as the same is advanced to wrap the panel around the peripheries of said ends to present a tubular shell closed by the tank ends, each assembly having means coupled with one of the rollers thereof for driving the same, and means including a shaft pivotally mounted intermediate the ends thereof on said chassis and operably coupled with the other roller, said shaft being swingable in opposed directions to shift the other of the rollers toward and away from said roller, each assembly having an outermost and an innermost end, the chassis including elongated portions supporting said assemblies respectively, each portion being tiltable with respect to the other portion, whereby the shaft structure may be tilted, the outermost end of one assembly and the innermost end of the other assembly respectively, said portions being fulcrumed intermediate the ends thereof for vertical tilting movement there being means on the chassis for tilting the portions and thereby said structures, each assembly having means supporting its rollers and its roller driving means for vertical swinging movement as a unit independently of and in parallelism with its tilting movement.

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10