

July 17, 1951

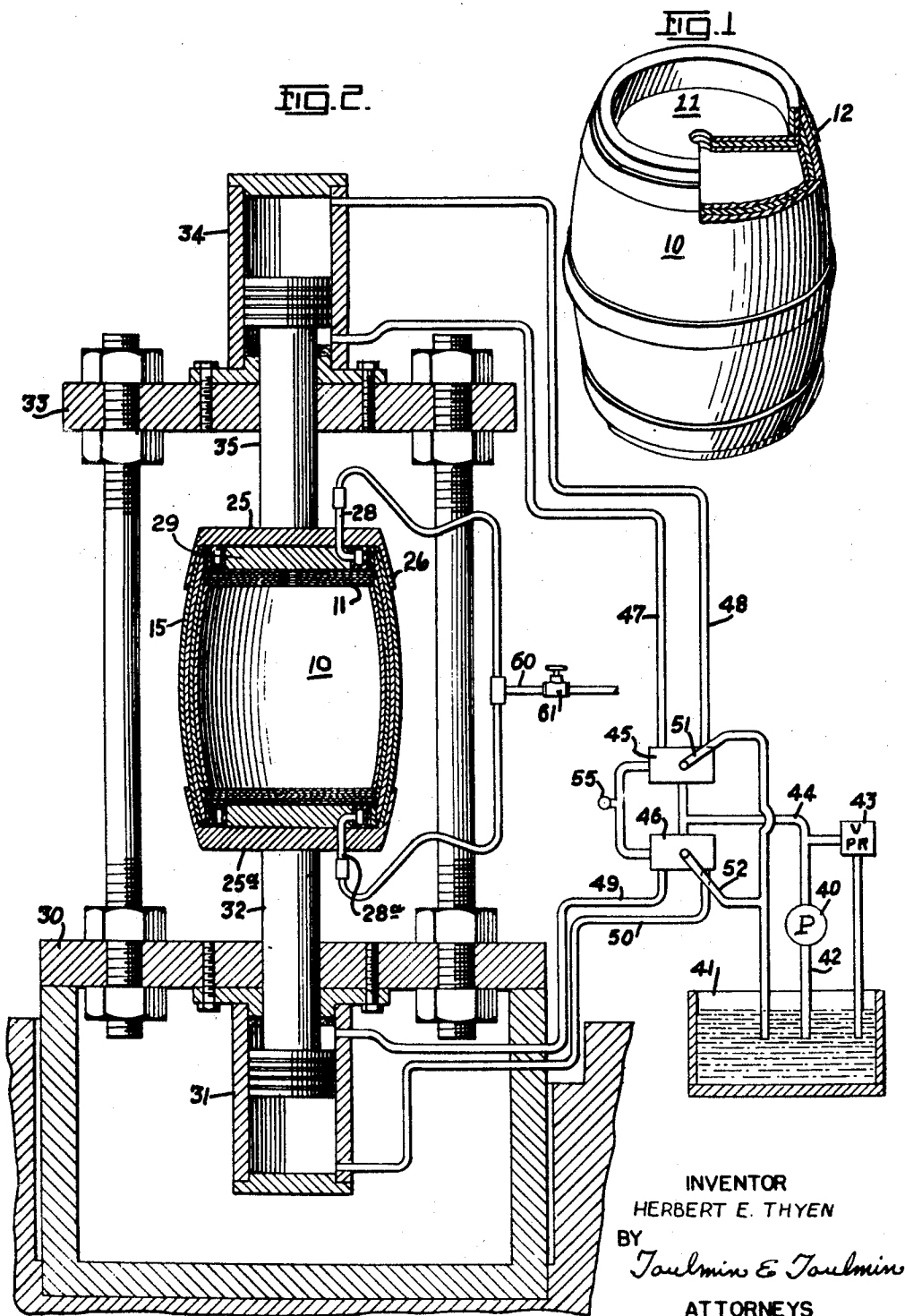
H. E. THYEN

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APPARATUS FOR BONDING HEADS INTO BARRELS

Original Filed Oct. 31, 1947

2 Sheets-Sheet 1



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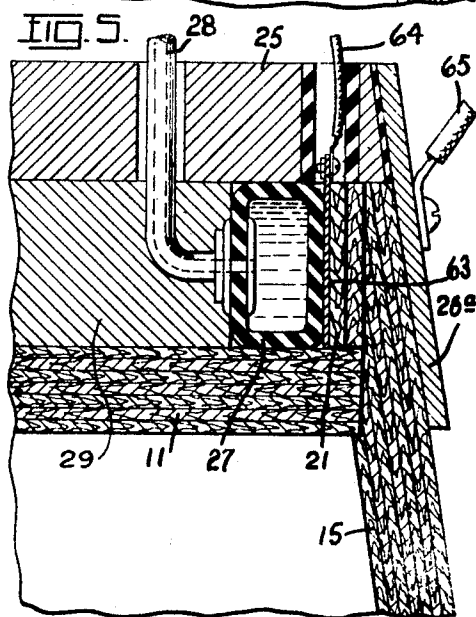
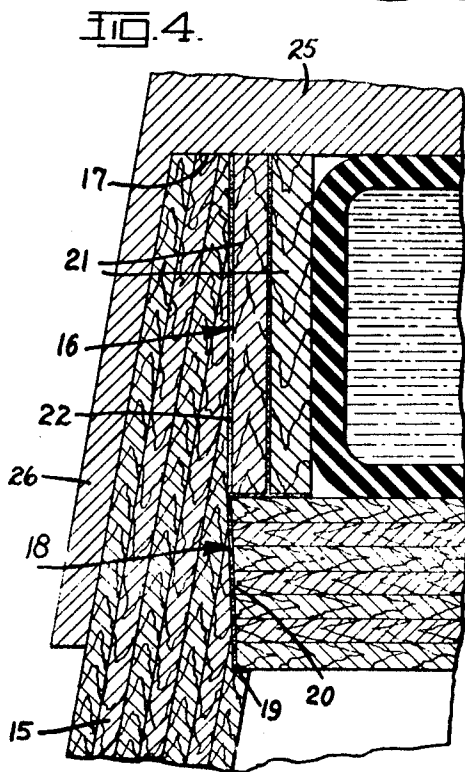
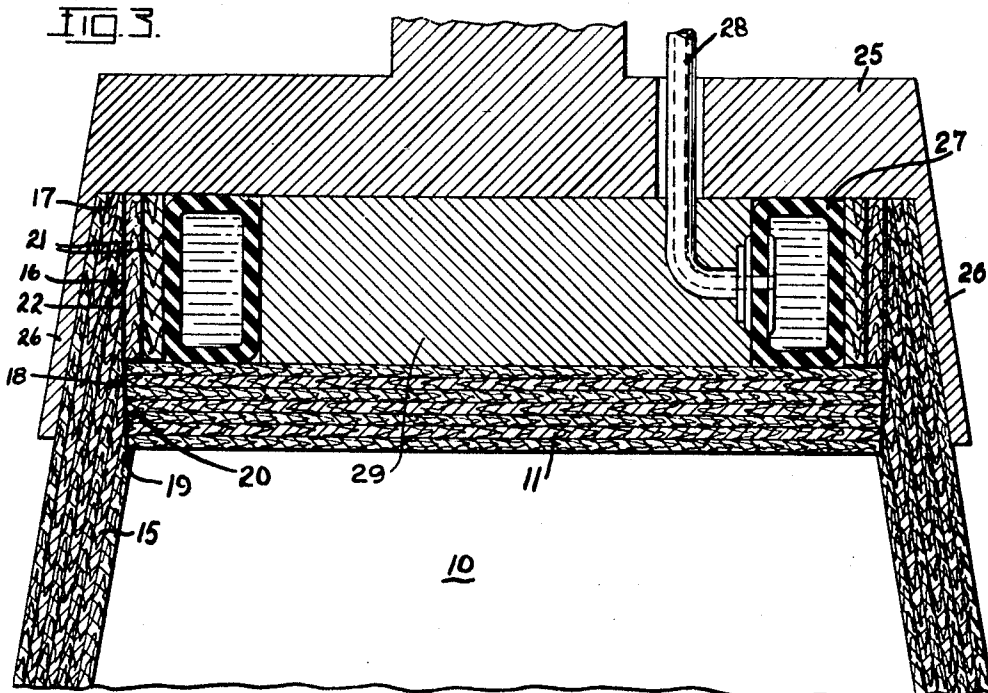
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2 Sheets-Sheet 2



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2,560,906

APPARATUS FOR BONDING HEADS
INTO BARRELSHerbert E. Thyen, Jasper, Ind., assignor to Jasper
Wood Crafters, Inc., Jasper, Ind., a corporation
of IndianaOriginal application October 31, 1947, Serial No.
783,243. Divided and this application February
1, 1949, Serial No. 73,939

3 Claims. (Cl. 147-6)

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The invention relates to an apparatus for installing a barrel head within the end of a bilge barrel, and to secure the same therein with reinforcements to prevent removal of the barrel head.

More particularly, the invention relates to apparatus for securing a barrel head construction within the end of a barrel, the barrel being of such construction that the barrel head can be inserted freely through one end of the barrel for disposition in a tapered seat provided in the end of the barrel. After the barrel head is positioned in the tapered seat, layers of wood veneer are then positioned above the barrel head, and in engagement therewith, and secured to the upper edge of the barrel to hold the barrel head in position and thereby prevent its removal from the barrel.

An object of this invention is to provide apparatus for installing a barrel head construction within the end of a barrel, particularly of a bilge barrel, with more ease and facility, and wherein, after assembly, the barrel head cannot be removed from the end of the barrel.

It is still another object of the invention to provide an apparatus for installing the barrel heads into the opposite ends of a barrel simultaneously and to retain the heads in place while they are being bonded to the body of the barrel.

Further objects and advantages will become more apparent upon reference to the accompanying drawings and the following description in which:

Figure 1 is an elevational view of a barrel having a barrel head secured therein utilizing apparatus of this invention.

Figure 2 is a schematic view of an apparatus in which the barrel heads may be installed in a barrel.

Figure 3 is an enlarged cross-sectional view of the upper portion of a barrel showing the manner of installing the barrel head.

Figure 4 is a still further enlarged cross-sectional view of the barrel head of this invention to clearly show the glue lines and the tapered seat for the barrel head.

Figure 5 is a partial cross-sectional view of the manner of installing the barrel head in a barrel illustrating the use of high frequency energy for heating the bonding agent between the barrel head and the barrel.

The manner of installing a head in the end of a barrel, particularly a bilge barrel, has involved somewhat of a problem to obtain absolute leak-proofness and to bond the barrel head

to the barrel. In this invention the barrel head and the end portion of the barrel is constructed in such a manner that the barrel head can readily be inserted into the end of the barrel and be bonded permanently to the barrel.

While the apparatus of this invention is particularly illustrated and described with reference to the manufacture of a plywood barrel and the installing of a plywood head in the same, yet it will be understood the invention is applicable to barrels that may be constructed in other ways such as from a plurality of individual staves. Further, the barrel head may be a solid wood member rather than a plywood construction as shown and described herein.

The barrel disclosed in this invention is constructed such that the inner surface of the end portion of the barrel is shaped so that it has a cylindrical portion terminating in a tapered seat, the tapered seat terminating in a ledge. A barrel head is provided with a tapered periphery to engage the tapered seat in the side wall of the barrel, the bottom or inner face of the barrel head engaging the ledge. One or more plies of wood veneer are then positioned within the cylindrical portion of the end of the barrel with the ends joined with either a scarf or butt joint and in engagement with the inner surface of the barrel and with the upper or outer surface of the barrel head. The barrel head and the layer or layers of wood veneer are then urged against the barrel to seat the barrel head in the tapered seat and simultaneously expand the wood veneer plies against the cylindrical portion of the barrel end by the apparatus of this invention, a suitable bonding agent or adhesive being provided between the barrel parts.

In Figure 1 there is shown a plywood barrel 10 which may be constructed according to the method disclosed by C. U. Gramelspacher in Patent No. 2,365,754. The barrel 10 is provided with the usual heads 11, and may be provided with metal bands 12 to protect the barrel during handling. The upper end of the barrel will be constructed as more particularly illustrated in Figures 3 and 4.

The body of the barrel 10 may consist of a plywood wall 15, or may consist of a plurality of individual wood staves suitably secured together. The end portion of the wall 15 is provided with a cylindrical portion 16 that extends from the end edge 17 of the barrel toward the interior thereof. This cylindrical portion 16 terminates in a tapered portion 18 that is in the form of a truncated cone with the base portion

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positioned outwardly toward the end edge of the barrel. The tapered seat portion terminates in a horizontal ledge 19 which forms a stop to regulate the position of the head.

The barrel head 11 is a disc that may be either of a plywood construction, as illustrated, or may be a solid member. The edge periphery 20 of the head 11 is tapered to cooperate with the tapered seat portion 18 in the inner surface of the wall 15 of the barrel. The barrel head disc 11 is, therefore, in the form of a truncated cone with the base positioned outwardly toward the end edge of the barrel.

With the barrel head in position, as illustrated in Figures 3 and 4, one or more layers of wood veneer 21 are positioned between the barrel head 11 and the end edge 17 of the barrel against the cylindrical wall portion 16 of the barrel. These layers of wood veneer 21 are suitably bonded to the cylindrical wall portion 16 and to the head 11 of the barrel, a bonding agent 22 being provided for this purpose.

To install the barrel head 11 within the end of the barrel 10, it will, of course, be understood that the end portion of the barrel is first prepared with the cylindrical portion 16, the tapered seat portion 18, and the ledge or stop 19. The barrel head 11 is also first provided with its tapered periphery 20.

The prepared inner surface of the barrel is then coated with an adhesive or bonding agent and the barrel head is dropped into position in engagement with the tapered seat 18 with the inner surface of the barrel head 11 in engagement with the ledge 19. One or more plies of wood veneer 21 are then positioned within the cylindrical portion 16, a suitable bonding agent being provided between the layers of wood veneer and between the wood veneer and the barrel 10.

The apparatus for holding the assembled barrel parts together and for bonding them together is then brought into engagement with the upper edge of the wood veneer sheets 21, which at this time may still extend above the upper edge 17 of the barrel. The pressure member of the apparatus forces the wood veneer sheets 21 downwardly within the cylindrical portion 16 of the barrel into engagement with the outer face of the barrel head 11 to thereby force the barrel head into engagement with the tapered seat 18 and the ledge 19. Heat is then applied to the wood veneer sheets 21 and to the barrel head 11 to bond the adhesive, or the adhesive may be an air drying adhesive.

The pressure applying apparatus consists of a head 25 that has a downwardly extending annular flange 26 that engages the outer surface of the wall 15 of the barrel when the head 25 is in the position shown in Figure 3. A centrally arranged backing plate 29 extends from the head 25 and is positioned coaxial of the cavity formed by the head 25 and the flange 26. The head 25 carries a flexible bag 27, surrounds the plate 29 and receives fluid under pressure through a pipe 28. The fluid admitted into the interior of the bag 27 may be hot and it may be circulated continuously within the bag 27 by providing a suitable outlet at a position remote from the pipe 28.

With the head 11 of the barrel and the wood veneer sheets 21 in the position shown in Figures 3 and 4, pressure is introduced into the flexible bag 27 which thereby expands the wood veneer sheets outwardly against the cylindrical wall 16 of the barrel 10, the flange portion 26 of the head 25 forming an outer wall form or sup-

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port for the upper edge of the barrel. The pressure may be retained in the bag 27 until the adhesive material has set, either as an air drying adhesive or under heat as applied through the fluid admitted into the bag 27, or by the use of external heat, such as in a hot room or oven.

An apparatus in which pressure can be applied upon the heads of the barrel during assembly and bonding is illustrated diagrammatically in Figure 2. The press may consist of a bed 30 which carries an hydraulic motor 31 having the ram 32 extending from the bed of the press.

The press will also be provided with a head 33 which carries an hydraulic motor 34 having a ram 35 extending through the head of the press. The rams 32 and 35 carry the pressure heads 25 and 25a, previously described. The hydraulic system for operating the hydraulic motors 31 and 34 may consist of a pump 40 which receives fluid from the supply tank 41 through the suction line 42. A pressure relief valve 43 relieves excess pressure from the hydraulic system above a predetermined value.

Fluid is delivered from the pump 40 through the discharge line 44 into the flow control valves 45 and 46. The flow control valve 45 has the service lines 47 and 48 which supply fluid under pressure to opposite ends of the hydraulic motor 34 to cause reciprocation of the ram 35. Similarly, the flow control valve 46 is provided with service lines 49 and 50 to control the motor 31.

The flow control valves 45 and 46 have exhaust lines 51 and 52, respectively, which discharge into the supply tank 41. The flow control valves 45 and 46 are thus what is termed a four-way control valve to alternately supply fluid to opposite ends of an hydraulic motor while exhausting fluid from the end of the hydraulic motor opposite to that into which fluid under pressure is supplied, to thus control reciprocation of the hydraulic motor.

The flow control valves 45 and 46 may be operated separately or together. As illustrated in the drawing, a manual control 55 is provided for moving the internal mechanism of the valve to regulate the direction of flow of fluid through it. To supply fluid under pressure into the flexible bag 27, the pipes 28 and 28a are connected with a source of fluid under pressure, such as the pipe 60, having a control valve 61 therein. The fluid supplied may be either gaseous or liquid, and may be a hot fluid for the purpose of heating the bonding agent, as previously described.

In Figure 5 there is shown an alternate method of heating the bonding agent between the head 11 and the wall 15 of the barrel and between the sheets of wood veneer 21. In this arrangement the pressure applying member 25 is provided with a metal annular flange 26a, the main body of the pressure applying member 25 either being of insulating material, such as wood or the annular flange 26a may be insulated from a metal member which may form the body of the pressure applying member 25. A thin annular metal sheet 63 is placed between the expansible bag 27 and the inner wood veneer sheet 21. The metal sheet 63 and the flange 26a are adapted to be connected to a suitable source of high frequency current by means of the electric lines 64 and 65.

After the head of the barrel is placed in assembled condition as shown in Figure 1 and pressure has been applied to the expansible bag 27, high frequency current will be introduced into the electric lines 64 and 65 to heat the bonding agent and cause it to set. In this case, preferably,

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a thermosetting resin is used as the bonding agent.

This application is a division of my co-pending application, Ser. No. 783,243 filed October 31, 1947.

While the device disclosed and described herein constitutes a preferred form of the invention, yet it will be understood that modifications that fall within the scope of the appended claims are intended to be included herein.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. Apparatus for bonding a head into a barrel, which apparatus consists of, a body member having an annular peripheral flange projecting from one side of said body, a projection extending from said body centrally thereof on the same side as said flange, spaced therefrom, and projecting in the same direction as said flange and cooperating therewith to form an annular cavity in said body that is open at one side thereof, a flexible expansible bag carried on said body within said cavity and arranged around said projection in juxtaposition thereto and having the periphery of the bag in spaced relationship to said flange to maintain open a part of said cavity annularly between said bag and said flange, and means connected with said bag for introducing fluid under pressure thereinto.

2. Apparatus for bonding a head into a barrel, which apparatus consists of, a body member having a flat annular surface thereon, an annular peripheral flange projecting from said body at the outer periphery of said annular surface, a projection on said body disposed centrally thereof and having the outer periphery in spaced relationship to said flange, spaced therefrom, and cooperating with said flange and said annular surface to form an open ended annular cavity in said body, said projection having a flat surface extending across the same parallel to the annular flat surface on said body, and a flexible expansible bag positioned in said cavity around said projection in juxtaposition thereto and having the periphery thereof in spaced relationship to said flange.

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3. Apparatus for bonding a head into a barrel, which apparatus consists of, a body member having a flat annular surface thereon, an annular peripheral flange projecting from said body at the outer periphery of said annular surface, a projection on said body disposed centrally thereof and having the outer periphery in spaced relationship to said flange, spaced therefrom, and cooperating with said flange and said annular surface to form an open ended annular cavity in said body, said projection having a flat surface extending across the same parallel to the annular flat surface on said body, and a flexible expansible bag positioned in said cavity around said projection in juxtaposition thereto and having the periphery thereof in spaced relationship to said flange, said flange comprising a metal member and insulated electrically relative to said body member to form one electrode of a high frequency electrical circuit, and an annularly arranged metal member positioned within said cavity around the periphery of said bag in juxtaposition thereto and in spaced relationship to said flange and forming the other electrode of a high frequency electrical circuit.

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