Oct. 11, 1932. H. PARKER 1,881,916

METHOD OF FORMING FIBROUS BELL MOUTH TUBE ENDS

Original Filed March 21, 1930 2 Sheets-Sheet 1

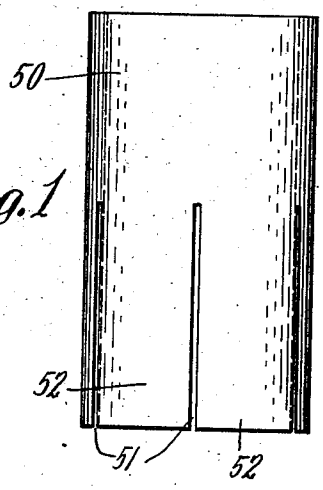


Fig. 1

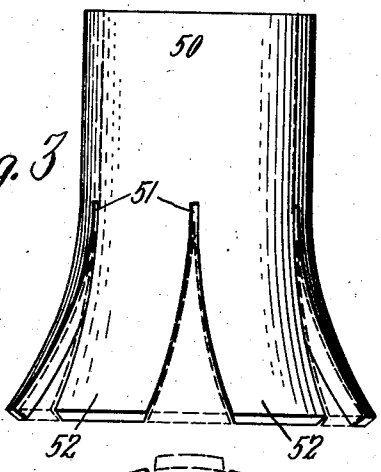


Fig. 3

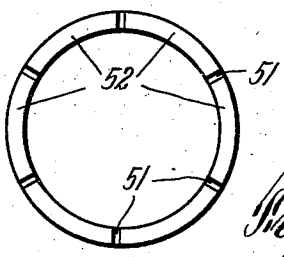


Fig. 2

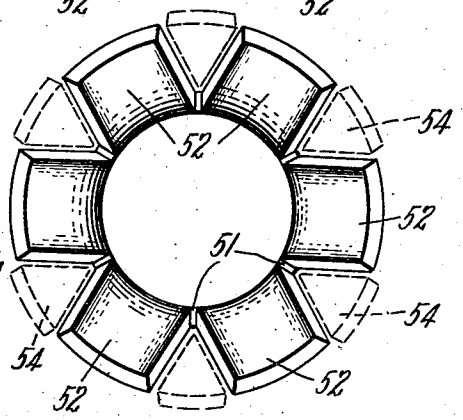


Fig. 4

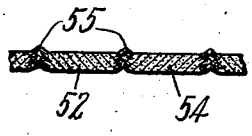


Fig. 5

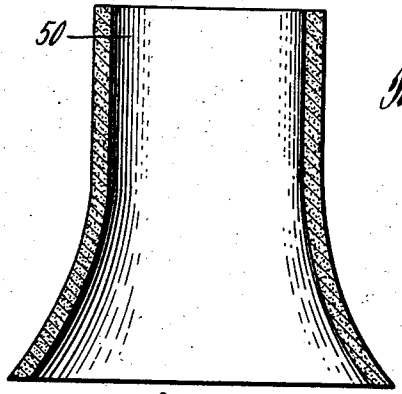


Fig. 6

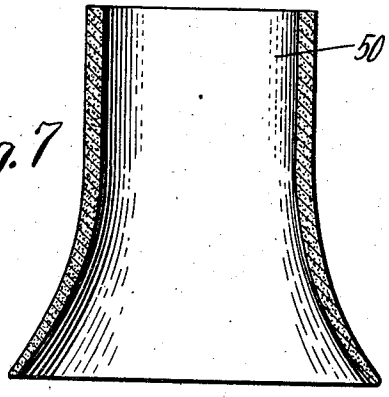


Fig. 7

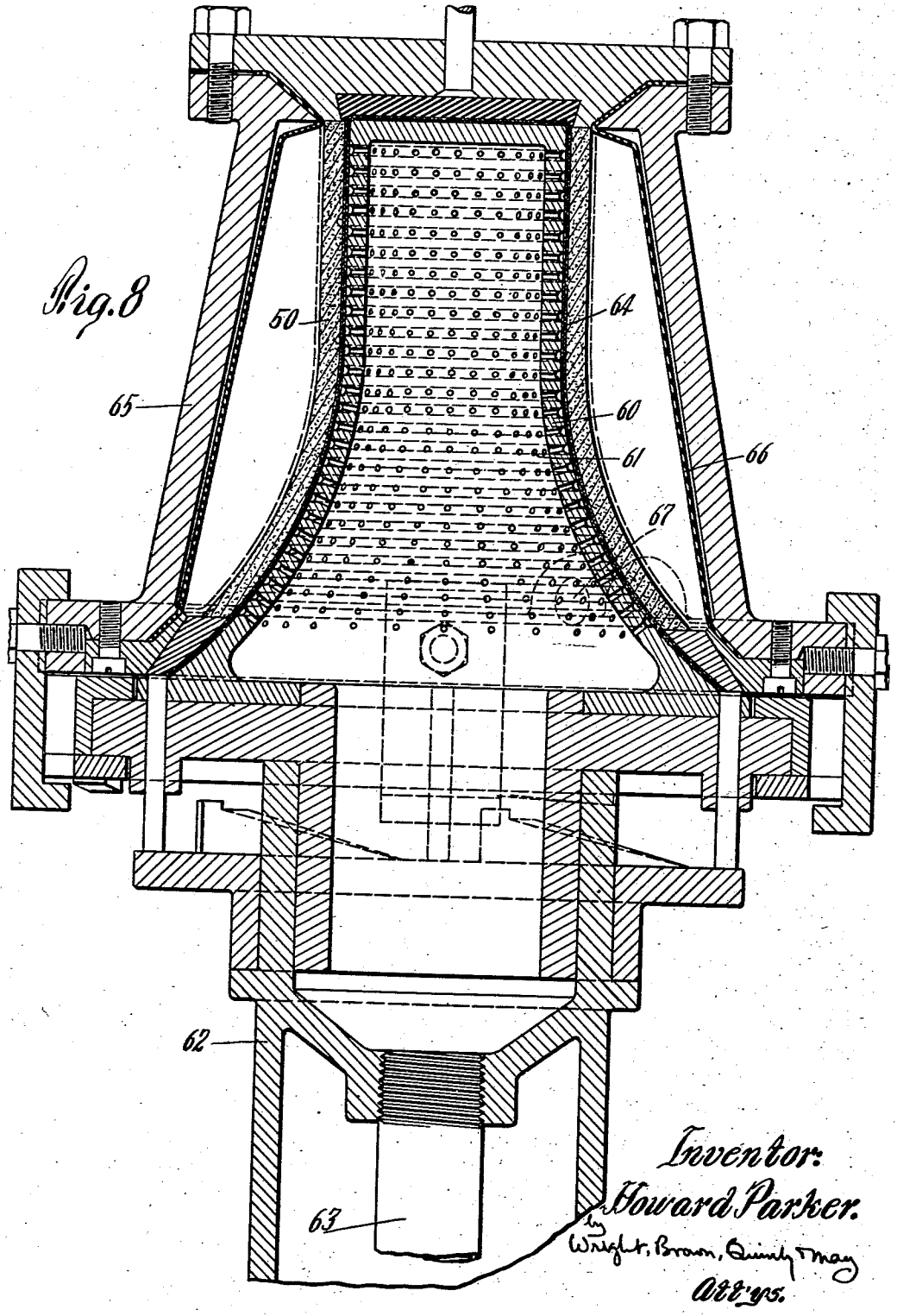
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Fig. 8



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UNITED STATES PATENT OFFICE

HOWARD PARKER, OF BERLIN, NEW HAMPSHIRE, ASSIGNOR TO BROWN COMPANY, OF BERLIN, NEW HAMPSHIRE, A CORPORATION OF MAINE

METHOD OF FORMING FIBROUS BELL-MOUTH TUBE ENDS

Original application filed March 21, 1930, Serial No. 437,692. Divided and this application filed February 28, 1931. Serial No. 519,094.

This application is a division of my copending application Serial No. 437,692 filed March 21, 1930. The invention relates to a method of forming fiber bell-mouth members for use with fiber conduit. When fiber conduits are laid underground for telephone wires, electric cables, etc., the conduits are interrupted at intervals by man-holes through which new wires may be threaded through the conduits, and in which connections can be made for branching wires, etc. The conduits open into the man-holes on two or more sides. The wires or cables entering at one side are usually bent around along the wall of the man-hole instead of projecting straight across, to keep the central portion of the man-hole clear for workmen. In order to avoid sharp bends in the cables as they enter the man-holes, it is desirable that the conduits be laid with flared or bell-mouth ends to provide curved surfaces around which the cables can bend as they enter a man-hole. If metal or tile conduits be used, such bell mouth ends can be cast or molded to any desired shape. Where fiber conduit is used, however, the problem of forming bell-mouth ends is more difficult, since the strength of a fiber article depends largely on the method of forming it, owing to the fact that the strength of such an article arises chiefly from the thoroughness with which the fibers are interfelted. If, for example, fibrous tubing be made by winding a wet web of pulp on itself on a mandrel, under pressure, the resulting tube, if properly dried, has comparatively great strength owing to the efficient interfelting of the fibers caused by pressing the wet layers together prior to drying. The mechanical strength of such tube is far in excess of that of a tube of similar dimensions made by pressing pulp into a mold. In order to retain the strength of the fibrous tubing made as described by winding a wet web on itself under pressure, the bell mouth embodying the present invention is preferably made from such tubing, the ends of a tube section being slit and spread to increase the diameter, fiber gussets being inserted in the openings to complete the structure.

According to the invention such a structure is preferably assembled while the materials are thoroughly wet, and the assembled structure is thereupon subjected to high pressure which not only gives it its finished shape, but also interfelts the separate parts into a well knitted unit.

For a more complete understanding of the invention reference may be had to the description thereof which follows, and to the drawings, of which,—

Figure 1 is an elevation of a section of fiber tubing, with an end slotted.

Figure 2 is an end view of the same.

Figure 3 is an elevation of a split tube section with the end elements bent outwardly.

Figure 4 is an end view of the same.

Figure 5 is a fragmentary section of the tube wall (developed in a plane) after the insertion of gussets in the splits.

Figure 6 is a sectional view of a bell-mouth as it comes from the press.

Figure 7 is a similar view of a bell-mouth after being tooled to final shape.

Figure 8 is a sectional view of pressing apparatus.

In forming a bell mouth according to the invention, a short length of fiber tube 50 is thoroughly soaked in water. The end of this section is slit longitudinally, as at 51, these slits being preferably uniformly spaced around the circumference of the tube. The tube may be split either before or after soaking. The soaked and split end of the tube is then spread, as shown in Figures 3 and 4, forming triangular openings between the split end elements 52. This may be done by forcing the split end down over a suitable flaring mold such as is illustrated in Figure 8. The side edges of the elements 52 may then be bent slightly outward, as indicated at 55 in Figure 5. In the triangular openings suitable gussets 54 may be inserted, these gussets having been previously prepared. The gussets may be cut from fiber tubing and thoroughly soaked in water. Prior to insertion in the triangular openings, the side edges of the gussets are preferably bent upwardly, as shown in Figure 5. After the gussets are in place, the bent up edges may be patted down flush to knit or felt together

the abutting edges of the gussets 54 and the tube elements 52. This is preferably done while the tubular member 50 is on the flaring mold used for spreading the elements 52. The entire member 50 may now be pressed to shape the member as a whole and to consolidate the seams between the elements 52 and the gussets 54. This may be done by suitable apparatus such, for example, as is illustrated in Figure 8, and is more fully illustrated and described in my application Serial No. 437,692, hereinbefore referred to. After being pressed, the bell-mouth may be dried, treated with waterproofing material and machined to its final shape.

Apparatus for pressing the bell-mouth is shown in Figure 8. A bell-shaped mold 60 with suitable perforations 61 to carry off water expressed from the bell-mouth, is removably mounted on a standard 62 in which is a drain or suction line 63. The mold 60 may be covered with a suitable cloth bag 64 which facilitates stripping the mold after a bell mouth has been pressed to shape thereon. Over the mold is a heavy, removable cap 65 within which is a rubber bag or diaphragm 66. The diaphragm is tubular and is secured to the cap along its entire upper and lower edges so as to form a closed chamber with the side wall of the cap. An opening 67 leads through the cap wall into this chamber and communicates with a supply of pressure fluid such as water. After a tube-portion 50 has been placed on the mold 60 and the gussets have been suitably inserted, the cap is lowered into place as shown, and firmly clamped in place. Water under pressure may then be introduced through the inlet 67 to press the diaphragm 66 against the tube portion 50. This compacts the fibrous structure and expresses considerable of the water from the member 50. After being pressed, the member is ready for removal, drying and further treatment.

I claim:

1. A method of joining together edge to edge two articles each composed of a piece of wet fiber tubing material, which comprises bending the marginal portions at the abutting edges upwardly, pressing the abutting edges together so that the upwardly bent portions form a slight ridge, and pressing said ridge approximately flush with the adjacent surfaces of said articles.

2. A method of forming bell-mouth ends, which comprises slitting the end portion of a fiber tube to form a plurality of end elements, soaking the slit portion in water, spreading the elements between the slits whereby wedge-shaped openings are formed between adjacent elements, fitting gussets of tube-wall thickness into said openings, and felting together the abutting edges of said gussets and elements.

3. A method of forming bell-mouth ends, which comprises longitudinally slitting an end portion of a fiber tube, soaking said end portion in water, spreading the split end over a form, fitting wet fiber gussets into the widened slits to form a bell-mouth, working the abutting edges together, and applying pressure to the outer surface of said bell-mouth.

4. A method of forming fiber bell-mouth ends, which comprises longitudinally slitting a wet end portion of a fiber tube, pressing outwardly the material along said slits, spreading the slit end portion over a bell-shaped mold, fitting into the widened slits gussets of material similar to that of said tube, said gussets having their side edges upturned whereby a complete bell-mouth structure is formed with ridges along the seams, and pressing said ridges flush with the adjacent surface.

In testimony whereof I have affixed my signature.

HOWARD PARKER.