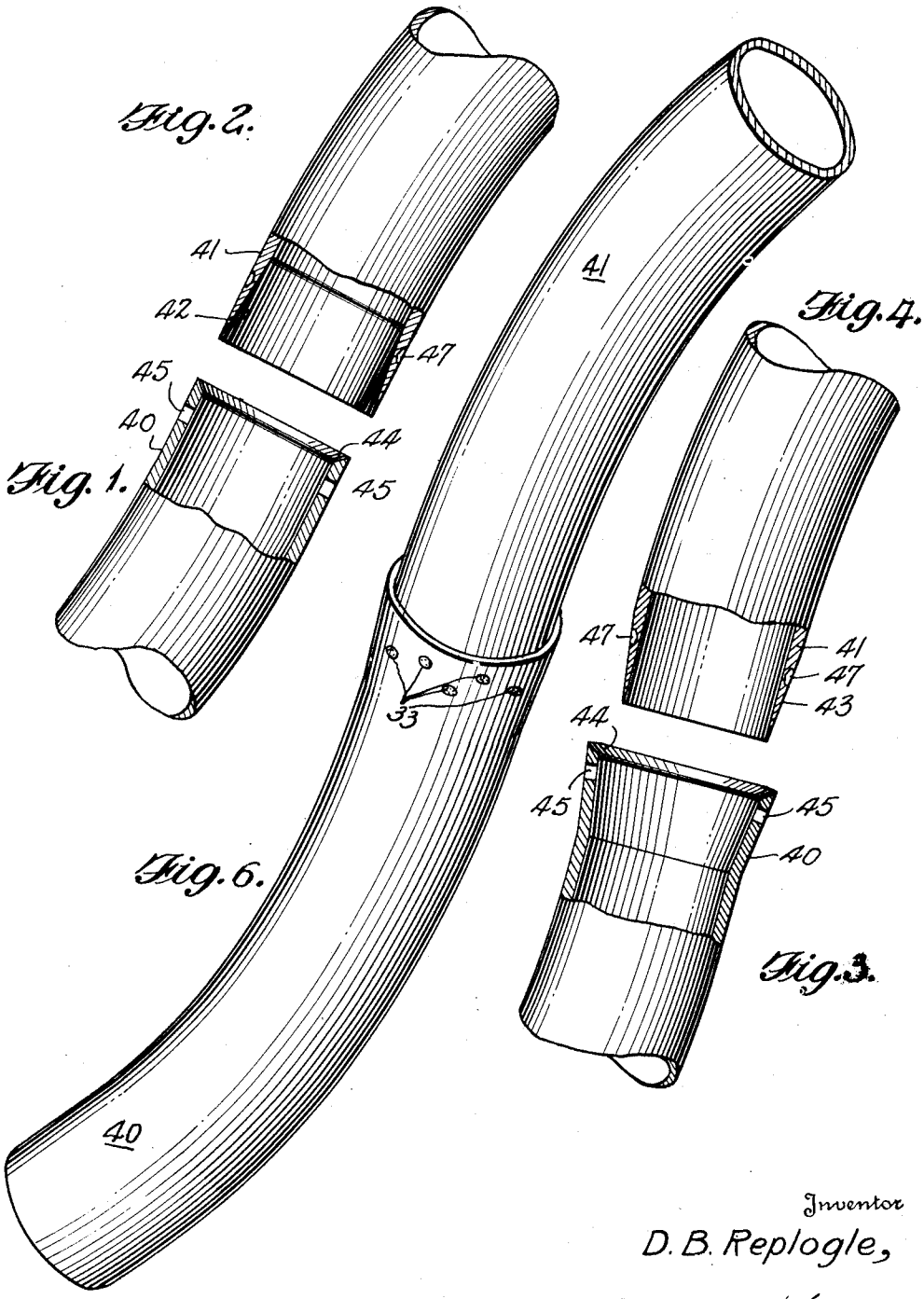
Jan. 3, 1939. D. B. REPLOGLE 2,142,150

METHOD OF JOINING FIBER TUBES

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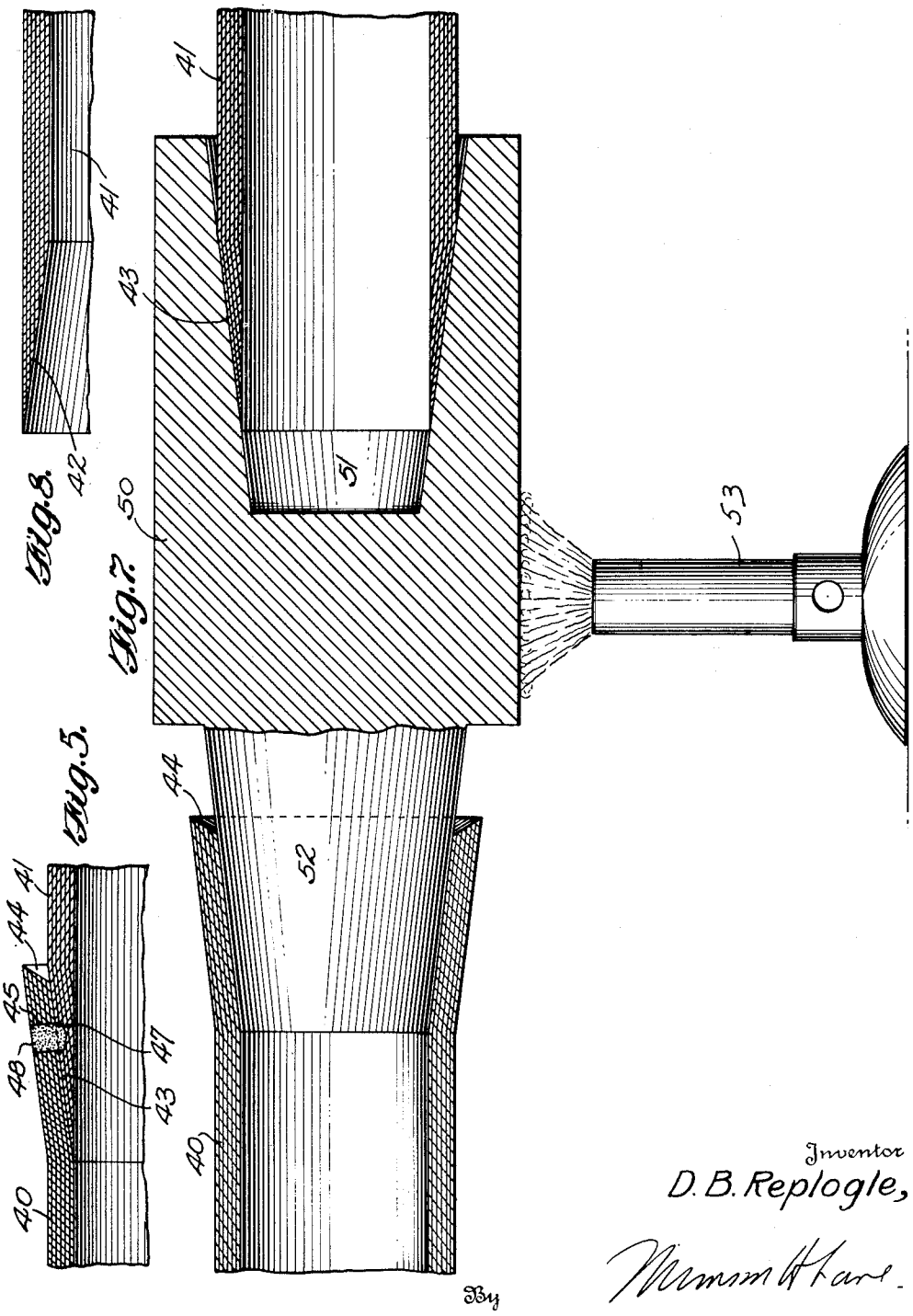


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METHOD OF JOINING FIBER TUBES

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METHOD OF JOINING FIBER TUBES

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Application August 7, 1936, Serial No. 94,849

1 Claim. (Cl. 285—115)

The invention relates to a method of joining fiber tube sections initially of the same diameter to form a fluid-tight bell and spigot joint.

According to the preferred embodiment of my invention the method comprises internally scarfing the end of the section which is to comprise the spigot part, soaking the scarfed end, then contracting the scarfed end in a form until the slope is all on the outside and the interior of the pipe section is straight and continuous, drying the contracted end to less than its normal moisture content, soaking and expanding the end of the other section which is to constitute the bell member of the joint, telescoping the expanded end over the reduced end to form a bell and spigot joint, and allowing the fiber of which the joint is composed to resume its normal moisture content, whereby a fluid tight fit is obtained.

The present application is continuation-in-part of my application Serial No. 586,192, filed January 12, 1932, the entire disclosure of which, including the drawings, is hereby incorporated by reference as part of the disclosure of the present application.

The word fiber as used in this specification refers to what is commercially known as vulcanized fiber; but must be of a good strong quality, such as is made into tubes by winding rag paper on mandrels, treating with chlorides, and rolling to a suitable hardness. Any other product having sufficient strength, hygrometric quality of expansion and contraction, and dielectric qualities may be substituted.

The invention will be further understood by reference to the accompanying drawings and the further detailed description which, with the disclosure in my application Serial No. 586,192, are intended as illustrative only rather than as limiting the invention to the precise details set forth.

In the drawings:—

Figs. 1 and 2 are views showing the ends of two fiber or like tubes which are to be joined;

Figs. 3 and 4 show the same two tube ends one having been expanded and the other contracted preparatory to being joined;

Fig. 5 is a view showing the joined tubes;

Fig. 6 shows a slightly different securing means for the joint;

Fig. 7 is a view illustrating a former designed for heating, contracting and expanding the tube ends to be joined;

Fig. 8 is a detailed sectional view showing the fiber tube end scarfed or bevelled on the inside.

In Figs. 1 to 8, I have shown steps in the process of joining fiber tube ends.

The numerals 40 and 41 denote curved sections of tubing preferably composed of hard fiber or other suitable hygrometric material, whose ends are joined. These tubes are preferably of the same interior diameters which, for the purpose of illustration, may be one inch. These tube ends are to be connected by what may be termed a bell and spigot joint, the member 40 including the bell end of the joint and the member 41 the spigot end.

As shown, the fiber tube end 41 which constitues the spigot member is scarfed or bevelled interiorly at 42 and brought to a sharp edge. A scarf of about three-quarters of an inch for a pipe of one inch in diameter has been found satisfactory. Of course the invention is not limited to these precise dimensions. Where the pipe is composed of laminated material, or where the pipe is made by winding rag paper on mandrels, the scarf cuts across the laminations as indicated in enlarged section in Fig. 8. The bevelled tube 41 is then subjected to a heating treatment and at the same time the outside is reduced so that the slope is all on the outside, as indicated at 43 in Figs. 4 and 7, whereas the interior of the pipe is straight and continuous.

The bell end 40 is also initially scarfed on the inside at 44 so as to make it easy to slip the bell over the spigot end after the bell has been soaked and expanded. The bevel 44 is preferably not over one-eighth to one-quarter inch for a pipe one inch in diameter. The scarfed bell is now soaked in water until fully expanded by absorption of its maximum capacity of water. One or more holes 45 are now bored in the bell flange at a distance from the edge, say a quarter of an inch or more so that the bore coincides with the thick part of the spigot wall when the parts are assembled. A sudden drying of the bell end on an expanding form will permit it to be enlarged more fully by again soaking and repeating the process where necessary. The moistened bell end is preferably stretched over a form such as is illustrated in Fig. 7 and quickly dried, preferably by the application of heat. This expanding process may be repeated accompanied by moistening the tube end between the expansion treatments as many times as necessary or desired.

The shape of the two parts to be joined is indicated in Figs. 3 and 4. The expanded portion of the bell end corresponds in length to the length of the reduced portion 43 of the spigot member 41. Holes 47 corresponding in location to the holes 45 in the bell member 40 are formed in the

spigot end and preferably do not extend clear through the inner wall.

The ends are now ready to be joined. The bell 40, having been moistened to its capacity and the spigot end dried to its capacity, the parts are now united with a snug fit. The parts are then ready to dry, the spigot end absorbing a part of the moisture from the bell member. This causes the spigot member to expand while the bell member on drying contracts forming a very tight joint. Plugs 48, preferably of plastic material, may be pressed into the bores 45 and 47 in the bell and spigot respectively. The bores should not be oppositely arranged but at quartering distances as to the circumference where more than one bore is used. Any anchoring method for the plastic plug may be employed. It will be noted that the interior of the joined tubes shown in Fig. 5 is uniform and continuous.

In Fig. 6 a joint is shown which may be formed as above described, the ends being connected by plastic rivets 33 arranged in staggered relation.

Fig. 7 illustrates a convenient apparatus for treating the bell and spigot ends. As shown, a suitably suspended steel block 50 is provided with a tapered socket 51 extending into one end and a correspondingly tapered male end 52 extending in the opposite direction. The block is adapted to be heated in a suitable manner as, for instance, by a gas heater 53, the heat passing by conduction to the socket 51 and to the expanding end former 52.

The invention has been described in detail for the purpose of illustration but it will be obvious that many variations and modifications may be resorted to without departing from the spirit of the invention.

I claim:

A method of joining fiber tube sections initially having the same diameter, to form a fluid tight bell and spigot joint; which comprises internally scarfing the end of the section which is to comprise the spigot part, soaking the scarfed end, then contracting the scarfed end in a form until the slope is all on the outside and the interior of the pipe section is straight and continuous, drying the contracted end to less than its normal moisture content, soaking and expanding the end of the other section which is to constitute the bell member of the joint, telescoping the expanded end over the reduced end to form a bell and spigot joint, and allowing the fiber of which the joint is composed to resume its normal moisture content, whereby a fluid tight fit is obtained.

DANIEL BENSON REPLOGLE.