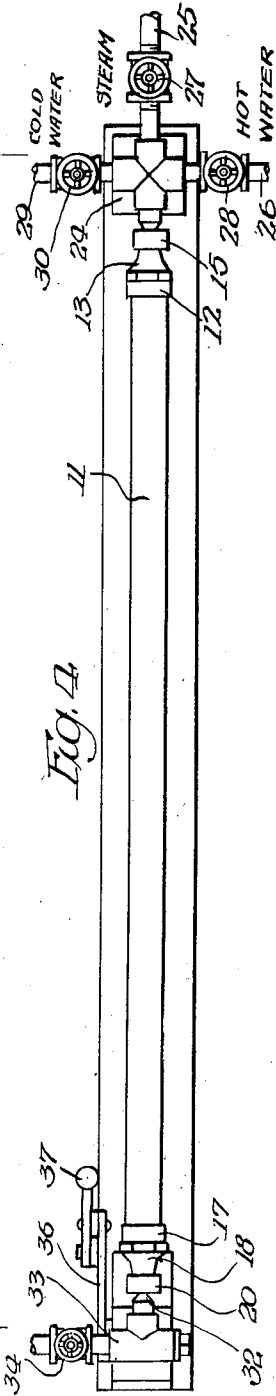
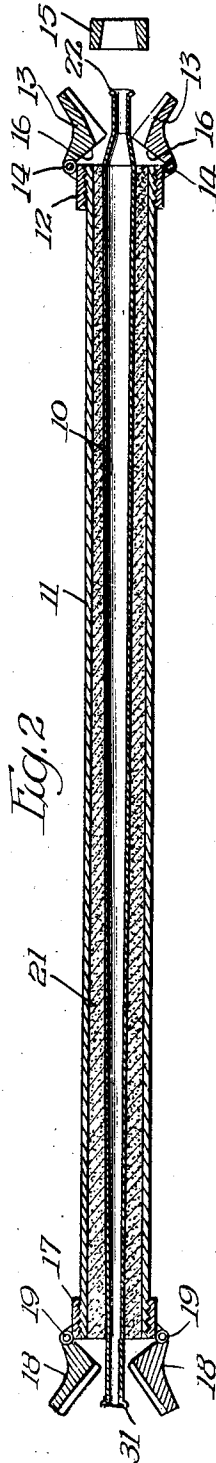
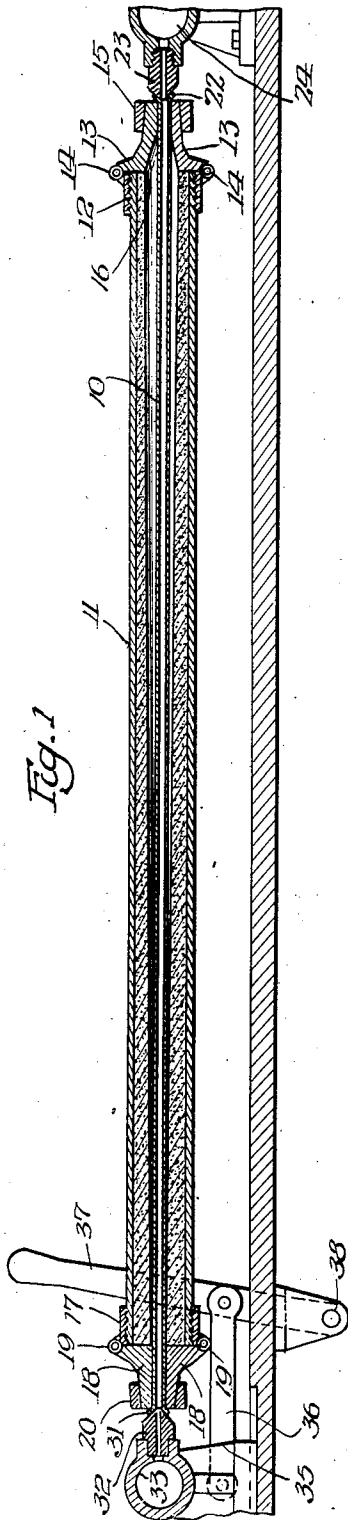


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H. G. BARRETT

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APPARATUS FOR AND METHOD OF MAKING TUBULAR SHAFTS
FOR GOLF CLUBS AND THE LIKE
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UNITED STATES PATENT OFFICE

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APPARATUS FOR AND METHOD OF MAKING TUBULAR SHAFTS FOR GOLF CLUBS AND THE LIKE

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This invention relates to an improved apparatus for and method of making hollow or tubular shafts for golf clubs and the like, and one of the objects of the invention is to shape a hollow shaft which is constructed of a nitro-cellulose composition as pyroxyline, or any other suitable non-metallic material.

Tubular shafts of this character when originally manufactured are usually of a hollow construction and the internal and external diameters of the shaft are generally respectively uniform through the length thereof.

For use as a shaft for golf clubs and the like it is preferable to shape the shaft so that it will be tapering and by so doing a hollow, tapering, re-enforcing core may be inserted thereinto without injury to the shaft or core.

If it is attempted to insert a re-enforcing core into such a shaft when the shaft is of a uniform diameter and when the core tightly fits the shaft, considerable difficulty and inconvenience will be experienced and damage will be caused to the shaft.

To overcome these difficulties and objections and to provide an improved method of shaping the shaft so as to form a casing, and before the core is inserted thereinto and to cause the shaft or casing to tightly fit the core, is one of the objects of the present invention.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the parts of the apparatus, and in substantially the method, hereinafter more fully described and claimed, and taken in connection with the accompanying drawing showing a means whereby this method may be carried into operation.

In the drawing

Figure 1 is a longitudinal sectional view of an apparatus of this character constructed in accordance with the principles of this invention and showing a tubular shaft of non-metallic material therein, the shaft having its internal and external diameters respectively uniform throughout their lengths.

Figure 2 is a longitudinal sectional view of the mold or form portion of the apparatus

showing a shaft which has been shaped and the mold opened therein to prevent removal of the shaft.

Figure 3 is a longitudinal sectional view of the shaft after the same has been shaped and removed from the mold and before the ends of the shaft have been cut off.

Figure 4 is a top plan view of the apparatus.

In carrying this invention into operation a tubular shaft 10 is provided which may be constructed of pyroxyline, or any other suitable non-metallic material, which may be originally of uniform internal and external diameters throughout its length.

The shaft is shaped in any desired or suitable form or configuration, preferably by means of fluid pressure and to that end the shaft is placed within a mold or form and then subjected to the action of heat to render the same pliable, after which it is subjected to fluid pressure to shape the same into the desired configuration.

Any suitable apparatus may be employed for this purpose, but the preferred apparatus preferably embodies a tubular casing 11 of any desired internal diameter and is open at both ends.

Secured to one extremity of the casing, in any desired manner, preferably by being threaded thereupon is a collar 12, to which end or closure members 13 are pivotally connected as at 14. The ends of the members 13 are adapted to be swung across the extremity of the casing 11 and secured in position by means of a suitable collar 15 sleeved thereupon. The inner faces of the members 13 are preferably cut away as at 16 to form a conical recess, and this recess extends entirely through the members 13.

To the other end of the casing 11 is secured in any suitable manner such as by being threaded thereupon, a collar 17, and to this latter collar end members 18 are pivotally connected as at 19. These members are adapted to be brought together to form a closure for the end of the casing and are provided with recesses to form an opening extending through the end members when the latter are closed.

A collar 20 is adapted to be sleeved upon

the members 18 to hold them in closed position.

Within the casing 11 is arranged a mold or form 21 which may be of any desired configuration, the internal diameter of which may be of any desired configuration according to the shape which it is desired to impart to the shaft or tube 10.

This mold may be formed of any suitable material, and in practice it has been found that the mold may be shaped by inserting a mandrel within the casing 11 and then placing plastic material about the mandrel. After the plastic material has set the mandrel may be withdrawn, or if desired the mold or form 21 may be shaped before being inserted into the casing 11.

Obviously the end members 13 and 18 may be opened to permit of the insertion or the withdrawal of the mold or form 21.

The shaft or tube 10 to be shaped is placed within the mold 21 and is of a length that the extremities of the tube or shaft will be gripped between the respective co-operating end members 13—18, after which the collars 15—20 may be placed in position upon the end members to hold them together and to anchor the tube or shaft 10.

The casing with the associated parts is then placed in position to be supported by suitable supports to permit of the entrance of fluid into the tube or shaft 10.

To that end the extremity 22 of the tube 10 may be flared as shown to receive the end of a nozzle 23, the latter being preferably supported by means of a header or pipe 24.

Connected with this pipe or header 24 are fluid conveying pipes 25—26, having controlling valves 27—28 therein.

The pipe 25 leads from any suitable source of fluid pressure preferably steam, and the pipe 26 leads to any suitable source of liquid supply, the latter being preferably hot.

Another pipe 29 leads from a suitable source of fluid supply such as water, of a temperature to chill or reduce the temperature of the tube or shaft after the latter has been shaped. A valve 30 is arranged in the pipe 29 to control the same.

The other extremity of the tube 10 is preferably flared as at 31 and is adapted to receive the end of a nozzle 32, the latter being connected with a pipe 33 which forms a discharge outlet for the fluid that is delivered into the tube 10 through the nozzle 23.

A valve 34 is provided for controlling the outlet pipe 33.

The pipe 33 and the nozzle 32 are preferably mounted upon a shiftable bearing 35 to which a link 36 is connected and which link is also connected with an operating handle 37 pivotally mounted as at 38, whereby the bearing or support 35 may be bodily moved forwardly and backwardly so as to move the nozzle 32 into engagement with one end of

the tube 10 and to move the entire casing 11 toward the member 24 so that the other end 22 of the tube 10 will be moved against the nozzle 23 so that the entire casing 11 will be supported by the nozzles 23 and 32, and the parts will then be in the position shown in Figure 1.

In carrying the improved method into operation after the tube has been thus positioned either of the valves 27 or 28 may be opened according to the nature of the hot fluid which it is desired to employ, previous to which, however, the valve 34 must be opened to permit the hot fluid to flow from the nozzle 23 into and through the tube 10, out of the nozzle 32 into the discharge pipe 33.

The hot fluid, which may be at any desired temperature, is allowed to flow through the tube or shaft 10 until the tube is rendered pliable due to its subjection to the action of heat of the fluid.

The valve 34 is then closed and the hot fluid is allowed to continue to flow into the tube 10 under pressure and the pressure of the fluid within the tube or shaft 10 acting upon the pliable shaft will cause it to expand or conform to the configuration of the mold within which the shaft or tube is located.

After the tube or shaft has thus been shaped, the valve or valves controlling the supply of hot fluid to the tube or shaft are closed and the valve 34 is opened. The valve 30 is then opened to permit cold fluid, such as water or the like, to flow into the shaped tube or shaft, thereby reducing the temperature thereof, and this cold fluid is allowed to flow through the shaped tube until the material in the tube becomes set.

The entire casing is then removed from its support by shifting the handle 33 to move the bearing 35 away from the casing 11.

The collars 15 and 20 are then removed which will expose a considerable portion of the end of the tube adjacent each end of the casing 11. The shaped tube or shaft may be withdrawn from the mold by drawing upon the larger end thereof or by exerting a pressure upon the smaller end to force the same out of the mold.

The ends of the shaped tube or shaft are then cut off along the lines 39—40, and the shaft or tube will then be ready to be placed upon a golf club shaft or core and secured thereto in any suitable manner.

When the shaft or casing thus formed is placed upon a core there will be produced a shaft for golf clubs and the like which will be constructed of a non-metallic material reinforced by a metallic core, if a metallic core is employed, and a shaft of this character will possess all of the attributes of a wood shaft and a metallic shaft without the disadvantages of either, and the shaft will be of the desired strength and rigidity and possess the necessary tensile strength.

Obviously the steps in the operation of the method may be varied and any apparatus suitable for the purpose may be employed in carrying out this invention.

What is claimed as new is:

1. An apparatus for shaping hollow non-metallic shafts and embodying an open ended mold for receiving the shaft, members pivotally connected with the mold and co-operating to form a closure therefor, said members having co-operating recesses to receive a portion of the shaft, means for introducing a fluid into the mold and into the shaft, and means for controlling the introduction of such fluid.

2. An apparatus for shaping hollow non-metallic shafts and embodying an open ended mold for receiving the shaft, members pivotally connected with the mold and co-operating to form a closure therefor, said members having co-operating recesses to receive a portion of the shaft, means for introducing a fluid into the mold and into the shaft, means for controlling the introduction of such fluid, means for conveying away such fluid, and means for controlling the last recited means.

In testimony whereof I have signed my name to this specification, on this 14th day of April, A. D. 1927.

HAROLD G. BARRETT.