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3,043,003

METHOD FOR FORMING JOINTS

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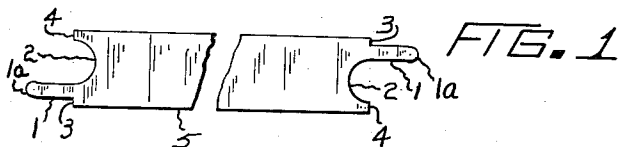


FIG. 2

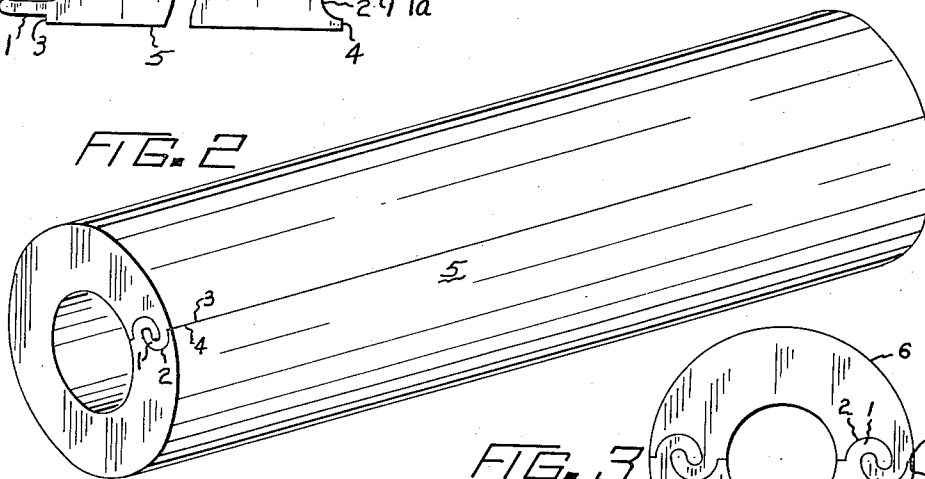


FIG. 3

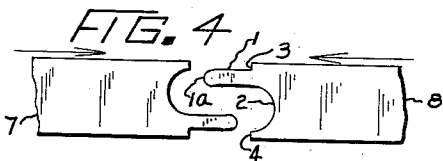
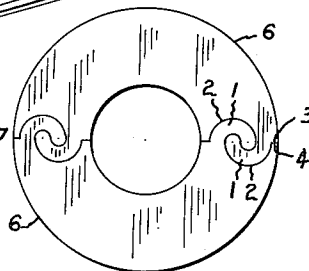


FIG. 5

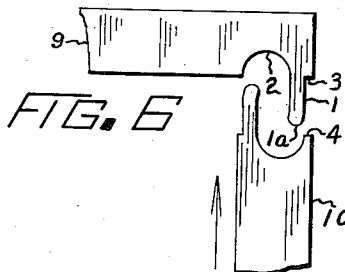
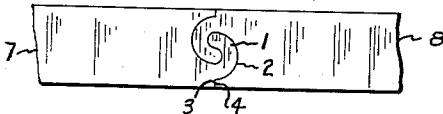


FIG. 6

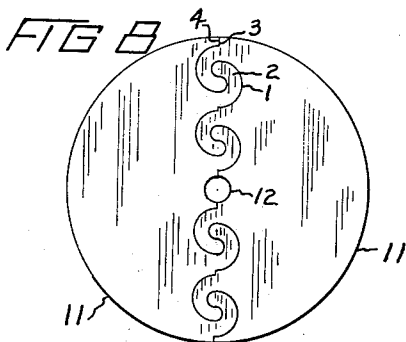


FIG. 7

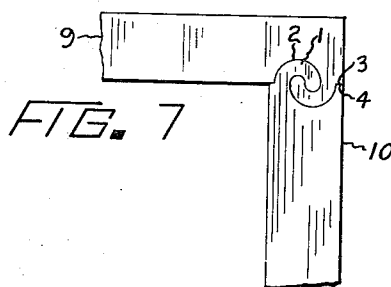


FIG. 8

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3,043,003

METHOD FOR FORMING JOINT

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This invention relates to joints, and to methods of establishing such joints, to rigidly and permanently interconnect adjoining members of malleable metal or other such material.

The invention hereinafter disclosed is of considerable value in the manufacture of tubular products, including conduits, shafts, etc., and is of particular value when such products require oil holes or grooves or other features entailing machining, as for such uses as rotating shafts or rock shafts and the like.

In previous practice, shafts for these uses have been manufactured from extruded seamless steel tubing. Such practice is subject to the disadvantages of inaccuracies of internal and external diameters of such tubing, lack of concentricity of the inner and outer circumferences, and to the necessity of expensively machining upon a tubular member such features as mentioned above.

The present invention affords the less expensive method of performing such machining operations on material in the form of one or more flat elongated blanks, and subsequently forming the desired tubular product from the blank or blanks so prepared. The longitudinal edges of said blanks are interconnected by joints as described hereinafter.

Such joint has further uses in interconnecting adjoining members of various and varying sizes and shapes.

An object of the invention is to provide each of a plurality of adjoining members with a protuberance, nested in a recess formed in an adjoining member and interlocking with the protuberance carried by the latter.

Another object is to devise a method of establishing the joint, such method entailing provision on each said member of such protuberance and recess, and disposition of said members to be forced together in an adjoining relation, causing said protuberances to interlock.

Still another object is to adapt said joint and method to rigidly interconnect the longitudinal edges of an elongated tube forming member, or members.

These and various other objects are attained by the invention hereinafter described and illustrated in the accompanying drawing, wherein:

FIG. 1 is an end view of an elongated bar having its edges prepared to be joined.

FIG. 2 is a perspective view of a tube formed from said bar with said edges rigidly joined.

FIG. 3 is an end view of an elongated tube formed of two elongated complementary bars.

FIGS. 4, 5, 6 and 7 are end views of elongated bars illustrating application of the joint to non-tubular members, before and after the joint is established.

FIG. 8 illustrates a plural application of the joint to a pair of elongated semi-cylindrical members.

In these views the reference character 5 (FIGS. 1 and 2) designates a flat, elongated bar of malleable material such as metal. Said bar has its longitudinal edges formed, as by machining or rolling, with reversely disposed flanges 1. At the base of each flange, and coextensive therewith is formed a channel 2, of arcuate cross-section.

Following the preparation of its edges as aforesaid, any required machining operations may be performed to prepare said bar for the intended use of the tubular product. Such bar is then curved, as by a rolling machine, to a substantially tubular shape to bring the flange 1

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of each edge into confronting relation with the channel 2 of the other edge. Sufficient force is then applied to bring said edges tightly together, each flange being bent to nest in and conform to the confronting channel. Such channels serve as dies, causing the flanges to curl conformingly thereto and effecting an interlocking engagement of said flanges 1 to complete the tube as shown in FIG. 2. It is desirable to apply a slight curve to the edge 1a of said flanges to facilitate said curling. It is preferred to leave a shoulder 3 in forming the flange 1; and in forming the channel 2, it is preferred to leave a flat 4 on each edge. In the completed tube, said shoulders 3 and flats 4 abut each other so closely as to form a fluid sealed joint which prevents, for example, escape of lubricating oil through or along said joint from a bearing, when the tube is used as a shaft in any machine. It will, of course, be obvious that the herein disclosed joint and method for making same is applicable to a tube comprised of two or more longitudinal sections 6, as shown in FIG. 3.

FIG. 4 illustrates flat elongated members 7 and 8, each having an edge prepared with the flange 1 and channel 2. Said members are disposed in the same plane for application of force in direction of the arrows to bring the edges together and effect the joint as shown in FIG. 5. FIGS. 6 and 7 illustrate application of the joint to interconnect a pair of flat members 9 and 10 in transverse relation. FIG. 8 shows a plural application of the joint between the flat surfaces of semi-cylindrical members 11 to form an elongated cylinder having an axially extending hole 12. This latter application would of course afford premachining of the members 11 to provide the hole 12, avoiding expensive drilling on very long parts requiring such a hole.

What I claim is:

1. A method for producing a joint between two elongated edges of malleable material consisting in preparing each of said edges with a deformable off-center flange constituting a minor proportion of the thickness of the material together with a central arcuate recess at the base of said flange for receiving and deforming the flange of the opposing edge, said flanges and recesses being so proportioned as to accommodate deformation of the respective flanges within opposed recesses to inter-engaging hook shaped elements, engaging each of the flanges with the portion of the arcuate recess on the other edge remote from the flange on the same edge thereof, and then applying edgewise pressure to said edges thereby camming said flanges about the arcuate surfaces of each of the recesses and into interlocking engagement with each other to form a rigid interlocking joint with said respective flanges in hooked relationship.

2. A method as set forth in claim 1 wherein said flanges are so proportioned and deformed through edge pressure as to occupy substantially the entire space within the opposed recesses so that the joint will be substantially solid and fluid tight.

3. A method as set forth in claim 1 wherein a shoulder is formed at the base of each of said flanges on the side thereof opposite said arcuate recess to operate as a limit stop for engagement by an opposing edge and wherein said edges are pressed together to abutting position against said shoulders.

4. A method for producing a tube from rectangular malleable sheet stock comprising the preparation of opposite longitudinal edges of the stock for interlocking engagement by providing a longitudinally extending off-center flange on opposite sides along each of said edges, such flange constituting a minor portion of the thickness of said stock, together with a longitudinally extending centrally located arcuate recess at the base of said flange,

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forming said flat stock into tubular form with said flanges overlapping, engaging each of the flanges with the portion of the arcuate recess on the other edge remote from the flange on the same edge thereof, and then applying edge-wise pressure to said edges thereby camming said flanges about the arcuate surfaces of each of the recesses and into interlocking engagement with each other to cause said flanges to curl upon said opposed arcuate surfaces into tightly inter-engaging hook shaped elements.

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