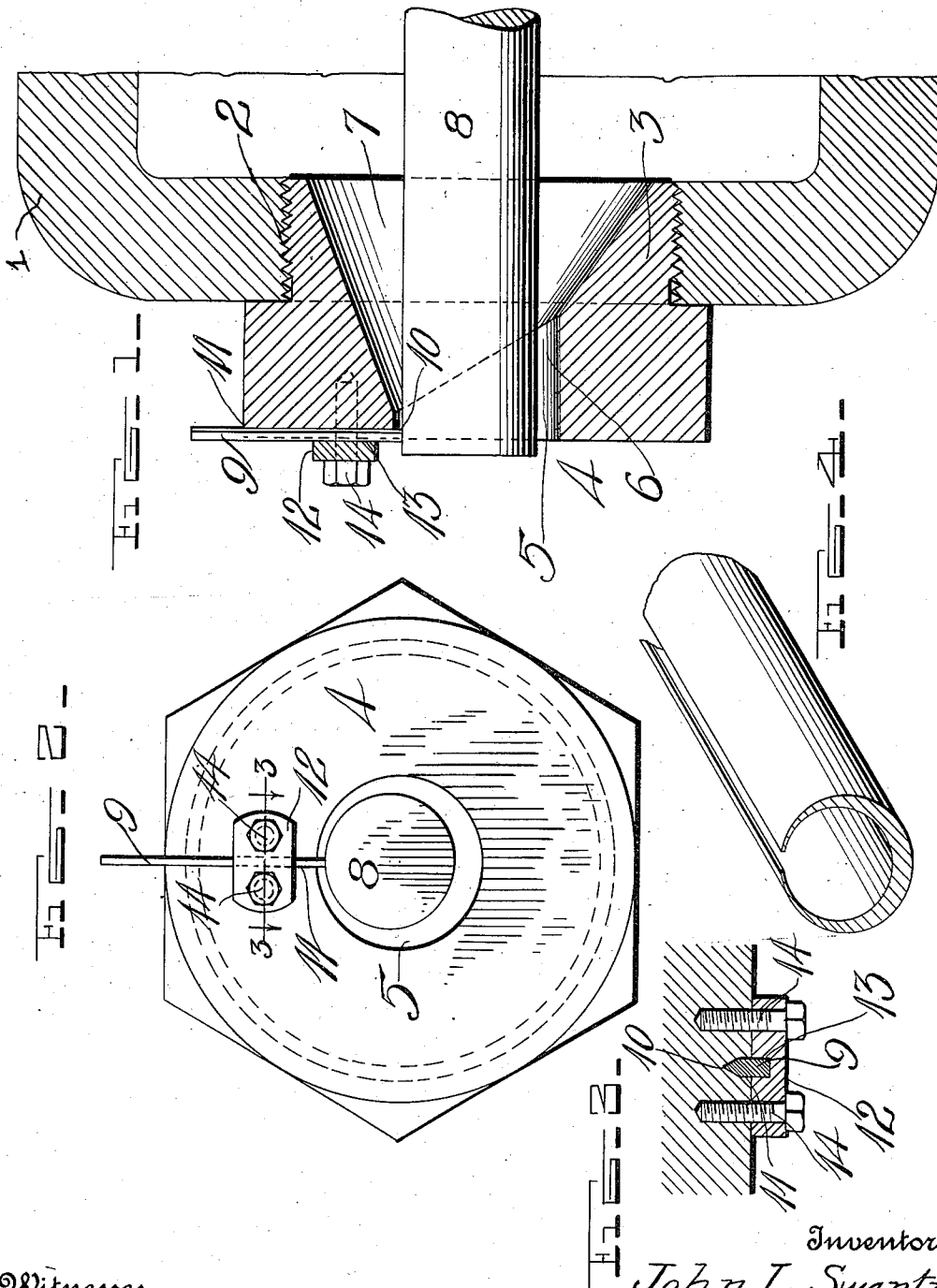


J. L. SWARTZ.
TUBING DIE.
APPLICATION FILED DEC. 12, 1912.

1,133,892.

Patented Mar. 30, 1915.



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UNITED STATES PATENT OFFICE.

JOHN L. SWARTZ, OF AKRON, OHIO.

TUBING-DIE.

1,133,892.

Specification of Letters Patent.

Patented Mar. 30, 1915.

Application filed December 12, 1912. Serial No. 736,446.

To all whom it may concern:

Be it known that I, JOHN L. SWARTZ, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Tubing-Dies; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in tubing dies.

One object of the invention is to provide an improved construction of tubing die having arranged thereon means whereby the tube is split or cut longitudinally simultaneously with the forming thereof.

Another object is to provide a die of this character having an adjustable core or mandrel which may be arranged concentric or eccentric to the die thus providing for the formation of tubes having the same thickness all around or having a greater thickness at one side.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1 is a longitudinal sectional view of my improved die showing the core engaged therewith; Fig. 2 is an end view of the same; Fig. 3 is a detail horizontal sectional view on the line 3—3 of Fig. 2 showing the construction and arrangement of the tube splitting knife; and, Fig. 4 is a perspective view of a portion of a tube formed by my improved die.

Referring more particularly to the drawings, 1 denotes the cylinder to which my improved die is connected and which is adapted to contain the material for forming the tube. In the end of the cylinder 1 is formed a threaded passage 2 in which is screwed the reduced threaded end 3 of my improved tubing die 4. The outer end of the die 4 is provided with flat wrench engaging surfaces and is here shown as being of hexagonal shape. The die 4 is provided with a centrally disposed tube forming passage 5 the outer end of which for a portion of its length is of cylindrical shape, as shown at 6, said cylindrical portion of the

passage having its inner end formed at an angle to its axis so that the passage is of greater length at its bottom than at its top. The inner portion 7 of the passage flares from the inclined or angular inner end of the cylindrical portion 6 whereby the inner end of the passage is of much greater diameter than the outer end. When the lower side of the cylindrical portion 6 is longer than its upper side as seen in Fig. 1, the upper side of the flaring portion 7 will be struck on about an angle of 20° whereas the lower side of the same will be struck on an angle of about 35°, but the angularity in either case will be such as to complement the corresponding length of the top and bottom of the cylindrical portion 6 so that the extremities of the die will be vertical. In thus forming the passage 5 a funnel shaped construction is provided which will tend to gradually direct the material of which the tube is formed into the cylindrical outer portion of the passage and around the core 8 which projects through the passage and is supported therein in any suitable manner. When the upper side of the cylindrical portion is short as shown, the upper side of the flaring portion will be correspondingly lengthened, and the proportions of the lower side of these portions of the opening will correspond as has already been explained. The core or mandrel 8 may be supported concentric to the cylindrical portion 6 of the die passage whereby tubes having walls of uniform thickness will be formed by the die or the core may be arranged eccentrically in the passage 5 thus providing for the formation of tubes having walls of a greater thickness at one side as clearly shown in Fig. 4 of the drawings. In the latter case, however, the gentler incline at the top of the flaring portion will considerably compress the material which is fed through the short upper part of the cylindrical portion and eventually forms the thinner side of the tube, and the more abrupt inclination at the bottom of the flaring portion will direct the material into the lower part of the cylindrical portion 6 with greater rapidity but under less pressure—both of which conditions are advisable and possible.

In order to split or cut the tube longitudinally at the same time the tube is formed I provide a splitting knife 9 having a beveled or tapered inner cutting edge 10.

The knife 9 is set into a groove or recess 11 formed in the outer face of the die and adjustably secured by means of a clamping plate 12 having on its inner side a vertical groove 13 with which the knife is engaged. The plate 12 is secured to the outer surface of the die 4 by clamping screws 14 which when screwed up will securely clamp the knife in place. By thus fastening the knife the latter may be adjusted vertically to bring the lower end into engagement with the core in whatever position the same may be arranged thus cutting entirely through the portion of the tube above the core.

My improved die is especially designed for forming tires for automobiles and bicycles and can be constructed in any desired size for forming tubes of the desired diameter. By means of the die, tubes having any desired thickness may be formed and cut at one operation and may be made as much thicker at one point as desired. When the dies are constructed for forming tubes having walls of greater thickness at one side the die 4 is bored to provide a cylindrical portion of greater length where the thickened portion of the tube is to be made, said

increased length of the cylindrical portion of the bore shortening the funnel shaped inner end of the bore at this point thereby causing the material to be fed more abundantly through the part of the die where the thickened construction of the tube is to be made.

Having thus described my invention what I claim is:

A tubing die comprising a body having a cylindrical bore provided with an enlarged funnel-shaped inner end, into which plastic material may be forced, a core projecting eccentrically through said bore whereby to form an annular discharge opening gradually increasing in width from one side to the other, and a cutter projecting across the narrow side of said annular discharge opening, whereby to slit the material forced therethrough.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN L. SWARTZ.

Witnesses:

Iva M. Smith,
Ethel F. Croy.