METHOD OF FORMING INTERNAL KEYS ON TUBES

Filed June 22, 1923
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Application filed June 22, 1923. Serial No. 647,090.

To all whom it may concern:
Be it known that I, WILLIAM H. MILLSPAUGH, a citizen of the United States, and a resident of Sandusky, county of Erie, and State of Ohio, have invented certain new and useful Improvements in Methods of Forming Internal Keys on Tubes, of which the following is a specification.

This invention relates to a method of forming internal keys on tubes.

The invention relates more particularly to tubes such as are used for engraving or printing in paper mills and in cloth and paper printing. Such tubes are usually made of copper or brass and are from 1/2 inch to an inch in thickness and have an internal key therein. These tubes are used successively for different designs by turning off the outer surface having the design formed thereon. In view of the cost of the tubes, it is desirable that they be used as many times or for as many different designs as possible and, therefore, the tubes should be so formed that they can be successively turned down until practically the entire thickness thereof has been utilized.

Tubes of the character described are provided with internal keys and these keys are preferably formed integral with the tube since a key that extends into the wall of the tube eliminates the portion of the tube thickness into which it extends from use as an engraving surface and weakens the tube.

This invention has for its object, therefore, to provide a method and apparatus for forming internal keys on tubes.

Another object of the invention is to provide a method and apparatus of the character described so constituted that the method can be economically carried out.

Further objects of the invention will appear from the following specification taken in connection with the drawings, which form a part of this application, and in which—

Fig. 1 is an elevational view of the finished tube constructed in accordance with the invention.

Figs. 2, 3 and 4 are sectional elevations illustrating the steps in the process of making the internal key in the tube.

Fig. 5 is an elevational view showing apparatus for carrying out the method, and

Fig. 6 is a sectional elevation on an enlarged scale taken substantially on line 6—6 of Fig. 5.

The invention briefly described consists, first, in forming a tube with a projection or excess metal extending longitudinally on its outer surface, second, in placing this tube on an arbor having a longitudinally extending keyway, the tube and arbor being so relatively positioned that the excess metal on the tube will be disposed in alinement with the keyway of the arbor and pressing the metal of the tube into the keyway of the arbor.

The apparatus for carrying out this method comprises supports means for the tube and means for forcing the tube under a member such as a roller for pressing the metal of the tube into the arbor keyway. Further details of the invention will appear from the following description.

The tube 10 is preferably, although not necessarily, formed in a centrifugal casting machine with a longitudinal projection 11 on its outer surface forming excess metal.

The tube so formed is then placed on an arbor 12 usually longitudinally tapered and having a longitudinally extending groove or keyway 13 therein. The tube and arbor are relatively positioned as shown in Fig. 2 with the keyway 13 aligned with the projection 11. The tube and arbor are then placed in a carriage 15 supported on slides or on rollers 16 and having V blocks 17 in which the tube rests. The tube and carriage 15 therefor are disposed in alinement with a hydraulic ram or plunger 20 mounted in a cylinder 21 supported on a frame 22 and on a base 23. Other operating means may be used, if desired.

A frame 24 is mounted in alinement with the carriage 15 and tube 10 and is braced by tie rods 25 secured to the frame 22. This frame has mounted therein rollers 26 for supporting the tube support or carriage 15 and also has mounted therein above the tube a roller 27. The apparatus is used in the manner illustrated in Fig. 5 as follows. The tube and arbor are placed in the V blocks 17 with the projection 11 and arbor keyway disposed beneath the roller 27. The roller and V blocks are so relatively mounted that the roller will press the longitudinal projection on the outer surface of the tube into the cylindrical surface of the tube and during this pressing operation the material of the
tube in alinement with the projection 11 is pressed inwardly into the keyway 13 of the arbor 12. As illustrated in Fig. 5, the plunger 20 of the hydraulic ram engages an abutment 28 formed on the support 15 and against which the tube abuts and this support and tube are moved longitudinally by the ram forcing the tube and projection 11 thereon beneath the roller 27. This will cause the metal of the tube to be forced into the keyway 13 as described.

Although one specific form of apparatus has been illustrated for carrying out the method, it will be understood that the method may be carried out by other forms of apparatus and that changes in the construction and in the arrangement of the various cooperating parts of the apparatus may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. A method of forming internal keys on tubes which consists in forming the tube with a longitudinal projection on its outer surface providing excess metal thereon, inserting a member in the tube having a longitudinal keyway disposed in alinement with the excess metal and pressing the metal of the tube into said keyway.

2. A method of forming internal keys on tubes which consists in forming the tube with a longitudinal projection on its outer surface providing excess metal thereon, inserting a member in the tube having a longitudinal keyway disposed in alinement with the excess metal and forcing the tube with the excess metal beneath a pressure member thereby causing the metal of the tube in alinement with the excess metal to enter the keyway.

3. A method of forming internal keys on tubes which consists in forming the tube with a longitudinal projection on its outer surface providing excess metal thereon, inserting a member in the tube having a longitudinal keyway disposed in alinement with the excess metal and forcing the tube with the excess metal beneath a roller thereby causing the metal of the tube in alinement with the excess metal to enter the keyway.

In witness whereof, I have hereunto set my hand this 12th day of June, 1928.

WILLIAM H. MILLSPOUGH.