UNITED STATES PATENT OFFICE.

SAMUEL WALKER, OF BIRMINGHAM, COUNTY OF WARWICK, ENGLAND.

METHOD OF MAKING CIRCULAR DISKS FOR TUBES.

SPECIFICATION forming part of Letters Patent No. 283,727, dated August 21, 1883.

Application filed April 12, 1883. (No model.) Patented in England March 31, 1882, No. 1,577.

To all whom it may concern:

Be it known that I, SAMUEL WALKER, a subject of the Queen of Great Britain, residing at Birmingham, in the county of Warwick, England, have invented certain new and useful Improvements in the Method of Making Circular Disks for Tubes, (for which I have received Letters Patent in Great Britain, No. 1,577, dated March 31, 1882,) of which the following is a specification.

My invention is principally applicable to the manufacture of tubes and rollers of copper and alloys of copper, and tubes of other metals and alloys.

I will describe my invention in its application to the manufacture of copper tubes.

In manufacturing copper tubes according to my invention I take circular disks, of copper, either cold or heated, and by forcing the same, by means of a plunger or mandrel, through raising, forcing, or drawing, through dies, I give to the said disks of copper a cup-like figure—that is, the figure of a hollow cylinder, closed at one end. This forming of the disk of copper into a hollow cylinder may be performed at one or several operations, according to the size and strength of the disks of copper operated upon.

I prefer to operate the die, or the plug, or mandrel by hydraulic power, but I do not limit myself thereto, as other motive power may be employed; and I prefer to make the circular disks of copper, to be made into tubes, in the manner hereinafter explained.

The hollow cylinders, closed at one end and thus formed, may be converted into tubes of the required length and diameter by cutting off the closed end and elongating them and reducing their diameter and thickness, by rolling and drawing; or, instead of cutting off the closed end, the said end may be pierced in its center, and the metal forming the said end expanded into a tubular form, before the hollow cylinder is rolled and drawn into a tube. The hollow cylinders, made as above described, are suitable for rollers for printing fabrics.

The circular copper disks from which tubes are made according to my invention may either be formed by casting, or they may be cut or punched out of thick sheet-copper. I prefer, however, to make them in the following manner: I cast copper into disks of an elliptical figure, the said disks having their longer diameter about double that of their shorter diameter. I roll these disks by means of a pair of plain cylindrical rolls, the elliptical disks being so passed through the rolls that the motion of the disk is in the line of its shortest diameter. By this treatment the elliptical disk is converted into a circular, or nearly circular, disk, and the production of scrap or waste metal which occurs when circular disks are cut from sheet metal is almost wholly avoided.

In order more fully to explain my invention, I will describe the manufacture according to my invention of a copper tube of a particular size.

In making a copper tube of about three inches external diameter, and having a thickness of metal of about one-eighth of an inch, I proceed as follows: I take a circular disk of copper of about two feet in diameter and five-eighths of an inch thick (more or less.) By means of raising dies or tools of the ordinary kind I operate upon the said disk four or five times, or as many times as are requisite, so as to give it the figure of a hollow cylinder closed at one end, and about four inches in diameter. I prefer to operate the movable die, plug, or mandrel by hydraulic power, but do not limit myself thereto. The bottom of the hollow cylinder is cut away or pierced, and the short tube thus made is brought to the required length and thickness by rolling and drawing.

The metal may be annealed, as required, during the operation of the raising dies or tools.

The copper disk may be operated upon either hot or cold.

The details of the process whereby the disk of copper is raised into a hollow cylinder closed at one end are varied according to the size, length, and strength of the copper tube to be made. The size of the disk, as well as its thickness and the number of times it is operated upon by the dies, may be varied without materially affecting the result.

The manufacture of tubes of alloys of copper, and of other metals and alloys, differs in no essential respect from the manufacture of copper tubes herein described, the number of rollings, drawings, and annealings (when annealing is required) being varied according to the

physical properties of the metal or alloy operated upon, as is well understood by metal-workers.

Having now described the nature of my invention and the manner in which the same is to be performed, I wish it to be understood that I claim as my invention—

The method of producing a circular disk to be raised into a tube or cylinder by stamping, casting, or otherwise forming an elliptical disk of metal, and then converting the same into a circular disk by passing it between rolls in the direction of its shortest diameter, substantially as described.

SAMUEL WALKER. [L. S.]

Witnesses.

RICHARD SKERRETT,

ARTHUR JOHN POWELL.