(No Model.)

R. CHILLINGWORTH.

MEANS FOR FORMING BRANCHES UPON WROUGHT METAL TUBES.

No. 596,770. Patented Jan. 4, 1898.

FIG. 2.

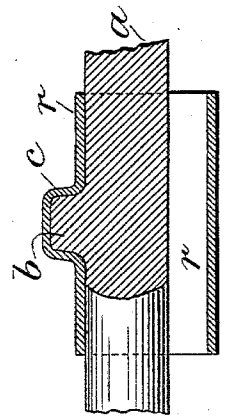


FIG. 5.

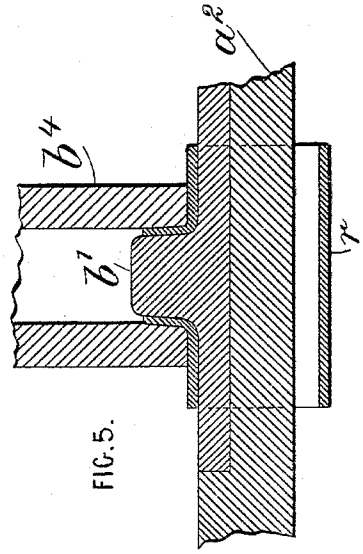


FIG. 7.

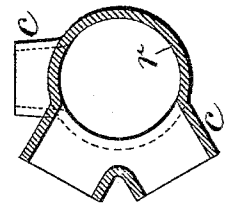


FIG. 3.

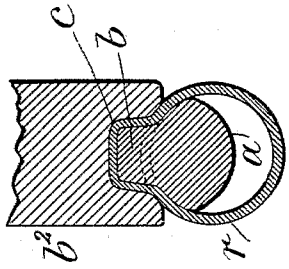


FIG. 6.

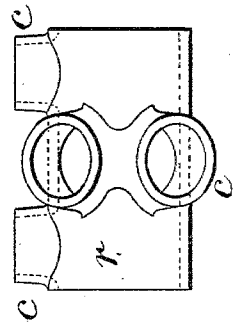


FIG. 1.

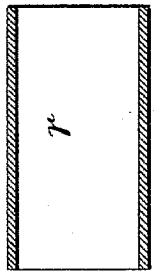
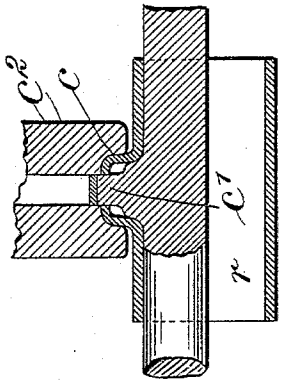


FIG. 4.



Witnesses
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

RUDOLF CHILLINGWORTH, OF NUREMBERG, GERMANY, ASSIGNOR TO THE STANDARD WELDLESS TUBE AND CYCLE COMPONENTS, LIMITED, OF LONDON, ENGLAND.

MEANS FOR FORMING BRANCHES UPON WROUGHT-METAL TUBES.

SPECIFICATION forming part of Letters Patent No. 596,770, dated January 4, 1898.

Application filed August 4, 1896. Serial No. 601,628. (No model.) Patented in Germany April 6, 1895, No. 84,352; in Austria April 20, 1895, No. 45/2,809; in England April 23, 1895, No. 8,050; in France July 1, 1895, No. 248,564, and in Belgium March 11, 1896, No. 120,302.

To all whom it may concern:

Be it known that I, RUDOLF CHILLINGWORTH, a subject of the Emperor of Germany, residing at Nuremberg, Germany, have invented an Improvement in Means for Forming Tubular Branches upon Wrought-Metal Tubes, of which the following is a specification.

This invention has been patented in Great Britain April 23, 1895, No. 8,050; in Germany April 6, 1895, No. 84,352; in Austria April 20, 1895, No. 45/2,809; in France July 1, 1895, No. 248,564, and in Belgium March 11, 1896, No. 120,302.

Efforts have been made to manufacture tubes with tubular branches by making a hole in the tube, placing the tube in a die, and drawing through the hole a conical spreader for distending the metal. These devices are difficult to manipulate and the metal is liable to become chilled.

In the present improvement I provide a series of dies and punches adapted to act instantaneously upon the wrought-metal tube and to develop and complete the branch by a series of operations, as hereinafter described.

In the drawings, Figure 1 represents the wrought-metal tube. Fig. 2 shows the first operation thereon. Fig. 3 is a cross-section of the devices shown in Fig. 2, together with the external die. Fig. 4 represents the teat with the die for making a hole in the same. Fig. 5 shows a finishing operation by which the branch tube is brought to its ultimate shape. Fig. 6 shows a tube with four tubular branches or sockets upon the same, and Fig. 7 is a cross-section of Fig. 6.

It is to be understood that any desired number of tubular branches may be formed upon a wrought-metal tube and in the relative positions desired, the completed article (illustrated in Figs. 6 and 7) representing the crank-shaft tube for a bicycle-frame.

The tube r is subjected to the action of the punch b, supported by a core or mandrel a, within the tube, there being a die b^3 upon the outside of the tube acting in connection with the punch b to produce a teat c in the desired position on the tube. In this operation the metal of the tube r is stretched so that the thickness of the teat c is not materially lessened and, if desired, the teat c may be still further elongated by the action of a second punch and its die. The end of the teat is now opened by forming a hole therein, as illustrated in Fig. 4. This may be punched in any desired manner and advantageously by the punch c' and die c^2. The tube with the open-ended teat is now subjected to the action of a punch b', (shown in Fig. 5,) which is of a shape corresponding to the desired shape of the interior of the tubular branch, and an exterior die b^4, acting in conjunction with the punch, gives to the branch and to the tube r adjacent to the branch the proper shape for the completed article.

It is advantageous to provide a base to the punch b', as represented in Fig. 5, such base being received into a recess in the mandrel or core a^2, so that the same mandrel or core may be used with different punches.

It is to be understood that if the tube r is bent or otherwise misshaped in the formation of the tubular branches it can be straightened out during the last operation. The tube of wrought metal with the four tubular sockets or branches is represented in Fig. 6, and a section of the same is shown in Fig. 7; but the number of tubular branches or sockets may vary.

I claim as my invention—

In the manufacture of wrought-metal tubes with tubular branches, a mandrel adapted to pass into the tube and a punch supported thereby and acting within the tube, and an external die coöperating with the punch for pressing up a teat, means for forming a hole through the end of the teat and an internal punch, and an external die for giving the final shape to the tube and to the open tubular branch, substantially as specified.

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

RUDOLF CHILLINGWORTH.

Witnesses:
ANDREAS STICH,
OSCAR BOCK.