S. E. DIESCHER.

MANUFACTURE OF SEAMLESS TUBES.

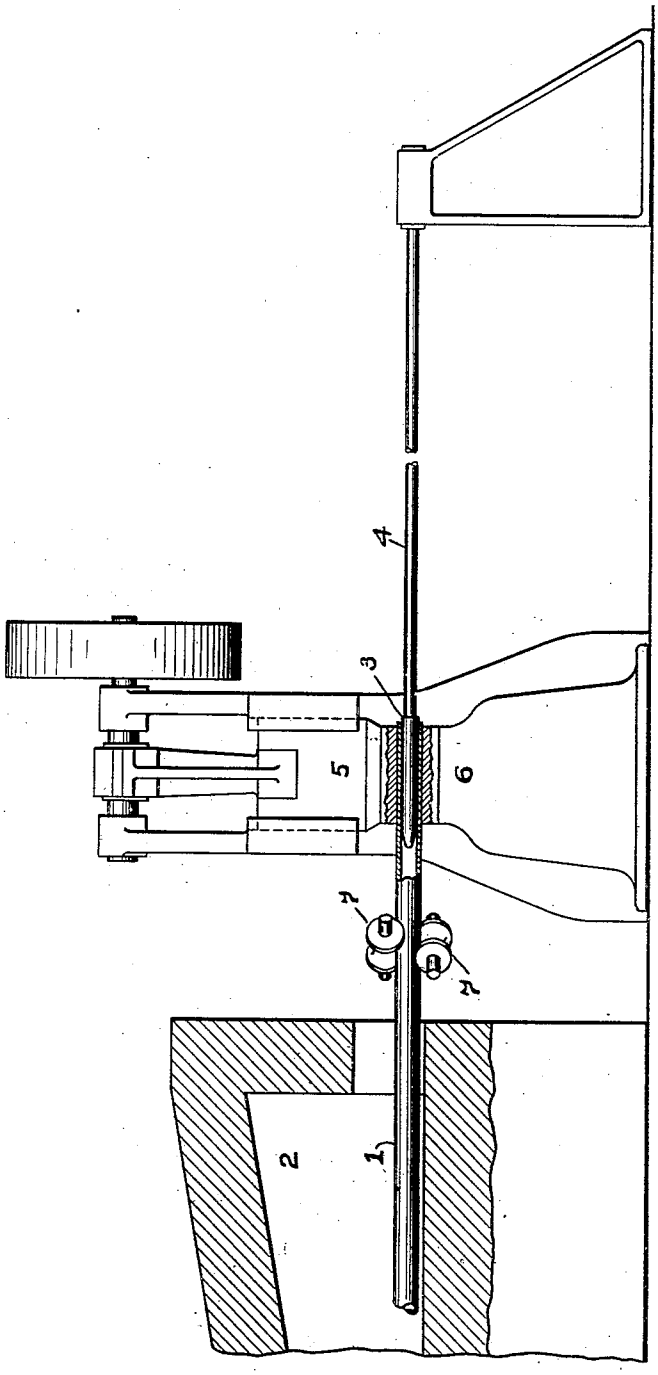
APPLICATION FILED FEB. 3, 1911.

1,056,326.

Patented Mar. 18, 1913.

2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

Fred G. Lahrhage.

Thomas Joyce

INVENTOR

Samuel E. Diescher

by Samuel E. Wolcott Atty

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2 SHEETS—SHEET 2.

FIG. 3.

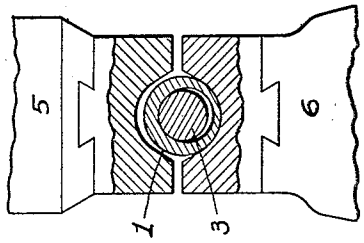


FIG. 5.

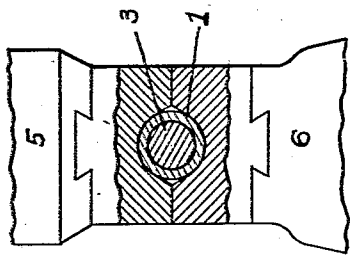


FIG. 2.

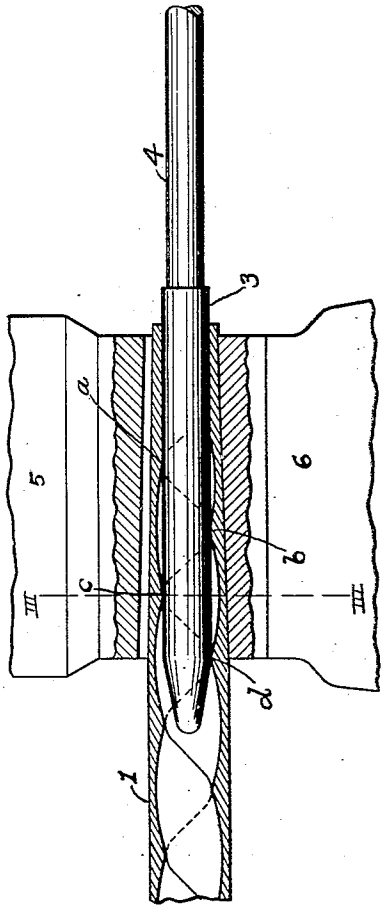
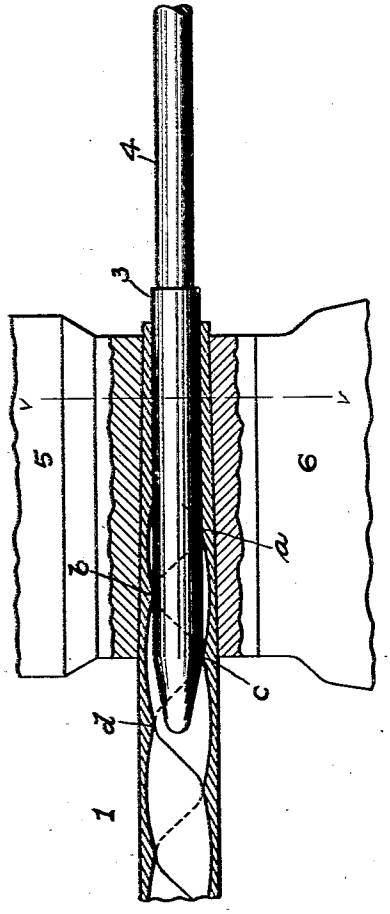


FIG. 4.



WITNESSES:

Fred G Sahrhage.

Thomas Joyce.

INVENTOR

Samuel E. Diescher

by Dannis & Wright Atty

UNITED STATES PATENT OFFICE.

SAMUEL E. DIESCHER, OF PITTSBURGH, PENNSYLVANIA.

MANUFACTURE OF SEAMLESS TUBES.

1,056,326. Specification of Letters Patent. Patented Mar. 18, 1913.

Application filed February 3, 1911. Serial No. 606,440.

To all whom it may concern:

Be it known that I, SAMUEL E. DIESCHER, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, citizen of the United States, have invented or discovered certain new and useful Improvements in the Manufacture of Seamless Tubes, of which improvement the following is a specification.

As is well known to those skilled in the art it has been heretofore practically impossible when piercing is effected by the conjoint action of rolls and a mandrel to produce seamless tubes of uniform gage thickness of wall. This is due to the fact that in piercing the billet an irregular inner surface is produced. This irregularity consists generally of inwardly projecting spiral ribs of a pitch corresponding to that of the twist of the billet during the piercing operation. While this irregularity is somewhat reduced or modified in the reduction of the pierced billet to the finished tube, it has not been possible to wholly remove it by any of the methods now in use for reducing the pierced blank.

The invention described herein has for its object the reduction of the irregularities produced in piercing and the production of a blank having uniform gage or thickness of wall throughout its entire length.

The invention is hereinafter more fully described and claimed.

In the accompanying drawing forming a part of this specification Figure 1 is a side elevation partly in section of a form of apparatus for the practice of my invention; Fig. 2 is an enlarged sectional view illustrating the pressing surfaces and mandrel the former being in open position; Fig. 3 is a transverse section on a plane indicated by the line 111—111 Fig. 2; Fig. 4 is a view similar to Fig. 2 showing the pressing surfaces in closed position and Fig. 5 is a section on a plane indicated by the line V—V Fig. 4.

In the practice of my invention the blank 1 as it comes from the piercing mill if it is sufficiently plastic, or from a heating furnace 2 is slid over a mandrel 3 which is held in position by a bar 4 between pressing surfaces having one or both a relative to and fro movement. It is preferred that these surfaces should be formed by grooves in the head 5 and anvil block 6 of a press of any suitable construction. These grooves should be made of such transverse dimensions that when the head and anvil are placed together they form an approximately circular pass a little smaller than the external diameter of the pierced billet or blank. Preferably the entrance end of the grooves or pass is made a little larger than the opposite or finishing end. In other words the pass is made slightly tapering. The mandrel 3 is made of a diameter sufficiently smaller than the smallest internal diameter of the blank so that the pierced billet made may be easily slid over the mandrel without any wiping or dislodgment of the apices of the inwardly projecting ridges. As before stated these ridges or relatively thick bands of metal are spirally disposed along the tube, the pitch of such spiral corresponding to the twist given to the billet in the piercing operation. The mandrel should be made of such a length relative to the pitch of the ridges or thick bands that when the billet is subjected to action of the pressure surfaces the ridge or band will bear at such points on the mandrel to prevent it from being shifted to an angle to the axis of the billet. This will be readily understood by reference to Fig. 2. If the mandrel were so short as to be supported by the ridge only at points *a* and *b*, the point of the mandrel would be forced down and there would be only a slight if any reduction of the ridge. If however the mandrel were made of a length a little greater than the pitch of the ridge the points of support *a*, *b*, and *c* of the mandrel would be so disposed as to maintain the mandrel centrally. It is preferred in order to insure the best results that the mandrel should have a length greater than one and a half times the pitch of the ridge so that there will be an equal number of supports on all sides of the mandrel and the reduction of ridge will be uniform. While being fed between the pressing surfaces and over the mandrel the billet should be rotated so as to be subjected uniformly to reducing pressure. Any suitable means may be employed for feeding the billet as for example the angularly arranged rolls 7. In this operation there need not be any material lengthening of the billet as the pressing surfaces are only adapted to bring the walls of the billet or blank to an uniform gage and this is done by causing a flow of the metal from the thicker to the thin portions of the wall.

As before stated the head and anvil are provided with grooves which will form when the head is forced against the anvil as is the designed operation of the parts, a circular pass, and consequently in addition to bringing the walls of the article to uniform gage, the article will in the practice of my invention be brought to a uniform external diameter throughout its entire length.

I claim herein as my invention:

1. The improvement in the art of manufacturing seamless tubes, the method herein described which consists in piercing a billet by forcing it over a mandrel by rotating the billet on its axis, and circumferentially pressing the article so pierced against a centrally maintained mandrel.

2. The improvement in the art of manufacturing seamless tubes, the method herein described which consists in piercing a billet by forcing it over a mandrel by rotation on its axis and subjecting the wall of the article so pierced to pressure between surfaces of a length greater than the distance between ridges due to the piercing operation.

3. The improvement in the art of manufacturing seamless tubes, the method herein described which consists in supporting a mandrel on a plurality of inwardly projecting portions of the tube so distributed along the inner wall of the tube as to maintain the mandrel centrally, and subjecting the external surface of the article to pressure extending a distance along the article greater than the distance between adjacent mandrel supporting portions.

4. The improvement in the art of manufacturing seamless tubes, the method herein described which consists in supporting a mandrel on a plurality of inwardly projecting portions of the tube so distributed along the inner wall of the tube as to maintain the mandrel centrally, and subjecting the external surface of the article to oppositely acting pressing faces one having a predetermined movement relative to the other, whereby the walls of the tube are brought to uniform gage and the tube to uniform external diameter.

In testimony whereof, I have hereunto set my hand.

SAMUEL E. DIESCHER.

Witnesses:

ALICE A. TRILL,

THOMAS JOYCE.