

(No Model.)

S. P. M. TASKER.

ROLLER MANDREL.

No. 331,573.

Patented Dec. 1, 1885.

Fig. 1.

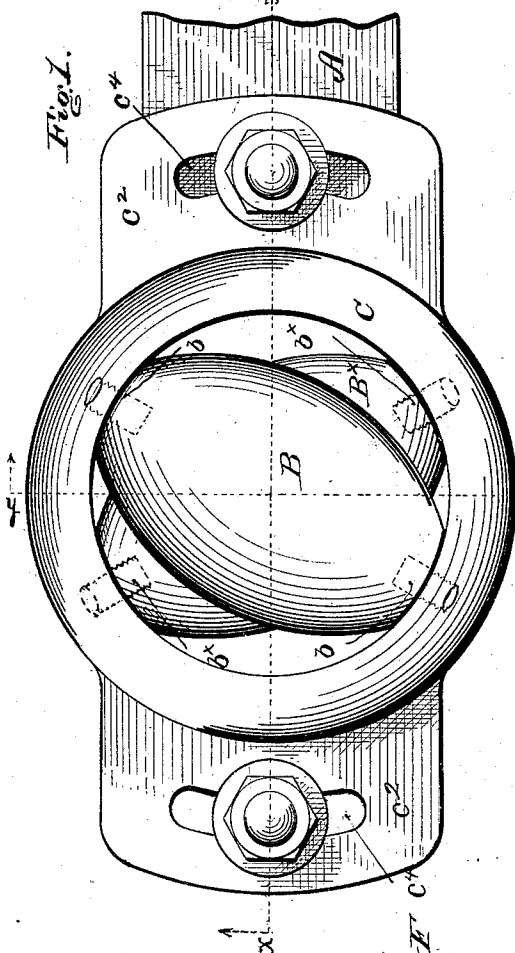


Fig. 2.

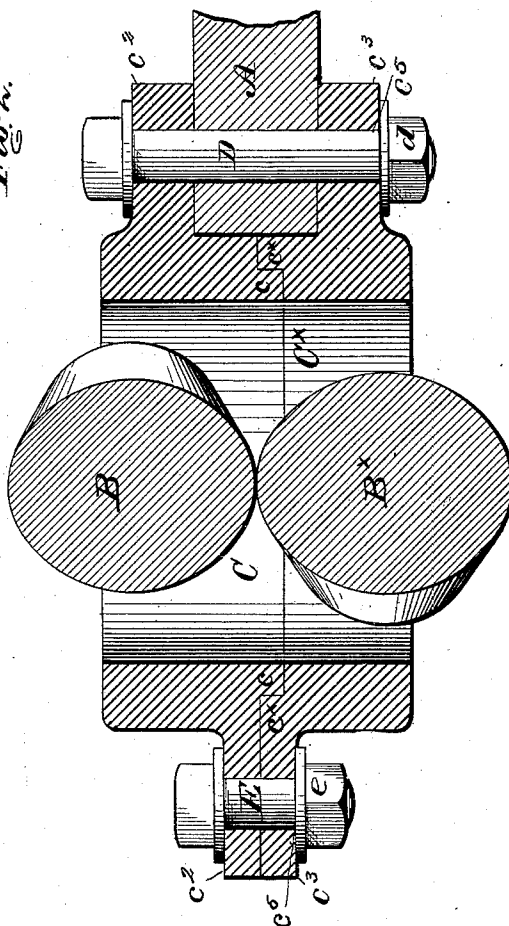
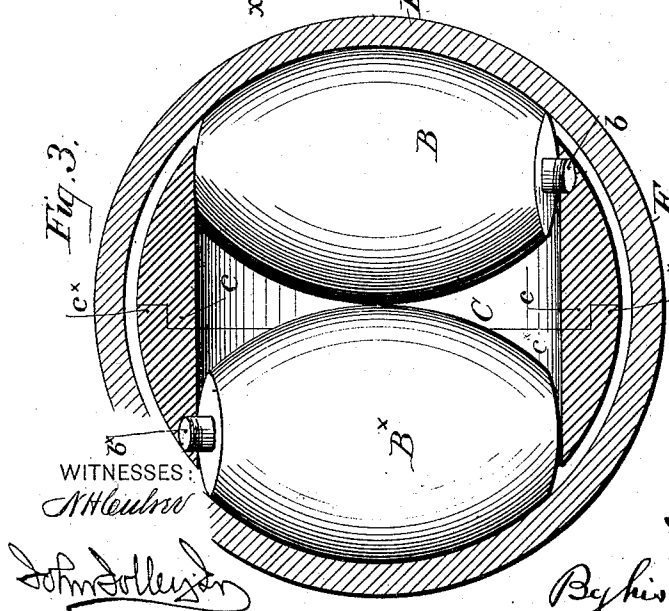


Fig. 3.

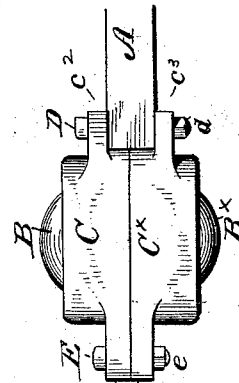


WITNESSES:

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Fig. 4.



INVENTOR

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UNITED STATES PATENT OFFICE.

STEPHEN P. M. TASKER, OF PHILADELPHIA, PENNSYLVANIA.

ROLLER-MANDREL.

SPECIFICATION forming part of Letters Patent No. 331,573, dated December 1, 1885.

Application filed July 20, 1885. Serial No. 172,046. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN P. M. TASKER, a citizen of the United States, residing in the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Mandrels for Manufacturing Metal Tubes, of which the following is a specification.

My invention relates to a class of mandrels in which the head, ball, or mandrel proper is provided with a pair of ellipsoidal friction-rolls which are so mounted as to have their axes in parallel planes and to bear and roll upon each other at their central portion, and the diameter of each of which is one-half of the internal diameter of the tube to be rolled.

A mandrel of the foregoing class was invented by me and patented to me in and by Letters Patent of the United States No. 151,323, dated May 26, 1874, to which Letters Patent reference is to be made for a more full understanding of this improvement. The intention of the employment of a mandrel of the foregoing class is to obviate friction between the interior surfaces of the tube and the ball of the mandrel, and to permit of the more ready passage of the tube over the mandrel and withdrawal of the mandrel from the tube.

The object of my present invention is to provide a mandrel of the foregoing class the rolls of which cross each other at an angle—that is to say, have their respective longitudinal axes so disposed as to cross or be inclined to each other, and which are capable of adjustment the one with respect to the other, as opposed to being fixedly parallel.

My mandrel is especially designed for employment in connection with certain apparatus for manufacturing tubes in which a set or pair or a series of sets or pairs of rolls, each of which sets is composed of two concave-faced rolls arranged one above the other, with their axes at an angle or arranged to cross, is or are employed for rolling down a tube upon a mandrel, the said machine constituting the subject-matter of several applications for patents executed by me and filed in the United States Patent Office contemporaneously with this application.

Apparatus embodying a good form of my invention is represented in the accompany-

ing drawings, and described in this specification, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings, Figure 1 is a top plan view of a mandrel embodying my invention. Fig. 2 is a central vertical longitudinal sectional elevation of the mandrel of Fig. 1 in the plane of the dotted line $x x$ of Fig. 1, and sight being taken in the direction of the arrows upon said lines. Fig. 3 is a central vertical sectional face elevation in the plane of the dotted line $Y Y$ of Fig. 1, and sight being taken in the direction of the arrows upon said line, the rolls, however, not being in section, and a tube being represented upon them. Fig. 4 is a side elevation of the mandrel of Fig. 1 drawn to a smaller scale.

In all of the figures the rolls occupy what is assumed to be their normal position.

Similar letters of reference indicate corresponding parts.

In the drawings, A represents the mandrel-rod, upon which the mandrel proper is mounted, and by which it is, if desired, actuated.

$B B^x$ are a pair of equal-sized ellipsoidal or spherical cross-rolls, the diameter of each of which at the central portion thereof is equal to one-half of the diameter of the bore of the tube to be rolled. The rolls correspond in size, shape, and general dimensions.

$C C^x$ are two roll-frames within which the rolls are respectively journaled. The roll-frames are conveniently of hollow cylindrical shape, and are fitted or socketed together by means of concentric beads $c c^x$, which fit together after the manner of a socket or male-and-female connection, and which permit of the frames moving upon each other about a common center, which is a line coinciding with a central vertical diametric line of the two rolls. Each of the roll-frames is conveniently provided with an extension in the nature of a lip or flange, which I have respectively designated as $c^2 c^3$. Each of these flanges is provided with a segmental slot, $c^4 c^4$, $c^5 c^5$, the slots being upon arcs of a circle concentric with the circle of the roll-frames.

D is a master-bolt, which passes through the mandrel-rod, and upon each side passes

through the mandrel-slots of neighboring or opposite flanges on the roll-frames.

d is a nut upon said master-bolt, by means of which the said flanges can be clamped upon the mandrel-rod in any desired position.

E is an auxiliary bolt, which passes through the segmental slots in the two flanges, which are longitudinally opposite to the flanges which bear upon the mandrel-rod. The said auxiliary bolt is provided with a nut, e , by means of which the said last-mentioned flanges can be clamped together in any predetermined position.

F is a tube upon the mandrel. The roll-frames, as will be best understood by a reference to Fig. 3, are, if I omit from consideration for the moment their flanges, together of the form of the segment of a sphere included between planes equally distant from a central diametric plane passing between the two rolls, and the diameter of such portion of the said frames as constitutes the said spherical segment is slightly less than the combined diameters of the two rolls at their central portions, so that the surfaces of the said spherical segment are below the acting surfaces of the rolls and not in contact with the tube, all as clearly represented in Fig. 3. The rolls are each provided with axial studs, journals, or axles b b^* , which are either secured to the rolls and borne in fixed bearings in the respective frames or else are connected fixedly with the said frames and entered within bearings in the rolls.

Such being a good construction of a mandrel embodying my improvements, it will be readily understood that in the normal set of the parts, or that represented in the drawings, the two rolls cross each other at an angle, and that by loosening the bolts D and E , which are normally tightened up, the respective roll-frames can be moved, the one upon the other, about their common center of revolution, so as to permit of the angular adjustment of the rolls with respect to each other, the bolts being again tightened when any given adjustment has been effected, so that the rolls remain for action in their adjusted positions. In whatever position the rolls are adjusted they bear upon each other at their central portion, so that the inward thrust of the tube upon them is taken off their journals and borne upon their central bodies.

It is obvious that the form of the roll-frames, and the means by which the said frames are fitted together and made adjustable the one upon the other, as well as the means by which the said frames are connected to the mandrel-rod, are immaterial to the invention, the gist of which resides in the construction of a roller-mandrel provided with two rolls, which cross each other at an angle.

In employing the said mandrel with a set of concave-faced rolls the axes of which are inclined to or cross each other the mandrel is to be inserted in the pass of the concave-faced rolls, and the rolls of the mandrels are

to be adjusted so that their respective axes are parallel with the axes of the rolls which they respectively operate in connection with, and when the said rolls are adjusted a similar adjustment to preserve the said parallelism of the axes is to be made in the rolls of the mandrel. I contemplate employing a series of mandrels of this class in connection with a series of rolls of the class referred to. It is obvious that if desired the frames can be so set that the rolls are parallel. It is obvious that the mandrel can be employed in connection with dies instead of rolls, and that it is adapted to be used for the rolling of metal either hot or cold. Where a series of these mandrels are employed in connection with a series of rolls, it is preferable that both the mandrels and the rolls should be successively disposed at right angles to their neighbors, so that every portion of the tube may be subjected to the action of the rolls upon the mandrels. The frames are conveniently made sectional, so as to permit of the ready application or removal of the rolls; but the roll-journals may be entered through the frames from the outside, as shown in Fig. 1.

Instead of the bolts, other means of retaining the frames in different adjusted positions can be readily employed.

Having thus described my invention, I claim—

1. The combination, in a roller-mandrel, of two ellipsoidal rolls the axes of which are inclined to each other, substantially as set forth.

2. The combination, in a roller-mandrel, of two ellipsoidal rolls the axes of which are inclined to each other, and a two-part frame, one part of which carries one roll, and the other part of which carries the other roll, substantially as set forth.

3. The combination, in a roller-mandrel, of two ellipsoidal rolls the axes of which are inclined to each other, a two-part frame, one part of which carries one roll, and the other part of which carries the other roll, and means for adjusting the position of the frames the one with respect to the other, so as to alter the inclination of the axes of the rolls, substantially as set forth.

4. The combination, in a roller-mandrel, of two ellipsoidal rolls, roll-frames respectively carrying the said rolls, a mandrel-rod to which said roll-frames are connected, means for securing the relative adjustment of the said frames with respect to each other and with respect to the mandrel-rod, substantially as set forth.

5. The combination, in a roller-mandrel, of the ellipsoidal rolls, the roll-frames respectively bearing the said rolls and adapted to have a movement about a common center, a mandrel-rod, and means for securing the said frames in various adjusted positions with respect to each other and said mandrel-rod, substantially as set forth.

6. The combination, in a roller-mandrel, of

the ellipsoidal rolls B B^x, the frames C C^x,
the mandrel-rod A, and the bolts D and E,
substantially as set forth.

5 7. The combination, in a roller-mandrel, of
the ellipsoidal rolls, the frames provided with
flanges having segmental slots, the mandrel-
rod, and the retaining-bolts, substantially as
set forth.

In testimony whereof I have hereunto
signed my name this 6th day of July, A. D. 1885.

STEPHEN P. M. TASKER.

In presence of—

J. BONSALE TAYLOR,

JOHN JOLLEY, Jr.