

M. PETERS.
MANUFACTURE OF TUBES.
APPLICATION FILED JUNE 9, 1909.

948,961.

Patented Feb. 8, 1910.

Fig. 1

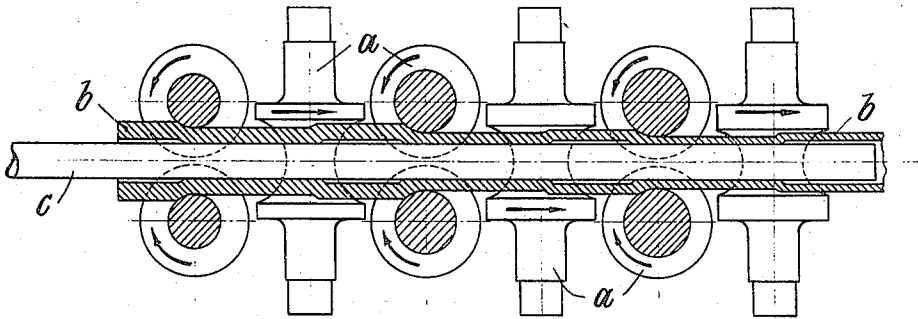


Fig. 2

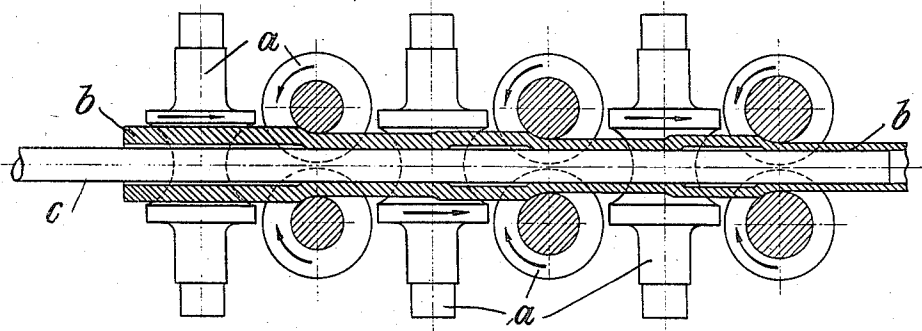
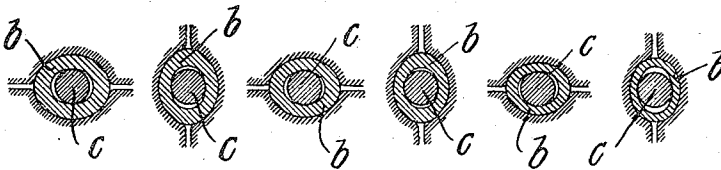


Fig. 3



Witnesses:
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MANUFACTURE OF TUBES.

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Specification of Letters Patent.

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Application filed June 9, 1909. Serial No. 501,207.

To all whom it may concern:

Be it known that I, MATHIAS PETERS, mechanical engineer, subject of the German Emperor, and residing at Benrath, near Dusseldorf, Germany, have invented a certain new and useful Improvement in the Manufacture of Tubes, of which the following is a specification.

The invention relates to the production of tubes; and particularly to a mill provided with several pairs of rolls, the successive rolls running at an increasing peripheral speed, having axes crossing one another and arranged behind each other, and of oval-shaped or elliptical calibers in all pairs of rolls.

It has for its object to roll a finished tube which shall be materially longer than the required mandrel, and of superior quality; and to reduce the power consumption during the rolling, as well as to lessen the work required in stripping the finished tube from mandrel. I attain these objects by passing the work-piece through rolls as aforesaid and in which the eccentricity or ratio of the distance of one focus from the center to one-half of the major axis of the oval-shaped calibers is the same throughout all the rolls.

Hitherto rolling mills of this kind have been known with oval-shaped calibers only but of varying eccentricity for the various pairs of rolls; or, partly with circular and partly with oval-shaped calibers. In the first type of mill the friction between the mandrel and the work-piece is very great within the first slightly oval-shaped calibers, whereby, owing to this great friction, the inside portion of the work-piece remains behind during the rolling process, causing distortions of same to arise, and which exercise an unfavorable influence upon the work-piece. The grooves, also, of the rolling-calibers provided to assist in taking along the work-piece which tends to remain behind on the inside of same due to excessive friction between the inner surface of the said work-piece and the mandrel, have to be renewed repeatedly as otherwise, owing to the congestion in the work-piece, breakages of spindles, rolls, &c., may be expected. In the second type of mill mentioned, besides the draw-back of the formation of a seam, &c., due to the considerable reduction which must occur in the first pair

of rolls pressing the metal into the space left between the said rolls and which are of circular caliber, there is another inconvenience *i. e.* that the tube for its whole length incloses the mandrel, owing to the circular caliber of the last pair of rolls, in such a way that the tube during subsequent drawing off from the mandrel within a mandrel-draw-bench, as is well known, can be accomplished only by means of great force. In this process the tube, owing to the great friction arising between the mandrel and the work-piece, will become much deformed and useless at that end which is being drawn against the abutment of the draw-bench.

The nature of my invention will be best understood in connection with the accompanying drawings, in which—

Figures 1 and 2 are respectively a vertical and a horizontal section. Fig. 3 shows fragmentary sections of the work-piece, mandrel and rolls.

Similar characters of reference designate corresponding parts throughout the several views.

In the drawings, *a* designates the pairs of rolls, which are set alternately at right angles to each other and each succeeding pair being driven at an increasing peripheral speed. The rolls are all of oval-shaped caliber, and the eccentricity thereof is the same throughout all the rolls.

b designates the work-piece within which is a mandrel *c*.

Owing to the equal eccentricity for all pairs of the oval-shaped rolls *a*, according to this invention, the friction between the mandrel *c* and the work-piece *b* will be reduced as much as possible, because the tube of oval-shape section comes into contact with the periphery of the mandrel always only in two places, and therefore easily slides over the same. The consumption of the power of the mill will thus be lessened, and the work-piece will be protected against the great injurious strain mentioned before, so that the tubes produced will be much superior in quality, especially as regards thickness of wall. The speed, also, of the mandrel would tend to change from one pair of rolls to the other in touching and leaving with the work-piece the said rolls, that is to say the mandrel adopts a speed which is the most favorable one to the tube to be rolled.

As now the first pairs of rolls, *i. e.* those running with the lowest speed exercise the greatest stress upon the work-piece and the mandrel, and as the movement of the mandrel is in proportion to the stresses and speeds of the various pairs of rolls, the mean speed of the mandrel in this case is a little greater than the peripheral speed of the first pairs of rolls. In a rolling mill of the kind set forth, therefore, the finished tube will be materially longer than the required mandrel.

I claim:—

1. The manufacture of tubes in a mill having a series of sets of rolls with passes arranged in alinement with the axes of successive sets arranged at right angles, which consists in subjecting a work piece assembled over a mandrel which is permitted to move along with the work piece to a continuous rolling action in said mill, the passes in the different sets of rolls all so constructed and arranged, that the work piece will be subjected to a reducing pressure on opposite sides and will be allowed to separate from the mandrel at substantially right angles from the point of greatest reduction, the portions of the work piece which are reduced and permitted to separate from the mandrel in one pass being respectively per-

mitted to separate from the mandrel and reduced in the succeeding pass.

2. The manufacture of tubes in a mill having a series of sets of rolls forming substantially complete elliptical passes whose eccentricities are the same and arranged in alinement with the axes of successive sets arranged at right angles, which consists in subjecting a work piece assembled over a mandrel which is permitted to move along with the work piece to a continuous rolling action in said mill, the passes in the different sets of rolls all so constructed and arranged, that the work piece will be subjected to a reducing pressure on opposite sides and will be allowed to separate from the mandrel at substantially right angles from the point of greatest reduction, the portions of the work piece which are reduced and permitted to separate from the mandrel in one pass being respectively permitted to separate from the mandrel and reduced in the succeeding pass.

In testimony whereof I have signed my name to the specification in the presence of two subscribing witnesses.

MATHIAS PETERS.

Witnesses:

WILLIS VANDORY,
BESSIE F. DUNLAP.