Aug. 6, 1935. L. KLEIN 2,010,400

METHOD OF MANUFACTURING TUBES AND PIPES

Filed Feb. 19, 1932

Fig. 1

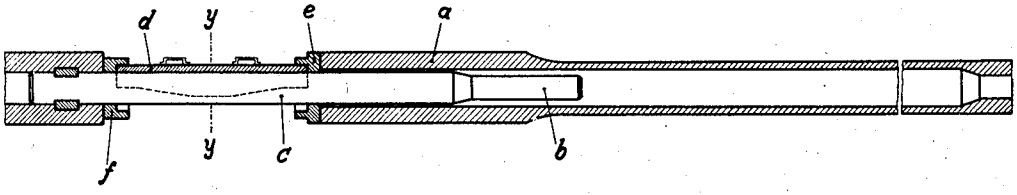


Fig. 1a

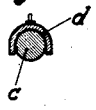


Fig. 2

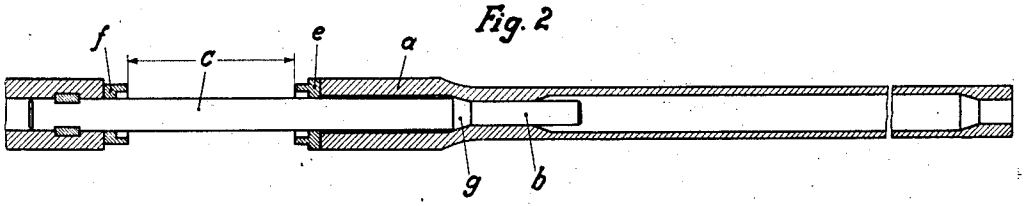
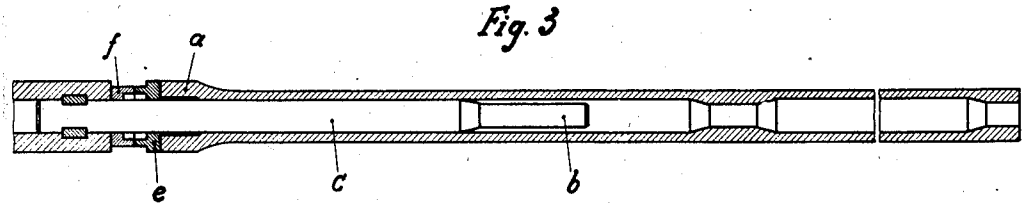


Fig. 3



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2,010,400

METHOD OF MANUFACTURING TUBES AND PIPES

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6 Claims. (Cl. 80—62)

My prior Patent No. 1,898,779 relates to a method of producing tubes and pipes with internally thickened ends by the pilgering process with the aid of a mandrel having an offset, the main feature being that while the thickened tube end is being rolled out over the offset portion of the mandrel and during the time in which the rolls in rolling out the material over the part of the mandrel of normal thickness are still operative at the offset part of the mandrel, the material is expanded rearwards.

The object of the present invention is to apply this method to the manufacture of tubes and pipes of a desired length which have not only thickened ends, but have in general local inwardly extending thickenings at desired points. Such pipes are used for instance as columns and generally in all cases where a pipe having a smooth cylindrical external surface must at certain places have a thickened cross-section for considerations of strength or for other reasons.

The invention relates moreover to tubes and pipes of a desired length which have local inwardly extending thickenings manufactured by the pilgering process with the aid of a mandrel having an offset portion, wherein said thickenings can be formed at desired and predetermined points along the inside of the tube or pipe, and independent of the length of the same such as to produce tubes or pipes of a desired length with a desired number of said internal thickenings in desired spaces. Moreover the invention comprises the finished tube or pipe of a desired length which is provided at its one end and at predetermined points along its inside with local inwardly extending thickenings and at its other end with an outwardly extending thickening.

The method according to the invention is also suitable for the manufacture of tubular rods with inwardly thickened ends when the tubes are to be made not in single but in double or multiple lengths. Through the application of the new method for this purpose the output of the rolling mill is considerably increased, the waste of material reduced and the percentage turned out improved, so that the manufacturing costs become considerably lower.

The manufacture of tubes of a desired length with local inwardly extending thickenings at desired points is carried out according to the invention by the tubular blank being rolled down on the thicker part of a mandrel having an offset end until a place which is to be thickened internally is reached, thereupon moving longitudinally and securing the blank in place with respect to the mandrel in such a position that the material for producing the thickening encloses the offset end portion of the mandrel, and then rolling down the thickened part of the blank on said offset portion. After this rolling down of the thickening the work piece may be released on the mandrel for enabling the blank to be further rolled down.

For fixing the blank with respect to the mandrel during the rolling down of the thickening a bridging piece is placed over the exposed portion of the part of the mandrel of normal thickness, which bears at both ends against a stripping ring and an auxiliary ring respectively. After the thickening has been rolled the bridging piece is removed for enabling the next part of the tube of normal cross-section to be rolled down. Through the part of the mandrel of normal thickness becoming available again and through the blank resting with the thickening just formed against the offset on the mandrel the exact rolling of the blank over the offset on the mandrel becomes possible, that is to say, the material can yield rearwardly when rolling down the place where the thick-walled cross-section merges into the thin-walled cross-section.

In the accompanying drawing different phases of the method according to the invention are illustrated on a constructional example.

In Fig. 1, of which Fig. 1*a* represents a section along *y—y*, the tubular blank *a* is provided at its forward end in accordance with the method described in my said prior patent with an inwardly extending thickening and has been rolled down next to this thickening over a certain length to the normal tubular cross-section. In order to produce at a desired place an inwardly extending local thickening, the blank is held with respect to the mandrel in such a position that the material required for producing the thickening is over the offset part *b* of the mandrel. It is fixed in this position by the insertion of the bridging piece *d* on to the exposed portion of the part *c* of normal thickness of the mandrel, the bridging piece *d* bearing at one end against the stripping ring *e* and at the other end against the auxiliary ring *f*.

Fig. 2 shows the tube after the production of the local inwardly extending thickening. For enabling the portion of the tube adjoining the thickening to be rolled down to the normal cross-section, the bridging piece *d* has been removed. For this reason and because the blank bears with the thickening just produced against the shoulder *g* of the mandrel, in rolling down the transitional part the material can yield rearwardly, until the rings *e* and *f* bear against one another

as shown in Fig. 3, whereupon the rolling down of the tube proceeds in the normal manner, that is to say, the material is stretched out forwardly. The outwardly extending thickening or pilger head *a* remaining at the rear end of the tube, as shown in Fig. 3, may thereupon be rolled down in the manner described in my said prior patent so as to produce an inwardly thickened tube end.

Instead of making one local inwardly extending thickening in addition to the inwardly thickened tube ends, it is of course possible to make any number of thickenings by the new method.

What I claim is:

1. A method of manufacturing a tube or pipe having local inwardly extending thickenings at desired points, consisting in rolling down a tubular blank on the thicker part of a mandrel having an offset end smaller than its other portions until a place which is to be thickened internally is reached, thereupon moving longitudinally and securing the blank in place with respect to the mandrel in such a position that the material for producing the thickening encloses the offset end portion of the mandrel, and then rolling down the thickened part of the blank on said offset end portion, as set forth.

2. A method of manufacturing tubes and pipes of a desired length with local inwardly extending thickenings at desired points, consisting in rolling down a tubular blank on the thicker part of a mandrel having a smaller offset portion until a place is reached which is to be thickened internally, thereupon moving the blank or mandrel longitudinally with respect the one to the other and securing the blank with respect to the mandrel in such a position that the material for producing the thickening encloses the smaller offset portion of the mandrel, then rolling down the thickened part of the blank onto said offset and releasing the blank with respect to the mandrel for enabling the blank to be further moved longitudinally and rolled down, as and for the purpose set forth.

3. A method of manufacturing tubes and pipes of a desired length with local inwardly extending thickenings at desired points, consisting in rolling down on a mandrel having different diameters a tubular blank on the thicker part of the mandrel having a smaller offset end portion until a place is reached which is to be thickened internally, thereupon placing a bridging piece covering only a part of the circumference of the mandrel on the exposed part of the mandrel, whereby the covering may be withdrawn transversely of the mandrel but may secure the blank from longitudinal movement with respect to the mandrel in such a position that the material for producing the thickening encloses the offset portion of the mandrel, and then rolling down the thickened part of the blank on the smaller offset end portion of the mandrel.

4. A method of manufacturing tubes and pipes of a desired length with local inwardly extending thickenings at desired points, consisting in rolling down a tubular blank on the thicker part of a mandrel having a smaller offset end portion until a place is reached which is to be thickened internally, thereupon placing a bridging piece covering only a part of the circumference of the mandrel on the exposed part of the mandrel, thereby securing the blank from longitudinal motion with respect to the mandrel in such a position that the material for producing the thickening encloses the offset portion of the mandrel, then rolling down the thickened part of the blank and thereupon removing the bridging piece from the mandrel thereby releasing the blank with respect to the mandrel for enabling the blank to be further rolled down, as and for the purpose set forth.

5. A method of manufacturing a tube or pipe having local inwardly extending thickenings at desired points consisting in rolling down a tubular blank which has been constricted near its front end on the smaller offset end portion of a mandrel so as to produce an inner end thickening of the blank, thereupon rolling out the blank on the thicker part of the mandrel until a place is reached which is to be thickened internally, thereupon moving the blank longitudinally with respect to the mandrel and securing the blank with respect to the mandrel in such a position that the material for producing the thickening encloses the smaller offset portion of the mandrel, then rolling down the thickened part of the blank onto said offset, releasing the blank with respect to the mandrel for enabling the blank to be further moved longitudinally and rolled down in its normal thickness and rolling an inner thickening at the rear end of the blank.

6. A tube or pipe of a desired length being provided at its one end and at predetermined points along its inside with local inwardly extending thickenings and at its other end with outwardly extending thickening.

LUDWIG KLEIN.