Nov. 7, 1939. H. E. PASSMORE, JR 2,179,194

TUBE DRAWING BENCH

Filed July 22, 1938 3 Sheets-Sheet 1

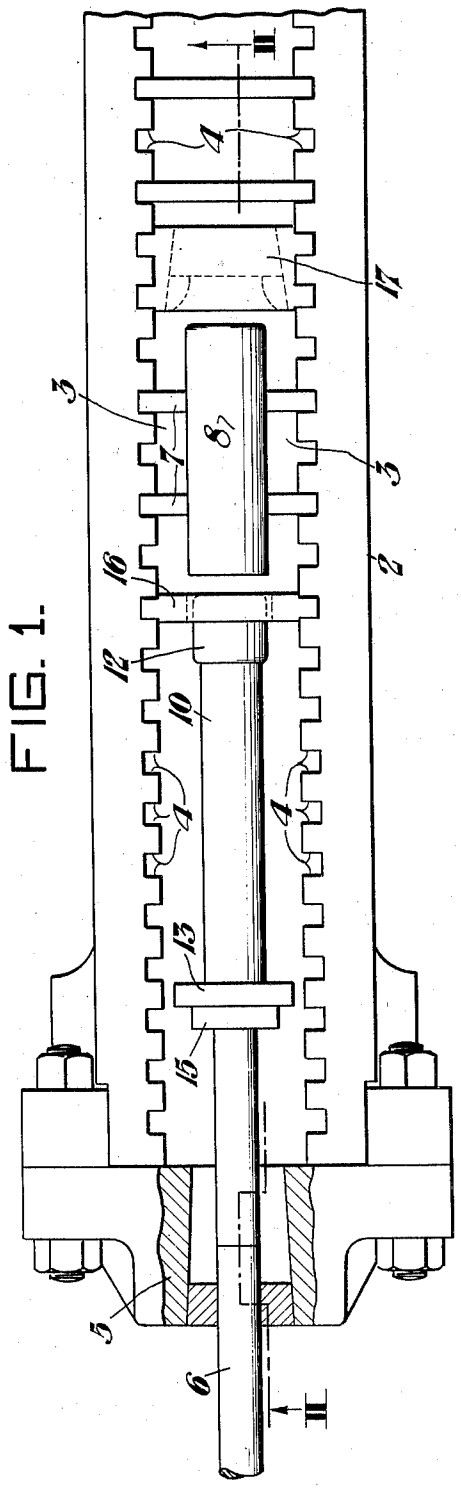


FIG. 1.

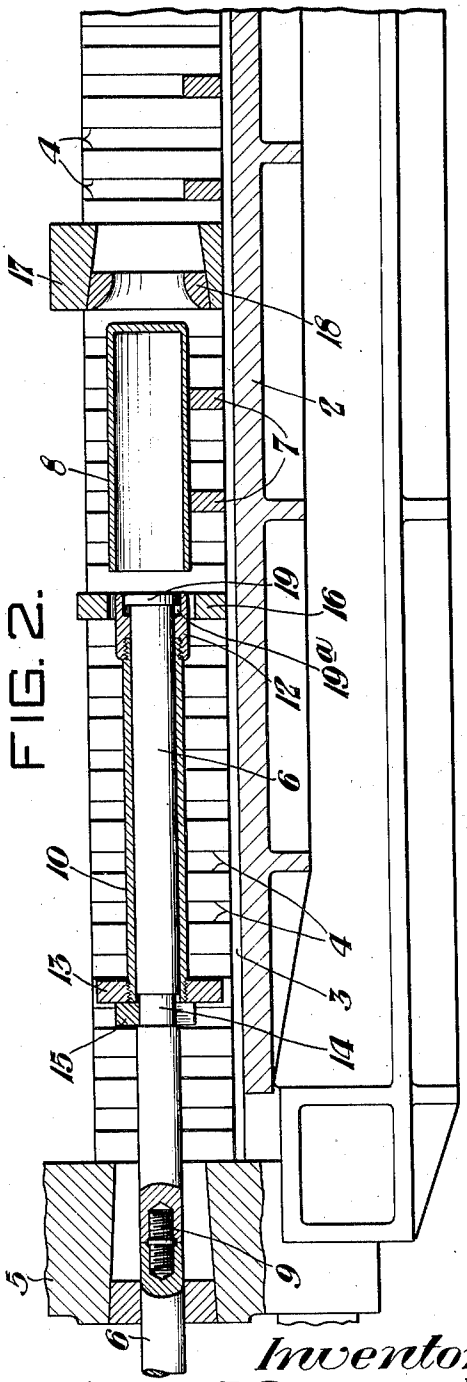


FIG. 2.

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TUBE DRAWING BENCH

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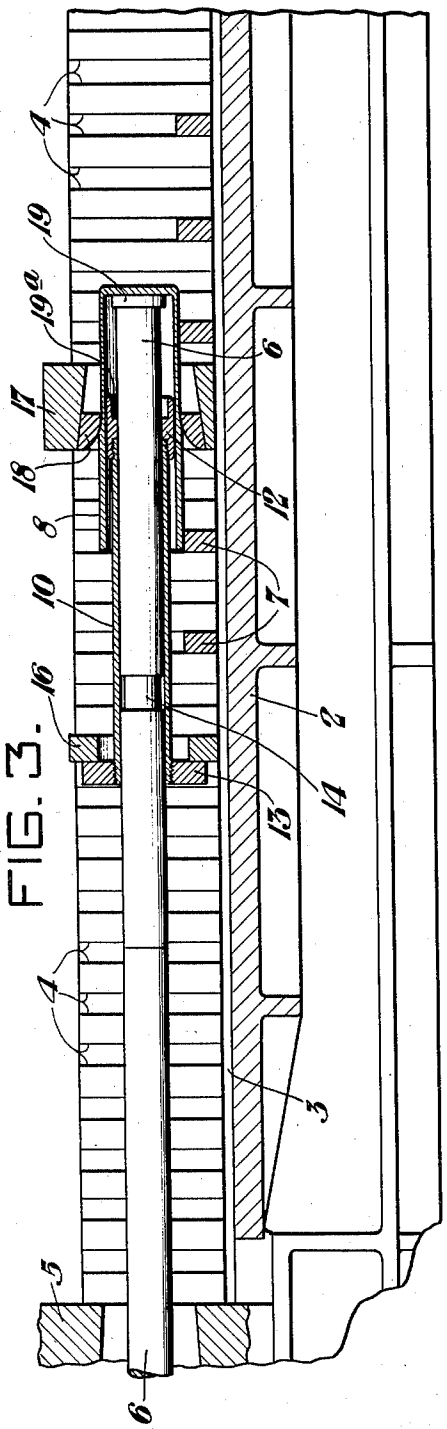


FIG. 3.

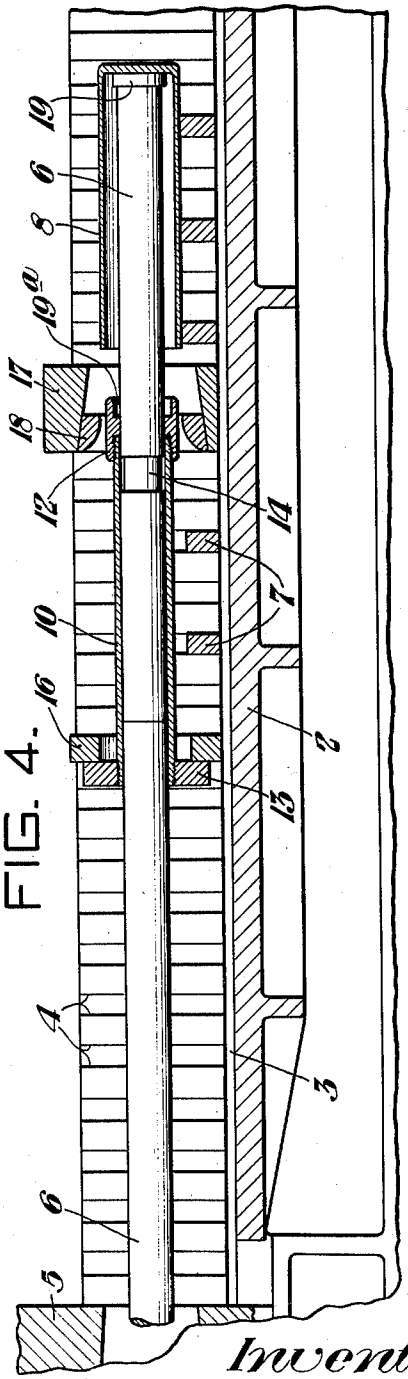


FIG. 4.

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TUBE DRAWING BENCH

Filed July 22, 1938 3 Sheets-Sheet 3

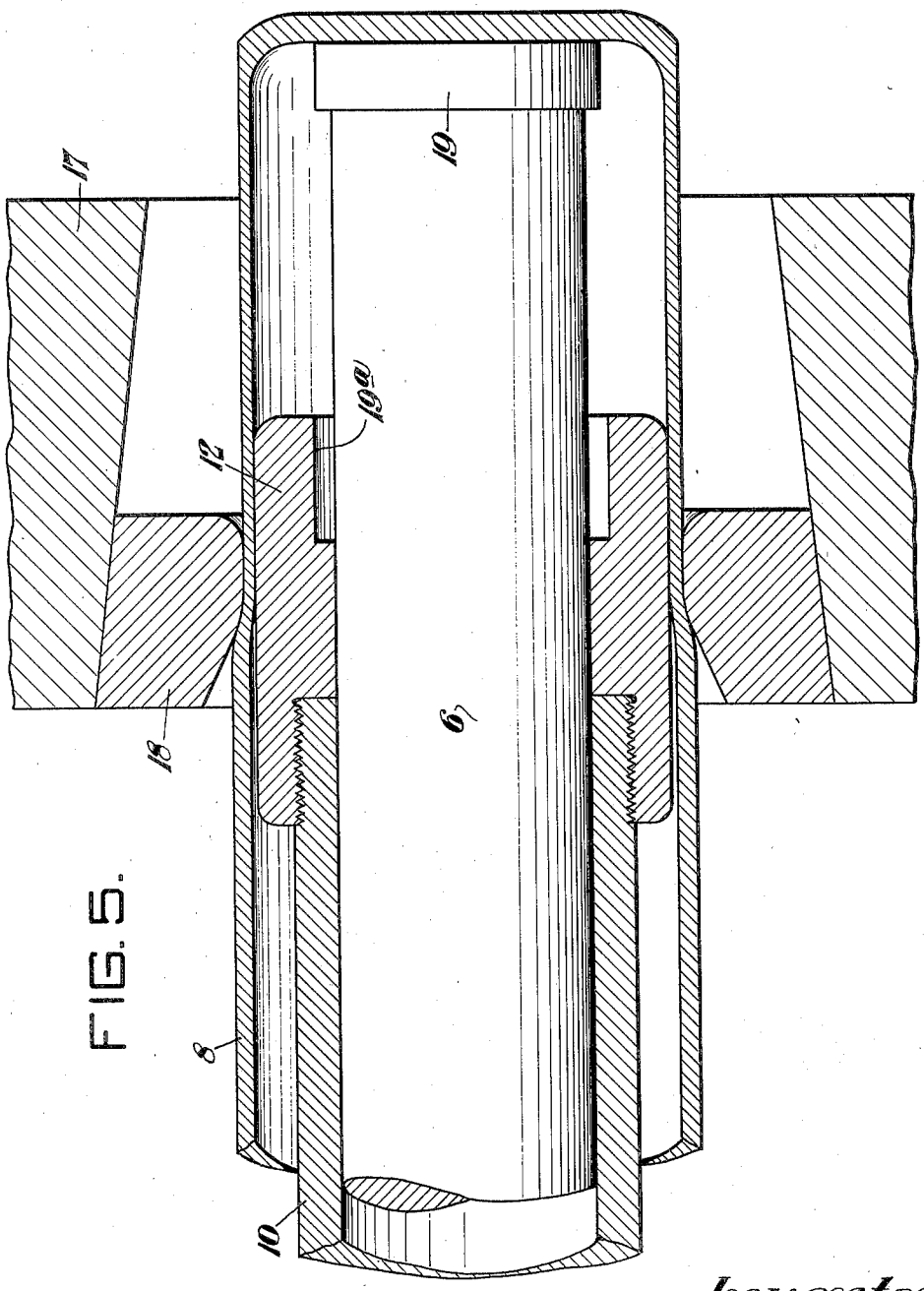


FIG. 5.

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UNITED STATES PATENT OFFICE

2,179,194

TUBE DRAWING BENCH

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Application July 22, 1938, Serial No. 220,813

3 Claims. (Cl. 205—4)

This invention relates to a method and means for cold drawing tubes, cylindrical articles and the like, and particularly to an improved method and means for drawing closed-end tubes to size.

It is usually the practice to manufacture such tubes by hot drawing them to size, but this method of manufacture is not so satisfactory for the reason that it has very definite limitations in the thickness of a wall that can be produced and in the tolerances and physical properties that can be maintained. It has been found that thinner walls within closer tolerances and with a varying range of physical properties can be produced by cold drawing the tubes to size by the practice of the present invention.

Heretofore, in cold drawing operations, it has been difficult and a problem to strip closed-end tubes from the mandrels after they have been drawn to size and it was usually necessary to provide some means for stripping the tubes therefrom which was, of course, inconvenient and an additional expense in the manufacture of tubes.

Tubes drawn to size according to the method of the present invention, are automatically stripped from the mandrels at the completion of the drawing operation, and such a method also permits a substantially large reduction of the walls.

It is an object of the present invention to provide an improved and inexpensive method and means for cold drawing tubes to the size which will permit as large a reduction as any method heretofore used for drawing closed-end tubes to size and, at the same time, obtaining the widest range of physical properties possible by cold working.

It is another object of the invention to provide an improved method and means for cold drawing closed-end tubes which automatically strips the tubes from the mandrel during the drawing operation.

It is a further object of the invention to provide an improved means for cold drawing closed-end tubes which permits easy and quick replacement of the mandrel and die in case of wear.

Various other objects and advantages of this invention will more fully appear during the course of the following specification and will be particularly pointed out in the appended claims.

In the accompanying drawings, I have shown, for the purpose of illustration, one embodiment which my invention may assume in practice.

In these drawings:

Figure 1 is a plan of a means for practicing the improved method of my invention for cold drawing tubes;

Figure 2 is a section taken on the line II—II of Figure 1, showing the mandrel and ram in their initial position;

Figure 3 is a section similar to Figure 2 showing the mandrel positioned in the die and arrested from further movement;

Figure 4 is also a section similar to Figure 2 showing the mandrel at rest and the finished tube and ram at the completion of the stroke, the tube having been drawn between the mandrel and the die; and,

Figure 5 is an enlarged detail section of the tube being drawn between the mandrel head and the die.

There is illustrated in the drawings one type of draw-bench with which the improved method of cold drawing tubes of my invention can be practiced. This draw-bench comprises a stand or base 2 having a longitudinally extending channel 3 therein with a plurality of sets of opposed slots 4 arranged on the opposite walls thereof. On one end of the base there is arranged a head 5 having a suitable bearing therein which is adapted to support a reciprocating ram 6. This ram 6 is preferably made of two parts which are integrally connected by means of a stud 9. There is suitably arranged in the slots 4 of the frame V-blocks 7 which are adapted to support a tube 8 as it is being reduced to size.

There is telescopically positioned on the outer end of the ram 6 a sleeve-like mandrel 10 which preferably consists of a mandrel-head 12 positioned on the extreme outer end thereof and a flange 13 positioned on the inner or opposite end. The ram 6 has a reduced portion 14 arranged thereon adjacent the outside of the flange 13 of the mandrel, which is adapted to receive preferably a removable U-shaped collar 15, but any other suitable means may be provided for securely locking the mandrel on the outer end of the ram. There is positioned in one of the sets of slots 4 of the base, adjacent the end of the mandrel and the ram when they are in their normal positions as shown in Figure 2, a removable stop plate 16. There is also suitably arranged in one of the sets of slots 4, the proper distance from the stop 16, a removable die holder 17 which is adapted to hold a die 18.

It will be understood that the shells to be drawn have both a larger inside and outside diameter than the finished cold drawn tubes and also have relatively thicker walls. The tubes or shells which are to be drawn have a closed end, preferably of a flat contour, but it will be understood that the end contour may be of any desired shape, such as

concave or convex, preferably to agree with the end surface of the ram.

Tubes or shells having a closed end to be drawn to size according to the method of the present invention are reduced as follows:

The shell or tube is placed on the V-blocks 7 so that they will assume the correct position on the end of the mandrel, such as shown in Figure 2. The ram, together with the mandrel, is then moved forwardly by any suitable source of power, preferably by hydraulic means, carrying the mandrel and ram within the tube against the end thereof. The ram and mandrel continue to move forwardly together until the flange 13 of the mandrel contacts the stop 16 carried by the base. This positions the sizing mandrel-head portion 12 together with the end of the shell 8 within the die 18. At this point the U-shaped collar 15 is removed from the ram, as shown in Figure 3. The mandrel is now arrested from further movement and the ram allowed to move against the end of the tube, drawing the same between the mandrel and the die to reduce the same. After the tube has been drawn to size through the die and the mandrel, the ram is moved in the opposite direction with the enlarged head or flange 19 on the end of the ram being positioned in the recess 19a in the mandrel-head carrying the mandrel therewith to the initial position. Upon reaching the starting or initial position, the U-shaped plate 15 is again placed in position on the ram 6 ready for the next drawing operation.

It will be understood that the draw-bench that I have described in connection with my invention is only for the purpse of illustration and that any suitable draw-bench of similar construction could be used to carry out the method of my invention.

While I have shown and described an embodiment of my invention, it will be understood that this embodiment is merely for the purpose of illustration and description and that various other forms may be devised within the scope of my invention, as defined in the appended claims.

I claim:

1. Means for drawing closed-end tubes to size including, in combination, a base support having a longitudinally extending channel portion arranged therein, a head arranged at one end of said support, a ram associated with said head and mounted for longitudinal movement in the channel portion of said support, a sleeve-like mandrel telescopically arranged on the outer end of said ram and disposed within said channel removable means for securely locking the mandrel on the end of said ram, a removable plate-like stop member adjustably disposed in said channel, a flange portion arranged on the inner end of said mandrel, a removable die holder adjustably positioned in said channel, a removable die carried by said die holder, means for spacing said plate-like stop member and said die holder a predetermined distance apart, the flange portion of said mandrel adapted to cooperate with said plate-like stop member to arrest the same from further movement when the ram is moved in the drawing direction so as to position the outer end of said mandrel properly in relation to the die, and means carried by the outer end of the ram which is adapted to cooperate with the outer end of said mandrel to move the same away from the die when the ram is moved in the opposite direction.

2. Means for drawing closed-end tubes to size including, in combination, a base support having a longitudinally extending channel portion arranged therein, a plurality of sets of slots arranged in the opposed side walls of said channel at a predetermined spaced distance apart, a head arranged at one end of said support, a ram associated with said head and mounted for longitudinal movement in the channel portion of said support, a sleeve-like mandrel telescopically arranged on the outer end of said ram and disposed within said channel, removable means for securely locking the mandrel on the end of said ram, a removable plate-like stop member adapted to be disposed in any one of said sets of slots in said channel, a flange portion carried by the inner end of said mandrel, a removable die holder adapted to be arranged in any one of said sets of slots in said channel at a predetermined distance from said stop member, a removable die carried by said die holder, the flange portion of said mandrel adapted to cooperate with said plate-like stop member to arrest the same from further movement when the ram is moved in the drawing direction so as to position the outer end of the mandrel properly in relation to the die, and means carried by the outer end of the ram which is adapted to cooperate with the outer end of said mandrel to move the same away from the die when the ram is moved in the opposite direction.

3. Means for drawing closed-end tubes to size including, in combination, a base support having a longitudinally extending channel portion arranged therein, a plurality of sets of slots arranged in the opposed side walls of said channel at a predetermined spaced distance apart, a head arranged at one end of said support, a ram associated with said head and mounted for longitudinal movement in the channel portion of said support, a sleeve-like mandrel telescopically arranged on the outer end of said ram and disposed in said channel portion, a removable head arranged on the outer end of said mandrel, removable means for securely locking the mandrel on the end of said ram, a removable plate-like stop member adapted to be disposed in any one of said sets of slots in said channel, a flange portion carried by the inner end of said mandrel, a removable die holder adapted to be disposed in any one of said sets of slots in said channel portion at a predetermined distance from said stop member, a removable die carried by said die holder, a flanged portion arranged on the outer end of said ram and adapted to be disposed in one position in a recess arranged in the outer end of said mandrel-head, the flange portion of said mandrel adapted to cooperate with said plate-like stop member to arrest the same from further movement when the ram is moved in the drawing direction so as to position the mandrel-head properly in relation to the die, and said flange on the end of said ram adapted to cooperate with the recess in said mandrel-head to move the mandrel away from the die when the ram is moved in the opposite direction.

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