

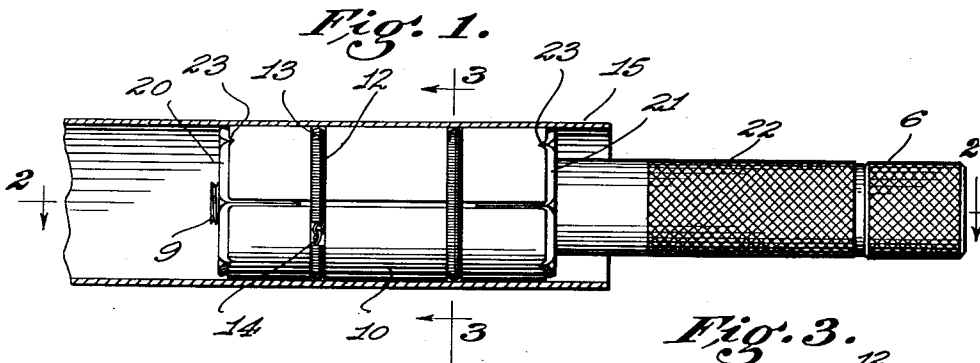
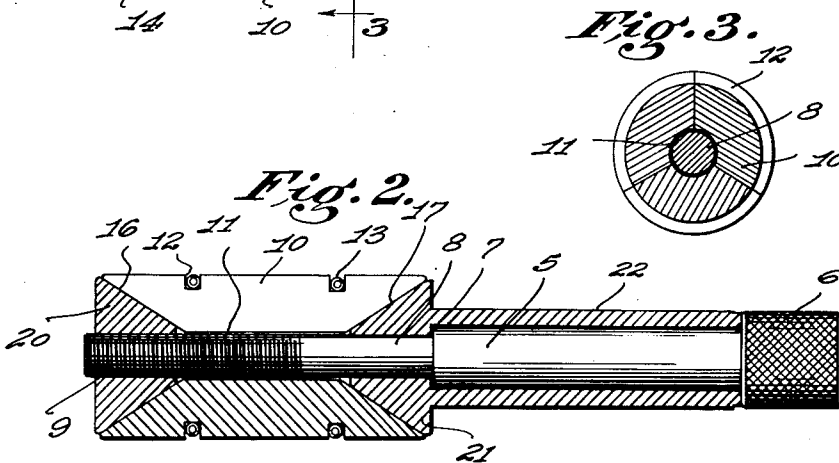
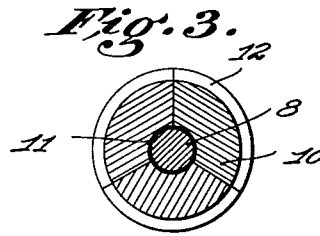
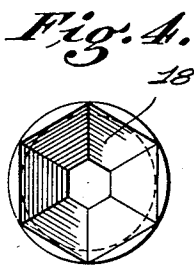
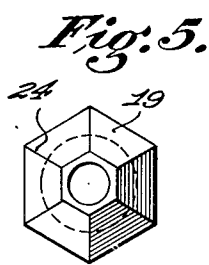
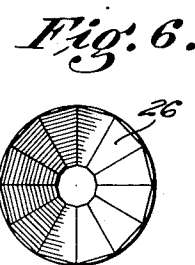
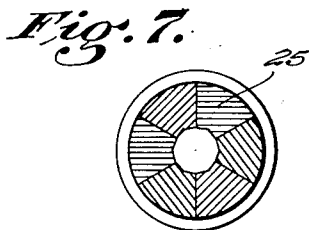
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H. C. SPAHN

2,226,078

EXPANDING MANDREL

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EXPANDING MANDREL

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3 Claims. (Cl. 10—107)

This invention relates to mandrels and more particularly to an expanding mandrel especially designed for use by plumbers and others when threading or cutting thin tubes or pipes.

5 The object of the invention is to provide an expansible mandrel of simple and durable construction adapted to fit within a tube or pipe so as to prevent crushing or denting of the walls thereof when the pipe is clamped in a chuck or vice preparatory to threading the same.

10 A further object of the invention is to provide a mandrel comprising a plurality of spring-pressed expansible sections and an operating member extending longitudinally through said sections and provided with coating tapered heads for forcing said sections laterally against the tension of the spring into engagement with the inner walls of a pipe.

15 A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency as well as to reduce the cost of manufacture.

20 In the accompanying drawing forming a part of this specification and in which similar numerals of reference indicate corresponding parts in all the figures of the drawing:

Figure 1 is a side elevation of an expanding mandrel embodying the present invention showing the same in position within a tube or pipe,

30 Figure 2 is a longitudinal sectional view taken on the line 2—2 of Figure 1,

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1 with the spring omitted for the sake of clearness,

35 Figure 4 is an end elevation with the adjacent expanding head removed and showing the construction of the receiving socket for said head,

Figure 5 is a view looking at the tapered end of the forward expanding head,

40 Figure 6 is an end view illustrating a modified form of the invention, the outer expanding head being removed, and

Figure 7 is a transverse sectional view of the structure shown in Figure 6.

45 The improved expanding mandrel forming the subject-matter of the present invention comprises a supporting rod 5 cylindrical in cross section and having one end thereof provided with a knurled finger-piece 6 and its other end reduced at 7 to form an extension 8 provided with threads, indicated at 9.

50 Loosely mounted on the extension 8 are a plurality of expansible sections 10, preferably three in number as shown, and having their inner faces cut-away at 11 to accommodate the extension 8

and their outer faces formed with circumferential grooves 12 for the reception of coiled springs 13. The adjacent ends of the coiled springs 13 are provided with interengaging fastening loops 14 to prevent displacement of the springs and also to permit the springs to be readily removed or replaced when desired. The springs 13 serve to normally and yieldably hold the inner faces 11 of the expansible segments 10 in engagement with the extension 8 so as to permit the mandrel to be readily inserted within a tube or pipe, indicated at 15.

The opposite ends of the sectional expanding members are provided with inwardly extending tapered sockets 16 and 17 having hexagonal walls 18 which engage correspondingly shaped walls 19 on suitable expanding heads, indicated at 20 and 21. The expanding head 20 is provided with a threaded base for engagement with the threads 9 on the extension 8 while the expanding head 21 is slidably mounted on the extension 8, as shown. The head 21 is provided with a longitudinally disposed sleeve 22 which fits loosely around the supporting rod 5 with its outer end normally bearing against the finger-piece 6 so that, when said finger-piece is rotated, the heads 20 and 21 by engagement with the angular walls 18 of the sockets 16 and 17 will force the expansible sections 10 laterally into clamping engagement with the inner wall of the pipe 15 and thus prevent crushing or bending of the pipe when the latter is clamped in a chuck or vice preparatory to threading said pipe. It will here be noted that the outer ends of the expansible sections 10 are provided with substantially V-shaped guide notches 23 which receive the angular portions or ribs 24 of the adjacent expanding heads, said angular portions or ribs 24 being disposed at the junction of the angular walls of the expanding heads, as best shown in Figure 5 of the drawing.

Under normal conditions, the coiled springs 13 hold the expansible sections against the extension 8 of the supporting rod and in which position the outer surfaces of the expansible sections will be flush or smooth so as to permit the mandrel to be readily inserted in the adjacent end of the pipe 15. After the mandrel has been positioned within the pipe, the finger-piece 6 is rotated and by engagement with the adjacent end of the sleeve 22 forces the head 21 longitudinally of the extension 8 while at the same time the head 20 by engagement with the threads 9 will be fed inwardly, thus expanding the segmental sections 10 laterally against the tension of the spring 13 and into engagement with the inner wall of the pipe

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or tube 15, thereby permitting the pipe to be clamped between the jaws of a vice or chuck without danger of crushing the pipe. After the pipe has been threaded, cut or otherwise operated upon, the finger-piece 6 is rotated in the reverse direction which releases the heads 20 and 21 from engagement with the tapered walls of the sockets 16 and 17, whereupon the springs 13 will contract said sections so as to permit the mandrel to be readily removed from the pipe or tube.

In Figures 6 and 7 of the drawing, there is illustrated a modified form of the invention, in which the expandible portion of the mandrel is formed in six sections, indicated at 25, and the walls of the sockets for the reception of the expanding heads are provided with twelve angular faces, indicated at 26, instead of six, the construction and operation of the mandrel being otherwise similar to that shown in Figure 1 of the drawing.

The mandrel is exceedingly simple in construction and easy to operate and will effectually retain the walls of relatively thin tubes and pipe sections in their original shape when threading said pipe sections without danger of crushing or denting the same.

It will, of course, be understood that the mandrels may be made in different sizes and shapes and provided with any desired number of expandible sections without departing from the spirit of the invention.

Having thus described the invention, what is claimed as new is:

1. A tool of the class described comprising a rod having one end thereof reduced to form a longitudinal extension provided with a threaded portion and a smooth portion, a sectional expanding member mounted on the rod and provided with oppositely disposed tapered sockets having angular walls, springs surrounding the sections of the expanding member, tapered expanding heads having angular walls adapted to engage the angular walls of the adjacent sockets, one of said expanding heads having threaded engagement with the threads on the extension and the other head being loosely mounted on the smooth portion of said extension, a sleeve carried by the last-mentioned head and loosely fitting

over the supporting rod, and a finger-piece on one end of said supporting rod and bearing against the sleeve.

2. A tool of the class described comprising a supporting rod having one end thereof reduced to form a longitudinal extension, a portion of which is threaded and another portion thereof smooth, a sectional expanding member mounted on the rod and provided with oppositely disposed tapered sockets having angular walls, there being substantially V-shaped notches formed in said sections at the junction of the angular walls thereof, tapered expanding heads having correspondingly angular walls fitting within the adjacent sockets, one of said expanding heads engaging the threads on the extension and the other loosely mounted on the smooth portion thereof, a sleeve forming a continuation of the last-mentioned head and loosely mounted on the supporting rod, there being ribs disposed at the junction of the angular walls of the expanding heads and adapted to fit within the V-shaped notches, and a finger-piece mounted on one end of the supporting rod and bearing against the adjacent end of the sleeve.

3. A tool of the class described comprising a supporting rod having one end thereof reduced to form a longitudinal extension, a portion of which is threaded and another portion thereof smooth, a sectional expandible member mounted on the rod and provided with oppositely disposed tapered sockets, there being circumferential grooves formed in said expanding member, springs fitted within said grooves for normally holding the section of the expanding member yieldably in engagement with the rod extension, tapered heads fitting within the adjacent sockets, one of said heads engaging the threads on the extension and the other being loosely mounted on the smooth portion of said extension, a sleeve extending longitudinally from the last-mentioned expanding head and loosely fitting over the supporting rod, and a finger-piece carried by one end of the supporting rod for actuating the heads to expand the sections of said member.

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