Sept. 28, 1926.

1,601,329

C. SLESAZECK

ROLLING IN TOOL FOR TUBES

Filed April 12, 1926

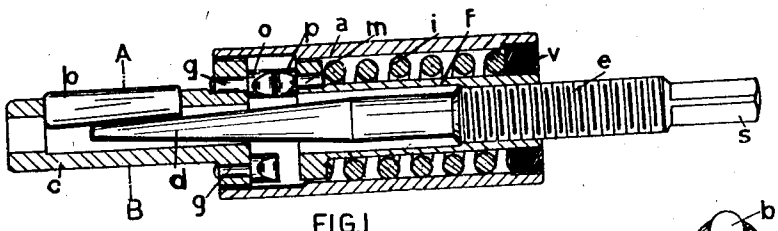


FIG.1

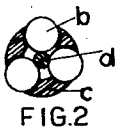


FIG.2

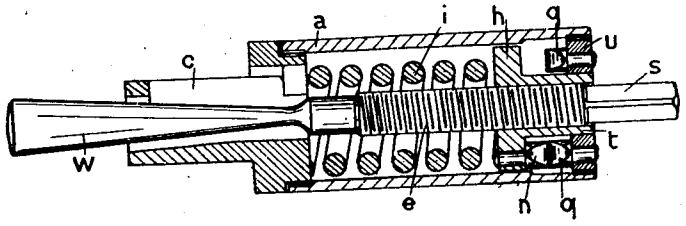


FIG.3

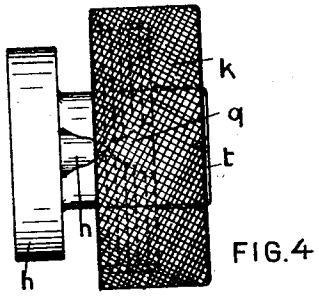


FIG.4

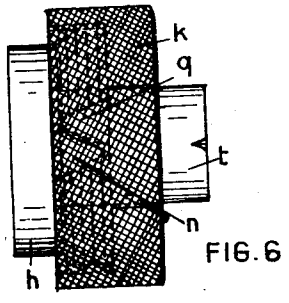


FIG.6

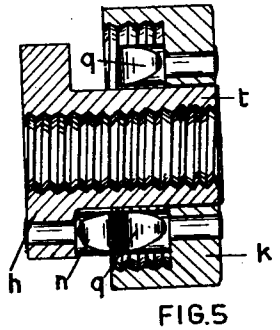


FIG.5

Carl Slesazeck, Inventor

by his attorneys.

Mack & Blum

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UNITED STATES PATENT OFFICE.

CARL SLESAZECK, OF BERLIN, GERMANY.

ROLLING-IN TOOL FOR TUBES.

Application filed April 12, 1926, Serial No. 101,458, and in Germany April 17, 1925.

My invention relates to a tool for the tight rolling-in of tubes into boiler heads, fire boxes, and the like, the rolling-in being effected in known manner by rollers or rolls —generally three—pressed radially outwards by means of the conical portion of a conical mandrel adapted to be shifted axially by a screw-thread provided upon the shank of said mandrel. The known tube rolling-in devices of this type suffer from the drawback that the more or less good rolling-in depends upon the attention of the workman who relies so-to-say upon his tactility so that the tubes or tube ends are expanded sometimes either too little in which case the tightness is insufficient, or too much in which case the boiler head is caused to warp so as to lose its proper shape.

The improved rolling-in device forming the subject-matter of the present invention is free from those drawbacks. Its gist resides in the features that between the roller cage and the mandrel shank an engaging and disengaging coupling is inserted which is disengaged automatically when the radial pressure of the rollers upon the tube end to be rolled-in, and, therefore, upon the conical portion of the mandrel, has attained a certain height. The labor is now rendered independent of the skill of the workman, and every tube end is rolled-in equally tightly and uniformly at every portion of its circumference.

The invention is illustrated diagrammatically and by way of examples in the accompanying drawing on which Figure 1 is a longitudinal section through the first example, only the mandrel being shown in side-view; Figure 2 is a cross-section in the plane A—B of Fig. 1; Figure 3 is a longitudinal section through another constructional form; and Figs. 4, 5 and 6 show some modified details, drawn to an enlarged scale, all as more fully described hereinafter.

On the drawing, *c*, Fig. 1, denotes the roller cage which is provided with three longitudinal slots in which three rollers *b*, Figs. 1 and 2, are housed. The cage is screwed into one end of a casing *a*; into the other end of this casing is screwed a ring *v*. *d* denotes the conical portion of the mandrel which can be moved forward axially by means of its threaded shank *e* and its square rear end *s* either manually or with the aid of any auxiliary device. The thread of the shank *e* engages an internal thread provided in the rear end of a sleeve *f* having a thick flange at its front end and being encompassed by a strong helical spring *i* pressing with its front end against said flange and with its rear end against the ring *v*.

A thick flange is provided also at the rear end of the roller cage *c*. This flange is located in the front end of the casing *a*, and provided with some bores enclosing shanks *g* of pins *o* having oblique heads, as shown. Opposite these pins similar pins *p* are inserted with their shanks *m* into bores of a flange of the sleeve *f*. I wish it, however, to be understood that instead of a plurality of pins *g*/*o* and *m*/*p* only some in each of the two flanges may do.

The sleeve *f* is shiftable in the casing *a* together with the mandrel. Its normal position within the casing is not that shown in Fig. 1. The position shown in this figure is that in which the mandrel or, more precisely, its conical working end, is just being withdrawn from the rollers *b*. When the rolling-in work is being commenced, the pins *p* lie laterally from the pins *o*, side by side with them, so that they transmit the rotary motion of the sleeve *f* to the cage *c* and the rollers *b* by the intermediary of the pins *o*. The pins *o* and *p* constitute, in fact, a coupling, a pin coupling. When the tube has been end rolled-in tightly by the rollers *b*, the resistance increases so much that the pins *p* slide off the pins *o* along the oblique surfaces of the heads of both pins, or sets of pins, the pins *p* and the sleeve *f* being forced rearwardly so as to compress the spring *i* correspondingly. The workman perceives, of course, at once this condition which indicates to him that the proper tight rolling-in has been finished, whereupon he withdraws his tool.

In the modification shown in Fig. 3, the direction of the conicalness of the working end of the mandrel is the reverse of that in Fig. 1, and the position of the spring *i* on one hand and of the pins *o* and *p* on the other hand is also the reverse of the position of these parts in Fig. 1. While in this latter figure the pins are located lefthand from the spring, they are located in Fig. 3 righthand thereof. The spring *i* presses on its lefthand end against the cage *c*, and on its righthand end against a flange *h* of a short sleeve *t* having the internal thread for the

shank of the mandrel. Also with this constructional form of the tool the members forming the pin coupling are disengaged automatically as soon as the proper tight rolling-in of the tube-end has been effected, the position of the pins in this moment being then that shown in Fig. 3.

While in Fig. 1 a ring *v* and in Fig. 3 a ring *u* is screwed into the casing *a*, Figs. 4, 5 and 6 show a modification in which a cap-nut *k* is employed instead of said rings. This cap nut which, as such, is to be screwed upon the respective end of the casing *a* instead of thereinto, carries the pins q, as shown in Fig. 5. Supposing this figure be turned for 90° in clockwise direction, the position of the pins *q* and *n* relatively to each other will correspond to the position of the same pins in Fig. 3. The position of the cap nut *k* and the flange *h* in Fig. 4 corresponds to the position of the same parts in Fig. 5, these parts being, however, shown in side-view instead of in axial section. Also Fig. 6 shows these parts in side-view, but in that position of them relatively to each other which they occupy when the rolling-in operation is commencing, the coupling pins lying then side by side.

I wish it also to be understood that the pin-coupling is illustrated merely by way of example. There are other suitable coupling members which may be used as well.

I claim:

1. A rolling-in tool for tubes, comprising, in combination, a casing, a cage and rollers therein, a mandrel extending through said casing and being adapted to co-operate at one end with said rollers, and being conical at this end, and having a screw-thread on its shank; and an automatically engaging and disengaging coupling arranged between said cage and said mandrel, substantially as set forth.

2. A rolling-in tool for tubes, comprising, in combination, a casing, a cage and rollers therein, a mandrel extending through said casing and being adapted to co-operate at one end with said rollers, and being conical at this end, and having a screw-thread on its shank; and an automatically engaging and disengaging coupling comprising pins located opposite to each other and having heads with oblique surfaces adapted to slide along each other, substantially as set forth.

3. A rolling-in tool for tubes, comprising, in combination, a casing, a cage and rollers therein, a mandrel extending through said casing and being adapted to co-operate at one end with said rollers, and being conical at this end, and having a screw-thread on its shank; and an automatically engaging and disengaging coupling, an internally threaded sleeve encompassing the threaded portion of the shank; said automatically engaging and disengaging coupling comprising pins located opposite to each other and having heads with oblique surfaces adapted to slide along each other; and a spring located inside said casing and being so arranged as to be adapted to make the coupling pins engage one another, substantially as set forth.

4. A rolling-in tool for tubes, comprising, in combination, a casing, a cage located at one end of said casing, and rollers located in said cage; a cap-nut screwed upon the other end of the casing; a mandrel extending through the said casing and being adapted to co-operate at one end with said rollers, and being conical at this end, and having a screw-thread on its shank; the conical portion of the mandrel enlarging from the shank portion to its free end; an automatically engaging and disengaging coupling comprising pins extending forth inwardly from said cap-nut, and oppositely located pins, all pins having heads with oblique surfaces adapted to slide along each other; and a spring located inside said casing and being so arranged as to be adapted to make the coupling pins engage one another, substantially as set forth.

In testimony whereof I affix my signature.

CARL SLESAZECK.