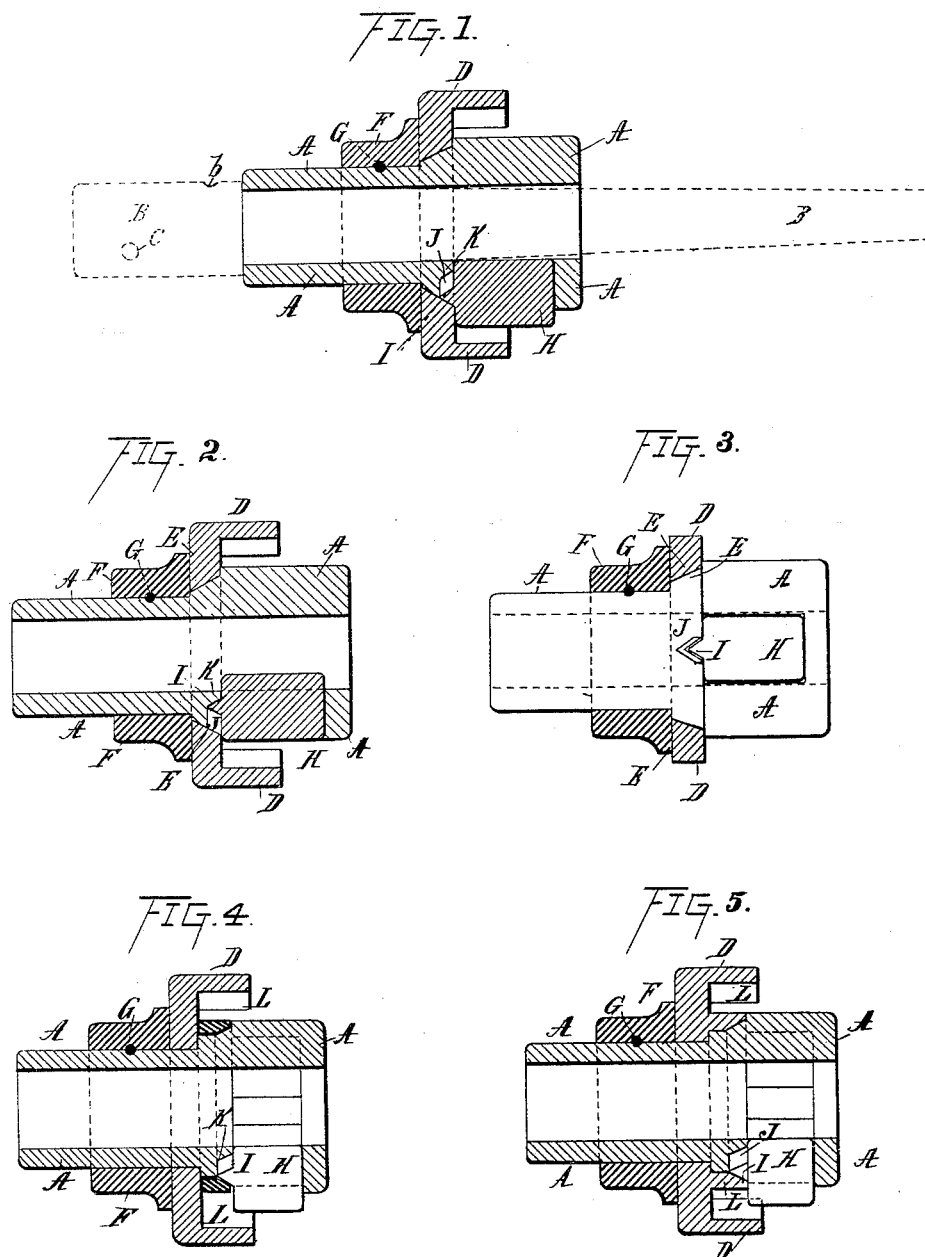


(No Model.)

R. H. DUDGEON & J. WEEKS.
TUBE EXPANDER.

No. 459,176.

Patented Sept. 8, 1891.



WITNESSES:
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UNITED STATES PATENT OFFICE.

RICHARD H. DUDGEON AND JOHN WEEKS, OF NEW YORK, N. Y.; SAID
WEEKS ASSIGNOR TO SAID DUDGEON.

TUBE-EXPANDER.

SPECIFICATION forming part of Letters Patent No. 459,176, dated September 8, 1891.

Application filed April 23, 1891. Serial No. 390,128. (No model.)

To all whom it may concern:

Be it known that we, RICHARD H. DUDGEON and JOHN WEEKS, both citizens of the United States, and residents of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Tube-Expanders, of which the following is a specification.

Our invention relates to improvements in tube-expanders; and it consists in improvements in the construction and arrangement of the parts whereby we secure much greater simplicity in manufacture, greater strength, and very greatly reduced cost.

Our invention, generally stated, consists in improvements in the body of the expander; also in the means whereby the rollers are confined to the body and prevented from dropping therefrom, and also to improvements in the construction of the guide-ring.

In the drawings hereof like letters indicate like parts in all of the figures.

Figure 1 illustrates a longitudinal section of the invention, showing one of the rollers projected to its utmost limit, the tapering mandrel being shown in dotted lines and partly broken away. Fig. 2 shows a like view, the tapering mandrel, however, being not shown. Fig. 3 shows a view partly in section and partly in plan, the body of the expander being shown in plan. Fig. 4 shows a modified construction of the invention, partly in longitudinal section and partly in elevation. Fig. 5 shows still another modification, partly in longitudinal section and partly in elevation.

A is the body of the expander. It may be made of cast or forged metal, as preferred.

B (see Fig. 1) is a tapering mandrel or expander. It is shown in dotted lines only and is broken off at its smaller end. C are the holes in its butt end, through which the twisting-rod passes, as usual in such cases.

D is the guide-ring. It is made of a single piece and is preferably shouldered upon the body part A upon a tapering shoulder E. This shoulder or resting-place may, however, be of such shape as preferred.

F is the confining-ring whereby the guide-ring D is held in position.

G is a pin set half-and-half in the confining-ring F and in the body part A, whereby the confining-ring is held firmly in place. Any other suitable means, however, for holding this ring in position may be employed.

H are the rollers. They are or may be made as usual. Heretofore, in order that these rollers H might not drop out of or be separable from the body of the expander, and thus become lost and the tool rendered useless, it has been customary to resort to a number of expedients to confine them in place—as, for instance, the rollers have been set in holes which in cross-section had somewhat the contour of a truncated ellipse, and the rollers have been set into them from the front or rear end of the body part, and then a cap or disk has been screwed onto the end of the body part, front or rear, as the case may be, to hold the rollers in place. This form is objectionable, because the cutting of the holes is an expensive and difficult matter; also, the driving of the mandrel and the rough use to which the tool is put loosens the screws in the front plate and they very soon become loose, and then the tool has to be sent back for repairs. Again, the rollers have been elongated and their rear part has been covered by a portion of the guide-ring which held them in position. This form is objectionable, because the increased length of the rollers renders them liable to crack, which they frequently do in heavy work. Again, a disk or washer has been screwed or otherwise fastened to the small end of the mandrel, so that the mandrel could not be withdrawn from the body of the expander. Thus the mandrel held the rollers from falling inwardly, and the recesses in which the rollers were placed were so formed that they could not pass through them outwardly, the form of the recess being substantially the same as one-half of that just described; but this, for various reasons, is undesirable. The washer or disk is very liable to become lost or misplaced; also, it is frequently desirable to separate the mandrel from the body part of the expander. Again, a projecting headed stud-like part has been formed upon one end of the rollers which passes through a retaining plate or disk set in the body of the ex-

pander and held there by bolts or screws. This form is objectionable, also, because of the expense attending the manufacture, the number of parts required, and the liability to get out of order. This class of tool should be made with as few parts as possible, as simply and strong in construction as possible, and without screws, bolts, or other holding or fastening devices, if possible. We think our present invention embodies these features to a greater extent and our device is the simplest, most durable, and effective of any now known.

We have heretofore described the general construction of our improved expander. We will now describe our improved method of holding the rollers permanently in position, irrespective of whether the expanding-mandrel is in position or not and without the employment of screws, bolts, or any other similar means.

Referring first to Figs. 1, 2, and 3, I is a centrally-disposed projection or point upon the rear end of each roller. This point enters a recess J, cut in the body of the expander, extending radially into it, but not through it, there being a shoulder or ledge K left next to the bore of the body part, against which the projection I rests and prevents the rollers from dropping through to the interior of the expander, and the guide-ring D when in position affords a similar stop or shoulder, as seen clearly in Figs. 1 and 2, against which the projection I abuts when moved to its most outward position. It will be seen that the projection I, while allowing free movement of the roller in and out, will prevent it by reason of the forward end of the roller abutting against the front end of the recess in which the roller works from dropping away from the expander either inwardly or outwardly. The formation of the recess J and projection I upon the roller is a very simple mechanical operation, and the slot or mortise in which the roller works is simply a square slotted hole made right through the body of the expander in substantially the same manner as a carriage-hub is mortised.

From the foregoing it will be seen that our expander-body is comprised of three parts only—to wit, a solid body part A, a solid guide-ring D, and a solid confining-ring F—and that the whole structure is rigidly held in position by a single pin G, which is a perfectly reliable and effective mechanical device.

In Figs. 4 and 5 we show slight modifications of our invention which we sometimes prefer, because by their use we reduce the length of the rollers. These two modifications are in effect one form only, being simply two ways of making the same thing—that

is to say, in order that the guide-ring D may have the requisite rearward position to allow of the necessary projection of the tube within it relative to the rollers, and yet the rollers be reduced in length, we provide a forwardly-projecting roller-confining ring L, which is held in place by the guide-ring D, the front edge of the ring L taking the place of the web of the ring D, as shown in Fig. 1. This of course reduces the length of the rollers, as seen clearly in Figs. 4 and 5. Fig. 5 is the same as Fig. 4, with the exception that the ring L is not separate from the guide-ring D, but, on the contrary, is made integral with it.

We do not limit ourselves to the details of construction shown and described, because they may be somewhat departed from and yet the essential features of our invention be employed.

We claim—

1. A tube-expander comprising five elements only: a body part, a guide-ring, a confining-ring, rollers, and means to hold the confining-ring, substantially as set forth.

2. A tube-expander in which the rollers are provided with a projection from one end and recesses in the body part of the expander, closed at their ends, in which the projection from the rollers are located, substantially as set forth.

3. A tube-expander comprising, essentially, rollers having a projection upon one end, a body part having recesses closed at one end by a portion of the body part and closed at the other end by the guide-ring, and means whereby the guide-ring is held in place, substantially as set forth.

4. A tube-expander comprising, essentially, a body part having recesses closed at one end by a portion of the body part and a stop or shoulder for the other end thereof, rollers having a projection at one end, a guide-ring, and means for holding the guide-ring in position, substantially as set forth.

5. A tube-expander the body part whereof has mortises extending from the outside to the inside, and recesses at one end of the mortises made in the body part and extending from the outside thereof toward but not through to the inside, substantially as set forth.

6. A roller for a tube-expander, having a projection at one end thereof integral with the body of the roller, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 21st day of April, A. D. 1891.

RICHARD H. DUDGEON.
JOHN WEEKS.

Witnesses:

PHILLIPS ABBOTT,
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