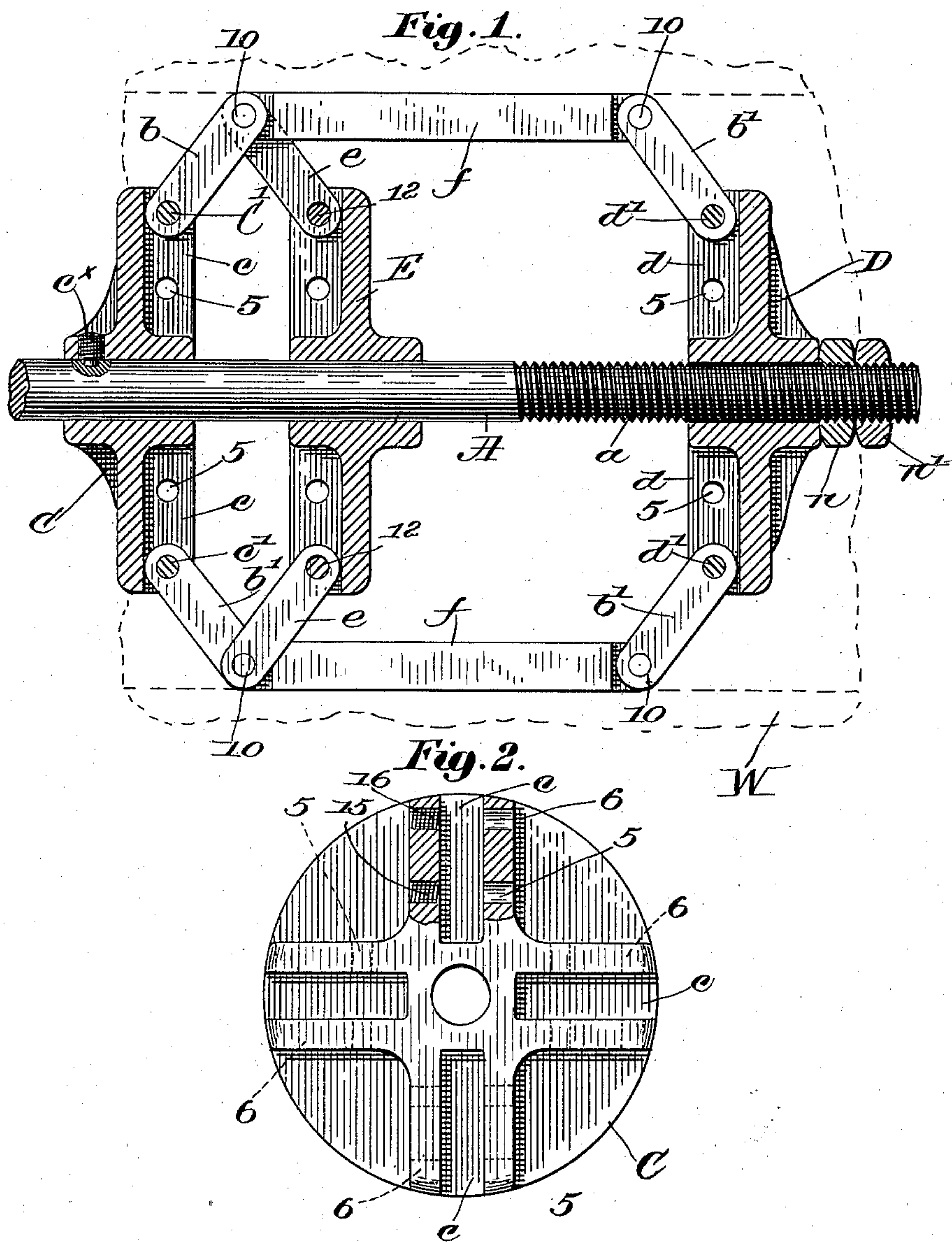


(No Model.)

H. W. ROSE.
EXPANSIBLE MANDREL.

No. 567,658.

Patented Sept. 15, 1896.



Witnesses:
Walter E. Lombard.
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UNITED STATES PATENT OFFICE.

HENRY W. ROSE, OF MANCHESTER, NEW HAMPSHIRE.

EXPANSIBLE MANDREL.

SPECIFICATION forming part of Letters Patent No. 567,658, dated September 15, 1896.

Application filed December 2, 1895. Serial No. 570,794. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. ROSE, of Manchester, county of Hillsborough, State of New Hampshire, have invented an Improvement in Expansible Mandrels, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to expansible mandrels, and has for its object the production of a strong and simple mandrel, capable of use in either conical or cylindrical holes or openings of various dimensions and readily applied to or removed from the work. The mandrel consists, primarily, of a supporting-spindle, work-engaging members carried thereby and movable laterally toward and from the same, and means to adjust said members, substantially as will be described.

Other features of my invention will be hereinafter described, and particularly pointed out in the claims.

Figure 1 is a partial longitudinal section of an expansible mandrel embodying my invention, the work to which it is applied being indicated by broken lines; and Fig. 2 is an inner face view of one of the collars, partly broken out.

The supporting-spindle A is threaded for a portion of its length at *a*, preferably its outer end, and two collars or heads C and D are mounted on the spindle, the collar C being rigidly secured to the spindle in suitable manner, as by a set-screw *c*^x, while the collar D is adapted to slide longitudinally upon the spindle. An adjusting-nut *n* and preferably a check-nut *n'* on the threaded portion *a* of the spindle outside of the collar D serve to slide the latter inward and to retain it in adjusted position on the spindle.

The inner faces of the collars are shown as provided with radial recesses *c* and *d*, respectively, formed in this instance by sets of parallel ribs, through which holes 5 and 6 are bored, the holes 5 being nearer the center. Each collar is provided with a like number of recesses similarly located, four being shown in Fig. 2, and by means of pins *c'* and *d'* links *b* and *b'* are pivotally connected at their inner ends to the two collars, respectively, four links to each collar. A series of work-en-

gaging members (shown as stout metal bars *f*, Fig. 1) are pivotally connected by the links *b* and *b'* to the two collars, studs 10 connecting the outer ends of the links and the bars *f*. As shown in Fig. 1, the pivot-pins *c'* and *d'* are extended through the holes 6 in the collars, so that the inner ends of the links are farthest from the spindle, giving the larger range for the mandrel. By putting the pins in the holes 5 the mandrel is adapted for a smaller range of work, one or other set of holes being used according to circumstances. It will be seen that if the mandrel is inserted in a piece of work, as W, (see broken lines, Fig. 1,) and the nut *n* be screwed up to force the collar D toward the collar C the links *b* and *b'* will act to force the work-engaging members *f* outward away from the supporting-spindle A and against the work, firmly clamping it to the mandrel. The check-nut *n'* serves to prevent any accidental loosening of the nut *n*.

The links and work-engaging members form a species of toggle-joint powerful in operation and simple in construction, and the range of work varies from the position of the work-holders *f* when the links are just out of alignment therewith to the point where they are almost at right angles to the spindle A. By the arrangement of the work-holders the mandrel is equally well adapted for conical holes, for the links will properly position themselves and the bars *f* when the mandrel is inserted in the work. Instead of a simple nut, as *n*, a hand-wheel having a threaded hub could be used, as will be obvious; and the collars might be slotted and provided with ears or cheeks to receive the removable pivot-pins *c'* *d'*, respectively. I prefer to make these pins threaded at one end to engage the threaded openings in one of the ribs of each pair, such construction of the holes 5 and 6 being shown in Fig. 2 at 15 and 16. Three equally-disposed work-engaging members might be used, or four or more, according to circumstances.

To prevent the ends of the work-engaging members nearest the collar C from collapsing toward the spindle A, as might sometimes happen, I place an intermediate slide-collar E on the spindle, similar in construction to the collars C or D, and connect it by links *e*

to the studs 10, joining the links *b* and the members *f*. The collar E is free to slide upon the spindle A, but by means of the links *e* cooperating with the links *b* the adjacent ends 5 of the work-engaging members *f* are kept in proper position. Pins 12 connect the links *e* and the collar E.

My invention is not restricted to the precise construction and arrangement shown 10 and described, and the same may be modified without departing from the spirit and scope of my invention.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An expansible mandrel, comprising a supporting-spindle, a fixed and a sliding collar thereon, a plurality of work-engaging members oppositely-inclined links connecting the 20 ends of the members to said collars, and means to move the sliding collar on the spindle, to change the angle between the links and thereby extend or retract the work-engaging members laterally, substantially as described.

25 2. In an expansible mandrel, a supporting-spindle having a threaded portion, a fixed and two sliding collars thereon, a series of work-engaging members, oppositely-inclined

links connecting one end of each of said members and the fixed and adjacent sliding collar, 30 links connecting the other ends of the members to the outer sliding collars, and a nut engaging the threaded portion of the spindle, to bear against and retain the endmost sliding collar in adjusted position, substantially 35 as described.

3. In an expansible mandrel, a supporting-spindle, a fixed and a sliding collar thereon, a series of work-engaging members movable toward and from said spindle, links connect- 40 ing said members and collars, means to change the pivotal points of attachment of the links on the collars, means to prevent collapse of the ends of the work-engaging members connected to the fixed collar, and an adjusting 45 device on the spindle, to hold the movable collar in adjusted position, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of 50 two subscribing witnesses.

HENRY W. ROSE.

Witnesses:

WALTER M. MORGAN,
WILLIAM I. SCULLY.