

C. T. HANSEN.
 COLLAPSIBLE MANDREL.
 APPLICATION FILED NOV. 15, 1910.

1,003,255.

Patented Sept. 12, 1911.

2 SHEETS—SHEET 1.

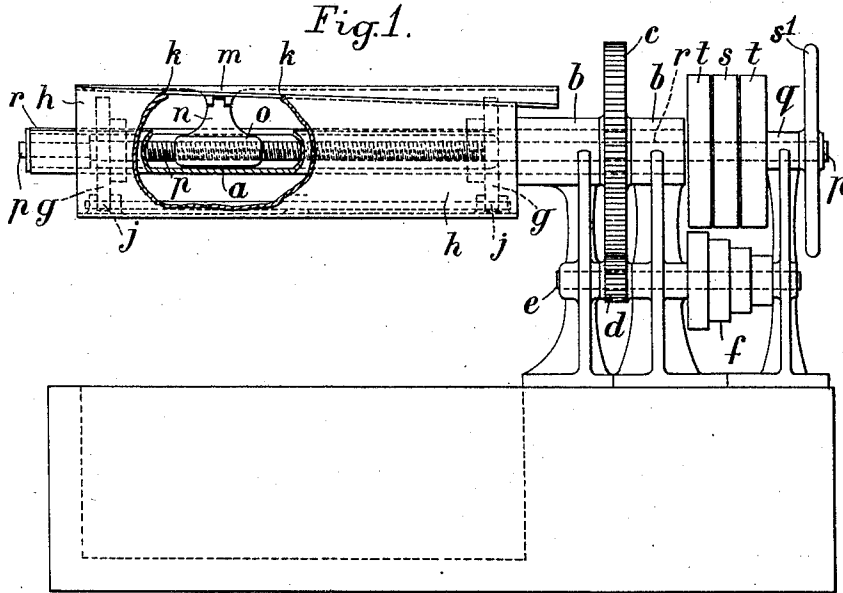


Fig. 2.

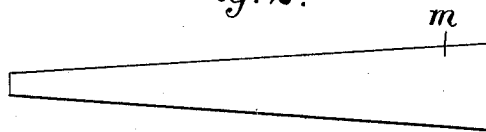


Fig. 3.

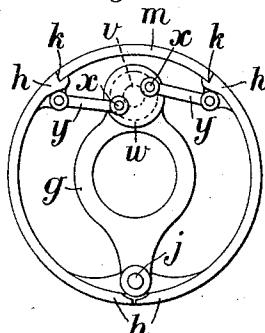
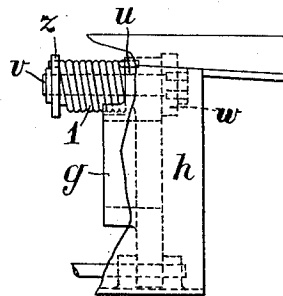


Fig. 4.



Witnesses:

[Signature]
[Signature]

Inventor
 Clarence T. Hansen

by *[Signature]*
[Signature]

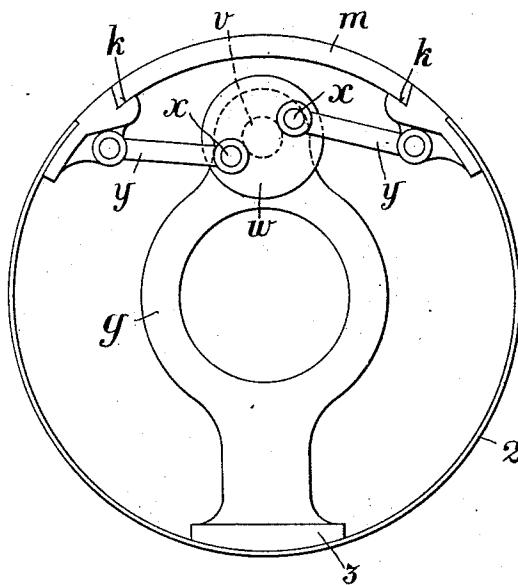
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2 SHEETS-SHEET 2.

Fig. 5.



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CLARENCE THORVALD HANSEN, OF LANCASTER, ENGLAND.

COLLAPSIBLE MANDREL.

1,003,255.

Specification of Letters Patent.

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Application filed November 15, 1910. Serial No. 592,531.

To all whom it may concern:

Be it known that I, CLARENCE THORVALD HANSEN, a citizen of the United States, residing at Lancaster, Lancashire, England, have invented new and useful Improvements in Collapsible Mandrels, of which the following is a specification.

This invention relates to collapsible mandrels of the kind wherein there is a tube or cylinder divided longitudinally into segments, which are held in their distended position by means of a keylike segment sliding between two free segment-edges.

According to the present invention, in order to enable the mandrel to be used of different diameters in its distended position, the longitudinal edges of the key-segment and the corresponding free segment-edges are made convergent or inclined toward one end, the said key-segment being connected to a nut movable along a screw-threaded spindle, which is rotatably mounted in the frame of the mandrel but is prevented from moving axially, so that by turning the said spindle relatively to the mandrel in one direction, the mandrel can be reduced in diameter and ultimately collapsed and by turning the said spindle in the opposite direction, the mandrel can be expanded to the required diameter, which may be adjusted within definite limits.

The free segment-edges are preferably drawn together or against the edges of the key-segment by means of links which are pivotally connected at their outer ends to the free segment-edges and at their inner ends to crank-pins on a rotatably mounted shaft that is acted upon by a spiral or other suitable spring in such a manner as to turn it in such a direction as to draw together the outer ends of the links and with them the free segment-edges.

In the accompanying drawings:—Figure 1 is a side elevation, with parts broken away, showing a constructional form of the improved mandrel, and Fig. 2 is a plan of the longitudinally-movable segment, shown separately. Fig. 3 is an end elevation, and Fig. 4 a side elevation, both drawn to an enlarged scale, showing details of construction of said mandrel, and Fig. 5 is a view similar to Fig. 3, showing a modification wherein a single mandrel segment is employed.

In said drawings, *a* is a hollow shaft which is here shown as rotatably supported

at one end in bearings *b, b*, said shaft being driven *e. g.* by means of a gear-wheel *c* fixed on said shaft between said bearings and gearing with a pinion *d* on a counter-shaft *e* provided with a stepped driving cone *f*.

The shaft *a* bears externally a suitable number of fixed brackets *g, g*, to which mandrel-segments *h, h* are pivoted at *j*. The free edges of these segments are inclined so as to converge toward the left-hand end of the mandrel and are formed with grooves *k, k* to receive the correspondingly inclined edges of a longitudinally-movable mandrel-segment *m* which is connected to a lug *n* on a nut *o*. This nut slides freely along the interior of the shaft *a*, which is provided with a suitable longitudinal slot to clear the lug *n*. The nut *o* moreover engages with a screw-threaded spindle *p* arranged concentrically within the shaft *a* and supported in a fixed bearing *q* lying beyond the bearings *b, b* and in bearings *r, r* mounted in the ends of the shaft *a*. Between the bearings *b, b*, the spindle *p* has fixed thereon a driving pulley *s*, on each side of which is arranged a loose pulley *t, t*, so as to enable the said spindle to be turned in either direction accordingly as it is required to distend or to collapse the mandrel. By providing an adjustable stop for the nut *o* at the left-hand end of the mandrel, the maximum diameter of said mandrel can be varied, for example, in accordance with the diameter of the cylinders or tubes to be made on said mandrel. *s'* is a hand-wheel fixed to the spindle *p* for enabling the latter to be turned by hand. The brackets *g, g* are also provided, on the opposite side of the shaft *a* to the pivots *j*, with bearings *u, u*, in which are rotatably mounted shafts *v, v* each provided at one end with a fixed disk *w* having two diametrically-opposite crank-pins *x, x* pivotally connected by links *y, y* to the free or grooved edges of the segments *h, h*. The shafts *v, v* are each provided at their outer ends with a fixed disk *z*, to which is fixed one end of a spring 1 whose other end is fixed to the bearing *u*, the springs 1, 1 being arranged to exert a torque on the shafts *v, v* in a counterclockwise direction (Fig. 3) and thus draw the grooved edges of the segments *h, h* tightly into engagement with the longitudinal edges of the segment *m*.

In the modification shown in Fig. 5, the hinged segments *h, h* are replaced by a single segment 2 made of suitable elastic sheet

metal secured along the middle to projections 3 on the brackets *g, g*.

What I claim is:—

1. A collapsible mandrel comprising a plurality of segments, one of said segments having its longitudinal edges convergent toward one end, means for moving this segment longitudinally, correspondingly-inclined segment-edges for engaging with the convergent edges of said longitudinally-movable segment, a frame, diametrically-opposite cranks rotatably mounted on said frame, links connecting said cranks to the segment-edges in engagement with the longitudinally-movable segment, and a spring acting to turn said cranks.

2. A collapsible mandrel comprising a longitudinally-slotted hollow shaft, a frame fixed to said hollow shaft, segments pivot-

ally mounted on said frame, diametrically-opposite cranks rotatably mounted on said frame, links connecting said cranks to the free edges of said segments, a spring acting to rotate said cranks, a segment having its longitudinal edges convergent toward one end and sliding on the free edges of said pivoted segments, which edges are correspondingly inclined, a screw-threaded spindle mounted in said hollow shaft so as to be capable of rotating but not of moving axially, a nut engaging said screw-threaded spindle and a lug extending through the slot in said shaft and connecting said nut to said segment with convergent edges.

CLARENCE THORVALD HANSEN.

Witnesses:

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GEORGE WEAVER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."