

C. T. HANSEN.
 COLLAPSIBLE MANDREL.
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1,000,261.

Patented Aug. 8, 1911.

Fig. 1.

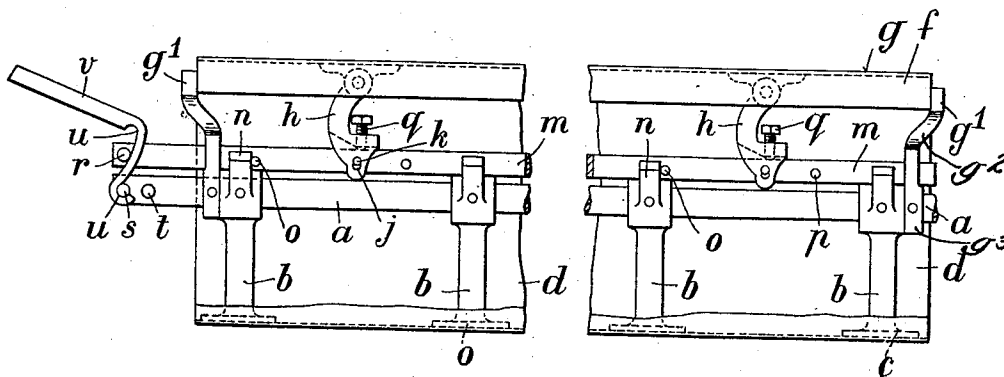


Fig. 2.

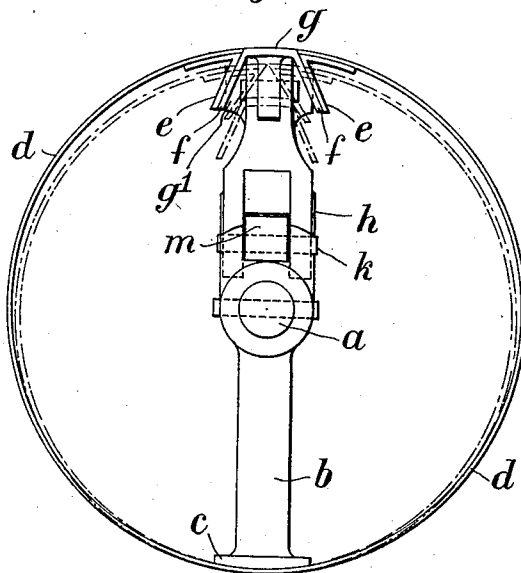
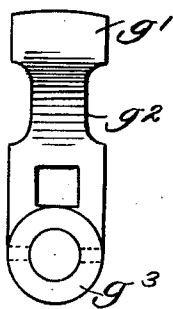


Fig. 3.



Witnesses:

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COLLAPSIBLE MANDREL.

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Specification of Letters Patent.

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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 an improved collapsible mandrel which may be used for example in the manufacture of cylinders, tubes and the like by winding thereon a web of fibrous material.

According to the present invention, the mandrel comprises an inwardly and outwardly movable segment, which is suitably guided to move perpendicularly to the axis of the mandrel and which is connected by means of links to a longitudinally movable member, so that, by moving said member in one or the other direction, the said segment can be advanced or retracted radially. The said segment is provided along each side with an outwardly inclined guide-piece, these guide-pieces respectively engaging with correspondingly-shaped guide-pieces on the inner sides of the free edges of another segment or of the outer members of a series of segments hinged or otherwise suitably connected together such free edges with their guide-pieces being drawn toward each other and toward the axis of the mandrel, either by the elasticity of the material (when such free edges are on a single segment) or by means of suitable springs. By this means, the radially movable segment in its outward motion will force apart the free edges of the other segment or segments and in its inward motion will allow the other segment or segments to collapse. The said links are made with lost motion in one of their pivots and are provided with set-screws which, when the radially movable segment is in its extended position, bear against either the longitudinally movable member or the said segment and thus enable the outer surface of the radially-movable segment to be adjusted accurately into register with the outer surface of the other segment or segments. A key consisting of a lever made with two seats which can be reversibly engaged with projecting pins on the longitudinally-movable member and on the frame of the mandrel, is provided for actuating said longitudinally-movable member to distend or collapse the mandrel.

In the accompanying drawings:—Figure 1 is a longitudinal section of the improved mandrel, and Fig. 2 an end elevation thereof with the end segment-guide removed. Fig. 3 is a detail view showing said segment-guide separately.

In the example shown, *a* is a shaft bearing fixed brackets *b b*, which, together with said shaft and guides *g'* to be hereinafter described, form the frame of the mandrel. To the enlarged outer ends *c, c* of the said brackets is secured the middle part of a mandrel-segment *d* formed of elastic sheet metal. To the longitudinal free edges of this segment *d* are secured internally flaring guide-pieces *e, e* which engage with correspondingly-inclined guide-pieces *f, f* on a segment *g* and which are urged toward each other and toward the shaft *a* by the resiliency of the metal of the segment *d*, so that, when the segment *g* is in its retracted position indicated in dotted lines in Fig. 2, the guide-pieces *e, e* are in contact with each other.

g' are guides for the ends of the segment *g*. These guides consist of the plates *g'* arranged perpendicularly to the spindle *a* and supported by means of arms *g²* on hubs *g³* pinned on said spindle. These plates *g'* do not extend beyond the outer surface of the segment *d* when the latter is retracted. The bent arms *g²* are made sufficiently narrow to clear the guide-pieces *f, f* when the segment *g* is in its retracted position.

The segment *g* has pivoted to its inner side a plurality of links *h* which are each connected by a slot *j* and pin *k* to a rod *m*, that is capable of sliding in guides *n* on the brackets *b, b* and is provided with stops *o, p* for limiting its motion in each direction. The links *h* are each provided with a set-screw *q*, which, when the links are substantially perpendicular to the shaft *a*, abut against the rod *m* and enable the outer surface of the segment *g* to be adjusted into register with the outer surface of the segment *d*. By bringing the links into this position, moreover, the segment *g* will be automatically locked in its distended position.

On the outer end of the rod *m* is mounted a laterally projecting pin *r* and on the outer end of the shaft *a* two laterally projecting pins *s, t*. These pins are adapted to engage seats *u, u* on a key or lever *v* to move the

rod *m* in either direction as required. In the position shown in Fig. 1, the lever *v* is at the end of its travel in distending the mandrel. In order to collapse the mandrel, the lever is introduced from the underside between the pins *s*, *t*, so as to engage with the pins *r* and *z* whereupon the rod *m* can be moved to the right until the stop *p* abuts against the guides *n* on the bracket *b*. During this motion, the links *h*, *h* are moved to the right (see Fig. 1) at their lower ends and, since the segment *g* rests against the guide *g'* at its right-hand end, it is prevented from moving with the rod *m* and is drawn inward, this motion being assisted by the resilient segment *d*, which acts thereon through the inclined surfaces of the guide-pieces *e*, *f*.

To expand the mandrel, the rod *m* is moved to the left (Fig. 1); the segment *g* then bears against the left-hand guide *g'* and is forced outward by the links *h*, *h* as the latter approach the radial position, in which the set-screws *q*, *q* bear against the surface of the rod *m* and prevent further motion of the latter toward the left-hand side. During such outward movement of the segment *g*, the edges of the segment *d* are forced apart by the inclined surfaces *f*, *f* until the outer surface of the segment *g* registers with the outer surface of the segment *d*, which is arranged to take place when the set-screws *q*, *q* abut against the rod *m*.

What I claim is:—

1. A collapsible mandrel comprising a frame, a plurality of segments, guides permitting radial movement of one of said segments, a rod movable in said frame longitudinally of the mandrel, links connecting said radially-movable segment and said rod with a small amount of lost motion, set-screws on said links for adjusting the outermost position of said radially-movable segment, laterally-flaring guide-pieces on said radially movable segment, correspondingly inclined guide-pieces on the segment-edges engaging with said flaring guide-pieces and

means for drawing together said segment-edges.

2. A collapsible mandrel comprising a frame, a segment of elastic material secured to said frame and internally-flaring guide-pieces on the longitudinal edges of said segment, a narrow segment having laterally-inclined guide-pieces for sliding on the guide-pieces on the other segment, guides for permitting radial movement of said narrow segment, a rod longitudinally movable in said frame and links connecting said rod and said narrow segment.

3. A collapsible mandrel comprising a frame, a segment of elastic material, internally flaring guide-pieces on the longitudinal edges of said segment, a narrow segment having laterally-inclined guide-pieces for sliding on the guide-pieces on the other segment, guides for permitting radial movement of said narrow segment, a rod longitudinally movable in said frame, links connecting said rod and said narrow segment with a small amount of lost motion, set-screws on said links for adjusting the outermost position of said radially-movable segment, and means for moving said rod.

4. A collapsible mandrel comprising a frame, a segment of elastic material, internally flaring guide-pieces on the longitudinal edges of said segment, a narrow segment having laterally-inclined guide-pieces for sliding on the guide-pieces on the other segment, guides for permitting radial movement of said narrow segment, a rod longitudinally movable in said frame, links connecting said rod and said narrow segment with a small amount of lost motion, set-screws on said links for adjusting the outermost position of said radially-movable segment, transverse pins on said frame and on said longitudinally-movable rod, and a lever for engaging said pins.

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Witnesses:

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