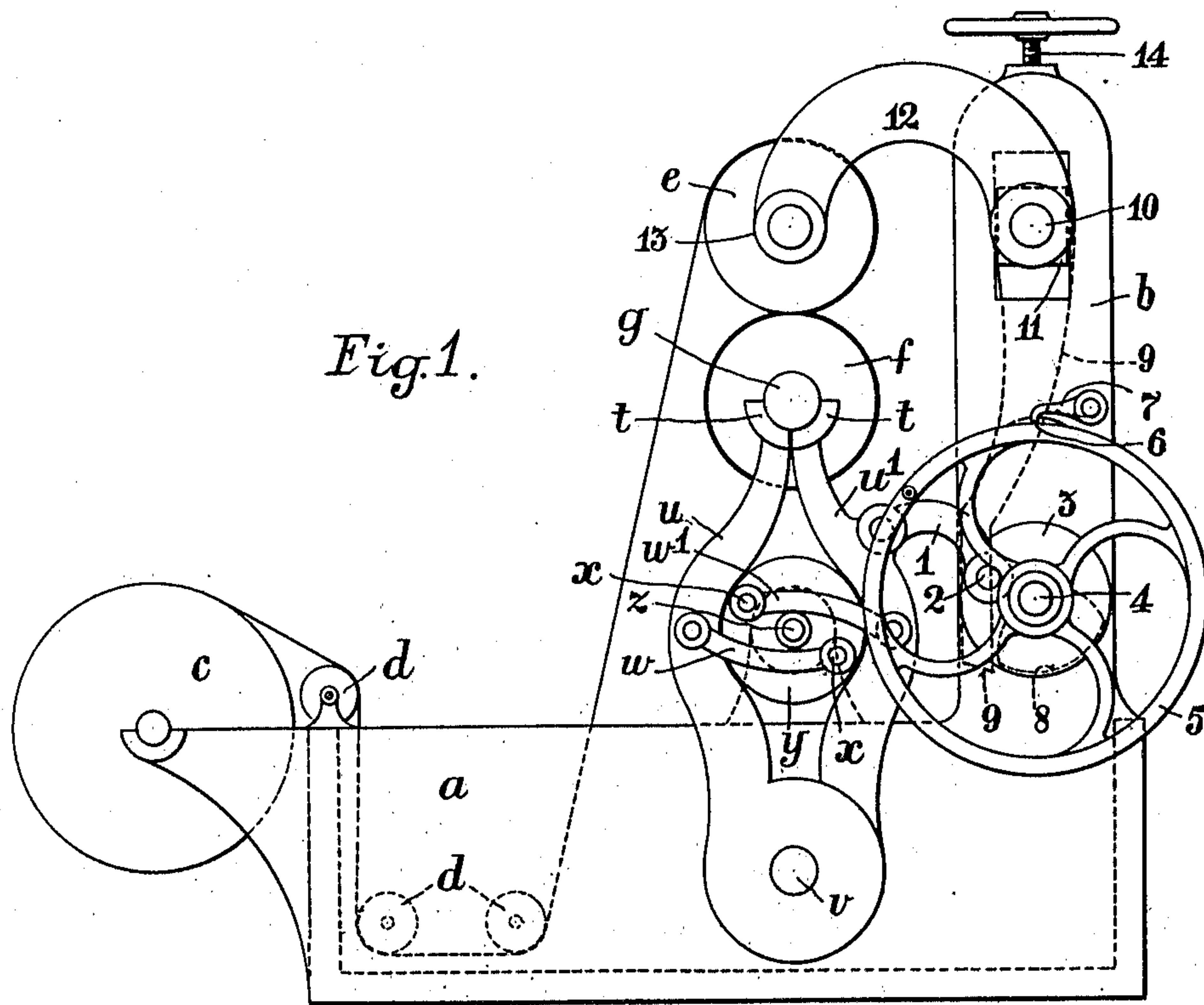


C. T. HANSEN.  
MACHINE FOR MAKING TUBES FROM FIBROUS MATERIALS.  
APPLICATION FILED NOV. 15, 1910.

990,043.

Patented Apr. 18, 1911.

2 SHEETS—SHEET 1.



Witnesses

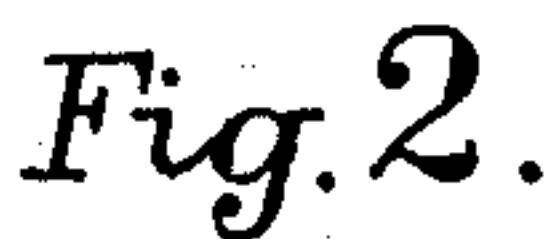
*Wm. Keifer*  
*Chas. Keifer*

Inventor  
Clarence T. Hansen

by *James L. Norris & Co.*  
*attys*

**990,043.**

**2 SHEETS--SHEET 2.**



Carl Keeler

24  
James L. Norris, Jr.

every



# UNITED STATES PATENT OFFICE

CLARENCE THORVALD HANSEN, OF LANCASTER, ENGLAND.

MACHINE FOR MAKING TUBES FROM FIBROUS MATERIALS.

990,043.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed November 15, 1910. Serial No. 592,533.

*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 Machines for Making Tubes from Fibrous Materials, of which the following is a specification.

This invention relates to machines for making cylinders, tubes and like articles, such as roving cans, by winding a web of fibrous material on a preferably collapsible mandrel and simultaneously compressing and consolidating the several layers of material on said mandrel by means of a calender roll.

According to the present invention, in order to facilitate the removal of the cylinder or tube from the mandrel after the winding operation is complete, means are provided for moving aside the bearing at one end of the mandrel and at the same time lifting the calender roll from the mandrel, which is supported, driven and operated from the other end. For this purpose, the said movable bearing consists of a bearing-box divided into two along a vertical plane extending through the axis of the journal or trunnion, each half of said box being supported on a substantially vertical arm or lever. These arms or levers are pivotally supported at their lower ends and are connected together by gearing such that when one lever is moved laterally away from the journal or trunnion, the other also moves laterally away from said journal or trunnion in the opposite direction. To open and close the bearing-box, one of the said arms or levers is connected by suitable gearing, such as a link and a crank, to a shaft provided with a crank-handle or hand-wheel, so that by turning said crank or wheel the halves of the bearing-box can be moved toward or away from each other. The said wheel is also provided with a notch or recess, in which a dog or pawl is adapted to engage when the bearing-box is closed. Any other suitable locking device can however be employed for this purpose.

In order to effect the lifting of the calender-roll from the mandrel simultaneously

with the opening of the bearing-box, the crank-shaft above mentioned has fixed thereto a cam which acts on a lever-arm on a shaft to which are fixed two other lever-arms carrying the bearings of said calender-roll. By suitably setting this cam, the lever arms can be oscillated to raise the calender-roll and maintain it in its raised position at any required time relatively to the opening of the bearing-box. By these means, the cylinder or tube, after the winding on is completed, can be very readily removed by drawing it off the end of the mandrel between the separated halves of the bearing-box.

In the accompanying drawings:—Figure 1 is a side elevation of the improved cylinder- or tube-making machine, and Fig. 2 a front elevation thereof.

*a* is a tank forming the base of the machine and having standards *b, b*; *c* is a rolled up band or web of paper, which is guided by means of rollers *d, d* so as to pass through the liquid in the tank *a*, whence it passes over the calender-roll *e* on to the mandrel *f*, being meanwhile pressed between said mandrel and the calender-roll as shown.

The mandrel-shaft *g* is supported at one end in bearings *h, h* and is here shown as driven through spur-gearing *j, k* from a countershaft *m* provided with a stepped driving pulley *n*. The mandrel *f* is preferably collapsible and adapted to be distended and contracted for example as in application Serial No. 592,531 by means of a screw-threaded spindle *o* which can be rotated in either direction by means of a pulley *p* having a loose pulley *q, q* on each side for an open and a crossed driving belt. The other end of the mandrel-shaft *g* is supported, during the winding-on of the paper band *c*, by means of a bearing-box divided along a vertical plane into two parts *t, t* respectively mounted on the upper ends of arms or levers *u, u'*, which are pivoted at *v* to the outside of the tank *a*. Each of these arms *u, u'* is connected by a link *w* to one of two diametrically-opposite crank-pins *x, x* on a disk *y* which is pivotally mounted at *z* on the base *a*. The arm *u'* is moreover connected by a link 1 to the pin 2



of a crank-disk 3 mounted on a shaft 4, which is rotatably mounted in suitable bearings in the standards *b, b*. The shaft 4 also has fixed thereon a hand-wheel 5 provided with a notch or recess 6 in which engages a pivoted dog or pawl 7, whereby the arms *u, u'* together with the bearing-box sections *t, t* can be retained in the positions shown in Fig. 1. The shaft 4 also bears cams 8, 8 which, when the said shaft is turned to separate the bearing-box-sections *t, t*, act on the lower end of arms 9, 9 fixed to a shaft 10 rotatably mounted in vertically-adjustable bearings 11 in the standards *b, b*. This shaft 10 has fixed thereto arms 12, 12, on which are mounted the bearings 13, 13 of the calender-roll *e*. The bearings 11, 11 are supported on screw-threaded adjusting shafts 14, 14 whereby the height to which the calender roll is raised by the cams 8, 8 can be varied within limits.

The operation of the improved mechanism is as follows:—If it be desired to remove a cylinder or tube from the mandrel *f*, the mandrel is collapsed *e. g.* by means of the spindle *o*, and the dog 7 removed from the notch 6 in the wheel 5 which is then turned clockwise (Fig. 1) so as to draw outward the arm *u'* by means of the link 1. This motion of the arm *u'* by means of the link *w'* causes the crank-disk *z* to rotate and to force outward the arm *u* by means of the link *w*. This motion is continued until the bearing-box-sections *t, t* are sufficiently far apart to permit the drawing off of the cylinder or tube from the end of the mandrel *f*. During this motion, moreover, the calender-roll *e* is raised by the action of the cams 8, 8 on the levers 9, 9, so as to release the said cylinder or tube on the mandrel *f*. Other suitable gearing may be employed for enabling the arm *u* to be moved outward by the movement of the arm *u'* in the opposite direction, for example, the said arms can be mounted on separate pivot-shafts and be connected by segmental gear-wheels.

What I claim is:—

1. A machine for the purposes specified, comprising a frame, a mandrel, a journal at each end of said mandrel, a fixed bearing supporting said mandrel at one end, a bearing divided into laterally-movable sections for supporting the mandrel at the other end, means for moving said bearing-sections toward and away from the corresponding mandrel-journal, a calender-roll adapted to rest on said mandrel, bearings for said calender-roll, a movable support for said calender-roll-bearings, means for moving said support so as to raise said calender-roll from said mandrel, and interconnected means for actuating the mechanism for raising and lowering the calender-roll and for moving the sections of the divided mandrel-bearing respectively.

2. A machine for the purposes specified, comprising a frame, a mandrel, a journal at each end of said mandrel, a fixed bearing supporting said mandrel at one end, a bearing divided into laterally-movable sections for supporting the mandrel at the other end, pivotally-supported arms carrying said bearing-sections, motion-reversing gear connecting said arms, a crank-shaft, a link pivotally connecting said crank to one of said arms, a calender-roll adapted to rest on said mandrel, bearings for said calender-roll, a pivotal support for said calender-roll-bearings, and a cam on said crank-shaft engaging said pivotal support.

3. A machine for the purposes specified, comprising a frame, a mandrel, a journal at each end of said mandrel, a fixed bearing supporting said mandrel at one end, a bearing divided into laterally movable sections for supporting the mandrel at the other end, pivotally supported arms carrying said bearing-sections, motion-reversing gear connecting said arms, a crank-shaft, a link pivotally connecting said crank to one of said arms, a calender-roll adapted to rest on said mandrel, bearings for said calender-roll, a pivotal support for said calender-roll-bearings, a cam on said crank-shaft engaging said pivotal support, and a detent for enabling said crank-shaft to be held fast against rotation.

4. A machine for the purposes specified, comprising a frame, a mandrel, a journal at each end of said mandrel, a fixed bearing supporting said mandrel at one end, a bearing divided into laterally-movable sections for supporting the mandrel at the other end, pivotally mounted arms carrying said bearing-sections, a rotatably-mounted crank-shaft having two diametrically-opposite cranks, links pivotally connecting said cranks to said arms respectively, a calender-roll adapted to rest on said mandrel, bearings for said calender-roll, a movable support for said calender-roll-bearings, means for moving said support so as to raise said calender-roll from said mandrel, and interconnected means for actuating the mechanism for raising and lowering the calender-roll and for moving the sections of the divided mandrel-bearing respectively.

5. A machine for the purposes specified, comprising a frame, a mandrel, a journal at each end of said mandrel, a fixed bearing supporting said mandrel at one end, a bearing divided into laterally-movable sections for supporting the mandrel at the other end, a shaft rotatably mounted with its axis extending between said bearing-sections, oppositely-arranged cranks on said shaft, a link connecting each crank with one of said bearing-sections respectively, a second crank-shaft, and a link connecting one of said bearing-sections and said second crank-shaft.



6. A machine for the purposes specified, comprising a frame, a mandrel, a journal at each end of said mandrel, a fixed bearing supporting said mandrel at one end, a bearing divided into laterally-movable sections for supporting the mandrel at the other end, supports for said bearing-sections, motion-reversing gear connecting said supports, and actuating means engaging one of said supports.

CLARENCE THORVALD HANSEN.

Witnesses:

MALCOLM SMETHURST,  
GEORGE WEAVER.

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

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