Jan. 22, 1952 R. P. PIPEROUX ET AL 2,583,117

MANDREL

Filed June 8, 1950

FIG. 1.

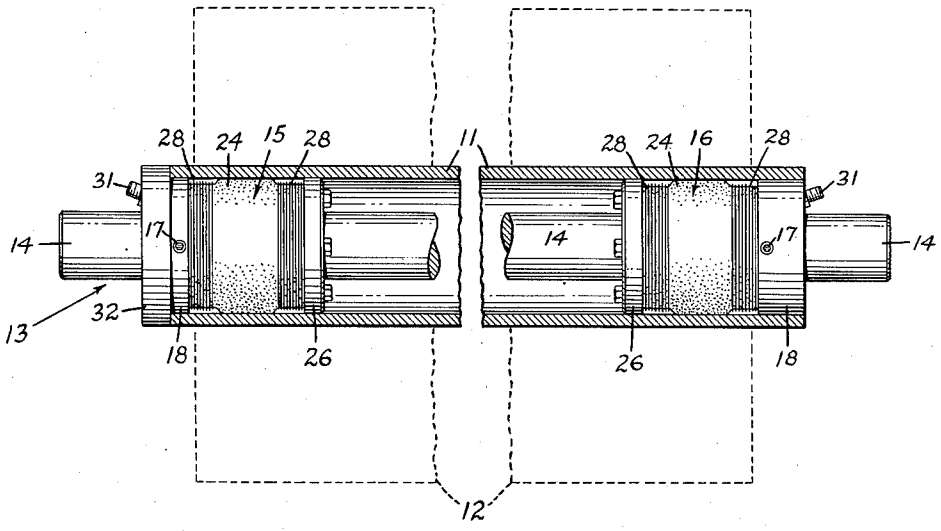
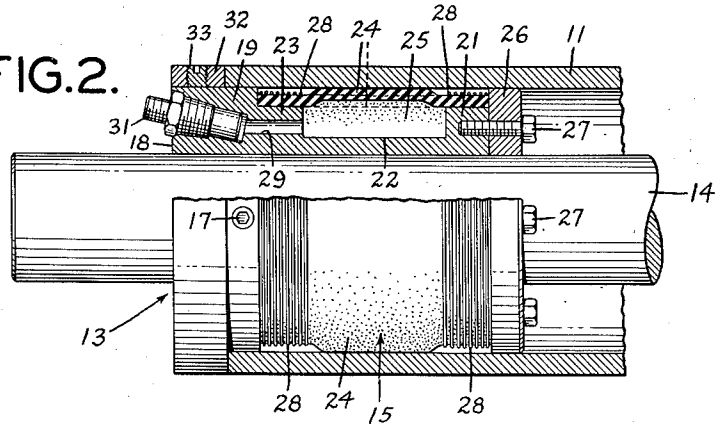


FIG. 2.



INVENTORS.
RENE P. PIPEROUX
JOHN N. BIRMINGHAM
BY
ATTORNEYS.

Patented Jan. 22, 1952

2,583,117

UNITED STATES PATENT OFFICE

2,583,117

MANDREL

Rene P. Piperoux, Radburn, and John N. Birmingham, Nutley, N. J., assignors to Celanese Corporation of America, New York, N. Y., a corporation of Delaware

Application June 8, 1950, Serial No. 166,953

5 Claims. (Cl. 242—72)

1

This invention relates to mandrels and relates more particularly to a mandrel adapted to engage and support a tubular member such as a web-supporting core.

When materials such as film, foil, paper, fabric and the like are produced and processed in the form of a web, it is common to wind said materials onto a tubular core to assist in handling, storing and shipping the same. During the winding operation, the tubular core is mounted on a mandrel which acts both to support the tubular core in the winding apparatus and to transmit thereto the driving force necessary to rotate the same. To obtain satisfactory results, the mandrel must engage the tubular core firmly so that there will be no slippage between the two during the winding operation. In addition, the mandrel must be constructed so that the tubular core may be mounted thereon and removed therefrom quickly and without difficulty, and so that the tubular core will be concentric with the axis of rotation of the mandrel. The means employed to engage the tubular core should not damage either the inside or outside surface of said core and should align the tubular core properly with respect to the web of material being wound thereon.

It is an important object of this invention to provide a mandrel which will satisfy the foregoing requirements and which will be especially simple in construction and efficient in use. A further object of this invention is the provision of a novel mandrel adapted to engage and support a tubular core and to transmit thereto the driving force necessary to rotate the same.

Other objects of this invention, together with certain details of construction and combinations of parts, will be apparent from the following detailed description and claims.

According to the present invention, the mandrel is formed by mounting one or more fittings on a shaft. The fittings employed comprise a tubular part having a groove extending circumferentially thereof and a sleeve of fluid-impermeable, elastic material carried by said tubular part in such a manner that the sleeve forms with the groove a passageway sealed from the atmosphere. The fittings are provided with means for introducing fluid under pressure into the passageway whereby, after a tubular core is positioned on the mandrel, the elastic sleeve may be expanded to come into contact with the interior of the tubular core, holding the latter firmly on the mandrel. To remove the tubular core from the mandrel, the fluid is caused to be exhausted from the passageway, permitting the elastic sleeve to contract and resume its static position out of contact with the interior of the tubular core. The tubular core may then be readily slipped off the mandrel.

2

A preferred embodiment of this invention is shown in the accompanying drawing wherein:

Fig. 1 is a side-elevational view, partly in section, of a mandrel having a tubular core mounted thereon, and

Fig. 2 is a detail view, on an enlarged scale, and partly in section, of a portion of the mandrel shown in Fig. 1.

Referring now to the drawing, the reference numeral 11 designates a tubular core, for supporting a winding 12, mounted on a mandrel, indicated generally by reference numeral 13. The mandrel 13 comprises a shaft 14 that extends axially of the tubular core 11 and projects beyond the ends thereof, permitting the mandrel to be mounted for rotation during the winding operation. Mounted on the shaft 14 are fittings, indicated generally by reference numerals 15 and 16, that engage and support the tubular core 11.

The fittings 15 and 16 are substantially similar in construction and are secured in spaced relation to each other on the shaft 14 by means of a set-screw 17. Each of the fittings comprises a tubular part 18 provided between its ends 19 and 21 with a groove 22. The end 19 is of larger diameter than the end 21, but is cut away at 23 to form a circumferential seat of the same diameter as the end 21. A sleeve 24 of fluid-impermeable, elastic material, such as rubber is fitted onto the seat 23 and the end 21 and bridges the groove 22 to form a passageway 25 sealed from the atmosphere. An annular disc 26, having a diameter equal to that of the end 19 and slightly less than that of the tubular core 11 is fastened by means of bolts 27 to the end 21 of tubular part 18. The sleeve 24 is cemented to the end 21 and the seat 23, whose outer surfaces are roughened to improve the efficacy of the cemented bond, and the sleeve 24 is held securely in place by means of a wrapping 28 of fine wire. Communicating with the passageway 25 is a conduit 29 that extends through the end 19 and the seat 23 and is provided at its outer end with a valve 31, which may be of the type employed in pneumatic tires. The fitting 15 is also provided with a ring 32 fastened to the end 19 with a set screw 33.

In use, a tubular core 11 is slide over the fittings 15 and 16, the ring 32 acting as a stop to position said tubular core properly on the man-

drel 13. A fluid under pressure is then admitted into the passageway 25 of each of the fittings 15 and 16 through the valves 31 and the conduits 29, which fluid causes the sleeve 24 to expand into contact with the interior of the tubular core 11, engaging the same firmly as shown in Fig. 2 of the accompanying drawing. To release the tubular core 11, the fluid under pressure is exhausted from the passageway 25 of each of the fittings 15 and 16 through the conduits 29 and the valves 31, permitting the sleeves 24 to contract to the position shown in dotted lines in Fig. 2 of the accompanying drawing, i. e. out of contact with said tubular core 11, which may then be removed readily from the mandrel 13.

Instead of providing each of the fittings 15 and 16 with a valve 31, the passageways 25 in said fittings may be operatively connected by suitable tubing, so that fluid under pressure may be admitted to both of said passageways simultaneously through a single valve. While the mandrel 13 shown in the accompanying drawing has two fittings 15 and 16 for engaging the tubular core 11, any desired number of fittings may be employed for this purpose.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of our invention.

Having described our invention, what we desire to secure by Letters Patent is:

1. In a mandrel adapted to engage and support a tubular member, a shaft, a fitting mounted on said shaft, a groove extending circumferentially of said fitting, surfaces positioned on each side of said groove and extending circumferentially of said fitting, a sleeve of elastic material fastened to said surfaces and extending across said groove, and a conduit for introducing a fluid under pressure into said groove whereby the sleeve may be expanded into contact with the tubular member.

2. In a mandrel adapted to engage and support a tubular member, a shaft, a pair of fittings mounted on said shaft, each of said fittings having a groove extending circumferentially thereof, elastic members positioned over each of said grooves, means for introducing a fluid under pressure into said grooves whereby the elastic members may be expanded into contact with the tubular member, and stop means fastened to the outer end of one of said fittings to position said tubular member properly on said mandrel.

3. In a mandrel adapted to engage and support a tubular member, a shaft, a pair of fittings mounted on said shaft, each of said fittings having a groove extending circumferentially thereof, surfaces positioned on each side of said groove and extending circumferentially of said fitting, a sleeve of elastic material fastened to said surfaces and extending across said groove, conduits

for introducing a fluid under pressure into said grooves whereby the sleeves may be expanded into contact with the tubular member, and stop means fastened to the outer end of one of said fittings to position said tubular member properly on said mandrel.

4. In a mandrel adapted to engage and support a tubular member, a shaft, and a fitting mounted on said shaft and comprising a tubular part having one end thereof of larger diameter than the other and having an annular disc fastened to the other end thereof, said larger end and said disc having a diameter slightly less than the inner diameter of the tubular member whereby the tubular member may be slid readily onto said mandrel, and said larger end having a seat whose diameter equals that of the smaller end, a groove extending circumferentially of the tubular part between said seat and said smaller end, a sleeve of fluid-impermeable elastic material fastened to said seat and said smaller end and extending across said groove, and a conduit extending through said tubular part for introducing a fluid under pressure into said groove whereby the sleeve may be expanded into contact with the tubular member.

5. In a mandrel adapted to engage and support a tubular member, a shaft, and a pair of fittings mounted on said shaft, each of said fittings comprising a tubular part having one end thereof of larger diameter than the other and having an annular disc fastened to the other end thereof, said larger end and said disc having a diameter slightly less than the inner diameter of the tubular member whereby the tubular member may be slid readily onto said mandrel, and said larger end having a seat whose diameter equals that of the smaller end, a groove extending circumferentially of the tubular part between said seat and said smaller end, a sleeve of fluid-impermeable elastic material fastened to said seat and said smaller end and extending across said groove, a conduit extending through said larger end for introducing a fluid under pressure into said groove whereby the sleeve may be expanded into contact with the tubular member, and a ring fastened to the larger end of one of said fittings to position the tubular member properly on the mandrel.

RENE P. PIPEROUX.
JOHN N. BIRMINGHAM.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,289,453	Randall	July 14, 1942
2,289,519	Randall	July 14, 1942
2,331,743	Sullivan	Oct. 12, 1943
2,481,000	Brunner	Sept. 6, 1949