June 28, 1949. E. G. HILL 2,474,672

MANDREL

Filed June 4, 1947

Fig. 1

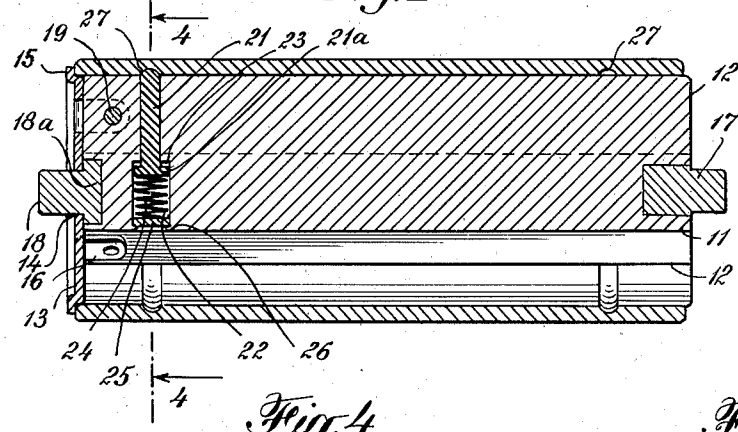


Fig. 2.

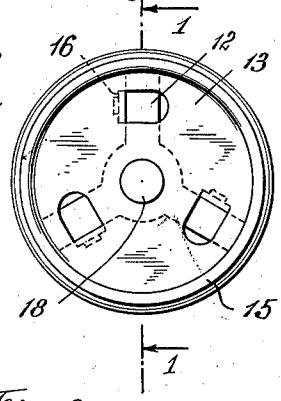


Fig. 4.

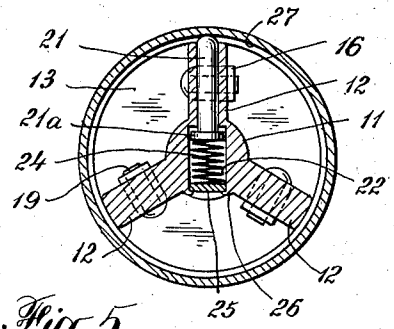


Fig. 3.

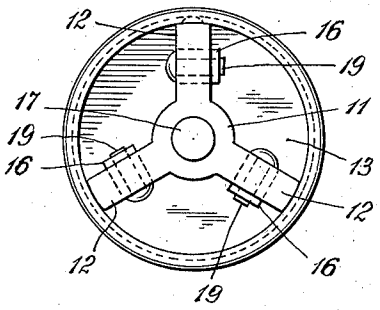


Fig. 5.

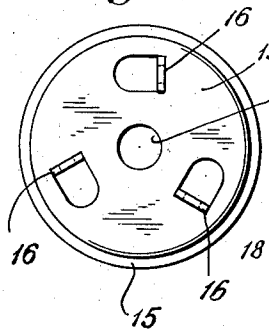
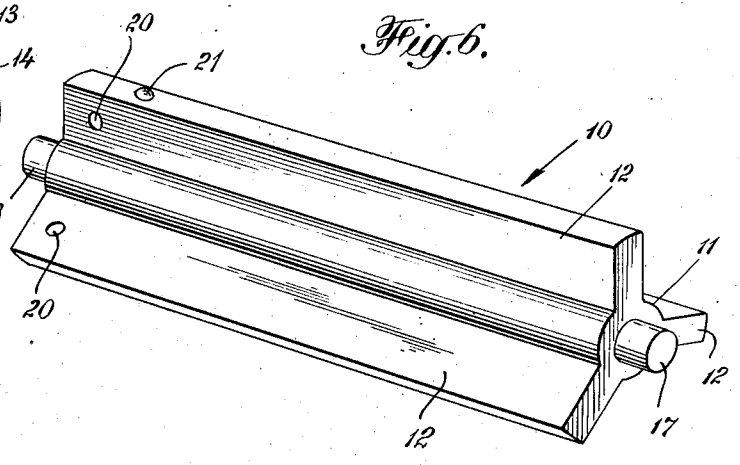


Fig. 6.



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MANDREL

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4 Claims. (Cl. 242—130)

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This invention relates to mandrels, such as are used for supporting a tubular core, while yarn is wound thereon to form a yarn package. More particularly, the invention is concerned with a novel mandrel for the purpose mentioned, which is of simple construction, light in weight, and highly durable. The new mandrel is made entirely of metal, so that it is not affected by atmospheric conditions, and it is so constructed that it is not likely to be injured or distorted during handling. Its dimensions, accordingly, remain constant throughout its use and a tube can be readily mounted on it or removed therefrom without sticking. It includes simple means for holding the tube in proper position longitudinally and such means operate automatically to anchor the tube, as the latter is telescoped over the mandrel, and may be made to release the tube with little effort. The mandrel provides excellent support for the tube, while the latter is rotated during the winding operation and it is not substantially longer than the tube, so that its use does not require additional space in the winding machine.

For a better understanding of the invention, reference may be made to the accompanying drawing, in which

Fig. 1 is a longitudinal sectional view on the line 1—1 of Fig. 2 of one form of the new mandrel with a tube mounted thereon;

Fig. 2 is an end view looking from the left in Fig. 1;

Fig. 3 is an end view looking from the right in Fig. 1;

Fig. 4 is a sectional view on the line 4—4 of Fig. 1;

Fig. 5 is an end view of the cap; and

Fig. 6 is a view in perspective of the main body of the mandrel.

The mandrel in the form shown in the drawings comprises a bar 10 of generally Y-section, the bar preferably including a cylindrical central section 11, from which radiate three blades 12, which are of equal length and equi-angularly spaced. The bar is preferably made of a light metal, such as aluminum or magnesium, and it may be produced in indefinite length by an extrusion operation and then cut into sections appropriate for use for individual mandrels, or a bar of the length suitable for a single mandrel may be made by molding. The blades of the bar are relatively thick,

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so that the bar is strong and will not be distorted or damaged during handling as, for example, if it is dropped.

The bar is provided at one end with a round cap 13, which is preferably formed of sheet metal, for example, aluminum or magnesium, and may be produced by a stamping operation. The cap has a diameter slightly greater than that of the cylinder described by rotation of the bar 10 on its axis and, during the formation of the cap, it is provided with a central opening 14 and an offset peripheral flange 15. Also, as an incident to the production of the cap, three equiangular spaced tongues 16 are stuck from the cap to extend at right angles to the plane thereof.

The mandrel is provided with steel gudgeons 17, 18, which are mounted in the ends of the bar 10, to extend coaxially therewith. The gudgeon 17 is forcibly inserted into an opening drilled in one end of the cylindrical section 11 of the bar and is held in place frictionally. The other gudgeon 18 has an enlarged end 18a, which is inserted in an opening in the other end of the cylindrical section 11 of the bar. The main body of gudgeon 18 is of slightly less size than the opening 14 through the cap, and in order to hold the gudgeon in place, its enlarged end is forced into the opening therefor in the end of the bar, and thereafter, the cap 13 is placed against the end of the bar with the tongues 16 bearing against the faces of the respective blades 12. The tongues are then secured to the blades by rivets 19, each of which is passed through an opening 20 formed in the blade and through an opening in the tongue and then headed over. The edge of the cap around the opening 14 lies against the outer face of the enlarged end 18a of the gudgeon, so that the gudgeon is held in place partly by friction and partly by means of the cap.

The mandrel is provided with means for anchoring the tube in position longitudinally thereon and such means take the form of a spring-pressed detent. The detent illustrated is a plunger 21, which is of enlarged diameter at one end. The plunger is mounted in a passage 22, which extends through the cylindrical section 11 of the bar and through one of the blades to the outer edge thereof. The passage has sections of different diameter and, as the plunger is moved outwardly through the passage, its enlarged end

21*a* seats against a circumferential shoulder 23 in the passage. When the plunger is in this position, its outer end projects beyond the outer face of the blade in which it is mounted. The plunger is normally held in outermost position by means of a spring 24, which lies within the passage and bears at one end against the plunger and at the other against a disc 25, which is inserted in the enlarged end of the passage and is held in place by metal around the edge of the opening, which has been peened over the disc, as indicated at 26.

The tubes, with which the mandrel is to be used, are preferably made of a hard plastic material, such as that known as "Bakelite," and each tube is formed with a pair of circumferential channels 27 in its inner surface. The distance between each channel and the adjacent end of the tube is the same as the distance from the end of the plunger 21 to the opposed face of the flange 15 of the cap. When a tube is telescoped over the mandrel and moved along the latter, the edge of the tube engages the rounded end of the plunger and forces it down into the passage through the blade. The tube then passes over the top of the plunger and, when the end of the tube has seated against the flange 15, the plunger enters a channel 27 in the tube. The force of the spring is such that the plunger entering the channel holds the tube firmly against accidental displacement lengthwise of the mandrel.

The new mandrel is made entirely of metal and, because of that, it is not subject to changes in dimensions as a result in variations in atmospheric conditions. Prior mandrels made of wood shrink and swell as the humidity in the atmosphere varies and such changes cause the mandrels either to fit loosely within the tubes or else to bind as the tubes are mounted thereon or removed therefrom. The blades of the bar of the new mandrel are thick and rigid, so that there is little possibility of their being damaged or bent during handling, and although the cap is made of thin metal, it projects only slightly beyond the edges of the blades of the bar and is protected thereby.

The gudgeons project only a short distance beyond the ends of the bar, so that the overall length of the mandrel is only slightly greater than that of the tube. The use of the mandrel, accordingly, requires little space additional to that necessary for the tube in the winding machine.

The detent securely holds the tube in place during winding but permits ready release of the tube from the mandrel when desired. For this purpose, the mandrel with the tube thereon is placed with its gudgeon 17 on a flat surface, whereupon only little force is required to move the tube lengthwise of the mandrel to cause the plunger to ride out of the groove in the tube. Thereafter, the tube can be readily removed from the mandrel. Because of the maintenance of its dimensions, the mandrel fits snugly within the tube and provides good support for the latter during winding. Also, the spring-pressed detent is light in weight, so that its mounting within the bar does not unbalance the latter and cause vibration during rotation.

The mandrel illustrated includes three blades, but a larger number may be used if desired. Preferably, an odd number of blades is employed since, with this arrangement, the formation of the passage in which the detent is mounted is simplified. With an odd number of blades, an opening can be drilled through the central part of the mandrel and through one of the blades to its outer surface, whereas, if an even number of blades were employed, two of the blades would be aligned and this would make the formation of the passage more difficult. It would probably be undesirable to use as many as seven blades, because the weight of the mandrel would then approach that of the cylinder. Accordingly, a mandrel of three or five blades is preferred.

I claim:

1. A mandrel for supporting a core upon which a strand is to be wound, which comprises a bar of Y-section, a cap at one end of the bar and of greater diameter than the cylinder described by rotation of the bar on its axis, tongues extending from the cap and lying against the legs of the bar and secured thereto, a pair of gudgeons mounted on the bar in the axis thereof at opposite ends of the bar, one of the gudgeons projecting beyond the cap, and a spring-pressed detent mounted on the bar and normally extending beyond the outer face of one leg thereof.

2. A mandrel for supporting a core upon which a strand is to be wound, which comprises a bar having a solid central section and at least three like blades extending radially and axially of the central section, a pair of gudgeons seated in axial recesses at the ends of the central section, a cap attached to one end of the bar and of greater diameter than the cylinder described by the ends of the blades, when the bar is rotated on its axis, one of the gudgeons projecting through the cap, a passage extending diametrically through the central section of the bar and through one of the blades to the outer edge thereof, a detent mounted in the passage and projecting out of the end of the passage beyond the outer edge of said blade, a spring within the passage pressing the detent outwardly, and a disc closing the other end of the passage and forming a seat for the spring.

3. A mandrel for supporting a core upon which a strand is to be wound, which comprises a bar having a solid central section and at least three like blades extending radially and axially of the central section, a pair of gudgeons seated in axial recesses at the ends of the central section, a cap attached to one end of the bar and of greater diameter than the cylinder described by the ends of the blades, when the bar is rotated on its axis, one of the gudgeons projecting through the cap, a passage extending diametrically through the central section of the bar and through one of the blades to the outer edge thereof, the passage having a large diameter portion within the central section and a small diameter portion within said blade, a plunger having a stem and a head receivable, respectively, in the small and large diameter portions of the passage, the stem being longer than the small diameter portion of the passage, a spring within the passage acting on the head of the plunger and urging the end of the stem out of the end of the passage beyond the outer edge of said blade, and a disc closing the other end of the passage.

4. A mandrel for supporting a core upon which a strand is to be wound, which comprises a bar having a solid central section and at least three like blades extending radially and axially of the central section, a pair of gudgeons seated in axial recesses at the ends of the central section, one of the gudgeons having a portion of large diameter in its recess and a portion of small diameter projecting out of the recess, a cap attached to one end of the bar and of greater diameter than the cylinder described by the ends

of the blades, when the bar is rotated on its axis, the cap having an opening for passage of the portion of small diameter of said gudgeon and engaging the portion of large diameter to hold the gudgeon in its recess, a passage extending diametrically through the central section of the bar and through one of the blades to the outer edge thereof, a detent mounted in the passage and projecting out of the end of the passage beyond the outer edge of said blades, a spring within the passage pressing the detent outwardly, and a disc closing the other end of the passage and forming a seat for the spring.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,283,626	Freydberg	May 19, 1942
2,409,742	Dougherty	Oct. 22, 1946
2,416,785	Welch	Mar. 4, 1947

FOREIGN PATENTS

Number	Country	Date
258,376	Great Britain	Sept. 23, 1926
311,280	Italy	Sept. 26, 1933
727,690	France	Feb. 13, 1931