Jan. 19, 1954 R. B. BATTERSBY 2,666,599

PLASTIC CONE

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FIG. 1.

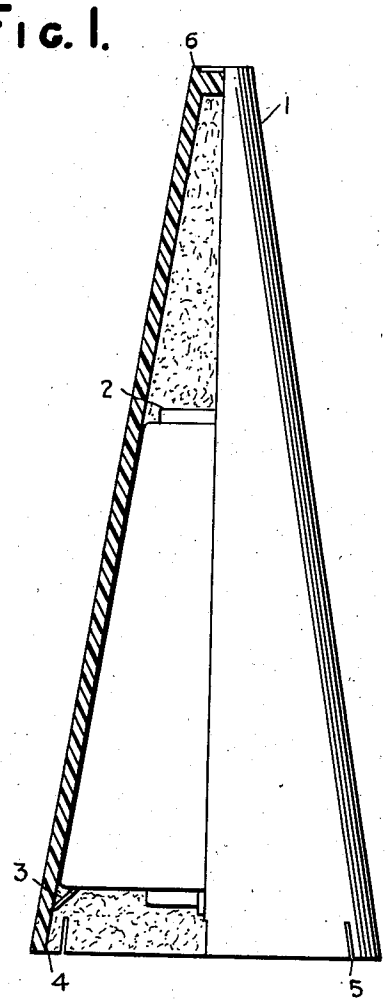


FIG. 3.

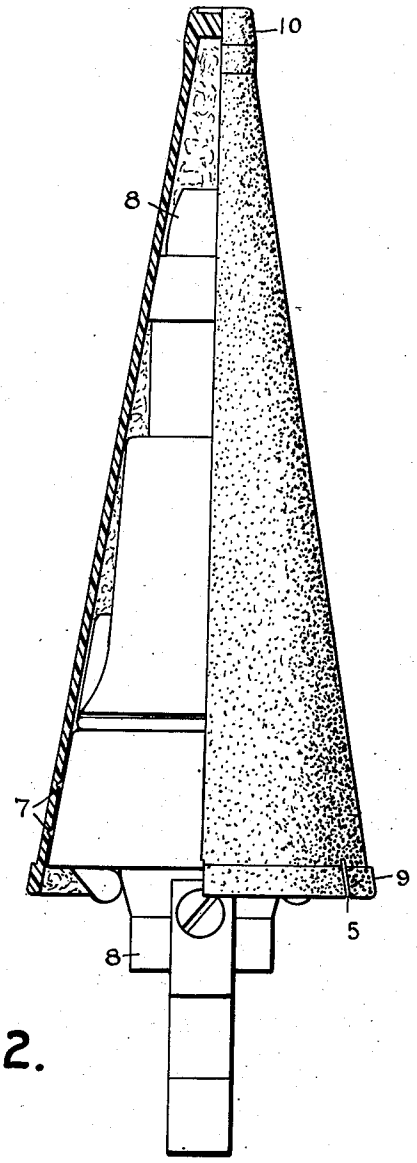
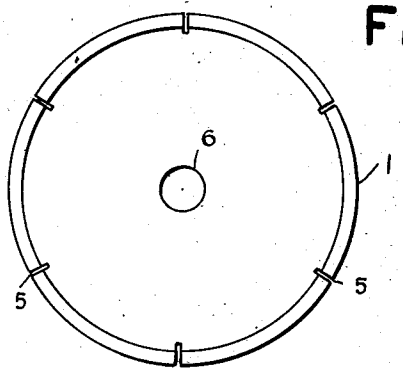


FIG. 2.



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PLASTIC CONE

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9 Claims. (Cl. 242—122)

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This invention relates to a cone for receiving and storing yarn or thread, and more in particular it refers to a plastic cone characterized by a soft resilient surface.

There have been many attempts made to produce plastic cones or bobbins for holding thread or yarn. These have not proven satisfactory because of the hard and smooth surface characteristics of the plastic. U. S. Patent 1,237,457 to Benjamin discloses a bobbin having a shank impregnated with a thermo-plastic material. Patent 2,448,242 to Wilson shows a bobbin molded from plastic material having reinforcing metallic members. U. S. Patent 1,570,534 to Sweeney relates to bobbins or cones used in weaving or knitting, wherein the desired surface texture is obtained by having an outer covering of resilient sponge rubber. U. S. Patent 1,591,370 to Dunlap shows a double tapered cone made of paper. This is the cone commonly used in the industry today.

One of the objects of the present invention is to obtain a shaped article having a soft resilient surface.

Another object of the present invention is to have a plastic article containing a fibrous material as a filler which fibrous material is exposed on the surface to give a soft resilient surface.

Still another object of this invention is to produce a cone somewhat similar in shape to the Dunlap cone, but improved to the extent that it has a soft resilient exterior finish, but yet has rigidity and ability to withstand impact and hard usage which is the normal condition in textile mills.

It is still a further object of this invention to produce a cone manufactured from one material, in contrast to the cone shown by the Sweeney patent, which material gives a resilient and non-sloughing surface and still retains its rigidity and resistance to cutting by the cone head dogs, which is the disadvantage of the paper cone.

The present invention comprises an article of a particular shape having a desired soft resilient surface made by casting a fibrous material impregnated with a plastic and then removing the plastic from the surface of the article to expose the fiber, thereby producing the surface texture desired in the industry to hold the thread and at the same time to give a rigid article that will have the necessary strength. The industry has long used the paper cone to hold thread. This cone is used in conjunction with certain types of winding machines. These machines

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comprise a steel, cone-shaped spindle on which the cone is placed. The cone is mounted on this rotating head which forces the cone against the Roto-Coner roller. This roller drives the cone by means of friction and spreads the yarn or the thread upon the cone in the proper manner. The head retains the cone by means of dogs which contact the inner surface of the cone and these dogs destroy the interior surface of the paper cones after a few operations, thus making the cones useless. These dogs are retractible on the Universal and Foster machines, the two types commonly found in the industry today. When it is desired to remove the cone the dogs are retracted and the cone is slipped off the steel spindle. It has been found necessary to have a soft resilient surface on the cone in order to have the thread adhere thereto and paper has been commonly used in the past for this purpose. If the cone does not have this surface texture the thread from the cheese or cake will slough off of the cone when it is rewound on bobbins or withdrawn from the cone onto the beam. The difficulty with the paper cones is that they do not have the strength necessary for many repeated uses, as the dogs bite into the paper and cut the walls thereof, to such an extent that they have to be discarded. Also they lack rigidity and will not stand normal handling in the mills. In the past there have been many attempts to use cones of a more substantial material but they have all failed because of the difficulty in obtaining the proper surface texture. The patent to Sweeney referred to above is one of these attempts.

The present invention comprises a cone, which cone is made from a molding compound of either the thermoplastic or thermo-setting type. Various types of resin are in the scope of this invention, such as nylon, cellulose acetate, polyvinyl and with these materials is mixed a fibrous material of either natural or synthetic origin, such as cotton, wool or a synthetic fiber of the type of nylon, rayon etc. The preferred materials are a phenolic resin and this is mixed with macerated cotton rag filler to give a molding composition which produces a cone having the desired characteristics. An example of the cone produced by this invention is made from a molding compound comprising 45% phenol formaldehyde resin and 55% macerated cotton rag filler. This material is cast into a cone as shown in the drawings and upon proper treatment is given the desired surface texture.

In the drawings:

Figure 1 shows a horizontal view of the cone as molded in partial cross section;

Figure 2 is a vertical view of the cone; and

Figure 3 is a horizontal view of a finished cone in partial cross section.

Figure 1 shows a cone 1 mounted on a spindle 2, of the Foster type, having dogs 3 in forced contact with the inner surface 4 of cone 1, which cone has slots in the larger end thereof to receive the end of the thread when the thread is first wound on the cone. The upper end of the cone 1 may be of any shape so long as it is smooth and does not have any sharp corners which would cause tearing or cutting of the thread. The cone as molded and shown in Figure 1 has the usual smooth surface of a molded phenolic article and is treated to give the desired surface as shown in Figure 3. The finished article as shown in Figure 3 may be mounted on the spindle of the Universal type wherein the dogs 7 are in forced contact with the inner surface of the cone and hold it in rotating relation with this spindle 8. The surface of the cone, as shown in Figure 1, is of glazed, hard nature, obtained by the usual molding process of a plastic article and is entirely unfit to receive or to retain the thread. The surface of the cone is then treated so as to remove some of the plastic impregnite and expose the rag fiber filler. This may be done by mechanical means or by chemical means and is more fully described in my copending application Serial No. 268,130, filed January 24, 1952 wherein the process is specifically set forth and claimed. The entire outer surface of this cone may be of the soft texture or the hard outer glaze may be left on the lower ring surrounding the bottom of the cone 9, the upper end of the cone 10, and the interior surfaces thereof. The cone may have the contour as shown in Figure 1 or 3. Under some conditions the cone shown in Figure 3 is most advantageous, but it is to be understood that this invention also covers the cone shown in Figure 1. The rims 9 and 10 are optional, one or both of which may be omitted, without interfering with the successful operation of this cone for the purpose for which it has been designed.

In operation, using the present paper cone, the cone is grasped in the left hand, a small wad containing the leading end of yarn or thread is dropped into the open end of the cone, and the cone is then mounted on the head and given a slight rotating movement with the right hand. The movement starts the yarn on the body of the cone. This movement is then maintained by the roller and the friction between the cone and the roller continues the rotating action of the cone causing the thread to be wound. The draw-back to the present method is that with fine yarn it takes an appreciable length of time to work up the wad containing the leading end and feed it into the interior of the cone. The cone produced by this invention is provided with slots whereby the free end of the yarn, without making up a wad, can be pulled across the open end of the cone into the slots and the cone placed directly on the head, again giving it a slight rotating movement and allowing the thread to feed on as it does in the present machine. This eliminates the wadding operation. While six slots are shown, one is all that is necessary, the others are added as a matter of convenience, and more or less are within the scope of this invention.

The resilient fibrous surface grips the thread and holds it until such a body of thread is on the cone that it will function as a cushion for this roller. The fibrous surface of the bare cone has enough resiliency to prevent damage to the thread by the roller on the first layer. Subsequent layers will increase this cushioning effect so as to prevent excessive damage to the thread.

The thread is removed from the cone by winding on to the bobbins which are fed into the shuttle of the loom or it is withdrawn from the cone and wound on the warp beam.

While the cone, the subject matter of this invention, is described for purposes of example, as a phenol formaldehyde resin, it is well understood by those skilled in the art pertaining to plastic materials that other types of resin, such as cellulose acetate, ethyl cellulose, nylon, kralastic, and plexene may be used. Also the rag content as described is 55%, but this may be varied in wide range and other fibrous materials, such as linters, wool and other materials containing fibers may be used. The desired surface texture may be obtained by treating with a chemical solution to remove the plastic from the fiber on the surface of the cone, not only on the exterior surface but also on the interior surface, as this gives an improved contact with the spindle, but it is not necessary to have the interior surface of the cone so treated. The exterior surface contacting the thread must be treated so as to give a soft resilient texture that will grip the thread and prevent damage on the initial winding and hold the thread to prevent sloughing of the cake during spinning. The cone made of plastic has the strength and resiliency to allow its reuse many times in actual commercial practice. Tests have shown that cones may be used in the neighborhood of one thousand times each when made according to this invention, while the paper cones failed after less than ten reuses. The cone produced by this invention is described as fitting the two standard machines for winding thread but may be made to fit any machine for this purpose. The invention relies not in the shape but in the material from which the cone is made and the surface texture obtained from this material with the strength inherent therein.

While it is understood by one skilled in the art that while the above described article is prepared from cotton rag and phenolic resin, many substitutes are apparent any may be used therefor, and this invention being basic in this industry contemplates the use of suitable materials, other than those herein specifically mentioned.

What is claimed is:

1. A new article of manufacture, a cone comprising a body formed of substances selected from the group consisting of a thermo-setting and a thermo-plastic material having incorporated therein a fiber filler, said article being characterized by having the surface comprising the exposed fiber filler.

2. As a new article of manufacture, a cone comprising a body formed of a thermo-setting plastic material having incorporated therein a fiber filler having a surface characterized by the exposed fiber filler.

3. As a new article of manufacture, a cone comprising a body formed of phenol formaldehyde resin and macerated cotton rag filler, having a surface consisting of the exposed cotton rag filler.

4. As a new article of manufacture, a cone having a body comprising 45% to 55% of a hard resin and 55% to 45% fiber filler, and a soft

resilient surface characterized by the exposed fiber contents of the body.

5. As a new article of manufacture, a cone comprising a body formed of a thermo-plastic material having incorporated therein a fiber filler having a surface characterized by the exposed fiber filler.

6. A new article of manufacture, a cone comprising a body formed of nylon and cotton linter filler, having a surface consisting of the exposed cotton linter filler.

7. A rigid, shape maintaining article composed of a synthetic resin fiber composition and having a surface consisting of the anchored fibers projecting beyond the composition.

8. A rigid, shape maintaining article composed of fibers impregnated with a synthetic resin composition and having the surface consisting of the exposed fibers.

9. A rigid, shape maintaining article composed of fibers impregnated with a synthetic resin composition and having a surface consisting of the partially embedded fibers projecting beyond and covering the composition.

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