Oct. 8, 1940. E. A. MORTON 2,217,561

WINDING MACHINE

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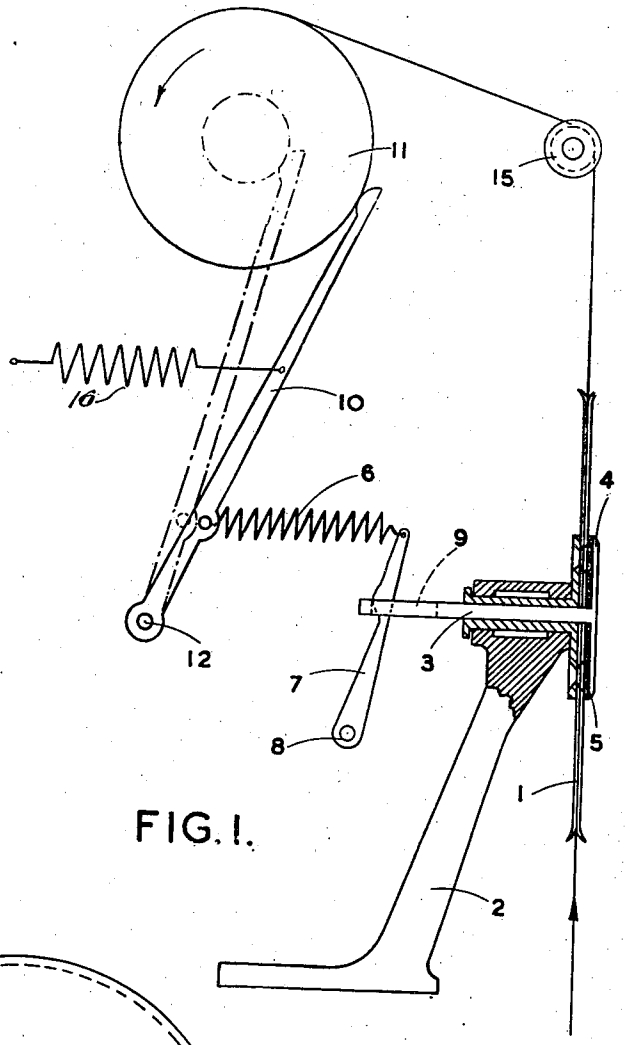


FIG. 1.

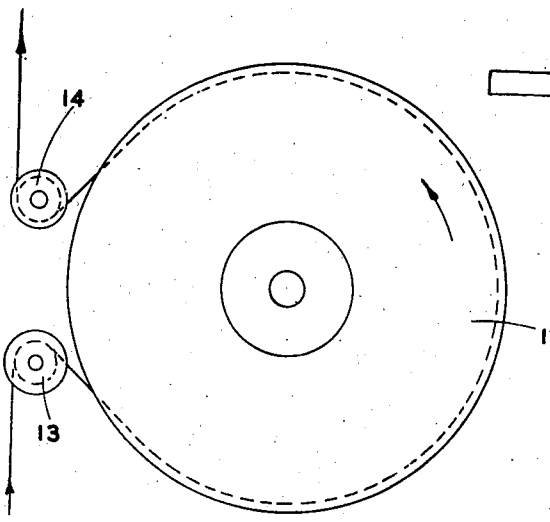


FIG. 2.

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WINDING MACHINE

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2 Claims. (Cl. 242—45)

This invention relates to winding threads, particularly threads of textile materials. It may be used, for example, in winding an artificial thread of regenerated cellulose onto a bobbin, reel, cone, tube or other core (which we will hereinafter refer to as a bobbin) from a cake of such thread produced by collection in a centrifugal box.

When winding threads onto a bobbin the package may be rotated either by driving the bobbin spindle at a constant angular speed or by frictional contact of the package itself with a driven roller. In either case it is necessary to exert a tension on the thread between the source of supply and collection to steady the thread and give good winding. This invention is concerned with that type of winding wherein the bobbin spindle is caused to rotate at a constant speed. In this case it is well known that the tension exerted by the pull of the bobbin on the thread gradually increases as the amount of thread wound on to the bobbin and consequently the speed of travel of the thread increases. This gradual increase of tension has undesirable effects on the thread and various proposals have been made to overcome its disadvantages. Such proposals are usually based on the principle of correspondingly gradually diminishing the tension exerted on the thread by a device through which the thread passes between the source of supply and collection, so that the ultimate tension in the thread as it is wound on to the bobbin remains substantially constant.

According to the present invention the device for use in the winding of thread on to a bobbin rotating at a constant angular speed in order to compensate for the gradual increase in the tension exerted by the rotating bobbin which occurs as the amount of thread on the bobbin increases, comprising a freely mounted light pulley wheel round the grooved circumference of which the thread is caused to pass, a friction brake acting on the said wheel and means operated by a feeler arm in contact with the wound thread on the bobbin for gradually releasing the pressure of the brake on the wheel as the amount of thread wound on to the bobbin increases.

When winding thread using apparatus according to the present invention tension is exerted on the thread in the course of winding by means of the said very light pulley wheel round which the thread is caused to pass by means of guides. The said pulley wheel being freely mounted on a shaft is turned by the thread passing round it and sufficient resistance to turning to give good winding is caused by the friction brake acting on the pulley. This brake may be, for example, a felt-covered disc which is pressed against the pulley wheel by means of a system of rods and levers through which it is connected to the feeler arm which is constantly in contact with the wound thread on the bobbin. As the diameter of the collected mass gradually increases, the levers and rods are gradually moved causing a gradual reduction of the pressure of the felt disc on the pulley wheel. A gradual diminution in the tension exerted by the wheel on the thread is thereby caused compensating for the gradual increase in the pull exerted by the bobbin due to the increasing diameter of the mass of collected thread, so that the resultant tension in the thread as it is wound onto the bobbin is substantially constant throughout the collection. The pulley wheel should be at least 3 inches in diameter, very light and so freely mounted that the load necessary to drive it when the brake is not applied is very small compared with the braking load applied to it at the commencement of the winding of the bobbin and the groove should be of a suitable shape, preferably V-shaped so that the thread is slightly gripped, for example, by the root of the V. The pulley wheel may be of compressed fibre, paper, ebonite or similar material.

In winding threads according to the present invention I prefer that the thread should come as little as possible into contact with stationary surfaces between the source of supply and collection thus avoiding the undesirable rubbing and displacement of twist caused when the thread passes over stationary rods, rollers, guides or other surfaces.

The accompanying diagrammatic drawing illustrates one form of apparatus according to the present invention,

Figure 1 being a view of the whole apparatus and

Figure 2 a view showing the path taken by the thread round the pulley wheel; the invention is not restricted to the particular form shown.

A light pulley wheel 1 is mounted on a bearing 2 so that it is free to rotate. A fixed shaft 3 provided at one end with a flange 4 is also mounted on the bearing 2 and passes through the centre of the wheel 1. Between the flange 4 and the wheel 1 a disc of felt 5 is placed. A spring 6 acts on a lever 7 pivoted about a point 8, which lever passes through a slot 9 in the shaft 3 and presses the flange 4 and the felt 5 against the wheel 1. The other end of the spring is attached to a feeler arm 10 which is maintained in constant contact with the wound thread on the bobbin 11 by any well

known means such as a spring 16, and is pivoted about the point 12. The thread is passed from a cake or other source of supply (not shown) over a small guide wheel 13 round the wheel 1 under another guide wheel 14, through a guide 15 to the bobbin which is rotated at a constant angular speed. The friction of the felt disc on the wheel 1 gives sufficient resistance to turning of the wheel by the thread to give good winding and as the size of the bobbin increases the feeler arm gradually moves about the pivot 12 lessening the force exerted by the spring and thus gradually reducing the pressure of the felt 5 on the wheel 1 and thereby the tension on the thread and compensating for the gradual increase in tension which is exerted as the size of the bobbin increases.

What I claim is:

1. A device for use in the winding of thread on to a bobbin rotating at a constant angular speed in order to compensate for the gradual increase in the tension exerted by the rotating bobbin which occurs as the amount of thread on the bobbin increases, which comprises a freely mounted light pulley wheel round the grooved circumference of which the thread is caused to pass, a friction brake acting on the said wheel and means operated by a feeler arm in contact with the wound thread on the bobbin for gradually releasing the pressure of the brake on the wheel as the amount of thread wound on to the bobbin increases.

2. A device for use in the winding of thread on to a bobbin rotating at a constant speed in order to compensate for the gradual increase in the tension exerted by the rotating bobbin which occurs as the amount of thread on the bobbin increases, which comprises a freely mounted light pulley wheel having a grooved circumference round which the thread is passed, a friction brake comprising a felt disc acting on said wheel, a feeler arm in contact with the wound thread on the bobbin, means comprising a system of rods and levers connected with said feeler arm for pressing said felt disc against said pulley wheel, and for gradually releasing the pressure of the brake on the wheel as the amount of thread wound on the bobbin increases.

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