Oct. 9, 1934. R. J. POWERS ET AL 1,976,683

WINDING MECHANISM AND SPEED CONTROL THEREFOR

Filed June 6, 1933 3 Sheets-Sheet 1

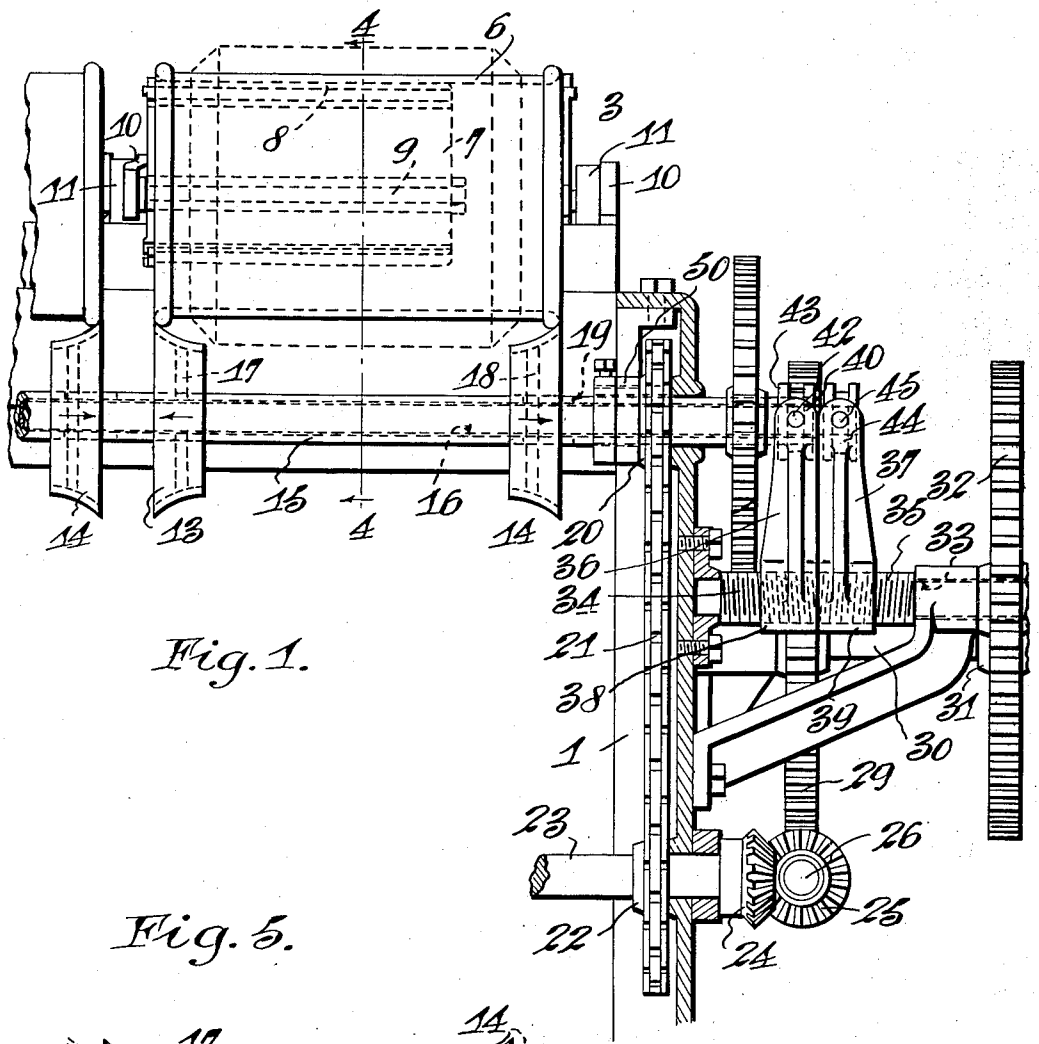
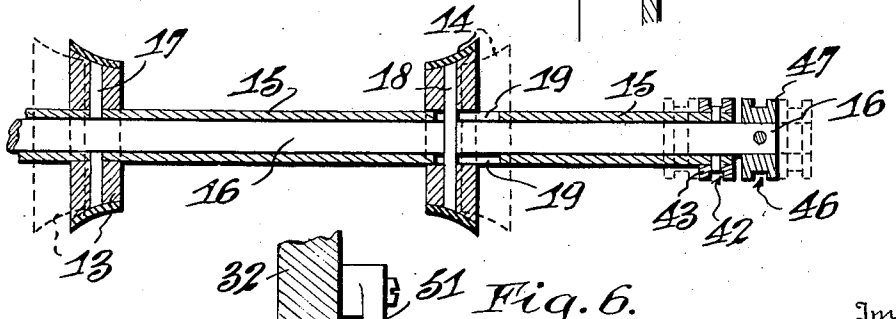


Fig. 1.

Fig. 5.



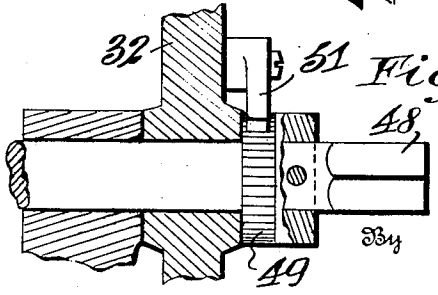


Fig. 6.

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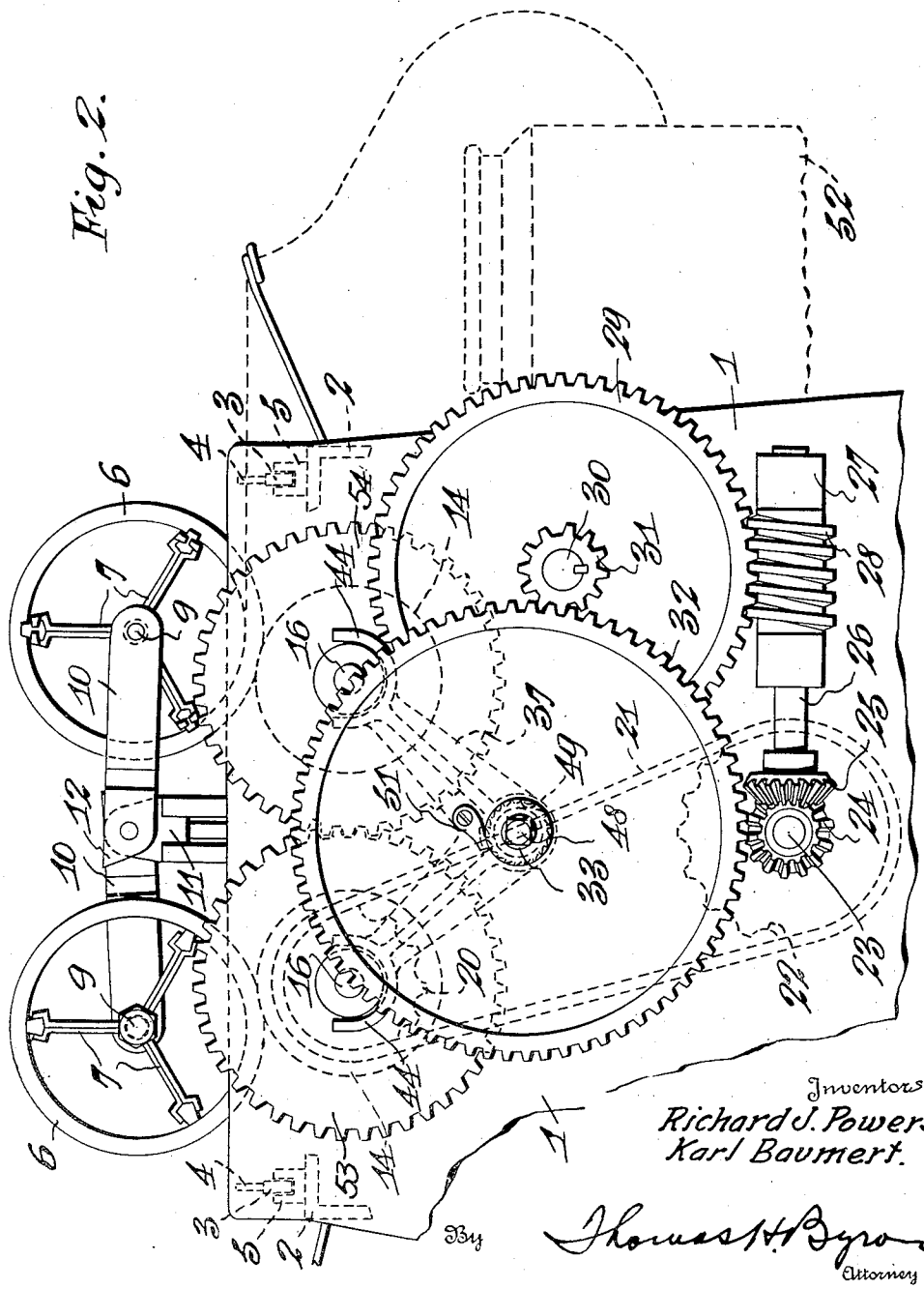
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WINDING MECHANISM AND SPEED CONTROL THEREFOR

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Fig. 2.



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WINDING MECHANISM AND SPEED CONTROL THEREFOR

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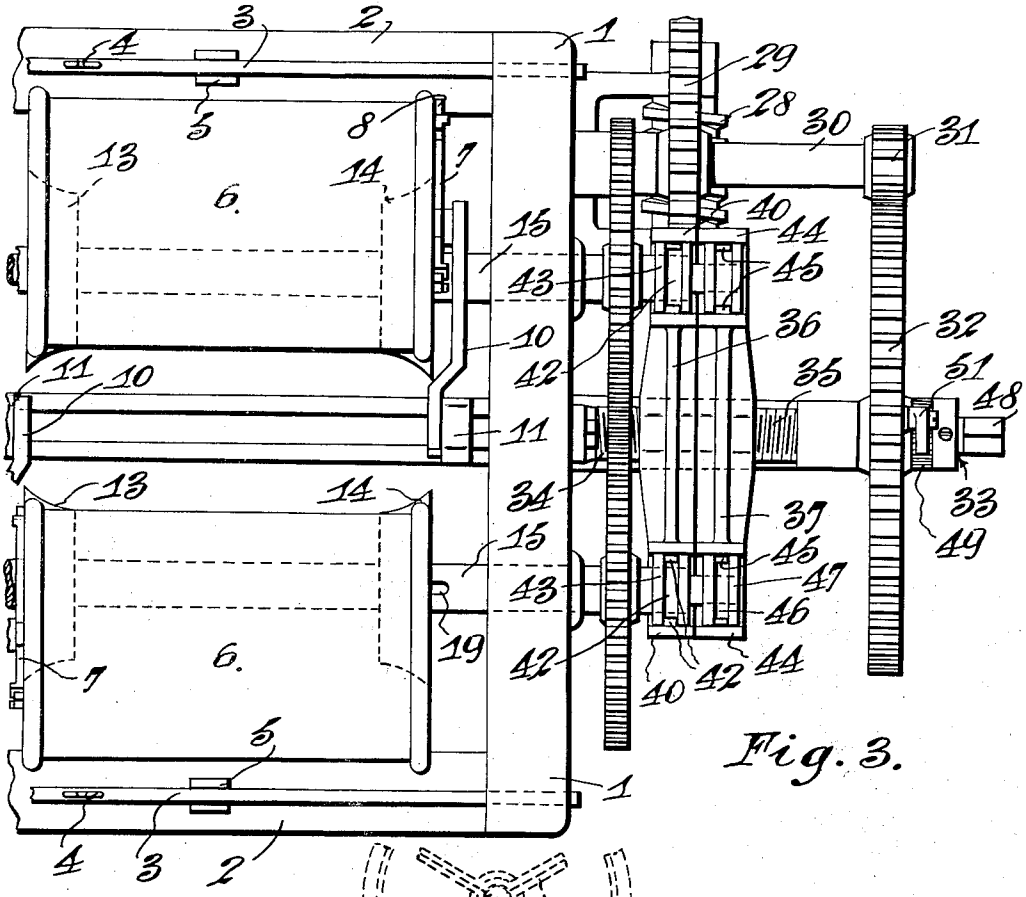


Fig. 3.

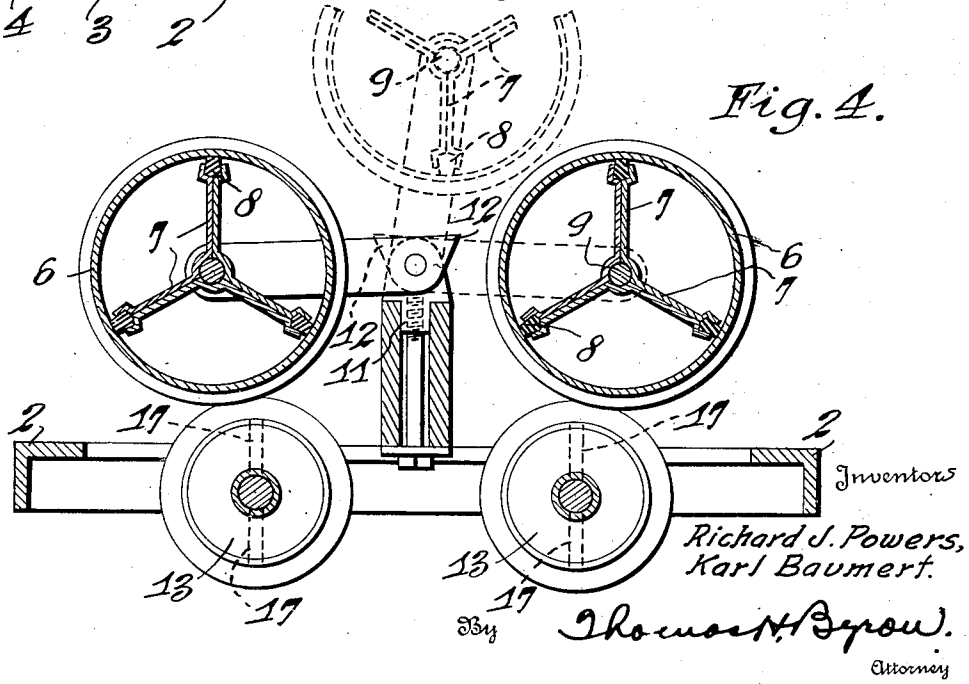


Fig. 4.

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UNITED STATES PATENT OFFICE

1,976,683

WINDING MECHANISM AND SPEED CONTROL THEREFOR

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Application June 6, 1933, Serial No. 674,496

10 Claims. (Cl. 242—18)

This invention relates to winding machines but primarily has for its object to provide an apparatus which will wind thread under a uniform tension.

Another object of the present invention is to provide a speed compensation means in direct engagement with the thread takeup means.

A further object of the present invention is to provide a speed compensation means in direct engagement with the take-up means which does not contact with the yarn body itself.

These and other objects will in part be pointed out and in part become obvious from a study of the following specification taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of one end of a winding machine illustrating the invention applied;

Figure 2 is an end elevation of the parts shown in Figure 1;

Figure 3 is a plan view of the same;

Figure 4 is a detail cross section taken on the line 4—4 of Figure 1 showing in dotted lines how the spools are swung up off the drive rollers for doffing;

Figure 5 is a detail longitudinal section showing a pair of compensating drive cones and the manner of mounting them on the compensating driving means, in dotted lines is indicated the position of the cones at the end of the wind; and

Figure 6 is an enlarged detail section showing resetting means for the screw shaft after one winding operation has been completed.

In the winding of threads, it has been found necessary in order to procure the best yarn bodies, a uniform wind is essential. That is, the winding tension must be uniform and the number of traverse winds to the layer should be the same. However, as the yarn body builds up, thereby increasing in diameter, the take-up speed becomes greater and must be compensated for. It is therefore necessary to decrease the speed of the take-up means so that the peripheral speed of the yarn body will remain constant.

Heretofore, it has usually been the custom in the art to drive the yarn bodies direct, that is the spool lay upon a rotating cylinder and as the yarn body built up it was self-compensating, due to the fact that the periphery of the yarn body acted as the driving means. However, this method has resulted in yarn bodies that are wound too tightly and the thread is easily broken due to the friction of running directly on the drive means. This manner of winding has also resulted in increased number of slubs or knots which are distinctly undesirable.

It is therefore the object of the present invention to overcome the aforementioned difficulties by driving the spools alone and not contacting with the yarn at all. In order to insure a more even wind, it is also the purpose to drive the spools directly by the compensating means itself as will be brought out in the following description.

In the drawings, in which like numerals of reference indicate like parts, 1 indicates the end frame of a winding machine and 2 indicates the longitudinal angle irons of the frame. The traverse thread guide rods 3 carrying the thread guides 4 reciprocate in bearing brackets 5 set on the angle irons 2. They operate in the usual manner, operating means not being illustrated.

The take-up spools 6 are slipped over spool holders 7 having rubber inserts 8 in order not to damage the spools and also to frictionally hold the spools 6. The spool holders 7 are rotatably mounted on shafts 9 secured on a pivoted arm 10. The arms 10 are pivoted on brackets 11 secured to the frame of the machine.

The arms 10 have projections 12 which prevent the arms 10 pivoting too far when the arm 10 is raised in doffing the spool 6 as shown in dotted lines in Figure 4.

The spools 6 rest on the conical rollers 13 and 14 and are driven thereby. It can be readily seen that by separating the driving rollers 13 and 14 the speed of the spools will be decreased due to the decreasing periphery of the rollers 13 and 14.

The driving shafts consist of tubular outer shafts 15 and inner shafts 16 slidable within the tubes 15. The rollers 13 are pin connected at 17 to the tube 15 and the rollers 14 have a sliding fit on the tube 15, but are pin connected at 18 to the inner shaft 16. The pins 18 extend through slots 19 in the tubular shaft 15 for the purpose of allowing lateral movement between the tubular shaft 15 and inner shaft 16. It is therefore readily perceived that the shaft 15 and the roller 13 are integral and that the shaft 16 and roller 14 are integral and that they will rotate together but have a slidable relation one with the other.

The tubular shafts 15 and the inner shafts 16 are rotated through the medium of a sprocket 20 which is so mounted as at 50 in any suitable manner so as to allow the shaft 15 to be slidable and yet be rotated thereby. A chain 21 goes over the sprocket 20 and around another

sprocket 22 mounted on the main drive shaft 23.

Gear wheels 53—54 are mounted on the tubular shafts 15 so that the left hand roller shaft will operate to turn the right hand roller shaft in the opposite direction to drive the spools 6 on the right hand side of the machine. These gears, 53—54, move in and out with the tubular shafts 15.

The main drive shaft 23 has mounted on one end a bevel gear 24 which meshes with and drives a bevel gear 25 on a cross shaft 26. The shaft 26 is mounted in a bearing bracket 27 and carries a worm 28 which drives a worm gear 29 on an intermediate shaft 30. The shaft 30 has secured thereupon a pinion 31 which meshes with a gear 32 to drive the screw shaft 33.

The screw shaft 33 is divided by right hand threads 34 at one end and left hand threads 35 at the other end for the purpose of separating two forked members 36—37 upon rotation of the screw shaft 33.

The forked members 36—37 have threaded bores 38—39 which are mounted on the threads 34—35 of the screw shaft.

The forked member 36 has at the upper end of each arm a fork 40 having pins 42 which extend into the groove 42 of a bearing collar 43 mounted on the end of the tubular shaft 15 which construction will allow the shaft 15 to rotate unimpeded but at the same time the forked member 36 may move the tubular shaft 15 laterally.

The forked member 37 on the other hand has at the upper end of each arm a fork 44 having pins 45 which extend into the groove 46 of a bearing collar 47 mounted on the end of the inner shaft 16 which will allow the shaft 16 to rotate but at the same time the forked member 37 may move the shaft 16 laterally in the opposite direction to the tubular shaft 15.

In order to reset the compensating rollers 13 and 14 at the end of the wind the screw shaft 33 is squared on the end as shown at 48 of the drawings, and by turning the shaft in the opposite direction, the forked members 36—37 will be returned to the original position illustrated in Figure 1 of the drawings thereby sliding the shafts 15 and 16 laterally and the rollers 13 and 14 on the shafts 15 and 16 respectively toward one another. The gear wheel 32 is loosely mounted on the screw shaft 33 but has a driving connection through the ratchet teeth 49 which are integrally attached to the shaft 33 and a pawl 51 mounted on the gear 32.

It will thus be seen that by merely releasing the pawl 51 the shaft 33 may be reversed and bring back the forked members 36—37 to their original position at the beginning of the wind.

In operation the parts are in the position illustrated in the drawings. That is the spools 6 are resting on the large end of the conical compensating drive rollers 13 and 14. The main drive shaft 23 is rotating the tubular shaft 15 and its inner shaft 16 through the chain drive 20, 21 and 22. The spools 6 are thereby rotated and collect the threads from a supply spool 52 shown in dotted lines in Figure 2. The yarn being laid on the spool traversely by the thread guides 4 on the traversely reciprocating thread guide rod 3.

As the yarn body builds up the screw shaft 33 is being slowly operated by the reduction gearing 24, 25, 28, 29, 31 and 32. Due to the opposed threads 34—35, the forked members 36—37 are driven apart carry the tubular shaft 15 and the rollers 13 in the left hand direction and the inner shaft 16 and rollers 14 in the opposite direction, thereby decreasing the spool speed uniformly and keeping constant the peripheral speed of the increasing yarn body.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete construction, operation and advantages of the invention will be clear to those skilled in the art to which it relates.

What we claim is:

1. A take-up mechanism for winding threads on spools, comprising, a take-up means provided with thread receiving means, and reciprocating thread guide for placing the thread on said thread receiving means, means for rotating the said take-up means including oppositely positioned cones in driving contact with said take-up means, and means for progressively moving the said cones in opposite directions, one with the other.

2. A take-up mechanism for winding threads on spools, comprising, a pivotally mounted rotatable take-up means provided with thread receiving means and reciprocating thread guide for placing the thread on said thread receiving means, means for rotating the said take-up means including oppositely positioned cones in driving contact with said take-up means, and means for progressively moving the said cones in opposite directions, one with the other.

3. A take-up mechanism for winding threads on spools, comprising, a pivotally mounted rotatable take-up means provided with thread receiving means and reciprocating thread guide for placing the thread on said thread receiving means, means for rotating the said take-up means, including oppositely positioned cones in driving contact with said take-up means, a tubular shaft, an inner shaft slidable within said tubular shaft, one of said cones attached to said tubular shaft, the other of said cones slidable on said tubular shaft but attached to said inner shaft, and means for progressively moving the said tubular shaft and said inner shaft in opposite directions one with the other.

4. A take-up mechanism for winding threads on spools, comprising, a pivotally mounted rotatable take-up means provided with thread receiving means and reciprocating thread guide for placing the thread on said thread receiving means, means for rotating the said take-up means including oppositely positioned cones in driving contact with said take-up means, a tubular shaft, an inner shaft slidable within said tubular shaft, one of said cones attached to said tubular shaft, the other of said cones slidable on said tubular shaft but attached to said inner shaft, and means for progressively moving the said tubular shaft and said inner shaft in opposite directions one with the other, said last mentioned means comprising an oppositely threaded screw means and means for operating said threaded screw means.

5. A take-up mechanism for winding threads on spools, comprising, a pivotally mounted take-up means provided with thread receiving means, and reciprocating thread guide for placing the thread on said receiving means, means for rotating the said take-up means including oppositely positioned cones in driving contact with said take-up means, a tubular shaft, an inner shaft slidable within said tubular shaft, one of

said cones attached to said tubular shaft, the other of said cones slidable on said tubular shaft but attached to said inner shaft, and means for progressively moving the said tubular shaft and said inner shaft in opposite directions one with the other, said last mentioned means comprising forked members contacting with said tubular shaft, the other of said members contacting with said inner shaft, said forked members mounted on an oppositely threaded screw means, and means for operating said threaded screw means.

6. A driving mechanism for a take-up means upon whcih thread is to be wound, comprising means for maintaining the peripheral speed of a thread body constant, as the thickness of the thread body increases including oppositely positioned cones in driving contact with said take-up means, and means for progressively moving the said cones in opposite directions one with the other.

7. A driving mechanism for a take-up means upon which thread is to be wound, comprising means for maintaining the peripheral speed of a thread body constant, as the thickness of the thread body increases including oppositely positioned cones in driving contact with said take-up means, and means for progressively moving the said cones in opposite directions one with the other, including a tubular shaft, an inner shaft slidable within said tubular shaft, one of said cones attached to said tubular shaft, the other of said cones slidable on said tubular shaft, but attached to said inner shaft, and means for progressively moving the said tubular shaft and said inner shaft in opposite directions one with the other.

8. A driving mechanism for a take-up means upon which thread is to be wound, comprising means for maintaining the peripheral speed of a thread body constant, as the thickness of the thread body increases including oppositely positioned cones in driving contact with said take-up means, and means for progressively moving the said cones in opposite directions one with the other, including a tubular shaft, an inner shaft slidable within said tubular shaft, one of said cones attached to said tubular shaft, the other of said cones slidable on said tubular shaft, but attached to said inner shaft, and means for progressively moving the said tubular shaft and said inner shaft in opposite directions one with the other, said last mentioned means comprising an oppositely threaded screw means, and means for operating said threaded screw means.

9. A driving mechanism for a take-up means upon which thread is to be wound, comprising means for maintaining the peripheral speed of a thread body constant, as the thickness of the thread body increases including oppositely positioned cones in driving contact with said take-up means, and means for progressively moving the said cones in opposite directions one with the other, including a tubular shaft, an inner shaft slidable within said tubular shaft, one of said cones attached to said tubular shaft, the other of said cones slidable on said tubular shaft, but attached to said inner shaft, and means for progressively moving the said tubular shaft and said inner shaft in opposite directions one with the other, said last mentioned means comprising forked members contacting with said tubular shaft, the other of said members contacting with said inner shaft, said forked members mounted on an oppositely threaded screw means, and means for operating said threaded screw means.

10. A take-up mechanism for winding threads on spools, comprising, a take-up means provided with thread receiving means, and reciprocating thread guide for placing the thread on said thread receiving means, means for rotating the said take-up means including oppositely positioned cones in driving contact with said take-up means, and means for varying the distance between said cones.

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