July 10, 1923.

1,461,705

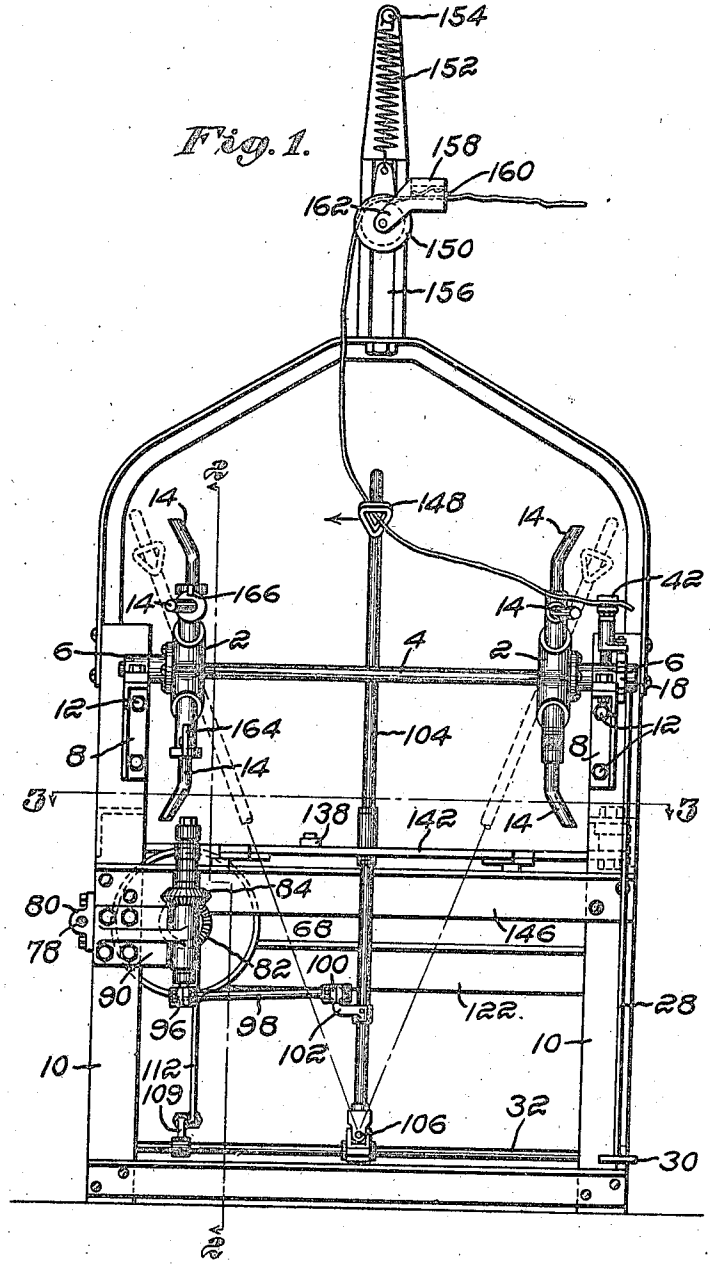
A. E. DUNHAM

WINDING AND HANKING MACHINE

Filed Sept. 15, 1921

4 Sheets-Sheet 1

Fig. 1.



Inventor:
Arthur E. Dunham
by Emery, Booth, Janney & Varney
Attys.

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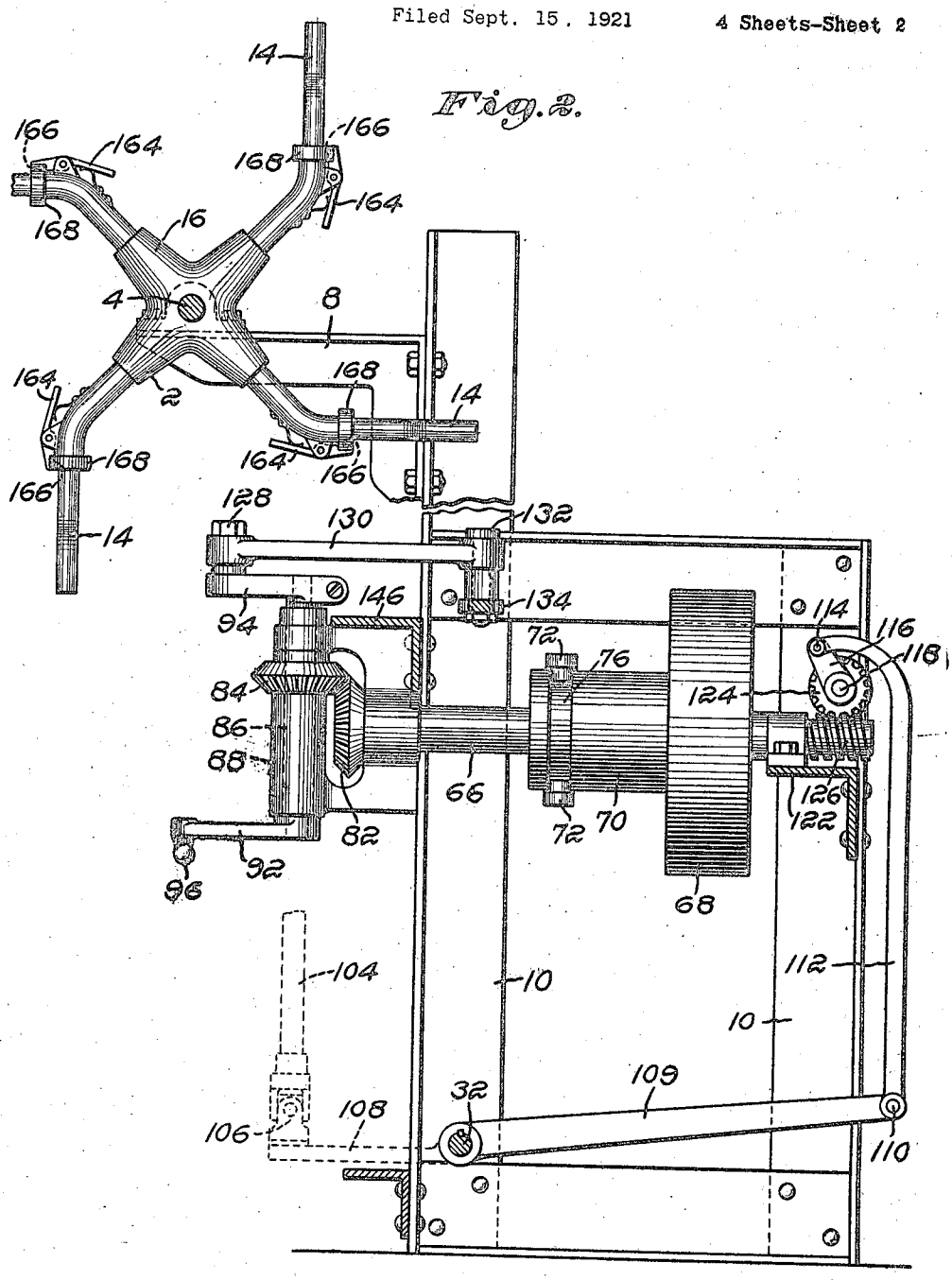
A. E. DUNHAM

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Fig. 2.



Inventor:
Arthur E. Dunham,
by Emery, Booth, Janney & Varney.
Attys.

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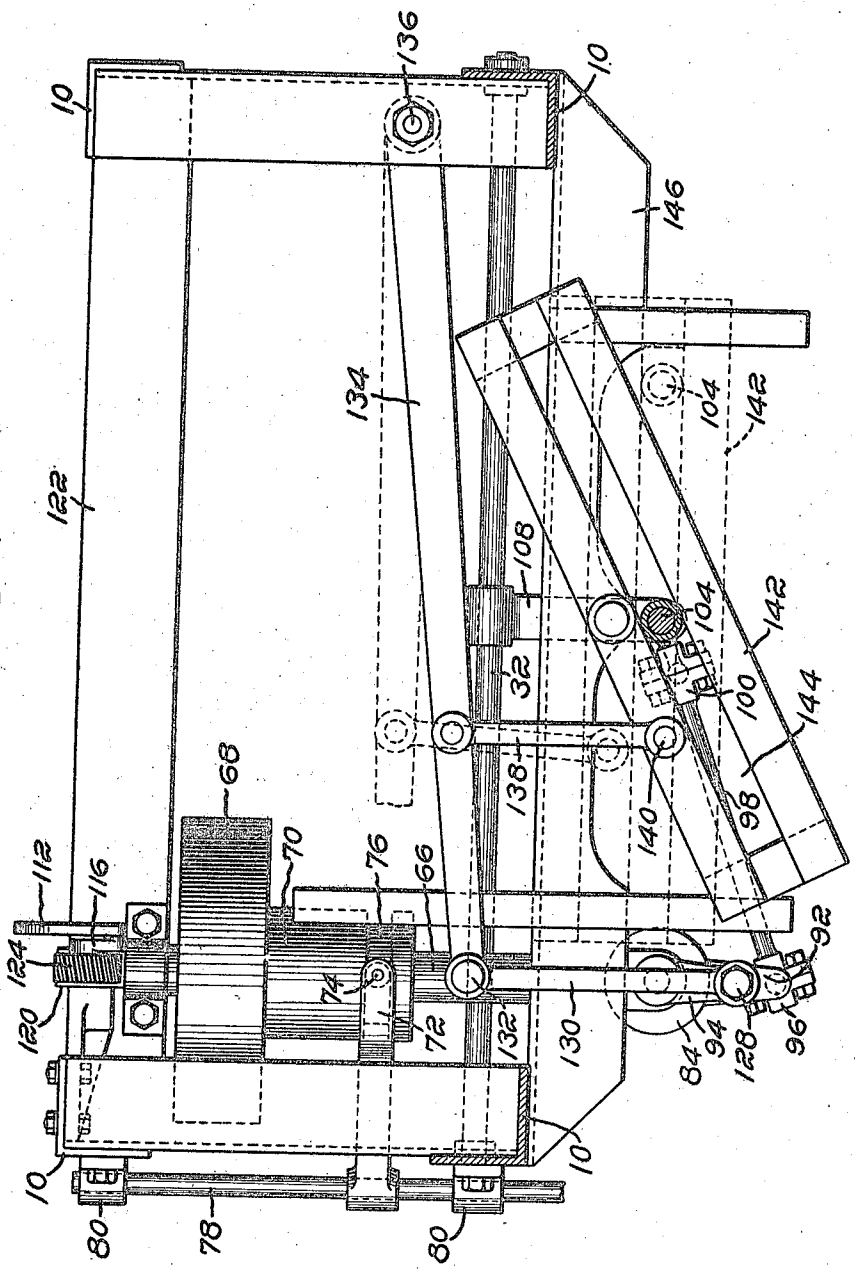
A. E. DUNHAM

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Fig. 3.



Inventor:
Arthur E. Dunham,
by Emery, Booth, Janney & Varney.
Attys.

July 10, 1923.

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A. E. DUNHAM

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4 Sheets-Sheet 4

Fig. 4.

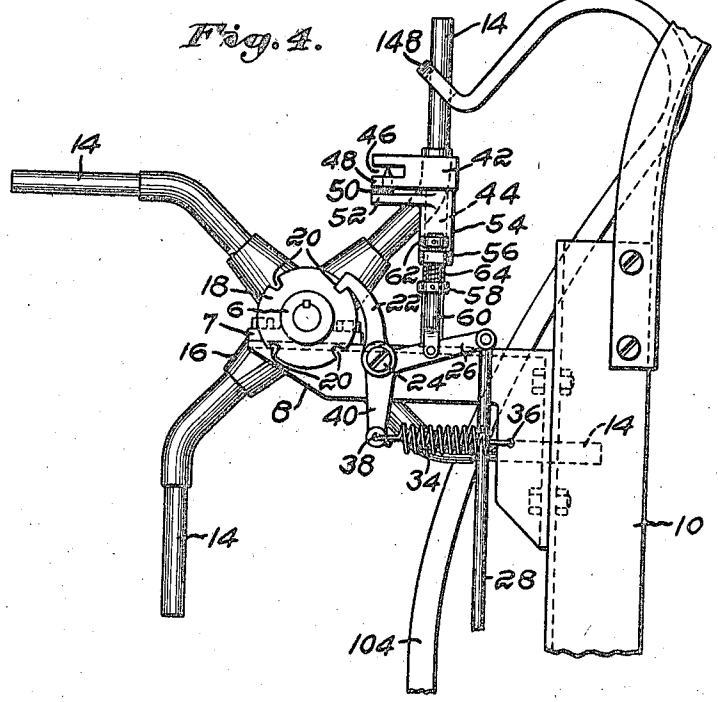
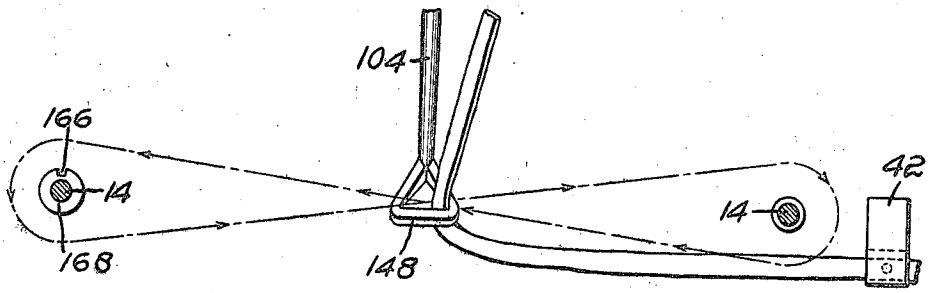


Fig. 5.



Inventor:
Arthur E. Dunham,
by Emery, Booth, Janney & Varney.
Attys.

Patented July 10, 1923. 1,461,705

UNITED STATES PATENT OFFICE.

ARTHUR E. DUNHAM, OF BROCKTON, MASSACHUSETTS, ASSIGNOR TO BROCKTON WELTING CO., INC., OF BROCKTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

WINDING AND HANKING MACHINE.

Application filed September 15, 1921. Serial No. 500,990.

To all whom it may concern:

Be it known that I, ARTHUR E. DUNHAM, a citizen of the United States, and a resident of Brockton, in the county of Plymouth and Commonwealth of Massachusetts, have invented an Improvement in Winding and Hanking Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to winding machines and more particularly to those in which the material is wound in the form of a skein or hank.

The invention and its aims and objects will be clearly understood from the following description taken in connection with the accompanying drawings of a machine embodying one form of the invention herein described for illustrative purposes, the invention in its true scope being more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a front view of a machine embodying one form of the invention;

Fig. 2 is a vertical elevation on line 2—2 of Fig. 1, certain parts being shown in section;

Fig. 3 is a top plan view on line 3—3 of Fig. 1;

Fig. 4 is a detail of the reel and its locking means together with the clamp for the material to be wound and the winding arm; and

Fig. 5 illustrates the path followed by the winding eye, as viewed from above in a vertical direction.

In the illustrative embodiment of the invention herein shown the reel comprises two hubs 2—2 mounted upon the shaft 4 and provided with sleeves 6, 6 keyed to said shaft and journaled in bearings 7. These bearings are mounted on brackets projecting forwardly from the side frame members 10, 10 to which they are secured in any suitable manner, as by bolts 12. The hubs 2, 2 are each provided with a plurality of arms 14 suitably secured in sockets 16 on the hubs. Herein each hub is provided with four arms 14 but any suitable number may be provided. The hubs 2, 2 are adjusted angularly on the shaft 4 in such manner that each arm 14 of one of the hubs is in alignment or in the same plane with an arm 14 of the other hub, the skein or hank being herein formed or wound on those two arms of the two hubs that are in the same plane, and preferably about the two that are directed upwardly from the hub, this being the operative position of the arms. By turning the shaft 4 the different pairs of arms on the two hubs may be brought into this operative position. Means are herein provided to hold or lock the reel against rotation when any two arms are in operative position. This means may be of any suitable construction but herein it comprises a disk 18 secured to the sleeve 6 of one of the hubs 2, herein to the hub shown at the right in Fig. 1, see Figs. 1 and 4. In the periphery of the disk 18 there are provided four notches 20, each adapted to be engaged by a latch 22 when one of the arms 14 on each of the hubs 2 is in a vertical position, this being the operative position.

The latch is pivoted at 24 upon the bracket 8. An arm 26 projecting from the latch 22 at an angle from the latter has its free end pivoted to a rod 28 having its lower end pivoted to a treadle 30 mounted for rocking movement upon a shaft 32. This shaft is journaled at its opposite ends in the two side frame members 10. The spring 34 has one end connected at 36 to the vertical part of the bracket 8, its free end being connected at 38 to the free end of an arm 40 connected to the latch 22. The spring 34 tends to keep the latch 22 in engagement with the notch 20 when the latter comes into proper position, and by pressing downwardly upon the treadle 30 the rod 28 will be drawn downwardly to swing the latch outwardly about its pivot 24 to free the reel so that the latter may be turned to bring another pair of arms 14 into operative position in which they may be locked by engagement of the latch 22 with the corresponding notch 20.

Means are also provided to hold the free end of the material to be wound during the winding or hanking operation. Such means may be of any suitable construction but herein conveniently comprises a member 42 secured at one end upon the top end of a rod 44 and provided in its free end

with a horizontal slot 46 open at one end. The lower wall 48 of this slot is provided with an opening adapted to receive a pin 50 carried by an arm 52 projecting from a sleeve 54 slidably mounted upon the rod 44 beneath the member 42. At its lower end the sleeve 54 is provided with an ear 56 which is located above and registers with an ear 58 projecting from the rod 44. Through the ears 56 and 58 there extends a rod 60 headed at 62 and encircled by a helical spring 64 bearing with its opposite ends against the ears 56 and 58 respectively. The lower end of the rod 60 is conveniently connected to the arm 26 of the latch operating mechanism above described.

From the above description it will be readily understood that when the treadle is pressed upon to withdraw the latch 22 from the notch 20 in the hub, the sleeve 54 will be drawn downwardly against the action of the spring 64, thus drawing the pin 50 downwardly in the slot 46 of the member 42 and freeing the material clamped between the upper end of said pin and the upper wall of the member 42. If the treadle be released the sleeve 54 will rise under the action of the spring 64 thus causing the pin 50 to clamp the material between it and the upper wall of the member 42. The upper end of said pin 50 will preferably be relatively pointed more securely to hold the material.

The main shaft 66 of the machine extends from front to rear thereof and is journaled in suitable bearings carried by the frame members and which it is unnecessary more fully to describe. The shaft 66 carries a pulley 68 adapted to be driven by a belt from any suitable source of power. This pulley is loose upon the shaft 66 to which it may be clutched when desired to drive the machine by any suitable clutch mechanism 70. Herein the clutch conveniently used is of the construction known as the Johnson clutch which it so well known that any further description thereof is unnecessary. A lug 72 is provided with studs 74 engaging an annular slot 76 in the clutch sleeve 70, the other end of said lug being rigidly connected to a rod 78 mounted in fixed bearings 80, 80 and provided at its free end (not shown) with means for operating the clutch in the usual manner.

At its forward end the shaft 66 is provided with a bevelled gear 82 which is adapted to mesh with a bevelled gear 84 fast upon a vertical shaft 86. This shaft is journaled in a sleeve 88 carried by a bracket 90 bolted or otherwise rigidly secured to the left side frame member 10, see Fig. 1.

The shaft 86 carries two cranks 92, 94 secured to the lower and upper ends of said shaft respectively.

The free end of the crank 92 is connected by a universal joint 96 to one end of a link 98, the other end of which is connected by a universal joint 100 to the end of an arm 102 rigidly secured to the winding arm 104.

The lower end of the winding arm 104 is pivotally connected by a universal joint at 106 to one end of a lever 108 having its other end rigidly secured to the shaft 32. To this shaft is also secured one end of a lever 109 pivotally connected at 110 to a curved link 112. The upper end of this link 112 is pivotally connected at 114 to a crank arm 116 mounted upon the end of a short shaft 118 mounted in suitable bearings 120 upon the rear frame member 122.

The shaft 118 carries a worm gear 124 which meshes with a worm 126 upon the rear end of the main shaft 66, for the purpose hereinafter more fully described.

The free end of the crank 94 is pivotally connected at 128 to a link 130, Figs. 2 and 3, having its other end pivotally connected at 132 to one end of a lever 134 pivoted at 136 to the frame of the machine. Intermediate its two ends, there is pivoted to the lever 134 one end of a link 138 having its other end pivoted at 140 to a frame 142 having a slot 144 through which extends the winding arm 104. The frame 142 is pivoted substantially centrally to a cross member 146 of the frame of the machine.

From the above description it will be apparent that by operation of the main shaft 66, the crank 92 will impart to the winding arm 104 a swinging movement transversely of the machine. while the crank 94 acting through links 130 and 138 and lever 134 and frame 142 will impart to said winding arm a reciprocating movement from front to rear of the machine. The resultant of these two movements will be to impart to the eye 148 of the winding lever a movement transversely of the machine substantially in the form of an elongated figure 8, as shown in Fig. 5, and as the upper end of the winding arm 104 is curved rearwardly and then downwardly and forwardly, substantially as shown in Fig. 4, so as to bring the eye 148 through which the material to be wound extends, into the horizontal plane of the upwardly directed arms 14, 14 of the two reel members, the eye 148 in the motion described will wind the material about said arms 14 in the form of a figure 8 or a hank.

Simultaneously with the two motions above described there will be imparted to the winding arm 104 an up and down movement, by means of the worm 126, gear 124, crank 116, link 112, lever 109, shaft 32 and arm 108, above described. This movement has for its object to prevent the windings from piling up upon each other upon the arms 14, 14 of the reel, by distributing them up and down the latter.

It will be understood that during the

winding operation the free end of the material to be wound is secured in the clamp 42, said material after passing through the eye 148 of the winding arm 104 passing over a pulley 150 sustained by a spring 152 from an upwardly directed standard 154 of the frame and guided vertically in a slot 156. Means are provided to produce a slight drag on the material, said means herein comprising a guide 158 having an eye 160 through which the material extends. The guide is pivoted by a yoke 162 to the pivot of the pulley 150 and thus tends to bind the material in the groove of the pulley by the downwardly directed weight of said guide resting on the material. If desired said guide may be held downwardly by a spring.

In operation, the material to be wound having been passed from the source of supply through the guide 158, over the pulley 150 and through the eye 148 of the winding arm, its free end is secured in the clamp 42 as above described and the clutch of the machine is then thrown in. The motions above described are thus communicated to the winding arm 104 which winds the material in the form of a hank upon the two then upwardly directed arms 14 of the reel. When a hank of sufficient size has been formed the clutch is thrown out, the material is severed at a suitable distance from the hank and the free end of the material having been released from the clamp 42 by downward pressure upon the treadle 30, the hank is removed from the arm 14. To facilitate removal the arms 14 are mounted for rotary movement so that they may be turned inwardly, their inclined upper ends being turned outwardly during the winding operation in order the better to retain the hank upon the arms.

To hold the arms 14 in their inturned or out-turned position, said arms are provided with locking means, herein conveniently consisting of spring pressed latches 164 adapted to engage suitably placed slots 166 provided in diametrically opposed position in a collar 168 upon said arm.

It will be apparent that it is not indispensable that all of the features of the invention be used conjointly, since they may be used to advantage separately in various combinations and sub-combinations. It will also be understood that, while the invention is herein described as embodied in the details illustrated, it is not to be considered as circumscribed by or limited to these details, or any of them, but that said details may be variously modified within the true scope of the invention which is definitely set forth by the claims.

Claims:

1. In a machine of the class described, in combination, means to hold the free end of the material to be wound; an eye through which the material to be wound extends between said holding means and its source of supply; reel members provided with arms upon which to wind the material, and mechanism comprising a movable arm and movable guide therefor to impart to said eye movement substantially in the form of an **8** to wind the material in the form of a hank upon said arm.

2. In a machine of the class described, in combination, means to hold the free end of the material to be wound; an eye through which the material to be wound extends between said holding means and its source of supply; reel members provided with arms upon which to wind the material; mechanism to impart to said eye movement substantially in the form of an **8** to wind the material in the form of a hank upon said arm, and mechanism to impart to said eye a reciprocatory motion lengthwise said arms to distribute the windings longitudinally thereon.

3. In a machine of the class described, two rotary reel members each provided with a plurality of radial arms upon which to wind the material; and treadle operated means to lock said reel members against rotation with a radial arm on each in operative position.

4. In a machine of the class described, a reel member mounted for rotary movement; a clamp to clamp the material to be wound; locking means to lock said reel member against rotation; and means to open the clamp and release said locking means to permit rotation of the reel member.

5. In a machine of the class described a reel; means to wind material upon said reel; mechanism to operate said winding means to wind the material on the reel substantially in the form of an **8**; a source of supply of the material to be wound; means to hold the free end of the material to be wound; and means operated by gravity between said winding means and the source of supply of the material to be wound to produce a drag on said material.

6. In a machine of the class described in combination, a reel having opposed members upon which to wind the material to be wound; winding means; and means comprising a swinging arm and swinging guide therefor to impart to said winding means a resultant movement to wind the material upon said opposed members substantially in the form of an **8**.

7. In a machine of the class described in combination, a reel having opposed members upon which to wind the material to be wound; winding means; means to impart to said winding means a resultant movement to wind the material upon said opposed members substantially in the form of an

8; and means to impart to said winding means; during the winding operation, a movement to distribute the windings upon said opposed members.

8. In a machine of the class described, in combination opposed arms upon which to wind the material to be wound; a member mounted for universal swinging movement between said arms; means upon said member to engage the material to be wound; a guide for said member extending transversely thereof; and mechanism to move said member and guide to impart to the thread engaging means a movement substantially in the form of an 8 to wind said thread upon said opposed arms in the form of a hank.

9. In a machine of the class described, a reel member mounted for rotary movement; a clamp to clamp the material to be wound; opposed arms on said reel; means to wind the material upon said arms substantially in the form of an 8; locking means to lock said reel member against rotation; and means simultaneously to open said clamp and release said locking means.

In testimony whereof, I have signed my name to this specification.

ARTHUR E. DUNHAM.