Jan. 22, 1935. S. E. BRILLHART ET AL 1,988,437

STRAND REELING MACHINE

Filed Nov. 2, 1932 2 Sheets-Sheet 1

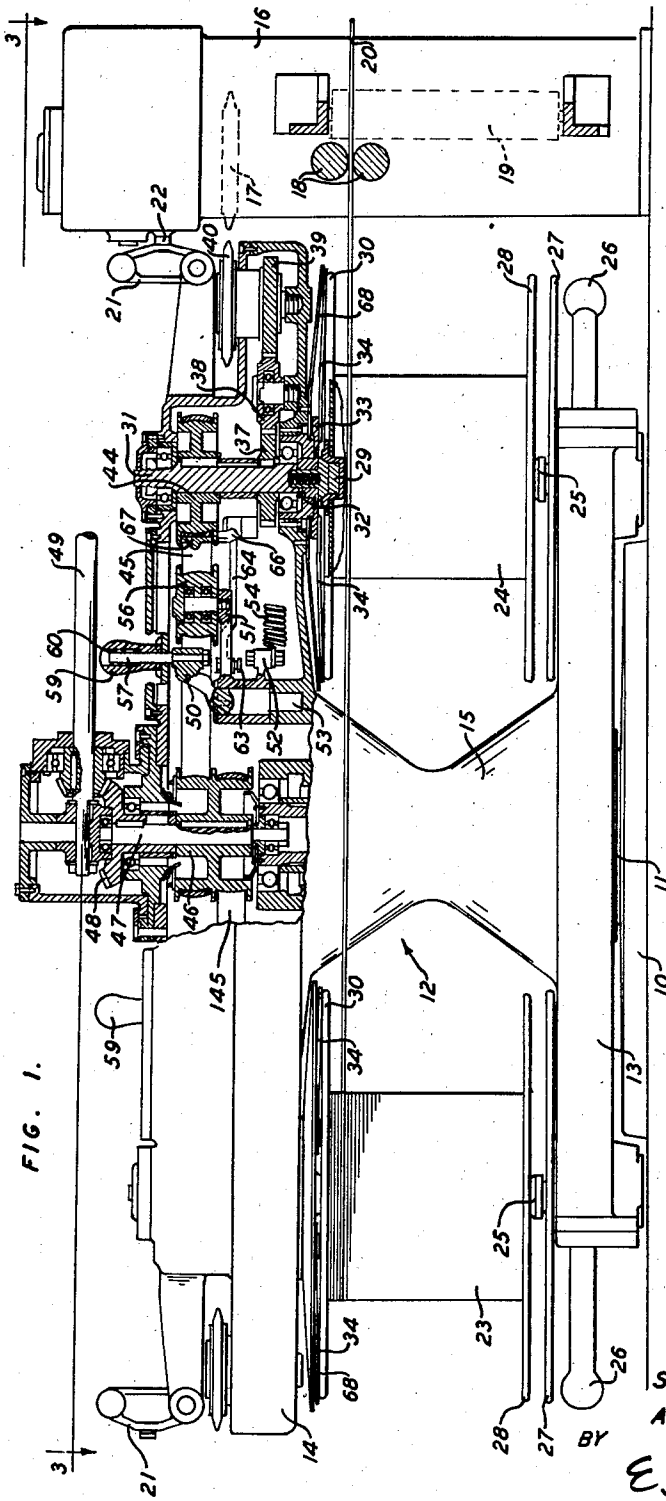


FIG. 1.

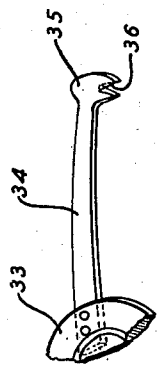


FIG. 2.

INVENTORS
S. E. BRILLHART
A. LEBOUTILLIER

BY

E. R. Nowlan
ATTORNEY

Jan. 22, 1935. S. E. BRILLHART ET AL 1,988,437

STRAND REELING MACHINE

Filed Nov. 2, 1932 2 Sheets-Sheet 2

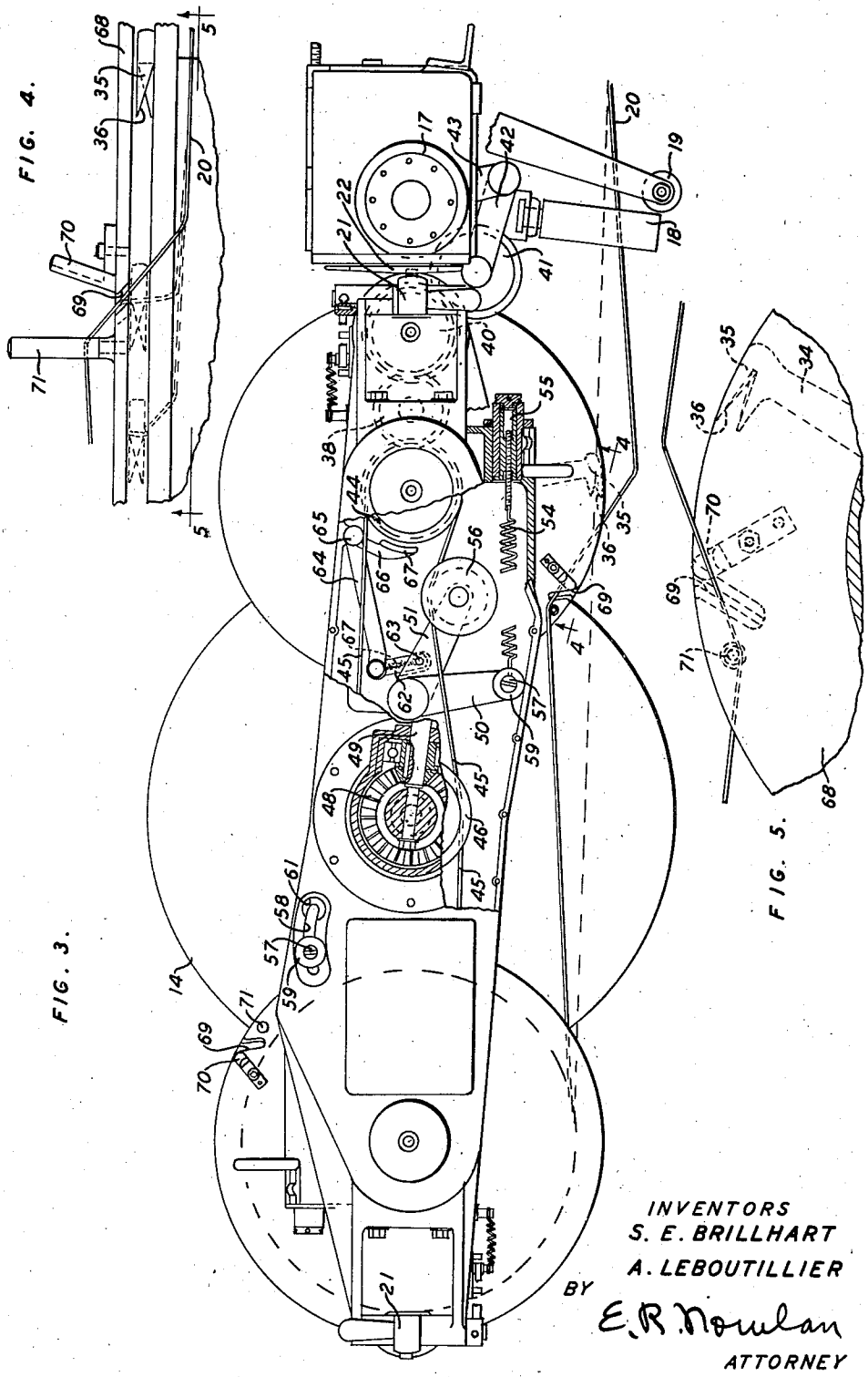


FIG. 4.

FIG. 5.

FIG. 3.

INVENTORS
S. E. BRILLHART
A. LEBOUTILLIER
BY
E. R. Nowlan
ATTORNEY

Patented Jan. 22, 1935 1,988,437

UNITED STATES PATENT OFFICE

1,988,437

STRAND REELING MACHINE

Samuel E. Brillhart and Austin Le Boutillier, Baltimore, Md., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application November 2, 1932, Serial No. 640,806

12 Claims. (Cl. 242—25)

This invention relates to strand reeling machines, and more particularly to such machines where it is desirable that the flow of the strand to be reeled to the reels of the reeling machine shall be uninterrupted and of substantially unvarying velocity.

The primary object of the invention is to permit continuous reeling of a strand at substantially unvarying speed and without imposing injurious stresses or changes of stress upon the strand.

One embodiment of the invention presents a reeling machine having a rotatable reel holding frame with a plurality of reels mounted therein and means to drive the reels independently of each other at relatively equal and substantially uniform speed and with adjustably predeterminable maximum driving power delivered thereby to the reels. The parts are so arranged and related that when a reel is nearly filled, a partial rotation of the frame will bring an empty reel, already rotating at strand winding speed, into winding position; and means are provided to catch and cut the strand and attach it to the empty reel without interrupting or slackening the flow of the strand.

Other objects and advantages of the invention will appear more fully from the following detailed description, taken in connection with the accompanying drawings, wherein

Fig. 1 is a broken view in front elevation and partly in vertical section of a strand reeling machine embodying the invention;

Fig. 2 is a detached perspective view of a reel drive arm showing the strand catching head thereof;

Fig 3 is a broken plan view partly in horizontal section on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary view in front elevation showing the strand catching, severing and clamping means, and

Fig. 5 is a similar view in reverse plan on the line 5—5 of Fig. 4.

In carrying out the invention as herein disclosed there is employed a strand reeling machine having a mounting base 10 securely mounted on a floor or other foundation. The base 10 carries an upstanding pivot pillar 11 on which is mounted with freedom to rotate thereon a bilaterally symmetrical reel carrying frame generally indicated by the numeral 12 comprising a base portion 13, a top casing 14, and an intermediate central pillar 15, by which latter the frame base 13 and the top casing 14 are spaced apart and held together.

Beside the general structure thus far described there is provided a separate distributor casing 16 containing mechanism for distributing the coils of a strand being wound on a reel in regular order. The nature and details of this mechanism are irrelevant to the present invention and so are not disclosed here, being well known in winding and reeling machines generally. It suffices to note that the distributor is driven by an angular faced metal sheave 17 deriving power from the reeling mechanism as will be described hereinafter. A strand being reeled is guided by horizontal and vertical guide rolls 18—18, between which the strand 20 passes and which are carried up and down by the distributor mechanism (not shown). A vertical guide roll 19 is used to suppress excessive lateral displacement of the strand when it is manipulated as hereinafter described.

The entire frame 12 is rotatable on the pillar 11, and is provided on the upper face of the top 14 with two identical latches 21—21 which cooperate with a complementary notched locking member 22 formed on the casing 16. The latches 21 are spring pressed in any approved manner (not shown) to releasably engage the member 22 for holding the reel frame 12 in either of two positons 180° apart.

The frame 12 and its associated parts are adapted and arranged to hold and drive a pair of strand winding or take-up reels 23 and 24. In the frame base 13 is mounted a pair of cone-topped, freely rotatable pivots 25—25 to engage in central axial sockets in the lower heads 28—28 of the reels 23 and 24 to support the reels. The pivots 25—25 are retractible downwardly by any convenient mechanism (not shown) actuated by the levers or pedals 26—26 to be disengaged individually from the reels.

The base 13 is further provided with fixed circular bottom reel guards 27—27 coaxial with and a little larger in diameter than the neighboring, lower reel heads 28—28.

At its upper end each reel 23 or 24 is centrally engaged by a spring pressed plug 29, as shown in the right hand side of Fig. 1, which enters a central axial socket in the upper reel head 30. The plug 29 has formed thereon an axial longitudinally bored stem seated in a corresponding axial bore in the lower end of a reel drive shaft 31 journalled in antifriction bearings mounted in the top casing 14. The plug 29 has a limited freedom of longitudinal motion relative to the shaft 31, being held in place by a set screw 32 passing through the wall of the bore in the lower end of the shaft 31 and entering a slightly elongated vertical slot in the upstanding stem of the

plug. A compression spring located in the bore in the stem of the plug 29 and bearing against the bottom of the bore in the shaft 31 keeps the plug urged downwardly thus allowing for minor variations in the vertical dimensions of the reels.

At its lower end, the shaft 31 is formed with an integral collar 33 to the under side of which is rigidly attached a plurality of radially horizontally extending reel drive arms 34. These arms 34 are made of stiffly elastic material and are curved slightly downwardly, as shown in Fig. 2. Each arm 34 is formed at its outward extremity with a head 35, flattened horizontally and formed with a wedge shaped notch 36 whose function will appear hereinafter.

Just above its lower bearing the shaft 31 has keyed thereto a gear 37, which through intermediate gears 38 and 39 drives an angular faced metal sheave 40 corresponding and juxtaposed to the similar drive sheave 17 of the distributor. A rubber faced grooved sheave 41 (Fig. 3) is rotatably mounted on an arm 42 pivoted in a lug 43 formed on the casing 16. For simplicity this sheave 41 and the arm 42 and lug 43 are omitted from Fig. 1. The arm 42 is spring pressed by any approved means (not shown) to keep the rubber faced sheave 41 normally in contact with the sheaves 40 and 17 whereby the sheave 17 and therewith the distributor mechanism are driven from the shaft 31. When the frame 12 is rotated on the pillar 11, as hereinafter described, the arm 42 yields to permit the sheave 40 to pass the sheave 41.

Near its upper end, the shaft 31 has keyed thereto a belt pulley 44 which is driven by a corresponding belt 45 from a double grooved belt pulley 46 keyed to a vertical central drive shaft 47 suitably journaled in antifriction bearings carried by the casing 14. The pulley 46 also drives a second belt 145 extending to the left in Fig. 1 and in turn driving a twin set of mechanism on the left of the shaft 47, corresponding to that on the right. A bevel gear 48 keyed to the upper part of the shaft 47 is driven by a coacting bevel gear keyed to a main power shaft 49 driven by any approved power source (not shown).

A bell crank having three arms 50, 51 and 52 is pivoted on a pin 53 mounted in the casing 14. To the outer end of the arm 52 is attached one end of a tension spring 54 whose other end is anchored to the casing 14 by any approved tension adjusting means such as the turnscrew device generally indicated at 55. The outer end of the bell crank arm 51 carries a belt tightener pulley 56 mounted to rotate thereon on antifriction bearings and shown in Fig. 3 as pressing against the belt 45 under the tension of the spring 54. The third arm 50 of the bell crank is provided with a pin 57 extending up through the top of the casing 14 through an arcuate slot 58 therein. A handle 59 is mounted on the pin 57 and can be longitudinally slid thereon against the spring tension of a spring 60 interposed between the handle and the pin. At the end of the slot 58 away from the spring 54 is located a recess 61 adapted to receive the lower end of the handle 59 and thereby to lock the bell crank when rotated against the pull of the spring 54. By lifting the handle 59 against the urge of the spring 60 the crank is released to move under the pull of the spring 54 and press the tightener pulley 56 against the belt 45.

Near its inner or pivotal end, the arm 51 is attached to a link 62 by means of a pin 63 rigidly mounted in the arm and passing through a slot longitudinally located in one end of the link. The other end of the link is pivoted to the outer end of the arm 64 of a bell crank mounted on a pivot pin 65 carried by the casing 14. The other arm 66 of this bell crank carries a brake shoe 67 for coaction with the face of the pulley 44. A compression spring 67 abuts at one end against the pin 63 and at the other end against the pivot whereby the link 62 is attached to the arm 64.

At each end of the casing 14 one of a pair of top reel guards 68—68 is rigidly attached to the under surface of the casing. These reel guards are rigid, slightly conical discs, positioned over the reels 23 and 24 coaxially therewith, and are slightly larger than the reels in diameter. Each reel guard 68 is formed with a slot 69 extending inwardly from the periphery of the guard at an acute angle to the radial direction of the guard at the mouth of the slot. The side walls of the slot are parallel to each other and slope from left up to right down (Fig. 4). A pair of strand guide pins 70 and 71 is mounted rigidly on the top of the guard, one on each side of the slot 69.

To describe the operation of the machine, let it be assumed that the machine is running and is reeling or taking-up the strand 20, coming from some undisclosed source, upon a reel on the right hand side in the position of the reel 24 as shown in Fig. 1. Let it be assumed that this reel is full and it is desired to change the reeling of the strand to an empty reel. Let it be further assumed that there is no reel in the left side of the machine in the position of reel 23 as shown in Fig. 1 and that the left hand handle 59 is in the corresponding socket 61. In this position of the handle 59 the left hand mechanism is stationary as the corresponding tightener pulley 56 is drawn back leaving the belt 145 slack and the corresponding brake shoe 67 is pressed against the corresponding pulley 44 holding the same motionless.

By actuating the left hand lever 26 the corresponding pivot 25 is drawn down into the base. An empty take-up reel is now placed in position and the lever 26 returned. The pivot 25 rises into the central socket of the reel head 28 and lifts the reel. The plug 29 enters the central socket of the reel head 30 and the spring arms 34 have their heads 35 engaged frictionally with the top surface of the upper reel head 30.

The handle 59 at the left is lifted out of the recess 61 and allowed to swing under the pull of the tension spring 54. The bell crank 50, 51, 52 rotates into a position corresponding to that shown in the right hand side of Fig. 3, thus retracting the brake shoe 67 from the pulley 44 and pressing the tightener pulley 56 against the belt 45 bringing the pulley 44 up to speed and with it the shaft 31, its collar 33 and the reel driving arms 34, which by virtue of their frictional engagement with the reel head 30 drive the reel.

Now the right hand latch 21 is disengaged from the member 22 and the entire frame 12 is rotated 180° clockwise (Fig. 3) until the other latch 21 engages the member 22, bringing the whole into the position shown in Figs. 1 and 3. In the embodiment herein disclosed the frame 12 is turned by hand, although power means may be provided if desired.

The strand 20 is then lifted, manually or by any suitable device and without interrupting or appreciably affecting its motion, from the path shown in full lines in Fig. 1 and in dotted lines in Fig. 3 to the path shown in full lines in Figs.

3, 4 and 5, passing through the slot 69 and between the guide pins 70 and 71.

The next driving arm head 35 which sweeps past the slot 69, catches the strand in its notch 36, severs the same at once against the sharp lower edge of the trailing side of the slot 69 and jams the new front end of the strand simultaneously between the under face of the driving arm head 35 and the upper face of the top reel head 30. Thus the strand is practically instantaneously caught, cut and attached to the new reel to be wound thereby without interrupting or appreciably affecting its motion.

The empty reel just before the above takes place is rotating a trifle faster than the full reel as it is not subject to the drag of the strand. Hence it picks up the winding pull on the strand immediately and no slack is formed in the strand.

The handle 59 now at the left is pushed over and engaged in the corresponding recess 61 thus discontinuing the power and applying the brake to the drive of the full left hand reel 23. When the reel stops, the lever 26 is actuated and the reel removed, thus bringing back the state of affairs presented at the beginning of this consideration of the operation of the machine.

The effectiveness of the drive of the pulley 44 by the pulley 46 depends upon the pressure of the tightener pulley 56 against the belt 45. The tension of the spring 54 is adjusted so that the belt 45 is just about to slip or does slip a trile on the pulley 44 at the desired winding speed of the strand 20. Then if any extra stress is imposed during the change-over from reel to reel or from any other cause, the reel is able to yield momentarily by the slipping of the belt 45 on the pulley 44 and pick up again the moment the disturbance has passed. Thus the strand is protected against shocks and sudden stresses or changes of stress while at the same time the reeling of the strand is done continuously.

It will be obvious that the embodiment herein disclosed is only illustrative and not exhaustive of the invention and may be varied in many ways without departing from the spirit and scope of the invention as principally characterized by a reeling machine having means to transfer a moving strand from one reel to another without affecting the progress of the strand in combination with means to protect the moving strand at all times from sudden stresses or changes of stress and as further characterized by additional features and combinations thereof more minutely particularized and pointed out in the appended claims.

What is claimed is:

1. In a strand reeling machine having means to support a plurality of reels, a member engageable with one of the reels to drive the same and coacting therewith to catch, sever and grip a strand to be reeled on the said reel.

2. In a strand reeling machine having means to support a plurality of reels, means to drive a reel and to effect a transfer of a moving strand from one of said reels to another of said reels comprising a member engageable with the second of said reels to drive the same and coacting therewith to catch, sever and grip the strand.

3. In a strand reeling machine having means to support a plurality of reels, means to drive a reel and to effect a transfer of a moving strand from one of said reels to another of said reels comprising a member engageable with the second of said reels to drive the same and coacting therewith to catch, sever and grip the strand, and means to guide the moving strand to the said member.

4. In a strand reeling machine having means to support a plurality of reels, means to effect a transfer of a moving strand from one of said to another of said reels comprising a spring pressed arm associated with the second of the said reels having a slotted head to catch, sever and grip the strand.

5. In a strand reeling machine having means to support a plurality of reels, means to effect a transfer of a moving strand from one of said to another of said reels comprising a spring pressed arm associated with the second of the said reels having a slotted head to catch, sever and grip the strand, the slot in the said head being tapered longitudinally and inclined transversely.

6. In a strand reeling machine having means to support a plurality of reels, means to effect a transfer of a moving strand from one of said to another of said reels comprising a spring pressed arm associated with the second of the said reels having a slotted head to catch, sever and grip the strand, and means to guide the moving strand comprising a slotted guard adjacent to the second of said reels.

7. In a strand reeling machine having means to support a plurality of reels, means to effect a transfer of a moving strand from one of said to another of said reels comprising a spring pressed arm associated with the second of the said reels having a slotted head to catch, sever and grip the strand, the slot in the said head being tapered longitudinally and inclined transversely, and means to guide the moving strand comprising a slotted guard adjacent to the second of said reels and a pin positioned on either side of the slot in the said guard.

8. In a strand reeling machine having means to support a plurality of reels, means to effect a transfer of a moving strand from one of the said reels to another of the said reels comprising a reel guard provided with means to guide the strand in a path divergent from normal and a member associated with the said other reel to catch, sever and grip the strand when the strand is travelling along the divergent path.

9. In a strand reeling machine having two driven reels, means to interchange the position of the two reels, and means to transfer a strand being reeled from one of the said reels to the other of the said reels comprising a member associated with the said other reel to catch, sever and grip the strand without affecting the progress of the strand.

10. In a strand reeling machine having means to support a plurality of reels, a reel driving spindle and a spring pressed arm carried thereby and engageable with one of the said reels to drive the same and having a slotted head to catch, sever and grip a strand.

11. In a strand reeling machine having means to support a plurality of reels, means to interchange the positions of the said reels, a main drive shaft, a driven shaft, means interposed between the drive shaft and the driven shaft to transmit power therebetween only up to a predeterminable maximum amount, and means connected to the driven shaft to engage one of the said reels to drive the same and including means to catch, sever and grip a strand.

12. In a strand reeling machine having means to support a plurality of reels, means to interchange the positions of the reels comprising a

rotatable reel carrying frame, means to drive one of the said reels comprising a drive shaft, a driving pulley thereon, a driven shaft, a driven pulley thereon, a belt to transmit power from the driving pulley to the driven pulley, an idler pulley in engagement with the belt, adjustable means to vary the pressure of the idler pulley against the belt, means whereby the driven shaft may drive a reel comprising a spring pressed arm carried by the driven shaft and frictionally engageable with the reel to drive the same, and in combination therewith means to effect a transfer of a moving strand to the driven reel comprising a stationary reel guard, a strand guide thereon to guide the strand in a path divergent from normal, and a slotted head on the spring pressed arm to catch, sever and grip the moving strand when in its divergent-from-normal path.

SAMUEL E. BRILLHART.
AUSTIN LE BOUTILLIER.