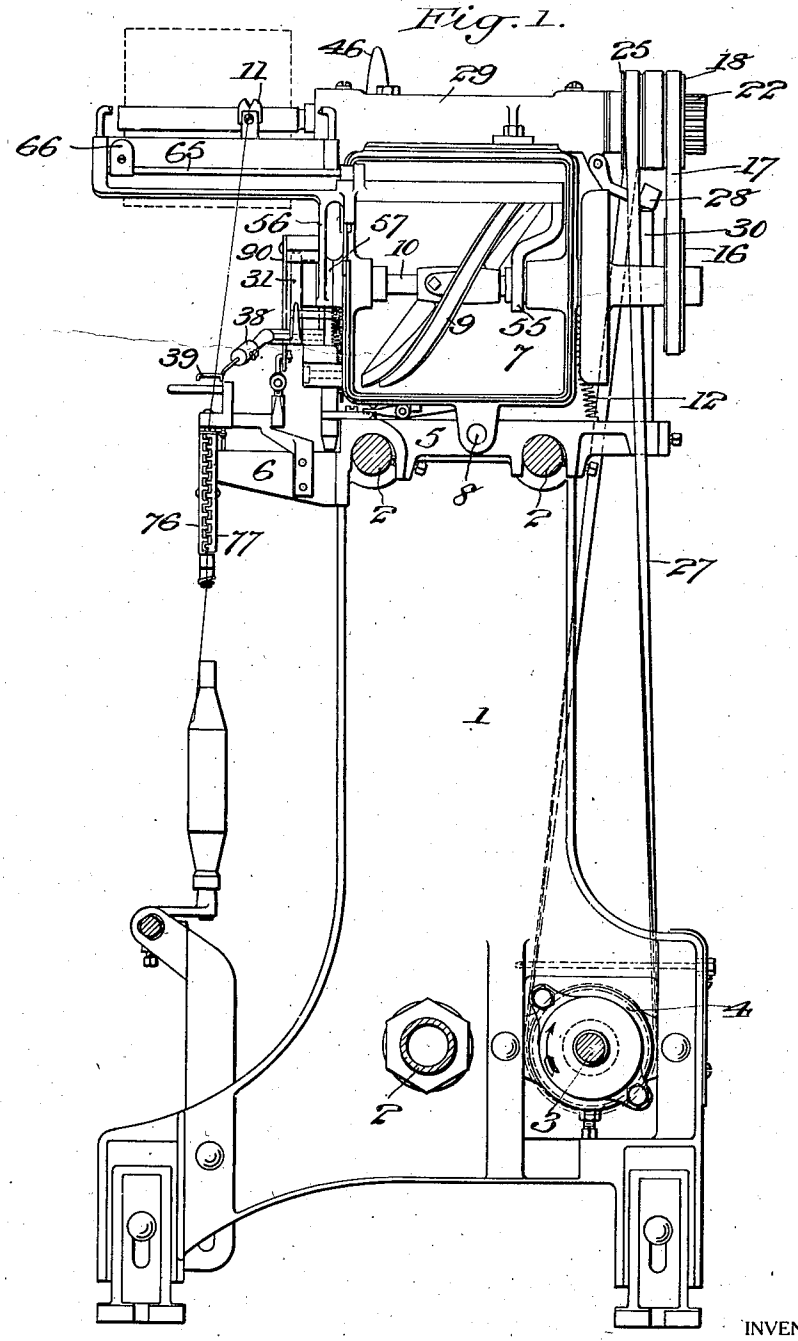
Nov. 1, 1927. 1,647,534

J. O. McKEAN

WINDING MACHINE

Filed May 16, 1924 6 Sheets-Sheet 1

Fig. 1.



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Cummings & Cummings

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Nov. 1, 1927.

1,647,534

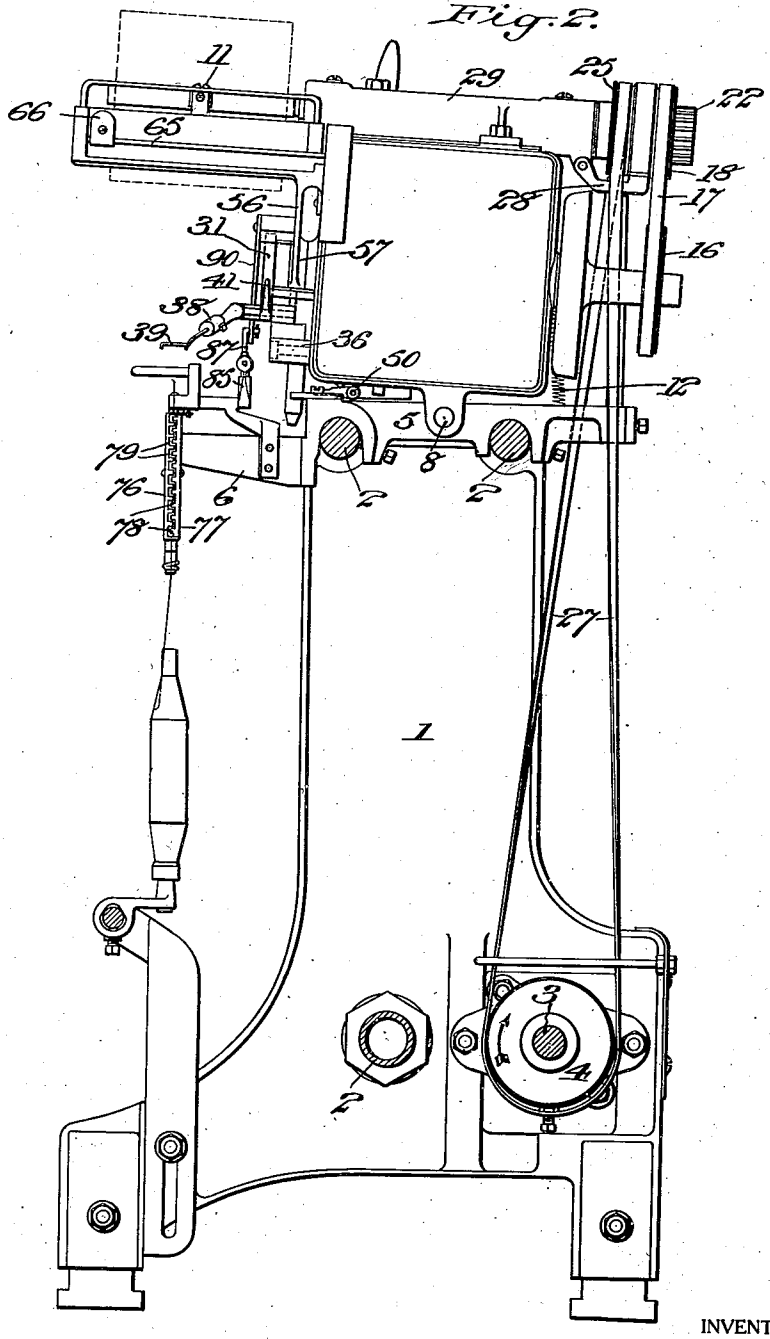
J. O. McKEAN

WINDING MACHINE

Filed May 16, 1924

6 Sheets-Sheet 2

Fig. 2.



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Nov. 1, 1927.

1,647,534

J. O. McKEAN

WINDING MACHINE

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6 Sheets-Sheet 3

Fig. 3.

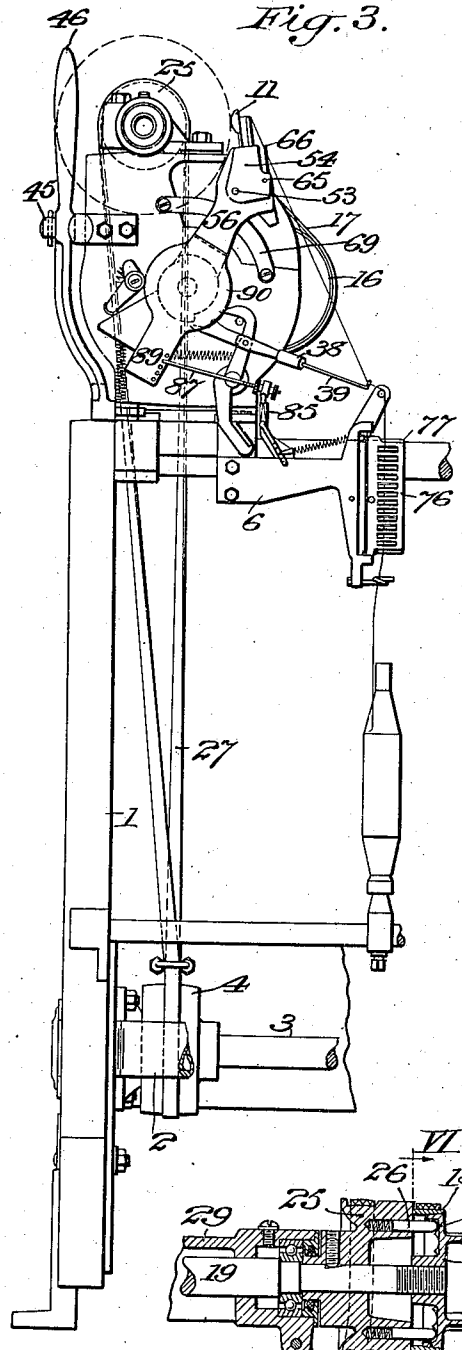


Fig. 4.

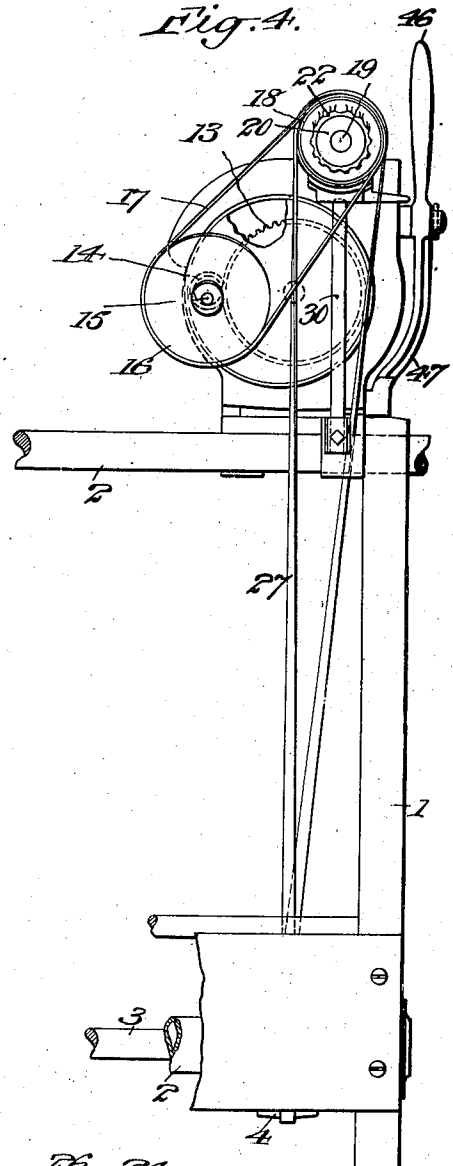


Fig. 5.

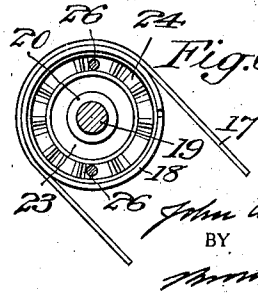


Fig. 6.

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Nov. 1, 1927.

1,647,534

J. O. McKEAN

WINDING MACHINE

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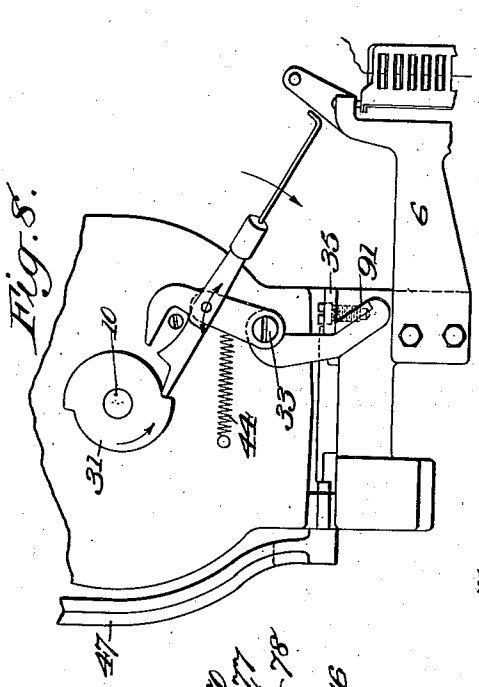


Fig. 8.

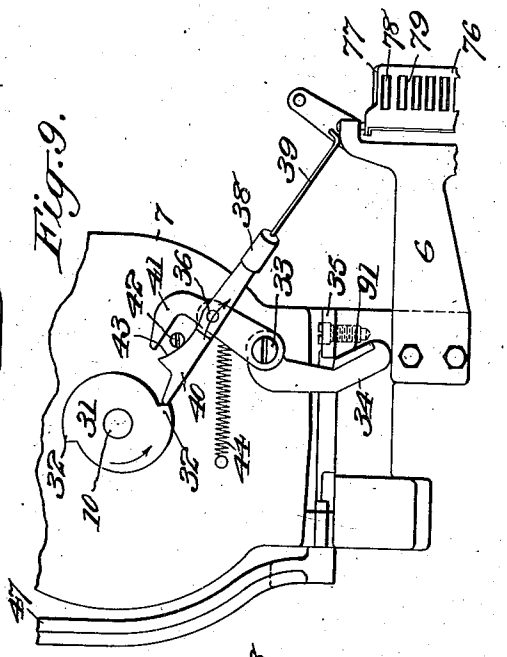


Fig. 9.

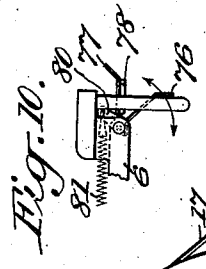


Fig. 10.

Fig. 7.

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WINDING MACHINE

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Fig. 11.

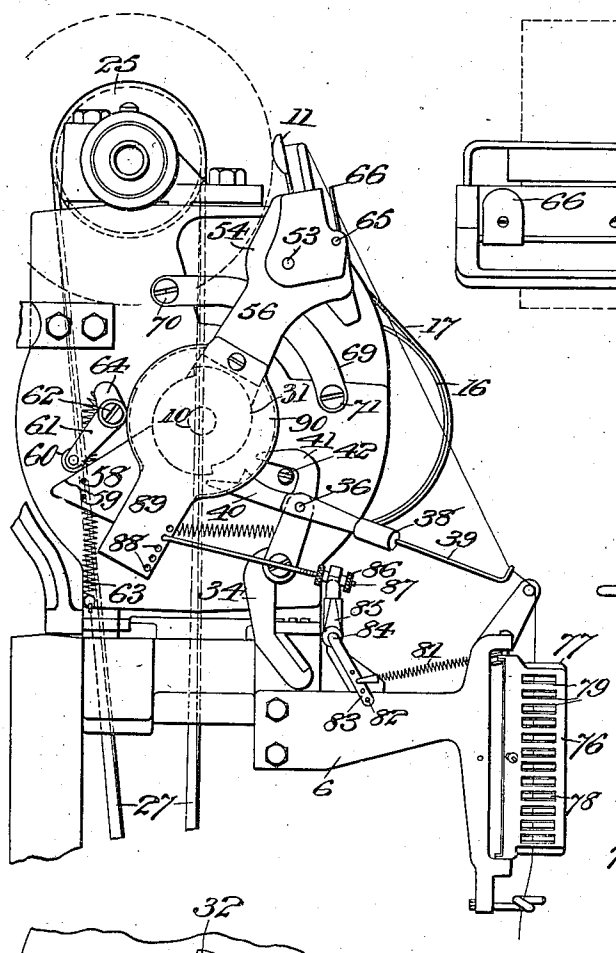
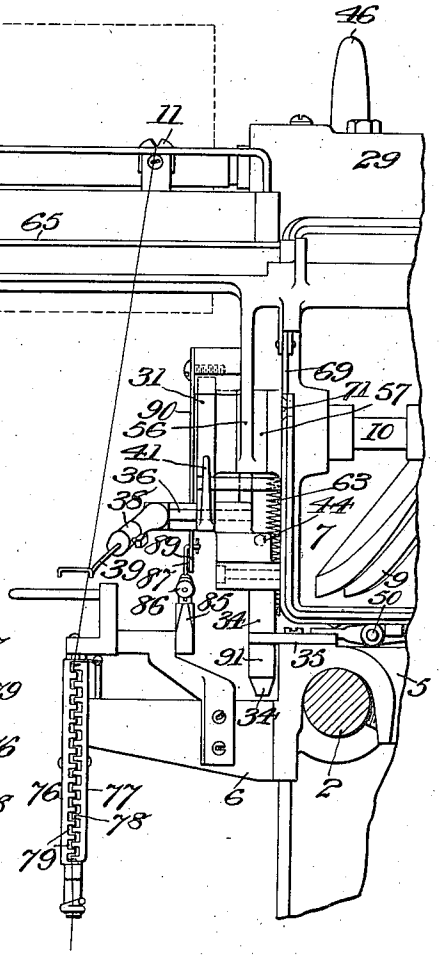


Fig. 12.



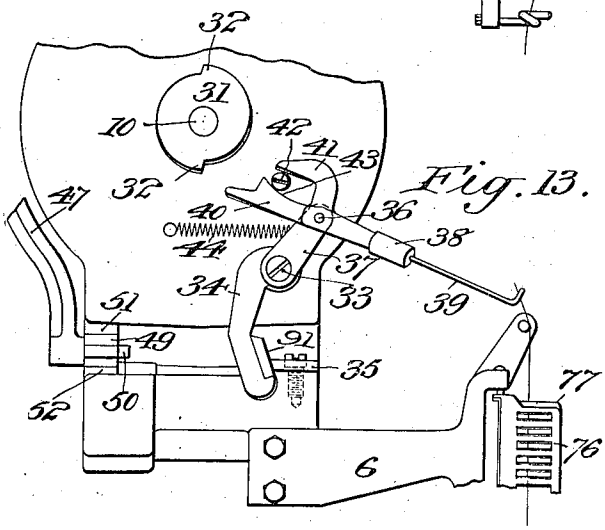


Fig. 13.

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Nov. 1, 1927. 1,647,534

J. O. McKEAN

WINDING MACHINE

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Fig. 14.

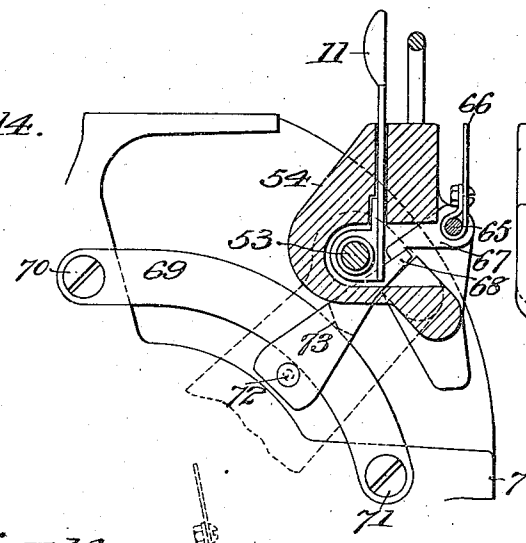


Fig. 15.

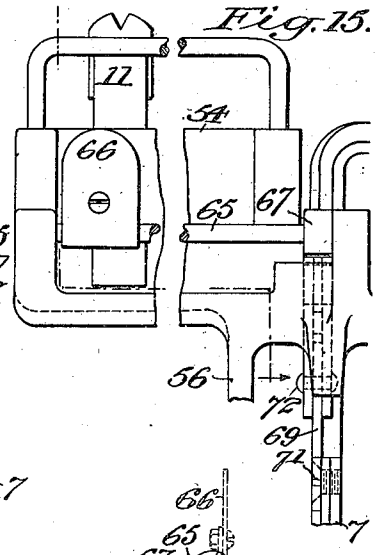


Fig. 16.

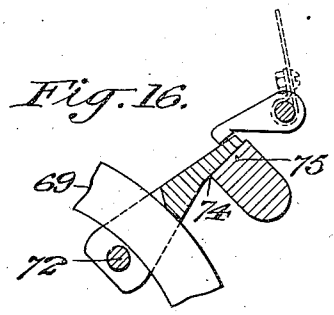


Fig. 17.

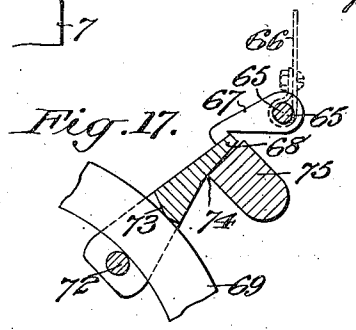


Fig. 18.

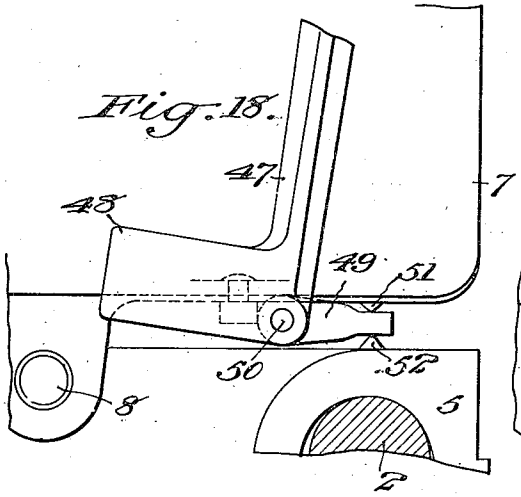
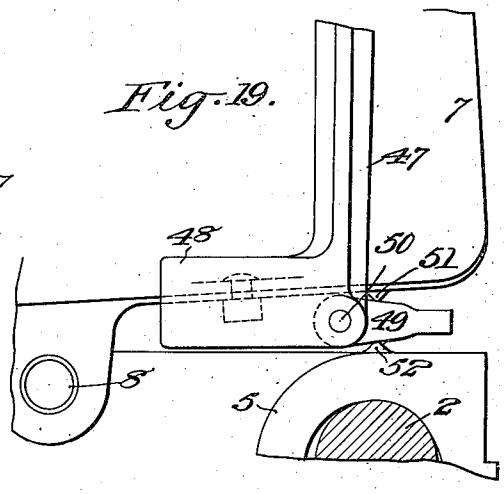


Fig. 19.



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Patented Nov. 1, 1927. 1,647,534

UNITED STATES PATENT OFFICE.

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WINDING MACHINE.

Application filed May 16, 1924. Serial No. 713,740.

This invention provides certain improvements in the construction, form and arrangement of the several parts of a belt-driven tube or cone winding machine for winding thread or the like, whereby the operation of the machine is facilitated, its life and efficiency materially increased and its cost of production decreased.

This invention comprises a belt driven winding head including a complete winding unit which is automatically movable to stop the winding operation when the thread or the like is broken, or the supply is exhausted, this movement automatically relieving the driving belt from its stretched driving condition, permitting the belt to return to its normal non-stretched condition; thereby increasing its driving efficiency and life.

This invention also comprises a manually released lever arranged to automatically lock the winding head in its "non-winding" or inoperative position.

This invention also comprises novel means whereby the pressure on the cop being wound and the tension on the thread or the like are both gradually decreased as the winding of the cop proceeds.

This invention also comprises a novel steadying device for the guide mechanism for the thread or the like, which steadying device includes a manually released steadying catch lever for permitting the free outward movement of the thread guide mechanism but preventing the unintentional inward movement of the guide mechanism during the winding of the cop.

This invention is equally well adapted for either tube or cone winders by the application of the proper holder and the adjustment of the position of the holder. In the present instance the machine is shown as a tube winder, only one winding head being shown and described, it being understood that the machine may include as many winding heads as desired.

A practical embodiment of this invention is represented in the accompanying drawings, in which

Fig. 1 represents a vertical cross section through the machine, with the parts shown in their "winding" or operative position.

Fig. 2 represents a similar section with the parts in their "non-winding" or inoperative position.

Fig. 3 represents a detail front elevation with the parts in their "winding" position.

Fig. 4 represents a detail rear elevation with the parts in their "non-winding" position.

Fig. 5 represents a detail section, on an enlarged scale, of the brake and gainer mechanisms.

Fig. 6 represents a detail section taken in the plane of the line VI—VI of Fig. 5.

Fig. 7 represents a detail front elevation, on an enlarged scale, of the winding head and its adjacent parts, in the positions they assume, as the winding of the cop is started.

Fig. 8 represents a similar detail view, showing the positions of certain of the parts, immediately after the thread or the like breaks, or the supply is exhausted.

Fig. 9 represents a similar view, showing the next positions of the parts in the action of the stop motion.

Fig. 10 represents a detail top plan of the thread tension device.

Fig. 11 represents a view similar to Fig 7, with the parts in the positions they assume after a considerable portion of the cop has been wound.

Fig. 12 represents a detail side elevation of the same.

Fig. 13 represents a detail front elevation, showing the positions of the parts of the stop motion after the winding head has moved to stop the winding of the cop.

Fig. 14 represents a detail view, partly in elevation and partly in section, of the guide and guideway, showing more particularly the manually released device for preventing the unintentional inward movement of the guide.

Fig. 15 represents a detail front view of the same.

Fig. 16 represents a detail section, showing the steadying catch lever of the guideway in released position.

Fig. 17 represents a similar view, showing the steadying catch lever in working position.

Fig. 18 represents a detail elevation, show-

ing the manually released winding head locking lever in its "released" position.

Fig. 19 represents a similar view, showing the manually released winding head lever in its "locking" position.

The winding machine frame includes the upright 1 and connecting bars 2, of well known or approved construction. The common drive shaft is denoted by 3 and the drive pulley thereon for the winding head to be described, by 4. The base 5 for the winding head which includes the complete winding unit is mounted on the two upper bars 2, 2, from which base projects the bracket 6 for holding the thread tension device.

The housing 7 of the winding machine head is movable from its "winding" or operative position to its "non-winding" or operative position. In the present instance it is pivoted at 8, about midway between its ends, to have a limited rocking or tilting movement on the base 5. Within this housing 7 is located the rotary cam 9, fixed to the shaft 10, which cam controls the reciprocating movement of the thread guide 11, in the usual manner. A spring 12, extending between the base 5 and the housing 7, tends to rock the head to its "non-winding" position, when the stop motion mechanism releases the head, due to the breaking of the thread, or the exhaustion of the supply.

The cam shaft 10 is provided with a gear 13 which meshes with a pinion 14 on the auxiliary shaft 15, which shaft is provided with a pulley 16 driven by the short belt 17 from the "gainer" or expansion split pulley 18, mounted on the cop holding spindle shaft 19. It will be understood that the pulley 16 is interchangeable for different ratios of wind and that the pulley 18 may be expanded and contracted to vary its diameter, producing a gain or loss in the drive, as may be found necessary.

The means herein shown for expanding and contracting the split "gainer" pulley 18 to gain or lose in the wind, comprises a nut 20, screw-threaded onto the end of the spindle shaft 19, which nut is provided with a conical or tapered flange 21, fitted within the split pulley 18. The nut 20 is provided with a knob 22 for turning the nut to expand or contract the pulley. The parts are held in their adjusted position by providing the web 23 of the nut with an annular series of depressions 24 and providing the belt driven spindle shaft pulley 25 with one or more spring pressed pins 26, engaging certain of said depressions. This spindle shaft pulley 25 is driven from the pulley 4 on the common drive shaft 3, through the belt 27, when the head is in its "winding" position. When the head is rocked or tilted to its "non-winding" position, by the breaking of the thread or the like, or the exhaustion of the supply, the belt driven spindle shaft pulley 25 will be moved toward the main drive pulley 4, sufficiently to loosen the belt and stop the driving of the pulley 25 from said pulley 4, through said belt. To ensure the immediate stopping of the spindle shaft pulley 25, there is provided a lever brake 28 which is pivoted to the spindle shaft housing 29 with its brake shoe resting upon the upper end of a vertically adjustable rod 30, in position to frictionally engage the spindle shaft pulley 25.

The stop motion mechanism for causing the winding head to rock from its "winding" position to its "non-winding" position when the thread or the like breaks, or the supply is exhausted, is constructed, arranged and operates as follows:

A rotary kicker 31, in the present instance provided with two peripheral abutments 32, is fixed to the outer end of the cam shaft 10, exterior to the winding head housing 7. A latch lever is pivoted at 33 to the housing 7, the depending latch arm 34 of which lever is arranged to be engaged with and disengaged from the keeper 35, secured to the base 5 for holding the head in its "winding" position. The drop wire lever is pivoted at 36 to the upper end of the arm 37 of the latch lever, which drop wire lever is provided with one arm 38, bearing the drop wire 39 for engaging the thread or the like, and another arm 40 arranged to be brought into and out of engagement with one of the abutments 32 of the rotary kicker 31, as will be hereinafter explained. This drop wire lever is also provided with a hook arm 41. A trip pin 42 projects from the housing 7 between the arms 40 and 41 of the drop wire lever, which pin, together with the arms 40 and 41, serves not only to limit the swinging movement of the drop wire 39, but also coacts with the cam surface 43 of the arm 40, to swing the drop wire upwardly into threading position when the stop motion has acted to stop the winding of the cop. A spring 44 extending between the housing 7 and the arm 37 of the latch lever tends not only to swing the latch lever in a direction to bring the latch arm 34 into locking engagement with its keeper 35, but also tends to hold the drop wire lever in position to be operated by the kicker when the drop wire falls because of the breaking of the thread or the like, or the exhaustion of the supply; it being understood that the arm 40 of the drop wire lever is normally held out of the path of the rotary kicker by the engagement of the thread or the like with the drop wire 39.

To prevent the unintentional movement of the winding head, from its "non-winding" position to its "winding" position, a manually released lever is provided for auto-

matically locking the winding head when it rocks to its "non-winding" position. This lever is pivoted at 45 to the housing, its upper arm 46 being developed into a handle and its lower arm 47 in the present instance being weighted, as shown at 48. A wedge 49 is pivoted at 50 to the weighted end of the arm 47 of the lever, which wedge is located between projections 51 and 52 on the housing and base respectively.

The guide mechanism for the thread or the like is constructed, arranged and operated as follows:

The thread guide 11, hereinbefore referred to, is reciprocated upon the guide bar 53, suitably mounted in the guideway 54, which guideway is provided with the usual arms 55, 56, loosely mounted on the cam shaft 10. The hub 57 of the guideway arm 56 is provided with a depending cam arm 58, the cam surface 59 of which is engaged by a stud or roller 60, carried by the arm 61 of a pressure lever pivoted at 62 on the winding head housing. A spring 63 connects the other arm 64 of said pressure lever with the winding head housing 7. The relative positions of the spring and lever arm 64 and the length of said arm are such that the spring causes the lever arm 61 to exert its greatest pressure on the cam arm 58 at the start of the winding operation, which pressure gradually decreases as the size of the cop increases.

Means are provided for keeping the outward movement of the thread guide steady and prevent it from chattering as the cop is being built up, which means is constructed, arranged and operating as follows:

A rock shaft 65 is mounted in the guideway 54, parallel to the guide bar 53, which rock shaft is provided near its outer end with a hand lever 66 and near its inner end with a release arm 67 which engages the free end of a steadying catch lever 68, which steadying lever is bifurcated to form branches embracing a sector bar 69, concentric to the cam shaft 10 and secured at 70, 71, to the outer end of the winding head housing 7, in the plane of its outer end wall. This steadying catch lever 68 is provided with a cross pin 72, arranged to travel along the inner periphery of the sector bar 69, and the bottom of the slot formed by the bifurcations is provided with a cam surface 73 arranged to travel along the outer periphery of the sector bar 69. The relationship between the cam surface 73 and the cross pin 72 is such that the guideway 54 will be permitted to swing outwardly, as the cop is being wound, but will be prevented from swinging inwardly by the biting action on the sector bar 69 of the cross pin 72 and cam surface 73 of the steadying catch lever 68. The outer end of this steadying catch lever 68 is fulcrumed at 74 on a projection 75 of the guideway 54, the engagement of the release arm 67 with the steadying catch lever being beyond the fulcrum 74 so that when the hand lever 66 is pressed inwardly by the operator, the steadying catch lever is released from its biting engagement with the sector bar 69, thus permitting the guideway to be moved inwardly.

The tension device, hereinbefore referred to, carried by the bracket arm 6, is shown as comprising a movable plate 76 and a fixed plate 77, which movable plate is hinged to swing into and out of engagement with the fixed plate, the fixed plate being provided with a vertical series of ribs 78 and the movable plate with a vertical series of slots 79, to receive said ribs. The proper graduated tension on the device is provided by a combined spring and lever control as follows:

The movable tension plate 76 is provided with an arm 80, which arm is adjustably connected through a spring 81 to one of a series of holes 82 in the depending arm 83 of a lever pivoted at 84 to the base 5. This lever is provided with an uprising arm 85 having an adjustable nut 86 threaded on one end of a connecting rod 87, the other end of which rod is adjustably secured to one of a series of holes 88 in an arm 89 depending from the cover plate 90, removably secured to the guideway arm 56.

This lever and spring control for the movable tension plate 76 eliminates a rigid connection between the said movable tension plate and its pressure operating means, thereby permitting the plate to yield when so required by bunches in the thread or the like, and to be freely opened by the operator for threading without disturbing the other parts.

From the above description it will be seen that when the winding of the cop starts with the parts in the positions shown in Fig. 7, the thread or the like is holding up the drop wire 39 and is thereby holding the arm 40 out of the path of the abutments 32 on the rotating kicker 31. The spring 44 is also holding the latch lever arm 34 in locking engagement with the keeper 35 on the base, to hold the winding head in its "winding" position. Also the pressure lever tension spring 63 is exerting its maximum pull to hold the guide 11 against the cop, with its maximum pressure. Also the maximum tension on the thread or the like is being exerted by the spring 81, which maximum tension is readily adjustable by the adjustment of the spring connection with the lever arm 83, the adjustable nut 86 on the outer end of the rod 87, and by the adjustment of the inner end of the rod 87 along the arm 89 of the cover plate 90 in any one of the radial series of holes 88, at a greater or lesser distance from the rocking axis of the guideway.

As the cop "builds up" and the guideway

54 is rocked outwardly by the engagement of the guide 11 with the cop, the guideway movement is kept steady and the guideway is prevented from chattering. The guideway is also locked against unintentional inward movement by the steadying mechanism hereinbefore described, which includes the sector bar 69 and the catch lever 68, engaged therewith. After the cop has been completed and removed, or whenever it is so desired, the operator may swing the guideway 54 and its guide 11 inwardly, by pressing the hand lever 66 inwardly to release the steadying catch lever 68 from its non-return gripping action on the sector bar 69.

During the winding of the cop, the pressure of the guide 11 on the cop is gradually lessened by the coaction and relationship of the tension spring 63, pressure lever 61, 64 and the cam arm 58 of the guideway, whereby the upper end of the tension spring 63 is gradually brought nearer to the axis 62 of said pressure lever by the upward and inward movement of the pressure lever arm 64. Also, as the cop is being wound, the tension on the thread or the like is gradually lessened by the movement of the lever arm 89 of the cover plate 90, carried by the guideway, in a direction to lessen the tension of the spring 81 which is connected to the arm 80 of the movable tension plate 76.

When the thread or the like breaks, or the supply becomes exhausted, the drop wire 39 is released and permitted to drop sufficiently to bring the drop wire lever arm 40 into the path of the abutments 32 of the rotating kicker 31. The kicker will then, by its engagement with the said arm 40, swing the latch lever arm 34 out of locking engagement with the keeper 35 on the base 5, thereby permitting the winding head to be rocked from its "winding" to its "non-winding" position. In the present instance this is accomplished by means of the spring 12, although the pull of the drive belt 27 is ordinarily sufficient to rock the head to this position, without the assistance of the said spring 12.

As the winding head is rocked to its "non-winding" position, the cam face 91 of the latch lever arm 34, by its engagement with the side of the keeper 35, will positively swing the latch lever far enough to not only move the drop wire lever arm 40 out of the path of the rotating kicker 31, but also cause the cam surface 43 on said lever arm 40, because of its engagement with the pin 42 to lift the drop wire 39 into ready position for threading.

As the winding head is rocked to its "non-winding" position, the pulley 25 is moved toward the main drive pulley 4, thereby loosening the driving belt 27, causing it to drop away from its drive pulley 4 and rendering it ineffective to drive the said pulley 25. At the same time the pulley 25 and the brake 28 are brought into frictional contact, to immediately stop the rotary movement of the pulley and thereby stop the winding operation. The position of the brake 28 with respect to the pulley 25 may be determined by the vertical adjustment of the rod 30 upon the free end of which the brake rests.

During this movement of the winding head from its "winding" to its "non-winding" position, the manually released lever, hereinbefore described, moves automatically either by gravity, as shown, or by any other urge, in a direction to slide the wedge 49 between the projections 51 and 52 on the head and base respectively, to lock the head in said "non-winding" position until it is intentionally released by the movement of the lever in the opposite direction, by the operator. This locking arrangement of the winding head prevents the unintentional rocking of the head to its "winding" position and is particularly desirable for preventing the movement of the head to re-start the machine while the cop is being removed from its holder.

When it is desired to re-start the machine after the thread or the like breaks, or its supply is exhausted, the manually released lever is moved by the operator in a direction to withdraw the wedge 49 from between the abutments 51 and 52, thereby permitting the winding head to be manually rocked back to its "winding" position. This movement of the head will cause the latch lever arm 34 to engage the keeper 35 on the base and hold the head in its "winding" position. When it is desired to start the winding of a new cop, the guideway 54 and its thread guide 11 are moved inwardly after manually releasing the steadying catch lever 68 from the sector bar 69, this inward movement of the guideway serving to place the maximum tension on the cop and on the thread or the like being led thereto. The winding head is then manually rocked to its "winding" position and there held, as before described.

Among the many advantages arising from the use of the movable winding head are; the removal of strain upon the driving belt except when the belt is in use, thereby adding materially to the life of the belt; the elimination of the usual belt shifting mechanism and its loose pulley; the elimination of the usual clutch mechanism which has the disadvantage of an unduly abrupt starting of the winding; and the provision of a mechanism which is able to start the winding slowly and easily, when so desired.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my in-

vention; hence, I do not intend to limit myself to the particular embodiment herein shown and described, but

What I claim is:—

1. In a belt-driven winding machine, a movable winding head, means for automatically locking it in its winding position, the winding head pulley, a drive shaft, its pulley, a belt connecting said pulleys, means controlled by the breaking of the thread or the like, or the exhaustion of the supply, to automatically unlock the head and cause it to move in a direction to loosen the belt and thereby stop the winding operation, and manually released means operable to automatically lock the head in its "non-winding" position.

2. In a belt-driven winding machine, a movable winding head, means for automatically locking it in its winding position, a cop holding spindle shaft carried by the winding head, a pulley on said shaft, a drive shaft, its pulley, a belt connecting said pulleys, means controlled by the breaking of the thread or the like, or the exhaustion of the supply, to automatically unlock the head and cause it to move in a direction to loosen the belt and thereby stop the winding operation, and manually released means operable to automatically lock the head in its "non-winding" position.

3. In a belt-driven winding machine, a movable winding head, its pulley, a drive shaft, its pulley, a belt connecting said pulleys, means controlled by the breaking of the thread or the like, or the exhaustion of the supply, to automatically cause the head to move in a direction to loosen the belt and thereby stop the winding operation, a brake arranged to be brought into frictional engagement with the winding head pulley, by said movement of the head, and a manually released means operable to automatically lock the head in its "non-winding" position.

5. In a belt-driven winding machine, a base, a winding head pivoted thereon, a winding head pulley, a drive shaft, its pulley, a belt connecting said pulleys, means controlled by the breaking of the thread or the like, or the exhaustion of the supply, to automatically cause the head to rock in a direction to loosen the belt and stop the winding operation, and a manually released lever carrying a wedge arranged to be automatically inserted between the head and its base, to lock the head in its "non-winding" position.

5. In a belt-driven winding machine, a base, a winding head pivoted thereon, a winding head pulley, a drive shaft, its pulley, a belt connecting said pulleys, means controlled by the breaking of the thread or the like, or the exhaustion of the supply, to automatically cause the head to rock in a direction to loosen the belt and stop the winding operation, a brake hinged to the head, and an adjustable support for the brake, to cause it to be brought into frictional engagement with the winding head pulley by said movement of the head.

6. In a belt-driven winding machine, a base, a winding head pivoted thereon, a winding head pulley, a drive shaft, its pulley, a belt connecting said pulleys, means controlled by the breaking of the thread or the like, or the exhaustion of the supply, to automatically cause the head to rock in a direction to loosen the belt and stop the winding operation, a brake arranged to be brought into frictional engagement with the winding head pulley by said movement of the head, and a manually released means operable to automatically lock the head in its "non-winding" position.

7. In a belt-driven winding machine, a base, a winding head pivoted thereon, a winding head pulley, a drive shaft, its pulley, a belt connecting said pulleys, means controlled by the breaking of the thread or the like, or the exhaustion of the supply, to automatically cause the head to rock in a direction to loosen the belt and stop the winding operation, a brake arranged to be brought into frictional engagement with the winding head pulley by said movement of the head, and a manually released lever carrying a wedge arranged to be automatically inserted between the head and its base to lock the head in its "non-winding" position.

8. In a belt-driven winding machine, a base, a winding head pivoted thereon, tending to rock from its "winding" to its "non-winding" position, automatically released means for locking the head in its "winding" position comprising a keeper on the base, a latch lever carried by the head, a rotating kicker carried by the head, and a drop wire lever carried by the latch lever in position, when released, to be brought into the path of the kicker, for moving the latch lever out of locking engagement with the keeper.

9. In a belt-driven winding machine, a base, a winding head pivoted thereon, tending to rock from its "winding" to its "non-winding" position, automatically released means for locking the head in its "winding" position comprising a keeper on the base, a latch lever carried by the head, a rotating kicker carried by the head, and a drop wire lever carried by the latch lever in position, when released, to be brought into the path of the kicker, for moving the latch lever out of locking engagement with the keeper, said latch lever having a cam engagement with the keeper, as the winding head rocks to its "non-winding" position to move and hold the drop wire lever out of the path of the rotating kicker.

10. In a belt-driven winding machine, a base, a winding head pivoted thereon, tend-

ing to rock from its "winding" to its "non-winding" position, automatically released means for locking the head in its "winding" position comprising a keeper on the base, a latch lever carried by the head, a rotating kicker carried by the head, and a drop wire lever carried by the latch lever in position, when released, to be brought into the path of the kicker, for moving the latch lever out of locking engagement with the keeper, said latch lever having a cam engagement with the keeper as the winding head rocks to its "non-winding" position to move and hold the drop wire lever out of the path of the rotating kicker, said winding head having a pin and said drop wire lever having a cam surface engaging said pin as the head rocks to its "non-winding" position, to lift the drop wire to its re-threading position.

In testimony, that I claim the foregoing as my invention, I have signed my name this 12th day of May 1924.

JOHN O. McKEAN.