Oct. 7, 1930. M. F. HAAS 1,777,612

THREAD DOUBLING AND TWISTING MACHINE

Filed Feb. 21, 1929 2 Sheets-Sheet 1

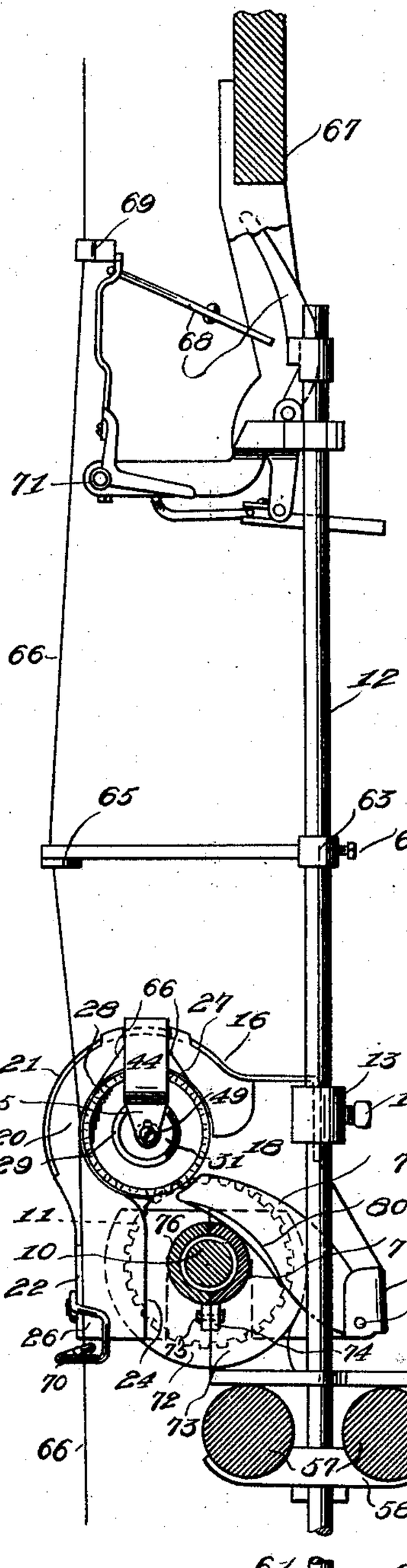

Fig. 1

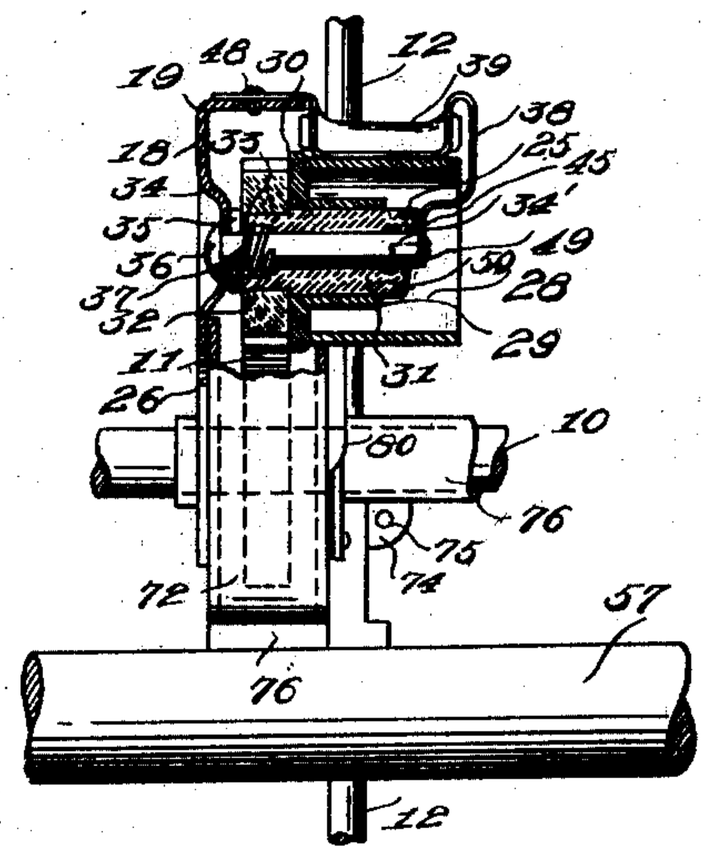

Fig. 2

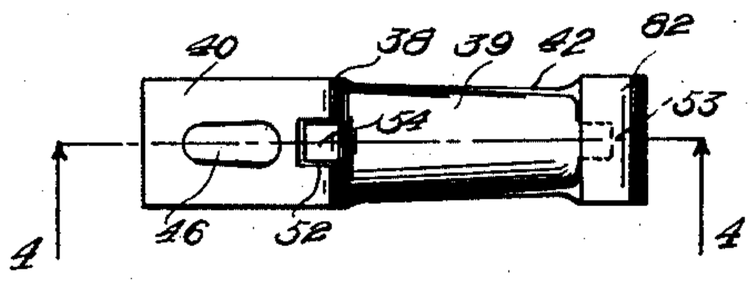

Fig. 3

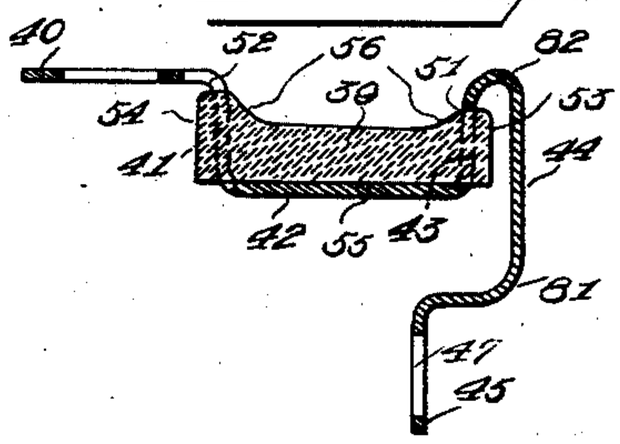

Fig. 4

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THREAD DOUBLING AND TWISTING MACHINE

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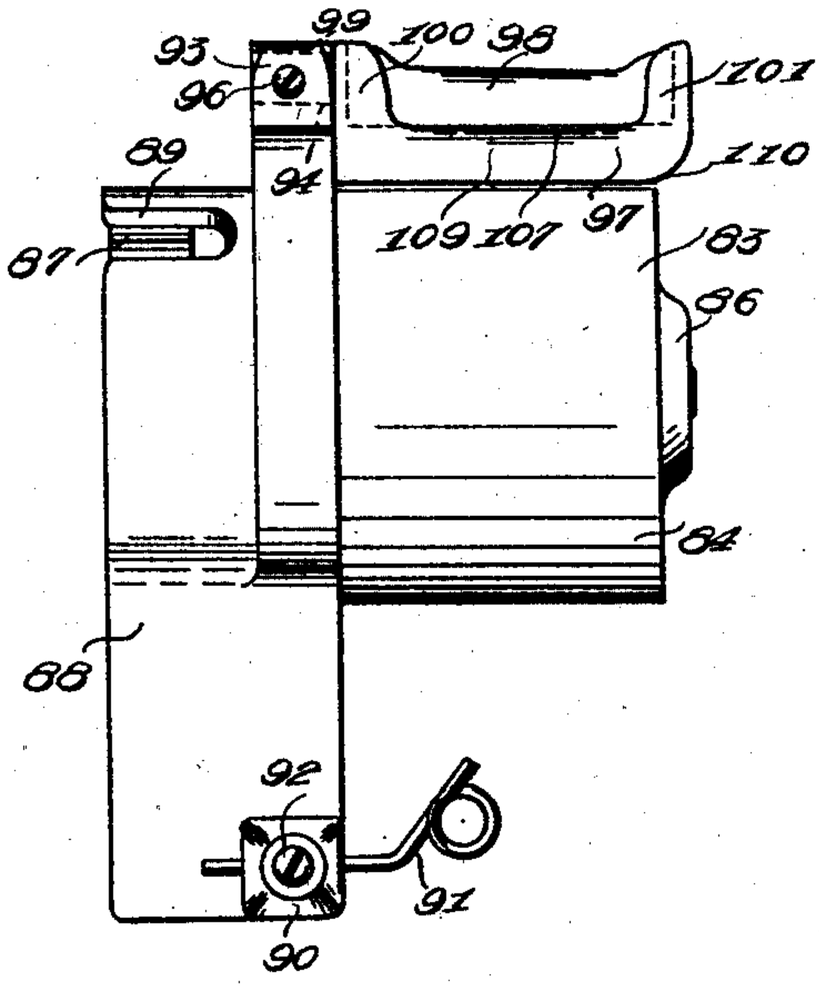

Fig. 5

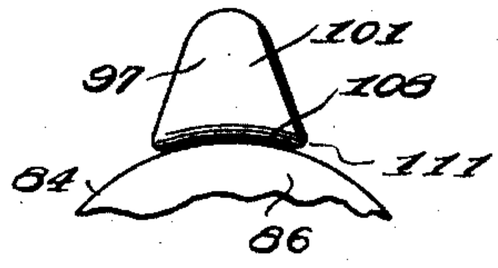

Fig. 6

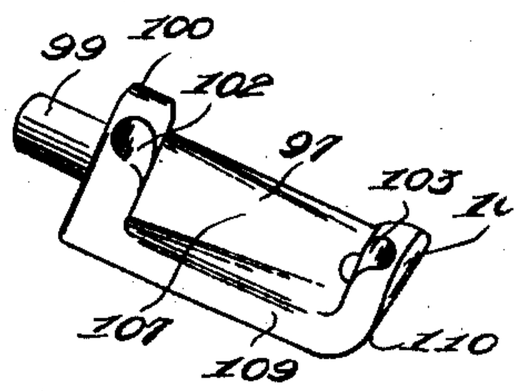

Fig. 7

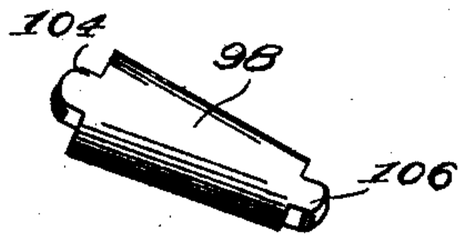

Fig. 8

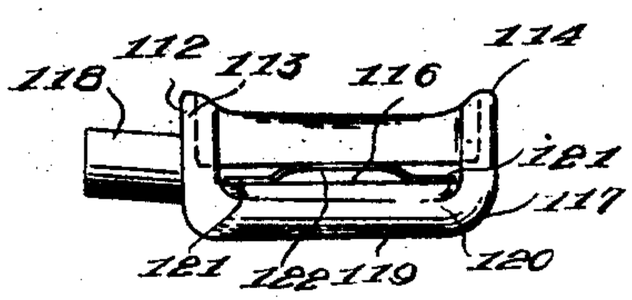

Fig. 9

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1,777,612

UNITED STATES PATENT OFFICE

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THREAD DOUBLING AND TWISTING MACHINE

Application filed February 21, 1929. Serial No. 341,716.

The present invention relates to thread doubling and twisting machines, and more particularly to improvements in the feeding rollers and casings, thread separating guides, and guide supporting and holding members, and is a continuation in part of my copending applications Serial Nos. 197,736, filed June 9, 1927, and 274,571, filed May 2, 1928.

Heretofore it has been common practice in the thread spinning art, to employ a separating guide, or combined separator and holder therefor, in conjunction with a feeding roller, supported only at one end thereof, and with the bottom thereof spaced at a substantial distance above the roller, for example as shown in U. S. patent to Bradley, 1,516,076.

In such arrangements there is a tendency for broken threads or strands to have their ends carried through the space between the separator holder and the roller, after which they become entangled and wound about the feed roller forming built up roll laps of yarn or silk which are not only difficult to disentangle and cut loose, and cause considerable waste of the operator's time and decreased operating efficiency of the spinning machines, but also are likely to exert such a pressure upon the under side of the separator holder as to distort or even break the same. In addition, when the operator is winding the threads about the roller and separator in such prior arrangements to initiate operation of the spinner individual thereto, he or she is likely to accidentally slip the thread over the end of the roller between the latter and the separator holder, thereby entangling the strands, causing waste of time and reducing the efficiency of the machines materially.

Again, it often happens that the threads will lap themselves, not directly around roller, but about the entire roller and separator construction to form built up roll laps which may exert a destructive pressure downwardly upon the separator to fracture or break the same and even to ruin the holder therefor if permitted to build up by the operator. In addition to waste of the operator's time, decrease of spinning capacity of the machines, and destruction of the parts of the mechanisms, considerable loss of material results due to the fact that while the roll laps are forming the broken strands of material remain tight, and the stop mechanisms fail to function so that considerable lengths of defective thread are twisted and wound on the bobbins, which if spun into cloth, results in a flaw in the material.

Certain remedies have been proposed for the solution of the above problems. In the patent to Doherty, 1,487,466, there is provided a separator holder which is positioned closely adjacent the roller. It, however, is purposely made with sharp lateral ridges which, I have found, have a tendency to cut the threads in an undersirable manner and not to flick away the thread ends which may pass between the roller and holder. Further, said holder being shorter than the roller, the attendant is liable, during the winding operation, to slide the threads under the holder instead of up and over it in the proper manner.

In the two patents above discussed, and throughout the entire art, separating guides are employed which are so shaped and formed as to be easily broken when made of frangible material and which cannot readily be removed and replaced without the aid of mechanical tools.

It is the principal object of this invention to overcome the above mentioned defects and disadvantages of prior constructions, and to provide thread guiding and separating devices for twisting machines that materially increase the efficiency of operation and reduce wastage in spinning machines of the character mentioned.

It is also an object of my invention to provide a simple but sturdy guide and feed roller attachment which can be cheaply manufactured for use in new twisting or spinning machines and for replacement of inferior devices in old and existing machines.

Another object of the invention is to provide an attachment that is practically vibrationless during running and which operates to maintain the thread tension substantially constant.

Still another object of my invention is to provide a separator holder for spinning ma-

chines that is substantially undeformable and which is so shaped as to prevent the passage of threads between itself and the feeding roller.

A further object of the invention is the provision of a separator of improved shape, durability and strength having a large seating surface which is conveniently replaceable, and which may, in some instances, be resiliently seated.

It is also an object of this invention to provide a gear casing which shall have a minimum number of parts, thereby lessening the tendency of exposed edges to break the threads, and which may be readily and cheaply manufactured.

Another object is to construct and arrange a separator holder and feed roller in such manner that the latter shall have a slight reciprocating motion as it rotates, thereby to shift the threads back and forth over the separator to prevent cutting and any uneven wear on the surface of the latter.

With the above objects in view, as well as others that will appear from the following disclosure and from the terms of the appended claims, reference will be had to the accompanying drawings forming part of same, and in which:—

Figure 1 is a side elevation of a portion of a conventional thread doubling and twisting or spinning machine with one form of my invention disposed therein.

Figure 2 is a front elevation of a portion of the machine shown in Figure 1, with the feeding roller and it supporting casing shown in longitudinal section.

Figure 3 is a plan view of the separator and its support, as employed in Figure 2.

Figure 4 is a longitudinal section taken on line 4—4, Figure 3.

Figure 5 shows, in front elevation, a well known feeding roller construction with one form of the separator of the present invention detachably mounted thereon.

Figure 6 is a partial side elevation, as seen when looking at the right end of Figure 5, of the feeding roller and separator support.

Figure 7 is a view in perspective of the separator support embodied in Figures 5 and 6.

Figure 8 is a perspective view of a readily removable separator which may be inserted in any of the separator supports shown in Figures 1 to 7 inclusive and 9.

Figure 9 is a modified form of the separator of Figures 5 to 7, and discloses a resilient separator mounting which may be utilized in connection with any of the separators and supports shown in the drawings.

Referring now to the drawings by reference characters, in which like characters designate like parts, and first to the form of invention illustrated in Figures 1 and 2, 10 designates a horizontal drive shaft which is continuously rotated from a source of power (not shown), and which has fixedly mounted thereon a gear wheel 11. Adjacent this wheel is an upright lifting rod 12 of conventional design. A collar 13 and a cooperating threaded stud 14 are provided for engaging rod 12 and a casing 16 for maintaining the latter in fixed relation with respect to said rod. The casing 16 is preferably cut, folded and stamped from a single sheet of metal to comprise a rear wall 18, a side wall 19, a front wall 20, bent into position by the aid of incisions 21 and 22, and a bracket 23. The front wall 20 is cut away as at 24 (see Figure 1) and the rear wall as at 26 (see Figure 2) to permit the passage of shaft 10 through the casing. In like manner an opening 27 is provided in the front wall for the reception of a feeding roller 28. The construction and method of mounting this roller will now be described.

With reference to Figure 1, and particularly to Figure 2, roller 28 consists of a cup shaped cylinder provided with an integral, axially extending sleeve 29 which is substantially shorter in length than the cylinder proper, and with an annular enlargement 30. Disposed with a tight fit within sleeve 29 and having its ends projecting outwardly therefrom is a bushing 31, preferably formed from a composition of fibrous material. A gear wheel 32, likewise preferably fibrous, and of a thickness substantially equal to the length of the outward extension of bushing 31, is fixed upon one end of the bushing and adapted to mesh with gear 11. The other end of bushing 31 is cut away so as to have a surface which is disposed at a slight angle to a plane normal to the axis of the bushing. From this it results that one side of the inclined surface, as at 25, is approximately $\frac{1}{16}$ inch closer to the open end of the roller than is the other side, 50. A cylindrical centered recess 33 is formed in the outer end of bushing 31. The rear wall 18 of the casing has a depression 34 therein. A spindle 34′, having a collar 35 adjacent one end, is securely riveted as at 36 with said depressed portion 34 rigidly clamped between collar 35 and the rivet. A compression spring 37 is freely mounted upon spindle 34′ and, fitting within cylindrical recess 33, it tends to thrust the entire roller construction to the right along the spindle. The utility of this feature will later be described.

To place the roller in operative position one need but to insert it through the casing aperture 27 with its axis in alignment with that of the spindle 34′, and thereafter thrust it to the left until it resiliently abuts the collar 35 with spring 37 received in recess 33. It will be seen from the above described construction, in which a spring and fibrous materials are used, that the roller is driven quietly, without vibration, and with need for but little or no oil.

A supporting and holding member 38, in which a separator or guide 39 is mounted, is secured to the casing above the roller. This separator support 38 is stamped from a single strip of metal and comprises a series of connected flat portions 40, 41, 42, 43, 44 and 45 respectively (see Figures 3 and 4), which flat portions are joined together at large and gradual angles of bending to insure that the entire outer surface shall be devoid of any sharp projections or knife edges. Elongated slots 46 and 47 are provided in portions 40 and 45 respectively. A cap screw 48 is adapted to pass through slot 46 to secure portion 40 in position upon the casing wall 19, and a similar cap screw 49 is utilized to cooperate with slot 47 and one end of spindle 34 to fix flat portion 45 against relative movement with respect to the spindle. The length of arms 41 and 43 are such that the flat portion 42 of the support 38 is substantially flush with the upper surface of the roller at all times. Since slots 46 and 47 are greater in length than the diameters of their respective screws 48 and 49, an adjustment is provided by which the support 38, and hence its table portion 42, can always be conveniently maintained in proper relation to the roller 28. A slot 51 is formed in portion 43 of support 38 and the portion 41 is provided with a slot 52 which extends throughout its length and part way into the flat portion 40. These slots are adapted to receive lugs 53 and 54 respectively of the aforementioned separator 39 which is preferably formed of a vitreous material such as porcelain and has a flat lower surface 55 of substantial area adapted to rest upon the flat holder portion 42, and a smooth rounded upper surface inclined at a slight downward angle to the right in Figures 2 and 4. Its width is substantially the same as that of said holder portion 42, and its height preferably approaches that of arms 41 and 43. It is preferred to increase the height of the separator gradually near the ends of the body proper, thus causing said ends to be longitudinally curved upwardly as at 56 to merge into, or become substantially tangential to, the upper surface of the holder (see Figure 4).

The separator 39 can be quickly mounted by inserting lug 53 into slot 51 and thereafter dropping lug 54 into slot 52. By reversing this operation the separator may be quickly removed. Further disassembling may be conveniently performed by merely removing screws 48 and 49 and thereafter withdrawing, not only the separator and its support, but also the roller with its bushing 31 and gear wheel 32.

Returning to Figures 1 and 2, the lifting or release rod 12, which supports the entire mechanism just described, projects downwardly between the usual shafts and through the seating and guiding bracket 58, and is provided at its lower end with a normally compressed spring 59 which is abutted by a collar 61 held in place by a locking stud 62. A similar collar and stud, designated by numerals 63 and 64, cooperates with that portion of the rod which is disposed just above the feed roller mechanism, for locking a thread guide 65 in operative position. A plurality of threads 66 (of which only one can be seen in Figure 1) pass downwardly through guide 65, thence beneath the roller cylinder 28 in contact therewith, thence upwardly and over the separator holder 38 and in contact with the smooth slightly inclined upper surface of the porcelain separator carried thereby and thence downwardly through guide 70 to the usual spinning and winding mechanism (not shown).

At the upper end of rod 12 there is disposed a frame 67 which supports a safety stop mechanism of well known construction, indicated generally at 68, and a thread guide 69. The character and operation of the safety device 68 being well known, it will not be described in detail here. Suffice it to say that, with the threads 66 under tension, as shown, the guide 69 is held in operative position and the rod 12 is locked in its lowermost position with the gears 11 and 32 in mesh; and that, should a thread become loose due to breakage, the guide 69 is permitted to fall pivotally about point 71, thereby actuating the stop mechanism 68 to release the rod 12 against the action of spring 59, with the result that the spring thrusts the rod upwardly to carry roller gear 32 out of meshing engagement with driving gear 11.

Projecting upwardly with a sliding fit into casing 16 and partially enclosing the driving gear 11 to prevent access of foreign material, and especially threads, thereto, is a second casing formed of two parts 72 and 73, these parts being secured together by cooperating ears 74 united by a screw bolt 75. The part 73 is mounted upon a supporting bracket 76 which rests upon shafts 57. The casing parts 72 and 73 are provided with semi-cylindrical bosses 76 and 77 respectively which, when cooperatively drawn together, form an axially projecting housing for a portion of drive shaft 10. Pivotally mounted between bracket 23 and rear wall 18 upon a pin 78 is a shield 79, which shield is shaped to conform in general with an outer portion of gear wheel 11, and which has an outturned flange 80 adapted to ride upon the shaft housing sections 76 and 77. It will be seen that, when the stop mechanism comes into play and rod 12, together with casing 16 and gear 32, rises, the weight of shield 79 will cause it to ride forwardly over the driving gear 11 to prevent the access of any broken threads or the like thereto.

The manner in which some of the objects of invention are realized in the construction

shown in Figures 1 to 4, already specifically described, will now be pointed out.

By cutting and stamping a single sheet of metal to form the casing 16, its manufacture can be simplified and cheapened over that of similar casings now employed in spinning machines. The outer casing 16, together with shield 79 and the inner casing formed from parts 72 and 73, completely encloses the moving parts at all times, thus preventing the gear wheels etc. from engaging and breaking the threads and from catching up any loose ends to wind them about rotating parts and clog the mechanism. The casings, together with the separating elements, can be quickly demounted and disassembled for cleaning and repair.

It will be perceived that, as the roller is rotated together with its bushing 31 and gear 32, it will simultaneously be given a slight reciprocating motion. Each time that the portion 25 of the inclined end surface of the bushing rides past the inner side of part 45 of the holder, which position is illustrated in Figure 2, the bushing is thrust to the left against the resistance of spring 37, and as the portion 25 gradually rides out of engagement with part 45, the bushing is forced to the right by spring 37 until end portion 50 abuts the part 45 of the holder. From this it results that the roller is reciprocated through a stroke of about $\frac{1}{16}''$ (more or less, depending on the angle of inclination of the outer bushing end surface) and that the threads to be passed over the roller will be given a corresponding back and forth movement to prevent them from cutting the surface of the separator, as they often do in prior constructions.

It is practically impossible to fracture the separator 39, or to oscillate it to any extent about its axis, because its flat surface bears against the flat portion 42 of the holder at all points to provide for even distribution of downward pressures. The separator may be taken out or replaced at will by an attendant without the use of any tools whatsover. The flat holder portion 42 being substantially flush with the rotating roller and its edges being blunt and smooth, there will be no tendency toward cutting the threads and any loose ends that may appear will be flicked away from the separator by said smooth edges to prevent their entrance between the roller and separator holder with subsequent formation of laps of thread about the roller which are extremely difficult to disentangle. It is likewise impossible for such roll laps to be formed accidentally by the operator during the wrapping operation, because the portions 44 and 45 of the holder absolutely prevent the sidewise insertion of threads over the upper surface of the roller itself (between roller and holder) instead of over the top of the separator where they properly belong. Again, the holder 38 being substantially in contact with the roller surface and firmly fastened to the casing structure by screws 48 and 49, it cannot be broken down nor even distorted, no matter how great the thread tension becomes nor how large a roll lap formation that might accidentally become built up around the entire roller and separator assembly. This rigid holder construction is likewise advantageous if, due to improper adjustment, a roll lap might form around the roller only. In such cases the usual tendency is for the roll lap to build itself to such proportions as, by the application of an upwardly directed force, to break the separator and possibly the separator holder as well. The separator of the present invention cannot be broken in this manner because the holder portion 42 prevents the direct application of pressure against it. The holder is of such length that its outer end projects beyond the outer roller edge. This outer end, comprising member 44 and the smoothly curved portions 81 and 82 which connect 44 with the remaining holder structure, accurately guides the threads, during the wrapping operation, up and onto the porcelain separator. It will thus be seen that comparatively unskilled attendants can operate my improved machine in satisfactory manner.

Turning now to Figures 5 to 8, wherein another form of separator and holder embodying my invention are illustrated, Figures 5 and 6 show the improvement attached to an old form of roller and its supporting structure, like unto that disclosed in the aforementioned patent to Bradley, 1,516,076. The roller 83, having cylindrical side walls 84 and a closed, bossed outer end 86, is mounted, with its gear wheel 87, in a casing 88, which casing is provided with an aperture 89 for inspection and oiling of the internal mechanism. The casing carries a conventional thread guide consisting of a lug 90, a wire 91, and a locking stud 92 for securing the wire within the lug. Formed on its upper side is a projecting ear 93 having a hole 94 therein for receiving the shank of a separator holder. A set screw 96 is provided for locking the shank against longitudinal and rotative movement.

The attachment of this invention, to be mounted on the device just described, comprises a holder 97 supporting a separator 98 and having a shank 99 adapted to be slidably received in the hole 94 of lug 93. The holder 97, preferably made of hardened steel, has a pair of spaced upstanding ears 100 and 101, slightly tapered from bottom to top, in which is provided a corresponding pair of vertical surface slots 102 and 103 for the reception of the lugs 104 and 106 of the removable separator 98. This separator being of substantially the same shape as that shown in Figures 3 and 4, it need not be described again in detail at this time. Its flat bottom

surface rests upon the flat supporting surface 107 of the holder. The under surface 108 of the holder is ground to conform to the shape of the cylindrical roller and overhangs the same substantially in contact therewith. The side portions 109 of the holder are ground to the same general curvature as the upper surface of the separator. The holder, like that in Figure 2, is of such length that it projects beyond the outer edge of the roll. Its projecting end is smoothly curved as at 110 to guide the threads, during the initial winding operation by the attendant, upwards and away from the line of contact between the holder and the outer edge of the roll. The lateral lower edges 111 of the holder are made sufficiently dull and smooth to prevent them from cutting the threads being separated. In fact, all parts of the holder are preferably highly polished to avoid the cutting and snapping of threads.

A modified form of holder, 112, is shown in Figure 9. It is substantially like holder 97, having slotted ears 113 and 114, a flat supporting surface 116, an end curvature 117, and a shank 118. It differs, however, in that the lower surface 119 is convex rather than concave, thus establishing a line contact with the cylinder instead of a full surface contact. Its sides are likewise convexly curved and they merge as at 120 into the lower convex surface 119.

Shown in Figure 9 only for purposes of illustration, and equally adaptable to the other forms of my invention, is a resilient mounting for the separator. It comprises a spring having two flat ends 121 resting upon the flat holder surface 116 and joined by a flat central portion 122 upon which rests the flat bottom of the vitreous separator described above. By the use of a spring of this type the separator is permitted to ride up and down in the holder to cause shifting of the threads along the separator, and to prevent breaking or otherwise damaging the threads as their tension varies.

The separating devices of Figures 5 to 9 have the same general utilities as those set forth for that shown in Figures 1 to 4, namely, the prevention of the formation of roll laps, and the prevention of damage to the elements thereof. While the holders are shown with their shanks slightly inclined to their axes to adapt them for use in existing machines which have inclined holes for shank reception, it is to be understood that the shanks may project from the holder bodies in any other desired form or manner.

While in the drawings the lower surface of each separator holder is shown substantially in contact with its corresponding roller surface, it is possible, in some instances, to operate with these surfaces somewhat spaced apart. The spacing, however, must be so slight as to ensure that the ends of any broken threads will be flicked away from the entrance to the space and not permitted to pass therethrough, and the spacing, within certain limits, dependent upon the kind and size of threads, the peripheral speed of the roller and the type of mechanisms employed in the entire machine, etc., may be varied somewhat.

Though I have disclosed certain specific embodiments of my invention, they are to be construed as merely illustrative and not restrictive, the scope of the invention being defined by the terms of the appended claims.

What I desire to secure by Letters Patent and claim as new is:—

1. In a machine of the class described, a casing, a horizontal spindle fixed at one end to said casing, a cylindrical roller open at one end and mounted upon the spindle with said open end projecting beyond the projecting end of the spindle, a thread separator and a separator support adjacent the outer roller surface, said support being secured at one end to the casing and having its other end fastened to the projecting end of the spindle.

2. The combination as set forth in claim 1, in which that side of the support opposite the separator is substantially flush with the roller.

3. In the combination set forth in claim 1, said ends of the support being provided with means for adjusting the support with respect to either the casing or the projecting end of the spindle.

4. In a device of the character described, a rotatably mounted feeding roller, a thread separator having a flat surface, a separator support mounted adjacent the roller and provided with a flat surface, and a spring member inserted between said flat surfaces, said member consisting of a series of parallel and resiliently connected flat portions.

5. A device adapted for use in a machine of the class described, comprising a cylindrical feeding roller having an interior concentric sleeve carried by one of its ends, and a fibrous gear wheel mounted at said one end of the roller and provided with a fibrous sleeve which projects into said concentric sleeve with a tight fit.

6. In a machine of the class described, a casing, a spindle rigidly secured to one wall of the casing and projecting outwardly therefrom, a spring surrounding the spindle adjacent the secured end of the latter, a fibrous sleeve rotatably mounted upon said spindle and having a recess in one end for the reception of said spring, a fibrous gear wheel fixed upon the recessed end of said fibrous sleeve, and a metallic roller mounted upon said fibrous sleeve adjacent said gear wheel.

7. In a spinning or twisting machine, a casing, a driven feed roller rotatably and reciprocably mounted in said casing, means

mounted on the casing and projecting into proximity to said roller to provide an abutment, mechanism for rotating the roller, and cooperating means associated with said abutment and said driven roller for periodically reciprocating the latter in response to rotation thereof.

8. In a machine of the class described, a casing having a projecting spindle, a roller mounted for rotation and reciprocation upon said spindle, a separator holder mounted upon the casing adjacent the roller, means for rotating the roller, and cooperating means associated with said roller and said holder for reciprocating the roller during rotation thereof.

9. In the device defined in claim 8, said cooperating means comprising a bushing secured within said roller and slidably mounted upon said spindle, a spring between said bushing and said casing, an extension on said holder secured to the end of the spindle, and a cam formed on the end of the bushing and engaging said extension.

10. In a thread doubling and twisting machine, a roll stand, a feed roll rotatably mounted on said stand, a thread guide extending axially along said feed roll around which and the roll the threads extend, means for rotating said feed roll, and means for imparting an axial reciprocating motion to said roll as it rotates, comprising a cam surface at one end of said roll, an abutment opposite said cam surface, and resilient means pressing axially on said roll to hold said cam surface in contact with said abutment.

11. In a thread doubling and twisting machine, a roll stand, a feed roll rotatably mounted on said stand, said feed roll having a hub one end of which is inclined to its axis, an abutment opposite the inclined end of said hub, a thread guide extending axially along said feed roll around which and the roll the threads extend, means for rotating said feed roll, and resilient means pressing axially on said roll to hold the inclined end of said hub in contact with said abutment, whereby an axial reciprocating motion is imparted to said roll as it rotates.

12. In a machine of the class described, a roll stand, a feed roll carried thereby, a thread separating guide, a holder for said guide secured to said roll stand and having slotted supporting portions adapted to receive the ends of said guide, and shoulders on said guide adjacent the ends thereof for confining the lateral movement of the threads.

13. In a machine of the class described, a roll stand, a feed roll carried thereby, a thread separating guide, means mounting said guide for limited radial movement with respect to said feed roll, and yieldable means urging said guide toward its outer limit.

14. In a machine of the class described, a roll stand, a feed roll carried thereby, a thread separating guide presenting to the threads a surface inclined to the axis of said feed roll, means mounting said guide for limited radial movement with respect to said feed roll, and yieldable means urging said guide toward its outer limit.

15. In a device of the character described, a feeding roller having a free outer edge, means for mounting and driving said roller, a thread separating unit, said unit being mounted substantially in contact with the roller with its normal thread-engaging surface so disposed that a line substantially perpendicular thereto will intersect the axis of said feeding roller and with one of its ends projecting beyond said outer edge thereof, said projecting end having a smooth upwardly curved surface for guiding threads away from the space between the roller and the unit.

16. In a device defined in claim 15, said separating unit comprising a separating element and a holder therefor, said smooth upwardly curved surface being that of the holder, and said separating element being provided with a smoothly curved surface which merges into the surface of said holder.

17. In a device of the class described, a rotatably mounted feeding roller, a frangible thread separator having an elongated flat seating surface and a curved separating surface, a separator support mounted adjacent the roller and means on said support providing a cooperating seat for the entire flat surface of said separator, said elongated flat seating surface being disposed between said curved separating surface and the feeding roller.

18. In the construction defined in claim 17, said separator being provided with end lugs, and corresponding slots in the support adapted to detachably receive said lugs.

19. In combination with the lifting rod and driving gear of a machine of the character described, a stamped casing mounted upon the lifting rod and adapted to partially house the driving gear, said casing being open at the bottom to receive the driving gear, and having an opening in the upper portion of one of its walls for the reception of a feeding roller mechanism, and a second casing open at its upper end and disposed in the open bottom of said casing to completely house the lower side of said driving gear, said casings being separable upon movement of said lifting rod.

20. In combination with the lifting rod and driving gear of a machine of the character described, a casing mounted upon the lifting rod adapted to partially house the driving gear, said casing being open at the bottom to receive the driving gear, and having an opening in the upper portions of its walls for the reception of a feeding roller mecha-

nism, a second casing open at its upper end and disposed in the open bottom of said first-mentioned casing to house the lower side of said driving gear, said second casing having a transversely projecting hollow boss and a shield having a shape conforming to a portion of the driving gear, said shield being pivoted at its lower end to said first casing and freely resting upon said hollow boss.

21. In a machine of the class described, a feed roll mechanism comprising a supporting bracket, an extension on said bracket, a feed roll rotatably and reciprocably supported by said extension, means for rotating said roll, and cooperating means carred by said extension and said roll for causing the latter to reciprocate in response to its rotation.

In testimony whereof I affix my signature.

MARTIN F. HAAS.