E. SYKES.

YARN OR LIKE WINDING MACHINE.

APPLICATION FILED MAR. 13, 1911.

1,014,981.

Patented Jan. 16, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

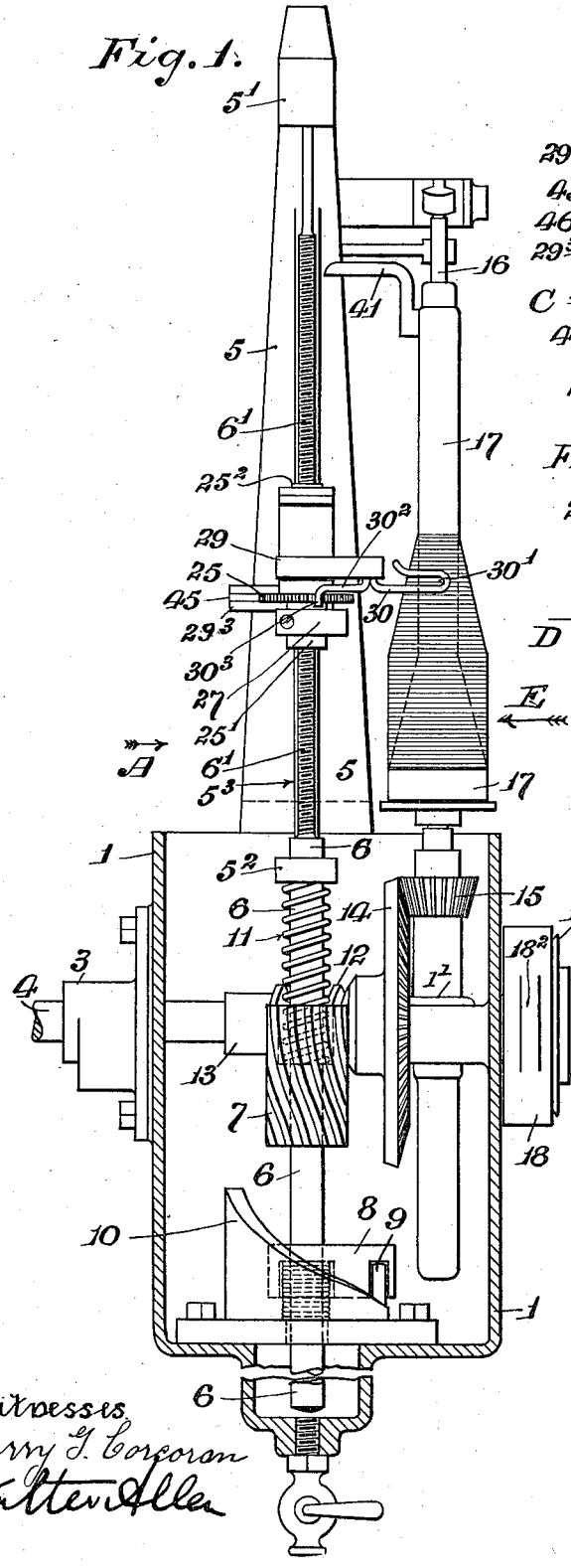


Fig. 3.

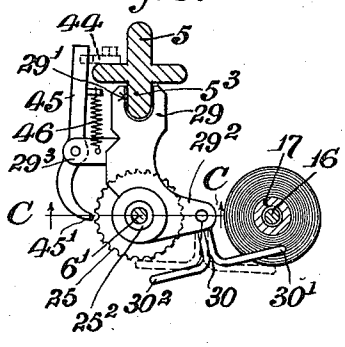


Fig. 4.

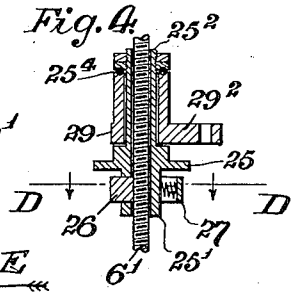
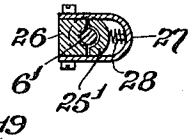


Fig. 5.



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3 SHEETS—SHEET 2.

Fig. 2.

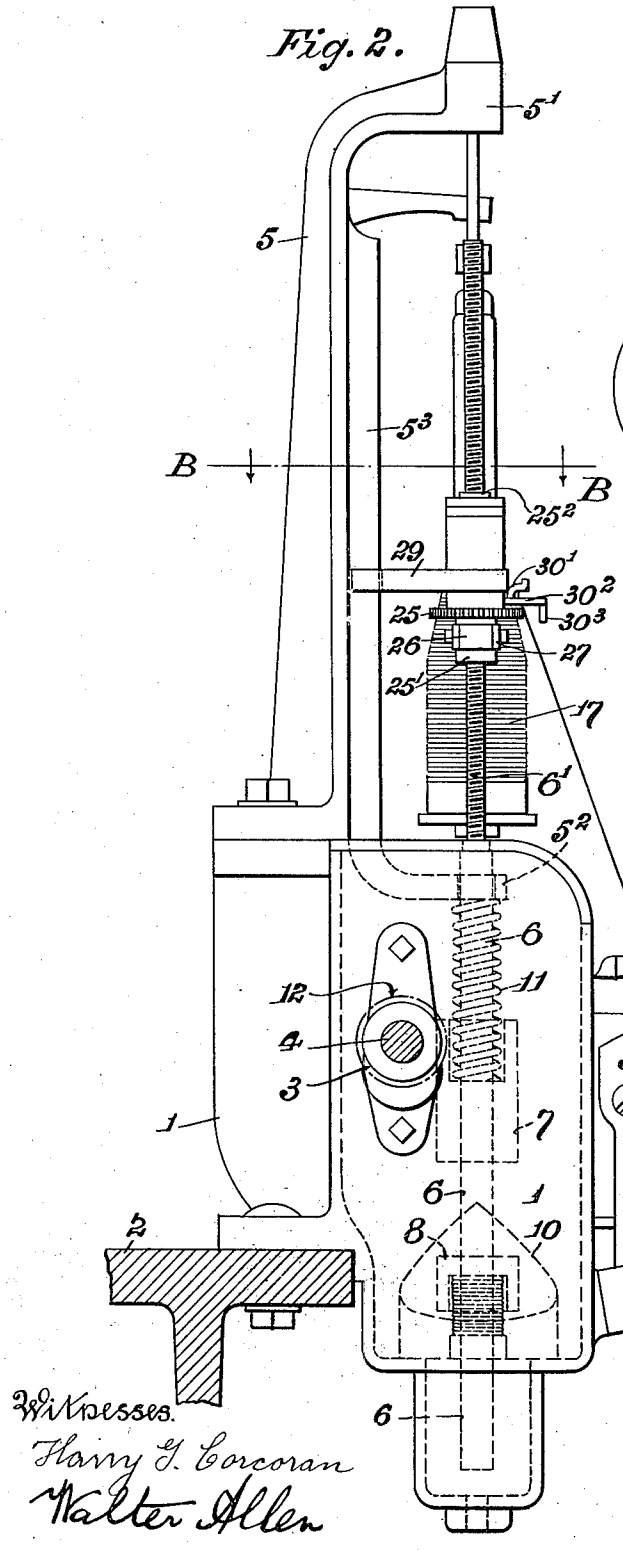
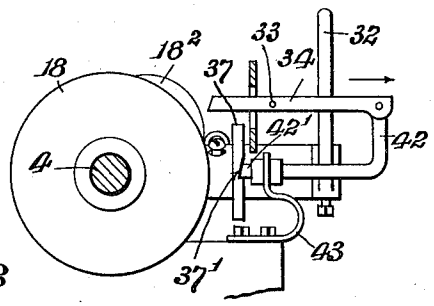


Fig. 10.



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3 SHEETS—SHEET 3.

Fig. 6.

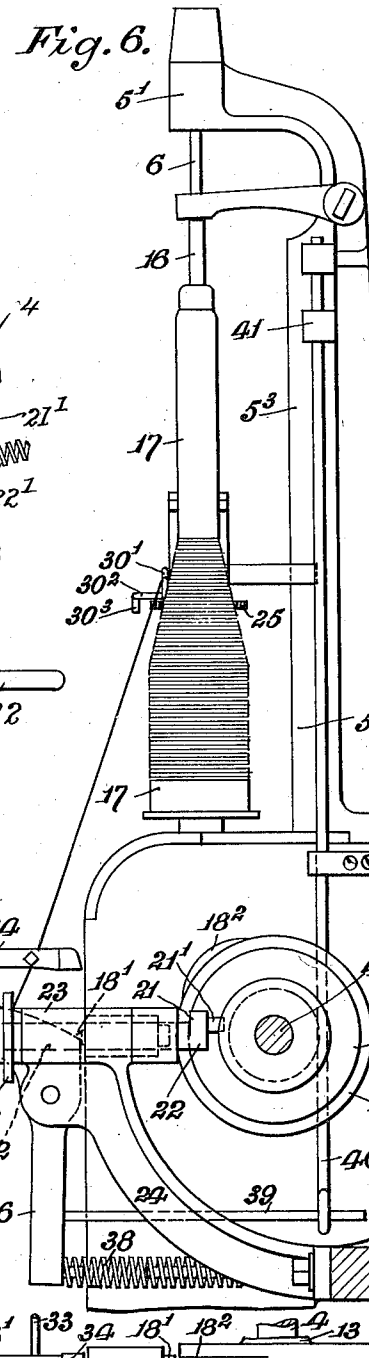


Fig. 9.

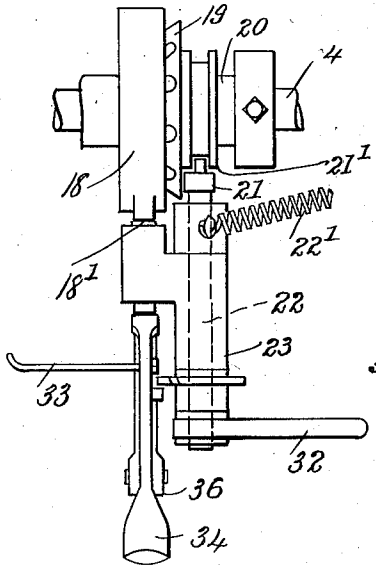


Fig. 7.

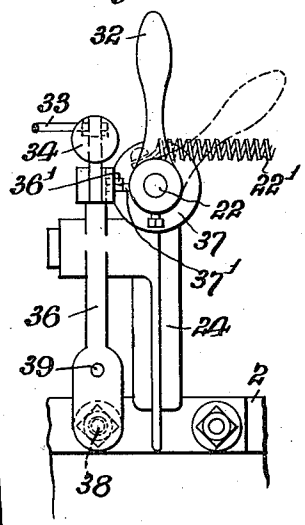


Fig. 11.

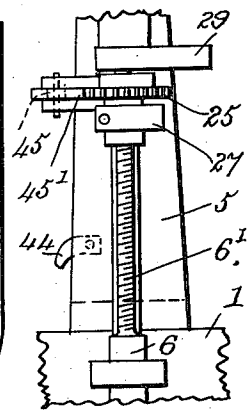
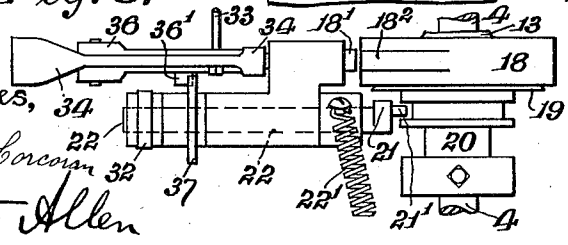


Fig. 8.



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UNITED STATES PATENT OFFICE.

EDWIN SYKES, OF HUDDERSFIELD, ENGLAND.

YARN OR LIKE WINDING MACHINE.

1,014,981. Specification of Letters Patent. Patented Jan. 16, 1912.

Application filed March 13, 1911. Serial No. 614,011.

To all whom it may concern:

Be it known that I, EDWIN SYKES, a subject of King George V of Great Britain, residing at Huddersfield, in the county of York, England, have invented certain new and useful Improvements in Yarn or Like Winding Machines, of which the following is a specification.

This invention has reference to the winding of yarn or the like on tubes, bobbins or similar carriers and comprises new or improved means for effecting the winding operation, the object of my improvements being to wind the yarn in a solid, uniform and compact mass and at a high velocity. In unwinding the yarn from cops or bobbins wound by the said means, the liability of the yarn to "sluff" off or otherwise become disarranged is minimized.

In the accompanying drawings:—Figure 1 is a front elevation partly in section, of one winding head of a winding machine constructed in accordance with, and embodying my improvements; Fig. 2 is a side elevation looking in the direction of the arrow A, Fig. 1, some parts shown in this figure being omitted from Fig. 1; Fig. 3 is a part plan view taken on the line B, B, Fig. 2; Fig. 4 is a vertical section taken on the line C, C, Fig. 3; Fig. 5 is a section taken as on the line D, D, Fig. 4, looking in the direction of the arrows; Fig. 6 is a side elevation looking in the direction of the arrow E, Fig. 1; Fig. 7 is a part front elevation of Fig. 6 looking in the direction of the arrow F, same figure; Fig. 8 is a part plan view of Fig. 6; Fig. 9 corresponds to Fig. 1 but shows some of the parts in different positions, and Fig. 10 illustrates a modification hereinafter referred to. Fig. 11 is a detail view showing the arm 45 and the cam surface 44.

As my improved winding machine is built up of a number of similar winding heads, I have only deemed it necessary for the purpose of describing my invention to illustrate and particularly describe one of such heads. It will be understood that the machine may comprise any number of heads arranged side by side, and preferably I provide two rows of winding heads in a machine, one row facing to one side of the machine and the other row facing to the opposite side thereof. Further, I preferably drive the said two rows independently so that one row of heads may be driven at a speed suitable for one class of yarns and the other row at a speed suitable for a different class of yarns so that two different classes of yarn can be wound at the same time in the machine.

Referring to the drawings, each winding head comprises a suitable casing 1 conveniently mounted on a longitudinal rail 2 and having a suitable bearing 3 for the driving shaft 4 which extends the full length of the machine and is driven by band, strap, or other means from any suitable source, the system of drive adopted being preferably one that will revolve the shaft 4 at a high rate of speed, the machine and the individual winding heads being so constructed as to be capable of being driven at the highest possible speed suitable for the yarn to be wound, and at a much higher speed than is now usual in winding frames.

Secured on the casing 1 at the back thereof is a vertical bracket 5 having at its upper end a bearing 5′ and at its lower end a bearing 5^2 which said bearings support and guide a vertical spindle 6 adapted to have a rotary and an up and down motion thereon. The spindle 6 for a portion of its length has thereon a screw thread 6′ and has fast thereon, toward its lower end, a helical pinion or gear wheel 7 of a suitable length. Also fast on the spindle 6 at its lower end is an arm or extension 8 carrying a small roll or bowl 9 which rests upon and is adapted to travel over a fixed cam track 10 as the spindle is rotated and to give a vertical rising and falling motion to the spindle at each revolution, the roll 9 being maintained in engagement with the cam track by a coiled spring 11 confined between the upper face of the helical pinion 7 and the underside of the bracket bearing 5^2. The helical pinion or gear wheel 7 meshes with a helical toothed wheel 12 fast on a sleeve 13 mounted on the longitudinal shaft 4. On said sleeve is also fast a bevel wheel 14 with which meshes a bevel pinion 15 fast on a "Rabbeth" or other suitable spindle 16 supported in this instance in a lug 1′ in the interior of the casing, and being adapted to receive in the usual way the bobbin 17, or it may be the tube, upon which the yarn is to be wound.

Fast on the end of the sleeve 13 is a clutch boss 18 adapted to be engaged by a clutch member 19 slidable on and rotatively connected to a sleeve 20 fast on the shaft

4, operation of the clutch member 19 enabling the sleeve 13 to be revolubly connected to the driving shaft to drive the winding head or to be disconnected therefrom at will to allow the head to remain stationary, without interfering with or stopping the remaining winding heads on the machine. The clutch member 19 is, in the embodiment shown, adapted to be actuated by a pin 21′ on a short arm or extension 21 on a spindle 22 journaled in a bearing 23 on a bracket 24 fast to the rail 2. A stop motion, to be hereinafter fully described, is provided to self-actingly actuate the spindle 22, on breakage or failure of yarn, to cause the clutch member 19 to be moved out of frictional engagement with the clutch boss 18 and the winding head thus stopped.

On the screwed portion 6′ of the vertical spindle 6 is loosely mounted a toothed or notched disk or wheel 25 having a downwardly extending hub 25′ of which a portion is cut away (see Figs. 4 and 5) to admit a half circular or segmental nut 26 carried by a clamp 27 provided with a spring 28 acting to normally hold the said nut 26 in engagement with the thread of the spindle, the engagement of the nut causing the disk 25 to move vertically with the spindle 6 as the latter is moved up and down by the action of the cam surface 10 as said spindle revolves, and the frictional engagement of the nut causing it to revolve with the spindle and consequently to revolve the disk 25 whose vertical position with respect to the spindle therefore remains unchanged.

Loosely mounted on the upwardly extending boss 25^2 of the disk 25 is an arm 29 which has an opening 29′ in the free end thereof forming a fork adapted to embrace and slide up and down in a vertical guide track 5^3 in the bracket 5 which prevents oscillatory or rotary movement of said arm. The arm 29 has a side extension 29^2 in an opening in which is pivotally mounted a wire or finger 30 having a guide hook or eyelet 30′ at one end thereof adapted to guide the yarn on to the bobbin and an arm 30^2 having a downward extension 30^3 which normally occupies a position adjacent to but clear of the notched periphery of the disk 25. The extension 30^3 is normally held out of engagement with the ratchet wheel by the tension of the yarn which passes to the guide hook 30′ at an angle, as shown in Fig. 2. A ball bearing 25^4 (Fig. 4) is provided to permit of free movement of the disk 25 when same is rotated.

The yarn to be wound on the tube or bobbin 17 is unwound from its carrier and caused to pass through a tension device 31 of any suitable construction and through the hook or eyelet 30′ of the pivoted wire or finger 30 and is then wound around the bobbin to secure it thereto, the disk 25 being lowered on the screw 6′ to bring said eyelet or hook 30′ into proper position to commence winding at the butt end of the bobbin. On the spindle 22 being moved, by the actuating lever 32 fast thereon, to cause the clutch member 19 to be moved into frictional engagement with the clutch boss 18 on the sleeve 13, the spindles 6 and 16 are revolved and through the action of the fixed cam 10 the spindle 6 is given a rapid up and down movement to give the required chase to the yarn wound on the bobbin 17, the depth of chase being of course determined by the lift of the cam. As the disk 25 moves down with the spindle 6 as the latter descends and the eyelet or hook 30′ comes opposite to the full diameter at the bottom of the bobbin, assuming that the latter has the ordinary tapered butt end, the said eyelet or hook is moved outwardly as is indicated by the dotted lines in Fig. 3 and the downward extension 30^3 and the arm 30^2 of the pivoted wire or finger 30 is moved inwardly and caused to engage the toothed or notched periphery of the disk 25. This causes the rotary movement of the said disk due to the frictional engagement of the nut 26 with the screw 6′, to be momentarily retarded and the screw therefore rotates through the nut and causes the disk to be raised slightly on the screw, the point of commencement of the chase thus being raised gradually as the yarn mass on the bobbin reaches its full diameter at each chase, and the yarn continuing to be wound on in uniform layers one above the other to build up the remainder of the cop to the same diameter.

To automatically stop the parts on the breakage or failure of the yarn I provide the following means. The yarn on passing from the tension device to the eyelet or hook 30′ is led under a detector wire or pin 33 extending out laterally from a dagger 34 pivoted loosely at 35 to one arm of a lever 36 pivotally mounted on the bracket 24. The lever 36 has a lateral projection 36′ (Figs. 8 and 9) adapted to normally extend into a recess 37′ in a disk 37 fast on the spindle 22, a spring 38 acting on the downwardly extending arm of the said lever, to hold the projection in engagement with the disk. If the yarn should break or fail the pivoted dagger 34 is allowed to fall and its front end drops into the path of and is engaged by a spring pin or plunger 18′ reciprocated by the engagement therewith of a swell or enlargement 18^2 on the clutch boss 18, which causes the said dagger to be forced endwise and to rock the lever 36 on its pivot, withdrawing the projection 36′ from engagement with the notch 37′ in the disk 37 and allowing a spring 22′ to act to

partly rotate the spindle 22 and cause the clutch member 19 to be moved out of frictional engagement with the clutch boss 18, thus disconnecting the sleeve 13 from the driving shaft and allowing the parts to come to rest. A rearwardly extending rod 39 projecting from the downwardly extending arm of the lever 36 passes through an eyelet or loop at the lower end of a vertically movable rod 40 having at its upper end a finger or arm 41 adapted to extend into the path of the arm 29 carried by the disk 25. When the cop has been built up to the desired height the finger or arm 41 is engaged by the arm 29 and the rod 40 is raised which, as will be understood, causes the lever 36 to be rocked on its pivot and the disk 37 to be freed, to permit the spindle 22 to be rocked to stop the motions of the parts. On completion of winding of a cop, the clamp 27 is actuated to remove the nut 26 from engagement with the screw 6′ and the disk is slid down the spindle back to its initial or starting position.

In a modified construction of stop motion (Fig. 10) for stopping the winding head on breakage or failure of the yarn or thread, the pivoted dagger 34 carrying the detector wire 33 is pivoted to an arm 42 passing through a spring plate 43 carried by a suitable fixed part, the spring acting to normally hold the forward end 42′ of the arm 42 in engagement with a notch or recess 37′ in a disk 37 fast on the spindle 22 controlling the clutch member 19. On the dagger 34 dropping, through breakage or failure of yarn, into the path of the swell 18^2 on the clutch boss 18, and being forced endwise thereby, the disk 37 is released and a spring acts to partly rotate the spindle 22 to bring about a stoppage as above described.

When winding on to paper tubes or tubes without taper heads or butts, I provide on the bracket 5 a cam surface 44 (Fig. 3) so located that during the winding of the lower portion of the cop, a finger 45 pivoted in an extension 29^3 of the arm 29 carried by the disk 25, is caused to wipe over same and to be moved at each vertical movement of the spindle 6 against the action of a spring 46 to bring its opposite end 45′ into engagement with the notched periphery of the disk 25 to intermittently hold same stationary and give the required build to the bottom of the cop. The cam surface 44 is set at the desired height on the bracket 5 and on the requisite build having being attained and the full diameter of the cop reached the pivoted finger 30 commences to act and the building up of the remainder of the cop proceeds in the manner previously described.

It will be understood that I do not limit myself to the exact constructions above set forth and that other forms of gearing for driving the spindle 6 may be employed although so far I have found helically toothed wheels to answer very well for the high speeds at which my improved winding heads revolve.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a winding machine, the combination, with a revoluble bobbin spindle, of a revoluble guide spindle provided with a screwthreaded portion, means for reciprocating the guide spindle longitudinally, a yarn guide, an arm for supporting the yarn guide, a sectional nut operatively connected with the said arm and normally held in frictional driving engagement with the screw threaded portion of the guide spindle, and means for arresting the rotation of the sectional nut periodically without arresting the rotation of the guide spindle, thereby moving the said arm and yarn guide longitudinally of the bobbin spindle.

2. In a winding machine, the combination, with a revoluble bobbin spindle, of a revoluble guide spindle provided with a screw threaded portion, means for reciprocating the guide spindle longitudinally, a pivoted yarn guide having an extension, an arm for supporting the yarn guide, a screw threaded sleeve encircling the guide spindle and having the said arm mounted on it, a toothed wheel secured on the said sleeve and adapted to be engaged periodically by the extension on the yarn guide to arrest the rotation of the wheel without arresting the rotation of the guide spindle, and a sectional nut carried by the said sleeve and normally held in frictional driving engagement with the screw threaded portion of the guide spindle.

3. In a winding machine, the combination, with a revoluble bobbin spindle, and a beveled toothed pinion secured thereto; a revoluble guide spindle, a helical toothed wheel secured to the guide spindle, and an arm also secured to the guide spindle; and a stationary cam for actuating the said arm and reciprocating the guide spindle longitudinally; of a revoluble driving shaft, a beveled toothed wheel secured on the driving shaft and gearing into the said beveled toothed pinion, and a helical toothed wheel gearing into the aforesaid helical toothed wheel and also secured on the driving shaft; and a yarn guide operatively connected with the said guide spindle.

4. In a winding machine, the combination, with a revoluble bobbin spindle, of a revoluble guide spindle provided with a screw threaded portion, means for reciprocating the guide spindle longitudinally, a pivoted yarn guide having an extension, an arm for supporting the yarn guide, a screw

threaded sleeve encircling the guide spindle and having the said arm mounted on it, a toothed wheel secured on the said sleeve and adapted to be engaged periodically by the extension on the yarn guide to arrest the rotation of the wheel without arresting the rotation of the guide spindle, a sectional nut carried by the said sleeve and normally held in frictional driving engagement with the screw threaded portion of the guide spindle, a spring controlled lever pivotally supported by the said arm and provided with a pawl which is also adapted to engage with the said toothed wheel, and a stationary projection which places the said pawl in engagement with the wheel at one end of each stroke of the guide spindle thereby temporarily arresting the rotation of the wheel and giving build to one end portion of the cop.

In testimony whereof I affix my signature in the presence of two witnesses.

EDWIN SYKES.

Witnesses:

THOMAS H. BARRON,

ELSIE M. GLEDHILL.