UNITED STATES PATENT OFFICE.

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MACHINE FOR SPILICING AND PIECING UP COTTON, LINEN, OR SIMILAR THREADS.

1,396,618.


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To all whom it may concern:

Be it known that I, Arthur Bennett, a British subject, residing at Hollinwood, Lancashire, England, have invented certain new and useful Improvements in Machines for Splicing and Piecing up Cotton, Linen, or Similar Threads, for which I have filed application in Great Britain No. 20,289, dated September 11, 1913, Patent No. 20,329, dated September 11, 1913, of which the following is a specification.

This invention relates to improvements in machines for splicing and piecing up cotton, linen or similar threads.

It consists essentially of a machine which will automatically take out the twist in the two ends to be spliced together, and after splicing re-insert the twist into the spliced thread, and in which the spindles are arranged in two parallel rows so that the thread from any number of pairs of bobbins can be spliced together at one operation.

The invention will be fully described with reference to the accompanying drawings—Fig. 2 is a plan of the machine. Fig. 3 is a transverse section. Fig. 4 is a perspective view of the knocking off motion. Fig. 5 is a perspective view showing the mechanism for holding the threads while the twist is being taken out and re-inserted.

The frame A of the machine is of any suitable construction and is provided along the front with a fixed rail B carrying a number of spindles b to carry bobbins E and at the rear with two or more rails C C' mounted one above the other in a suitable frame D. The frame D is controlled by a rack d and pinion d' mounted on shaft d' to bring any of the rails C C' into operative position, the shaft d' being rotated by a hand wheel at the end thereof. The rails C C' are provided with spindles e e' to carry bobbins E', the spindles e e' on the rails C C' being equal in number and opposite to the spindles b on the fixed rail E.

At one end of frame A a shaft f is mounted carrying a fast and loose pulley F driven by hand or from any suitable source of power. Two pulleys G G' are key- to the shaft f, one at each end of the fast and loose pulley F. The pulley G' is connected by a crossed belt g with a fast and loose pulley H mounted on a shaft J running the length of the frame A and the pulley G' is connected by an open belt g' with a fast and loose pulley H' also mounted on the shaft J.

The crossed belt g is controlled by a belt fork h sliding on a rod h and the open belt g' is controlled by a belt fork h' also sliding on the rod h'. The belt fork h is provided with a downwardly projecting arm h' carrying a rod h' sliding through a frame K. The rod h' carries a spring k held between an abutment stop k' on the rod h' and the frame K. The spring k holds the belt fork h in the position to maintain the belt g on the loose pulley and when the fork h is moved to put the belt g on to the fast pulley the spring is compressed. The abutment stop k' carries a bar k' provided with a notch k' into which a weighed lever k' falls when the belt fork h is moved to bring the belt g into position on the fast pulley, thus preventing the spring k from moving the fork h back again until the lever k' is raised by an automatic knock-off motion which will be described later.

The belt fork h' controlling the movement of the open belt g' is provided with an upwardly projecting arm h' carrying a rod h' also sliding through the frame K. The rod h' carries a spring k' held between an abutment stop k' on the rod h' and the frame K. The spring k' holds the belt fork h' in the position to maintain the belt g' on the loose pulley and when the fork h' is moved to put the belt g' on to the fast pulley the spring k' is compressed. The abutment stop k' carries a bar k' provided with a notch k' into which a weighed lever k' falls when the belt fork h' is moved to bring the belt g' into position on the fast pulley, thus preventing the spring k' from moving the belt fork h' back again until the lever k' is raised by the automatic stop motion which will be described later.

The bosses of the belt forks h and h' are made sufficiently wide so that when one is in the position to bring the corresponding belt...
onto its fast pulley, the other cannot be moved. In Figs. 1 and 2, both belts are shown on the loose pulleys, the loose pulleys of each fast and loose pulley H or H', being on the outside and the fast pulley on the inside.

The shaft J is the shaft which operates the mechanism for first taking the twist out of the ends of yarn or thread to be spliced and then after splicing reinserting the twist therein so that it is necessary that the shaft J should be first rotated in one direction for a predetermined number of revolutions and then after the ends of the yarn or thread have been spliced together, rotated in the opposite direction for an equal number of revolutions.

The predetermined number of revolutions which the shaft J has to make depends on the amount of twist in the ends of the yarn or thread being spliced together.

The fast pulley of the fast and loose pulley is employed to rotate the shaft J in the direction for removing the twist from the ends to be spliced together and the fast pulley of the fast and loose pulley H' is employed to rotate the shaft J in the opposite direction to reinsert the twist after splicing. The functions of the pulleys H and H', could be reversed depending on the direction of rotation of the main driving pulley F.

In order to insure that the right amount of twist is taken out of the ends before splicing and that the same amount is reinserted after splicing, it is necessary to provide an automatic knock off motion which will release the weighted lever k\textsuperscript{b} from the notch k\textsuperscript{a} in the rod k\textsuperscript{2} and allow the spring k to return the belt fork h to the loose pulley of the fast and loose pulley H to stop the rotation of the shaft J when the requisite amount of twist has been taken out of the ends and which will also release the weighted lever k\textsuperscript{b} from the notch k\textsuperscript{a} in the bar k\textsuperscript{2} to permit the spring k\textsuperscript{b} to return the belt fork h' to the loose pulley of the fast and loose pulley H' to stop the rotation of the shaft J when the same amount of twist has been re-inserted into the ends after they have been spliced together.

This automatic knock off motion comprises a vertical rack L in a slot in which are inserted two projecting T headed pins M M' which can be held in any desired position by means of the clamping nuts m m'. The end of the pivoted weighted lever k\textsuperscript{a} holding the belt fork h with the belt g on its fast pulley is arranged in the path of the lower pin M and the end of the pivoted weighted lever k\textsuperscript{b} holding the belt fork h' with the belt g' on its fast pulley, is arranged in the path of the upper pin M'. It will thus be seen that when the rack L has moved downward until the pin M has engaged the lever k\textsuperscript{a} the latter will be moved out of engagement with the notch in the rod k\textsuperscript{2} and the spring k will move the belt fork h and cause the latter to carry with it the belt g from the fast to the loose pulley and so stop the rotation of the shaft J. Similarly when the shaft J is being rotated in the opposite direction by the belt g' to reinsert the twist the engagement of the pin M' with the end of the pivoted weighted lever k\textsuperscript{a} will cause the latter to be moved out of engagement with the notch in the rod k\textsuperscript{2} and the spring k\textsuperscript{b} will move the belt fork h' to carry the belt g' from the fast to the loose pulley thus stopping the rotation of the shaft J.

The rack L is carried in a suitable supporting tube L' which is graduated to correspond to the number of revolutions of the shaft J required to take out and insert any given twist and is provided with a pointer L working over the graduations to assist in the adjustment of the pins M and M'.

The rack L is operated from a small pinion M' on the shaft J which gears with a larger toothed wheel F. The wheel F is connected to the small pinion M' which gears with the large wheel F' keyed to a stud on a shaft on which is also keyed the pinion F' gearing with the teeth F of the rack L. The rack L carrying the knocking off pins N M M' is thus connected to the shaft J and comes into operation as described above.

The shaft J running the whole length of the frame A carries a number of pairs of spiral gears j j', the number of pairs of such gears being equal to the number of spindles b carried on the front fixed rail B. The spiral gears j j' gear with spiral gears n n' mounted on shafts n n' on the ends of which are carried the yarn clamping devices N N'. The clamping devices N N' as will be seen from Fig. 5 are in the form of a screw the yarn being held between the head thereof and the flattened end of the shaft. The spiral gears n and shafts n' of the clamping devices N for the thread or yarn from the bobbins E are provided with slits extending to the center to receive the thread or yarn but such an arrangement is not necessary for the thread or yarn from the bobbins E' as in this case the thread does not extend beyond the clamp.

The other ends of the yarn or thread are held by clamping devices O adjacent to the bobbins E'. The clamps O comprise a fixed plate o mounted on a bar P and a plate o' carried on a rod O' screwed at the end o" engaging in the nut o'. To clamp or unclamp the yarn or thread it is only necessary to rotate the rod o' when all the ends in the frame are clamped or unclamped together. The bar P is mounted on wedges p and held by winged nuts p' so that if the latter are slackened the wedges p can be driven in to tilt the bar P and slacken.
the yarn or thread held between the clamps N and O.

A bar Q is arranged between the bevels n and the bobbins E provided with pins q engaging the yarn or thread. The bar Q is connected by a cord q' passing over a pulley to a weight to impart a certain amount of drag to the yarn or thread.

Where a thread is composed of a number of strands it is advantageous to break the ends of the strands at different points along the length thereof to obtain a more uniform splicing. To obtain this a framework R is provided between the clamps N and O. (See Fig. 5.) The frame R is composed of a number of strips r carrying cutting edges r' so that the different strands can be severed as desired.

In operation the bobbins are to be spliced together are placed on the spindles b and c (or c') and the ends held between the clamps N and O as shown in Fig. 2. The shaft J is then rotated the necessary amount to take the twist out of the length between the points N and O, the shaft J being stopped by the automatic knock off when this has been done. One of the ends is then removed from its clamp and laid over the other end and then spliced together. The shaft J is then rotated in the opposite direction to re-insert the twist, the automatic knock off motion stopping the rotation of the shaft J, when this has been completed. The bobbins are then removed from the frame.

What I claim as my invention and desire to protect by Letters Patent is—

1. A machine for splicing or piecing up cotton, linen or similar threads comprising clamps for the ends of the threads, a shaft rotating said clamps first in one direction and then in the other to take out and re-insert the twist in the ends, fast and loose pulleys driving said shaft, first in one direction and then in the other, and an automatic knock off motion to stop the rotation of the shaft after making the predetermined number of revolutions for taking out or re-inserting the twist.

2. A machine for splicing or piecing up cotton, linen or similar threads comprising a stationary rail at the front of the machine, spindles for bobbins mounted thereon, a plurality of rails at the rear of the machine capable of being moved up and down vertically, spindles for bobbins mounted thereon, stationary clamps mounted on a bar in front of the movable rails, revolving clamps adjacent to the stationary rail, a shaft rotating the said revolving clamps first in one direction and then in the other, gearing connecting the shaft to the revolving clamps, a pair of fast and loose pulleys mounted on the shaft and an automatic knock off motion to stop the rotation of the shaft after it has made a predetermined number of revolutions in either direction.

3. A machine for splicing or piecing up cotton, linen or similar threads comprising a stationary rail at the front of the machine, spindles for bobbins mounted thereon, a plurality of rails at the rear of the machine capable of being moved up and down vertically, spindles for bobbins mounted thereon, a bar in front of the movable rails, carrying a number of plates affixed thereto, an equal number of plates pressed against the former plates to grip the yarn or thread, a number of short shafts arranged adjacent to the fixed rail, screw clamps at the ends of said shafts to grip the yarn or thread, a shaft rotating the short shafts, first in one direction and then in the other, gearing connecting the shaft to the revolving clamps, a pair of fast and loose pulleys mounted on the shaft and an adjustable automatic knock off motion to stop the rotation of the shaft after it has made a predetermined number of revolutions in either direction.

4. A machine for splicing or piecing up cotton, linen or similar threads comprising a stationary rail at the front of the machine, spindles for bobbins mounted thereon, a plurality of rails at the rear of the machine capable of being moved up and down vertically, spindles for bobbins mounted thereon, a bar in front of the movable rails carrying a number of plates affixed thereto, an equal number of plates pressed against the former plates to grip the yarn or thread, a number of short shafts arranged adjacent to the fixed rail, screw clamps at the ends of said shafts to grip the yarn or thread, a shaft rotating the short shafts, first in one direction and then in the other, gearing connecting the shaft to the short shafts, a pair of fast and loose pulleys mounted on said shaft, belt forks controlling the belts on said pulleys, spring controlled bars normally holding the belt forks on the loose pulleys, weighted levers to engage projections from said bar to hold the springs out of action, a rack driven from the rotating shaft and pins on said rack to release the weighted levers from engagement with the projections on the bars to allow the belt forks to return to the loose pulleys, and stop the rotation of the shaft.

5. A machine for splicing or piecing up cotton, linen or similar threads comprising a stationary rail at the front of the machine, spindles for bobbins mounted thereon, a plurality of rails at the rear of the machine capable of being moved up and down vertically, spindles for bobbins mounted thereon, a bar in front of the movable rails carrying a number of plates affixed thereto, an equal number of plates pressed against the former plates to grip the yarn or thread.
number of short shafts arranged adjacent to the fixed rail, screw clamps at the ends of said shafts to grip the yarn or thread, a shaft rotating the short shafts, first in one direction and then in the other, gearing connecting the shaft to the short shafts, a pair of fast and loose pulleys mounted on said shaft, belt forks controlling the belts on said pulleys, spring controlled bars normally holding the belt forks on the loose pulleys, weighted levers to engage projections from said bar to hold the springs out of action, a rack driven from the rotating shaft, pins on said rack to release the weighted levers from engagement with the 15 projections on the bars to allow the belt forks to return to the loose pulleys and stop the rotation of the shaft, and a frame placed between the clamping devices carrying knives to sever the strands of the thread at 20 different points.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARThUR BENNETT.

Witnesses:

Geo. H. O'Brien,

E. Howard.