

Nov. 12, 1929.

F. NOYER ET AL

1,735,651

TWIST LACE MACHINE

Filed Dec. 15, 1924

4 Sheets-Sheet 1

Fig. 5. Fig. 6.

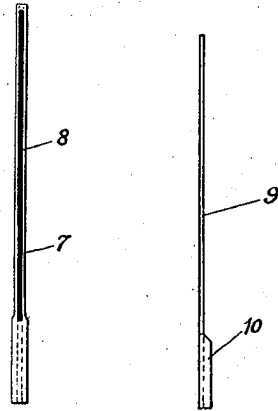
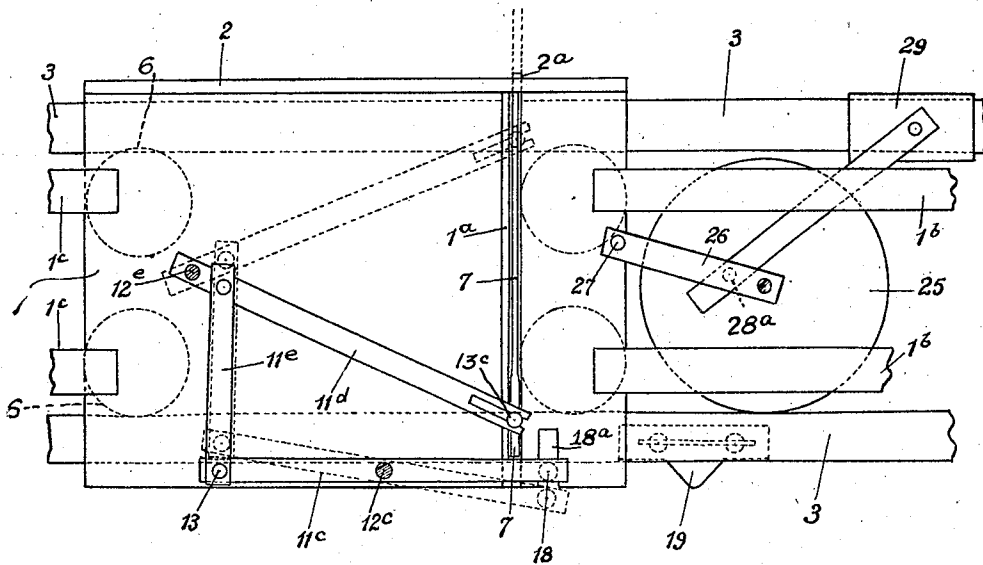


Fig. 1.



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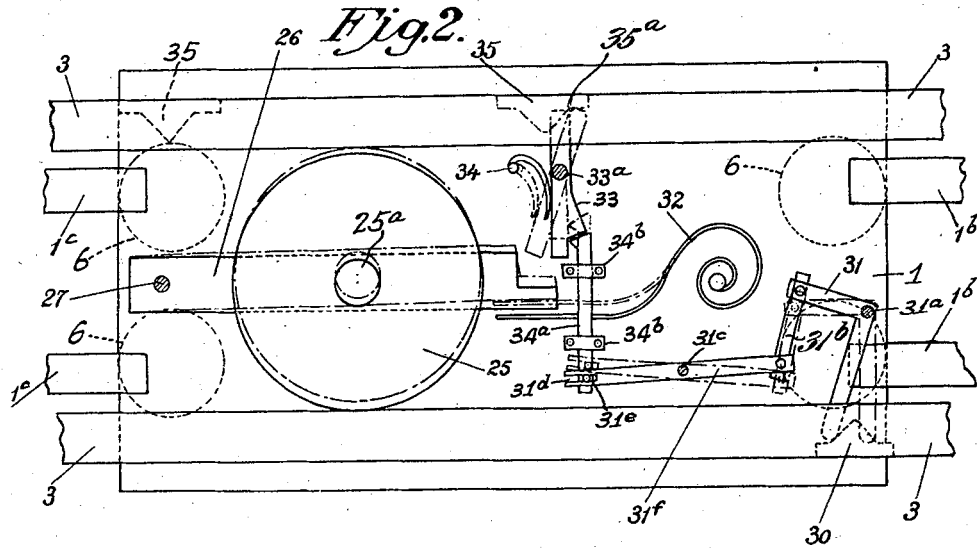


Fig. 3.

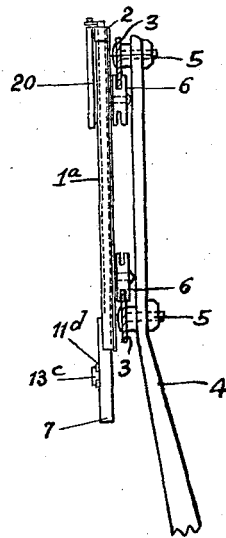
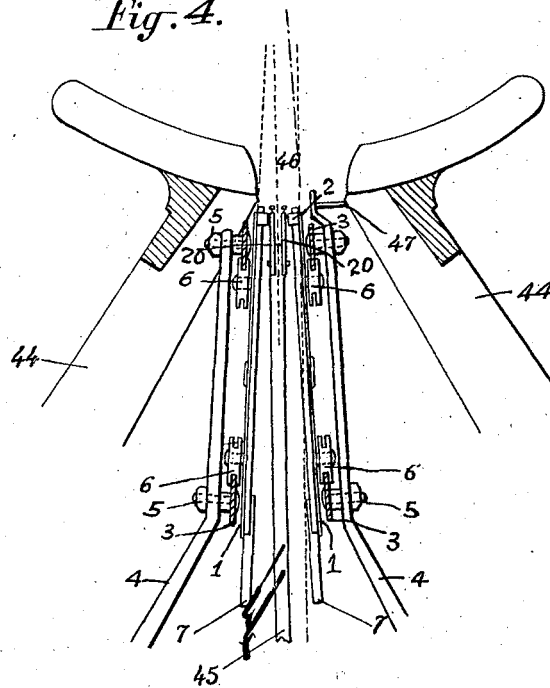


Fig. 4.



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Fig. 8.

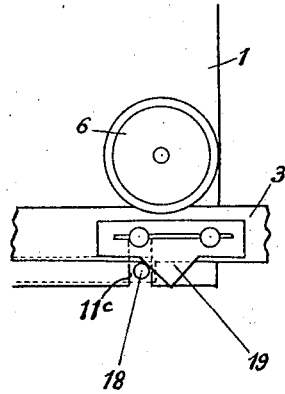


Fig. 7.

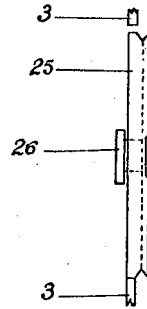


Fig. 9.

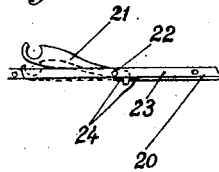


Fig. 10.

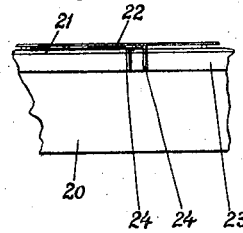
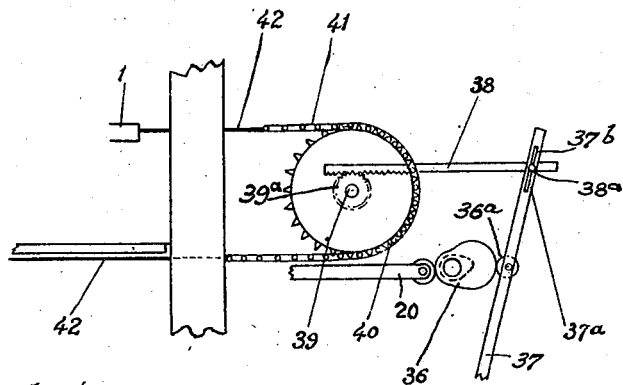


Fig. 11.



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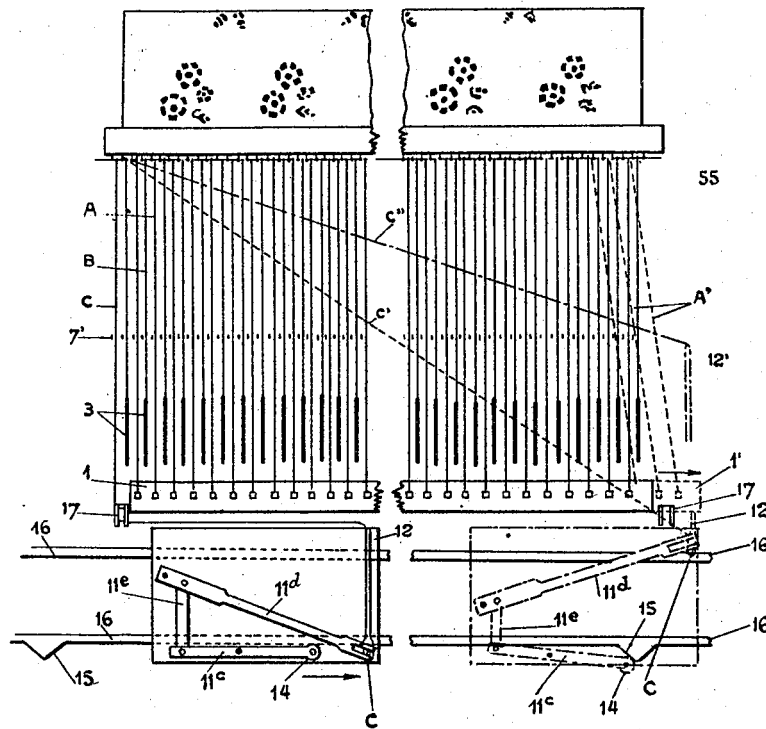


Fig. 13

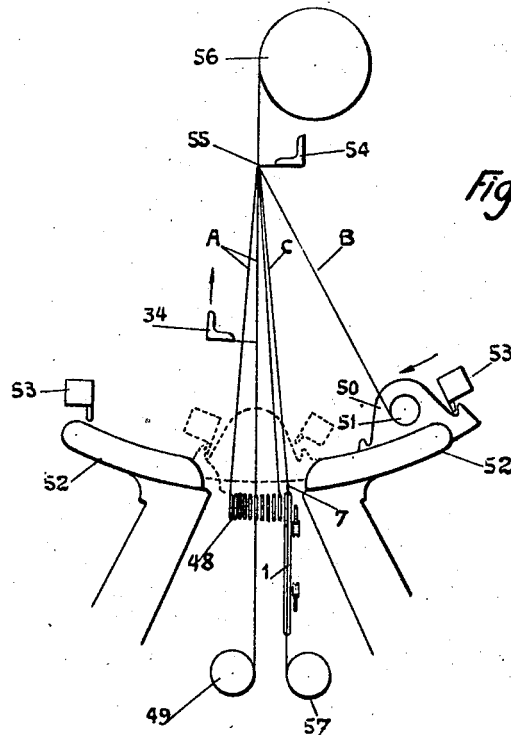


Fig. 12

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TWIST-LACE MACHINE

Application filed December 15, 1924, Serial No. 756,146, and in France February 12, 1924.

This invention relates to twist lace machines of "Levers" and "go-through" type.

Lace produced by "Levers" or "go-through" machines, consists of a series of threads disposed parallel to each other and longitudinally with respect to the length of the material; threads which are twisted about certain of the last mentioned threads by jacquard mechanism; and threads, which may be regarded as weft threads, and have a to and fro disposition transversely with respect to the length of the fabric and at right angles to the longitudinally disposed threads.

The object of the invention, hereinafter described is to provide mechanism of novel construction which carries a single thread to and fro throughout the entire width of the fabric, from edge to edge.

The operations attained by the mechanism hereinafter described and claimed consist in introducing into machines for making tulle and lace a supplementary weft crossing over, for the entire width of the loom, the warp threads passed through the bars and the gimp threads or embroiderers unroll themselves from the carriages in such manner that this weft permits of obtaining of woven fabric, plain or embroidered, of tightened mesh upon machines usually making nets and lace with wide spaces or interstices; besides, this weft suppresses the necessity of making connections between lengths of fabric since it joins the vertical threads together.

Finally by the said mechanism the operation is obtained which consists in the addition of a third series of threads to the two series of threads woven together upon these machines and to pass this third thread horizontally through the whole of the threads of the other two categories.

Therefore, according to this invention, a needle or needles are employed and are mounted on a suitably supported bar and in operative connection with a system of levers, also carried by the bar, and having motion imparted to them by suitable mechanism such as a cam.

Further, the invention, consists of a particular construction and arrangement of parts of needle operating mechanism and

further, the invention consists in mechanism co-operatively combined with the needle operating mechanism to assist the needle to pull the thread from rollers disposed beneath the machine.

Further, the invention consists in a particular construction and arrangement of parts of mechanism for imparting reciprocating movement to the needle carrying bar.

Further, the invention consists in a particular arrangement of needle operating mechanisms, which are constructed according to this invention, with twist lace machines.

Further, the invention consists in the combination with the particular mechanisms described, of needles found to be most effective to efficient operation.

Reference being had to the drawings herewith:—

Figure 1 shows, in side elevation, Levers mechanism for operating a needle, and means for controlling the thread which is used by the needle; Fig. 2 shows alternative mechanism for controlling the thread; Fig. 3 shows, in end elevation, a form of support for the mechanism; Fig. 4 illustrates the application of duplicated mechanism to a lace machine.

Figure 5 shows a form of needle 7 in the form of a tube split longitudinally at 8 and of gutter or U-shape.

Figure 6 shows another form of needle 9 of tubular shape and not slit and preferably of oval section.

Figures 7 to 13 show, in detail, parts of mechanism described with reference to Figures 1 to 4 and more particularly referred to hereinafter.

Referring first to Fig. 1 the needle 7 is capable of sliding movement in guides 1^a on bar 1, which is reinforced at its upper edge by a strip of metal 2 which has a perforation 2^a to further guide and retain the needle in place.

Referring to Figure 5 the needle 7 is constructed in the form of a longitudinally split tube as shown at 8 that is to say it is gutter or U shaped. In Figure 6 a needle 9 is illustrated which is not split but is of tubular shape and preferably of oval section. Both

these forms of needles have an enlargement 10 at their lower ends and said needles are respectively applicable to the manufacture of different materials.

5 The bar 1 has grooved rollers 6 upon one face; the rollers engaging edges of bars 3 supported as hereinafter described, by stationary parts so that, by means of draw-bars 1^b and suitable mechanism, it can be reciprocated. A very suitable mechanism for the purpose is shown in Fig. 11 and comprises a cam 36 operating against an anti-friction roller 36^a on a lever 37, capable of oscillation and having a slot 37^b to engage over a pin 38^a in a rack bar 38. The teeth of this bar engage a pinion 39^a on a shaft 39 which also supports a sprocket 40. A chain 41 and flexible strands 42 impart the to and fro motion produced by the cam, to the draw-bars 1^b, 1^c.

20 A lever 11^c is pivoted to the bar 1 at 12^c, and has a pin 18 passing through a slot 18^a in the bar 1 to engage a cam 19, adjustable on the lower bar 3. The other end of the lever is pivoted at 13 to a link 11^e, pivoted to a lever 11^d which is bifurcated, at one end, to engage a pin 13^c on the needle and, at its other end, is pivoted to the bar 1 at 12^a.

It will be understood that when the bar 1 is drawn along its guide bars 3 until the pin 18 rides up the cam 19, the link 11^e and lever 11^d will raise the needle as indicated by the dotted lines; the needle and levers falling when the pin 18 recedes from the cam.

35 In order to assist the needle in withdrawing the thread from a roller or spool it is passed over a wheel 25 (Figs. 1 and 7) carried near the end of a lever 26 pivoted to the bar 1 at 27; a lever 28 being pivoted to the lever 26 at 28^a and to a slide 29 on the upper bar 3. When the bar 1 moves in one direction, the friction of the slide 29 on the bar 3 will cause the levers to partly straighten and draw the wheel towards the upper bar, and, when the plate moves in the other direction, to resume their former positions and carry the wheel on to the lower bar. The wheel therefore always turns in the same direction.

45 Alternative mechanism for operating the wheel 25 is shown in Fig. 2, which illustrates the reverse side of the bar 1 as shown in Fig. 1. The wheel operates on this side of the bar 1 and is carried by a pin 25^a on a lever 26 which is pivoted to the plate 1 at 27; its free end being normally raised by a spring 32 so that the wheel 25 engages the upper rail. When however, the plate 1 reaches the end of its stroke, one arm of a bell-crank lever 31, pivoted at 31^a to the bar 1, comes into contact with a fixed cam 30 on one of the lower bars 3. This raises a link 31^b, connecting the lever 31 with one free end of a lever 31^c, pivoted to the plate 1 at 31^c and having a slot 31^d at its other end to engage a pin 31^e on a rod 34^a. This rod, being capable of sliding in brackets 34^b, is de-

pressed and draws down the spring 32, permitting the wheel 25 to fall, by reason of its weight, and engage the lower rail. The wheel is kept in this position by a pawl 33 engaging the upper end of the rod 34^a; the pawl being pivoted to the plate 1 at 33^a and pressed into effective position by a spring 34. The wheel 25 again engages the upper rail 3 when the pawl comes into contact with a cam 35 on the upper rail in the manner shown at 35^a.

The rails 3 can be secured to and spaced from a support 4 (Figs. 3 and 4), the rollers running between them, or, one rail 3 can be secured, as at 5, to a support 4; the rollers 6, on the bar 1, running on the upper and lower edges of the rails 3.

The mechanism, so far described and shown in Fig. 3 may be and is shown as duplicated in its application to a "Levers" lace machine as illustrated in Fig. 4, there being two supports 4 for guide rails 3. The improved needle operating mechanism is supported beneath the usual opening 46 which is between the so-called "comb-bars" 44 of the lace machine; the bars 1 being preferably slightly inclined inwardly at their upper edges. One of the supports 4 extends upwardly and has a projecting pin 47 which supports certain essential parts of the lace machine.

A support 45 (Fig. 4) between the bars 1, carries thread gripping mechanism, shown in detail in Figs. 9 and 10, and comprises a hook carrying bar 20, or bars as shown in Fig. 4 situated near to the needle, and having pivoted thereto, at 22, a hook 21; its purpose being to grip and retain the thread beneath the carriages during their movements, and to free the thread at the exact moment when the needle rises. A draw-bar 23, operated by any known mechanism, such as a cam, is slidably disposed beneath the bar 20 and has transversely projecting pins 24 which engage and disengage the shank of the hook at the proper times to cause it to fall and rise to grip the thread or release it.

110 In Figures 12 and 13 is illustrated the application of the invention to a Levers or rectilinear type of machine for weaving net or lace, Figure 12 being a side view and Figure 13 a longitudinal view of the relevant parts of the machine. As shown in these figures a series of bars 48 being steel blades arranged parallel to one another in the central opening of the machine and carried by brackets provided with holes in which pass the chain stitches A coming from the bobbins 49 disposed beneath the machine are provided.

115 These bars are displaceable independently of one another and before each passage of the shuttle in a rectilinear movement of slight amplitude so as to incline the threads from A to A according to their axis and by reason of the jacquard mechanism.

A series of carriages 50 each having a bobbin 51 oscillating altogether perpendicularly

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to the bars 48 and above them between the "combs" or support guides 52 by passing through the central opening of the machine in order to cross and twist the threads B with the threads A.

These carriages are moved by the driving cover bars 53 which draw together and then move apart simultaneously from the centre of the machine by regular movement due to cams.

Two ranges of points 54 come down in turn, pick up the threads which have been passed and twisted A—B so as to tighten them on the line X—55 above which the lace is terminated and wound upon the cylinder 56.

To these known parts are added according to the invention, a new needle carrying bar 1 displaceable in the opening of the machine parallel with the bars 48, from one end to the other of the machine.

This bar carries a hollow needle 7 hereinbefore described in which passes the thread C which unwinds from the bobbin 57 disposed beneath the machine as illustrated in Figure 12. At each passage of the carriage 50 by reason of a series of pivotally connected levers 11^c, 11^a, 11^e, the extremity of one (11^c) of which carries a roller 14 which meets, in its movement, one of two inclines 15, whereby the needle 7 delivers the thread C at C'' to the points 54 which pick up at the same time as the twisted threads A—B.

Two oscillating claws 17 placed each one at the extremity of the machine, holding back the thread C beneath the carriages 50 during their passage across the central opening so that they shall not be broken at C', releasing then the thread after this cross passage at the moment when the needle 7 rises.

We claim:—

1. In a twist lace machine, a needle, a bar carrying said needle, means supporting said bar, levers carried by said bar in operative pivotal connection therewith, means for imparting motion to said levers, said levers being pivotally connected and one of said levers being pivotally connected to the needle to impart reciprocating motion thereto.

2. In a twist lace machine, a needle, a bar carrying said needle, means supporting said bar, a reinforcing strip at the upper edge of said bar, a guide opening therein for a needle, vertically disposed guides for the needle, levers pivotally connected to the bar and to each other, mechanism such as a cam for imparting motion to said levers, one of said levers being pivotally connected to the needle to impart reciprocating motion thereto.

3. In a twist lace machine, a needle, a bar carrying said needle, means supporting said bar, a strip reinforcing said bar at its upper edge, a guide opening therein for a needle, vertically disposed guides for the needle, levers pivotally connected to the bar and to each other, means for imparting motion to said levers, one of said levers being pivotally

connected to the needle to impart reciprocating motion thereto.

4. In a twist lace machine, a needle, a bar carrying said needle, means supporting said bar, a strip at the upper edge of said bar for reinforcing the same, a guide opening therein for the needle, a vertically disposed guide for said needle, levers pivotally connected to said bar and to each other, one of said levers being pivotally connected to the needle to impart reciprocating movement thereto, draw-bars, a cam for imparting reciprocating movement to the needle carrying bar, a stationary and adjustable cam, one of said levers being adapted for intermittent contact with said stationary and adjustable cam, motion being intermittently imparted to said levers and the needle thereby receiving reciprocating motion of very large amplitude.

5. In a twist lace machine, a needle, a bar carrying said needle, means supporting said bar, a strip at the upper edge of said bar for reinforcing same, a guide opening therein for a needle, vertically disposed guides for the needle, levers pivotally connected to the bar and to each other, one of said levers being pivotally connected to the needle to impart reciprocating movement to the needle carrying bar, a stationary and adjustable cam, one of said levers being adapted for intermittent contact with said stationary cam whereby motion is intermittently imparted to said levers the needle receiving therefrom a reciprocating motion of very large amplitude, a spool, means for assisting the needle to draw thread from said spool, said means comprising a wheel, levers carrying said wheel, one of said levers being pivotally attached to the needle supporting bar, a slide, a stationary bar support carrying said slide, another of said levers being pivotally connected to said slide, said wheel being adapted to have the thread passed about its perimenter and to have rotary motion imparted thereto, in the same direction, by the bar supporting means.

6. In a twist lace machine, a needle, a bar carrying said needle, means supporting said bar, a reinforcing strip at the upper edge of said bar, a guide opening therein for a needle, vertically disposed guides for the needle, levers pivotally connected to the bar and to each other, and one of said levers being pivotally connected to the needle to impart reciprocating movement thereto, draw-bars and a cam for imparting reciprocating movement to the needle carrying bar, a stationary and adjustable cam, one of said levers being pivotally connected to said bar and being adapted for intermittent contact with said stationary and adjustable cam motion being thereby intermittently imparted to said levers the needle thereby receiving reciprocating motion of very large amplitude,

a spool, means for assisting the needle to draw thread from said spool, said means comprising a wheel, levers carrying said wheel, one of said levers being pivotally attached to the needle supporting bar, a slide on the stationary support for said bar, a lever attached to said slide, said wheel being adapted to have the thread passed about its perimeter and to have rotary motion imparted to it, in the same direction, by the bar supporting means, thread gripping and releasing mechanism consisting of a bar, a hook carried by and pivoted to said bar, a drawbar operated by a cam member and a support for said mechanism.

7. In a twist lace machine, a needle, a bar carrying said needle, means supporting said bar, a reinforcing strip at the upper edge of said bar, a guide opening therein for a needle, vertically disposed guides for the needle, levers pivotally connected to the bar and to each other, one of said levers being pivotally connected to the needle to impart reciprocating movement thereto, a drawbar and a cam for imparting reciprocating movement to the needle carrying bar, a stationary and adjustable cam, one of the levers which are pivotally connected to the needle carrying bar being adapted for intermittent contact with said stationary and adjustable cam by which motion is intermittently imparted to said levers the needle thereby receiving reciprocating motion of a very large amplitude, a spool, means for assisting the needle to draw thread from said spool, said means comprising a wheel, levers carrying said wheel, one of said levers being pivotally attached to the needle supporting bar, a stationary support for said bar, a slide on said support, another lever pivotally attached to said slide, said wheel being adapted to have the thread passed about its perimeter and to have rotary motion imparted to it, in the same direction, by the bar supporting means, thread gripping and releasing mechanism consisting of a hook carrying bar, a hook pivoted thereto, a drawbar operated by a cam member, a support for said mechanism, means for imparting reciprocating movement to the needle bar said means comprising a lever having one end capable of oscillation, a cam for oscillating said lever, a rack bar connected with said lever, a pinion in mesh with said rack, a sprocket turnable with said pinion, a chain on said sprocket, and flexible connections between said chain and draw-bars on the needle bar.

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