(No Model.) 2 Sheets—Sheet 1.

J. RUCKDESCHEL.

EMBROIDERING MACHINE.

No. 458,040. Patented Aug. 18, 1891.

Fig. 1.

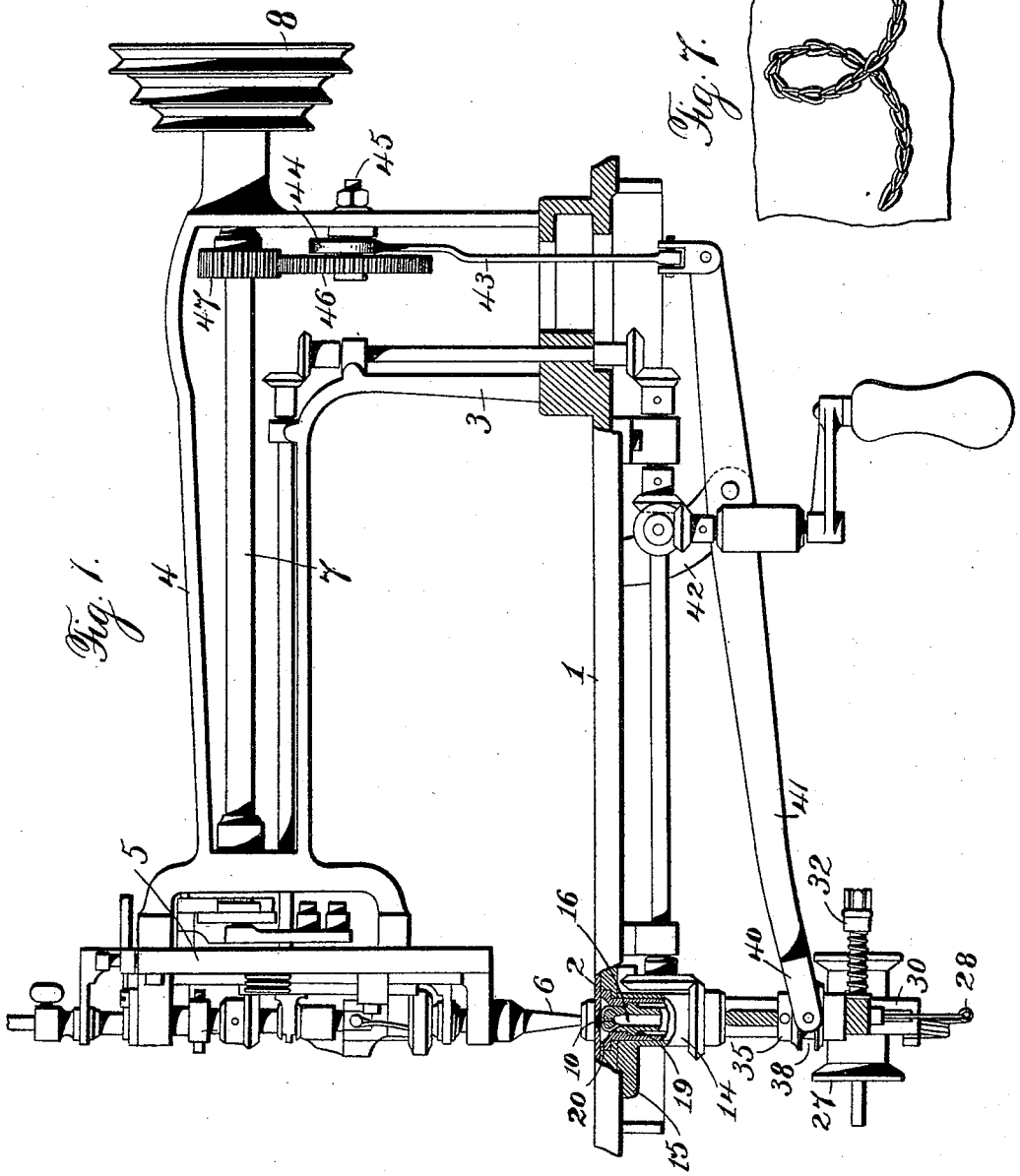

Fig. 2.

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Fig. 3. Fig. 4. Fig. 5. Fig. 6.

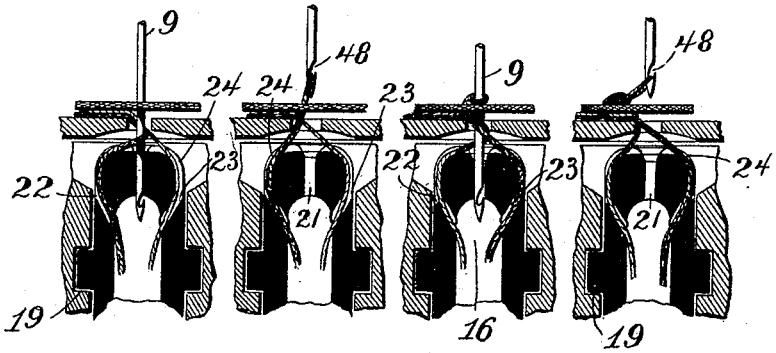
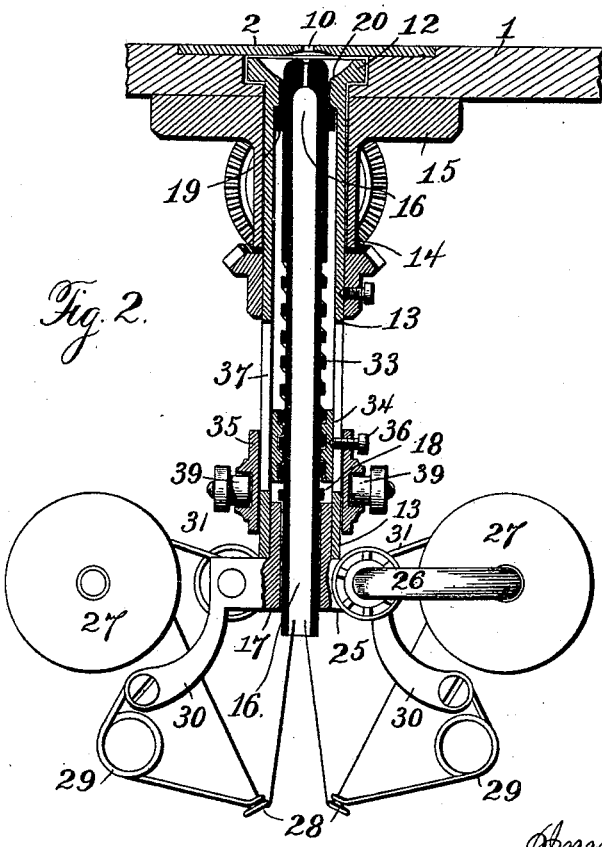


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHANN RUCKDESCHEL, OF PLAUEN, GERMANY.

EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 458,040, dated August 18, 1891.

Application filed January 17, 1891. Serial No. 378,132. (No model.)

To all whom it may concern:

Be it known that I, JOHANN RUCKDESCHEL, manufacturer, of Plauen, Voigtland, Germany, a citizen of Germany, residing at Plauen, Voigtland, in the Kingdom of Saxony, Germany, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

It is the purpose of my invention to provide mechanism whereby an ornamental line of stitching, formed in two or more contrasting colors, may be laid upon the surface of a textile or other fabric, each color being produced by a separate thread.

It is my object more particularly to provide simple automatic mechanism capable of carrying as many separate threads as there are distinct or different colors in the line of stitching, and provided with a shifting thread-guide whereby each of said threads is brought in its turn within reach of the needle of the machine, by which each thread is engaged, drawn through the cloth or other fabric, and looped, the loop being laid upon the surface of the fabric and the needle disengaged from it to permit the engagement of the latter with the succeeding thread and the formation of a further stitch of a different color.

The invention consists to these ends in the several novel features of construction and new combinations of parts hereinafter fully described, and then specifically pointed out and defined in the claims following this specification.

To enable others skilled in the art to understand and practice said invention, I will proceed to describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional elevation of a machine embodying my invention, the vertical-section plane lying substantially in the line of the axis of the thread-guide. Fig. 2 is a central vertical section of the thread-guide and its connections and of the cloth-plate and a portion of the bed-plate, said parts being represented on an enlarged scale. Fig. 3 is a sectional view, upon an enlarged scale, of a portion of the thread-guide, needle-plate, and needle, showing the manner of effecting the engagement of the needle with the threads. Fig. 4 is a similar view showing the same parts, the needle being raised and the stitch partly formed from one of the threads. Fig. 5 is a similar view of the same parts, showing the needle in position for a successive engagement with the thread and the thread-guide shifted for forming a second stitch by the other and separate thread. Fig. 6 is a view of the same parts, showing the feed movement of the fabric following the rise of the needle to enable the latter to lay the loop or stitch upon said fabric. Fig. 7 is a diagram showing a portion of fabric ornamented with the stitch.

In the said drawings, the reference-numeral 1 denotes the bed-plate of the machine having a removable cloth-plate 2, of the usual construction in sewing-machines. From one end of the bed-plate rises an arm 3, supporting a horizontal arm 4, which carries the head 5, within or upon which is mounted the needle-bar and the presser-foot 6, with the devices by which the former is reciprocated through the movement communicated by the shaft 7, which is driven by a pulley 8 from any suitable source of power. The needle 9 in this machine is a straight vertically-reciprocating needle, and the feed movement is derived from the presser-foot 6 by any known or preferred form of actuating devices, which are all familiar to those skilled in the art, and therefore need no description in this specification.

Beneath the cloth-plate 2 and concentric with the needle-opening 10, formed therein, is a recess within which lies the flange or collar 12 of a vertical sleeve 13, which passes down through the bed-plate and drops some distance beneath the latter, its upper portion reciving further support in a short sleeve-bearing 14, depending from a plate 15, secured to the lower face of the bed-plate.

Within the sleeve 13 is arranged a thread-guide 16, consisting of a tubular body having a length greater than that of the sleeve 13, whereby its lower open end passes through a plug 17, closing the lower end of said sleeve, and projects below the same. A collar 18, formed upon the tubular body of the thread-guide, rests upon the plug 17 and prevents the down-

ward movement thereof, while a second collar 19, lying below an inwardly-formed projection 20, near the upper end of the sleeve 13, prevents the longitudinal upward displacement of the thread-guide, but presents no obstacle to its rotary movement. The upper end of the thread-guide is closed, save as to a central vertical aperture 21, to permit the entrance of the needle. At diametrically-opposite points relatively to the needle-opening 21 thread-openings 22 and 23 are formed, lying at an angle with the axis of the tubular body and communicating with the interior thereof and with shallow channels 24, cut in the outer surface of the closed end or head of the thread-guide between the needle-opening and the ends of the thread-openings.

Upon the plug 17, which projects below the end of the sleeve 13, is mounted or formed a stationary cross-head 25, having two opposite bracket-arms 26, upon which are mounted spools 27, carrying the threads, which are passed through eyes 28 in the ends of spring-guides 29, the latter being supported by arms 30, mounted on the cross-head 25. From the eyes 28 the threads pass upward within the tubular body of the thread-guide and their ends are threaded through the openings 23 and 24 and pass up through the needle-opening in the cloth-plate. A tension-spring 31, coiled upon a pin 32, set in the cross-head 25, rests upon each spool, the tension being adjusted by turning the pin 32.

Upon the exterior of the tubular body of the thread-guide is formed a male thread 33, of high pitch, meshing with which is a nut 34, arranged to slide within the sleeve 13. Surrounding the latter is a ring 35, connected with the nut 34 by one or more screws 36, which pass through vertical slots 37 in the sleeve. In the central part of the ring is formed a circumferential channel or race 38, in which at points diametrically opposite each other lie trunnion-bearings 39, mounted upon the ends of the arms of a fork 40 upon the end of a lever 41. This lever has its fulcrum upon a drop-bracket 42 upon the under side of the bed-plate, and its end is connected by a pitman 43 with a ring-cam 44 upon stud-bearing 45, which is geared to the shaft 7 by a spur-gear 46, having a diameter double that of the driving-pinion 47, whereby the spur-gear will have a half-revolution to each complete revolution of the shaft 7. By this means the ring 35 will rise at one revolution of the shaft 7 and descend at the next revolution, giving opposite revolution to the thread-guide 16 at each successive rotation of said shaft.

The needle used in this machine is a straight vertically-reciprocating needle having, instead of an eye, an open hook 48 formed at or about the point where the needle-eye is usually located in the ordinary sewing needle. No shuttle is employed, as the stitch formed is of the kind ordinarily known as a "chain-stitch."

The operation of the mechanism is as follows: The threads lying in the thread-openings 22 and 23 being of different colors, and being carried from the spring-guides upward through the tubular body of the thread-guide 16, and being threaded through the said openings in the upper end or head of the guide, are laid in the thread-channels or slots 24, leading to the central vertical opening 21 for the needle and then brought up through the needle-opening 10 in the cloth-plate 2. The machine is now ready for operation. The cloth or other fabric being laid upon the cloth-plate between the same and the presser and feed foot 6, the machine is started, the needle making its downward stroke without carrying a thread. As the hook 48 upon said needle passes into the needle-aperture 21 in the upper end of the thread-guide 16 and begins to withdraw from the same, the said thread-guide 16, which has been meantime in rotation, has moved so far that one of the threads—for example, that lying in the thread-opening 22—is drawn partly around the needle and over that edge of the same upon which the open hook is formed, as shown in Fig. 3, whereby as the hook 48 emerges from the needle-opening 21 in the thread-guide it catches said thread and draws it up through the needle-opening in the cloth-plate and through the fabric in the form of a loop, as shown in Fig. 4. The fabric is now fed one step and the needle descends to form a second stitch, laying the formed loop of thread upon the fabric as its hook passes through the latter, where it is held by the presser and feed foot 6, which advances to make a further feed. As the needle descends in the manner described, the ring 35 moves in a direction opposite to that imparted to it during the first stroke of the needle, and it thereby causes a reverse rotation of the tubular thread-guide 16, by which the other thread from opening 23 is drawn partly around it, as shown in Fig. 5, the thread from opening 22 being at the same time brought into such a position as to avoid engagement with the hook 48. As the needle rises this hook catches the thread lying in the thread-opening 23 and draws the loop formed thereby through the loop laid upon the fabric by the previous action of the needle. The fabric is now fed a single step, as before. The needle ascends, laying the second loop upon said fabric. The presser and feed foot 6 advances and holds the loop. The thread-guide again rotates, and the operation is repeated. In this manner a line of stitching may be formed of two contrasting colors, giving a highly-ornamental effect.

The thread used may not be only of different colors, but may also be of different size, whereby the decorative appearance of the stitching may be varied.

By making the cross-head 25 stationary and disconnecting it from the thread-guide 16 I avoid imposing the weight of the cross-head and spools or bobbins upon said thread-guide.

The latter is in consequence more easily operated, and as the gearing is not compelled to carry any surplus weight the mechanism is capable of more rapid operation. This construction requires that the thread-guide shall rotate alternately in opposite directions to avoid twisting the threads.

What I claim as my invention is—

1. In a machine for forming ornamental stitching, the combination, with a reciprocating needle having an open hook, of a tubular thread-guide having a central needle-opening and opposite thread-openings and opposite exterior channels guiding the threads to the central needle-opening, and means for imparting to said thread-guide a series of intermittent rotary movements in opposite directions, alternately, substantially as described.

2. In a machine for forming ornamental stitching, the combination, with a vertically-reciprocating needle having an open hook, of a tubular thread-guide having a central needle-opening in its upper end beneath and in line with the needle-opening in the cloth-plate and provided with thread-openings leading from the interior of the thread-guide into opposite exterior channels formed in the sides and top of the thread-guide and leading to the central needle-opening, and means for imparting to said thread-guide successive half-rotations in opposite directions by successive complete revolutions of the needle-shaft, substantially as described.

3. In a machine for forming ornamental stitching, the combination, with a vertically-reciprocating needle having an open hook and with a presser and feed foot, of a tubular thread-guide arranged vertically, its upper closed end lying beneath the cloth-plate and having a central needle-opening communicating by opposite channels with thread-openings passing through the cylindrical wall of the thread-guide, and a support for said thread-guide and having stationary spool-brackets, substantially as described.

4. In a machine for forming ornamental stitching, the combination, with a needle having an open hook and with a vertical tubular thread-guide having its closed end provided with a central needle-opening in line with the opening in the cloth-plate and communicating with channels leading to thread-openings in the cylindrical wall of the thread-guide, of a nut meshing with a male thread on said guide, a ring movable on a sleeve supporting said guide and connected with the nut by pins or screws passing through slots in the sleeve, a lever having a forked end connected to said ring, and a ring-cam on a counter-shaft geared with the needle-shaft to revolve once to two revolutions of the latter, said cam being connected to the lever by a pitman, substantially as described.

5. In a machine for forming decorative stitching, the combination, with a vertically-moving needle having an open hook, of a tubular thread-guide having its closed upper end arranged beneath the cloth-plate and provided with a central needle-opening, a supporting and guiding sleeve for the thread-guide, having stationary spool-brackets carrying spools of different-colored threads which pass through spring-eyes and up through the tubular thread-guide, through thread-openings in its cylindrical wall, and thence through the needle-opening in the cloth-plate, and tension devices acting upon said spools, substantially as described.

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

JOHANN RUCKDESCHEL.

Witnesses:

CARL FR. KEICHELT,

PAUL DRUCKMÜLLER.