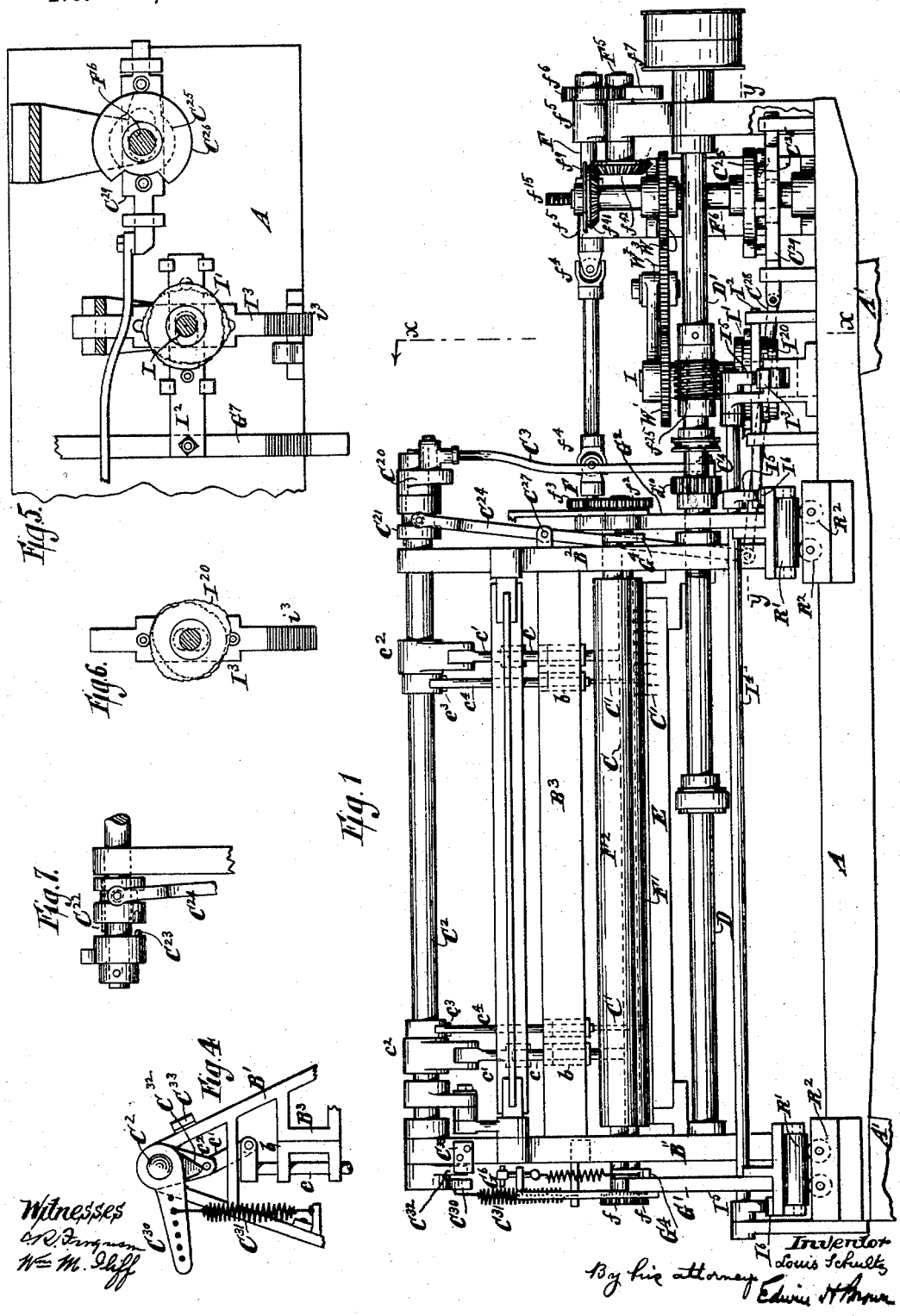
(No Model.) 2 Sheets—Sheet 1.

L. SCHULTZ.

QUILTING MACHINE.

No. 456,740. Patented July 28, 1891.



Witnesses
C. R. Ferguson
Wm. M. Ihoff

Inventor
Louis Schultz
By his attorney
Edwin H. Brown

(No Model.) 2 Sheets—Sheet 2.

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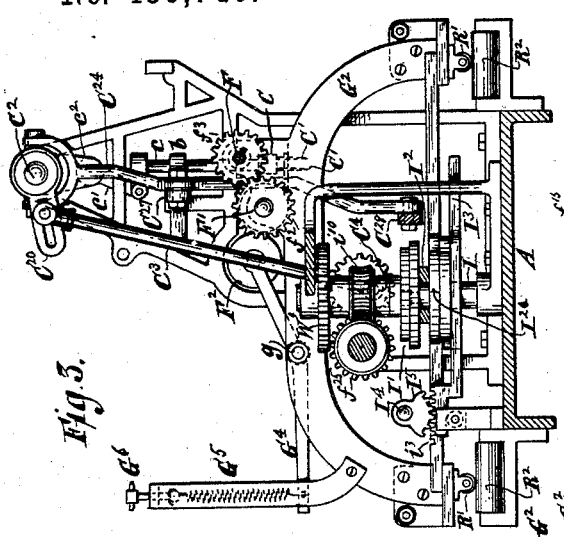

Fig. 3.

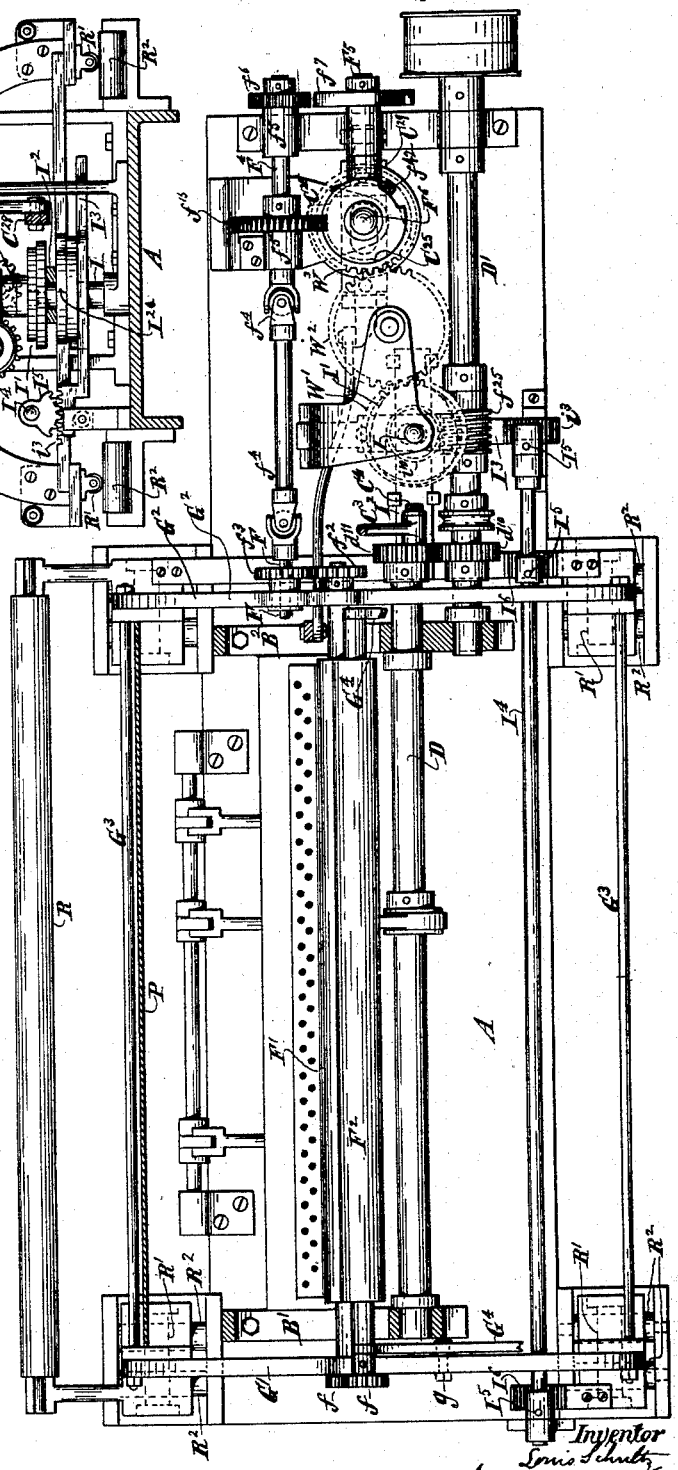

Fig. 2.

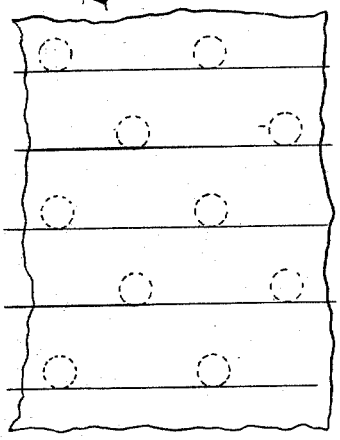

Fig. 8.

Witnesses
C. R. Ferguson
Wm. M. Duff

Inventor
Louis Schultz
By his attorney
Edwin H. Brown

UNITED STATES PATENT OFFICE.

LOUIS SCHULTZ, OF NEW YORK, N. Y., ASSIGNOR TO THE EXCELSIOR QUILTING COMPANY, OF SAME PLACE.

QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 456,740, dated July 28, 1891.

Application filed July 24, 1890. Serial No. 359,781. (No model.)

To all whom it may concern:

Be it known that I, LOUIS SCHULTZ, of New York, in the State of New York, have invented a certain new and useful Improvement in Quilting-Machines, of which the following is a specification.

The present improvement is particularly intended for quilting-machines of the kind which work a row of figures and then feed the fabric to a different position and work another row of figures, and so on.

I will describe a machine embodying my improvement, and then point out the novel features in the claims.

In the accompanying drawings, Figure 1 is a back view of a machine embodying my improvement, certain parts being broken away to economize space. Fig. 2 is a plan or top view of the machine, certain parts being represented in section. Fig. 3 is a transverse vertical section taken at the plane of the dotted line *x x*, Fig. 1, and looking in the direction indicated by the arrow which is contiguous to such line. Fig. 4 is an elevation of certain parts located at that end of the machine which is at the left in Fig. 1. Fig. 5 is a horizontal section of a portion of the machine taken at the plane of the dotted line *y y*, Fig. 1. Fig. 6 is a top view of certain cams and a slider-bar, whereby motion is imparted to a carriage that is comprised in the machine. Fig. 7 is a front elevation of certain parts, whereby the operation of the needles may be suspended. These parts are shown somewhat similarly in Fig. 1, except that the latter is a rear view and certain of the parts occupy different positions. Fig. 8 is a face view of a piece of quilted fabric which may be worked in this machine.

Similar letters of reference designate corresponding parts in all the figures.

A designates the bed of the machine. As here shown, it is supported on legs A'.

B' B^2 designate two side frames, secured in the present instance to the bed A by bolts or otherwise, to occupy parallel positions.

C designates the needle-bar. This has secured to it a series of needles C', which, in the present instance, are arranged in two rows, so that the needles of the second row will be behind those of the first row and opposite the spaces between those of the first row. This arrangement of the needles may be understood by reference to Figs. 1 and 3, where some of the needles are represented, and it also may be understood by reference to the zigzag row of circles, which in Fig. 2 represent holes in the cover of the shuttle or looper-chamber.

Secured to the needle-bar are a number of upright rods *c*, which work vertically within brackets *b*, attached to the front of a bar B^3, which is fastened to the side frames B' B^2. At the upper end the rods *c* are connected by links *c'* with arms c^2, affixed to a rock-shaft C^2. On the rock-shaft are other arms c^3, and these coact with rods c^4, secured to a presser-foot bar. The rock-shaft is oscillated by means of a rod C^3, deriving motion from a crank C^4, arranged upon a shaft D. The rod C^3 connects with a crank C^{20}, mounted on the shaft C^2. The shaft D derives motion from a driving-shaft D' through the agency of a gear-wheel d^{10}, affixed to the shaft D' and a gear-wheel d^{11}, meshing therewith and affixed to the shaft D. The shaft D will be driven constantly while the machine is in motion. It will be readily understood that the rock-shaft imparts a vertically-reciprocating motion to the needle-bar and needles. The only motion which the needles have in this machine is an up-and-down movement. The machine includes shuttle mechanism, as represented, and E designates the race-bar therefor.

The crank C^{20}, whereby motion is transmitted from the rod C^3 to the rock-shaft C^2, is loosely mounted upon the shaft C^2 and is capable of being periodically interlocked therewith by means of a clutch. The clutch which I have shown consists of a collar C^{21}, surrounding the shaft C^2 and movable lengthwise thereof, but it is engaged with the shaft by a spline or feather C^{22}, so as to be incapable of independent rotary movement. When the collar C^{21} is moved up to the hub of the crank C^{20}, a pin C^{23}, with which the hub of this crank is provided, engages with a corresponding recess in the clutch-collar C^{21}, and thereupon the clutch-collar and crank become so engaged that the motion of the crank C^{20} will be imparted through the clutch C^{21} to the rock-shaft C^2. By the movement of the clutch-

collar lengthwise of the shaft the crank C^{20} may obviously be periodically disengaged from the crank, so as to cause a suspension of movement in the shaft C^2, and consequently a suspension of the movement of the needles. I have shown the clutch-collar as operated by a mechanism consisting, essentially, of a lever C^{24} and cams C^{25} C^{26}. The lever C^{24} is fulcrumed between its ends to a bracket C^{27}, which is secured to the side piece B^2 of the main frame of the machine. At the upper end this lever is forked and provided with pins which enter a circumferential groove formed in the clutch-collar C^{21}. The lower end of the lever is connected by a link C^{28} with a sliding plate C^{29}, that is operated by the cams C^{25} C^{26}. The construction of these cams may best be understood by reference to Fig. 5.

It will be seen that the sliding plate C^{29} has two anti-friction rollers projecting upwardly from it to coact with the cams. The cam C^{25} is of circular form, saving only that at one point it has a radially-projecting toe. The other cam C^{26} is made in the form of a larger circle, but has at a point in its periphery which is approximately opposite the toe of the cam C^{25} a circumferential notch. These cams C^{25} C^{26} are secured to a shaft F^6, which is supported in a bracket erected upon the bed A of the machine.

The shaft D′ has affixed to it a worm f^{25}. This engages with a worm-wheel i^{10} affixed to an upright shaft I, which is supported in brackets erected upon the bed A of the machine. This shaft I has affixed to it a gear-wheel W′ that engages with another gear-wheel W^2, which is mounted upon a shaft supported in the bracket whereby the shaft I is supported. The gear-wheel W^2 engages with a gear-wheel W^3, which is affixed to the shaft F^6. In this way the shaft F^6 derives motion from the driving-shaft D′.

When the operation of the needles is suspended, they are intended to occupy an elevated position so as not to interfere with the feeding of the fabric beneath them. I will now describe a mechanism whereby they will be so raised, in the event that they shall not be raised by the crank C^{20} just before the disengagement of the latter from the rock-shaft. This mechanism to which I am about to refer serves to maintain the needles in a raised position while their operation is suspended. It comprises an arm C^{30}, which is affixed to the rock-shaft C^2. (See particularly Figs. 1 and 4.) To this arm is connected a spring C^{31}, which is also connected to an appurtenance of the side frame B′. The action of this spring upon the arm C^{30} is such that it tends to effect the rotation of the rock-shaft C^2 in a direction to elevate the needles. When the spring acts it pulls the arm C^{30} down into a position approximately in line with that point at which the spring is secured to the side frame B′, but it will not assume a position exactly in line because the weight of the needles, the needle-bar, and other parts will counteract the tendency of the spring to bring the arm C into the described position. Affixed to the shaft C^2 is another arm C^{32}, which may be formed integral with the arm C^{30}. When the spring C^{31} actuates the rock-shaft C^2, the arm C^{32} contacts with a stop C^{33}, which is fastened to the side frame B′. In this way the motion of the rock-shaft C^2, under the influence of the spring C^{31}, will be arrested. It is not intended, however, that the arm C^{32} shall remain in contact with the stop C^{33}. The weight of the needle-bar, the needles, and the appurtenances of these parts will cause the arm C^{32} to recoil or move away from the stop C^{33} after contacting with it. Preferably the stop C^{33} will be faced with resilient material on that side which is opposed to the arm C^{32}.

The spring C^{31} may be adjusted to different points in the length of the arm C^{30} for the purpose of enabling it to move the rock-shaft C^2 to the desired position, which, of course, will be a position enabling the clutch-collar C^{21} to re-engage with the crank C^{20}. To facilitate the re-engagement of the clutch and crank, the pin C^{23} of the crank may be slightly pointed and the corresponding cavity in the clutch-collar may be made flared at the mouth.

In this machine the fabric to be quilted is fed lengthwise beneath the needles and is also moved laterally. Rollers F′ F^2 serve to move it longitudinally. These rollers are supported in a carriage G′ G^2 G^3. This carriage consists of two side frames G′ G^2 and rods G^3 securing them together. It is free to move in any direction in a horizontal plane. As shown, these side frames G′ G^2 have secured to them rollers R′ extending widthwise of the machine parallel with the needle-bar and journaled in brackets fastened to the lower extremities of the side frames. Beneath these rollers R′ are pairs of rollers R^2 extending forwardly and backwardly of the machine and journaled in brackets secured to the bed A. The rollers R′ rest upon and are supported by the rollers R^2. It will readily be understood that the rollers R′ may roll upon the rollers R^2 in the direction of the axis of the latter, so as to enable the carriage to move backwardly and forwardly, and that the rollers R^2 can rotate under the rollers R′ to enable the carriage to move laterally, or, in other words, lengthwise of the needle-bar. The feed-roller F′ is journaled in the side frames G′ G^2 of the carriage. The roller F^2 is journaled in levers G^4, which are fulcrumed between their ends by pins or bolts *g* to the side frames G′ G^2 of the carriage. At the rear ends the levers G^4 are connected to springs G^5, attached to screws G^6, engaging with upright bars fastened to the side frames of the carriage. These springs force the roller F^2 with greater or less pressure toward the roller F′.

The fabric to be quilted is at first rolled on a roller R attached to the carriage. Thence

it is drawn by the feed-rollers over an apron P, extending beneath the needles and attached to the carriage. The feed-rollers F′ F² are geared together by gear-wheels *f*, affixed to their journals at one end. To the roller F′ is affixed a gear-wheel f^2. The gear-wheel f^2 derives motion from a gear-wheel f^3, affixed to a shaft F, which is supported at one end in the side frame B^2 of the carriage. The shaft F does not partake of the lateral movement of the carriage. Hence there must be a relative sliding movement between it and the carriage. Because of this the gear-wheel f^3 is to be secured to the shaft F by means of a spline or feather and connected to the bearing of the carriage receiving the shaft F, so that the gear-wheel will move with the carriage and have a sliding movement relatively to the shaft F. The shaft F is connected by a universal joint f^4 to a shaft F^4. This shaft F^4 is supported in bearings f^5, supported by the bed A of the machine. Owing to the universal joint between the shafts F and F^4 the carriage is able to move forwardly and backwardly. It is therefore possible for the carriage to move in any and all directions in a horizontal plane without interfering with the transmission of rotary motion to the feed-rollers.

The shaft F^4 has mounted on it a gear-wheel f^6, and the latter and through it the shaft F^4 derives motion periodically from a toothed segment f^7, affixed to the shaft F^5. This shaft F^5 is supported in a bracket or stand erected upon the bed A, and derives motion from the upright shaft F^6, previously mentioned, through the agency of bevel-gear wheels f^{41} f^{42}, with which this shaft F^6 and the shaft F^5 are provided.

It must be understood that only when the segment f^7 engages with the gear-wheel f^6 the feed-rollers have any rotary motion. In making such a pattern as is illustrated in Fig. 8 it will be only necessary to operate the feed-rollers to shift or feed the fabric the distance between two adjacent corresponding rows of circles, so as to properly present the fabric for receiving two other rows of circles.

On the shaft F^4 a toothed lock-wheel f^{15} is affixed. Its teeth coact with a stop flange or disk f^9, affixed to the shaft F^6. The stop flange or disk f^9 is circular in form, but has a notch or opening in its periphery. Except when this notch comes opposite the lock-wheel f^{15} the stop flange or disk engages with the lock-wheel f^{15} and holds the latter against rotation. While the shaft F^4, carrying this lock-wheel, is thus held against rotation the feed-rollers are precluded from rotating. One end of the notch or opening in the stop flange or disk comes opposite the lock-wheel f^{15} just before one end of the toothed segment f^7 enters into engagement with the gear-wheel f^6 on the shaft F^4, and the notch or opening is not carried beyond the lock-wheel until after said toothed segment has gone out of engagement with the wheel f^6. It follows, therefore, that the stop flange or disk locks the shaft F^4 and the feed-rollers at all times, except when the toothed segment f^7 engages with the wheel f^6 to rotate the shaft F^4 and the feed-rollers.

Having now described the means for rotating the feed-rollers and explained the motions of the carriage, I will describe the means which are employed for producing motion in the carriage. The shaft I has affixed to it a pair of cams I′, which operate in conjunction with a bar or plate I^2, fitted to slide in bearings, and provided with bowls or rollers for engaging with the cams. The bar or plate I^2 is connected to a bar that is secured to the carriage G′ G^2 G^3 and extends lengthwise of the machine. Obviously the carriage will be moved laterally by the action of the cams I′ upon the bar or plate I^2. It will be seen that the two cams of the pair are shaped somewhat differently from each other and occupy such relative positions as that they will cause a dwell or interruption in the lateral movement of the carriage. The cams will be so set that this dwell or interruption will be caused to occur at the times that it will be requisite to shift the fabric through the agency of the feed-rollers to present a new surface for receiving circles.

On the shaft I there are also affixed a pair of cams I^{20}. These coact with a bar or plate I^3, which is fitted to slide in bearings forward and backward, or, in other words, transversely to the length of the machine, and is provided with bowls or rollers for engaging with the cams. On this bar or plate I^3 is a toothed rack i^3, which engages with a toothed segment I^5, affixed to a shaft I^4, journaled in bearings supported by the bed A. The shaft I^4 has affixed to it two toothed segments I^5, and these engage with toothed racks I^6, secured to the carriage G′ G^2 G^3. Whenever the cams I^{20} impart movement to the bar or plate I^3 this movement will be transmitted to the carriage and will cause a backward and forward movement of the latter. The combined movements of the cams I′ and I^{20} cause the carriage to swing in a circular path, as in the present example of my improvement. Obviously the cams may be varied in shape to produce a movement of the carriage suitable for the production of other figures. The cams of the pair I^{20} are differently shaped and so disposed as to produce a dwell at the same time that the cams I′ dwell or interrupt the movement of the carriage, and, owing to this, the carriage may be absolutely stationary during the feeding of the fabric by the feed-rollers. The cams I′ and I^{20} are so shaped that each time that the carriage is operated to cause the needles to form the circles or analogous figures the carriage will be made to move twice in the path necessary for the desired figures. The bars or plates I^2 I^3 are longitudinally slotted to fit the shaft I and yet be free to move.

I have other applications for Letters Patent showing some combinations of parts,

which are herein represented but not herein claimed. I therefore reserve the right to claim in such other applications all novel combinations not herein claimed.

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

1. In a sewing-machine, the combination of a carriage for supporting and moving the material to be sewed, feed-rollers supported in the carriage, mechanism for moving the carriage and feed-rollers alternately, a series of needles, a shaft for operating the needles, a driving-shaft, mechanism intermediate of the driving-shaft and needle-operating mechanism for transmitting motion to the latter, and a detachable connection between said mechanism and the needle-operating shaft, substantially as specified.

2. In a sewing-machine, the combination of a carriage for supporting and moving the material to be sewed, feed-rollers supported in the carriage, mechanism for moving the carriage and feed-rollers alternately, a series of needles, a shaft for operating the needles, a crank on this shaft, a clutch for engaging said crank with the shaft, a driving-shaft, mechanism intermediate of the driving-shaft and needle-operating shaft for transmitting motion to the latter, and cam mechanism for operating the clutch, substantially as specified.

3. In a sewing-machine, the combination of a needle-bar, a shaft for reciprocating the needle-bar, mechanism for driving the said shaft and having a detachable connection with it, and mechanism for raising the needle-bar when the said shaft is disconnected from its driving mechanism, substantially as specified.

4. In a sewing-machine, the combination of a needle-bar, a rock-shaft for imparting motion to the needle-bar, a crank on the needle-bar for transmitting motion thereto, a clutch whereby the crank may be engaged and disengaged from the said rock-shaft, and a spring for raising the needle-bar when the crank is disconnected from said rock-shaft, substantially as specified.

5. In a sewing-machine, the combination of a needle-bar, a rock-shaft for imparting motion to the needle-bar, a crank on the needle-bar for transmitting motion thereto, a clutch whereby the crank may be engaged and disengaged from the said rock-shaft, an arm affixed to said rock-shaft, and a spring operating upon said arm to oscillate said rock-shaft in the direction necessary for raising the needle-bar, substantially as specified.

6. In a sewing-machine, the combination of a needle-bar, a rock-shaft for imparting motion to the needle-bar, a crank on the needle-bar for transmitting motion thereto, a clutch whereby the crank may be engaged and disengaged from the said rock-shaft, an arm affixed to said rock-shaft, a spring connected with said arm for oscillating the rock-shaft to raise the needle-bar, a stop for limiting the movement of the rock-shaft under the influence of the spring, and another arm on said rock-shaft for coacting with said stop, substantially as specified.

LOUIS SCHULTZ.

Witnesses:
S. O. EDMONDS,
WM. M. ILIFF.