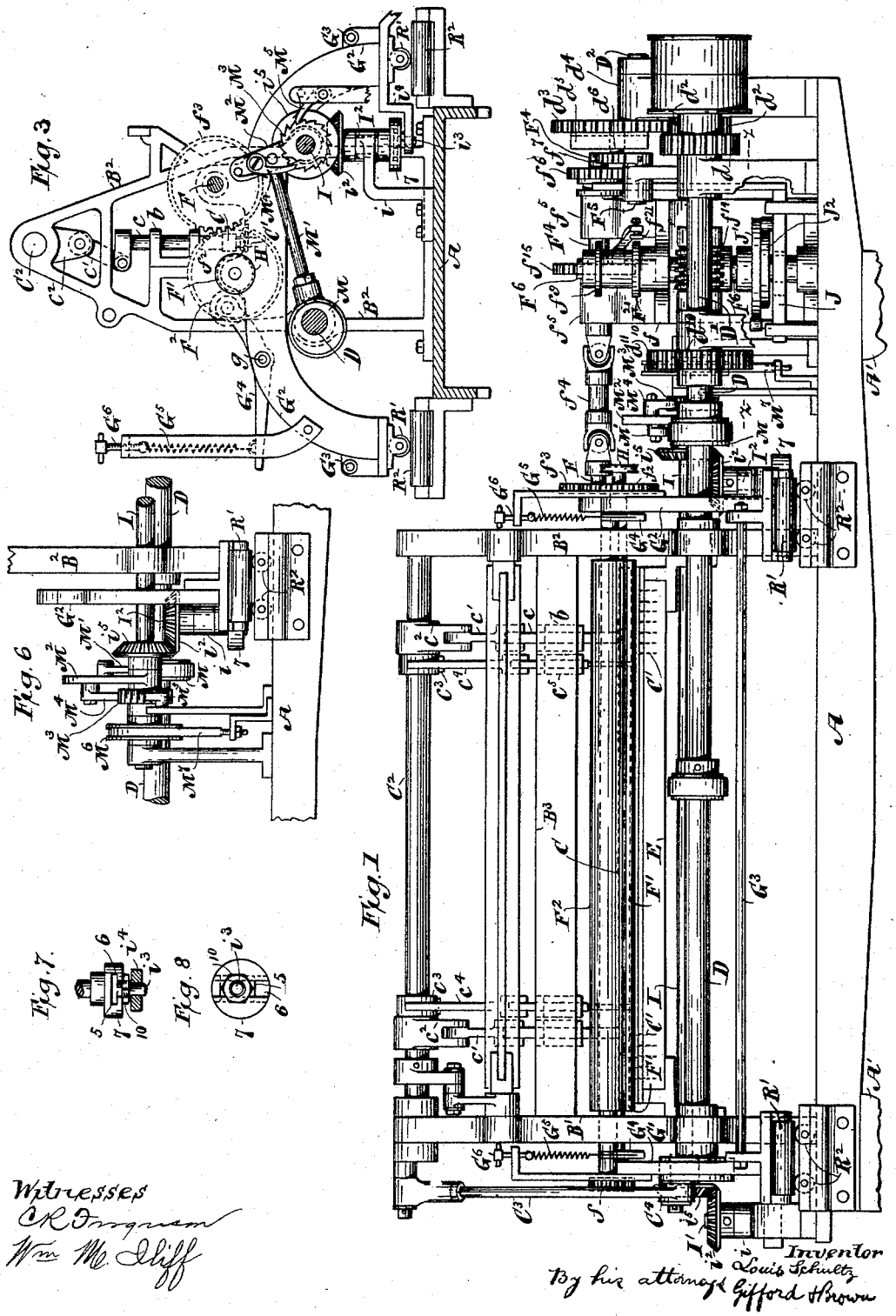
(No Model.)

2 Sheets—Sheet 1.

L. SCHULTZ.

QUILTING MACHINE.

No. 456,738. Patented July 28, 1891.



Witnesses
C. R. Ingram
Wm. M. Cliff

Inventor
Louis Schultz
By his attorneys Gifford & Brown

(No Model.)

2 Sheets—Sheet 2.

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Fig. 9

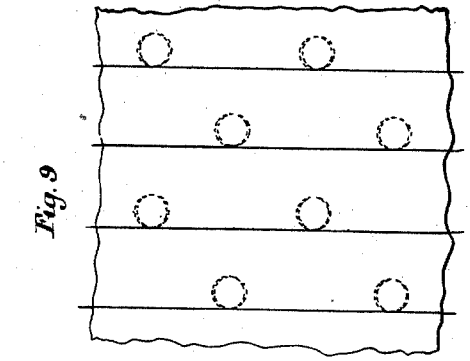


Fig. 4

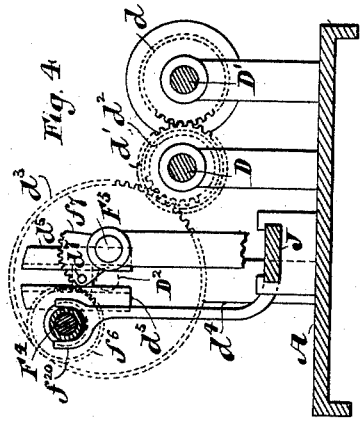


Fig. 5

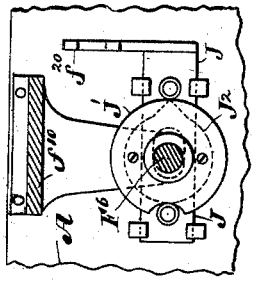
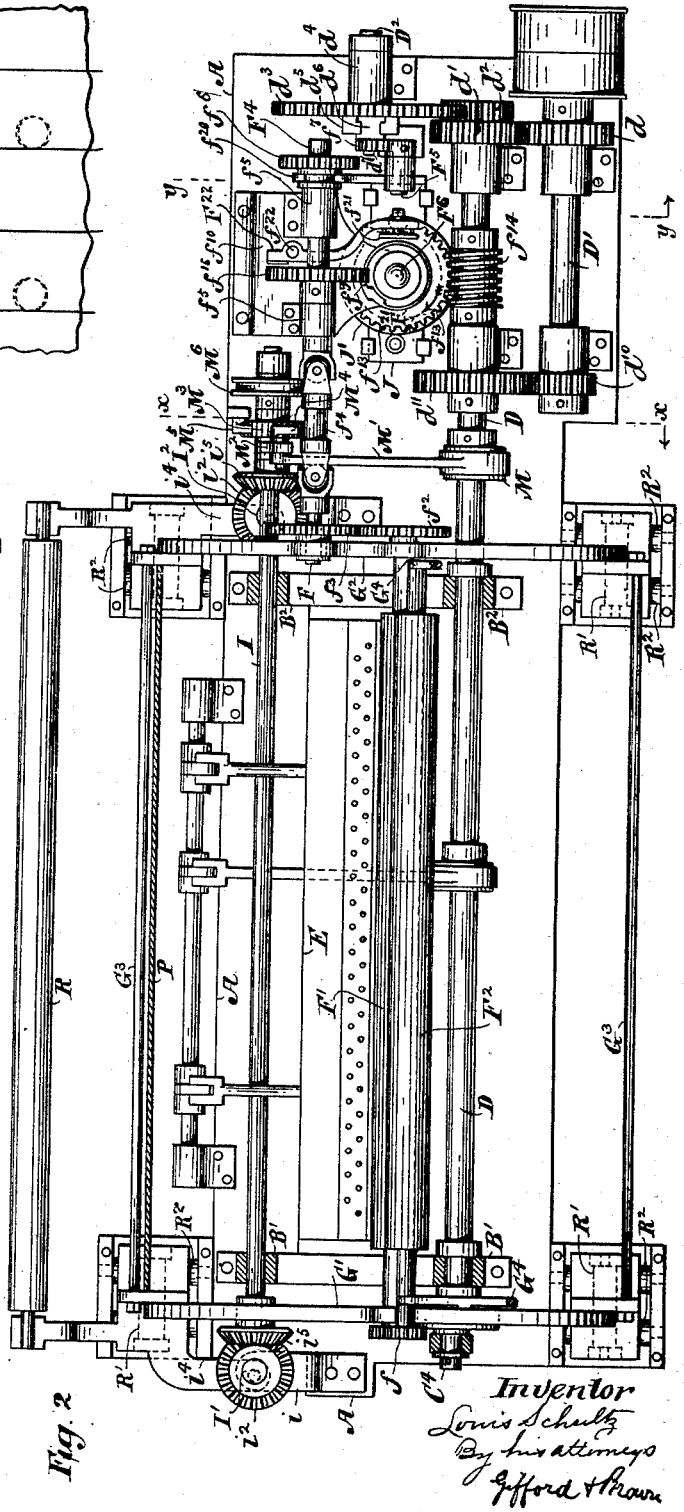


Fig. 2



Witnesses
C. R. Ingram
Wm. M. Iliff

Inventor
Louis Schultz
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Gifford & 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. 456,738, dated July 28, 1891.

Application filed October 18, 1889. Serial No. 327,451. (No model.)

To all whom it may concern:

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

I will describe a quilting-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 on the plane of the dotted line *x x*, Fig. 2, and looking in the direction indicated by the arrow which is contiguous to such line. Fig. 4 is a transverse vertical section taken on the plane of the dotted line *y y*, Fig. 2, and looking in the direction indicated by the arrow which is contiguous to such line. Fig. 5 is a horizontal section of a portion of the machine, taken on the plane of the dotted line *z z*, Fig. 1. Fig. 6 is a front view of certain parts of a ratchet mechanism comprised in the machine. Fig. 7 is a sectional elevation of certain parts employed to impart motion to a carriage comprised in the machine. Fig. 8 is a bottom view of parts represented in Fig. 7. Fig. 9 represents a piece of fabric embellished with quilting, which may be performed by the 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 may also be understood by reference to the zigzag row of circles, which in Fig. 2 represent holes in the cover of the shuttle or loop chamber.

Secured to the needle-bar are a number of upright rods *c*, which work vertically within brackets *b*, attached to the front of the bar C, and are connected at the upper end 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 are connected 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 shaft D is driven from a driving-shaft D' through the agency of a small gear-wheel d^{10}, affixed to the shaft D', and a large gear-wheel d^{11}, affixed to the shaft D. The shaft D will obviously be driven at a less rapid speed than the speed of the driving-shaft D'. It will, however, be driven constantly when the machine is in operation, and hence during the entire operation of the machine the needle will operate. It will be readily understood that the rock-shaft imparts a vertically-reciprocating motion to the needle-bar and needles. The needles in this machine have only an up-and-down movement.

In the machine is included shuttle mechanism, and E designates the race-bar therefor.

In the present example of the improvement the fabric to be quilted is fed lengthwise under the needles and 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 axes 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′ G² of the carriage. The roller F² is journaled in levers G⁴, which are fulcrumed between their ends by pins or bolts *g* to the side frames G′ G² of the carriage. At the rear ends the levers G⁴ are connected to springs G⁵, attached to screws G⁶, engaging with upright bars fastened to the side frames of the carriage. These springs force the roller F² 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 apon 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 B² 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 F⁴. This shaft F⁴ is supported in bearings f^5, supported by the bed A of the machine. Owing to the universal joint between the shafts F and F⁴ 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 F⁴ has mounted on it a gear-wheel f^6, and the latter, and through it the shaft F⁴, derives motion periodically from a toothed segment f^7, affixed to a shaft F⁵. This shaft F⁵ is supported in a bracket or stand erected upon the bed A. The driving-shaft D′ has affixed to it a gear-wheel *d*, which engages with a gear-wheel *d*′, which in the present instance is loosely supported upon the shaft D and has affixed to it a gear-wheel d^2. Obviously any rotary motion transmitted to the wheel *d*′ will also be transmitted to the wheel d^2. The wheel d^2 engages with a gear-wheel d^3, mounted upon a shaft D², supported in a bracket d^4, erected upon the bed A. The wheel d^3 is arranged at one side of the segment f^7, and is provided upon that side which is adjacent to the segment f^7 with a groove. This groove extends in the direction of a radius of the wheel. In the present instance this groove is formed by affixing two parallel bars d^5 to the wheel d^3. The bars may be affixed by casting or formed separately and attached by screws or otherwise. Between these bars a block d^6 is so arranged that it may move lengthwise of the bars. The segment f^7 is provided near that end which enters the wheel f^6 each time the segment engages with said wheel with a pin d^7, which extends into the block d^6. Obviously the same effect might be produced by affixing a pin to the block and extending it through a hole in the segment. As the wheel d^3 rotates it imparts a rotary motion to the segment f^7 with a variable speed. In Fig. 4 the segment is represented as just about entering the wheel f^6, and it will be observed that the pin d^7 is near the axis of the wheel d^3. The motion imparted to the segment at the start will therefore be a very slow one; but as the rotation continues the pin d^7 will gradually become nearer to the periphery of the wheel d^3, and the motion imparted by the wheel d^3 to the segment f^7 will grow more rapid.

It will be readily understood that only when the segment f^7 engages with the gear-wheel f^6 is motion transmitted to the feed-rollers. In making such a pattern as illustrated in Fig. 9 it will only be necessary to operate the feed-rollers to shift or feed the fabric from one row of circles to the next corresponding row of circles, and this is what is accomplished by the periodical driving through the segment f^7 in the manner described.

It may not be desirable to have the segment f^7 impart motion to the gear-wheel f^6 and shaft F⁴ in each revolution of the segment. Owing to this, I connect the gear-wheel f^6 with the shaft F⁴, so that it may slide lengthwise of said shaft into and out of the plane of the segment, it being connected to the shaft by a spline or feather, so as to rotate therewith. I have shown the hub of the wheel f^6 as provided with a circumferential groove receiving an arm f^{20} on a bar or plate J. This bar or plate is shown as provided with bowls or rollers coacting with cams J′ J², affixed to a shaft F⁶. These cams serve to impart such a movement to the bar or plate as to cause the movement of the gear-wheel f^6 into and out of the plane of the segment f^7. The shifting of the wheel f^6 will be performed quickly between one descent of the needles and the next following descent thereof and without providing for any unusual dwell of the needles.

F^{21} is a cam affixed to the shaft F⁶ and operating a brake-lever F^{22}, employed for the purpose of gradually checking the rotation of the shaft F⁴ when it becomes disengaged from the toothed segment f^7. As here shown, this brake consists of a lever fulcrumed by a pin f^{22} to a standard or bracket and having at one end an adjustable bearing-plate f^{21}, coacting with the cam, and at the other end a pad bearing against a wheel f^{15}, which is affixed to the shaft F⁴. This wheel f^{15} is not merely employed to coact with the brake, but is provided with teeth to serve as a lock-wheel. Its teeth coact with a stop flange or disk f^9, which is circular in form and 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. The shaft F^6 derives its rotary motion through a gear-wheel f^{13}, which is affixed to it, and engages with a worm f^{14}, affixed to the shaft D.

On one of the journals of the roller F′ may be affixed a pulley H, to enable the roller to transmit rotary motion to a roller upon which the completed fabric will be taken up or wound.

Having now described the mechanism by which rotary motion is imparted to the feed-rollers and explained the rotary motions imparted to the carriers, I will now describe the means which are here employed for producing the motions of the carriage.

I′ I^2 designate two upright shafts journaled in brackets i, secured on the bed A. On these shafts are affixed bevel gear-wheels i' i^2. These shafts I′ I^2 have also affixed to them cranks i^3, which enter holes in arms i^4, that are affixed rigidly to the side frames G′ G^2 of the carriage. The cranks i^3 are not fixedly secured to the shafts I′ I^2; but they are fastened to blocks 5, which slide in grooves 6 in disks 7. The disks 7 are secured to the shafts I′ I^2. Their grooves 6 are open at the under side and extend diametrically across them. The cranks are screw-threaded and have applied to them below the disks nuts 10, (see Figs. 7 and 8,) by means of which the blocks may be clamped in any position upon the disks to which they may be adjusted. The cranks extend beyond the nuts into holes in the arms i^4. The bevel gear-wheels i' i^2 of the shafts I′ I^2 engage with bevel gear-wheels i^5, affixed to a shaft I, journaled in bearings in the side frames B′ B^2. The shaft I rotates the shafts I′ I^2 in unison. Obviously, if the shafts I′ I^2 rotate, their cranks i^3 will move the carriage in a circle, so that the work will be moved in a circular line or path beneath every one of the needles. As a result of this movement, a number of circles of stitches will be made, as represented in Fig. 9. The threads may be carried between adjacent circles produced by the same row of needles, as represented by the full lines in Fig. 9.

The shaft I has affixed to it a ratchet-wheel M^3, and loosely mounted upon it is an arm M^2, having pivotally connected to it a pawl M^4, which imparts motion to the ratchet-wheel M^3, and consequently to the shaft I whenever the pawl is properly actuated. The arm M^2 is oscillated to actuate the pawl by means of an eccentric M, affixed to the shaft D, and a rod M′, extending from the eccentric to the arm. A stop-pawl M^5 may be combined with the ratchet-wheel M^3 to prevent the rotation of the latter in the wrong direction.

Preferably a brake will be combined with the shaft I to preclude the possibility of any undesirable movement. I have shown a brake wheel or pulley M^6 affixed to the shaft I and receiving around it a brake-band M^7, which at one end is fastened to any fixed support—as, for instance, a bracket upon the bed A—and at the other end is provided with a screw passing over a bracket secured to the bed A and receiving on its end a nut, whereby it may be tightened or loosened to bear with more or less force upon the pulley.

I have other applications for Letters Patent, Serial Nos. 326,671 and 327,096, showing some combinations of parts which are herein represented and not herein claimed. I therefore reserve the right to claim in the other applications the 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 series of needles, a carriage for moving material to be stitched in a circular or a similar path, mechanism for causing such movement, feed-rollers supported by said carriage and operated so as to remain stationary during the movement of the carriage and to rotate while the carriage is at rest, a wheel d^3, a toothed segment connected by a groove and block or rib with the wheel just mentioned, and a wheel deriving motion from the segment and arranged upon a shaft transmitting motion to the feed-rollers, substantially as specified.

2. In a sewing-machine, the combination of a series of needles, a carriage for moving material to be stitched in a circular or a similar path, feed-rollers supported by said carriage and operated so as to remain stationary during the movement of the carriage and to rotate while the carriage is at rest, a shaft D, a wheel d^3, a toothed segment connected with said wheel d^3 by a groove and block or rib, a shaft transmitting motion to the feed-rollers, a wheel sliding axially of this shaft and deriving motion from the said toothed segment, and a cam for imparting to said sliding wheel its movements axially of its shaft, said cam being operated from the shaft D, which operates the pawl, substantially as specified.

LOUIS SCHULTZ.

Witnesses:
C. R. FERGUSON,
WM. M. ILIFF.