(No Model.) 4 Sheets—Sheet 1.

K. ZALLUD.

QUILTING MACHINE.

No. 373,510. Patented Nov. 22, 1887.

Fig. 1

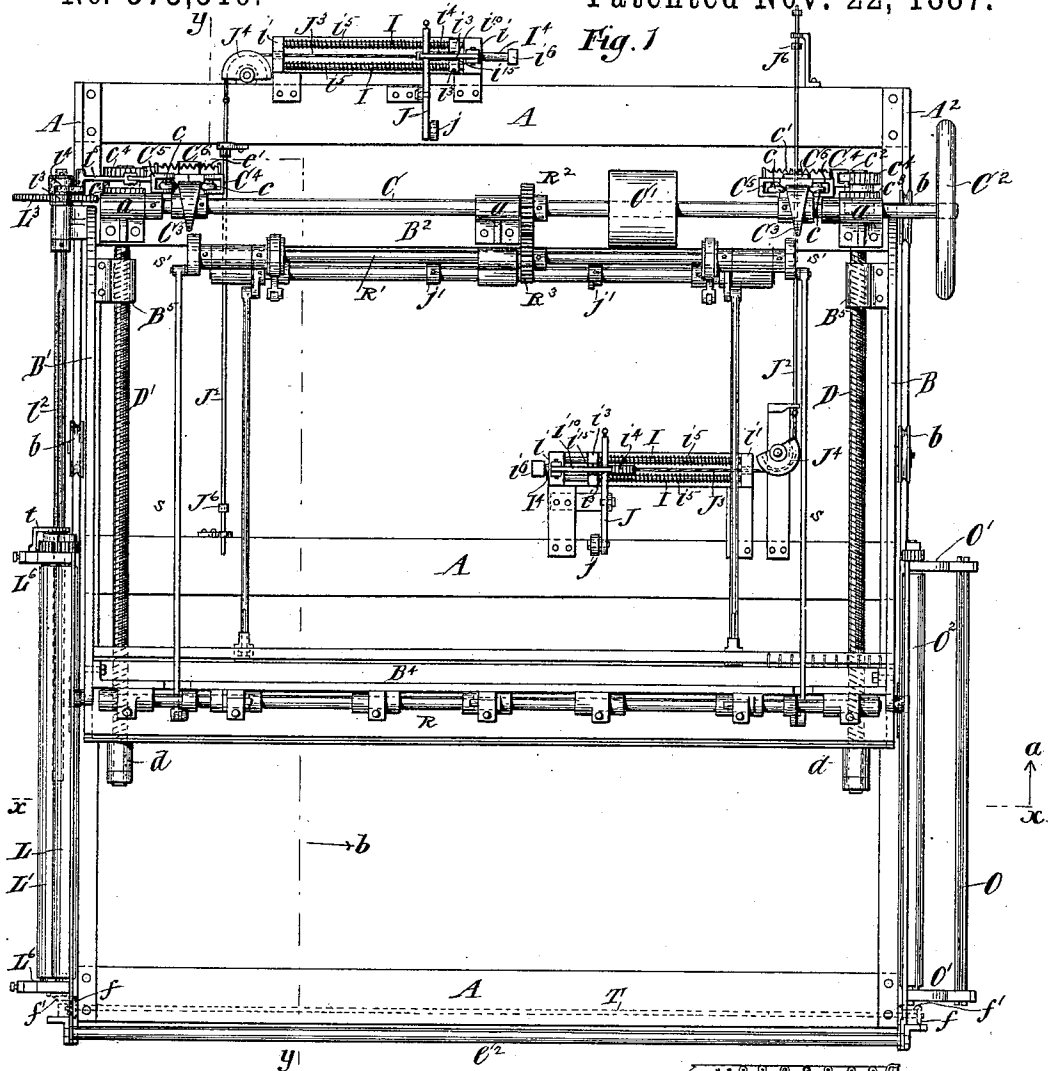
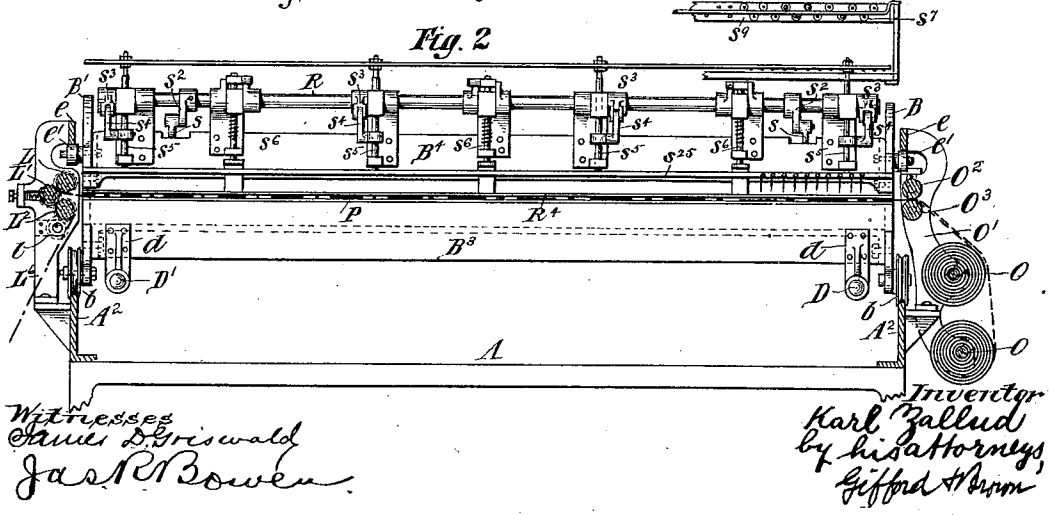


Fig. 2



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K. ZALLUD.

QUILTING MACHINE.

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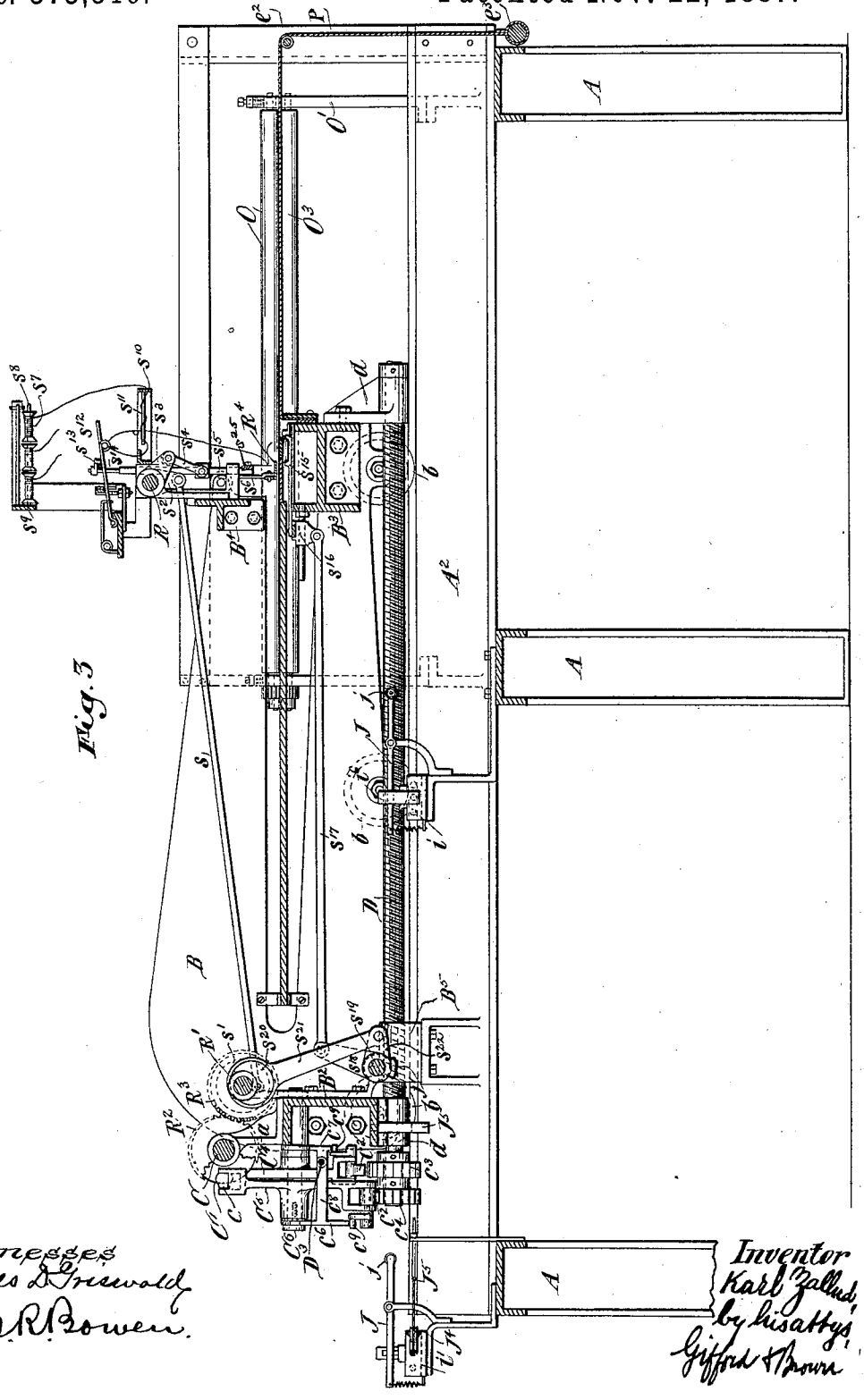


Fig. 3

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(No Model.) 4 Sheets—Sheet 3.

K. ZALLUD.

QUILTING MACHINE.

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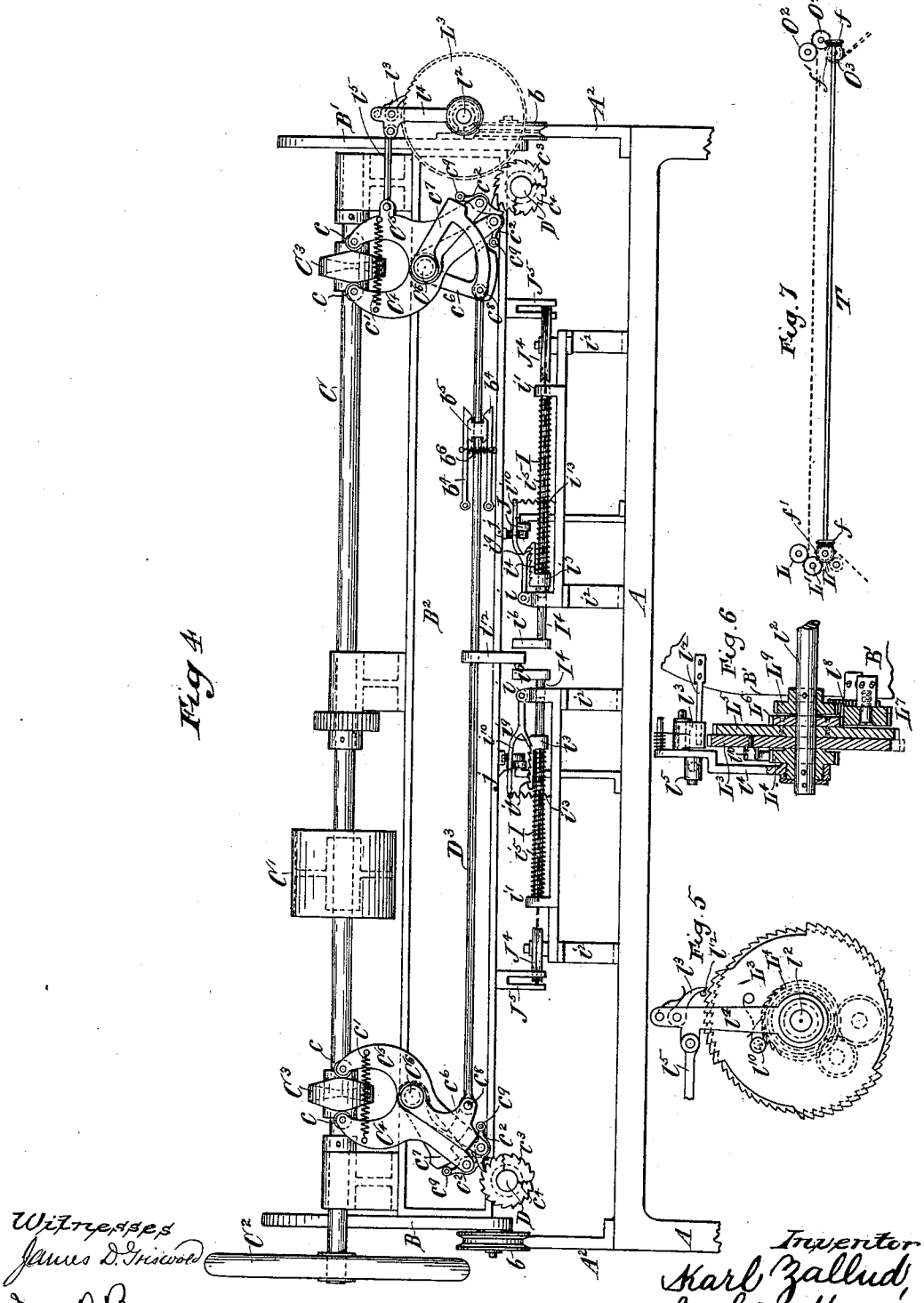


Fig. 4

Fig. 7

Fig. 6

Fig. 5

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(No Model.) 4 Sheets—Sheet 4.

K. ZALLUD.

QUILTING MACHINE.

No. 373,510. Patented Nov. 22, 1887.

Fig. 8.

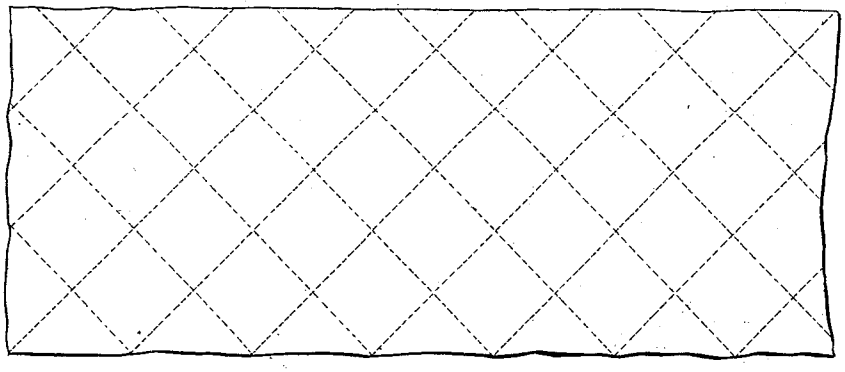
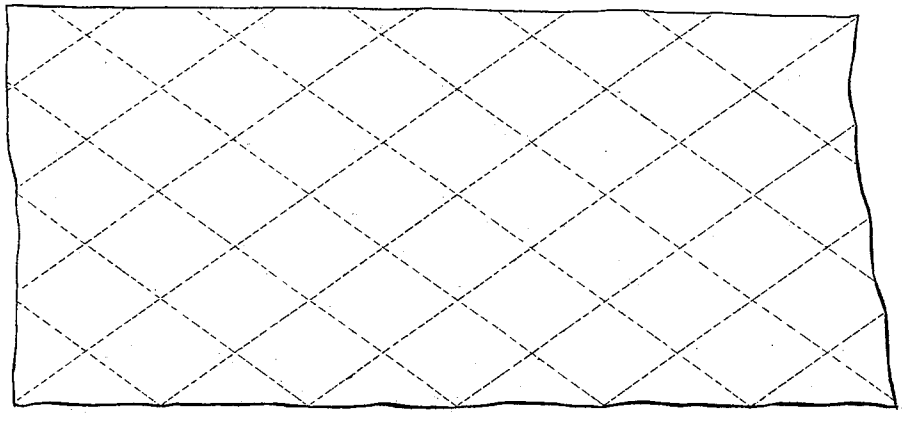


Fig. 9.



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UNITED STATES PATENT OFFICE.

KARL ZALLUD, OF NEW YORK, N. Y.

QUILTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 373,510, dated November 22, 1887.

App'lication filed August 19, 1886. Serial No. 211,266. (No model.)

To all whom it may concern:

Be it known that I, KARL ZALLUD, of New York, in the county 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 in detail a quilting-machine embodying my improvement, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a plan or top view of a quilting-machine embodying my improvement, portions being broken away to disclose parts which would otherwise be concealed. Fig. 2 is a transverse section thereof, taken on the plane of the dotted line *x x* and looking in the direction of the arrow *a*, Fig. 1, certain parts being broken away. Fig. 3 is a section taken as indicated by the dotted line *y y*, Fig. 1, and looking in the direction of the arrow *b*. Fig. 4 is a rear view of the same with certain parts omitted. Figs. 5, 6, and 7 are detail views to be referred to; and Figs. 8 and 9 are diagrams representing the quilting done by my machine, the differences exhibited by the two diagrams being due to a variation in the feed.

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

A designates the main frame of the machine, comprising rails A^2. I employ a carriage mounted upon grooved wheels *b* and adapted to travel backward and forward upon the rails A^2. Upon this carriage are carried the needle and shuttle operating mechanisms, the take-up mechanism and means for reversing the direction of movement of the carriage. The goods to be sewed are fed along in front of the needles in a direction transverse to the direction of movement of the carriage.

The carriage consists, essentially, of horse-shoe-shaped portions B B′ and cross-ties or braces B^2 B^3 B^4, extending between the portions B B′.

C designates the main shaft of the machine journaled in suitable bearings, *a*, upon the cross-tie B^2 of the carriage.

C′ designates a pulley keyed to the main shaft, to which motion may be imparted by a belt. Upon the outer end of the shaft is a hand-wheel, C^2. Near each end of the shaft C are keyed wedge-shaped cams C^3, which rotate with the shaft.

C^4 C^5 designate pawl-carriers, arranged in pairs and pivoted near their centers upon pins or studs C^6, extending from the cross-tie B^2 of the carriage. (See Fig. 4.) The upwardly-extending arms of the pawl-carriers bear rollers or bowls *c*, which bear against the side surfaces of the cams C^3, and are maintained in such contact by springs *c′*, extending between said upwardly-extending arms. The downwardly-extending ends of these pawl-carriers bear pawls c^2. The pawls are adapted to alternately engage teeth upon ratchet-wheels c^3 c^4, keyed upon screws D, D′, near the ends of the latter. These screws extend lengthwise of the carriages, and are, as shown, journaled in suitable bearings, *d*, upon the cross-ties B^2 B^3 of the frame.

Upon the rails A^2 are nuts B^5, through which the screws D D′ extend. The rotation of the cams C^3 cause the pawl-carriers C^4 C^5 to rock on the studs C^6, and their lower ends are thereby moved, so as to cause the pawls which they carry to engage successive teeth upon the wheels c^3 c^4 and rotate the shafts D D′. When one of the pawls c^2 is in engagement with the teeth upon one of the ratchet-wheels c^3 c^4, the other of said pawls occupies such a position that it will not engage the teeth upon its corresponding ratchet-wheel. The teeth upon the ratchet-wheels c^3 extend in a reverse direction to the teeth upon the wheels c^4. Accordingly, when the wheels c^3 are being operated upon, the screws D D′ will be rotated in one direction, and when the wheels c^4 are being operated upon the screws will be rotated in the reverse direction, whereby the carriage will be moved backward or forward, as the case may be. The rotation of the shafts D D′ is intermittent, and consequently the motion of the carriage is intermittent. The goods having an intermittent forward feed in front of the needles and the carriage having a similar movement transverse to the length of the goods, resulting rows of diagonal stitching are produced. When the needles have been carried entirely across the goods, it is essential that the direction of movement of the carriage and needles should be changed. When such change is effected, the needles sew other diagonal lines across the goods, crossing the lines previously made at approximate right angles, thus producing a diamond-pattern of stitching

on the goods. The reversal of the direction of movement of the carriage is effected automatically in the following manner.

Pivoted upon the pins or studs C^6 are trips, comprising two portions, c^6 c^7, rigidly connected together by means of cross-bars c^8, so that they will move in unision. (See Figs. 3 and 4.) The portions c^6 c^7 of the trips are arranged outside the pawl-carriers C^4 C^5. The under sides of the portions c^6 c^7 are provided with cam-surfaces. When the trip is rocked to and fro, these cam-surfaces alternately come in contact with rollers or bowls c^9, mounted upon the pawls c^2, near one of the ends of the latter, and move the pawls with which they so come in contact into a position where they will not engage the teeth of the ratchet-wheels, while others of the pawls, being at that time out of contact with the cam-surfaces, will engage the ratchet-teeth—as, for instance, when the cam-surfaces at the portions c^7 of the trips come in contact with the rollers on the pawls c^2, which are upon the pawl-carriers C^5, such pawls will not engage the teeth on the ratchet-wheels c^4; but the pawls c^2, which are on the pawl-carriers C^4, will not be in contact with the cam-surfaces on the portions c^6 of the trip, and such pawls will therefore engage the teeth on the ratchet-wheels c^3 and transmit motion thereto.

The trips are rocked to operate the pawls, when it is desired to reverse the direction of movement of the carriage, by means of a rod, D^3, extending between the trips and connected to the cross-bars c^8 thereof. The bar being moved in the direction of its length, operates the trips. Such movement is imparted to it by means of reversing devices, which alternately throw the rod first in one direction and then in another. These reversing devices are arranged one to the rear of the machine and one about midway in its length. Both are below the bottom of the carriage. These reversing devices being alike, I will describe but one.

I designates bars rigidly secured to uprights i i', mounted on standards i^2, secured to portions of the frame A. Surrounding and sliding upon these bars are collars i^3, joined together by a connecting-piece, i^{15}, which is provided upon the upper side with an extension, i^4, having ratchet-teeth. Springs i^5 are coiled about the bars, and bear at one of their ends against the uprights i and at the other against the collars i^3. A pawl, i^9, engages the teeth upon the extension i^4. This pawl is pivoted upon a lip or lug on the upright i. A bar, I^4, extends outwardly beyond the upright i^2 from the connecting-piece i^4, to which it is secured, and bears at its end an upwardly-extending toe or projection, i^6. When the bar I^4 is moved in such direction as to compress the spring i^5, the ratchet-teeth on the extension i^4 are moved beneath the pawl, and the latter will retain the bar in position to be shot forward when the pawl is released.

J designates a lever fulcrumed upon a bracket secured to one of the portions, A, of the frame. Upon one of the arms of this lever is a roller or bowl, j. Upon a shaft, s^{19}, is a cam-surface, j'. When the carriage has moved sufficiently far, the cam-surface j' comes in contact with the roller or bowl depresses that end of the lever, and raises the other end. The end so raised comes in contact with a projection, i^{10}, extending from the pawl i^9, and lifts the pawl, so as to release the bar I^4. The latter is then shot rapidly forward by the springs, causing the toe i^6 to come in contact with a projection, i^{12}, extending downwardly from and rigidly secured to the rod D^3. Motion is thus imparted to the rod, which rocks the trips, as described. A spring, i^{13}, is employed to normally hold the pawl i^9 in engagement with the ratchet-teeth on the extension i^4.

Pivoted on the portion B^2 of the carriage are detents d^4. (See Fig. 4.) On the rod D is a projection, b^5, which projection is shown as having beveled ends. One of the detents b^4 extends above such projection and the other below it. A spring, b^6, extending between the detents, tends to keep them in contact with the projection b^5. In whichever direction the rod D^3 is moved the detents will engage the beveled ends on the projection, and so lock the rod against endwise movement until again moved by one of the reversing devices. The reversing device which is at the rear of the carriage causes the rod to be shifted so that the carriage shall start to move forward, and the other reversing device operates to cause the carriage to be moved backwardly. When the carriage moves forward, it resets the releasing device which is to the rear of the carriage, and when it moves backwardly it resets the other of said releasing devices. This is accomplished by rods J^2, (see particularly Fig. 1,) extending fore and aft the machine and sliding in suitable guides on the frame, and to these rods are secured cords or chains J^3, extending about segmental wheels J^4, and secured at their other ends to the collars i^3 on the bars I. The cords or chains are delineated in heavy dotted lines in Fig. 4.

On the portions B^2 of the frame are downwardly-extending forks J^5, which extend about the rods J^2. When the carriage has moved sufficiently far, the forks come in contact with collars J^6 on the rods J^2 and move the rods for a distance, thereby causing the teeth on the extensions i^4 to be moved beneath the pawls i^9 and the reversing devices to be reset. The rods J^2 of course extend in reverse directions, and are operated upon alternately.

Feed-rollers L L′ L^2, geared together and mounted in suitable bearings in brackets L^6, secured to one of the rails A^2 of the carriage, draw the goods forward beneath the needles. They rotate intermittently, motion being transmitted to them by a gear-wheel, l, (see Fig. 2,) loosely mounted upon a shaft, l^2, extending lengthwise of the machine outside the frame.

The shaft l^2 is longitudinally grooved, and the gear-wheel l is provided with a projection extending into the groove, whereby the shaft may slide through the wheel, but will still rotate it. A yoke, t, keeps the wheel l^2 in place. This shaft bears at its other end a ratchet-wheel, L^3, with which engages a pawl, l^3, mounted upon a rocking pawl-carrier, l^4, hung upon the end of the shaft l^2, to the rear of the ratchet-wheel. The pawl-carrier l^4 is pivotally connected to a link, l^5, also pivotally connected to the pawl-carrier C^5. (See Fig. 4.) When the pawl-carrier C^5 is rocked, therefore, the shaft l^2 and the feed-rollers are rotated.

The goods to be sewed are wound upon delivery-rollers O, journaled in brackets O′, secured to the other of the rails A^2 of the frame. They also pass between rollers O^2 O^3, journaled in the brackets O′.

Between the brackets L^5, and also between the brackets O′, extend rails e. (See Fig. 2.)

Mounted on studs upon the portions B B′ of the carriage are rollers e'. When the carriage is moved to and fro, these rollers travel along the under sides of the rails e, and the carriage is thereby guided and steadied in its movements.

P designates a flexible table over which the goods pass. This table, as here shown, consists of a strip of canvas or similar material secured at one end to the portion B^3 of the carriage, and extending over a roller, e^2, extending between certain brackets at the front of the machine. At its free end this table has secured to it a weight, here shown as a roller, e^3. The table follows the carriage in its to and fro movements.

The shuttle and needle operating mechanisms, as well as the take-up mechanism, may be of the usual or any desired construction, and as those shown do not broadly constitute part of my invention, I will refer to them briefly.

R designates a rock-shaft journaled in suitable bearings in arms on the portion B^4 of the carriage. Motion is transmitted to it by pitmen s, connected at one of their ends to cranks s', mounted on a shaft, R′, journaled in bearings on the portion B^2 of the carriage, and deriving motion from a gear-wheel, R^2, on the main shaft, which meshes with a gear-wheel, R^3, on the shaft R′. The pitmen s connect at their other ends with cranks s^2 on the shaft R. The rock-shaft R transmits motion through cranks s^3, links s^4, and sliding rods s^5 to the needle bar s^{25}. A presser-bar, R^4, is operated from the rock-shaft by means of toes on the rock-shaft engaging with projections on upwardly-extending rods s^6, secured to the presser-bar. The needle-thread is wound upon spools s^7, placed upon spindles s^8, secured in a cross-bar, s^9, extending between upwardly-extending arms on the portion B^4 of the carriage. The thread passes from the spools s^7, through eyes on a cross-bar, s^{10}, around tension-pins s^{11}, secured in such cross-bar, through eyes in resilient take-up devices s^{12}, and thence downwardly to the needles. A bar, s^{13}, mounted upon the upwardly-extending ends of rods s^{14}, deriving motion from the needle-bar, extends over all the take-up devices s^{12}. When the needle-bar descends, this bar depresses all the take-up devices in unison, and thus permits the thread to run freely.

The shuttles are carried by the usual shuttle-carriers, s^{15}, secured to a shuttle-driver, s^{16}. Motion is transmitted to the shuttle-drivers by pitmen s^{17}, secured at their other ends to cranks s^{18} on a rock-shaft, s^{19}, journaled in bearings in the portion B^2 of the carriage. The shaft s^{19} derives motion from eccentrics s^{20} on the shaft R, from which extend crank-rods s^{21}, connected to crank s^{22} on the rock-shaft s^{19}. Of course the direction of feed of the goods might be reversed from that shown, if desirable.

In Figs. 5, 6, and 7 I have shown details of mechanism, whereby the goods being sewed may be alternately fed forward and backward, so as to produce rows of diagonal stitching extending widthwise of the goods. This mechanism is such that the direction of rotation of the shaft l^2 is reversed at intervals, and by proper gearing the rollers O^2 O^3, in conjunction with a roller, O^4, act as feed-rollers alternately with the rollers L L′ L^2. The ratchet-wheel L^3 is in this case constructed with segmental portions provided with ratchet-teeth and depressed intermediate portions unprovided with teeth. The wheel L^3 in this case is loosely mounted on the shaft. Outside the wheel L^3 is a ratchet-wheel, L^4, which wheel is of less diameter than the wheel L^3, and is rigidly mounted on the shaft. This wheel is provided with a hub, upon which the pawl-carrier l^4 is mounted. Mounted upon the side of the wheel L^3 is a spring-actuated pawl, l^{10}, which engages the teeth upon the ratchet-wheel L^4. When the pawl l^3 is in engagement with the ratchet-teeth on the wheel L^3, the wheel L^4 will cause the shaft l^2 to rotate in one direction. Inside the wheel L^3 is another wheel, L^5, with ratchet-teeth around its entire periphery. This wheel is also loosely mounted on the shaft. It has affixed to it a gear-wheel, L^6, which is loose on the shaft and rotates with the wheel L^5. This gear-wheel meshes with another gear-wheel, L^7, mounted on a stud extending from the portion B′ of the carriage. The gear-wheel L^7 meshes with a gear-wheel, l^8, mounted on another stud, also extending from the portion B′ of the carriage. This gear-wheel meshes with a gear-wheel, L^9, keyed upon the shaft l^2. The teeth upon the wheel L^3 in this case, it will be observed, extend beyond the teeth upon the wheel L^5, so that when the pawl l^3 engages the teeth on the former it will not engage the teeth on the latter. The teeth on the wheel L^5 extend beyond the untoothed portions of the wheel L^3. When the pawl l^3 has moved past any of the toothed segments on the wheel L^3, it drops into the teeth on the wheel L^5 and ro-

tates such wheel, causing the shaft l^2, by means of the gearing described, to be rotated in a reverse direction from that imparted to it by the wheel L^3. Each time the pawl-carrier l^4 is retracted the pawl l^3 is caused to ride up onto a pin or projection, l^{12}, extending from the portion B′ of the carriage. This projection lifts the pawl so high that it will pass beyond the teeth on the segmental portions of the wheel L^3 and be in a position to engage such teeth whenever they are again brought beneath the pawl. The direction of rotation of the shaft l^2 is thereby reversed at intervals.

By varying the number or position of the toothed segmental portions of the wheel L^3 the duration of rotation of the shaft in a given direction may be varied, whereby diagonal lines of stitching of various kinds may be produced.

When the reversing mechanism is employed, the rollers L L′ L^2 and O^2 O^3 O^4 are geared together. I have shown such an arrangement in dotted outline in Fig. 1, and in full lines in Fig. 7, in which T designates a shaft journaled in the rails A^2 and bearing gear-wheels f, meshing with gear-wheels f' on the rollers O^3 and L^2.

When this machine is employed to sew zigzag lines widthwise of the goods, as described, the threads will need to be cut when the needles have made a complete movement from side to side of the goods, the machine being stopped for this purpose. The goods may then be drawn forward between the rollers by hand or otherwise a distance equivalent to the length of the row of needles. The machine being again started, the needles will then sew other zigzag lines across the goods in their reverse movement.

Some general features of the machine herein shown are the same or substantially the same as are shown and described in my application Serial No. 195,934, filed March 20, 1886, to which case broad claims on some of these features are reserved.

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

1. The combination, with a reciprocating carriage, of screws for moving said carriage along, ratchet-wheels having reversely-extending teeth mounted upon each of said screws, pawls for alternately engaging said ratchet-teeth, pawl-carriers upon which said pawls are mounted, cams for operating said pawl-carriers, trips for operating the pawls to disengage them from the ratchet-wheels, and reversing mechanism for alternately operating said trips, substantially as specified.

2. The combination, with a reciprocating carriage, of screws for moving said carriage along, ratchet-wheels having reversely-extending teeth mounted upon each of said screws, pawls for alternately engaging said ratchet-teeth, pawl-carriers upon which said pawls are mounted, wedge-shaped cams for operating said pawl-carriers, trips for operating the pawls to disengage them from the ratchet-wheels, and reversing mechanism for alternately operating said trips, substantially as specified.

3. The combination, with a reciprocating carriage, of screws moving said carriage along, ratchet-wheels having reversely-extending teeth mounted upon each of said screws, pawls for alternately engaging said ratchet-teeth, pawl-carriers upon which said pawls are mounted, cams for operating said pawl-carriers, feed-rollers, a shaft and gearing for transmitting motion to said feed-rollers, and a ratchet-wheel, as L^3, fixed to said shaft and actuated from one of said pawl-carriers, substantially as specified.

4. The combination, with a reciprocating carriage, of feed-rollers for the goods, arranged in such manner that the goods will be fed transversely to the direction of reciprocation of the carriage, and a flexible table secured near one end to the carriage, over which table the goods pass, substantially as specified.

5. The combination, with a reciprocating carriage, of screws, as D D′, ratchet-wheels c^3 c^4, pawl-carriers C^4 C^5, pawls c^2, cams C^2, trips c^6 c^7 c^8, rod D^3, and reversing devices, substantially as specified.

6. The combination, with a reciprocating carriage, of screws, as D D′, ratchet-wheels c^3 c^4, pawl-carriers C^4 C^5, pawls c^2, cams C^2, trips c^6 c^7 c^8, rod D^3, reversing devices, and a lock for said rod, substantially as specified.

7. The combination, with a reciprocating carriage, of the rod D^3, provided with the projection i^{12} of reversing devices comprising the rods I, springs i^5, collars i^3, extensions i^4, provided with ratchet-teeth, rods I^4, toes i^6, pawls i, and levers J, substantially as specified.

8. The combination, with a reciprocating carriage, of the rod D^3, provided with the projection i^{12} of reversing devices comprising the rods I, springs i^5, collars i^3, extensions i^4, provided with ratchet-teeth, rods I^4, toes i^6, pawls i^9, levers J, rods J^2, cords or chains J^3, and forks J^5, substantially as specified.

9. In a quilting-machine, the combination, with a reciprocating carriage on which the stitch-forming mechanisms are mounted, of two sets of feed-rollers for the goods, one set on each side of the machine, a shaft and gearing for connecting said sets of rollers, so that they will rotate in unison, and reversing mechanism for changing the direction of rotation of the said rollers, substantially as set forth.

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