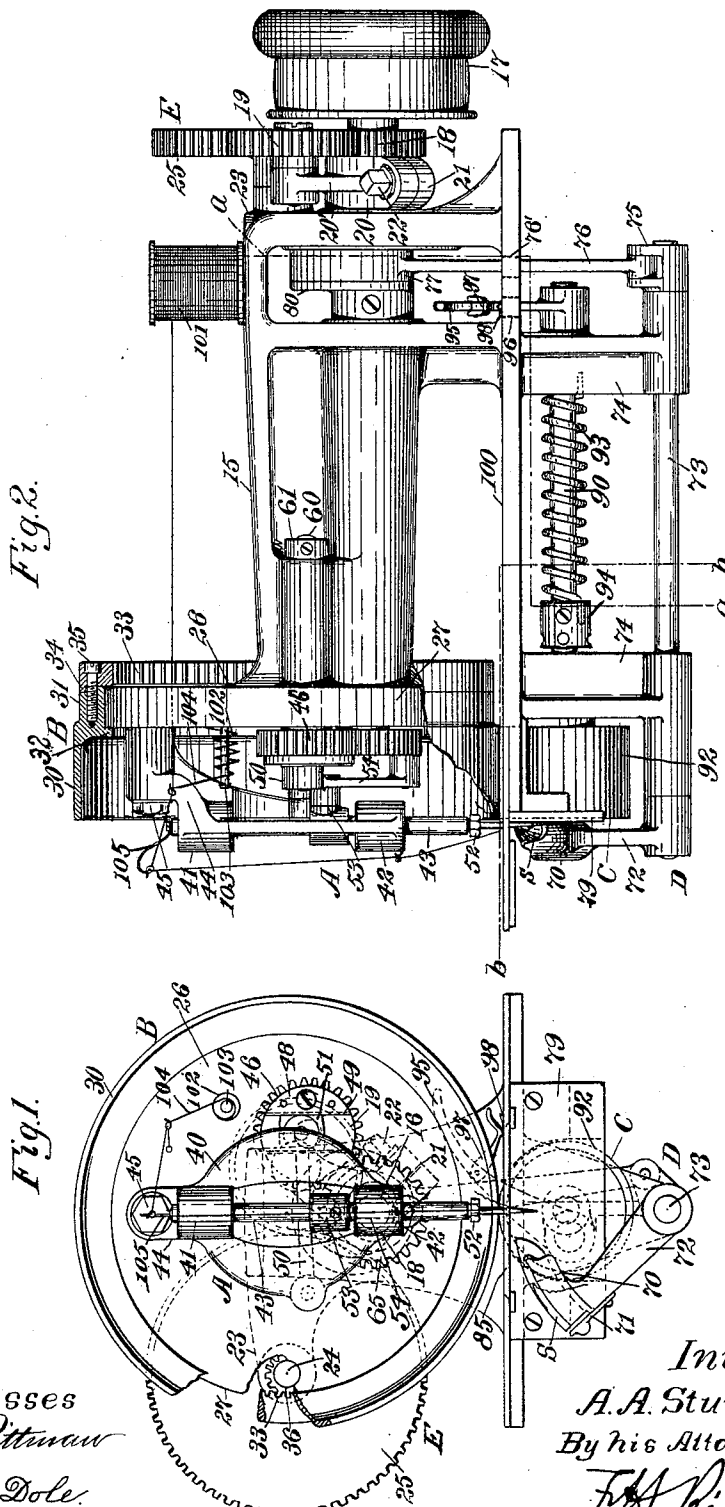


A. A. STURTEVANT.
SEWING MACHINE.

No. 581,496.

Patented Apr. 27, 1897.



Witnesses
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Fred. J. Dole.

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Fig. 3.

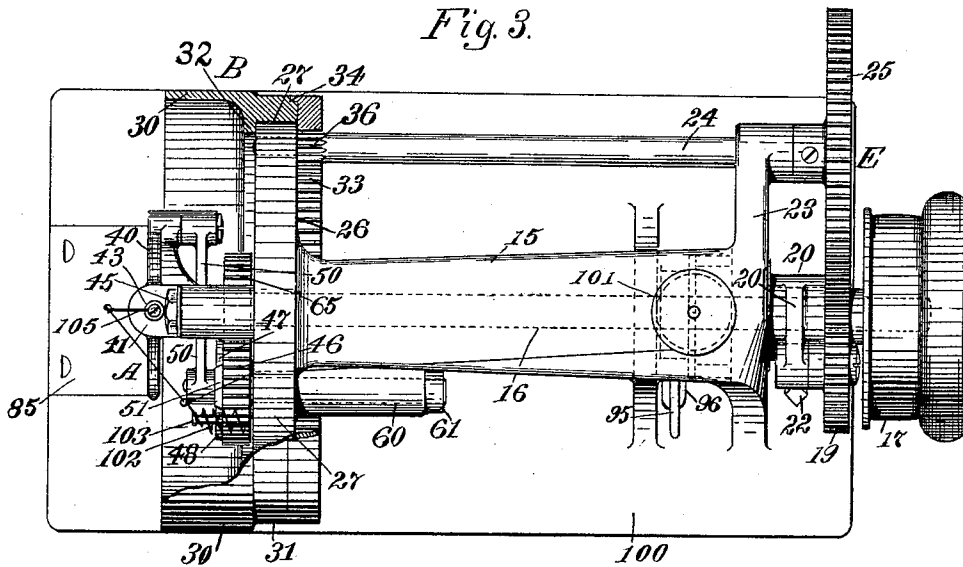


Fig. 10.

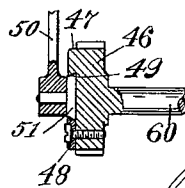


Fig. 4.

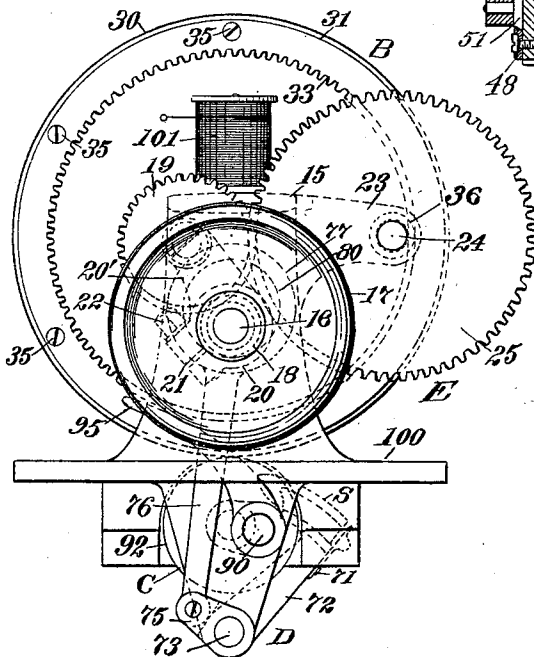
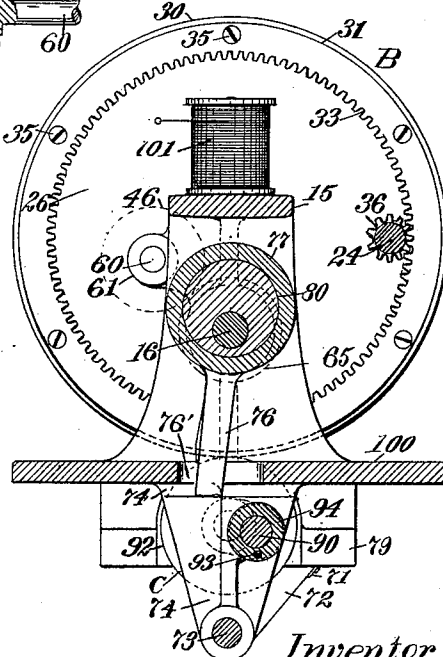


Fig. 5.



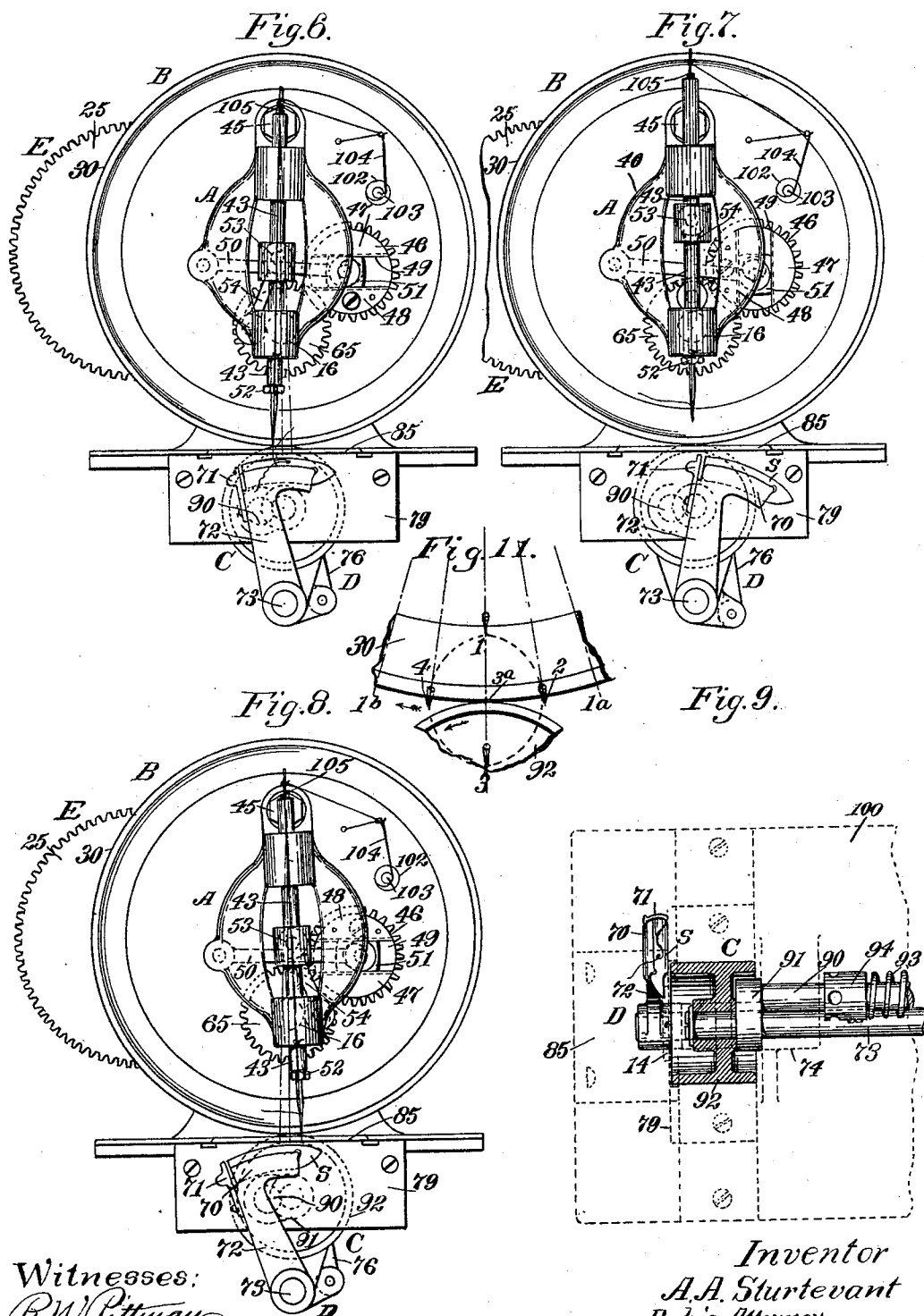
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UNITED STATES PATENT OFFICE.

ALBERT A. STURTEVANT, OF HARTLAND, VERMONT.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 581,496, dated April 27, 1897.

Application filed July 20, 1895. Serial No. 556,575. (No model.)

To all whom it may concern:

Be it known that I, ALBERT A. STURTEVANT, a citizen of the United States, residing at Hartland, in the county of Windsor and State of Vermont, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates to sewing-machines adapted more especially for sewing coarse fabrics, such as bags, and for sewing pamphlets and books, or similar articles, where a comparatively long stitch is required; and the object of the invention is to provide a machine in which the material will be fed by a continuously-rotative feed mechanism in connection with an oscillatory reciprocatory needle mechanism, whereby the needle will move in a substantially elliptical path and be carried forward synchronously with the feed mechanism, and whereby the jars and shocks and buckling of the material usually incidental to an intermittent reciprocatory feed or an intermittent rotary feed are obviated.

A further object of the invention is to provide a machine in which a comparatively long stitch can be made simultaneously with the carrying forward of the material by a continuously-rotative feed mechanism by an oscillatory reciprocatory needle mechanism operative synchronously with said continuously-rotative feed mechanism.

A further object of the invention is to provide a continuously-rotative feed mechanism in combination with an oscillatory reciprocatory needle mechanism and a continuously-rotative automatically-adjustable presser-wheel mechanism and an oscillatory shuttle mechanism.

In the accompanying drawings, Figure 1 is an end view of this improved sewing-machine, looking toward the right hand in Fig. 2, a part thereof being broken away to show the rotary feed-wheel and its circular track, a part of the machine being shown in dotted lines. Fig. 2 is a front elevation of the machine, having a part thereof also broken away to more clearly illustrate the feeding and needle mechanisms. Fig. 3 is a top view having likewise a part thereof broken out to illustrate more clearly the feeding and needle mechanisms. Fig. 4 is an end view of the

machine, looking toward the left hand in Fig. 2 and having a part thereof in dotted lines. Fig. 5 is a transverse sectional view, partly in elevation, taken in line *a a*, Fig. 2, and having a part thereof broken away. Fig. 6 is an end view looking toward the right hand in Fig. 2 and showing the needle making its upward stroke and the shuttle its forward movement to catch the loop. Fig. 7 is a similar view to Fig. 6, showing the needle at the end of its upward stroke and the shuttle in its extreme forward position. Fig. 8 is a similar view to Figs. 6 and 7, showing the needle making its downward stroke in a path remotely disposed from the path of its upward stroke and showing the shuttle moving back toward its starting position. Fig. 9 is a plan view, partly in section, taken in line *b b*, Fig. 2, to more clearly illustrate the presser-wheel mechanism. Fig. 10 is a detail sectional view of the device for adjusting the throw of the needle-carrier; and Fig. 11 is a diagrammatic view, on an enlarged scale, showing the path and the different positions of the needle during the operation of the machine and also showing the relative positions of the rotary feed-wheel when the needle is at certain points in its path.

Similar characters designate like parts in all the figures of the drawings.

This improved sewing-machine comprises, in a general way, an oscillatory reciprocatory needle mechanism (designated in a general way by A) operative to actuate the needle in a substantially elliptical path and also operative synchronously with a continuously-rotative feed mechanism, (designated in a general way by B,) a continuously-rotative, automatically-adjustable presser-wheel mechanism, (designated in a general way by C,) an oscillatory shuttle mechanism, (designated in a general way by D,) together with mechanism for driving or actuating the oscillatory reciprocatory needle mechanism, the continuously-rotative feed mechanism, and the shuttle mechanism, (designated in a general way by E.)

This improved machine consists, in the preferred form thereof herein shown and described, of a suitable frame consisting of a bed or supporting plate 100, having a suitable slot 14 for the needle and having se-

cured thereon the overhanging or supporting arm 15 of any suitable construction adapted to support the necessary mechanism.

The driving or actuating mechanism (designated in a general way by E) in the preferred form thereof herein shown comprises a main driving-shaft 16, suitably journaled in the overhanging arm 15, having at one end thereof keyed or secured thereon in any suitable way the driving-pulley 17. This main driving-shaft carries a pinion 18, secured thereon, which pinion meshes with a gear-wheel 19, adjustably supported on a hub, preferably integral with the supporting-neck 15, and which forms a bearing for the main driving-shaft 16 by means of a suitable adjustable support 20, which consists of an arm 20', having secured thereto a split clamp 21, adapted to be clamped to the hub by means of a locking device or bolt 22. By means of this adjustable support 20 the gear-wheel 19 can be adjusted to any desired position to mesh with different sizes of gears for transmitting power to the rotary continuous feed mechanism hereinafter described.

The overhanging arm 15 has an extending bracket-arm 23, in which one end of a rotary shaft 24 is journaled. Removably secured to this shaft 24 by any suitable means is a gear 25 in mesh with the gear 19, carried by the adjustable support 20.

The overhanging arm 15 has formed at or adjacent to its end opposite to the bracket 23 a head 26, adapted for supporting the needle mechanism A, and forming a circular track 27, serving as a guideway for the rotary continuous feed mechanism B.

The continuously-rotative feed mechanism (designated in a general way by B) consists, in the preferred form thereof herein shown and described, of a circular rim or wheel 30, adapted to preferably encircle and inclose the main portion of the needle mechanism A, and consists of a relatively wide rim or bearing-surface, which may, if desired, be corrugated or roughened or may be provided with a rubber or other tire to form a frictional bearing-surface to more thoroughly engage the material to be operated on, and has a circular hub 31, preferably formed integral therewith, having an inwardly-projecting annular flange 32, forming one member of the guideway. This wheel is preferably supported to permit its bearing-surface to be a slight distance above the bed or plate 100.

An internal gear 33 is secured to the hub 31 of the feed-wheel 30 by any suitable means—such as an annular rabbet 34 and screws 35. This internal gear has its rim preferably somewhat larger in diametrical cross-section than the hub of the feed-wheel, whereby it is adapted to constitute the other member of the guideway to permit the feed-wheel 30 to be guided on the circular track 27.

The rotary shaft 24 hereinbefore mentioned has its end opposite to the bracket 23 suitably journaled in the head 26 of the over-

hanging arm 15, and carries a pinion 36 either adjustably secured thereon or formed integral therewith, as desired, and adapted to mesh with the internal gear 33 and thereby rotate the same when power is applied to the driving-pulley 17 on the shaft, and whereby the feed-wheel has a continuous rotary motion to thereby feed the material being operated upon continuously forward.

The oscillatory reciprocatory needle mechanism (designated in a general way by A) in the preferred form thereof herein shown and described comprises a needle-carrier or supporting-arm 40 of any suitable construction adapted to carry the reciprocatory needle-bar. This carrier 40 is provided with brackets or sleeves 41 and 42, in which the tubular needle-bar 43 is adapted to reciprocate.

Secured to the upper end of the needle-carrier is a sleeve-bearing 44, journaled on a projecting stud 45 of the head and secured against separation therefrom by means of a suitable locking device or nut.

Integral with or removably secured to an auxiliary shaft 60, journaled for rotation in the head 26 and the overhanging arm 15, and secured against longitudinal displacement therein by a locking-collar 61 and preferably adjacent to the needle-carrier is a gear 46, having integral with one of its side faces or secured thereto by any suitable means a preferably segmental plate 47. Secured opposite to said plate by means of screws or a locking device is a similar clamping-plate 48. These plates are so disposed that their adjacent sides form a dovetailed guideway 49, and for this purpose each of said plates has its edge beveled. In this guideway 49 one end of a link 50 is adapted to be adjustably secured by means of a suitably-beveled block 51, pivotally carried by said link. (See Figs. 3 and 10.) The opposite end of the link 50 is pivoted to the carrier 40, whereby, on the rotation of the main shaft and the pinion 65 hereinafter described and the gear 46, an oscillatory motion is imparted to said needle-carrier. By means of this clamping-plate 48 the link 50 can be adjusted to any desired position within certain determinate limits to thereby regulate the length of throw of the needle.

Reciprocally secured in the sleeves or brackets 41 and 42 of the needle-carrier 40 is a needle-bar 43, preferably having a split tapering lower end in which the needle is held and secured by means of a locking tapering nut 52. This bar carries a projecting stud 53, secured thereto in any suitable way. A link 54 has one of its ends journaled on this projecting stud 53 and has its other end pivoted to a pinion 65, carried by the main shaft 16 and in mesh with the gear 46. When the main shaft is rotated, motion is imparted to the pinion 65, whereby the needle-bar 43 and its needle, by means of the link 54, are vertically reciprocated in the sleeves 41 and 42 of the carrier. That portion of the needle mechanism which comprises the needle-bar is pref-

erably disposed outside, but adjacent to the outer edge of the rotary feed-wheel, to permit the needle to work through the slot 14 in the bed-plate 100.

5 The oscillatory shuttle mechanism (designated in a general way by D) comprises in the preferred form thereof herein shown and described a suitable preferably open-sided shuttle-carrier 70, having a suitable locking
10 device 71, adapted to be operated to lock or unlock a shuttle S in its carrier. Any other suitable shuttle-carrier might be used, if desired, in place of the shuttle-carrier herein described. The shuttle-carrier 70 is carried
15 by an oscillatory arm 72, secured to a shaft 73, suitably journaled in bearings carried by brackets or arms 74, projecting from the supporting-plate 100.

Adjustably secured on the main shaft 16
20 at any suitable place thereon is an eccentric 80. The shaft 73 is connected with this eccentric 80 by means of a link 75 and arm 76, having a band 77 encircling the eccentric, a suitable slot 76' being formed in the bed-plate
25 100 for the passage of the arm 76.

On the rotation of the main shaft 16 it will be obvious that the shuttle-carrier 70, with its shuttle S, will be oscillated by means of the eccentric 80 and shaft 73 to form a lock-stitch
30 in connection with the needle mechanism.

In order to prevent the shuttle S from becoming separated from its shuttle-carrier 70, a plate 79 is secured to the supporting-table 100 in any suitable way, against which the
35 shuttle-carrier slides in its oscillatory movement.

Instead of using a shuttle it will be understood that a looper might be used, if desired, to form a chain-stitch instead of a lock-stitch.

40 The supporting-bed 100 is provided with a sliding thumb-plate 85 to permit the shuttle to be placed in or removed from its carrier 70 when the machine is in place on a support or table.

45 The continuously-rotative automatically-adjustable presser-wheel mechanism (designated in a general way by C) in the preferred form thereof herein shown and described comprises a suitable auxiliary shaft 90, journaled in the supporting-brackets 74, carrying
50 the shuttle-carrier shaft 73, or at any other suitable place on the frame, and has a crank-arm 91 at one end (see Fig. 9) on which the presser-wheel 92 is journaled for rotation. This presser-wheel 92 has a portion of its periphery—when in its normal operative position—extending through a suitable aperture in the supporting-plate 100 of the machine, and is preferably of the same width as the
60 width of the bearing-surface of the rotary feed-wheel 30 and is supported in adjustable engagement therewith, whereby it is continuously rotated.

As a means for holding the presser-wheel
65 in automatic engagement with the feed-wheel and to permit different thicknesses of material to be fed between said wheels, the shaft

90 carries a spiral spring 93, one end of which is secured to the frame or to the bracket-arm and the other end carried by an adjustable
70 nut 94, by means of which the tension of the spring and the consequent adjustability of the presser-wheel is regulated. Pin-holes are provided in the nut for this purpose, and the nut is secured to the shaft 90 by means of
75 any suitable locking device or screw. Fixed to the opposite end of this auxiliary shaft 90 is a lever 95, projecting through a slot 96 in the supporting-plate 100 and having any suitable handle desired, and by means of which
80 lever the presser-wheel 92 is moved out of engagement with the feed-wheel 30, the spring 93 throwing said presser-wheel 92 into reengagement when the lever 95 is released.

A suitable catch 97 may be provided for
85 holding the lever 95 depressed. This catch has a projection adapted to engage a pin 98 on the bed-plate 100, whereby the presser-wheel can be held out of engagement with the feed-wheel to insert or remove the material
90 operated upon.

The thread or cord is carried by the usual spool 101, secured in the usual way to any suitable place on the overhanging arm 15, and the thread is preferably guided through an
95 aperture in the head 26 of the arm. A suitable take-up device of any desired construction may be used, but is herein shown consisting of a coiled spring 102, having a projecting arm 104, supported on a pin 103, projecting
100 from the head 26, and through an eye of said arm 104 the thread is carried. A suitable guide 105 for the thread is also carried by the tubular reciprocating needle-sleeve 45, and is secured thereto at the upper end
105 thereof by means of a screw, and through the eye of which the thread is carried.

In the operation of this improved sewing-machine the presser-wheel 92 is moved away from engagement with the rotary feed-wheel
110 30 by means of the lever 95 and the material to be operated upon then inserted beneath said feed-wheel. The lever 95 is then released and the presser-wheel permitted, by means of its spring 93, to automatically adjust itself to press the material into engagement with the feed-wheel 30, so that the same will be continuously fed forward by the rotary feed-wheel, and not slip thereunder when
115 said wheel is in operation. Power having been applied to the driving-pulley 17, the driving mechanism E is set in operation, whereby the continuously-rotative feed mechanism B is also set in operation to continuously feed the material to be operated upon
120 forward without intermission. At the same time the needle mechanism A is also set in operation to operate synchronously with the continuously-rotative feed mechanism, whereby the needle-carrier 40 is oscillated to carry
125 the needle in its laterally reciprocatory or oscillatory path and the needle-bar 43 also operated to vertically reciprocate the needle, whereby, by means of this oscillatory re-

reciprocatory movement of the needle mechanism, the needle is operated in a substantially elliptical path, and is carried forward synchronously with the rotary continuous feed-wheel, which is operating to carry the material continuously forward. The operation of this particular movement is more clearly shown in the enlarged diagrammatic view, Fig. 11. When the needle is at the starting-point, (marked 1,) the rotary feed-wheel will be at its starting-point, (marked 1^a.) When the needle-carrier 40 has moved forward in its oscillatory path and the needle-bar 43 moved in its reciprocatory path and the needle reaches the point marked 2, the feed-wheel has also reached the same point, or the point marked 2. When the needle in its continued oscillatory reciprocatory movement has reached the point marked 3, the rotary feed-wheel has reached the point marked 3^a. When the needle in its continued movement has reached the point marked 4, the rotary feed-wheel has also reached the same point, or the point marked 4, and when the needle has reached its starting-point, or the point marked 1, the rotary feed-wheel has reached the point marked 1^b, so that in the diagrammatic view shown the material has been fed forward to permit a stitch one and seven-eighths inches long, during which time, however, the needle mechanism has moved synchronously with the continuously-rotative feed mechanism, and there has been no cessation of the rotary feed or the oscillatory reciprocatory needle mechanism.

In order to change the speed of the continuous rotary feed mechanism, it is simply necessary to remove the gear 25 and replace the same by a smaller or larger gear, as desired, and to adjust the adjustable support 20, carrying the gear 19, into position to mesh with the substituted gear. When it is desired to adjust the needle-carrier for a shorter or longer oscillation thereof, the screw and clamping-plate 48 are released to permit the adjustment of the block 51 in its dovetailed guideway and then reclamped to clamp the block in such adjusted position.

From the foregoing it will be seen that a stitch of comparatively great length can be obtained, only limited by the proportions of the machine, while at the same time a comparatively short stitch can also be obtained on the same machine, if desired, by the adjustment of the needle-carrier 40 and the changing of the gear 25. I have found, however, in practice that the preferable construction of machine is one that will permit a stitch from three-eighths of an inch to one and seven-eighths inches long.

Having thus described my invention, I claim—

1. The combination with a frame having a circular, vertically-disposed track; of a feed-wheel supported for rotation on said track; a gear secured thereto; a driving-shaft carrying a pinion meshing with said gear; oscil-

latory, reciprocatory needle mechanism; driving mechanism for actuating said needle mechanism and for rotating said shaft to thereby rotate the feed-wheel; a presser-wheel shaft journaled in said frame; a rotary presser-wheel thereon and cooperating with said feed-wheel; a spring carried by and surrounding said shaft for holding said presser-wheel in position to cooperate with said feed-wheel; and shuttle mechanism cooperating with the needle mechanism.

2. The combination with a crank-shaft, of a presser-wheel supported directly on said shaft; a spiral spring carried by and surrounding said shaft and adapted to actuate said wheel into operative position; and a lever adapted to operate said shaft and wheel, to thereby overcome the pressure of the spring.

3. The combination with feed mechanism, of means for rotating said feed mechanism; presser-wheel mechanism consisting of a crank-shaft, a wheel loosely supported for rotation thereon, a spiral spring carried by and surrounding said shaft for automatically moving said presser-wheel, and a lever secured to said shaft and operable to overcome the stress of said spring.

4. The combination with a frame having a circular track; of a feed-wheel supported for rotation on said track; an internal gear secured thereto; a driving-shaft carrying a pinion in mesh with the internal gear; a main driving-shaft carrying a pinion; an adjustable gear-support supported on said frame and carrying a gear in mesh with the main-driving-shaft pinion; and a removable gear carried by internal-gear pinion-shaft, and adapted to mesh with the gear carried by the adjustable support.

5. The combination of a crank-shaft; a presser-wheel supported on said shaft; a spring carried by said shaft and adapted to throw said presser-wheel into operative relation; a lever secured to said shaft and operative to overcome the pressure of said spring; and means also carried by said shaft for adjusting the tension of said spring.

6. The combination with a frame; of an oscillatory reciprocatory needle mechanism consisting of a needle-carrier pivotally supported on the frame for oscillation; a needle-bar carried by said oscillatory carrier for reciprocation relatively thereto and adapted to carry a needle; a main driving-shaft carrying a pinion; a link pivotally connected to said reciprocatory needle-bar and to said main-driving-shaft pinion, whereby said bar will be reciprocated; a gear supported on the frame and in mesh with the main-driving-shaft pinion; and a link pivotally secured to the carrier and adjustably secured to said gear for oscillating said carrier.

7. The combination with a frame; of an oscillatory reciprocatory needle mechanism consisting of a needle-carrier pivotally supported on the frame for oscillation; a needle-bar car-

ried by said oscillatory carrier for reciproca-
 tion relatively thereto and adapted to carry
 a needle; a main driving-shaft carrying a pin-
 ion; a link pivotally connected to said recip-
 5 rocatory needle-bar and to said main-shaft
 pinion, whereby said bar will be reciprocated;
 and adjustable means in connection with the
 carrier and operated by said main-shaft pin-
 ion for oscillating said carrier, whereby the
 10 movement of said carrier can be regulated.

8. The combination with a frame; of an os-
 cillatory reciprocatory needle mechanism con-
 sisting of a needle-carrier pivotally supported
 on the frame for oscillation; a needle-bar car-
 15 ried by said oscillatory carrier for reciproca-
 tion relatively to said carrier and adapted to
 carry a needle; a main driving-shaft carry-
 ing a pinion; a link pivotally connected to
 said reciprocatory needle-bar and to said
 20 main-shaft pinion, whereby said bar will be
 reciprocated; a gear supported on the frame
 and in mesh with the main-shaft pinion and
 having a segmental plate secured thereto; a
 segmental clamping-plate also secured to said
 25 gear, said plates forming a guideway; and a
 link pivotally connected to said needle-carrier
 and adjustably connected in the guideway of
 said gear, whereby the movement of said car-
 rier can be regulated.

9. The combination with a frame having a
 circular track; of a feed-wheel supported for
 rotation on said track; an internal gear se-
 cured to said wheel; a driving-shaft carrying
 a pinion in mesh with said internal gear; a
 35 main shaft carrying a pinion; an adjustable
 supporting-arm secured to said frame and
 carrying a gear in mesh with said main-shaft
 pinion; a removable gear carried on the in-
 ternal-gear pinion-shaft and meshing with
 40 the gear on the supporting-arm; and a rota-
 tive, automatically-movable presser-wheel.

10. The combination with a frame; of rota-
 tive feed mechanism, and oscillatory recipro-
 catory needle mechanism operative synchro-
 45 nously with the feed mechanism, and con-
 sisting of a needle-carrier pivotally connected
 to the frame; a reciprocatory needle-bar car-
 ried by said carrier; a main driving-shaft
 carrying mechanism for rotating said feed
 50 mechanism, and also carrying a pinion; a
 link pivotally connected to said reciprocatory
 needle-bar and pinion; an auxiliary shaft car-
 rying a gear in mesh with said pinion on the
 main shaft; and a link pivotally carried by

said carrier and adjustably carried by said 55
 gear for oscillating said carrier.

11. The combination with a frame; of a ro-
 tative feed mechanism consisting of a feed-
 wheel supported for rotation on the frame-
 an internal gear secured thereto; an auxil; 60
 iary shaft carrying a pinion in mesh with
 said internal gear; an oscillatory reciproca-
 tory needle mechanism operative synchro-
 nously with the feed mechanism; a rotative,
 automatically-movable presser-wheel mech- 65
 anism; an oscillatory shuttle; and suitable
 driving mechanism for actuating the shuttle
 and for synchronously and continuously oper-
 ating said feed mechanism and reciprocatory
 oscillatory needle mechanism, whereby the
 70 needle carried by said needle mechanism will
 be actuated in a substantially elliptical path.

12. The combination with a frame; of an
 oscillatory needle-carrier pivotally supported
 thereon a reciprocating needle carried there- 75
 by; a gear supported on said frame and hav-
 ing a segmental plate connected to one face
 thereof and having a beveled edge; a seg-
 mental clamping-plate secured to said gear
 and also having a beveled edge, said plates 80
 forming a guideway; a block adjustably sup-
 ported in said guideway; and a link having
 one end pivotally secured to said carrier and
 having its other end pivotally secured to said
 85 block, whereby said link can be adjusted in
 said guideway to regulate the movement of
 said carrier.

13. The combination with a frame; of a ro-
 tative feed mechanism; a rotative presser- 90
 wheel mechanism; and an oscillatory recip-
 rocatory needle mechanism operative syn-
 chronously with the feed mechanism, and con-
 sisting of needle-carrier pivotally connected
 to the frame; a reciprocatory needle-bar car-
 ried by said carrier; a main driving-shaft 95
 carrying means for rotating said feed mech-
 anism, and also carrying a pinion, a link
 pivotally connected to said reciprocatory nee-
 dle-bar and pinion; an auxiliary shaft carry-
 ing a gear in mesh with said pinion on the 100
 main driving-shaft; and a link pivotally con-
 nected to said needle-carrier and adjustably
 carried by said gear for oscillating said carrier.

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