

No. 620,304.

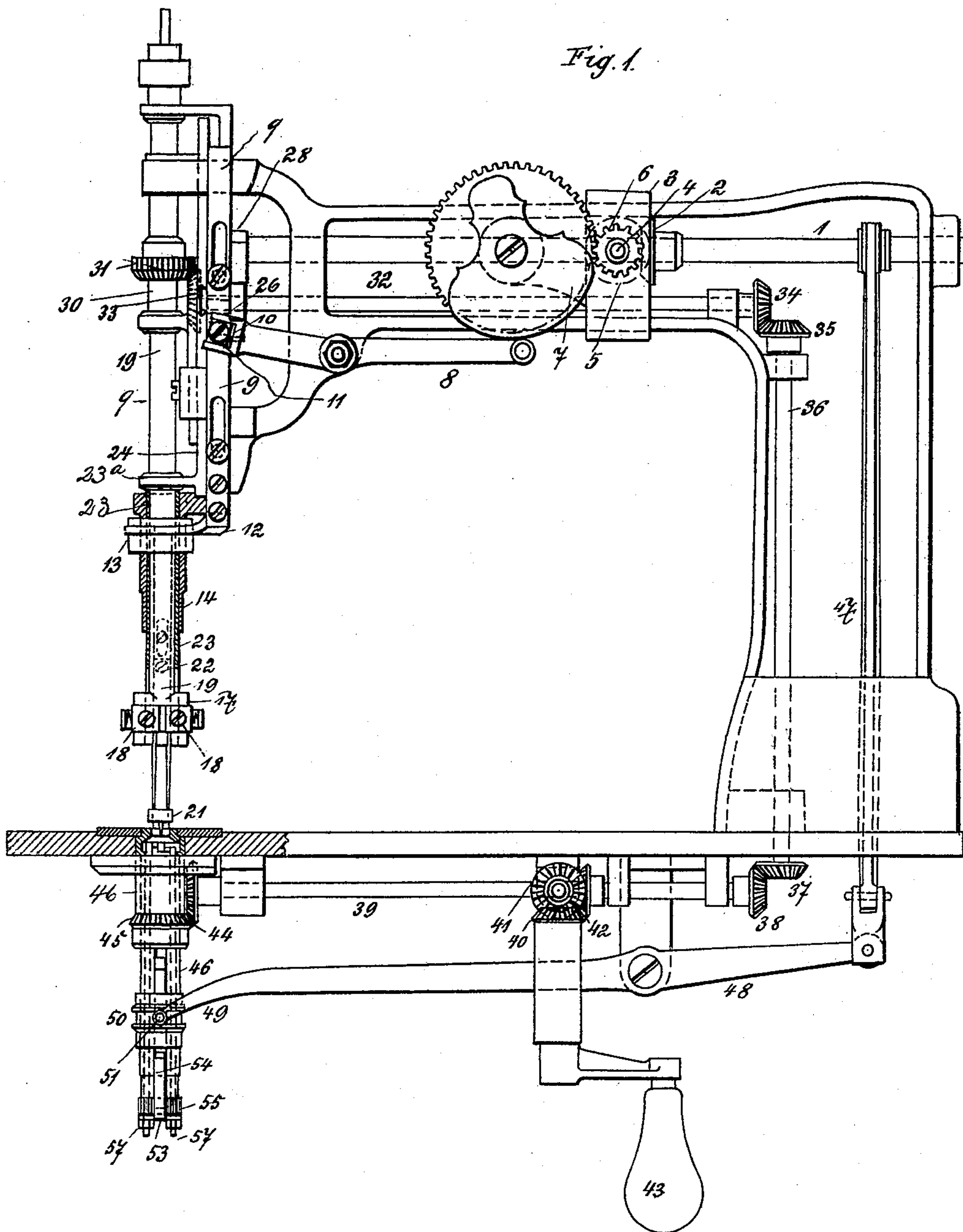
Patented Feb. 28, 1899.

J. GUTMANN.
HEMSTITCH SEWING MACHINE.

(Application filed Dec. 31, 1897.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
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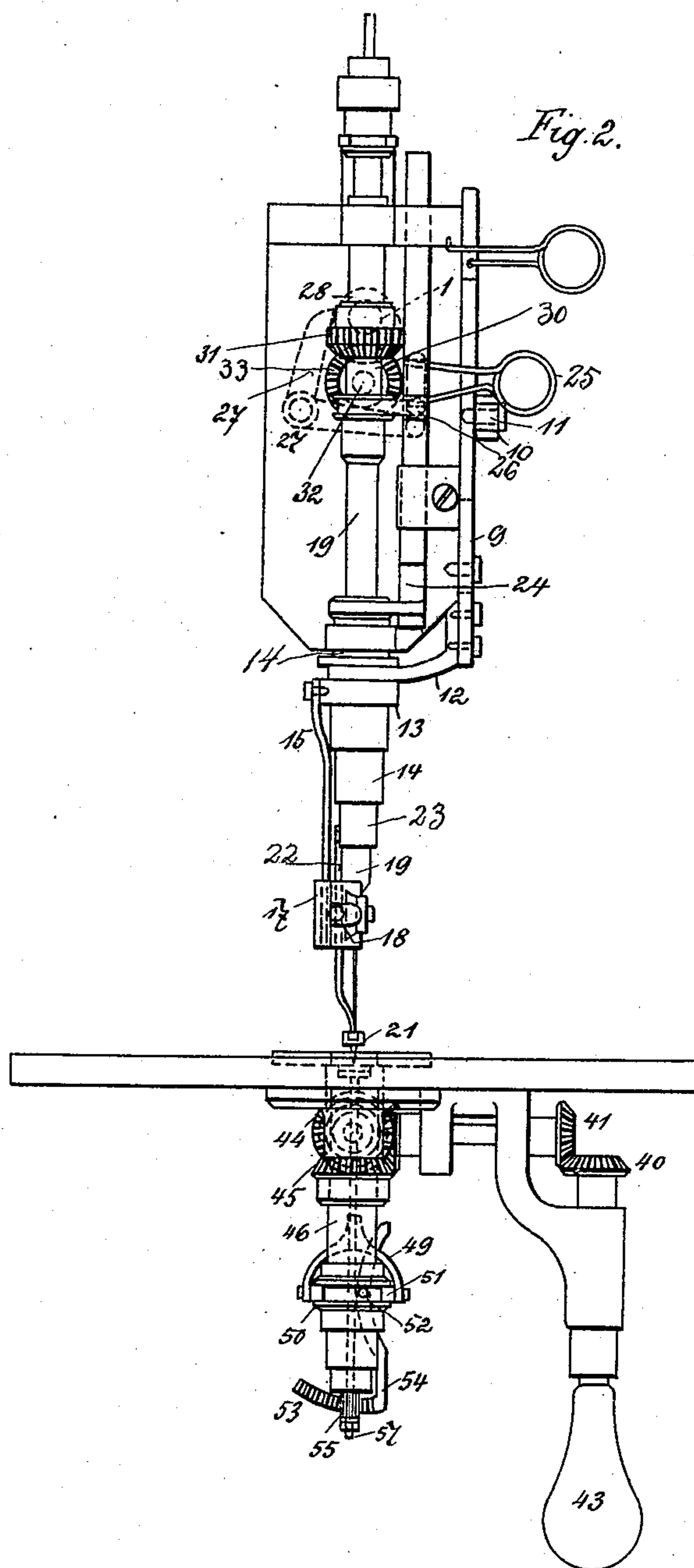
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(No Model.)

3 Sheets—Sheet 2.



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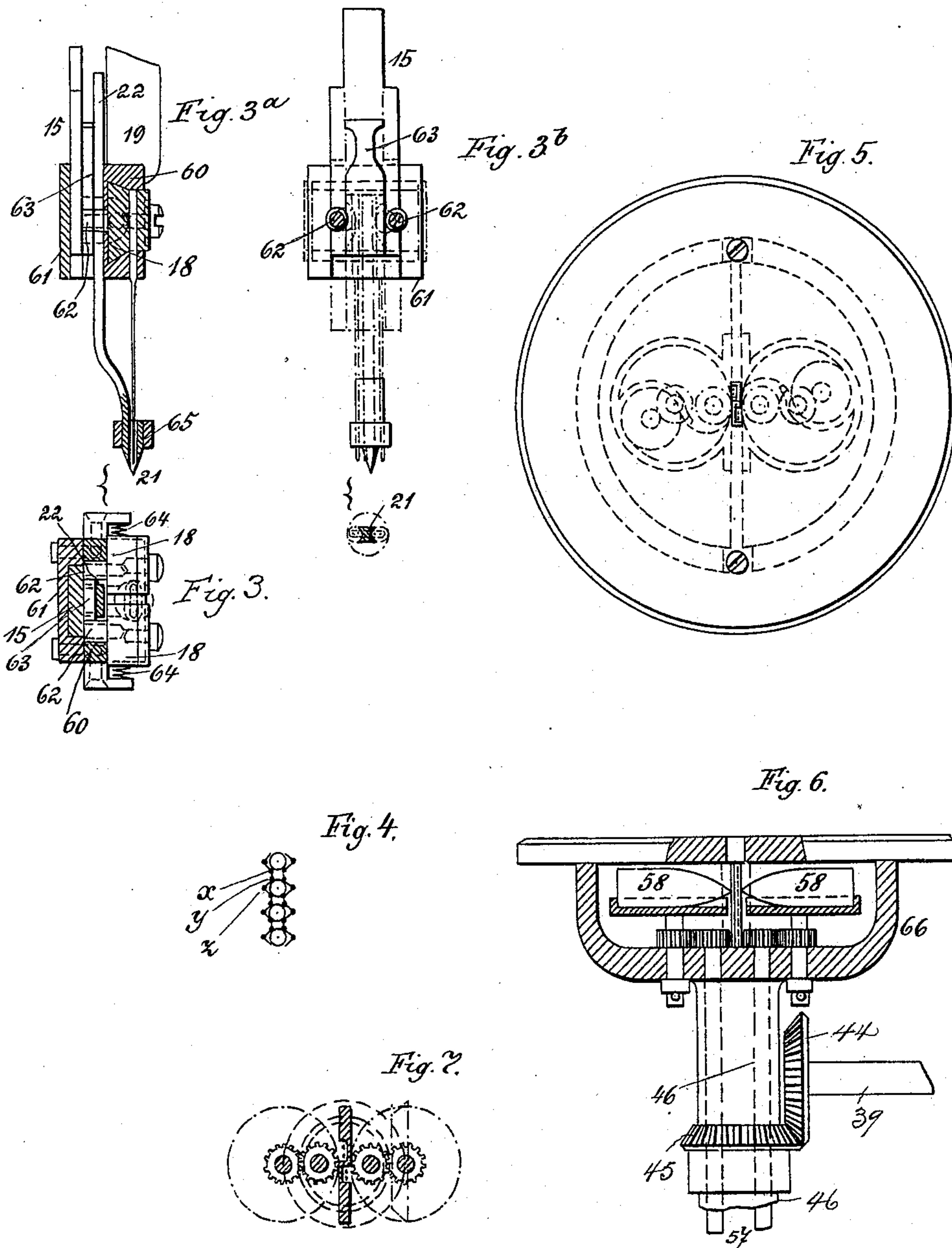
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(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

JULIUS GUTMANN, OF BERLIN, GERMANY, ASSIGNOR TO THE FABRIK FÜR
SPEZIALNEIHMASCHINEN ACTIEN-GESELLSCHAFT PATENTE JULIUS GUT-
MANN, OF ZURICH, SWITZERLAND.

HEMSTITCH SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 620,304, dated February 28, 1899.

Application filed December 31, 1897. Serial No. 665,008. (No model.)

To all whom it may concern:

Be it known that I, JULIUS GUTMANN; a
subject of the King of Prussia, residing at the
city of Berlin, Germany, have invented cer-
tain new and useful Improvements in Hem-
stitch Sewing-Machines, (for which I have ob-
tained a patent in France, No. 265,456, bear-
ing date March 29, 1897, and in Switzerland,
No. 14,605, bearing date May 15, 1897;) and I
do hereby declare that the following is a full,
clear, and exact description of the invention,
which will enable others skilled in the art to
which it appertains to make and use the same.

This invention relates to hemstitch-ma-
chines for sewing winding seams of the kind
that would follow a line winding to and fro
in a curved form between two parallel lines
and in which machines the sewing is per-
formed by means of a piercer and needles,
the piercer, with the needles, penetrating the
fabric to be sewed and the needles forming
stitches at the side of the piercer.

The invention has for its object to provide
in such winding-seam-sewing machines means
by which the winding seam can be produced
not only in the direction of a straight line,
but in all directions and configurations, for
which purpose the needles and piercer, as also
the catcher or shuttle driving mechanism,
may simultaneously be turned from one di-
rection to another.

The invention consists in an arrangement
in hemstitch sewing-machines of two driving
mechanisms connected with a common driv-
ing-spindle, one of which mechanisms is in
connection with the rotatable and displace-
able needle-carrying rod, upon which latter is
located the rotatable and displaceable sleeve,
which carries the piercer, and the other driv-
ing mechanism in connection with the rota-
table sleeve carrying the catcher or shuttle
driving mechanism. Hitherto only such
hemstitch sewing-machines have been known
as will sew such a seam in one direction and
not allow of desired changes in the direc-
tion thereof, whereas by means of this in-
vention such changes are rendered practi-
cable by reason of the collective mechanisms
for the production of the winding seam being

maintained in a certain prescribed position
relatively to the central line of the winding
seam, as they are all adapted to turn simul-
taneously in the desired direction of the wind-
ing seam to be sewed, to which end the head
on which the needle-bearings are seated, the
piercer, the needle-plate, and the catcher or
shuttle seats are arranged to turn, the mech-
anisms for operating the rotation of said
parts being so connected through spindles
and bevel-wheels with a single spindle that
the rotation of all these parts may be oper-
ated therefrom simultaneously and in the
same direction. The needle-clamps are ar-
ranged so as to be displaceable parallel to one
another, and the piercer has a motion inde-
pendent of the needles in the line of its lon-
gitudinal axis. Therefore it is not compelled
to take part in the whole downward move-
ment of the needles, but may remain station-
ary, while the needles move lower and again
higher. When the needles are rising above
the fabric, the piercer may still remain in the
same, which thus has for a short interval a
hold on the piercer seated in it.

In the accompanying drawings, Figure 1 is
a part-sectional side view of a hemstitch sew-
ing-machine constructed in accordance with
this invention; Fig. 2, an end view looking
toward the machine-head, the mechanisms
which do not form part of the invention be-
ing omitted with a view to greater clearness.
Fig. 3 is a horizontal sectional detail view,
Fig. 3^a a like vertical sectional view, and Fig.
3^b a vertical sectional elevation on the line of
the projection 63 on slide 15 of Fig. 3^a, illus-
trating the construction and relative arrange-
ment of the needle-head and the means for
spreading the needle-carriers. Fig. 4 is a dia-
grammatic view of the stitches. Figs. 5, 6,
and 7 are views relating to the shuttle-driv-
ing mechanism.

1 is the main spindle of the machine, on
which is fixed a bevel-toothed wheel 2, which
sets in rotation the spindle 4, carried in the
plate 3, and this movement is transmitted
through the toothed wheel 5 on spindle 4 to
the toothed wheel 6 and to the cam 7, at-
tached to this latter. The cam 7 acts on the

lever 8, which is mounted to oscillate on the machine-frame, and has connected to the end of its shorter arm a slide-bar 9, for which purpose said end of said lever is fork-shaped and has there fitted to it a bearing-block 10 for the reception of a pin 11, projecting from the slide-bar. Consequently this latter is moved from the cam up and down at certain intervals of time.

12 is a fork attached to the lower end of the slide-bar 9 and holding suspended and so as to be capable of turning therein the sleeve 13, which has transmitted to it the up-and-down movement of said slide-bar.

On the sleeve 13, which turns on the sleeve 14 and is movable up and down thereon, is held a slide-plate 15, over which the head 17, provided with the needle seats or clamps 18, moves up and down. The sleeve 14 is firmly attached to the machine-head. The head 17 is connected to the rod 19 and moves with it both in the turning movement taking place in the fixed sleeve 14 and in the up-and-down movement, the latter movement being brought about in the usual manner by a cam fixed on the spindle 1, as in the ordinary Singer machine. The movement of the piercer 21 is independent of the rod 19. Said piercer is connected by means of a small plate 22 to the sleeve 23, placed on the rod 19, upon which latter said sleeve is adapted to slide up and down, and therefore has a separate movement in this direction, but turns with it owing to the engagement of a small lug on the rod in a slot of the sleeve. The up-and-down movement of the sleeve 23, Fig. 2, is occasioned by the slide 24, which is guided in the machine-head and is normally pressed downward by a spring 25. The slide 24 is raised by means of a small bell-crank lever 27, Fig. 2, which takes underneath a lug 26, projecting from said slide. The bell-crank lever 27 is operated by an eccentric 28, fixed on the spindle 1, and when said lever is thus caused to perform a stroke it lifts the slide 24, the sleeve 23, displaceable on rod 19, and the piercer 21, and after the lever 27 has lifted the slide 24 the latter is pressed downward by the spring 25. Therefore the rod 19, which moves the needle-seats up and down, is itself moved up and down from the spindle 1, in which movement it is guided in the sleeve 23 and turns with this latter in the sleeve 14, and the piercer is operated from the spindle 1, as before described.

30 is a sleeve mounted on the rod 19, near its upper end, and so in connection therewith that it turns with said rod, but does not move up and down with it. On this sleeve is fixed a bevel-toothed wheel 31, which meshes with a similar wheel 33, fixed on a spindle 32, mounted in the machine-frame and carrying at its rear end the bevel-toothed wheel 34, meshing with the wheel 35, fixed on the upper end of the vertical spindle 36.

39 is a horizontal spindle which is in connection with the vertical spindle 36 through

bevel-toothed wheels 37 38 and is set in rotation from the crank-handle 43 through bevel-toothed wheels 40 41 42, the wheel 40 being fixed on or in one piece with the crank-spindle, and upon rotating this latter the spindles 39 36 32, the toothed wheel 31, the sleeve 30, carrying with it the rod 19, and the sleeve 23 on the latter, or, in other words, the piercer 21 and the head 17, furnished with seats for and carrying the needles, are rotated. There is, further, on the spindle 39 a bevel-toothed wheel 44, which, meshing with a similar wheel 45, turns the sleeve 46, on which the latter wheel is fixed and on which the mechanisms for operating the catcher or shuttle are arranged, said mechanisms being turned from the crank-handle 43 simultaneously with the mechanisms for bringing about the movement of the needles and piercer.

The catcher or shuttle motion for forming the thread-loops is obtained from the spindle 1 through a crank motion, whereby the lever 48 is caused to oscillate up and down. This lever at its free end is formed with a fork 49, carrying a ring 51, in which a sleeve 50 is so held as to be capable of turning therein and also of sliding up and down on the sleeve 46, with which it rotates when the crank-handle 43 is turned.

The sleeve 46 is fitted with a pin 52, which does not project beyond the cylindrical surface of the same. On this pin is mounted a lever 54, provided with a toothed segment 53. A slot in said sleeve allows the lever 54 to strike outward, and this action is brought about by the up-and-down movement of the sleeve 50 when it presses alternately against the upper and lower arms of the lever 54 and causes this lever to swing. In this swinging movement the toothed segment turns first in one direction and then in the other the small toothed wheels 55, fixed on spindles 57 of the shuttle-driving mechanism, whereby said mechanism is actuated, Figs. 5 and 6. Consequently the shuttle motion is obtained from the spindle 1 through the lever 48, whereby the sleeve 50 is moved up and down on the sleeve 46, by which movement the lever 54, with its toothed segment 53, is set in oscillation and the shuttles rotated. The collective shuttle-driving mechanisms up to the lever 48 take part in the rotary movement of the sleeve 46. The needle-plate is also connected with the sleeve 46 and joins in the rotary movement.

The head 17 for the needle seats or clamps 18 consists of a part 60, having a groove for the reception and guidance of said needle-seats, and of a part 61, screwed thereto, in which the slide-plate 15 is guided, Fig. 3^a. The needle seats or clamps 18 move to and fro in the groove of the part 60. They are provided with small rollers 62, which take against a raised surface 63 of the slide-plate 15; but they allow the slide 22, which carries the piercer, to slide untouched between them.

The movement of the needles is as follows: The slide-plate 15, guided in the part 61 of

the needle-head, is, with its wedge-shaped raised surface 63, so actuated by the lever 8 and cam 7 relatively to the rod 19, which has a regular up-and-down movement, that at every third downward movement of the needle-rod the wedge-surface 63 passes at the point of its greatest width between the rollers 62. In this the needle seats or clamps 18, which are connected to said rollers, are displaced parallel to one another in the groove or slideway of the part 60 and then perform their greatest outward stroke, the springs 64 then pressing them against the wedge-surface 63. In the greatest outward stroke of the needles the wedge-surface 63 remains with its widest part between the rollers 62 until the needles are withdrawn from the fabric—that is, so long as the slide-plate 15 and the rod 19 move up and down—and then the needle-seats return to their inward position. The piercer upon each descent of the needles moves quite independently of these latter. The needles engage in the piercer, as shown in Figs. 3^a and 3^b, yet the downward stroke of the piercer is not the same as that of the needles, seeing that it remains in a raised position after it has pierced the fabric, which permits the contact of the attachment 65 with the needle-plate, while the needles pass lower down, pass through the fabric, and form the stitch. The stitches are formed by means of shuttles 58 in the known manner, said shuttles being driven from the toothed segment 53 through the spindles 57, rotated in the manner above described. The box 66, in which the mechanisms for driving the shuttles and the needle-plate are located, is connected to the sleeve 46 and turns therewith.

The machine works as follows: The needles descend with and at the same time as the piercer. The piercer pierces the fabric and then remains stationary, while the needles continue their downward movement and form a stitch. In two successive stitches the needles descend within the piercer or within the range or boundary thereof. In the next following or third stitch the needles descend with the piercer as in the two previous stitches up to a certain point; but before entering the fabric they perform a lateral outward stroke, which takes them beyond the piercer, and it is at these points that they enter the fabric, Fig. 4. In this way the known winding seam is produced. By dispensing with one of the needles a partial or one-sided winding seam is produced. In sewing such a seam the crank-handle 43 is turned according to the windings or curves of the seam to be sewed. The sleeve 13 then turns with the slide-plate 15, the rod 19 with the needle-head 17, the sleeve 23 with the piercer 21, and the sleeve 46 with the shuttles and the needle-plate, all regularly together.

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

1. In a hemstitch sewing-machine, the combination with the stitch-forming appliances,

comprising a needle-bar adapted to revolve and reciprocate vertically, a needle-head secured thereto and adapted to carry one or more needles, a piercer revoluble with the needle-bar, means for reciprocating the piercer vertically on said needle-bar, means for periodically displacing the needle or needles relatively to the piercer to form the winding stitches, a revoluble shuttle-box adapted to receive one or more shuttles and suitable shuttle-driving mechanism, and mechanisms adapted to impart a vertical reciprocating movement to the needle-bar and to the piercer; of a revoluble shaft and intermediate mechanisms controlled by the movements of said shaft and adapted to simultaneously revolve the shuttle-box, the needle-bar and piercer, whereby said parts can be displaced in accordance with the irregularity in the line of seam to be sewed.

2. In a hemstitch sewing-machine, the combination with the needle-bar, means for reciprocating the same vertically, the needle-head secured to said bar and adapted to carry one or more needles, a gear-wheel on said needle-bar adapted to revolve the same without reciprocating therewith, a piercer revoluble with the needle-bar, means for reciprocating the piercer vertically on said needle-bar, and means for displacing the needle or needles relatively to the piercer to form the winding stitches, a revoluble shuttle-box carrying a gear-wheel and adapted to receive one or more shuttles, and suitable shuttle-driving mechanism; of two shafts geared to revolve in unison and respectively geared to the wheel on the shuttle-box and to the wheel on the needle-bar, and means for revolving one of said shafts, for the purpose set forth.

3. In a hemstitch sewing-machine, the combination with the needle-bar, means for reciprocating the same vertically, the needle-head secured to said bar and adapted to carry one or more needles, a gear-wheel on said needle-bar adapted to revolve the same without reciprocating therewith, a piercer revoluble with the needle-bar, means for reciprocating the piercer vertically on said needle-bar, and means for displacing the needle or needles relatively to the piercer to form the winding stitches, a revoluble shuttle-box carrying a gear-wheel and adapted to receive one or more shuttles, and suitable shuttle-driving mechanism; of two shafts geared to revolve in unison and respectively geared to the wheel on the shuttle-box and to the wheel on the needle-bar, and a hand-operated crank-shaft geared to one of the aforesaid two shafts, for the purpose set forth.

4. In a hemstitch sewing-machine, the combination with the needle-bar, the needle-head thereon, the needle carriers or seats having reciprocal motion in said head, means for moving the needle-carriers into their normal positions when moved out of it, a piercer on the needle-bar, means for reciprocating said piercer and needle-bar independently of each

other, and suitable shuttles and shuttle-driving mechanism; of a spreader-slide adapted to periodically operate on the needle-carriers to displace the same relatively to the piercer to form the winding stitches, substantially as and for the purpose set forth.

5. The combination with the needle-bar, the needle-head, the needle-carriers having reciprocal motion in said head, means for moving said carriers back into their normal position when moved out of it, means for reciprocating the needle-bar, the sleeve 23 thereon, the piercer connected with said sleeve, and means for reciprocating the latter independently of the needle-bar, and complementary stitch-forming appliances cooperating with said needle-bar; of the collar 13, the slide 15 provided with the actuating-plate 63, said plate adapted to act upon the needle-carriers to displace the same relatively to the piercer to form the winding stitches, and means for periodically reciprocating said slide independently of the needle-bar and piercer, substantially as and for the purpose set forth.

6. The combination with the revoluble shuttle-box 66, the bevel-gear 45 and needle-plate thereon, the shuttles and the shuttle-driving mechanism revoluble with the shuttle-box, the main driving-shaft of the machine and a rock-lever operated by said shaft and adapted to actuate the shuttle-driving mechanism, and complementary stitch-forming appliances cooperating with the shuttles; of means for revolving the shuttle-box, needle-plate and shuttle-driving mechanism about a common center without interfering with the operation of the aforesaid rock-lever, for the purpose set forth.

7. In a hemstitch sewing-machine, a revol-

luble needle-bar, means for reciprocating the same vertically, the needle-head on said bar, and needle-seats having reciprocal motion in said head, means for periodically moving said seats apart, the piercer, and mechanism for reciprocating the same independently of the needle-bar, the shuttle-box, the shuttle, and shuttle-driving mechanism, said appliances adapted to revolve about a common center; of mechanism for revolving the needle-bar and shuttle-box simultaneously, and independently of the mechanisms for reciprocating said needle-bar and for driving the shuttles, for the purpose set forth.

8. In a hemstitch sewing-machine, a revoluble needle-bar, a needle-head thereon, needle-seats having reciprocal motion in said head, a slide acting upon the needle-seats to move the same apart, a piercer, a shuttle-box, the needle-plate carried thereby, the shuttles, and shuttle-driving mechanism, said parts adapted to revolve about a common center; of mechanism for reciprocating the needle-bar, the needle-spreading slide and piercer independently of each other, mechanism for actuating the shuttle-driving mechanism, and hand-operated appliances for synchronously revolving the needle-bar and shuttle-box about their common center without interfering with the operation of the mechanisms for reciprocating said needle-bar and for driving the shuttles, for the purpose set forth.

In testimony whereof I sign this specification in the presence of two subscribing witnesses.

JULIUS GUTMANN.

Witnesses:

HENRY HASPER,
CHAS. H. DAY.