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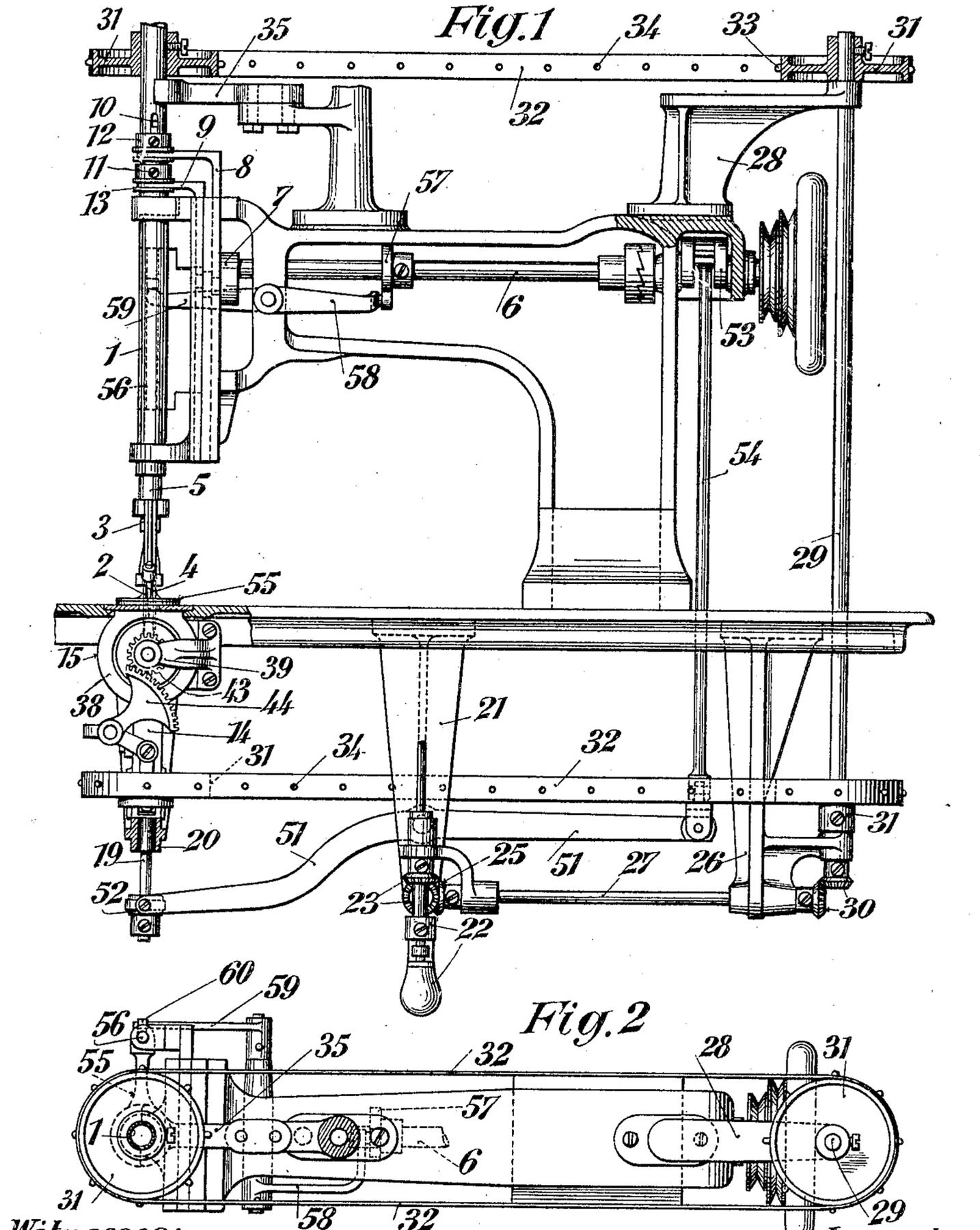
PATENTED MAY 22, 1906.

F. GEGAUF.

ORNAMENTAL STITCHING AND EMBROIDERY MACHINE.

APPLICATION FILED SEPT. 6, 1904.

4 SHEETS—SHEET 1.



Witnesses:

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O. Rommers

Inventor:

Friedrich Gegauf.

by Henry Orth for
attys.

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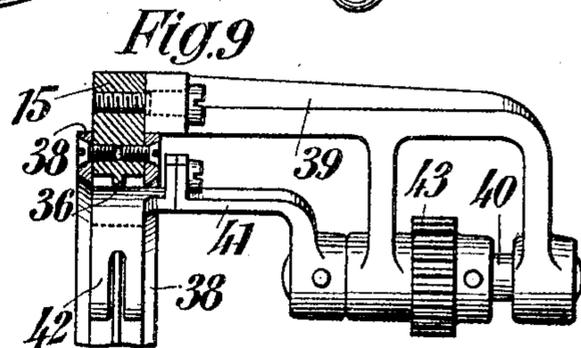
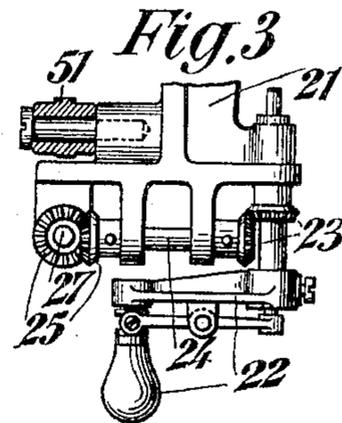
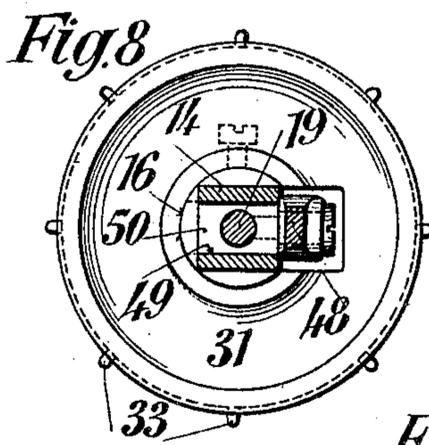
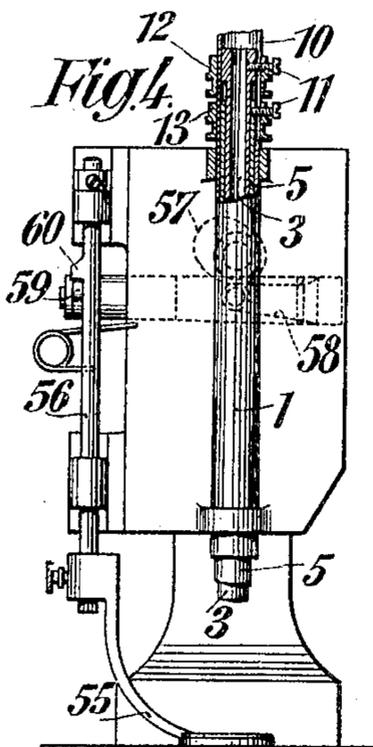
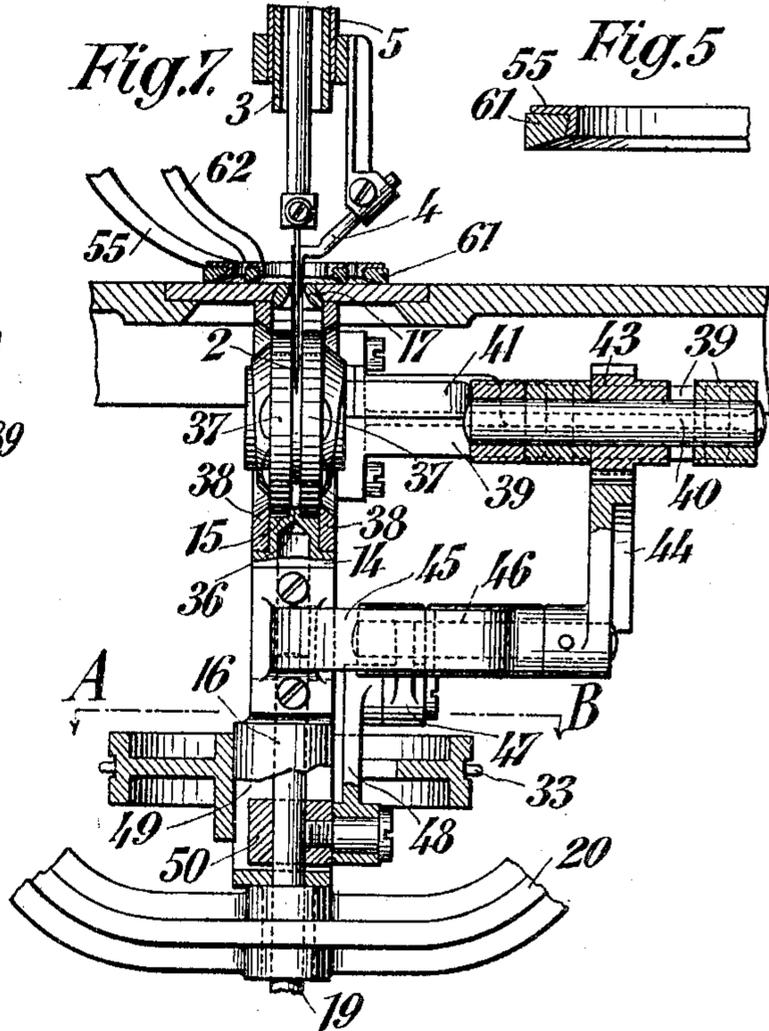
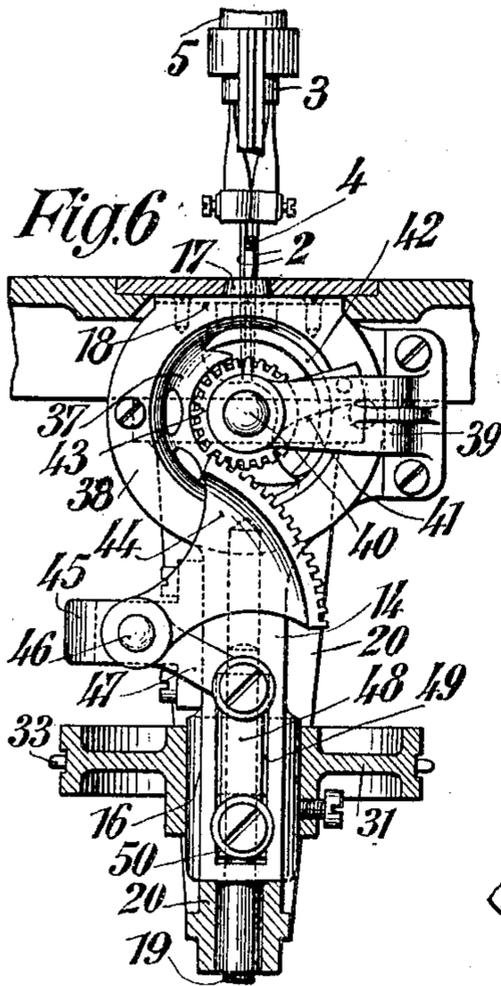
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4 SHEETS—SHEET 2.



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APPLICATION FILED SEPT. 6, 1904.

4 SHEETS—SHEET 3.

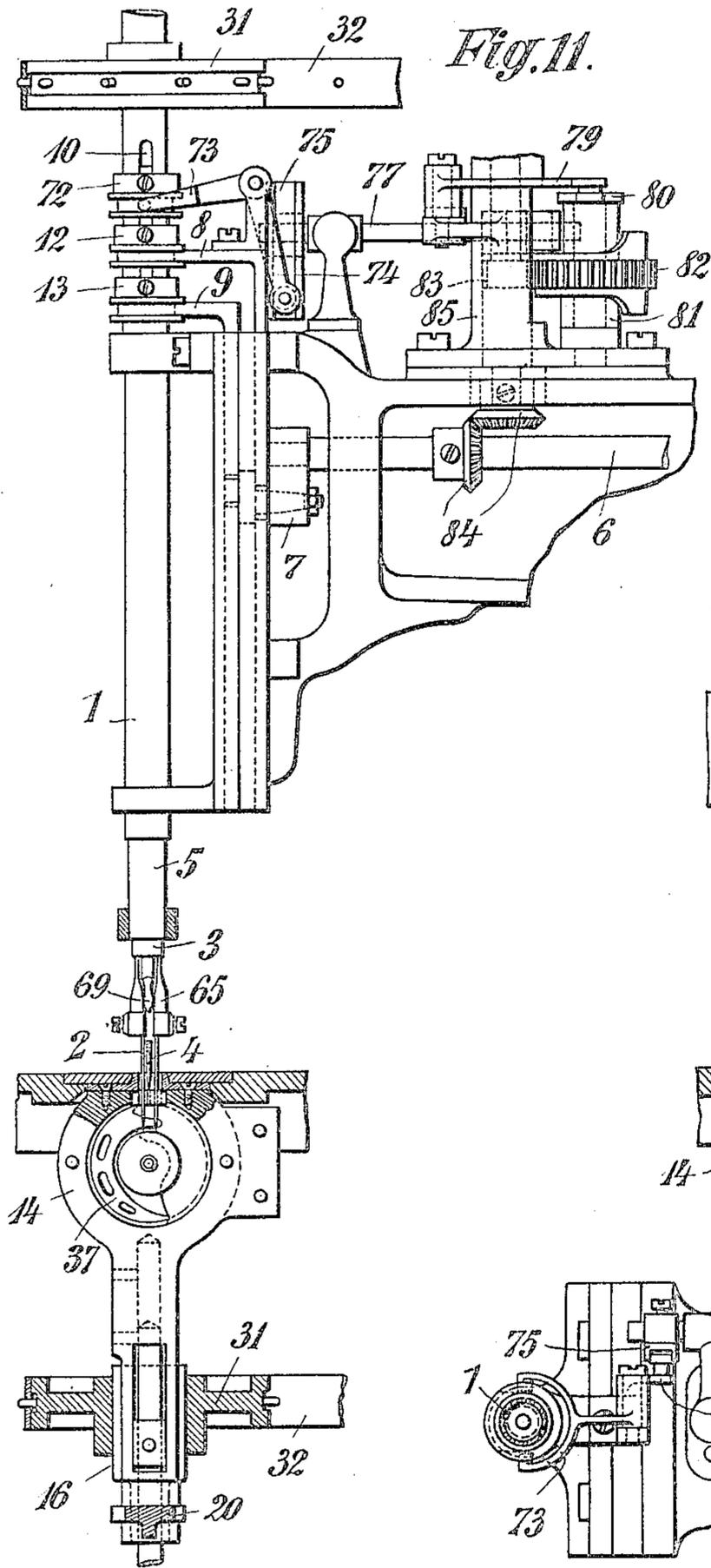


Fig. 11.

Fig. 13.

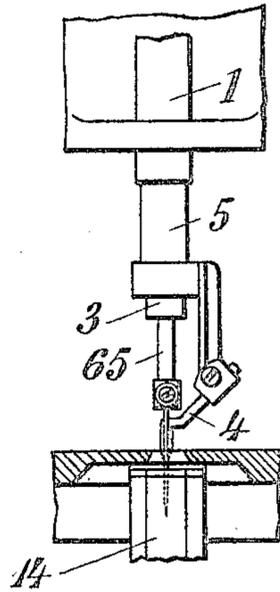
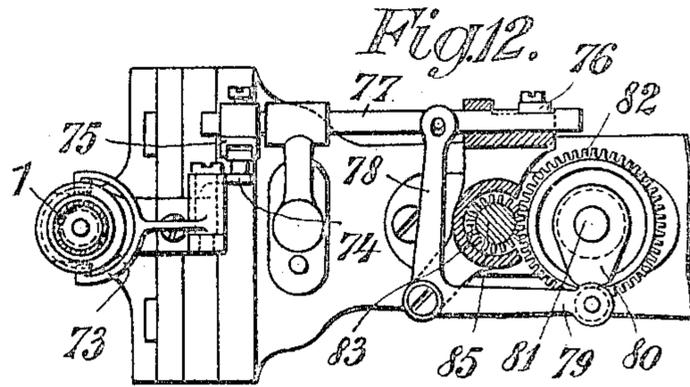


Fig. 12.



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4 SHEETS—SHEET 4.

Fig. 15.

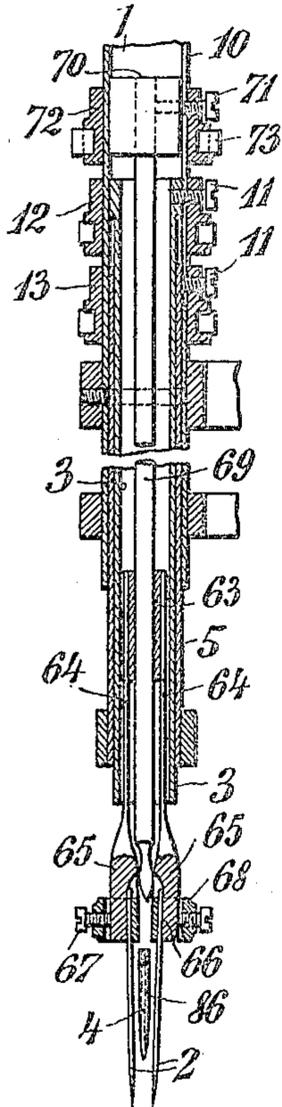


Fig. 14.

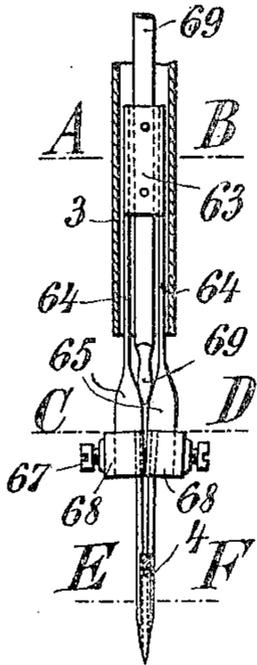


Fig. 16.

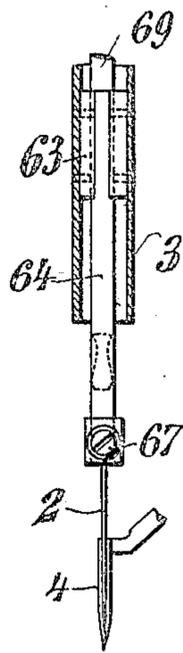


Fig. 20.

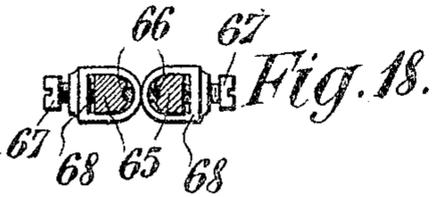
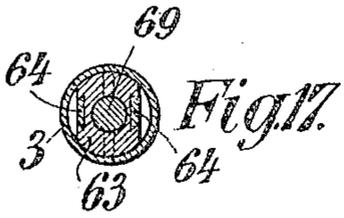
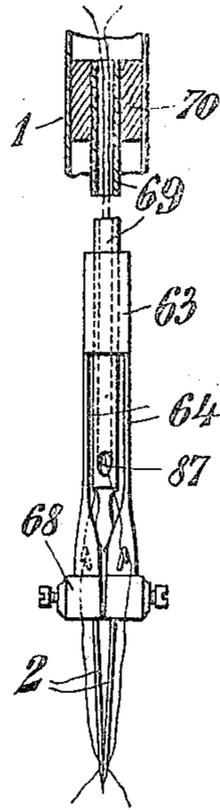
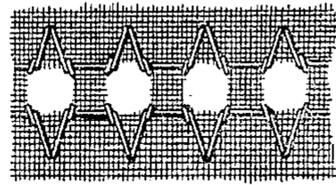


Fig. 21.



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UNITED STATES PATENT OFFICE.

FRIEDRICH GEGAUF, OF STECKBORN, SWITZERLAND.

ORNAMENTAL-STITCHING AND EMBROIDERY MACHINE.

No. 821,233.

Specification of Letters Patent.

Patented May 22, 1906.

Application filed September 6, 1904. Serial No. 223,558.

To all whom it may concern:

Be it known that I, FRIEDRICH GEGAUF, a subject of the German Emperor, residing at Steckborn, in the Republic of Switzerland, have invented new and useful Improvements in and Connected with Ornamental-Stitching and Embroidery Machines, of which the following is a specification.

This invention has for its object a crank hemstitch embroidering-machine for making hems of any suitable curvature which has needles and a borer mounted in tubes located one in the other, both of which are arranged in a carrier or guide tube and each separately movable, which needles and borer are simultaneously operated from one place, together with the shuttle mounted in a carrier, the needle-carrier tube and the shuttle-carrier being each connected by means of an endless flexible transmission mechanism, (band,) with a shaft common to both, which shaft may be revolved by means of the usual crank arranged beneath the table of the machine, while the material-presser is not revoluble and may be lifted at each stitch.

A form of construction of the object of the invention is shown as an example in the accompanying drawings.

Figure 1 is a side view and partial section of the machine; Fig. 2, a plan view; Fig. 3, crank-driving mechanism; Fig. 4, a partial front view of the machine, partly in section, showing the movement of the presser; Fig. 5, a detail of the material-presser in section and on an enlarged scale. Fig. 6 is a side view, partially in section, of the shuttle-operating mechanism; Fig. 7, a front view of the same, also partially in section; Fig. 8, a section on the line A B of Fig. 7; Fig. 9, a partial plan view of Fig. 7, also partly in section; Fig. 10, a detail of the shuttle-operating mechanism; Fig. 11, a part of the machine, on an enlarged scale, partly in section, with the means for operating the spreading or separation of the needles; Fig. 12, a plan view, partly in section, of Fig. 11; Fig. 13, a partial front view, partly in section, of Fig. 11; Figs. 14, 15, and 16, details on an enlarged scale and partly in section of the needle-separating mechanism; Figs. 17, 18, and 19, sections, on an enlarged scale, respectively on the lines A B, C D, and E F of Fig. 14; Fig. 20, a modification of a detail of the machine; Fig. 21, a view, on an enlarged scale, of the hemstitch produced with the machine on the upper side of the fabric.

In Figs. 1 and 2, 1 is a tube revolubly mounted on the head-plate of the machine, in which tube a tube 3, carrying the needles 2, and also a tube 5, carrying the borer 4, said tube 5 being located in the tube 3, are arranged in such a way as to be adapted to be moved up and down. These tubes 3 and 5 receive independent movements from the driving-shaft 6 of the machine by the intermediary of a crank 7 and slide-pieces 8 and 9, which latter engage in grooved rings 12 and 13, mounted on the tube 1 and connected with their respective tubes by means of screws 11, traveling in an elongated slot 10 in the tube 1, Figs. 1 and 4.

The revoluble shuttle-carrier 14, lying in a prolongation of the longitudinal axis of the tube 1, is vertically arranged under the table-plate of the machine, and its upper part is formed like a case, and it also has at its lower end a cylindrical shaft or shank 16.

By means of a tapering frame 17, provided with an aperture for the needles 2, which frame is mounted on a plate 18, attached to the casing 15, the shuttle-carrier is, on the one hand, pivotally mounted in the table-plate of the machine, and by means of a prolongation of the shaft 16, arranged on a vertical axis 19, the shuttle-carrier is also, on the other hand, pivotally mounted in a carrier or bracket 20, connected with the table-plate of the machine.

Under the table of the machine a crank 22, adapted to be operated by hand, is revolubly mounted on a support 21 and connected with a shaft 24 by means of bevel-gear 23, which in turn is connected by bevel-gear 25 with a shaft 27, partly mounted in the support 21 and partly mounted in a support 26, Figs. 1 and 3. A shaft 29, lying in a vertical plane laid through the longitudinal center of the machine, has one end mounted in this support 26 and the other end in a support or bracket 28, fixed on the machine-frame, said shaft being arranged parallel to the tube 1 and outside the hand-wheel of the machine and connected by bevel-gear 30 with the shaft 27. Pulleys 31 are mounted on the upper and lower ends of this shaft 29, respectively, and a similar pulley 31 is mounted on the cylindrical part of the shaft 16 of the shuttle-carrier 14 and also another on the upper end of the tube 1. The upper pulley 31 on the shaft 29 is connected by an endless band 32—for instance, a thin steel band—with the pulley of the tube 1, and the lower pulley 31

on the shaft 29 is connected by a similar band with the pulley on the shuttle-carrier 14, the pulleys 31 being provided on their periphery with radially-arranged studs 33, which engage in corresponding holes 34 in the band 32, Figs. 1 and 2. In order to prevent the upper end of the tube 1 bending, a support 35, attached to the machine-frame, rests against it, which support may be formed as a ball-bearing.

The part 15 of the shuttle-carrier 14 has a continuous cylindrical recess which is divided into two chambers by a flange 36, vertically arranged in its center and running all round, in each of which chambers a circular shuttle 37 is loosely vertically mounted, the shuttles being separated by the bar 36 and held on the outside by flat rings or covers 38, fixed on the flat sides of the casing 15 by means of screws. A spindle 40, lying in the prolonged horizontal axis of rotation of the shuttle 37, is revolvably mounted in a carrier 39, fixed on the casing 15, on which spindle an arm 41 is mounted, which is connected with a shuttle-driver 42, which passes in the casing inside the bar 36, and both ends of which shuttle-driver bear against the two shuttles 37, Figs. 6, 9, and 10, in such a way that the shuttles share in the movement of the arm 41. A toothed pinion 43 is also mounted on the spindle 40, with which pinion a toothed segment 44 gears, which is mounted on a spindle 46, mounted in a bearing 45, fixed laterally to the shaft part of the shuttle-carrier 14. An arm 47 is also mounted on this spindle 46, which arm forms in conjunction with another arm 48 an elbow-lever, this arm 48 being fixed on a spindle 19, adapted to be moved up and down on the shaft part 16 of the shuttle-carrier, and is linked to a slide-piece 50, displaceable in a slide or guide 49, vertically arranged on this part 16. A double lever 51, pivotally and vertically mounted on the bracket 21, engages with the end of one of its arms with a grooved ring 52, mounted on the lower end of the shaft 19, while a rod 54, connected with the crank 53 of the driving-shaft 6, is linked to the end of the other arm.

The material-presser consists of a presser-foot 55, annular in form at its lower end, and a bar 56, carrying the same and displaceably mounted on the head-plate of the machine, on one side of the tube 1 and parallel therewith. It receives its movement from the driving-shaft 6 of the machine by the intermediary of a cam 57, mounted thereon, and lever-arms 58 59, pivotally mounted in the machine head. Of these lever-arms the arm 58 bears against the disk 57 and the arm 59 against a projection 60, arranged laterally on the bar 56, which is subject to the action of a spring. An india-rubber ring 61 is arranged round the annular part of the presser-foot, the under surface of which india-rubber ring, which is to bear on the material to be treated and

extends all round, tapers from the inside to the outside. The material-presser is arranged around a foot of the material-shifting device 62, the foot of the latter being also provided with an india-rubber ring in such a way that the device 62 works inside the material-presser.

A socket 63, Figs. 14 and 17, is mounted in the lower end of the tube 3, in which socket the dovetailed upper ends of two spring-arms 64, lying diametrically opposite one another, are mounted, which arms 64 extend downward, and their lower ends, projecting from the tube 3, have enlargements 65, which serve as needle-heads, and have grooves 66 on their facing inner sides for receiving the needles 2, Fig. 19. The needles 2, adjustably mounted in the grooves 66, may be held fast in the needle-heads 65, Figs. 15 and 18, by means of yokes or stirrup-shaped pieces 68, provided with clamp-screws 67 and arranged on the tapered ends of the needle-heads 65.

A bar 69 is displaceably mounted in the socket 63, which bar is guided in the tube 1 by means of a head 70. The lower wedge-shaped end of this bar in its upper position comes to lie between the spring-arms 64. The head 70 is in turn connected, by means of a screw 71, passing through the elongated slot 10 in the tube 1, with a grooved ring 72, arranged on the tube 1. In the groove of this ring a forked arm 73 of an elbow-lever 73 74, pivotally mounted on the slide-piece 8, engages, the other arm 74 of said lever being guided in a vertical slide which is mounted on a horizontally-guided bar 77, provided with a projection or stud 76. One arm, 78, of a pivotal elbow-lever 78 79, horizontally mounted on the machine-frame, engages this bar 77, and the other arm, 79, of said lever bears, by means of a roller, against a cam 80, which is mounted on the hub of a toothed wheel 82, revoluble on a vertical pin 81, which toothed wheel is in engagement with the toothed pinion 83 of a vertical shaft 85, connected, by means of bevel-gear 84, with the fly-wheel shaft 6 of the machine, by which arrangement, which is described as an example, the bar 69 receives an up-and-down movement, Figs. 11 and 12. The borer 4 has lateral grooves 86 slightly displaced relatively to one another, against which grooves the needles 2 are pressed by the spring-arms 64, Figs. 14 and 19.

The method of working of the machine hereinbefore described is as follows: The tube 3, carrying the needles 2, descends simultaneously with the tube 5, carrying the borer 4. The borer penetrates the material and remains standing at the height fixed, while the needles, in consequence of the separate arrangement of the tube 3, move farther downward and form a stitch, enlarging the hole made by the borer. At each two stitches the needles 2 in this manner descend

within reach of the borer, during which time the bar 69 is in its upper position. At the succeeding third stitch the needles, similarly to what was done in the first two stitches, descend simultaneously with the borer to a certain point. Before they perforate the material, however, they move a little aside and do not penetrate the material within reach of the borer, but somewhat at the side of the same, thus producing the well-known hemstitch seam. (Shown in Fig. 21.) The axial displacement of the tubes 3 and 5 is possible by reason of the arrangement of the slot 10 in the tube 1, in which slot the screws 11, which connected the tubes with the grooved rings 12 and 13, travel, the grooved rings being moved up and down under the intermediary of the crank 7 from the shaft 6 by means of the slide-pieces 8 and 9 engaging the grooved ring, while the lateral separation of the needles 2 is operated by the bar 69 sliding axially downward, its wedge-shaped lower end coming between the needle-heads 65 and moving these outward, together with the needles fixed therein, and springing the arms 64 apart. The displacement of the bar 69 takes place, as already hereinbefore mentioned, from the shaft 6 by the intermediary of bevel-wheels 84 and face-wheels 83 and 82 and the cam-disk 80, which latter in its rotation operates the elbow-lever 78 79, while the latter in turn produces a displacement of the bar 77, and thereby a turning of the elbow-lever 73 74, by which latter the bar 69 is moved downward by the intermediary of the grooved ring 72 and the screw 71, sliding in the slot 10 of the tube 1. The proportions of the wheels 83 and 84 are so chosen that one revolution of the wheel 82 takes place to three revolutions of the shaft 6 and pinion 83 in such a way that a separation of the needles only takes place before the third insertion of the same by means of the downwardly-moving bar 69. The wedge-shaped end of the bar 69 remains between the needle-heads 65 until the third side stitch is made or, rather, until the needles 2 have again quitted the material, whereupon it again moves upward, so that the needles 2 under the action of the spring - arms 64 again rest against the borer, in which position they remain up to just before the next third stitch. The double lever 51 transmits its rocking movement received from the diving-shaft 6 through the crank-rod 54 to the bar 19 and this latter, by the intermediary of the elbow-lever 47 48, to the toothed segment 44 and pinion 43 and the shaft 40, which imparts a reciprocating movement to the arms 41 and segment-piece 42 and through the latter to the two shuttles 37 in the casing 15. The needles 2 pass in their descent into the interstices formed through the bar 36 between the shuttles, the needle-threads being engaged by the shuttles and the loops and stitches formed in the

ordinary manner by the reciprocating movement of the shuttles. The material-presser 55 56 is lifted at each stitch by the intermediary of the disk 57 and the lever-arms 58 59, and by its descent and pressure on the material the latter is each time stretched by the india-rubber ring 61, which is expanded outwardly in consequence of the tapering under support-surface. If the hemstitch made in this manner is to be made in curves, the crank 22 is turned, thus turning with it the shafts 24, 27, and 29 and also setting in rotation, by means of the disks 31, mounted on the latter, the tube 1 and the shuttle-carriers 14 by the intermediary of the disks 31, mounted on these bars and endless bands 32. The tube 3, carrying the needles 2, and also the tube 5, carrying the borer 4, and also the bar 69 share in the movement of the tube 1 by means of the screws 11 and 71, mounted in the longitudinal slot 10 in the tube 1, and also the shuttles mounted in the shuttle-carrier by the movement of the latter, so that thus the needles, the borer, and the shuttles are simultaneously operated by the cranks 22 and may be adjusted into the correct position relative to the center line of the hemstitch to be made.

By the arrangement of the hereinbefore-described band driving-gear for the simultaneous movement of the needles and shuttles an exact adjustment of the needles by the shuttles is obtained, in contrast to previous forms of construction provided with gear-wheels and intermediate shafts, thus avoiding the play arising by this latter arrangement. Instead of endless bands 32 endless chains may be employed as means for transmitting the movement of the shaft 29 to the tube 1 and the shuttle-carrier 14.

In Fig. 20 the rod 69 is formed as a tube and has above its wedge-shaped end lateral apertures 87, with the object of allowing the needle-threads to be passed through the tubes and the apertures to the needles.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a hemstitch embroidering-machine, the combination with a pair of hook-shuttles having their axes in horizontal alinement and means for driving the shuttles about their axes; of a needle-carrying tube, a piercer-carrying tube surrounding the same and a needle-spreader tube in telescopic slidable relation, mechanisms to reciprocate the needle-carrying and piercer tubes, and the needle-spreader and mechanism to simultaneously revolve the tubes and shuttles during the driving of the latter.

2. In a hemstitch sewing-machine, the combination with telescoping tubes for the needles, piercer and needle-spreader respectively, and means to independently reciprocate

cate them; of a sprocket-wheel on one of the tubes, a shaft at one end of the machine having sprocket-wheels thereon, a shuttle-carrier, mechanism to drive the shuttles therein, a sprocket-wheel on the carrier, endless bands connecting the sprocket-wheels on the shaft with those on the carrier and tubes respectively, and hand-operated mechanism to rotate the shaft.

3. In hemstitch sewing-machines, the combination with the needles and needle-tube, of vertical shuttle-races, hook-shuttles therein, an arcuate shuttle-driver 42 to rotate the shuttles about their horizontal axes, an arm 41 on which said driver is mounted, a pinion 43 on said arm, a sector 44 to drive the pinion, vertically-reciprocating mechanism to operate the sector and hand-operated mechanism to simultaneously rotate all of the foregoing parts, substantially as described.

4. In a hemstitch sewing-machine, the combination with a plurality of concentric tubes slidably connected, a piercer, a needle-spreader and a pair of needles carried by said tubes respectively, and mechanism to reciprocate the tubes, of a sprocket-wheel fixed on one of the tubes to rotate all of them in unison, a vertical shaft 29, a sprocket-wheel at its upper end, an endless perforated metallic band connecting the sprocket-wheels, a shuttle-carrier, shuttles therein, a shuttle-driver, a sector 44 to actuate the driver, a sprocket-wheel on the carrier and a similar sprocket-wheel near the lower end of the vertical shaft, a second endless perforated band connecting the sprocket-wheels, a rocker-arm 51 driven from the machine, means operatively connecting the rocker-arm and sector, and hand-operated mechanism to actuate the vertical shaft.

5. In a hemstitch embroidering-machine in combination, a presser-foot, a fabric-feeder operating within the presser-foot, a driving-tube, a needle-tube, needles mounted therein, a piercer-tube and piercer, all of said tubes concentric, a spreader mounted centrally in the tubes, the tubes and spreader slidably connected to the driving-tube, mechanism to rotate and operate the parts, a pair of hook-shuttles, a shuttle-carrier, mechanism to oscillate the same and devices to rotatably connect the driving-tube and shuttle-carrier whereby the mechanism connected to the tube and the shuttles will be simultaneously rotated.

6. In a hemstitch embroidering-machine, a driving-tube, a needle-carrying tube slidably connected thereto, springs normally held together in said tube, needles mounted on the

springs and a needle-spreader slidably connected to the driving-tube and passing through both tubes between the springs and mechanism to operate the parts, whereby the needles will be intermittently spread, substantially as described.

7. In a hemstitch embroidering-machine, a driving-tube, a needle-carrying tube slidably connected to the driving-tube, spring needle-carriers within the needle-tube and projecting therefrom, needles therein, a hollow needle-spreader within the tubes and slidably connected to the driving-tube to act as a thread-guide for the needle-threads and the lower end of which contacts with the projecting ends of the spring-carriers to periodically separate the needles.

8. In a hemstitch embroidering-machine, the combination with a driving-tube, of a needle-tube, spring needle-carriers therein projecting from the bottom of the tube, a piercer-tube slidably connected to the driving-tube, a piercer on the piercer-tube, yokes embracing the ends of the needle-carriers, needles held between the yokes and carriers, mechanism to independently reciprocate the spreader, piercer and needle tubes, said spreader engaging between the lower projecting ends of the spring-carriers to laterally move the needles.

9. In a hemstitch embroidering-machine, the combination with a driving-tube of a needle-carrying tube, needles mounted therein, a hollow needle-spreader, said tube and spreader independently reciprocable in the driving-tube, said hollow spreader to guide the thread to the needles and likewise periodically separate them.

10. In a hemstitch embroidering-machine, a shuttle-carrier comprising a hollow stem having a slot therein and a head having a transverse circular opening therethrough and an internal flange to form two adjacent shuttle-races, shuttles in the races, a forked arcuate shuttle-driver projecting into the head and engaging the shuttles, a pinion in alignment with the center of the shuttle-races and to which said driver is connected, a sector on the carrier, a rod reciprocable within the stem of the carrier and a link connection between the sector and rod, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRIEDRICH GEGAUF.

Witnesses:

ERNST FISCHER,
EMIL BLUM.