

No. 751,057.

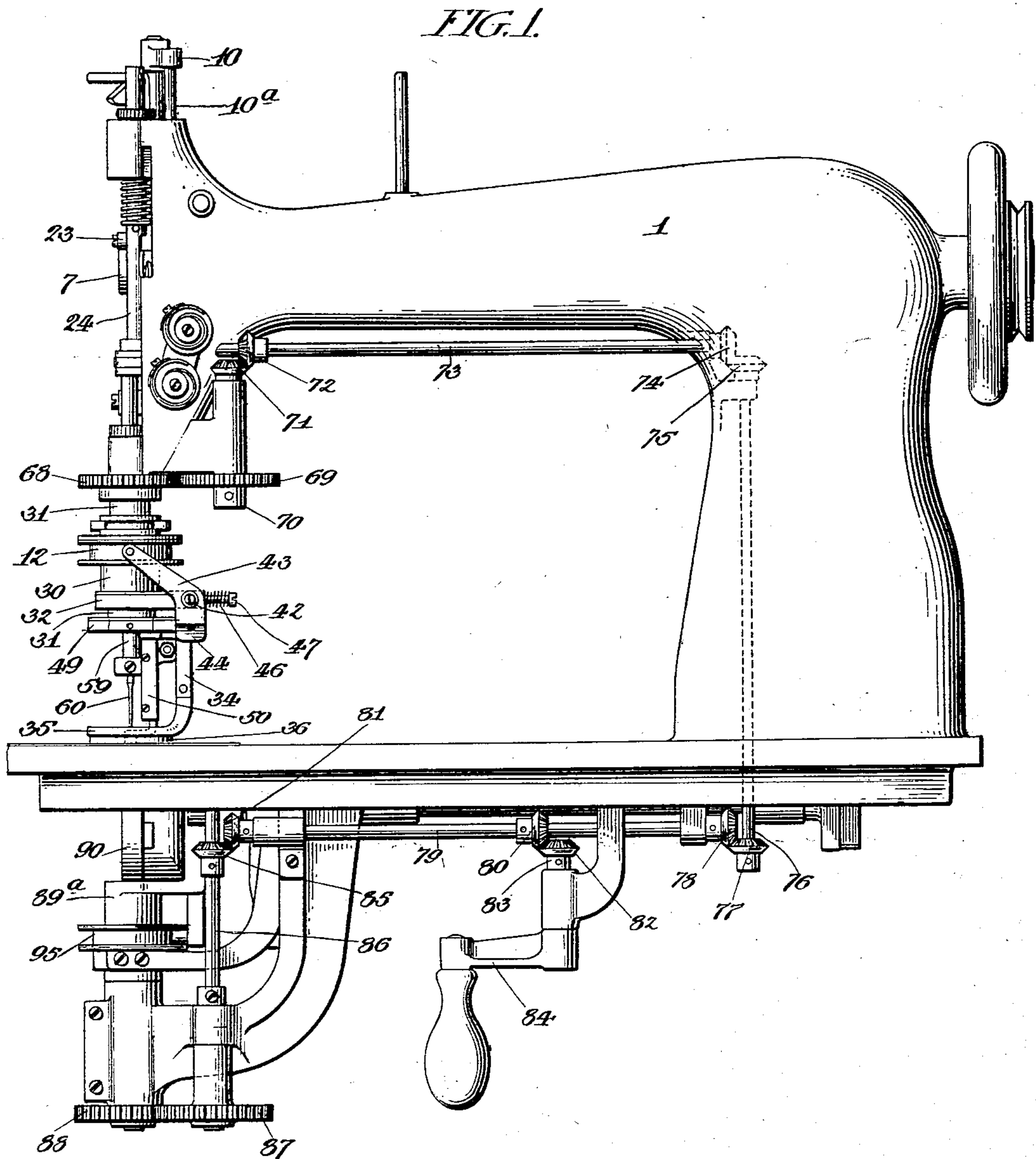
PATENTED FEB. 2, 1904.

E. H. COOPER & C. SCHÜTZ.
SEWING MACHINE.

APPLICATION FILED NOV. 13, 1902.

NO MODEL.

5 SHEETS—SHEET 1.



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Inventors:

E. H. Cooper & C. Schütz
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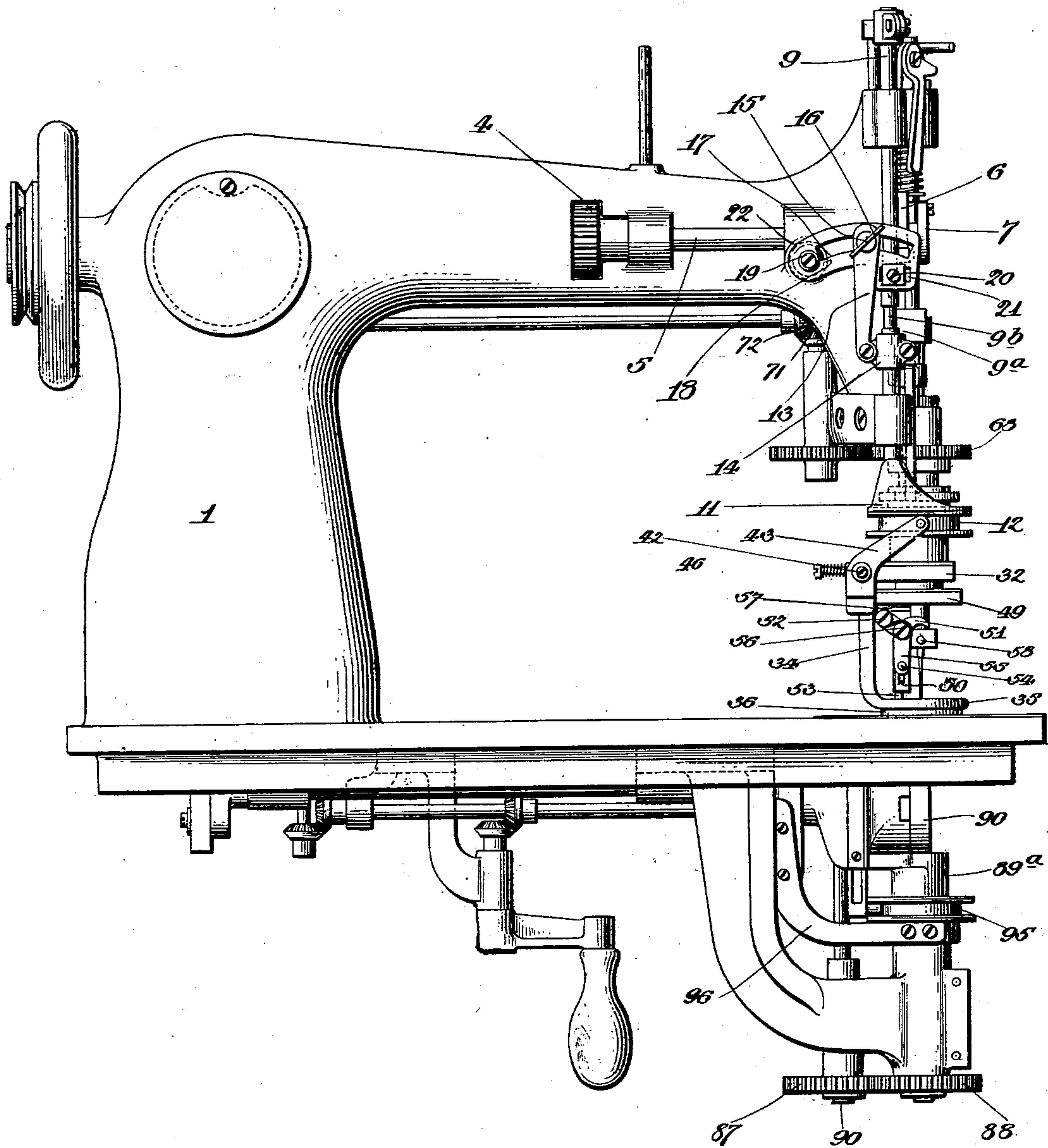
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5 SHEETS—SHEET 2.

FIG. 2.



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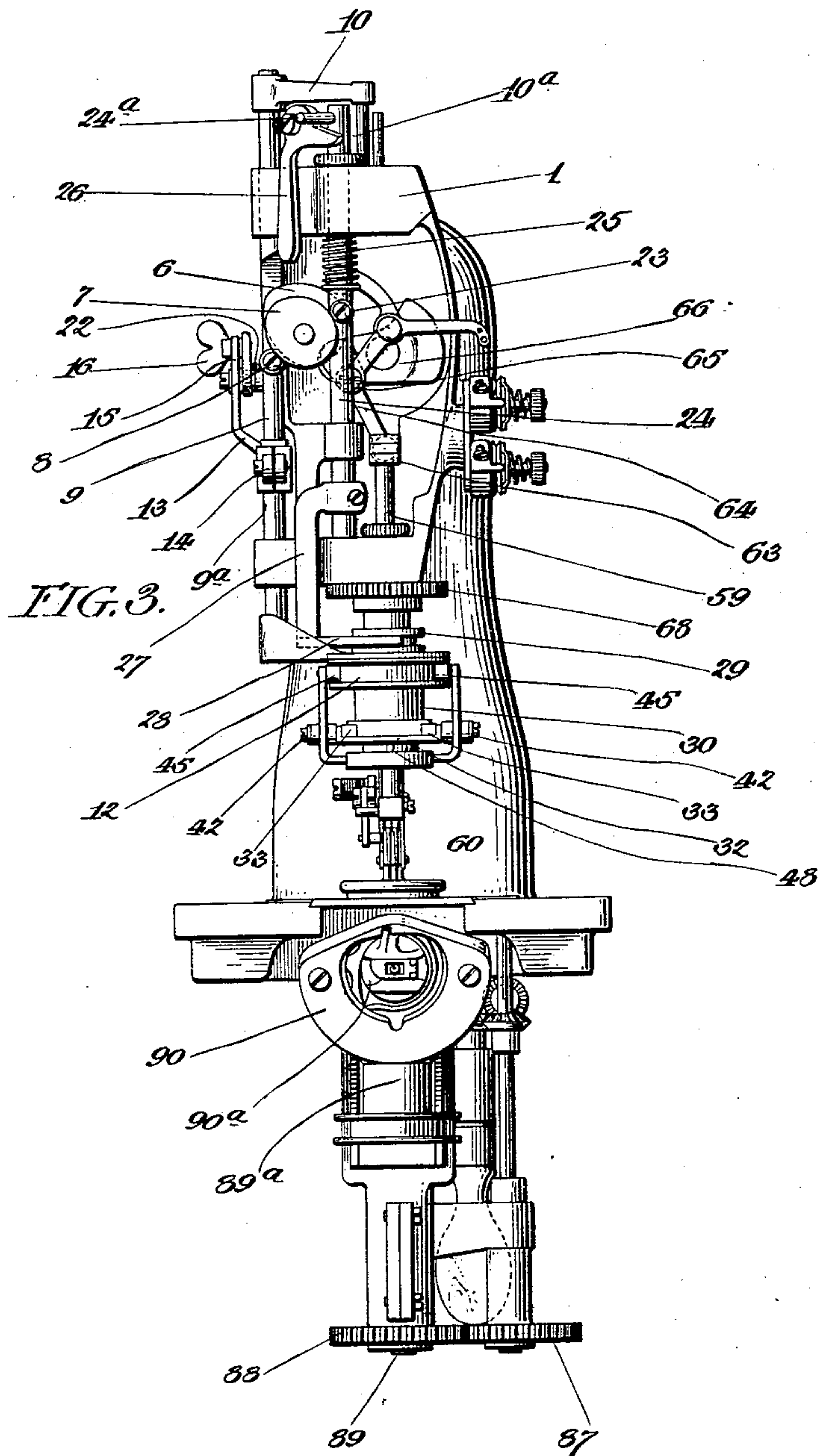
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5 SHEETS—SHEET 3.



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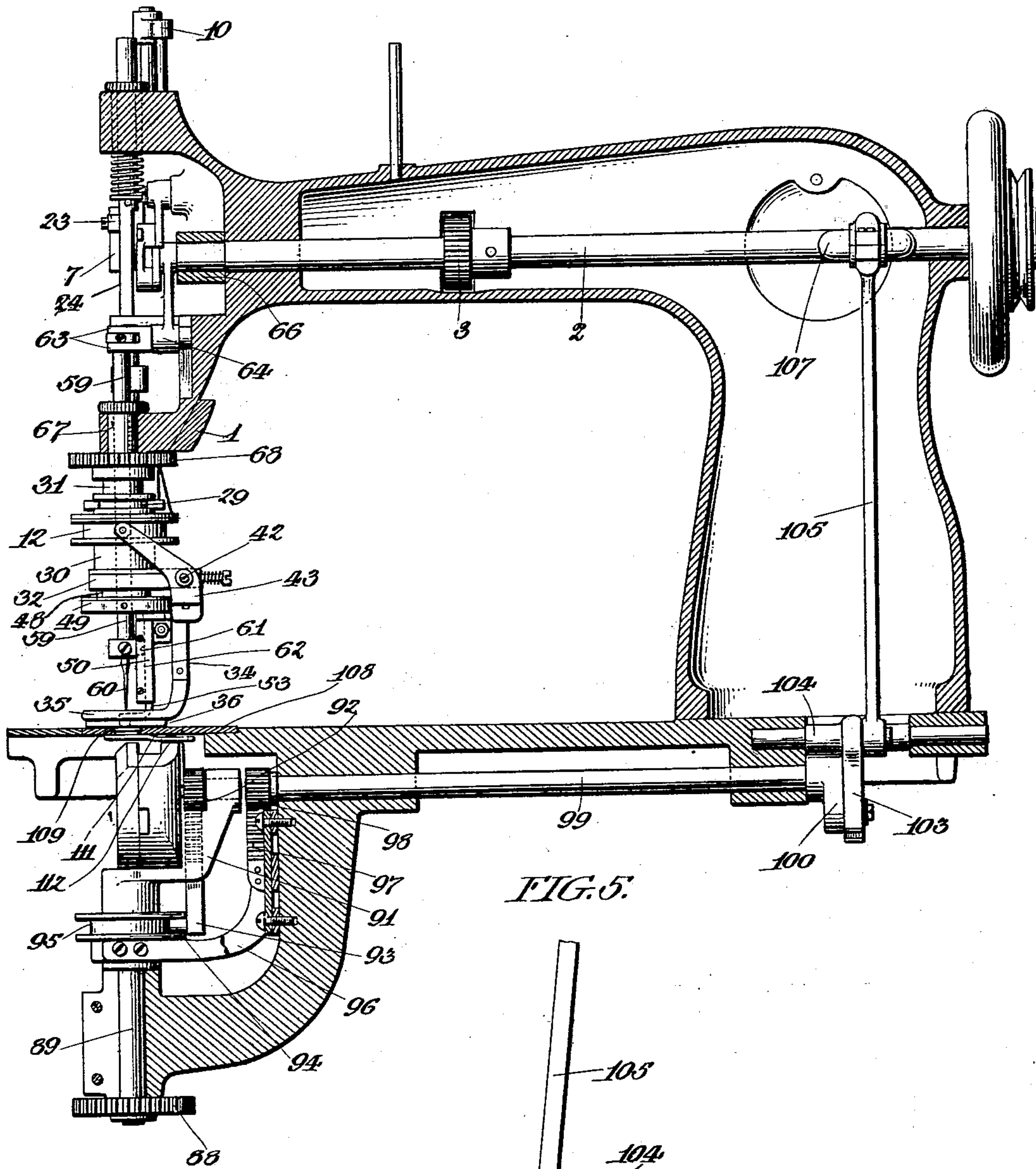
SEWING MACHINE.

APPLICATION FILED NOV. 13, 1902.

NO MODEL.

5 SHEETS—SHEET 4.

FIG. 4.



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PATENTED FEB. 2, 1904.

E. H. COOPER & C. SCHÜTZ.

SEWING MACHINE.

APPLICATION FILED NOV. 13, 1902.

NO MODEL.

5 SHEETS—SHEET 5.

FIG. 6.

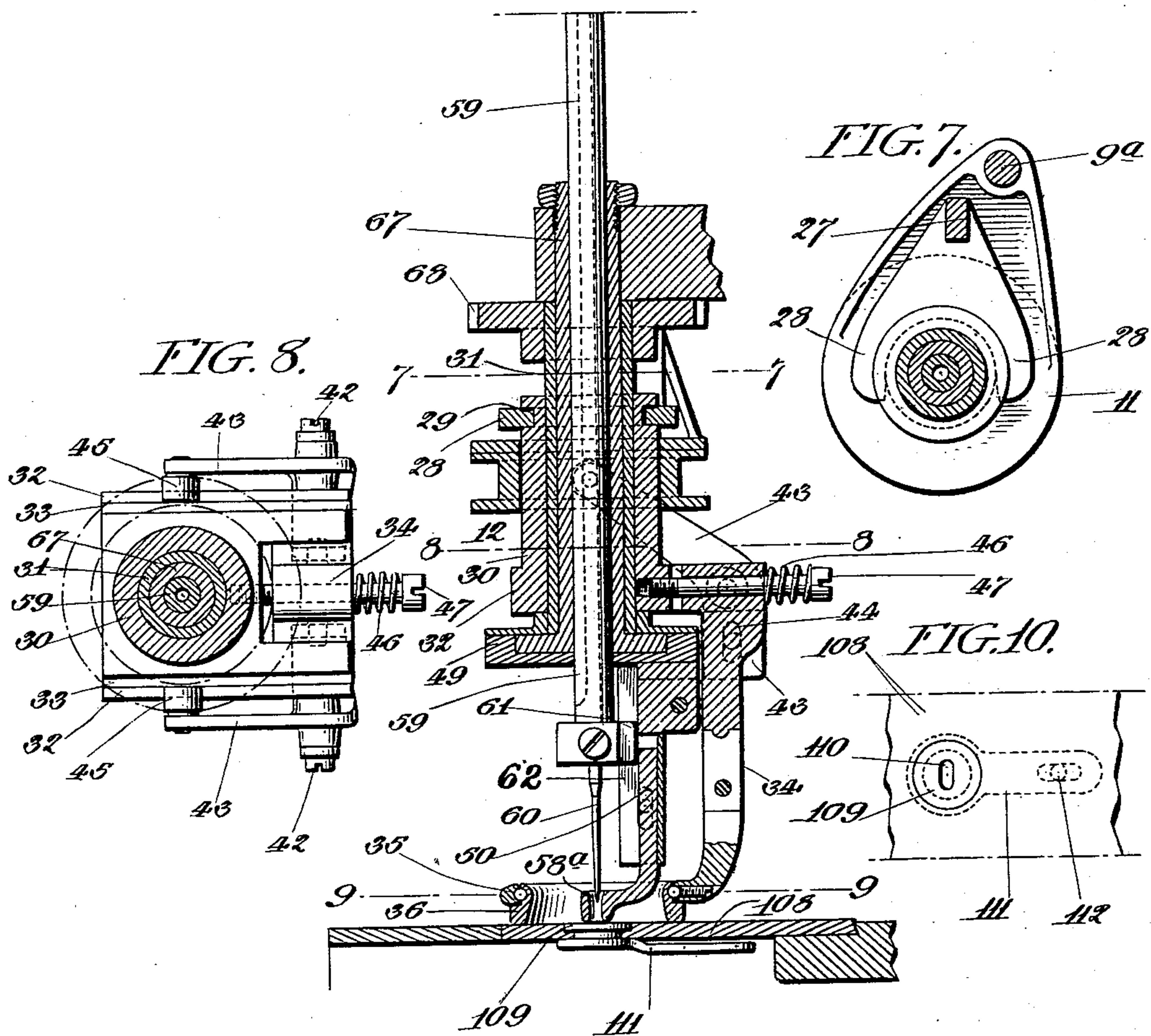
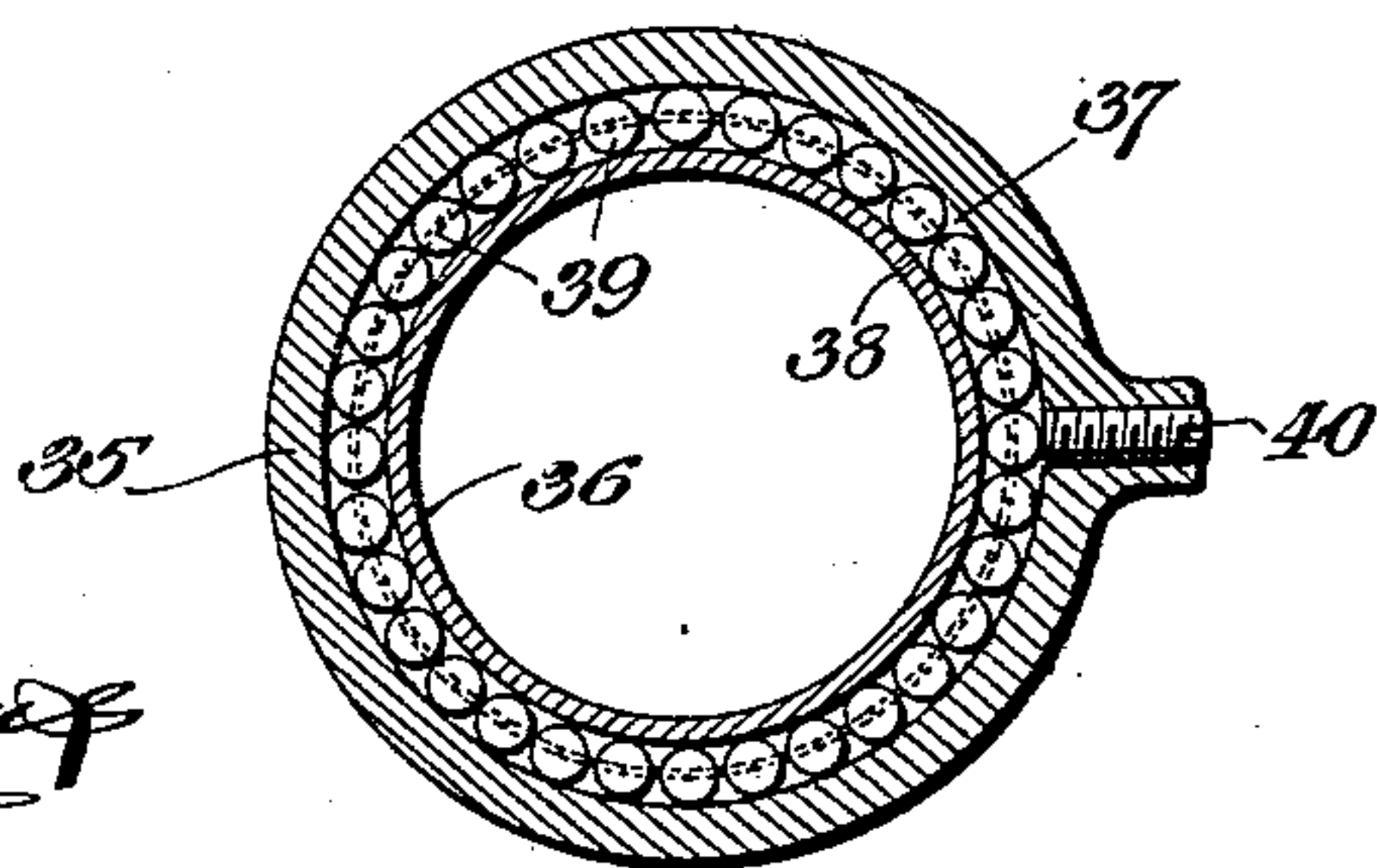


FIG. 9.



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UNITED STATES PATENT OFFICE.

ERNEST H. COOPER AND CONRAD SCHÜTZ, OF PHILADELPHIA,
PENNSYLVANIA.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 751,057, dated February 2, 1904.

Application filed November 13, 1902. Serial No. 131,275. (No model.)

To all whom it may concern:

Be it known that we, ERNEST H. COOPER and CONRAD SCHÜTZ, citizens of the United States, and residents of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have jointly invented certain Improvements in Sewing-Machines, of which the following is a specification.

This invention is a sewing-machine having peculiar universal feeding mechanism and peculiar universal stitching mechanism, providing improved means for universal sewing, embroidering, braiding, and analogous operations.

The nature and characteristic features of the improvements will more fully appear by reference to the following description and the accompanying drawings, of which—

Figure 1 is a front elevation of a sewing-machine embodying our invention. Fig. 2 is a rear elevation thereof. Fig. 3 is an end elevation thereof. Fig. 4 is a front view in vertical section. Fig. 5 is a detached view of the pitman connection for operating the revoluble shuttle or hook. Fig. 6 is a vertical sectional view on the line of the needle-bar. Fig. 7 is a sectional view on the line 7 7 of Fig. 6. Fig. 8 is a sectional view on the line 8 8 of Fig. 6. Fig. 9 is a sectional view on the line 9 9 of Fig. 6, and Fig. 10 is a plan view of the needle-plate.

As shown in the drawings, the sewing-machine head 1, of usual type, has journaled therein the revoluble shaft 2, having fixed thereon a gear-wheel 3, which engages with a gear-wheel 4, fixed on a revoluble shaft 5, having the cams 6 and 7 fixed thereon.

The cam 6 engages the boss 8 of the vertically-reciprocating sectional bar 9, which carries the arm 10, having the guide-pin 10^a, reciprocating in the head 1, and the shoe 11, having the bearing-ring 12 thereon, the bar comprising the sleeved section 9^a and the telescoping section 9^b, movable with relation to each other. The section 9^a is pivotally connected to one end of a link 13, as by means of a clip 14, the other end of the link being pivotally engaged by a bearing 15, adapted to be set by means of the clamp-nut 16 at any

desired point in the curved slot 17 of the lever 18. The lever 18 has the pivotal engagement 19 with the head and is also engaged with the bar-section 9^b by means of the boss 20 thereon, which lies in the slot 21 of the lever. A coiled spring 22, having one end fixed to the head 1 and the other end fixed to the lever 18, elevates the bar 9 through the described connections of the lever 18 with the bar-sections 9^a and 9^b, while the bar-sections are depressed through the action of the cam 6 on the boss 8 and the engagement of the section 9^a with section 9^b through the lever 18. The section 9^a is thus provided with an adjustable connection by means of which its stroke may be varied and the stitch regulated, as will hereinafter appear.

The cam 7 engages the boss 23 of the vertically-reciprocating bar 24, which is elevated by the cam and depressed by gravity aided by the spring 25, having one end connected therewith and the other with the head, the bar being held up by means of the projection 24^a thereon and the pivoted latch 26 engaging therewith. Connected with the bar 24 is the auxiliary bar 27, having thereon a yoke 28, which engages a collar 29 of the sleeve 30, revoluble in said yoke and adapted to be reciprocated thereby within the ring 12 and on the sleeve 31, supported by the stem 67, fixed to the head. The sleeve 30 is provided with the bearing or bearings 32, in which is adapted to be reciprocated the yoke or slides 33, connected to the shank 34 of the feeding mechanism, this shank carrying the foot comprising the bearing-ring 35 and the feeding-ring 36, revoluble therein. The ring 36 telescopes with the ring 35, and the two are held together by means of their complementary channels 37 and 38, having the balls 39 therein, the balls being introduced to the raceway formed by the channels through the opening closed by the plug 40. Fulcrumed on the bearings 32 at the points 42 are the levers 43, having their short arms pivotally connected by the pintles 44 with the shank 34 and their long arms connected by the rollers 45 with the channeled ring 12. The downward movement of the ring 12 rocks the levers 43 and moves the shank 34 radially from its

center of revolution, while the upward movement of the ring effects the opposite action, this inward radial movement being assisted by a spring 46, having one end engaged by the stud 47 on the bearing 32 and the other end engaging the cross-head of the slides 33. It will now be understood that the stroke of the rod-section 9^a, acting by the ring 12 on the levers 43, regulates the stroke of the foot and the length of the stitch.

The revoluble sleeve 31 has the spline connection 48 with the sleeve 30, by which the sleeve 31 revolves the sleeve 30 and the feeding mechanism carried thereby. The base 49 of the stem has depending therefrom the guide-bar 50, with which the lever 51 has the pivotal connection 52. The vertically-reciprocating nipple bar or shank 53, controlled by the guide-bar, has the pivotal connection 54 with the link 55, which has the pivotal connection 56 with the lever 51. A spring 57, one end of which is connected with the base 49 and the other end with the lever 52, acts to press the nipple 58^a down upon the work. The nipple is lifted at each step of the foot by the engagement of the projection 58 on the reciprocating needle-bar 59 with the lever 51, located in its path, as the needle or needles 60 complete their upward stroke and strikes down on the work after it has been advanced by the foot and while the needle or needles are descending.

The needle-bar 59, reciprocating in the stem 67 and made hollow to pass the thread, is revolved by the engagement of the boss 61, fixed thereon, with the channel 62 of the guide-bar 50. The needle-bar is revolubly connected and longitudinally fixed to the bearings 63, which in turn is pivotally connected with the pitman 64, having a pivotal connection at 65 with the crank 66, fixed on the revoluble shaft 2, by which the needle-bar is reciprocated.

The sleeve 31, journaled on the stem 67, is revolved, revolving the sleeve 30 and the needle-bar 59 by the engagement of the gear-wheel 68, fixed on the sleeve, with the gear-wheel 69, which is fixed on a revoluble shaft 70, having a bevel-gear 71 fixed thereon. Engaging with the bevel-gear 71 is a bevel-gear 72, fixed on a revoluble shaft 73, having a bevel-gear 74 fixed thereon. Engaging with the bevel-gear 74 is a bevel-gear 75, fixed on the revoluble shaft 76, having the bevel-gear 77 fixed thereon. Engaging with the bevel-gear 77 is a bevel-gear 78, fixed on the revoluble shaft 79, having the bevel-gears 80 and 81 fixed thereon. The shaft 79 and the mechanisms connected therewith are driven by the bevel-gear 82, fixed on the revoluble shaft 83, turned by the crank 84. Engaging with the bevel-gear 81 is a bevel-gear 85, fixed on a revoluble shaft 86, having the gear-wheel 87 fixed thereon. Engaging with the gear-wheel 87 is a gear-wheel 88, fixed on a revoluble shaft 89, having a usual form of hook or shuttle car-

rier 90 fixed on the enlarged section 89^a thereof. The bracket 91, fixed in relation to the shaft-section 89^a, has journaled thereon a gear-wheel 92, connected with the reciprocating shuttle 90^a. The gear-wheel 92 engages with a reciprocating rack 93, having thereon a roller 94, which engages the channeled ring 95, sleeved on the section 89^a. Connected with the ring 95 is the angle-bar 96, having thereon the rack 97, which engages a gear-wheel 98, fixed on the end of a journaled shaft 99. A crank 100, fixed on the opposite end of the shaft 99, has the boss 101, adapted to reciprocate in the slot 102 of the lever 103, which rocks on the pivot 104. A pitman 105, having the pivotal connection 106 with the lever 103, is connected to the crank 107 of the driving-shaft 2, by which and the described intermediate mechanism the rack 93 is reciprocated and the shuttle oscillated regardless of the position to which it may be revolved.

It will now be seen that the shuttle is revolved on its vertical axis in unison with the revolution of the needle or needles and the nipple and the feeding mechanism, when the crank 84 is revolved and the direction of feeding the work changed. It will also be seen that the needle, the nipple, the feeding mechanism, and the shuttle reciprocate in unison.

In the throat-plate 108 there is set the revoluble needle-plate 109, provided with an oblong opening 110, adapted for the simultaneous passage of a plurality of needles. An arm 111, fixed to the needle-plate, is engaged by a stud 112 on the shuttle-carrier, the revolution of the shuttle-carrier on its vertical axis revolving the needle-plate in unison with the revolution of the needles.

Having described our invention, we claim—

1. In a sewing-machine, the combination of a reciprocating and revoluble needle, with a reciprocating and revoluble shuttle, and a universally-reciprocating foot, said foot having a feeding device and a support for said feeding device revoluble in relation thereto, substantially as specified.

2. In a sewing-machine, the combination of a reciprocating and revoluble needle, with a reciprocating and revoluble shuttle, and a universal feeding mechanism having a revoluble foot, said foot comprising a work-engaging member adapted to be held stationary axially and a supporting member adapted to be revolved relatively thereto, substantially as specified.

3. In a sewing-machine, the combination of a reciprocating nipple, with a reciprocating needle, a reciprocating shuttle, and a reciprocating feeding mechanism having a revoluble foot, said foot comprising a work-engaging member adapted to be held stationary axially, and a supporting member adapted to be revolved relatively thereto, substantially as specified.

4. In a sewing-machine, the combination of a reciprocating and revoluble nipple, with a reciprocating and revoluble needle, a reciprocating and revoluble shuttle, and a reciprocating and revoluble feeding mechanism, said feeding mechanism comprising a work-engaging member adapted to be held stationary axially, substantially as specified.

5. In a sewing-machine, the combination of a reciprocating and revoluble needle, with a reciprocating and revoluble feeding mechanism, comprising a work-engaging ring adapted to be held stationary axially, and a revoluble reciprocating shuttle having a separate motion of revolution, substantially as specified.

6. In a sewing-machine, the combination of a reciprocating and revoluble needle, with universal feeding mechanism having a revoluble foot, comprising a work-engaging ring adapted to be held stationary axially and shuttle mechanism coacting therewith, substantially as specified.

7. In a sewing-machine, a revoluble shaft, a revoluble and reciprocating needle-bar, eccentric mechanism connecting said shaft and bar, mechanism for revolving said needle-bar, and a universal feeding mechanism comprising a foot having a feeding device and a support for said feeding device revoluble in relation thereto, substantially as specified.

8. In a sewing-machine, a revoluble shaft, a pitman having an eccentric connection therewith, a revoluble and reciprocating needle-bar connected with said pitman, mechanism for revolving said needle-bar, and a revoluble and universally-reciprocating foot, said foot having a feeding device and a support for said feeding device revoluble in relation thereto, substantially as specified.

9. In a sewing-machine, a revoluble shaft, a link having an eccentric pivotal connection therewith, a bearing pivotally connected to said link, a revoluble and reciprocating needle-bar pivotally connected to said bearing, and a revoluble and universally-reciprocating foot having a feeding device and a support for said feeding device revoluble in relation thereto, substantially as specified.

10. In a sewing-machine, a revoluble shaft, a shuttle adapted to be reciprocated on an axis carried by said shaft, a pinion connected with and adapted to reciprocate said shuttle, a rack connected with and adapted to reciprocate said pinion, a bearing connected with and adapted to reciprocate said rack, a second rack and pinion connected with and adapted to reciprocate said bearing, a revoluble and reciprocating needle, mechanism for synchronously revolving said needle and shuttle, and mechanism for synchronously reciprocating said needle and shuttle, substantially as specified.

11. In a sewing-machine, a revoluble shaft, a shuttle adapted to be reciprocated on an axis carried by said shaft, a pinion connected with and adapted to reciprocate said shuttle, a rack

connected with and adapted to reciprocate said pinion, a reciprocating bearing on said shaft engaging and reciprocating said rack, said rack being revolubly connected to said bearing, a revoluble and reciprocating needle, mechanism for synchronously revolving said needle and shaft, and mechanism for synchronously reciprocating said needle and bearing, substantially as specified.

12. In a sewing-machine, a revoluble shaft, a reciprocating shuttle carried by said shaft, a pinion connected with and adapted to reciprocate said shuttle, a rack engaging said pinion, a bearing-ring free on said shaft, said rack being revolubly connected with said ring, and mechanism for reciprocating said ring, substantially as specified.

13. In a sewing-machine, a revoluble shaft, a reciprocating shuttle carried by said shaft, a pinion connected with and adapted to reciprocate said shuttle, a rack engaging said pinion, a bearing-ring free on said shaft, said rack being revolubly connected with said ring, a second rack connected with and adapted to reciprocate said ring, and a revoluble pinion engaging said second rack, substantially as specified.

14. In a sewing-machine, a revoluble shuttle-carrier, a shuttle adapted to reciprocate therein, a throat-plate, a needle-plate revolubly seated in said throat-plate, and an arm for connecting said needle-plate in relation to said shuttle-carrier, said needle-plate being thereby adapted to be revolved with said shuttle-carrier, substantially as specified.

15. In a sewing-machine, a needle-bar adapted to reciprocate, a nipple adapted to reciprocate, and a fulcrumed lever connected with said needle-bar and said nipple whereby the reciprocation of said needle-bar effects the reciprocation of said nipple, substantially as specified.

16. In a sewing-machine, a needle-bar adapted to reciprocate, a nipple-bar adapted to reciprocate, a spring-pressed lever pivoted upon a fixed support and adapted to be operated by said needle-bar, and mechanism connecting said nipple-bar with said lever whereby said lever operates said nipple-bar, substantially as specified.

17. In a sewing-machine, a reciprocating needle-bar, a nipple-bar adapted to reciprocate, a lever fulcrumed on a fixed support and adapted to be operated by said needle-bar, and a link pivotally connected to said lever and nipple-bar, substantially as specified.

18. In a sewing-machine, a reciprocating sectional bar, a lever fulcrumed on a fixed support and having a pivotal connection with one section of said bar, a link having a pivotal connection with said lever and with the other section of said bar, said sections being adapted to move independently and feeding mechanism connected therewith, substantially as specified.

19. In a sewing-machine, a reciprocating sectional bar, a lever fulcrumed on a fixed support and having a pivotal connection with one section of said bar for reciprocating the
5 same, a link pivotally connected to the other section of said bar and having a movable pivotal connection with said lever, whereby the throw of said second section may be varied and feeding mechanism connected therewith,
10 substantially as specified.

20. In a sewing-machine, a reciprocating sectional rod, mechanism connecting the sections of said rod whereby the one maintains a constant throw while the other is varied, a
15 bearing-ring carried by the rod-section of variable throw, a fulcrumed lever connected with and oscillated by said ring, and a reciprocating foot connected with and actuated by said lever, substantially as specified.

20 21. In a sewing-machine, a reciprocating

sectional rod, mechanism connecting the sections of said rod whereby the constant throw of the one imparts a variable throw to the other, a bearing-ring carried by the rod-section of variable throw, a revoluble sleeve having guides, feeding mechanism adapted to reciprocate with relation to said guides, and a fulcrumed lever connected with said ring and feeding mechanism for reciprocating said feeding mechanism, substantially as specified. 25 30

In testimony whereof we have hereunto set our names, in the presence of the subscribing witnesses, this 10th day of November, A. D. 1902.

ERNEST H. COOPER.
CONRAD SCHÜTZ.

Witnesses:

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UTLEY E. CRANE, Jr.