

No. 763,001.

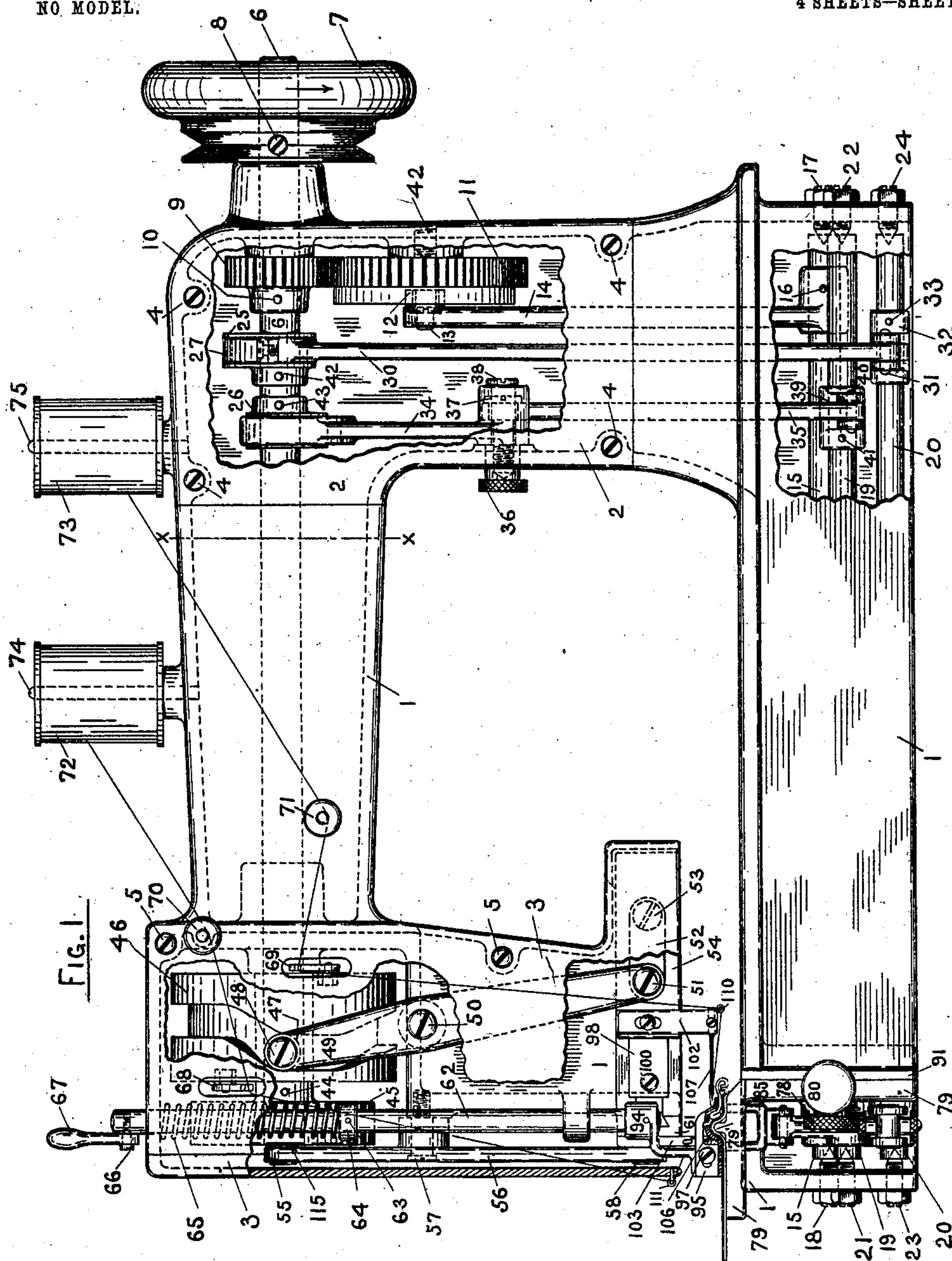
PATENTED JUNE 21, 1904.

P. E. KAUFMAN.
SEWING MACHINE FOR FELLING.

APPLICATION FILED OCT. 25, 1902.

NO MODEL.

4 SHEETS—SHEET 1.



WITNESSES

J. J. Downey
H. R. Kennedy

INVENTOR

Paul E. Kaufman.
By his attys.,
Reinier Goldsborough

No. 763,001.

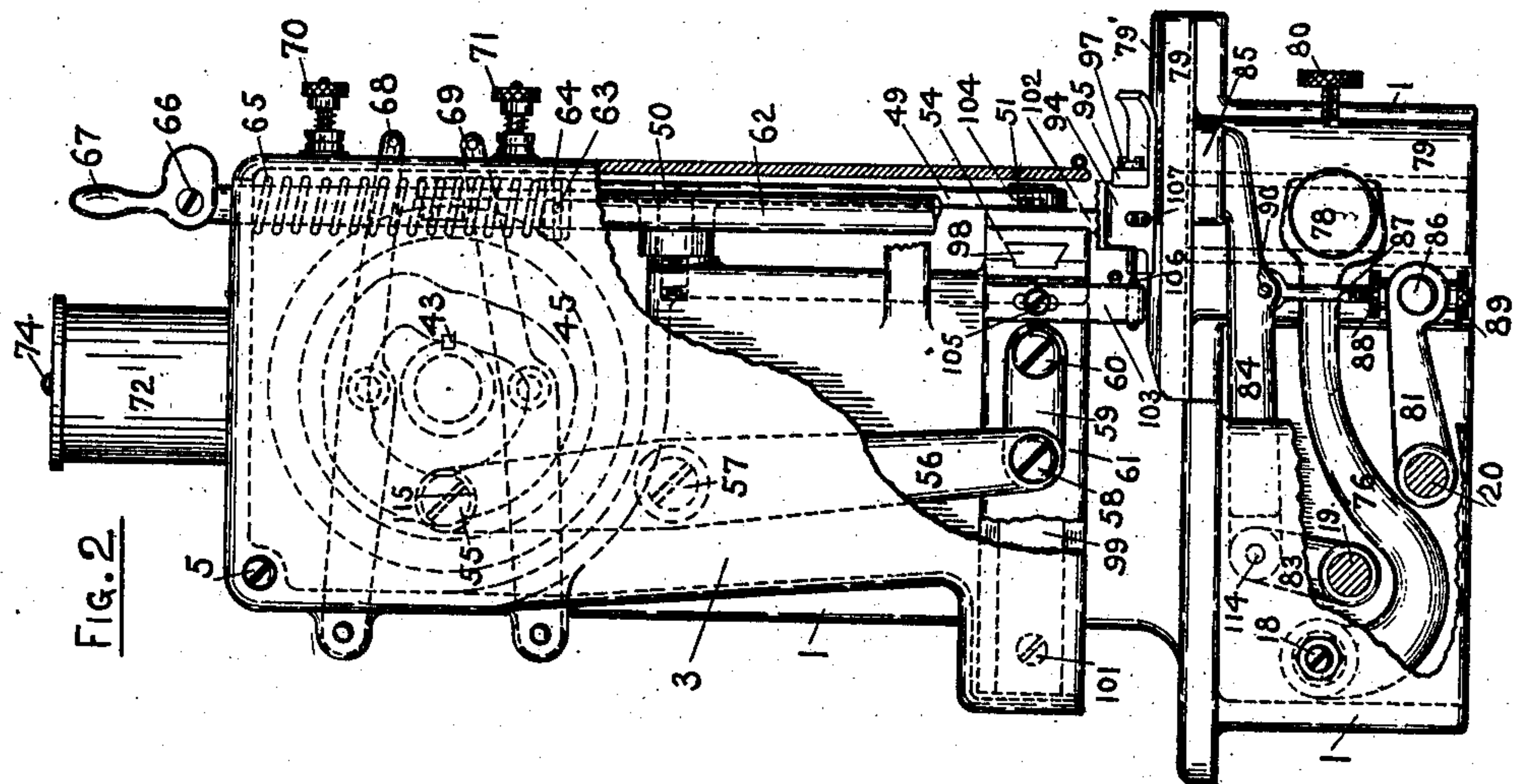
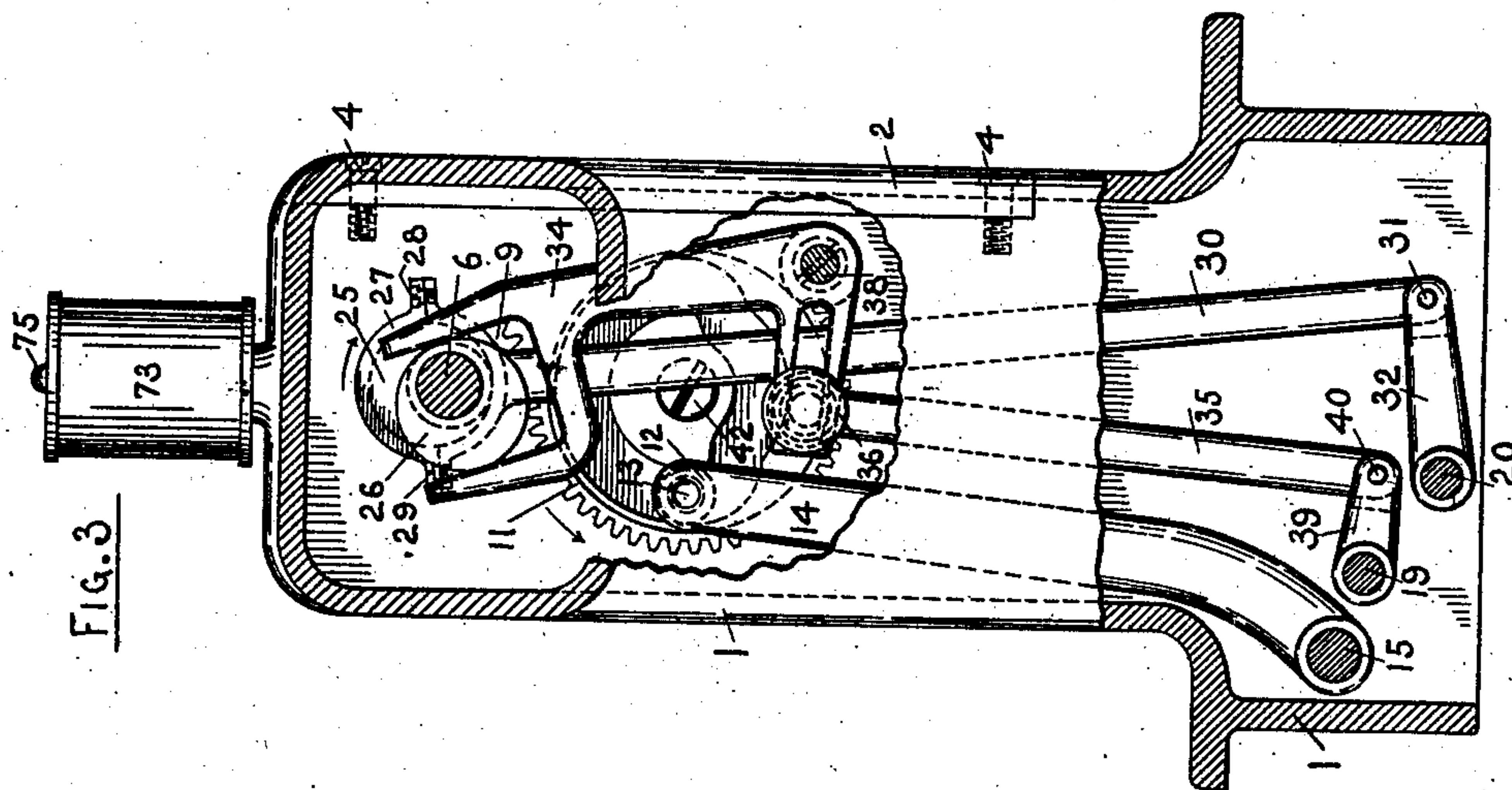
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J. J. Downey
H. R. Kennedy

INVENTOR

Paul E. Kaufman.
By his attys.
Rennie Goldsborough

No. 763,001.

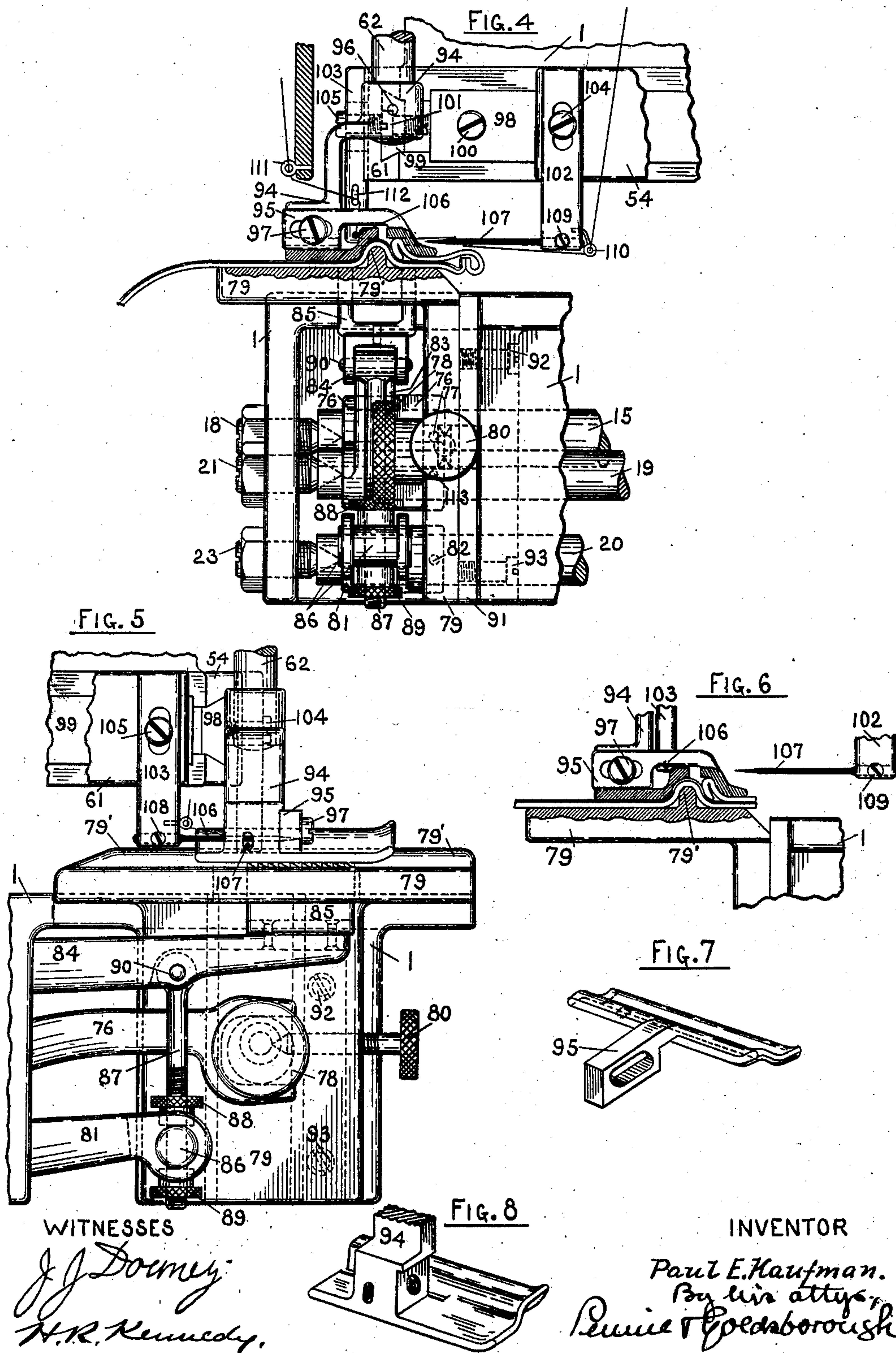
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4 SHEETS—SHEET 4.

Fig. 9

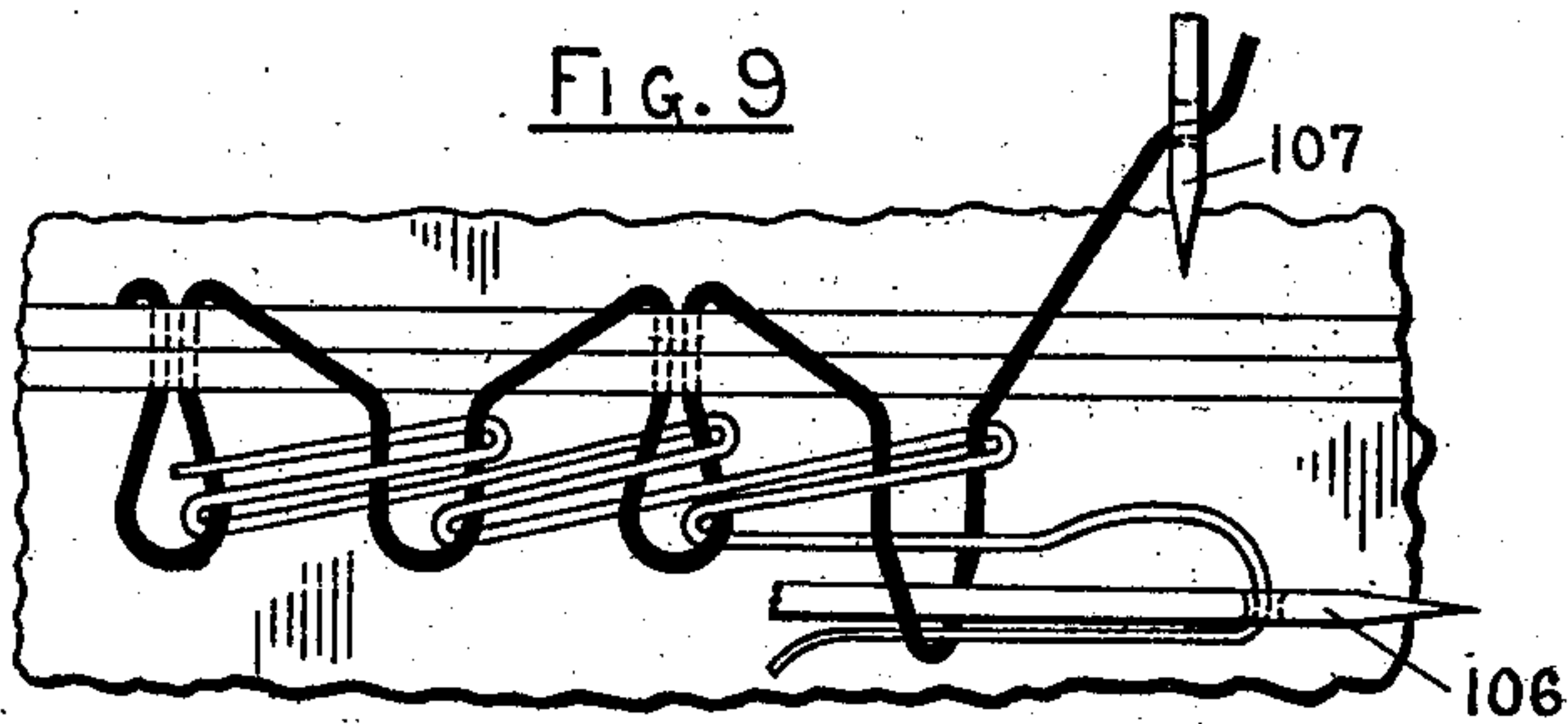


Fig. 10

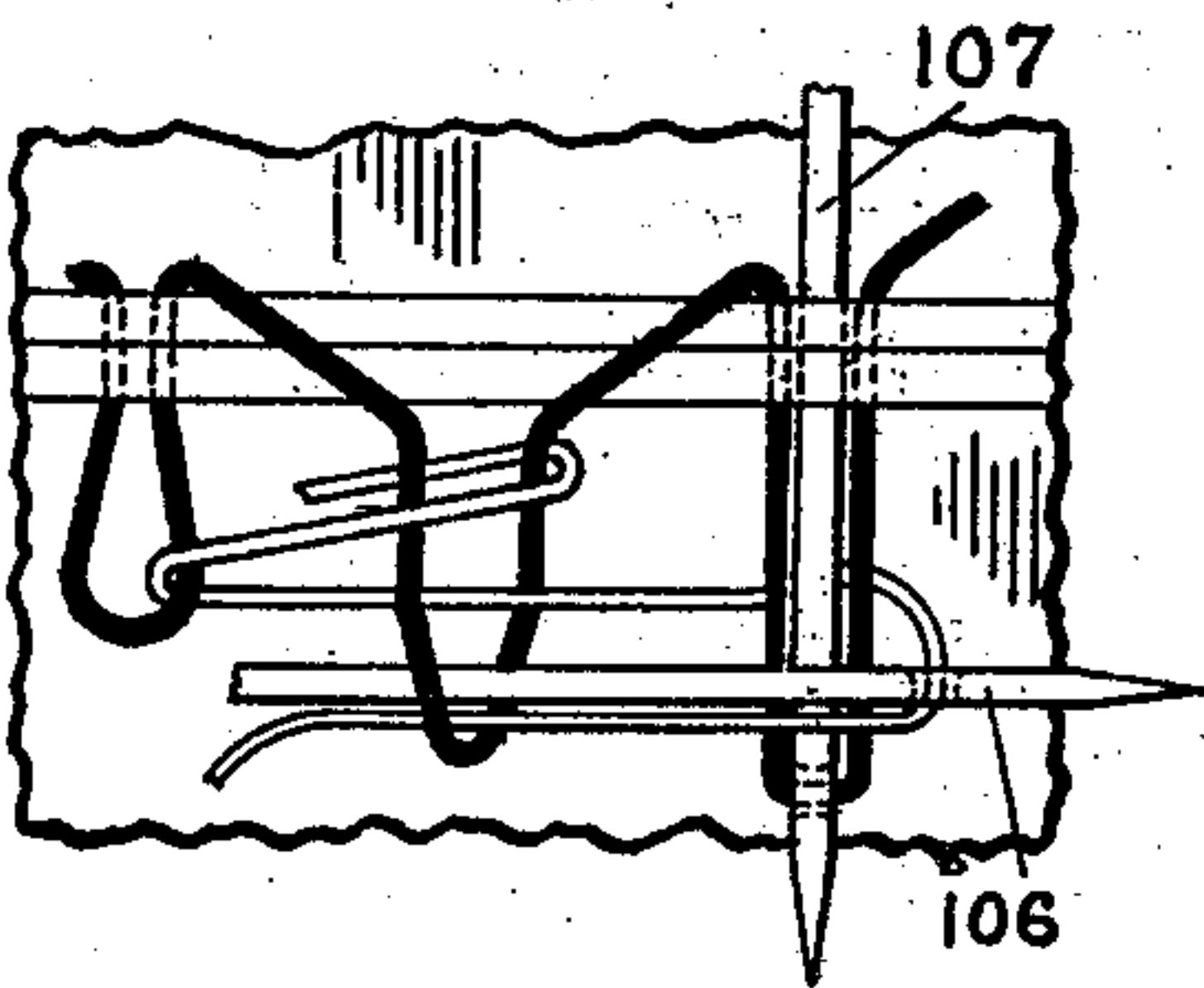


Fig. 11

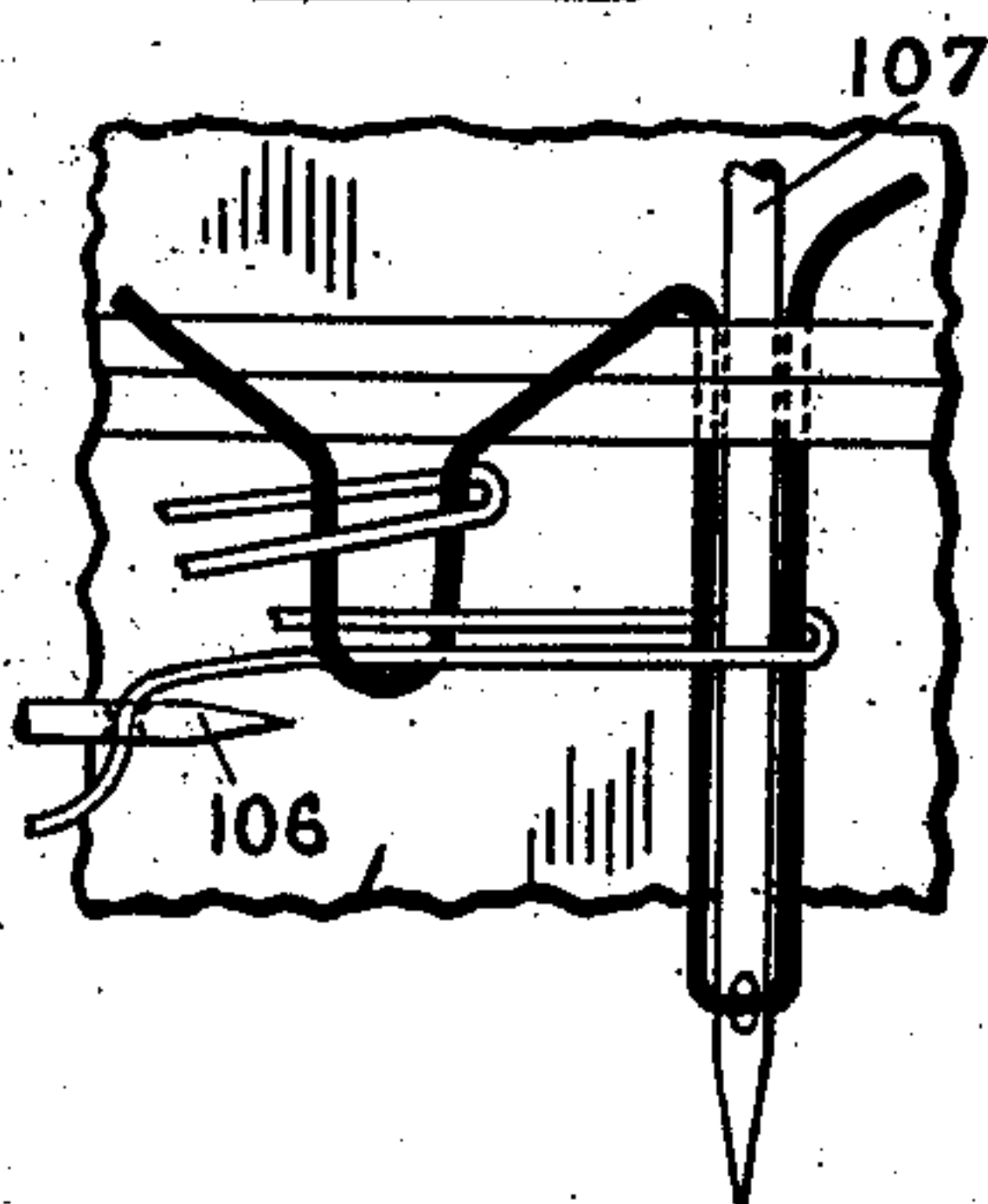


Fig. 12

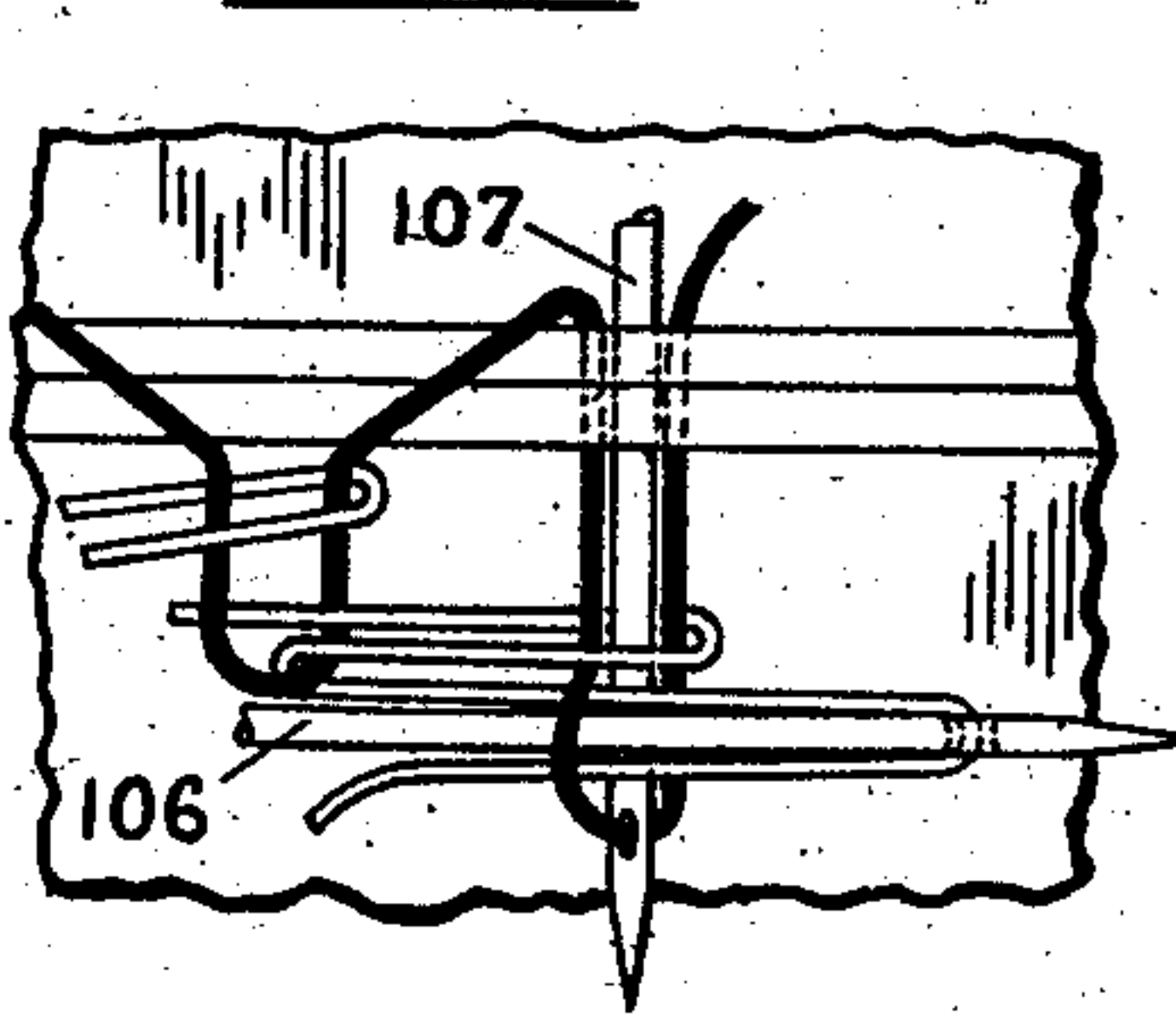


Fig. 13

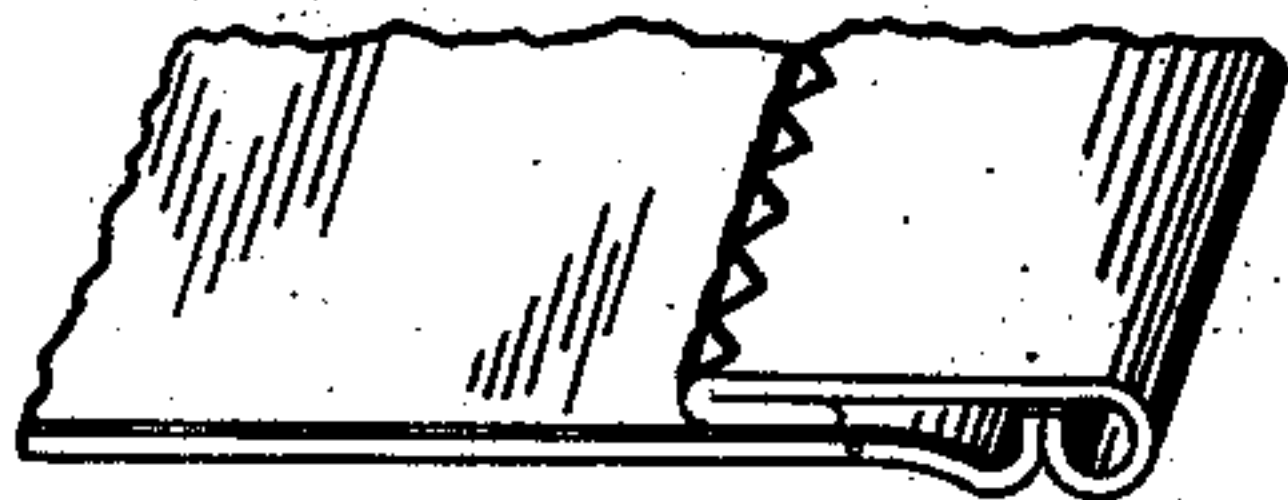
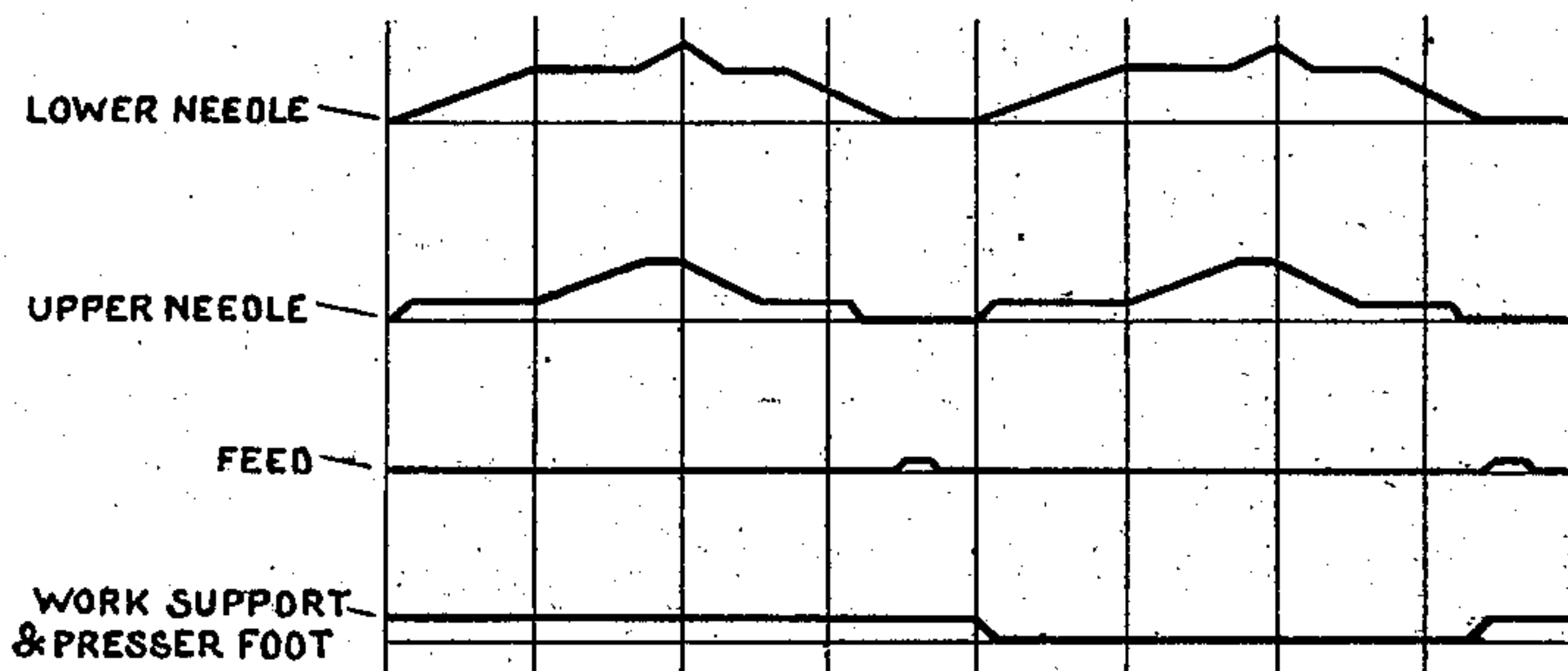


Fig. 14



WITNESSES

J. J. Downey
H. R. Kennedy.

INVENTOR

Paul E. Kaufman.
By his atty.
Rennie F. Goodenough

UNITED STATES PATENT OFFICE.

PAUL E. KAUFMAN, OF CINCINNATI, OHIO, ASSIGNOR OF TWO-THIRDS TO SEWARD HEIDELBACH AND JULIAN S. RAUH, OF CINCINNATI, OHIO.

SEWING-MACHINE FOR FELLING.

SPECIFICATION forming part of Letters Patent No. 763,001, dated June 21, 1904.

Application filed October 25, 1902. Serial No. 128,772. (No model.)

To all whom it may concern:

Be it known that I, PAUL E. KAUFMAN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Sewing-Machine for Felling, of which the following is a specification.

The invention relates to sewing-machines for felling.

One of the objects of the invention is to provide an improved combination of creasing and stitch-forming mechanism.

Another object is to provide a mechanism in which the work may lie flat on the work-table and be freely guided thereon without interference from the operative parts.

Another object is to provide for the adjustment of the operative parts whereby the machine may be adapted to different fabrics and to varying thicknesses of material.

It further consists in certain details of form, combination, and arrangement, all of which will be more fully set forth in the description of the accompanying drawings.

In the annexed drawings, illustrating my invention, Figure 1 is a side elevation, partly in section, showing the driving-shaft, cams, and connecting mechanism which give motion to my two needle-bars and work-support. Fig. 2 is an end elevation, partly in section. Fig. 3 is a sectional view on the line X X, Fig. 1, showing the feed and work-support actuating mechanism. Figs. 4 and 5 are enlarged detail views of the presser-foot, work-support, and adjustments, showing the method of holding and feeding the work. Figs. 6, 7, and 8 are detail views. Figs. 9 to 12 are enlarged diagrams of the stitch, showing the relative movements of the needle and needle-looper. Fig. 13 is a perspective view of one class of the work produced. Fig. 14 is a diagram showing the relative movements of the respective parts.

Similar characters refer to similar parts throughout the several views.

The frame 1, Figs. 1 and 2, has the general appearance of the standard sewing-machine frames now on the market and is provided with two covers 2 and 3, removably held to

it by screws 4 and 5, respectively, in order to give access to the mechanism for assembling, cleaning, and oiling.

The driving-shaft 6, Fig. 1, rotates in substantial bearings in the frame 1 in the direction of the arrow by means of power applied to the hand-wheel 7 through a belt actuated by any of the usual methods, such as a treadle. The hand-wheel is rigidly held to the driving-shaft by the set-screw 8. The driving-shaft is held in position axially by the hand-wheel 7 and the pinion 9, the latter being fastened to the driving-shaft by the pin 10. This pinion makes two revolutions to one of the gear 11, with which it meshes. The gear 11 revolves on the shouldered stud 42, tapped into the frame 1, and has in one side a cam which engages the roll 12, Fig. 3. This roll revolves on the stud 13, rigidly held in the lever 14, and this lever is fastened to the shaft 15 by means of the pin 16. The shaft 15 is pivotally supported at its two ends, respectively, by the pointed screws 17 and 18. The shafts 19 and 20 are similarly supported at their respective ends by screws 21, 22, 23, and 24. Fastened to the driving-shaft 6 by pins 42 and 43, respectively, are the flanged and plain feed-eccentrics 25 and 26. To the eccentric 25 is operatively attached by strap 27 and screws 28 and 29 the connecting-rod 30. The lower end of this connecting-rod is pivotally attached, by means of pin 31, to the arm 32, rigidly fastened, by means of pin 33, to shaft 20, Fig. 1.

The plain eccentric 26 engages the forked arm of the bell-crank lever 34, Figs. 1 and 3. The other arm of said lever 34 is slotted and adjustably connected to the connecting-rod 35 by means of thumb-knurl 36 and flattened shoulder-screw 37. The frame 1 is slotted to permit adjustment of the knurled thumb-nut 36. This adjustment regulates the feed by giving more or less throw to the connecting-rod 35, and hence to the feed-dog, as will be hereinafter explained. The shoulder-screw 38 fulcrums the bell-crank lever to the frame 1, Fig. 1. The lower end of the connecting-rod 35 is pivotally attached to the arm 39 by means of the pin 40, and this arm

is rigidly held to the shaft 19 by means of the pin 41, Fig. 1. On the front end of the driving-shaft 6 are rigidly fastened, by means of the key 43, Fig. 2, a pin 44, Fig. 1, the face-cam 45, with a hub, and the drum-cam 46. The cam 46 engages the roll 47, which revolves on the stud 48, rigidly fastened in the lever 49. This lever is fulcrumed to the frame 1 by the screw 50 and at its lower end by means of the screw 51 and link 52. A screw 53 is operatively connected to the needle-bar 54, Fig. 1. Similarly the face-cam 45 engages the roll 115, Fig. 2, rotative on the stud 55, which is rigidly fastened to the lever 56, and this lever, fulcrumed to the frame 1 by the screw 57, has at its lower end a screw 58 and link 59 and a screw 60, through which it is adapted to reciprocate the needle-bar 61, Fig. 2. The needle-bars 54 and 61 are adapted to slide on the frame 1 and are held thereto, respectively, by dovetailed strips 98 and 99. These strips are fastened to the frame 1 by one or more screws 100 and 101, Figs. 1 and 2. Tongued into the needle-bars 54 and 61, respectively, are the needle-holders 102 and 103, Figs. 4 and 5, and held thereto by screws 104 and 105, thereby to adapt said needle-holder to be adjusted vertically. The upper needle 106 and lower needle 107 are respectively fastened to these holders by the binding-screws 108 and 109. The thread to the lower needle, Figs. 1, 4, and 5, passes from the spool 73 through tongue 71 and take-up 69 to the eye 110 and thence along the groove in the bottom of the needle 107 through its eye to the cloth, so as to form the loop on top of the needle. The thread to the upper needle passes from the spool 72 through the tongue 70 and take-up 68 to the eye 111, thence to the eye 112 in the needle-holder 103. Then passing along a groove in the top of the needle 106 it goes through the eye to the cloth, forming the loop on the bottom of the needle 106. The presser-foot stem 62 is supported in bearings on the frame 1, Fig. 1. Fastened to this stem by the pin 63 is a collar 64, and on the stem abutting the collar 64 and the frame 1 is a spiral spring 65 under compression. Pivoted on top of the presser-foot stem by the screw 66 and clearing the frame 1 by a space slightly greater than the total vertical motion of the work-support 79 is a cam 67, adapted to raise the presser-foot when the needles are in the correct position. The take-up levers 68 and 69 are respectively actuated by cams (not shown) in the sides of the drum-cam 46. The tensions 70 and 71 are fastened to the frame 1 and are adapted, respectively, to operatively grip the threads from spools 72 and 73. These spools respectively rotate on studs 74 and 75, Fig. 1. Fig. 2 shows an arm 76, one end of which is rigidly fastened to shaft 15, Fig. 4, by pin 77. The other end of said arm is forked and engages the eccentric 78, Fig. 5. One end

of this eccentric enters a hole in the work-support 79 and is grooved, Fig. 4, so that after the work-table has been adjusted the point of the binding-screw 80, which enters the groove, can bind the eccentric. The arm 81, Fig. 2, which is rigidly fastened to the shaft 20 by a pin 82, Fig. 4, gives vertical motion to the dog and is adjustably and pivotally connected to the feed-bar 84 through the pin 86, which has a hole through it allowing the threaded portion of the link 87 to slide axially. On the link 87 are two knurled thumb-nuts 88 and 89, adapted to adjust the dog 85 vertically. The upper end of the link 87 is pivotally connected to the feed-bar 84 by the pin 90. The arm 83 is rigidly fastened to the shaft 19 by the pin 113, Fig. 4, and is pivotally connected to the feed-bar 84 by the pin 114 and gives horizontal motion to said feed-bar, and hence to the dog 85, which is fastened thereto. The work-support is dovetailed and adapted to slide on the frame 1 and held thereto by the gib 91, Fig. 4, and this gib is fastened to the frame 1 by screws 92 and 93. On the top of the work-support 79 is a ridge 79', adapted to raise the work to the correct position for the needles to operate upon it, as will be hereinafter more fully described. The presser-foot 94 is fastened to the presser-foot stem 62 by the pin 96, Fig. 4. The presser-foot 94 and extension 95, Figs. 8 and 7, each have a hole elongated vertically for the lower needle to work in and to allow the presser-foot to reciprocate vertically with the work-support 79. The pressure-foot extension 95 is adjustably fastened to the presser-foot 94 by the screw 97, which passes through a slot in the extension and threads into a hole in the presser-foot. The object of this adjustment will be explained farther on.

The cloth being on the work-support 79, the lining on top and the binding, as for skirts, in the position shown in Fig. 4, I first adjust my needles with relation to each other vertically, then tighten the screws 104 and 105. I then adjust their relative relation axially and tighten the screws 108 and 109. Next I adjust my work-support 79 vertically with relation to the needles 106 and 107 by turning the eccentric 78 until ridge 79' on the support 79 when at its highest point will raise the cloth and lining to such position that the needle 107 in reciprocating will thrust through the binding and lining, but not through the cloth. I then adjust the presser-foot extension so as to hold the binding snugly against the lining. A hemmer, one of the standard makes, (not shown,) is fastened to the presser-foot and turns this binding in the usual manner just previous to its entering under the presser-foot extension 95.

Having described the construction of my improved sewing-machine, I will now describe its operation in detail.

The shaft 6 and cams 45 and 46 revolving give, through the levers 49 56 and their connections, a reciprocating motion in approximately parallel planes and at approximately right angles to the needle-bars 54 and 61, Figs. 1 and 2. At the same time the pinion 9, by means of the cam in gear 11 through an arm 14, shaft 15, and arm 76, gives a periodic reciprocating motion to the work-support 79 and presser-foot stem 62, the feed being actuated vertically from the flanged eccentric 25 through the connecting-rod 30, arm 32, shaft 20, and arm 81 and horizontally from the plain eccentric 26, bell-crank 34, connecting-rod 35, arm 39, shaft 19, and arm 83. The relative operation of these mechanisms can more clearly be understood by a study of Figs. 9 to 12. These figures are enlarged and somewhat distorted plan views of the lining, binding, threads, stitch, and needles above referred to. The black thread is from the lower needle 107 and the white is from the upper needle 106. As the shaft 6, Fig. 1, begins to revolve the relative movements of the needles, feed, work - support, and presser-foot is as follows:

In Fig. 9 needle-looper 106 moves backward enough to form a loop. Simultaneously needle 107 thrusts forward through the binding and lining and enters the loop of the needle-looper, taking the position shown in Fig. 10. Then the needle remains stationary, while the needle-looper moves backward out of the previous loop of the needle and remains stationary, while the needle moves farther forward, drawing up its previous loop, as shown in Fig. 11. Then the needle moves backward enough to form a loop and stops while the needle-looper, which starts simultaneously with it, moves forward through the loop of the needle, as shown by Fig. 12, and then remains stationary while the needle pulls out of the cloth; but just before the needle completes this motion the needle-looper moves forward, tightening its loop. Then the cloth feeds. This completes one revolution of the driving-shaft 6, and hence all the motions of the needles and feed; but as my stitch requires for some classes of work that alternately the stitch shall be through the material, then over the material just before the next stitch, and just after the feed the work and work-support are lowered, and with them the presser-foot and presser-foot extension, into the position illustrated by Fig. 6, allowing the needle 107 at the next stitch to miss the binding and lining, and the work and other parts lowered therewith remain down until the stitch is completed; but the work, work-support, and presser-foot rise just before the next feed, so that the feeding conditions are identical for succeeding stitches. These relative motions of the needles, feed, work-support, and presser-foot can be easily followed on the diagram Fig. 14.

I am thus enabled to provide a sewing-machine for special classes of work in which the stitch-forming elements are delicate and capable of producing fine as well as coarse work, in which the operative parts do not obstruct the view of the operator, with which work may be done at the edge or near the center of large articles, and in which the work is handled, guided, and manipulated in substantially the same manner as in an ordinary sewing-machine.

Having thus described the invention, what I claim is—

1. In a sewing-machine, the combination of a work-support comprising a ridge extending in the line of feed, a needle working across the ridge, and a longitudinally-reciprocating thread-carrying needle-looper working across the line of the needle alongside of the ridge.

2. In a sewing-machine, the combination of a work-support comprising a ridge extending in the line of feed, a needle working across the ridge, a longitudinally-reciprocating thread-carrying needle-looper working across the line of the needle alongside of the ridge, and means for changing the relative positions of the work and needle.

3. In a sewing-machine, the combination of a work-support comprising a ridge extending in the line of feed, a needle working across the ridge, means for changing the relative positions of the work and needle, whereby the latter will form some of its loops in and some of its loops out of the work, a longitudinally-reciprocating thread-carrying needle-looper working transversely to the needle alongside of the ridge, and mechanism for operating the needle and needle-looper to cause the loop of each to pass through the loop of the other.

4. The combination of a work-support comprising a ridge extending in the line of feed, a needle working across the ridge, and a longitudinally-reciprocating thread-carrying needle-looper working across the line of the needle alongside of the ridge, said needle and needle-looper being adjustable transversely with respect to the work.

5. In a sewing-machine, the combination of a work-support comprising a ridge extending in the line of feed, a needle working across the ridge, means for changing the relative positions of the work and needle so that the latter will form some of its loops through and some above the fabric, and a thread-carrying looper working across the line of the needle alongside of the ridge, so that the loops of the looper will be passed through the loops of the needle, and the loops of the needle will be passed through the loops of the looper.

6. In a sewing-machine, the combination of a work-support comprising a ridge extending in the line of feed, a needle working across the ridge, means for changing the relative positions of the work and needle so that the latter will form some of its loops through and

some above the fabric, and an auxiliary needle working transversely to the main needle, alongside of the ridge, and in the direction of the feed so that each loop of the auxiliary needle will be passed through one of the loops of the main needle and extended forward so that the next loop of the main needle may be passed through it before the auxiliary needle recedes.

7. In a sewing-machine, the combination of a work-support comprising a ridge extending in the line of feed, a needle working across the ridge, means for periodically changing the relative positions of the work and needle so that the latter will form some of its loops through and some above the fabric, an auxiliary needle working transversely to the main needle alongside of the ridge so as to pass its loops through the loops of the first-mentioned needle, and means for adjusting the positions of the two needles transversely with respect to the work-support.

8. In a sewing-machine, the combination of a work-support having a ridge extending in the line of the feed, a needle working across the ridge, a looper reciprocating across the line of the needle alongside of the ridge, the movements of said needle and looper being such as to form the stitch herein specified.

9. In a sewing-machine, a work-support having a ridge extending in the line of feed, a needle working across the ridge, means for shifting the relative position of the ridge and needle so that the needle will form some of its loops through and some above the fabric, a looper of the character specified reciprocating across the line of the needle alongside the ridge, the movements of the needle and looper being such as to form the stitch herein specified.

10. In a sewing-machine, a work-support having a ridge, a needle working across the ridge, means for shifting the relative positions of the ridge and needle so that the needle will form some of its loops through and some above the fabric, and a thread-carrying looper of the character specified reciprocating across the line of the needle alongside the ridge so that the loops of the looper will pass through the loops of the needle, and the loops of the needle will be passed through the loops of the looper to form the stitch herein specified.

11. In a sewing-machine, the combination of a work-support comprising a ridge extending in the line of feed, a needle reciprocating across the ridge, means for changing the relative position of the work-support and needle so that the needle will form some of its loops through and some above the fabric, and an auxiliary needle working transversely to the main needle, alongside the ridge and in the direction of the feed, so that each loop of the auxiliary needle will be passed through one of the loops of the main needle and extended forward so that the next loop of the main

needle will pass through it before the auxiliary needle recedes, to form the stitch herein specified.

12. In a sewing-machine, a work-support having a ridge and an adjacent substantially horizontal support for the work, an arm overhanging the work-support, stitch-forming mechanism supported by and movable relative to said overhanging arm comprising a needle movable across the ridge, and a longitudinally-reciprocating thread-carrying needle-looper arranged to work across the line of the needle alongside said ridge.

13. The combination of mechanism for creasing the work, means independent of the creasing mechanism, for supporting the free portion of the work at one side of the crease, and stitch-forming mechanism supported above the work-support, and comprising two thread-carrying elements, one to work across the crease for penetrating the work and the other a needle-looper adapted to reciprocate longitudinally at one side of the crease.

14. In a sewing-machine, creasing mechanism for the work, means independent of the creasing mechanism for supporting the free portion of the work in a substantially horizontal condition, and a presser-foot and stitching mechanism supported above the work, the stitching mechanism including two longitudinally-reciprocating thread-carrying parts, one movable through the crease and the other alongside of said crease.

15. In a sewing-machine, a work-support having a ridge, and mounted in bearings in the base of the frame, an overhanging arm, a needle mounted at the end of said overhanging arm and arranged to reciprocate across the ridge of the work-support, a presser-foot carried by said overhanging arm adapted to hold the work in place on the work-support, a needle mounted at the end of said overhanging arm and arranged to reciprocate alongside said ridge, the said needles being so controlled as to time and movements as to respectively thrust through loops formed by the opposite needle.

16. In a sewing-machine, a work-support having a ridge and mounted in bearings in the base of the frame, means for alternately raising and lowering said work-support, an overhanging arm, a needle mounted at the end of said overhanging arm and arranged to reciprocate across the ridge of the work-support, a presser-foot carried by said overhanging arm to hold the work in place on the work-support, a needle mounted at the end of said overhanging arm and arranged to reciprocate alongside said ridge, the needles and work-support being so controlled as to time and movements that one of the needles will make part of its thrusts through the work and part above the work, and so that said needles will respectively thrust through loops formed by the opposite needle.

17. In a sewing-machine, a work-support having a ridge, an overhanging arm, a needle mounted at the end of said overhanging arm and arranged to reciprocate in a substantially horizontal direction across said ridge, a presser-foot adapted to hold the work in place on the work-support, and to follow the vertical movements thereof, a needle also mounted at the end of the overhanging arm and arranged to reciprocate alongside said ridge, the said needles being so controlled as to time and movements as to respectively thrust through loops formed by the opposite needle.

18. In a sewing-machine, a work-support having a ridge, an overhanging arm, a needle mounted at the end of the overhanging arm and arranged to reciprocate in a substantially horizontal direction across said ridge, a presser-foot adapted to hold the work in place on the work-support, a section adjustable relative to the main portion of said presser-foot to accommodate work of different dimensions, a needle mounted at the end of said overhanging arm and arranged to reciprocate in a substantially horizontal direction alongside said ridge, the said needles being so controlled as to time and movements as to respectively thrust through loops formed by the opposite needle.

19. In a sewing-machine, a work-support having a ridge, an overhanging arm, a needle mounted at the end of said overhanging arm and arranged to reciprocate across the ridge of the work-support, means for adjusting said needle vertically relative to the overhanging arm, a presser-foot carried by said overhanging arm adapted to hold the work in place on the work-support, a needle mounted at the end of said overhanging arm and arranged to reciprocate alongside said ridge, the said needles being so controlled as to time and movements as to respectively thrust through loops formed by the opposite needle.

20. In a sewing-machine, a work-support having a ridge, an overhanging arm, a needle mounted at the end of said overhanging arm and arranged to reciprocate across the ridge of the work-support, a presser-foot carried by the overhanging arm adapted to hold the work in place on the work-support, a needle mounted at the end of said overhanging arm and arranged to reciprocate in a substantially horizontal direction alongside said ridge, means for adjusting said needle vertically relative to the overhanging arm, the said needles being so controlled as to time and movements as to respectively thrust through loops formed by the opposite needle.

21. In a sewing-machine, a work-support having a ridge, an overhanging arm, a needle mounted at the end of said overhanging arm and arranged to reciprocate in a substantially horizontal direction across the ridge of the work-support, a presser-foot adapted to sup-

port and hold the work in place on the work-support in front and rear of the needle, and having a recess for the passage of the needle, a needle mounted at the end of the overhanging arm and arranged to reciprocate in a substantially horizontal direction at right angles to said former needle, the said needles being so controlled as to time and movement as to respectively thrust through loops formed by the opposite needle.

22. In a sewing-machine in combination with a work-support having a ridge, two needles operating one across and one parallel with the ridge, mechanism for reciprocating said needles in proper relative time, each of said needles respectively thrusting through loops formed by the opposite needle.

23. In a sewing-machine, the combination of mechanism for forming the work into a crease and for feeding the work in the direction of the length of the crease, and stitch-forming mechanism comprising two elements reciprocatory along straight paths transverse to each other, and one of which is adapted to penetrate the work, and the other of which moves in the direction of the line of feed.

24. In a sewing-machine, the combination of mechanism for forming the work into a crease, feeding the same in the direction of the length of the crease, and for intermittently moving the work in a direction transverse to the line of feed, and stitch-forming mechanism comprising two elements reciprocatory along straight paths transverse to each other, and one of which is adapted to penetrate the work, and the other of which moves in the direction of the line of feed.

25. In a sewing-machine, the combination of stitch-forming mechanism comprising two elements reciprocatory along straight paths transverse to each other, and one of which is adapted to penetrate the work, and the other of which moves in the direction of the line of feed, and a work-support having a ridge extending in the line of feed.

26. In a sewing-machine, the combination of stitch-forming mechanism comprising two elements reciprocatory along straight paths transverse to each other, and one of which is adapted to penetrate the work, and the other of which moves in the direction of the line of feed, a work-support having a ridge extending in the line of feed, and mechanism for intermittently imparting a movement to the work-support transverse to the paths of the stitch-forming elements, whereby the work-penetrating element will alternately pass free of the work.

In testimony whereof I have hereunto set my hand this 20th day of October, 1902.

PAUL E. KAUFMAN.

Witnesses:

JULIAN S. RAUH,

C. C. MUND.