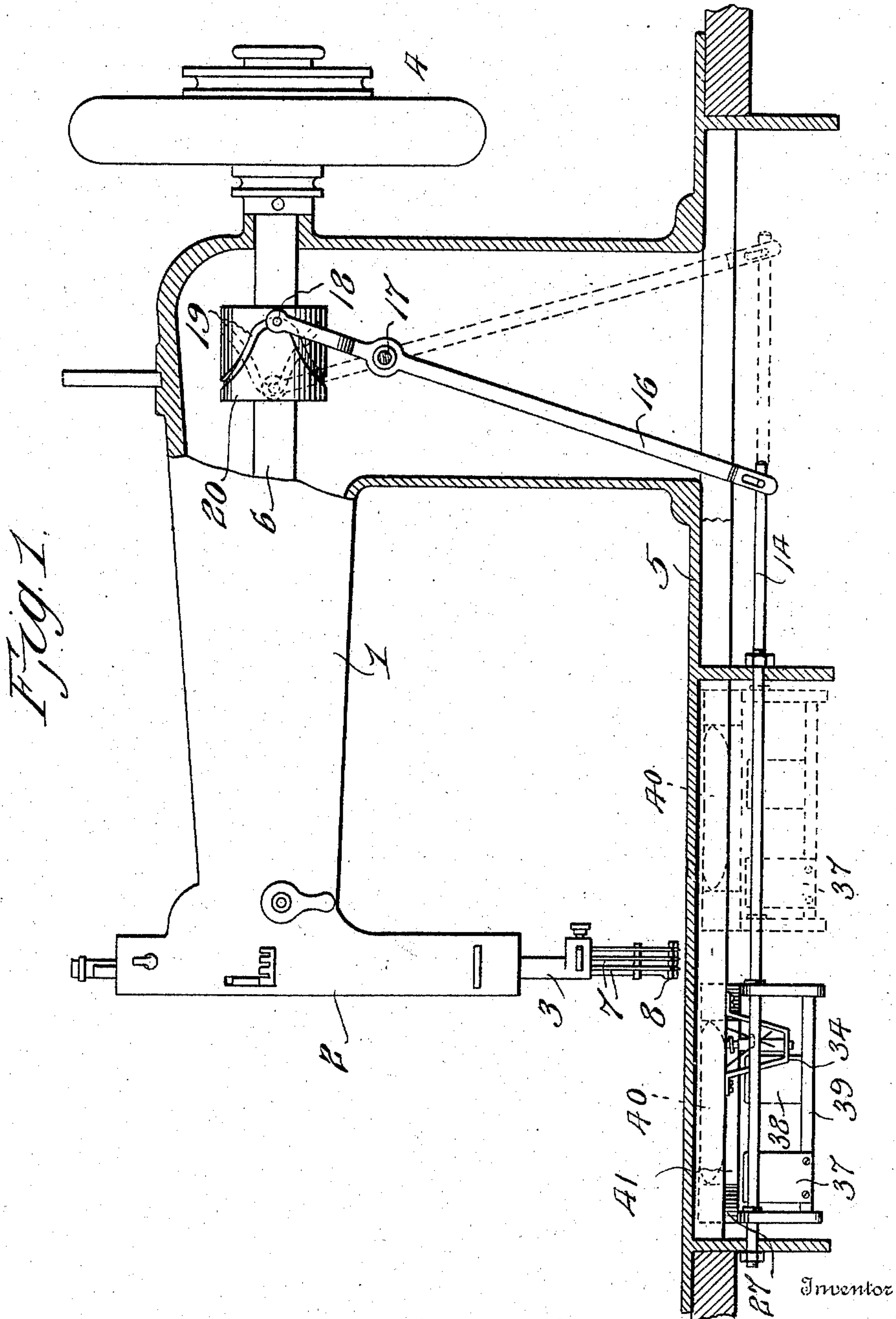


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A. METZLER.
SEWING MACHINE.
APPLICATION FILED FEB. 19, 1909.

Patented Aug. 9, 1910.
2 SHEETS—SHEET 1.



Witnesses
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R. M. Smith.

Anton Metzler,
By Victor J. Evans
Attorney

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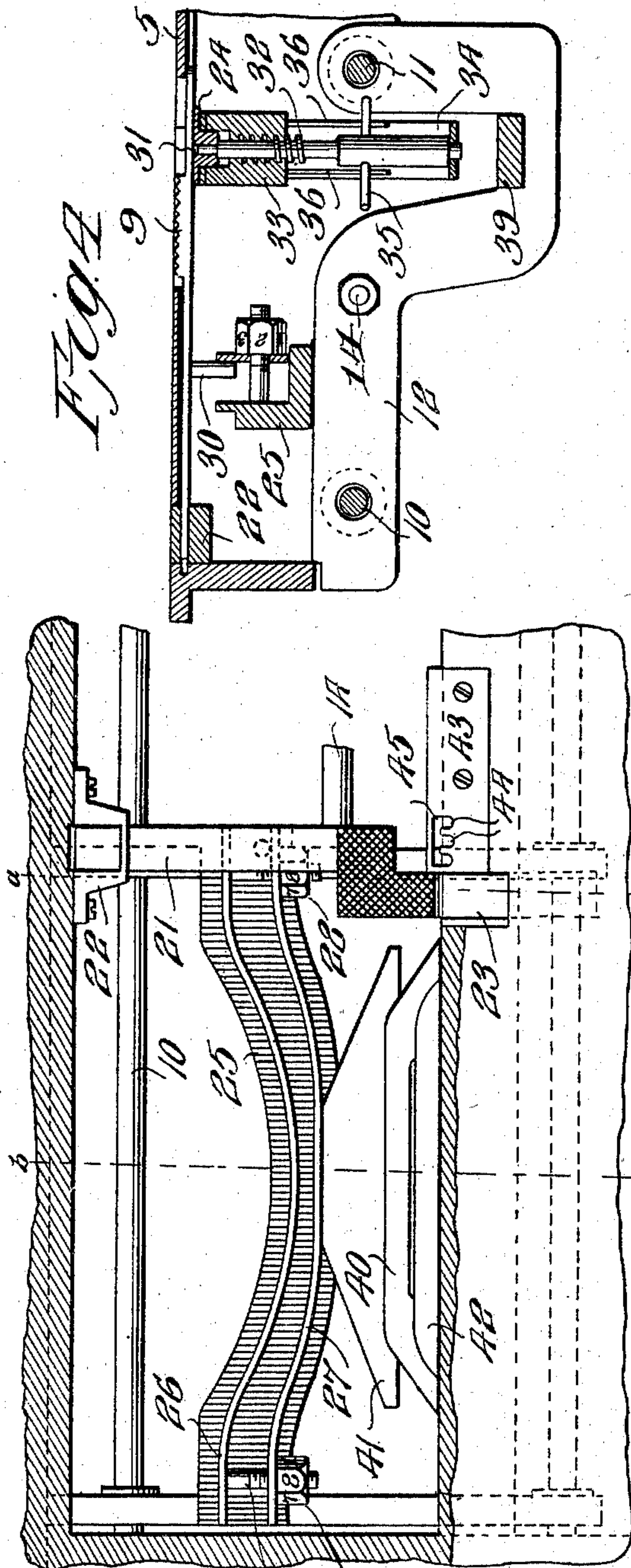


Fig. 2.

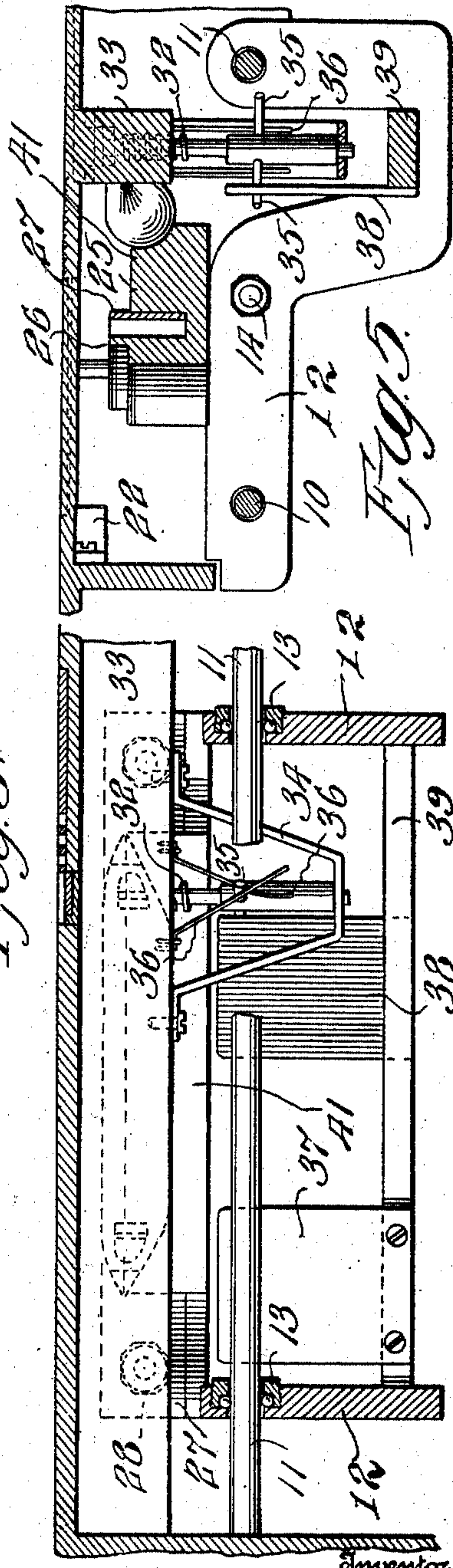


Fig. 3.

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UNITED STATES PATENT OFFICE.

ANTON METZLER, OF ROCHESTER, NEW YORK.

SEWING-MACHINE.

966,937.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed February 19, 1909. Serial No. 478,845.

To all whom it may concern:

Be it known that I, ANTON METZLER, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates to sewing machines and has particular reference to the stitch spacing mechanism and incidentally the shuttle driving mechanism, the object of the invention being to provide simple and reliable means for effecting a back and forth movement of the shuttle in a line transverse to the direction of movement of the work, and the seam or line of stitching being effected by the machine; also to provide for a double operation of the shuttle, or in other words, a loop of the threads in each stroke of the shuttle.

Another object of the invention is to so combine and arrange the mechanism referred to as to enable any desired number of needles to be employed in accordance with the nature of the work, also to provide means whereby the length of the stitches may be regulated to produce long or short stitches and also to regulate the relative length of alternate stitches, a feature of considerable value in special or ornamental work.

With the above and other objects in view the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangement herein fully described, illustrated and claimed.

In the accompanying drawings: Figure 1 is a front elevation partly in section of a sufficient portion of a sewing machine to illustrate the present invention. Fig. 2 is a plan view of the work support, partly broken away to show the stitch spacing and shuttle driving mechanism beneath. Fig. 3 is a vertical longitudinal section through the same. Fig. 4 is a vertical transverse section on the line *a-a* of Fig. 2. Fig. 5 is a vertical transverse section on the line *b-b* of Fig. 2.

In the drawings, I have shown the standard type of sewing machine comprising the arm 1, head 2, needle bar 3, driving wheel 4, work support or table 5, and main shaft 6. The needle bar 3 is shown as provided with means for securing in position a plurality of needles 7 and it will be understood that any desired number of needles may be employed

according to the nature of the work to be performed.

8 designates the presser foot and 9 the feed plate having the usual roughened upper surface adapted to feed the work from the front toward the rear of the machine.

In carrying out the present invention I employ the parallel guide rods 10 and 11, supported fixedly at their opposite ends by the frame of the machine and mounted to slide on said guide rods is a runner embodying end pieces 12 having openings through which the guide rods 10 and 11 pass, the said openings preferably having fitted thereto ball-bearings as indicated at 13 to relieve friction and allow the runner to move freely back and forth on the guide rods.

The runner is reciprocated in a direction at right-angles to the path of movement of the work by means of an actuating rod 14 which is fastened at one end to one of the end pieces 12 and works through a guide opening in the machine frame. This actuating rod 14 is connected at one end to a lever 16 fulcrumed at 17 at a point intermediate its length and provided at its upper end with a pin 18 which operates in a cam groove 19 in a collar 20 which is fast on the shaft 6 and revolves with the latter. The cam groove 19 is so described as to impart a rocking movement to the lever 16 which results in a reciprocatory movement being imparted to the actuating rod 14.

The feed plate 9 comprises a rearwardly extending shank 21 which is received in a guide 22 secured to the frame of the machine and said feed plate also comprises a forwardly extending shank 23 adapted to slide back and forth under the work support 5 as shown in Fig. 4, the shank 23 being upheld by means of a feed plate support 24 the operation of which will be hereinafter described.

Connected at its opposite ends to the end pieces 12 is a stitch spacing bar 25 illustrated in plan in Fig. 2 and extending upward from the bar 25 are two curved cam plates 26 and 27. The cam plate 26 is fixed relatively to the bar 25 while the other cam plate 27 which is curved on a larger radius has its central portion fastened to the bar 25 in any suitable manner but the opposite end portions of the plate 27 are free for adjustment which is accomplished by means of stitch regulators in the form of nuts 28 threaded upon screws or bolts 29 carried by the stitch

spacing bar 25 as shown in Fig. 4. The cam plate 27 is formed of spring metal and the construction described provides for adjusting the free ends of said spring cam plate toward and away from the corresponding ends of the fixed cam plate 26. In order to provide for equally or unequally adjusting the distances between the corresponding ends of the cam plates 26 and 27, the flat sides of the nuts 28 are graduated or provided with numbers or other similar reference characters as indicated in Figs. 2 and 4. The shank 21 of the feed plate 9 is provided on its underside with a pendent projection 30 shown in the form of a pin or stud which works between the cam plates 26 and 27 and therefore as the stitch spacing bar 25 is reciprocated back and forth, a reciprocatory movement is imparted to the feed plate 9 in a direction at right angles to the path of movement of the runner and the stitch spacing bar 25 and the extent of back and forth movement of the feed plate 9 is regulated and governed by the distance between the extremities of the cam plates 26 and 27.

To provide for the up and down movements of the feed plate 9, the feed plate support 24 is mounted on the reduced upper extremity 31 of a lift screw 32 having a threaded engagement with a fixed part 33 of the machine frame. The lower end of the lift screw 32 is supported by means of an inverted U-shaped brace or bracket 34 as best illustrated in Figs. 3, 4 and 5. At a suitable point in its length, the lift screw 32 is provided with oppositely projecting crank arms 35 shown for convenience as consisting of a pin inserted transversely through the shank of the screw 32 so as to project in opposite directions therefrom, the lift screw 32 being normally held against rotation by means of return springs 36 which are fastened at their upper ends to the frame of the machine and which bear yieldingly against opposite sides of the crank arms 35 as illustrated in Figs. 3, 4 and 5, to hold the lift screw in a neutral position.

The lift screw is oscillated or partially turned in opposition to the springs 36 by means of tappet arms 37 and 38 arranged at opposite sides of a tappet bar 39 which is connected rigidly at its opposite ends to the end pieces 12 of the runner and which forms a part of the runner. The tappet arms 37 and 38 are not arranged opposite each other but at proper points to engage the crank arms 35 as the runner moves back and forth, one of said tappet arms engaging one of the crank arms 35 as the runner moves in one direction, and the other tappet arm engaging the other crank arm 35 as the runner moves in the opposite direction, thus in each half stroke of the runner, the lift screw 33 is turned and caused to elevate the feed plate support 34, which has the ef-

fect of correspondingly elevating the feed plate perpendicular to the movement of the latter toward the rear of the work support. In this way, the feed plate 9 is alternately raised and lowered as it is reciprocated back and forth by the stitch spacing bar 25.

41 designates a shuttle driving head secured to and carried by the stitch spacing bar 25, while 40 designates a shuttle holder connected to said head, 42 representing a double ended or pointed shuttle removably fitted to the holder 40.

43 designates a needle hole plate provided with a plurality of needle holes 44 which merge into and communicate with a single slot 45 to admit of the necessary interlooping of the top and bottom threads.

From the foregoing description it will be understood that the shuttle is reciprocated in a plane perpendicular to the plane of movement of the work and the feed plate; also that the extent of back and forth movement of the feed plate may be varied and regulated by adjusting the stitch regulating nuts 28. It will also be seen that by varying the relative distances between the cam plates 26 and 27 at their opposite ends, the length of the stitches will be correspondingly varied and in this way an alternate arrangement of the long and short stitches may be obtained for fancy work. By using a double ended or double pointed shuttle, the looping of the top and bottom threads may be effected in each single stroke of the shuttle thus saving a considerable amount of energy in driving the machine as well as admitting of a higher speed.

I claim:—

1. In a sewing machine, the combination of a feed plate mounted for back and forth movement, a reciprocatory runner movable in a plane perpendicular to the plane of movement of the feed plate, a stitch spacing bar carried by the runner, and oppositely arranged cam plates on said bar adapted for cooperation with the feed plate, one of said cam plates being fixed and the other cam plate being adjustable toward and away from its mate.

2. In a sewing machine, the combination of a feed plate mounted for back and forth movement, a reciprocatory runner movable in a plane perpendicular to the plane of movement of the feed plate, a stitch spacing bar carried by said runner, cam plates on said bar, and a projection on the feed plate working between said cam plates, one of said cam plates having a free end portion combined with means for setting such free end portion toward or away from the other cam.

3. In a sewing machine, the combination of a feed plate mounted for back and forth movement, a reciprocatory runner movable in a plane perpendicular to the plane of movement of the feed plate, a stitch spacing

bar carried by said runner, a stationary cam plate on said bar, another cam plate on said bar having spring terminal portions, and means for adjusting said terminal portions toward and away from the corresponding portions of the stationary cam plate, and a projection on the feed plate operated upon by said cam plates.

4. In a sewing machine, the combination of a feed plate mounted for back and forth movement, a reciprocatory runner movable in a plane perpendicular to the plane of movement of the feed plate, a stitch spacing bar carried by said runner, a stationary cam plate on said bar, another cam plate on said bar having free terminal portions, stitch regulators independently adjustable for moving said free terminal portions of the cam plate toward and away from the corresponding portions of the stationary cam plate, and a projection on the feed plate operated upon by said cam plates.

5. In a sewing machine, the combination of a feed plate mounted for back and forth movement, a reciprocatory runner movable in a plane perpendicular to the plane of movement of the feed plate and cooperating with the latter to impart back and forth movements thereto, a vertically movable feed plate support, an oscillatory lifting element for said feed plate support, and tappet

mechanism carried by said runner and operating to oscillate the support lifting element.

6. In a sewing machine, the combination of a feed plate mounted for back and forth movement, a reciprocatory runner movable in a plane perpendicular to the plane of movement of the feed plate, a tappet bar carried by said runner, tappet arms on said bar, a vertically movable feed plate support, a lift screw for elevating said support, and crank arms on said screw operated upon by the tappet arms on the runner.

7. In a sewing machine, the combination of a feed plate mounted for back and forth movement, a reciprocatory runner movable in a plane perpendicular to the plane of movement of the feed plate, a tappet bar carried by said runner, tappet arms projecting from said bar, a vertically movable feed plate support, a lift screw engaging said support, crank arms on said screw adapted to be struck by the tappet arms, and return springs for maintaining the lift screw in a predetermined position.

In testimony whereof I affix my signature in presence of two witnesses.

ANTON METZLER.

Witnesses:

BERTHOLD BAUML,
FRANK BAUML.