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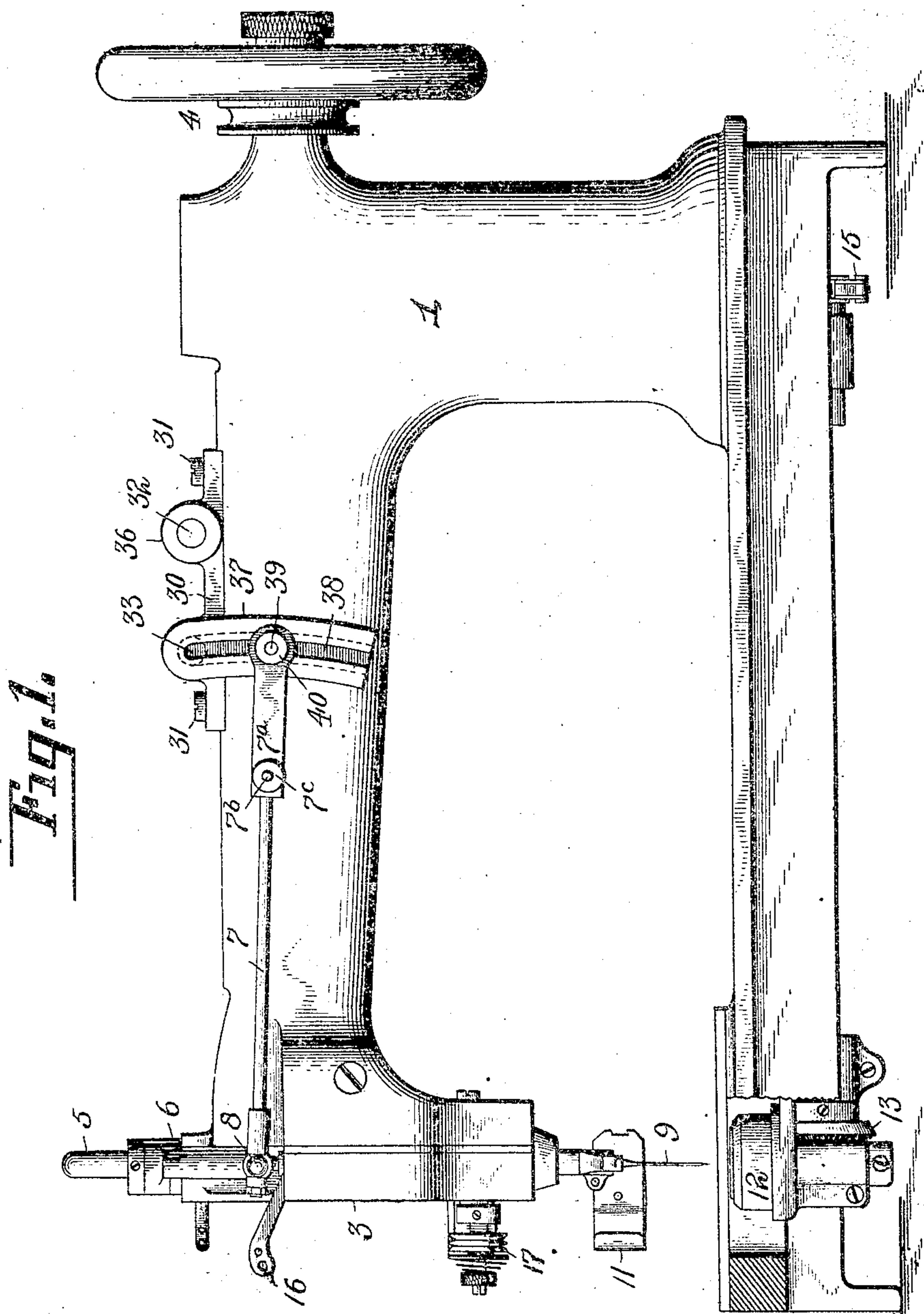
PATENTED DEC. 31, 1907.

W. N. PARKES.

NEEDLE ACTUATING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED NOV. 2, 1903.

4 SHEETS—SHEET 1.



WITNESSES:

J.B. McGirr.
M. Herskovitz.

INVENTOR.

William A. Parker
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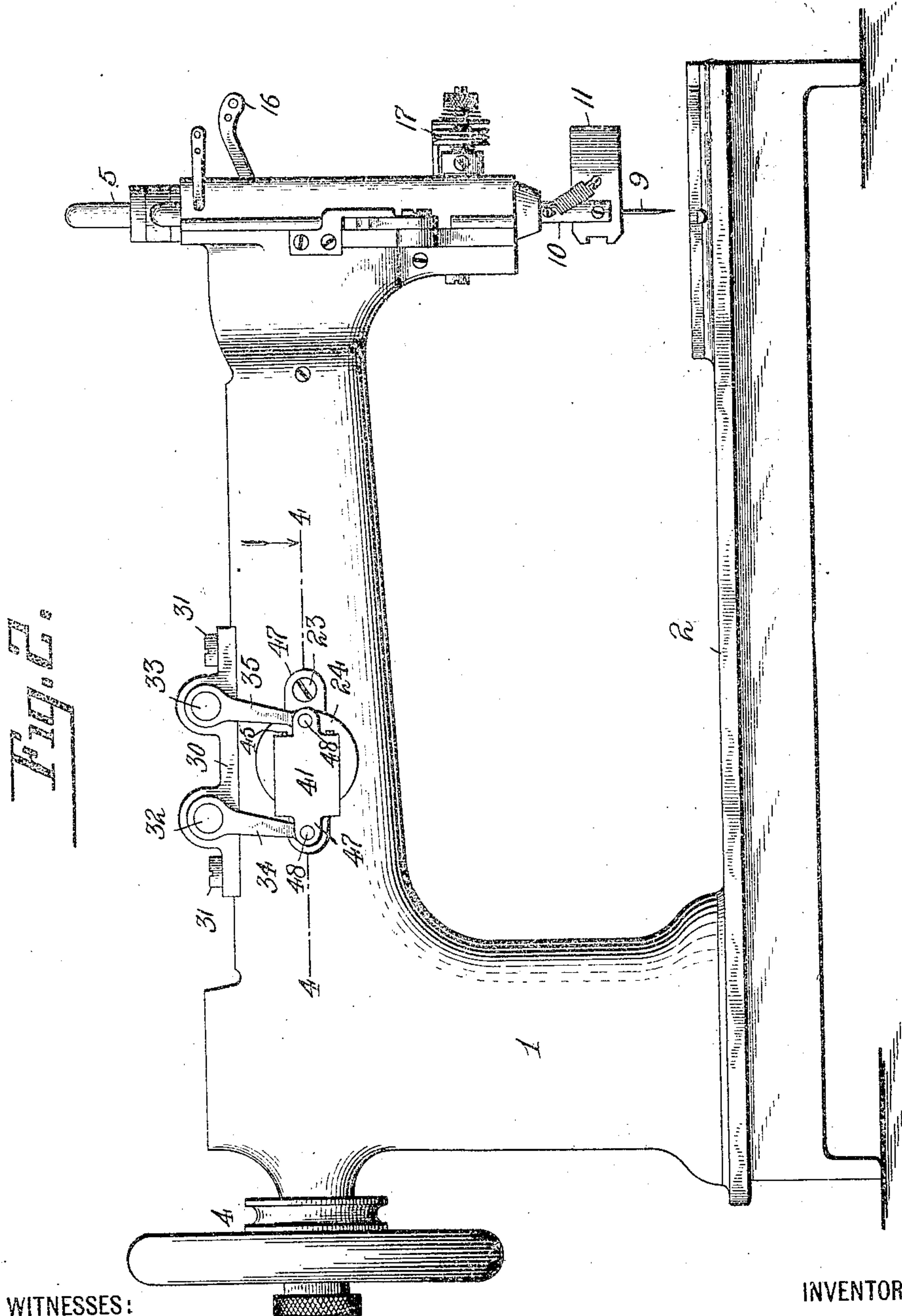
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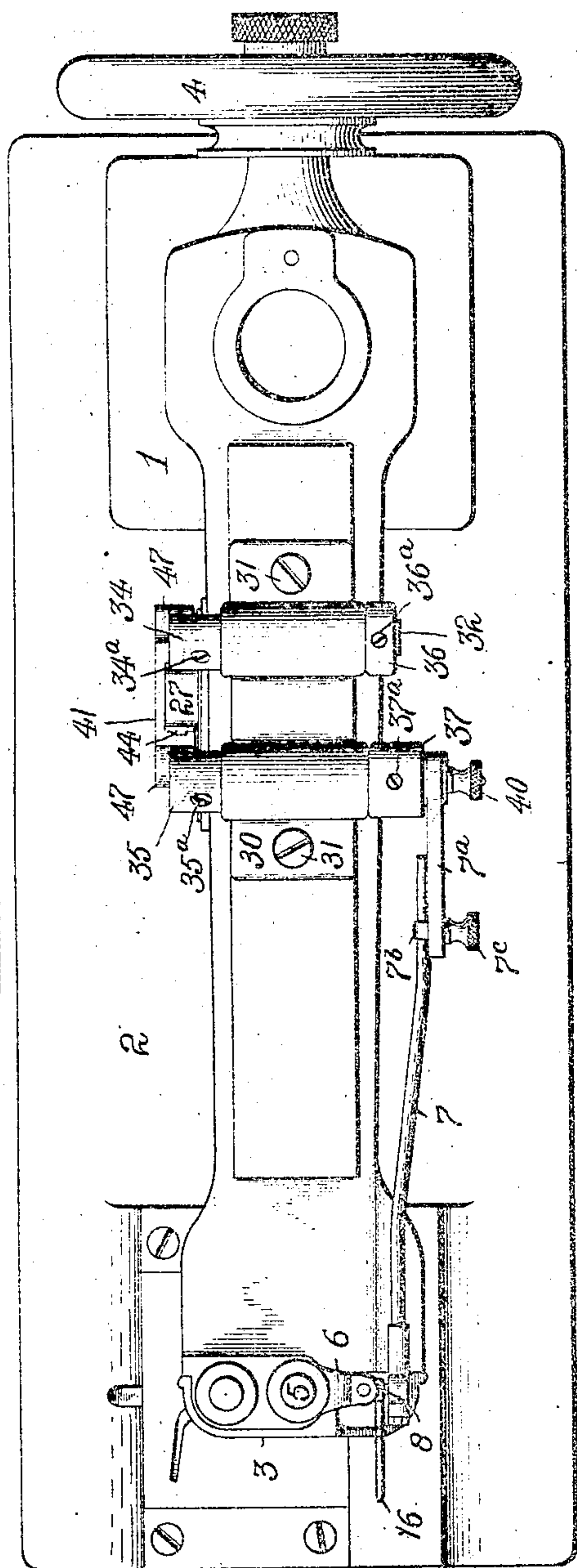
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4 SHEETS—SHEET 3.

Fig. 3.



WITNESSES:

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Fig. 4.

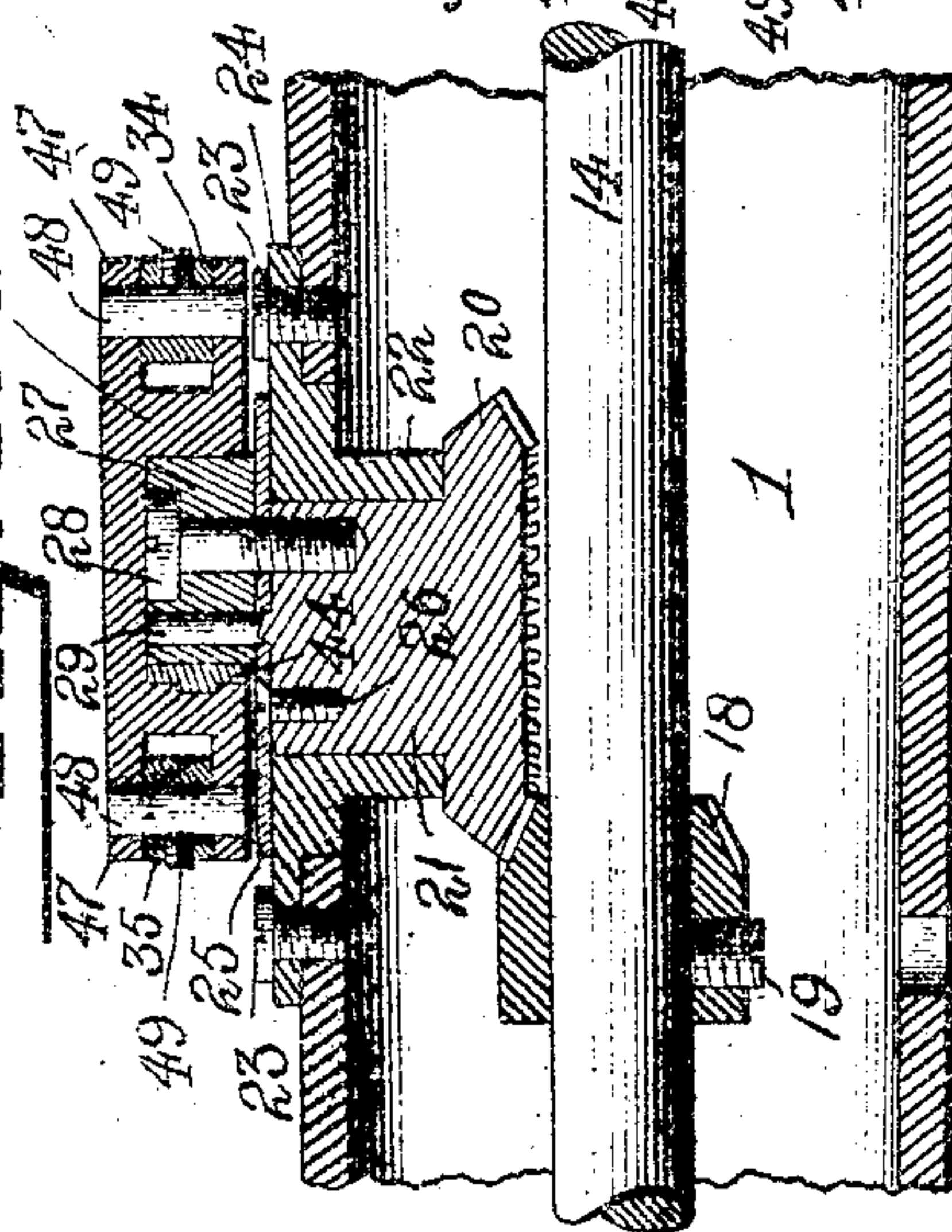
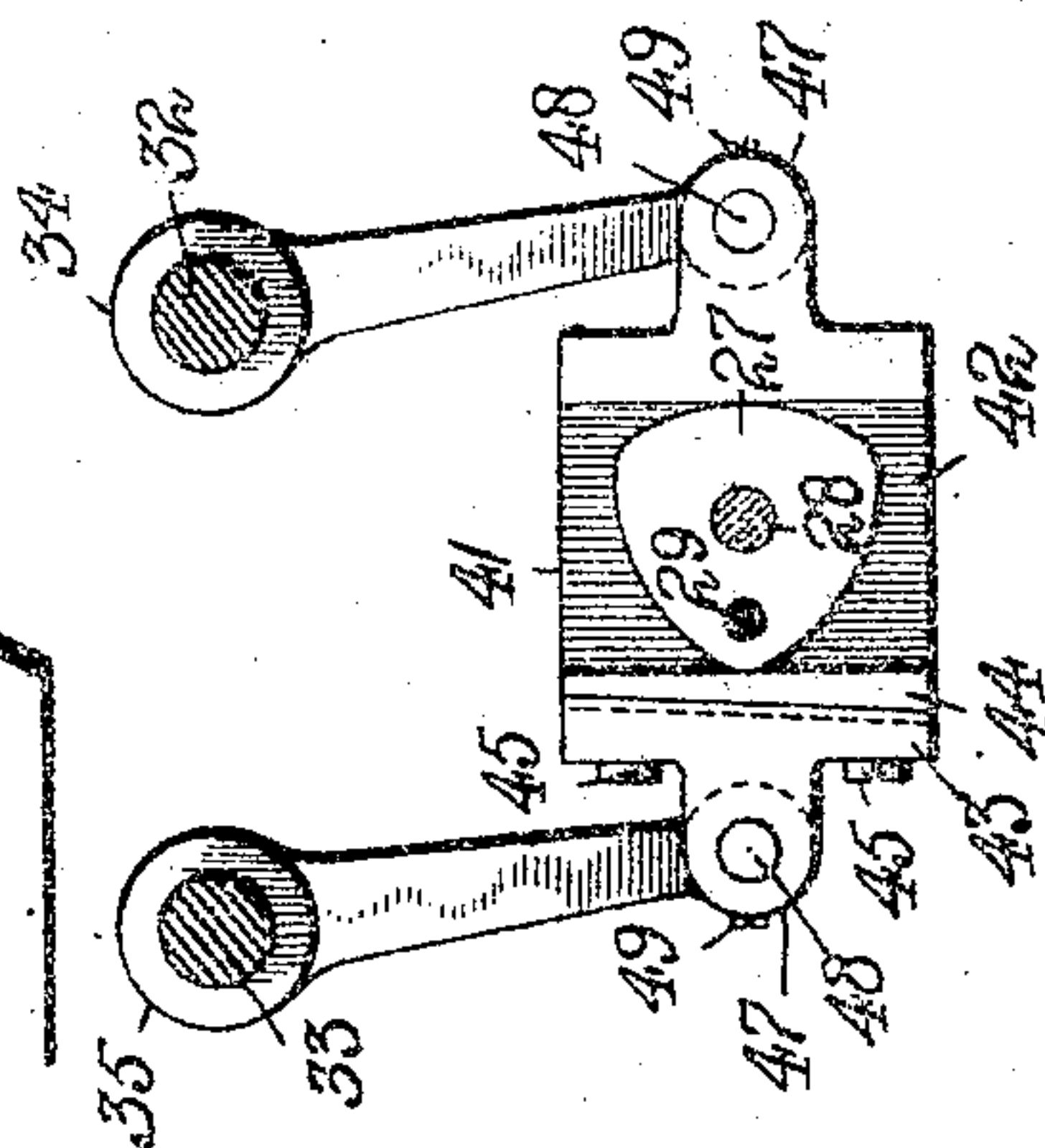


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM N. PARKES, OF BROOKLYN, NEW YORK.

NEEDLE-ACTUATING MECHANISM FOR SEWING-MACHINES.

No. 875,620.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed November 2, 1903. Serial No. 179,470.

To all whom it may concern:

Be it known that I, WILLIAM N. PARKES, a citizen of the United States, residing in Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Needle-Actuating Mechanism for Sewing-Machines, of which the following is a description.

This invention is primarily intended for use in sewing machines.

One of its main objects is to provide improved means for converting a rotary movement into an oscillatory or reciprocating movement that may be used in connection with various parts of a sewing machine that it is desired to reciprocate, oscillate or vibrate.

In zigzag machines the needle is moved laterally at right angles to the plane in which the driving shaft revolves, once to each vertical reciprocation of said needle, and this lateral movement takes place during the time the needle is disengaged from the work. It will thus be understood that each lateral movement of the needle takes place during less than a cycle of movement of the driving shaft which revolves once to each vertical reciprocation of the needle. In practice this lateral movement takes place during about one half of a rotation of said driving shaft. From this it is seen that the revolving movement of the driving shaft in these machines, is not all converted into a lateral movement at the needle, but that only about one half of this movement is so converted. It has been common to convert the rotary movement of the driving shaft into an oscillating lever, by means of a rotary peripheral cam acting between a bifurcated end of said lever, and then transmitting the movement of the lever to the needle. This is objectionable however because of the difference in speed of the lateral movement of said lever in one direction relative to its speed of movement in the other direction, and the difference in time it takes to make said movement in one direction relative to the other direction. In these machines the needle is moved laterally while it is disengaged from the work, and therefore the time in which this lateral movement can be made is limited. In high speed machines the needle is given a shorter reciprocating movement vertically than in the old style slow speed machines, therefore in said high speed machines the needle is disengaged from the work a shorter time relative to its com-

plete movement than it is in said old style machines. And because of this the time in which the needle can be moved laterally in these high speed machines is more limited, than in said old style machines.

It is very desirable to move the needle, laterally from the movement of a peripheral cam, and one of the main objects of my invention is to provide means in combination with such a cam whereby the said needle will be moved laterally in either direction at the same speed and in the same length of time. And it is also an object of this invention to provide improved means for moving a needle or needles laterally, and to so construct said means that it will be convenient to move other parts of a machine from the same in combination with a laterally moving needle.

Other objects of my invention will be disclosed during the course of this description and with the same in view, together with those above detailed, my invention consists in the elements, features and combinations hereinafter described and claimed.

Referring to the drawings: Figure 1 is a side elevation showing a machine with my mechanism applied thereto, a portion of the bed-plate being broken away to disclose the looper mechanism; Fig. 2 is a rear elevation of a machine showing my invention applied thereto; Fig. 3 is a top plan view; Fig. 4 is a transverse sectional view on the line 4—4 of Fig. 2, the arrow on the latter figure indicating the line of sight; Fig. 5 is a detail showing in elevation a portion of the needle-bar actuating mechanism; Fig. 6 is a detail similar to Fig. 5, a portion being in section to illustrate the means for taking up wear and compensating for lost motion; Fig. 7 is a front elevation of a portion of the overhanging arm of the machine, illustrating another form of mechanism for actuating the needle-bar; and Fig. 8 is a section on the line 8—8 of Fig. 7.

In the drawings, 1 represents the frame of the machine, 2 the bed-plate, 3 the head, 4 the hand-wheel and driving pulley, 5 the needle-bar which reciprocates vertically in the head of the machine, and has imparted thereto oscillating or vibrating movement, preferably on its axis through the medium of a vibrating arm or frame 6, suitably connected to the needle-bar and actuated by means of the pitman 7, connected by a universal joint 8, to the arm 6.

The needle is indicated by 9, the presser-

bar by 10, its foot by 11, the looper by 12, actuated from the lower shaft, not shown, by gearing 13. The driving-shaft 14, through suitable connecting means, preferably chain 5 and sprocket mechanism 15, actuates the looper driving-shaft to impart rotary movement to the gearing 13. A suitable take-up 16, and tension 17, are employed. These several parts and mechanisms have been 10 briefly described and only partially illustrated because the same form no part of my present invention, and may be in all respects substantially identical with like elements or parts shown in my application filed Oct. 26, 15 Serial Number 178,629.

The driving-shaft 14, has adjustably attached thereto a bevel-gear 18, by means of a screw 19, tapped therethrough and engaging the shaft. The bevel-gear 18, meshes 20 with the bevel-gear 20, supported in the overhanging arm of the machine, said gear being twice the diameter of the gear 18, so that the gear 20, turns once to two rotations of the gear 18. The gear 20, has an extended 25 hub 21, which is adapted to rotate in a bearing 22, attached to the overhanging arm of the machine by means of the screws 23, tapped through the flange 24, and through said arm. A thin plate 25, is attached to 30 the end of the hub 21, by means of the screw 26. To the hub 21, is attached a cam 27, by means of a screw 28, passing through said cam to plate 25, and into the hub 21. A reduced portion 29 of the hub 21, passes 35 through the plate 25 and into the cam, said reduced portion having the function of properly locating the cam on the hub and holding it rigidly and preventing it from any movement with respect to the hub. The reduced 40 portion 29, and the screw 28, provide additional means for securing the plate 25, to the hub 21, for retaining the latter in its bearing 22. The said reduced portion 29 is located central with respect to the hub 21 of the gear, 45 and said portion also serves as a means for properly locating the cam 27, and it is to be noted that this cam revolves about the axis of the gear 20 which is the center of said reduced portion 29.

50 On the overhanging arm of the machine is attached a bracket 30, by means of screws 31, said bracket having journaled therein two short shafts 32 and 33. To the rear end of the said shafts depending arms 34 and 35 55 are respectively attached by means of screws 34^a and 35^a, respectively tapped through said arms and into said shaft. The shaft 32, is held from longitudinal movement in its bearing by means of the said arm 34, and a collar 60 36, secured to its opposite end by means of a screw 36^a, tapped therethrough and into the shaft. The shaft 33, is held from longitudinal movement in its bearing by means of the arm 35, and the segment arm 37, secured to 65 its opposite end by means of the screw 37^a,

tapped through said arm and into said shaft. The segment arm 37 is provided with a way 38 in which is secured in a usual manner a bearing bolt 39 on which is located a usual bushing (not shown) and on said bushing is 70 pivoted an end 7^a of the pitman 7. A usual clamping nut 40 engages said usual bushing and thereby in a usual manner adjustably clamps the bolt 39 in said way 38. The way 38 extends over the axis of the shaft 33 to a 75 sufficient extent for the end of 7^a to be located directly over said axis and lateral movement of the pitman 7 and the needle are thereby in a usual manner suspended. The portion 7^a of the pitman, is adjustable on the 80 portion 7, by means of a clamping-loop 7^b, encircling the inner end of the portion 7, and passing through the portion 7^a and engaged by the clamping-nut 7^c which binds adjustably the two parts of the pitman together. 85

A yoke 41, having a way 42 formed in it, embraces the cam 27, carried by the gear 20. One wall 43, of the yoke is, preferably, inclined and provided with a groove in which runs the rib of an adjustable wedge 44, said 90 wedge forming the bearing or engaging portion for the cam 27. To secure accurate engagement of the walls of the yoke with the cam 27, or for taking up wear, or for compensating for lost motion, the wedge 44, is 95 rendered adjustable by means of screws 45, which pass through elongated slots 46, into wall 43, and enter the wedge 44. By this means the wedge may be adjusted longitudinally and properly clamped and held after 100 such adjustment. The yoke is provided at opposite ends with bifurcated lugs 47, provided with apertures through which short pins 48, pass for the purpose of pivotally connecting the yoke, respectively to the arms 105 34 and 35. Said arms extend between the prongs of the respective lugs 47, and screws 49 rigidly secure the pins 48, to said arms. Thus the pins journal in the bifurcated lugs and are prevented from escaping therefrom. 110 The connection just described, as will be obvious upon reference to Figs. 2, 5 and 6, will keep the walls of the way 42, in parallel vertical planes throughout the lateral movements of the yoke 41, and will impart to the arms 115 34 and 35, lateral movements of equal extent and of equal speed in both directions, and will also keep said arms in parallelism.

From the construction just described, it will be clear that in each rotation of the driving-shaft 14, the gear 20 and the cam 27, will be given a half rotation, resulting in a lateral movement, in one or the other direction, of the yoke 41, which in turn imparts movement to parallel arms 34 and 35, the arm 37; 120 the pitman 7, and the needle-bar 5. Two rotations of the main-shaft 14, will give a complete rotation to the gear 20 and cam 27, resulting in a complete reciprocation or vibration of the train of mechanism extending 130

from said cam and including the needle-bar. The three-cornered or triangular cam 27, is so proportioned that during substantially the first quarter of its movement it moves the arms 34, 35 and 37 laterally in one direction, and then during substantially the second quarter of its movement said arms are at rest, then during substantially the third quarter of its movement the said arms are moved back to their initial position, after which during the fourth quarter of its movement the said arms are again at rest. The cam is, of course, so timed, that it moves the said arms laterally when the needles are disengaged from the work.

In the operation of the machine herein disclosed the needle is in one of its extreme lateral positions when the cam 27 and the parts that are in engagement with it are in the position shown in Fig. 5, and it is in its other extreme lateral position when the said parts are in the position shown in Fig. 6, and in the movement of these parts from one to the other of these positions the said cam makes just one half of a revolution. During the time the said cam 27 is turned from the position it is shown in, in said Fig. 5, to the position it is in, in Fig. 6, the driving shaft 14 of the machine makes one complete rotation, and in the movement of the parts back again to the position shown in said Fig. 5, the said driving shaft makes another complete rotation, and thus it is understood that there are two complete vertical reciprocations of the needle to one complete lateral reciprocation of the same. At the time the parts are in the position shown in Figs. 5 or 6, no lateral movement of the needle is taking place, and the periphery of the cam 27 is so constructed that no lateral movement of the needle takes place during one quarter turn of said cam, and in the position shown in Figs. 5 or 6, said cam has moved one half of this quarter turn, or one eighth of its complete rotation. Just as the said cam completes another one-eighth of its forward movement from either one of the positions shown in these figures, the functional part of the periphery of the same comes into engagement with one of the jaws of the yoke 41, and lateral movement of the parts actuated by said cam commences. Viewing Fig. 5 for example, it will be obvious that as the cam swings around its axis at 29, and its functional part engages the adjustable jaw 44 its power will be exerted on said jaw and the yoke will be thereby moved to the position it is shown in, in Fig. 6. From the construction shown in these two figures, it is obvious that the movements of the arms 34 and 35 will be the same in either direction, and from the connection between one of these arms and the needle, it is seen that the needle will be moved laterally at the same speed in either direction.

It will be understood from the foregoing that the revolving movement of the driving shaft 14 is reduced by means of the gears 18 and 20, so that the ratio between the shaft 14 and the gear 20 is two to one. The yoke 41, and the pivoted arms 34 and 35, perform the function of transmitting the action of the cam 27 to the arm 37 so that said arm moves in either direction at a uniform speed, and from the same the needle is moved laterally at a uniform speed in either direction. And it is noted that there are four sections to the periphery of this cam 27, two of these sections are shown in engagement with the jaws of the yoke 41, in Figs. 5 and 6, and the sections not in engagement with said jaws in said figures are the other two sections, and these sections that are in engagement with said jaws in these figures, are the sections that do not transmit any movement. And these opposite sections that are shown in engagement with said jaws in said figures are of such an extent that the cam turns just one quarter around while they are in engagement with the jaws without transmitting any movement, then during the next quarter turn the full movement is transmitted. It is thus seen that the cam during each alternate quarter turn transmits a lateral movement to the yoke 41, and from the movement of this yoke a lateral movement is transmitted to the needle. The cam is so constructed that its periphery is always in engagement with the jaws of the yoke, and the adjustable part 44, serves as a means for always maintaining a fit between the jaws and the cam.

From the movement illustrated as having taken place in the parts, from Figs. 5 to 6, it will be clearly understood that the face of the jaws or walls of the yoke, which the periphery of the cam 27 engages, will always remain in the same plane in any of the lateral positions to which said yoke may be moved, and in view of this it is clear that the cam will move said yoke to and fro at a uniform speed in either direction. And the part 44 is so constructed that the adjustment of the same to take up wear, will not change its face relative to the face of the opposite jaw, or in other words, the faces of the jaws that the cam 27 engages will remain parallel with respect to each other under any adjustment of the part 44. This will be clearly seen by referring to Figs. 5 and 6. And it will also be understood from said figures, that the pivots 48 on which the yoke 41 is mounted are each oscillated bodily and separately in separate arcs of circles, around the shafts 32 and 33, and the yoke 41 is oscillated bodily in an arc of a circle, the center of which is intermediate the axis of the said shafts 32 and 33, and the arm 37 is oscillated in an arc of a circle about the axis of the shaft 33.

The means by which a revolving movement of a shaft is converted into a positive oscillatory movement, of a uniform speed in either direction by a peripheral cam, has now
 5 been described. It is clear that the means employed for this purpose may be modified without departing from the spirit of my invention, and it is therefore to be understood that I do not wish to be limited to the exact
 10 construction of means herein disclosed. The ratio of two to one speed between the driving shaft 14 and the cam is not to be understood as an essential element. This ratio is herein
 15 used for the purpose of transmitting one lateral movement to the needle to each vertical reciprocating movement of the same. It is obvious that for other purposes different ratios of speed between the driving shaft and cam might be desirable, and it is to be ob-
 20 served that two shafts are oscillated namely shafts 33 and 32, and that while the oscillation of shaft 33 is only used for transmitting lateral movement to the needle, both of said shafts serve as pivots for the arms on which
 25 the part 41 is pivoted. And it is also to be observed that these shafts may be used to move other parts than those herein shown, as is illustrated in my co-pending application Serial No. 360,900, filed March 6, 1907, in the
 30 said application the oscillating movement of one of these shafts is used for moving the needle laterally, and the oscillating movement of the other of said shaft is used for the purpose of operating a ratchet mechanism.
 35 In Figs. 7 and 8 I have illustrated a modified form of my invention, and therein the driving-shaft 14, the gears 18 and 20 and the other parts up to and including the cam 27, are substantially the same as shown in
 40 the first form of my invention described. In the form of Figs. 7 and 8, however, the yoke 41 is arranged on the front of the overhanging arm instead of the rear and is connected to the segment-arm 37 by means of the
 45 bifurcated lug 50, between the prongs of which a lug 51 on the segment-arm 37 extends, said lug 51 being secured in the bifurcated lug 50 by means of the pin 52 which journals in said lug, and is fixed by means of
 50 a screw 53 to the lug 51. The other end of the yoke 41, is provided with the lug 54, to which is pivotally held the block 55 by means of the screw-bolt 56, held in place by the nut 57. Adjacent the lug 54 of the yoke 41, the arm
 55 of the machine is provided with a way 58, within which is secured the guide 59, by means of the screw 60, tapped through the guide and into the arm. The guide 59 is provided with the extending arms 61 constituting a way or guide for the block 55, to
 60 slide and pivot in. The yoke 41, is arranged between the arms 61 and the plate 25, secured to the hub 21, thus preventing the same from having lateral movement or
 65 wobbling in its action.

The cam 27 in the above described modified form of my invention is revolved, as is evident, the same as in the form first described, but by reason of the change in the mounting of the yoke the transmission of movement will not
 70 be just the same. By referring to Fig. 7 it will be observed that as the lever 37 is vibrated laterally, it will of course move in an arc of a circle about its pivot, and therefore the end of the connection 41 that is
 75 pivoted to said lever will be raised and lowered as said lever is oscillated. In this modification of my invention the pin 52 serves as one of the pivots of the part 41, and the bolt 56 as the other pivot for said part, 80
 so it will be observed that this yoke 41 is also pivoted on either side in this modified form, but instead of the lug 54 being pivoted on the end of a depending arm, it is pivoted on a
 85 sliding block. It is obvious that a depending arm, as shown in the first form described, would serve as a pivot for the lug 54, and that said arm would cooperate with the arm 37 and thus the yoke 41 would be pivoted on
 90 two arms substantially the same as in the said first form. But in practice I prefer the first form with the yoke 41 pivoted on the ends of two arms, and a third arm provided for transmitting the movement to the needle. By this construction the arm on which said
 95 yoke is pivoted may be both constructed the same, and more suitable for the function of carrying the yoke. And by having the arm 37 separately from the other arms, it too may be made simpler, and more suitable for its
 100 function. Pivoting the yoke on the ends of two arms as in Fig. 2, is better than pivoting the same on an arm and a sliding pivot as shown in Fig. 7, and an arm is obviously
 105 more simple and less expensive than the sliding pivot shown in said Fig. 7. In connection with the said modified form of my invention it is noted that the object of illustrating and describing the same is for the
 110 purpose of showing that changes may be made in said invention without departing from the spirit of the same. The first form of the invention described is the preferred form, but it is to be understood that a patent
 115 is desired that will cover both of these forms. Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A sewing machine comprising a reciprocating needle adapted to be moved laterally, means for moving said needle laterally comprising a part that is mounted on a plurality of pivots carried by a plurality of pivoted members that are mounted on independent axes, and a cam adapted to
 120 oscillate said part.

2. A sewing machine comprising a reciprocating needle adapted to be moved laterally, means for moving said needle laterally comprising a part that is mounted on two
 130

pivots and intermediate the same, said pivots carried by two pivoted members that are mounted on independent axes, a connection between said part and the aforesaid 5 needle, and means for oscillating said part.

3. In a sewing machine having a stitch forming mechanism comprising a needle adapted to be moved laterally, two arms separately pivoted to oscillate in a vertical 10 plane about separate axes which run in a horizontal plane, a part comprising two bearings or jaws running parallel to each other, said part pivoted to the extending ends of the said arms and intermediate the same, an 15 operating cam in engagement with the said jaws and between the same, and means intermediate one of the said elements and the aforesaid needle whereby the needle is moved laterally.

4. In combination, a reciprocating needle-bar, a rotating driving-device, and means for 20 converting the rotary movement of said device into reciprocating movement for said bar, including a yoke for embracing the driving-device, two pivotally supported arms 25 pivotally connected to the yoke, and means for compensating for wear between the rotary device and the yoke.

5. In combination, a rotary driving-shaft; 30 a circularly moving actuating device; means between the latter and said shaft for imparting the circular movement; a vibrating needle-bar; and means between the actuating device and said bar for transmitting move-

ment from one to the other, including a 35 plurality of pivotally supported arms, means for maintaining the arms in parallelism, means for connecting the latter means with the actuating device, and means connecting 40 the arms with the vibrating bar.

6. A sewing machine comprising a pivoted arm, a second pivoted arm, a part pivoted 45 on the ends of said arms and disposed intermediate the same, a cam and means for operating it, said cam adapted to oscillate 45 said pivoted part, a needle adapted to be moved laterally, and a connection between said needle and one of said pivoted arms.

7. A sewing machine comprising a vertically reciprocating needle adapted to be 50 moved laterally, a driving shaft and means for revolving it, a peripheral cam, means intermediate said shaft and said cam whereby the cam is revolved once to two rotations 55 of said driving shaft, a part adapted to be engaged by said cam, two pivoted arms that are disposed parallel with each other, said 60 part pivoted on said arms and disposed intermediate the same, and a connection between one of said elements and the needle.

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

WILLIAM N. PARKES.

Witnesses:

CHAS. McC. CHAPMAN,
M. HERSKOVITZ.