

No. 878,196.

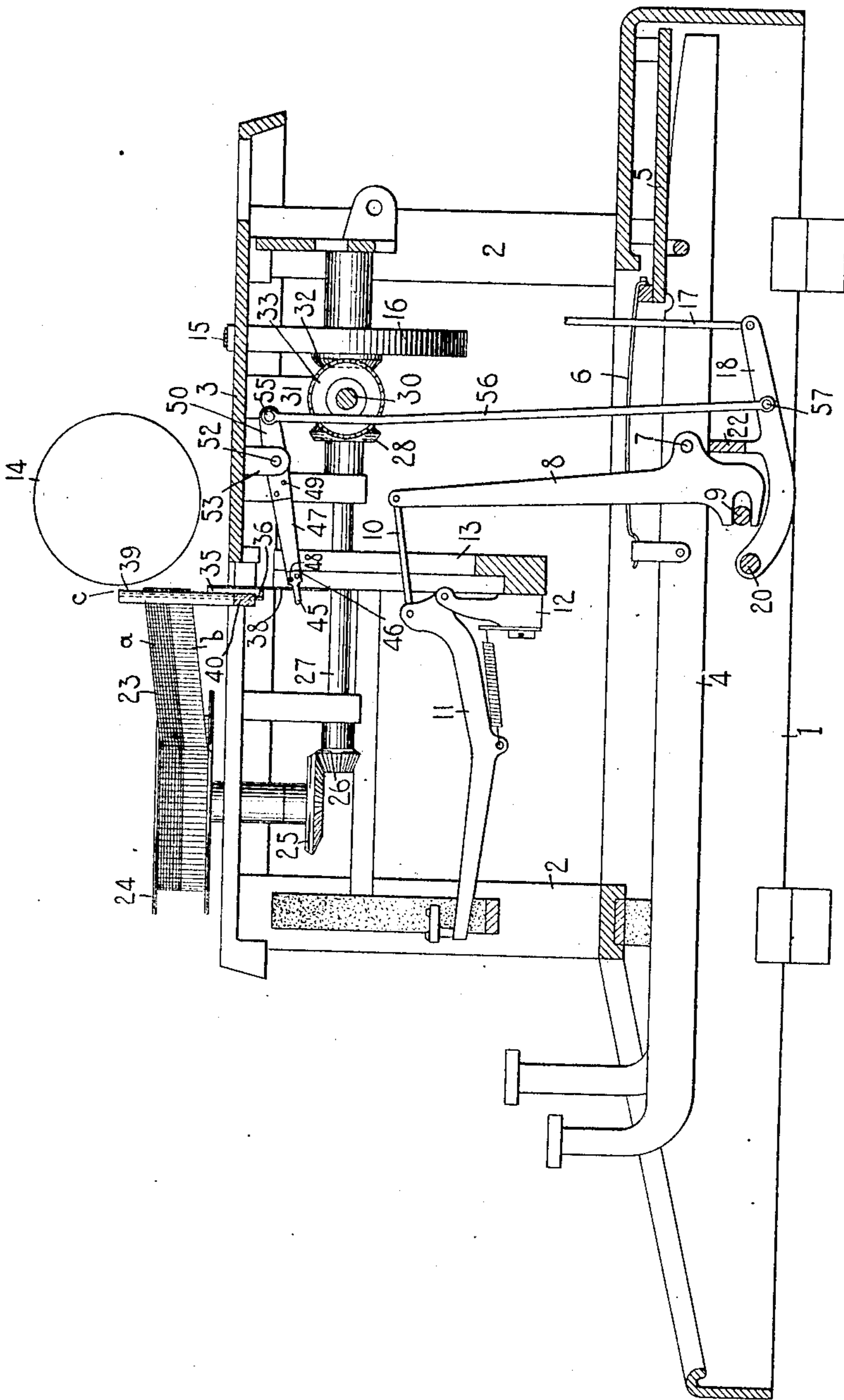
J. FELBEL.

PATENTED FEB. 4, 1908.

TYPE WRITING MACHINE.

APPLICATION FILED SEPT. 26, 1906.

3 SHEETS—SHEET 1.



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WITNESSES:

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New Pool

INVENTOR:

Jacob Felber

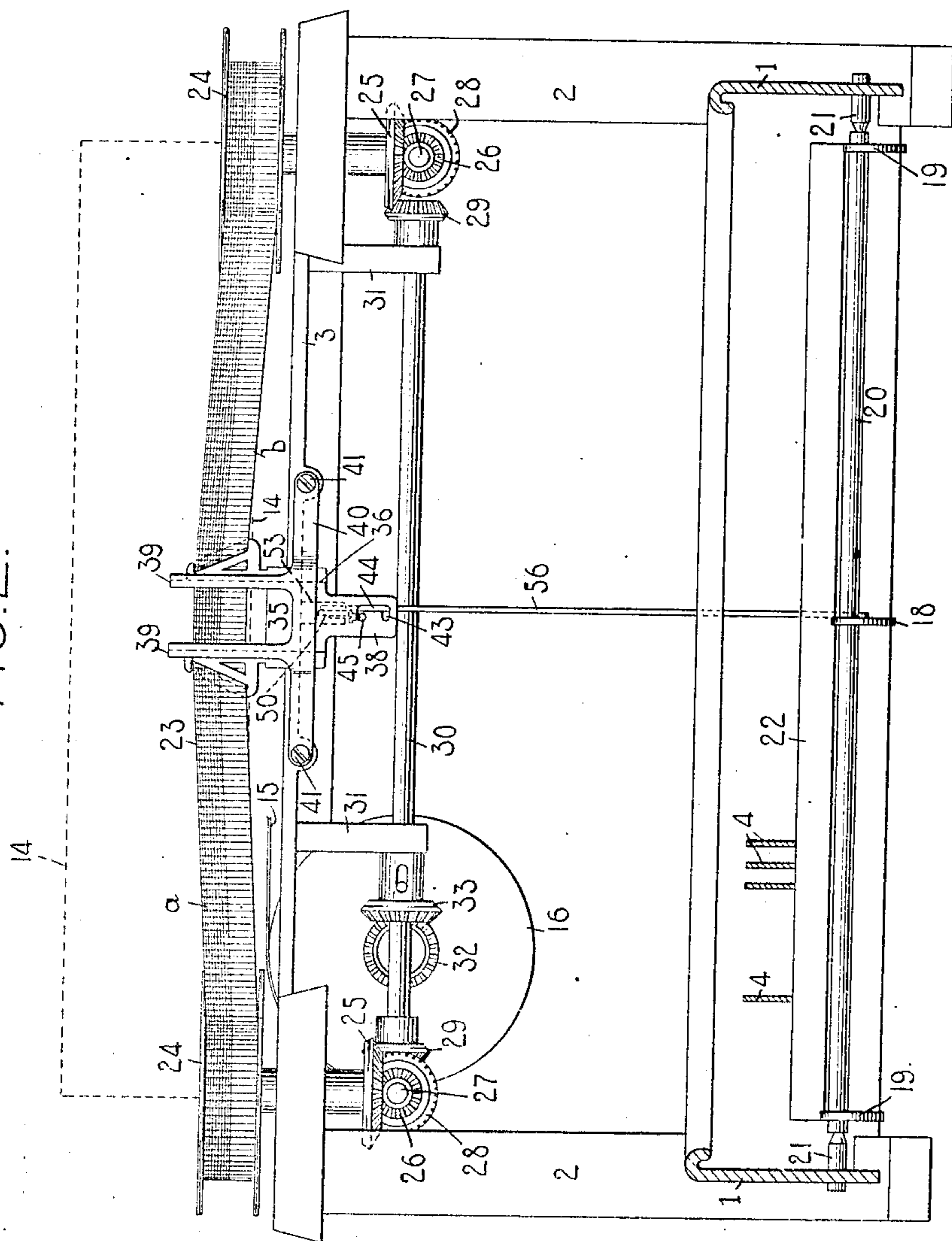
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3 SHEETS—SHEET 2.

FIG. 2.



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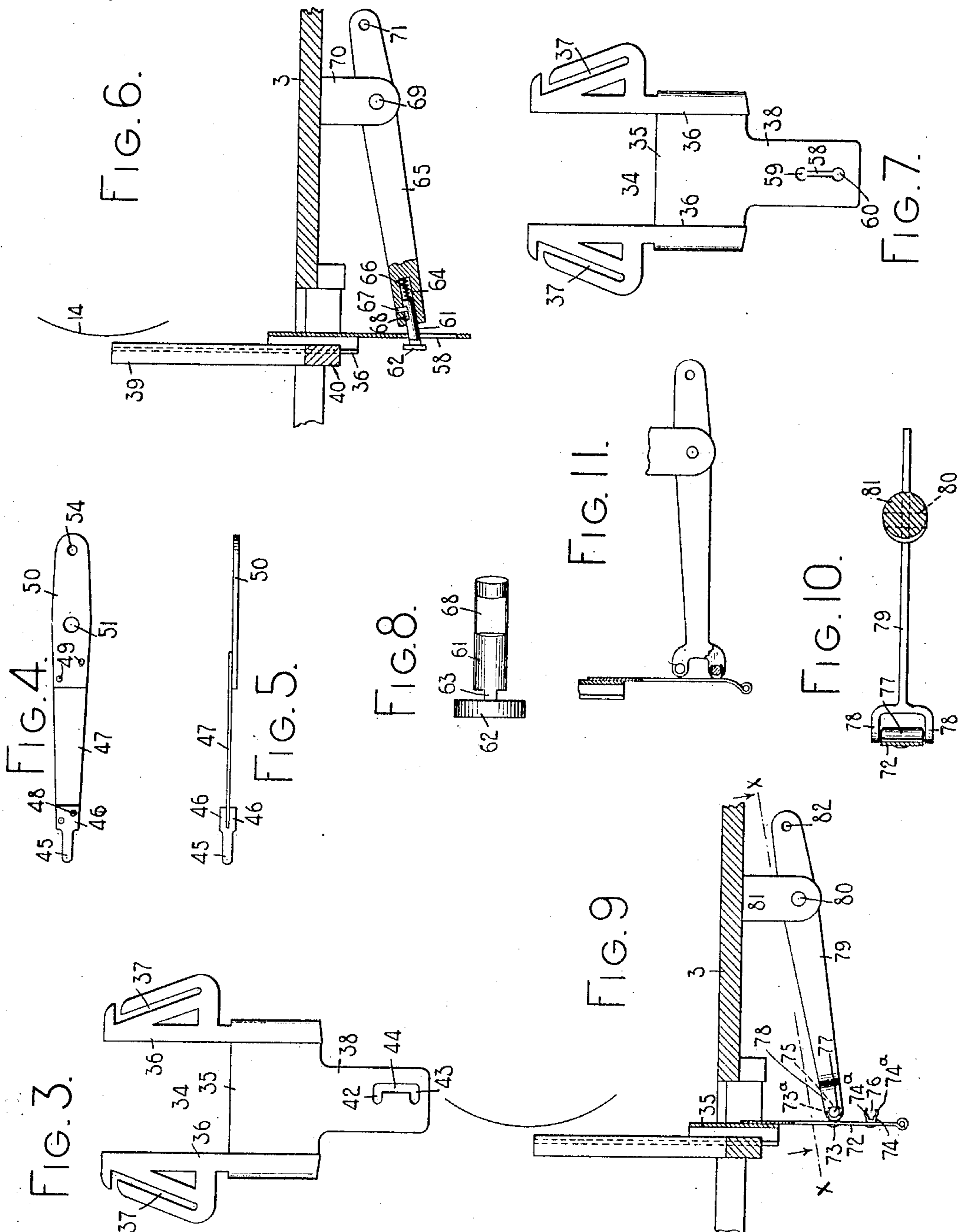
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3 SHEETS—SHEET 3.



WITNESSES.

E. M. Wells.  
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# UNITED STATES PATENT OFFICE.

JACOB FELBEL, OF NEW YORK, N. Y., ASSIGNOR TO UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## TYPE-WRITING MACHINE.

No. 878,196.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed September 26, 1906. Serial No. 336,314.

*To all whom it may concern:*

Be it known that I, JACOB FELBEL, citizen of the United States, and resident of the borough of Manhattan, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates more particularly to ribbon mechanism for typewriting machines and has for one of its objects to provide an improved construction wherein a ribbon normally removed from the printing point and having a plurality of fields of different characteristics or colors may be controlled so that under the influence of the printing keys, said ribbon may be moved to cover the printing point with any desired field. Although especially adapted for use with ribbons of the character referred to (usually termed polychrome ribbons), my invention may, nevertheless, be employed advantageously with ribbons of uniform character or color throughout in order to make use substantially of the full width of such ribbons in parallel lines.

To the above and other ends, the invention consists in the features of construction, combinations of devices and arrangements of parts hereinafter fully described and particularly pointed out in the claims.

The invention is shown as applied to a Monarch typewriter, but the nature of said invention is such that it may be readily adapted to other forms of writing machines.

In machines of the Monarch style the movements of the ribbon to and from the printing point are controlled by a vibratory ribbon carrier or vibrator which is actuated by a train of devices including an operating member or lever which is pivotally connected with said vibrator. In carrying out my present invention I provide a construction wherein the point of pivotal connection between the vibrator and the operating lever may be altered without altering the extent of throw or movement of the vibrator towards the printing point. As a result of the alteration of the vibrator's point of connection with its actuating means the normal position of the vibrator is altered and the widthwise portion or field of the ribbon which is brought opposite the printing point is also changed. When a ribbon is divided longitudinally into stripes or fields of different

colors or characters the alteration just referred to causes a change in the color or other salient characteristic of the printing.

Several forms of my invention are illustrated in the accompanying drawings wherein,

Figure 1 is a vertical longitudinal sectional view of a typewriting machine, parts of which are omitted and parts broken away. Fig. 2 is a transverse vertical sectional view of the machine taken on a plane just forward of the top plate, parts being omitted and parts being broken away. Fig. 3 is an enlarged detached front elevation of the ribbon carrier or vibrator. Figs. 4 and 5 are enlarged views in side elevation and plan respectively of the lever for operating the ribbon vibrator. Fig. 6 is an enlarged fragmentary side view, partly in section, of a ribbon vibrator, its operating lever and associate parts showing a modified construction of my invention. Fig. 7 is an enlarged detached front elevation of the vibrator shown in Fig. 6. Fig. 8 is an enlarged plan view of one of the parts shown in Fig. 6. Fig. 9 is an enlarged fragmentary side view, partly in section, of a ribbon vibrator, its operating lever and associate parts showing a further modification of my invention. Fig. 10 is a horizontal sectional view taken on the plane represented by the line  $x-x$  in Fig. 9 and looking in the direction of the arrows at said line. Fig. 11 is a detail sectional side elevation of a further modification of my invention.

Referring to Figs. 1 to 5 inclusive of the drawings, and first more especially to Figs. 1 and 2, the main frame of the machine is shown as comprising a base 1, corner posts 2 and a top plate 3. Key levers 4 are fulcrumed on a fulcrum plate 5, each key lever being provided with a restoring spring 6 and having pivoted to it at 7 a sub-lever 8. The lower end portion of each sub-lever is slotted to cooperate with a fixed abutment 9 and the upper end of the sub-lever is connected by a link 10 to a type bar 11, said type bar being pivoted in a hanger 12 secured to a segmental hanger support 13 on which the hangers are arranged in segmental series. The type bars cooperate with the front face of a platen 14, which is diagrammatically illustrated, said platen being supported in a carriage (not shown) and the carriage being connected by a band or strap 15 with a spring drum 16 which constantly tends to draw the

carriage and platen leftward across but above the top plate. The leftward movements of the platen and carriage are controlled by a letter space feeding mechanism which is or may be of the usual construction but is omitted from the drawings, said mechanism comprising devices which are connected by a link 17 with a central rearwardly extending arm 18 of a universal bar frame. Said frame comprises in addition to the arm 18, side arms 19, connected by a rock shaft 20 which is pivoted on screw pivots 21, and a universal bar proper 22, the latter extending from side to side of the machine beneath the key levers 4 and being adapted to be swung downwardly each time one of said key levers is suitably actuated.

A ribbon 23 is wound upon a pair of ribbon spools 24, one disposed at each side of the machine forwardly of the platen and above the top plate. As herein shown the ribbon is divided into longitudinal stripes or fields *a* and *b* of different characteristics; that is to say, the field *a* may be of one color, such as black, and the field *b* of another and different color, such as red, for example; or the field *a* may be record ribbon and the field *b* copying ribbon. The ribbon may be fed longitudinally back and forth between the spools by any suitable ribbon feeding mechanism, that shown in the drawings being the usual mechanism of the Monarch machine and comprising for each ribbon spool a small beveled gear 25 operatively connected with the spool and meshing with a beveled pinion 26 at the forward end of a horizontal shaft 27, said shaft carrying at its rear end a beveled pinion 28. Each pinion 28 is adapted to mesh with a driving pinion 29 fixed to a horizontal driving shaft 30 journaled in lugs 31 depending from the under side of the top plate, said shaft extending from side to side of the machine. The driving shaft is connected with and receives motion from the spring drum 16, the connections comprising two beveled gears 32 and 33, the gear 32 being operatively connected with the spring drum and the gear 33 with the driving shaft 30 in such a way that while said gear 33 and said shaft turn together yet said shaft may be moved endwise relatively to said gear. The endwise movement of the driving shaft serves to connect one or the other of the driving pinions 29 with its associate pinion 28 and to cause one or the other of the ribbon spools to be turned to wind the ribbon thereon in the usual manner.

That portion of the ribbon which extends between the ribbon spools is normally held or maintained below the printing point *c* at the front of the platen by a vibratory ribbon carrier or ribbon vibrator, a form of which is most clearly shown in Fig. 3 and represented as a whole by the numeral 34. The vibrator is preferably constructed of a single piece of

sheet metal and comprises a cross-head 35 at the sides of which are arms 36, said arms being bent inwardly towards each other, and being provided at their upper portions with oppositely inclined guiding slots 37 through which the ribbon is threaded. A stem 38 extends downwardly from the middle of the cross-head 35. The vibrator 34 is adapted to be reciprocated up and down in a substantially vertical direction, being guided and supported on the upright arms 39 of a guide bracket 40, said guide bracket being secured to the top plate of the machine by screws 41, all as in the Monarch machine. But unlike the Monarch vibrator, the lower portion of the stem 38 of the vibrator is provided with two engageable or engaging devices in the form of two short parallel horizontal bearing openings or slots 42 and 43, said devices or slots being spaced apart and connected at one side by a vertical opening or slot 44. The engaging devices or slots 42 and 43 and the slot 44 form a continuous aperture, the horizontal ends 42 and 43 of which extend transversely from the middle of the stem towards one side thereof, the connecting slot being at one side of the middle of the stem and longitudinal thereof. The engaging devices, slots or openings 42 and 43 are adapted to cooperate at will with, and serve as bearing openings for, the forward end of an operating lever which, in the present instance, preferably comprises three parts and will now be described in detail. The aperture in the stem receives one end of the operating lever fashioned as an engaging device or stud 45, said device or stud being horizontally disposed and projecting forwardly through the aperture. The stud 45 is bifurcated at its rear end portion and the forks 46 of the bifurcation, as will be best understood from a consideration of Figs. 4 and 5, embrace the forward end portion of a horizontally disposed spring plate or flexible blade 47, the forks 46 and the blade 47 being secured in a fixed relation by any suitable means, as by rivets 48. The rear end portion of the spring plate or blade 47 is suitably secured as by rivets 49 to the body portion of the operating lever, said body portion being provided between its ends with a bearing opening 51 which receives a fulcrum pin 52 supported in a lug 53 depending from the under side of the top plate (Fig. 1). Near its rear end the body portion 50 is provided with an opening 54 which receives a pin or rivet 55, the latter serving to pivotally connect the operating lever with the upper end of an actuating link 56 the lower end whereof is connected at 57 with the arm 18 of the universal bar frame.

Referring now to the operation of the parts and assuming that the device or stud 45 is in cooperation with the upper device, slot or notch 42, as shown in Figs. 1 and 2, it will be

understood that at each actuation of a printing key lever 4 the associate type bar will be operated and the universal bar 22 will be swung downwardly, operating the escapement devices and pulling down the actuating link 56. The downward movement of the actuating link swings down the rear arm of the three-part operating lever and causes the stud 45 at the front end of the forward arm of said lever to actuate the ribbon vibrator upwardly, said vibrator sliding on the upright arms 39 of the guide bracket 40, starting from the normal position shown in Figs. 1 and 2 and being thrown far enough to bring the upper field or portion *a* of the ribbon into the path of the type. Of course, when the printing key is released the vibrator will fall back or return to normal position in the usual way. It will be understood that when the parts are related as shown in Figs. 1 and 2, the ribbon at each printing operation will be moved upwardly always to substantially the same extent and that consequently the type impressions will follow in a path longitudinal of the upper field or portion *a* of said ribbon.

When it is desired to make use of the lower portion or field *b* of the ribbon the operator takes hold of the end of the stud 45 which projects through the stem 38 of the vibrator and presses said stud towards the right. This causes a flexure of the spring blade 47 which is the middle portion of the operating lever, said spring blade yielding until the stud 45 contacts with the opposite end of the slot 42 where the latter joins the upper end of the connecting slot 44. The vibrator may now be moved upwardly by hand, the slot 44 receiving the stud 45, the upward movement of the vibrator being continued until the lower end of the slot 44 contacts with the stud 45; thereupon the stud 45 may be released and the tension of the spring blade 47 will serve to move said stud horizontally through the slot 43 until said stud contacts with the inner end of said slot. By the manual operation just described it will be seen that the point at which the vibrator and the operating lever are pivotally connected is altered and that while the normal position of the operating lever remains unchanged the normal position of the vibrator, and that portion of the ribbon controlled thereby, have, however, been correspondingly altered, said vibrator being shifted vertically upward to a new normal position which is above the first normal position a distance equal to the distance between the slots 42 and 43. If thereafter one or another of the printing key levers be actuated the vibrator actuating devices, comprising the link 56 and the operating lever, will be moved substantially the same extent as before and consequently the throw of the vibrator or the distance it is moved upwardly will be sub-

stantially the same as before. The normal position of the vibrator however has been altered so that the limit of upward movement of said vibrator will be altered a corresponding extent, said limit being moved upwardly a distance equal to the distance the normal position of said vibrator has been moved upwardly or altered. The amount of this alteration is so calculated that the upward movement of the vibrator will bring the lower field *b* of the ribbon to the printing point. It will be apparent that as long as the readjustment just described is maintained the ribbon will be moved upward always to substantially the same extent and the type impressions will follow in a straight path longitudinal of the lower ribbon field *b*.

When it is desired to again make use of the upper field *a* of the ribbon the pivotal device or stud 45 may be pressed from the left to the right-hand side of the engaging device or slot 43 against the tension of the spring blade 47 and then the vibrator may be lowered by hand until the upper end of the slot 44 contacts with the device or stud 45, whereupon the latter may be released to permit it to move under the influence of the spring blade 47 through the engaging device or slot 42 until said stud engages with the inner end of said slot, as shown in Fig. 2. The flexible or spring blade 47 while readily yielding to lateral pressure is of sufficient width to be practically unyielding to the vertical strain to which it is subjected during up and down movements of the operating lever.

Various changes of construction may be effected without departing from the gist of my invention, and in Figs. 6, 7 and 8 I have illustrated one example of such changes. In the modified construction shown in the last named figures, the stem 38 of the vibrator is provided, as best shown in Fig. 7, with a central vertical slot 58, terminating at the top and bottom in enlarged circular engaging devices or openings 59 and 60. Coöperative at will with either of the openings 59 or 60 is a device in the form of a cylindrical spring plunger 61 shown in detail in Fig. 8. The plunger is adapted to fit loosely in and extend forwardly through one or another of the bearing openings 59, 60, and at its forward end in front of the stem 38, said plunger is provided with a cap or button 62. The plunger proper is joined to the cap by a reduced portion or neck 63. The plunger is received in a depression or hole 64 formed in the front end of an operating lever 65. A coiled spring 66 is seated in the bottom of the opening 64 and coöperates with the plunger 61 to maintain it normally in the position shown in Fig. 6 at the limit of forward movement, this limit being determined by a pin 67 which extends into the opening 64 and coöperates with a cut-away or slot 68 formed in

the upper portion of the plunger. The pin 67 and slot 68 serve also to determine the rearward limit of movement of the plunger when the latter is pressed in a manner presently to be described, and said pin and slot furthermore cooperate to prevent rotary movement of said plunger so that the neck 63 thereof is always vertically disposed, this vertical disposition of the neck being necessary to enable it to cooperate properly with the slot 58 in the vibrator stem, as will hereinafter be explained. The operating lever 65 is pivoted at 69 in a lug 70 depending from the top plate 3 and is connected at 71 with the upper end of the actuating link 56. When positioned as illustrated in Fig. 6, that is, with the device or plunger 61 bearing in the upper engaging device or opening 59 in the stem of the vibrator, said vibrator will at printing operations be lifted or thrown far enough to bring the upper field of the ribbon to the printing point. When it is desired to make use of the lower field of the ribbon, the operator presses rearwardly against the cap 62 of the plunger, compressing the spring 66 and bringing the neck 63 into register with the bearing opening 59, or, in other words, into the same vertical plane with the stem of the vibrator. The slot 58 is too narrow to receive the cylindrical part of the plunger 61, but is of sufficient width to receive the neck 63 so that by holding the cap 62 pressed rearwardly the vibrator may be lifted until the bearing opening or engaging device 60 engages with the plunger, whereupon the latter may be released. Said plunger will then be pressed forwardly by its spring, causing the cylindrical portion of the plunger to engage with the circular bearing opening 60. The normal position of the vibrator is by this adjusting operation moved vertically upward a distance equal to the distance between the bearing openings 59 and 60, and consequently at printing operation the lower field *b* of the ribbon will be brought to the printing point. When it is desired to again make use of the upper field of the ribbon the relation between the vibrator and its operating lever may be readjusted by reversing the operations just described, thereby restoring the parts to the normal relations shown in Fig. 6.

A further modified construction is illustrated in Figs. 9 and 10 of the drawings wherein a flexible stem 72 of spring metal is suitably secured to and depends from the cross-head 35 of the vibrator. It will be understood, of course, that though for convenience of manufacture the stem 72 is in this construction made separate from and thereafter fixedly secured to the upper portion of the vibrator, yet said stem, if preferred, may be formed integral with the other portion of the vibrator and in any case comprises with said other portion practically a one-part or single-piece vibrator. Bearing members or

engaging devices 73 and 74 spaced apart one above the other are suitably secured to the flexible stem 72 in any suitable manner as by riveting. The bearing members each comprise a pair of spring arms 73<sup>a</sup> and 74<sup>a</sup> respectively, said arms extending rearwardly from the back of the stem 72 and the arms of each pair being so disposed with respect to each other as to form respective bearing openings 75 and 76. The free ends of the spring arms are adapted to be slightly forced apart against their inherent spring tension so as to admit a round bearing pin or engaging device 77 to their respective bearing openings 75 and 76, said pin being adapted to be retained in the openings by the spring tension of the arms forming the same and being further adapted to turn in said bearing openings. The pin 77 as shown in Fig. 10 is suitably secured in the arms 78 of the forked or bifurcated forward end of an operating lever 79, said lever being fulcrumed at 80 in a lug 81 depending from the top plate 3. The rear arm of the lever is perforated at 82 for connection of the link 56. When the parts are normally related as shown in Fig. 9 the vibrator at each printing operation will be thrown upward far enough to bring the upper field of the ribbon to the printing point. When it is desired to make use of the lower field *b* of the ribbon the operator may grasp the lower end of the stem 72 and pull the same forward, thereby flexing said stem and withdrawing the member 73 from cooperation with the pin 77. The vibrator may then be slid vertically upward until the member 74 is high enough to engage with the pin 77, whereupon the pull on the stem 72 is relaxed and the latter is permitted to return to the vertical, the inherent tension of said stem being sufficient to force the arms 74<sup>a</sup> slightly apart and to bring the bearing opening 76 into cooperation with the pin 77. By this adjusting operation the normal position of the vibrator as well as the ribbon is altered so that thereafter at each printing operation, although the throw of the vibrator remains the same as before, said vibrator will be elevated far enough to bring the lower field *b* of the ribbon to the printing point. By reversing the adjusting operation just described the vibrator and its operating lever may be restored to the first normal relation illustrated in Fig. 9.

It will be apparent that in the constructions hereinbefore described each of the actuating devices for the vibrator, including the operating lever, has a single normal position, while the vibrator itself has a plurality of normal positions; that in each case the vibrator and its operating lever are pivotally connected together so that while the movements of the operating lever are rotary and the movements of the vibrator are in a right line, yet there is entire freedom of oper-

ation; that means are provided for altering or changing the point of pivotal connection thereby changing the normal position of said vibrator, the consequence being that while the amount of throw of the vibrator is always the same, yet the starting and stopping points of the forward edge of the vibrator are variable; that the vibrator has a pair of engageable or engaging devices one above the other providing pivotal engaging points for the operating lever which has a single pivotal engaging device and providing a single point of connection; and that the relationship of the three engaging devices is variable at will to vary the normal relationship between the vibrator and the operating lever by a relative shifting movement between the two latter parts.

Besides the changes hereinbefore explained other changes may be made within my invention, such, for example, as shown in Fig. 11, wherein the two engaging devices are arranged on the operating lever and the single co-acting engaging member is arranged on the vibrator.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a typewriting machine, the combination of a vibratory ribbon carrier; actuating means pivotally connected therewith and operative to give a constant throw to the ribbon carrier; and means for changing the pivotal point of connection between the ribbon carrier and its actuating means without changing the extent of throw of the vibrator.

2. In a typewriting machine, the combination of a vibratory ribbon carrier having a plurality of bearing openings one over the other; and an operating lever having a part adapted to coöperate at will with one or another of said bearing openings.

3. In a typewriting machine, the combination of a vibratory ribbon carrier comprising a stem provided with a plurality of bearing openings; and a flexible operating lever having a portion adapted to coöperate at will with one or another of said bearing openings.

4. In a front strike writing machine and in a ribbon mechanism, the combination of an operating lever, a ribbon vibrator having two different points of connection one above the other for said lever, said lever being adapted to be connected at either of said points by a manual movement of said vibrator up or down so as to disengage one point of said vibrator from said lever and engage the other point of said vibrator with the same part of said lever and at the same point.

5. In a ribbon mechanism, the combination of a ribbon vibrator provided with two points of connection, an actuating lever therefor having a single point of connection with said vibrator, the parts being constructed so that the vibrator may be disconnected

from the lever at one connecting point and engaged with said lever at the other connecting point.

6. In a ribbon mechanism, the combination of a ribbon vibrator having two pivotal engaging points, and an actuating lever provided with a pivotal device to engage at will either of said engaging points on said vibrator, the said vibrator having a uniform extent of throw but having a different starting position according to the engagement of one or the other of said pivotal engaging points with said pivotal device.

7. In a front strike writing machine and in a ribbon mechanism, the combination of a ribbon vibrator having two points of engagement one above the other, an operating lever having a single device adapted to pivotally engage at will either of said points of engagement, and means for vibrating said lever and said vibrator and the ribbon a uniform distance at all times whether the lever be engaged with one or the other of the engaging points on said vibrator.

8. In a ribbon mechanism, the combination of an actuating lever having an unvarying extent of throw and provided with an engaging device, a ribbon vibrator having two engaging devices to coöperate pivotally with the engaging device on the lever, the relationship between the three engaging devices being variable at will by a relative movement between said lever and said vibrator, the said vibrator having a uniform extent of throw but having a different starting position according to the adjustments of said engaging devices.

9. In a ribbon mechanism, the combination of an actuating lever and a ribbon vibrator, three engaging devices, two on one described member and one on the other described member, adapted to provide two different pivotal points of connection between said lever and said vibrator, and said pivotal points of connection being variable at will by a relative shifting movement between the said lever and the said vibrator, the said vibrator having a uniform extent of throw but having a different starting position according to the adjustments of said engaging devices.

10. In a ribbon mechanism, the combination of a ribbon vibrator provided with two engageable devices connected together by a slot or passage-way, and an actuating lever provided with a device movable through said slot or passage-way to co-act with either of said engaging devices, the said vibrator having a uniform extent of throw but having a different starting position according to the engagement of one or the other of said engageable devices with said device on said actuating lever.

11. In a ribbon mechanism, the combination of a ribbon vibrator provided with two

transverse slots and one longitudinal, connecting slot, and an actuating lever provided with a device to move through said longitudinal slot and engage either of said  
5 transverse slots.

Signed at the borough of Manhattan, city of New York, in the county of New York,

and State of New York, this 25th day of September A. D. 1906.

JACOB FELBEL.

Witnesses:

E. M. WELLS,  
J. B. DEEVES.