No. 752,210. PATENTED FEB. 16, 1904.

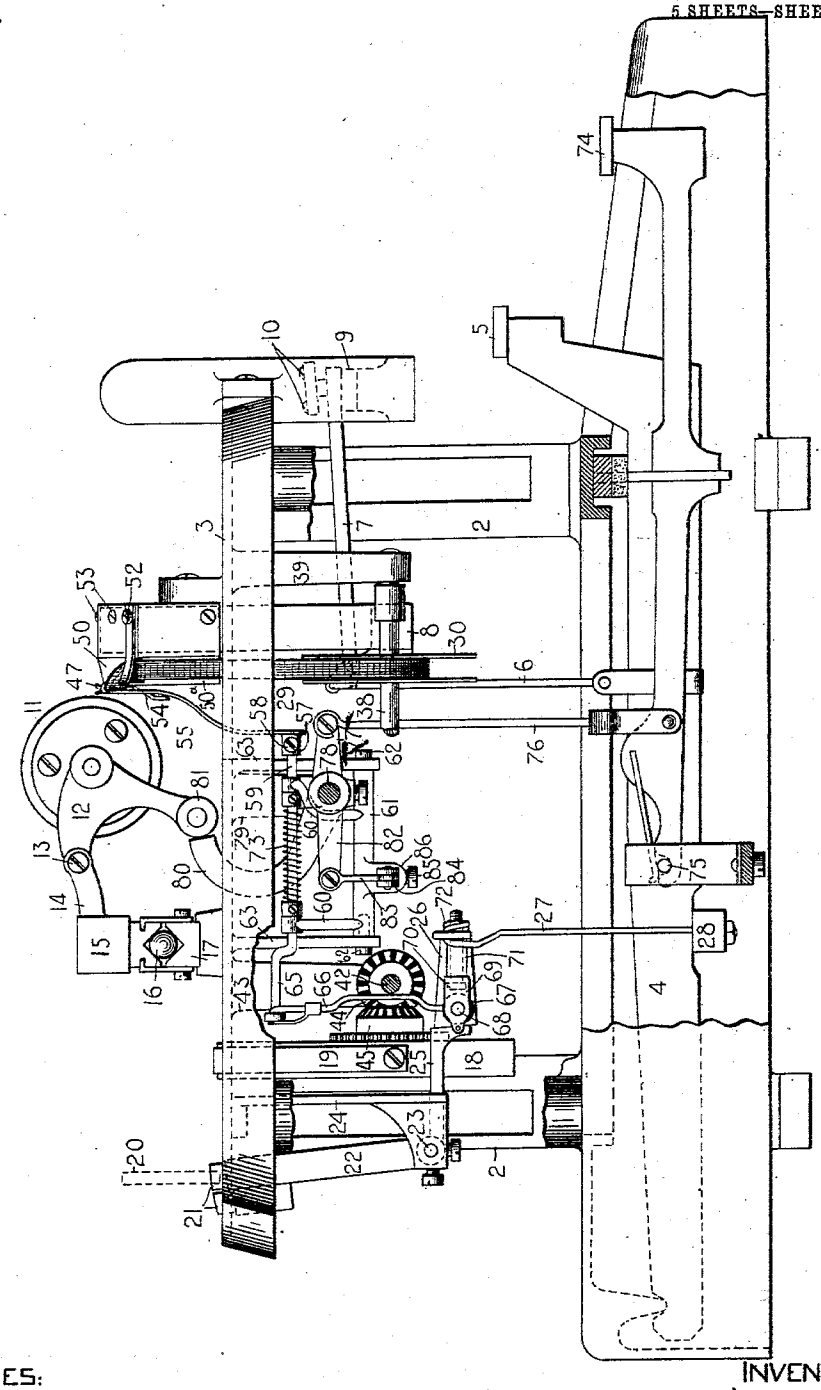
L. P. DISS.

TYPE WRITING MACHINE.

APPLICATION FILED AUG. 2, 1901.

NO MODEL. 5 SHEETS—SHEET 1.

FIG. I.



WITNESSES:

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Florence Keeling

INVENTOR:

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NO MODEL. 5 SHEETS—SHEET 2.

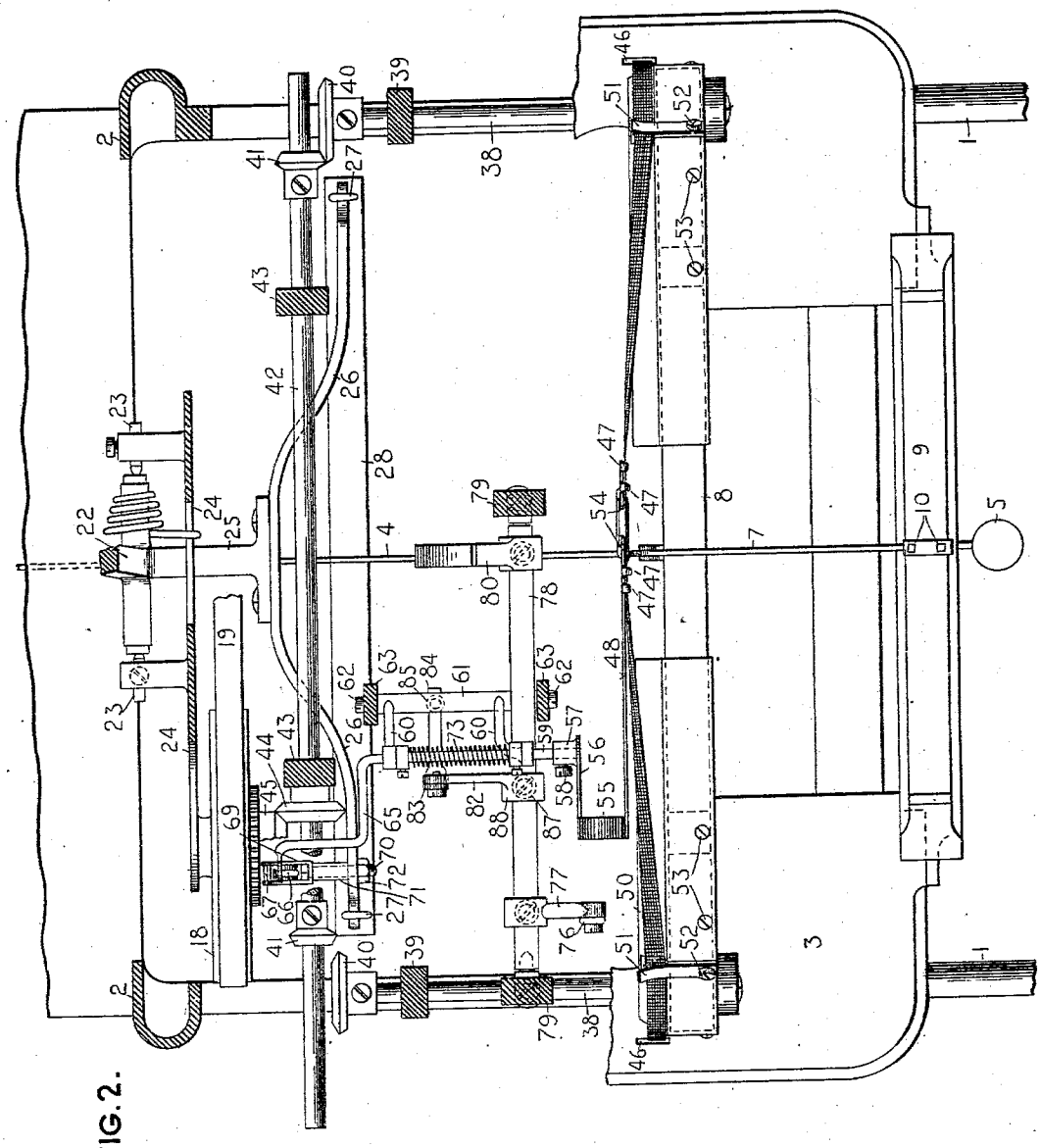


FIG. 2.

WITNESSES:

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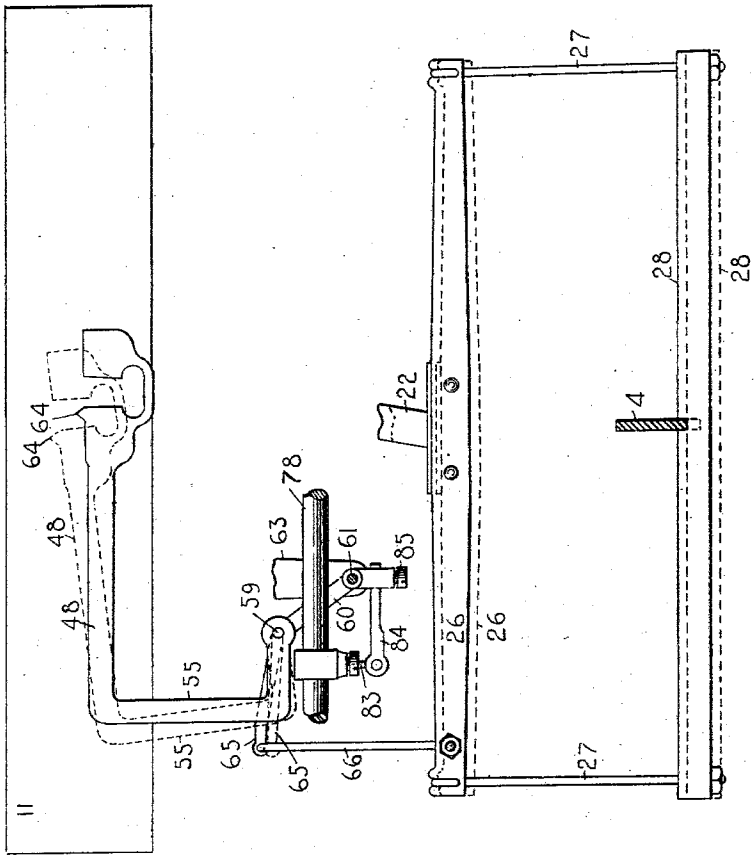
L. P. DISS.

TYPE WRITING MACHINE.

APPLICATION FILED AUG. 2, 1901.

NO MODEL. 5 SHEETS—SHEET 3.

FIG. 3.



WITNESSES:

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No. 752,210. PATENTED FEB. 16, 1904.

L. P. DISS.

TYPE WRITING MACHINE.

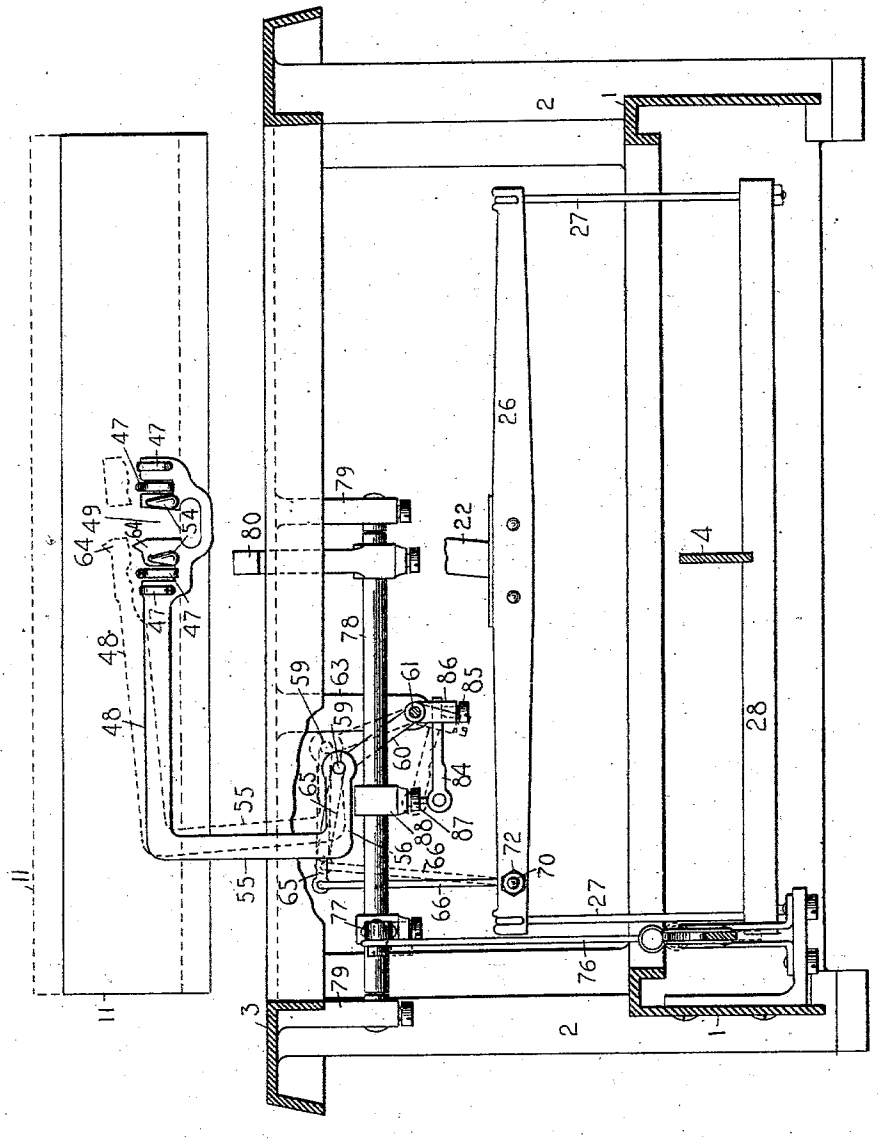
APPLICATION FILED AUG. 2, 1901.

NO MODEL. 5 SHEETS—SHEET 4.

FIG. 9.



FIG. 4.



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L. P. DISS.

TYPE WRITING MACHINE.

APPLICATION FILED AUG. 2, 1901.

NO MODEL. 5 SHEETS—SHEET 5.

FIG. 8.

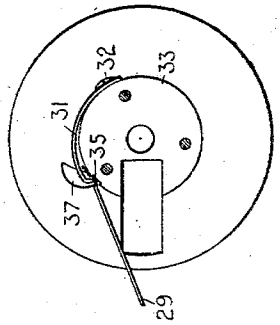


FIG. 6.

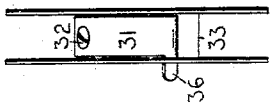


FIG. 7.

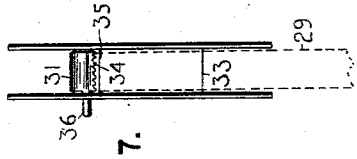
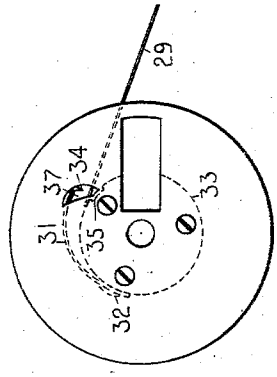


FIG. 5.



WITNESSES:

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No. 752,210. Patented February 16, 1904.

UNITED STATES PATENT OFFICE.

LOUIS P. DISS, OF ILION, NEW YORK, ASSIGNOR TO WYCKOFF, SEAMANS & BENEDICT, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 752,210, dated February 16, 1904.

Application filed August 2, 1901. Serial No. 70,617. (No model.)

To all whom it may concern:

Be it known that I, LOUIS P. DISS, a citizen of the United States, and a resident of Ilion, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to the ribbon-movements of writing-machines; and its main objects are to improve the vibrating mechanism, whereby at each type impression the ribbon is caused to cover and uncover the printing-point, and also to provide improved means for causing the ribbon to shift transversely when the platen is shifted from one printing-center to another.

To these and other ends, which will hereinafter appear, my invention consists in certain combinations of devices, features of construction, and arrangements of parts, all as will be hereinafter fully set forth, and particularly pointed out in the concluding claims.

In the accompanying drawings, Figure 1 is a side elevation of a front-strike writing-machine embodying my improvements, the several parts being shown in normal position. Fig. 2 is a plan of the machine, partly in section. Fig. 3 is a front elevation of the ribbon-vibrator and a portion of the carriage-feeding mechanism connected thereto, the normal position of the parts being shown in full lines and the working position in dotted lines. Fig. 4 is a cross-section of the machine, taken just in front of the ribbon-vibrator, but omitting the ribbon-winding mechanism. Fig. 5 is a face view of a spool, showing the mode of attaching the ribbon thereto. Fig. 6 is an edge view of the empty spool, showing the ribbon-clip thereon. Fig. 7 is an edge view of Fig. 5. Fig. 8 is a sectional view showing a ribbon end attached to a spool, and Fig. 9 is an enlarged cross-section through cone 54.

In the several views portions are omitted or broken away in order to give a clearer idea of the mechanism and similar parts are designated by similar numerals of reference.

The frame of the machine comprises a base 1, corner-posts 2, and top plate 3. At the rear of the base are fulcrumed levers 4, bearing keys 5 and connected by links 6 to type-bars 7, which are mounted upon a segment 8 and at their forward ends lie upon a curved rest 9, each bar carrying a plurality of type-faces 10. The types strike rearwardly against a platen 11, which is journaled in a frame 12, the latter being hinged at 13 to arms 14 of a carriage 15, which runs upon antifriction-balls 16, rolling in a grooved rail 17, set upon the top plate 3. The carriage is propelled in the usual manner by a spring-drum 18 and strap 19, and its movements are controlled by the usual escapement-wheel 20 and dogs 21, the latter being carried upon a rocker 22, pivoted at 23 in a bracket 24, which depends from the top plate. The dog-rocker is provided with a forwardly-directed arm 25, having branches 26, from which is suspended, by means of hooks 27, a universal bar 28, which extends transversely beneath the key-levers 4, so that at each operation of the latter the dog-rocker 22 is vibrated and the carriage is advanced a letter-space in the usual manner.

A narrow ribbon 29 is wound upon spools 30, each spool being provided with a spring-catch 31, (Figs. 5 to 8,) which is secured at one end by a screw 32 to the spool-core 33, and thence curves around the core, being provided at its free end with serrations or teeth 34 for catching the ribbon. The spool-core is notched or grooved transversely at 35 opposite to said teeth, so that by reason of the spring-pressure the teeth may force the ribbon down into the notch, thus attaching it securely to the spool, as at Fig. 8. The free end of the clamp is provided with a finger-piece 36, which extends laterally through an aperture 37, formed in one of the spool-flanges, whereby the operator is enabled to lift the teeth 34 out of the notch 35, so as either to insert the ribbon or to detach it, as at Fig. 5.

The spools are mounted upon horizontal shafts 38, supported at the sides of the machine in hangers 39 and bearing at their rear ends bevel-gears 40, which are adapted to mesh alternately with gears 41, carried by a transverse horizontal driving-shaft 42, the latter being mounted in hangers 43 and carrying a splined bevel-pinion 44 in mesh with a

pinion 45, rotated by the spring-drum 18 in the usual manner. The ribbon passes up from the spools through slots 46 in the top plate and extends across the machine in front of the platen 11, the central portion of the ribbon being arranged on edge or vertically and being threaded between vertical guiding-fingers 47, formed upon a vibrating arm 48. It will be observed that a pair of oppositely-directed fingers is provided upon each side of the type-opening 49 and that the ribbon twists from horizontal to vertical position before entering the vibrator. The portions of the ribbon at the sides of the vibrator rest upon transversely-arranged supporting or guiding plates 50, shaped in conformity with the twist of the ribbon and curving downwardly at their ends at 50^a, so as to deflect the ribbon down to the spools. Projecting over the deflecting portions 50^a are upwardly and rearwardly curving guiding-fingers 51, through which the ribbon is threaded, whereby it is given a compound twist, thus taking up the slack along the lower edge of the ribbon which results from twisting it from horizontal to vertical position. Said fingers are secured by screws 52 to the plates 50 and the latter by screws 53 to the upper portion of the type-bar segment 8.

Ordinarily in moving or vibrating a ribbon laterally to and away from the printing-point one edge of the ribbon is strained more than the other, leaving one edge comparatively taut and the other comparatively slack, so that the slack side affords no support or resistance to the side which is taut, and the ribbon is apt to become creased in the direction of its width. This is especially true where one portion of the ribbon is twisted at an angle to another portion in its movement from one spool to another, as in the present structure. This unevenness of tension is due to the fact that one edge of the ribbon is maintained and moved to a greater distance from its fixed line of support than the other. Thus in the present structure it will be observed upon reference to Fig. 1 that the edge of the ribbon which is uppermost in the vibrator is farther from the ribbon-spools than the lower edge is and that ordinarily there would be greater strain upon this upper edge than there would be upon the lower edge. It will be likewise understood that when the ribbon-vibrator has moved upwardly this difference in the strain on the edges is increased, and the liability of the ribbon being creased widthwise by the taut edges resisting the lateral movement of the slack edge, is increased. By my present invention, however, this objectionable feature is obviated, and a substantially equal strain is exerted upon both edges of the ribbon, or the lower edge thereof has a slightly-increased tension, and the ribbon is maintained taut and free from creases, as will now appear.

At the sides of the opening 49, between the inner guiding-fingers 47, are formed in the body of the ribbon-vibrator, conoidal projections 54, over which the ribbon slips as it feeds through the vibrator, the conoidal projections forming forwardly and downwardly inclined bearing-surfaces for the ribbon. The lower portions of the projections have the greatest swell, thus providing an inclined bearing-surface, which takes up slack to the greatest extent at the lower edge of the ribbon, where the most slack ordinarily occurs, and the slope of each projection gradually decreases toward its upper end, where it coöperates with the upper edge of the ribbon, which ordinarily has the greatest strain and the least slack. In other words, the lower edge of the ribbon is caused by the coöperation of the guiding-fingers and the offset conoidal projections to pursue a tortuous course, whereas the upper edge runs comparatively straight, so that an increased tension will be exerted upon the lower edge of the ribbon, or a substantially even tension will be exerted upon the ribbon from edge to edge, and the ribbon will be maintained flat and free from creases. The idea might be differently expressed by saying that by this feature of my invention a substantially uniform amount of slack is provided from edge to edge of the ribbon at all times or that one side has substantially the same amount of slack as the other. That edge of the ribbon which ordinarily has the objectionable slack and which is the lower edge in the present instance may be given a slightly-greater tension than the other or upper edge; but in no case should it have less tension.

The inclination of the conoidal projections affords a means for gradually taking up the slack in the ribbon in an increased amount from at or near the upper edge thereof to the lower edge, it being understood that the slack is given to the ribbon in this way in the particular structure shown and described.

While I have shown but one device for overcoming the objectionable unevenness of tension of the ribbon and its consequent liability to crease, I am aware that various means may be provided for this purpose and without departing from the spirit of my invention, which contemplates, broadly, the embodiment of means for taking up any objectionable slack in a laterally-vibrating ribbon.

The vibrator-arm 48 extends from the printing-point toward the left and is then bent downwardly and rearwardly at 55 and again to the right at 56, the latter portion being provided with a hub 57, Figs. 1 and 2, which is secured by a set-screw 58 upon a short horizontal rearwardly-extending rock-shaft 59, this shaft being carried upon the upper ends of a pair of movable arms 60, which are supported by a usually stationary shaft 61 parallel with and below the shaft 59 and journaled upon pivot-screws 62 in hangers 63. The vibrator 48 turns about the axis 59 when lift-

ing the ribbon up to cover the printing-point, and, as will be observed at Fig. 3, said axis is disposed below and to the left of the printing-point, so that an index 64, which is formed upon the vibrator at the left-hand edge of the type-opening 49, may normally stand just below the point upon which the next type impression is to fall and so that the vibrator may swing upwardly and to the left, thereby positioning the type-opening 49 directly in front of said impression-point, as indicated by dotted lines at Fig. 3.

The rock-shaft 59 is provided at its rear end with a bent operating-arm 65, preferably formed integral with the shaft and connected by a drop-link 66 to the left branch 26 of the dog-rocker, so that as said branch is depressed at each key-lever stroke the link 66 is pulled down and by means of the arm 65 rocks the shaft 59, so as to cause the vibrator to swing upwardly and toward the left, thus covering the printing-point with the ribbon and enabling the types to strike through the opening 49. The lower end of the link 66 is threaded into a hub 67, which is pivoted at 68 in a fork 69, projecting rearwardly from said branch 26 and secured thereto by a screw 70, collar 71, and nut 72. The link 66 may be screwed into or out of the hub 67, so as to adjust the relation between the dog-rocker and the ribbon-vibrator, and is hooked at its upper end to the bent arms 65. A returning-spring 73 for the vibrator is coiled around the shaft 59 between the arms 60.

A platen-shift key 74 is fulcrumed at its rear end at 75 and connected by a pull-link 76 and arm 77 to a transverse horizontal rock-shaft 78, which is pivoted in hangers 79 and carries at its inner end an upwardly and rearwardly directed arm 80, the free end whereof is adapted to bear against a rod 81, mounted upon the lower portion of the platen-frame 12 and extending longitudinally of the platen. This rod is engageable at all points in its endwise travel by the arm 80 and is also nearly in line with the rock-shaft 78 and the platen-frame hinge 13, so that when the key 74 is depressed and causes the rod 76 to rock the shaft 78 the arm 80 may throw the rod 81 forwardly, thus shifting the platen upwardly about the hinge 13, so that the top or outermost characters 10 upon the type-bars may print.

In order that the narrow ribbon may shift vertically in unison with this case-shift movement of the platen, a rearwardly-extending arm 82 is provided upon the platen-shifting rock-shaft 78 and connected by a drop-link 83 to a horizontal operating-arm 84, which is adjustably fixed by a set-screw 85 upon the usually stationary rock-shaft 61, which carries the supporting-arms 60 for the ribbon-vibrator. It will be observed that said arm 84 is secured in an eye formed in a lug 86 depending from said shaft 61. When the shaft 78 is rocked for shifting the platen, its arm 82 pulls up the link 83 and arm 84, thereby rocking said shaft 61 and causing the supporting-arms 60 thereon to swing upwardly and inwardly, as indicated by dotted lines at Fig. 4. By this action of the supporting-arms 60 the ribbon-vibrator is given a compound swinging movement, whereby the index 64 is carried upwardly in a substantially vertical line, so that it may serve its purpose when the platen is in either lower or upper case position. It will be perceived that said compound movement results partly from the bodily movement of the axis 59 about the axis 61 and partly from the idle movement of the link 66 about its lower pivot 68, said link being so proportioned and arranged with reference to the axis 59 and 61 as to secure the desired upward movement of the vibrator and the index 64 thereon. By shortening or lengthening the operating-arm 84 the throw of the ribbon-vibrator may be increased or diminished, as required, and the connected arm 82 may be adjusted accordingly along the platen-shifting rock-shaft 78, being secured in its adjusted position by a set-screw 87, tapped into a hub 88 on the arm. When the several parts are shifted to the dotted-line positions at Fig. 4, the pointer 64 again stands normally just beneath the point where the next impression is to be made upon the paper, and at the operation of the type-keys the link 66 is caused to swing the vibrator upwardly and toward the left the same as when the parts stand normally at the Fig. 3 position.

In operation by the depression of a key 5 and its lever 4 the link 6 is caused to swing the type-bar 7 rearwardly to deliver its impression upon the platen. At the same time the universal bar 28 is carried down and by means of hooks 27 and rocker 22 swings the dogs 21 forwardly. By this movement of the dog-rocker the link 66 is pulled down and through the bent arm 65 and shaft 59 swings the vibrator 48 upwardly, thus moving the ribbon edgewise to cover the printing-point. Upon the release of the key from pressure the type-bar and dog-rocker return to normal position and the carriage feeds in the usual manner under the tension of the spring 18. At the same time the spring 73 returns the ribbon-vibrator to normal position beneath the printing-point. When it is desired to print a capital letter, the key 74 is depressed and by means of the rod 76 rocks the shaft 78 and its arm 80, thereby swinging the platen-frame upon the hinge 13 and lifting the front side of the platen, so that the capital type 10 may print. At the same time the vibrator-supporting arms 60 are moved by the arm 82 and link 83, thus causing the vibrator to shift upwardly. Then the keys 5 are depressed to cause the type impression to be made in the described manner, the link 66 being operated by the universal bar 28, as before, to cause the elevation of the ribbon at each type impression. Upon the relief of the shift-key from pres-

sure the platen and ribbon-vibrator drop to lower-case position.

It will be seen that the spools are arranged at opposite sides of the type system upon horizontal parallel axes and that means are provided at the printing-point for guiding the ribbon on edge or vertically and causing it to cover and uncover the printing-point, the ribbon preferably being caused to twist from a horizontal to a vertical position between said spools and said guiding means; that the ribbon-guiding fingers 51, arranged between the vibrator and the spools, extend obliquely in such a direction as to produce a compound twist of the ribbon between the spools and the vibrator; that the relation of the ribbon-guiding fingers 47 to the downwardly and forwardly inclined bearing-surfaces 54 is such as to cause the ribbon to pursue a tortuous course through the vibrator, said surfaces being offset forwardly from said fingers for this purpose, whereby the slack in the lower edges of the ribbon is taken up and the ribbon prevented from creasing widthwise. It will further be seen that the vibrator at each type impression is moved diagonally upward and sidewise in a substantially vertical plane, whereby the index 64, carried thereon, is moved out of the path of the type and that to this end the vibrator is pivoted at the left of and below the printing-point. It will be also perceived that the vibrator is pivoted upon a movable support which is operatively connected to the platen-shifting means, so that the platen and vibrator are shifted simultaneously, thus both enabling the ribbon to cover the printing-point at the operation of the keys for printing capital letters and also enabling the index 64 to serve its purpose in either of the upper or lower shift positions of the platen; that a link 83 connects the pivoted support 60 to the platen-shifting means, and that a link 66 connects the ribbon-vibrator to a part, as 26, which moves at each type-stroke, the latter link swinging idly at the operation of shifting the platen and vibrator; that the swinging support 60 for the vibrator extends upwardly and to the left from its pivot or axis 61, and that the ribbon-vibrator is supported upon pivoted arms, as 60 and 66, and is connected to the platen-shifting means, said vibrator moving bodily upon said pivoted arms in accordance with the movement of the platen. It will also be observed that the ribbon is attached to the spool by means of a spring 31, fixed at one end to the core and serrated at its free end, a notch being formed in the core for coöperation with said serrations to clamp the ribbon, and a finger-piece being formed upon said spring and projecting through an aperture formed in one of said flanges.

Many variations may be made within the scope of the invention, and portions of my improvements may be used without others.

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

1. In a front-strike writing-machine, the combination with a platen and a system of types, of a pair of spools arranged at opposite sides of the type system and having horizontal parallel axes, means at the printing-point for guiding the ribbon on edge or vertically and moving it vertically to cover and uncover the printing-point, means for automatically moving the vibrator during the printing operation, and guiding-plates 50 arranged between said ribbon-guiding means and said spools, said plates being shaped substantially in conformity with the twist of the ribbon.

2. In a front-strike writing-machine, the combination with a platen and a system of types, of a pair of spools arranged at opposite sides of the type system and having horizontal parallel axes, means at the printing-point for guiding the ribbon on edge or vertically and moving it vertically to cover and uncover the printing-point, means for vibrating the ribbon during the operation of printing, and ribbon-guiding fingers 51 arranged between said guiding means and said spools, said fingers extending obliquely in such a direction as to produce a compound twist of the ribbon between the spools and the guiding means at the printing-point.

3. In a front-strike writing-machine, the combination with a series of types and a platen, of a ribbon-vibrator arranged forwardly of the platen and provided with ribbon-guiding fingers and also with downwardly and forwardly inclined bearing-surfaces for the ribbon and which extend beyond the plane of the fingers, the relation of said fingers to said bearing-surfaces being such as to cause the ribbon to pursue a tortuous course through the vibrator and to take up the slack on one side or edge of the ribbon.

4. In a front-strike writing-machine, the combination with a series of types and a platen, of a ribbon-vibrator arranged forwardly of the platen and provided with ribbon-guiding fingers and also with downwardly and forwardly inclined bearing-surfaces for the ribbon, the relation of said fingers to said bearing-surfaces being such as to cause the ribbon to pursue a tortuous course through the vibrator, said bearing-surfaces being arranged between said fingers, and a type-opening being provided upon the vibrator between said bearing-surfaces.

5. In a front-strike writing-machine, the combination with a system of types and a platen, of a ribbon-vibrator arranged forwardly thereof and provided with a type-opening and also having on each side of the type-opening oppositely-directed guiding-fingers, and cones 54 projecting forwardly from the face of the vibrator and arranged one upon each side of the type-opening.

6. In a front-strike writing-machine, the combination with a system of types and a platen, of a ribbon-vibrator arranged forwardly thereof and provided with a type-opening and also having on each side of the type-opening both upwardly and downwardly directed vertical guiding-fingers, and cones projecting forwardly from the face of the vibrator, said upwardly-directed fingers being arranged at the outer sides of said cones, and said downwardly-directed fingers being arranged at the outer sides of said upwardly-directed fingers.

7. In a front-strike writing-machine, the combination with a series of types and a platen, of a ribbon-vibrator arranged forwardly of the platen and provided with ribbon-guiding fingers, and coöperative offset ribbon-guiding devices so arranged with relation to said fingers that the ribbon is caused to pursue a tortuous course, whereby the slack on one side or edge of the ribbon is taken up.

8. In a front-strike writing-machine, the combination with a series of types and a platen, of a ribbon-vibrator arranged forwardly of the platen and provided with ribbon-guiding fingers, and coöperative angularly-offset ribbon-guiding devices placed between said fingers and so arranged with relation to said fingers that the ribbon is caused to pursue a tortuous course, whereby the slack on one side or edge of the ribbon is taken up.

9. In a front-strike writing-machine, the combination with a series of types and a platen, of a ribbon-vibrator arranged forwardly of the platen and provided with devices for guiding the ribbon on edge past the printing-point, and cones 54 arranged upon the vibrator between said guiding devices, said cones forming downwardly and forwardly extending bearing-surfaces for the ribbon, and causing the latter to pursue a tortuous path as it is fed through the vibrator.

10. In a front-strike writing-machine, the combination with a system of types and a platen of a ribbon-vibrator arranged forwardly of the platen and provided upon its front face with upwardly-directed ribbon-guiding fingers and forwardly-protruding conical ribbon-guiding surfaces between said guiding-fingers.

11. In a front-strike writing-machine, the combination with a system of types and a platen, of a ribbon-vibrator arranged forwardly of the platen and provided with outer downwardly-directed guiding-fingers, inner upwardly-directed guiding-fingers, downwardly and forwardly inclined bearing-surfaces arranged between said inner guiding-fingers, and a type-opening between said inclined bearing-surfaces.

12. In a front-strike writing-machine, the combination with a system of types and a platen, of a ribbon-vibrator having an index standing contiguous to and normally indicating the printing-point and arranged forwardly of the platen and means for moving said vibrator at each type impression diagonally upward and sidewise in a substantially vertical plane.

13. In a front-strike type-writing machine, the combination with a system of types and a platen, of a ribbon-vibrator mounted to move diagonally and sidewise in a substantially vertical plane and having a type-opening, and a printing-point indicator arranged to one side of the type-opening, the said indicator standing normally at the printing-point and the type-opening to one side of and below the printing-point, and means for moving said vibrator and causing the type-opening and ribbon to register with the printing-point.

14. In a front-strike writing-machine, the combination with a system of types and a platen, of a ribbon-vibrator having an index and a type-opening at the right thereof, and also having ribbon-guiding devices upon each side of said type-opening, said vibrator being pivoted at the left of and below the printing-point and vibrating diagonally in a substantially vertical plane.

15. In a front-strike writing-machine, the combination with a system of keys, a system of types and a platen, of a ribbon-vibrator 48 having type-opening 49, cones 54 on the sides of said type-opening, both upwardly and downwardly directed ribbon-guiding fingers 47 on the outer sides of said cones, an index 64 at the left of said opening, a pivot 59 for said vibrator at the left of and below the printing-point, and means connected to the keys for operating said vibrator.

16. In a front-strike writing-machine, the combination with a platen and means for shifting the same, of a system of types, a vibrator for causing the ribbon to cover and uncover the printing-point, a pivoted support for said vibrator, a link connecting said pivoted support to the platen-shifting means, and a link connecting said vibrator to a part which moves at each type-stroke.

17. In a front-strike writing-machine, the combination with a platen and means for shifting the same, of a system of types, a vibrator for causing the ribbon to cover and uncover the printing-point, shaft 59 for said vibrator, arms 60 in which said shaft is journaled, shaft 61 upon which said arms are carried, adjustable arm 84 mounted upon said shaft 61 and connected to said platen-shifting means, arm 65 connected to said vibrator, and link 66 connecting the arm 65 to a part which moves at each type-stroke.

18. In a front-strike writing-machine, the combination with a platen and means for shifting the same, of a system of types, a vibrator for causing the ribbon to cover and uncover the printing-point, said vibrator carrying an

index 64 and being pivoted below and to one side of the printing-point, a pivoted support upon which said vibrator is pivoted, said pivoted support being connected to said platen-shifting means, and a connection from said vibrator to a part which moves at each type-stroke, said connection moving idly at the shifting movement of the platen and ribbon-vibrator.

19. In a front-strike writing-machine, the combination with a system of types, a platen, and means for shifting the platen, of a vibrator for causing the ribbon to cover and uncover the printing-point, said vibrator being pivoted below and to the left of the printing-point and carrying an index 64, a swinging support 60 for said vibrator, said support extending upwardly and to the left of its pivot and being connected to said platen-shifting means, and a link 66 connecting an arm 65 of said vibrator to a part which moves at each type-stroke.

20. In a front-strike writing-machine, the combination with a system of types and a platen, of a vibrator 48 having a type-opening 49 and devices for holding the ribbon, shaft 59 upon which said vibrator is mounted, arms 60 upon which said shaft is carried, shaft 61 upon which said arms 60 are mounted, arm 84 secured to the shaft 61, link 83 connecting said arm 84 to arm 82 secured upon a platen-shifting shaft 78, arm 65 provided upon shaft 59, and link 66 connecting the arm 65 to a part that moves at each type-stroke.

21. In a type-writing machine, the combination with a system of types and a platen, of means for shifting the platen, a ribbon-vibrator provided with an index, means for shifting said vibrator and index together with said platen, and means for moving said vibrator and index upwardly and laterally to cause the ribbon to cover and the printing-point at either shift position of the platen.

22. In a front-strike writing-machine, the combination with a system of keys, a system of types and a platen, of means for shifting the platen, a ribbon-vibrator arranged forwardly thereof and provided with an index arranged normally contiguous to and registering with the printing-point, a movable device upon which said vibrator is pivoted, means connected to said movable device for causing the vibrator and index to shift with the platen, and means connected with the keys for causing the vibrator to cover the printing-point with the ribbon.

23. In a front-strike writing-machine, the combination with a system of types and a platen, of means for shifting the platen, and a ribbon-vibrator connected to the keys, said ribbon-vibrator being supported upon pivoted arms, as 60 and 66, and being connected to the platen-shifting means, the construction and arrangement being such that at the platen-shifting operation said vibrator is moved bodily upon said pivoted arms in accordance with the movement of the platen.

24. In a ribbon-spool for type-writing machines, the combination with a core and flanges, of a spring 31 fixed at one end to the core and serrated at its free end, a notch in the core for coöperation with said serrations to clamp the ribbon, and a finger-piece integral with said spring and projecting through and adapted to move toward and away from the core of the spool in an aperture formed in one of said flanges.

25. In a ribbon-spool for type-writing machines the combination with a core and flanges, of spring 31 fixed at one end and curving thence around the core and serrated at its free end, and a finger-piece carried by said spring and projecting through an aperture formed in one of said flanges, and adapted to move in unison with said spring, so that it may be employed to move the free end of the spring toward and away from the core of the spool.

26. In a type-writing machine, the combination of means for vibrating a ribbon laterally and means for taking up the slack in one edge or side of the ribbon in order to prevent the ribbon from creasing during its lateral vibration by the vibrating means.

27. In a type-writing machine, the combination of means for vibrating the ribbon laterally and means for taking up the slack in the ribbon to different extents from one edge or side thereof to the other in order to take up any objectionable slack when the ribbon is vibrated laterally by the vibrating means.

28. In a type-writing machine, the combination of ribbon-spools, a vibrator which vibrates the ribbon laterally and means for providing a substantial uniform tension upon said ribbon from edge to edge thereof during the vibration of said ribbon-vibrator.

29. In a type-writing machine, the combination of ribbon-spools, a vibrator which vibrates the ribbon laterally and means for assuring substantially uniform amount of slack in said ribbon from edge to edge thereof during the vibration of said ribbon-vibrator.

30. In a type-writing machine, the combination of a ribbon-vibrator, means for operating said vibrator and means carried by said vibrator for taking up an objectionable slack on one side of the ribbon in order to prevent a widthwise creasing of said ribbon.

31. In a type-writing machine, the combination of a ribbon-vibrator, means for operating said vibrator and means carried by said vibrator for taking up an objectionable slack to a gradually-increasing extent from one side to the other of the ribbon in order to prevent a widthwise creasing of said ribbon.

32. In a type-writing machine, the combination of a ribbon-vibrator, means for operating said vibrator and conoidal ribbon-bear-

ing projections carried by said vibrator for taking up an objectionable slack to a gradually-increasing extent from one side to the other of the ribbon in order to prevent a widthwise creating of said ribbon.

33. In a type-writing machine, the combination of ribbon-spools, a ribbon, means for maintaining said ribbon twisted in the movement thereof from spool to spool, and means for taking up the slack produced by said twist in one edge portion of the ribbon.

34. In a type-writing machine, the combination of ribbon-spools, a ribbon, means for maintaining said ribbon twisted in the movement thereof from spool to spool and means for taking up the slack to a gradually-increasing extent from one edge to the other of the ribbon.

Signed at Ilion, in the county of Herkimer and State of New York, this 18th day of July, A. D. 1901.

LOUIS P. DISS.

Witnesses:
WM. A. SCHMIDT,
RALPH W. GOUGH.