July 18, 1933. D. Y. READ 1,918,665

TYPEWRITING MACHINE

Filed Feb. 9, 1926 3 Sheets-Sheet 1

Fig. 1.

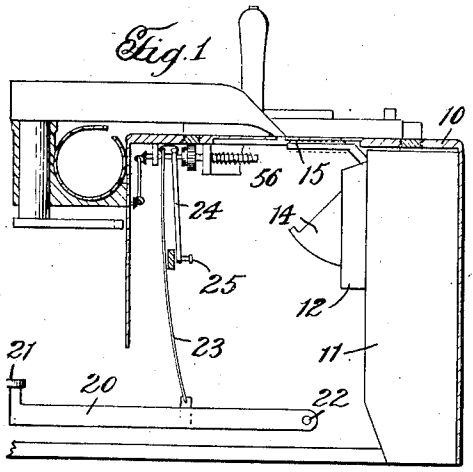


Fig. 2.

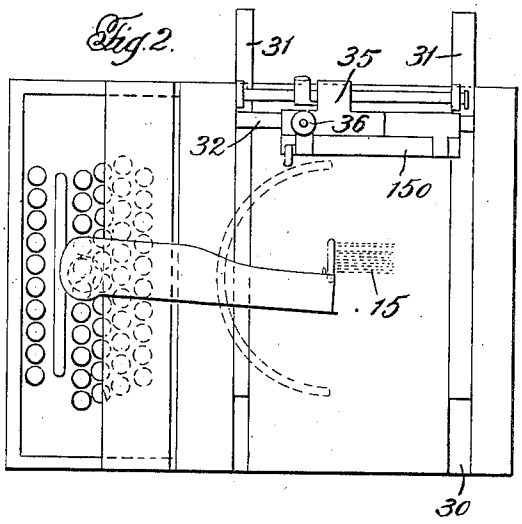
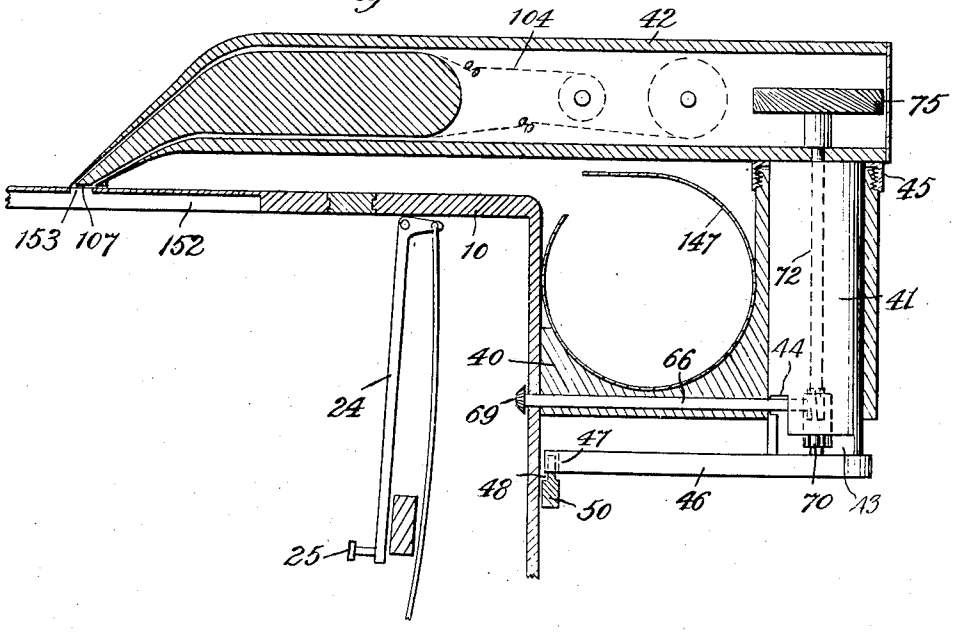


Fig. 3.



Inventor:

David Y. Read,

By Henry H. Snelling

Attorney.

July 18, 1933. D. Y. READ 1,918,665

TYPEWRITING MACHINE

Filed Feb. 9, 1926 3 Sheets-Sheet 2

Fig. 4.

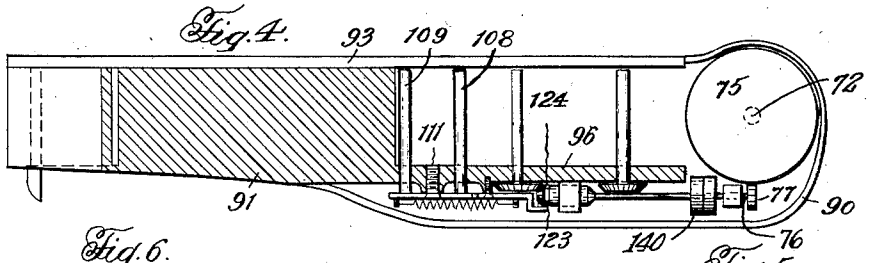


Fig. 6.

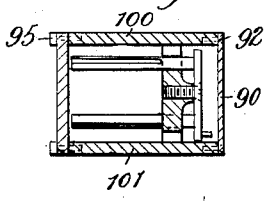
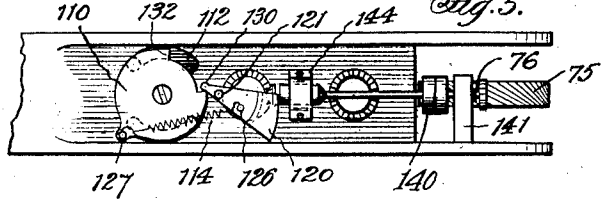


Fig. 5.



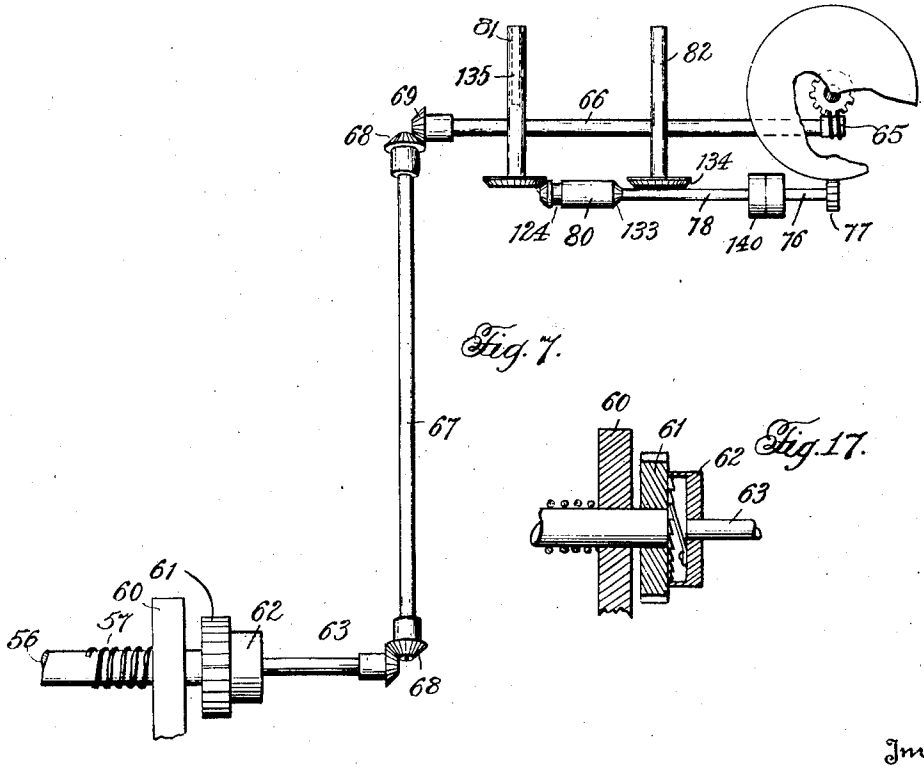


Fig. 7.

Fig. 17.

Inventor:

David Y. Read,

By Henry H. Snelling

Attorney.

July 18, 1933. D. Y. READ 1,918,665

TYPEWRITING MACHINE

Filed Feb. 9, 1926 3 Sheets-Sheet 3

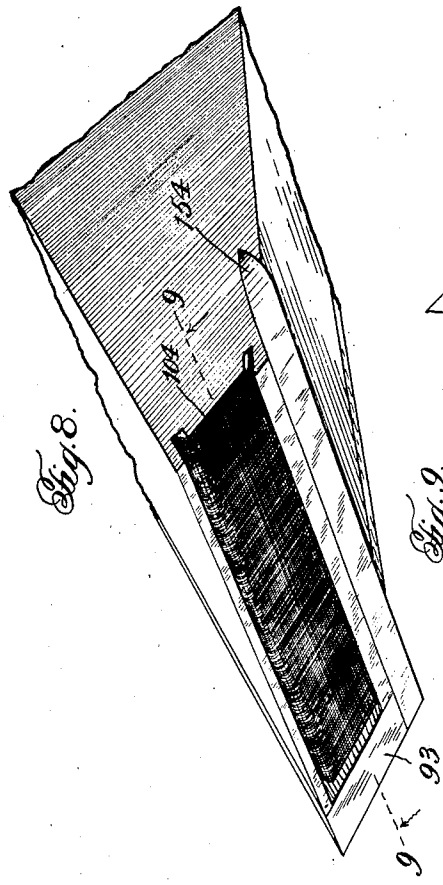


Fig. 8.

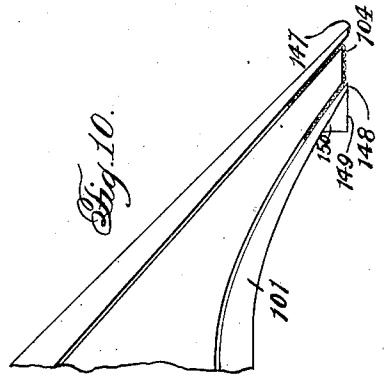


Fig. 10.

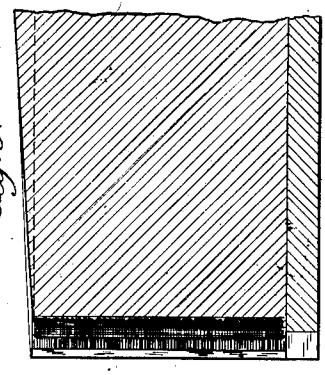


Fig. 9.

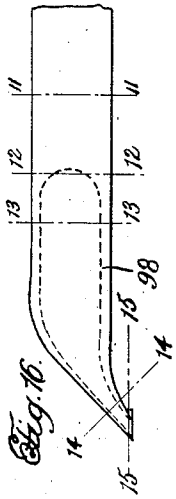


Fig. 16.

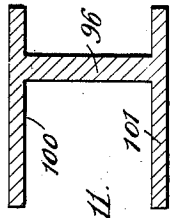


Fig. 11.

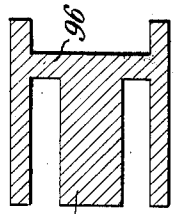


Fig. 12.

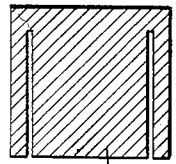


Fig. 13.

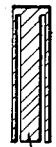


Fig. 14.

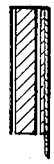


Fig. 15.

Inventor:
David Y. Read,
By Henry L. Snelling
Attorney:

Patented July 18, 1933 1,918,665

UNITED STATES PATENT OFFICE

DAVID Y. READ, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-FOURTH TO JESSIE P. GRANDY, OF WASHINGTON, DISTRICT OF COLUMBIA, AND ONE-FOURTH TO HENRY H. SNELLING, OF WASHINGTON, DISTRICT OF COLUMBIA

TYPEWRITING MACHINE

Application filed February 9, 1926. Serial No. 87,075.

This invention relates to typewriters and has for its principal object the provision of a computing typewriter in which the papers being written on may lie flat in a plane parallel to the face of the type at the moment of impact of either the typewriter characters or the calculating machine characters.

A further object of the present invention lies in the provision of a typewriter having an adding and calculating machine mechanism in which the writing of the typewriter and of the adding machine are both of the so-called "visible" type in which a character after being struck moves into a position where it can be seen by the operator.

A still further object of the invention lies in the provision of a typewriter having positive letter types in which the impression is made by impact against a color carrying ribbon of paper or of fabric.

Other objects of the present invention are described in detail in the specification and are particularly pointed out in the claims.

There are computing machines on the market in which the typist by a proper operation of keys may typewrite a bill, printing in the name of the purchaser, the address, and listing the articles by means of the typewriter mechanism and either in the same operation or by a separate operation, by pressing other keys which multiply the amounts by the rates, may print both the sub-totals and the grand total, the latter being the sum of all of the products of the several multiplications and also the sum of the various sub-totals, but in these machines the typewriter is "blind" in spite of the fact that in every other field but in billing blind typewriters have been displaced by the visible machines.

The work of a computing typewriter operator is so intense that with the writing hidden from her the strain on the nerves is so great that frequently she finds it easier to make part of the bill on a visible typewriter and to make the calculations separately on another machine and to insert the products and totals on the work in the visible typewriter. Many attempts have been made to combine the visible typewriter with a multiplying machine which will print visibly but none have been successful owing to what seems to be the impossibility of having the type strike the paper in the usual fashion, that is, where the type strikes the ribbon and impresses the ribbon on the paper. By reversing this movement and having the paper between the type and the ribbon I am able to preserve the present day computing printing mechanism substantially unchanged and yet to be able to add visible typewriting and the additional advantage of having the paper flat instead of having it wound about the cylinder. An important feature of the present invention therefore is the provision of a platen having a plane face in combination with a series of positive type adapted to strike that plane from one side only of a plane at right angle thereto and passing adjacent the center of the platen.

In the drawings:—

Figure 1 is a vertical cross section taken from front to back thru a point just to one side of the center and looking toward the carriage advancing means.

Figure 2 is a top plan view.

Figure 3 is a sectional view, on a plane from back to front thru the center of the platen, this view being on a larger scale.

Figure 4 is a horizontal section thru the ribbon housing.

Figure 5 is a side elevation showing the ribbon driving mechanism, the detachable cover plate being removed for clearness of illustration.

Figure 6 is a vertical cross section thru the ribbon housing showing the ribbon reverse mechanism in elevation.

Figure 7 is a view showing the complete drive between the main shaft and the ribbon spindles.

Figure 8 is a perspective view of the snout or platen end of the ribbon housing.

Figure 9 is a view taken on the median plane of the snout, this plane being marked 9—9 in Figure 8.

Figure 10 is an elevation of the snout taken from the opposite side from that shown in Figure 8, the side cover plate being removed.

Figures 11 to 15 are sections thru the platen beam.

Figure 16 is an elevation of the housing showing the location of the planes on which Figures 11 to 15 were taken.

Figure 17 is a cross section thru one of the slip clutches.

Considering the machine as a whole, the typewriting mechanism is of well-known and old form except for the type characters themselves, and the computing machine is also of old and well-known mechanism except that the printing hammers are very slightly altered to conform with other operations of the device and the rack bar characters are positive. Except for these two machines the entire mechanism of the present invention is carried by a hood 10 which may be lifted vertically off the typewriting and adding machine mechanisms, this vertical movement of the hood being an important feature of the present invention.

Since the computing machine and typewriting mechanisms per se form no part of the present invention they are diagrammatically shown only, the printing computing machine mechanism being denoted as a whole by the numeral 11, the hammer frame by the numeral 12, and the printing hammers themselves being indicated by the numeral 14, while the rack bars are numbered 15 in the drawings, being shown in full lines in Figure 1 and merely indicated by the parallel dotted lines in Figure 2.

Each of the typewriter key levers 20 has a key 21 and is pivoted as at 22 and connected by a link 23 with the bell-crank type bar 24, which carries at its free end, not the ordinary type, but a reversed or so-called positive type 25. In this invention the color carrying medium is above the paper and these type pieces 25 strike underneath the paper and hence in order to form the usual positive impression they must themselves be positive, whereas the usual type characters in all present typewriters are negative so that if viewed in a mirror will appear positive.

In the hood is a pair of grooves 30 in which slide a pair of grooved bars 31 which are permanently secured together by a cross member 32 so that these three elements form an H-shape frame or paper carriage which carries the paper feeding mechanism indicated as a whole by the numeral 35. This paper feeding mechanism moves toward and away from the operator automatically at the end of a line or at will by the handle 36 while the entire device and the paper move automatically to the left of the operator, and are returned by hand, or preferably by a motor. The advance and return mechanisms since they form per se no part of the present invention are not shown.

A block 40 is permanently secured to the hood 10 in any desired manner and rotatably and slidably receives a hollow cylindrical member 41 which I will hereafter term the sleeve. To the top of this sleeve is permanently secured a ribbon housing 42 to be later described in detail. This housing rests upon the internally threaded ring 45, the pitch of the threads preferably being very slight in order to position very accurately the head of the ribbon housing above the top surface of the hood 10. At the bottom of the sleeve 41 or lever arm is a crank 46 which has at its free end a slot 47 which receives the vertical pin 48 carried by or integral with a rod 50 which is operated synchronously with the striking of numerals by the calculating machine portion, but is not moved by the striking of numerals on the typewriter mechanism.

The carriage, including the paper carrying mechanism 35, is driven from beneath by a main shaft 56 by virtue of a strong helical spring 57 which is fast at one end to the drive shaft 56 and at the other end to a portion of the fixed frame of the typewriter, so that as the carriage is returned the spring is wound, and upon striking any key the spring urges the carriage to the left in the usual way, this mechanism being substituted in the present device for the ordinary band spring, the carriage in each case however, moving in the same direction, i. e., to the left as one writes.

Referring now particularly to Figure 7, 60 is the leg of a bracket which carries the escapement mechanism and is secured to the hood in such manner that it may be readily detached therefrom. The shaft 56 extends through the bracket legs and at each end carries a pinion 61 which meshes with rack teeth cut in the bottom of the two parallel bars 31 of the H-frame and drives the frame or carriage. The slip clutch 62 transmits motion from the main drive shaft 56 to a ribbon shaft 63 when the carriage is moving to the left, but permits the shaft 63 to remain stationary when the carriage is being returned.

The shaft 63 drives the worm 65 on a shaft 66 by means of a sloping shaft 67 having at each end beveled gear wheels 68. The shaft 66 it will be noted is journaled in the block 40 (Figure 3) so that the beveled gear 69 which meshes with the gear 68 is in close proximity to the vertical wall of the hood 10 while the worm 65 is inside of the hollow cylinder or sleeve 41. The pinion 70 which is driven by the worm 65 is relatively long so as to remain in engagement with the worm when the sleeve 41 is raised. The vertical shaft 72 which carries this elongated pinion 70 projects through the bottom wall of the housing 41 and carries at its top a relatively large worm gear 75 which drives a small pinion 77 on a shaft 78 to which is splined the double beveled gear unit 80 adapted to be shifted to

drive either one of the two ribbon spindles 81 and 82.

Referring now particularly to Figures 11 to 16, the ribbon housing consists generally of three pieces, one a casting in the shape of an I-beam, while the other two are mere side plates, one of which, 90, is secured to the casting 91 by means of screws 92 or other semi-permanent fastenings, while the larger flat plate 93 is preferably secured to the housing by means of key hole slots in the plate and pins 95 in the top and bottom walls of the casting, in order to permit the operator to remove this flat plate 93 with minimum trouble as the plate has to be taken off to replace the ribbon. Attention is invited, however, to the fact that while the ribbon spindles 81 and 82 touch the side plate or at least just clear it they are not supported in any way by the side plate having their entire bearing in the vertical web 96 of the platen beam casting.

At the snout or platen end of the housing an integral core 98 is provided substantially uniform in cross section for a considerable part of its horizontal extent but gradually tapering with the snout toward the ribbon exposing (platen) end of the housing. The side plate 90 which surrounds the worm wheel 75 and also the operating mechanism 35 terminates far short of the platen end so that on this side at the snout end the ribbon is visible, altho hidden from view when looking at the housing from the opposite side, since on this latter side the plate 93 follows the entire outline of the housing and is flush at its bottom with the two bottom faces of the top and bottom flanges 100 and 101 of the I-beam of the housing.

Considering the cross sections Figures 11 to 15, inclusive, it will be seen that the vertical web 96 of the I-beam while very conspicuous in the right hand portion of the housing as seen in Figures 4 and 11, becomes one side of the casting in Figure 13, is but half its full thickness in Figure 14, and has entirely disappeared in Figure 15 by virtue of the slight side tapering of the left hand side of the ribbon carrying housing as seen from the operator. Figure 8 is taken from this side, but the housing in this case is viewed at an angle from below so as more readily to show the relation of the ribbon to the bottom parallel surfaces of the two flanges and of the side plate 93.

The ordinary ribbon drive is as follows: A key is struck which advances the carriage one notch under urge of the main spring 57. This rotates the shaft 63 an equal amount, and thru the shafts 66 and 67 rotates the worm 65, also the same number of angular degrees. The worm 65 drives the elongated pinion 70 and the relatively large worm wheel 75 which drives the pinion 77 as shown in Figure 7. This drives the left hand spindle 81 as shown which is in fact the spindle furthest from the operator. The size of the various gears is such that it requires from ten to fifteen revolutions of the shaft 63 to cause one revolution of the spindle 81, although naturally this relation is purely a matter of choice.

The ribbon 104 which may be either of paper or of fabric is secured at one end to the spindle 81 and at the other end to the spindle 82 passing from one to the other as shown by the dotted lines in Figure 3, passing between the core and the upper flange 100 in the opposite direction, and passing over the flat platen end 107 of the core just out of contact with the paper.

In passing from one spool to the other the ribbon 104 slides freely through two slotted guides 108 and 109 each fastened to a member, here shown as a disk 110, pivoted as by the screw 111 to the vertical web 96 of the casting in such way that the two guides may travel freely in arcuate slots 112 in this vertical web. Near each end of the ribbon there is a rivet or grommet (this is ordinary practice and therefore not shown) which cannot pass through the slot in the guide, so that when the ribbon gets to its end or rather nearly to its end, the grommet strikes the guide and rotates the member 110 about its pivot 111, so as to bring the spring 114 past straight line position at which time the resilience of the spring will snap the disk 110 the remainder of its travel. A triangular cam member 120, pivoted to the web 96 as at 121, has an inturned flange 123 in constant engagement with the annular groove 124 in the unit 80. The spring 114 tends to move the lug 126 on the cam 120 toward the lug 127 on the disk 110. The latter has its movement limited by the engagement of the guide 109 with the end of its slot 112 and the cam 120 has its movement limited by bottom flange 101 of the I-beam in the position shown in Figure 5. On reverse movement of the spring the limit of movement of the disk 110 is formed by the other guide 108, and the top wall 100 of the I-beam limits the movement of the cam 120.

The cam 120 has a knob 130 at its apex which lies within the peripheral margin of the disk 110, which margin is cut away between two radial shoulders 132 to form a slot to receive this knob. As the spring 114 snaps the disk 110 to its other limit of angular travel the radial shoulder 132, acting as a hammer, strikes the knob 130, and snaps the cam to its other position, this movement being assured, since the engagement between the knob and the shoulder occurs only toward the end of travel of the disk 110, and the inertia of the moving parts is so great there is no possibility of the complete movement not taking place even if it were not for the fact that the spring 114 itself tends to complete the travel because it then passes over both centers, that is, the pivots 111 and 121.

Such movement of the cam 120 shifts the unit 80 so that the beveled gear 133 now engages the beveled gear 134 on the spindle 82 reversing the travel of the ribbon.

While the method of attaching the ribbon 104 to the spindles 81 and 82 may be varied at will I find it convenient to cut a slight groove such as 135 in each of the spindles, which groove is engaged by a downturned flange on the ribbon spool or core, this construction permitting the ribbon to be readily slipped off the spindles by merely removing the detachable flat side plate 93.

In combined typewriting and calculating and printing mechanisms it is essential that some means be provided whereby the ribbon will feed when using the adding or computing machine mechanism and not using the typewriting mechanism. Since in listing work the carriage does not move from side to side and in ordinary typewriting the ribbon is not fed during line spacing but only during the advance movement of the carriage from the right side to the left side.

As previously described the entire housing 42, the sleeve 41 and the crank 46, all three of which move as a unit, are moved about their pivot which is the axis of the shaft 72, whenever the rod 50 is reciprocated which occurs every time a figure is printed by the computing mechanism entirely irrespective of the movement of the carriage, and the bar 50 naturally is returned to initial position immediately after the adding machine has printed the characters.

Since the wheel 75 remains absolutely stationary during the printing of characters by the calculating machine or during line spacing, the oscillation of the housing 42 about its axis causes relative movement between the small pinion 77 and the worm wheel 75. This movement however, if the pinion 77 were permanently fixed to the shaft 78, would have no effect as it would merely rotate the ribbon spindle in one direction and then return it the same amount. To cause a constant feed of ribbon I connect the shaft 76 which carries the pinion 77 to the shaft 78 on which is splined the unit 80 by means of a slip clutch 140 so that upon movement in any one direction, say clockwise, of the shaft 76, the shaft 78 will move in the same direction and the same amount but upon reverse rotation of the shaft 76 no movement will be imparted to the shaft 78, consequently the shaft 78 by the repeated slight oscillation of the ribbon housing 42 will be caused to move constantly in a direction to wind the ribbon on whichever spool is being driven, for example, 81 as the parts are seen in Figure 7. At all times the free spindle 82 here, is naturally disconnected so as to permit the ribbon to unwind so as to be wound on the other spool. While the clutch 140 may be placed in any position, I prefer that it shall be located close to the post 141, integral or secured to the lower flange 101, this post forming the bearing for the shaft 76, the shaft 78 being supported in a bearing 144 detachably secured to the vertical web 96.

The operation of the device is as follows: One or more sheets of paper are pushed into the block 40 where they are received and guided by the open cylinder 147 preferably of light metal and preferably secured permanently to the block 40 altho this is not essential. The hood 10 is thinned from the bottom as at 152 to receive the rack bars 15 and in this thin portion I cut an opening or slot 153 of such depth from front to back as conveniently to receive a type of the typewriter and of such width from side to side as to receive simultaneously as many numerical characters as the calculating machine can print at one time.

In typewriting, the ribbon housing, the bottom of which forms the platen or anvil, is positioned as shown in Figure 2, that is, the left hand corner (as viewed from the front) covers a portion of the right hand portion of the slot. During typewriting, the platen or ribbon housing does not oscillate. Upon the depression of any key of the typewriter the positive type 25 passes thru the opening 153 and strikes the bottom surface of the paper which naturally is sufficiently yielding as to allow the paper to come upward between the three margins at the bottom of the snout of the housing. This is illustrated most clearly in Figure 10 altho in this figure the bottom surface of the side plate 93 is not shown as the plate is removed. The bottom surface 107, i. e., the platen however, is not flush quite with the bottom surface 147 of the top flange, the bottom surface 148 of the bottom flange and the bottom surface 149 of the line guide 150 which is a small triangular piece of metal permanently secured to the lower edge of the bottom flange 101 and projecting to the left of the housing as a whole so as to indicate to the operator the proper position of the paper to write upon a given line of the paper.

The ribbon housing is raised or lowered, depending upon the number of sheets of paper used, by turning the ring 45. I prefer that the snout of the housing shall just touch the top sheet of paper altho it may clear it if desired to facilitate the feeding of paper as in posting. The horizontal surface of the ribbon is just sufficiently higher than the surfaces 147—148—149 to insure positively that the ribbon will not come into contact with the paper except under the impact of a type 25 or a numerical type of the calculating machine.

As the key bar 24 returns to normal position the carriage pawls operate so as to free the carriage to permit it to advance one step

and during this movement the shaft 56 advances the ribbon the desired amount. The type both of the typewriter and of the calculating machine, print positive characters on the top of the sheet so naturally if carbons are used they should be placed within the sheets with the carbon surfaces downward, each carbon printing positive characters on the sheet next below. As the carriage advances upon each stroke, the character just written becomes immediately visible just to the left of the tapered edge of the housing 42. The platen surface 107 is approximately the same size and shape as the slot or opening 153 but only a very small portion of this surface is used in typewriting.

It is necessary to provide clearance in the sleeve 41 for the shaft 66, not only to provide for the slight oscillation of the ribbon housing 42 but to allow the ribbon housing to be moved entirely out of the way in making erasures for example. I therefore provide a Z slot in the sleeve, the vertical portion of which permits lifting of the housing and the lower leg 43 which may be and preferably is, a recess rather than a slot, supports the ribbon housing when the operator has moved it thru a large angle, while the shorter horizontal slot 44 is merely for the purpose of allowing the slight oscillation of the platen when the calculating machine is in use, during which latter operation the platen just before every stroke is moved to cover the entire slot 107 and upon the characters being struck the platen jumps back to the position shown in Figure 2.

The pin 47 being vertical and fitting in a slot in the bar 46 offers no obstruction to the vertical lifting of the platen when in normal position shown in Figure 2. The platen however, cannot be lifted when the slot 153 is entirely covered. To gain access to the work as for example in erasing or under exceptional circumstances, the ribbon housing is first raised vertically and the free end is then thrown to the operator's right; it cannot be thrown to the operator's left beyond the slot 153. It is not necessary to lift the ribbon housing in inserting the sheets to be written on or to shift the various sheets with respect to each other as the housing does not interfere with these ordinary operations. The line guide 149 is purposely bent upwardly and tapered off at its point 154 (Figure 8) to facilitate proper returning of short top sheets which have passed the printing point.

What I claim is:—

1. In a typewriting machine, a hollow arm, pivoted about a vertical axis, a platen at the end of said arm, a plurality of type bars, a ribbon passing across said platen and means carried by and within said arm for moving said ribbon, said arm being pivoted for oscillation to bring the platen to operative position for cooperation with said type bars.

2. In a typewriter, a carriage, means for advancing said carriage, means carried by said carriage for holding a sheet of paper, a platen arm above the paper carried by the carriage, a ribbon within said arm, and means operated by the carriage advancing means for shifting said ribbon longitudinally across said platen.

3. In a typewriter, a frame, a plurality of type bars mounted within the frame, a carriage slidable above said frame, a platen above the frame, a ribbon, means for advancing the ribbon at each stroke of one of said type bars, and additional means for further advancing said ribbon upon manual movement of said platen.

4. In a typewriting machine, an elongated arm rotatable about a vertical pivot at one end and secured by a vertical pivot and having a platen at the other end thereof, a plurality of type bars adapted to strike said platen, said platen being manually movable about its vertical pivot and out of the path of said types.

5. In a typewriting machine, an arm having a tapered nose with a flat free end forming a platen, winding mechanism carried by said arm and a ribbon secured to said winding mechanism and passing over said flat platen end.

6. In a typewriter, a carriage, a plurality of type bars, a hollow arm above the carriage, a platen in said arm, and a ribbon entirely within the arm and passing across the platen.

7. In a typewriter, a plurality of type bars, a hollow platen carrying arm, a platen integral with said arm, and a ribbon crossing the platen from front to back and extending tight to one side edge of the platen.

8. In a typewriting machine, a plurality of type bars each carrying a positive letter type, a bar sloping downwardly away from the operator, and a horizontal platen at the lower end of the bar.

9. In a typewriting machine, a flat-topped frame, a plurality of type bars carried thereby, means for supporting a sheet of paper to be written upon on said frame above said type bars, a hollow member pivoted between the operator and the type bars, a cylinder secured to said member and forming the pivot thereof, a platen secured to said hollow member, and means for minutely adjusting the height of said platen above the paper on the top of the frame.

10. In a typewriting machine, a generally rectangular frame, a plurality of type bars within the frame, a block extending forwardly from the frame, a hollow arm pivotally carried by said block, a platen carried by said arm, paper receiving means in said block, a carriage slidable along the top of the frame and adapted to advance a sheet of paper across the top of the frame, means for op-

erating the type bars, ribbon mechanism within said arm, and means passing thru said block arm and arm pivot for advancing the ribbon across the platen as the type bars are operated.

11. In a typewriting machine, a paper carriage, a plurality of type bars, an arm having two parallel slots therein at one side and pivotally supported above the carriage, an extension of the central portion forming a platen, and means within the arm for advancing a ribbon thru the slots and across the platen when the type bars are actuated.

12. A platen for a typewriting machine consisting of an elongated bar slotted longitudinally at one side to form three separated portions, the central portion being a platen and clearing the other two portions to an extent to receive a horizontal stretch of an inking ribbon.

13. In a typewriting machine, a plurality of type bars, a carriage, a platen consisting of an elongated arm having a tapered, downwardly extending portion and having slots therein to form a continuous path for a ribbon, a ribbon within said slots and mechanism for advancing the ribbon so as to cross the platen in a front to back direction and tight to one side edge of the platen, whereby the last character struck is visible immediately upon movement of said carriage.

14. In a typewriting machine, an arm pivoted to oscillate about a vertical axis, a platen secured to the end of the arm, a carriage beneath said platen, type bars beneath said carriage adapted to strike against said platen when in a predetermined position, and a ribbon passing across said platen.

15. In a typewriter, a casing having a platen surface, a ribbon within the casing and passing over the platen surface, a pair of spools within the casing, driving means for rotating said spools alternately, a disk having a pair of guides receiving said ribbon, and means for reversing the ribbon drive, said last mentioned means including a member for connecting the guides.

16. In a ribbon feeding mechanism for typewriters, a pivoted supporting means, a gear rotatable about the pivotal axis of said supporting means, a pair of ribbon spools carried by said supporting means, means connecting the gear and the spools, means for driving said gear to feed the ribbon, and said means supporting said ribbon spools being rotatable about the axis of said gear whereby the ribbon will be fed when said gear is driven and the supporting means is still and will also be fed when the gear is still and the supporting means is moved about its pivot.

17. In a ribbon feeding mechanism, a pivotally mounted casing, a pair of spools mounted in said casing to support a ribbon, a rotatable shaft passing thru the casing coaxial with its pivotal axis, and means operatively connecting said shaft with said ribbon spools whereby the ribbon will be fed when the shaft is turned relatively to the casing and when the casing is turned relatively to the shaft.

18. In a typewriter having a frame with a plane top, a paper basket forwardly of the front edge of the plane top, a horizontal arm pivoted at the front of and extending over the basket as well as over the plane top, and a platen at the rear end of said arm.

19. The device of claim 18 in which the rear end of the arm is tapered rearwardly and bent downwardly into close proximity to the plane top surface disclosing the surface immediately behind the writing point whereby the writing is made visible immediately after being uncovered by the point.

20. A typewriter having a frame, a horizontal arm extending from the front of said frame to the writing point, and a platen carried by the arm, said arm being pivoted about a vertical axis so the platen can be moved with respect to the writing point.

21. In a ribbon feeding mechanism, a pair of ribbon receiving spindles having bearings at one side only, ribbon reversing mechanism to one side of the spindles, driving mechanism for advancing the ribbon spindles including a gear wheel, and means pivoted about the axis of said gear wheel for carrying all of said members except said gear wheel, said gear wheel being located on the opposite side of the spindles for the reversing mechanism.

22. In a typewriter, a plurality of type bars, a paper support above the shift bars, a platen above said paper support at the writing point, a carriage, means for guiding a printing ribbon above the paper support and below the platen, means for advancing the carriage upon each movement of a type bar so as to carry the paper beyond the edge of said platen, whereby to render visible the last character struck immediately upon movement of said carriage, said platen having a vertical edge in close proximity to the writing point.

23. In a typewriter, a pivoted arm, a platen, means carried by the arm for guiding a ribbon across the platen, means for advancing the ribbon across the platen including a rotatable member concentric with the pivotal axis of the arm and also a device for transmitting rotary motion in one way only, said device serving to advance the ribbon on movement of the platen in one direction and not moving the ribbon upon reverse movement of the platen.

DAVID Y. READ.