

B. C. STICKNEY.
TYPE WRITING MACHINE.

APPLICATION FILED APR. 17, 1903. RENEWED MAR. 3, 1909.

1,054,470.

Patented Feb. 25, 1913.

3 SHEETS—SHEET 1.

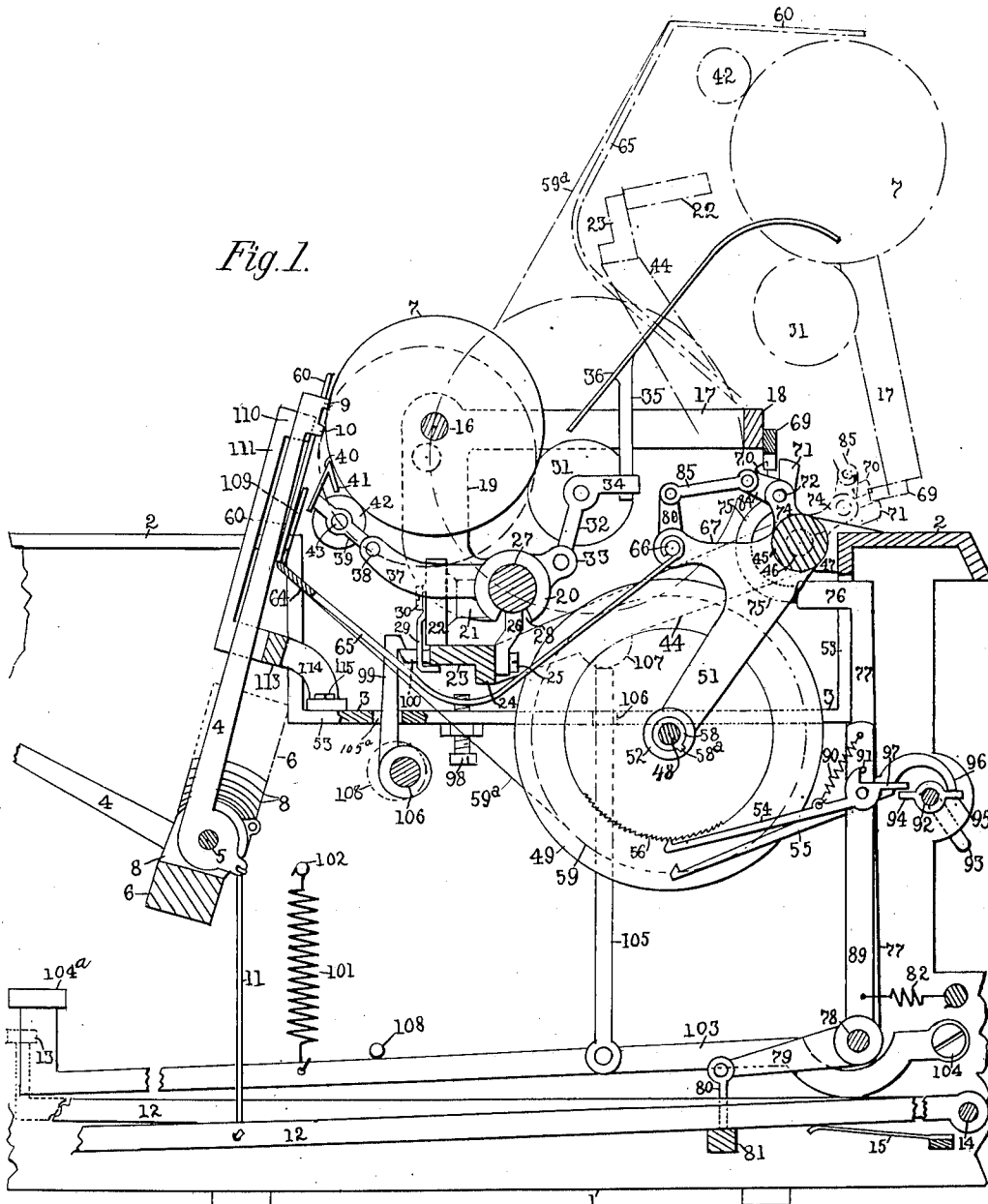


Fig. 1.

WITNESSES

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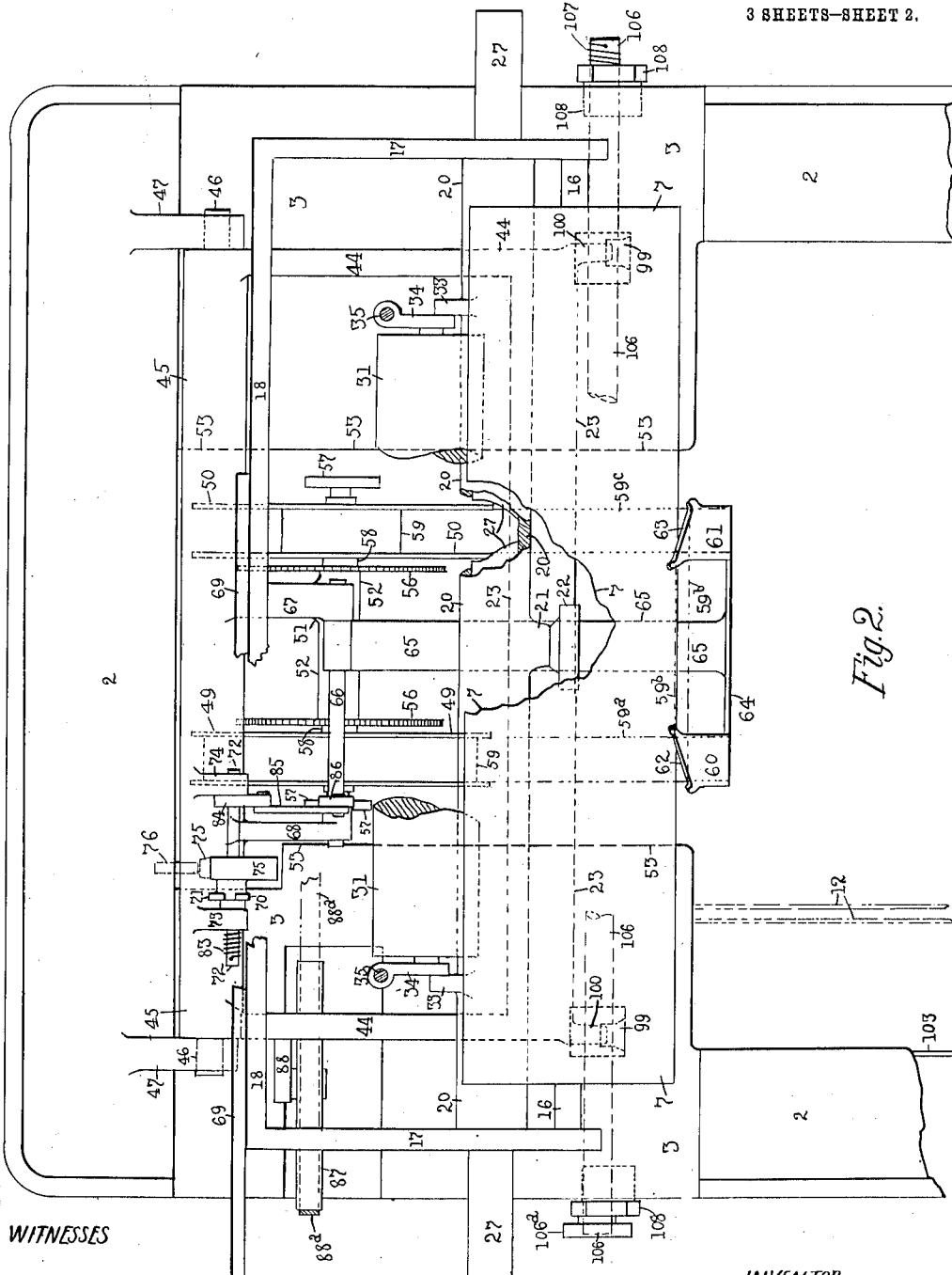


Fig. 2.

WITNESSES

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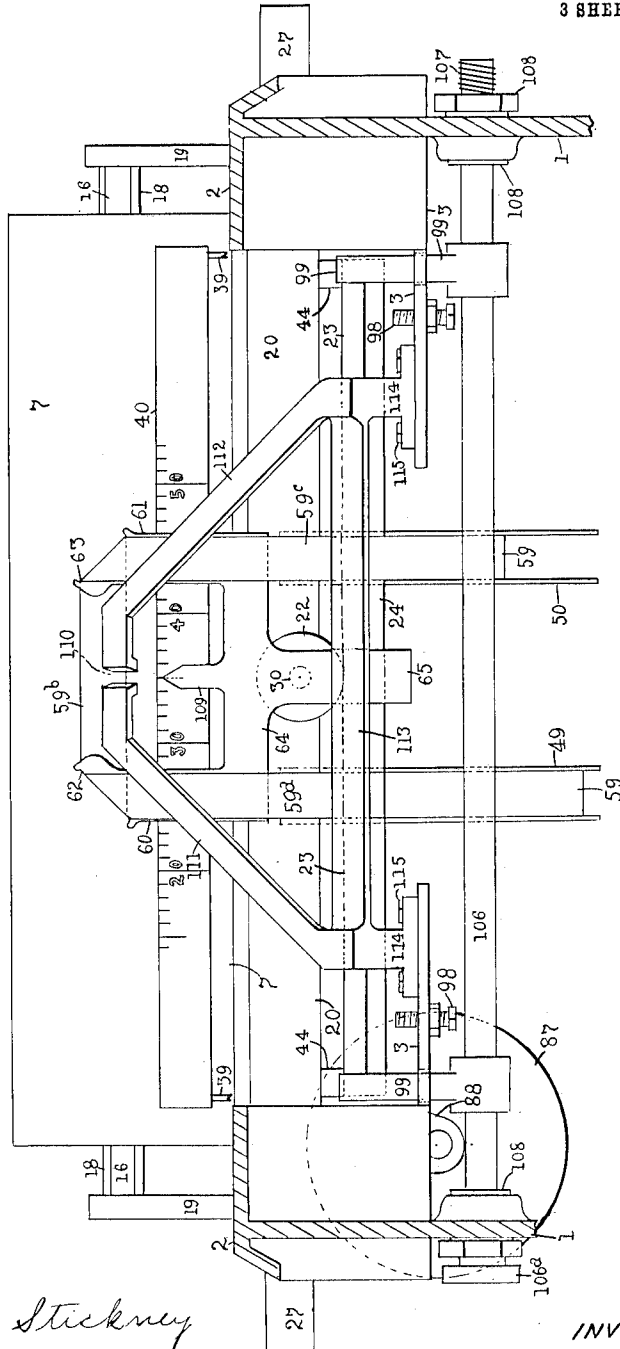
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3 SHEETS—SHEET 3.

Fig. 3.



WITNESSES

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TYPE-WRITING MACHINE.

1,054,470.

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed April 17, 1903, Serial No. 153,024. Renewed March 3, 1909. Serial No. 481,022.

To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and resident of the city of Elizabeth, county of Union, and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to so-called "visible" writing machines, in which the line of writing is always in view, and particularly to those of the "front strike" class; and one of its principal objects is to make a more satisfactory disposition of the ribbon spools than has heretofore been made in this sort of machines. Usually the ribbon spools are mounted in front of the platen, in positions where they are either so exposed as to be objectionable because of the unsightly lengths of ribbon extending from the spools to the printing point, or so confined as to be almost inaccessible. By my invention only a minimum length of ribbon is exposed to view, and the ribbon spools are mounted beneath the carriage or platen and behind the type bars; while provision is made for rendering them accessible when necessary, for adjusting or changing the ribbon, detaching the spools, etc.

Other objects and advantages will hereinafter appear.

My invention consists in certain combinations of devices, features of construction, and arrangements of parts, which will be hereinafter fully described and particularly pointed out in the concluding claims.

In the drawings forming part of this specification, Figure 1 is a longitudinal sectional elevation of a front strike writing machine embodying my improvements; one type action being shown in printing position, and the carriage being shown in full lines in normal position, and in dotted lines when tilted up to render the ribbon spools accessible to the operator; the position of the platen when capitals are being written being also indicated by dotted lines below the full-line position. Fig. 2 is a plan; and Fig. 3 is a sectional front view of the machine.

In the several views portions are omitted or broken away for the sake of clearness; and like signs denote like parts.

The framework of the machine comprises side walls 1, whose lower portions may be connected to form a base, and a top plate 2 supported upon said walls; a portion of the top plate being depressed, as at 3, to make room for the paper carriage and its supports.

Forwardly extending type bars 4 are pivoted at their rear ends upon a curved fulcrum-rod 5 mounted in a segment 6, and strike rearwardly against a cylindrical or other platen 7. The segment is radially slotted at 8 to receive the type-bar hubs; and preferably both the segment and the fulcrum-wire incline upwardly and rearwardly, so that the types may strike upon the front side of the platen at a point a little above the horizontal plane of the platen axis. Each type-bar is provided with a lower-case type 9 and an upper-case type 10, the former being uppermost when the type bar is in printing position, although this relation may be reversed within the scope of my improvements, and the type-bars may be otherwise mounted. The type bars may be operated by any suitable means, as for instance pull-links 11 and forwardly-extending levers 12 connected to the links and bearing at their forward ends keys 13; said key-levers being fulcrumed at their rear ends upon a transverse bar 14, and being provided with returning springs 15.

The platen 7 may be mounted by means of an axle 16 upon a carriage which may be of any suitable construction, and is illustrated as comprising side bars 17, united at their rear ends by a longitudinal bar 18, said side bars extending rearwardly from the platen axle; and arms 19 extending downwardly and rearwardly from the platen axle, and connected at their lower ends by a longitudinal carriage-guiding bar 20. Upon a forwardly protruding boss 21 about midway of said bar 20 is mounted a carriage roll 22, which runs upon a horizontal rail 23, provided upon its rear side with a depending flange 24. Secured by screws

25 upon the rear side of this flange are up-
standing arms 26, which support a cylin-
drical rail 27. The carriage-bar 20 is bored
longitudinally to slide along upon this rail
5 27, and is also recessed upon its under side
at 28 to pass the arms 26. A finger 29, se-
cured by the carriage-roll screw 30, hooks
under the front edge of the rail 23, thereby
coöperating with the bar 20 to hold the
10 carriage upon the rails. A feeding-in roller
31 may be mounted in rear of the platen
upon links 32 rising from ears 33 on the
carriage-bar 20; and said links may be pro-
vided with rearwardly-extending lugs 34
15 for receiving legs 35 of a paper-shelf 36.
From the front side of the bar 20 may pro-
ject forwardly and upwardly extending
arms 37, upon whose forward ends may be
hinged at 38 a bail consisting of a pair of
20 upwardly and forwardly extending arms
39 and a platen-scale 40 fixed upon the
forward ends of said arms and provided
with an apron 41 upon its rear side con-
tiguous to the platen; the upper edge of
25 said scale being below the printing line upon
the platen. One or more pressure rollers 42
may be mounted upon an axle 43 mounted
at its ends in said arms 39 about midway
of their length. Any suitable springs may
30 be provided for the front and rear pressure
rollers.

So far as my present improvements are
concerned, the carriage, paper-feeding
means and carriage-supporting and guiding
35 bars or rails may be of any other desired
construction.

The flanged rail 23, 24 forms part of a
movable frame, whereby the paper carriage
is enabled not only to run in letter-space
40 direction, but to move also in a direction
transverse thereto. This frame comprises,
in addition to said rail (which need not be
flanged in all cases) rearwardly extending
arms 44, which are united at their forward
45 ends by said rail, and a rock-shaft 45, which
unites, the rear ends of said arms, said rock-
shaft being horizontally mounted or hinged
upon pintles 46, working in ears 47 project-
ing forwardly from the front portion of the
50 rear part of the top plate 2. The carriage
and its supporting frame may be swung to-
gether up about said hinge and tilted rear-
wardly to the dotted line position at Fig. 1,
so as to expose the underside of the car-
55 riage. Said supporting frame may, how-
ever, be otherwise formed and otherwise
movably supported within the scope of my
improvements.

In rear of the type bars and below the
60 platen is mounted upon an axle or axis 48
a pair of ribbon spools 49, 50, said axis being
horizontal, and said spools being arranged
on edge and side by side. The axis 48,
which extends transversely of the machine,

that is, from side to side thereof, or from 65
left to right, is mounted in and transfixes
the lower end of a forwardly and down-
wardly extending arm 51, preferably cast
integral with the rock-shaft 45, and hav-
ing an elongated boss 52 for suitably sup- 70
porting the axis 48. It will be perceived
that when in normal position the ribbon
spools are inaccessible to the operator, but
that when the hinged frame is swung up
to the dotted line position at Fig. 1, said 75
spools are brought to an accessible posi-
tion, for convenience in examining or ad-
justing or attaching the ribbon, or of detach-
ing or replacing the spools, etc. The de-
pressed portion 3 of the top plate is pref- 80
erably cleft, as at 53, to make room for the
spools, which in normal position dip below
said depressed portion.

For rotating the spools, I preferably use
a pair of pawls 54, 55, operated at every 85
type stroke, and adapted to engage a pair
of ratchet wheels 56, associated with the
ribbon spools. The latter may be slipped
off and onto the axis 48, being retained by
thumb-nuts 57; and each ratchet wheel may 90
be connected to its spool by a collar or other
device 58, so that one spool with its ratchet
may turn upon the axis independently of
the other spool and its ratchet. If desired,
the member 58 may be splined to the spool, 95
as at 58^a, so as to permit the latter to be
slipped off; or the axis 48 may be divided
into two lengths, one fixed to and revolving
with each spool and ratchet; or any other
suitable spool-mounting and revolving 100
means may be employed within the scope of
my invention. One ratchet may be omit-
ted, and the other fixed to an undivided
axis, and the spools may be alternately
clamped to the axis by the thumb-nuts 57, 105
so as to cause the ribbon to wind first on
one spool and then on the other.

From one spool the ribbon 59 is led for-
wardly and upwardly, as at 59^a, then across
the printing point at the front side of the 110
platen, as at 59^b, and then back to the other
spool, as at 59^c. At the front side of the
platen are provided ribbon-guiding arms 60
and 61, formed at their upper ends with re-
versely inclined tips 62, 63, the angle of 115
each tip being about 45 degrees, for prop-
erly conducting the ribbon across the print-
ing point or field between its ascending
and descending portions. Said arms 60 and
61 form part of a ribbon vibrator, being 120
connected at their lower ends by a cross-
arm 64, whereby they are supported upon
a bent arm 65, which extends backwardly
beneath the rail 23 and at its rear end is
pivoted by means of a rock-shaft 66 upon 125
bearing-arms 67 and 68, both of the latter
projecting forwardly from the rock-shaft
45 of the carriage-supporting hinged frame,

and arm 67 overlying the spool-carrying arm 51. By this vibrator, the ribbon may be lifted to cover the printing point at each impression, as at Fig. 1, and depressed to uncover the same; and since the vibrator is mounted upon the hinged frame, it is carried up with the latter when tilted to the dotted-line position at Fig. 1, thus facilitating the reeving of the ribbon from the spools over the guiding arms 62 and 63. Said ribbon-vibrator is operatively connected to carriage-feeding mechanism also mounted upon the hinged carriage-supporting frame and coöperating with a rack 69 on the carriage; said feeding mechanism comprising a detent dog 70 and a feeding dog 71, the latter being normally in engagement with the rack. These dogs are mounted upon a rocker or rock-shaft 72, mounted upon ears 73 and 74 upon the rock-shaft 45; and said rocker 72 is provided with an operating arm 75 which curves downwardly and rearwardly beneath the rock-shaft 45, in position to be operated by a finger 76 projecting forwardly from the upper end of an upstanding rocker-arm 77, fixed upon a rock-shaft 78 mounted transversely in the base of the machine. Said rock-shaft 78 carries near its ends forwardly directed arms 79, from which is suspended, by means of rods 80, a universal bar 81, extending transversely beneath all of the type-operating key-levers 12, so as to be operated at each type stroke. The universal-bar and rocker 78 may be returned to normal position by a spring 82; and a returning-spring 83 for the dog-rocker may be coiled about the shaft 72. The connection between the latter and the ribbon-vibrator consists of an arm 84 mounted upon shaft 72, a pull-link 85 connected to said arm and extending forwardly, and an arm 86 connected to said link and mounted upon the vibrator shaft 66. By this means, whenever the dog-rocker is vibrated by the keys, the vibrator is elevated to cause the ribbon to cover the printing point; and upon the return of the carriage-feeding mechanism to normal position, said vibrator drops to permit the ribbon to uncover the printing point.

The carriage may be propelled by a spring-barrel 87 (Figs. 2 and 3), mounted upon an arm 88, projecting laterally and downwardly from the side-bar 44 of the hinged carriage-supporting frame; and a strap 88^a may connect the spring-barrel to the carriage. By mounting both the spring barrel and the carriage-feeding mechanism upon the hinged frame, the latter is permitted to swing freely up and down, without liability of deranging the carriage-controlling devices, which always maintain their proper relation to the carriage, although by reason of the arm 75 swinging

away from the finger 76, the latter cannot of course operate the feeding mechanism when the carriage is tilted up.

The ribbon-feeding pawls 54 and 55 may be pivoted at their rear ends upon arms 89 upstanding from the universal-bar rocker 78, and provided with draw-springs 90 connected at their lower ends to the pawls and at their upper ends to the arms 89, whereby the pawls may be held in engagement with the ratchet wheels 56; each pawl being provided with a stop 91, to prevent undue upward movement thereof when the ratchet wheels are swung away from the pawls at the tilting up of the carriage. Behind the pawls is mounted in the side walls of the machine a horizontal shaft 92, having an operating handle 93, and carrying wings 94, 95, the latter being shown as lifting an arm 96 projecting rearwardly from the pawl 55, so as to hold the toothed end of the latter down out of engagement with its ratchet wheel. The shaft may be rocked to depress the wing 95 and allow said pawl to reengage the ratchet-wheel, while the other wing 94 rises and lifts an arm 97 provided upon the other pawl, and throwing the latter out of engagement, whereby the feed of the ribbon is reversed. Any other suitable ribbon-feeding and reversing ribbon may be employed, and the ribbon spools may be otherwise disposed within the limits of my invention.

Preferably advantage is also taken of the hinging of the carriage-support, to enable the latter to be shifted up and down to enable different types to print. Normally the carriage and platen are in an elevated position, as seen in full lines at Fig. 1, thereby enabling the lower-case types 9 to print; while by depressing the carriage and platen (the latter in its depressed position being indicated by a dotted circle at Fig. 1), the upper-case types 10 are enabled to print. The downward movement of the carriage is limited by a pair of adjustable stops 98, and its upward movement by a pair of stops having the form of hooks 99 which overhang lugs 100 projecting forwardly from the carriage-supporting rail 23 at the ends thereof. A spring 101, Fig. 1, sustains the carriage and hinged frame normally against the hooks 99, said spring being caught at its upper end over a pin 102 projecting from the side wall of the machine, and at its lower end being caught in a lever 103, which is fulcrumed at its rear end upon a shoulder-screw 104, and is provided between its ends with a vertical thrust-rod 105, which is guided at its upper end in an eye 106 formed in the depressed portion 3 of the top plate, and contacts with a boss 107 formed upon the under side of the side arm 44 of the hinged frame, thereby supporting

the latter. A stop-pin 108, overlying the lever 103, prevents undue upward movement of the latter when the carriage is tilted up. The lever 103 is provided with a key 104^a, by pressure upon which the pull of the spring 101 may be overcome, and the lever 103 and rod 105 carried down, permitting the carriage and hinged frame to drop and rest upon the screw-stops 98.

The hooks 99, which extend through eyes 105^a in the top plate 3, are fixed upon a rock-shaft 106, whereby they may be vibrated forwardly to release the hinged frame and carriage, to permit the latter to be tilted up; said rock-shaft being provided with a returning spring 107, and being mounted in eccentric-nuts 108, by the adjustment of which the hooks 99 may be elevated or lowered so as to position the platen with accuracy. It will be noted that the hinge 46 of the carriage-supporting frame is in rear of and below the platen, so that the latter may shift downwardly and forwardly in a direction agreeing substantially with the tip of the type-bar segment 6, the forward movement being in this instance, however, very slight.

At Fig. 3 it will be noted that the ribbon comes up in direct paths from the spools to the front side of the platen, and that the ribbon-guiding arms 60, 61 are widely separated, so as to expose to view somewhat more than one of the major divisions upon the platen scale, so that at least one of the whole numbers marked upon the platen scale is always visible to the operator between said arms, and he can readily determine at what point the carriage is standing, an index 109 being preferably formed upon the cross-bar 64 for this purpose. The type-guide has a type-opening 110 above the platen scale, and arms 111 and 112 extending laterally and downwardly from said opening, in a manner to leave exposed all of the platen scale which is visible between the ribbon-guiding arms 60 and 61; said type-guiding arms being connected at their bases by a bar 113, and the type-guiding frame being secured upon the depressed portion of the top-plate 3 by arms 114 and screws 115. At Fig. 1 it will be seen that the type-guiding frame is tipped rearwardly and substantially parallel with the plane of the type bar pivots.

This application is restricted to ribbon devices; claims covering broadly the platen-shaft devices and the vertically-shiftable platen frame or carriage, movable up to give access to its under side, and other features of carriage construction and mounting, being included in my co-pending divisional application No. 475,930, filed February 3, 1909.

Wide variations in the construction and operation of the different mechanisms may be resorted to within the scope of my inven-

tion; and portions of my improvements may be used without others.

Certain features herein disclosed relating to the carriage supporting and shifting devices, letter-feeding devices, and other carriage adjuncts, are made the subject of my divisional application No. 475,930, filed February 3, 1909. The claims herein are limited to ribbon devices.

Having thus described my invention, I claim:

1. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a carriage whereon said platen is mounted, a movable frame whereon said carriage is mounted, ribbon spools mounted upon said movable frame beneath said carriage, and means for leading the ribbon from the spools to the front side of the platen.

2. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a carriage whereon said platen is mounted, a liftable frame whereon said carriage is mounted, ribbon spools mounted upon said liftable frame beneath said carriage, and a ribbon vibrator also mounted upon said liftable frame and extending to the front of the platen.

3. In a front strike writing machine, the combination of a series of rearwardly striking types, a paper-carriage, a hinged support whereon said carriage is mounted, ribbon spools mounted upon said hinged support beneath said carriage, and movable with said support to an accessible position, and means for vibrating the ribbon at every type-stroke to cover and uncover the impression point.

4. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a paper carriage whereon said platen is mounted, a frame whereon said carriage is mounted, said frame being hinged in rear of the platen to the framework of the machine, ribbon spools mounted upon said hinged frame below the carriage, and means for leading the ribbon to the front side of the platen.

5. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a frame whereon said platen is mounted, ribbon spools mounted below the platen and in rear of the types, and a support whereon said ribbon spools are mounted; said platen frame and said support being movable to permit access to the ribbon spools.

6. In a front strike writing machine, the combination of a platen, a frame whereon said platen is mounted, a series of types striking rearwardly against the front of the platen, ribbon spools covered up by the platen and in rear of said types, means for guiding the ribbon from one spool to the

front of the platen and back to the other spool and so constructed as to present the ribbon flatwise to the front of the platen, and an upwardly and rearwardly tiltable hinged frame whereon said platen frame is mounted; said parts being so constructed and related, that a movement of said hinged frame upwardly and rearwardly exposes the spools so that they may conveniently be manipulated.

7. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen against the front side of which said types strike, an upwardly and rearwardly tiltable carriage for said platen, ribbon spools mounted face to face in rear of said types and covered up by said carriage, a ribbon vibrator extending to the vicinity of the impression point and constructed to present the ribbon flatwise to the front side of the platen, and means for operating said vibrator; said spools being uncovered by the operation of tilting rearwardly said carriage.

8. In a front strike writing machine, the combination of a series of rearwardly striking type bars, an upwardly and rearwardly tiltable carriage, a platen upon said carriage, ribbon spools mounted side by side below said carriage and in rear of the type bars, an upwardly and rearwardly tiltable support upon which said spools are mounted, and a ribbon vibrator movable with said support and extending to the front of the platen.

9. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a platen carriage, a pair of ribbon spools mounted side by side so that their axes extend transversely of the machine, and so that they are covered by said platen carriage, and means, including a hinged support for said carriage, for rendering said spools accessible.

10. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a platen carriage, a frame upon which said carriage travels and which is hinged in rear of the platen so that it may be swung upwardly, a pair of ribbon spools mounted upon said frame side by side so that their axes extend transversely of the machine, said spools being below said carriage and in rear of the types, and means for leading the ribbon up from one spool, across the printing point, and down to the other spool.

11. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a platen carriage, a frame upon which said carriage travels and which is hinged in rear of the platen so that it may be swung upwardly, a pair of ribbon spools mounted upon said frame side by side so that their axes extend trans-

versely of the machine, said spools being below said carriage and in rear of the types, means for leading the ribbon up from one spool, across the printing point, and down to the other spool, said leading means being mounted upon said hinged frame, and means for vibrating said leading means at each type stroke to cover and uncover the printing point.

12. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a liftable platen carriage, a pair of detachable ribbon spools at the rear portion of the machine and in rear of said type-bars and covered up by said carriage, said spools standing face to face with their axes extending transversely of the machine, means for leading the ribbon forwardly and upwardly from one spool, then across the printing point with the ribbon flatwise to the front side of the platen, and then downwardly and rearwardly to the other spool, and means for vibrating the ribbon to cover and uncover the printing point; the spools being uncovered by the lifting of said carriage.

13. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a platen carriage, a pair of ribbon spools mounted side by side upon an axis in rear of the platen, said axis extending transversely of the machine, means for leading the ribbon forwardly from one spool, up in front of the platen, across the printing point and back beneath the platen to the other spool, means for vibrating the ribbon at each type impression to cover and uncover the printing point, and means for moving said platen frame in a manner to permit access to the spools and ribbon.

14. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a paper carriage, a hinged frame along which said carriage travels, ribbon spools mounted side by side upon said hinged frame below said carriage, and means for leading the ribbon to the front of the carriage and vibrating it to cover and uncover the printing point.

15. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a carriage for said platen, a frame along which said carriage travels, a pair of ribbon spools mounted on said frame in an inaccessible position in rear of the type bars, means for leading the ribbon to and across the printing point, means for vibrating the ribbon to cover and uncover the printing point, and means for moving said frame so as to bring the ribbon spools to an accessible position.

16. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a carriage for said

platen, a frame along which said carriage travels, carriage-propelling and feeding mechanism, a pair of ribbon spools also mounted on said frame detachably side by side in rear of the type bars, means for leading the ribbon to and across the printing point, means operable with said feeding mechanism for vibrating the ribbon to cover and uncover the printing point, and a hinge upon which said frame may turn to bring said ribbon spools to an accessible position.

17. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a carriage for said platen, a frame along which said carriage travels, carriage-feeding mechanism, ribbon-vibrating mechanism also mounted on said frame and operatively connected with said carriage-feeding mechanism, a pair of ribbon-spools also mounted on said frame in rear of the type bars, and means for enabling said frame to be tilted so as to render the spools accessible.

18. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a carriage, a rail along which said carriage runs, a hinged support for said rail, a pair of ribbon spools in rear of said rails, and means for leading the ribbon from the spools forwardly beneath said rail and up to the printing point.

19. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a carriage, a rail along which said carriage runs, a platen mounted upon said carriage, a hinged support in rear of the platen for said rail, whereby said carriage and rail may be tilted upwardly and rearwardly, a pair of ribbon spools mounted upon said hinged support in rear of said rail and in rear of the type bars, means in front of the platen for guiding the ribbon, carriage-feeding mechanism mounted upon said hinged support, and operative connections extending forwardly from said carriage-feeding mechanism and beneath said rail to said ribbon-guiding means.

20. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a carriage, a frame whereon said carriage travels, a pair of ribbon spools mounted upon said frame in an inaccessible position in rear of the type bars, and means for rotating said ribbon-spools, said rotating means being mounted upon the framework of the machine, and said frame being pivotally mounted so as to enable said spools to be moved thereon away from said rotating means and into an accessible position.

21. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a carriage, a frame whereon said carriage travels, a pair of ribbon spools mounted side by side upon said frame in an inaccessible position in rear of the type bars,

a ratchet wheel for each spool, and pawls mounted upon the framework of the machine for engagement with said ratchet wheels; said frame being pivotally mounted so as to enable said spools and ratchet wheels to be moved thereon away from said pawls and into an accessible position.

22. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a frame whereon said carriage is mounted, said frame comprising a horizontal rock shaft, forwardly extending arms, and a bar uniting said arms at their forward ends and having a part whereon said carriage travels, a forwardly extending arm on said rock shaft, a horizontal shaft upon said arm and parallel with said rock shaft, a pair of ribbon spools mounted on said shaft, and a ribbon vibrator also mounted upon said frame and having a part extending up in front of the platen.

23. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a frame whereon said carriage is mounted, said frame comprising a horizontal rock shaft, forwardly extending arms, and a carriage-rail uniting said arms at their forward ends, a pair of ribbon spools mounted side by side upon said rock-shaft, means for leading the ribbon from the spools to the front side of the platen.

24. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a carriage for said platen, a frame whereon said carriage runs, ribbon spools mounted on said frame below the platen, means for shifting said frame up and down to enable different types to print, and means for tilting said frame up sufficiently to bring said spools into an accessible position.

25. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a pair of ribbon spools mounted beneath said carriage and behind said types, means for shifting said carriage up and down to enable different types to print, and means for lifting said carriage sufficiently to render said ribbon spools accessible.

26. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a frame whereon said carriage runs, said frame being hinged in rear of the platen, a pair of ribbon spools mounted upon said frame behind the type bars and below the platen, means for shifting said frame upon said hinge to enable different types to print, and means for enabling said frame to be tilted upwardly and rearwardly to bring said spools to an accessible position.

27. In a front strike writing machine, the

combination of a series of rearwardly striking types, a platen, a platen carriage, a frame whereon said carriage runs, said frame being hinged, ribbon spools mounted upon said frame in rear of said types and below said platen, a ribbon vibrator also mounted upon said frame and extending to the front of the platen, means for shifting said frame to enable different types to print, adjustable stops for limiting the shifting movements of said frame, and means for enabling said frame to be tilted upwardly and rearwardly to expose said ribbon spools.

28. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a frame whereon said carriage runs, ribbon spools mounted upon said frame behind the types, means for shifting said frame up and down to enable different types to print, a releasable stop for limiting the upward shifting movement of said frame, and means for enabling said frame to be lifted sufficiently to give access to said spools.

29. In a front strike writing machine, the combination of a series of rearwardly striking types, a carriage, a hinged frame whereon said carriage runs, means for shifting said frame up and down to enable different types to print, an adjustable stop for limiting the upward shifting movement of said frame, and ribbon spools mounted side by side upon said frame behind said type bars and below said carriage; said stop being releasable, so as to permit the frame to be tilted upwardly and backwardly to give access to said spools.

30. In a front strike writing machine, the combination of a series of rearwardly striking type bars, an upwardly and rearwardly inclined segment whereon they are pivoted, a platen, a platen carriage, a frame whereon said carriage runs, said frame being hinged in rear of the platen and below the printing point, ribbon spools mounted on said frame behind the type bars and below the platen, means for shifting said frame and carriage up and down to enable different types to print, a releasable stop limiting the upward shift of the carriage and frame, whereby when said stop is released, the carriage and frame may be tilted upwardly and rearwardly, and means for leading the ribbon to the front side of the platen and for vibrating the same to cover and uncover the printing point.

31. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen against the front side of which said types strike, a frame whereon the platen is mounted, ribbon spools mounted behind the types and covered up by said platen and frame, an upwardly and rearwardly tiltable hinged frame whereon said

platen frame is mounted, and a case-shifting mechanism including means for giving said tiltable frame a short up and down movement to enable different types to print; said hinged frame being so hinged that it uncovers the spools when it is tilted up and back on its hinge.

32. In a front strike writing machine, the combination of a series of rearwardly striking type bars, an upwardly and rearwardly tiltable paper-carriage, ribbon spools detachably mounted side by side below said carriage and in rear of the type bars, a ribbon vibrator extending to the front side of the platen, means for moving said vibrator to cover and uncover the printing point, and means for giving said carriage a limited up and down shift for enabling different types to print.

33. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a platen carriage, a pair of ribbon spools mounted side by side upon axes in rear of the platen, said axes extending transversely of the machine, means for leading the ribbon forwardly from one spool, up in front of the platen, across the printing point and back beneath the platen to the other spool, means for vibrating the ribbon at each type impression to cover and uncover the printing point, and means for giving the platen frame either a limited up-and-down shifting movement to enable different types to print or an extensive upward and rearward movement to bring said spools to an accessible position.

34. In a front strike writing machine, the combination of a series of rearwardly striking types, a paper carriage, a hinged frame along which said carriage travels, a carriage-propelling spring, escapement mechanism, ribbon spools mounted upon said hinged frame behind said types and at the under side of the carriage, means for leading the ribbon to the front of the carriage and vibrating it to cover and uncover the printing point, and means for giving said hinged frame either a limited shifting stroke for enabling different types to print or an extensive upward swing for rendering said spools accessible.

35. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a platen carriage, a frame whereon said carriage runs, said frame being hinged in rear of said platen, a spring lifting said frame, a stop against which said frame is lifted by said spring, means for depressing said frame to enable different types to print, and ribbon spools mounted upon said frame in rear of the type bars and below the platen; said stop being releasable, so as to enable said frame to be tilted up to bring said spools to an accessible position.

36. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a platen carriage, a frame whereon said platen runs, said frame being hinged in rear of the platen, a spring-pressed device for sustaining said frame, a stop against which said frame is held by said spring-pressed device, a key connected to said spring-pressed device so that by the operation of the key said spring-pressed device is withdrawn and said frame and carriage are permitted to drop so as to enable different types to print, spools mounted on said hinged frame in rear of the type bars and below the platen, and means for leading a ribbon from the spools to the front side of the platen and vibrating the ribbon to cover and uncover the printing point, said stop being releasable so as to enable said hinged frame to be tilted up to bring the spools to an accessible position.

37. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a frame upon which said carriage runs, a pair of ribbon spools mounted on said frame, a spring for sustaining said frame and carriage in normal position, means for moving said frame and carriage in one direction to enable different types to print, and means for moving said frame and carriage in another direction to bring said spools to an accessible position.

38. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a platen carriage, a platen scale supported contiguous to the platen and below the printing point, an index, ribbon-guiding arms one at each side of said index, and separated sufficiently to expose therebetween two of the major graduations of said scale, and a type-guide having a type-opening above said scale, and supporting arms extending outwardly and downwardly in front of said ribbon-guiding arms and so as to leave the portion of the scale between said ribbon-guiding arms uncovered.

39. In a front strike writing machine, the combination of a series of rearwardly striking type bars, a platen, a platen carriage, a frame whereon said carriage runs, said frame being hinged in rear of the platen, a platen scale supported contiguous to the platen and below the printing point, an index, ribbon-guiding arms mounted on said hinged frame and one at each side of said index, said arms extending up in front of said scale and being separated sufficiently to expose therebetween more than one major division of said scale, a type-guide having a type-opening above said scale, and having supporting arms extending outwardly and downwardly in front of said ribbon-guiding arms and so as to leave the portion of the

scale between said ribbon-guiding arms substantially uncovered; said hinged frame being tiltable upwardly and rearwardly to expose the under side of said carriage; and ribbon spools mounted upon said frame in rear of the type bars and below the platen.

40. In a typewriting machine, the combination of a ribbon which may be vibrated to cover and uncover the printing point, and a pair of spools which are located behind the type bars and beneath the platen, and are covered by the latter and rendered accessible only when the platen rises.

41. In a front strike writing machine, the combination with a platen and type mounted to strike rearwardly upon the front thereof, of ribbon spools mounted behind the types and covered up by the platen, means for holding the ribbon flatwise to the front side of the platen at the printing point and for vibrating the ribbon to cover and uncover the printing point, and means for enabling the platen to be moved up and off to uncover the spools.

42. The combination with keys and ribbon-winding means operated thereby, including a pawl and ratchet wheel, of a carriage, a frame whereon it runs, said frame being movable, and said ratchet wheel being mounted on said frame and movable therewith away from said pawl.

43. The combination of a platen, type-bars striking rearwardly against the front of the platen, a pair of ribbon spools behind the type-bars and beneath the platen and covered up by the latter so as to be inaccessible, and means, including a platen-frame which may be lifted up and back, for rendering the spools accessible; means being also provided for leading the ribbon from one spool upwardly and forwardly to the front side of the platen and then back to the other spool.

44. The combination of a platen, type-bars striking rearwardly against the front of the platen, a platen carriage running upon a track beneath the platen, ribbon-spools mounted beneath and behind said track in an inaccessible position, means for leading the ribbon from one spool to the front side of the platen and back to the other spool, and means for rendering the spools accessible, inclusive of a device for enabling said track and carriage to be lifted.

45. The combination of a platen, a platen frame, a hinged frame having a track whereon said carriage runs, carriage-feeding mechanism, spools carried upon said hinged frame below the carriage, means upon said hinged frame for supporting the ribbon in front of the platen, and type-bars mounted independently of said hinged frame forwardly of the spools and so as to strike against the front of the platen.

46. The combination with a movable

track-frame carrying spools and a ribbon vibrator and also carrying feeding dogs, of a connection from the dogs to the vibrator, said spools being beneath the track frame, and the latter being movable to render the spools accessible.

47. The combination with the platen carriage and a track beneath the platen, of a shifting frame including said track and carrying feeding dogs, a ribbon vibrator hinged back of the platen a little below the printing point and bending downwardly beneath said track and up in front of the platen, and a connection from said vibrator to the dogs.

48. The combination with a platen frame, of a hinged frame having beneath the platen a track 23, and also a rear track 27, for the carriage, and ribbon winding and vibrating mechanism all mounted in rear of said tracks.

49. The combination of a pair of ribbon spools and a carriage, the spools being below and covered up by the carriage, and the carriage being movable up and also movable in letter-feeding direction while the ribbon remains stationary, and the ribbon running transversely of the platen.

50. The combination of a pair of ribbon spools and a carriage, and a carriage track frame, the spools being beneath the carriage track, and the frame being movable up to render the spools accessible, and the carriage being movable in letter feeding direction relatively to the frame and the ribbon.

51. The combination with a pair of ribbon spools of a platen and platen frame, said frame being mounted above the spools and rendering them normally inaccessible, and being movable up to render the spools accessible, and being also movable in letter feeding direction while the spools remain stationary.

52. The combination with a ribbon led from the front of the platen downwardly and rearwardly beneath the platen and carried around spools, of a platen frame normally covering the ribbon and movable up to render the same accessible.

53. A ribbon-spool vibrator mounted behind and beneath a platen and extending forwardly up and around the front of the platen, and a carriage traveling over said vibrator and movable up from over the same.

54. A shifting carriage-track frame having a pair of ribbon-spools mounted thereon beneath the same, and a carriage running on the carriage-track frame.

55. The combination with a carriage, of a ribbon carried from the front of the platen down beneath the platen and extending rearwardly in two reaches and mounted on spools, the carriage being movable up to render the ribbon accessible.

56. In a typewriting machine, the combination with a platen carriage, of a pair of spools mounted on edge and side by side beneath the platen carriage, a ribbon carrier in front of the platen over which the ribbon runs between the spools, and spool-winding devices mounted between said spools.

57. In a typewriting machine, the combination with a platen carriage, of a pair of spools mounted on edge and side by side beneath the platen carriage, a ribbon carrier in front of the platen over which the ribbon runs between the spools, and spool-winding devices mounted between said spools; said spools being detachably connected to the ribbon-winding devices.

58. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a frame whereon said carriage runs, means for shifting said frame to enable different types to print, means for enabling said frame to be tilted upwardly and rearwardly to enable the under side of the carriage to be exposed, and a ribbon mechanism on said frame.

59. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a frame whereon said carriage runs, said frame being hinged, means for shifting said frame to enable different types to print, adjustable stops for limiting the shifting movements of said frame, means for enabling said frame to be tilted upwardly and rearwardly to expose the under side of the carriage, and a ribbon mechanism on said frame.

60. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a frame whereon said carriage runs, means for shifting said frame up and down to enable different types to print, a releasable stop for limiting the upward shifting movement of said frame, means for enabling said frame to be lifted sufficiently to give access to the under side of the carriage, and a ribbon mechanism on said frame.

61. In a front strike writing machine, the combination of a series of rearwardly striking types, a carriage, a hinged frame whereon said carriage runs, means for shifting said frame up and down to enable different types to print, an adjustable stop for limiting the upward shifting movement of said frame; said stop being also releasable, so as to permit the frame to be tilted upward and backwardly to give access to the under side of the carriage, and a ribbon mechanism on said frame.

62. In a front strike writing machine, the combination of a series of rearwardly striking type bars, an upwardly and rearwardly inclined segment whereon they are pivoted, a platen, a platen carriage, a frame where-

on said carriage runs, said frame being hinged in rear of the platen and below the printing point, means for shifting said frame and carriage up and down to enable different types to print, a releasable stop limiting the upward shift of the frame and carriage; whereby when said stop is released, the frame and carriage may be tilted upwardly and rearwardly, and a ribbon mechanism on said frame.

63. In a front strike writing machine, the combination of a series of rearwardly striking types, a platen, a platen carriage, a frame whereon said carriage runs, said frame being hinged in rear of the platen, a spring for lifting said frame, a releasable stop against which said frame is pressed by said spring, means whereby said frame may drop to enable different types to print; said frame being tiltable upwardly and rearwardly, when said stop is released, so as to expose the under side of the carriage, and a ribbon mechanism on said frame.

64. In a front-strike typewriting machine in which the type strike the front side of the platen, the combination with a main frame, and a laterally-movable carriage and platen, of a vertically-movable shift-frame for the carriage pivoted to the main frame in rear of the platen, the pivotal axis being horizontal, substantially as set forth, and a ribbon mechanism on said shift frame.

65. In a visible-writing typewriting machine in which the type-bars swing upwardly and rearwardly to the platen, the combination of a main frame, a laterally-movable platen-carriage, a shift-frame which entirely supports the carriage and is pivoted to the main frame to swing up and down to place the platen in different printing positions, said shift-frame being connected to the main frame by separated pivots located in rear of the platen and parallel therewith, substantially as set forth, and a ribbon mechanism on said shift frame.

66. In a visible-writing typewriting machine in which the type-bars swing upwardly and rearwardly to the platen, the combination of a main frame, a laterally-movable carriage supporting the platen, a carriage-shift frame which entirely supports the carriage and is pivoted to the main frame in rear of the platen, substantially as set forth, and a ribbon mechanism on said shift frame.

67. In a visible-writing typewriting machine in which the type-bars swing upwardly and rearwardly to the platen, the combination of a main frame, a laterally-movable platen-supporting carriage, a shift-frame which is of substantially the same length as the carriage and entirely supports said carriage and is pivoted to the

main frame to swing up and down to place the platen in different printing positions, said carriage and shift-frame being constructed to allow the carriage to move laterally on the shift-frame beyond the ends thereof, substantially as set forth, and a ribbon mechanism on said shift-frame.

68. In a visible-writing typewriting machine in which the type-bars swing upwardly and rearwardly to the platen, the combination of a main frame, a laterally-movable platen-supporting carriage, a shift-frame which entirely supports said carriage and is pivoted to the main frame in rear of the carriage to swing up and down to place the platen in different printing positions; said carriage being movable laterally on the shift-frame in front of the pivotal connection between the shift-frame and the main frame, and said shift-frame and carriage being constructed to allow the carriage to move laterally beyond the ends of said shift-frame, substantially as set forth, and a ribbon mechanism on said shift-frame.

69. In a visible-writing typewriting machine in which the type-bars swing upwardly and rearwardly to the platen, the combination of a main frame, a laterally-movable carriage, a shift-frame which is of substantially the same length as the carriage and entirely supports said carriage and is pivoted to the main frame substantially parallel to the axis of the platen to swing up and down to place the platen in different printing positions, said carriage and shift-frame being constructed to allow the carriage to move on the shift-frame laterally past the pivotal connection of the shift-frame with the main frame, substantially as set forth, and a ribbon mechanism on said shift frame.

70. In a typewriting machine in which the type-bars swing upwardly and rearwardly to the platen, the combination of a laterally-movable platen-carriage, a main frame, a rigid shift-frame provided with a carriage-supporting track along its front side, the shift-frame being pivotally connected to the main frame by two pivots at its rear, substantially as set forth, and a ribbon mechanism on said shift-frame.

71. In a typewriting machine in which the type-bars swing upwardly and rearwardly to the platen, the combination of a laterally-movable platen-carriage, a main frame, and a rigid rectangular shift-frame pivoted at its rear portion to the main frame to swing up and down, a track which entirely supports the carriage and is located wholly in front of said pivotal connection, substantially as set forth, and a ribbon mechanism on said shift-frame.

72. In a typewriting machine in which the type-bars swing upwardly and rear-

wardly to the platen, the combination of a laterally-movable platen-carriage, a main frame, a rigid rectangular shift-frame having a supporting-track for the carriage along its front, a pair of separate pivots 5 connecting the rear of the shift-frame to the main frame, substantially as set forth, and a ribbon mechanism on said shift frame.

73. The combination with a rocking frame and a carriage thereon, of spools on the rocking frame, a carriage escapement mechanism operated by the keys, and spool winding mechanism connected to the carriage escape- 10 ment mechanism.

74. In a typewriting machine, the combination with a platen, of a ribbon vibrator hinged at the rear of the platen and extending from its hinge downwardly beneath the platen rail and then upwardly to the front 20 of the platen.

75. In a typewriting machine, the combination with a platen, of a ribbon vibrator hinged at the rear of the platen and extending from its hinge downwardly beneath the platen rail and then upwardly to the front 25 of the platen, and having an elbow at its front end to clear the pressure rolls and front scale.

76. A ribbon shifting device comprising a shaft 92 having ears 94 and 95 and a finger-piece 93 to engage the driving pawls in alternation, said driving pawls pivoted side by side and having arms to be engaged by 35 said ears.

77. In a typewriting machine, the combination of a carriage shift frame, a vibrating ribbon guide and a pivoted vibrating lever for the same supported on said shift frame, 40 a lever fulcrumed in rear of the vibrating lever pivot and having an arm projecting upwardly and forwardly, and a link pivotally connected to said lever arm and to the vibrating lever, substantially as set forth.

78. In a typewriting machine, the combination with a platen and a carriage for the platen, of a shift frame which forms the entire support for the carriage and is movable to shift the platen to different printing positions, a ribbon vibrator lever mounted on 50 the shift frame, and means for vibrating the lever with the carriage and shift frame in both the normal and shifted positions, substantially as set forth.

79. In a typewriting machine, the combination with a platen, a platen frame, a rail along which the frame runs, said rail in rear of the platen, types mounted to strike upon the front of the platen, and key levers for 60 operating the types, of spools mounted on edge between said rail and said levers, and a ribbon passing up from one spool to the front of the platen, and thence down to the other spool, and means for enabling the 65 levers to wind the spools.

80. In a typewriting machine, the combination with a platen and types mounted to strike upon a visible side thereof, of spools mounted on edge below the platen, a ribbon extending up from the spools to the front of the platen and there running over a vibrator, the platen and spools being mounted to move upwardly to give access to the spools, and a spool-winding device mounted upon the framework of the machine and disconnected 70 from the spools by such upward movement of the spools.

81. In a typewriting machine, the combination with a platen and types mounted to strike upon a visible side thereof, of spools mounted on edge below the platen, a ribbon extending up from the spools to the front of the platen and there running over a vibrator, the platen and spools being mounted to move upwardly to give access 80 to the spools, and a spool-winding device mounted upon the framework of the machine and disconnected from the spools by such upward movement of the spools; the spools being detachably mounted to enable 85 them to be removed independently of their winding means.

82. In a typewriting machine provided with a platen, a carriage therefor, a track upon which the carriage runs, and type bars 95 below the platen to strike upon the front thereof, a pair of ribbon spools journaled side by side on edge below said carriage and track in rear of the type bars, a ribbon on said spools, a ribbon vibrator in front of the platen, the ribbon extending from one spool forwardly beneath the carriage and platen and upwardly and over said vibrator, and thence downwardly and rearwardly 100 to the other spool, means for automatically operating said vibrator, and means for automatically winding said spools.

83. In a typewriting machine provided with a platen, a carriage therefor, a track upon which the carriage runs, and type bars 110 below the platen to strike upon the front thereof, a pair of ribbon spools journaled side by side on edge below said carriage and track in rear of the type bars, a ribbon on said spools, a ribbon vibrator in front of the platen, the ribbon extending from one spool forwardly beneath the carriage and platen and upwardly and over said vibrator, and thence downwardly and rearwardly to the other spool, means for automatically operating 115 said vibrator, and means for automatically winding said spools, said carriage with said track being movable upwardly to afford ready access to said spools.

84. In a front-strike writing machine, the combination of a series of rearwardly striking types, a platen, a carriage whereon said platen is mounted, a frame whereon said carriage is mounted, said frame being 125 hinged in rear of the platen to the frame-

work of the machine, ribbon spools mounted upon said hinged frame, and means for guiding the ribbon to cover the printing point.

- 5 85. In a typewriting machine in which the type-bars swing upwardly and rearwardly to the platen, the combination of a laterally-movable platen-carriage, a main frame, and a rigid rectangular shift-frame pivoted at
10 its rear portion to the main frame to swing up and down, a track which entirely supports the carriage and is located wholly in front of said pivotal connection, and a ribbon-vibrating mechanism mounted to shift
15 with said shift-frame.

86. In a typewriting machine having printing keys, the combination of a platen-carriage, a frame whereon said carriage travels in letter-feeding direction, said frame hinged to the framework of the machine for shifting up and down, to shift said carriage bodily up and down to enable different types to print, and a ribbon-vibrating mechanism operable by the printing keys and mounted to shift with said shifting
20 frame. 25

BURNHAM C. STICKNEY.

Witnesses:

SAMUEL R. OGDEN,
LIDA ROSS.