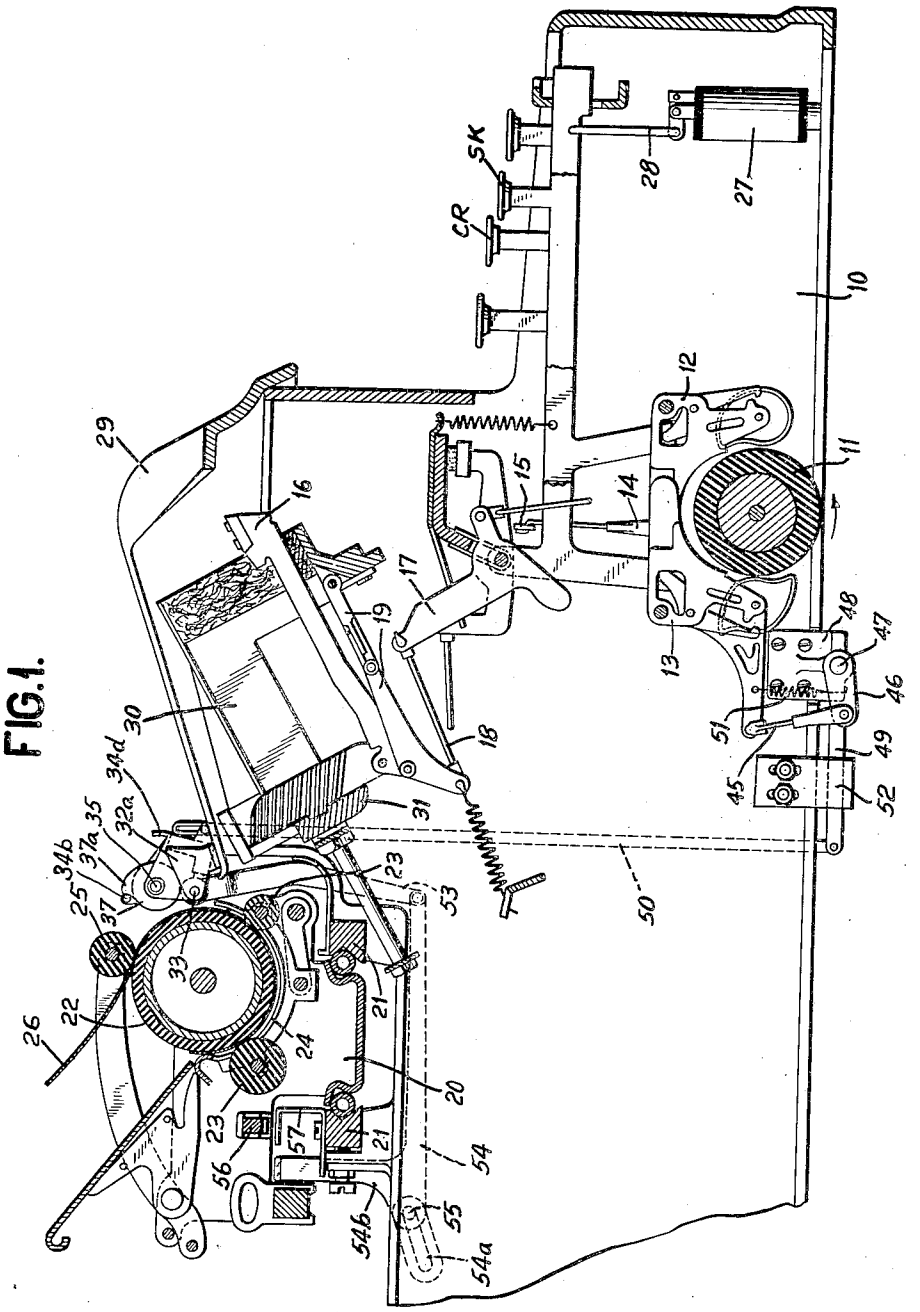
Dec. 30, 1941. W. A. AYRES 2,268,437

PRINTING MACHINE

Filed Dec. 29, 1939 2 Sheets-Sheet 1

FIG. 1.



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PRINTING MACHINE

Filed Dec. 29, 1939 2 Sheets-Sheet 2

FIG. 2.

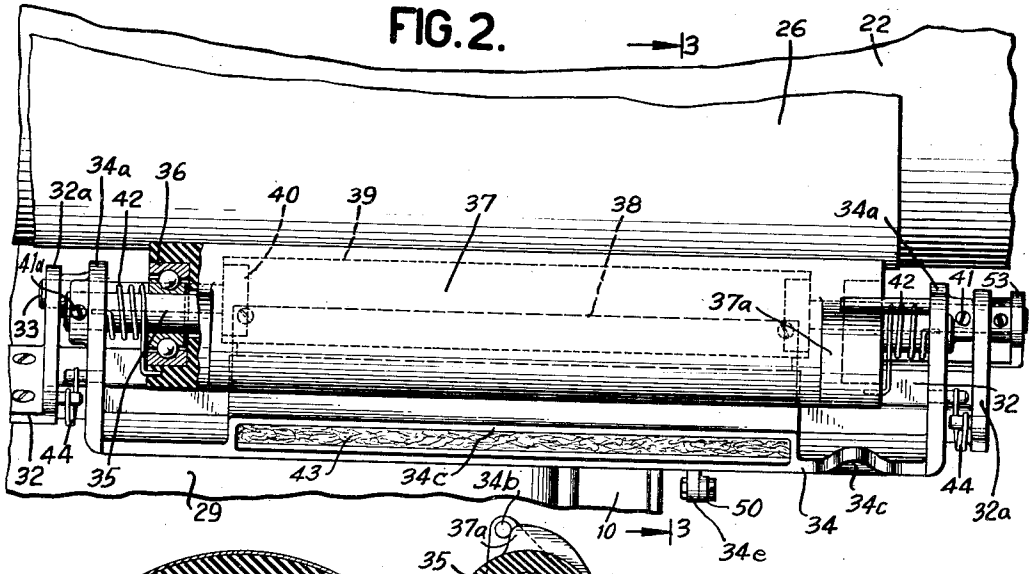


FIG. 3.

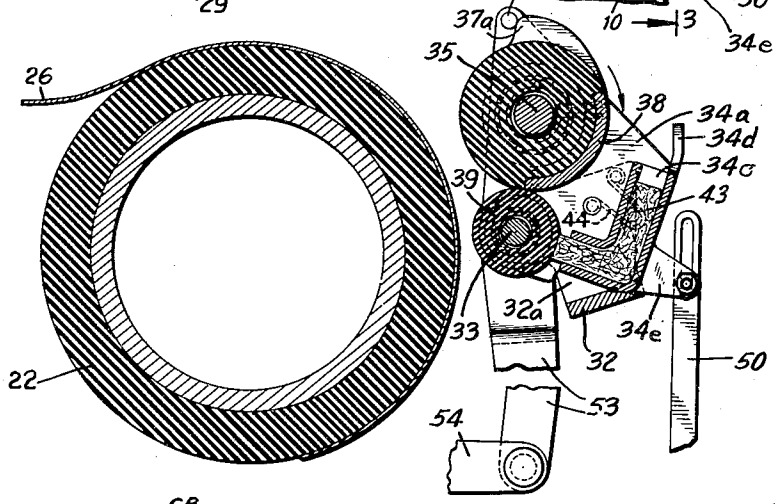
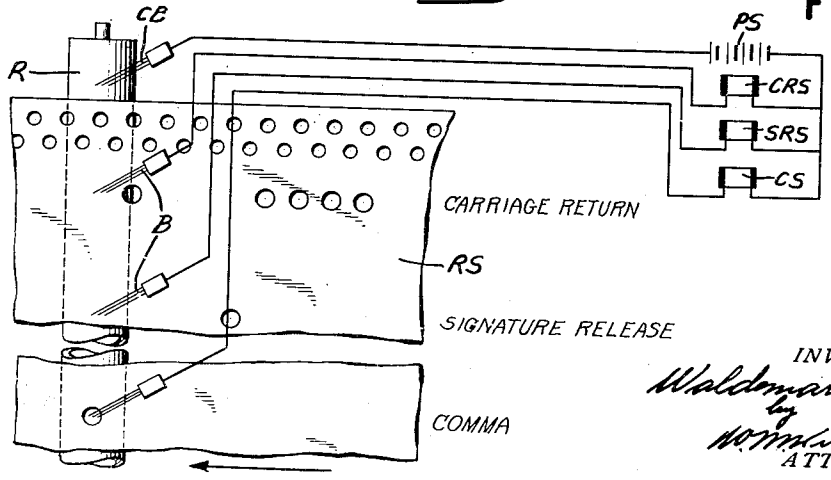


FIG. 4.



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Patented Dec. 30, 1941 2,268,437

UNITED STATES PATENT OFFICE

2,268,437

PRINTING MACHINE

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Application December 29, 1939, Serial No. 311,500

16 Claims. (Cl. 197—1)

This invention relates to typewriting machines. The broad object of the present invention is to provide an automatic letter signing device suitable for use in typewriting machines.

An object is to provide a letter signing device which is very simple and requires very little power to operate it.

Another object is to provide a letter signing device which may be operated by the rotation of the platen of the typewriting machine.

A further object is to provide a letter signing device which may be power operated and controlled by a key to relieve the operator of the labor of operating the letter signing device.

An object is to provide a letter signing device suitable for use in automatic letter writers.

An object is to provide an automatic letter signing device which may be controlled by a perforation or other designation in a record.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a vertical section through the typewriting machine.

Fig. 2 is a plan view of the letter signing device.

Fig. 3 is a vertical section of the line 3—3 in Fig. 2.

Fig. 4 is a wiring diagram.

The invention is disclosed in the drawings as applied to the well known "International" electric writing machine, formerly known as the "Electromatic," purely as a matter of convenience. It is desired, therefore, to point out that application of this invention is not limited to the particular form of power operated typewriter shown in the drawings or to power operated typewriters as this invention may be applied to other power operated typewriters or to manually operated typewriters of any kind by suitable alterations in the framework and other parts of the letter signing device.

With reference to Fig. 1, the reference numeral 10 generally designates the base or framework of the machine in which is rotatably mounted the usual power roller 11 which is continuously driven in the direction of the arrow by means of a suitable motor (not shown). Cooperating with the power roller 11 are cam units of which only two are shown in Fig. 1 and designated 12 and 13, respectively. The cam unit 12, which has a single lobed cam, operates the usual carriage return clutch, and is controlled by the carriage return key CR. The other cam unit 13 is provided with a double lobed cam and is similar to the cam units which operate type bars. The cam unit 13 is controlled by the signature key SK.

The cam unit 12 is connected by a link 14 to the operating lever 15, one arm of which forms part of the toggle used for engaging the carriage return clutch in a well known way. This clutch is described in Patent No. 2,104,559. When the key CR is depressed, the cam unit 12 is caused to rock in a counterclockwise direction (Fig. 1), by power roller 11 in a well known way, thereby drawing down the link 14 and actuating the lever 15 to engage the carriage return clutch. This causes the carriage to be drawn to the right until arrested by the usual marginal stop determining the left hand margin, and also causes a line-spacing movement of the platen. When it is desired to line-space the platen after it has been returned to the marginal position, it is merely necessary to depress the key CR. Thus, rotation of the platen may be produced by repeated depression of the key CR.

It will be understood that any power operated line-spacing and carriage return mechanism known in the art may be successfully employed in cooperation with the automatic letter signing device about to be described. Other means may be utilized to rotate the platen, if desired, such as a device for quickly inserting and ejecting forms.

Each of the cam units associated with the character keys is similar to the cam unit 13 and operates one of the type bars 16, through a linkage comprising a link 14a, a bell crank 17, a link 18, and the toggle 19, in a well known way.

The carriage is generally designated 20, and is mounted for movement upon the rails 21 in a well known way. The platen 22 is rotatably mounted in the carriage 20, and in cooperation therewith are the usual pressure rollers 23, which are rotatably mounted in the power deflector 24. Also cooperating with the platen is the usual paper bail 25. The rollers 23 and 25 cooperate with the platen 22 to feed a work sheet 26 wrapped around the platen.

In automatic letter writers it is necessary to cause the type bars to be operated by a record provided with designations which control means, such as electromagnets or solenoids 27, connected to the keys by means of links 28. Only one of the solenoids 27 is shown in Fig. 1, but it will be un-

derstood that the keyboard is provided with a plurality of rows of electromagnets, each connected to a key.

With reference to Fig. 4, there is shown diagrammatically the base of an electrically controlled automatic letter writer in which figure the letters denote the comma solenoid 27, the signature release solenoid, and the carriage return solenoids, respectively. The solenoids are shown as connected to designation sensing brushes B which cooperate with suitable contact means, such as a contact roller R, having a common contact brush CB to which the solenoids CS, SRS, and CRS may be connected in common through a battery or other suitable source of power designated PS. Suitable means, not shown, is provided to cause a record sheet RS to be fed in the direction of the arrow in Fig. 4, between the brushes B and roller R whereby the former successively sense designations in the record sheet. In the present case, the designations consist of holes disposed in the record sheet in the same relative positions as the corresponding keys on the keyboard. The lowest brush B in Fig. 4 is the one which senses the hole signifying a comma, the middle brush senses the hole which controls the signature release key solenoid SRS, while the topmost brush senses the holes controlling the carriage return solenoid CRS. It will be seen that by suitably locating the holes designating the various functions of the machine along the record sheet RS, it is possible to selectively control the solenoids CS, SRS, CRS in timed relationship.

The automatic signature device is mounted upon the cover 29 (Fig. 1) over the type basket 30 in which the type bars 16 are mounted in a well known way by means of the usual segment 31. The signature device is attached to the cover 29 by means of a frame member such as a bracket 32 having two ears 32*a* rotatably supporting a shaft 33 on which is mounted most of the working parts of the signature device. Secured to the shaft 33 is a frame 34 which preferably is in the form of a die casting. The frame 34 is provided with ears 34*a*, which not only serves as a means for securing the frame 34 to shaft 33, but also rigidly supports a shaft 35.

Rotatably mounted upon the shaft 35 by means of anti-friction bearings such as ball bearings 40, is a printing roller 37 provided with an electrotype or similar printing plate 38 on which the desired signature has been formed in reverse. Cooperating with the printing roller 37 is an ink transfer roller 39 which may be rotatably mounted on shaft 33 by anti-friction bearings 40, it being desirable that both printing roller 37 and the ink transfer roller 39 rotate freely as possible on the shafts 33, 35. The characters on plate 38 are slightly raised above the surface of roller 37 so that roller 39 is rotated only when plate 38 contacts roller 39.

The rollers 37, 39 are held in the proper position on shafts 33 and 35 by suitably fastening the inner ball races of the anti-friction bearings 36, 40 on the shafts 33, 35. The ears 34*a* of frame 34 are provided with suitable bosses through which passes the shaft 33, and one of these bosses is provided with a set screw 41 for the purposes of holding the shaft 33 in place. The shaft 35 is held in place in a generally similar manner by the provision of a set screw 41*a* threaded into a hole formed in a boss on the left hand ear 34*a* (Fig. 2). The bosses through which the shaft 33 passes also cooperate with the sides of the ears 32*a* to center the frame 34 between the ears 32*a* and prevents movement of the frame 34 longitudinally of shaft 33.

Restoring means is provided for the roller 37, taking the form of torsion springs 42, the ends of which are hooked into holes in the ends of the printing roller 37 and holes in the ears 34*a*, respectively. The springs 42 tend to rotate the roller 37 counter to the direction of the arrow in Fig. 3. The roller 37 is formed with a cam 37*a* for a purpose to be made clearer hereinafter. Normally the cam engages a pin 34*b* (Figs. 2 and 3) on an extension of the right hand ear 34*a* which pin limits counterclockwise movement (Fig. 3) of roller 37.

The frame 34 is formed with an ink chamber 34*c* which extends the length of the printing plate 38 and is L-shaped in cross-section, as shown in Fig. 3. This chamber is packed with a wick 43, which is saturated with ink and barely touches the ink roller to moisten the surface of the latter throughout the portion thereof which cooperates with the characters on the printing plate 38.

The frame 34 is normally held in the position of Figs. 2 and 3, with a portion thereof engaging the bracket 32 as a stop, by means of two toggle springs 44 interposed between pins carried by the ears 32*a* and 34*a*, respectively. However, when the frame 34 is tilted far enough in a counterclockwise direction (Fig. 3), the springs 44 become operative to rock the frame a further extent and cause the printing roller 37 to engage the surface of a work sheet 26 wrapped around the platen 22 and to yieldingly hold said roller in engagement with said work sheet. If the platen is now rotated by hand in a counterclockwise direction (Figs. 1 and 3), the roller 37 will be caused to rotate in the direction of the arrow in Fig. 3. When the roller rotates in this fashion, the printing plate 38 will first be inked by contact with the ink transfer roller 39 which always carries a film of ink. Thereafter the printing plate 38, with continued rotation of the roller 37, will roll over the surface of the work sheet 26, thereby printing a facsimile signature on the work sheet 26 at the desired point.

For the purpose of manually tilting the frame 34 to bring the roller 37 in cooperation with the work sheet 26, the frame 34 may be provided with a tab 34*c* of convenient length and favorable to be pressed by the operator's thumb.

It will be appreciated from the foregoing that the signature device may be successfully employed in a manual typewriter equally as well as in one operated by power, and therefore, is not limited to use in a power operated typewriter. It is desirable, however, to provide power means to tilt the signature device to render it operative and to rotate the platen in order that the device may require a minimum of effort by the operator and in order that it may be used in automatic letter writing machines in which all operations except initial operations of the machine, such as the writing of introductory matter, the inside address, and salutation, are performed automatically under control of suitable designations in a record sheet.

In the present case the usual power carriage return mechanism and line-spacing mechanism are utilized to position the carriage before effecting the automatic signing of the letter and thereafter to rotate the platen, while the cam unit 13 is utilized under control of the key SK to operate the frame 34. The cam unit 13 is connected by a

link 45 (Fig. 1) to an arm 46 secured to shaft 47. This shaft is journaled in a bracket 48 secured to the inside face of the right hand side of the main framework. Shaft 47 projects through a hole in the framework 10 and has secured to it, adjacent the outside face of the framework 10, an arm 49 extending horizontally toward the rear of the machine, or to the left in Fig. 1. The arm 49 is connected to a vertical link 50 having a pin and slot connection to an arm 34e formed in the frame 34. The slot in the link 50 is of such length that the frame 34 may be tilted by hand by means of the finger piece 34d without affecting the cam unit 13. This slot also permits the cam unit to restore to the position of Fig. 1 without affecting frame 34.

A spring 51, anchored to the arm of cam unit 13 to which is pivoted link 45 and to an ear (not shown) in bracket 48, tends to rotate the cam unit in a counterclockwise direction. This spring normally holds the arm 49 down against one arm of a bracket 52 secured to the inside face of the side of framework 10. Bracket 52 thus acts as a stop to limit counterclockwise movement of the arm 49.

When the signature key SK is depressed manually or by means of its solenoid SRS the cam unit 13 is rendered effective for operation in a well known way by the power roller 11, causing said cam unit to rock in a clockwise direction. Arm 46, shaft 47, and arm 49 are similarly rotated, thereby lifting line 50 and tilting the frame 34 in a counterclockwise direction until the springs 44 are rendered effective to rock the frame 34 the rest of the way. The platen may then be rotated by depression of the carriage return key or it may be rotated by hand.

In Fig. 4 there is shown one way in which the signature device may be automatically controlled by a record sheet. The lowermost brush B is shown sensing the hole designating the comma of the closing line. The topmost brush B then senses a single hole controlling the carriage return operation which causes the carriage to move to the position of Fig. 2. Since the left hand marginal stop is usually located about one inch from the left hand edge of the letterhead in most cases, the carriage will be returned so that a portion of it extends beyond the right hand side of the base, as shown in Fig. 2. It is preferred that the frame 32 be mounted in such a position that, when the carriage is returned after writing the comma of the complimentary close, the middle of the signature plate 38 will be approximately in vertical alignment with the center of the complimentary close line, whereby the signature will be printed directly below the complimentary close of the letter.

The first carriage return hole at the left causes the platen to be rotated one line-space in the usual way. The next hole to be sensed is the one controlling the printing of the signature and is sensed by the middle brush in Fig. 4. This energizes the signature release solenoid SRS and causes the cam unit 13 to operate as above to bring the printing roller 37 into cooperation with the platen. Next follows a succession of carriage return holes which causes a succession of line spacing operations to take place thereby rotating the roller 37 intermittently in a clockwise direction (Fig. 1) against the tension of torsion springs 42 (Fig. 2). After the printing roller 37 has rotated approximately one-half a revolution and completed the printing of the signature, the cam 37a engages the surface of the work sheet 26 and, with the continued rotation of the roller 37, cams the frame 34 back to the over balancing position of the springs 44. The latter then become operative to tilt the frame 34 back to the position of Fig. 3. As soon as the cam 37a on roller 37 is moved clear of the surface of the work sheet 26, the springs 42 assume control of the printing roller and will rotate it in a counterclockwise direction back to the position of Fig. 3.

In order to insure that the usual escapement dogs will properly engage the escapement rack or the escapement ratchet, whichever is used, when the carriage is returned, provision is usually made for a small clearance to enable the carriage to move slightly beyond the left hand marginal position. Such movement is usually very small and amounts to one-half letter-space or less and, when the platen is line spaced by use of the carriage return mechanism, a very small movement of the carriage on its rails is produced with each application of force to the carriage by the carriage return tape, or by the rack and pinion drive of the carriage by the carriage return mechanism. This produces a movement of the platen which is undesirable when the platen is rotating the printing roller 37 as it tends to smudge the work sheet, and blurs the impression of the type. In order to prevent this smudging, it is desirable that means be provided to cooperate with the carriage to hold it stationary during line-spacing movements taking place while the printing roller 37 is in cooperative relationship with the platen. This means may consist of a simple lock mechanism which may cooperate with some convenient part of the typewriter carriage, such as the usual marginal stop rack, and is controlled by the movement of frame 34.

The locking mechanism is most clearly shown in Fig. 1, although parts of it appear in Figs. 2 and 3. This mechanism includes an arm 53 which is secured to the right hand end (Fig. 2) of the shaft 33 and is suitably bent toward the framework 10 and downwardly.

At pitman 54 is pivoted at its right hand end (Fig. 1) to the lower end of arm 53 and at its left hand end is provided with a cam slot 54a embracing a stud 55 carried by the framework 10 on the right hand side of the machine. This pitman 54 is provided with an extension 54b the upper end of which is shaped similar to a tooth space in the marginal stop rack 56 which adjustably supports the marginal stops in a well known way. Secured to the rear rail 21, which may be extended beyond the right hand side of the machine, if necessary, is a bracket 57 provided with two vertically aligned slots for guiding the extension 54b. The end of the extension 54b has a normal position located approximately half-way between the two horizontal arms of bracket 57.

When the frame 34 is rotated in a counterclockwise direction (Fig. 1) by the operation of cam unit 13 and by the toggle springs 44 to engage the printing roller 37 with platen 22, the arm 53 rocks in the same direction and draws the pitman 54 to the right. In consequence of the shape of the slot 54a, the left hand end of the pitman is raised and also will be drawn to the right thereby causing the toothed end of extension 54b to be moved upwardly and to the right, through the slot in the upper arm of bracket 57, and into a tooth space in the rack 56. This locks the carriage against movement.

The cam 37a is so positioned with respect to the printing plate 38 that the cam will not com-

mence to disengage the cylindrical portion of the printing roller 37 from the work sheet until after the printing plate has moved clear of the work sheet. The locking mechanism comprising the arm 53 and pitman 54 is so designed that the toothed end of extension 54b engages the marginal stop rack before the surface of the printing roller 37 actually contacts the work sheet. Thus, it is impossible to disengage the locking mechanism until after the printing plate has printed the signature and has passed from contact with the work sheet.

The locking mechanism has the further advantage in that it is not necessary to rely on the marginal stop to hold the carriage against movement when line-spacing the platen to effect operation of the signature device. For instance, when it is desired to operate the signature device manually, the locking mechanism becomes immediately effective to lock the carriage against movement regardless of the position of the carriage. It is possible therefore, to place the signature in any desired position with respect to the edge of the work sheet by simply moving the carriage to the desired position. Since the signature device is offset with respect to the printing point, this feature is only partly realized in the so-called standard machines provided with platens which have an effective length of ten inches or less. This is due to the fact that the platen cannot be shifted far enough past the printing point in its movement toward the position determining the left hand margin of the work sheet, consequently in such machines there will be a zone approximately two inches wide on the work sheet where the signature cannot be printed. This will not be true in the case of machines equipped with platens having an effective length of twelve inches or greater, since the extra length of the platen will compensate for the off-setting of the signature device.

As shown in Fig. 2, the signature device is mounted in such a position that the extreme left hand end of printing plate 38 is approximately two inches from the printing point. It will be understood, however, that the signature device may be mounted in position nearer to the printing point whereby the signature may be printed at any point in a line. It is thus flexible enough for use as a countersigning device in writing checks or other documents which must be authenticated by a signature. When the signature device is controlled automatically, or solely by operation of the keys on the keyboard, the carriage may be positioned to print the signature by means of a tabulating mechanism controlled by the tabulating key. Under such circumstances it will be merely necessary to tabulate the carriage to the desired point, operate the signature release and then repeatedly operate the carriage return key as many times as desired to cause the rotation of the printing roller. Obviously, this procedure may be followed under control of a perforated record sheet by simply providing the record sheet with holes controlling the tabulating key through its solenoid. It will be seen that the device is very flexible and may be controlled in a variety of ways, which may be wholly manual, partly manual and partly automatic, and wholly automatic.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a machine of the class described, the combination with a carriage, a main frame, means to mount the carriage on said frame, a platen rotatably mounted in the carriage; an automatic signature device comprising an impression roller, an inking roller cooperating with the impression roller, and means to supply the inking roller with ink; means on said frame to mount said signature device for movement into and out of cooperation with a work sheet on the platen, means to engage said device with said work sheet, means to rotate the platen to effect an impression from said compression roller, said impression roller being rotated by the rotatable movement of the platen, and a record sensing device for controlling the operation of the engaging and rotating means.

2. In a machine of the class described, a main frame, a carriage mounted on said frame and including a rotatable platen, means to rotate the platen, a signature device; means to mount said signature device on the main frame for movement into and out of cooperation with a work sheet on said platen, said device being operable by rotation of the platen; key controlled power means for moving the signature device into cooperation with the work sheet on the platen, and means to prevent movement of the carriage while the platen is being rotated to operate the signature device.

3. A machine of the class described, the combination of a record sensing device, a rotatable signature device, a rotatable platen, means controlled by the record sensing device for engaging the signature device with the platen, and means controlled by said sensing device for causing rotative movement of the platen to rotatably operate said signature device.

4. In a machine of the class described, the combination of a rotatable platen, a signature device engageable with the platen and operable by rotation thereof, power operated means to engage the signature device with the platen, power operated means for causing rotation of the platen to operate said device, and keys for controlling the power operated means.

5. In a machine of the class described, a rotatable platen, and a normally inactive signature device cooperating with the platen and operable by rotation of the platen, said signature device including a printing roller, inking means for the printing roller, means to mount the printing roller for movement from an idle position into and out of engagement with the platen, and means to move said printing roller from the idle position into engagement with said platen including a key for controlling the operation of the signature device, said device also including means operated by rotation of the platen to automatically restore the printing roller to initial position.

6. In a machine of the class described, the combination with a rotatable platen; a signature device comprising a movable frame, an impression roller rotatably mounted in said frame and engageable with the platen when said frame is moved, means alternately effective to hold said roller in and out of engagement with the

platen, means to automatically move the roller clear of the platen after a predetermined rotational movement of said roller, and key controlled means to render the holding means effective to hold the roller in engagement with the platen.

7. In a machine of the class described, the combination of a carriage and a platen rotatably mounted on the carriage, a relatively stationary letter signing device engageable with the platen and operable by rotation of the platen, means to engage said device with the platen, and means to automatically lock the carriage against movement relative to said device while said device is being operated by the platen.

8. In a machine of the class described, the combination of a carriage, a platen rotatably mounted on the carriage, a relatively stationary letter signing device including a printing roller engageable with the platen and rotatable thereby by a line spacing movement of the platen, means to move the printing roller from an idle position into engagement with the platen, and means to prevent movement of the carriage relative to the printing roller while the platen is being line spaced with the printing roller in engagement therewith.

9. In a machine of the class described, the combination of a carriage, a platen rotatably mounted on the carriage; a printing roller relative to which the carriage is movable, means to movably mount the printing roller for movement into and out of engagement with the platen, said printing roller when engaged by the platen being rotatable thereby; and means controlled by the movement of the printing roller into engagement with the platen for preventing movement of the carriage relative to the printing roller while the printing roller is in engagement with the platen.

10. In a machine of the class described, the combination of a carriage, a support mounted on the carriage and movable to feed a work sheet, a printing member relative to which the carriage is movable, means to mount the printing member for engagement with a work sheet on said support, said printing member when engaged with the work sheet on the movable support being operable thereby to print upon the work sheet, control means for causing the engagement of the printing member with the work sheet on the support, and means controlled by the movement of the printing member into engagement with the work sheet for preventing movement of the carriage relative to the printing member whereby to prevent the work sheet from moving laterally of the printing movement of the printing member.

11. In a machine of the class described, the combination of typing means, a work sheet support movable in one direction to letter space characters typed by the typing means and in another direction to line space the characters typed, a printing member engageable with a work sheet on the support and relative to which the support is movable in letter spacing direction; means to movably mount the printing member, said printing member when engaged with the work sheet being operable by one of said movements of the work sheet support; means to engage said member with said support to initiate operation of the printing member, and means controlled by the movement of the printing member into engagement with the work sheet for preventing movement of the support in its other direction of movement.

12. In a machine of the class described, the combination of a work sheet support; typing means, said typing means and said support being relatively movable in two directions to letter space characters and to line space characters, respectively; a letter signing device including a printing member relative to which the support moves and engageable with a work sheet on the support and operable by one of said relative movements, means to control engagement of the printing member with said support to initiate operation thereof, and means controlled by the movement of the printing member to prevent the other relative movement between the work sheet support and the typing means.

13. In a machine of the class described, a work sheet support; typing means for typing characters upon a work sheet on said support, said work sheet support and said typing means being movable relative to each other in two directions at right angles to line space and letter space, respectively, the characters typed; a stationary printing member engageable with the work sheet on said support and operable by one of said relative movements, means to control the operation of the printing member, and means to automatically prevent further relative movement of the support in the other direction while the printing member is being operated.

14. In a machine of the class described, a main frame, a work sheet support movable in two directions relative to said frame, a signature device engageable with the work sheet support and operable by one of the relative movements between the work sheet support and said frame, power means for causing the signature device to engage the work sheet, a key for controlling the operation of the power means, and means to prevent the other relative movement when said device is being operated by the first movement of the work sheet support.

15. In a machine of the class described, a work sheet support movable to line space items printed upon the work sheet, a printing member engageable with the work sheet and operable by the line space movement thereof, a record sensing device, means controlled by the record sensing device for engaging the printing member with the work sheet, and means controlled by the record sensing device for causing line spacing movement of the support.

16. In a machine having automatic carriage return mechanism wherein the carriage return mechanism effects line spacing of a platen, the combination with said platen of a printing member engageable with a work sheet on the platen and operable by line space movement thereof; a printing device, means to mount said device for movement into and out of engagement with the platen, said printing device being operable by the line space movement of the platen; means to cause line space movement of the platen, means to cause engagement of said device with the platen, and a record sensing device for controlling both causing means.

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