June 13, 1944. F. SCHULTZ 2,351,075

TYPEWRITING MACHINE

Filed April 7, 1942 2 Sheets-Sheet 1

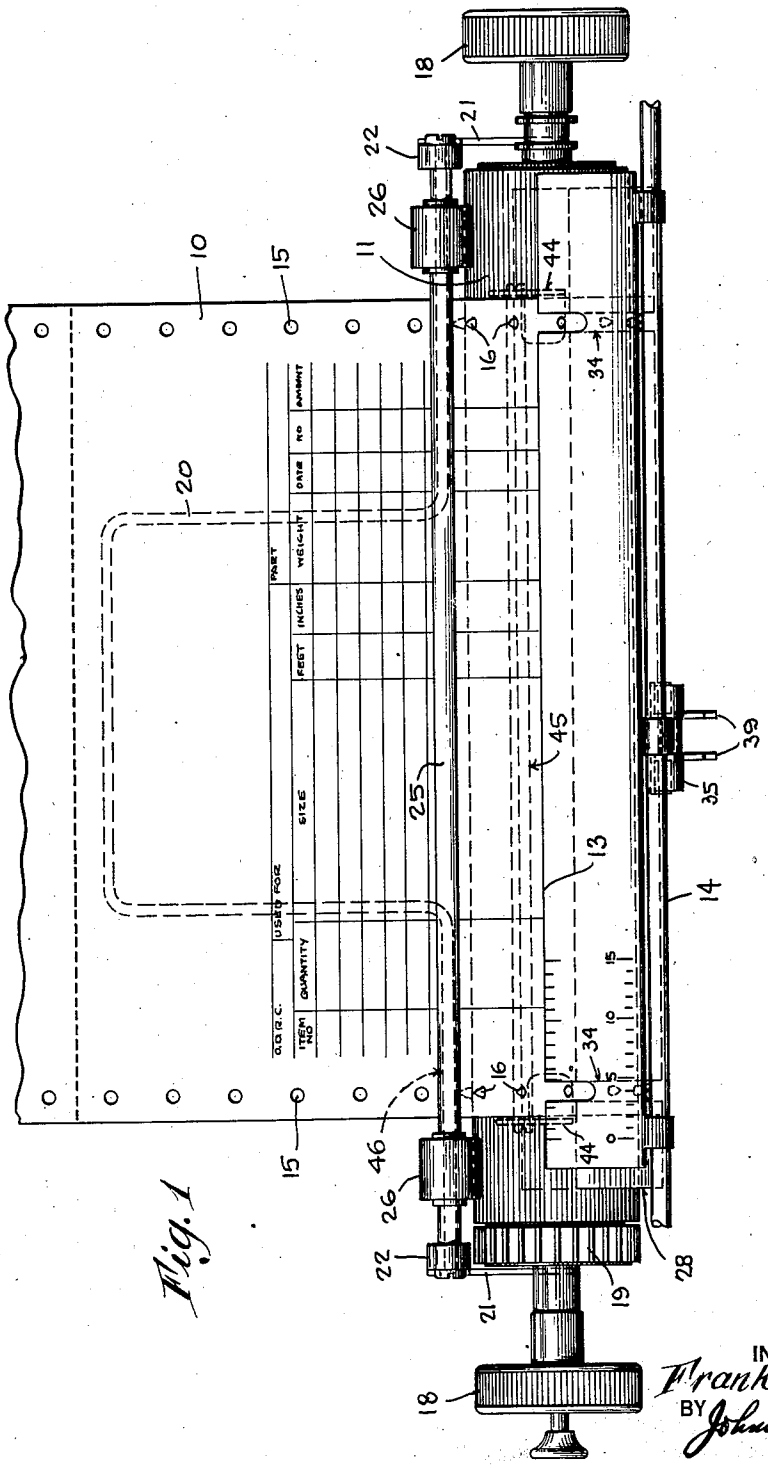


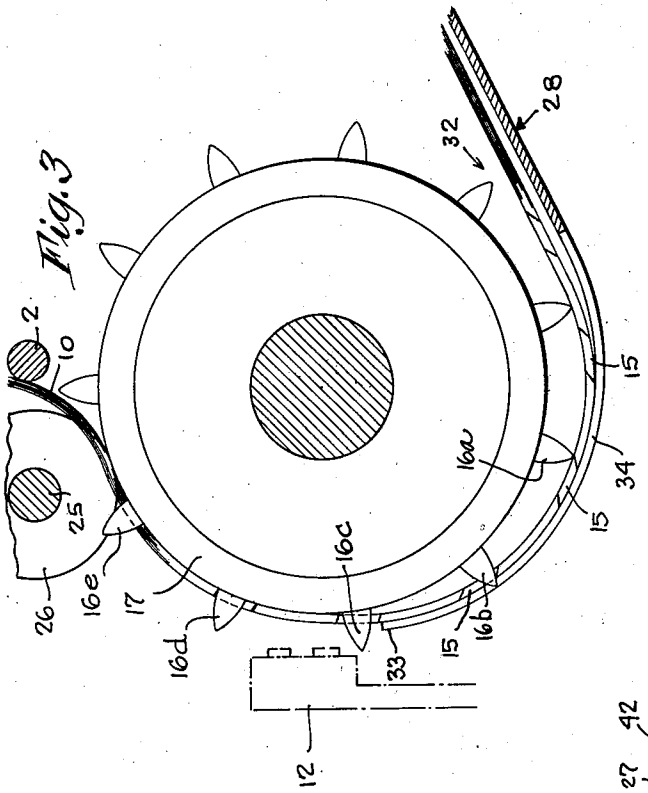
Fig. 1

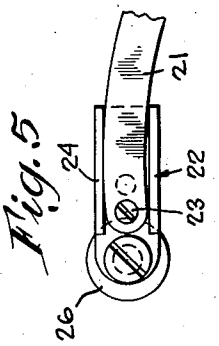
INVENTOR
Frank Schultz
BY Johnson, Kline and Smyth
ATTORNEYS

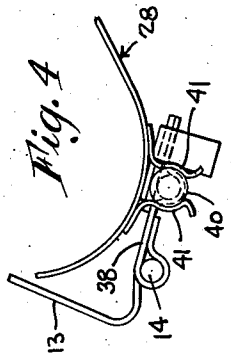
June 13, 1944. F. SCHULTZ 2,351,075

TYPEWRITING MACHINE

Filed April 7, 1942 2 Sheets-Sheet 2







INVENTOR
Frank Schultz
BY Johnson, Kline and Smyth
ATTORNEYS

Patented June 13, 1944 2,351,075

UNITED STATES PATENT OFFICE

2,351,075

TYPEWRITING MACHINE

Frank Schultz, Cliffside Park, N. J., assignor to Autographic Register Company, Hoboken, N. J., a corporation of New Jersey

Application April 7, 1942, Serial No. 437,964

3 Claims. (Cl. 197—133)

This invention relates to typewriting machines, and more particularly to means for positively feeding continuous record and/or carbon strips through such machines to maintain the strips in registration at the writing line and in properly aligned position on, and with respect to, the platen.

It has been the custom to feed and control continuous strips in a writing machine by means of spaced pins carried by the platen for successively engaging similarly spaced holes in the strips. When the pins are fixed on the platen and the thickness of the pile of strips is not too great, the strips may be satisfactorily fed and controlled in this way without any special arrangement being made to guide or control the strips.

When, however, the thickness of the pile of strips is substantial, for instance when there are five record and four carbon strips, if the feed holes in the strips are aligned at the writing line, those at the introductory side of the platen will be so offset depthwise of the pile that the pins cannot readily enter the holes in the strips without tearing the paper and destroying the holes for their aligning functions. This offsetting is caused by the bending of the pile of strips around the cylindrical surface of the platen, the thickness of the intervening strips causing the radii of curvature of the outer strips to be greater than the radii of curvature of the inner strips.

This problem has long been recognized, and various solutions of it have been proposed and attempted. Usually, they have involved changes in the construction, location and arrangement of the pinwheel so that only those pins which are located near the writing line (where the offset is not sufficient to be troublesome) may engage the holes in the strip. But, these suggestions have involved the use of special mechanisms, or at least extra moving parts, with the attendant cost of manufacture, installation and maintenance.

According to the present invention, the problem is solved without the use of extra parts and merely by a novel disposition of the paper table of the typewriting machine with respect to the platen and the fixed pins carried thereby. This is accomplished by lowering the rear end of the paper table and/or changing the curvature thereof so that the strips are not forced by the table against the platen or the pin of the wheels until a point in their travel toward the writing line is reached in which the feed holes in the respective paper strips are sufficiently aligned to receive the pins.

Preferably, the paper table is so located and shaped with respect to the platen that a gradually narrowing throat is provided from the introductory side of the platen to the printing side, and in this throat the strips are carried gradually closer to the platen and the pins thereon as the line of writing is approached.

With this arrangement, the pins at the under rear side of the platen are in position to engage the holes in the strips if the holes are aligned. For instance, where a few record and carbon strips are used so that the pile would have little thickness and the offsetting of the holes would not be appreciable, all of the pins on the platen adjacent the paper table may engage the holes, and they would so do if the drag on the strips as they pass over the rear end of the paper table is sufficient to hold the strips up against the platen at the mouth of the paper table. Where a substantial number of strips is used or the strips are of heavy or thick material, danger of tearing the material at the point of engagement of the pins with the aligned holes in the feeding operation is not great because of the mass of material engaged. However, when fewer strips are used, the danger of tearing increases, and it is therefore important that a greater number of pins engages the strips so as to distribute the load and avoid tearing of the holes.

It will be seen that, according to the present invention, the pins may enter the holes in the paper whenever the holes are sufficiently aligned to receive the pins, and that this will happen soon or later depending upon whether the pile is thick or thin.

Another feature of the present invention is the provision of means whereby an existing typewriter may be quickly and easily converted so as to operate according to the present invention.

Other features and advantages will hereinafter appear.

In the accompanying drawings, which illustrate one form of this invention as exemplary thereof—

Figure 1 is a front elevation of the platen and parts of the carriage of a typewriting machine, showing the relation between the paper strips and the paper guiding and supporting means and the feeding means for the strips.

Fig. 2 is a transverse sectional view taken through the parts shown in Fig. 1, and showing the relation of the paper table and platen of the present invention.

Fig. 3 is an enlarged view, partly diagrammatic, showing the relation between the paper table, the pinwheel feed device, and the paper strips.

Fig. 4 is a detail view showing suitable means for detachably holding the paper table on the usual feed roll release rod of a typewriting machine.

Fig. 5 is a detail view showing the manner in which the guide roller bail may be extended to accommodate the present invention.

As shown in the accompanying drawings, the continuous strips **10** are fed over a platen **11** by which they are supported to receive impressions from type bars **12** or other suitable imprinting device along a line of writing indicated by the letter gauge plate **13** which forms part of the typewriter carriage and which is supported on a bar **14**. The paper strips **10** have along either or both margins feed apertures **15** equally spaced and adapted to engage similarly spaced pins **16** mounted directly on the platen or carried by a pinwheel **17** secured to the platen and which usually has the same diameter as the platen.

As the platen is rotated by one of the knobs **18** or by line-space mechanism including a ratchet **19**, the pins **16**, being in engagement with the aligned holes **15** in the strips, cause the strips to advance together while maintaining them in registration and in alignment on, and with respect to, the platen. To remove the strips from the pin and to support the portions of the strips advanced beyond the platen, the present invention provides a special strip-supporting bail **20** which is supported by arms **21** forming part of the guide roll supporting bail of the typewriting machine. Each of these arms **21** is extended, according to the present invention, by a block **22** secured to the arm by a screw **23** and having over and underlying ledges **24**. This is done for the purpose of moving a paper guide rod **25** forwardly so that the guide rod **25** will permit the pile of strips to rise from the pin as the leading edge is guided upwardly by the bail **20**. Rollers **26** carried on the rod **25** rest on the platen beyond the edges of the pile of strips and serve merely to support the front end of the bail comprising the arms **21** and rod **25**, the bail being pivotally mounted at its rear end at **27** on the carriage frame.

To adapt an existing typewriter to the present invention, in addition to the extension of the guide roller bail and the provision of the supporting bail **20**, the platen is first removed by the release of convenient and well-known means, then the usual paper table is taken from the carriage, the new paper table provided by the present invention is then substituted for it, and then the platen is returned to the carriage.

The usual paper table has a portion substantially conforming to the curvature of the platen and located in close proximity thereto and carries feed rollers engaging the paper wrapped around the platen. This portion of the paper table meets with an upwardly and rearwardly extending portion and together these two portions guide the paper and hold it close to the platen at the introductory side thereof. If the platen is provided with fixed pins and a substantially thick pile of record and carbon strips is introduced to the platen with the use of the ordinary paper table, it will be found that, as the leading edge of the pile is brought to the writing line, the pins approaching the paper at the introductory side of the platen will tear the paper of the outer strips of the pile as they try to enter the feeding apertures. This is due to the fact that the outer layers of the pile have larger radii of curvature than the inner strips, and therefore equal portions of the inner and outer layers do not reach angularly about the platen the same extent, causing the holes to be angularly offset depthwise of the pile. Where only a few strips are used in the pile, the difference in radii between the inner and outer strips is not great enough to prevent the pins from entering the holes without tearing the paper, especially where the holes are as usual slightly larger in diameter than the diameter of the pins.

To avoid this difficulty, it has been proposed heretofore to so locate the pinwheel with relation to the platen that only a few of the pins near the line of writing where the strips are substantially in registration will engage the holes, or to move the pins radially of the platen so that all except a few pins near the line of writing will be located below the surface of the platen. These proposals required additional mechanism to support and operate the pinwheel or means for mounting each pin for individual movement and providing means for ejecting and retracting the pins.

According to the present invention, the need for this extra mechanism, with its attendant cost and mechanical troubles, is obviated by merely substituting for the usual paper table the improved paper table **28** of the present invention. This paper table may have a rear portion **29** which is preferably rounded and over which the pile of strips passes to the machine. Forwardly of the rounded portion **29** the table may have a flat downwardly extending portion **30** which joins with a curved portion **31**, the rear end of which is substantially spaced from the platen and the pins of the pinwheels and the forward end of which extends upwardly toward the writing line and inwardly toward the platen.

As shown in Fig. 3, there is thus formed between the rear end of curved portion **31** of the paper table on the one hand, and the surface of the platen on the other, a wide throat **32**, which gradually narrows as it extends forwardly, through which the strips pass in being fed. At the opening of the throat, that is to say, at the introductory side of the platen, the straight and curved portions of the paper table are so spaced from the ends of the pins **16** that a pile of strips of substantial thickness may pass between the end of the pin and the surface of the paper table without the pins engaging the strips. As the strips proceed forwardly and then upwardly under and around the platen, this space decreases so that at a more advanced point, for instance the position indicated by the pin marked **16***a* in Fig. 3, the end of the pin just about touches the innermost strip of the pile. Continuing forwardly, the paper table more closely approaches the surface of the platen so that the pin, marked **16***b* in Fig. 3, passes through the holes **15** in the strips, although, due to the fact that the holes have a larger diameter than the pin and that the pin is tapered, feeding contact with the pin and the paper does not occur as yet at this point. Continuing upwardly toward the line of writing, the upper end **33** of the paper table holds the pile of strips quite close to the platen, and the pin, marked **16***c*, in Fig. 3, is beginning to take control of the strips. As the strips extend upwardly and rearwardly, it will be seen that the pins, marked **16***d* and **16***e* in Fig. 3, have completely registered the strips, and these pins, along with the pin **16***c*, have the burden of feeding the pile.

It will thus be seen that, because of the gradual narrowing throat **32**, the strips are brought grad-

ually closer to the platen as they advance, and should they tend to move toward the platen, they may be held away by the ends of the pins until the holes are so nearly registered that the pins may enter them without tearing the strip.

Should a relatively thin pile of strips be fed, in which case the offsetting between the inner and outer strips of the pile is not great, a greater number of pins may engage the strips than when a thicker pile is fed. Assuming that the weight of the pile of strips led over the rounded portion 29 of the end of the table is sufficient to hold the pile of strips up toward the platen, as indicated in dot-and-dash lines in Fig. 2, the strips would be engaged not only by three pins as shown in Fig. 3, but by the next three pins, thus distributing the load between the pins and the paper over six pins and holes rather than three. This is extremely advantageous, for where the strips are few and thin, the danger of tearing the paper in the feeding operation is greater than when the pile has substantial thickness, or when the strips of the pile themselves have greater thickness.

It follows that piles of various thicknesses between the rather thin pile shown in dot-and-dash lines in Fig. 2 and the rather thick pile shown in Fig. 3 will take positions intermediate those shown in Fig. 2 and Fig. 3, according to the degree of offset between the holes in the strips at the point where the pin may engage the strips, and that, if the offset is too great, the pins may merely hold the pile of strips off or away from the platen until they may enter without opposition from the paper table.

The curved portion 31 of the paper table may be provided with a slot 34 through which the ends of the pins may extend as the pins rotate around or with the platen.

In the broader aspects of the invention, the paper table 28 may be supported in the typewriter in any suitable way. As shown in Fig. 2, it has a bracket 36 carrying a cylindrical portion 35 which fits in a depression 37 in an arm 38 carried by the feed roll release rod 14. The bracket 36 has lugs 39 extending on both sides of the arm 38 to hold the table against lateral motion. As shown in Fig. 4, a rod 40 which is carried by the arm 38 is left in position and the table has spring clips 41 which snap over this rod and hold the table in place. As shown in Fig. 2, the rear end of the table rests on a rod 42 found on the typewriter, and the table may be provided with spring clips 43 to engage this rod.

To guide the strips laterally into the introductory side of the platen, the paper table 28 may be provided with lateral guides 44, and, extending between these, there may be provided a rod 45 serving to hold the strips against casual movement away from the paper table.

The front support 20 for the paper strips may have any suitable form or shape. In the form of the invention shown, it is formed of a rod bent in U-shape and having extensions 46 on the ends of its legs which are fastened into the blocks 24 carried by the bail arms 21.

Variations and modifications may be made within the scope of this invention, and portions of the improvements may be used without others.

I claim:

1. In a typewriting machine, a rotary platen, a pinwheel rotated with the platen and having fixed thereon a series of equispaced radially extending feed pins for engagement with similarly spaced feed holes in superposed strips in substantial registration to feed the latter around the platen in substantial registration with each other and in alignment with the platen, and a paper table forming with the adjacent surface of the platen, a throat through which the pile of strips passes, means for applying a yielding drag to the superposed strips in the throat to move the same toward the axis of the platen, the introductory side of the table having its surface spaced substantially from the adjacent surface of the platen to permit the superposed strips supported upon the ends of the pins to pass between the ends of the pins and the table so that the pins may enter the holes in the strips under the urge of the drag thereon at any point from the introductory side of the platen forward at which the holes are sufficiently aligned to receive the pins, the surface of the table gradually approaching the surface of the platen as it extends upwardly and forwardly to guide the strips into engagement with the pins as the writing line is approached.

2. In a typewriting machine, a rotary platen, a pinwheel rotated with the platen and having fixed thereon a series of equispaced radially extending feed pins for engagement with similarly spaced feed holes in strips to feed the latter around the platen in registration and in alignment with the platen, and a paper table cooperating with the platen to form an unobstructed passage for the strip, means for causing the portion of the strips in said passage to be yieldingly urged toward the axis of the platen, said paper table having a rear edge over which the strips may travel in a line tangential to the platen when the strips are sufficiently in register to permit the pins at the introductory side of the platen to freely enter the holes in the strips, the portion of the table at the introductory side of the platen having its surface spaced substantially from the adjacent surface of the platen to permit the pile to pass between the ends of the pins and the table when the strips are offset to such an extent at their pin-engaging positions that the pins may not freely enter the holes in the strips.

3. In a typewriting machine, a rotary platen, a pinwheel rotated with the platen and having fixed thereon a series of equispaced radially extending feed pins for engagement with similarly spaced feed holes in superposed strips to feed the latter around the platen in registration with each other and in alignment with the platen, a paper table disposed below the platen in spaced relation thereto, the adjacent surfaces of the table and platen forming a throat through which the superposed strips pass, means for maintaining an upward and rearward yielding drag on the portion of the strips in the throat beneath the platen and pinwheel to urge the strips to move toward impaling position on the pinwheel, the introductory side of the table being spaced from the pins sufficiently to permit the pile of strips to pass freely thereover while supported by the engagement of the inner strip by the pins until the point in the travel of the pile is reached in which the feed holes are sufficiently aligned to permit the pins to freely enter said feed holes, the surface of the table approaching the surface of the platen as the table extends upwardly and forwardly to guide the strips into engagement with the pins as the writing line is approached.

FRANK SCHULTZ.