March 29, 1932. A. F. LEAR 1,851,049

TYPEWRITING MACHINE

Filed Oct. 7, 1927

Fig. 1.

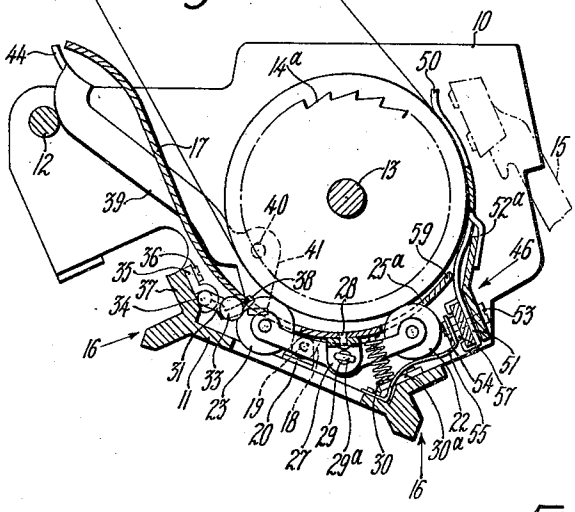


Fig. 2.

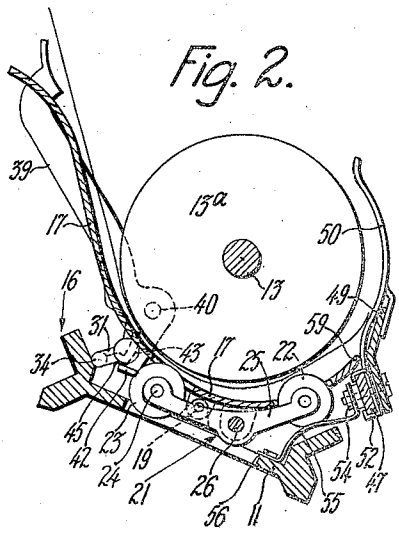


Fig. 3.

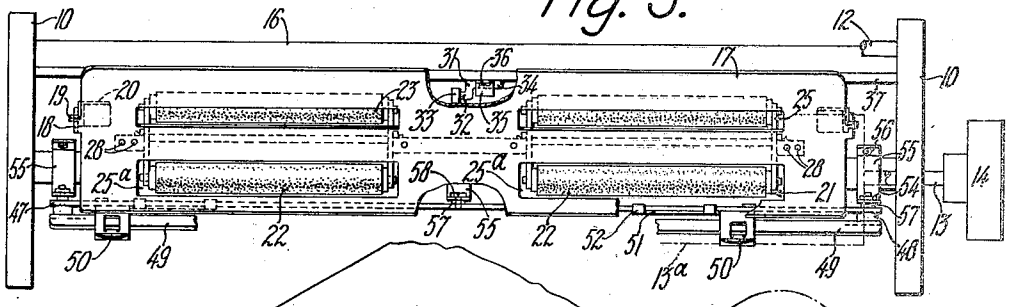
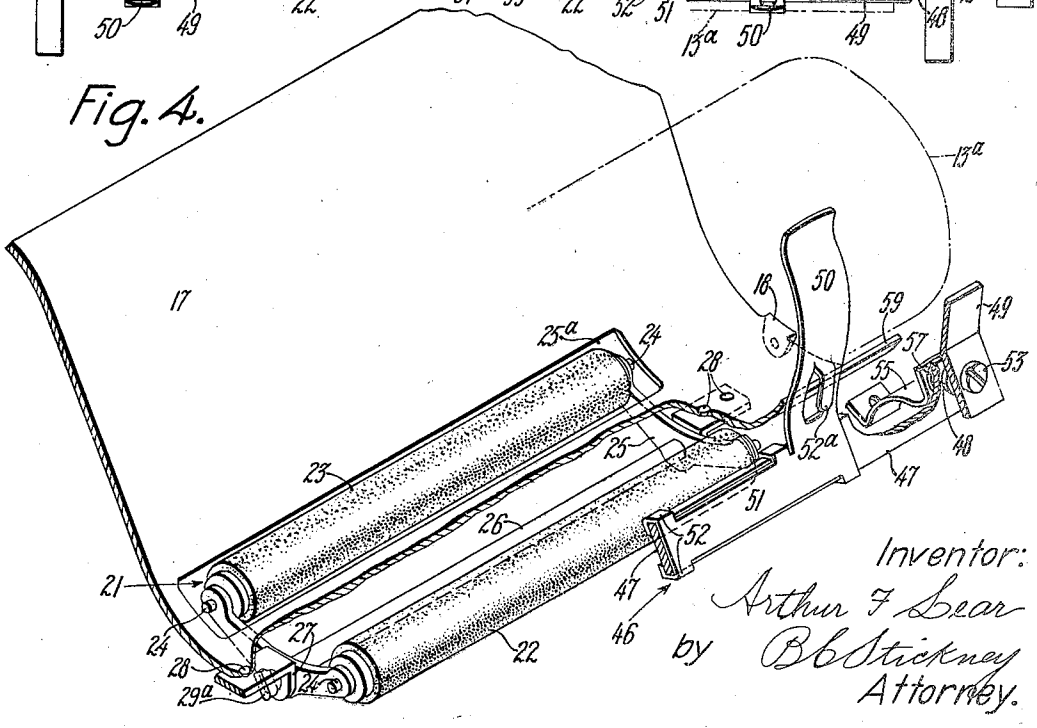


Fig. 4.



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UNITED STATES PATENT OFFICE

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TYPEWRITING MACHINE

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This invention relates to paper-feeding mechanism in small typewriters, and in particular is directed to improvements on the feed-rolls and adjacent parts. The object is to provide a compact and simple construction for easy insertion and aligning of a work-piece and proper feed thereof over a revoluble platen.

In the platen-carriage of an Underwood portable typewriter (shown to illustrate the invention), a paper guide or apron encircles the lower part of the platen and rocks, and serves as a movable support for the pressure feed-rolls to release or restore the same.

A feature of the invention provides a swingable member or system compactly arranged upon said paper-guide, tiltable also in a plane at right angles to the platen-axis, and carrying at opposed ends the feed-rolls proper. This arrangement allows a combined front and rear set of feed-rolls, upon engagement thereof, to balance each other and to be self-adjusting to bear evenly upon the lower part of the platen. It will serve to easily insert a work-piece due to the presence of the rear feed-rolls and to keep the work in areal contact with the platen when feeding. It will hence positively prevent its shifting relatively to the platen, which is liable to occur where a single row of feed-rolls only offers line-contact of the paper with the platen and wherever the feed-roll pressure is not properly equalized.

In the preferred embodiment there is provided a plurality of such tilting systems upon the apron, which offers greater adaptability to the platen, and whereby, in addition, each unit in itself, due to loose interconnection of the parts, is rendered highly adaptable to the platen-surface. This adaptability of the feed-rolls is essential in portable type-writers to make up for allowance in manufacture and for deformation of parts of the machine, liable to occur with the general light structure of such machines.

Another feature relates to means for conducting and aligning the work-piece, which may be advantageously used with the present arrangement of feed-rolls. In constructions known heretofore, a conventional front scale for paper aligning, bearing the usual paper-fingers, laterally slidable thereon, has been rigidly connected to the front part of the paper-guide, and, when shifting the feed-rolls by tilting said paper-guide, the front scale will perform a noticeable up-and-down movement which might confuse the operator in aligning the work-piece. According to this feature, arrangement is made so that the front scale and the paper-fingers as a separate front-guiding structure may be supported upon the platen-carriage by suitable movable or resilient members, which allow said structure to be moved relatively to the platen-surface for convenient paper insertion and alignment, this movement or play being automatically provided by the operative relation between the feed-roll-release mechanism and said front structure.

The novel arrangement of the front structure furthermore provides that the front scale may be arranged with better visibility for the operator; that strain upon the paper-guide will not affect said front structure, which, due to its independent resilient supports, may be evenly held against the platen over its entire length; that the simple shape of the paper-guide will allow its cheap replacement; and that the play of the front scale structure may be easily controlled and regulated by constructive measures to suit conditions.

Other features reside in certain arrangements and co-ordination of parts, to aid in smoothly conducting the work-piece around the platen.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a cross-sectional elevation of an Underwood platen-carriage, showing the feed-roll mechanism having self-adjusting feed-rolls and showing the novel arrangement of the front scale and paper-fingers. The mechanism is shown in paper-feeding engagement.

Figure 2 is a similar section, showing the feed-rolls in released position and the apron effectively separating the front scale from the platen.

Figure 3 is a plan view upon a platen-carriage with the platen removed to show the arrangement of independent sets of self-adjusting feed-rolls and with parts broken away to show constructive details.

Figure 4 is a detached fractional perspective showing more clearly the arrangement of the self-adjusting feed-rolls and their relation to the front scale and paper-fingers, the platen being indicated in dot and dash.

In Figure 1 is shown a platen-carriage of a typewriter including side plates 10, a base-plate 11 and a tie-rod 12 connecting said side plates in which is journaled a shaft 13 of a platen 13ª. The platen may be rotated by means of a finger-wheel 14 shown at the right-hand end of the platen-shaft. The usual line-space mechanism is indicated by a ratchet-wheel 14ª. A striking type-bar 15 (in dot and dash) is included to indicate the front of the platen. The base-plate 11 of the platen-carriage is formed with rail-members 16 for guiding letter-feed movement of the platen-carriage. A paper guide or apron 17 encircling the lower part of the platen is preferably reversely curved as shown. It is formed of a single piece of sheet-metal and is provided at either side with a turned-down ear 18 to receive a pivot 19 to bear in a bearing plate 20, which is mounted upon the platen-frame. As shown in the drawings, paper-guide 17 may be rocked around its pivots in a plane at right angles to the platen-axis between Figure 1 and Figure 2 positions. The paper-guide carries two independent feed-roll units 21 symmetrically disposed at the left and the right hand lower part of the platen and depending from beneath the lower side thereof. One unit includes a front roller 22 and a rear roller 23, each having a shaft 24, both shafts at either end being loosely joined by cross-members or hangers 25 to form a roller-carrying system which is pivoted for slight tilting movement upon the lower side of the paper-guide 17, which has provided therein rectangular apertures 25ª through which the feed-rollers extend into contact with the platen-surface. To support the unit upon the paper-guide the hangers 25 are loosely mounted upon an axle 26 intermediate said two rollers and journaled in depending ears 27 which are riveted at 28 onto said paper-guide 17. The projecting ends 29 of the axle are flattened out at 29ª to secure the same in place (see Figure 4). In the Figure 1 position of the paper-table the rollers bear upon the platen for feed of the paper by means of the same, while a coil-spring 30 pressing upon said apron furnishes tension to the feed-rolls. A bracket 30ª screwed upon the base-plate has a pin to extend inside the spring 30 to serve as a footing, while the other end of the spring is held in place by another pin upon the paper-guide. In Figure 2 position of the paper-table, pressure feed-rolls are shown as being released from the platen to permit the easy insertion, removal and adjustment of the paper. In order to throw the paper-table from Figure 1 to Figure 2 position so as to release the rolls, an arm 31 is provided. This arm has a lateral offset 32 at its upper end, which carries roller 33 for frictionless engagement with the rear of the paper-table. The arm 31 is fast to or forms an offset on one end of a rock-shaft 34.

The rock-shaft extends longitudinally of the carriage and finds its bearings as in hook-members 35 screwed at 36 upon a flange 37 of the carriage-rail-member 16. The other end of the rock-shaft adjacent one of the side plates is formed with an arm or lip 38 by which the rock-shaft may be operated. To this end, an operating or feed-roll-release lever 39 is fulcrumed at 40 upon the side plate 10, the lower extension 41 of said lever being formed with a bent-over tab 42, which is arranged to engage a cam-surface 43 of said lip. In Figure 1 the lever is shown in inoperative position and resting against the tie-rod 12 as a stop. The lever has a finger-piece 44 by which it may be thrown into Figure 2 position, whereby said tab 42 catches behind an offset 45 on said lip and blocks the feed-rolls in ineffective position against the tension of spring 30. The paper-table (see Figure 3) is mechanically well balanced for operation, as the cam-roller 33 engages the same centrally and intermediately of the two feed-roll units.

A structure combining a front scale and paper-fingers is independently supported upon the platen-carriage and designated as a whole by the numeral 46. This structure includes a rail 47 which is spaced by spacer-plates or shims 48 from a conventional front scale 49. The scale will assist in guiding the work to the printing line and may be employed to align the work with the printing line as well as transversely of the machine. The clearance thus provided between the rail and the front scale may receive the paper-fingers 50 which, in effect, form an upward continuation of the paper-table around the platen, each finger being unitary with a slide 51 set against the rail and slidably held thereto by ears 52 bent over and around the upper and the lower edges of the rail (see Figure 4). The fingers may therefore be moved laterally along the rail for marginal engagement with papers of different widths. To stabilize their sliding movement the paper-fingers have in addition stamped-out tongues 52ª bent over and around the upper edge of said front scale 49. Rail and front scale are joined together at both ends by through bolts 53 and nuts 54, the rail being supported upon the platen-carriage by a plurality of resilient cross-pieces or straps 55, which are screwed at 56 to the platen-frame. Each end of the

rail 47 is supported by a strap 55 to which it is fastened by through bolts 53. Washers are interposed between the straps and the rail to provide clearance for the ears 52 of the paper-fingers. A strap may intermediately support the rail to which it is fastened by screw 58 tapped into said rail and also carrying a clearance washer 57. The resilient supporting straps are preferably curved, as shown, to meet individual constructive requirements, as indicated above.

Figure 1 shows a work-sheet as being fed around the platen with the feed-rolls engaged, and it may furthermore be noted that a forward nose 59 of the paper-guide, partly overlapping the front scale and the paper-fingers, provides a smooth transition of the paper from the paper-guide to the front-scale structure 46, thus eliminating, over prior constructions, the possibility of the paper being caught and turned over on the front scale and paper-fingers. The paper-guide and the paper-fingers, in Figure 1 position of the paper-table, are shown to form a smooth curved line which, starting from the rear, converges into the platen outline.

When a work-sheet is loosely inserted and aligned, that is, with the feed-rolls released as is shown to be the case in Figure 2, the danger of the front scale or paper-fingers obstructing the leading edge of the paper is obviated by so constructing the rear part of the hangers as to be of greater length than the front part, so that, due to the overbalancing of the rear rolls, the front part of the hangers rests against the paper-guide, the arrangement of the parts being such that both the front and the rear feed-rolls then are kept slightly separated from the platen-surface without obstructing the passage of the work-sheet. Consequently, it will be seen that the work-sheet is kept close to the platen-surface and smoothly conducted into the guidance of the paper-fingers which meanwhile, due to the nose 59 of the apron 17 urging the same outward, and due to the resiliency of the supporting members, are held separated from the platen-surface.

With respect to Figure 1, it will be noted, as to the general arrangement of the parts, that the swivel axis of the paper-guide 17 is located approximately at the center of the carriage-base-plate 11 which is preferably transversely inclined, having a lower front and an upper rear end; said swivel axis also being located approximately at the center of the lower curved part of said paper-guide, the curvature of the paper-guide being considerably larger than the platen, so as to allow for adequate rocking movement. A suitable distance forwardly from said swivel axis, the swivel center of the feed-roll system is located upon the paper-guide, which swivel center happens to be substantially in a vertical plane with the platen-axis. Still further forward is arranged one or a plurality of said coil-springs 30, which normally keep the feed-rolls in engagement. The springs fit in between the paper-table and the lower front corner of the carriage-base-plate. In the opposite higher corner of the base-plate is located a cam-mechanism which actuates the feed-roll release, as already described above. From this compact arrangement, it will be seen that the leverage of the forces acting upon the paper-table is kept relatively small, so that no considerable bending stresses will be set up in the same, and deformation of the usually light paper-table, which might impair the function of the feed-roll mechanism, is avoided. The rear rollers are spaced from their swivel center well beyond the swivel axis of the paper-table, so that a work-piece, especially a card, when inserted with the feed-rolls engaged, will readily be gripped and fed thereby. On the other hand, when the paper-table is rocked forwardly for feed-roll release (Figure 2), the feed-roll system will rock in opposite direction to abut said paper-table as a stop, so that the feed roll system is shifted in substantially parallel relation to and from the platen-surface, and the feed-rolls as a result will always be properly spaced from the platen for free passage of a work-sheet. The feed-rolls, furthermore, due to their movable arrangement upon and relatively to the paper-guide, will minimize the space required for the shifting mass between the platen and the carriage-base-plate.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. The combination with a revoluble platen and a frame, of a paper-guiding apron curving forwardly under said platen, the platen-frame having a pivot upon which said apron is hinged to swing up and down, sets of forward and rear feed-rolls to rotate against the under side of said platen, said apron forming a pressure-equalizing frame for all of said roll-sets upon which the rolls are revolubly mounted, end levers extending from the forward rolls to the rear rolls, the end levers being swiveled to said apron at a point about midway between the front and rear feed-rolls, and a spring engaging the middle portion of said apron at a point about midway between the front and rear roll-axes, the pressure of said spring, through the cooperation of said end levers, being substantially equally divided among said rolls.

2. The combination with a revoluble platen, of a platen-frame and a paper-guiding apron hinged upon the platen-frame and curving forwardly under the platen and movable downwardly to release the work-sheet, paper-guiding fingers arranged at the front

of the platen, a bar in front of the platen under the printing line upon which said paper-fingers are adjustable along the platen, and yieldable supports extending from said bar to the platen-frame and secured to the latter to permit the paper-fingers to swing forwardly from the front of the platen, said paper-fingers being engageable by the front of said paper-guiding apron to be swung forwardly by the downward movement of the apron.

3. The combination with a revoluble platen, of a platen-frame and a paper-guiding apron hinged upon the platen-frame and curving forwardly under the platen and movable downwardly to release the work-sheet, paper-guiding fingers arranged at the front of the platen, a bar in front of the platen under the printing line upon which said paper-fingers are adjustable along the platen, yieldable supports extending from said bar to the platen-frame and secured to the latter to permit the paper-fingers to swing forwardly from the front of the platen, said paper-fingers being engageable by the front of said paper-guiding apron to be swung forwardly by the downward movement of the apron, and a platen-scale secured upon said bar above the same and below the printing line.

4. In a portable typewriting machine, the compact combination with a paper-feeding revoluble platen journaled in a platen-carriage having a forwardly-inclined base-plate formed with a front and a rear rail-member for lateral movement of the carriage upon the machine, of a paper-table back of the platen and extending around the lower part thereof, said paper-table at its lower part pivoted upon said carriage base-plate substantially at the center thereof and curved to allow for rocking movement in a plane at right angles to the platen-axis, a spring arranged between said front rail-member and the front part of the paper-table, normally urging the same towards the platen, a cam-shaft effective to rock the paper-table and a system of feed-rolls to co-operate with the lower part of the platen in paper feed, said system including a pressure-equalizing feed-roll carrier pivoted between its front and rear upon the lower side of said paper-table and tiltable in a plane at right angles to the platen-axis, and feed-rolls at the front and the rear end respectively, of said carrier, the tilting axis being located intermediate the swing axis of the paper-table and said spring, the rear part of the tilting feed-roll-carrier extending beyond the swing axis of the paper-table to locate the rollers between said swing axis and said cam-shaft, the front part of said carrier extending forwardly to locate the front rollers beyond said spring system, the front and rear feed-rolls, due to their movable support, being capable of evenly engaging the platen.

5. In a typewriting machine, the combination with a paper-feeding revoluble platen journaled in a platen-carriage, of a system of feed-rolls to co-operate with the lower part of the platen, a paper-table and guide back of the platen and extending around the lower part to the front thereof and mounted upon the platen-carriage for rocking movement to carry supported thereon said feed-rolls, and rockable for feed-roll release and engagement, and a movable structure in front of the platen for upwardly conducting the paper, said structure including a rail or front scale for paper alignment having slidable thereon upwardly-extending paper-fingers, and further including a plurality of flat spring members extending below the front part of said paper-table to resiliently support said front structure upon the platen-carriage while normally urging the guiding parts against the platen-surface, the front edge of the paper-table, upon its feed-roll release movement, operatively engaging the guiding parts of said front structure to separate the same from the platen-carriage for clear paper passage.

6. In a typewriting machine, the combination with a paper-feeding revoluble platen and a platen-frame, of combined means for inserting, aligning and feeding a work-piece, said means including a paper-table to guide the paper around the lower part of the platen and mounted upon the platen-carriage for rocking movement in a plane at right angles to the platen-axis, a movable system of feed-rolls to co-operate with the lower part of the platen, including a combined set of front and rear feed-rolls mounted upon the front and rear part, respectively, of a pressure-equalizing lever-frame hung from the lower side of said paper-table, the feed-rolls being normally rendered effective when the paper-table is spring-pressed into rearward and upward position, means to operate the paper-table for feed-roll release, and parts in front of the platen mounted independently of said paper-table to co-operate with said paper-table in aligning and conducting the paper around the platen, said parts including a rail, paper-fingers laterally slidable thereon to form an upward extension of the paper-table, a scale-member for paper aligning in front of said rail-member and in rigid relation thereto, and resilient supports to mount said rail upon the platen-frame, in such a manner that, upon downward feed-roll release, the paper-guide may urge said front parts from the platen for clear paper passage while the front-scale upper edge moves forwardly in substantially horizontal direction to facilitate paper aligning.

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