Jan. 12, 1932. M. GARBELL 1,841,115

TYPEWRITING MACHINE ACTION

Filed Dec. 12. 1927 4 Sheets-Sheet 1

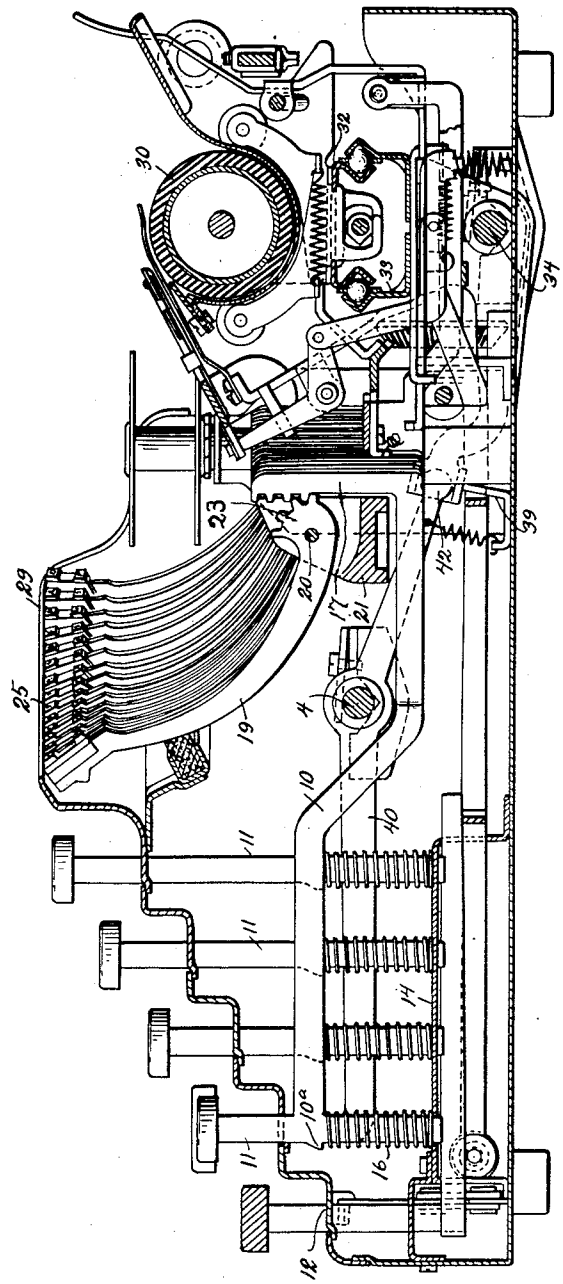


Fig. 1.

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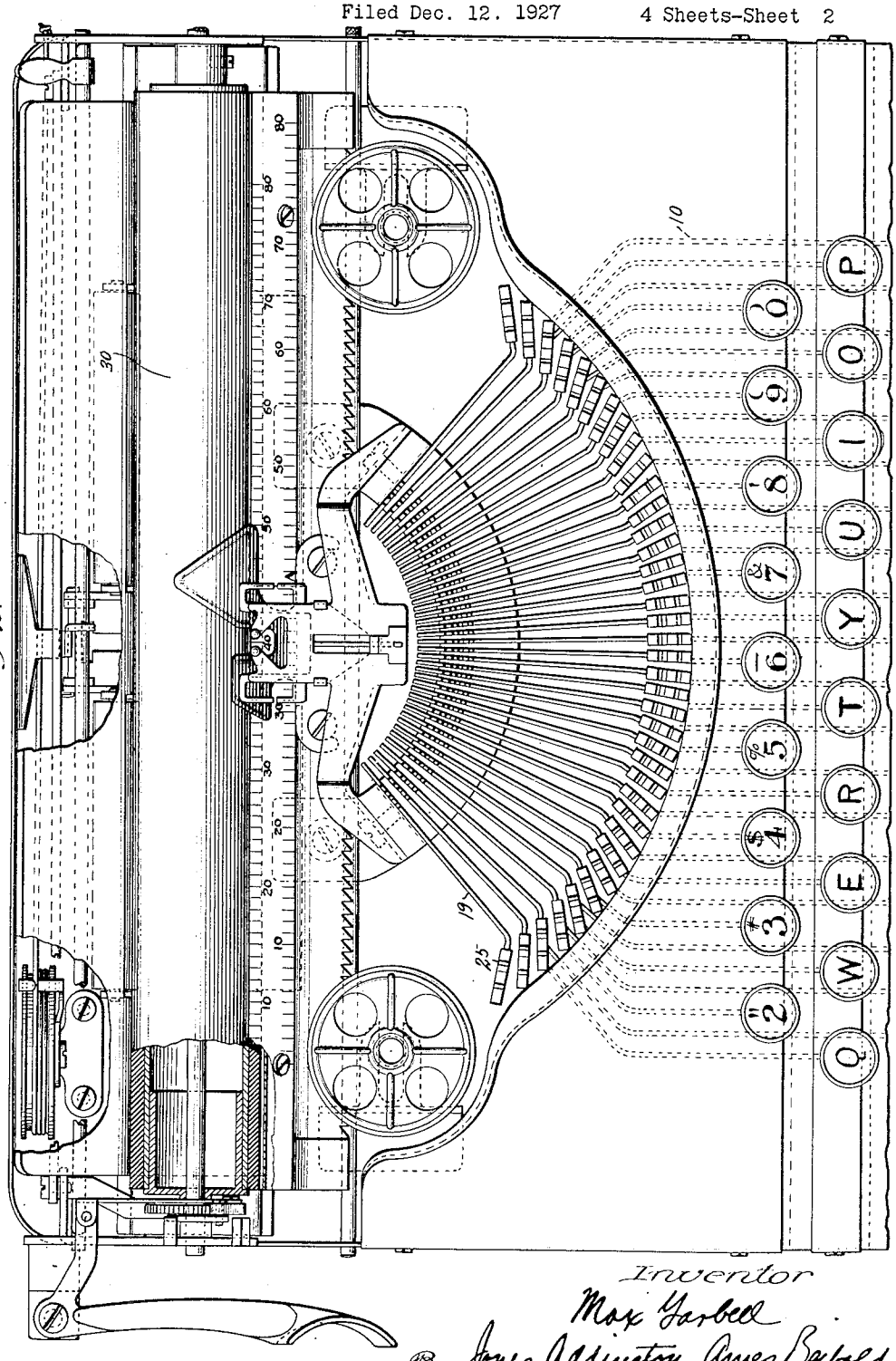


Fig. 2.

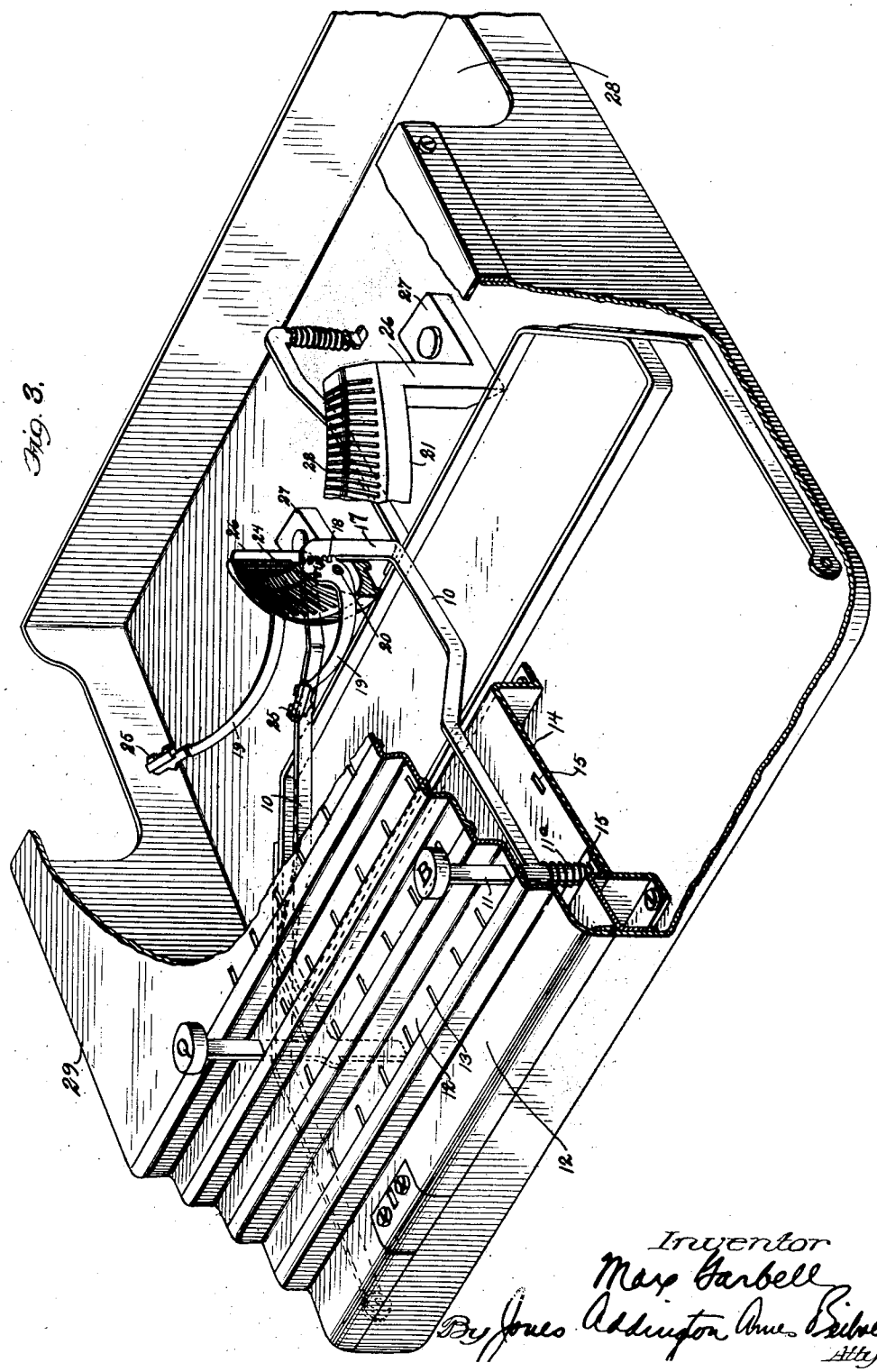
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Fig. 3.



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TYPEWRITING MACHINE ACTION

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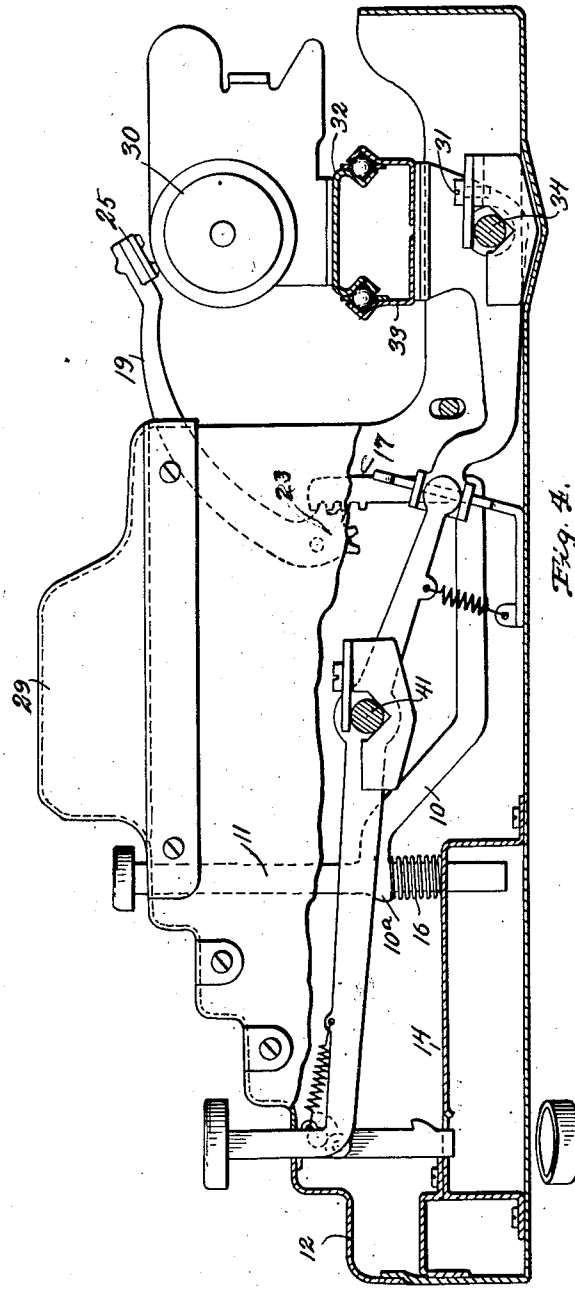


Fig. 4.

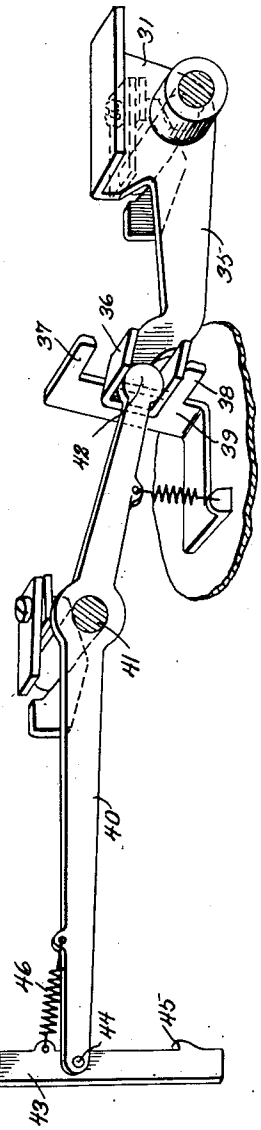


Fig. 5.

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UNITED STATES PATENT OFFICE

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TYPEWRITING MACHINE ACTION

Application filed December 12, 1927. Serial No. 239,336.

My invention relates to typewriting machines and it has particular relation to the typebar actions which are embodied therein, which actions comprise a train of mechanism whereby the pressure or power applied to a key bearing an indicia to be printed is transmitted to, and operates, a typebar to throw a typehead on the latter to the printing point and make the desired impression upon a reception surface positioned on the platen of a typewriting machine.

A large number of features enter into the design of such a typebar action in order that several diverse requirements may be reconciled. The action which I shall hereinafter describe is primarily for the purpose of permitting the construction of a typewriting machine at an exceeding low cost, with a consequent minimum sale price; it being my desire to so lessen the cost of production and, as a logical sequence, the sale price of typewriting machines, as to bring these machines into the reach of an entirely new field of potential customers.

Such field and its customers have not been heretofore served because in general any low priced machines offered for sale have been considered more as substitutes and toys than of practical utility, wherefrom they have not been attractive to those wishing to use a machine for actual commercial purposes.

While therefore the typewriter which I hereinafter describe in general, and the action which I illustrate and claim specifically, are composed of a minimum number of parts in order that the cost of production may be a minimum, it should be understood that the mechanisms described are in no sense toy-like or lacking in utility and durability. As the hereinafter description is perused, it will be apparent to those interested in such machines that my invention has reduced the number of total parts utilized in any of the mechanisms so radically that the cost of building the machine is markedly less than in the past. Not only have I reduced the number of parts, but I have evolved in connection with most of the separable assemblies which comprise a typewriter, novel mechanisms wherein the elements are so combined that parts produced by stamping or punching operations may be utilized.

Again, I have eliminated a large number of the various connecting levers and links which have previously been essential in a well designed typewriter in order to produce the required movement of parts. My machine contemplates, in many places where such involved linkages have heretofore been used, the embodiment of direct contactive connections between operating and operated parts, and it is to the attainment of this latter object that the invention hereinafter described is, in a large measure, directed.

Inasmuch as the typewriting machine hereinafter described is substantially a non-separable entity, because of the particular and peculiarly novel interconnection and interrelation of the parts, the said machine is not susceptible of being described and claimed in a number of applications, as might be the case with some other machine.

I have found it desirable, and in fact necessary, not only to properly place before the art the machine as an inventive whole but, in order to insure the maximum protection for myself, to describe and claim the machine in a relatively small number of applications. One part which seems to warrant separation relates to the typebar action and its correlated parts, and this mechanism I will hereinafter describe in the present application.

The frame member of the machine, which is novel so far as I am aware, has been described in another application copending herewith, Serial No. 239,821, filed December 14, 1927, and although there may be some overlapping between the two applications, I have separated the applications as indicated.

Again, the various operating mechanisms or assemblies embodied in my machine, even though they might be properly included herein since they are operated by the key depressed member, have been included in another copending application describing the ribbon vibrator, the escapement mechanism, case shift assembly, etc., which application is serially numbered 239,015, and was filed on December 14, 1927.

Reverting now to the specific action which is incorporated in my novel typewriting machine, the first element of novelty to which attention is directed is the embodiment of the working parts of the action per se in two parts—one pivoted and the other movable horizontally. The latter, which comprises a member bearing a key, is depressible in a truly vertically or rectilinearly direction. This member extends rearwardly and is provided with teeth at its rear end, which teeth are so arranged that they mesh with complemental teeth on the rear of a pivotally mounted typebar. Through the medium of the said teeth, there is direct contactive connection between the aforesaid operating and operated members. Such novel mechanism permits not only of a very inexpensive product but at the same time effects a very desirable and markedly efficient action in my typewriting machine because of the particular manner in which the aforesaid elements are assembled, as will hereinafter be more fully described.

With the above brief reference to the action of my machine, the same will be better understood by reference to the accompanying drawings, in which:

Figure 1 is an elevational, sectional view taken centrally and fore-and-aft of a typewriting machine embodying my improved typebar action;

Fig. 2 is a plan view of a machine embodying my action;

Fig. 3 is an elevational, perspective view partially in section showing so much of the typebar action elements as is necessary to disclose an embodiment of my invention from this point of view;

Fig. 4 is a side elevational view of a machine embodying my invention; and

Fig. 5 is a fragmentary perspective view illustrating the mechanism whereby the platen is shifted to receive either type on the typebar.

Referring now more particularly to the drawings, my action comprises a plurality of key operated members, designated as 10. These members comprise a forward vertical portion 11, which latter has a part extending above the horizontal portion 10 and another part 11*a* below said portion 10. The typewriter which, as a whole, is, as indicated, more fully described and claimed in my copending application Serial No. 239,015, comprises a closed front or closed key-board frame composed of a series of stepped plates 12, each of said plates being provided with a plurality of slots 13. It will be observed that these plates are arranged in four steps to accommodate the usual four banks of keys which are used on a standard key-board machine. Extending transversely of the machine and beneath the stepped plates 12, is a frame member 14 provided with slots 15. These latter slots are positioned vertically directly beneath the corresponding slots 13 in the stepped plates 12 so that a double bearing or guideway is provided for the vertically extending portions 11 and 11*a* of the key operated members, it being observed that said portions are in said slots when the assembly is completed.

A spring 16 is coiled about the lower portion 11*a* and is contained between said member or plate 14 and the portion 10 of the key operated member, a lug 10*a* being also provided on the key operated member to insure proper stopping and holding of the spring 16. When, therefore, the member 10 is depressed vertically, the spring 16 is stressed by being compressed to return the member 10 to its normal position when pressure is relieved.

Of course, I do not intend to limit my invention to the returning by a spring placed in the particular position shown, since such return may be accomplished in a variety of ways to attain the same end without departing from the spirit of my invention. However, the depression of the spring as shown is one of the features which contributes to the ease of assembly and cheapness of production of my machine.

The said member 10 also comprises a rear vertical portion 17 which extends upwardly and is provided with a plurality of teeth 18. The action further comprises type-bars 19 which are pivotally mounted on a pivot wire 20, which latter is positioned in a typebar segment 21. Said segment is provided with slots 22 within which heels 23 of the typebars are confined as they move pivotally about the wire 20. Said heels or rear portions 23 of the typebars are provided with teeth 24 which mesh with the teeth 18 so that, when the member 10 is vertically depressed, typeheads 25 on said typebars are thrown to printing position, as best shown in Fig. 4.

The member 10 is, therefore, rectilinearly guided in its vertical movement, not only by the forward bearings comprised in slots 13 and 15, but also by the direct contactive connection between the teeth 18 and the teeth 24 within the slots 22 of the segment 21. Incidentally this latter comprises standards 26 rising from feet 27 through which feet the segment is secured to a bottom portion 28 of the typewriter frame; all as more fully described in the hereinbefore-identified application directed specifically to the frame member of my machine.

Since there are four banks of keys the keys of the various banks are initially formed with the connection which they make in the typebar segment in mind, and moreover, as may be seen by reference to Fig. 2, the keys on either side of the central key are bent so that the rear vertical portions 17 of the side keys are in planar alignment with the heels

of the typebars actuated by said key members. In other words, the teeth, in order to properly mesh will, of course, be in the same plane and this is provided for as shown in Fig. 2. The simplicity of the above described typebar and key-member action will be appreciated by those skilled in the art, and I do not deem it necessary to further emphasize this feature of my invention.

It may be well, however, in order to round out the description of the machine embodying my invention to again indicate, as I have in the heretofore identified copending application, Serial No. 239,821, that the particular key member action just described, is peculiarly adaptable to rapid and inexpensive assembly in connection with the stepped plate frame members 12, and that this assembly forms an important part of my invention.

Moreover, it will be observed that a top plate 29, which comprises the top forming or assembling member, is so designed and contoured as to provide a desirable shield to conceal the typeheads 25 when the same are in normal nested relation (see Figs. 1 and 4). When the key members are depressed, the typebars are thrown to the printing point from under said top plate, as heretofore described in connection with Fig. 4.

In order to insure a printing of the upper case type on such typehead, I mount my platen 30 on a tiltable carriage 31, rails 32 and 33 forming the bearing between said support 31 and the platen 30, wherefrom the usual transverse movement of the platen is obtained. The mounting piece 31 is pivotally positioned in members 34 at each side of the typewriter frame and is expanded forwardly into a part 35 which has bearing member 36 formed thereon. Said bearing member is stopped in its up-and-down movement by members 37 and 38 on a stop piece 39 fastened to the typewriter frame. A shift lever 40 is pivoted at 41 and has a part 42 working in the square collar 36 so that when said lever is depressed about the pivot 41, the carriage or platen is pivotally swung rearwardly to provide for case shift, as will be seen by reference to the drawings.

The lever 40 is operated by a shift key 43 secured at 44 to said lever. Said member 43 upon depression may be swung about its pivotal connection 44 and so held against plate 14 by the interaction of a lug 45 and a spring 46 that the platen may be permanently maintained in shifted position, if such is desired. The aforesaid manner in which the various elements of the case shift assembly cooperates with my typebar action further exemplifies the marked decrease in the number of parts utilized in my machine with a consequent reduction in the cost thereof.

While I have described but one embodiment of my invention it is obvious that those skilled in the art may utilize equivalents thereof without departing from the spirit of my invention and I desire, therefore, that the same be limited only by the showing of the prior art and by the appended claims.

I claim:

1. In a top-strike typewriting machine action, a rectilinearly movable key lever having two vertically extending portions and a connecting portion therebetween, a pivoted type bar having direct contactive operating relation with one of said vertical portions, and bearings for said lever providing an exact vertical movement of the same to impart printing strokes to said bar, one of said bearings comprising two guideways for one of said vertical portions and the other of said bearings comprising a type-bar segment having a slot therein constituting a guideway for the contactive operative connection between the lever and bar.

2. In a typewriting machine action, a rectilinearly movable key lever having two vertically extending portions and a connecting portion therebetween, a pivoted type bar having direct contactive operating relation with one of said vertical portions, a key on the upper end of the other of said vertical portions, two guideways in which the latter portion slides to insure vertical movement of said lever when said key is struck, and another guide for said first mentioned vertical portion at the point where said contactive connection is effected, the latter comprising a slotted segment in which the type bars are pivotally mounted.

3. In a typewriting machine, a pivoted type bar, a vertically depressible key lever, said lever comprising a portion extending to the rear of said bar and there having direct contactive operation therewith, guides for the front ends of said levers comprising pairs of vertically disposed slots through which said levers pass and by which they are compelled to move vertically, and a guide for the rear ends of said levers comprising type-bar segment slots.

4. In a typewriting machine action, a rectilinearly movable key lever having two vertically extending portions and a connecting portion therebetween, a pivoted type bar having direct geared operative connection with one of said vertical portions, and a universal bar pivoted forwardly of said connection point and adapted to be struck by said horizontally extending portion of the key lever.

5. In a typewriter machine action, a key operated member comprising a front vertical arm, a rear vertical arm, and a substantially horizontal portion connecting the arms, guides for insuring the rectilinear vertical movement of said arms comprising slotted plates for holding and guiding said front arm, a type bar directly connected to said rear arm, a guide for said rear arm compris-

ing a slot in a type bar segment, and a spring embracing said front arm and disposed between a portion thereof and one of said plates to be stressed upon depression of said member.

In witness whereof, I have hereunto subscribed my name.

MAX GARBELL.