

May 12, 1925.

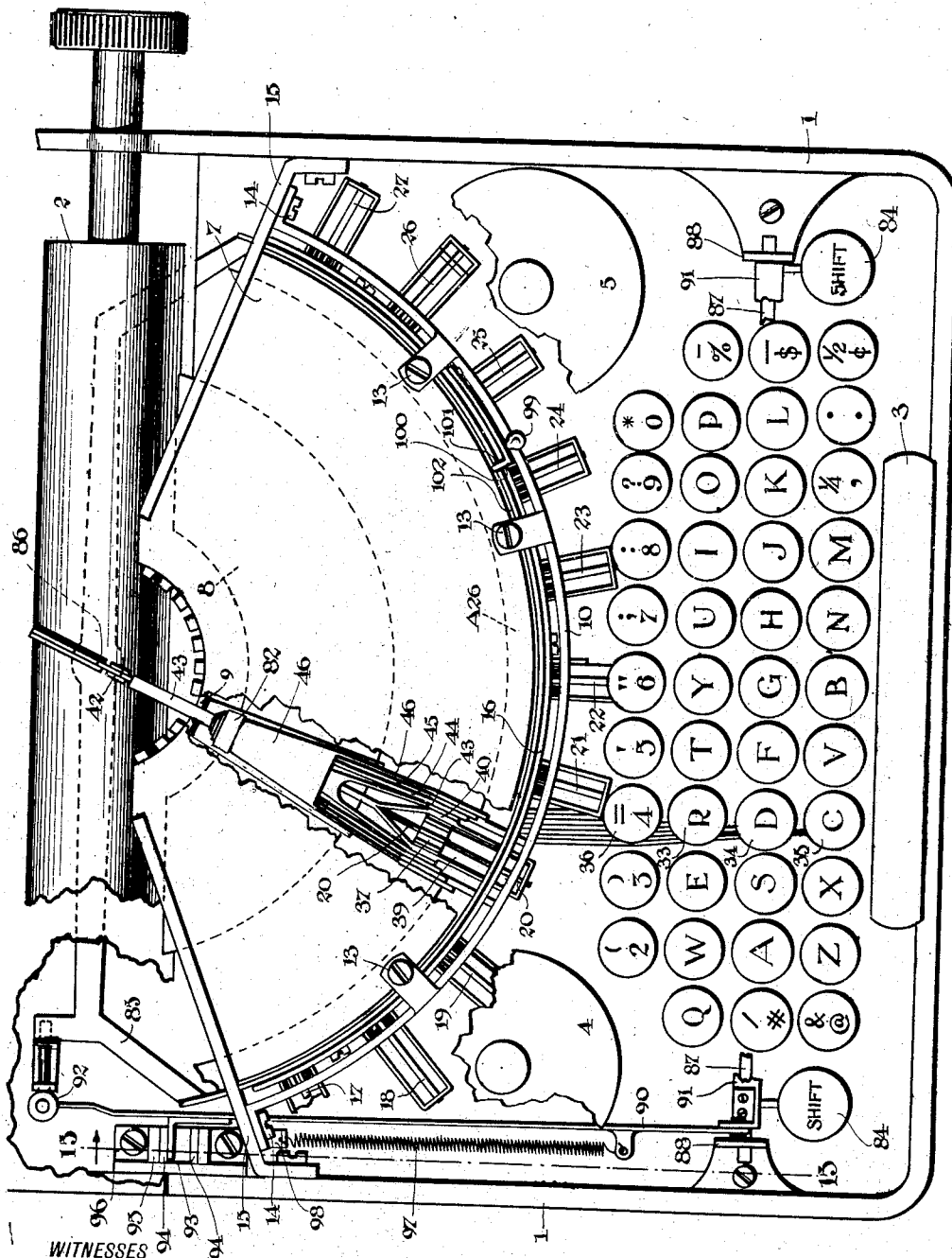
J. SMITH

1,537,147

TYPEWRITER

Filed Dec. 18, 1920

6 Sheets-Sheet 1



WITNESSES

J. P. Schrott

Fig. 1.

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TYPEWRITER

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6 Sheets-Sheet 2

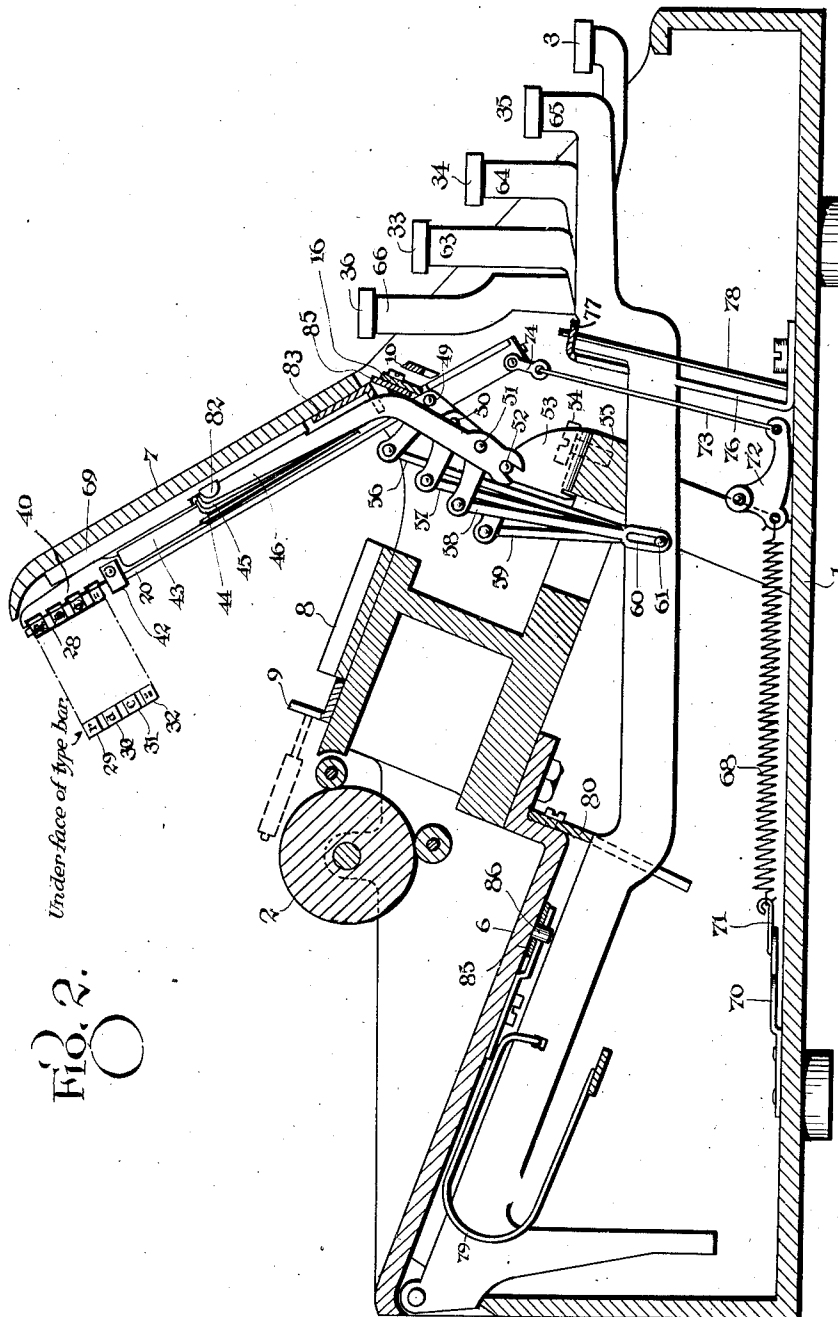


FIG. 2.

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J. SMITH
TYPEWRITER

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6 Sheets-Sheet 3

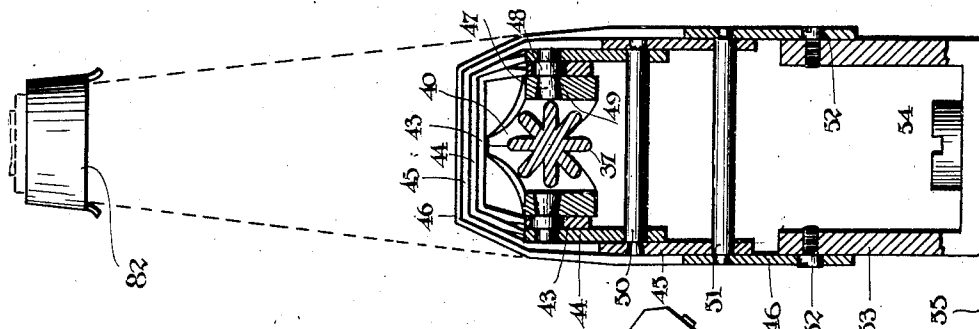


FIG. 4.

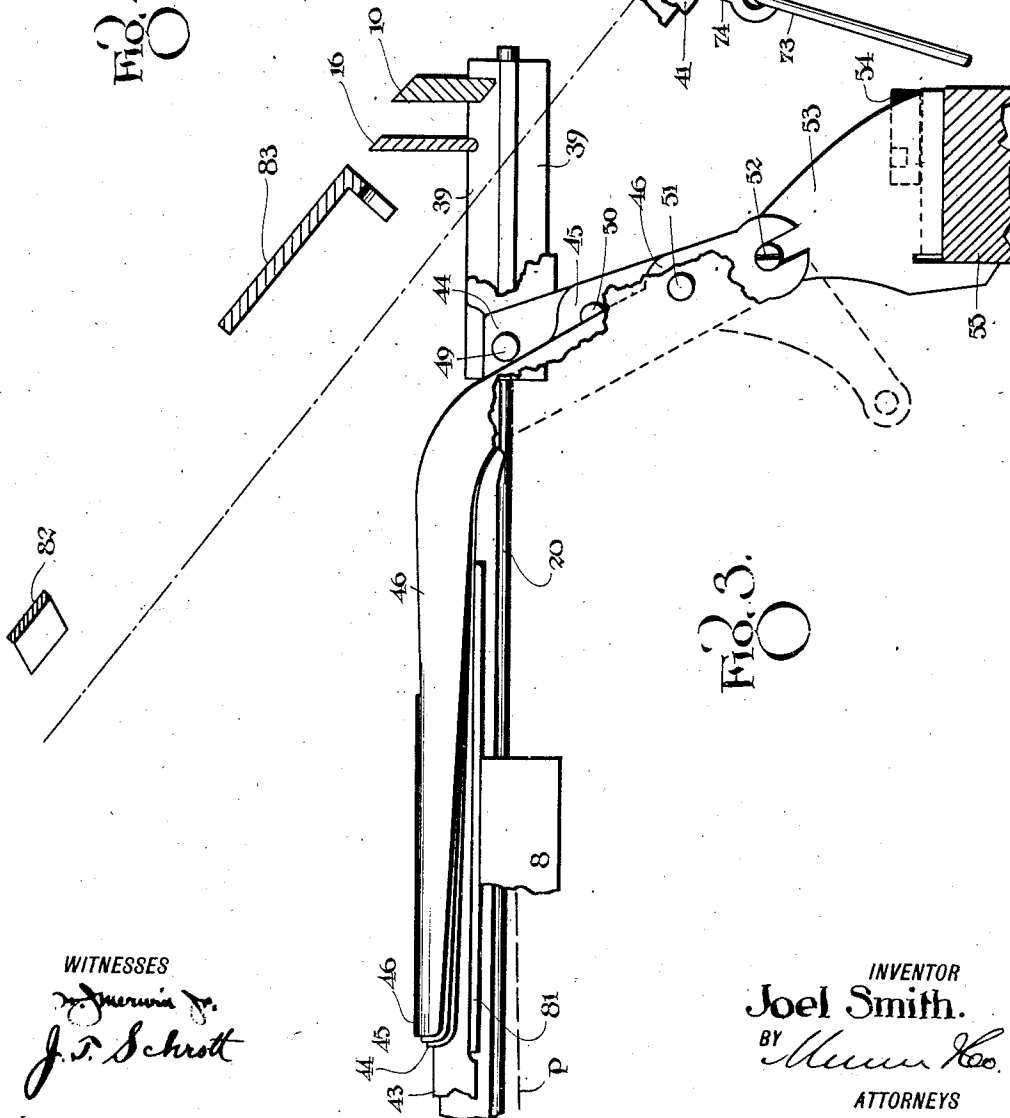


FIG. 3.

WITNESSES

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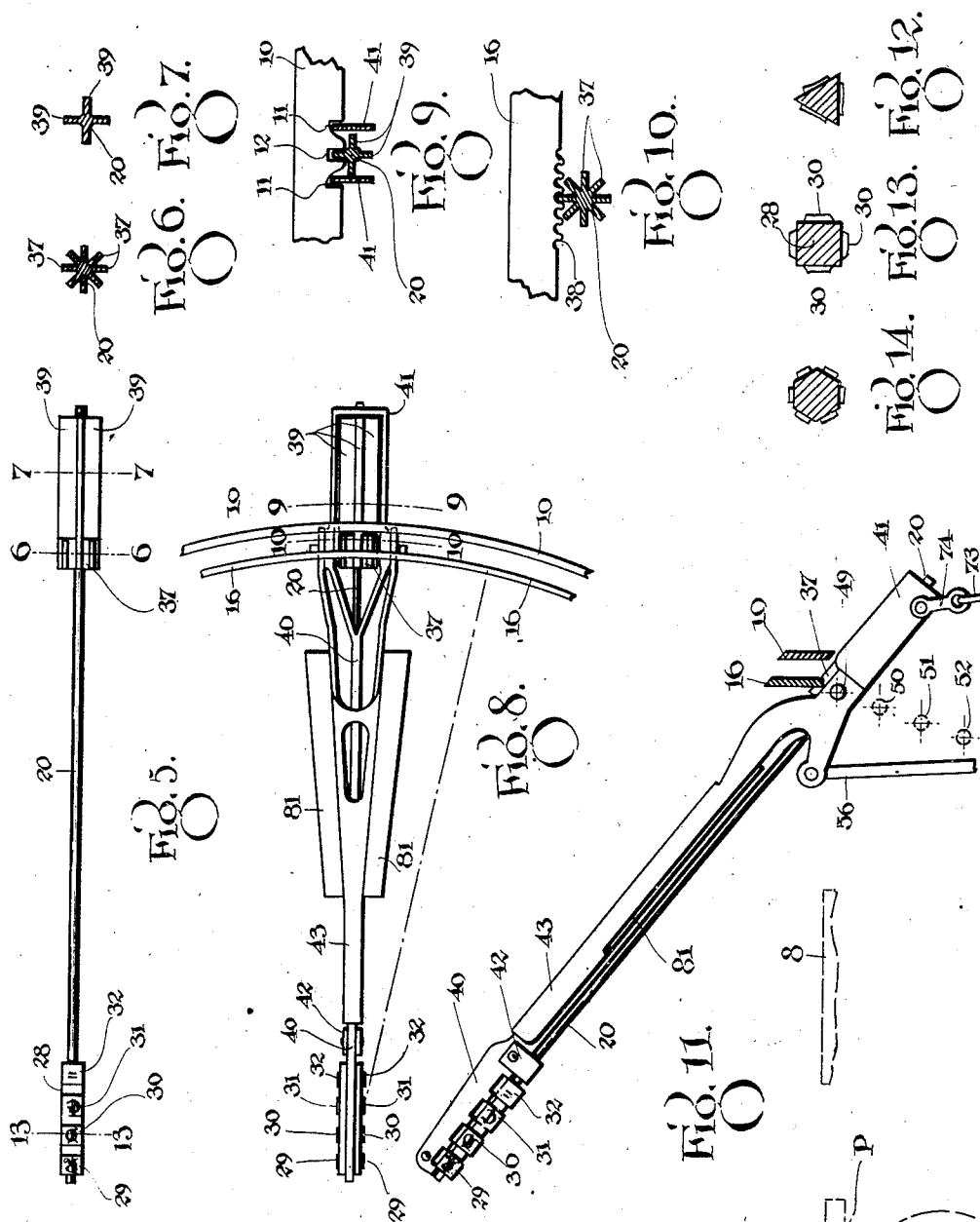
May 12, 1925.

J. SMITH
TYPEWRITER

1,537,147

Filed Dec. 18, 1920

6 Sheets-Sheet 4



WITNESSES
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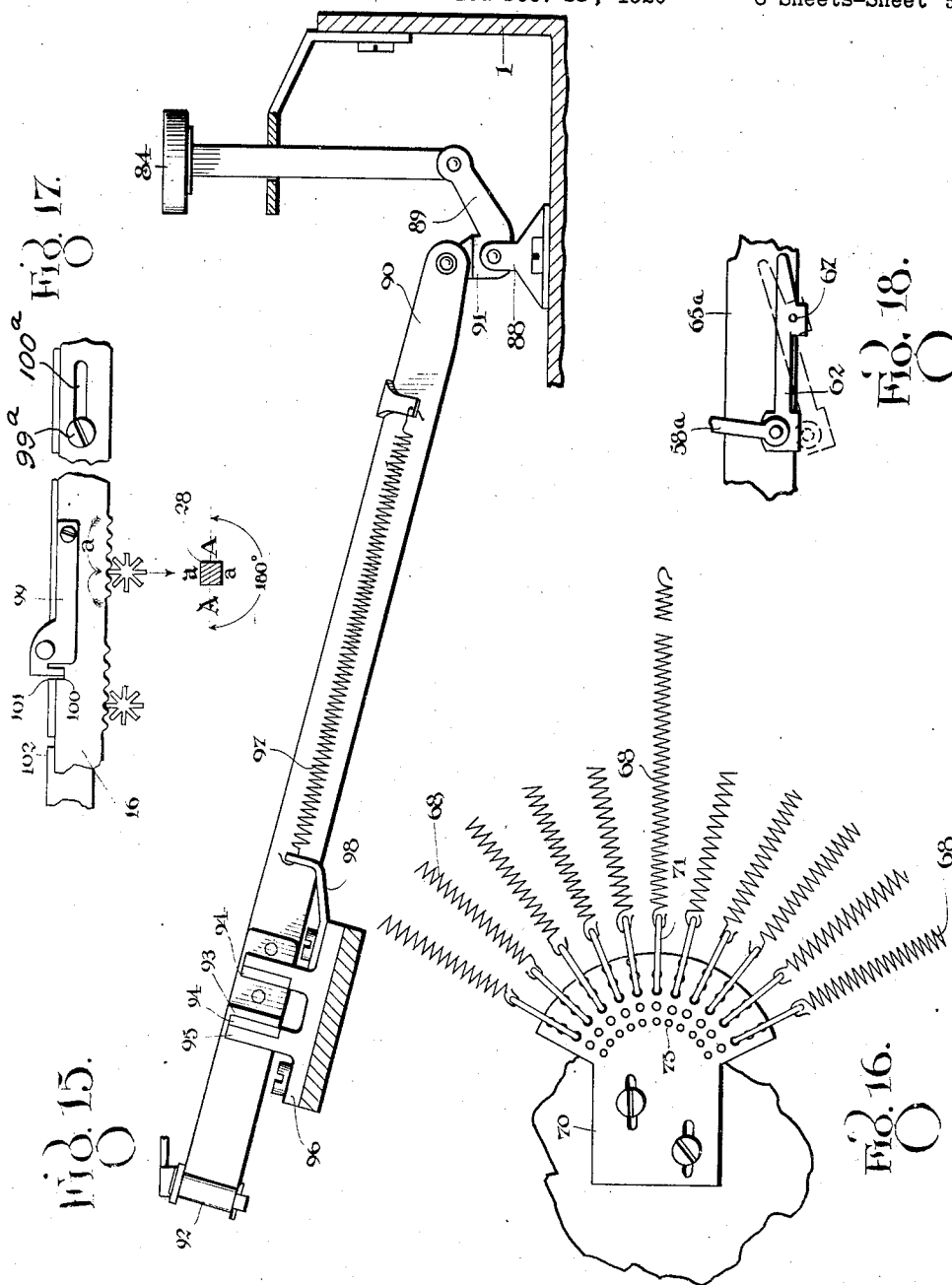
May 12, 1925.

1,537,147

J. SMITH
TYPEWRITER

Filed Dec. 18, 1920

6 Sheets-Sheet 5



WITNESSES

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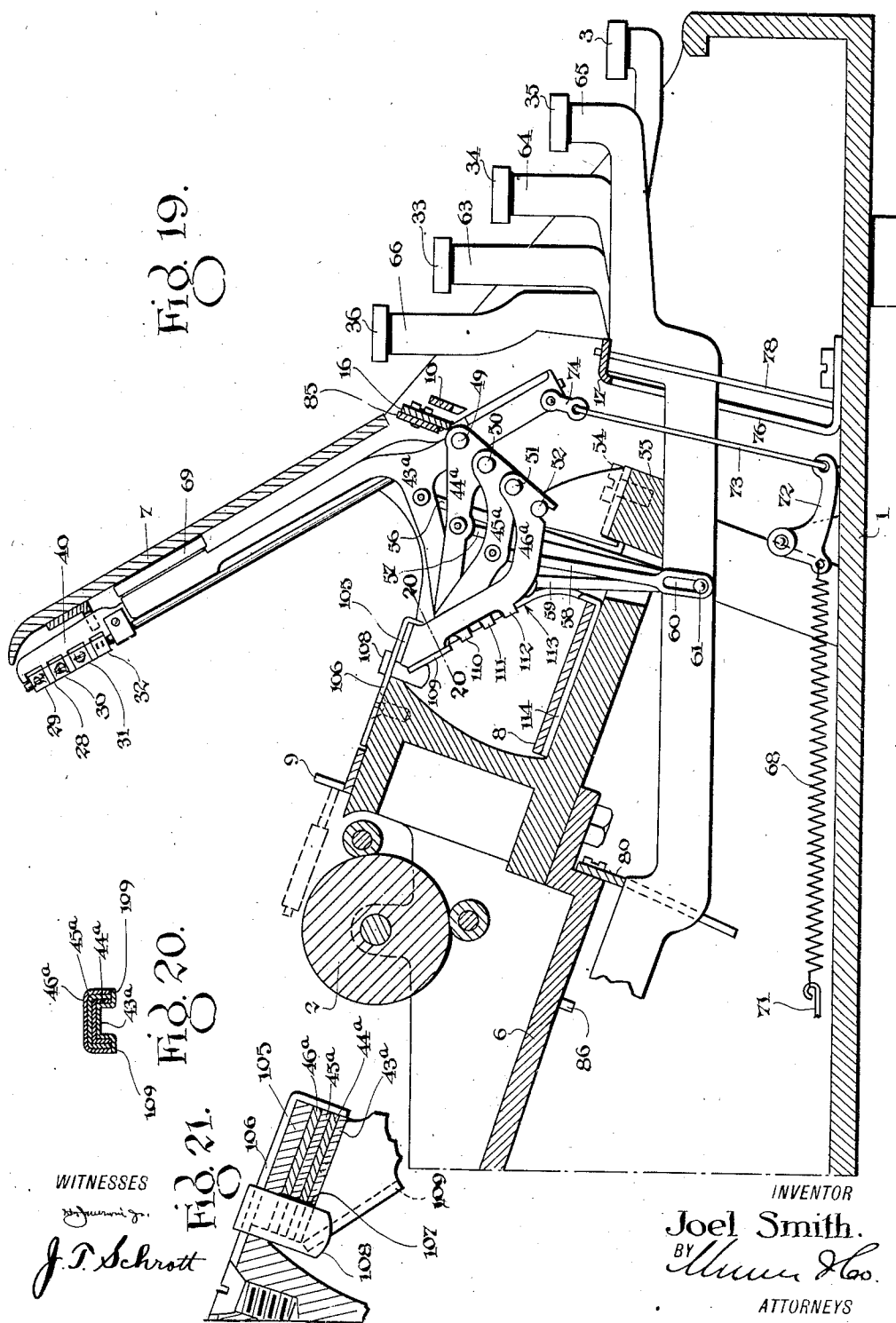
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J. SMITH

TYPEWRITER

Filed Dec. 18, 1920

6 Sheets-Sheet .6



UNITED STATES PATENT OFFICE.

JOEL SMITH, OF MORAN, MICHIGAN.

TYPEWRITER.

Application filed December 18, 1920. Serial No. 431,698.

To all whom it may concern:

Be it known that I, JOEL SMITH, a citizen of the United States, and a resident of Moran, in the county of Mackinac and State of Michigan, have invented certain new and useful Improvements in Typewriters, of which the following is a specification.

My invention relates to improvements in typewriters, and it consists in the constructions, combinations and mode of operation herein described and claimed.

One of the foremost objects of the invention is to provide a typewriter with provision for carrying capital and small letters of a plurality of styles of type, with means for readily shifting from one style to another without doing more than merely moving a small handle.

A further object of the invention is to provide a typewriter wherein one of the important features centers on the compound joint at which four printing keys are gathered and so arranged that their levers may operate on one type bar in such a manner that the desired type or character may be imprinted on the paper.

A further object of the invention is to provide a typewriter having a perfectly straight but rotary type bar, capable of carrying a plurality of styles of type in both capital and small letters; there being means for readily turning all of the type bars of the machine simultaneously to bring the desired kind of type into readiness for printing, the shifting from small to capital letters or from one kind of type to another, being done with no noise whatever.

A further object of the invention is to provide a typewriter of durable yet simple construction, the former virtue being obtained principally through the use of large open parts permitting light yet strong construction.

A further object of the invention is to provide a typewriter wherein the working parts are covered so as not to distract the attention of the operator, and wherein there is increased visibility in writing, since the printing line is tilted toward the operator.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawings, in which:—

Figure 1 is a plan view of a typewriter constructed in accordance with the invention, only those parts relating directly thereto being illustrated.

Figure 2 is a longitudinal section,

Figure 3 is a diagrammatic sectional view showing how all four bar carriers depress the type bar as one, when a certain one of the printing keys is actuated.

Figure 4 is a cross section on an enlarged scale, showing how the bar carriers are nested and mutually pivoted together,

Figure 5 is a detail view of one of the rotary type bars,

Figures 6 and 7 are cross sections on the lines 6—6 and 7—7 of Figure 5,

Figure 8 is a detail plan view showing the rotary type bar in place in its holder.

Figures 9 and 10 are cross sections on the lines 9—9 and 10—10 of Figure 8,

Figure 11 is a side elevation illustrating the first bar carrier in place on the holder of one of the rotary type bars,

Figures 12, 13 and 14 are detail cross sections as for example on the line 13—13 of Figure 5, illustrating various shapes of the type head whereby one, two and three complete sets of type may be employed in the machine as conditions may require,

Figure 15 is a longitudinal section taken substantially on the line 15—15 of Figure 1, illustrating the type-shift mechanism,

Figure 16 is a detail plan view of the eleven retrieving springs and the spring base to which the rear ends are adjustably secured,

Figure 17 is a detail elevation of the type change mechanism,

Figure 18 is a detail view illustrating a modification in the manner of connecting the hangers to the key levers,

Figure 19 is a longitudinal section of a typewriter constructed in accordance with my invention, illustrating a modified construction of type bars,

Figure 20 is a detail cross section on the line 20—20 of Figure 19, and

Figure 21 is an enlarged sectional view illustrating more clearly how the heel of the bar carriers are locked together.

In order that the invention may be quickly understood, the description of the construction and mode of operation is subdivided into the following subjects, occurring in the order of their importance: (1) general construction; (2) rotary type bar; (3) compound joints; (4) printing operation; (5) letter shift action; (6) type change action; (7) the modified construction, and (8) résumé of advantages. Considering these in the order named,

(1) *The general construction*

comprises the frame 1, usually made of cast metal, but obviously constructed in any desired manner, which carries the platen or printing roller 2. No spacing mechanism, either in connection with the various banks of printing keys or the space bar 3, is shown for moving the platen across the frame step by step, because any desired spacing mechanism may be employed without affecting the operation of the real invention, to the illustration of which the drawings are solely confined.

Ribbon spools 4 and 5 feed a ribbon across the printing point on the platen 2, with the customary step-by-step motion, the mechanism for doing this being omitted from the illustration for the reason stated above. Most of the mechanism is concealed from view by covers 6 and 7, perhaps best illustrated in Figure 2. The first cover acts as a catcher for the erasings falling from the platen 2.

A very objectionable feature common to the majority of typewriters now known, is entirely obviated by the provision of the cover 6. Little or no dirt can get into the inside of the machine, being prevented from doing so by this cover. It is an easy matter to sweep out what dirt does accumulate in the trough of the cover. The second cover 7 shields the type bar in a measure from dust falling directly thereupon, but performs the more important function of concealing the working parts from the eyes of the operator, thus enabling him to concentrate on the printing point which appears directly in the line of his vision above the upper curved edge of the cover or shield 7.

A stop pad 8, semi-circular in shape to conform with the general layout of the type bars, and made of some suitable soft material, provides a stop for the flanges of the various type bar holders as they are depressed to the printing position upon actuating the various printing keys. It is from

the position last assumed by a type bar holder, i. e. when it abuts the stop pad 8, that the type bar itself departs by virtue of its own momentum into engagement with the platen 2, to produce the ultimate printing act.

A rear lock 9, of a semi-circular toothed construction, catches the various type bar holders as they are depressed into the printing position, so as to insure the stabilizing of the holder as the type bar departs therefrom to produce the type impression. There is also a front bar lock 10 with which parts of the type bars cooperate. It has lock teeth 11 and 12 as shown in Figure 9, there being a particular tooth formation as illustrated in Figure 9, for each of the eleven type bars.

The front bar lock 10 extends in a semi-circle around the front of the machine, being fastened at 13 to some convenient part as for example, the shield 7, and at 14 to the brackets 15 which support the shield itself. Extending along the same semi-circle with the front lock 10 is the shift rack 16, of which there is a fuller description under the fifth subject below. Briefly stated though, a slight movement of this shift rack simultaneously changes the letters of all of the type bars, as for example, from small letters to capitals, with so little sound that it cannot even be heard by the operator.

It has been stated that there are eleven type bars, designated 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 and 27 in Figure 1. It is about the type bar 20, and its associated parts, that the description below largely centers, the type bar 20 being selected merely as an example for the purposes of description, since the construction and manner of operation of the rest is precisely the same. Attention is now directed to the construction of

(2) *The rotary type bar 20,*

the details of which are shown in Figures 5 to 14. It has a rectangular type head 28 at the rear end. In this particular instance, the type head is square in cross section, as shown in Figure 13, and on each of the four faces of the head, there are four characters 29, 30, 31 and 32.

Two different styles of type are to be accommodated by the four faces of the head 28; both small and capital letters of each style. For example, one style may be that of the well-known typewriter characters, while the other may be in old English or small pica. The characters represented are controlled by the longitudinal row of printing keys 33, 34, 35 and 36.

More or less than two styles of type may be carried by the type bar 20. The cross sectional face of the head 28 will then vary in accordance. When only one style of type is carried, the head will be triangular in cross

section as in Figure 12, so as to provide two faces for the capital and small letters. When three styles of type are to be carried, the cross sectional face of the head will be hexagonal as in Figure 14, so as to provide six faces, two for the capital and small letters of each style respectively. On the same principle, even a greater number of styles may be carried, so the reader will observe that this machine is really two or three typewriters in one.

At the front of the type bar 20 there is a pinion 37 of eight teeth, two for each type face of the head 28. The teeth 38 of the shift rack 16 engage the pinion 37, and by this means the type bar 20 is partially rotated to change from small to capital letters of one style of type. Beyond a fixed point, every other one of the teeth of the pinion is removed to leave four lock teeth 39, running true with each of the four type faces of the head 28.

The uppermost one of these lock teeth 39 rises into engagement with the central notch 12 of the front bar lock 10 at every act of printing, thus holding the corresponding type face of the bar 20 true while the printing is being done.

There is a holder 40 for the type bar 20. It is narrow for a major part of its length, diverging at the front to form a guard 41 which embraces the lock teeth 39 and provides a bearing for the front extremity of the type bar. The rear end of the type bar has a bearing support 42 from the holder. The holder moves as an integral part of the bar, but the type bar 20 has a free rotary movement in the bearings 41, 42, when operated to change type, by the shifting of the rack 16 over the pinion 37. The sides of the guard 41 enter the notches 11 in the front lock bar 10 when a printing position is assumed, as illustrated in Figure 9. Consider now

(3) The compound joint,

by means of which any one of the four characters on a printing face of the head 28 can be thrown into contact with the platen 2 at the correct printing point. Four bar carriers, nested one within the other as in Figure 4 and respectively designated 43, 44, 45 and 46, depress the type bar 20 to throw the various characters into printing engagement with the platen, accordingly as they are respectively actuated by their printing keys 33, 34, 35 and 36.

These bar carriers are pivoted one upon the other, as illustrated in Figure 4, thus constituting the compound joint to which so much importance is attached because through its functions the various type faces are made to strike at the common printing point. The type bar holder 40 has trun-

nions 47 fixed therein and projecting at the sides, the collar 48 forming the bearing for the first bar carrier 43, the pintle 49 extending into the adjacent side of the second bar carrier 44.

A stud 50, fixed in the sides of the carrier 45, provides the bearing for the second carrier 44. Similarly, a stud 51, fixed in the sides of the carrier 46, forms the bearing for the third carrier 45. Finally, the fourth carrier 46 is pivoted at 52 on the U base bearing 53 which is secured at 54 to the bar joint base 55.

So it will be seen that one bar carrier is hung upon the other and they collectively bear down on the holder 40 in such numbers as represented by the associated printing keys. The first carrier 43 will bear down singly, but the fourth bar carrier 46 will bear down all carriers beneath it, and the type head 28 is thrown forwardly that distance as represented by the various pivots 49, etc. When the first carrier 43 is actuated, the movement occurs from the top pivot 49 and the rest remain immovable. When the fourth bar carrier 46 is engaged, the whole structure moves as one on the lowermost stationary pivot 52, the parts then assuming the position illustrated in Figure 3.

Connections are made between the printing keys and bar carriers by links 56, 57, 58 and 59, the order of connection being that of the numerals. For example, the printing key 33, in the third bank from the operator, is connected to the first bar carrier 43 through the link 56. The printing keys 34 and 35 follow in order, being connected to the second and third carriers 44 and 45 through the links 57 and 58, the last carrier 46 being connected with the uppermost printing key 36 through the link 59.

The reason for connecting the last carrier to the uppermost printing key is that the characters on the uppermost bank are used less frequently than the other printing characters, thus the arrangement made entails a lesser amount of work on the part of the operator, since each depression of a printing key in the uppermost bank means the carrying of all of the bar carriers beneath the upper one 46. Slot and pin connections 60, 61, as illustrated in the instance of the link 58 in Figure 2, join the various links to the levers 63, 64, 65 and 66 of the printing keys. The various hangers may thus move with the bar carriers without disturbing the printing keys themselves.

A modification of the manner of connecting the links to the key levers, is illustrated in Figure 18, wherein the link 58^a is connected to the shoe 62, which in turn is pivoted to the key lever 65^a at 67. The dotted line position clearly illustrates the function of the shoe. The bar carriers and

links may be depressed as outlined above, without disturbing the key levers.

A retrieving spring 68 returns the type bar 20, and all appended parts, to the normal position against the felt or rubber sound-absorbing pad 69 with which the shield 7 is faced on the inside. There is one retrieving spring for each type bar 17, 18 etc., there being consequently eleven in number as shown in Figure 16. The spring 68 is long and thus applies an easy tension on its type bar.

The rear end is connected to the spring base 70 through the link 71, the front end being connected to one arm of the pivoted spring crank 72 from the other arm of which there is a spring connecting link 73 extending to the yoke 74, the latter in turn pivoted to the front of the holder guard 41.

Adjustments in the tension of the spring 68 may be made by inserting the link 71 in the various ones of the radial holes 75 in the spring base. There may also be an adjustment of tension of all retrieving springs by providing the spring base 70 with slots in which the holding screws are set, enabling sliding the base back and forth as may be required. A piece 76 rising up from the sides and extending across in the shape of a shoulder 77 provides a stop for the key levers as they rise to the rest positions. Lengths of small steel wire 78, extending between the shoulder 77 and base of the piece 76, provide spacers between the key lever and materially aid in reducing friction by keeping the levers true to their positions, since they run rather close at the points where the spacers are placed. Key lever retrieving springs 79 are located near the pivots at the back. A slotted guide 80 embraces the key levers where they drop lowest beneath their pivotal points, so as to keep the levers in their correct positions.

(4) The printing operation

may now be more readily understood. Normally, the machine prints small letters, it being necessary to shift when it is desired to print capitals. To print the letter "r," strike the key 33. The lever 33 moves on its pivot, pulls the link 56 down, thereby similarly drawing the first bar carrier 43 down until the flanges 81 of the latter strike the stop pad 8, from which position the type bar 20 departs a relatively short distance by virtue of its own momentum, to the final printing position in relation to the platen 2.

Since the actuation of the printing key 33 caused the first carrier 43 to move on its pivot 48 and since that pivot stands farthest from the printing point on the platen 2, as the reader may readily observe in any of the normal positions illustrated, it follows that the remotest character on the type head

28 will be brought down. This character being "r," consequently the letter "r" will be impressed on the paper.

The spacing mechanism is now supposed to operate, presuming that the key 33 has been released. To print the letter "d," strike the key 34. This moves the lever 64 on its pivot, draws down the link 57, together with the second bar carrier 44 to which it is connected, thus rocking the parts on the second pivot 50 and causing the second character on the type head 28, counting down from the top, to engage the platen 2 at the printing point. This character is the letter "d."

In the first instance, the bar carrier 43 carried the holder 40 and type bar 20 with it. In the second instance, the bar carrier 44 carried the carrier 43, holder 40 and type bar 20 with it. Upon striking the key 35, the lever 65 will draw down the link 58 and its bar carrier 45, moving the carriers 44, 43, the holder 40 and type bar 20 beneath it.

This third printing operation brings the third pivot 51 into play, causing the third character on the type head 28 to strike the platen at the printing point. The various pivots are progressively nearer the platen and through this arrangement the various characters are made to engage at the printing point as they are brought into operation. The same principle of operation prevails when the key 36 is struck.

In this instance the carrier 46, being actuated by the link 59 and lever 66, carries three bar carriers beneath it, together with the holder 40 and type bar 20. The pivot 52, which now comes into play, being nearest the platen 2, causes the lowermost character to engage at the printing point. As pointed out above, the characters in the upper bank of keys are relatively little used and for that reason are placed in the upper bank. The most work is done on the first three banks of keys, counting from the operator; the lever and link connections with the various bar carriers are such as to produce an equalization of the energy required in operation.

To illustrate: The shortest lever 63 of those in the three banks mentioned, has the longest link connection 56 to the first bar carrier 43. The next longest lever 64 has a little shorter link connection 57 to the second carrier 44, while the lever 65, longest of all, has a still shorter link connection 57 to the third carrier 45. Thus, the increased leverage serves to equalize the increase of weight of parts operated.

Parting mention is made of the fact that each time the holder 40 is depressed in a printing operation, it engages the lock 9 at the rear and 10 at the front. This double engagement holds the holder immovable and

in the correct position to let the type bar 20 make its slight departure into the second position represented by the dotted lines P in Figures 3 and 11. The notches 11 and 12 are deep enough to permit the additional movement of the type bar and its holder 40 occasioned by their departure to the printing point. In addition to the rear and front locks 9 and 10, which function upon the depression of a type bar, there are top and heel rest locks 82 and 83 in back of the shield 7, which, however, function to hold the type bar and its appended parts firmly in the rest position when as illustrated in Figure 2.

(5) The letter shift action

is produced by simply depressing one or the other of the shift keys 84, whereupon all of the type heads 28 are made to simultaneously turn 90°, or a quarter turn, through the movement of the shift rack 16 over the pinion 37. The shift rack holder 85, to which the rack 16 is secured, is centrally pivoted at 86, which central pivot coincides with the printing point on the platen 2.

A shaft 87 extends from side to side of the frame 1, being mounted in bearings 88, and carries a crank 89, to one arm of which the left shift key 84 is pivotally attached, and to the other arm of which the connecting strap 90 is likewise pivotally attached. The crank 89 is formed with a cross strap 91 from which a crank arm of the other shift key 84 extends since the strap goes across the machine to the right side.

There is a pivotal connection 92 between the strap 90 and holder 85. The stop 93 of the strap 90, works between the pads 94 of stop studs 95, which are part of a block 96 secured to a part of the frame. The retrieving spring 97, connected between a lug 98, fixed on the block 96 and a suitable lug on the strap 90, holds the stop 93 against the upper pad 94 and keeps the shift keys 84 in the uppermost position in readiness to be depressed.

Depression of one of the shift keys 84 causes a movement of the shift rack 16 to the right consequently rolling all of the type bars toward the right the distance of two teeth, bringing the right type face under into the printing position. This right type face is composed of capital letters of the style of type now in use, for example, small pica. Upon release of the shift key, the retrieving spring 97 restores all parts to the original position, the type bars being then rolled 90° toward the left to present the small letters to the platen as before.

(6) The type change action

is produced by lifting the type change latch 99 from the now-aligning notches 100, 101, in

the shaft rack 16 and holder 85 respectively, and moving it toward the left until the notch 100 aligns with the second notch 102 in the holder. The latch 99 is now pressed down and the changing of the type will have been accomplished. The shifting of the latch 99 moves the shift rack 16 a distance toward the left equal to four teeth, as indicated by the arrow *a* in Figure 17, thus bringing the capital and small letters of the second style of type on the head 28 into the same relationship formerly assumed by that style now rotated out of operation. This can be readily be understood by considering the small diagram projected beneath the pinion at the right in Figure 17.

Shifting of the rack 16 (Fig. 17) is limited by stop means 99^a which may consist of a screw the shank of which passes through a slot 100^a in the rack.

When the top head 28 is in the original position, the small "a" of the small pica style is beneath, a quarter-turn as when the shift key 84 is depressed, bringing the capital "A" into the printing position. When the type change action occurs, by shifting the latch 99 to turn the type bar 180° or halfway round, as indicated by the arrow *b*, the old English "A" moves into the place of the small pica "A", while the small old English "a" moves into the former place of the small letter of the other style. Thereafter, ordinary typewriting prints small old English letters, and depression of the shift key 84 moves the capitals of the old English style around the printing position.

(7) The modified construction in Figure 19,

does not depart in principle from that disclosed in the form of the typewriter described above. A comparison of Figure 19 with Figure 2 will show a similarity of construction, with the exception that in Figure 19, the formation of the type bar carrier is different. Those parts of the typewriter which are alike, are designated by similar reference characters, only the construction of the modification being here specifically considered.

The construction of type bar carriers 43^a, 44^a, 45^a and 46^a is preferable in a model of this machine, having a short bar travel, as for example, in models carrying from two sets of type down to one set, the construction of bar carriers described in the first form of the invention being more particularly adapted to models of three or more sets of types. Instead of locking the bar carriers together at the top, as clearly shown in Figure 2, the bar carriers now extend toward the back of the machine from the crank connections of the hangers 58, etc., by which the key levers 65 etc. actuate them, only the top carrier 43^a remaining extended

up over the bar holder to control and actuate the same in the operation of printing.

Roughly considered, the compound joint now takes the shape of a fish-hook, the shorter end being the lower part, where all carriers cross over from side to side in continued connection, 43^a being underneath, 44^a next above, 45^a on top of that, and 46^a covering the whole. The carriers terminate in, what appears in side elevation, a spear head, the various carriers being nested within each other to form a lock at this point, assuming the formation shown in Figure 20. This lock comes to rest against the pad 105 of the stop plate 106, the points of the superposed carriers at the lock being slotted at 107 in Figure 21, to engage the lock piece 108.

On the underside of the spear head, the innermost carrier 43^a is seen to have laterally extended flanges 109 on which all of the other carriers rest. The construction is plainly shown in Figure 20. On the same line with the stop flanges 109 of the carrier 43 are stop studs 110, 111 and 112 of the carriers 44^a, 45^a and 46^a, respectively, intended to strike the rim 113 of the cam base 114. The pad 8 rests on this base, and the heels or stops of the various carriers engage this pad in the operation of the type bars.

(8) *A résumé of the advantages*

should be of assistance in concluding the foregoing description. The feature of a plurality of different styles of type permanently built into the type heads of the machine, is one of the foremost in importance because this gives the owner of one machine the advantages of several other machines, each having different styles of type.

The concentration of types on the type bar is also of importance, because it enables bringing the operating parts closer together, and so make a more compact machine. It has been fully pointed out above that the type heads 28 can be made in three or more faces, thus accommodating one or more complete sets of type.

One of the characters may be omitted from each type face, consequently doing away with the corresponding bank of printing keys. In such event, the operating principles of the machine remain the same as before. Practically no weight is moved in shifting the type bars, the only movement in any case consisting simply of rolling the bars 90° in one direction or 180° in the other, as already fully pointed out above.

This improvement in the shift eliminates not only the distracting noise usually accompanying the action of a typewriter, but also avoids absorbing a great deal of the operator's energy in moving either the entire type body or the carriage innumerable times in the course of a day's work. The type bars

always stand poised ready to drop upon the slightest touch on the printing keys, the printing being done by the momentum of the bar in going down, but when the actual printing is accomplished, the carriers 43 etc. are left behind in engagement with the stop pad 8 and are not carried all the way to the printing point.

While the construction and arrangement of the improved typewriter as herein described and claimed, is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:—

1. A typewriter, including a type bar with a series of characters, a plurality of bar carriers pivoted to each other but progressively nearer the printing point, and a plurality of printing keys respectively in connection with the various carriers, for moving the type bar on any of the pivots accordingly as the keys are depressed causing corresponding characters to strike the printing point.

2. A typewriter, including a type bar with a series of characters, means equal in number to that of the characters for individually throwing the type bar farther to cause the respective characters to strike at the printing point, said carrier means being mutually interlocked to prevent side play; and an equal plurality of printing keys with individual connections to the respective carriers.

3. The combination in a typewriter, of a type bar and a plurality of carriers for depressing it toward a printing point, nested one within the other to prevent side play.

4. A typewriter, including a type bar with a series of characters, a plurality of members by which the type bar is supported, pivoted upon each other at places progressively nearer the printing point; an equal plurality of printing keys, and separate connections from the individual keys to the respective members, accumulatively moving said members on progressively nearer pivots to variously advance individual characters to the printing point in accordance with the printing key selected.

5. A typewriter, including a single type bar with a plurality of characters, an equal plurality of means for depressing the bar to print by the respective characters, an equal plurality of printing keys with successively longer levers, and an equal plurality of connections between the levers and carrier means, of successively lesser lengths as they join successively longer levers for the purpose of compensating in leverage the increase in weight of the carrier means actuated by the various keys.

6. A typewriter, including a type bar with a plurality of type faces, a lock member, a pinion by means of which the bar is rotated,

having teeth of a predetermined number for each face; certain of the teeth being removed at a predetermined place to leave a predetermined number for each type face to engage and lock said member when the type bar is moved to the printing point.

7. A typewriter, including a type bar with a plurality of characters on one type face, means for depressing the type bar to carry the various characters to the printing point, imposed on the bar and superposed one upon the other; and printing keys, equal in number to that of the carrier means, with connections to the latter for accumulatively actuating the carrier means in accordance with the key depressed.

8. A typewriter, including a type bar with a plurality of characters on one type face, means for depressing the type bar to carry the various characters to the printing point, imposed on the bar and superposed one upon the other; printing keys, equal in number to that of the carrier means, with progressively longer levers; and connections between the levers and individual carrier means, becoming shorter as the longer levers are attached to, and being connected to the successive carrier means as they accumulate, thereby producing an increase in leverage as the weight on the type bar increases.

9. The combination in a typewriter, of a type bar, with a pinion by which it is rotated, the pinion having teeth removed to produce locking means; and a holder in which the bar is rotatably mounted, including a portion embracing the pinion and lock means to form a guard.

10. The combination in a typewriter, of a type bar, with a pinion by which it is rotated, the pinion having teeth removed to produce locking means, a holder in which the bar is rotatably mounted, including a portion embracing the pinion and locking means to form a guard, and relatively fixed locking means with which the locking means of the bar and portions of the guard engage when the bar is depressed to the printing point.

11. The combination in a typewriter, of a bar holder including a portion defining a guard, a type bar journaled on the holder, with a pinion and locking means housed by the guard; carrier means by which the holder and bar are actuated as one, and a pivotal mounting between said means and the holder permitting movement of the bar to the printing point after being depressed a predetermined distance in that direction by the carrier means.

12. The combination in a typewriter, of a bar holder including a portion defining a guard, a type bar journaled on the holder, with a pinion and locking means housed by the guard; carrier means by which the

holder and bar are actuated as one, a pivotal mounting between said means and the holder permitting movement of the bar to the printing point after being depressed a predetermined distance in that direction by the carrier means, and relatively fixed locking means for engaging the locking means and the guard of the type bar when the printing point is reached.

13. A typewriter, including a type bar with characters of different type styles on a plurality of axially disposed faces, means for ordinarily rotating the bar in one direction to bring the capitals of one style into the printing position, and associated means for turning the bar in the opposite direction to place another style in the position formerly occupied by the first, said shifting means being capable of acting to bring the capitals of said second style into the printing position.

14. A typewriter, including a multi-faced type bar, with means for turning the various faces into the printing position; shifting means rockably mounted in respect to said bar, means carried by the shifting means in engagement with the turning means of the bar for ordinarily turning the bar within a prescribed zone, and means associated with said engaging means enabling turning the bar in another direction independently of said shifting means, for bringing other faces into the printing position.

15. A typewriter, including a type bar, a plurality of carrier means for individually depressing the bar, and means engaging said carrier means when in the rest position, to keep the parts in place.

16. A typewriter, including a type bar with a plurality of characters, and carrier means individually representing the respective characters, so arranged in respect to each other as to prevent side motion of the type bar at any time.

17. A typewriter, including a type bar with a plurality of characters, carrier means for depressing the bar to the printing positions, superposed on the bar and themselves and individually representing the respective characters, said means being flanged to prevent lateral movement of the type bar or any underlying carrier.

18. A typewriter, including a type bar with a plurality of characters, carrier means superposed on the bar and on themselves for individually depressing the bar to the printing positions, means included therein for preventing side motion of the bar or said carrier means, and relatively fixed means for engaging the top and heel of the outermost carrier means for stabilizing the structure in the rest position.

19. A typewriter, having closely spaced levers with connections running to a single

type bar, and spacing means consisting of wire strands between the close levers, also aiding to reduce friction.

20. A typewriter, including a type bar with a plurality of characters, an equal plurality of printing keys controlling the one bar, and individual connections between the keys and bar to move the individual characters to the printing position, said connections having means rockably mounted to the key levers enabling movement of the connections without disturbing the key levers.

21. A typewriter, including a type bar, a bar carrier in operative engagement therewith, and a plurality of other bar carriers cooperating with the first for independently actuating the type bar, through said first carrier, each including portions nested within each other to form a lock against lateral movement, and each including stop means for abutting an adjacent stop pad.

22. A typewriter, including a type bar, means for actuating it, including a plurality of bar carriers, one having engagement with the bar; and a fixed lock piece engageable by nested and slotted portions of said carrier.

23. The combination, of a multi-faced type bar, a holder on which the bar is rotatable, a plurality of carriers, and a compound joint connecting the carriers, through which any individual carrier can depress the holder and type bar to the printing point.

24. In a typewriter, means to operate a straight multi-faced type bar, said means having working elements of but two kinds, namely; bar carriers and bearing pivots for the same, one carrier being built and pivoted inside of and to the other, with bearings rising from each outside carrier, each bearing set higher than the other to throw said multi-faced type bar in line with the joint pivots across a platen in the act of printing.

25. A typewriter having a type bar, a plurality of nested carriers for independently actuating the type bar, and means which is fixed relatively to the type bar engageable by one carrier to stabilize all of the others.

26. A typewriter having a type bar, and a plurality of carriers for independently actuating the type bar, the carriers being nested, one being in direct engagement with the type bar.

27. A typewriter having a type bar, a bar carrier in engagement therewith, a plurality of similar bar carriers cooperating with the first for independently actuating the type bar through said first carrier, each carrier including portions nested within each other; a stop pad, and stop means on the carriers to engage the pad.

28. In a typewriter, a compound joint

comprising a plurality of bar carriers having pairs of bearings by which they are pivoted upon each other, and means to operate one, a plurality, or all of the carriers on the pivotal bearings while the rest are stabilized, and depress them together in the printing act, a compact structure being formed when two or more carriers are actuated.

29. In a typewriter, a type bar having an integral type face, a holder by which the bar is carried, a carrier adapted to engage the holder to depress it to the printing point, means to arrest the carrier at a predetermined place causing the departure of the holder and type bar by momentum and the procedure of the type face to the printing point, and means upon which the carrier and holder have a common pivotal support so that the above functions may be carried out.

30. A typewriter having a type bar, lock teeth formed on the type bar, a holder by which the type bar is carried and upon which it is normally revoluble, means embodied in the holder disposed in respect to said lock means to form a guard, and a lock bar having teeth defining recesses adapted to be entered by certain of said lock teeth and said guard to steady the holder and also keep the type bar from turning when in the printing position.

31. A typewriter having a type bar, lock teeth formed on the type bar, a holder which is co-extensive with the type bar, means at one end of the holder in which the type bar has one bearing support, means at the other end of the holder providing a guard for said lock teeth and in which the type bar has another bearing support, a lock bar having recesses beneath which said other end of the holder and said lock teeth are normally disposed enabling rotation of the type bar in its bearings, carrier means engaging the holder in which carrier means the holder also has pivotal bearing, and means to move the carrier means to cause a printing operation and bring the guard and certain of the lock teeth into engagement with said recesses to steady the holder and keep the type bar from rotating.

32. A typewriter having a type bar provided with lock teeth and type faces, a holder having bearing means in which the type bar is revoluble to present any of the type faces, one of said bearing means forming a guard around the lock teeth; a plurality of means each capable of independently actuating the type bar, lock means, and means to independently operate said type bar actuating means each time bringing the guard and certain of the lock teeth into engagement with said lock means.

33. A typewriter having a type bar pro-

vided with teeth and type faces, a holder having bearing means in which the type bar is revoluble, one of said bearing means forming a guard around the teeth; means in permanent engagement with the teeth at one place adapted to revolve the type bar to present any of the faces to the printing point, lock means, and a plurality of means to independently operate the holder and type bar each time bringing the guard and said teeth at another place into engagement with said lock means. 10

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