Nov. 4, 1958 L. SALMON 2,858,923

TYPEWRITING AND LIKE MACHINES

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Fig. 1.

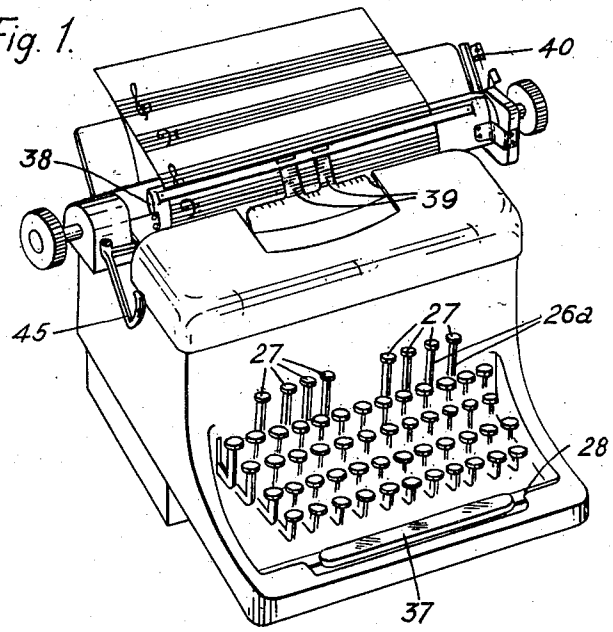
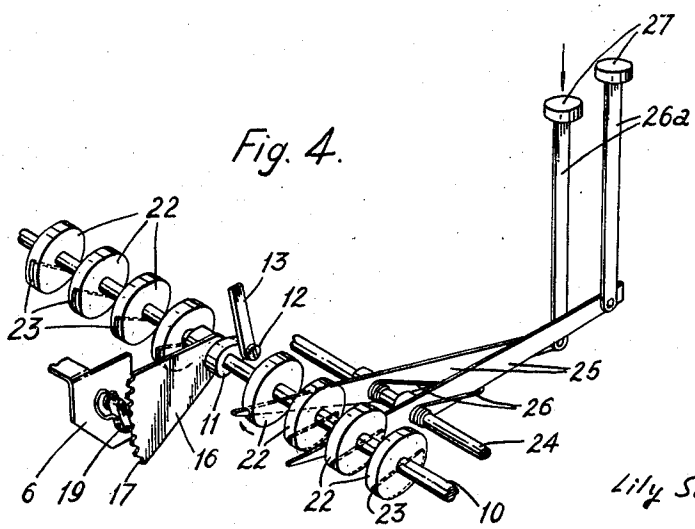


Fig. 4.



Inventor
Lily Salmon

By W. B. Hayman
Attorney

Nov. 4, 1958 L. SALMON 2,858,923

TYPEWRITING AND LIKE MACHINES

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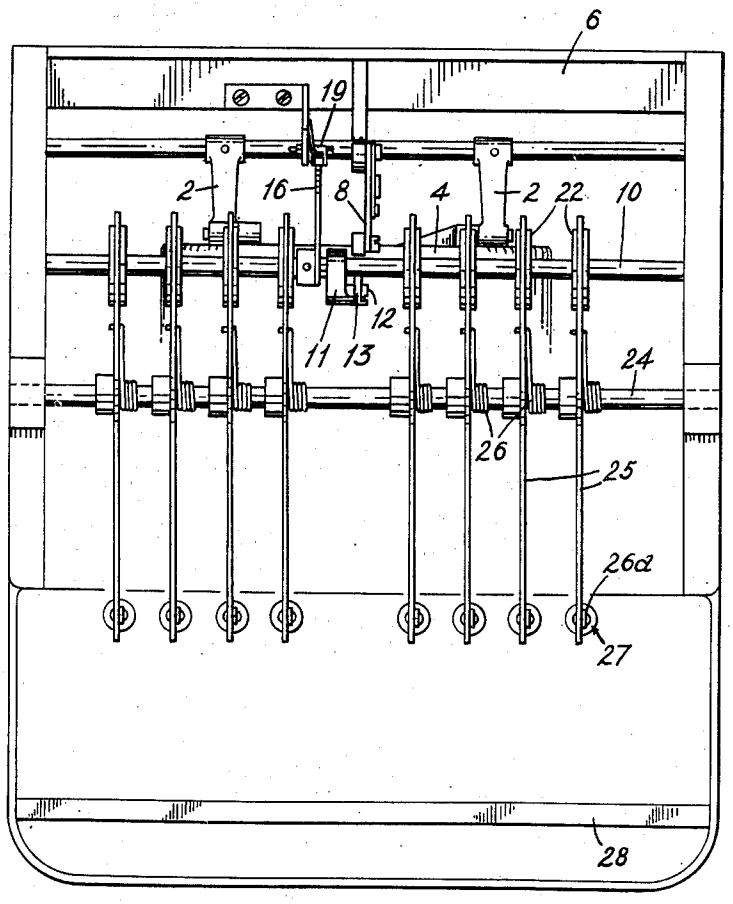
Fig. 2.



Inventor
Lily Salmon
By W. B. Hanpman
Attorney

Nov. 4, 1958 L. SALMON 2,858,923

TYPEWRITING AND LIKE MACHINES

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Fig. 3.

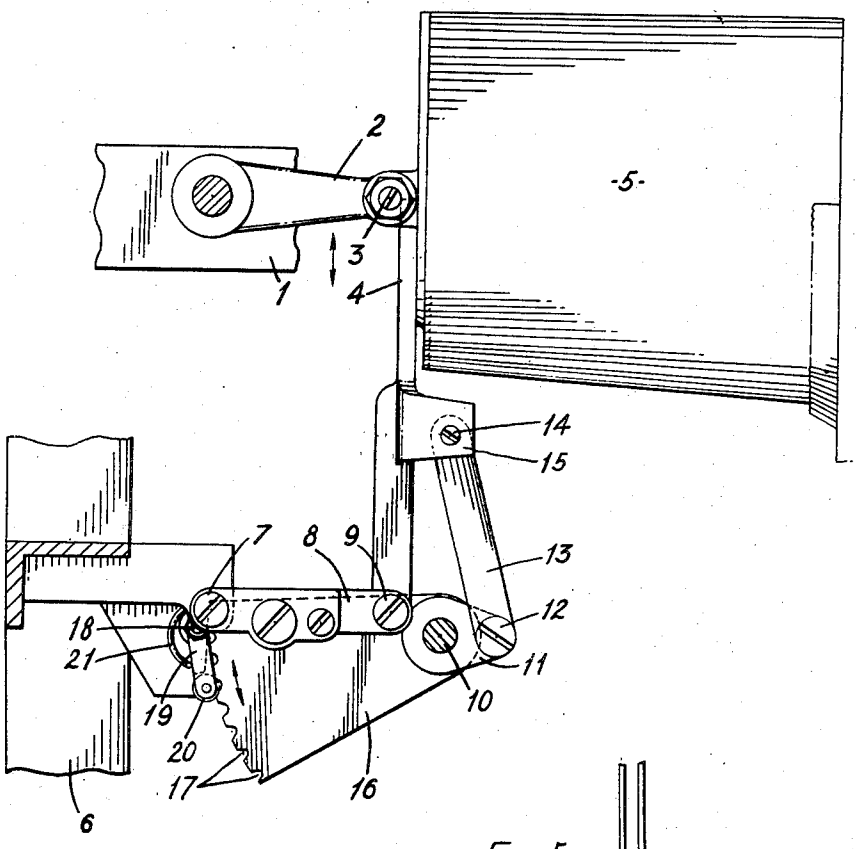
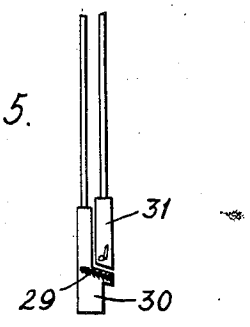


Fig. 5.



Inventor
Lily Salmon
By W. B. Hartman
Attorney

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TYPEWRITING AND LIKE MACHINES

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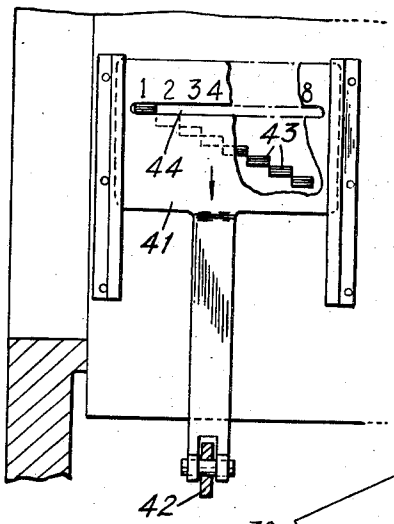

Fig. 6.

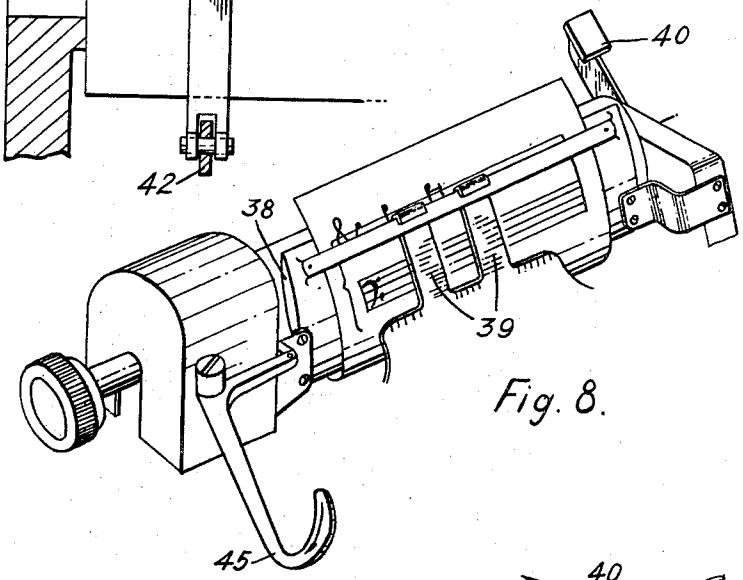

Fig. 8.

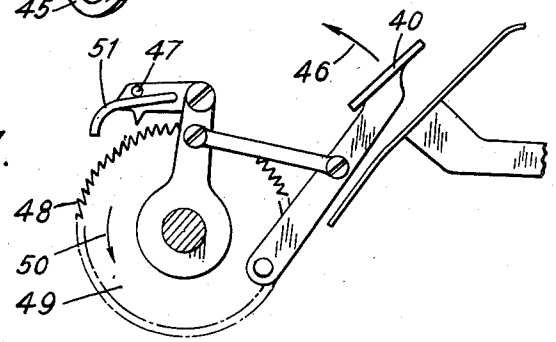

Fig. 7.

Inventor
Lily Salmon
By W. B. Harpman
Attorney

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TYPEWRITING AND LIKE MACHINES

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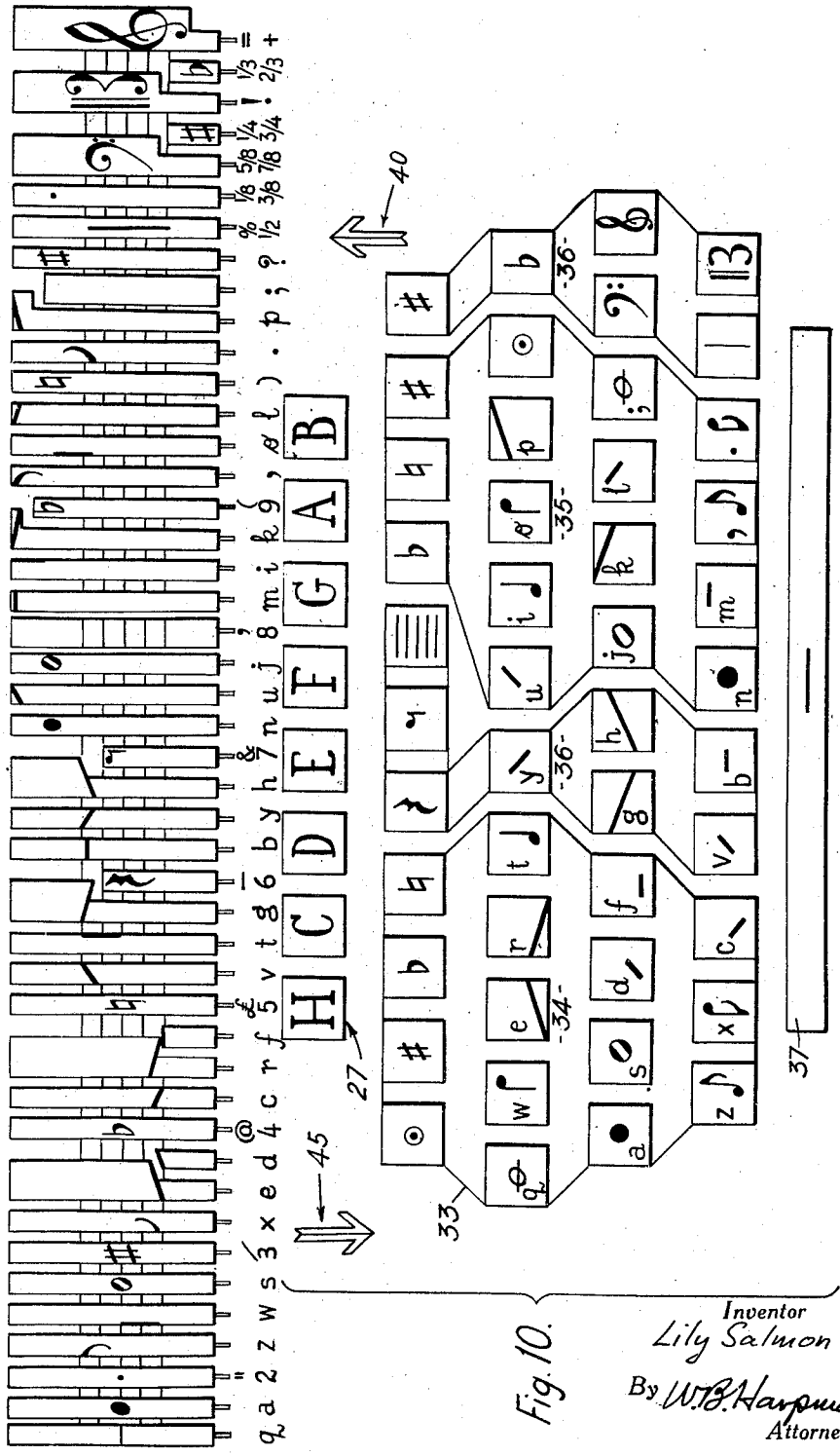

Fig. 9.

Fig. 10.

Inventor
Lily Salmon
By W.T.B. Harpman
Attorney

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TYPEWRITING AND LIKE MACHINES

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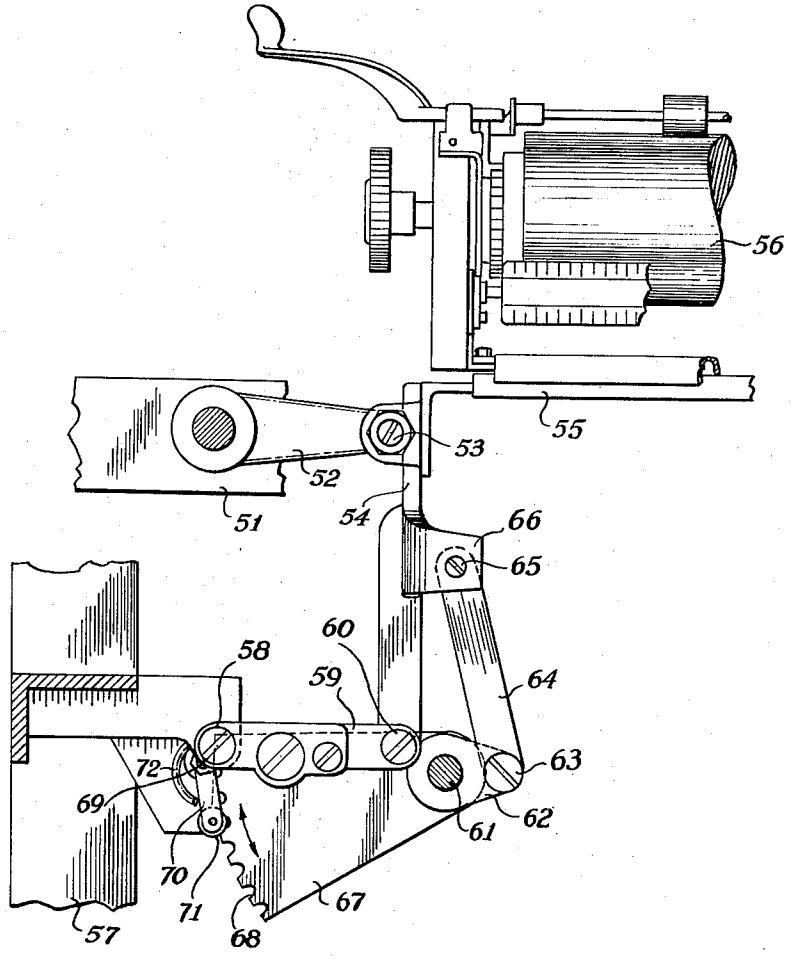
Fig. 11



INVENTOR.
Lily Salmon
BY
W. B. Harpman
ATTORNEY.

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2,858,923

TYPEWRITING AND LIKE MACHINES

Lily Salmon, London, England

Application August 13, 1957, Serial No. 677,867
Claims priority, application Great Britain June 12, 1957
7 Claims. (Cl. 197—8)

This invention relates to typewriting and like machines of the kind wherein typeheads are caused to strike, directly or through a ribbon, a paper or other sheet supported at the rear by a platen.

It is well known in the art to provide a shift mechanism whereby different parts of a typehead are caused to give an impression. Either the typehead may always act at the same relative height, the platen being raised or lowered as required, or again the platen is caused to remain at the same relative height and the typehead raised or lowered, e. g. the entire typehead and typebar basket in the case of some common forms of typewriter.

In some instances it may be desirable to have the positional relationship between the typehead and striker element variable selectively so as to give more than two positions. This occurs particularly where it is an essential, of the typescript to be formed, that some impressions shall be shifted vertically with respect to others over a relatively wide range, e. g. in the typing or printing of music.

Where the typescript impressions to be formed are to be shifted vertically in order to determine the relative position in which they are printed upon the paper only one symbol may be carried upon each type bar head or face, whilst, in order that any symbol may be typed upon the paper over a relatively wide vertical space, it is essential that the paper should be supported by a vertical striker plate or platen. Thus, where music is to be typed, it is necessary that any symbol may be able to be typed at any point over a vertical range equivalent to one octave, the position being able to be changed in a stepwise manner, each step being equivalent to one eighth of an octave.

The object of the present invention is to provide means whereby the positional relationship of striker element and typehead can be varied selectively in a positive manner and providing more than two possible positions of location.

According to the present invention, means for providing step-by-step relative shift motion of a striker element and the type in a typewriter or like printing machine comprise a series of camming elements coupled to the relatively movable part such that rotation of the camming elements causes alteration of the relative shift position thereof, and a corresponding number of shift levers coacting each with a camming element for movement of the camming element into a predetermined end position, the series of camming elements being arranged such that their end positions each provide a selectable shift position of the movable part.

The camming elements may be secured in fixed relationship on a common shaft, said shaft being in turn coupled to the movable part, e. g. by having a crank linked to the movable part.

Such camming elements may be, for example, discs with a chordal or diametral camming surface along which the shift lever abuts in the end position.

Preferably, means are included for step-by-step spring-loaded location of the movable part. Where the camming means are mounted on a common shaft, a peripherally notched quadrant may be secured on the shaft and a spring-loaded pawl arranged to seat releasably in the notches, thereby to provide step-by-step location.

In order that the nature of the invention may be readily ascertained, an embodiment of multiple shift means for a music typewriter is hereinafter particularly described with reference to the accompanying drawings, wherein:

Fig. 1 is a perspective elevation of a music typewriter, only those details relevant to the shift mechanism being described and shown.

Fig. 2 is an underplan view.

Fig. 3 is a fragmentary side elevation to show linkage and a step motion device controlling the shift of the typebar basket.

Fig. 4 is a fragmentary perspective elevation of the shift mechanism elements.

Fig. 5 is a plan of adjacent keys in a particular arrangement convenient for music typing.

Fig. 6 is a detail showing the arrangement of the indicator mechanism.

Fig. 7 is a detail showing the construction of a transport mechanism for moving the paper through a distance corresponding to one octave.

Fig. 8 is a perspective showing the arrangement of the paper-supporting platen.

Fig. 9 is a plan showing a complete type face which may be used upon a machine according to the present invention, and

Fig. 10 is a plan view of a keyboard for use with the type face shown in Fig. 9.

Figure 11 is a fragmentary side elevation to show linkage and a step motion device controlling the shift of a typewriter carriage.

The music typing machine illustrated is of the kind wherein the striker plate remains unchanged in height on the frame, although movable normally laterally, whilst the entire basket of type bars, operated through any suitable linkage from keys, is shiftable vertically with respect to the striker plate so as to permit the impression of the type head to be formed at the desired position on the usual stave lines of the music. As a considerable vertical range of movement is necessary, either a very deep ribbon must be used, or the whole typed by carbon paper or like means against the flat vertical striker plate.

Referring firstly to Fig. 3, there is illustrated the parallelogram vertical movement linkage of the type bar basket. An upper fixed frame element **1** has a pivot carrying an arm **2** pivoted at **3** to a frame **4** of the type bar basket **5**. A second lower fixed frame element **6** has a pivot **7** carrying an arm **8** pivoted at **9** to the lower part of the frame **4** of the basket. The basket **5** can thus move vertically by parallelogram movement about the pivots at the left hand ends of the arms **2** and **8**. The whole system is duplicated at the far side for symmetry.

Journalled in suitable bearings (not shown) in the machine frame is a cross shaft **10** having a short crank **11** bearing a pivot **12** coupling one end of a link **13** the other end of which is coupled by a pivot **14** to a lug **15** integrally formed on the frame **4** of the type bar basket. Thus, as the shaft **10** rotates clockwise the basket **5** is lowered, and vice versa. The shaft also has secured thereon a quadrant **16** with notches **17**. On the lower fixed frame element **6** is a pivot **18** carrying an arm **19** having at its free end a roller **20** capable of seating into the notches **17**. A spring **21**, secured at its upper end to the frame, bears against the arm **19** and urges the roller **20** into the selected notch **17**. The shaft **10** can thus be

rotated and will be located firmly by each notch in turn, giving predetermined positions of raising of the basket **5**.

Referring now to Fig. 4, in which the cross shaft **10** is seen with its linkage crank **11** and notched quadrant **16**, the shaft **10** has secured thereon eight cam elements **22**, each of which is in the form of a solid disc having an approximately semi-circular recess **23** cut in from the circumference. The discs are secured on the shaft **10** at equally rotationally shifted positions from one end to the other. Mounted in the frame of the machine is a pivot shaft **24** carrying in rotatable manner eight cam operating levers **25**, only two of the series being illustrated, for the sake of clarity in the drawing. Each lever **25** is engaged at one end in the recess of its cam disc. Downward pressure on the other end of each lever will thus cause it to rotate its cam disc, and thus also the cross shaft **10**, until the edge of the lever lies flat along the approximately diametral base of the cam disc recess. In the drawing the fourth cam is in this position with its lever. Springs **26** are provided to urge the levers **25** normally away from their cams. To the other end of each lever is pivoted a shift key **26***a* having a finger plate **27** and emerging at the front of the machine adjacent the usual keys, as seen in Fig. 1. Any suitable slideway device (not shown) keeps the shift keys **26***a* aligned but vertically movable.

With the cross shaft **10** in any one of its selectable positions of rotation corresponding to a particular height of the type bar basket with respect to the striker plate, the depression of any one of the other shift keys **26***a* will result in the associated lever **25** moving the associated cam **22** until fully located, bringing the cross shaft **10** into a new position of rotation and the type bar basket **5** to the new height selected. Any shift key **26***a* can be operated at any time, irrespective of the position of rotation of the cross shaft **10** at that time.

In practice, when the machine is being used, the operator can select the height at which successive type impressions will be made, and in a positive manner, by merely depressing the appropriate shift key **26***a*. By way of example, for a regular ascension, such as in a rising scale in music, the shift keys **26***a* would be operated in sequence from left to right, between each type bar operation.

In order that an operator might at any time immediately ascertain at which selected height the machine is set, a visual indicator (Fig. 6) may be provided which is operated by the type basket **5** and which moves with the type basket. A preferred form of indicator takes the form of a masking plate **41** moved by a linkage **42** suitably connected to the type basket mechanism over eight adjacent lines **43** which are stepped by a distance representing one eighth of an octave. The masking plate has a slot **44** through which one or other of said lines becomes visible according to the position of the type basket and masking plate and the lines may be marked according to a suitable notation so that the markings may be seen through the slot. The indicator may suitably be positioned upon the vertical face of the machine upon the side of the keyboard remote from the operator.

Referring to Fig. 5, there is seen an arrangement of typehead elements which permits continuous ascending lines to be typed. It is necessary for the line type **29** to be long enough to joint at each time of use with its own previous impression, so as to give a continuous line, assuming that the shift key mechanism is operated step by step as necessary. The line type block **30** is therefore made somewhat longer and wider to accommodate it. In a normal type bar basket this would not leave room for the next type bar, but in the arrangement shown the adjacent type head **31** has to be shortened appropriately, permitting the two to fit one adjacent the other.

When the typewriter is used, the paper is held against a flat platen **38** which may be rubber faced, thereby to allow for the relatively large vertical height of the paper which may be used at a time. Since it has been found that the normal form of paper-retaining rollers does not allow the paper to advance smoothly when the paper is to be moved vertically, these are replaced by retaining plates **39** which serve to hold the paper in abutment with the platen. This arrangement is shown in detail in Fig. 8. It will be appreciated that the larger vertical height of paper which is used at the one time necessitates the use of a very wide typewriter ribbon. Alternatively, it may be preferred to use the machine without a ribbon and to produce all of the typed copies by the use of carbon paper.

In addition to the cross feed which is obtained by manipulation of the space bar **37**, and the vertical feed which can be obtained by rotation of the carriage roller, levers **40** and **45** are provided which serve to lift and lower the paper by an amount equivalent to exactly one octave.

A suitable arrangement of the lever for racking up the paper by an amount equivalent to one octave is shown in detail in Fig. 7. Movement of the lever **40** in the direction indicated by the arrow **46** causes the pawl **47** to engage the ratchet teeth **48** to move the roller **49** in the direction indicated by the arrow **50**. When the roller has been moved through an appropriate distance the member **51** comes up against the stop which prevents its moving further. When the lever **40** is released a spring carries it back to its original position.

In Fig. 9 a complete set of type heads is shown in the form in which they may be arranged upon a typewriter. It will be seen that the individual type faces are of several different widths ranging from one to two or more times the normal width of a type bar face. By extending the principle described with reference to Fig. 5, the type face can be constructed in such a manner that although certain of the type face blocks are wider than others, each may be used without interfering with or coming into contact with adjacent blocks.

In Fig. 10 there is shown a typical keyboard which might be used with the type basket illustrated in Fig. 6. In this, the keys **27** are the shift keys which will move the type basket relative to the platen in eight steps over a distance representing one octave. The remaining keys represent the symbols which are used to build up the musical notation. These are arranged in groups which are shown joined together by the lines **33**, the group **34** and the group **35** being groups of keys which will normally be used in association with each other, whilst the remaining groups of keys **36** are those which may be used independently or together with the keys of either of the other groups. Since it is not desirable that the carriage should advance by one space each time a key is depressed, as it will sometimes be necessary to depress more than one key before it is desired to space the carriage without depressing a key, the space bar **37** represents the only means for advancing the carriage in spacewise cross-feed.

It will be appreciated that in the foregoing specific description reference has been made to a typewriter in which the type basket rises and falls relative to the frame and carriage of the machine when the shift keys are manipulated. By a number of relatively small and minor changes the same effect can be obtained in a typewriter in which the carriage rises and falls relative to the type basket and frame by the manipulation of the shift keys.

In Figure 11 of the drawings there is illustrated a parallelogram vertical movement linkage of the typewriter carriage. An upper fixed frame element **51** has a pivot carrying an arm **52** pivoted at **53** to a frame **54** of the typewriter carriage supporting member **55**. A typewriter carriage including a revolvable roll **56** is reciprocally mounted on the carriage supporting member **55** as known in the art. A second lower fixed frame element **57** has a pivot **58** carrying an arm **59** pivoted at **60** to the lower part of the frame **54** of the typewriter carriage support member **55**. The carriage support member **55** can thus move vertically by parallelogram movement at the left-

hand ends of the arms **52** and **59**. The whole system is duplicated at the far side for symmetry.

Journalled in suitable bearings (not shown) a cross shaft **61** having a short crank **62** bearing a pivot **63** coupling one end of a link **64** the other end of which is coupled by a pivot **65** to a lug **66** integrally formed on the frame **54** of the typewriter carriage. Thus, as the shaft **61** rotates clockwise the carriage **56** is lowered, and vice-versa. The shaft **61** also has secured thereon a quadrant **67** with notches **68**. On the lower fixed frame element **57** there is a pivot **69** carrying an arm **70** having at its free end a roller **71** capable of fitting into notches **68**. A spring **72**, secured at its upper end to the frame, bears against the arm **70** and urges the roller **71** into the selected notch **68**. The shaft **61** can thus be rotated and will be located firmly by each notch in turn, giving predetermined positions of raising of the typewriter carriage **56**. The shaft **61** is operated by a duplicate mechanism to that illustrated in Figure 3 of the drawings and hereinbefore described. It being observed in Figure 3 that the quadrant **16** and the shaft **10** duplicate quadrant **67** and the shaft **61** of the modification of Figure 11. It will thus be seen that the invention hereinbefore disclosed may be applied to typewriters in which the carriage rises and falls relative to the type basket and frame.

Having thus disclosed my invention, what I claim is:

1. In a typewriter, having a striker element, a type bar basket and a plurality of typeheads, means for providing step-by-step relative shift motion between said striker element and said type heads, comprising a series of camming elements coupled to said type bar basket such that rotation of the camming elements causes alteration of the relative shift position thereof, and a corresponding number of shift levers coacting each with a camming element for movement of the camming element into a predetermined end position, the series of camming elements being arranged such that their end

positions each provide a selectable shift position of said type bar basket.

2. In a typewriter, shift means as claimed in claim 1 wherein the camming elements are secured in fixed relationship on a common shaft, the shaft being coupled to said type bar basket.

3. In a typewriter, shift means as claimed in claim 2, wherein the shaft has a crank linked to said type bar basket.

4. In a typewriter, shift means as claimed in claim 1 wherein the camming elements are discs with a diametral camming surface along which the shift lever abuts in the end position.

5. In a typewriter, shift means as claimed in claim 1 including means for step by step spring-loaded location of said type bar basket.

6. In a typewriter, shift means as claimed in claim 2 wherein a peripherally notched quadrant is secured on the shaft and a spring-loaded pawl is arranged to seat releasably in the notches, thereby to provide step-by-step spring-loaded location of the shaft in rotation.

7. In a typewriter, having a vertically movable carriage including a striker element, a type bar assembly and a plurality of typeheads, means for providing step by step relative shift motion between said striker element and said type heads, comprising a series of camming elements coupled to said carriage such that rotation of the camming elements causes alteration of the relative shift position thereof, and a corresponding number of shift levers co-acting each with a camming element for movement of the camming element and into a predetermined end position, the series of camming elements being arranged such that their end positions each provide a selectable shift position of said carriage.

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