

March 16, 1954

C. S. EFFINGER

2,672,228

MUSIC TYPEWRITER

Filed Nov. 29, 1950

3 Sheets-Sheet 1

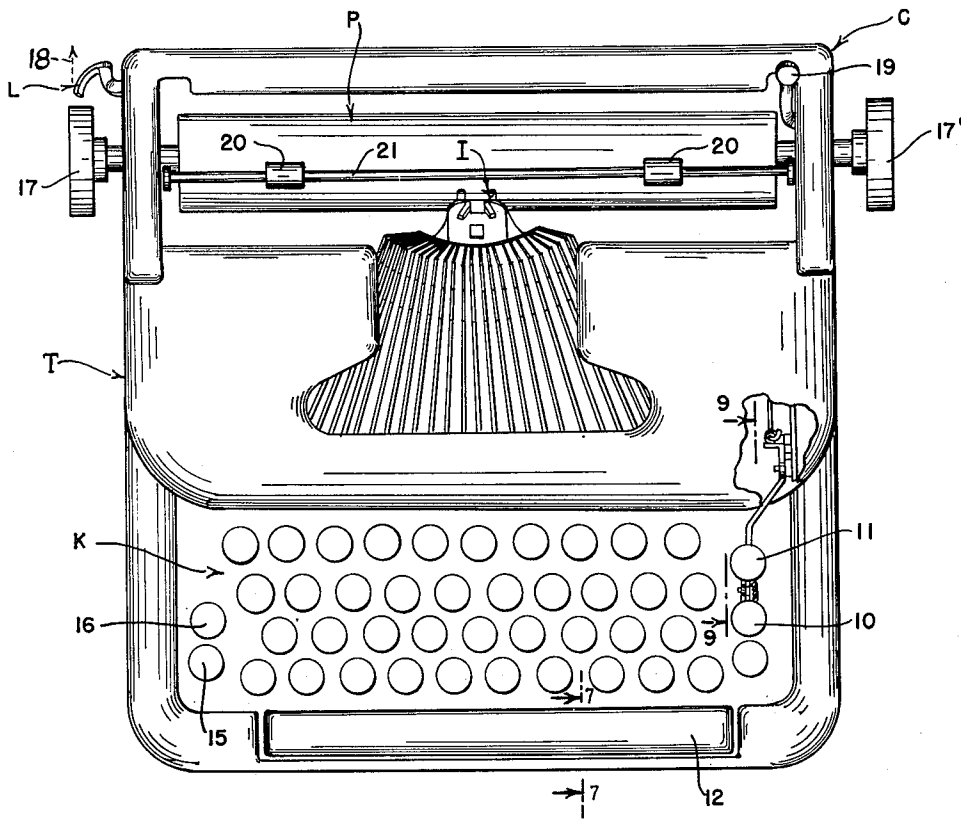


FIG. - 1

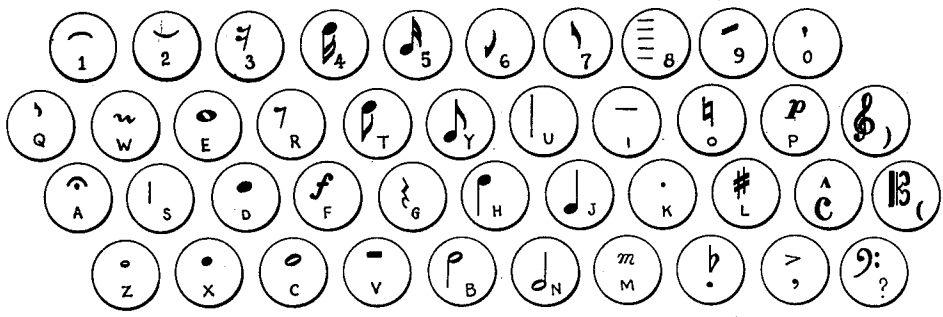


FIG. - 2

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3 Sheets-Sheet 2

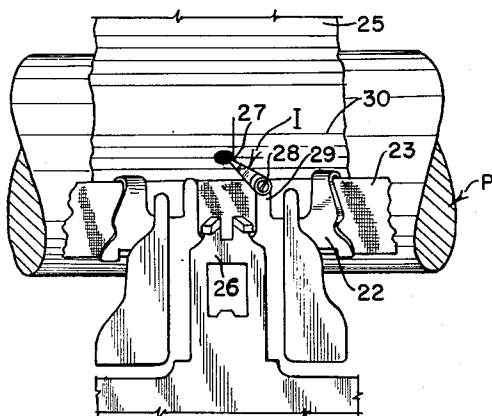


FIG.- 3

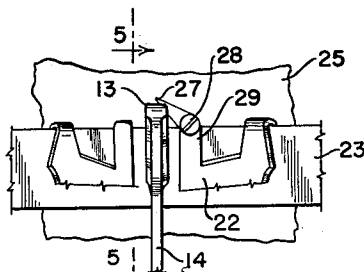


FIG - 4

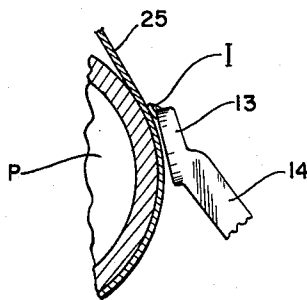


FIG.- 5

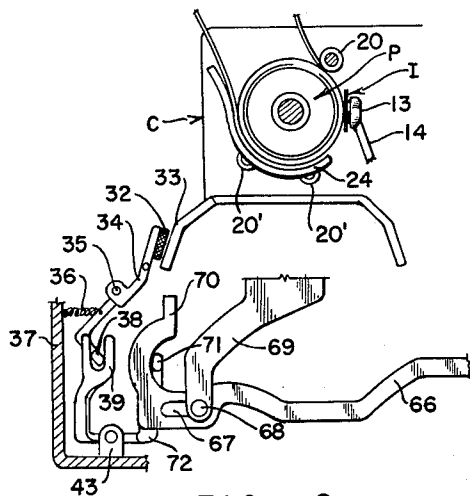


FIG. - 6

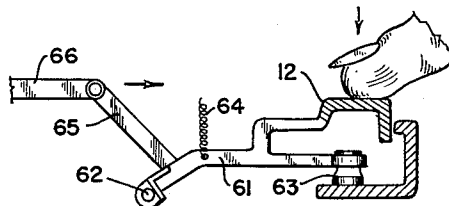


FIG.- 7

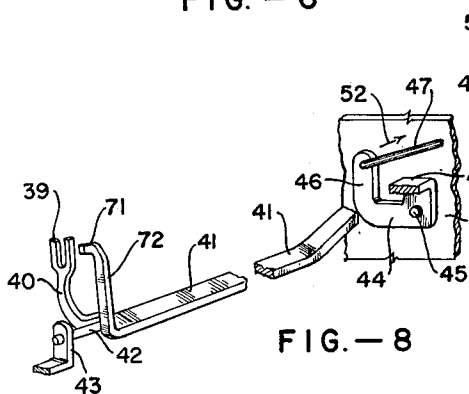


FIG.- 8

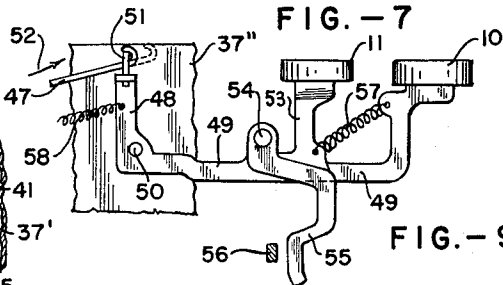


FIG.- 9

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3 Sheets-Sheet 3

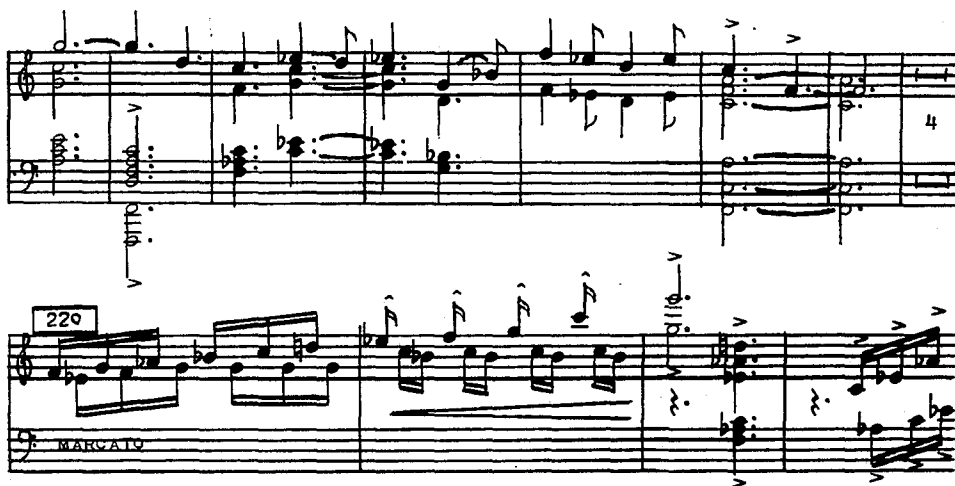


FIG. - 18

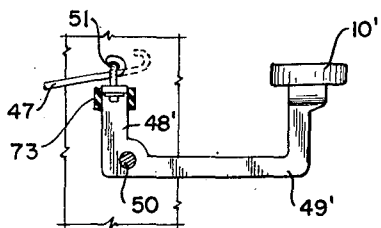
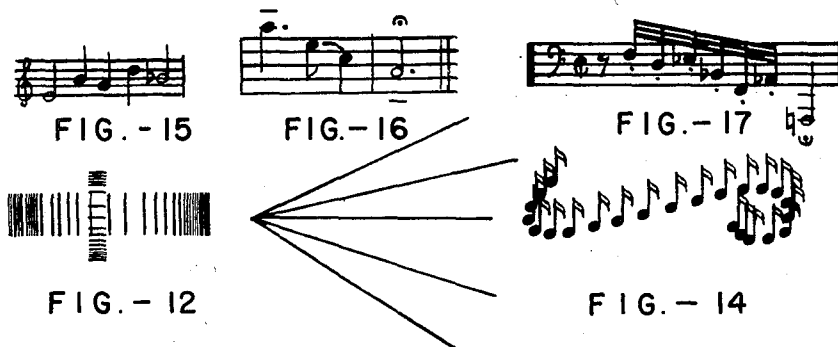


FIG. - 10

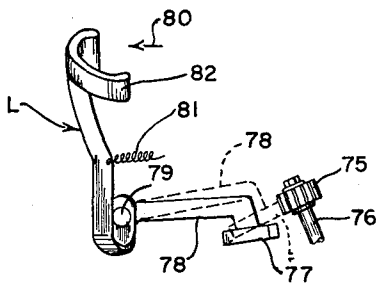


FIG. - 11

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2,672,228

MUSIC TYPEWRITER

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Application November 29, 1950, Serial No. 198,197

13 Claims. (Cl. 197—8)

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This invention relates to typewriters, and more particularly to typewriters for printing musical characters and the like.

Such typewriters are useful not only in composing music, but also in making copies of music for use as such, or for reproduction purposes. There have been numerous attempts to equip a typewriter to print music, such attempts going back over many years. Some of the previous attempts included complicated linkages or similar mechanism for moving the paper relative to the striking point of the type bars, or vice versa, so as to position the paper at a point so that a musical character, such as a note, would be printed at the desired vertical position on the staff. In addition, such typewriters have included an escapement connection, which automatically moves the carriage a predetermined distance to the left whenever a key or space bar is struck. Such previous music typewriters have required an inordinate amount of hand work and time to complete a musical score, while the complicated adjustments and similar mechanisms attempted to be utilized have resulted in unnatural appearing music and in the production of inaccuracies, particularly in the positioning of the notes, whenever a slight slip of the paper occurred. For this reason, it has been virtually impossible to make corrections or the like and reinsert the paper in the typewriter, and still obtain the previous relative position of the paper. Moreover, only a small percentage of vertical placement can be done advantageously by escapement or similar means, and uniform horizontal spacing of the notes is rarely compatible with the ready interpretation and reading of music. In a properly prepared page of music, the musical characters are placed in a flowing pattern which is best accomplished by what might be described as "freehand printing," in which there is no restriction as to placement of the characters and in which the mind and eye decision of the music typist has full control. Natural appearing music is the result.

Among the objects of this invention are to provide a novel music typewriter; to provide a music typewriter which permits musical scores to be printed in a manner which enables the music to be read and interpreted easily; to provide a music typewriter which will produce natural appearing music; to provide a music typewriter which permits any desired pattern of music to be typed; to provide a music typewriter which is not affected by slippage or misalignment of the paper; to provide a music typewriter which may be used with any desired size of staff which

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is compatible with the size of characters used, with paper on which staves are printed at various vertical distances apart, and with paper or staves in which there are irregularities; to provide a music typewriter which permits the placement of a character at any desired position, and also without the necessity for any complicated mechanical adjustment; to provide a music typewriter in which the paper may be removed from and replaced in the typewriter without any disadvantage whatsoever; to provide a music typewriter which does not require expensive additions to or deviations from an ordinary typewriter, such as used for printing primarily alphabetical characters; to provide a music typewriter which may be produced, by conversion, from a normal alphabetical typewriter with a minimum of expense and difficulty; to provide a music typewriter which is as comparatively simple in construction as the ordinary alphabetical typewriter; to provide a music typewriter which possesses a novel indicating element, indicating both the horizontal and vertical coordinates of a common printing point, useful also for alphabetical typewriters; and to provide a music typewriter which is simple to use and operate, requires no concentration on mechanical details of operation, and introduces the least possible inhibition between the musical thought process and the written result.

Additional objects and the novel features of this invention will become apparent from the description which follows, taken in connection with the accompanying drawings, in which:

Fig. 1 is a top plan view of an alphabetical typewriter with changes in certain parts to produce a music typewriter constructed in accordance with this invention;

Fig. 2 is a keyboard diagram, illustrative of one possible combination of keys and associated type bars, which may be utilized in the music typewriter of Fig. 1;

Fig. 3 is an enlarged fragmentary elevation of a portion of the music typewriter of Fig. 1, taken at the printing position and showing more particularly a novel printing point indicator of this invention, which is also useful on alphabetical typewriters;

Fig. 4 is an enlarged fragmentary elevation similar to Fig. 3, but including fewer parts and illustrating the position of a type bar during printing of a musical or other character;

Fig. 5 is a vertical section taken along line 5—5 of Fig. 4;

Fig. 6 is a fragmentary vertical section taken

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at the lower rear corner of the typewriter of Fig. 1, and illustrating a carriage brake and mechanism connected thereto;

Fig. 7 is a fragmentary vertical section taken at the front of the typewriter of Fig. 1, along line 7—7 thereof, and illustrating a space bar connected to release the brake of Fig. 6;

Fig. 8 is a fragmentary perspective view of an operating lever for the brake of Fig. 6;

Fig. 9 is an enlarged offset vertical section, taken along line 9—9 of Fig. 1, illustrating a key and locking key therefor, also adapted to operate the brake of Fig. 6 through the operating lever of Fig. 8;

Fig. 10 is a view similar to Fig. 9, illustrating a brake operating key without a locking key;

Fig. 11 is a fragmentary side elevation, illustrating a carriage lever for engaging a normally disengaged escapement mechanism, used when printing alphabetical characters with the typewriter of Fig. 1;

Figs. 12 to 18, inclusive, are photolithographic reproductions of musical printing done entirely on a typewriter constructed in accordance with this invention, as follows:

Fig. 12 shows parallel lines, both vertical and horizontal;

Fig. 13 shows various slanting lines;

Fig. 14 shows a flowing line of notes;

Figs. 15 to 17, inclusive, show different sized staves and illustrative examples of musical character combinations; and

Fig. 18 is a reproduction of measures 209 to 223, inclusive, of the piano part of the Third Movement of the "Piano Concerto," by Cecil S. Effinger.

In a broader aspect, the typewriter of this invention, such as the typewriter T of Fig. 1, includes a relatively freely rotatable platen or cylinder P, a freely movable carriage C for the platen, and an indicator I having a rest position indicating the point of printing on the paper. As described hereinafter, the typewriter T, which is shown as similar to the known L. C. Smith-Corona portable typewriter, may also include a brake for the carriage, and means for applying and releasing the brake, as through a key 10, with which a locking key 11 may be associated, while the conventional space bar 12 may be so connected with the brake that, when the brake is locked by key 10, the space bar may be depressed temporarily to release the brake and free the carriage.

The typewriter T is also provided with a keyboard K comprising a number of keys, each key being connected, by a conventional lever mechanism, with a type 13 (shown in Fig. 4) mounted on a lever 14, each type 13 being provided with two characters, in general a musical character and an alphabetical character, a convenient arrangement of the keys being shown in Fig. 2, although it will be understood that other arrangements of the musical and/or alphabetical characters may be utilized. It is to be understood, of course, that the term "alphabetical characters" as used herein, refers not only to the 26 letters of the alphabet, but also to the numerals and punctuations found in a conventional typewriter. In general, the characters are so arranged that the keys will cause the alphabetical characters to be printed in the release position of a shift lever actuated by a shift key 15, while the musical characters may be printed by pressing the shift key 15, which may be locked in position by a locking key 16. Conventional typewriters, of course, usually include additional keys, such as a back space

key, which may be found to be unnecessary for a typewriter of this invention, and thus have not been illustrated, it being understood that such keys may remain on the typewriter when a conventional alphabetical typewriter is converted to a music typewriter of this invention.

In using the typewriter of this invention for printing music, either during composing or reproducing music already written, it is necessary for the user only to grasp the platen or cylinder knob 17 or 17' with one hand, it being noted that knob 17 is at the left and knob 17' at the right end of the carriage, the particular knob grasped usually depending upon whether the user is right handed or left handed. Thus, with the one hand grasping the knob 17 or 17', the freely movable carriage C may be shifted to any lateral position, while the platen P may be turned freely so as to position the printing point vertically. One or more fingers of the other hand then may be utilized in striking the key which actuates the type bar having the particular musical character to be placed at that position. As will be evident, the freedom with which the freely movable carriage may be positioned laterally is important in permitting the music to be printed in a manner which is easily read and interpreted. The language of music is a flowing language, that is, the music should proceed smoothly along the staff and the musical characters should be spaced apart distances which are proportional to the value of the notes. Thus, $\frac{1}{8}$ and $\frac{1}{4}$ notes should normally be closer together than quarter, half or full notes, and the spacing between the notes normally should also vary in accordance with the tempo of the music. Thus, readily interpreted music is not printed with mathematical precision, but in accordance with the feel or flow of the music and by the mind-eye decision of the copyist. As will be evident, each bar of music thus will tend to have a different space length, a normal occurrence being that no two bars in several lines of music, for example, have exactly the same length, while two adjacent notes of different values are more often spaced unequal distances apart. In the case of a chord, of course, the notes should be in vertical alignment on the staff, which is readily accomplished in a manner explained later. When printing alphabetical characters, in order to produce words having musical connotation, such as *andante*, *pianissimo*, *crescendo*, *allegretto*, *diminuendo*, *moderato*, and the like, and under some conditions when printing certain of the musical characters, it is desirable to provide an automatic movement of the carriage a predetermined distance each time a key is struck; the conventional escapement mechanism being particularly adapted to be utilized for this purpose, in a manner also explained later.

In the conventional typewriter, the carriage C is tensioned by a spring, tending continually to urge the carriage to the left, a ratchet arrangement being utilized to permit the spring to move the carriage one space each time a key or the space bar 12 is struck. However, such a spring would prevent the carriage C from being freely movable, so that a simple manner in which a freely movable carriage may be provided consists merely in eliminating the spring action. This, of course, permits the carriage to be moved to any lateral position provided the escapement mechanism is disengaged, so that the freely flowing nature of easily read and readily interpreted music may be obtained. However, when printing alphabetical characters, such as involving

musical words, due to the lack of the spring, it is necessary for a slight pressure to be exerted on the carriage C, tending to move it toward the left, in order that the escapement mechanism may automatically cause the carriage to move a predetermined distance each time a key is struck. It will be understood, of course, that the words which can be printed by a typewriter of this invention also include the words or lyric of a song, when printed on the paper to accompany the music.

To enable alphabetical characters to be printed in a conventional manner, the typewriter of this invention therefore may be provided with a lever L, the preferred construction and connections thereto being described in detail later, but which in general is adapted to be engaged by the thumb or a finger of the left hand, the lever being moved rearwardly in the direction of the dotted arrow 18 and a slight pull to the left simultaneously exerted thereon, to urge the carriage C to the left, and thereby permit the automatic escapement to be operative. As described later, the lever L is connected to the escapement mechanism, so as to cause the latter to be engaged when the lever is moved rearwardly. A similar lever functioning in the same way may be placed at the right side of the carriage. A lever 19, at the right end of the carriage may be conventional, and used for the purpose of adjusting the pressure of rollers 20' beneath the platen P (see Fig. 4), to any desired degree from complete freedom of the paper from pressure of the rollers 20' to sufficient pressure to insure that the paper will be held firmly while a line or portion thereof is being typed horizontally across the paper.

In addition to the foregoing parts, the typewriter T may be provided with conventional rollers 20, mounted on a pivoted, spring pressed bar 21, for holding the paper against the platen P, and also with a ribbon vibrator 22, preferably of any suitable conventional design, through which the ribbon 23 moves, the ribbon movement mechanism being conventional and therefore not shown. The friction produced by the lower rollers 20' on the paper, as indicated previously, holds the paper in position during typing of alphabetical characters. It will be understood, of course, that other conventional mechanism, such as a dog and ratchet arrangement, and also the conventional line space lever, are preferably removed or arranged to be normally inoperative, when converting a conventional alphabetical typewriter to a music typewriter of this invention.

As will be evident, with a relatively freely movable platen and a freely movable carriage, it is necessary for the user to know exactly where the musical character will be printed. For this purpose, any suitable indicating device showing both horizontal and vertical coordinates of the printing point may be utilized, the indicating device I, shown in greater detail in Figs. 3-5, being preferred. This indicator also may be utilized on typewriters other than music typewriters. The indicator I, as in Fig. 3, is preferably mounted on the ribbon vibrator 22, so that it will be moved away from the printing position when a type 13, as in Fig. 4, strikes the paper 25. The purpose of the ribbon vibrator 22 is, of course, to permit the operator or user to observe what has been typed, the ribbon in rest position being below the printing point and when a key is struck the ribbon vibrator is moved upwardly, as in Fig. 4, so that the type character on the type 13, accurately

positioned by a conventional guide 26, will strike the ribbon with sufficient force to produce a print of the particular character on the type bar.

Preferably, the indicator I comprises a thin, elongated piece of resilient material, such as rubber, and softer than the material of which the type is made, to prevent damage to the type character if struck by the type. The indicator I may have any desired shape, although one end 27 should be pointed, so that the printing point may be observed with accuracy, the opposite end being enlarged for attachment to the vibrator 22, as by a small screw 28. Or, the indicator may be made of metal, and resiliently attached, as by a spring, to the vibrator. As shown, the indicator I is attached to an extending leg 29 of the ribbon vibrator, on the right side, so as to prevent interference with vision of what has already been printed, although it will be understood that the indicator may be placed on the left side. Also, the indicator I may be attached to the vibrator 22 in any other suitable manner, as by adhesive or cement, although a screw is preferred to permit replacement.

As in Figs. 4 and 5, the indicator I may be struck by the type each time a key is struck, although due to its resilient character and its being made of softer material than the type, damage to the type will be avoided. Also, as in Fig. 5, the curvature of the platen P and the corresponding curvature of the paper 25, permits the indicator I to be struck by the type without the indicator hitting the paper. Furthermore, particularly when the shift key 15 is not depressed or locked, to permit the alphabetical characters and numbers, such as shown on the lower portions of the keys of Fig. 2, to be printed, the type 13 may extend to a higher position than shown in Figs. 4 and 5, when it strikes the ribbon, but again the soft resilient material of the indicator prevents damage to the type, while the curvature of the platen and corresponding curvature of the paper permits the indicator to be struck and depressed without the indicator striking the paper.

As in Fig. 3, a note is shown in the printing position to which the indicator I points, the note being on the center line of a staff 30, it being understood that the paper 25 may be provided with a conventional series of staves, or the staff may be printed on the paper by a staff key.

As illustrated in Figs. 6-9, inclusive, a suitable brake for the carriage C, adapted to be applied when a chord or other arrangement of vertical characters is to be printed, may comprise a pad 32 adapted to be pressed into engagement with the flat surface of a conventional way 33 of the carriage C, it being understood that the ways move along a suitable slide, not shown but conventional in character. Brake pad 32 may be made of suitable friction material, such as rubber, and is preferably mounted on the upper end of a brake lever 34 pivoted centrally on a pin 35 and normally pressed into engagement with the carriage way 33 by a tension spring 36, one end of the spring 36 being attached to lever 34 below pin 35, and the opposite end to the frame work 37 of the typewriter T. The lower end of lever 34 may be provided with an offset, laterally extending lug 38, adapted to be engaged by a fork 39, to move the brake pad 32 out of engagement with the way 33. As in Fig. 8, the fork 39 may be formed at the upper

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end of one upstanding arm 40, conveniently formed integrally with a brake operating lever 41, the central portion of lever 41 being formed as a pin or shaft 42 extending through a bearing hole in a bearing bracket 43. The opposite end of lever 41 may be provided with an integral, laterally extending bracket 44, pivoted on a pin 45 mounted on another portion 31' of the typewriter housing, and also with an upstanding arm 46 to which the lower end of a rod 47 may be connected. The brake operating lever 41, as evident from Fig. 6, is disposed at the rear of the typewriter, and the rod 47 extends forwardly and upwardly to the upper end of an upstanding arm 48, disposed at the inner end of lever 49 for key 10, which is pivoted on a pin 50 mounted on another portion 31'' of the typewriter framework. The front end of rod 47 may be bent upwardly, as in Fig. 9, the rod passing through an eye 51 mounted on arm 48, so that when key 10 is depressed, the upper end of rod 47 will be moved to the dotted position of Fig. 9, i. e. in the direction of arrows 52 of Figs. 8 and 9, thereby turning brake operating lever 41 of Fig. 8, and causing fork 39 to move brake lever lug 38 inwardly, thereby moving brake pad 32 from way 33, so that the carriage will be free. Preferably, the friction produced by brake pad 32 is only sufficient to maintain the carriage stationary, and to exceed the friction of the platen rotation, but still permit the carriage to be moved manually to any desired lateral position.

Locking key 11 is associated with brake release key 10 in a conventional manner, so that when the locking key 11 is depressed, the key 10 will remain depressed. A lever 53 for locking key 11, as in Fig. 9, is pivotally mounted by a pin 54 on lever 49 for release key 10, and also is provided with a depending latch 55 adapted to engage a transverse bar 56 upon pressure on key 11 against the tension of a spring 57. The latch 55 is formed conventionally, so that, in locked position, pressure on key 10 will cause lever 53 for key 11 to pivot slightly upwardly, and release the latch, permitting both keys 10 and 11 to move upwardly, thereby engaging the brake. Key 10 is maintained normally in an upper position by a spring 58, which may be connected between arm 48 and a portion 31'' of the typewriter framework. The hooked upper end of rod 47 and the eye 51 also form a lost motion connection, which permits the brake to be released by the space bar 12 which, as in Fig. 1, extends transversely across the front of the typewriter, and, as in Fig. 7, is mounted on one or more levers 61, each pivoted at its inner end on a pin 62. In addition, each of the levers 61 is provided with a stop 63, adapted to limit downward movement of the space bar, while the space bar may be maintained normally in an upper position by a tension spring 64. One of the levers 61 is also provided with a rearwardly and upwardly extending arm 65, pivotally connected to the front end of a link 66, which extends to brake operating lever 41 at the rear of the typewriter. The rear end of link 66, as in Fig. 6, is provided with a horizontal slot 67 through which a pin 68 mounted on a bracket 69 extends, to guide link 66 in its backward and forward sliding motion. Rearwardly of slot 67, link 66 is provided with an upstanding arm 70, adapted to engage a transverse lug 71, formed at the upper end of an arm 72, which may be formed integrally with brake operating lever 41, as in Figs. 6 and 8. Thus, when the space bar 12 is depressed, as in

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Fig. 7, the brake pad 32 will be lifted from the way 33 to release the brake. Also, when the brake is applied, as for printing a number of chords or series of notes in vertical alignment, the space bar 12 may be depressed to permit the carriage to be moved to the position of the next chord.

Instead of a brake release key and a locking key, a single brake release key may be utilized, which is adapted to be depressed to release the brake and raised to cause the brake to be applied. As in Fig. 10, a single brake release key 10' may be mounted on a lever 49', having an upstanding arm 48, provided at its upper end with an eye 51 through which rod 47 extends. Normally, with brake key 10' in the upper position shown in Fig. 10, the brake pad 32 will be pressed against the carriage way 33, but when brake key 10' is depressed, the upper end of rod 47 will be moved to the dotted position of Fig. 10, thereby releasing the brake. Preferably, the spring 58 of Fig. 9 is eliminated, so that the brake release key 10' of Fig. 10 will tend to stay in either up or down position, when placed there. For this purpose, a friction pad 73 made of suitable material, such as rubber, engages arm 48' to maintain arm 48' and key 10' in any position to which they are moved, thereby maintaining rod 47 in either the full or dotted position of Fig. 10, and causes the carriage brake to be engaged or disengaged, respectively. It will be understood, of course, that the levers or other parts connecting the brake control keys with the brake may be so designed that the keys will be pressed down to throw on the brake, and also so that the normal position of the brake will be off, rather than on.

When typing alphabetical characters, it is desirable that the carriage be moved a predetermined distance after each key is struck, to position the paper automatically for the next letter. In the conventional typewriter, this is accomplished by an escapement mechanism connected with the keys and with the space bar, and such mechanism may include, as in the Smith-Corona, a ratchet mechanism adapted to rotate a pinion, such as pinion 75 of Fig. 11, which is mounted on the upper end of an inclined shaft 76, the pinion 75 being rotated by the ratchet mechanism whenever a key or the space bar is struck. Also, the carriage of such a typewriter is conventionally provided with a rack 77 mounted on an arm 78 pivoted on a pin 79, the rack 77 being adapted to be moved into and out of engagement with pinion 75, i. e. the rack 77 being moved out of engagement with the pinion 75 whenever the carriage release lever is actuated. In a typewriter of this invention, the lever L may be connected to the carriage rack 77, as at pin 79, so that whenever the lever L is moved rearwardly, as in the direction of the arrow 80, the rack 77 will be moved to the dotted position of Fig. 11, i. e. into engagement with pinion 75. In this position, the carriage will be permitted to move automatically a predetermined interval to the left, whenever one of the type keys is struck. The space bar 12 of Figs. 1 and 7 is, in a conventional alphabetical typewriter, also connected to shaft 76 through an escapement mechanism, so that each time the space bar is depressed, the carriage will be permitted to move a predetermined distance. In the typewriter of this invention, such space bar connection is not removed or disconnected, so that the space bar

12 is connected to the brake release mechanism and serves its normal function as well.

The lever L, as in Fig. 11, may be urged by a spring 81 into a forward position, so as to maintain the rack 77 normally out of engagement with the pinion 75, in the full line position of Fig. 11. In addition, instead of a small head or laterally extending lug at the upper end of the lever L (such as in the case of right hand tab or lever 19 of Fig. 1), the lever L, at the left, is preferably provided at its upper end with a relatively elongated, curved arm 82 which extends laterally and also forwardly. Thus, the lever not only may be moved to a rear position, to cause the rack 77 to engage pinion 75, but also pressure to the left may be more readily placed on the arm 78, to urge the carriage to the left, thereby permitting the escapement mechanism to shift the carriage automatically, such leftward pressure on the lever L compensating for the absence of the spring normally urging the carriage to the left, which spring, as indicated previously, has preferably been removed from the typewriter T.

As indicated previously, the type bars 13 may be provided with the characters indicated on the keyboard arrangement of Fig. 2, it being understood that other designs or styles of musical and alphabetical characters may be used, that the alphabetical characters may be either upper case or lower case, and that the arrangement of the letters and characters on the keys may vary from that shown in Fig. 2. A list of the musical characters on the various keys of Fig. 2, reading from left to right in each row, the lower or alphabetical character on each key being in the left hand column for each row and the musical character on the same key being in the right hand column, is as follows:

TOP ROW OF KEYS

Alphabetical Character	Musical Character
1.....	Tie.
2.....	Tie.
3.....	16th Rest.
4.....	16th Note, Stem Down.
5.....	16th Note, Stem Up.
6.....	Flag for Stem Down.
7.....	Flag for Stem Up.
8.....	Staff Liner.
9.....	Slanted Heavy Line.
0.....	Accent.

SECOND ROW OF KEYS

Q.....	Small Flag.
W.....	Mordent.
E.....	Whole Note.
R.....	8th Rest.
T.....	8th Note, Stem Down.
Y.....	8th Note, Stem Up.
U.....	Bar Line.
I.....	Leger Line.
O.....	Natural.
P.....	Piano.
Parenthesis.....	Treble Clef.

THIRD ROW OF KEYS

A.....	Firmata.
S.....	Short Vertical Line.
D.....	Quarter Note Head.
F.....	Forte.
G.....	Quarter Rest.
H.....	Quarter Note, Stem Down.
J.....	Quarter Note, Stem Up.
K.....	Dot.
L.....	Sharp.
Common Time Sign.....	Accent.
Parenthesis.....	C-Clef.

LOWER ROW OF KEYS

Alphabetical Character	Musical Character
Z.....	Small Half Note Head.
X.....	Small Quarter Note Head.
C.....	Half Note Head.
V.....	Horizontal Heavy Line.
B.....	Half Note, Stem Down.
N.....	Half Note, Stem Up.
M.....	Mezzo.
Period.....	Flat.
Comma.....	Accent.
?.....	Bass Clef.

As will be evident, the "common time sign" listed with the alphabetical characters in the third row of keys, is actually a musical character. The type forms for the musical characters may be made in any suitable manner, it being noted that the type forms used in printing the notes of Figs. 14 to 18, inclusive, were constructed in the manner shown in U. S. Patent No. 2,317,170 of Ralph J. Bostow and John R. Coburn, granted April 20, 1943.

The musical notations of Figs. 12-15, inclusive, are illustrative of what may be done with a music typewriter constructed in accordance with this invention, and provided with type bars having musical characters as shown in Fig. 2. In Fig. 12, a combination of leger lines (fourth key from the right in the second row of Fig. 2) and bar lines (fifth key from the right in the second row of Fig. 2) have been typed at varying distances apart, to illustrate the ease with which both horizontal and vertical spacing variation may be achieved.

Fig. 13 illustrates the ease with which lines disposed at different angles may be produced. These lines, one horizontal and the others slanting at different angles both above and below the horizontal line, are readily produced by tilting the paper with respect to the platen at the desired angle, then moving the carriage along while striking the leger line key (eighth from the left in the second row of Fig. 2). To return to a desired point on the paper at which the key will strike is relatively easy, by use of the indicator I.

The series of notes of Fig. 14 illustrates one variation in note pattern which may be produced, without the necessity for adjusting any levers, and may be produced merely by turning the relatively freely rotatable platen and simultaneously moving the freely movable carriage, with one hand, while the key to produce the desired note is struck with the other hand.

The accurate positioning of the notes, on a small staff drawn or printed on the paper, as in Fig. 15, or on a larger staff drawn on the paper, as in Fig. 16, is shown. In Fig. 17, the staff is typed directly on the paper, as also in Fig. 18, by means of the staff key (third from the right in the top row of Fig. 2). As will be evident, neither the size of the staff nor inaccuracies therein, detract from the ease with which the notes or other characters may be accurately placed. Thus, paper with staves of any size printed thereon are as readily used as blank paper on which the staff is produced by the staff key.

Fig. 17 also illustrates the ease with which a relatively difficult type of note pattern may be produced with accuracy, and in a minimum of time, on the staff. If it were necessary for the operator to move a lever for each note of Fig. 17, the inordinate amount of time which would be consumed is self-evident. Also, there would be a greater tendency for inaccuracy since with the

music typewriter of this invention, the operator actually observes the position, both horizontally and vertically, at which the note or other musical character is to be printed.

The beams which join the stems of a number of notes of Fig. 17 are readily produced by slanting the paper, as described previously, and striking the horizontal heavy line key (fourth from the left in the lowermost row of Fig. 2) while engaging the escapement by lever L. The upper and lower heavy line may be made in a similar manner, the paper while slanted being merely moved up or down to the desired position by moving the platen. It should be noted that the lengths of the heavy or light slanted or horizontal lines are not limited to the unit of escapement, since the ends may be finished to the slightest perceptible amount by releasing lever L. Above the last note of Fig. 16 is a "firmata," while beneath the last note of Fig. 17 is an inverted "firmata" (first key in third row of Fig. 2), the inverted note being produced by placing the paper in the carriage upside down. As will be evident, the paper may be removed and replaced in the carriage any number of times without affecting the accuracy of note and character placement, since the indicator I always shows the point at which the key will strike, and accurate positioning is obtainable by the relatively freely rotatable platen and freely movable carriage.

In Fig. 18, which is a photolithographic reproduction of measures 209 to 223, inclusive, of the piano part of the Third Movement of the "Piano Concerto" by Cecil S. Effinger, as made entirely by a music typewriter constructed in accordance with this invention, it will be noted that only measure 220 is numbered, but the other measures are readily identified. In Fig. 18, the different distances occupied by each bar, as well as the different distances occupied by the various notes, indicate the freedom of lateral displacement obtained by a freely movable carriage. The excerpt shown, of course, is easily read by a musician, and the variation in spacing causes the music to flow, as it were, in a rhythmic pattern. The relatively freely rotatable platen permits the paper to be turned quickly to a desired vertical position of the printing point, an indicator being necessary to permit the notes or other musical characters to be placed at the exact desired position, both vertically and horizontally. In Fig. 18, it is to be noted that measures 216 to 219, inclusive, comprise a rest of four measures. It will also be noted that there are a number of chords, such as in measures 209, 210, 211, 212, 214, 215 and 222. These chords are readily printed by setting the brake on the carriage, it being understood that in writing notes such as in measures 213, 220, 221 and 223, the brake is disengaged.

The slurs between measures 209 and 210, between measures 211 and 212, and between measures 214 and 215, as well as in measure 212, may be produced by a series of dots, or by a combination of dots and horizontal lines. In addition, the slanting heavy lines, joining the stems of the notes in measures 220, 221, and 223 may be produced by simply twisting the paper slightly on the platen and moving the carriage along, either with or without the use of the escapement, while striking the heavy bar key (fourth from the left in the lowermost row of Fig. 2) in succession a sufficient number of times to obtain the desired length of the bar. The

crescendo mark in measure 221 may be produced by first shifting the paper slightly to the right, to form the upper line of the mark, as by striking the leger line key (the seventh key from the left in the second row of Fig. 2) in succession a sufficient number of times, and then moving the upper edge of the paper slightly to the left, to form the lower line of the crescendo mark in a similar manner, i. e. such as used in producing the slanting lines of Fig. 13. A reverse or decrescendo mark may be made in a similar manner, it being observed that the operator may move the carriage either to the left or to the right in making such a mark.

The accent marks of measure 221 may be produced by the proper key (second from the right in the third row of Fig. 2), while the more pronounced accent marks of measures 214, 222 and 223 may be produced by a different key (the second key from the right in the lower row of Fig. 2).

From the foregoing, it will be evident that the music typewriter of this invention fulfills to a marked degree the requirements and objects hereinbefore set forth. The representative examples of music and musical characters which may be printed, as shown in Figs. 12-18, indicate clearly the value of the combination of a freely movable carriage, a relatively freely rotatable platen, and an indicator which shows the exact point of printing. The simple expedient of moving a single key to cause the carriage brake to be released or applied, adds to the ease and simplicity of use and with the brake on, accurate vertical alignment of several notes, as in a chord, is readily obtained. As will be evident, the necessary changes to convert a conventional alphabetical typewriter to a music typewriter of this invention are relatively few, although the results of such changes are outstanding. Furthermore, if a special music typewriter is to be made, little additional expense is involved over the manufacturing cost of a conventional alphabetical typewriter. Only a few special parts, namely, a pointer or indicator, a carriage brake, operating levers therefor, and a special lever for engaging the automatic ratchet mechanism for printing alphabetical characters, are required in addition to type having musical characters thereon and key caps corresponding thereto. As will be evident, the manufacturing and assembly problems, in constructing a typewriter in accordance with this invention, involve no more difficulty than the construction and assembly of a conventional alphabetical typewriter. As will further be evident, an indicator permits the operator to place the musical character or note at the exact position desired, the adjustment of the paper to such position by turning the platen or moving the carriage with one hand being accomplished simply, so that the results are not affected by slippage or misalignment of the paper. In fact, as described above, the paper may be intentionally placed at different angles, or taken out and replaced in the typewriter, without adversely affecting the alignment or placement of subsequent characters.

As will further be evident, a novel indicating device, having a pointed end and preferably affixed to the ribbon vibrator, and also being made of material softer than the type bars, is applicable to typewriters other than music typewriters, such as a conventional alphabetical typewriter.

It will be evident, of course, that variations in the construction of the typewriter of this inven-

tion may be utilized. For instance, the arrangement of keys may be different; the operating connections between the brake and the brake release key may be different from those shown; a brake may be placed in other positions and be operated by different structure; the lever for causing the automatic ratchet mechanism to be engaged may be varied in form, position and connection with the escapement mechanism; other types of printing point indicators may be used; and other ways of making the automatic escapement mechanism operative may be utilized, as by retaining the spring which ordinarily tends to urge the carriage to the left, and providing a disengageable connection between the spring and the carriage to permit the carriage to be made freely movable.

It will further be understood that other embodiments may exist and other variations may be made, all without departing from the spirit and scope of this invention.

What is claimed is:

1. In a typewriter for printing music characters on paper or the like, the combination of a series of type bars having music characters thereon; a series of activating keys associated with said type bars for moving individual type bars to printing position; a relatively freely rotatable platen; a freely movable carriage on which said platen is mounted, said carriage being independent of the action of said keys and type bars in its movement and position; and an indicator for accurately indicating on said paper a common printing point of said type bars.

2. In a typewriter for printing music characters on paper or the like, the combination of a series of type bars having music characters thereon; a series of activating keys associated with said type bars for moving individual type bars to printing position; a relatively freely rotatable platen; a freely movable carriage on which said platen is mounted, said carriage being independent of the action of said keys and type bars in its movement and position; an indicator for accurately indicating on said paper a common printing point of said type bars; a brake engageable with said carriage for maintaining said carriage in a desired position; and means for applying and releasing said brake.

3. In a typewriter for printing music characters on paper or the like, the combination of a series of type bars having music characters thereon; a series of activating keys associated with said type bars for moving individual type bars to printing position; a relatively freely rotatable platen; a freely movable carriage on which said platen is mounted, said carriage being normally independent of the action of said keys and type bars in its movement and position; an indicator for accurately indicating on said paper a common printing point on said type bars; a normally disengaged escapement mechanism for moving are struck; and means for engaging and disengaging said escapement mechanism.

4. In a typewriter for printing music characters on paper or the like, the combination of a series of type bars having music characters thereon; a series of activating keys associated with said type bars for moving individual type bars to printing position; a relatively freely rotatable platen; a freely movable carriage on which said platen is mounted, said carriage being normally independent of the action of said keys and type bars in its movement and position; an indicator

for accurately indicating on said paper a common printing point of said type bars; a brake engageable with said carriage for maintaining said carriage in a desired position; means for applying and releasing said brake; a normally disengaged escapement mechanism for moving said carriage in increments as individual keys are struck; and means for engaging and disengaging said escapement mechanism.

5. In a typewriter for printing musical and alphabetical characters, a series of type bars having musical and alphabetical characters thereon; a keyboard having keys individually connected with said type bars and other keys unconnected with a type bar; a relatively freely rotatable platen; a freely movable carriage for said platen; a normally disengaged escapement for moving said carriage in increments as successive type bar keys are struck; and a lever for engaging said escapement and positioned to permit a directional force to be applied simultaneously to said carriage.

6. In a typewriter for printing musical and alphabetical characters, as defined in claim 5, wherein said lever is mounted on said carriage adjacent the end thereof and is provided with a generally transversely extending bar for application of said directional force.

7. In a typewriter for printing musical characters and the like on paper or the like, and having type bars and a keyboard provided with keys connected to said type bars, the combination of music characters on said type bars; a relatively freely rotatable platen; a freely movable carriage for said platen; a brake for retaining said carriage in a desired position; and a key of said keyboard for applying and releasing said brake, said key being unconnected to a type bar.

8. In a typewriter for printing musical characters and the like on paper or the like, and having a ribbon vibrator, the combination defined in claim 7, and a lost motion connection between said key and said brake.

9. In a typewriter for printing musical characters and the like on paper or the like, and having a ribbon vibrator, the combination defined in claim 7, and a locking key for said brake key.

10. In a typewriter for printing musical and alphabetical characters, said typewriter having a series of type bars provided with musical and alphabetical characters, and a keyboard having keys individually connected with said type bars and other keys unconnected with a type bar, the improvement which comprises, in combination with music type bars, a relatively freely rotatable platen; a freely movable carriage for said platen and having a slide; a friction brake for said carriage and adapted to engage said slide; and means connecting said brake with a key unconnected to a type bar for applying and releasing said brake.

11. In a typewriter for printing musical and alphabetical characters, a series of type bars having musical and alphabetical characters thereon; a keyboard having keys individually connected with said type bars and other keys unconnected with a type bar; a relatively freely rotatable platen; a freely movable carriage for said platen; a normally disengaged escapement for moving said carriage in increments as successive type bar keys are struck; a friction brake for said carriage; means connecting said brake with a key unconnected to a type bar for applying and releasing said brake; and means for engaging and disengaging said escapement.

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12. In a typewriter for printing musical and alphabetical characters, as defined in claim 11, wherein said brake is normally applied and said key releases said brake; and including a bar for temporarily releasing said brake.

13. A typewriter for printing musical and alphabetical characters, comprising a series of type bars having musical and alphabetical characters thereon; a keyboard having keys individually connected with said type bars and other keys unconnected with a type bar and a space bar; a relatively freely rotatable platen; a freely movable carriage for said platen, said carriage being provided with ways slidable in stationary guides and being without a conventional spring for urging said carriage laterally of said typewriter; a movable ribbon vibrator having an upstanding arm; an elongated indicator having a pointed end mounted on said vibrator arm, said indicator being formed of resilient material softer than a type bar and its end having a position when said vibrator is at rest indicating the point of printing on said paper; a normally disengaged escapement for moving said carriage in increments as successive type bar keys are struck, said escapement including a pinion and a pivotally movable rack normally disengaged from said pinion but engageable therewith; a friction brake for said carriage including a lever, a friction pad on said lever for engaging one of said ways, and a spring tending to hold said pad against said

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way; a linkage system for engaging said brake lever to release said brake, said linkage system being connected to said space bar through a lost motion connection and including a rod extending to said keyboard; a key unconnected to a type bar and having a lost motion connection with said rod, for releasing said brake but permitting said brake to be released by said space bar; a locking key for said brake release key; and a lever mounted on said carriage adjacent the end thereof and provided with a generally transversely extending bar for application of a directional force to said carriage, said lever being connected to said rack so as to cause said rack to engage said pinion or to be disengaged therefrom.

CECIL S. EFFINGER.

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