Oct. 26, 1926.

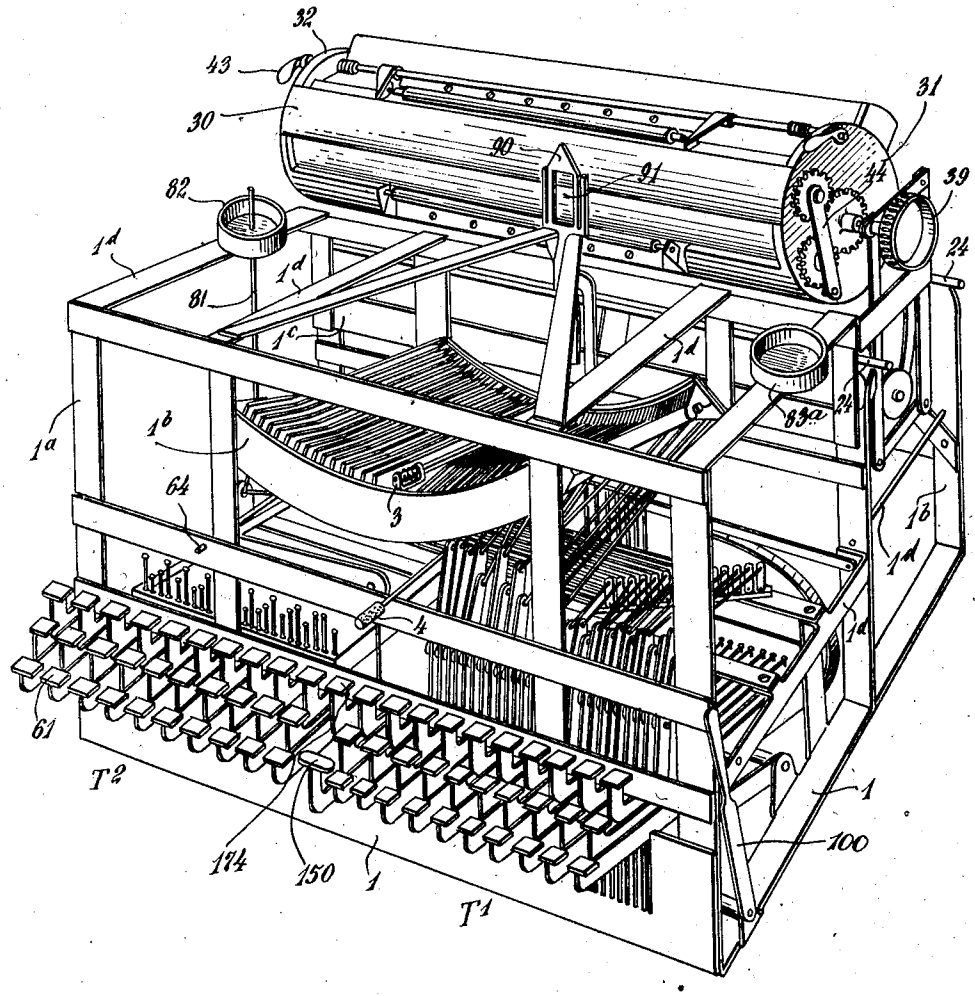
1,604,647

J. J. LUCAS

TYPEWRITER

Filed August 18, 1923 6 Sheets-Sheet 1

Fig. 1.



INVENTOR

José Joaquim Lucas

BY

ATTORNEY

Oct. 26, 1926. 1,604,647

J. J. LUCAS

TYPEWRITER

Filed August 18, 1923 6 Sheets-Sheet 2

Fig. 2.

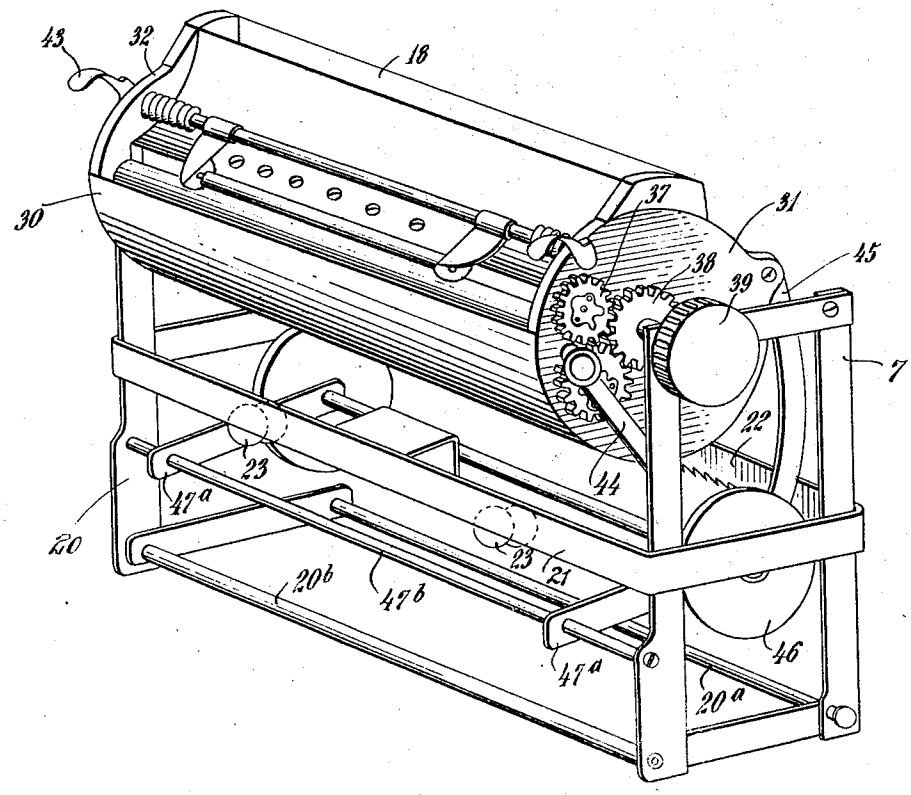
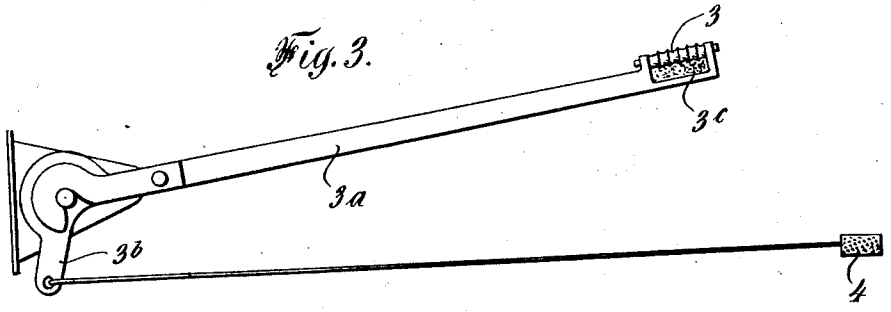


Fig. 3.



INVENTOR

José Joaquim Lucas

BY

ATTORNEY

Oct. 26, 1926. 1,604,647

J. J. LUCAS

TYPEWRITER

Filed August 18, 1923 6 Sheets-Sheet 3

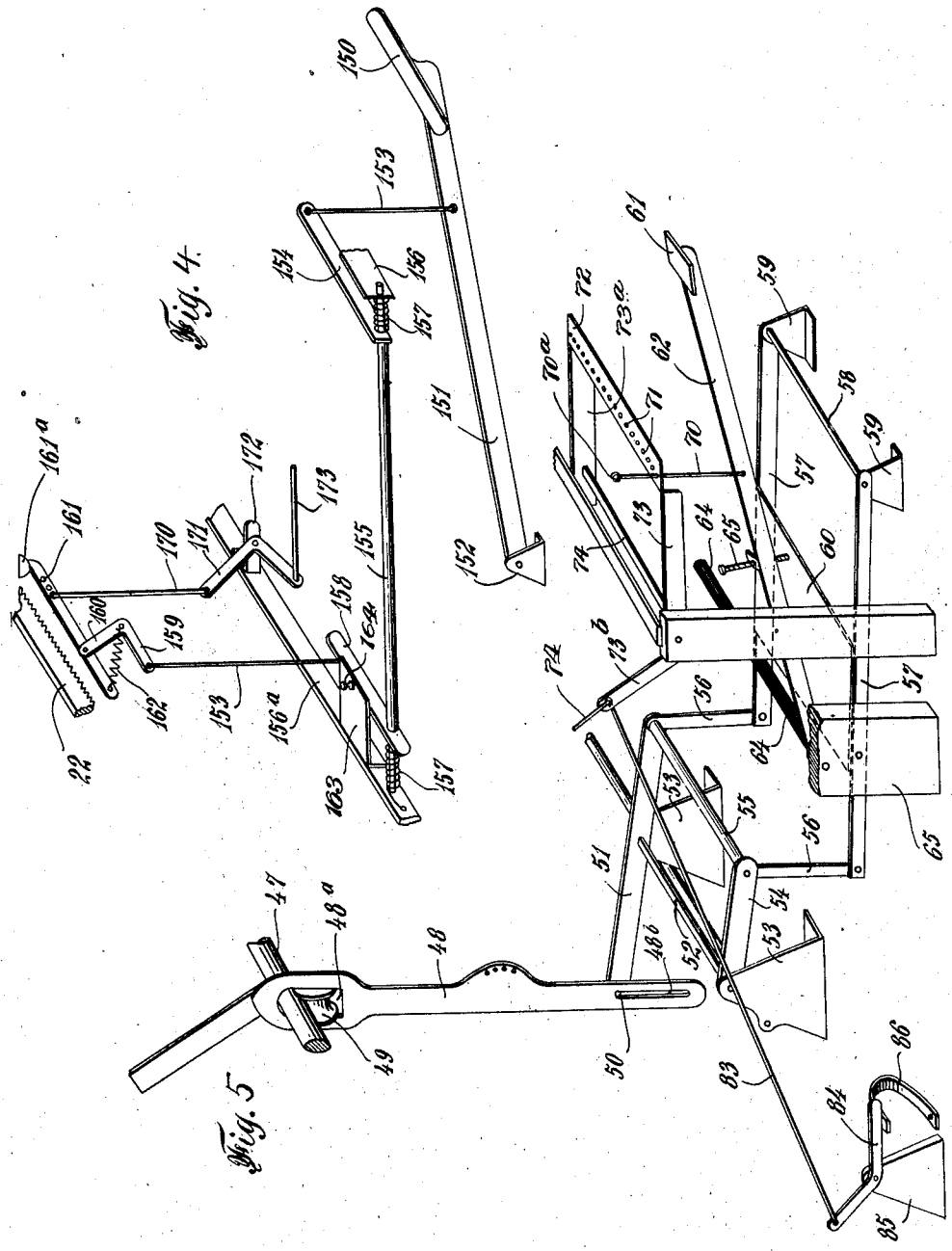


Fig. 4.

Fig. 5

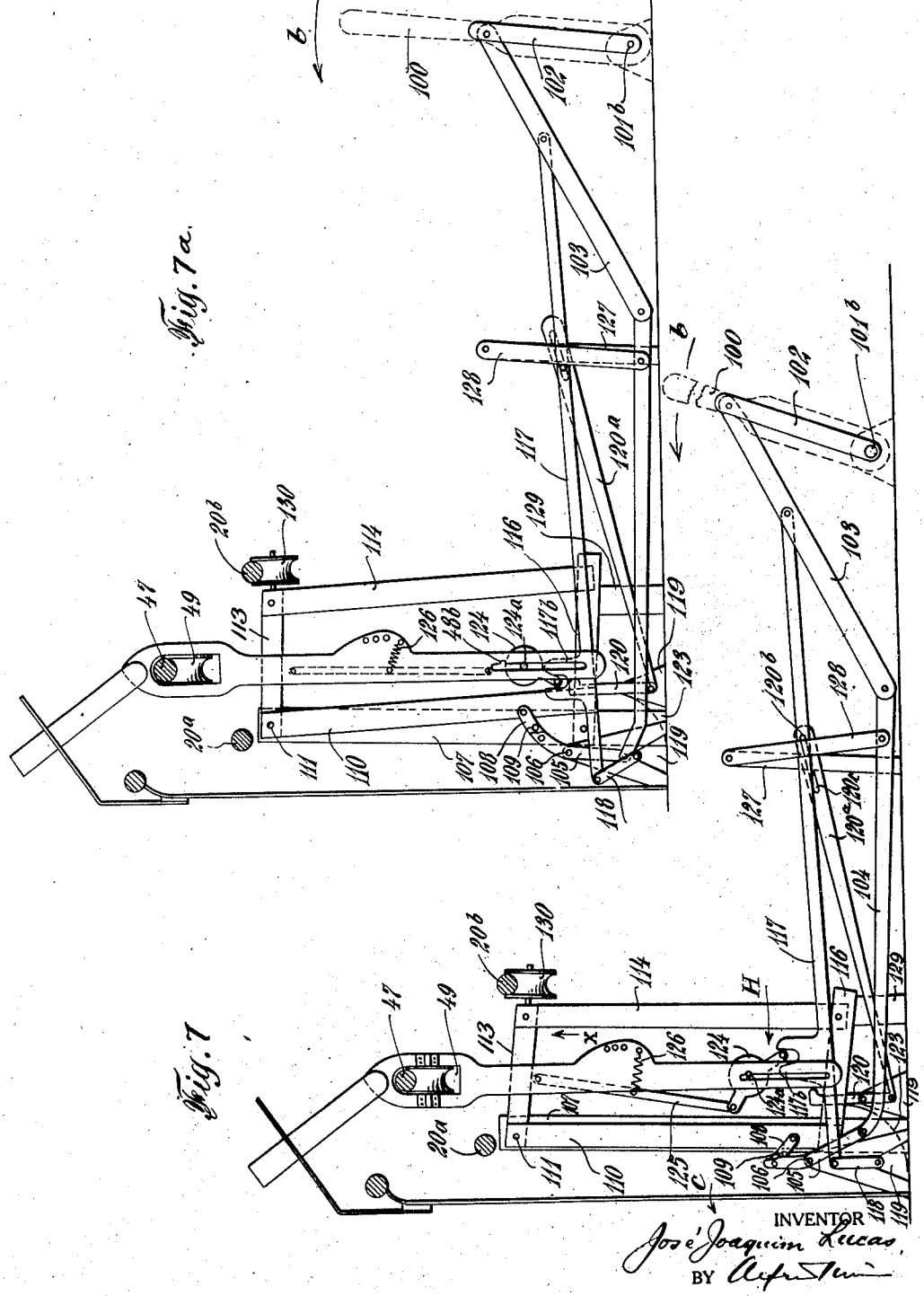
INVENTOR
José Joaquim Lucas
BY
ATTORNEY

Oct. 26, 1926. 1,604,647

J. J. LUCAS

TYPEWRITER

Filed August 18, 1923 6 Sheets-Sheet 4



INVENTOR
José Joaquim Lucas
BY

ATTORNEY

Oct. 26, 1926. 1,604,647

J. J. LUCAS

TYPEWRITER

Filed August 18, 1923 6 Sheets-Sheet 5

Fig. 8

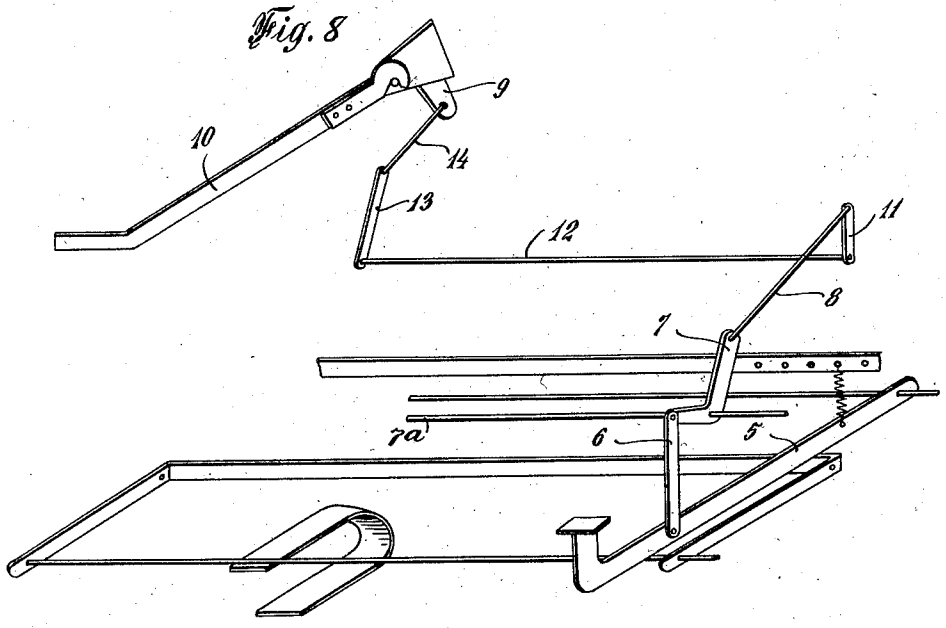
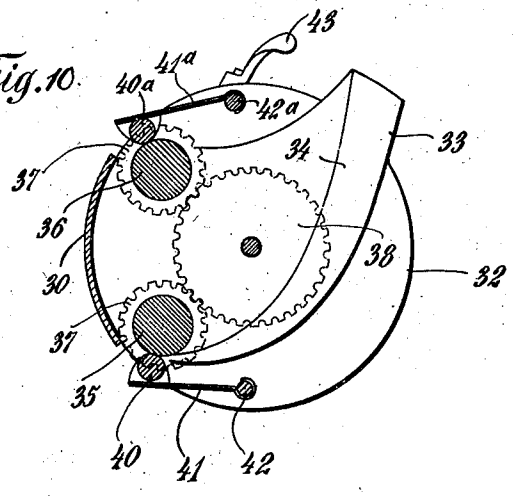


Fig. 10.



INVENTOR
José Joaquin Lucas,
BY
ATTORNEY

Oct. 26, 1926. 1,604,647

J. J. LUCAS

TYPEWRITER

Filed August 18, 1923 6 Sheets-Sheet 6

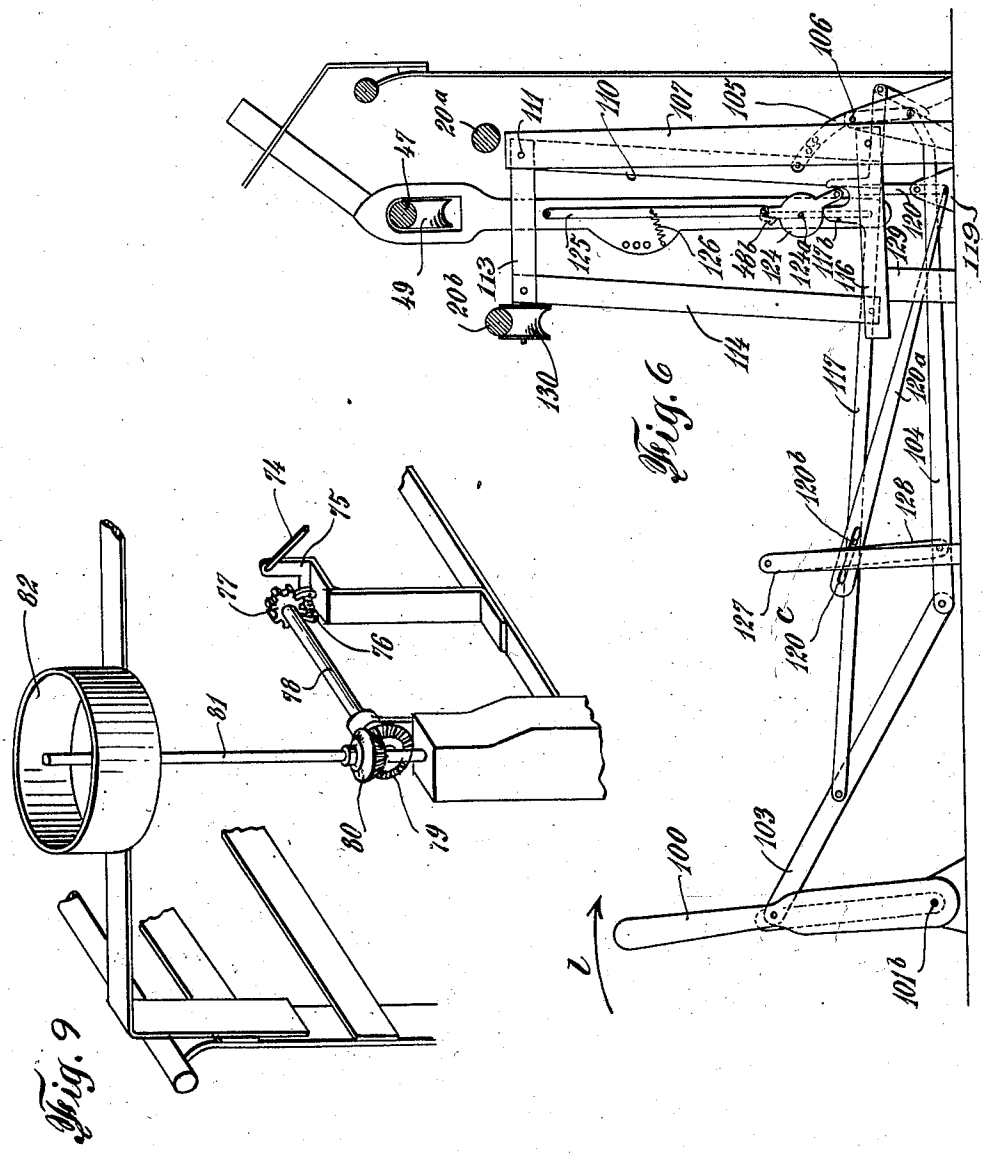


Fig. 6

Fig. 9

INVENTOR
José Joaquim Lucas
BY
ATTORNEY

Patented Oct. 26, 1926. 1,604,647

UNITED STATES PATENT OFFICE.

JOSÉ JOAQUIM LUCAS, OF RIO DE JANEIRO, BRAZIL.

TYPEWRITER.

Application filed August 18, 1923, Serial No. 658,081, and in Brazil September 14, 1922.

My invention relates to improvements in typewriters and has for its object to provide a typewriter adapted to music writing with or without words.

In the drawings:

Figure 1 is a perspective view of a machine built according to the present invention; Fig. 2 is a perspective view on a larger scale of the carriage for the paper support; Fig. 3 is a detail view of the staff ruling roll; Fig. 4 shows the spacing mechanism; Fig. 5 shows a mechanism for operating the paper support; Figs. 6, 7 and 7^a show the mechanism for elevating the carriage of the paper support; Fig. 8 shows the arrangement of the keys; Fig. 9 shows the operating mechanism for the ink ribbon; Fig. 10 is an end view partly in section of the paper support.

The machine shown in Figure 1 comprises a base 1, to the front end of which a rectangular, vertical member 1^a is attached, a similar member 1^b being attached to the rear end of the base and a third member 1^c being attached to the middle part of said base. The members 1^a, 1^b and 1^c are arranged longitudinally of the machine, being connected to each other by bracing bars 1^d. Base 1 and members 1^a, 1^b, 1^c and 1^d constitute the main frame of the machine.

The machine according to the invention comprises a printing key-board T^1, each of the keys of which operates, by means of a suitable mechanism, a bar, on which are formed, or to which are secured, two or four printing characters. The machine also comprises an oscillating key-board T^2 having 29 keys, each one of which, when depressed, communicates to the support for the paper a rotating motion which is different for each key. This rotating motion is communicated to the paper support through a mechanism hereinafter described, which causes said support to move so that the paper may present the desired line or space of the main staff or the supplemental, upper and lower, ones in correct printing position.

The machine according to the invention further comprises a staff ruling roll 3 provided in a recess formed at the free end of a bar 3^a (Fig. 3), similar to the bars of key-board T^1 and mounted on the frame so as to oscillate into contact with the ink ribbon, to press the latter against the paper. The bar 3^a of the ruling roll may be operated by means of a key or of any other manual device as for instance, a stem 4 connected with an arm 3^b formed on the end of bar 3^a. Between the ruling roll 3 and the bar 3^a is mounted an inking roll 3^c which serves to ink the ruling roll. When the ruling roll comes into contact with the ribbon and presses the latter onto the paper, the support for the paper is caused to travel along the rails guiding it, and a main staff of four or five lines will be ruled on the paper according to the roll which has been chosen to rule either the one or the other staff. Roll 3 shown in Fig. 3 is adapted to rule a five-line staff, but is mounted on a stem which can be easily removed with the roll; so that a roll adapted to rule a four line staff, i. e. the staff for Gregorian music, can be substituted for it when desired.

The key-board T^1 is provided with five printing characters adapted to print, respectively, one, two, three, four and five horizontal lines, thus providing for the printing of the lines of the upper supplemental staff and, likewise, of the lower staff of polyphonic music.

Among the printing characters of key-board T^1 there are also some adapted to print full or open heads for polyphonic music notes, and a character which prints a short vertical line. By means of this latter character and by communicating a suitable rotating motion to the support for the paper, through one of the keys of keyboard T^2, a vertical line of any desired length can be printed on the paper; for instance, a vertical line connected with a note or a dividing bar of the musical compass.

Printing characters are also provided adapted to print one, two, three or four tails corresponding respectively to whole notes, half notes, quarter notes and eighth notes.

Key-board T^1 is provided also with printing characters adapted to print the various pauses, accidents, ligatures, suspensions, clefs, signs and fractions indicating the compass, alphabetical characters, punctuation signs, figures and any other convenient or desired signs. For ligatures there are provided two different printing characters, one for the initial curve of the ligature and the other for the final curve. By means of these two characters and of the character which prints a horizontal line, a ligature of any length desired can be printed.

Key-board T^2 also comprises printing characters adapted to print the special notes and signs of Gregorian music; or it may be

adapted to print either polyphonic music or Gregorian music alone. In the latter case, the oscillating key-board would have a smaller number of keys.

As hereinbefore stated, each bar of key-board T^1 carries two or four printing characters. In the first case, the key-board is mounted on the main frame of the machine, the carriage of the support for the paper is movable vertically upwards, by means of a key or the like, to present the paper in proper printing position to one of the printing characters on the bar. This is illustrated in the machine shown in the drawings. In case there are four printing characters to each bar, key-board T^1 will be mounted on a separate member, arranged for vertical motion on the main frame, by means of a key or the like, the motion of the carriage, in addition, being effected as hereinbefore mentioned. In the lowermost position of the printing keyboard frame, any of the two characters on the bar may be printed according as the support for the paper is in the lower or upper position. In the uppermost position of the frame, any one of the other two characters may be printed, according to the position of the carriage.

The keys of key-board T^1 and T^2 and the forward portions of the bars carrying said keys are positioned forward of member 1^a of the main frame. The mechanism or device by means of which each key and its bar cause the corresponding printing bar to oscillate into printing position may be of any convenient or known type and so may be, likewise, the arrangement and mounting of the whole series of printing bars, but the invention comprises a feature which allows the printing key-board T^1 to be mounted in such manner that the whole of it lies either to the right or to the left of the vertical transversal plane passing through the middle of the series of printing bars when these are in inoperative position. Thus the printing key-board T^1 occupies only one half of the face of the main frame, leaving the other half to accommodate the oscillating key-board T^2. Without this feature, the length of the machine would have to be much greater, and the operator would be forced to have his arms wide apart to operate both key-boards. This feature is embodied in the machine shown in the drawings and consists of a modification of the mechanism, by means of which each key acts on the corresponding bar.

In the machine here illustrated, the printing bars lying to the right of the transverse vertical plane passing through the middle of the whole series of such bars are operated through the bars 5 (Fig. 8) of the corresponding keys by means of a mechanism which comprises a link 6 pivoted to the bar 5 at one end and pivoted at the other end to an arm of a bell-crank 7, which is mounted to oscillate on a fixed bar 7^a (common to all the bell-cranks) and the other arm of which is pivoted to one end of link 8 which has the other end pivoted directly (and not through the parts 11, 12, 13 and 14 shown in Fig. 8) to an arm 9 formed on the printing bar 10. The mechanism for each key of the other half of the whole series of printing bars lying to the left of said vertical plane also comprises a link 6, a bell crank 7 and a link 8; but this link 8, instead of being secured directly to arm 9 of printing bar 10, is connected with it through a device comprising a link 11, the other end of which is secured to the end of a shaft 12, mounted to rotate in bearings provided in the main frame (or in a separate frame in case printing bars with four characters are used, as hereinbefore mentioned), and the other end of which is connected with a link 13 which is in turn connected with a link 14, pivoted to arm 13 and to arm 9 of the printing bar 10. Through the use of said shaft 12 each key of one half of the printing key-board is positioned at a distance to the right of the transverse vertical plane passing through the pivot of each of the printing bars in said half and, therefore, the whole of the printing key-board lies to the right of the transverse vertical plane passing through the middle of the whole series of printing bars and thus occupies only half of the space on the face of the machine, leaving the other half of it to accommodate the oscillating key-board T^2.

Carriage of the paper support.—(Figs. 1, 2 and 10). This carriage comprises an open rectangular frame 20, Figs. 1 and 2, having at its front and at about the middle of its height a longitudinal member 21 and at the rear, at the same height, another longitudinal member 22.

On members 21 and 22 are mounted rolling trucks 23 on which carriage 20 is carried to the right or to the left along rails 24, longitudinally attached to the rear portion of the main frame between the members 1^b and 1^c thereof. The lower side of member 22 is provided with rack teeth by means of which and of the mechanism hereinafter described carriage 20 is pushed backward the desired distance to allow the paper to be moved to the succeeding printing position longitudinally.

Paper support.—This support comprises a plate 30, curved cylindrically, with reference to the horizontal plane and the segmental arch of curvature of which is of such a length that the paper placed on plate 30 presents a surface large enough to take in the printing of the main staff and of the supplemental ones, according to the rotary motion of the support for the paper under the action of the keys of key-board T^2. Plate 30 is

faced with leather, rubber or any other suitable material to provide a yielding surface and is secured at its ends to discs 31, 32 substantially circular in shape. The disks 31, 32 are pivoted at their centers to the upper forward corners of carriage 20 having secured to them the ends of a curved rear plate 33 and those of a curved front plate 34 which with plate 33 forms a tapering guide-way for the paper when the latter is inserted in the machine. This guide-way directs the paper to the lower side of a rubber roll 35 (Fig. 10) rotatably mounted in the disks 31, 32. In the latter is also rotatably mounted an upper rubber roll 36 similar to roll 35. Both these rolls, 35 and 36, lie parallel to the axis of rotation of the disks. The axles of rolls 35, 36 project outward from disk 31 each of them having at its end a toothed wheel 37 (Fig. 2). The wheels 37 are of equal diameter and each mesh with a larger wheel 38, concentric with the axis of rotation of disks 31, 32 and manually operable by means of a knurled knob 39. A rubber roll 40 (Fig. 10) of a diameter smaller than those of rolls 35, 36, but of equal length therewith, is mounted to rotate on the free ends of two arms 41, attached to a shaft 42 rotatably mounted in disks 31, 32 and provided with springs holding roll 40 in contact with the lower side of the rubber roll 35.

A rubber roll 40^a (Fig. 10) similar to roll 40 is mounted to rotate freely on the free ends of arms 41^a secured to an axle 42^a rotatably mounted in the disks 31, 32 and provided with springs which tend to push roll 40^a in contact with the upper face of roll 36. The axle of roll 40^a projects outward from disks 31, 32, having at its ends handles 43 for manually moving roll 40^a, against the action of the springs, away from roll 36.

Axle 42 also projects outward from the disks 31, 32, having at its ends handles 44 for manually moving roll 40 away from roll 35.

The sheet of paper is inserted into the tapering guide 33—34 till its border contacts with the lower side of roll 35, when roll 40 is moved away by means of one of the handles 44 and knob 39 turned; roll 35 then taking hold of the paper between itself and roll 40, the latter being released to permit the springs 41 to act on it. The paper is moved under the lower edge of the curved plate 30 and past it. The sheet of paper is next pulled up by its projecting lower edge, which is inserted between upper rolls 36 and 40^a so that the paper is stretched on the plate 30 and held in proper position for the printing of the musical signs on the first main staff or on the supplemental ones. When the end of the staff is reached, the sheet of paper is advanced to the next printing position by means of knob 39 and so on.

Mechanism for operating the paper support by means of the oscillating key-board.— (Figs. 2 and 5). To each disk 31, 32 of the paper support is pivoted an arm 45 extending downwards and having at its lower end a counterweight 46. The counterweights 46 are connected to each other by a round bar 47, parallel to the axis of rotation of the paper support and located somewhat below the plane of the rails 24 on which travels the carriage of the paper support. To each counterweight 46 is rigidly connected an arm 47^a which projects forward. Arms 47^a are pivoted on a longitudinal bar 47^b secured to the front uprights of the carriage. Round bar 47 passes through an opening 48^a in the upper end of a stem 48 (Fig. 5). Opening 48^a is fitted with a sheave 49 on which bar 47 slides, the upper side of the bar being quite close to the upper side of opening 48^a. Stem or bar 48 is mounted to move vertically on any suitable guide-ways provided in the main frame of the machine and located in the vertical transverse plane passing through the middle of its frame. At the lower end, stem 48 has a vertical slit 48^b in which is lodged a pin 50 secured to the rear end of a double lever 51, arranged in a nearly horizontal position in the said vertical transverse plane. Lever 51 is mounted to oscillate about the end of a longitudinal shaft 52 mounted on chairs 53, 53 resting on base 1 of the machine. On the other end of shaft 52 is mounted to oscillate an arm 54, the free end of which is rigidly connected to the forward end of lever 51 by a longitudinal shaft 55 on each end of which is mounted to oscillate an arm 56 directed downwards.

To the lower end of each arm 56 is pivoted the rear end of an arm 57 which lies nearly horizontal and the forward end of which is mounted to oscillate about a longitudinal shaft 58 mounted on chairs 59 resting on base 1 of the machine. Arms 57 are rigidly connected to each other by a plate 60. Each key of the oscillating key-board T^2 is attached to a lever 62 the rear end of which is pivoted on a horizontal shaft 64 which is common to all the keys of key-board T^2 and is mounted on chairs 65 of the base 1 of the machine. Each key 61 is held in inoperative position by a spring (not shown) which acts on the rear end of lever 62. Each lever 62 is provided with a screw 65 the lower end of which, when the key 61 is depressed, causes the paper support to oscillate, bears on the upper face of plate 60 and, as the key is further depressed, acts on said plate so as to cause the arms 57 to oscillate downwards. Arms 57 through the members 56—56, 51—54, 48 cause bar 47 to descend and, as this bar is connected to the counterweights 46 of the arms 45, pivoted on disks 31—32 of the paper support, the latter oscillates angularly into a position determined by the

extent of the operative portion of the angular motion of key 61 which is in turn determined by the length of that portion of screw 65 which extends below the key-bar 62. As hereinbefore mentioned, each key 61 communicates to the paper support an angular motion which is different for each key. When one of the keys 61 is depressed to bring the paper into the proper position for printing a note on a line or a space of the staff, the key should be held depressed, while the printing character of the line or space desired is operated on the printing key-board. This being done, key 61 is released returning automatically to its normal or inoperative position.

Operating mechanism for the ink ribbon.—(Figs. 5 and 9). To each lever 62 of the keys 61 of the oscillating key-board T^2 is pivoted a stem 70 directed upwards and passing through one of a series of holes 71 provided in a longitudinal bar 72 secured at its ends to the forward ends of two arms 73, 73^a pivoted on longitudinal shaft 74 mounted on chairs of the base 1 of the machine. Arm 73 has an extension 73^b which forms with it a bell crank lever 73, 73^b the rear end 73^b of which is connected by a link 74 to one arm of bell crank lever 75 (Fig. 9) pivoted on a fixed chair, the other end being provided with a pair of pawls 76, adapted to rotate a cog-wheel 77 mounted on one end of a horizontal shaft 78 mounted to rotate on fixed chairs. On the opposite end of shaft 78 is mounted a conical pinion 79 meshing with a similar pinion 80 mounted on the lower end of a vertical shaft 81 (Figs. 9 and 1) mounted to rotate in the frame of the machine. The upper portion of shaft 81 extends above the bottom of a cylindrical box 82 in the center of which there is an aperture through which passes the shaft 81. To the upper portion of shaft 81 is fitted the reel on which the inking ribbon is wound coming from another reel located in a similar cylindrical box 83 (Fig. 1). Boxes 82, 83 are located on opposite sides of the upper portion of the main frame of the machine. The rear end of the bell crank lever 73, 73^b hereinbefore mentioned, with which the link 74 is connected, is by means of a link 83, connected with one arm of the bell crank lever 84 mounted to oscillate vertically on a fixed chair 85.

The other arm of lever 84 rests on the upper free end of a curved yielding strip of metal 86 the lower end of which is secured to the base of the machine. When all the keys of the oscillating key-board T^2 are in inoperative position, strip 86 acts on bell-crank lever 84 so that the latter, through link 83, causes arm 73^b of the bell-crank lever 73—73^b to descend, till the upper side of arm 73 rests against a stop, this latter arm, as well as the arm 73^b and bar 72, lying then horizontally or in normal position. Each of the vertical stems 70 (connected to the levers 62 of the keys 61 of oscillating key-board T^2) has at the upper end a head 70^a. Each of the stems 70 is of such a length that, when one of the keys 61 is depressed to cause the support for the paper to oscillate, its corresponding stem 70 is pulled down through its hole 71 in bar 72, until the head 70^a of the stem rests against the upper side of bar 72 and, when the key is further depressed, stem 70 pulls down the bar 72, against the action of strip 86 and then the bar 72, by means of the mechanism hereinbefore described, causes the rotation of pinion 77 (Fig. 9) and thereby of the horizontal shaft 78. Shaft 78, in turn by means of the conical gears 79, 80, causes the rotation of vertical shaft 81 and with it that of the reel on which the inking ribbon is being wound, the ribbon passing through lateral slits, 82^a, 83^a in the boxes 82, 83 to a guiding member 90 (Fig. 1) provided with a four-sided opening 91 where a portion of the ribbon is exposed, to the action of a printing character by the depression of any one of the keys of the printing key-board T^1. Guiding member 90 is mounted and directed for alternate vertical motion, at the upper end of its travel presenting the ribbon in printing position and at the lower end carrying it below printing position, so that the character just printed becomes visible.

To move the guiding member 90 up and down, a link mechanism is provided connected with an arm rigidly secured to a frame located under the printing key-board, T^1 so that it can be operated by any of the printing keys. This frame is mounted to oscillate about a horizontal bar mounted on fixed chairs. Normally, guiding member 90 is maintained in its lowermost position by means of a spring. When any of the printing keys is depressed, it acts in opposition to the spring, and through the connections just mentioned, to raise member 90 to its uppermost position. This mechanism is not shown as its operation is easily understood.

Elevating mechanism for the carriage of the paper support.—(Figs. 6, 7 and 7^a). As hereinbefore stated, the carriage of the paper support, when in its normal position, allows the printing of one of the characters of each printing bar of the printing key board T^1, but it may be raised to allow the printing of a second character on each bar.

The mechanism through which this is accomplished is as follows: A manual lever 100 is secured to one end of a horizontal shaft 101^b which oscillates in chairs resting on the base of the machine. To the other end of shaft 101^b is secured an arm 102 which is connected by a link 103 to one end of a transverse lower bar 104 the opposite end of which is pivoted to the lower arm of a bell

crank lever 105 pivoted at 106 to a vertical chair 107, the upper end of which is located somewhat below the round bar 20[a] which is the lower horizontal rear member of carriage 20 of the paper support (Fig. 2). To the other arm of lever 105 is secured a link 108 which is held from coming abreast of lever 105 by a pin 109 on the link, which pin, in the normal position of the said link, enters a recess provided in the end of the upper arm of lever 105. To the upper end of chair 107 is pivoted the upper end of a bar 110, and to this upper end of bar 110 is rigidly secured the rear end of a transverse bar 113 to the front end of which is rigidly secured a bar 114 parallel to bar 110, on the lower end of which bar 114 is pivoted the forward end of a lower transverse bar 116, of greater length than that of the upper transverse bar 110 and the rear end of which is pivoted to the lower portion of the chair 107.

Intermediate the ends of link 103 is pivoted thereto the forward end of a link 117, the rear end of which is pivotally connected with the upper end of a link 118, the lower end of which is pivoted to a fixed chair on the base 1 of the machine. On base 1 is also mounted a chair 119 to which is pivoted a lever 120 to the lower end of which is pivoted the lower end of an arm 120[a] connected by a pin 120[b] and slot 120[c] with link 117. A spring 123 tends to push the upper end of lever 120 against the rear face of stem 48 which causes the paper support to oscillate. A bell crank lever 124 is pivoted on the pin by means of which the arm 51, Fig. 5, of the oscillating mechanism is held in the slot 48[b] of the vertical stem 48 which causes the paper support to oscillate, the stem 48 being located between 51 and 124. The lower arm of bell crank 124 is provided with a roller by means of which it can be operated by a fork formed on link 117. The upper arm of lever 124 is pivotally connected by a link 125 to the upper portion of the oscillating stem 48. A spring 126 secured to the stem 48 tends to pull forward link 125. To the upper end of the chair 127 which rests on the base of the machine is pivoted the upper end of link 128, the lower end of which is pivotally connected with a point on link 104 near its forward end. On the forward end of bar 113 is mounted to rotate freely a roller 130 on which rests the round bar 20[b], Fig. 2, which is the lower horizontal front member of the carriage of the paper support.

The elevating mechanism just described is operated as follows:

The carriage being in its lower position, Fig. 7, to raise it, the operator with his right hand pushes back toward the rear of the machine hand lever 100 which, through shaft 101[b], causes link 102 to move through an equal angle in the direction of arrow *b*. Link 102 in turn causes link 103 to move in same direction this latter link operating link 104, which causes curved lever 105 to describe an angle in the direction of arrow *c*, carrying link 108 into the position shown in Fig. 7[a]. Link 108 pivoted on bar 110 causes the latter to move through an angle, arm 113 moving through an equal angle in the vertical direction, upwards, the direction of arrow X and thus, by means of the sheave provided on the forward end of 113, the longitudinal lower member 20[b] at the front of the carriage or frame 20 is raised.

The round bars 47 and 47[b] must be raised simultaneously; otherwise the paper support would get out of level. The manner in which bar 47 is raised simultaneously with bar 47[b] by the actuation of hand lever 100 alone, shall now be explained.

The forward motion of link 103 is communicated to link 117 pivoted to it. Link 117 through fork 117[b] near its rear end transmits its motion to the lower arm of bell crank lever 124 which is oscillated in the direction of arrow H, Fig. 7, going to the position shown in Fig. 7[a].

By this motion, the upper arm of bell crank lever 124 causes link 125 to move from the inclined position shown in Fig. 7 to the vertical position shown in Fig. 7[a] and, as link 125 is pivoted to stem 48, the latter is in turn forced to ascend vertically raising bar 47.

The function of lever 120 shall now be explained.

When the carriage is in the lowermost position, Fig. 7, pin 124[a] is lodged in a recess in the upper part of slot 48[b] where it is located so as to oscillate. When the carriage is raised for the purpose hereinbefore mentioned, pin 124[a] must come out of the recess, otherwise it would hinder the raising of stem 48. This is done automatically through the motion of hand lever 100 in this manner.

When lever 100 is in inoperative position, Fig. 7, the pin 120[b] of link 117 does not allow the slotted stem to respond to the action of spring 123 which through bar 120[a] tends to move it to the left (shown in profile in Fig. 7). When, however, the operator pushes back lever 100, the link 117 moves in the direction of the arrow *b* and with in pin 120[b] and thus bar 120[a], which is pivoted by the slot 120[c] on said pin, becomes free to slide on slot 120[c] and bar 120[a] responds to the action of spring 123 which in turn pushes lever 120. The latter pushes then the lower end of stem 48, thus freeing pin 124[a] from the slot and stem 48 may now go up to the position shown in Fig. 7[a].

The operator, after having moved lever 100 to raise the carriage, is free to operate the printing key-board, T[1] since lever 100 is

held automatically in the new position by means of the weight of the carriage.

When lever 100 is operated to raise the carriage, bell crank lever 105 remains with its upper arm in the same longitudinal position as link 108, the end of this upper arm resting on pin 109 and tending to descend due to the weight of the carriage, but being held by pin 109. Thus the upper arm of lever 105 could only go upwards, but the weight of the carriage prevents it from doing so and the whole mechanism becomes stationary and the operator has his hand free to operate the keys.

It is to be noted that to go back to inoperative position as the operator pulls on lever 100, by the combined motion of the various parts, the upper part of bell crank lever 105 goes back to its inoperative position, moving upwards through an angle and assuming the position shown in dotted lines in Fig. 7ª.

Spacing mechanism.—(Fig. 4). A character or a vertical row of characters having been printed, the carriage of the paper support must be moved to the left the proper distance for printing another character or vertical row of characters. To do this, the machine, according to the present invention, is provided with a spacing mechanism which is not operated automatically by the keys of the printing key-board, but by means of a spacing key 150 mounted between the printing key-boards T^1 and T^2, Fig. 1. Key 150 (Fig. 4) is secured to a lever 151 pivoted, to oscillate vertically through a small angle, by its rear end on a shaft 152 (which may be the shaft common to the levers of the keys of the oscillating key-board or an independent shaft mounted on chairs resting on the base of the machine). To a point on lever 151 is pivoted a link 153 extending upwards and connected to the end of an arm 154 the other end of which is secured to a transverse shaft 155 mounted to oscillate in stationary members 156, 156ª (Fig. 4) of the frame of the machine. Springs 157 wound on the ends of shaft 155 tend to oscillate it to move arm 154 into horizontal position. Arm 154 is mounted near the forward end of shaft 155. Near the other end of shaft 155 is mounted on it another arm 158 identical and parallel to arm 154 and which by means of a link 153 extending upwards is connected with the lower arm of a bell crank lever 159, 160 pivoted on the main frame or on a member secured to the frame, so as to oscillate vertically in a longitudinal vertical plane.

To the upper arm of lever 160 is pivoted a double lever 161 to one arm of which is secured one end of a helicoidal spring 162 the other end of which is secured to one end of lever 161. On the opposite end of this lever is formed a curved tooth 161ª adapted to enter the recesses between the teeth of rack 22 of the carriage of the paper support, said teeth being similar to those of a saw. To member 156ª of the frame of the machine is secured a chair 163 on which is provided a screw 164 which acts as a stop to limit the upward angular motion of arm 158 and thus hold this arm and arm 154 in horizontal or inoperative position. When the spacing key 150 is depressed, it moves lever 161 toward the left, by means of connection 154, 158, 153 and 159, and lever 161 through its tooth 161ª (which under the action of spring 162 normally engages the teeth of rack 22) moves toward the left the carriage of the paper support over a distance limited by the angular motion of key 150. As key 150 is freed, springs 157 act to restore the various parts of the mechanism to their normal inoperative positions, and then tooth 161ª of lever 161 slides on its convex face over the teeth of the rack without affecting the same.

Mechanism for moving the carriage toward the right.—(Fig. 4). To the arm of lever 161, which carries tooth 161ª, is secured the upper end of a link 170 the lower end of which is secured to the upper arm of bell-crank lever 171, which is pivoted to oscillate in a transverse vertical plane on a chair 172 attached to member 156ª of the frame of the machine. The lower arm of lever 171 is connected through a link 173 with a key 174 (Fig. 1) in such a manner that, when the said key is depressed, the arm carrying tooth 161ª is lowered against the action of spring 162, and tooth 161ª is disengaged from the rack 22 and the carriage can then be moved toward the right to print at the beginning of the staff or to correct the printing, or supply any omission. The lever to which key 174 is secured is pivoted on the shaft common to all the keys of oscillating key-board T^2.

I claim as my invention:

1. In typewriting machines adapted for music writing, a paper support comprising two substantially circular disks, a printing surface consisting of a cylindrically curved plate having a radius equal to that of the said disks and secured at its ends thereto, the length of the arch of said curved plate being less than one-fourth the circumference of the said disks, a facing on the said printing surface, two curved plates secured with their curved sides to the inner faces of said disks, so as to provide between them a curved tapering channel opposed to the inner face of the said curved plate, a pair of cooperating rolls rotatably mounted in said disks and adapted to engage a sheet of paper as it emerges from the lower end of the said channel, and to move the sheet toward the lower edge of the said curved plate, a second pair of cooperating rolls adapted to grip and draw the paper upwards stretching it over

the said curved printing surface, and manually controlled means for positively rotating one of the said rolls.

2. The combination as specified in claim 1, comprising a movable carriage having rotatively mounted therein the said paper support, guide rails for said carriage, small trolleys mounted on said carriage and adapted to travel on said guide rails, rack teeth provided on said carriage, means adapted to engage said rack teeth, and means for operating the said last mentioned means for successively moving said carriage along the said rails.

3. The combination as specified in claim 1, comprising a movable carriage having rotatively mounted therein the said paper support, guide rails for said carriage, small trolleys mounted on said carriage and adapted to travel on said guide rails, rack teeth provided on said carriage, means adapted to engage said rack teeth, means for operating the said last mentioned means for successively moving said carriage along the said rails, a system of links pivotally connected to the said paper support and said carriage and adapted, upon one of its members being moved upwards, to cause the said paper support to rotate through a smaller or greater angle, according to the extent of said motion, the maximum angle being equal to the dihedral angle formed by the two radial planes of the said paper support passing through the upper and lower edges of the said printing surface, and means acting on the said link system, so as to hold it in inoperative position, permitting the printing of a printing character.

4. The combination as specified in claim 1, comprising a movable carriage having rotatively mounted therein the said paper support, guide rails for said carriage, small trolleys mounted on said carriage and adapted to travel on said guide rails, rack teeth provided on said carriage, means adapted to engage said rack teeth, means for operating the said last mentioned means for successively moving said carriage along the said rails, a system of links including a horizontal cylindrical bar pivoted to the said paper support and said carriage, and adapted, upon the said bar being moved upwards parallel to itself, to cause the said paper support to rotate through a smaller or greater angle, according to the extent of said motion, the maximum angle being equal to the dihedral angle formed by the two radial planes of the said paper support, passing through the lower and upper edges of the said printing surface, and means acting on the said link system so as to hold it in inoperative position, permitting the printing of a printing character.

5. In a typewriting machine adapted for music writing, the combination with the machine frame, of a printing key-board, a carriage adapted to travel in either direction transversely of said key-board, guiding rails for said carriage, means for successively moving said carriage along said guiding rails, a curved paper support rotatably mounted in said carriage, a system of links including a horizontal cylindrical bar pivoted to the said paper support and said carriage, and adapted to impart to the said paper support an angular motion, an oscillating mechanism mounted on the said machine frame, means operatively connecting the said oscillating mechanism to the system of links, and an oscillating key-board comprising a number of keys, which when depressed, operate the said oscillating mechanism, so as to raise the said cylindrical bar, thereby operating the said system of links, and imparting thereby a certain angular motion to the said paper support.

6. A typewriting machine as specified in claim 5, in which the said oscillating mechanism is operatively connected with the said horizontal cylindrical bar through an oscillating vertical bar, said vertical bar having an opening through which the said horizontal cylindrical bar passes, and an anti-friction roller for the said horizontal bar, the axle of which roller is mounted on opposite sides of the opening in the said vertical bar, so that when the said carriage is moved along the said rails, the said vertical bar will not be affected by the motion of the said carriage.

7. A typewriting machine as specified in claim 5, in which the said oscillating mechanism is operatively connected with the said horizontal cylindrical bar through an oscillating vertical bar, said vertical bar having an opening through which the said horizontal cylindrical bar, and an anti-friction roller for the said horizontal bar, the axle of which roller is mounted on opposite sides of the opening in the said vertical bar, so that when the said carriage is moved along the said rails, the said vertical bar will not be affected by the motion of the said carriage, the said oscillating vertical bar having at its lower end a vertical slot in which is pivoted a member of the said oscillating mechanism, by means of which member the said oscillating mechanism when operated lifts the said vertical bar, thereby causing the angular motion of the said paper support, a lateral recess being provided in the upper end of said slot for the pivot pin of the said member, and means being provided for tending to normally prevent the angular movement of the said paper support.

8. The combination as specified in claim 5, wherein the oscillating mechanism comprises a pivoted member adapted to be operated by any of the keys of the said oscillating key-board, mechanism operated by

one of the said keys to oscillate the said pivoted member through a predetermined angle, and means operated by the other keys to oscillate the said pivoted member through different angles which are successive multiples of the said predetermined angle.

9. The combination as specified in claim 5, together with a printing bar corresponding to each key of the said printing key-board, and provided with two printing characters, an elevating mechanism, a manual lever adapted to operate the said elevating mechanism for raising the said carriage of the said paper support to allow the second character of each printing bar to be printed, means responsive to movement of said elevating mechanism to operate the said oscillating mechanism to enable the two characters of each printing bar to be printed on the same horizontal line and automatic mechanism to retain the elevating mechanism in raised position to give the operator the free use of both hands for manipulating the keys of the key-board.

10. The combination as specified in claim 5, together with a printing bar corresponding to each key of the said printing key-board, and provided with two printing characters, an elevating mechanism, a manual lever adapted to operate said elevating mechanism for raising the paper support carriage to allow the second character of each printing bar to be printed, means responsive to movement of said elevating mechanism to operate the said oscillating mechanism to enable the two characters of each printing bar to be printed on the same horizontal line, automatic mechanism to retain the elevating mechanism in raised position to give the operator the free use of both hands for manipulating the keys of the key-board, the oscillating mechanism including a vertical bar having a vertical slot in the same, a member in said slot serving to lift the vertical bar, the elevating mechanism comprising a link system including an element pivoted on the last mentioned member and including lost motion mechanism permitting free movement of the oscillating mechanism when the carriage is in lowered position.

11. In a typewriting machine for music writing, a movable carriage, a paper support rotatably mounted thereon and comprising a curved segmental plate and two substantially circular disks secured thereto and having the same radius, two additional curved plates secured with their ends to said disks in such a position as to form a tapering guide-way for the paper, means for feeding the paper to said paper support, and means for clamping the paper to said support.

In testimony whereof I affix my signature.

FATHER JOSÉ JOAQUIM LUCAS.