P. F. SHAH.

TYPE WRITING MACHINE.

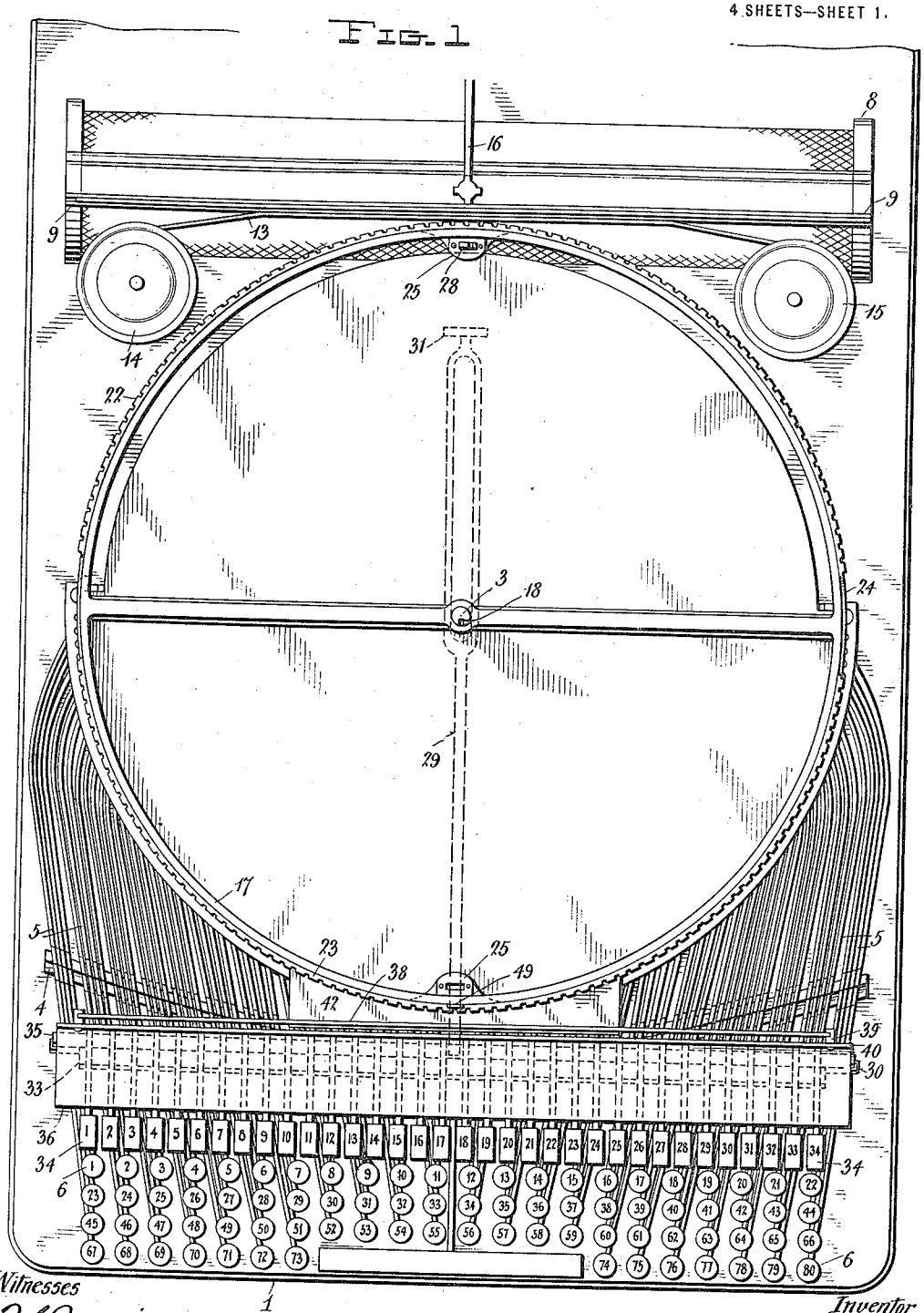
APPLICATION FILED OCT. 20, 1916.

1,247,585.

Patented Nov. 20, 1917.

4 SHEETS—SHEET 1.

Fig. 1



Witnesses

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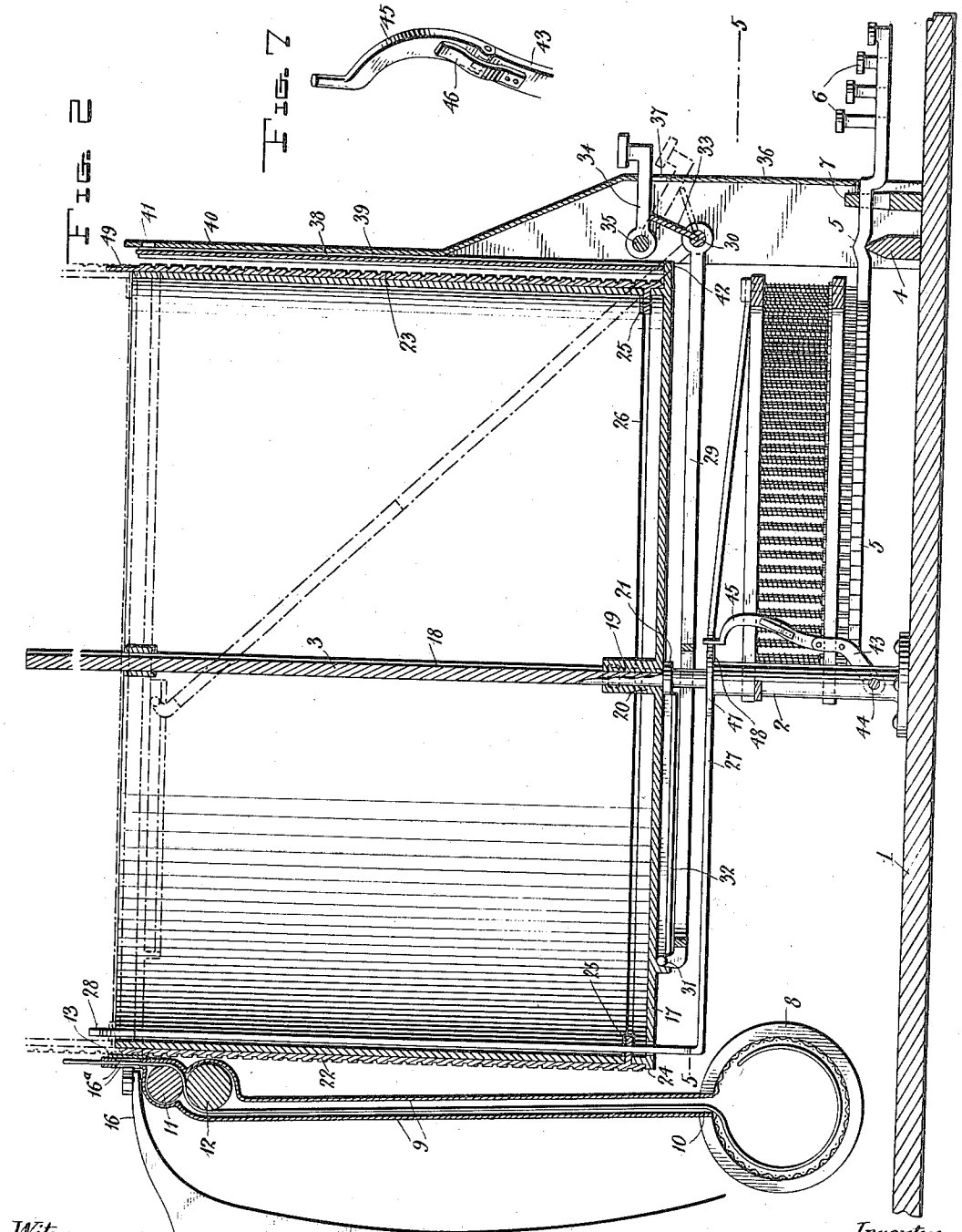
1,247,585.

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4 SHEETS—SHEET 2.

Fig. 2

Fig. 7



Witnesses

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4 SHEETS—SHEET 3.

FIG. 3

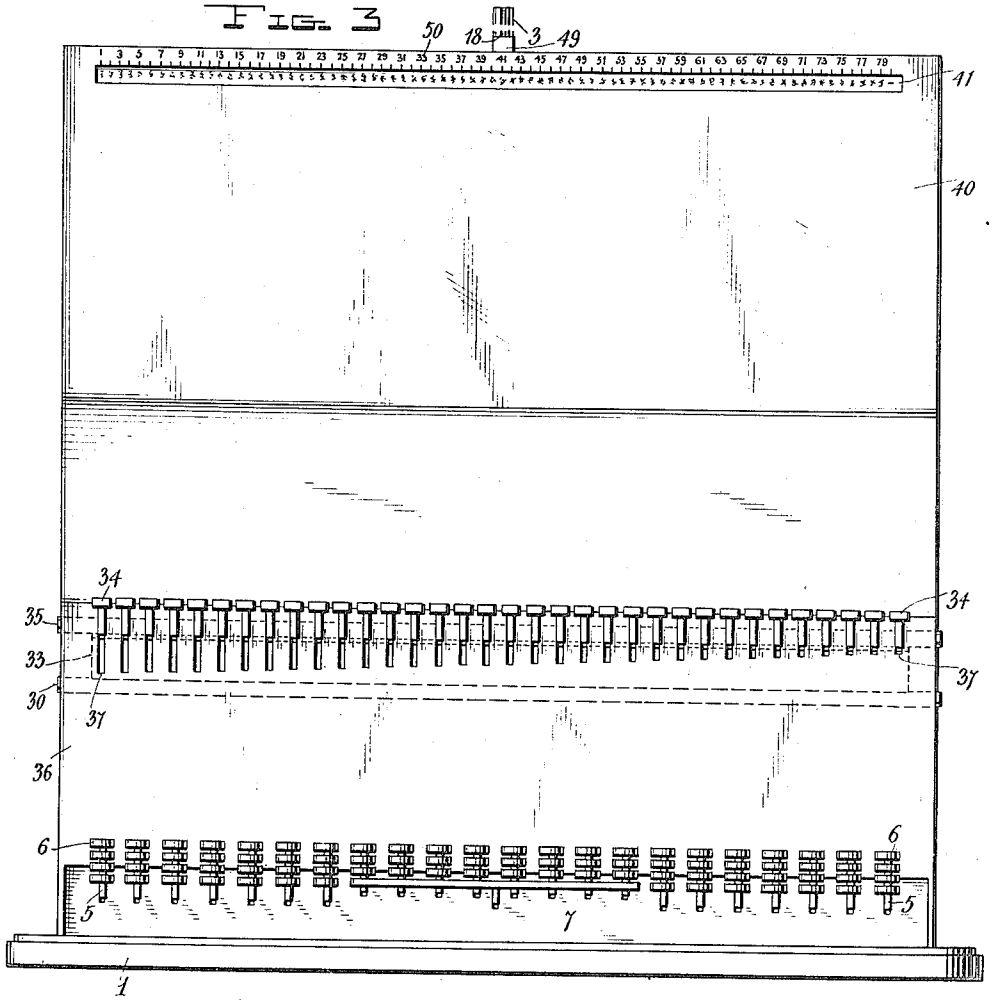
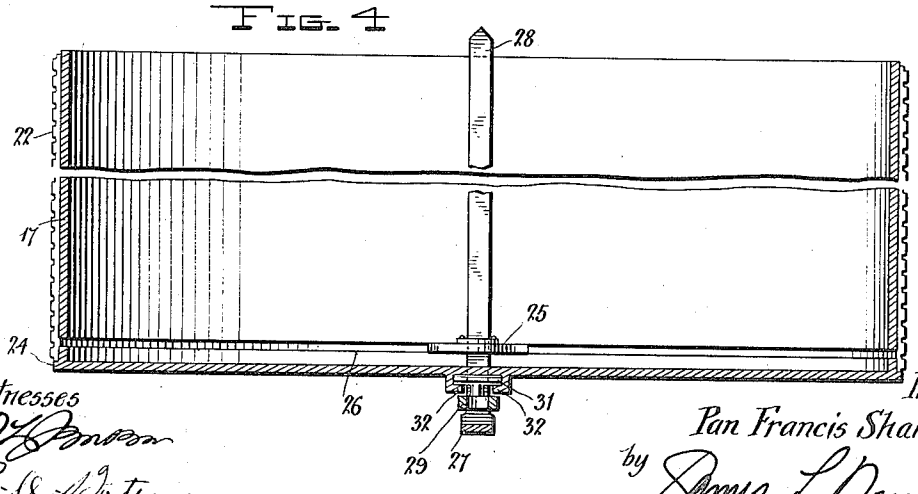


FIG. 4



Witnesses

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TYPE WRITING MACHINE.

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4 SHEETS—SHEET 4.

FIG. 5

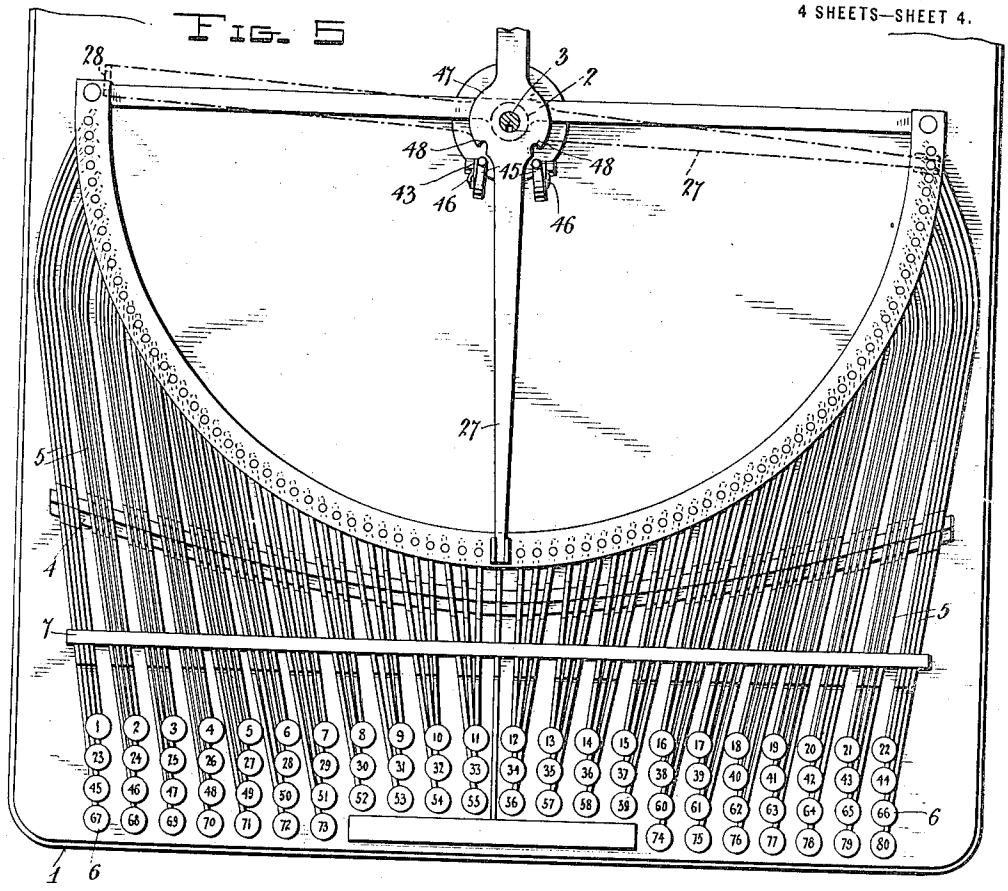
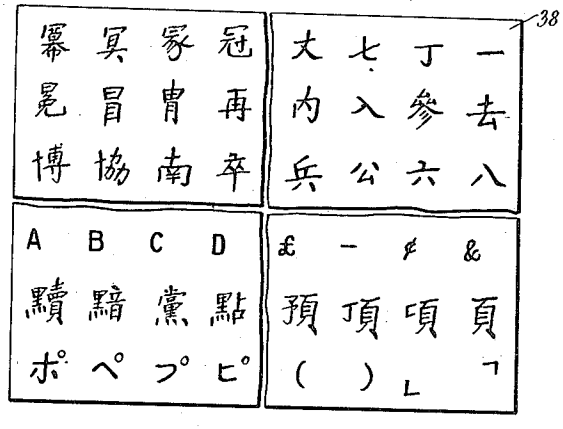


FIG. 6



Witnesses

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UNITED STATES PATENT OFFICE.

PAN FRANCIS SHAH, OF ISIN TIN LEE, TIENTSIN, CHINA.

TYPE-WRITING MACHINE.

1,247,585. Specification of Letters Patent. Patented Nov. 20, 1917.

Application filed October 20, 1916. Serial No. 126,790.

To all whom it may concern:

Be it known that I, PAN FRANCIS SHAH, a citizen of the Chinese Republic, residing at Isin Tin Lee, Tientsin, China, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My present invention relates to improvements in typewriting machines, and the primary object of the invention is to provide a machine of this class which is capable of printing from a very large number of type characters, thus enabling the machine to contain type characters corresponding to those of the Chinese or other vocabularies which employ a great number of characters.

The invention comprises means for accommodating the type characters corresponding to the great number of characters of the vocabulary, means whereby the selection of the different characters is facilitated, and means whereby impressions from the different type characters may be made with speed and ease.

To these and other ends, the invention consists in certain improvements, and combinations and arrangements of parts, all as will be hereinafter more fully described, the novel features being pointed out particularly in the claims at the end of the specification.

In the accompanying drawing:—

Figure 1 is a top plan view of a typewriting machine constructed in accordance with the present invention.

Fig. 2 represents a section taken centrally through the machine and in a direction forwardly and rearwardly thereof.

Fig. 3 is a front elevation of the machine.

Fig. 4 is a detail sectional view of the type supporting cylinder or member.

Fig. 5 represents a horizontal section on the line 5—5 of Fig. 2.

Fig. 6 is a fragmentary view of the indicating chart containing characters of the vocabulary corresponding to the type characters; and

Fig. 7 is a detail perspective view of one of the actuators for rotating the type plates.

Similar parts are designated by the same reference characters in the several views.

The present invention is capable of application to machines of different constructions. In the accompanying drawing, the improvements are shown as applied to a typewriting machine of the well-known Hammond type, as illustrated and described, for example, in Letters Patent, Nos. 290,419, granted December 18, 1883, and 501,504, granted July 18, 1893. It is to be understood, however, that the invention is not limited to typewriting machines of the particular class named, as constructions equivalent that shown are contemplated and will be included within the scope of the claims.

In the present instance 1 designates the base of the typewriting machine which supports a standard 2 for the upright shaft 3, and the base also supports a bar 4 on which the key levers 5 are fulcrumed, these key levers extending to the front of the machine to form a keyboard, and keys 6 of the key levers are provided, as is usual, for manipulation by the operator. A slotted bar 7 extending transversely on the base 1 serves to space the key levers properly and to support them in upright position on the fulcrum bar. Any suitable means may be provided for positioning and feeding the paper upon which the writing is to be produced, any suitable means may be provided for supplying the ink for the impressions, and any appropriate means may be provided for producing the impressions upon the paper from the type characters. As shown, a paper receiving tube 8 is provided which is adapted to accommodate the lower portion of a sheet of paper, a pair of suitably spaced plates 9 extend from an opening 10 in the tube 8 to a pair of rollers 11 and 12, thereby serving to direct the sheet of paper from the tube 8 to the point where the impression is to be made, and handles or other suitable means may be provided on one of the rollers for rotating them to feed the paper therebetween. The ink necessary for the impressions is supplied by a ribbon 13 which may be of the type commonly used on typewriting machines, the ends of the ribbon being wound upon spools 14 and 15. The impressions may be made by a hammer 16 operated by any suitable means such, for example, as that shown in the patents referred to, the impacts of the hammer driving the paper sheet against the ribbon and the latter in turn bearing against the type characters whereby the desired impressions are made upon the paper in the well-known way. In order to prevent ink on the ribbon soiling the paper, the plates 9 are preferably extended upwardly above the

rollers 11 and 12 and behind the ribbon, these plates having registering openings 16ª therein through which the hammer may operate to drive or press the paper spanning these openings against the ribbon immediately behind the type character in printing position, contact of the paper with the ribbon at all other points being thus avoided.

According to the present invention, a type cylinder or support 17 is provided, this cylinder or support being mounted to shift vertically on the shaft 3 but is non-rotatable with respect to said shaft. As shown, the shaft has a key-way 18 in which a key 19 on the hub 20 of the cylinder operates, thus forming a spline connection between the shaft and the type cylinder. A collar 21 on the shaft provides a stop against which the bottom of the type cylinder is adapted to engage, this collar thereby serving to set the type cylinder in its normal or lowermost position. A pair of type segments 22 and 23 are provided, each type segment preferably representing substantially one-half of a cylinder, and these type segments are fitted to rotate to different positions around the circumference of the cylinder. As shown, the type-supporting cylinder has a flange 24 projecting circumferentially from its lower peripheral edge, the type segments being positioned on the cylinder above this flange, and each type segment has an apertured lug 25 projecting inwardly therefrom and arranged to operate in a slot 26 which extends entirely around the type-supporting cylinder. Each type segment bears type characters arranged in rows both axially and circumferentially, the type character in any circumferential row being brought to the printing position or in front of the hammer 16 by rotation of the type segment to the proper degree, and the type character in any axial row being brought to the printing position by elevation of the type segment to the proper degree. In order to accommodate a number of type characters equal to those used, for example, in the Chinese vocabulary, one-half of the characters may be provided on one of the type segments and the other half of the characters may be provided on the other type segment. Where, however, the number of characters to be accommodated is smaller, the two type segments may be used to accommodate type characters of different styles. The means shown for rotating the type segment to bring a type character in one of the circumferential rows into printing position comprises a lever 27 which is pivoted concentrically of the shaft 3 and has an arm 28 extending upwardly therefrom and through the apertured lug 25 on the type segment in use. Rotation of the lever 27 to bring the type segment into the appropriate rotary position for the printing of the selected character may be effected, under control of the keyboard, by any suitable mechanism such, for example, as that shown in the prior patents referred to.

In the present instance, each type segment represents approximately a half cylinder, requiring rotation of the type segment through approximately a half circle to enable all the type characters thereon to be brought to the printing position. To enable this range of movement to be obtained, the rocking arms 43 attached to the rock shafts 44, (which latter are rotated by the rising of the key-levers 5 forming the respective halves of the keyboard), are provided with hinged upper ends 45. This construction enables the upper or operative ends of the arms 43 to deflect laterally, such lateral deflection, however, being opposed by a spring 46. The hub 47 of the arm 27 is provided at each side with a notch 48, these notches being arranged to receive the upper ends of the respective hinged members 45 when either of the latter swings rearwardly, thereby effecting rotation of the type segments. The arms 43 are only operative one at a time, the idle one being out of engagement with the corresponding notch 48.

Elevation of the type segment to bring any selected type character in one of the axial rows thereon to printing position is effected, according to the present invention, by a lever 29 which is fixed to a rock shaft 30 and has a stud 31 on its free end arranged to bear on the under side of the type-supporting cylinder, this stud being also arranged to coöperate with underlying flanges 32. The stud 31 during the swinging movements of the lever 29 about its rock shaft 30 reciprocates in a plane between the bottom of the type-carrying cylinder and the underlying flanges 32. The rock shaft 30 carries a plate 33, and a row of shift levers 34 are mounted on an axis 35 and cooperate with the plate 33. These shift levers correspond in number to the number of vertical positions which the type segment may occupy, and depression of any one of these shift levers operates on the plate 33 to swing the lever 29 upwardly and to thereby elevate the type segment. The type segment, however, is elevated to a different extent by each of these shift levers. Preferably, and as shown, a plate 36 is provided which has slots 37 in which the key-levers operate, these slots being graduated in lengths whereby the range of movement of the different shift levers varies. By this arrangement, each shift lever is limited in its movement so that it is capable of elevating the type segment to bring the circumferential row of type characters on the type segment to the printing level, rotation of the type segment to bring the selected type character in the circumferential row to the

printing point being effected, as before stated, by manipulation of the appropriate key 6 of the key-board.

The present invention also provides means for facilitating the selection of any desired type character by manipulation of the appropriate shift key and key-lever. As shown, such means comprises a chart 38 which bears on its respective sides characters corresponding to the type characters on the type segments, these characters on the chart being arranged in horizontal and vertical rows corresponding, respectively, to the circumferential and axial arrangement of the type characters on the type segments. This chart is fitted to shift vertically in a holder 39, which holder is preferably arranged at the front of the machine above the shift keys. The front wall 40 of the chart holder has a slot 41 therein through which the characters of the different horizontal rows on the chart may be visible as the chart is elevated to different levels. The chart at all times occupies a level corresponding to the elevation of the type segment, that is to say, the type chart participates in the vertical shifts of the type segment. To accomplish this result, an extension 42 projects forwardly from the type-supporting cylinder and provides a support on which the chart rests, the vertical movements of the type-supporting cylinder causing simultaneous and corresponding vertical movements of the chart.

In the operation of a typewriting machine constructed as described, the type segment is shifted vertically to bring the desired character thereon to the printing level, this being effected by manipulating the appropriate shift lever 34, the desired character being then visible on the chart through the slot 41, and the type segment is rotated to bring the desired character to the printing point by manipulation of the appropriate key 6 of the keyboard. Where two type segments are embodied in the machine, only one of these type segments is used at one time, the type segment not in use being supported on the type cylinder toward the front of the machine. In order to bring the other type segment into position for use, the type cylinder is lifted on the shaft 3 until the apertured lug 25 on the type segment clears the upper end of the rod 28. The position of the type segments on the cylinder may then be reversed by rotating the type segments a half revolution on the cylinder and the type-supporting cylinder lowered to its normal position on the collar 21. In order to facilitate reversing of the type segments, one of them may be provided with an upstanding handle 49. The chart is then reversed to expose the side thereof containing the characters corresponding to those of the type segment brought into use.

Furthermore, to facilitate manipulation of the keyboard, the edge of the slot 41 may be provided with a scale of numerals 50 corresponding to the number of characters in each circumferential row of characters on the type segment, and by providing the keys of the keyboard with corresponding numerals, the selection of the key corresponding to the character to be printed is easily accomplished.

I claim as my invention:—

1. In a typewriter, the combination of a type-bearing member, means for moving said member to bring a selected type character thereon to the printing point, a chart bearing characters corresponding with those on the type-bearing member and movable therewith, and a keyboard having keys corresponding to the characters on said member and chart and operative to bring the respective characters to printing position.

2. In a typewriter, the combination of a type-bearing member shiftable to bring different rows of type characters thereon to printing position, a chart bearing rows of characters corresponding with those on the type-bearing member and shiftable therewith to render visible on the chart the rows of type characters as such rows on the type-bearing member are brought to printing position, and a keyboard having keys operative individually to bring different rows of characters on the type bearing member into printing position.

3. In a typewriter, the combination of a type member bearing type characters arranged in rows thereon, means for shifting said member to bring any one of said rows of characters into printing position, a chart having thereon rows of characters corresponding to the rows of type characters on said member, a keyboard embodying keys individual to the respective rows of characters on the type member and chart and coöperative with said shifting means for the type member, and means for rendering visible on said chart a row of characters corresponding to the row of type characters on said member occupying printing position.

4. In a typewriter, the combination of a member bearing rows of type characters, means embodying a keyboard having individual keys for shifting said member to bring the different rows of characters thereon to printing position, a keyboard having keys corresponding to the characters of each row and operative to bring any selected character of such row into printing position, and a chart having thereon rows of characters corresponding to those on said member, said chart being shiftable in unison with said member to render visible on the chart the row of characters corresponding to those of the row in printing position on said member.

5. In a typewriter, the combination of a type segment bearing type characters arranged in circumferential rows thereon, means for shifting the segment to bring any one of said rows of characters to the printing level, a chart bearing rows of characters corresponding to the circumferential rows of characters on the type segment, and means for shifting the chart in unison with the type segment to render visible any row of characters thereon corresponding to the row of type characters on the segment at the printing level.

6. In a typewriter, the combination of a member bearing type characters arranged in rows thereon, and means for shifting said member to bring any row of characters thereon in alinement with the printing point, comprising a plurality of shift keys, and a plate having slots of graduated depths to correspondingly determine and graduate the strokes of said keys.

7. In a typewriter, the combination of a member bearing type characters arranged in rows thereon, and means for shifting said member to bring any row of characters thereon in alinement with the printing point, comprising a rock shaft operatively connected to said member and having a plate projecting therefrom, a plurality of shift keys operative in common on said plate, and means for graduating the strokes of said keys.

8. In a typewriting machine, the combination of a rotatable and axially shiftable segment bearing circumferential rows of type characters, means including a keyboard for effecting the rotary movements of the segment, a chart bearing rows of characters corresponding to those in the circumferential rows on the type segment; and a scale adapted to register with the different characters in each row on the chart, said scale having characters corresponding to the different keys of the keyboard.

9. In a typewriting machine, the combination of a supporting cylinder, means for non-rotatably supporting said cylinder, a plurality of type bearing segments rotatably mounted on the cylinder, each segment being rotatable above said cylinder to and from an operative position, and means to operate on each of said segments while the same is in operative position to bring selected characters thereon to printing position.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

PAN FRANCIS SHAH.

Witnesses:
JOHN L. FLETCHER,
JAMES L. NORRIS.