No. 807,556. PATENTED DEC. 19, 1905.

J. H. HOTSON.

KEYBOARD FOR TYPE WRITING MACHINES.

APPLICATION FILED JUNE 18, 1903.

2 SHEETS—SHEET 1.

Fig. 1.

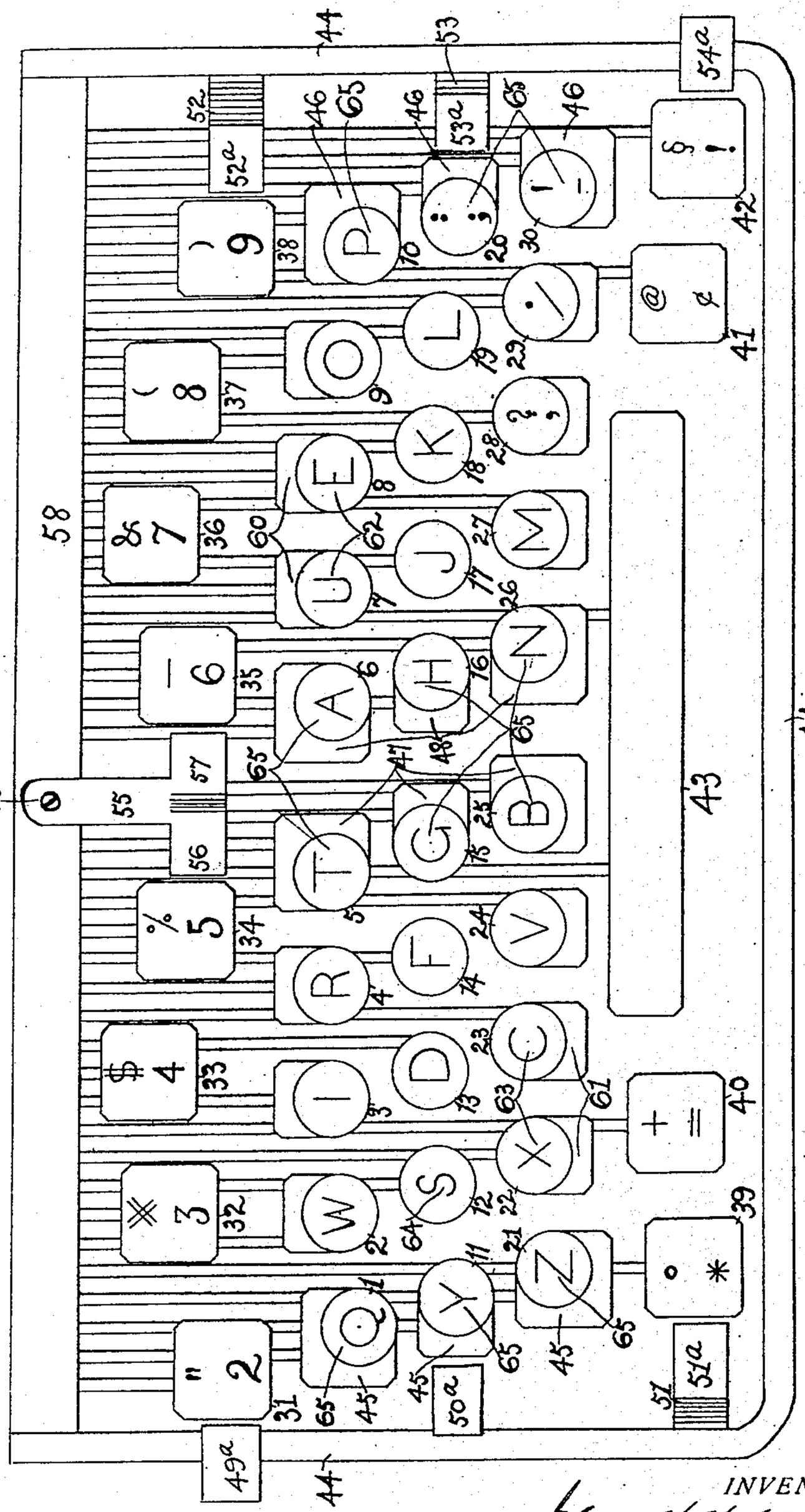

Fig. 3

Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M

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2 SHEETS—SHEET 2.

Fig. 2.

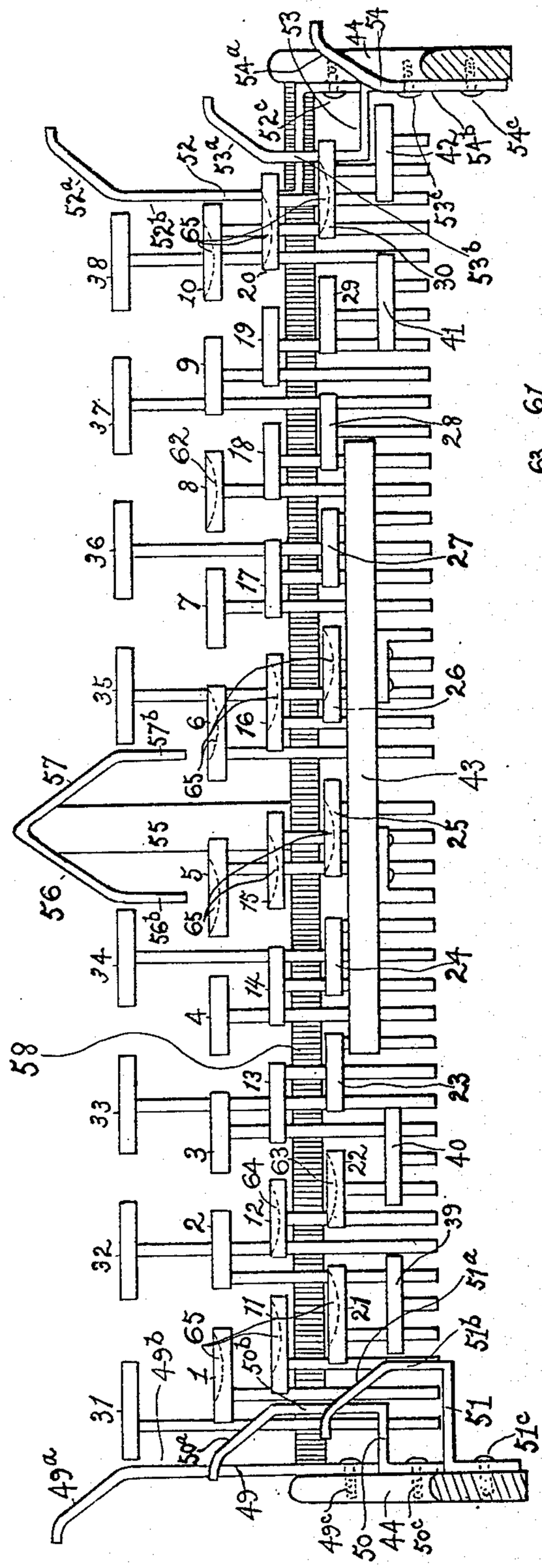


Fig. 6

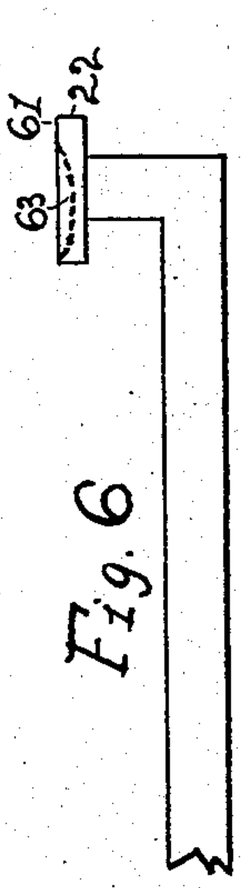
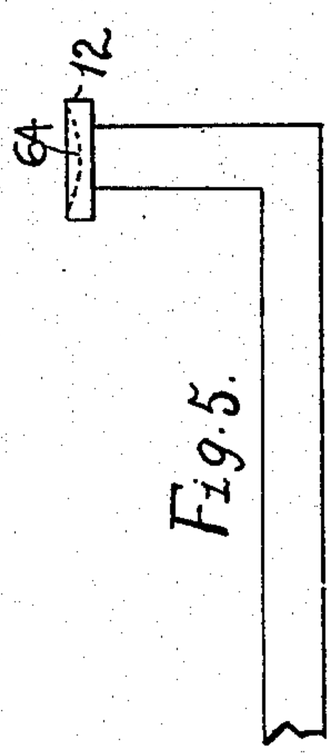


Fig. 4.

Fig. 5.



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KEYBOARD FOR TYPE-WRITING MACHINES.

No. 807,556. Specification of Letters Patent. Patented Dec. 19, 1905.

Application filed June 18, 1903. Serial No. 162,007.

To all whom it may concern:

Be it known that I, JOHN H. HOTSON, residing in Brooklyn, in the State of New York, have invented certain new and useful Improvements in Keyboards for Type-Writing Machines; and I hereby declare the following to be a full, clear, and exact description of the same.

This invention has relation to the keyboard of type-writers; and it consists in certain features of novelty which coöperate toward and have for their object an increase in ease, speed, and accuracy of operation of the keyboard, and is best described as consisting in improvements in the keyboard as set forth in the following specification and claims and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the keyboard of a type-writer embodying my improvements. Fig. 2 is a front elevation of the keyboard with the front frame of the machine cut away. Fig. 3 represents the universal keyboard. Fig. 4 is a side view of a lever and key thereon belonging to the rear row of letter-keys. Fig. 5 is a side view of a lever and key thereon belonging to the middle row of letter-keys. Fig. 6 is a side view of a lever and key thereon belonging to the front row of letter-keys.

I show the levers broken off, as their construction or connection with the rest of the type-writing machine forms no part of my invention.

In the following specification when I employ the word "letter-keys" I have reference to the keys in the three front banks or rows numbered from 1 to 30, the depression of which causes a letter or punctuation-mark to be written, and when I employ the word "figure-keys" I have reference to the rear row of keys bearing figures numbered from 31 to 38. In this designation the four supplementary keys located at the ends of the space-bar, 39 40 41 42, are not reckoned as a row of letter-keys. In my description hereinafter the rear row of letter-keys means the row numbered from 1 to 10, the middle row of letter-keys the one numbered from 11 to 20, and the front row of letter-keys the one numbered from 21 to 30, although it is to be carefully noted that the arrangement of the letters themselves as there shown forms no essential part of my improvements in the constitution of the keyboard. My reference is to the keys themselves and not to the names by which they happen to be called in the universal arrangement or order of the letters of the alphabet.

Fig. 1 shows a keyboard illustrating my invention, with arrangement of the letters of the alphabet similar to that known as the "universal," although I do not wish to be understood as limiting myself to that type of keyboard, as my improvements are applicable to any keyboard resembling in its general features the universal keyboard.

My improvements in the keyboard are more especially designed to facilitate all-finger operating, and as a consequence "touch" type-writing or operating the keyboard without looking at it, inasmuch as touch type-writing is generally done by the aid of all the fingers.

It is a common experience in writing with all the fingers upon that type of keyboard known as the "universal," where the keys are arranged in straight banks or rows running from side to side of the keyboard, to find that the little finger cannot conveniently reach the keys assigned to it. The difference in length of the first, second, and third fingers of the human hand (and especially when the fingers are curved into the shape in which they are usually held in operating the keys of a type-writer) is not sufficient to constitute any difficulty in operating a straight bank of keys—such as, for instance, upon the well-known Remington type of machine—and I therefore do not propose making any distinction in a cross-row of letter-keys as to location rearwardly or forwardly among the keys usually assigned to the said first three fingers of the hand; but the shortness of the little finger is distinctly inconvenient in reaching and operating keys as far back as the keys in the same row operated by the other fingers. This inconvenience is especially apparent in the case of the letters "Q" and "P," (in the universal keyboard,) numbered 1 and 10, which are usually assigned to the little fingers of the left and right hand, respectively, in operating. In order to operate the little finger, the entire ha be moved back to suppler the little finger, so as to e key. I propose to obvi locating the keys which tend to in operating by t further forward than th same row, so that the lit veniently reach and oper out the necessity of mov supplement their length. part of my invention I lo

about three-sixteenths of an inch forward of the central keys of the bank or row. As such forward location of the end keys alone would cause an angular effect in the bank, I prefer to obviate such an angle by locating the next adjacent keys in the bank at a less distance forward than the end keys, the middle or intervening keys of the bank remaining substantially in a straight line.

In all-finger type-writing it is the common practice to assign the left half of the keyboard to the left hand and the right half of the keyboard to the right hand, the dividing-line being between the letters (on the universal keyboard, see Fig. 3) "T G B" on the left side and "Y H N" on the right. It is the common practice to assign the front-to-rear row "Q A Z" to the little finger, the row "W S X" to the third finger, the row "E D C" to the second finger, and the two rows "R F V" and "T G B" to the first finger of the left hand, the two rows "Y H N" and "U J M" to the first finger, the row "I K ?" to the second finger, the row "O L ./" to the third finger, and the remaining row to the fourth finger of the right hand. The arranging of these front-to-rear rows parallel with each other has been found by experience to be advantageous in locating the letters in each row by the respective finger assigned to its operation, and I prefer to adhere to such parallel arrangement.

In touch type-writing it has been a common experience, owing to the proximity of the letters "T" and "Y," of the letters "G" and "H," and of the letters "B" and "N" in the universal keyboard, that the first finger of the left hand, whose duty it is to attend to "T G B," strikes a little too far to the right and prints the letter "Y," "H," or "N," respectively, and vice versa with the first finger of the right hand, which often accidentally prints the letters "T G B" from the same cause. To obviate this difficulty, I separate the row of letter-keys numbered 5, 15, 25, Fig. 1, from the row numbered 6, 16, 26 by a vacant space having its right and left boundaries parallel and being wider than the space between adjacent front-to-rear rows of keys within one of the sections thus created. The

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bank or too far in front
hereby failing to depress
To obviate such tendency to

miss the said keys, I extend the striking-surface of the keys in the rear bank or row rearward, as shown at 60, Fig. 1, and the striking-surface of the keys of the front bank forward, as shown at 61, Fig. 1.

I desire it to be understood that I do not limit myself to the exact shape of the keys shown in the illustration. They may be made oval or otherwise without departing from the scope of this part of my invention, the essential feature of which consists in the extension of the striking-surface of the keys in the rear row of letter-keys (1 to 10) and in the front row of letter-keys (21 to 30,) so that they are appreciably longer from front to rear than those of the middle row of letter-keys, (11 to 20.) The object of this proportion is to provide for a rearward extension of the striking-surface of the keys in the rear row of letter-keys and a forward extension of the striking-surface of the keys in the front row of letter-keys, so that they will be more easy and convenient to strike, at the same time that the keys in the middle row are kept sufficiently short, so as not to push the rear and front rows of letter-keys too far apart to allow of easy transition of the fingers from said rear to said front row, and vice versa, for if the striking-surface of the keys in the middle row were extended from front to rear as far as it is necessary to extend the surface of the keys of the rear and front rows to render them sufficiently convenient to strike (especially in touch operation) the rear and front banks would thereby be pushed so far apart that the ease of transition of the fingers from the rear bank to the front bank, and vice versa, would be impaired, or else the cross-banks of letter-keys would be crowded so close together as to impair the ease and accuracy of operation.

It frequently happens, also, that in attempting to strike a key on the extreme left or right edge of the keyboard the finger strikes entirely beyond and outside of the key, missing it altogether. To obviate this difficulty, I extend the striking-surface of the keys on the extreme left of the keyboard outward to the left, as shown at 45, and extend the striking-surface of the keys on the extreme right of the keyboard outward to the right, as illustrated at 46, Fig. 1. For the same reason I extend the striking-surface of the keys on the right side of the left section outward to the right, as shown at 47, and of the keys on the left side of the right-hand section outward to the left, as shown at 48.

I desire it to be understood that I do not limit myself to the exact shape of the side boundary keys shown in the illustration. They might be made round or oblong or otherwise without departing from the scope of this part of my invention, the essential feature of which consists in an extension of the striking-surface of the boundary keys at the right and left hand sides of each half-section of the

keyboard outwardly, so that they are appreciably broader from side to side or laterally than the interior keys in the same row.

I prefer to make a depression or hollow receptacle for the tip of the finger in the surface of the keys of the middle row 64, Fig. 5, and a depression or hollow receptacle of substantially the same character, 62 63, Figs. 4 and 6, in the upper surface of the rear and front rows of keys, preferably in the inner side or the side next to the middle row, so that the inner part of the extended keys, or the part next to the middle row of keys, shall present substantially the same feeling to the touch of the operator's finger as the keys of the middle row. This also enables the operator to recognize by the sense of touch whether he has struck the extended key true or not—*i. e.*, whether he has struck it on the inner or hollow part 62 63 or on the extended part 60 61. By this means he is enabled more accurately to gage the distance from the key struck to the next key to be depressed without the aid of the sight. For the same reason I prefer to make a similar depression or hollow receptacle 65 in the inner side of the boundary keys situated at the left and right hand sides of each section or half of the keyboard. I do not propose to limit myself as to the exact distance laterally across the key that the depression or hollow receptacle in the surface of the left and right hand boundary keys of the left and right hand sections of the keyboard shall extend. Neither do I propose to limit myself as to the exact distance from the inner edge of the front and rear rows of letter-keys—*i. e.*, the edge next to the middle row of letter-keys—that the depression or hollow receptacle in the surface of the key shall begin, nor the exact distance to the rear that the depression or hollow receptacle in the surface of the rear row of letter-keys shall extend, nor the distance to the front that the depression or hollow receptacle in the surface of the front row of letter-keys shall extend.

An important feature of my invention is the arrangement I make of the rearmost row of keys bearing figures. The ordinary arrangement of this row of keys has been found to entail great disadvantage. This arises principally from the fact that they are set too closely together—*i. e.*, with the same space between them as between the letter-keys—which is manifestly inadequate, for the reason that if a letter-key is struck wrong the mistake can almost invariably be easily detected from the incorrect appearance of the word, whereas if a wrong figure is struck there is usually nothing in the appearance of the figure or amount itself to indicate the error, and hence it is liable to go uncorrected, often resulting in ill consequences, as a mistake in a figure often makes a great difference in the result. Thus the consequences of a misstruck figure being generally so much more serious than the consequences of a misstruck letter I propose to make a more suitable arrangement in order to obviate the liability of striking the wrong figure-key by spacing the figure-keys wider apart from center to center than is the case with the letter-keys in one and the same section or half of the keyboard. Thus by a reference to Fig. 1 it will be seen that the distance from the center of the key bearing the figure "3" to the center of the key bearing the figure "4" is greater than the distance from the center of the key bearing the letter "W" to the center of the key bearing the letter "E." In the case of the figures there are four levers intervening between the key centers, whereas in the case of the letters there are only three levers between the key centers. A conspicuous advantage of this arrangement of the figure-keys is that thereby the figure-keys can be enlarged. In carrying out this feature of my invention I prefer to divide the figure-keys into two groups of four keys each, thus adapting them for more convenient operation by the four fingers of the left and right hand, respectively, and locate each figure-key in the vicinity of the key or keys in the rear row of letter-keys generally operated by the same finger in all-finger operating. Thus (in the universal keyboard) the letters "Q" and "P" are generally operated by the little fingers, the letters "W" and "O" by the third fingers, the letters "E" and "I" by the second fingers, and the letters "R" "T" and "Y" "U" by the first fingers. In this way the figure "2" is adapted for operation by the fourth finger, the figure "3" by the third finger, the figure "4" by the second finger, and the figure "5" by the first finger of the left hand, the figure "6" by the first finger, "7" by the second finger, "8" by the third finger, and "9" by the fourth finger of the right hand. This arrangement secures equal division of labor, making each finger responsible for the operation of one figure-key and no more and helping to obviate the liability of one finger encroaching on the sphere of operation of another. To further increase the ease of operation, I prefer to arrange each of these two groups of four keys each with the keys at distances toward the rear corresponding to the length of the respective finger appointed to operate the respective key. Thus I prefer to place the keys bearing the figures "2" and "9," which are designed for operation by the little fingers, at the shortest distance back of the letter-keys, the keys bearing the figures "4" and "7," which are designed for operation by the second or longest fingers, at the farthest distance back of the letter-keys, and the keys bearing the figures "3," "5," "6," and "8" at a medium distance, these relative distances corresponding to the length of the normal human fingers. The marked advantage of such an arrangement as this is that when a figure is to be written the operator can simply stretch

out the finger and bring it down on its respective figure-key without the necessity of moving the hand from its normal position over the letter-keys, such as is customary in touch-operating by the all-finger method. Thus my invention provides keys adapted to a new mode of operation in that the finger in order to strike the same is stretched out and brought down substantially parallel with the top of the key, whereas in operating the type-writer keys in general use the finger assumes a curved shape in striking the key and strikes it with the tip of the finger. To still further facilitate this new mode of operation, I prefer to place the row of figure-keys in an elevated position—that is, at a higher elevation above the rear row of letter-keys than one row of letter-keys is higher than the next lower row. This arrangement allows of the above improved mode of operation—*i. e.*, depressing the figure-key with the finger held substantially parallel with the top of the key—without the liability of striking at the same time a key in the rear row of letters, as would sometimes be the case without such elevation of the figure-keys. A conspicuous advantage of this new arrangement of the row of figure-keys is that a difficulty often experienced in type-writing is obviated. This difficulty consists in the liability (owing to the proximity of the figure-keys to the rear row of letter-keys) of striking a figure-key when it is desired to strike a letter-key, which is a fruitful source of annoyance, being particularly liable to occur in touch-operating, and the constant presence of this menace makes the operator uneasy and restricts his freedom of movement. As will be seen by a reference to Fig. 1, the figure-keys may be placed, according to my improved arrangement, considerably rearward of the letter-keys and still be within convenient reach of the outstretched finger. It can be readily understood that if the fingers of an individual operator vary materially from the normal length the figure-keys can be adjusted on their levers more forward or rearward to suit the individual hand. I do not, therefore, wish to restrict myself to any fixed distances; nor do I, in fact, wish to restrict myself to the arc-like arrangement of the figure-keys, nor to their arrangement in two separate groups. The essential feature of this part of my invention lies in spacing the figure-keys appreciably wider apart from center to center than is the case with letter-keys in one and the same row in one and the same section or half of the keyboard.

I provide guides 49 50 51 52 53 54 of common form, secured to the side frame of the machine 44 44 by screws 49^c 50^c 51^c 52^c 53^c 54^c and having a substantially vertical piece 49^b 50^b 51^b 52^b 53^b 54^b. I also provide an inner guide 55 to separate the left-hand group of figure-keys from the right and provide the left part of this guide with a surface 56, inclined downward toward the left to guide the index-finger of the left hand onto the key 5, and provide the right half of the guide with a surface 57, inclined downward toward the right to guide the index-finger of the right hand onto its key 6. This guide is secured by screw 55^c to the cross-bar 58, attached to the side frame of the machine back of the keyboard.

43 represents the space-bar.

In the foregoing I have described improvements adapted to a keyboard carrying the same number of characters as the well-known Remington No. 6 model—*i. e.*, seventy-six characters in all. In order, however, to adapt my keyboard to carry the number of characters written by the Remington No. 7 model—*i. e.*, eighty-four—I mount upon levers and locate in front of the letter-keys four supplementary keys, which I locate two at each end of the space-bar. These keys are designed for operation by the third and fourth fingers of each hand. To facilitate such operation, I prefer to place them in close proximity to those keys of the front row of letters which are operated by the same fingers in all-finger operating.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent of the United States:

1. In combination with type-writer keys bearing the letters of the alphabet, arranged in rows or banks, and divided into a left-hand and a right-hand section; a row of keys bearing figures, located along the rear of the rear row of letter-keys, said figure-keys spaced appreciably wider apart from center to center than is the case with letter-keys in one and the same cross-row within the said left-hand section, or the said right-hand section of the alphabetical keys.

2. In combination with cross-rows of type-writer keys bearing the letters of the alphabet, divided into a left-hand and a right-hand section; a row of keys bearing figures, located along the rear of the rear row of letter-keys; said figure-keys spaced appreciably wider apart from center to center than is the case with the letter-keys in one and the same cross-row within the said left-hand section or the said right-hand section of the alphabetical keys; said figure-keys being arranged in a left-hand group and a right-hand group of four keys each, each group being arranged in arc form.

3. In combination with cross-rows of type-writer keys bearing the letters of the alphabet, the rear row of which consists of ten keys; a row of eight keys bearing the figures 2, 3, 4, 5, 6, 7, 8 and 9, respectively, arranged along the rear of the said rear row of letter-keys, and so located as to occupy substantially the same extension laterally as the ten letter-keys.

4. In combination with cross-rows of type-writer keys bearing the letters of the alphabet, the rear row of which consists of ten keys; a row of four keys bearing figures, 2, 3, 4 and 5, respectively, arranged at the rear of the left five keys in the rear row of letter-keys, and spaced at appreciably wider intervals from center to center than is the case with the said left five keys of the rear row of letters; and a row of four keys bearing figures 6, 7, 8 and 9, respectively, arranged at the rear of the right five keys in the rear row of letters, and spaced at appreciably wider intervals from center to center than is the case with the said right five keys of the rear row of letters.

5. In combination with cross-rows of type-writer keys bearing the letters of the alphabet, the rear row of which consists of ten keys; a row of four keys bearing figures, 2, 3, 4 and 5, respectively, arranged at the rear of the left five keys in the rear row of letter-keys, and spaced at appreciably wider intervals from center to center than is the case with the said left five keys of the rear row of letters, so as to occupy substantially the same extension laterally as the said five letter-keys; and a row of four keys bearing figures 6, 7, 8 and 9, respectively, arranged at the rear of the right five keys in the rear row of letters, and spaced at appreciably wider intervals from center to center than is the case with the said right five keys of the rear row of letters, so as to occupy substantially the same extension laterally as the said five letter-keys.

6. In combination with cross-rows of type-writer keys bearing the letters of the alphabet, the rear row of which consists of ten keys; a row of four keys bearing figures, 2, 3, 4 and 5, respectively, arranged in arc form, substantially as shown, at the rear of the left five keys in the rear row of letter-keys, and spaced at appreciably wider intervals from center to center than is the case with the said left five keys of the rear row of letters; and a row of four keys bearing figures 6, 7, 8 and 9, respectively, arranged in arc form, substantially as shown, at the rear of the right five keys in the rear row of letters, and spaced at appreciably wider intervals from center to center than is the case with the said right five keys of the rear row of letters.

7. In combination with cross-rows of type-writer keys bearing the letters of the alphabet, arranged in rows or banks; the rear row of letters comprising ten keys; four keys bearing figures, 2, 3, 4, and 5, respectively, placed at the rear of the left five keys of the rear row of letter-keys, and spaced appreciably wider apart from center to center than is the case with the said left five letter-keys; said figure-keys being so located that they are in convenient proximity to the letter-keys generally operated by the same fingers in all-finger operating, the key bearing 2 being in convenient proximity to the letter-key generally operated by the little finger of the left hand (Q in the arrangement of the letters of the alphabet on type-writer keys known as the universal); the key bearing 3 being in convenient proximity to the letter-key generally operated by the left third finger in all-finger operating (W in the universal arrangement); the key bearing 4 in convenient proximity to the letter-key generally operated by the left second finger (E in the universal arrangement); and the key bearing 5 being in convenient proximity to the letter-keys generally operated by the left first or index finger in all-finger operating (T and R in the universal arrangement); the key bearing 6 being in convenient proximity to the letter-keys generally operated by the first finger of the right hand (Y and U in the universal arrangement); the key bearing 7 being in convenient proximity to the letter-key generally operated by the right second finger in all-finger operating (I in the universal arrangement); the key bearing 8 being in convenient proximity to the letter-key generally operated by the right third finger in all-finger operating (O in the universal arrangement), and the key bearing 9 being in convenient proximity to the letter-key generally operated by the right fourth finger in all-finger operating (P in the universal keyboard).

8. In combination with type-writer keys bearing the letters of the alphabet, arranged in rows or banks, which rise toward the rear like the steps of a stair, a row of keys bearing figures arranged at the rear of the rear row of letter-keys, and at an elevation above the rear row of letter-keys appreciably greater than the elevation of one row of letter-keys above the one next in front of it.

9. In combination with type-writer keys bearing the letters of the alphabet, arranged in cross rows or banks, which rise toward the rear, like the steps of a stair; a row of keys bearing figures arranged at an elevation above the rear row of letter-keys appreciably greater than the elevation of one row of letter-keys above the one next in front of it; said figure-keys being arranged in a right-hand group and a left-hand group of four keys each, each group arranged in arc form, substantially as described.

10. In a type-writer keyboard, in combination with banks of letter-keys, each full cross-bank being arranged substantially in the form of a shallow arc; a row of keys bearing figures, arranged at an elevation above the rear row of letter-keys appreciably greater than the elevation of one row of letter-keys above the one next in front of it, and arranged in a right and a left hand arc of four keys each, each key adapted to be operated by its corresponding finger, by raising and straightening out the respective finger to reach and depress its respective key.

11. In combination with type-writer keys

bearing the letters of the alphabet, arranged in rows or banks, which rise toward the rear like the steps of a stair, and divided into a left-hand and a right-hand section; a row of keys bearing figures located to the rear of the rear row of letter-keys, said figure-keys spaced appreciably wider apart from center to center than is the case with letter-keys in one and the same cross-row within the said left-hand section or the said right-hand section of the alphabetical keys; said figure-keys arranged at an elevation above the rear row of letter-keys appreciably greater than the elevation of one row of letter-keys above the one next in front of it.

12. In combination with cross-rows of type-writer keys bearing the letters of the alphabet, which rise toward the rear like the steps of a stair, and divided into a left-hand section and a right-hand section; a row of keys bearing figures, located to the rear of the rear row of letter-keys; said figure-keys spaced appreciably wider apart from center to center than is the case with the letter-keys in one and the same cross-row within the said left-hand section or the said right-hand section of the alphabetical keys; said figure-keys being arranged in a left-hand group and a right-hand group of four keys each, each group being arranged in arc form; said figure-keys arranged at an elevation above the rear row of letter-keys appreciably greater than the elevation of one row of letter-keys above the one next in front of it.

13. In combination with cross-rows of type-writer keys bearing the letters of the alphabet, which rise toward the rear like the steps of a stair, the rear row of which consists of ten keys; a row of eight keys bearing the figures 2, 3, 4, 5, 6, 7, 8, and 9, respectively, arranged along the rear of the said rear row of letter-keys and spaced out so as to occupy substantially the same extension laterally as the ten letter-keys; said figure-keys arranged at an elevation above the rear row of letter-keys appreciably greater than the elevation of one row of letter-keys above the one next in front of it.

14. In combination with cross-rows of type-writer keys bearing the letters of the alphabet, which rise toward the rear like the steps of a stair, the rear row of which consists of ten keys; a row of four keys bearing figures, 2, 3, 4 and 5, respectively, arranged at the rear of the left five keys in the rear row of letter-keys, and spaced at appreciably wider intervals from center to center than is the case with the said left five keys of the rear row of letters; and a row of four keys bearing figures, 6, 7, 8 and 9, respectively, arranged at the rear of the right five keys in the upper row of letters, and spaced at appreciably wider intervals from center to center than is the case with the said right-hand five keys of the rear row of letters; said figure-keys arranged at an elevation above the rear row of letter-keys appreciably greater than the elevation of one row of letter-keys above the one next in front of it.

15. In combination with type-writer keys bearing the letters of the alphabet, arranged in cross rows or banks, which rise toward the rear, like the steps of a stair; a row of keys bearing figures, arranged at an elevation above the rear row of letter-keys appreciably greater than the elevation of one row of letter-keys above the one next in front of it; said figure-keys spaced appreciably wider apart from center to center than is the case with the letter-keys in one and the same cross-row within the left half or the right half of the keyboard; said figure-keys being arranged in a left-hand group and a right-hand group of four keys each, each group arranged in arc form, each key being located at a distance back of the letter-keys corresponding to the length of the respective finger assigned to its operation, the key bearing 2 being adapted for operation by the little finger, 3 by the third finger, 4 by the second finger, and 5 by the first finger, of the left hand; the key bearing 6 by the first finger, 7 by the second finger, 8 by the third finger, and 9 by the fourth finger, of the right hand; substantially as described.

16. In a type-writer keyboard, with the letters of the alphabet arranged in three rows or banks, keys in the rear and front rows having their striking-surface appreciably longer or more extended from front to rear than it is broad, having a hollow receptacle for the tip of the finger in the part of the surface of the key next to the middle row or bank of keys.

17. In a type-writer keyboard, the arrangement of the letters of the alphabet in three rows or banks, the keys in the rear row of letters having a hollow receptacle for the tip of the finger in their striking-surface at the forward side, or the side next to the middle row of keys, and an extension of the striking-surface rearward.

18. In a type-writer keyboard, the arrangement of the letters of the alphabet in three rows or banks, the keys in the front row of letters having a hollow receptacle for the tip of the finger in their striking-surface at the rearward side, or side next to the middle row of keys, and an extension of the striking-surface forward.

19. In a type-writer keyboard, the arrangement of the letters of the alphabet in three rows or banks; keys to the extreme right and left of the keyboard, having a hollow receptacle for the tip of the finger in their striking-surface on the side nearest the middle of the keyboard, and an extension of their striking-surface outward in the opposite direction.

20. In a type-writer keyboard, the arrangement of the letters of the alphabet in three rows or banks, and divided into a right-hand section and a left-hand section; the keys on the right-hand boundary of the left section

and the keys on the left boundary of the right-hand section having a hollow receptacle for the tip of the finger in their striking-surface at the side next to the center of the section, and an extension of their striking-surface in the opposite direction.

21. In a type-writer keyboard, the arrangement of the letters of the alphabet in three rows or banks, the keys in the middle row having a hollow receptacle in their upper surface for the tip of the finger; keys in the rear row of letter-keys with their striking-surface extended rearward, and keys in the front row with their striking-surface extended forward, so that the said keys in the rear and front rows have their striking-surface appreciably longer or more extended from front to rear than the keys of the middle row, and having in the part of their striking-surface next to the middle row of keys a hollow receptacle of substantially the same character as the hollow receptacle in the surface of the middle row of keys, for the tip of the finger.

22. In a type-writer keyboard, the arrangement of the letters of the alphabet in three cross rows or banks; keys in the front and rear rows, with a hollow receptacle in their striking-surface for the tip of the finger; the upper surface of the keys in said front and rear rows, outside of the depression or hollow receptacle, being substantially level; the striking-surface of such keys in the front and rear rows of letter-keys being appreciably longer from front to rear than the striking-surface of the keys of the middle row.

23. In a type-writer keyboard, the arrangement of the letters of the alphabet in three cross rows or banks, and divided into a right and a left hand section; the right and left hand boundary-keys of each section having a hollow receptacle in their striking-surface for the tip of the finger; the upper surface of the said boundary-keys, outside of the hollow receptacle, being substantially level; the striking-surface of such boundary-keys of the said sections being appreciably broader from side to side, or laterally, than the striking-surface of the interior keys of the section.

24. In a type-writer keyboard, the arrangement of the letters of the alphabet in three cross rows or banks, keys in the rear row of letter-keys having their striking-surface extended toward the rear, in a substantially horizontal direction, and keys in the front row having their striking-surface extended toward the front, in a substantially horizontal direction, so that the striking-surface of the keys in the front and rear rows of letter-keys is appreciably longer from front to rear than the striking-surface of the keys of the middle row.

25. In a type-writer keyboard, the arrangement of the letters of the alphabet in three cross rows or banks, all of the keys in the rear row of letter-keys having their striking-surface extended toward the rear, in a substantially horizontal direction, and all of the keys in the front row having their striking-surface extended toward the front, in a substantially horizontal direction, so that the striking-surface of the keys in the front and rear rows of letter-keys is appreciably longer from front to rear than the striking-surface of the keys of the middle row.

26. A guide between the left and right groups of figure-keys, having an incline downward to the left, for the purpose of guiding the left index-finger onto its respective key, and having an incline downward to the right for the purpose of guiding the right index-finger onto its respective figure-key; substantially as shown.

JOHN H. HOTSON.

Witnesses:
OCTAVIUS KNIGHT,
J. GREEN.