A. T. BROWN.

TYPE WRITING MACHINE.

APPLICATION FILED NOV. 10, 1909.

1,066,075.

Patented July 1, 1913.

4 SHEETS—SHEET 1.

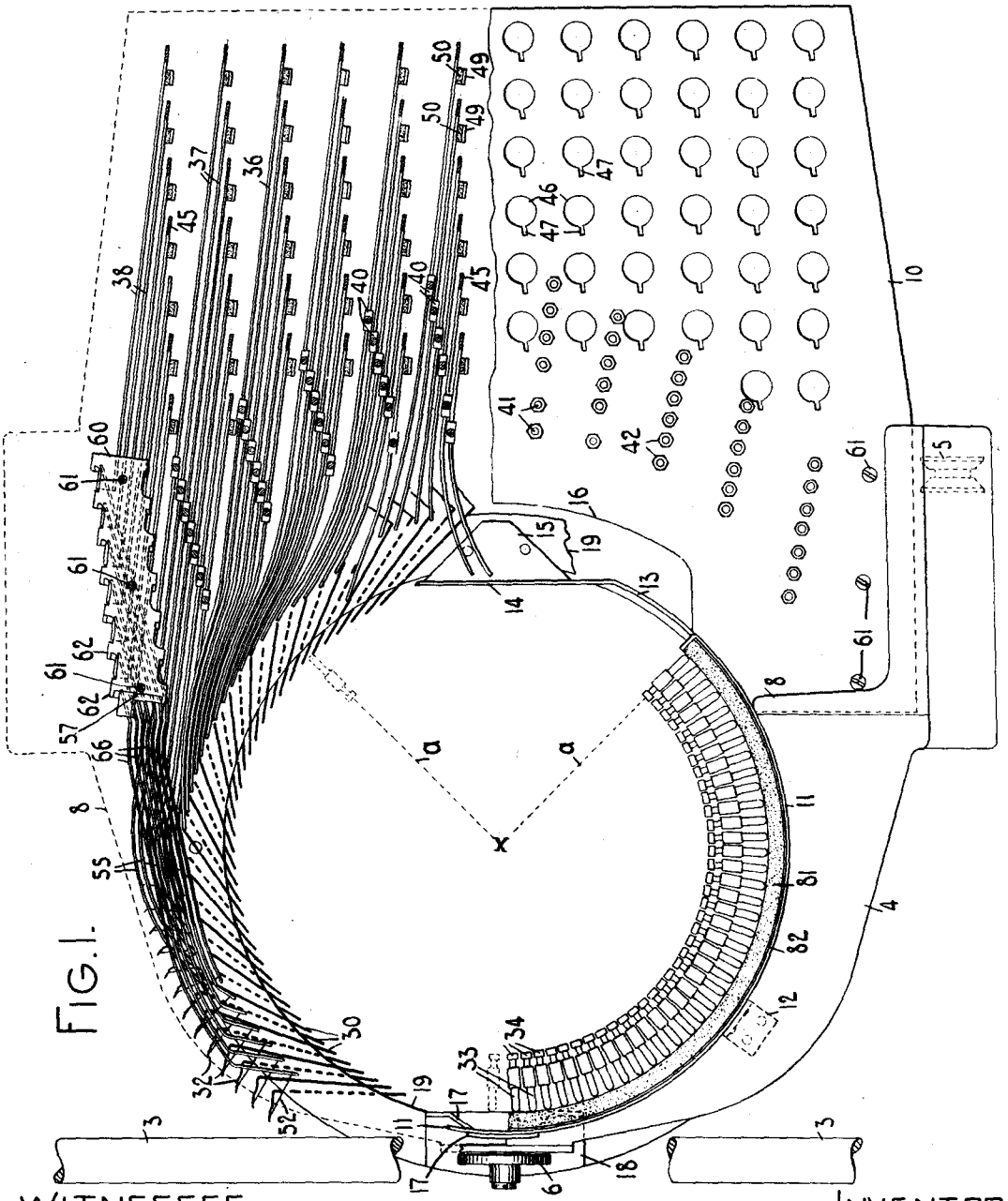

FIG. 1.

WITNESSES:

E. M. Wells.

R. H. Strother.

INVENTOR.

Alexander T. Brown

By Jacob Talbot

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4 SHEETS—SHEET 2.

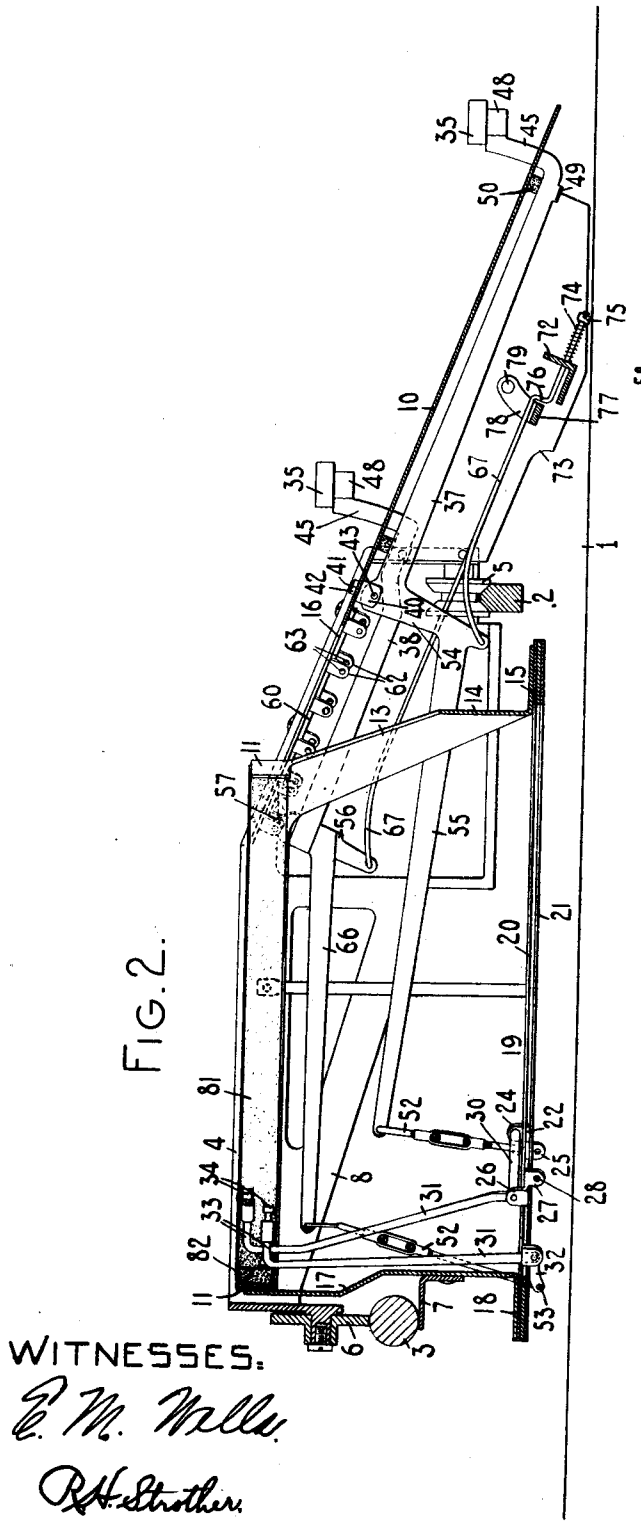

FIG. 2.

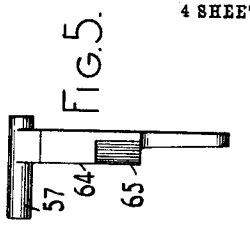

FIG. 5.

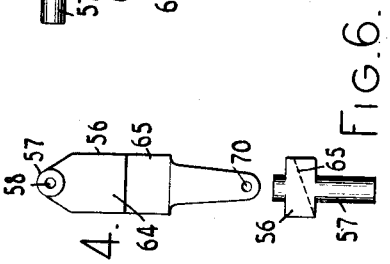

FIG. 6.

FIG. 4.

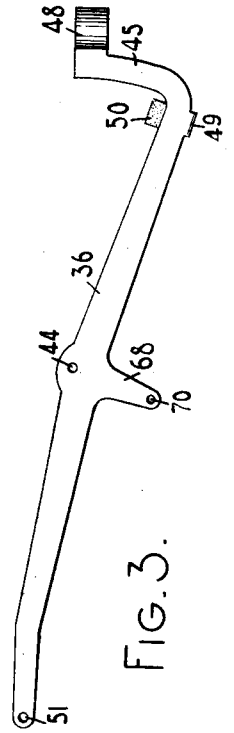

FIG. 3.

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4 SHEETS—SHEET 3.

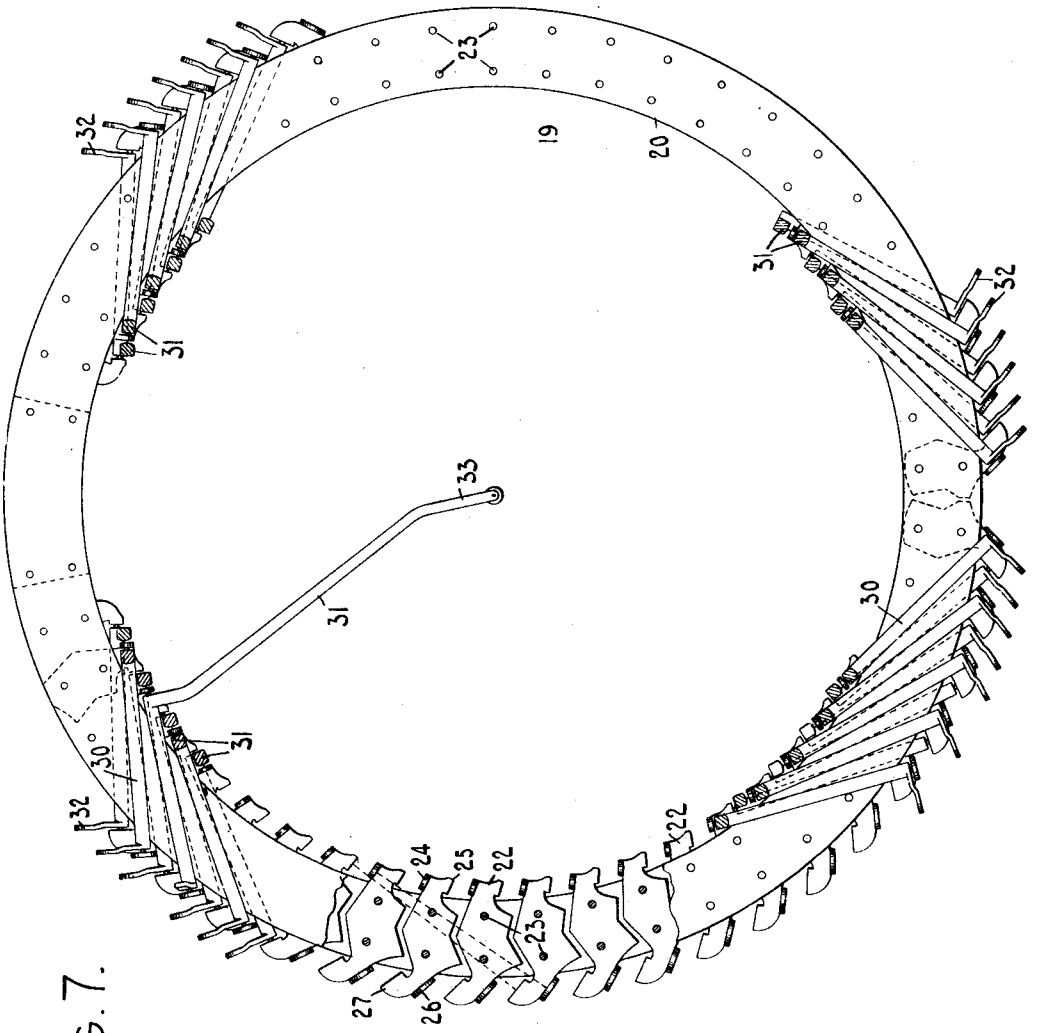

FIG. 7.

WITNESSES:

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1,066,075.

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4 SHEETS—SHEET 4.

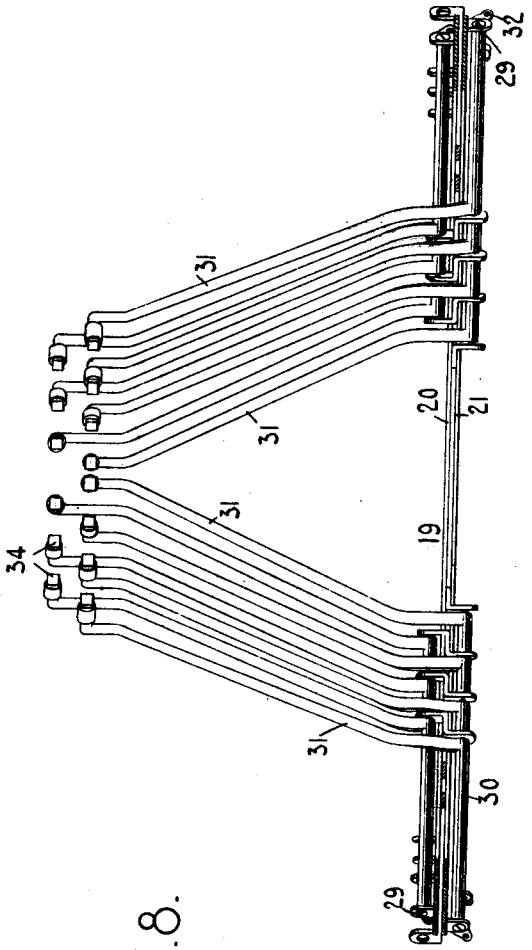

FIG. 8.

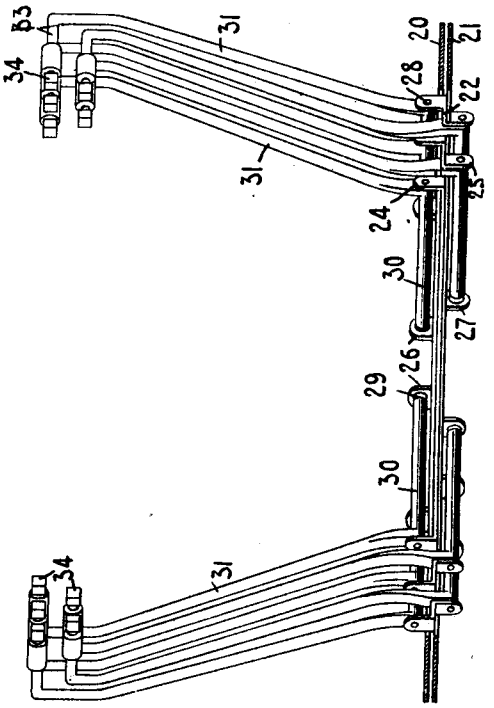

FIG. 9.

WITNESSES.

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UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

TYPE-WRITING MACHINE.

1,066,075. Specification of Letters Patent. Patented July 1, 1913.

Application filed November 10, 1909. Serial No. 527,204.

To all whom it may concern:

Be it known that I, ALEXANDER T. BROWN, citizen of the United States, and resident of Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to the type bar systems and type actions for such machines.

My invention has for one of its objects to provide a type bar system and a type action for a flat platen typewriter in which the type bars carry each only a single type and in which there is a separate key for each character to be written. In other words, it is one of the objects of the present invention to provide a full keyboard flat platen typewriter.

My invention also has for an object to improve the type actions of flat platen typewriters in certain respects.

Another object of my invention is to provide an improved type bar system in which the type bars have long pivots and in which provision is made for visibility of the writing.

Some of the features of the present invention are applicable or adaptable to other styles of typewriting machines than flat platen machines.

My invention consists in certain features of construction and combinations and arrangements of parts, all of which will be fully set forth herein and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a top plan view, partly in section and partly broken away, and with parts omitted and showing the type bars and their actuating devices and some of the framework of the machine. Fig. 2 is a fore and aft vertical sectional view of the same, some of the parts being omitted. Fig. 3 is a side elevation of one of the key levers. Figs. 4, 5 and 6 are a side view, a front view and a top view respectively of a pivot block forming part of certain of the key levers. Fig. 7 is a top plan view showing the type bearing hangers and some of the type bars, most of the latter being in section, and the ring being removed from the machine. In this view the observer is standing at the front of the machine so that the top of the sheet shows the rear part of the ring. Fig. 8 is a front elevation of some of the rear type bars of the system of type bars, the type ring being shown in vertical section and the type bars in normal position. Fig. 9 is a view from the rear and showing some of the type bars at the front of the machine in elevation, the type ring being in section and the type bars in normal position.

So much of the frame-work of the typewriter as is necessary to an understanding of the relation of the type action thereto, is shown in my prior Patent No. 924,885, dated June 15th, 1909, that patent being directed to the carriage feed mechanism. The machine comprises a flat platen which is represented in Fig. 2 of the present case by the line 1. A frame is mounted above said platen for motion up and down the paper to impart line space movements to the printing carriage and said frame comprises among other things a front rail 2 and a rear rail 3. The printing mechanism is mounted in a carriage 4 shown in Figs. 1 and 2, which carriage is mounted on the front rail 2 by means of two rollers 5, one at the right-hand and the other at the left-hand side of the carriage and said carriage is also mounted on the rear rail 3 by means of a single central roller 6 journaled on a stud projecting from the rear part of said carriage. An arm or bracket 7 secured to the framework of the carriage 4 lies beneath the rail 3 to prevent accidental displacement of the carriage from the rail and similar brackets (not shown) are mounted beneath the front rail 2.

As here shown, the framework of the carriage comprises a casting or castings 8 of the general outline indicated in Figs. 1 and 2, that is to say, having right-hand and left-hand branches which curve around the type basket, being joined together at the rear of the machine, and it is in these castings that the rollers 5 are journaled. Said castings are connected together across the front of the machine by a keyboard plate 10 which is secured to the castings by screws or other suitable means. The types are mounted in a frame which comprises a ring 11 encompassed by the upper parts of the castings 8 to which said ring is secured in any suitable manner as, for example, by angled

pieces 12 (Fig. 1) which are secured to the castings 8 and to the ring 11 by any suitable means as by screws or rivets. The ring 11 is of circular form but does not make a complete circle, an arc of the circle being cut out at the front of the machine to approximately the extent indicated by the two radial lines *a* in Fig. 1, this being done partly to afford visibility of the writing. The front part of the ring is formed with two arms 13 which extend downward at an angle as shown, being joined across the front considerably below the circular part of the ring 11, by a straight section 14 from which an ear 15 is bent off horizontally toward the front of the machine. The keyboard plate is cut away at its rear edge as indicated at 16, this being also for the purpose of affording visibility of the writing. An arm or bracket 17 is secured to the extreme rear part of the ring 11 from which it depends and at its lower end it is bent off into a horizontal portion or ear 18. It is to the bracket 17 that the guide bracket 7 is secured. The type ring as a whole is designated by the numeral 19, and said type ring is riveted or otherwise secured to the ears 15 and 18 so that this type ring is supported by the rigid frame-work of the printing carriage at a short distance above the platen 1. The type ring consists of two circular rings of sheet metal 20 and 21, the former standing directly above the latter. Between the two plates or rings 20 and 21 there are rigidly mounted a number of bearing pieces or hangers 22, each having the outline indicated in Fig. 7. Rivets 23 passing through the two rings and through these hangers secure the rings and hangers together into one rigid piece. Each of the hangers 22 projects from between the rings 20 and 21 both within said rings and without said rings, and at its inner end each of said hangers has an ear bent up at 24 and one bent down at 25, and at its outer end each of said hangers has an ear bent up at 26 and one bent down at 27 as will be understood by comparing Figs. 7 and 9. Each of the ears 24 and 25 is perforated at 28 to receive a pivot projecting from the axle of a type bar. Each of the ears 26 and 27 has a threaded opening through which a pivot screw 29 passes, said screw having its inner end received in a bearing opening in the end of a type bar axle.

Each of the type bars comprises an axle 30, a type carrying arm 31 and an operating arm 32, the type carrying arm being on the inner end of the axle and inside of the type ring and the operating arm being on the outer end of the axle and outside of said ring. Each of the type bars has its arm 31 made with a double bend shown in Fig. 7 and at its free end each of said arms is bent at about a right angle to the general plane of the arm, forming a section 33 in the end of which the type 34 is inserted. It will be perceived that the type bars, their hangers and the ring in which the type bars are mounted, resemble in a general way the corresponding parts of the bottom strike Smith Premier typewriter except that in this case the type bars strike downward instead of upward and with certain other exceptions which will be pointed out. It will be understood that the axles 30 of the type bars are arranged tangentially to an imaginary circle having its center directly above the printing point and that the general direction of the arm 31 of each of said type bars is at an obtuse angle with the axle 30. It will be understood that certain of the axles 30 extend each from one of the hanger ears 24 to one of the hanger ears 26 above the ring 18 and that other of said axles extend each from one of the ears 25 to one of the ears 27 below the ring, the type bars that are mounted above the ring alternating with those that are mounted below the ring.

In the Smith Premier typewriter referred to the type bars are arranged in a single circular series so that as said type bars hang in the basket their type bearing ends form a complete circle, and all of the inclined arms 31 hang spirally in a sort of cylindrical or frusto-conical ring. In the present case, however, the type bars are divided into two sets, one at either side of the middle line drawn through the printing point fore and aft of the machine. The type bars of each set are segmentally arranged, and the type bars of each set have their inclined arms 31 inclined toward the rear of the machine. At the rear of the type basket these inclined arms are arranged in the manner shown in Fig. 8 which is a front view of this part of the type basket. It will be seen that the type bars of the left-hand set at the extreme rear or outer end of said set have their arms 31 inclined toward the right and that the corresponding type bars of the right-hand set have their arms 31 inclined toward the left. As here shown, the extreme end type bars of the two sets have their type bearing ends close together, but this brings the axles of these two type bars at a considerable distance apart. As shown in Fig. 7 the axles of these rear type bars in the left-hand set have their right-hand ends inside the ring 19 and their left-hand ends, which carry the operating arms 32, outside of said rings, whereas the rear type bars of the right-hand set have the reverse arrangement, that is to say, their left-hand type bearing ends are within the ring 19 and their right-hand ends carrying the operating arms 32, are outside of the ring. At the front or inner end of each set of type bars, the outer ends of the axles 30, that is to say, the ends that extend to the outside of the

ring 19 and that carry the operating arms 32, are arranged somewhat close together and the inner ends of these axles are spread at some distance apart. Moreover at the front the arms 31 of the right-hand type bars incline toward the right and the arms 31 of the left-hand type bars incline toward the left as appears in Fig. 9 which shows these forward type bars of the two sets as seen from the rear of the machine. It will be seen that at the front of the machine there is a considerable space or gap between the types 34 of the right and left-hand sets and this fact taken in connection with the cut-out 16 of the keyboard plate makes the printing point, marked with a capital X in Fig. 1, very plainly visible to the operator. It will be seen that this arrangement of type bars contributes very materially to the visibility of the writing. Said arrangement also has advantages from an operating point of view. The operating arms 32 at the front of the ring 19 extend nearly to the middle of the ring and as there are keys in the middle of the keyboard these arms can be readily connected with said keys. On the other end at the rear of the ring where the arms 32 are not so easily connected with key levers having keys at the front of the machine, these operating arms 32 do not extend entirely to the middle of the ring; but the rearmost one of each set is at a considerable distance from the middle where it is possible to reach it with a simple key lever of the first order. Some of the advantages of this type bar arrangement are applicable to other than flat platen typewriters and to other than top strike typewriters.

The keys 35 and the connections for operating the type bars can be understood from Figs. 1 to 5 inclusive. The keys are arranged in twelve rows extending from front to back of the machine, the two outer rows at each side of the machine having seven keys therein and the intermediate rows having each six keys. The keys are mounted on key levers of the first order which are pivoted beneath the keyboard plate 10. These key levers are of three sorts and they are arranged in groups, the key levers of each group carrying the keys of one of the fore and aft rows. The eight middle groups have each six key levers 36 therein and all of these levers are of the general form seen in side view in Fig. 3, but they differ considerably in length as shown in Fig. 1. In order to avoid confusion the key levers 36 are not shown in Fig. 2 but their position with reference to the other key levers can be understood from Fig. 1 and the form of the key lever can be understood from Fig. 3. The next to the last row of keys on each side of the keyboard are mounted on key levers 37 (Figs. 1 and 2) of a somewhat different form from the key levers 36 and the extreme right and left-hand rows of keys are mounted on key levers 38 of still a third form, all of which will be explained in detail.

Each of the key levers 36 and 37 is pivoted on an individual hanger 40 which includes a threaded pin 41 that extends up through the keyboard plate 10 where it is secured in place by a nut 42. Each of these hangers at the under side of the keyboard is slotted to receive and guide the key lever which key lever is pivoted to the hanger by means of a pin 43 (Fig. 2) passing through a hole 44 (Fig. 3) in the key lever. It will be perceived that the form of these hangers is such as to admit of their being turned for the purpose of adjustment about the pin 41 at a center so as to give the proper inclination to the key lever and it will be observed in Fig. 1 that these key levers do not extend directly fore and aft of the machine but that they extend at a slight angle or inclination in that direction. It will also be seen that the pivots of the key levers are arranged in inclined rows. This arrangement enables me to operate key levers of the first order by keys arranged in rows extending directly fore and aft of the machine.

All of the key levers extend from their several pivots toward the front of the machine at the inclination above referred to, and at their forward ends said key levers are each formed with an upwardly curved part or arm 45, said arm being made on a curve having its center at the pivot point 44 of the type bar. Directly beneath each of the keys 35 the keyboard plate is formed with a round opening 46 which at its rear is prolonged into a short slot 47 and the arms 45 play in the slots 47, which slots guide the arms against deflection in a right and left-hand direction. At the top of each of the arms 45 the key lever is formed with a forwardly extending arm 48 bent into a circular outline to receive a stud-like projection from the bottom of each of the key buttons 35. The holes 46 in the keyboard plate are of such size that the rings or heads 48 can be passed up from below through said holes in assembling the machine and the buttons 35 are inserted in said rings or heads after the key levers are in position. When the key levers are depressed, the rings 48 enter the holes 46 to some extent. The key buttons 35 are preferably made of some light, non-metallic composition, and each of them is formed with a stud on its under side adapted to be forced into one of the rings 48.

A little back of the branch or curve 45 of each of the key levers, said lever has an arm 49 which when the lever is originally stamped out of the sheet metal extends downward but which is subsequently bent upward as shown in Fig. 3, and a piece 50 of

leather or similar material is clamped between the lever and the arm 49 to constitute a stop to limit the upward motion of the key lever, the stop 50 when the key is in normal position contacting with the under side of the keyboard plate 10 as shown in Fig. 2. The leather 50 acts as a sound deadening device or cushion.

The rear arm of each of the key levers has a pivot opening 51 (Fig. 3) in which is pivoted the upper end of a link 52, the lower end of which is pivoted at 53 (Fig. 2) to the operating arm 32 of one of the type bars. The links 52 are shown provided with turn buckles for the purpose of adjustment. It will be understood by reference to Fig. 1 that each of the key levers 36 of the eight middle groups, is made of a suitable length so that its forward end comes at the proper place in the keyboard and so that its rear end is in suitable position to coöperate with the connected type bar; and the pivot points of the several key levers are arranged to give the proper leverage on the type bars. It will also be seen that the various key levers are bent as viewed from above so as to bring the rear ends of said key levers approximately into the arc of a circle, the center of which is above the printing point. The rear end of each of the key levers is somewhat nearer to the center of this circle than the operating arms 32 of the type bars so that the links 52 incline outward at the bottom, being arranged approximately in the frustum of a cone having its apex above the printing point. These key levers are also bent in such form as not to interfere with one another, all as will be understood by an inspection of Fig. 1. The key levers do not pass above the type basket, but extend to the right and left-hand sides thereof, so as not to interfere with the visibility of the writing.

It will be seen in Fig. 1 that the extreme right-hand one of the key levers 36 that is shown in said figure, lies above the extreme left-hand one of the key levers 37 of the next to the last group of key levers, and it will also be seen that the rear arms of the key levers 38 all lie above the rear arms of said key levers 37. In order to admit of this arrangement said key levers 37 have the form shown in Fig. 2. Just below the pivot of each of said key levers the lever has a downwardly extending arm 54 and the rearwardly extending arm 55 springs from the arm 54 at some distance below the pivot so that the rear arms of these levers are off-set or dropped down a sufficient distance below the rear arms of both of the levers 36 and 38. The pivots of all the key levers lie approximately in a single plane.

The levers 38 have to reach to the seven rearmost type bars and in order to accomplish this, these levers are made of a special construction shown in Figs. 2, 4, 5 and 6. Each of these levers is built up of three pieces, the middle one consisting of a pivot block 56 (Figs. 4, 5 and 6). This pivot block comprises an arm that stands nearly up and down or which stands about at right angles to the keyboard plate 10 and at its upper end said block is formed with a transverse pivot piece 57 having a hole 58 therethrough. These seven levers are all mounted in a hanger consisting of a strip of sheet metal 60 which is secured to the under side of the keyboard plate 10 by means of screws 61. The plate 60 has seven pairs of ears 62 bent downward therefrom and each perforated at 63. Each of the pivot pieces 57 is supported by a pair of ears 62 by means of a pivot pin inserted in the holes 63 and 58. This gives a wide bearing for each of these key levers, which bearing is important because the pivots of these key levers are not directly in line between the key at one end and the link 52 at the other end. Each of the blocks 56 has at its upper part a flat surface 64 to which the forwardly extending arm of the corresponding key lever is secured and below this flat surface each of said blocks is formed with a beveled surface 65 to which the rearwardly extending arm 66 is secured. These arms may be secured to the block in any suitable way as by riveting or brazing. It will be seen that the forwardly extending arm is at a greater elevation than the rearwardly extending arm of each of these levers and it will be seen from Fig. 1 that the rear arms of some of these levers have to pass underneath the forward arms of other of said levers. These several levers 38, 66 are made of different lengths and are bent as shown in Fig. 1 to bring them into suitable coöperation with their respective type bars and to avoid interference with one another. The arms 66 are also made of slightly different outline as seen from the side in order to avoid interference.

A series of wires 67 extend toward the front of the machine from the several key levers. In the case of the key levers 36 these wires are pivoted to depending arms 68 made for the purpose. In the key levers 37 the wires 67 are pivoted to the extreme lower ends of the arms 54; and in the cases of the key levers 38 each of the pivot blocks 56 is prolonged downward and one of the wires 67 is pivoted thereto at 70. The wires 67 all pass through holes in a bar or angle iron 72 which is secured at its ends to flanges 73 bent downward from the right and left-hand sides of the keyboard plate 10. In front of the bar 72 each of the wires 67 has a compression spring 74 coiled about it and compressed between said bar 72 and a nut 75 threaded on to the end of the wire. These springs 74 are the return-

ing springs of the key levers and the tension of any one of them can be regulated by adjusting the nut 75.

Back of the bar 72 each of the wires 67 is bent to form a shoulder 76 which lies in front of a universal bar 77 which at its ends has arms 78 pivoted at 79 to the flanges 73. This universal bar operates the escapement as shown in my patent above referred to.

The type bars when in normal position rest against a pad 81 of suitable cushioning material, which pad is mounted in a ring-like casing 82 that fits inside of the ring 11, which ring 11 constitutes part of the frame-work of the carriage. The ring 82 may be secured in place in any suitable manner, as for example, by forming it with a small flange and simply springing it into the ring 11.

Various changes can be made in the details of construction and arrangement without departing from my invention.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a typewriting machine, the combination of a series of type bars comprising a right-hand segmentally arranged set and a left-hand segmentally arranged set, said sets being curved about a common printing center, and each type bar comprising an axle and a type carrying arm substantially at one end of said axle and set at an obtuse angle with said axle, the type bars of each set having their type carrying arms at the ends of their respective axles nearest the outer end of said set; and key levers for operating said type bars.

2. In a typewriting machine, the combination of a series of type bars comprising a right-hand segmentally arranged set and a left-hand segmentally arranged set, said sets being curved about a common printing center, and each type bar comprising an axle and a type carrying arm substantially at one end of said axle and set at an obtuse angle with said axle, and an operating arm substantially at the other end of said axle, key levers pivoted between their ends, links connecting said key levers with said operating arms, the operating arms of the type bars of each set being at the ends of their respective axles nearest the inner end of said set.

3. In a typewriting machine, the combination of a platen, a series of type bars arranged to strike downward on said platen, a series of keys in front of said type bars, and a series of key levers for operating said type bars, each of said type bars comprising an axle, a type-carrying arm substantially at one end of said axle and an operating arm substantially at the other end of the axle and those type bars near the front of the system having their operating arms arranged at the middle of the system of type bars and their type-carrying arms at the ends of the axles farthest from the middle of the system, whereby a gap is left between said type-carrying arms to afford visibility of the writing.

4. In a typewriting machine, the combination of a platen, a series of type bars arranged to strike downward on said platen, a series of keys in front of said series of type bars, and a series of key levers for operating said type bars, each of said type bars comprising an axle, a type-carrying arm substantially at one end of said axle and an operating arm substantially at the other end of said axle, those type bars near the rear of the system of type bars having their type carrying arms nearest the middle of the system and their operating arms at the ends of the axles farthest from the middle of the system, and the key levers for operating said rear type bars extending to the right and left-hand sides of the system of type bars whereby said key levers do not interfere with the visibility of the writing.

5. In a typewriting machine, the combination of a system of type bars disposed in arc shaped arrangement, keys and key levers for operating said type bars, said key levers being divided into groups and the key levers of one group having each one arm thereof dropped down out of the plane of the other arms of said key levers and the key levers of another group lying in part above said dropped down arms.

6. In a typewriting machine, the combination of a platen, a series of type bars arranged to strike downward on said platen, a series of keys in front of said series of type bars, and a series of key levers for operating said type bars, the key levers for the type bars near the rear of the system extending to the right and left-hand sides of said system of type bars, whereby said key levers do not obstruct the visibility of the writing and said key levers that reach farthest to the rear so as to operate the rearmost of the type bars being made to cross one another, the forwardly extending arms of certain of said key levers lying above the rearwardly extending arms of other of said key levers.

7. In a typewriting machine, the combination of a platen, a series of type bars, a series of keys in front of said series of type bars, and a series of key levers of the first order for operating said type bars, said key levers having their pivots substantially in a single plane and certain of said key levers having each an arm thereof set materially out of said plane and certain other of the key levers having arms that lie above or below said offset arms.

8. In a typewriting machine, the combination of a series of type bars, a series of key levers for operating said type bars, a keyboard plate, and a series of hangers depend-

ing from said keyboard plate and having said key levers pivoted therein, the key-bearing ends of said key levers being arranged in rows extending from front to back of the machine and said hangers being arranged in rows extending obliquely in a front and back direction.

9. In a typewriting machine, the combination of a series of keys arranged in rows extending fore and aft of the machine, a series of key levers operated by said keys, and extending obliquely from the keys toward the rear of the machine, pivots for said key levers arranged in oblique rows, and printing devices operated by said key levers.

10. In a typewriting machine, the combination of a key lever built up of a pivoted block, an arm extending from said pivoted block toward the front of the machine, and a second arm extending toward the rear of the machine from said block at an angle with the forwardly extending arm.

11. In a typewriting machine, the combination of a key lever having a branch bent back, a piece of sound deadening material clamped between the lever and said bent back branch, and a part against which said piece of sound deadening material strikes to arrest the key lever.

Signed at Syracuse, in the county of Onondaga and State of New York, this 4th day of November, A. D. 1909.

ALEXANDER T. BROWN.

Witnesses:
CARRIE E. ALLEN,
C. E. TOMLINSON.