

A. T. BROWN.
TYPE WRITING MACHINE.
APPLICATION FILED NOV. 11, 1904.

924,885.

Patented June 15, 1909.

2 SHEETS—SHEET 1.

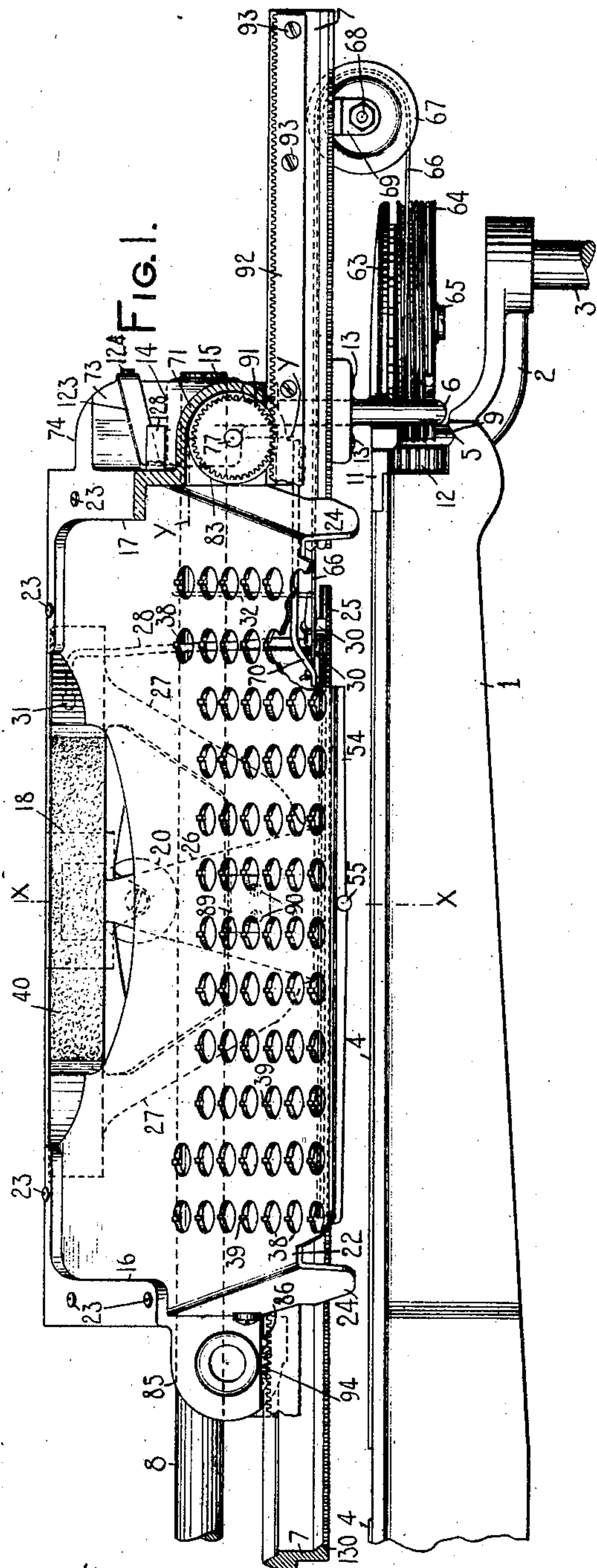


FIG. 1.

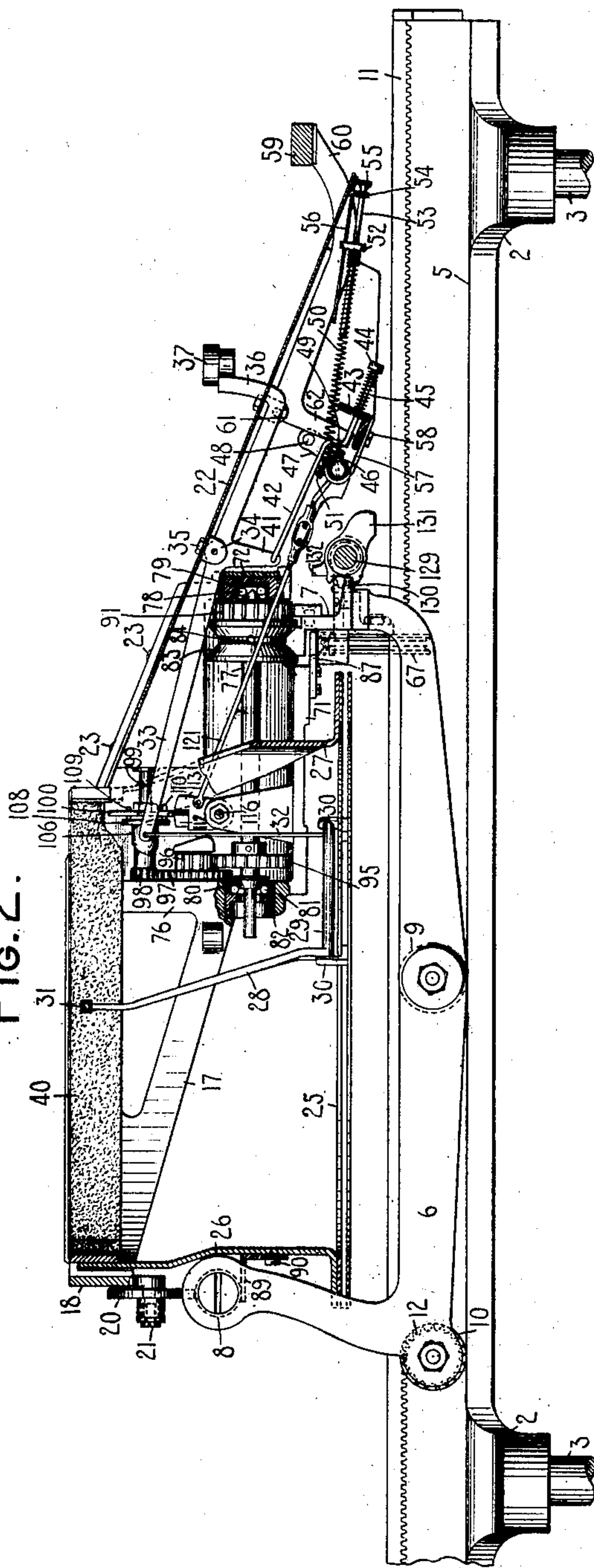


FIG. 2.

WITNESSES.

R. H. Strother.
E. M. Wells

INVENTOR.

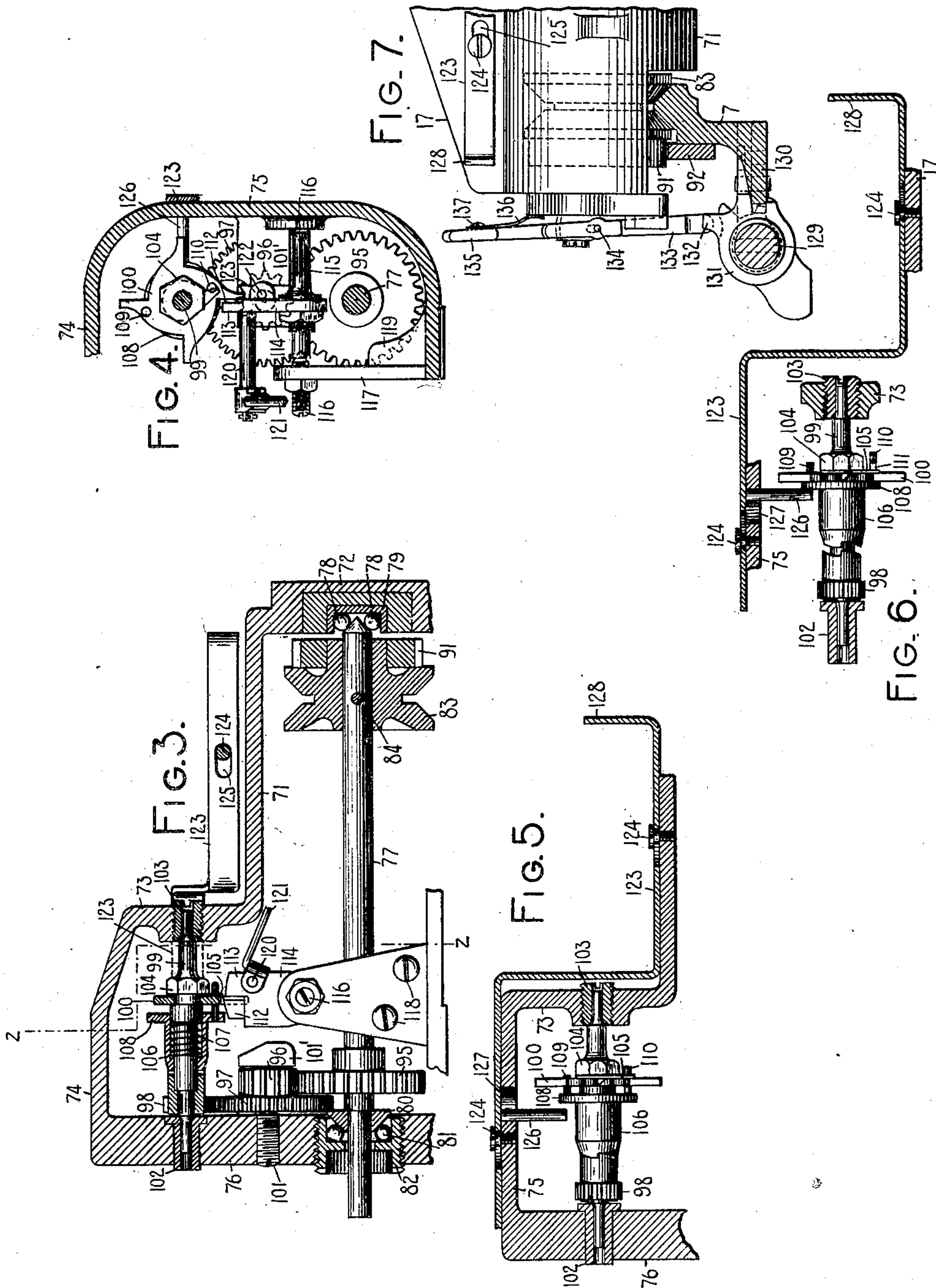
Alexander T. Brown
by James F. Felber
HIS ATTORNEY

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Alexander T. Brown
by *Jacob Felber*
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UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

TYPE-WRITING MACHINE.

No. 924,885.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed November 11, 1904. Serial No. 232,301.

To all whom it may concern:

Be it known that I, ALEXANDER T. BROWN, a 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.

My invention relates chiefly to the carriage feed of typewriting machines and more especially of the so-called "book typewriters."

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

In the accompanying drawings, Figure 1 is a view in front elevation of a typewriting machine in which my invention is embodied; Fig. 2 is a left-hand end elevation of the same, the carriage and frame being shown in vertical section on the line $x-x$ of Fig. 1 and also on the line $y-y$ of said figure; Fig. 3 is a vertical front to rear section through the escapement mechanism; Fig. 4 is a vertical section of the same on the line $z-z$ of Fig. 3; Fig. 5 is a horizontal section of the same; Fig. 6 is a view similar to Fig. 5, but showing the parts in different positions; and Fig. 7 is a fragmentary right-hand end elevation partly in section.

The typewriting machine shown in the present case comprises a stationary flat platen and printing instrumentalities which are mounted in a carriage which moves transversely across said flat platen on a line space frame, which in turn is movable across the platen toward and from the operator. The platen frame 1 is provided with brackets 2 which rest on the upper ends of posts 3 which support the platen frame and most of the mechanism of the machine and which are in turn supported in any suitable manner. The platen consists of the rectangular flat surface of the platen frame on which are spread a sheet or sheets 4 of rubber or other suitable material. Tracks 5 project from the right and left-hand edges of the platen frame, said tracks being depressed below the level of the platen surface.

The line space frame consists of two end

pieces 6 rigidly connected together by transverse bars 7 and 8. Each of the end pieces 6 has two rollers 9 and 10 journaled thereon, and these rollers rest on the tracks 5 and support the line space frame. A rack bar 11 projects over each of the right and left-hand edges of the platen frame and is toothed on its under side, and said rack bars are in mesh with pinions 12 which are mounted co-axially with the rollers 10. Suitable means may be provided for causing the two pinions 12 to turn in unison and thus impart a parallel line space motion to the line space frame. This mechanism is not shown in the present case as the particular construction thereof is immaterial to the present invention. Each of the end pieces 6 has a substantially horizontal portion which lies beneath the level of the platen surface and the forward end of each of said end pieces is formed with a substantial vertical portion to which the frame bar 7 is secured by screws 13 (Fig. 1). The end pieces also have at their rear ends substantial vertical portions which are connected by the bar 8 which, in the present instance, consists of a round rod which is inserted at its ends in bosses 14 (Fig. 1), formed in the end pieces 6, and said bar is secured in position by screws 15 which pass through the end pieces 6 and are threaded into the ends of said bar. The carriage is supported on three rollers, one of which runs on the rear bar 8 and the other two of which are spread wide apart and run on the front bar 7. For this reason said front bar is longer than the bar 8 and projects some distance beyond the end pieces 6 in both directions.

The framework of the carriage comprises a left-hand end casting 16 and a right-hand end casting 17, the ends of which abut at the back of the carriage and are joined together by a plate 18 which is secured to both castings by screws (not shown). A wheel or roller 20 is journaled on a stud projecting from the rear side of the plate 18 and said roller is held in position on said stud by a headed screw 21 which is threaded into the end of the stud. The roller 20 is thus situated in the middle of the carriage at the rear side thereof and runs on the rear frame bar 8 as a track. The castings 16 and 17 are joined at their forward ends by a plate 22 which constitutes the keyboard of the ma-

chine and which is secured to said castings by screws 23 which pass through said castings and are threaded into said plate. The plate 22 projects some distance forward from the castings and the forwardly projecting portion of the plate is formed at its right and left-hand end sides with depending portions 24. A type ring 25 is suspended from the above described portions of the framework by frame pieces 26 and 27 which are connected to said type ring near the rear and front portions thereof respectively. The type bars 28 have shafts 29 which are pivoted in hangers 30, which are secured to the type ring and said type bars carry types 31. The type bars are similar to those used in the Smith Premier typewriter, the type carrying arms springing from the inner ends of the shafts and actuating crank arms from the outer ends of said shafts. Said crank arms are connected by upwardly extending links 32 with the rear ends of key levers 33. Said key levers are pivoted in hangers 34 which are secured to the under side of the keyboard 22 by nuts 35, each of which is threaded on to a portion of the hanger 34 which projects through a hole in the plate 22. The key levers are levers of the first order and their forwardly extending arms are curved upward as shown at 36 and have keys 37 mounted thereon. The curved forward ends 36 of the key levers extend upward through openings 38 in the plate 22 and are guided by notches 39 forming parts of said openings. The type bars normally stand upright and rest against a pad 40 which is secured to the framework of the carriage.

When a key 37 is depressed the rear end of its key lever is elevated and the corresponding type is thrown down against the platen. Each of the key levers 33 has a third arm 41 which extends downward from the pivotal point of said lever, and each of said downwardly extending lever arms has pivoted thereto a link 42 which extends toward the front of the machine through an opening in a transverse frame piece 43 which is secured at its ends to the depending portions 24 of the keyboard. Each of the links 42 extends some distance in front of the frame piece 43 and has a nut 44 threaded on its end. A spring 45 coiled about the link is compressed between the nut 44 and the frame piece 43. This spring serves to return the key lever to normal position, and the tension of the spring may be regulated by adjusting the nut 44. It will be perceived that the tension of the returning springs of the different keys may be regulated separately. A universal bar 46 lies beneath the series of links 42 and said bar is supported at its ends by arms 47 which are pivoted at 48 to the depending portions 24 of the keyboard. Each of the links 42 is

formed with a shoulder 49 which lies in front of the universal bar, so that when any key is depressed the universal bar will be moved toward the back of the machine.

In the present case the links are made of wire, and the shoulders are formed by bending the wire as shown. The universal bar is returned to normal position by a spring 50 which is connected at its rear end to a hook 51 which projects from the universal bar near the middle thereof, and at its forward end said spring is connected to a nut 52 which is threaded on an adjusting screw 53 which passes loosely through a flange 54 depending from the keyboard and which has on its forward end a milled head 55, by turning which the tension on the spring may be regulated.

In order to prevent the nut 52 from turning with the screw 53, said nut is formed with a second opening through which passes a fixed rod 56 which is secured to the flange 54. The motion of the universal bar under the impulse of the spring 50 is limited by a plate 57 which is secured to the frame piece 43 by a screw 58 and the rear end of which acts as a stop for said universal bar. The space bar 59 lies across the keyboard in front of the bank of keys and is mounted at its ends on the forwardly extending arms of bell crank levers 60 which are pivoted in hangers 61, which are secured to the plate 26 in the same manner as the hangers 34. Said bell crank levers have downwardly extending arms 62 which lie in front of the universal bar, and which actuate said universal bar when said space bar is depressed. Said space bar may be provided with suitable returning springs.

The right-hand end piece 6 of the line space frame has projecting horizontally therefrom a disk shaped bracket 63 which has depending therefrom a vertically disposed stud on which is journaled a spring drum 64, said spring drum being held in position on said stud by a headed screw 65 which is threaded into the end of the stud. A cord 66 is wound about said drum, from which it is led over a pulley 67 which is journaled at 68 in a hanger 69 which depends from the frame bar 7 near the right-hand end thereof. The end of the cord 66 is secured to an arm or bracket 70 which is secured to the lower side of the carriage frame casting 17. The construction is such that the tension of the spring in the drum 64 tends to draw the carriage toward the right.

The present machine is of such width that two consecutive leaves of a large book may be spread out on the platen, so that the entire extent of movement of the carriage is very considerable. For this reason the drum 64 is formed with a spiral groove so that the cord 66 may be wound about said drum

several times without having one lap of the cord lying on top of another.

From the foregoing description it will be understood that the middle portion of the carriage beneath and back of the keyboard plate 22 is occupied by the key lever and type bar mechanisms, these parts being arranged but little above the forward rail or frame bar 7. The keys are thus placed low, being only a short distance above the platen. It has been a disadvantage of many prior flat-platen typewriters that the keyboard stood at a considerable height above the platen, with the result that the keys must either be placed so high as to be inconvenient to operate, or else the platen must be placed so low as to be in the way of the operator's knees and to be too far from the eyes. The castings 16 and 17 and the keyboard plate constitute a casing which covers the greater part of the key lever and type bar mechanism, both above and on the right and left-hand sides. The casting 17 extends downward from the top of the carriage almost to the level of the type ring 25, as will be seen by reference to Fig. 2. This portion of the casting 17 is peculiarly shaped to form a housing for the escapement mechanism and some associated parts of the machine. This housing includes a wall 71 which has the general form of a portion of a cylinder, the axis of which is horizontal and extends from front to back of the machine. The form of this wall will be understood by reference to Figs. 1 and 3. The housing also includes a front end wall 72 (Fig. 3) which closes the forward end of the cylindrical shaped chamber, of which the wall 71 forms the roof and side. The rear portion of said chamber is of greater height than the forward portion and has a front wall 73 and a roof 74 and a right-hand side wall 75 (Fig. 4). A rear wall 76 completes the housing of the chamber which is open on the side next the key lever mechanism. A horizontally disposed shaft 77 extending from front to back of the machine, is journaled at its forward end in the front end wall 72 and near its rear end in the rear end wall 76 of the chamber above described. As here shown, the forward end of the shaft is coned and bears on anti-friction balls 78 which run in a ball bearing cap 79 which is seated in the wall 72. The rear end of the shaft is reduced, thus forming a shoulder, and a cone bearing 80 is mounted on the reduced part of the shaft and seated against said shoulder. Said cone bearing engages anti-friction balls 81 which run in a ball bearing cup 82 which is threaded through the rear wall 76 of the chamber. The ball bearings may be adjusted by adjusting the threaded cup 82. Near its forward end the shaft 77 has rigidly mounted thereon a grooved roller 83 which is fixed in position on said shaft by a pin 84 which passes

through said roller and shaft. The grooved roller 83 runs on top of the frame bar 7, the upper portion of which is made with an inverted V-shaped cross section to cooperate with said roller, as shown in Fig. 7.

The casting 16 is so shaped as to form a housing 85 (Fig. 1), which is similar in form to the forward part of the housing formed by the casting 17. Within the housing 85 there is journaled a shaft similar in all respects to the shaft 77 and having mounted thereon a roller 86 similar to the roller 83.

It will be perceived that the rollers 83 and 86 are on the extreme right and left ends respectively of the carriage so that they are wide apart, and being grooved and running on the V-shaped track, they serve to guide the motion of the carriage across the machine in parallelism. Moreover, by placing these rollers and the escapement mechanism clear away at the sides of the key-lever system, I obtain room to mount said key-lever system low, where the keys are in convenient position for operation.

In order to prevent the rollers 83 and 86 from accidental displacement from the rail 7 a plate 87 of metal is secured to the underside of the housing 71 by screws 88, and said plate extends beneath the rail, as shown in Fig. 2. A bracket 89 is secured to the frame piece 26 by a screw 90 and extends beneath the frame rod or rail 8 and prevents accidental displacement of the roller 20 from said rail.

A pinion 91 is rigidly mounted on the hub of the roller 83 and said pinion meshes with a rack bar 92 which lies along the front face of the rail 7, as shown in Fig. 7, and which is secured to said rail by screws 93 (Fig. 1). A pinion 94 (Fig. 1) is secured to the hub of the roller 86 in the same manner as the pinion 91 to the hub of the roller 83. Said pinion 94 is used in connection with the ribbon mechanism which is not shown in the present case.

As best shown in Figs. 3 and 4, the escapement mechanism which controls the feed of the carriage under the impulse of the spring drum 64, is inclosed in the housing formed by the casting 17 and is geared to the shaft 77 which through the pinion 91 is geared to the rack bar 92. A gear wheel 95 is rigidly mounted on the shaft 77 and meshes with a pinion 96 which is rigidly connected with a gear wheel 97 which meshes with a pinion 98, which is loosely mounted on a shaft 99 on which is also mounted the escapement wheel 100. The pinion 96 and the gear 97 are journaled on a short shaft 101 which has a threaded portion which is threaded through the rear wall 76 of the housing. The forward end of the shaft 101 extends into a suitable opening in a bracket 101' (Fig. 3) which, as best shown in Fig. 4, projects toward the center of the machine from the

wall 75 of the housing. The gear 95 is larger than the pinion 96 and the gear 97 is larger than the pinion 96 and also larger than the pinion 98, so that the shaft 99 turns much more rapidly than the shaft 77.

In the present instance the escapement wheel is formed with four teeth and is so geared to the pinion 91 that this number of teeth feeds the carriage a letter space distance at each actuation of the escapement mechanism. The shaft 99 is formed with reduced ends each having a tapered portion, and said reduced ends are journaled in bushings 102 and 103 which are mounted in suitable openings in the rear wall 76 and the front wall 73 respectively of the upper rear portion of the chamber. The bushing 102 is formed with an annular shoulder to prevent endwise motion thereof and the bushing 103 is threaded through the wall 73 so that the bearing may be adjusted by tightening or loosening said bushing. The shaft 99 has its greatest diameter just back of the escapement wheel, thus forming an annular shoulder against which the escapement wheel is clamped by a nut 104 which is threaded on to the shaft. A washer 105 is interposed between the nut and the escapement wheel. This washer has a function which will be set forth hereinafter. A short distance back of the escapement wheel the shaft 99 is reduced in diameter, forming an annular shoulder and said shaft is again reduced in diameter within the hub of the pinion 98, thus forming a third annular shoulder which prevents motion of said pinion longitudinally of the shaft in one direction. Motion of said pinion longitudinally of the shaft in the other direction is prevented by the bushing 102. The hub of the pinion 98 is somewhat elongated toward the front of the machine and the forward end of said hub is formed with clutch teeth having one abrupt and one oblique face.

A sleeve 106 is loosely mounted on the shaft 99 between the pinion 98 and the escapement wheel, the bore of said sleeve at its rear end being of a diameter appropriate to the middle portion of the shaft and the bore at its forward end being appropriate to the greatest diameter of the shaft. The sleeve is thus formed with an internal annular shoulder, and a spring 107 (Fig. 3) coiled about the shaft 99 is compressed between this internal annular shoulder and the corresponding annular shoulder on the shaft. The sleeve 106 is formed at its rear end with clutch teeth which are adapted to cooperate with the clutch teeth on the hub of the pinion 98 and the spring 107 tends to keep these cooperating clutch members in engagement. The construction is such that if the sleeve 106 be held against rotation the engagement of the abrupt faces of the clutch teeth will hold the carriage against motion

under the impulse of its driving spring; but if the carriage be pushed in the opposite direction the oblique faces of the clutch teeth will slip past one another, pressing the sleeve 106 toward the front of the machine against the tension of the spring 107. The sleeve 106 is formed at its forward end with an annular flange 108 and pins 109 and 110 project toward the front of the machine from said flange and pass loosely through suitable openings in the escapement wheel. By means of these pins the sleeve 106 and the escapement wheel are constrained to turn in unison. In order to prevent the spring 107 acting through the sleeve 106 from pressing the pinion 98 against the bushing 102 and thus causing unnecessary friction, means are provided for limiting the motion of said sleeve under the impulse of said spring. In the present instance the pin 110 is flattened, forming a notch 111 (Fig. 6) and a tooth projecting from the washer 105 lies in this notch and engaging the forward end of the notch limits the backward motion of the sleeve.

Dogs 112 and 113 project upward from a dog carrier or arm 114, which is rigidly mounted on a rock shaft 115 which is pivoted at its ends on coned pivot screws 116, one of which is threaded through the side wall 75 of the housing and the other of which is threaded through a frame piece 117 which is secured by screws 118 (Fig. 3) to a bracket 119 (Fig. 4), which rises from the floor of the housing. The dog carrying arm 114 has a stud 120 projecting therefrom toward the middle of the machine. On the reduced end of said stud is pivoted a link 121 which extends toward the front of the machine and at its forward end is pivotally connected with the universal bar at or near the extreme right-hand end thereof. The construction is such that whenever the universal bar is operated by a key or the space bar, the dogs are rocked and the escapement wheel is permitted to move a distance equal to the space between two teeth thereof. The dog 113 is a fixed dog and the dog 112 a loose dog which, as shown in Fig. 4, is pivoted at 122 to an ear 123 which projects from the right-hand face of the dog carrier 114. The lug or bracket 101' stands back of the dog carrier and serves to prevent excessive motion of said carrier toward the back of the machine.

It is obvious that the carriage may be released from the escapement mechanism by pressing the sleeve 106 toward the front of the machine, thus disengaging the clutch connection between said sleeve and the pinion 98. I have provided a finger piece and connections for this purpose. A slide 123 is mounted on the outside of the escapement housing, being supported by headed screws 124 which pass loosely through elon-

gated slots 125 (Fig. 7) in said slide and are threaded into the housing. A pin 126 projects from said slide through a slot 127 (Fig. 5) in the side wall 75 and the end of said pin stands behind the flange 108 of the sleeve 106. The forward end of the slide 123 is bent to the right to form a finger piece 128 by means of which the slide may be drawn toward the front of the machine, when the pin 126 will move the sleeve 106 out of engagement with the hub of the pinion 98, as shown in Fig. 6.

As shown in Fig. 2, a rod 129 is fixed to the bar 7 and extends across the machine just in front of the lower edge of said bar. The lower part of the bar 7 is formed with a forwardly extending flange 130, which, as shown in Fig. 1, has teeth formed in its forward edge, said teeth being a letter space distance apart. A carriage stop or carriage stops 131 are mounted on the bar 129 in such manner that they may be adjusted by sliding them along said bar, and said stop, or any of them if there are more than one, may be secured in adjusted position by turning it about the rod 129 until a tooth projecting from the stop enters the notch between two of the teeth of the flange 130. The stop has an upwardly extending tooth 132 which stands in the path of a stop arm 133 which is pivoted to the casting 17 at 134 in such manner that the lower end of said stop arm may be moved toward the front of the machine. The stop arm 133 has an upwardly extending arm 135 which forms a finger piece, to the back of which a spring 136 is secured by a screw 137. Said spring engaging the casting tends to press the upper end of the stop arm toward the front of the machine and the lower end of the stop arm toward the back of the machine into the path of the tooth 132, but by pressing the finger piece 135 toward the back of the machine against the tension of the spring 136, the lower part of the arm may be moved toward the front of the machine out of the path of the stop piece 132. I prefer to mount the arm 133 in the position shown in Fig. 7 on the front end of the housing. The finger piece 128 which controls the carriage release slide 123 stands just back of the finger piece 135. The construction is such that either finger piece may be operated separately, or both finger pieces may be grasped at the same time, being pinched together between the thumb of the operator pressing against the finger piece 135 and the index finger pressing against the finger piece 128. When the parts are manipulated in this way the carriage is freed from the escapement mechanism and the carriage stop is thrown out of operative position, the two operations being performed simultaneously by a single movement of the hand.

Various changes in the details of construc-

tion and arrangement may be made without departing from the gist of my several improvements.

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

1. In a typewriting machine, the combination of a carriage; a rail or track; a supporting and guiding roller mounted on a shaft which is journaled in said carriage; an escapement device geared to said shaft; a pinion on said shaft; and a stationary rack meshing with said pinion.

2. In a typewriting machine, the combination of a carriage having key and type mechanisms mounted therein; a rear roller on said carriage; a stationary rear track for said roller; a front stationary track; two guiding rollers spaced wide apart and running on said front track; a stationary rack bar mounted adjacent said front track; a pinion engaging said stationary rack bar; and a key controlled escapement mechanism geared to said pinion.

3. In a typewriting machine, the combination of a carriage having key and type mechanisms mounted therein; a rear roller mounted on said carriage; a stationary rail or track for said rear roller; two guide rollers spaced apart nearer the front of the carriage than said rear roller; a stationary guide rail or track for said guide rollers; a stationary rack bar mounted adjacent said guide rail; a pinion on said carriage engaging said rack bar; an escapement mechanism controlling said pinion; a driving cord connected to said carriage; a spring drum for said cord; and a pulley for said cord mounted on said guide rail.

4. In a typewriting machine, the combination of a carriage having key levers and type mechanisms mounted therein; longitudinally movable shouldered links connected directly with said key levers; key lever returning springs connected with said shouldered links; and a universal bar operated by said shouldered links.

5. In a typewriting machine, the combination of a carriage having key levers and type mechanism mounted therein; arms depending from said key levers; longitudinally movable links connected with said arms; key lever returning springs connected with said links; individual returning spring adjustment devices for said links and returning springs; and a universal bar operated by said links.

6. In a typewriting machine, the combination of a carriage; an escapement mechanism for said carriage; a carriage release device including a finger-piece for freeing said carriage from said escapement mechanism; a carriage stop device including a finger piece and connections whereby said carriage stop device may be rendered inoperative; the finger piece of said carriage stop device

and the finger piece of said carriage release device being situated close together and adapted to move toward each other so that the two finger pieces may be pinched together by the hand of the operator and both finger pieces thus operated at the same time.

7. The combination with a carriage of an escapement mechanism for controlling said carriage, said escapement mechanism including a clutch, one member of which is slidable into and out of engagement with the other; a casing for said escapement mechanism having an opening therein; and a slide mounted on said casing and having a portion extending through said opening and engaging said slidable member to operate said clutch.

8. The combination with a carriage, and key mechanism and type mechanism carried thereby, of a frame on which said carriage is adapted to travel back and forth; a rack bar on said frame; a pinion on said carriage engaging said rack bar; an escapement mechanism for controlling said pinion; a housing for said escapement mechanism; and means whereby said escapement mechanism is controlled by said key mechanism; said key mechanism being disposed low over said rack bar and said escapement mechanism and its housing being arranged at one side of said key mechanism.

9. The combination with a carriage and a series of keys and key operated printing devices carried by said carriage, of a rack bar extending beneath a portion of said carriage; a pinion rotatably mounted in said carriage and engaging said rack; and an escapement mechanism controlled by said keys and controlling said pinion, said key levers being disposed low over and forward of said rack bar and said escapement mechanism and said pinion being carried by said carriage at one side thereof.

10. The combination of a platen; a frame movable across said platen for line spacing; a carriage movable across said line space frame for letter spacing; a rack bar carried by said line space frame; a pinion carried by said carriage and engaging said rack bar; a series of keys and printing instrumentalities controlled thereby; an escapement mechanism controlled by said keys and controlling said pinion, said keys being disposed low over and forward of said rack bar, and said escapement mechanism being situated at one side of said key mechanism; and spring means adapted to draw said carriage across said line-space frame.

11. The combination of a series of keys and printing devices operated by said keys; a universal bar common to and operable by all of said keys; an escapement mechanism situated at one side of said series of keys and including a dog; and a link connected to said universal bar near one end of said universal bar and operatively connected to said dog.

12. In a typewriting machine, the combination of a flat platen, a carriage arranged to travel over said platen, printing mechanism mounted in said carriage and comprising keys and type bars, said keys being disposed low over said platen, a universal bar arranged for operation by any of said keys, a carriage escapement arranged at one side of said printing mechanism, and a connection between said universal bar and said escapement.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 9th day of November A. D. 1904.

ALEXANDER T. BROWN.

Witnesses:

E. M. WELLS,
M. F. HAUNWEBER.