May 10, 1949. H. E. HOOE 2,469,390

KEY LEVER SPACER AND GUIDE FOR STENOGRAPHIC MACHINES

Filed May 10, 1946 5 Sheets-Sheet 1

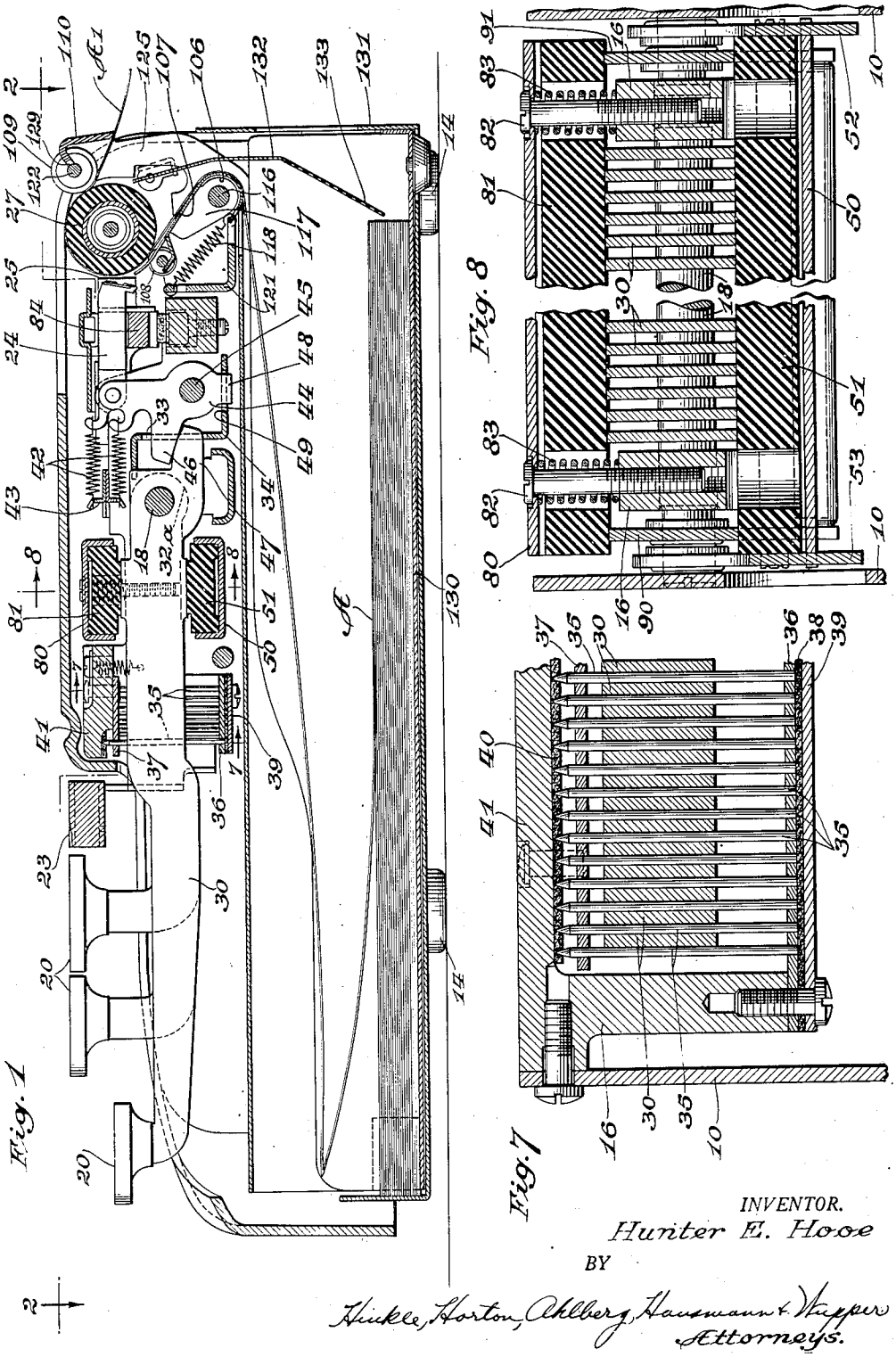


Fig. 1

Fig. 8

Fig. 7

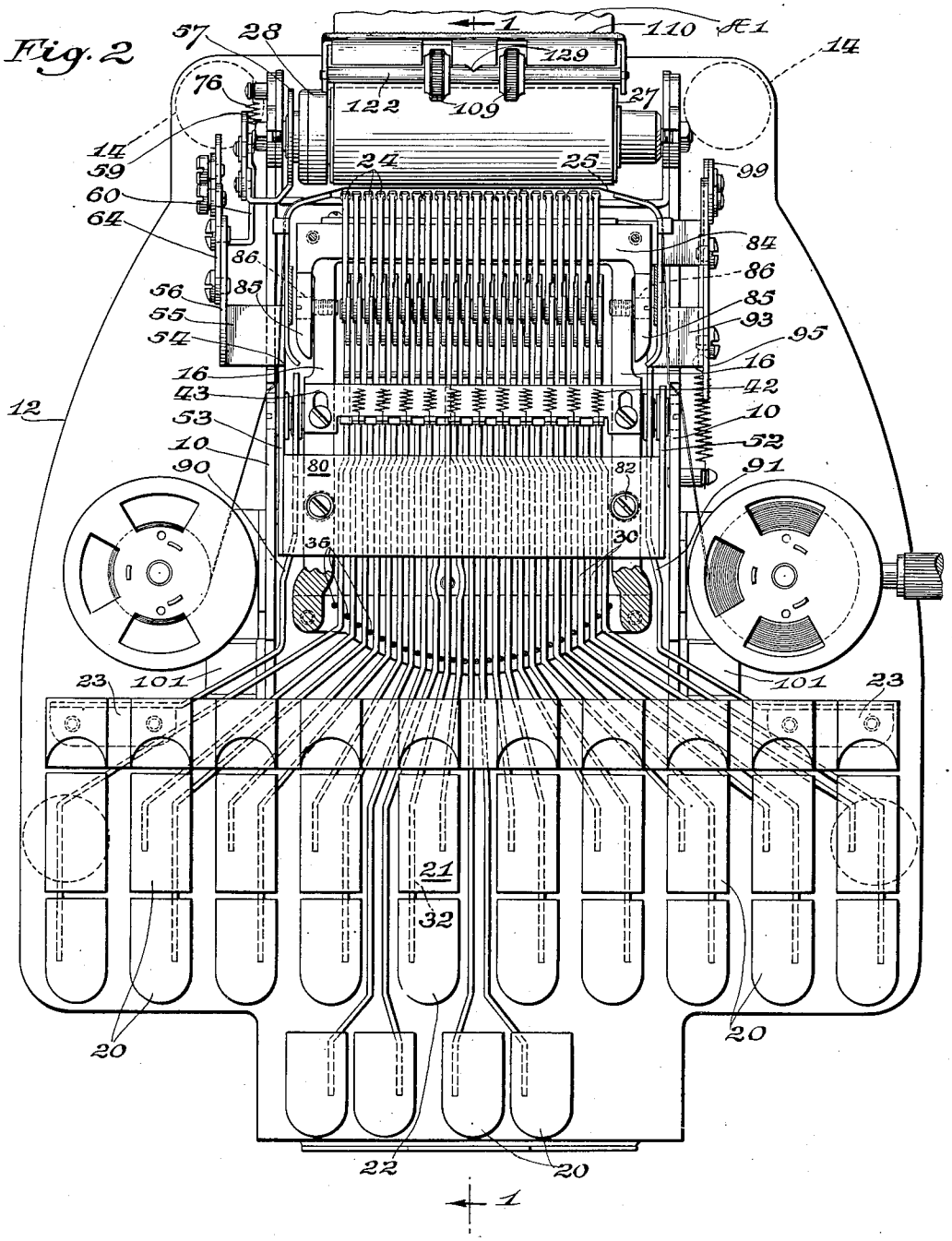
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KEY LEVER SPACER AND GUIDE FOR STENOGRAPHIC MACHINES

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Fig. 2



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KEY LEVER SPACER AND GUIDE
FOR STENOGRAPHIC MACHINES

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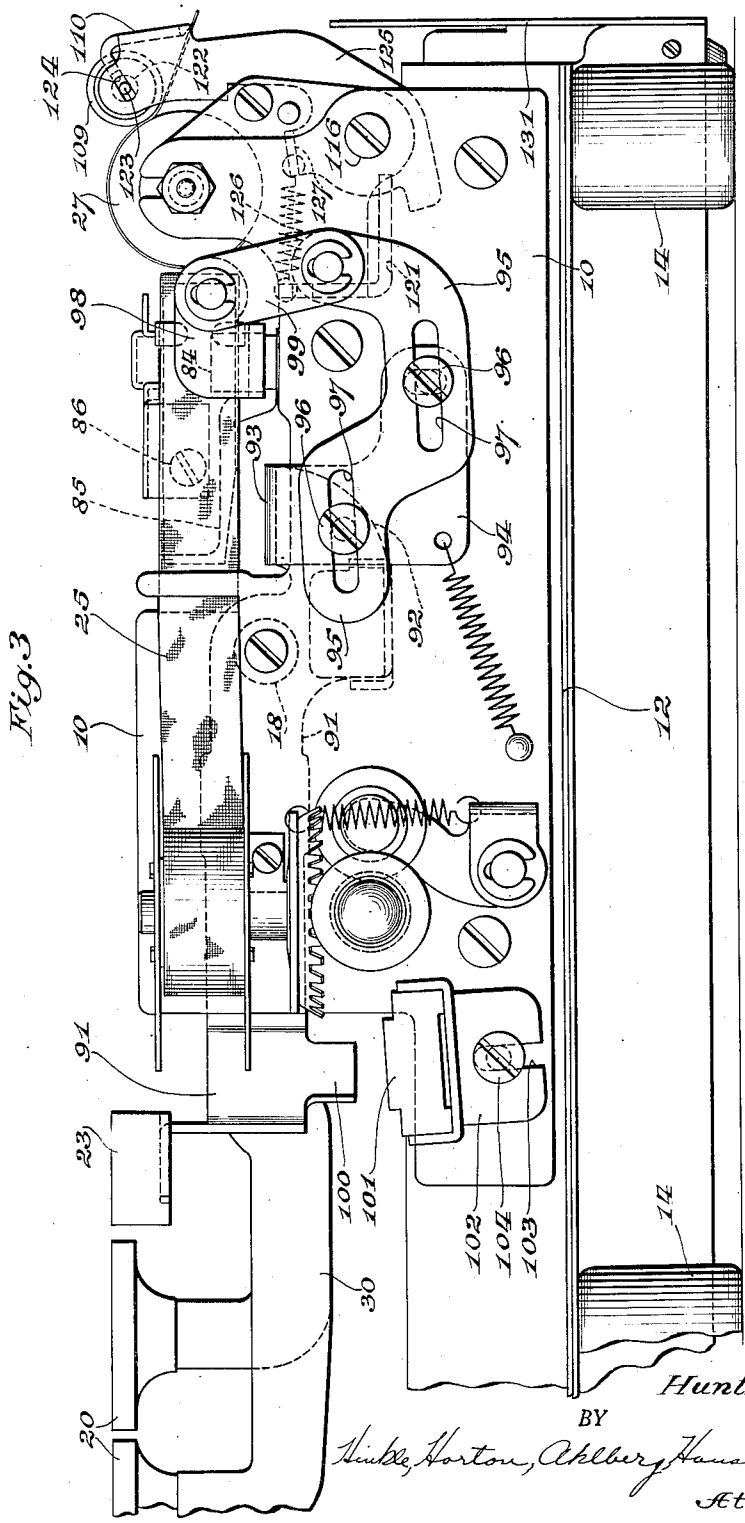


Fig. 3

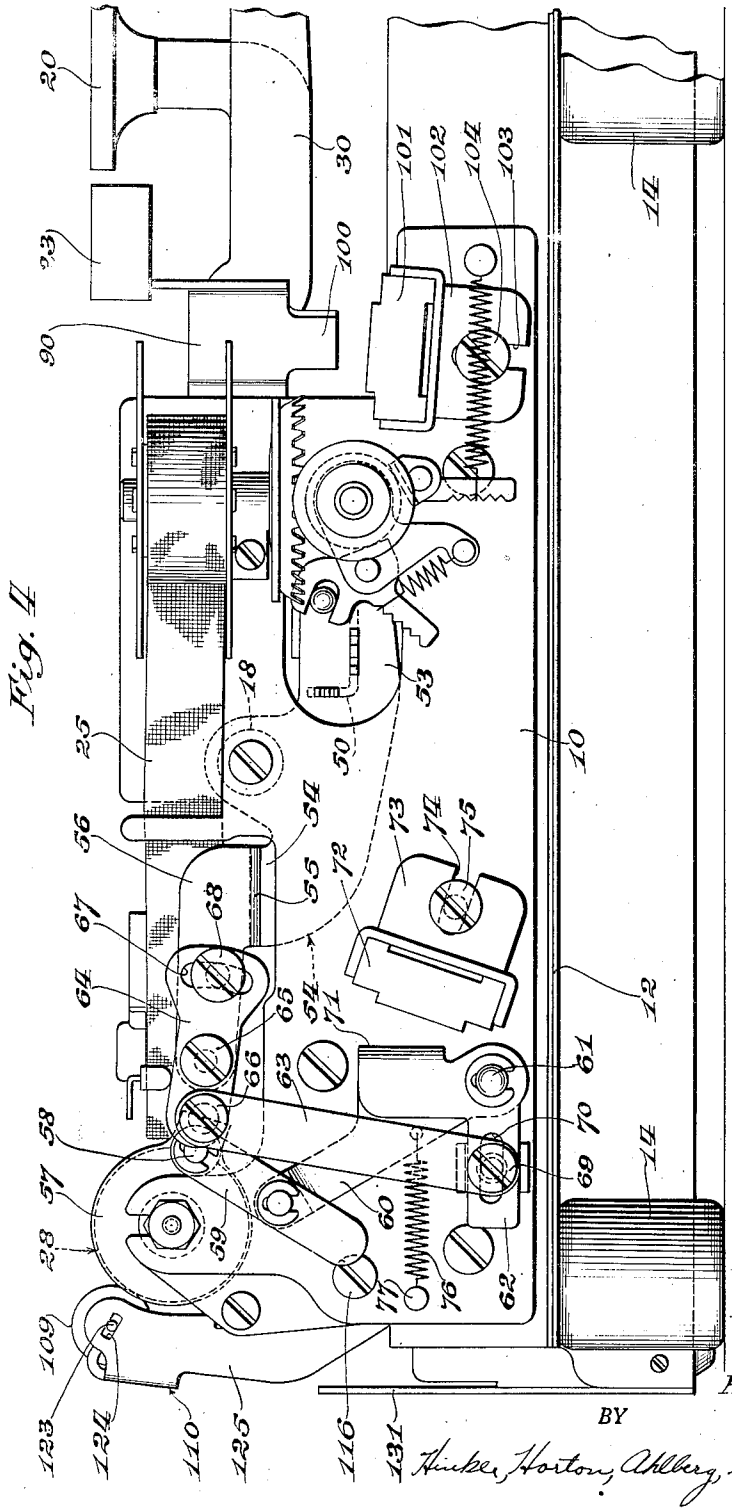
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Fig. 4



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KEY LEVER SPACER AND GUIDE FOR STENOGRAPHIC MACHINES

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Fig. 5

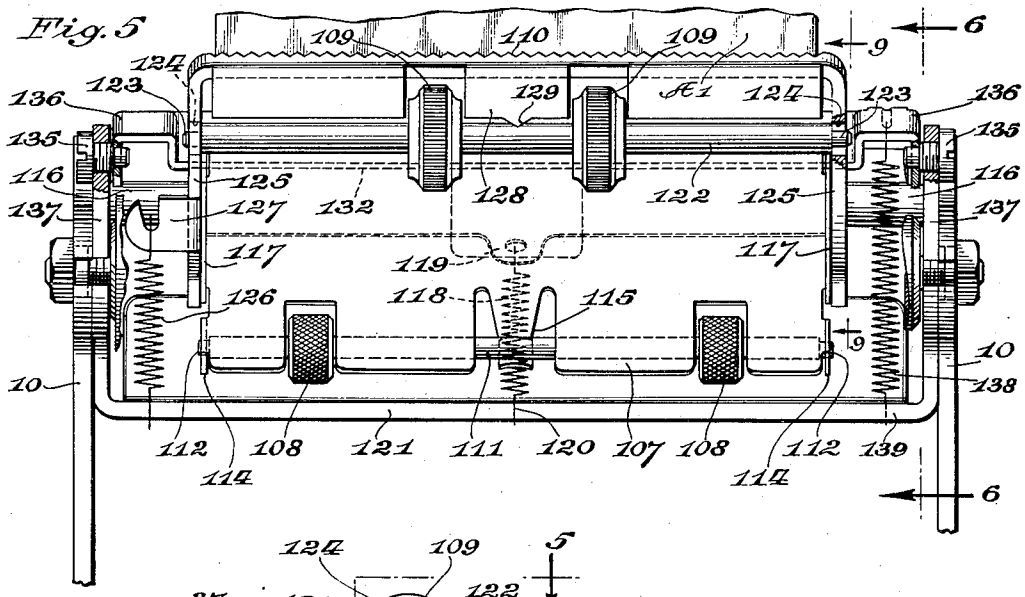


Fig. 6

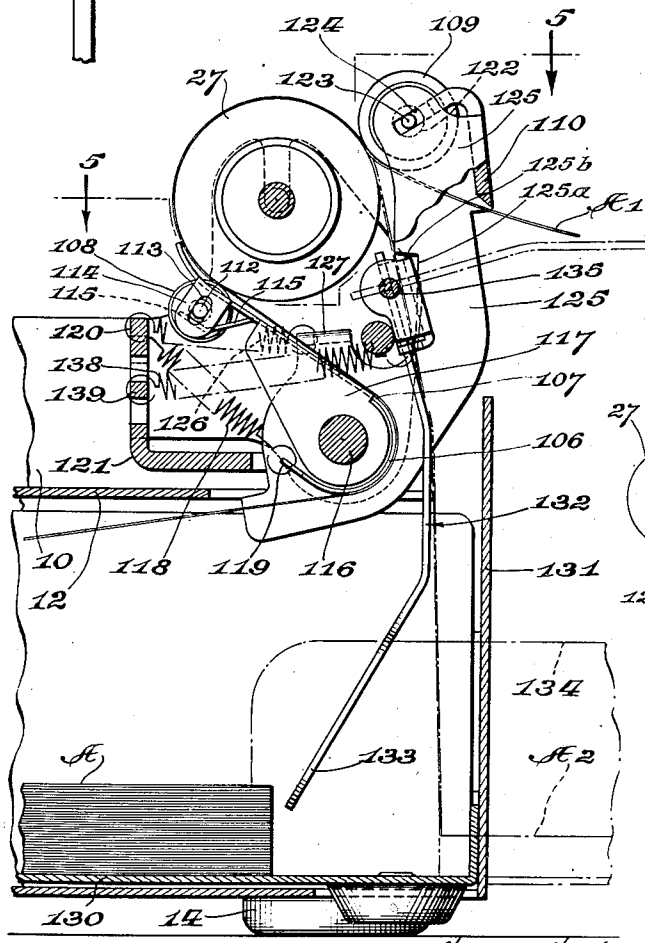
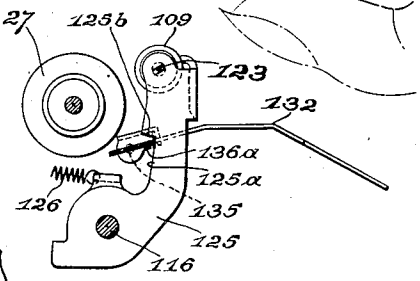


Fig. 9



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UNITED STATES PATENT OFFICE

2,469,390

KEY LEVER SPACER AND GUIDE FOR STENOGRAPHIC MACHINES

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Application May 10, 1946, Serial No. 668,872

4 Claims. (Cl. 197—106)

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This invention relates to stenographic machines of the type used in recording business dictation, conferences, court testimony and procedure, and the like.

The object of the invention is to provide a stenographic machine with improved spacing means for the key levers so as to reduce the friction incident to actuation.

Other objects and advantages of the invention will appear from the following description taken in connection with the drawings, in which:

Fig. 1 is a vertical sectional view of a stenographic machine embodying the invention, being taken substantially at the line 1—1 on Fig. 2;

Fig. 2 is a top plan view of the machine with the cover removed to reveal portions of the operating mechanism;

Fig. 3 is a side elevation of the mechanism as it appears from the right-hand side with the outer casing removed, a fragment of the machine being broken away at one end;

Fig. 4 is a side elevation of the mechanism as it appears from the left-hand side with the outer casing removed, a portion of the frame and case being broken away at one end;

Fig. 5 is a partial top plan view of the machine showing the paper feed mechanism with the platen roll removed, being taken substantially as indicated at line 5—5 on Fig. 6;

Fig. 6 is a vertical sectional view of the end portion of the machine which includes the platen roll and paper feed roller, being taken substantially as indicated at line 6—6 on Fig. 5;

Fig. 7 is a detail sectional view taken as indicated at line 7—7 on Fig. 1 and showing the spacing rods for the key levers;

Fig. 8 is a transverse vertical sectional view of the mechanism taken substantially as indicated at line 8—8 on Fig. 1 and showing the bank bar and universal bar with their resilient cushions; and

Fig. 9 is a diagrammatic view of certain parts of the structure of Fig. 6, showing the parts in a different position, and taken as a section at line 9—9 on Fig. 5.

As illustrated herein, the machine embodying this invention includes a main frame having side plates 10 secured to a base 12 having resilient feet 14 of rubber or like material. Between the side plates 10 there is mounted a subframe or chassis having side members 16 (Fig. 2) which support a key lever pivot shaft 18 (Fig. 1).

A machine of this type conventionally includes twenty-two keys denoted by the numeral 20, each of which represents a letter, together with a key

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21 which prints an asterisk and a space key 22. A numeral bar 23 extends transversely across the keyboard behind the rearward row of keys 20 so that it may be depressed simultaneously with any of the keys of that row. As any key or combination of keys 20 is depressed, the corresponding type bar or type bars 24 are moved against an inked ribbon 25 to make an impression on the paper which is fed around the axis of the platen roll 27. A clutch 28 is operatively connected to the keys 20, 21 and 22 so that each actuation of the keys rotates the platen roll 27 through a limited distance; and at the end of the stroke of any of the keys 20 or 22 an impression is made upon the paper corresponding to the key or keys which are depressed. This mode of operation is conventional and substantially standardized in machines of this character.

In the present structure, the keys 20, 21 and 22 are attached to key levers 30 which are of relatively thin stock disposed with their broader faces in parallel planes to form a bank of levers fulcrumed on shaft 18 between side bars 16 of the chassis. To provide for convenient spacing of the keys themselves the outer ends of the levers are bent laterally to a greater or less extent except at the middle portion of the group. The key levers 30 and the space key lever 32 are all fulcrumed on the shaft 18 and at their inner ends the key levers are spaced by engagement in vertical slots 33 formed in a transverse frame member 34. Forward of their fulcrums and just rearward of the bends in the levers, they are spaced between vertically disposed guide rods 35, as shown in Fig. 7. These rods are of round stock and are mounted for rotation about their own axes having their lower ends journaled in a plate 36 and their upper ends journaled in plate 37. The lower ends of the rods are stepped upon a cushion member of felt or like material shown at 38 supported on a bottom plate 39 and the upper and tapered ends of the rods engage in a felt cushion 40 disposed against the under side of the cross bar 41 of the chassis or subframe.

The rods 35 are spaced apart so as to afford mere working clearance for the key levers 30 and 32, but the fact that the rods 35 are of round cross section provides a line contact between each rod and the adjacent key lever. With most of the keys, because of their location laterally of the planes in which the levers 30 are guided by the rods 35, the pressure upon any key tends to twist the portion of the lever 30 which moves between the guide rods 35 so that the actual working contact is reduced almost to a point at the

upper edge of the lever and to a point at the lower opposite edge thereof. It may also be noted that as the key is depressed the arcuate movement of the lever 30 about the pivot shaft 18 will cause a slight longitudinal travel of these points of contact with respect to the rods 35 which they engage. The rods are free to rotate in response to this component of the lever movement, while their limited surface contact with the levers offers relatively slight frictional resistance to the vertical movement of the lever notwithstanding the torque therein which results from the positioning of the key (in most cases) at a substantial distance laterally of the plane in which the lever rocks. The felt cushions 38 and 40 permit the rods 35 sufficient freedom for rotation, but avoid the possibility of any tapping or clicking noise which might result if the ends of the rods were checked between metallic stop plates with any end play.

As seen in Fig. 1, the type bars 24 are horizontally slidable and are normally retracted from the platen 27 by springs 42 secured to an anchor plate 43 which is adjustably mounted on the side members 16 of the subframe. Each type bar 24 is pivotally connected to a bell crank lever 44, pivoted on a rod 45 and having an arm 46 which engages the slightly curved upper edge of the rearwardly extending arm 47 of a key lever 30. Each of the levers 44 has a short arm or lug 48 which registers in the slot 49 of the cross member 34 while the arm 46 of the lever extends into the same slot 33 which serves to position the inner end of the key lever 30. Depression of the corresponding key rocks the outer end of the key lever downwardly, moving the inner end portion 47 upwardly and thus swings the bell crank 48 about its fulcrum 45 to drive the type bar 24 toward the platen 27.

The downward movement of any of the key levers 30 or 32 carries with it the universal bar 50 which is shown as an upwardly open channel member provided with a pad 51 preferably of neoprene or other similar durable synthetic rubber-like material. The ends of the channel bar 50 are staked into universal bar levers 52 and 53 (Fig. 2), both of which are fulcrumed on the shaft 18. The lever 53 includes a rearwardly extending arm 54 (Figs. 2 and 4) having a laterally extending portion 55 and a terminal portion 56 carried by the part 55 in offset relation to the part 54 so that the portion 54 of the arm is disposed inside the side plate 10 and the portion 56 is positioned outside the side plate and in a plane beyond the end of the platen roll 27.

The clutch device 28 which drives the platen roll 27 may be of conventional construction and includes an actuating member 57 mounted to oscillate about the axis of the platen roll 27. The member 57 carries a crank pin 58 serving as a pivot for one end of a link 59 which constitutes one member of a toggle. The other member 60 of the toggle is fulcrumed on a pivot 61 secured to the side plate 10 of the frame and is in the form of a bell crank lever having a sidewardly offset shorter arm 62 operatively connected through a link 63 with the universal bar lever arm 54.

As shown in Fig. 4, the terminal portion 56 of the lever 53 carries an adjustable plate 64 secured to the part 56 by a pivot screw 65 and this plate carries the pivot screw 66 which provides the connection with the link 63. At the opposite side of the pivot 65 the plate 64 has an arcuate slot 67 through which a clamp screw 68 extends to the

body of the lever terminal 56. This permits adjustment of the plate 64 about the pivot screw 65 so as to vary the position of the clutch driving linkage for a given position of the universal bar 50. The pivot 69 by which the link 63 is attached to the lever arm 62 is adjustable in a slot 70 extending longitudinally of said lever arm for varying the stroke imparted to the clutch by a given movement of the universal bar 50 and thus varying the amount of the paper feed.

The extent of this feeding movement is limited by engagement of a stop face 71 on the lever 60 with a pad 72 preferably of neoprene or similar material carried on a bracket 73 which is slotted at 74 for adjustment and for securement by a clamping screw 75 which extends through the slot into the side plate 10 of the frame. The return movement of the universal bar and connected linkage is effected by a retractile spring 76 engaged with the lever 60 and anchored to the side plate 10 at 77; and this movement of the universal bar is limited by the bank bar or upstop 80 (Figs. 1 and 8) which is shown as a downwardly open channel extending across the subframe and provided with a cushion pad 81 preferably of neoprene or similar material. The bank bar 80 is held in place by screws 82 extending downwardly into the side members 16 of the subframe or chassis with springs 83 interposed between the bar 80 and said frame members 16 to uphold the bar 80 while permitting it to be vertically adjusted as desired.

Thus, each actuation of one of the key levers 30 depresses the universal bar 50 and causes a feeding movement of the platen roll 27. The lever 32 of the space key terminates at the fulcrum 18 as indicated in dotted outline at 32a but engages the universal bar 50 in the same manner as the key levers 30 so that depression of the space key 22 operates to feed the paper over the platen roll 27 without adding any type impression.

In addition to their reciprocating movements toward and from the platen roll 27 the type bars 24 are adapted to be shifted vertically. Some of the type bars are provided with two printing characters, the upper character being normally positioned for printing engagement with the platen 27. The type bars are slidable in a cradle which includes a cross member 84 (Fig. 1) and side arms 85 which are shown in Fig. 2 pivoted on the heads of cap screws 86 threaded in the side members 16 of the subframe. The cradle is thus adapted to be rocked upwardly for bringing the lower characters on the type bars 24 into printing position. Since in the conventional arrangement the lower characters on certain of the type bars are the numerals 1 to 9, inclusive, this shifting or rocking movement of the cradle is effected by the depression of the numeral bar 23, which is carried at the ends of levers 90 and 91, both fulcrumed on the pivot shaft 18. The lever 91 includes a portion 92, which extends rearwardly beyond the pivot shaft 18, and a laterally extending portion 93 which connects with an offset portion 94. A terminal extension 95 is attached to the part 94 of the lever by screws 96 engaging elongated slots 97 which permit adjustment of the extension 95 in a direction to vary the effective length of the lever as may be desired. The cradle by which the type bars 24 are carried includes an arm 98 extending from one end of the cross member 84 and connected by a link 99 to the adjustable extension 95 of the numeral bar lever 91. Thus, by adjusting this

extension 95 the actuation of the numeral bar 23 may be caused to lift the type bars by just the right amount to secure a proper impression of the numerals when the accompanying keys 20 are actuated. The downward stroke of the numeral bar 23 is limited by enagagement of lugs 100 with pads 101 of neoprene or like material carried in brackets 102 which are almost directly under the numeral bar 23 itself. These brackets are formed with slots 103 and are secured to the side plates 10 by clamping screws 104 which permit vertical adjustment of the pads 101 for securing the desired stroke of the numeral bar lever.

The folded strip of paper which is to be fed around the platen roll 27 is carried in the form of a pack shown at A (Fig. 6), the paper being guided upwardly from the pack around a curved shield 106. In loading the machine the end of the paper strip is fed over the inclined portion 107 of this shield and then between the platen roll 27 and the knurled feed rolls 108, which are free to rotate by frictional contact with the paper whenever the platen roll 27 is turned. The end of the paper then passes upwardly around the platen 27 and under the straightening rolls 109 from which it emerges under a cutter bar 110, the free end of the paper being denoted in Figs. 1 and 6 at A^1. The feed rolls 108, as shown in Figs. 5 and 6, are mounted on a shaft 111 having reduced portions 112 at its ends which are loosely journaled in slots 113 formed in the flanges 114 extending from the lateral margins of the paper guide 107. At the middle of the length of the shaft 111 and midway between the rollers 108 a pressure finger 115 is bent away from the guide plate 107 so as to bear resiliently against the under side of the shaft 111 for holding the rolls 108 in contact with the paper. This pressure is maintained by reason of the fact that the guide plate 107 is rockably mounted on a shaft 116 parallel to the axis of the platen roll 27. The plate 107 includes side flanges 117 which form bearings engaging the shaft 116. A spring 118 is stressed between a lug 119 on the curved portion 106 of the paper guide and an anchorage at 120 on a cross member 121 of the frame, said cross member connecting the side plates 10, as seen in Fig. 6. The spring 118 thus tends to swing the guide plate 107 clockwise toward the platen roll 27 and causes the pressure finger 115 to hold the rolls 108 in firm frictional engagement with the paper on the platen, with its force equally divided between the two rolls. This tends to insure straight, even feeding of the paper over the platen.

Additional guidance of the paper is provided by the straightening rolls 109 which, as seen in Fig. 5, are carried by a shaft 122 having trunnions 123 at its ends rotatable and slidable in elongated slots 124 formed in the bail arms 125 of the cutter bar 110. These arms extend downwardly and are pivoted on the shaft 116. A spring 126 is tensioned between a lug 127 on one of the arms 125 and the cross member 121, as seen in Fig. 6, to swing the arm 125 counterclockwise toward the axis of the platen roll 27. At the middle of its width the cutter bar includes a lug 128 having an angular rib or knife edge 129 which bears against the shaft 122 at the middle of its length and exactly midway between straightening rolls 109, so as to transmit the force of the spring 126 equally to the two rolls 109. This insures a balanced pressure of the rolls 109 against the paper and causes it to be fed with uniform linearity from the platen roll 27 as the latter is intermittently rotated by the action of the universal bar 50 through the intermediate linkage.

As seen in Fig. 1, the supply pack of paper A rests upon the bottom 130 of a drawer having an end wall 131 at the rear of the machine and having no end wall at its forward end. When this drawer is drawn out to extend rearwardly in position (as shown in dot-dash lines 134 in Fig. 6) to receive the paper as it feeds from the platen roll 27, its bottom slides under the pack to a position at which only the rearward end of the pack rests on the bottom 130 of the drawer. To prevent the pack from being withdrawn bodily by such outward movement of the drawer a guard plate 132 extends downwardly into the drawer as shown in Figs. 1 and 6 so that its lower end portion 133 is in a position to stop rearward movement. The prefolded form of the paper strip causes it to reassume its zigzag arrangement as it is fed from the platen roll 27 into the drawer extended to the position indicated at 134 in Fig. 6, but if there is any tendency for the paper to sag into a position in which its forward folded edges might accumulate within the base, the guard plate 132 and its lower end 133 will control these folded ends of the record strip as it accumulates in the drawer and will keep the imprinted portion, indicated at A^2 in Fig. 6, separated from the supply pack A.

The guard plate 132 is pivotally supported by the reduced ends of the screws 135 (Fig. 5) engaging the offset ends of brackets 136, as shown in Fig. 5, said screws 135 being threaded in the portions 137 of the cross member 121. The brackets 136 may be integral portions of the guard plate 132 offset from the main portion of the plate as seen in Fig. 5. A spring 138, anchored to the cross member 121 at 139, normally holds the plate 132 in its lowered position, as shown in full lines in Fig. 6, but permits it to be raised temporarily to the position shown in dot-dash lines at 132^a when the paper strip is being threaded over the guide 107 and between the rolls 108 and the plate 27. When the plate 132 is thus raised, a portion 136^a of each bracket 136 engages the edge 125^a of the adjacent arm 125, so that these arms are cammed readwardly, in a direction to separate the straightening rolls 109 from the platen roll 27, thus facilitating entry of the paper between said rolls. The upward swing of the plate 132 is limited by engagement of the parts 136^a with the steps 125^b of arms 125, and at this position the parts 136^a are swung past center with respect to the pivots 135, thus providing a detent effect for holding the plate 132 in upraised position, leaving both hands free for adjusting the paper.

Operation

To prepare the machine for use, a supply pack of folded paper strip is placed in the base in the position shown in Fig. 1. With the drawer partly withdrawn to the rear, the guard plate 132 is raised to the position shown at 132^a in Fig. 6, and the end of the paper strip is entered over the guide plate 107 between the platen roll 27 and the feed rollers 108. The platen is manually turned to bring the end of the paper to the upper side thereof, and this free end is then fed under the straightening rolls 109 so as to project as shown at A^1 in Fig. 6. The guard plate 132 is returned to normal position by its spring 138 and the drawer may be pulled out to the full

extent rearwardly of the machine to receive the imprinted record strip as it accumulates.

The phonetic recording of dictation or other speech is accomplished by depressing the keys **20** in groups to imprint the desired letters on the paper strip. The depression of a key **20** actuates its lever **30** causing the rounded end portion **47** of the lever to rock one of the bell crank levers **44** and advance one of the type bars **24** toward the platen **27**. The depression of any of the key levers **30** also actuates the universal bar **50** which rocks the lever **53** (see Fig. 4), thereby actuating the clutch **28** which feeds the platen roll in step-by-step movement to advance the paper. The arm **56** of the lever **53** acts through the link **63** and lever arm **62** to rock the lever arm **60** thereby straightening the toggle composed of the arm **60** and the link **59**, and causing the link **59** to advance the crank pin **58** on the driving member **57** of the clutch device. This paper feeding movement is completed just before an impression is made on the paper by the advancement of one or more of the type bars **24**.

If it is desired to imprint numerals instead of letters on the paper, the fingers are placed on the keys so as to extend over the numeral bar **23** and depress it simultaneously with one or more of the keys **20**. The numeral bar lever **91** to which the bar **23** is attached is thus rocked about the pivot shaft **18** so that the link **99**, attached to the extension **95** of this lever, lifts the cradle **84** which shifts all the type bars **24** to their upper positions and causes the numeral type thereon to make impressions against the platen when the type bars are advanced by actuation of the keys **20**.

As already pointed out, the present construction involves certain advantages. The provision of round guide rods for the key levers reduces friction substantially as compared with the use of flat guide surfaces, and the fact that the round rods are also rotatable insures a further reduction in the friction since the rods can turn in response to the arcuate movements of the levers.

The use of neoprene pads in the upstop or bank bar and in the universal bar insures durability as well as resiliency and quietness of operation at these points.

The equalized pressure on the feed rolls **108** and on the straightening rolls **109**, by means of pressure members acting midway between each pair of rolls, secures even pressure on the paper so that it always advances in a straight path as the platen roll is turned.

The clutch driving mechanism is simple and positive in operation and can be readily adjusted by shifting the pivot screws **68** and **69**, as already described. The feeding movement is limited by a neoprene stop to insure quiet action of this portion of the mechanism.

The shifting of the type bars by the numeral bar and its connected lever may also be accurately adjusted by means of the slotted extension **95** so as to bring the type bars to the desired printing position.

The paper guard **132** serves the double purpose of retaining the supply pack A within the base of the machine and guiding the accumulating record into proper position in the extended drawer.

While there is shown and described herein certain structure embodying the invention, it is to be understood that the invention is not limited thereto or thereby but embraces all changes and modifications in its various features which come within the scope of the appended claims.

I claim:

1. A key lever spacer and guide for a stenographic machine having a plurality of pivotally secured key levers comprising a series of parallelly arranged rollers spaced from each other for slidably receiving a single key lever between each pair of adjacent rollers, fixed means journaling said rollers in spaced relation, and separate means limiting axial movement of said rollers to maintain the same engaged in said fixed means.

2. A key lever spacer and guide for a stenographic machine having a plurality of pivotally secured key levers comprising a series of parallelly arranged rollers spaced from each other for slidably receiving a single key lever between each pair of adjacent rollers, fixed means journaling said rollers in spaced relation, and separate means limiting axial movement of said rollers to maintain the same engaged in said fixed means, including cushioning buffers for damping vibration and sound.

3. A key lever spacer and guide for a stenographic machine having a plurality of pivotally secured key levers comprising a series of parallelly arranged vertical rollers spaced from each other for slidably receiving a single key lever between each pair of adjacent rollers, means journaling said rollers in spaced relation adjacent the opposite ends thereof, means forming an abutment for the lower ends of said rollers for rotatably supporting the same, and separate means forming an abutment for the upper ends of said rollers for preventing axial movement thereof.

4. A key lever spacer and guide for a stenographic machine having a plurality of pivotally secured key levers comprising a series of parallelly arranged vertical rollers spaced from each other for slidably receiving a single key lever between each pair of adjacent rollers, means journaling said rollers in spaced relation adjacent the opposite ends thereof, means forming an abutment for the lower ends of said rollers for rotatably supporting the same, separate means forming an abutment for the upper ends of said rollers for preventing axial movement thereof, and cushioning buffers adapted to be engaged by the opposite ends of said rollers for damping vibration and sound.

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