Aug. 5, 1941. R. E. PERRY 2,251,616

SCRIPT WRITER

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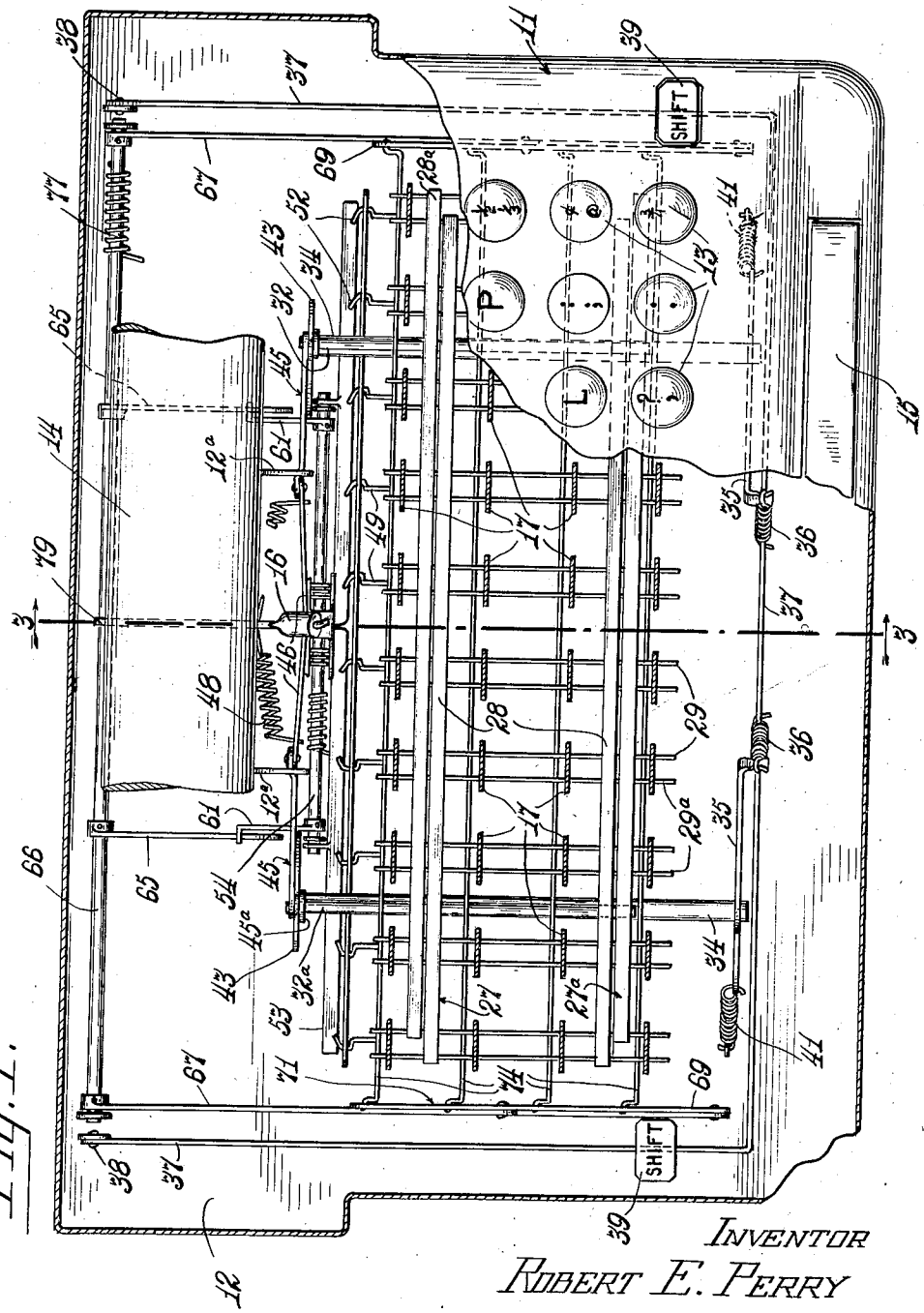


Fig. 1.

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Aug. 5, 1941. R. E. PERRY 2,251,616

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Filed Jan. 26, 1940 5 Sheets-Sheet 2

Fig. 2.

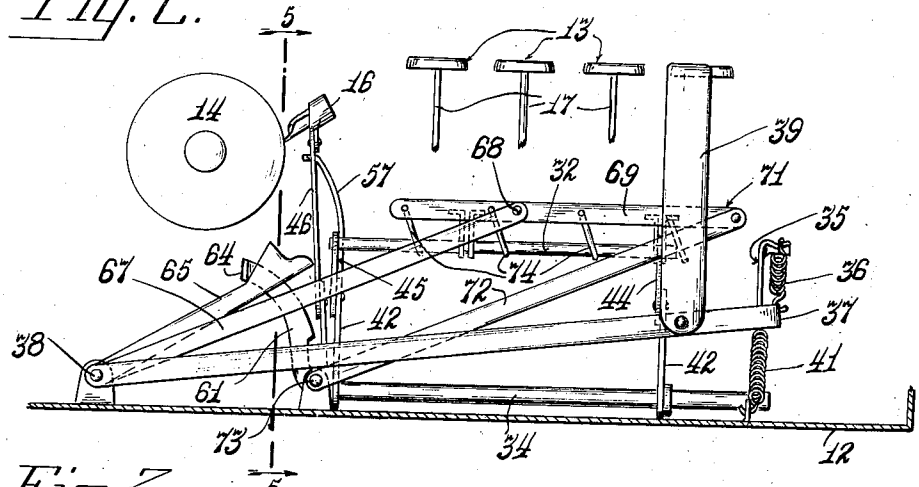


Fig. 3.

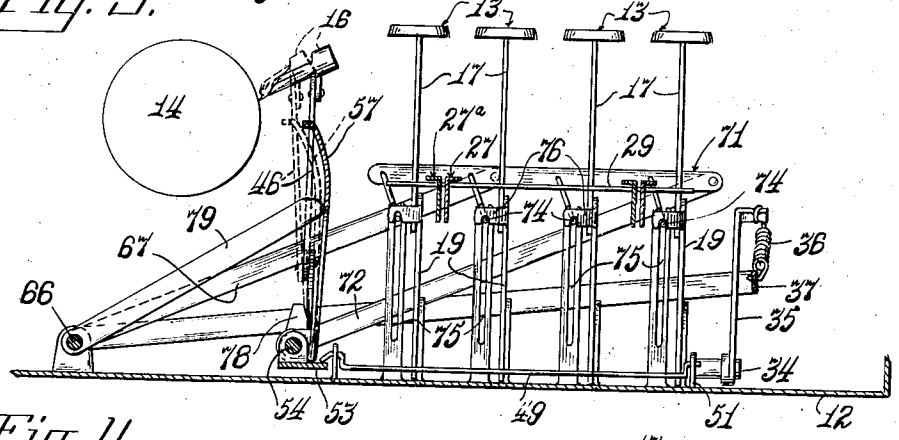
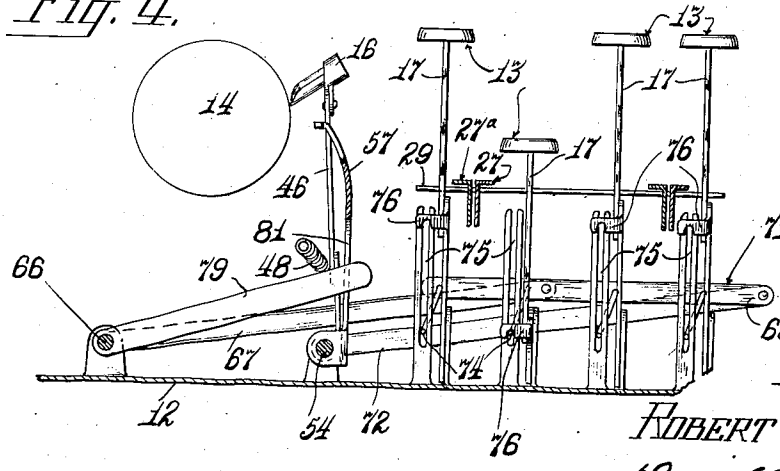


Fig. 4.



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Aug. 5, 1941. R. E. PERRY 2,251,616

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Filed Jan. 26, 1940 5 Sheets-Sheet 3

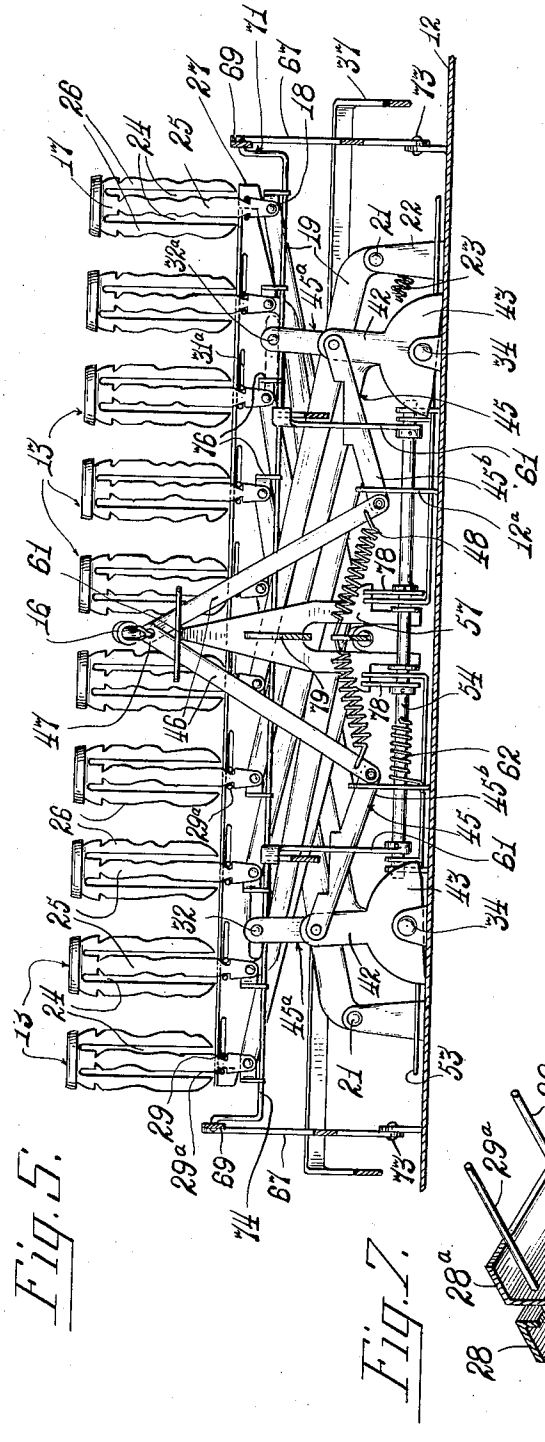


Fig. 5.

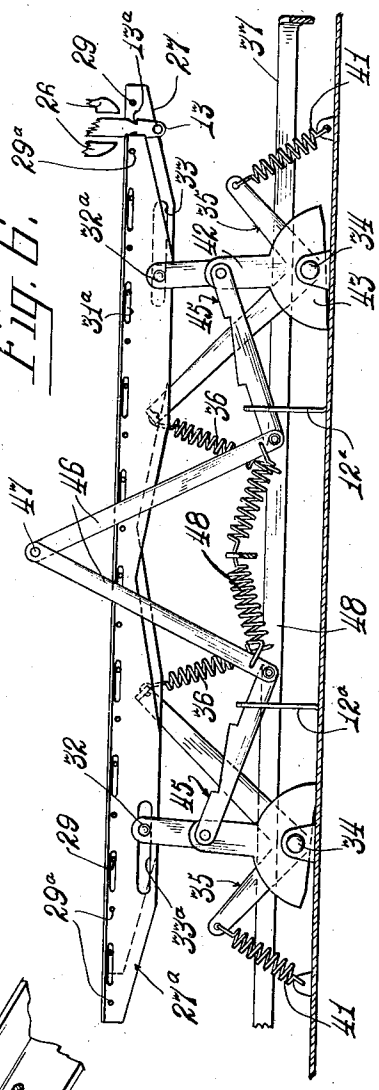


Fig. 6.

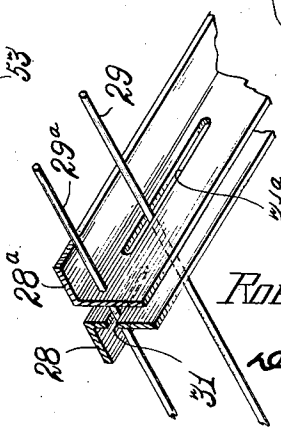


Fig. 7.

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Aug. 5, 1941. R. E. PERRY 2,251,616

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Filed Jan. 26, 1940 5 Sheets-Sheet 4

Fig. 8.

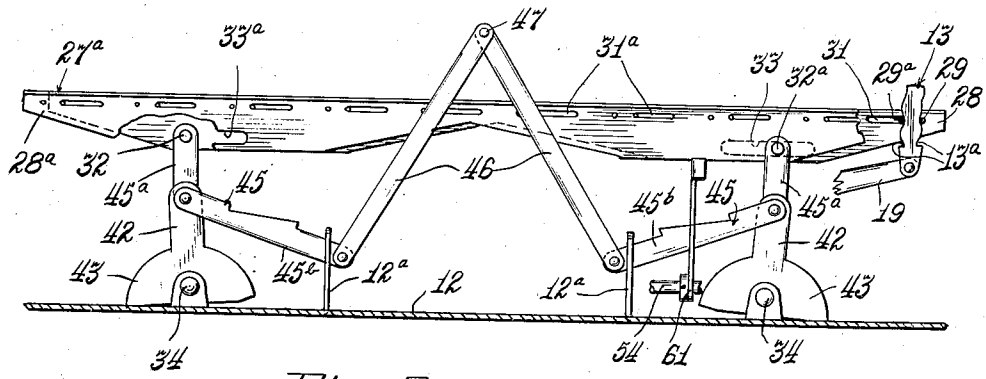


Fig. 9.

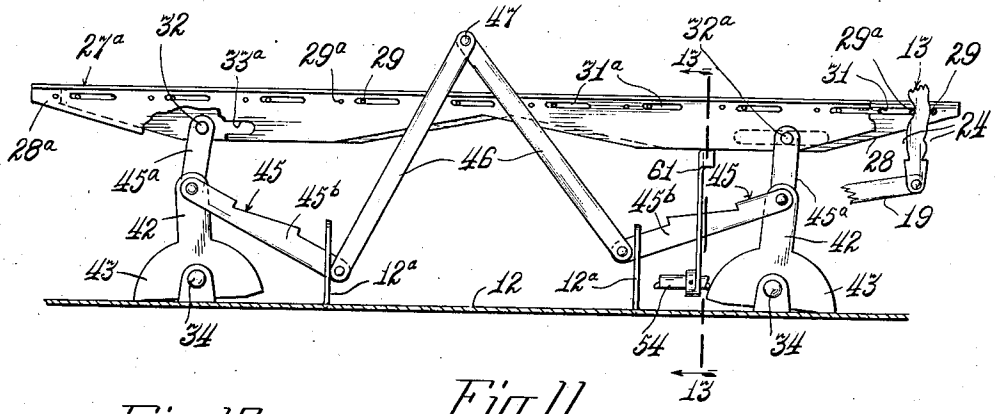


Fig. 10.

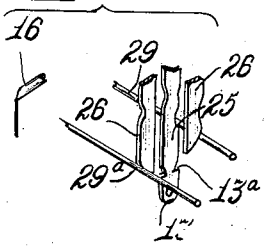


Fig. 11.

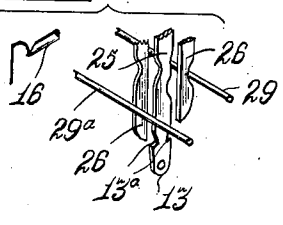


Fig. 12.

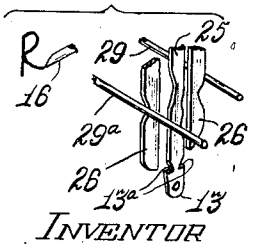
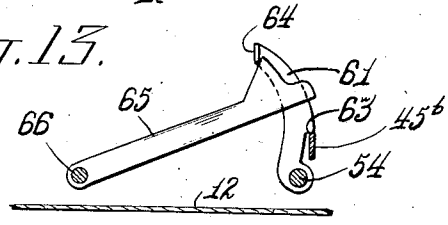


Fig. 13.



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Aug. 5, 1941. R. E. PERRY 2,251,616

SCRIPT WRITER

Filed Jan. 26, 1940 5 Sheets-Sheet 5

Fig. 14.

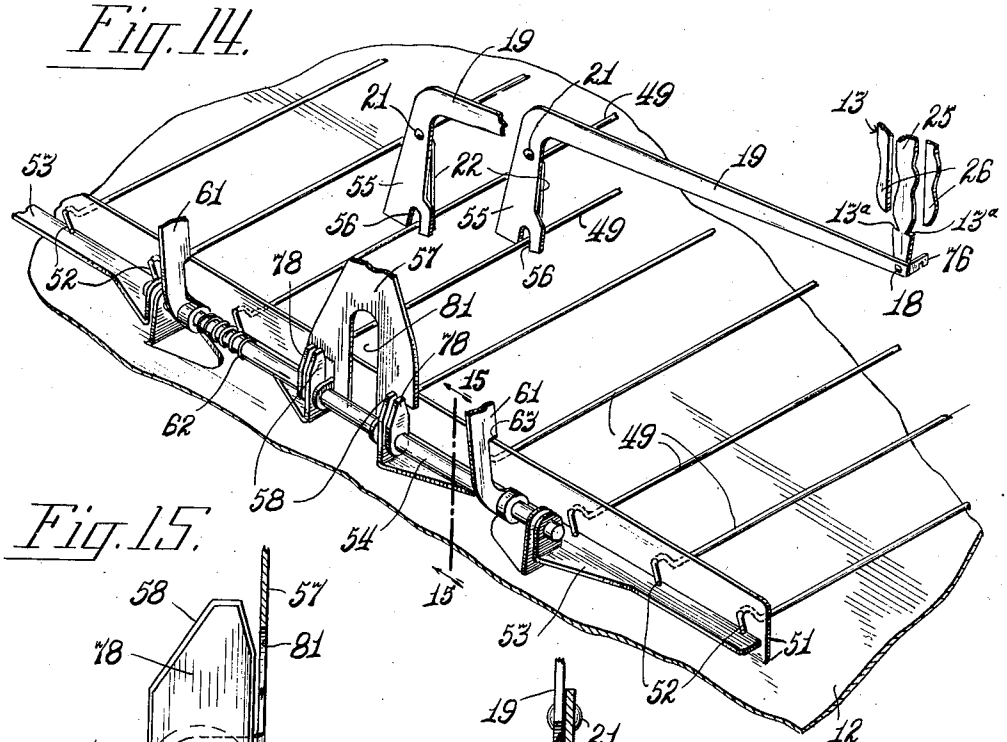


Fig. 15.

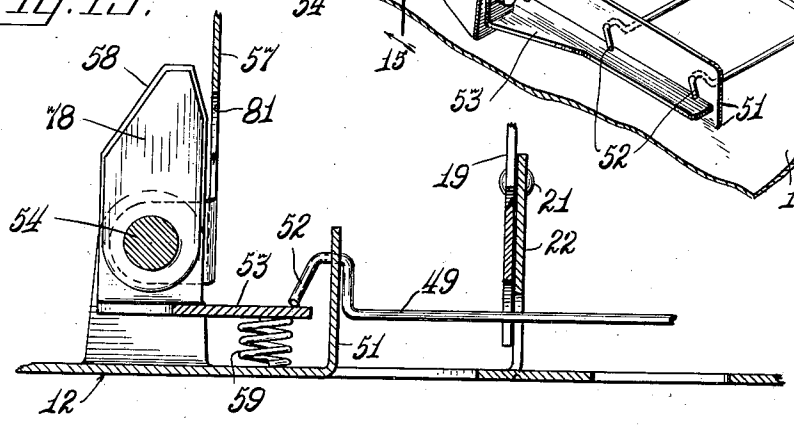
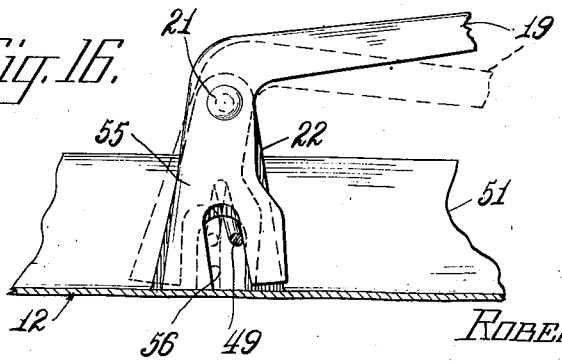


Fig. 16.



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Patented Aug. 5, 1941 2,251,616

UNITED STATES PATENT OFFICE

2,251,616

SCRIPT WRITER

Robert E. Perry, Chicago, Ill.

Application January 26, 1940, Serial No. 315,775

21 Claims. (Cl. 197—1)

The invention relates to improvements in writing machines and more particularly to a key actuated machine for writing script or making symbols, designs or the like.

The embodiment of the writing machine herein disclosed has the general appearance and characteristics of a key actuated printing machine of the type commonly known as a typewriter; and, although operable through selective actuation of keys, the machine writes or draws the selected characters as distinguished from printing.

An object of the invention is to provide a machine of the character referred to with means selectively operable to actuate related mechanism for moving and guiding a writing instrument through selected paths.

Another object is to provide a manually actuated writing machine with novel quickly responsive mechanism selectively operable to guide a writing instrument through a prescribed path to write a selected character.

Another object is to provide a writing machine, including a pen, with improved key actuated mechanism automatically operable to momentarily lift the pen from the writing surface.

Another object is to provide a key actuated writing machine with means to momentarily retard the return movement of its actuating mechanism until after completion of the return stroke of the operating key.

Another object is to provide an improved selectively operable key actuated writing machine which embodies fewer parts than a conventional typewriter.

Another object is to provide a writing machine with simple and durable mechanism which is easy to operate, efficient in operation, and inexpensive to manufacture and maintain.

The foregoing and such other objects of the invention as will appear hereinafter as the description proceeds will be more readily understood from a perusal of the following specification; in which reference is made to the accompanying drawings, wherein:

Fig. 1 is a plan view of the machine, shown partly broken away.

Fig. 2 is an end elevational view, showing the housing broken away and parts of the mechanism omitted.

Fig. 3 is a transverse sectional view, taken substantially on lines 3—3 of Fig. 1.

Fig. 4 is a sectional view like Fig. 3, showing a key in depressed position.

Fig. 5 is a rear view, taken substantially on line 5—5 of Fig. 2.

Fig. 6 is a view similar to Fig. 5, showing the pen moving mechanism in shifted or "upper case" position, with the keys and key levers omitted.

Fig. 7 is a fragmentary perspective view showing a detail of the key follower frame.

Fig. 8 is a view similar to Fig. 6, showing the pen moving mechanism in "lower case" position and one key in a partly depressed position.

Fig. 9 is a view similar to Fig. 8, showing the pen moving mechanism in a position assumed when the key is further depressed.

Figs. 10, 11 and 12 diagrammatically illustrate successive positions of a key and related parts while writing the character "R".

Fig. 13 is a vertical sectional view taken on line 13—13 of Fig. 8.

Fig. 14 is a fragmentary perspective view of the pen-lift mechanism.

Fig. 15 is a vertical sectional view taken on line 15—15 of Fig. 14.

Fig. 16 is an enlarged fragmentary elevational view of the pivotal mounting for a key lever, showing its co-operative association with the pen-lift mechanism.

The machine illustrated in the accompanying drawings and best shown in its entirety in Fig. 1, preferably is enclosed within a suitable housing 11, including a base 12. A plurality of vertically reciprocable character keys 13 extend upwardly through the top of the housing into a readily accessible position. The keys 13 preferably are arranged in the same manner and preferably bear the same legends as the keys on a typewriter.

A platen 14 extends longitudinally across the upper rear side of the housing 11. It may be like that used on a typewriter and may include any suitable mechanism (not shown) operable to effect a step by step movement, longitudinally of the platen, either upon actuation of a space bar 15 which extends across the forward edge of the top side of the housing, or upon actuation of keys 13.

As best illustrated in Figs. 1 and 5, the keys 13 cooperate with a follower mechanism (described in detail hereinafter) and are selectively operable to effect selective directional movement of a suitable writing instrument, such as for example, a pen 16. The pen 16 is mounted to bear against the platen 14 so that upon movement of the pen a selected character is written upon a sheet placed in the usual manner around

the platen. The structure, operation and function of each key 13 is identical, except as to the degree and direction of movement imparted to the pen, hence, the following description, insofar as it is common to all the keys, concerns itself with the structure and function of but a single key.

The key 13 is best shown in Fig. 5 and includes a flat stem 17 pivotally connected at its lower end 18 to the free end of a key lever 19. The other end of the lever 19 is pivotally mounted, at 21, to an ear 22 preferably struck upwardly out of the base 12. A spring 23 normally holds the lever in the raised position so that its key projects above the top of the housing. The stem 17 has two slots 24 which extend longitudinally from its lower end to define a center portion 25 and two side portions 26. As shown, the side portions 26 terminate short of the pivotal mounting 18. Both edges of the center portion 25 and the outside edges of the side portions 26 are cam shaped. Obviously, the shape of the cams on each key varies and each is designed to provide a required combination for controlling the movement of the associated follower mechanism so as to move the pen over a prescribed path for writing the selected character.

The follower mechanism includes two horizontally reciprocable follower frames 27 and 27*a* supported in a common plane for selective engagement by either the center portion 25 or the side portions 26 of the key 13. The frames 27 and 27*a* include spaced parallel angles 28 and 28*a* respectively, and a plurality of transverse connecting rods 29 and 29*a* respectively. The rods 29 and 29*a* are uniformly spaced in each frame a distance corresponding to the longitudinal spacing of keys 13.

The rods of the respective frames are arranged in pairs, that is, each pair includes one rod 29 and one rod 29*a*. The key 13 co-operates with one pair of the rods which are received normally one within each slot 24 when the key is depressed, as best shown in Fig. 9. Referring particularly to Fig. 7, it will be seen that each rod 29, of the frame 27, extends through a slot 31*a* in the frame 27*a* and that each rod 29*a* on frame 27*a* extends through a slot 31 in the frame 27. That construction allows the frames to move longitudinally in a horizontal plane one relative to the other. Independent movement in either direction of either or both frames is effected by depression of the key 13. Selective engagement of the cams on the center key portion 25 or of the cams on the side portions 26 with the associated pair of rods 29 and 29*a* is determined by the setting of suitable shift mechanism, which is fully described hereinafter.

Each follower frame 27 and 27*a* includes a transverse shaft 32 and 32*a* respectively. As best shown in Figs. 8 and 9, the shaft 32 is fixed in the frame 27 and extends freely through the slots 33*a* in the other frame 27*a*. The other shaft 32*a* is fixed in the frame 27*a* and extends freely through the slots 33 in the frame 27. Consequently, both of the frames are connected adjacent their ends by the shafts 32 and 32*a* in a manner to allow relative movement of said frames longitudinally.

The shift mechanism previously referred to is best illustrated in Figs. 2, 5 and 6. As shown, two rock shafts 34 are journalled on the base 12 and extend transversely one beneath each frame shaft 32 and 32*a*. Bell cranks 35 are secured (Fig. 6) one to the forward end of each rock shaft 34 and each has one of its arms connected by springs 36 to a shift frame 37. The shift frame 37 preferably is U-shaped and is pivoted at its ends to the base 12, as at 38. Two shift keys 39 are carried on said frame and extend upwardly through the top of the housing 11 for finger engagement. Depression of either key 39 swings the frame 37 downwardly and rocks the rock shafts. When the depressed shift key 39 is released, two springs 41, connecting the other bell crank arms with the base 12, function to return the frame 37 and rock shafts 34 to their original positions. Two rock arms 42 are mounted on each rock shaft 34 and each includes a wide base portion 43 disposed in close proximity to the base 12 for limiting the rocking movement of shafts 34.

As best shown in Fig. 2, two links 44 connect the free ends of the rock arms 42, mounted on the forward ends of the rock shafts 34, one with each frame shaft 32 and 32*a*.

A bell crank 45 is pivoted on the free end of each of the two rock arms 42 mounted on the rear ends of rock shafts 34. The arms 45*a* of each bell crank 45 are connected one to each shaft 32 and 32*a* and their other arms 45*b* extend downwardly angularly toward each other. Links 46, connected one to the end of each arm 45*b*, converge upwardly and are connected at 47 with the pen 16. Obviously, both follower frames 27 and 27*a* and the pen 16 are supported by the follower or shift mechanism just described and consequently, any movement imparted to either frame results in movement of the pen 16.

The relative positions of rest of the frames 27 and 27*a* and of the pen 16 may be altered by depressing either shift key 39. For example, the frames 27 and 27*a* and the pen 16 normally rest in the positions best shown in Fig. 5 with the pairs of frame rods 29 and 29*a* seated in the notches 13*a* of the respective keys 13. When a character key 13 is depressed while the parts are in this position, the rods 29 and 29*a* will co-operate with the cams on the center portion 25 of the key. Depression of that key moves the pen, in a manner to be more fully described later, to write a "lower case" character. Writing of an "upper case" character is obtained by holding either shift key 39 depressed. This action rocks the shafts 34 and shifts the related parts into a rest position best illustrated in Fig. 6. As there shown, the relative positions of the frames 27 and 27*a* has been altered to increase the space between each pair of rods 29 and 29*a*. While in that position the rods are engageable by the cams on the side portions 26 of the key 13. Shifting of the frames into "upper case" position and consequent movement of the bell cranks 45 does not alter the normal position of the pen due to the engagement of stops 12*a* over the bell crank arms 45*b*.

As best shown in Figs. 2 to 6, inclusive, a spring 48 connects the lower ends of the pen links 46 to normally hold the parts of the follower mechanism in the rest positions shown in Figs. 5 or 6. Said spring is bowed upwardly and rearwardly toward the platen, as shown, to normally pull the pen 16 against the platen. The pen is lifted from the platen at the beginning and end of its stroke and also momentarily while writing any one of the split letters, such as for example, "i", "j", ";", etc.

Interruption of the writing stroke while writing split letters preferably is obtained by a pen-lift mechanism best illustrated in Figs. 14, 15 and

16 which is automatically actuated to momentarily lift the pen at some point during the downward movement of a key 13. The split letter pen-lift mechanism preferably includes a plurality of bars 49 eccentrically mounted at their ends in longitudinal flanges 51 preferably struck up from the base 12. A projecting end 52 of each bar extends downwardly angularly and normally rests against a trip plate 53 freely mounted on a longitudinal shaft 54.

Tilting or rocking of the trip plate 53 is effected by rocking of any one of the bars 49. As previously noted, each key 13 is carried on a key lever 19. The levers 19 carrying split letter keys have their foot portions 55 forked as at 56 (Figs. 14 to 16) to freely embrace one of the associated bars 49.

Upon depression of a split letter key, the forked end of its key lever 19 engages and rocks the associated bar 49 to swing its projecting end 52 downwardly against the trip plate 53. The degree to which the trip plate 53 is tilted is determined by the degree of engagement between the fork 56 and the bar 49; in other words, a narrow fork causes earlier engagement and consequently a greater degree of rocking.

The longitudinal shaft 54 also has a pen-lift plate 57 freely mounted thereon. Cam fingers 58, formed integral with the trip plate 53, extend upwardly adjacent the rear face of the pen-lift plate 57. The trip plate 53 normally is held substantially horizontal by one or more springs 59 (Fig. 15). Upon being tilted, its fingers 58 are moved into engagement with and swing the pen-lift plate 57 forwardly from its writing position, best shown in dotted lines in Fig. 3, into the full line position there illustrated.

The upper free end of the pen-lift plate 57 is T-shaped, as best shown in Fig. 5, to engage the rear sides of the two links 46 adjacent their connection 47 with the pen 16. Movement of the pen-lift plate from the dotted line position into the full line position shown in Fig. 3 raises the pen 16 off of its writing surface against the action of the spring 48.

As hereinbefore noted, depression of a key 13 effects relative movement of the frames 27 and 27*a*. More specifically, initial downward movement of a key to write a lower case character cams the associated rods 29 and 29*a* out of the key notches 13*a* and moves the respective frames longitudinally in opposed directions from the position shown in Fig. 5 into the position illustrated in Fig. 8. This frame movement rocks both bell cranks 45 in a direction to raise their arms 45*b*, thus moving the pen 16, which has been lifted from the platen in a manner to be described later, through links 46 into its starting position. Continued depressing of the key returns the pen into contact with the platen and effects additional relative movement of the frames 27 and 27*a*, as shown in Fig. 9. The amount and direction of frame movement is determined solely by the contour of the cams of the key portion 25. During this relative movement of the frames 27 and 27*a*, the pen 16 is moved through a prescribed path, resulting from its link connections with said frames, to write the selected lower case character. Precisely the same movements of the parts occur when writing an upper case character, such as for example, the letter "R". As graphically illustrated in Figs. 10, 11 and 12, the rods 29 and 29*a* are engaged by the cam edges of the side portions 26 of the key.

It is necessary that the follower or pen moving mechanism be locked momentarily during the upward or return stroke of the key to avoid contact of the rods 29 and 29*a* with the key cams and consequent movement of the follower mechanism. To this end, a latch mechanism, best illustrated in Figs. 2, 5, 13 and 14, is provided. As shown, the shaft 54 has two latches 61 rigidly secured thereto. A coil spring 62 on said shaft tends normally to swing said latches inwardly toward the front of the machine so as to engage their notches 63 over the upper edges of the bell crank arms 45*b* after the writing stroke has been completed. The latches 61 are held out of latching engagement by cooperative engagement of lugs 64 thereon by arms 65 fixedly secured to a longitudinal rock shaft 66 (Fig. 1). Links 67, secured one adjacent each end of said shaft 66, extend forwardly and upwardly and are pivotally secured, as at 68, one to each end wall 69 of a vertically reciprocable latch actuating frame 71. A second pair of links 72 movably connects each end wall 69 with the base as at 73, thereby providing a parallelogram to maintain the latch frame 71 horizontally irrespective of its elevation.

The latch frame 71 is arranged to be carried downwardly upon depressing any one of the keys 13. It includes a plurality of spaced longitudinal bars 74, for that purpose, one arranged closely adjacent each longitudinal row of keys 13. The bars 74 are in a plane below the plane of the end walls 69 and are guided in rigid vertical guides 75 (best shown in Figs. 3 and 4). Each key lever 19 has a notched lip 76 on its free end arranged to engage over one or the other of the bars 74. Depression of any one of the keys 13 carries the latch actuating frame 71 downwardly from the position illustrated in Fig. 3 into a position best shown in Fig. 4. The shaft 66 is rotated thereby to swing its arms 65 (Fig. 2) inwardly downwardly to permit inward movement of the latches 61.

As soon as the bell crank arms 45 of the follower mechanism, which also is actuating, approach their lowest positions upon completion of the writing stroke, the inwardly downwardly swinging arms 65 strike the bell crank arms 45*b* and urge them into their lowermost positions whereupon the latch notches 63 engage over their upper edges and the entire follower mechanism is momentarily locked. As a result the two follower frames 27 and 27*a* are held in positions attained by the latching of the bell-crank arms to permit the depressed key to move upwardly to its original position without moving the frames or the follower mechanism associated therewith. As the returning key moves toward its original position, the latch operating frame 71 also raises toward its normal elevated position (Fig. 3) due to the action of a tension spring 77 on the shaft 66, and thereby swings the arms 65 upwardly against the lugs 64 on the latches 61. That urges the latches rearwardly out of engagement with the bell crank arms 45*b* and the spring 48 instantly returns the follower mechanism to its original position.

The pen-lift plate 57 is tilted forwardly during the entire return stroke of the keys so as to hold the pen off of the platen. This is effected by two cams 78 (Fig. 14) on the shaft 54 which bear against said lift plate while the latches 61 are engaged over the lever arms 45.

The pen 16 also is held off of the platen while the keys are in their normal rest positions. Initial downward movement of a key 13 positions

said pen at the beginning of its writing stroke and causes it to move into contact with the platen. Positioning of the pen is effected by movement of the rods 29 and 29a out of the notches 13a in the instance of a lower case character and by camming said rods over the inclined ends of the key side portions 26 in the instance of an upper case character.

Immediately following this initial key movement, the pen is dropped against the platen. This is effected, as best shown in Figs. 3 and 4, by movement of an arm 78, carried on the shaft 66. The arm 78 normally rests against the pen-lift plate 57 and holds said pen-lift plate in a raised position as illustrated in Fig. 3. Downward movement of a key and consequent lowering of the latch actuating frame 71, swings the arm 79 inwardly forwardly and its free end passes freely through an opening 81 in said plate (Fig. 4) whereupon said pen-lift plate moves rearwardly due to the action of the spring 48 and the pen rests on the platen. When the writing stroke is completed and the frame 71 moves upwardly, the arm 79 cams freely past the edge of the opening 81, thus again lifting the pen off from the platen.

It is obvious from the foregoing description that the improved writing machine is designed to quickly and accurately produce all of the characters now available in the known typewriter. As the keys are free from direct connection with the various operating mechanisms they return instantly to their original positions upon being released, independently of the quick return of the operating mechanism to its starting position.

I claim:

1. A writing machine including, in combination, a pen, two frames selectively movable independently of each other in a common plane, means operatively connecting said pen with both of said frames, and a plurality of reciprocable cams co-operating with the frames, individually operable, to produce relative movement to said frames, said movement resulting in actuation of said pen in predetermined directions.

2. A writing machine including, in combination, a pen, two frames selectively movable independently of each other, means operatively connecting said pen with both frames, a reciprocable key including a stem, and two cams on said stem arranged to co-operate one with each frame to produce relative movement of said frames when the key is moved in one direction.

3. A writing machine including, in combination, two frames selectively movable independently of each other in a common plane, a rod in each frame, the rod of one of said frames being adjacent the rod in the companion frame, an element operatively associated with both rods selectively operable to produce relative movement of said frames, a pen, and means operatively connecting said frames with said pen to transmit the resultant movement of said frames to said pen.

4. A writing machine including, in combination, a pen, two frames selectively movable independently of each other, means operatively connecting said pen with both frames, a reciprocable key including a stem, two pairs of cams on said stem, one of each pair being arranged for selective co-operation with each frame to produce relative movement of said frames when the key is moved in one direction, and means operable to position said frames for operative engagement by either of the two pairs of cams on the key stem.

5. A writing machine including, in combination, two independently movable frames, means to alter the rest positions of said frames, an operating element including a stem, two sets of cams on said stem, one set being arranged to co-operate with said frames while they are in one of their rest positions and the other set being arranged to co-operate with said frames while they are in another of their rest positions to produce relative movement of said frames, a pen, and means connecting said pen to both of said frames operable to impart the resultant of the movements of said frames to said pen.

6. In a writing machine, the combination of, a reciprocable key, two frames operatively associated with said key relatively movable upon movement of said key in one direction, two bell cranks operatively connected for movement one with each frame, a pen, and two links one connecting each bell crank with said pen whereby the resultant movement of said frames is imparted to said pen.

7. A writing machine comprising, in combination, two frames mounted for horizontal opposed movement in a common plane independently of each other, vertically reciprocable cam means common to both frames operable to produce relative movement of said frames, a pen, and link means connecting said pen with both frames to transmit the movement of said frames to said pen.

8. In a writing machine, the combination of, a pen, means to hold said pen off from its writing surface, means operable to impart a writing motion to said pen, a vertically reciprocable frame arranged to be moved during initial operation of said writing means, and means operable upon initial movement of said frame to release said holding means to enable said pen to contact its writing surface.

9. In a writing machine, the combination of, a pen, cam actuated means operable to move said pen over a writing surface, a vertically reciprocable frame arranged to be moved during operation of said means, a shaft operatively connected with the frame arranged to be rocked during movement of said frame, and means on said shaft normally effective to hold said pen off its writing surface prior to and during the initial rocking of said shaft.

10. In a writing machine, a lever, a key mounted on said lever, two frames relatively movable in a common plane during depression of said key, a pen, means connecting said pen and said frames operatively to actuate the pen when the frames are moved, pen-lift mechanism, and a rock bar operable by said lever near the end of the key stroke to actuate said pen-lift mechanism.

11. In a writing machine, a pen, a reciprocable key, mechanism operable upon movement of said key in one direction to move said pen, a spring actuated latch effective upon movement of said key in said one direction to co-act with said mechanism to retain said pen in its actuated position while said key is returning to its original position, and means operable to release said latch when the key reaches its original position.

12. In a writing machine, a pen, a reciprocable key, mechanism operable upon movement of said key in one direction to actuate said pen, and means actuated during said movement of the key to co-act with said mechanism to retain said pen in its actuated position during movement of said key in the other direction.

13. In a writing machine including a pair of relatively movable elements each having a rod, a

vertically reciprocable key operative to co-act with the rods to move said elements, said key including a stem, two pair of cams on said stem, and means operative to position said elements for selective engagement of said rods by either pair of cams.

14. In a writing machine, a pair of movable elements, a reciprocable key operatively associated with said elements, said key including a stem, two pairs of cams on said stem, and means selectively operable to position said elements for operative engagement by either of said pair of cams.

15. A key for a writing machine comprising, in combination, a stem having two longitudinal slots extending inwardly from one end, a center portion and two side portions defined by said slots, and a cam on each edge of said center portion and on the outside edges of said side portions.

16. In a writing machine, the combination of, a pen, means to hold said pen off from its writing surface, means operable to impart a writing motion to said pen, a vertically reciprocable frame arranged to be moved upon actuation of said writing means, means operable upon initial movement of said frame to release said holding means, and means to urge said pen against the writing surface when said holding means is released and during the remaining operation of said writing means.

17. In a writing machine, the combination of a reciprocable key, two frames operatively associated with said key relatively movable upon movement of said key in one direction, two bell-cranks operatively connected for movement one with each frame, a pen, two links one connecting each bell crank with said pen whereby the resultant movement of said frames is imparted to said pen, means to momentarily retard any return movement of said frames and their associated parts during the return movement of said key, and means to return said frames and their associated parts to their initial positions after said key has assumed its initial position.

18. In a writing machine including a pen and an operating key, a lever upon which said key is mounted, a foot portion on said lever, pen-lift mechanism, and means arranged to be actuated by said foot portion during operation of said key to actuate said pen-lift mechanism.

19. In a writing machine, in combination, two rock shafts, two frames, means on each rock shaft to support said frames in a common plane, said means being operatively connected one to each frame, and means operable to rock said shafts to move said frames relative to each other.

20. A key for a writing machine comprising, in combination, a stem having two longitudinal slots extending inwardly from one end thereof to define a center portion and two side portions, and a cam surface on two opposed edges of said center portion and on one edge of each side portion.

21. In a writing machine, a lever, a key mounted on said lever, two frames relatively movable in a common plane by and during depression of said key, a pen, means to hold said pen out of its writing position, means connecting said pen and said frames operatively to actuate the pen when the frames are moved by operation of the key, said key operation releasing the pen holding means, and shift means operable to move said frames independently of said key action.

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