

Jan. 18, 1927.

1,614,473

O. A. HOKANSON

POWER OPERATED TYPEWRITER

Filed April 3, 1924

7 Sheets-Sheet 1

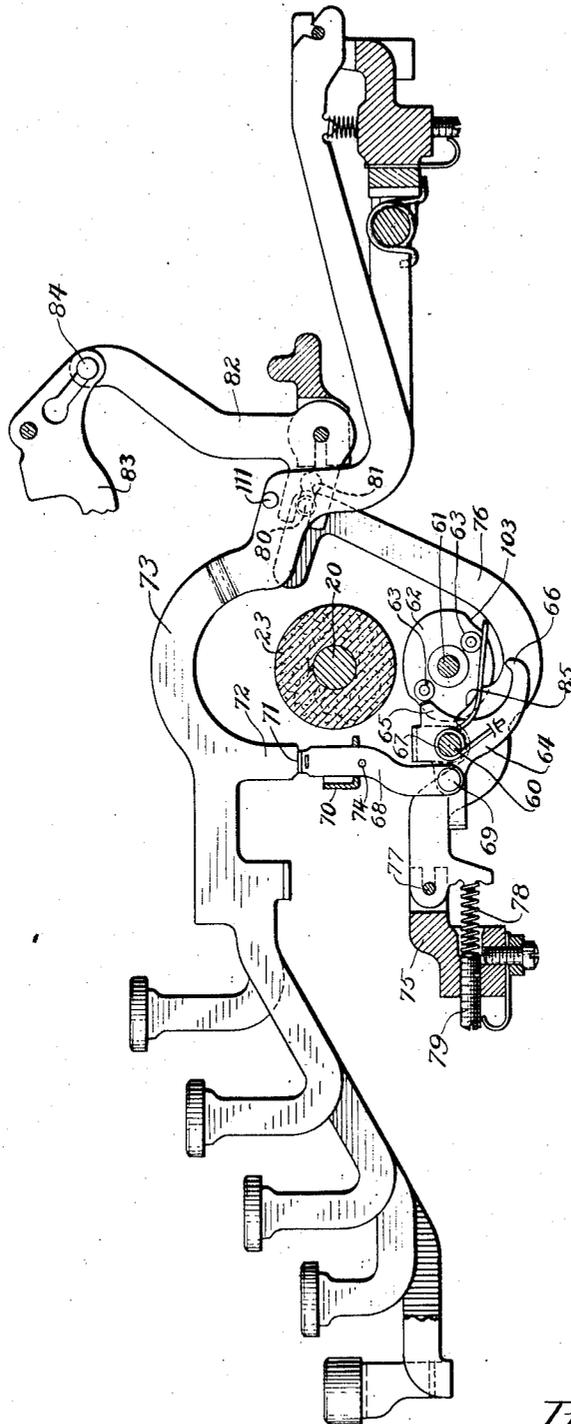


Fig. 1

Inventor:
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Jan. 18, 1927.

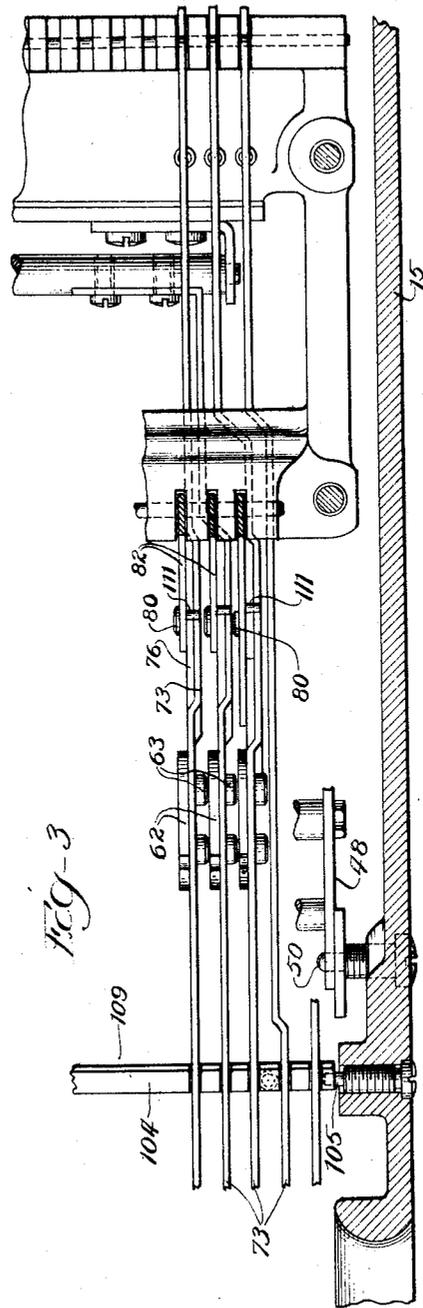
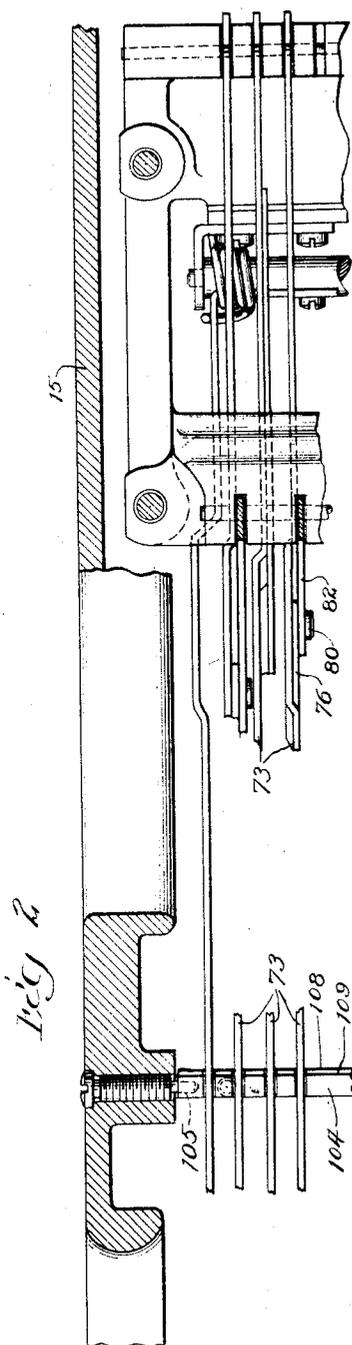
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POWER OPERATED TYPEWRITER

Filed April 3, 1924

7 Sheets-Sheet 2



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POWER OPERATED TYPEWRITER

Filed April 3, 1924

7 Sheets-Sheet 3

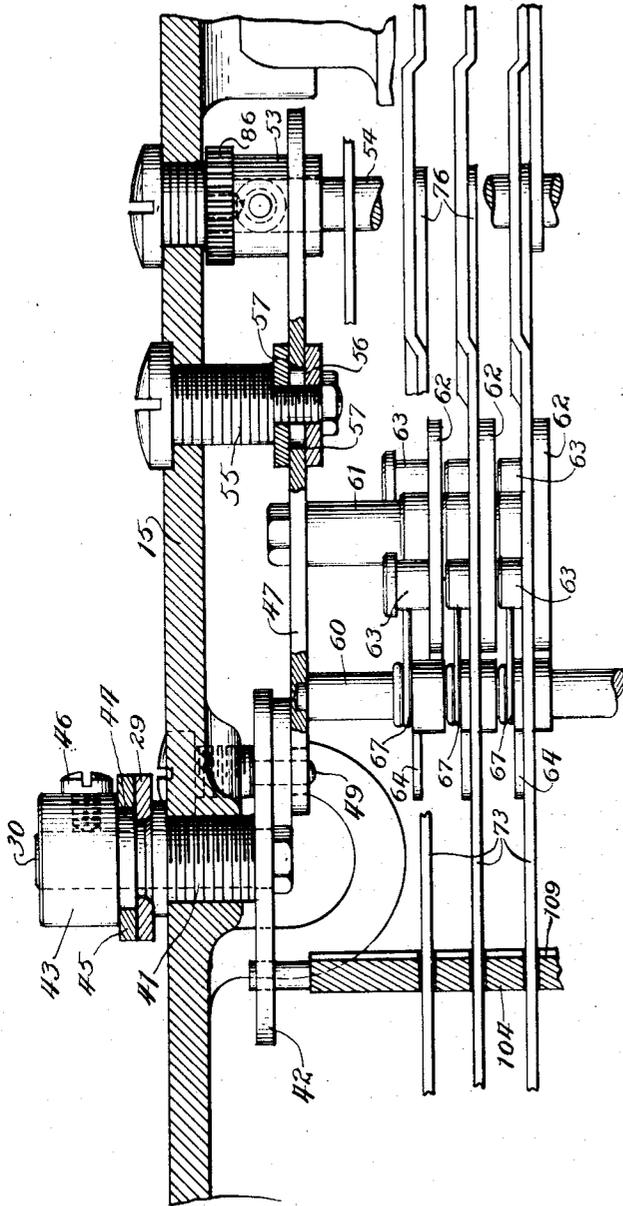


Fig. 4

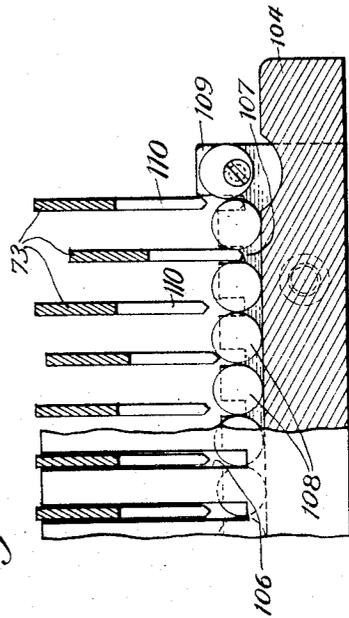


Fig. 5

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Jan. 18, 1927.

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POWER OPERATED TYPEWRITER

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7 Sheets-Sheet 4

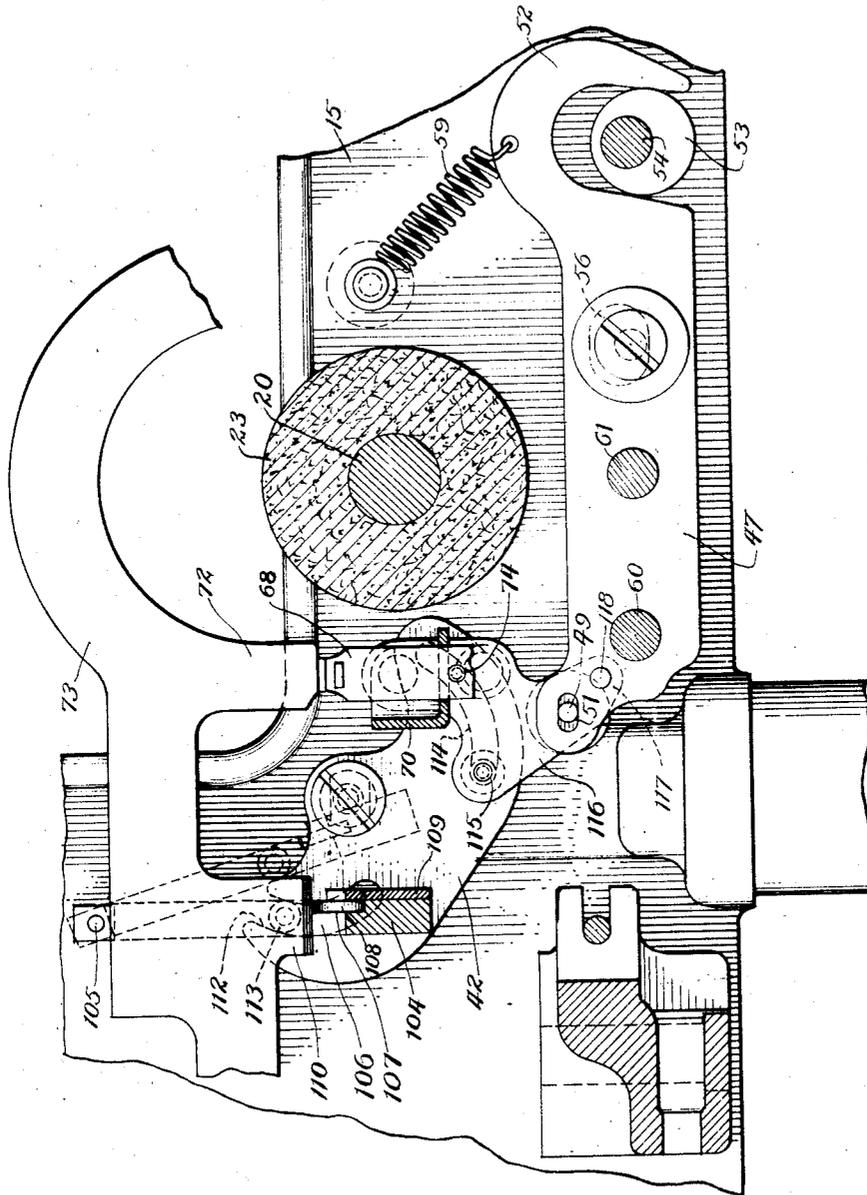


Fig-6

Inventor

Otto A. Hokanson

By Nissen & Erdos Attys.

Jan. 18, 1927.

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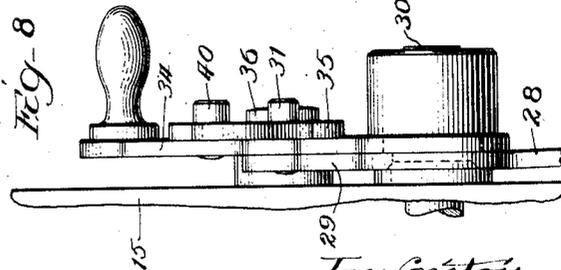
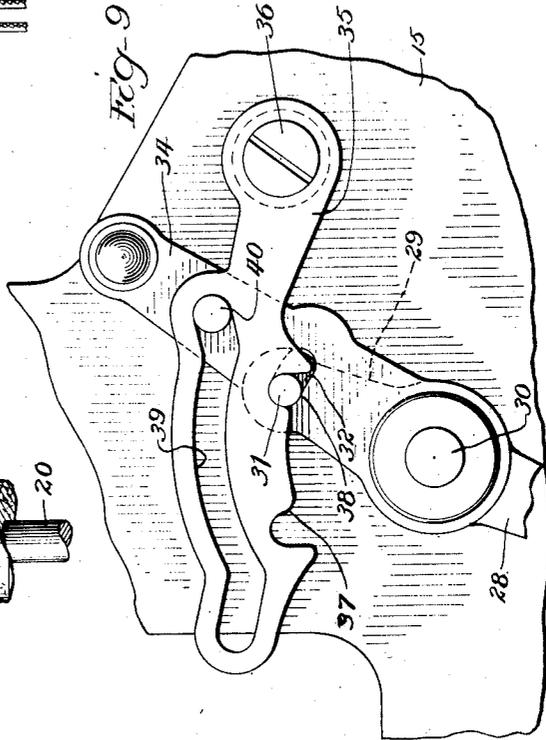
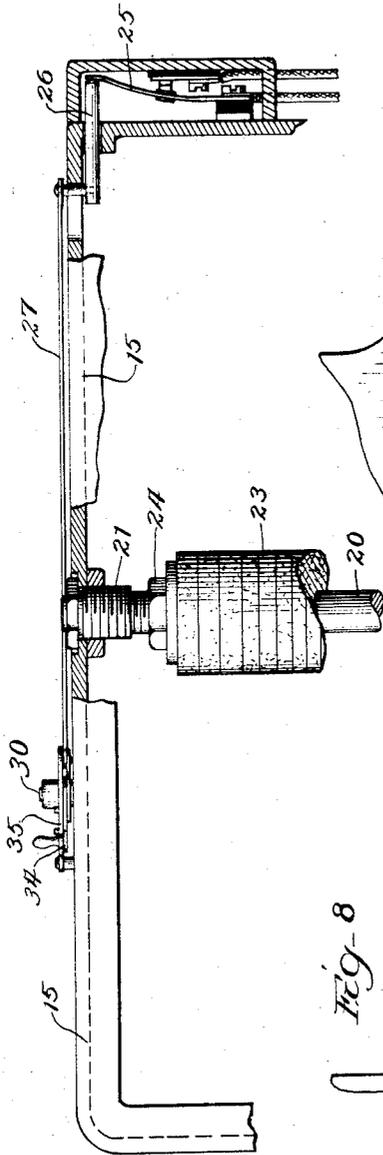
O. A. HOKANSON

POWER OPERATED TYPEWRITER

Filed April 3, 1924

7 Sheets-Sheet 5

Fig-7



Inventor:

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Jan. 18, 1927.

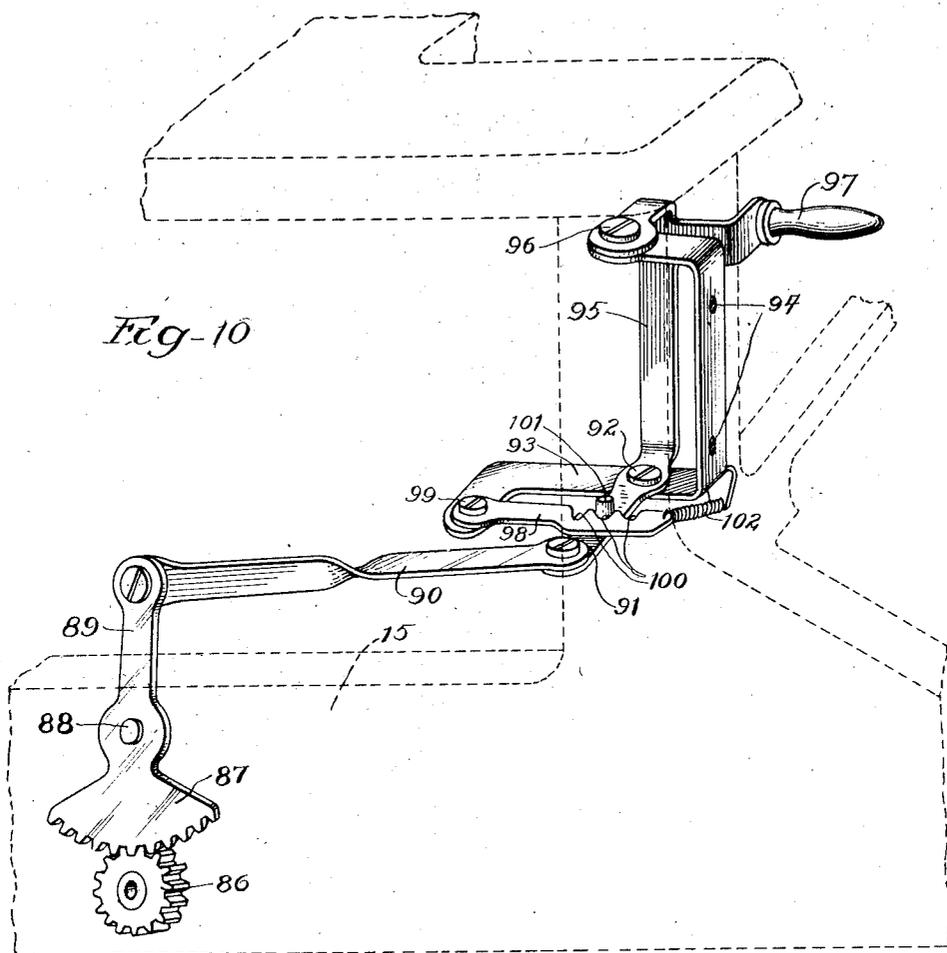
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POWER OPERATED TYPEWRITER

Filed April 3, 1924

7 Sheets-Sheet 6



Inventor:
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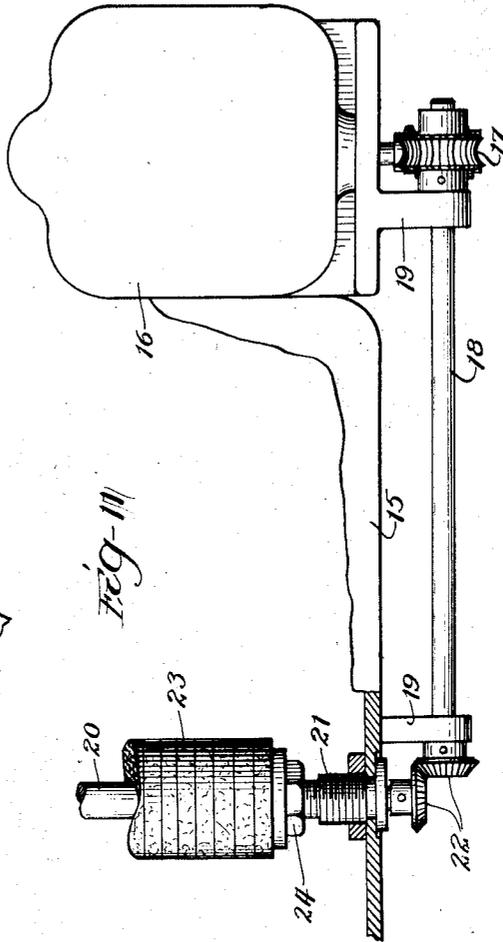
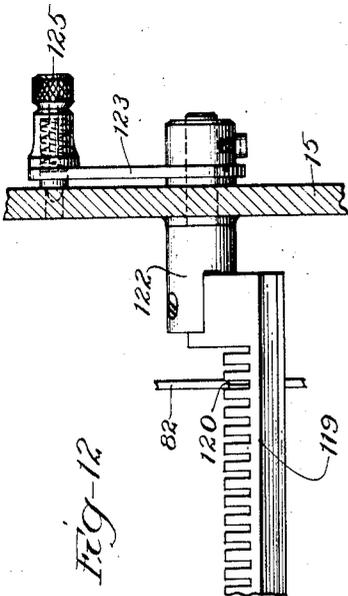
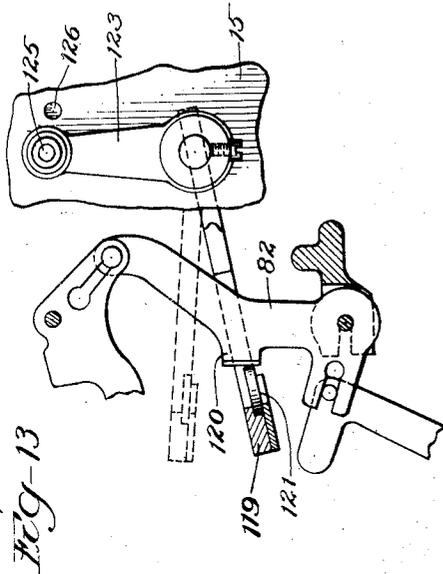
1,614,473

O. A. HOKANSON

POWER OPERATED TYPEWRITER

Filed April 3, 1924

7 Sheets-Sheet 7



Inventor:
Otto A. Hokanson
By: Neissen & Lane Attys.

UNITED STATES PATENT OFFICE.

OTTO A. HOKANSON, OF WOODSTOCK, ILLINOIS, ASSIGNOR TO WOODSTOCK TYPE-
WRITER COMPANY, OF WOODSTOCK, ILLINOIS, A CORPORATION OF ILLINOIS.

POWER-OPERATED TYPEWRITER.

Application filed April 3, 1924. Serial No. 703,927.

This invention relates to a typewriting machine driven by a power device, such as an electric motor, and has for its object the provision of such a machine which shall be of improved construction and operation and in which the energy for operating the type bars is supplied by the power apparatus, the machine being controlled by a keyboard in the usual manner.

The invention is exemplified in the combination and arrangement of parts shown in the accompanying drawings and described in the following specification, and it is more particularly pointed out in the appended claims.

In the drawings—

Fig. 1 is an elevation of a key lever showing the power mechanism controlled thereby for actuating a type bar;

Fig. 2 is a fragmentary horizontal sectional view showing the key lever mounting;

Fig. 3 is a view similar to Fig. 2, but showing the opposite side of the machine;

Fig. 4 is a fragmentary horizontal sectional view showing the adjustable control for the power operating mechanism;

Fig. 5 is a fragmentary vertical sectional view of the interlocking mechanism for the key levers;

Fig. 6 is a fragmentary vertical section showing the adjustable control for the power mechanism;

Fig. 7 is a fragmentary top plan, with parts in section, showing the control lever for the motor and associated parts;

Fig. 8 is a front elevation, and Fig. 9 is a side elevation of the control lever for the electric switch with its associated parts;

Fig. 10 is a perspective view of the hand lever and link connection for operating the control mechanism for the power drive;

Fig. 11 is a fragmentary top plan view, with parts in section, showing the motor connection for the power roller;

Fig. 12 is a top plan view, and Fig. 13 is a side elevation of a modified form of interlocking mechanism applied to the sublevers.

The numeral 15 designates the base frame of a typewriter, the form shown in the drawings being that of a "Woodstock" machine. Mounted on the rear of the frame 15 is a motor 16 provided with a worm drive 17 for rotating a shaft 18 journaled in brackets 19 projecting from the side of the machine. A shaft 20 is journaled in bush-

ings 21 mounted in the side plates of the frame 15 and is driven by beveled gears 22 from the shaft 18. The shaft 20 carries a friction roller 23 for operating the type bars in a manner to be described. The roller 23 may be made of leather rings or washers threaded on the shaft 20 and held in place by nuts 24. Other material may, of course, be used for the roller 23, but it has been found that leather provides a suitable friction surface for the roller.

The motor 16 is controlled by a switch 25 secured to the rear of the frame at the opposite side from the motor 16. The switch 25, as shown in Fig. 7, is operated by a plunger 26 and a link 27 connected with the lower end of a downwardly projecting arm 28 of a lever 29 pivoted at 30 on the frame 15. The lever 29, as shown in Figs. 8 and 9, is provided with a stud 31 which projects through a slot 32 in a hand crank 34. A detent 35 is pivoted at 36 to the frame 15 and is provided with spaced notches 37 and 38 for holding the lever 29 against pivotal movement. The detent 35 is provided with a cam slot 39 which receives a pin 40 carried by the hand crank 34. The cam slot 39 is so shaped as to lift the detent 35 during the first part of the movement of the hand crank 34. This will free the detent from the pin 31 so that by the time the hand crank 34 has moved the distance of the slot 32 the detent will be free from the pin 31 so that further movement of the hand crank will carry the lever 29 in unison with it until the pin 31 engages the notch 37. When the pin 31 reaches the notch 37 the detent is again lowered by the cam 39 to lock the lever 29 and consequently the switch link 27 in its other extreme position. It is thus seen that the detent 35 provides an automatic stop for locking the switch lever in either of its extreme positions, the stop being automatically released when the hand crank 34 is moved in either direction. This same movement of the hand crank 34, as will be explained later, sets the typewriting mechanism for either hand or power operation.

As shown more clearly in Fig. 4, the pivot pin 30 is journaled in a bushing 41 and is rigidly fixed with the lever arm 29. The inner end of the pivot pin 30 carries a cam plate 42 rigidly attached thereto for adjusting the operating mechanism into different positions for either hand or power actua-

tion, as will be described. The arm 29 is held to the pin 30 by means of a collar 43 to which the arm 29 is secured and which carries a shoulder 44 on which the hand crank 45 is journaled. The collar 43 is secured to the pin 30 by a set screw 46.

A pair of plates 47 and 48 are supported on pins 49 and 50, respectively, which project inwardly from the side plates of the machine frame, the plates being provided with slots 51 for permitting a limited longitudinal movement. The rear ends of the plates 47 and 48 are provided with hooks 52 for receiving cams 53 carried on a shaft 54. Stud 55 projecting inwardly from the walls of the frame 15 pass through the enlarged elongated openings 56 in the plates 47 and 48, the studs being provided with washers 57 to hold the plates 47 in an upright position and to prevent lateral movement thereof. Springs 59 normally hold the rear ends of the plates 47 and 48 in their upper positions. A pair of transverse rods 60 and 61 connect the plates 47 and 48. On the rod 61 are fixed a plurality of cam discs 62, each disc being provided with a pair of laterally projecting cam rollers 63. The rod 60 carries a plurality of escapement dogs 64, one for each disc 62. Each dog 64 has an abutment member 65, as shown in Fig. 1, for engaging one of the rollers 63 and is also provided with a nose 66 for engaging the rollers 63 when the disc 62 is turned to a different position from that shown in Fig. 1. A spring 67 is wound about the rod 60 and has one end thereof secured to the dog 64 while the other end bears against the rollers 63. The cam discs 62 are journaled on the rod 61 independently of one another so that each disc is free to rotate while the other discs remain stationary.

Each escapement dog 64 is provided with a plunger 68 pivoted thereto at 69 and extending upwardly through slots in one flange of an angle bar 70. The upper ends of the plungers 68 are provided with flanges 71 providing seats for engagement with contact lugs 72 on key levers 73. Each of the plungers 68 is provided with a transverse pin 74 to limit the movement of the plungers 68 under the influence of the spring 67 when the plungers are moved out of operative relation with the key levers, as will be explained later.

A transverse bar 75 extends from one side of the machine frame to the other and carries a series of arms 76 pivoted at 77 on the bar 75, each arm being provided with a spring 78 and an adjusting screw 79 for resiliently pressing the arm upwardly about its pivot 77. The ends of the arms 76 opposite the bar 75 are provided with pins 80 which engage slots 81 in a series of sublevers 82 which operate the type bars 83 by means of pin and slot connections 84. Each arm 76

carries a cam face 85 in the path of travel of the rollers 63. When one of the rollers 63 strikes the cam face 85 the arm 76 is moved downwardly and operating through the pins 80 and 84 imparts an impulse to the type bar 83 to produce a printing stroke. The roller 63 will not engage the cam face 85 throughout the entire movement of the type bar 83, but will leave the cam face prior to the completion of the printing stroke leaving the parts to complete the printing operation under the influence of their momentum. The force of the impact may be regulated by varying the position of the rod 61 relative to the cam face 85 so as to permit a greater or less period of contact between the rollers 63 and the cam face. The position of the rod 61 is shifted by means of the cams 53 on the shaft 54. It will be apparent that rotation of the shaft 54 will move the plates 47 and 48 fore and aft of the machine and consequently adjust the position of the rod 61.

The shaft 54 is provided with a pinion 86 secured to one end thereof and meshing with a segment 87 operated by lever mechanism shown more clearly in Fig. 10. The segment 87 is provided with a pivot 88 and an arm 89 on the inside of the machine frame 15. A link 90 connects the arm 89 with an arm 91 pivoted at 92 on a bracket 93 secured to the inner face of the forward upright post of the machine frame 15 by means of screws passing through openings 94. A yoke 95 is formed integrally with the arm 91 and is provided with an upper pivotal support 96 in alinement with the pivot 92. A hand lever 97 is secured to the yoke 95 by means of which the yoke and arm 91 may be swung about their pivotal supports 92 and 96. A detent 98 is pivoted at 99 on the bracket 93 and is provided with a series of notches 100 for receiving a pin 101 to yieldingly retain the arm 91 in its adjusted positions. A spring 102 holds the detent 98 against the pin 101 but permits movement of the pin when sufficient force is exerted on the lever 97.

If one of the key levers 73 is depressed while the power roller 23 is rotating the plunger 68 will be moved downwardly a slight distance to free abutment 65 from the roller 63. When this occurs the spring 67 will rotate the cam disc 62 about the rod 61 until the disc engages the roller 23, the disc being elongated so that when partially rotated its periphery will be brought into contact with the roller 23. As soon as the disc 62 engages the roller 23 it will be driven thereby to cause the roller 63 at the left of the center of the disc, as viewed in Fig. 1, to engage the cam surface 85 and actuate the type bar. The springs 59 resiliently hold the periphery of the roller 63 against the roller 23 during the driving operation and

permit sufficient downward movement of the rod 61 to accommodate the increase in the diameter of the cam disc due to its elongated shape. If the key is held down during this operation the roller 63 will be intercepted by the nose 66 of the dog 64 which is projected upwardly into the path of the roller by the depression of the key. This will arrest the rotation of the disc 62 with the depression 103 opposite the power roller 23 so that the power roller 23 is free to rotate without operating the cam disc after it has been arrested by the nosepiece 66. When the key is finally released the spring 67 will further rotate the cam disc until it is stopped by the abutment 65. If it should happen that the key lever is released prior to the completion of the printing action the roller 63 will be initially stopped by the abutment 65 since release of the key lever will return the abutment 65 into the path of the cam rollers simultaneously with the movement of the nosepiece 66 out of their path. It is seen that at each depression of a key lever the corresponding cam disc 66 is given a half rotation causing one of the rollers 63 to engage the cam face 65 and operate a type bar. The depression of the key lever is slight compared with that necessary for operating the type bars by hand and the force required is very slight since it is only necessary to overcome the resiliency of the spring 67. The power for performing the printing operation is furnished by the power roller 23. It is desirable that only one of the key levers shall be depressed at a given time and in order to positively prevent simultaneous depression of more than one lever an interlocking device is provided comprising a slotted bar or comb 104 extending transversely of the machine and pivotally supported at 105 on opposite sides of the machine frame. The bar is provided with a series of slots 106, one for each of the key levers 73. A recess 107 is provided in one face of the bar for receiving a series of discs 108. A plate 109 partially covers the recess 107 and retains the discs 108 in position in the recess. Sufficient clearance is provided between the discs 108 to accommodate the thickness of a single key lever only between the discs.

Each key lever is provided with a downwardly projecting portion 110 arranged to extend between the discs 108 and to be arrested in its downward movement by the bottom of the slots 106 in the comb 104 which thus constitutes a stop for limiting the movement of the key levers. It will be apparent from Fig. 5 that when one key lever is depressed any downward movement of an additional key lever will be arrested by engagement with one of the discs 108. The movement permitted by the slots 106 is relatively slight and is considerably less than is required when the type bars are operated by

the depression of the key levers. In some cases it may be desirable to disconnect the power mechanism and to operate the typewriter by hand. It will be seen from Fig. 1 that each of the key levers 73 is provided with a laterally projecting pin 111 arranged to engage the top of the operating arm of the sublever 82. If the key lever is depressed by hand a sufficient amount the type bar will be operated through the medium of the pin 111. This pin, however, does not interfere with the power operation of the machine since the movement of the sublever by power carries the short arm of the sublever away from the pin 111. In order to permit sufficient downward movement of the key levers for hand operation it is necessary to swing the comb 104 out of operative position and at the same time shift the plungers 68 out of registration with the projections 72 on the key levers. This change in the position of the parts for hand operation is secured by means of the cam plate 42 connected to the pivot pin 30 and takes place simultaneously with the operation of the switch 25 for disconnecting the power motor.

The cam plate 42 is provided with a cam groove 112 which engages a roller 113 projecting from the end of the plate 104. Rotation of the cam plate 42 swings the comb 104 from full line to broken line positions, as shown in Fig. 6, thus clearing the projections 101 to permit sufficient movement of the key levers for hand operation. Simultaneously with the movement of the comb 104 the plungers 68 are drawn forwardly out of registration with the projections 72 by means of a cam slot 114 in the plate 42. This cam slot engages a roller 115 mounted on a plate 116 which is pivoted on the pin 49 and which carries the angle bar 70. When the angle bar 70 is moved forwardly by the cam slot 114 the plungers 68 are held from upward movement by the pins 74, as previously explained. The plate 116 is provided with a downwardly projecting tailpiece 117 having an opening 118 therein arranged to register with a corresponding opening in the plate 47. A screw is inserted in these openings to facilitate assembling of the parts when the machine is being built, but after assembly the screw is removed so that the parts are free to move relative to one another. A cam plate 42 is provided at one side of the machine only as the bars 104 and 70 are sufficiently rigid to be swung from force applied at one end only.

The interlocking mechanism for preventing simultaneous movement of more than one key lever at a given time may be associated with various parts of the mechanism other than the key levers themselves. As an example, Figs. 12 and 13 show one arrangement by which the interlocking mechanism may be made to cooperate with the sublevers,

As there shown, a slotted comb 119 is arranged to register with projections 120 on the sublevers 82, the comb being provided with discs 121 interlocking with the projections 120 in the same manner as the discs 108 shown in Fig. 5. The comb is carried by stud pins 122, one pin being pivotally mounted at each side of the machine frame. One of the pins 122 is provided with a hand crank 123 by means of which the comb may be moved into and out of operative position, as shown in Fig. 13. A spring pressed pin or detent 125 is arranged to cooperate with various openings 126 in the machine frame to hold the comb in either of its adjusted positions.

While I have shown one embodiment of the present invention it will be understood that various changes in details of construction may be made without departing from the spirit and scope of the invention as defined in the appended claims.

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

1. In a typewriter, a motor driven device, a plurality of key levers, a plurality of type bars connected with said key levers for hand operation of said type bars, means controlled by said key levers for causing said type bars to be actuated by said motor driven device, a stop for limiting the movement of said key levers to a given amount for power operation of said typewriter, interlocking means for preventing operation of more than a single key lever at one time during power operation, and means for moving said stop and interlocking means out of operative position to permit a larger range of movement to said key levers for hand operation of said typewriter and to permit depression of more than a single key lever at one time during hand operation.

2. In a typewriter, a motor driven mechanism, a plurality of type bars, key levers, a device to stop the key levers so that they cannot be moved beyond the given position adapted to operation of the motor driven mechanism, said key lever stopping device comprising interlocking means for allowing no more than a single key to be depressed at one time, and means for moving said interlocking means into a new position adaptable to manual operation of the type bars and when in said new position permitting the key levers to be moved farther than the said given position and permitting more than one key lever to operate at a time.

3. In a typewriter, a plurality of key levers, interlocking mechanism for allowing only one key lever at a time to be operated by hand, said locking mechanism arranged to be placed in the path of the key lever in operable position, and means for moving said interlocking mechanism into a position where

it does not affect the operation of the key levers.

4. In a typewriter, a plurality of key-operated levers, interlocking mechanism for limiting the number of levers that can be operated at one time, said interlocking mechanism being movable out of operable position relative to said levers.

5. The combination with a typewriter having a plurality of key levers, said typewriter being manually operable by said key levers, of power mechanism controlled by said key levers for actuating said typewriter, a stop for limiting the movement of said key levers to a given range of movement during power operation of said typewriter, interlocking means for preventing operation of more than a single key lever at one time during power operation, and means for moving said stop and interlocking means out of operative relation with said key levers to permit hand operation of said typewriter.

6. The combination with a typewriter having a plurality of key levers, of power-operated mechanism controlled by said key levers for actuating said typewriter, a stop for limiting the movement of said key levers during power operation of said typewriter, a plurality of contact devices engaged by said key levers for selectively controlling said power-operated mechanism; and means for simultaneously shifting said stop and contact devices out of operative relation with said key levers to permit hand operation of said typewriter.

7. In combination, a typewriter having a plurality of key levers, a stop bar for limiting the movement of said key levers, a plurality of contact devices operable by said key levers, power-operated mechanism for said typewriter controlled by said contact devices, a guide bar for said contact devices, and a cam for shifting the position of said stop and guide bar to move said stop and contact devices out of operative relation with said key levers to permit hand operation of said typewriter.

8. The combination with a typewriter having means for either hand or power operation, of a control device for setting said typewriter for either hand or power operation, a movable member for operating said control device, and means actuated by said movable member for locking said device in different positions of adjustment.

9. The combination with a typewriter having means for either hand or power operation, of a movable member for adjusting said typewriter for hand or power operation, a detent for holding said movable member in different positions of adjustment, and means operated by said movable member during initial movement thereof for releasing said detent.

10. In a typewriter, a drive roller, a plu-

5 rality of rotatable members arranged to selectively engage said drive roller, and a frame for supporting said rotatable members, said frame being movable relative to said roller to vary the relation of said rotat-

10 11. The combination with a typewriter, of a drive roller therefor, a plurality of rotatable members for engaging said roller, a frame for supporting said rotatable members, resilient means for moving said frame toward said roller, and means for shifting said frame transversely of said roller to vary the relation of said rotatable members relative to said roller.

15 12. The combination with a typewriter, of a drive roller therefor, a plurality of rotatable members for selectively engaging said roller, a frame for supporting said rotatable members, said frame comprising a pair of plates at opposite sides of said typewriter pivoted for movement toward and away from said roller, means for shifting said plates transversely of said roller to change the position of said rotatable members relative to said roller, and a detent for holding said shifting means in different positions of adjustment.

20 13. The combination with a typewriter, of a drive roller therefor, a plurality of rotatable members for selectively engaging said drive roller, a frame for supporting said rotatable members, means for shifting said frame transversely of said roller to vary the relations of said rotatable members relative to said roller, link mechanism extending to a convenient position on said typewriter for access by the operator, a handle for operating said link mechanism, and a spring-pressed detent for holding said link mechanism in different positions of adjustment.

30 14. The combination with a typewriter, of a drive roller therefor, a pair of plates pivotally and slidably mounted at opposite sides of said typewriter adjacent said drive roller, a bar connecting said plates, a plurality of rotatable members mounted on said bar, means for selectively moving said rotatable members into engagement with said drive roller, springs engaging said plates to press said rotatable members against said drive roller, and a cam for shifting said plates transversely of said drive roller to vary the relation of said rotatable members relative to said drive roller.

35 15. In a typewriter, the combination with a drive roller, of a bar arranged parallel with said drive roller, a plurality of cam plates mounted on said bar for selectively engaging said drive roller; a second bar extending parallel with said drive roller, a plurality of escapement dogs for said cam plates mounted on said second bar, key levers, and means actuated by said key levers for controlling said escapement dogs.

16. In a typewriter, a drive roller, a bar arranged parallel with said drive roller and having a plurality of cam plates mounted thereon, yielding means for individually rotating said cam plates to bring the peripheries thereof into engagement with said drive roller, detents mounted independently of said bar for holding said cam plates against rotation, and key levers for releasing said detents to permit rotation of said cam plates.

70 17. In a typewriter, a drive roller, a shaft extending parallel with said roller, a plurality of cam plates independently rotatable on said shaft, a contact member carried by each of said plates, means for selectively engaging said cam plates with said drive roller, type bars, and means actuated by said contact members during rotation of said cam plates for operating said type bars.

75 18. The combination with a typewriter, of a drive roller therefor, a plurality of cam plates rotatably mounted adjacent said drive roller, a contact member carried by each of said cam plates, a detent for controlling the rotation of said cam plates, key levers for releasing said detents to permit movement of said cam plates by said drive roller, a plurality of type bars, and means engaged by said contact members during rotation of said cam plates by said drive roller for actuating said type bars.

80 19. In a typewriter, a drive roller, a plurality of cam plates journaled for rotation adjacent said drive roller each of said cam plates having oppositely disposed contact rollers thereon, a plurality of type bars, means supported independently of said cam plates for actuating said type bars and arranged to be engaged by said contact rollers, and cam controlled detents for selectively releasing said cam plates to permit operation thereof by said drive roller.

85 20. In a typewriter, a drive roller, a shaft arranged adjacent said roller and parallel therewith, frame plates for supporting said shaft and roller at opposite ends thereof, a plurality of cam plates mounted on said shaft, type bars, levers for actuating said type bars, and cam rollers mounted on said cam plates for engaging said levers to actuate said type bars.

90 21. In a typewriter, a drive roller, a pair of shafts arranged parallel with said drive roller, cam plates independently journaled on one of said shafts, control dogs for said cam plates pivoted on the other of said shafts, a plurality of type bars, levers pivoted independently of said shafts for actuating said type bars, hand actuated means for moving said dogs for selectively permitting said cam plates to engage said drive roller, and means on said cam plates for engaging said pivoted levers to operate said type bars.

22. A typewriter comprising a plurality of key levers, a plurality of type bars, a drive roller, a plurality of cam plates for engaging said drive roller, levers for actuating said type bars, means on said cam plates for engaging said levers to actuate the same, a plurality of dogs for controlling said cam plates, plungers separate from said key levers for moving said dogs, and means on said key levers for actuating said plungers.

23. In a typewriter, a plurality of type bars, a power roller, a plurality of cam plates for selectively engaging said power roller, levers pivoted independently of said cam plates for operating said type bars, said levers having cam faces thereon, means on said cam plates for engaging said cam faces, and means for shifting said cam plates relative to said levers and drive roller to vary the impact imparted to said type bars.

24. The combination with a type bar, of means for actuating said type bar having a cam face thereon, a rotary member for engaging said cam face to drive said actuating means, and means for relatively shifting said rotary member and said cam face to vary the impact imparted to said type bar thereby.

25. In a typewriter, a power roller, a cam plate for engaging said power roller, said cam plate having contact members at diamet-

rically opposite positions thereon, a spring normally tending to rotate said cam plate to cause it to engage said power roller, a detent for preventing rotation of said cam plate by said spring, a key lever for releasing said detent to permit rotation of said cam plate, a type bar, and means actuated by said contact members for operating said type bar.

26. In a typewriter, a type bar, a lever for operating said type bar, a fixed pivotal support for said lever, a power driven rotary member arranged to engage said lever to operate said type bar, and means for adjusting said power driven rotary member and lever relative to one another to vary the impact imparted to said type bar.

27. In a typewriter, a type bar, a pivoted lever for actuating said type bar having a cam face thereon, a drive roller, a cam plate arranged to engage said drive roller and having a contact member projecting therefrom, a detent for controlling said cam plate, key control means for releasing said detent, and means for shifting said cam roller relative to said operating lever to vary the impact imparted by said lever to said type bar.

In testimony whereof I have signed my name to this specification on this 3rd day of April A. D. 1924.

OTTO A. HOKANSON.