Dec. 13, 1932. E. B. HESS 1,890,990

TYPEWRITING MACHINE

Filed Aug. 10, 1927 5 Sheets-Sheet 1

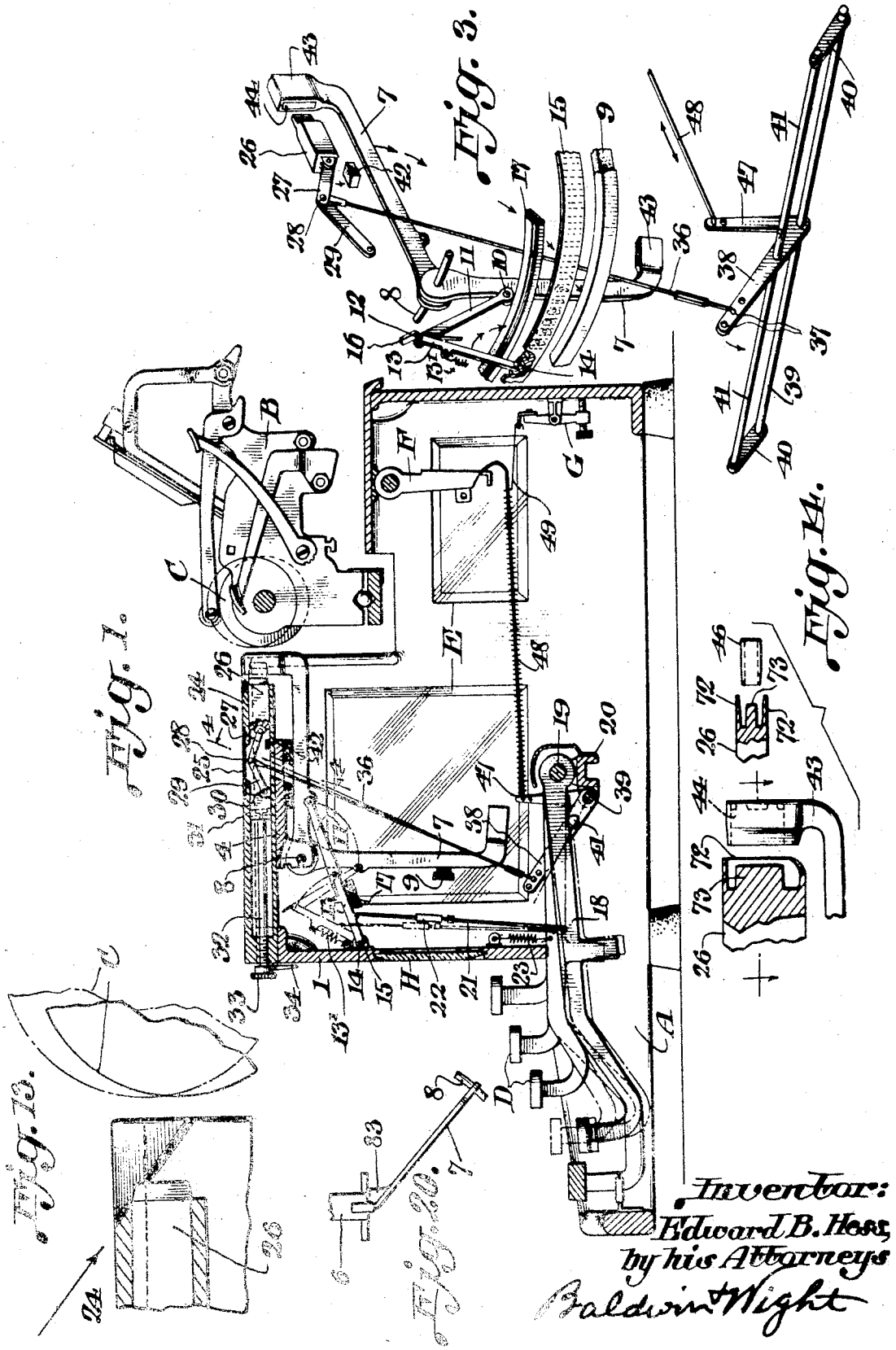


Fig. 1.

Fig. 3.

Fig. 14.

Fig. 12.

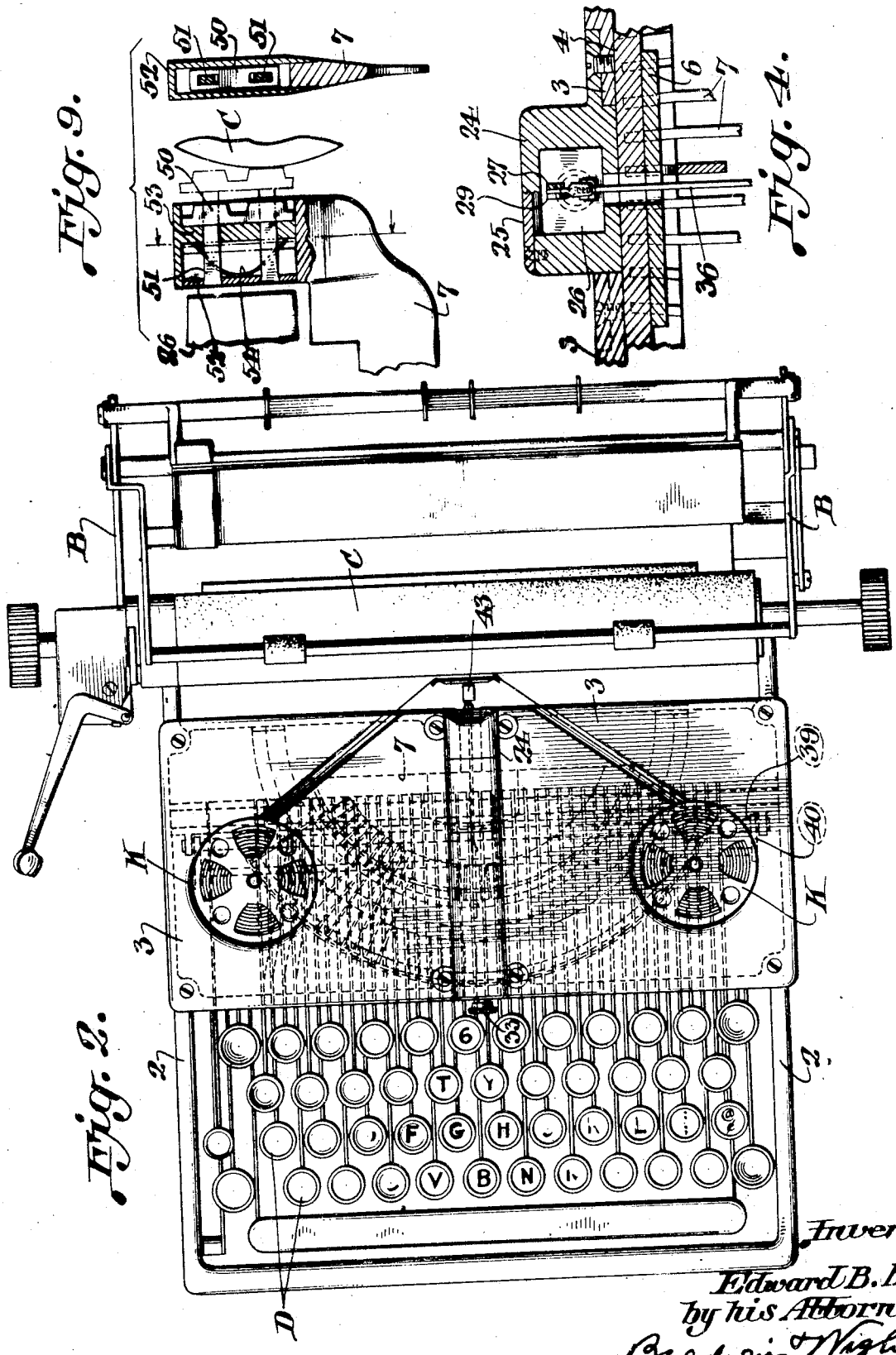
Fig. 20.

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TYPEWRITING MACHINE

Filed Aug. 10, 1927 5 Sheets-Sheet 2



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Dec. 13, 1932. E. B. HESS 1,890,990

TYPEWRITING MACHINE

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Fig. 5.

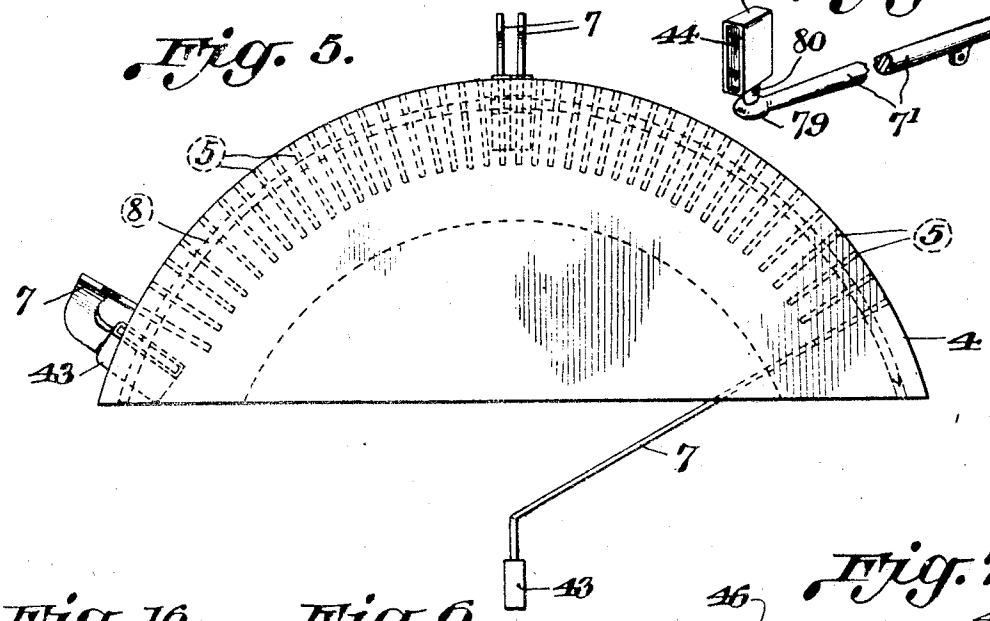


Fig. 18.

Fig. 16.

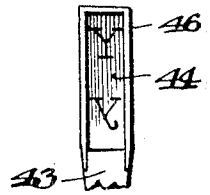


Fig. 6.

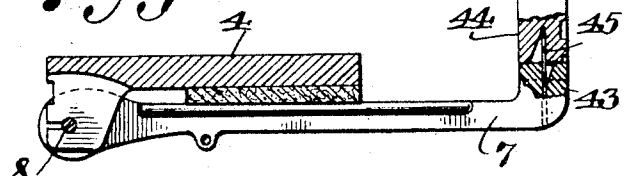


Fig. 7.

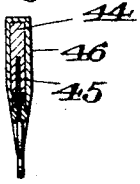


Fig. 8.

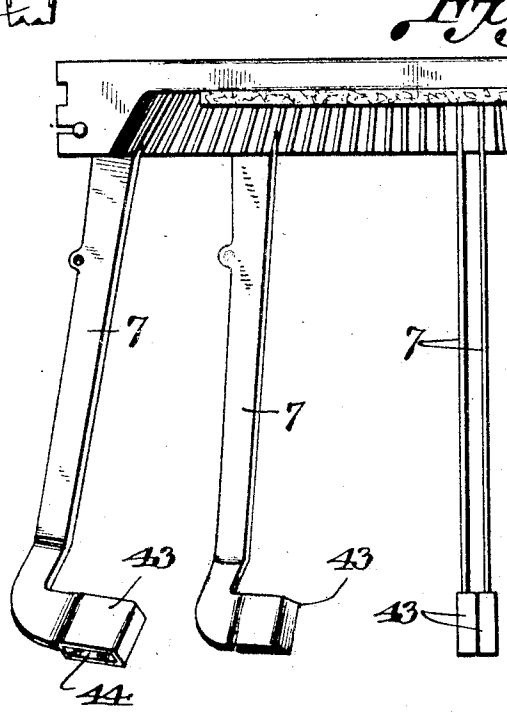
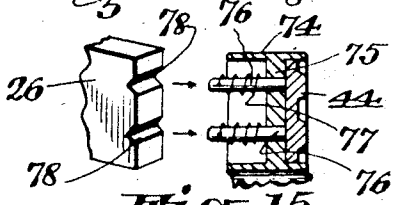


Fig. 15.



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TYPEWRITING MACHINE

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Fig. 19.

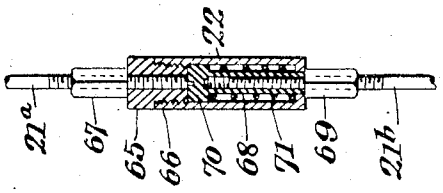


Fig. 10.

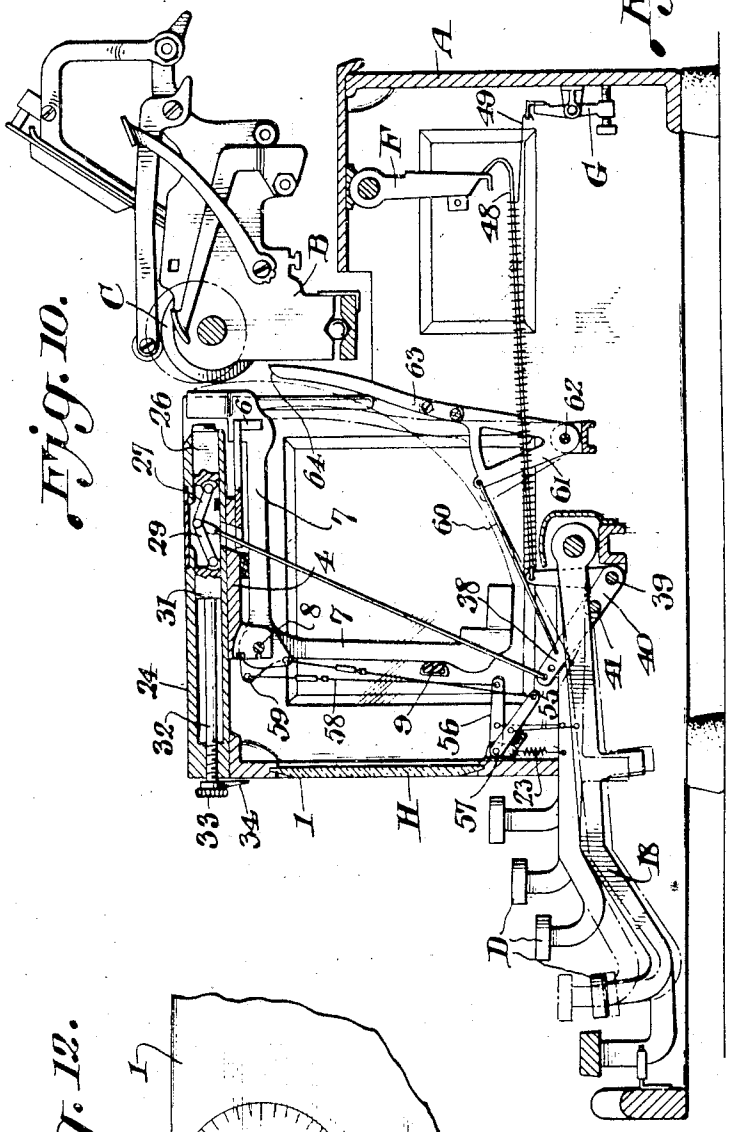


Fig. 11.

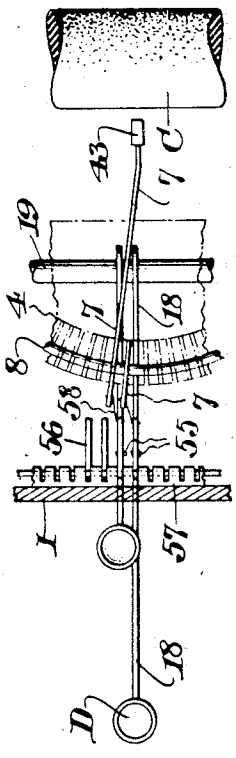
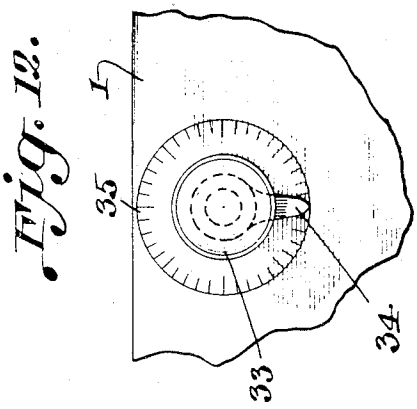


Fig. 12.



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TYPEWRITING MACHINE

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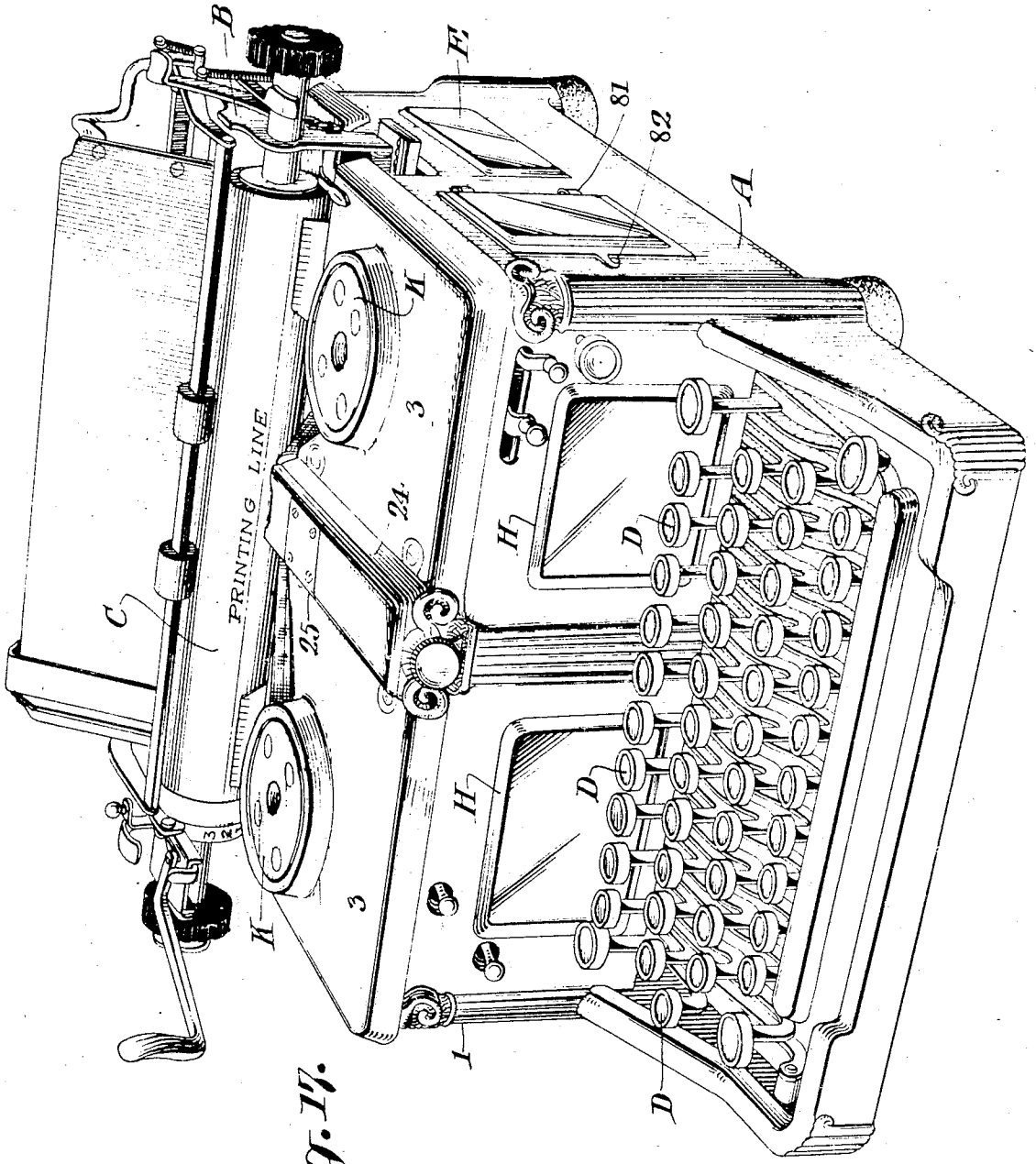


Fig. 17.

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Patented Dec. 13, 1932

1,890,990

UNITED STATES PATENT OFFICE

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TYPEWRITING MACHINE

Application filed August 10, 1927. Serial No. 212,025.

An object of this invention is to provide a new and improved type action for typewriting and similar machines which will be simple in construction, rapid and efficient in operation, will eliminate substantially all of the noise which results from the operation of the usual type action in a commercial machine, and at the same time provide visible writing.

The type action hereafter disclosed consists of a plurality of type carriers which are mounted in the usual segment and normally hang by gravity in a vertical position. They are swung to a position in front of the platen by connections from the usual key levers which may be of any desired or suitable type. Each type carrier has carried in the free end thereof a slidable type block which lies normally within a casing at the end of the type carrier and is retracted by a spring to a position where it will not be damaged by contact wth other type carriers or extraneous objects.

After the type carrier has moved to a position in front of the platen wherein it is held stationary this type block is forced against the platen by means of an impression member actuated by the straightening of a toggle. This toggle is connected to a universal member or frame which is operated by any of the key levers during the latter portion of their movement.

A further object of the invention is the provision of a type action such as specified which can be substituted in a typewriting machine without substantial modification of the other instrumentalities. The invention is illustrated as applied to a standard Royal machine in which this type action can be embodied with but little change in the construction of the other instrumentalities of the machine such as the key board, the carriage, platen shift mechanism, ribbon mechanism, escapement mechanism, and the like. Consequently certain of these instrumentalities have been omitted entirely from the drawings and others have been illustrated only partially. It is to be understood that this type action can be substituted in the standard Royal machine with almost no change in the above-mentioned instrumentalities. It can also be applied to other types of machines with but little or no change in their constructions except as regards the type action itself.

Other objects of the invention will be apparent from the following detailed description and will be set forth in the appended claims. It may be noted that substantially all of the figures of the drawings are drawn to scale either natural or one-half size.

In the drawings:

Figure 1 is a fore and aft vertical section through a typewriting machine disclosing one form of the invention.

Figure 2 is a top plan view of the same.

Figure 3 is a perspective view of a type action and related parts.

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a top plan view of the segment.

Figure 6 is a fore and aft section through the same.

Figure 7 is a section through the type carrier head at right angles to Figure 6.

Figure 8 is a rear elevation of the segment showing three type carriers in normal position.

Figure 9 is a longitudinal and cross-sectional view of a modified form of type block or head.

Figure 10 is a fore and aft vertical section of a typewriting machine illustrating a modified form of type action.

Figure 11 is a top plan view with parts in section of the type action shown in Figure 10.

Figure 12 is a front view of an adjusting means for the impression member.

Figure 13 is a side elevation with parts in section showing the visibility of the writing and the line of sight to the operator.

Figure 14 shows sectional views at right angles to each other of a modified form of type block and impression member.

Figure 15 is a sectional view with parts in elevation showing a still further modification of type block and impression member.

Figure 16 is a front view of the type block and the housing containing the same.

Figure 17 is a perspective view of a type-

writing machine constructed in accordance with the present invention.

Figure 18 is a perspective view showing a modified form of type carrier and means for attaching the type block housing thereto.

Figure 19 is a sectional view of one form of link which may be employed between the key levers and the type carrier.

Figure 20 is a detail view of a modification.

As above stated, the invention is illustrated as embodied in the Royal standard machine and there is shown the main frame A, the usual carriage B carrying a platen C, the usual key board with type operating keys D, the glass panels E in the sides of the frame, the depending universal bar F, and the spring tension adjusting means G, all of which are found in said machine. Since the invention in no substantial way modifies the form or operation of these instrumentalities it has been deemed unnecessary to illustrate the same in detail.

The front plate 1 of the machine has glass inspection panels H and this plate, together with the sides 2 of the main frame, support top plates 3 which are fastened thereto by screws or in any other desired manner. A segment 4 having grooves 5 to receive the type carriers is carried by the underside of these top plates. This segment together with the type guide 6 (when used) may be substantially the same as that now used in the standard Royal machine but is, of course, positioned in an entirely different manner. In some forms of the invention, the type guide 6 may be omitted as unnecessary. A plurality of type arms or carriers 7 are pivoted in the segment 4 on the usual pivot wire 8. These carriers normally hang by gravity in substantially vertical position and rest against a type rest 9 of suitable material.

Pivoted to each type carrier at a point 10 intermediate its ends as best shown in Figures 1 and 3 is one member 11 of a toggle which is pivoted at 12 to the other member 13 of the toggle which in turn is pivoted at 14 to a plate 15 attached at its central portion to the front plate 1 between the glass panels H and supported at its ends in any suitable or desired manner. The member 11 of the toggle preferably has an extension 16 beyond the pivot point 12 which gradually contacts with the side of the member 13 when the toggle is straightened and thus prevents any overthrow. The movement of the toggle is also limited by the contact of the member 13 with a sound deadening pad 17 of any desired character. A spring 13′ is attached to the toggle member 13 and to an ear on the plate 15 in such manner that it very slightly resists the straightening movement of the toggle and tends to break the same when the key lever is released.

The key levers 18 are of the usual type and are pivoted on a transverse rod 19 carried by a bridge 20 which extends from one side of the machine to the other. Each key lever is connected to its appropriate type carrier by means of a link 21 having an adjusting means 22 of the character shown in my Patent No. 1,227,438 granted May 22, 1917, and illustrated in Figure 19. In this construction one member 21ª of the link 21 is adjustably connected with a plug 65 screwed into one end of a tube 66 and held in its adjusted position by a nut 67. The other member 21ᵇ of the link 21 enters an internally threaded sleeve 68 and is adjustable therein, being held by a nut 69. The sleeve 68 enters the tube 66 and is formed at its inner end with a head 70. Between this head 70 and the end of the tube is a compression spring 71. This connection is not only adjustable but permits a certain cushion period in the movement of the key lever.

It is to be understood that any other form of connection may be employed which will permit a further movement of the key lever after the type carrier has been swung to its operative position in front of the platen and the toggle has been straightened. It is also to be noted that the two portions of the depression of the key lever may bear any desired relation to each other.

The link 21 which is connected to the key lever is connected at its other end to the member 13 of the toggle above described. A spring 23 attached to each key lever and to an ear on the front frame member 1 tends to return the parts to normal position. The weight of the type carriers themselves will also tend to return the parts to their rest position by gravity as soon as the toggle begins to break.

Mounted between the top plate 3 and rising above the same is a guide member 24 having a removable inspection plate 25 in its upper surface. An impression member or block 26 is mounted to slide in the guide 24 and has pivoted thereto one member 27 of a toggle which is pivoted at 28 to the other member 29 of the toggle. This member 29 is pivoted at its end at 30 to a block 31 carried by a rod 32 which is screw threaded into the front portion of the guide member 24 as clearly shown in Figures 1 and 10. The position of this block 31, and consequently the effective working position of the impression member 26, can be varied by turning a finger piece 33 on the front end of the rod 32. This finger piece is provided with an index 34 which passes over a scale 35 as shown in Figure 12. This affords a very simple and efficient means for varying the force of the printing impression and permits adjustment for manifolding in a quick and easy manner.

Connected to the toggle just described at the pivot point 28 is a link 36, the other end of which may be engaged to any one of a

plurality of holes 37 in an arm 38 of a bell crank member forming part of a universal frame or member which is pivoted to turn about the axis of a rod 39 mounted in the side frame of the machine. This rod 39 carries two arms 40 which are connected by a universal bar 41 which passes through or is connected to the arm 38 of the bell crank lever. A sound deadening pad 42 limits the movement of the toggle arm 27 and prevents its passing through the dead center.

The free end 43 of each type arm projects at right angles to the longitudinal axis of the arm, and forms a casing 46 having a transverse seat or opening in which is slidably mounted a type block 44. This block may be mounted in the type carrier in various ways. In the construction shown in Figures 6 and 7 the free end 43 of the type carrier has a slight depression communicating with a passage in which is inserted and held one end of a spring 45 which fits into a cut-out in the type block 44. This permits ready assembly of the parts and the removal of the spring whenever it is desired to replace the same. The casing 46 for the type block is attached to the type carrier by welding, soldering, or other desired manner. This casing may be very thin since it merely affords a guide for the type block and does not have to resist the force of the printing blow as does the usual type bar. It is evident that this construction allows the type block to be moved within the casing toward the platen and that the spring 45 will return it to normal position whenever the pressure is removed therefrom. Thus, the block is movable in a direction parallel to the longitudinal axis of the arm or carrier.

An alternative method of mounting the type block is shown in Figure 9. In this construction the type block 50 has two forwardly extending arms 51 which are attached to a member 52 and guided in a web 53 of the type carrier.

A bowed spring 54 is positioned between the web 53 and the member 52 and tends to return the type block to normal position when pressure is removed therefrom.

A further form of type block and mounting is shown in Figure 14 in which the end of the impression member 26 is formed with side portions 72 separated from a central portion 73 by spaces slightly wider than the thickness of the walls of the casing 46 in which the type block 44 slides. When the impression member is actuated, the part 73 engages the type block while the outside walls 72 fit outside of the casing 46, thus centering and aligning the carrier at the moment of printing.

A still further modification is shown in Figure 15 in which the free end of the type carrier has a hollow head 74 provided with a web 75 while the type block is carried by a plurality of pins 76 which slide in openings in the web 75 and are provided with coiled springs 77 which tend to return the type block to its normal position. The impression member 26 is provided with two grooves or depressions 78 which are adapted to contact with the rounded or bevelled ends of the pin 76 and thus force the type block to its printing position. Obviously various other forms may be employed for mounting the type block in the free end of the type carrier. In all cases as is clearly shown in the figures and particularly in Figure 16, the face of the type will lie normally within the casing so that the type will be protected from damage which might be caused by any interference between the type carriers or in any other manner.

The bell crank carried by the universal frame or member above described has an arm 47 which may, if desired, be independent of the arm 38 and connected to the rod 39 to oscillate therewith. This arm is connected by a link 48 to the usual depending universal bar F of the Royal standard machine through which the escapement and ribbon mechanism are actuated. The coil spring 49 surrounds the link 48 and has the usual spring tension adjusting means G connected thereto. In this manner each time a key lever is depressed and the universal frame is rocked, motion is transmitted to the universal bar F and the escapement, ribbon vibrating and ribbon feeding operation are effected in the usual manner.

It is believed that the above description is sufficient to show clearly the operation of the type action but it may be briefly described as follows. If a type carrier 7 is in its normal position and the key lever 18 corresponding thereto is operated, a pull on the link 21 will move the toggle constituted by the members 11 and 13 from the dotted line position of Figure 1 to the full line position. This will result in swinging the type carrier 7 to a position in front of the platen, where it is held stationary during the printing movement of the type block. A continued depression of the key lever will operate the universal bar 41 and thereby pull on the link 36, straightening the toggle formed by the members 27 and 29 and forcing the impression member 26 against the type block 44 thereby pressing the same against the platen and producing the desired imprint. The travel of the type block can be bodily adjusted forwardly or backwardly to vary the effective working position thereof by varying the position of the block 31 as above described and in this manner provision can be made for manifolding any desired number of copies. At the same time the rocking of the universal bar 41 will rock the frame and the arm 47 and as above described will transmit movement to the escapement and ribbon

mechanisms. As soon as pressure on the key lever is released, the springs 23 and 49 will start the return of the parts to normal position which will be hastened by the weight of the type carrier itself, and the spring associated with the type block will return said block to its initial position within its casing.

Since the printing movement is brought by pressure and not by impact and since the movement of the two toggles is limited by contact with sound absorbing pads, it will be evident that this type action is substantially noiseless.

Various modifications in the manner of transmitting motion from the key lever to the type carrier and the printing or impression member may be made without departing from the spirit of the invention. One of such modifications is disclosed in Figures 10 and 11.

In this construction the key levers 18 are connected by links 55 to front links 56 pivotally carried by a member 57 attached to the front frame member 1 at its center and supported at its ends in any desired manner. These front links correspond closely in general structure to those employed in the present standard Royal machine. These links 56 are connected by links 58 to points 59 of the heels of the type carriers 7. In all other respects the type action itself is identical with that described above. The links 58 will of course be yieldable. The operation thereof is believed to be evident.

There is also disclosed in this modification a further improvement which may be embodied in the first form shown if desired. The member 61 which is pivoted at 62 to a bar suitably supported by the frame of the machine is connected by a link 60 to the arm 38 of the universal frame. This member 61 has an upward extension 63 adjustably connected thereto and the upper end 64 of this extension is of such form that it will fit under and support the free end of the type carrier 7 which has been swung to printing position. It is to be noted that this member 61 does not begin its movement until the universal frame or member is moved and that this universal frame does not begin to move until the type carrier 7 has been swung into position in front of the platen. As the toggle formed by the members 27 and 29 begins to straighten, the member 61 simultaneously swings forward and its end engages under and behind the type carrying end of the type carrier or type bar 7 thus opposing any displacing movement that might accidentally be given to the type carrier at the time of printing. Each type carrier is in effect locked in its printing position while the type block is being projected to form its imprint upon the platen.

There is shown in Figure 18 a modified form of type carrier in which the body portion 7′ may be round and the free end 79 is slightly enlarged and formed with an opening in which is inserted a tapered portion 80 formed on the casing 46 which encloses the type block 44. This permits the casing carrying the block to be attached to the body of the carrier in any desired angular position.

The side panels E which lie toward the front of the machine may be provided with hinges 81 and a catch 82 which will allow these to be opened for the purpose of cleaning the type faces which lie facing downwardly when the type carriers are in normal position. The housings for the ribbon spools K may be made integral with the top plates 3 but the tops of the spools lie somewhat above these top plates as shown in Figure 17. The ribbon will be led from one spool to the usual vibrator as indicated in this figure.

It will be noted from Figure 17 that when there is no type carrier in operative position, the entire printing line is visible and erasures may be readily made at any point without the necessity of rotating the platen.

There are certain features of construction to which it is desired to call particular attention. All of the type carriers are vertically and radially arranged and when swung they bring the carriers and the type blocks carried thereby to a definite predetermined distance in front of the platen and preferably closely adjacent thereto, and at the same time quite closely adjacent the impression member. The carrier and type block are very light and the touch is correspondingly light. When a connecting link is employed which has a spring therein, this need only be strong enough so that the type carrier will be moved to position in front of the platen by the first part of the depression of the key lever, and in view of the light weight of the carrier, only a light spring will be required which will add but little to the work to be performed by the depression of the key.

The actual printing is performed by the movement of the impression member, and this movement, as well as the actuation of the escapement and ribbon mechanism, is brought about by the latter part of the movement of the key lever when it has acquired a certain momentum. Moreover the type block will be brought to its predetermined position in front of the platen with a minimum stress on the toggle or other connections, thus obviating any danger of vibration in bringing the type blocks to a correctly alined position. All of this movement takes place in advance of the increased load which results from the movement of the block to print, the operation of the escapement, ribbon mechanism, etc.

All type blocks move in a longitudinal plane and the necessary movement to printing position is very slight. The end of the impression carrier enters the casing only a very slight distance, and since the carrier

swings downwardly and away from this impression member, there is no interference between the two. It is clearly possible for a second type carrier to be moved up into position before the toggle has returned to its normal position, and this tends to permit great speed in operation.

The segment shown will permit a wider spacing of the type carriers if for any reason found necessary or desirable. In all such respects the drawings are to be considered as rather illustrative than limiting.

It is to be noted that the machine is entirely dust-protected from every point of view. Particularly do the top plates serve to protect the pivots of the key levers, type carriers, toggle members, and other points of pivotal connection in the action. Moreover, the type blocks when at rest, face downwardly and are positioned toward the front of the machine so that any erasures from the paper on the platen cannot fall on the type or any of the pivotal connections above mentioned.

If it is found desirable to obtain a more accurate alignment especially for the type carriers located at the sides of the segment, each type carrier 7 may be provided with a projection 83 which will engage the inner face of the type guide 6 when the carrier is moved into its operative position. This construction is illustrated in Figure 20 and is merely for the purpose of obtaining additional accuracy in alignment if at any time it should be found desirable.

It is evident that various features of the invention may be widely varied in their specific embodiment. Different forms of connection between the type carriers and the key levers can be employed, and details changed as is found necessary or desirable to adapt the action to machines of varying forms. In general it is to be understood that the invention is to be regarded as limited only by the scope of the appended claims.

I claim as my invention:

1. A type action comprising a type carrier movable to printing position, a key lever, a type block movably mounted in the type carrier, connections from the key lever to the type carrier to move the latter to printing position, means actuated during the latter part of the movement of the key lever to move the type block relatively to the type carrier to print therefrom, said later means including a toggle and an impression member actuated thereby, and means for adjusting the effective working position of the impression member.

2. A type action comprising a type carrier movable to printing position, a key lever, a type block movably mounted in the type carrier, connections from the key lever to the type carrier to move the latter in printing position, and means actuated by the key lever during the latter part of the movement thereof to lock the type carrier in its printing position and to move the type block relatively to the carrier to print therefrom.

3. In a typewriting machine having a carriage, platen, a universal frame, and the usual key levers, a series of type actions comprising a segment, type carriers pivotally mounted therein, means operated by the key levers for swinging the respective type carriers to a position in front of the platen, a slidable type block in each type carrier, and means for moving said block relatively to the carrier to contact with the platen, said last means including a universal member operated by all of the key levers, and means operated from said universal frame for locking the type carrier in its printing position while the block is moved into contact with the platen.

4. In a typewriting machine having a carriage, platen, and the usual key levers, a series of type actions including a segment horizontally arranged in front of the platen, depending type carriers pivotally mounted in said segment, means connecting the key levers and type carriers for swinging the latter to a position in front of the platen, a slidable type block in each type carrier, an impression member for moving said block against the platen to print, and means including a universal member actuated by the key levers for moving said impression member to force the type block against the platen to print.

5. In a typewriting machine having a carriage, platen, and the usual key levers, a series of type actions including a segment horizontally arranged in front of the platen, depending type carriers pivotally mounted in said segment, means connecting the key levers and type carriers for swinging the latter to a position in front of the platen, a slidable type block in each type carrier, an impression member for moving said block against the platen to print, and means including a universal member actuated by the key levers and a toggle connected thereto for moving said impression member to force the type block against the platen to print.

6. In a typewriting machine having a carriage, platen, and the usual key levers, a series of type actions each including a pivoted type carrier and connections from the corresponding key lever to move the type carrier to a printing position in front of the platen, a movable type block carried by each type carrier, a reciprocatory impression member, a universal member actuated by any key lever, and operating connections between the universal member and the impression member for moving the type block against the platen to print.

7. In a typewriting machine having a carriage, universal bar, platen, key levers, a series of type actions each including a pivoted type carrier and connections from the correspond-

ing key lever to move the type carrier to a position in front of the platen, a movable type block carried by each type carrier, a universal member actuated by any key lever, operating devices connected to said universal member to move the type block against the platen to print, and connections from said universal member to the universal bar.

8. In a typewriting machine having a carriage, a platen, key levers and a universal bar, a type action comprising type carriers, a type block mounted in each carrier and movable relatively thereto, connections between the carriers and the key levers whereby a predetermined carrier is moved to a position in front of the platen by the first part of the depression of the associated key lever, and means including a universal frame whereby the type block is moved to print and the universal bar is positively operated during the latter part of the depression of the same key lever.

9. In a typewriting machine having key levers and a platen, a type action comprising a type carrier, connections between the key lever and the type carrier for moving the latter to a predetermined position in front of the impression point on the platen which include a toggle and a yielding link between the key lever and the toggle to permit a further depression of the key lever after the toggle has straightened and the carrier has arrived at its predetermined position, and means for effecting printing during such further depression of the key lever and while the carrier remains stationary.

10. In a typewriting machine, a horizontally arranged type carrier segment having radial slots therein, gravity hanging type carriers pivoted in said slots to hang downwardly therefrom, and a type block slidably mounted at the free end of each carrier, each type block having its type face at substantially right angles to the longitudinal axis of its carrier, key levers, a single reciprocatory impression member separate from the carriers, connections between the key levers and carriers for first swinging a carrier upwardly upon the first part of the depression of any one key, and means for reciprocating the impression member during the latter part of the depression of the same key to move the type block to print.

11. In a typewriting machine, a type carrier movable to printing position, a housing at the free end thereof, a type block guided for movement in the housing, and means engaging both the carrier and the housing for aligning the same when the type carrier is in printing position.

12. In a typewriting machine, a type carrier swingable to printing position, a housing at the free end thereof, a type block guided for movement in the housing, a guiding member engaging the housing when the carrier is swung to its printing position, and an abutment on the carrier also engaging said guiding member to align the same.

13. In a typewriting machine, the combination with a platen, of key levers, a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, means for first moving a type arm to its horizontal printing position upon depression of a key lever, and means independent of the arm for subsequently moving the type block to print upon further depression of said key lever while said arm is in its operative position.

14. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a stop to limit the upward swinging movement of the arm, a movable type block mounted on the free end of each type arm, and means for first moving a type arm to its horizontal printing position and for subsequently moving the type block to print while said arm is in its operative position, said means including a key lever, a longitudinally yieldable connection between the type arm and the key lever, and means connected to said key lever for moving the type block to print while said arm is in its operative position.

15. In a typewriting machine, the combination with a machine frame, of a platen, a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a stop to limit the upward swinging movement of the arm, a movable type block mounted on the free end of each type arm, and means for first moving a type arm to its horizontal printing position and for subsequently moving the type block to print while said arm is in its operative position, said means including a key lever, a toggle connection between the machine frame and the type arm, a link connecting the toggle and the key lever, and means connected to said key lever for moving the type block to print while said arm is in its operative position.

16. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a type block slidably mounted at the free end of the arms for movement in

a direction parallel with the arm, and means for first moving a type arm to its operative horizontal printing position and for subsequently sliding said block to print while said arm is in its operative position.

17. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, a plurality of key levers, operative connections between the respective key levers and type arms for moving a predetermined arm to its operative horizontal printing position during the first portion of the depression of its associated key lever, and means operated by the same key lever during the latter part of its depression and while said arm is in its operative position to move the type block to print.

18. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, a plurality of key levers, operative connections between the respective key levers and type arms for moving a predetermined arm to its operative horizontal printing position during the first portion of the depression of its associated key lever, means operated by the same key lever during the latter part of its depression and while said arm is in its operative position to move the type block to print, said means including a reciprocatory impression member for moving the type block to print, a universal frame cooperating with said key levers, and operative connections between the universal frame and said impression member.

19. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, a plurality of key levers, operative connections between the respective key levers and type arms for moving a predetermined arm to its operative horizontal printing position during the first portion of the depression of its associated key lever, means operated by the same key lever during the latter part of its depression and while said arm is in its operative position to move the type block to print, said means including a reciprocatory impression member for moving the type block to print, a universal frame cooperating with said key levers, and operative connections including a toggle connected to the impression member, and a link connecting the toggle and the universal frame.

20. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, a plurality of key levers, operative connections between the respective key levers and type arms for moving a predetermined arm to its operative horizontal printing position during the first portion of the depression of its associated key lever, means operated by the same key lever during the latter part of its depression and while said arm is in its operative position to move the type block to print, said means including a reciprocatory impression member for moving the type block to print, a universal frame cooperating with said key levers, and operative connections including a toggle connected to the impression member, means cooperating with the toggle to vary the effective working position of the impression member, and a link connecting the toggle and the universal frame.

21. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, a plurality of key levers, operative connections between the respective key levers and type arms for moving a predetermined arm to its operative horizontal printing position during the first portion of the depression of its associated key lever, means operated by the same key lever during the latter part of its depression and while said arm is in its operative position to move the type block to print, said operative connections each including a toggle connected with the type arm, and a link connecting the toggle with the key lever.

22. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, a plurality of key levers, operative connections between the respective key levers and type arms for moving a predetermined arm to its operative horizontal printing position during the first portion of the depression of its associated key lever, means operated by the same key lever during the latter part of

its depression and while said arm is in its operative position to move the type block to print, said operative connections each including a toggle connected with the type arm, and a longitudinally yieldable link connecting the toggle with the key lever.

23. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, a plurality of key levers, operative connections between the respective key levers and type arms for moving a predetermined arm to its operative horizontal printing position during the first portion of the depression of its associated key lever, means operated by the same key lever during the latter part of its depression and while said arm is in its operative position to move the type block to print, said operative connections each including a toggle connected with the type arm, a stop to limit the operative movement of the toggle, and a link connecting the toggle with the key lever.

24. In a typewriting machine, the combination with a platen, of a reciprocatory impression member centrally located above the type bars, a horizontally arranged segment disposed in front of the platen and having radial slots therein, type bars respectively pivoted in said slots to normally hang downwardly and adapted to be swung upwardly to an operative horizontal printing position with the free ends thereof in front of the platen and in rear of the impression member, a type block movably mounted on the free end of each arm, and means for first moving a type arm to horizontal printing position and for subsequently actuating the impression member to move the type block to print while said arm is in its operative position.

25. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, means for first moving a type arm to its horizontal printing position and for subsequently moving the type block to print while said arm is in its operative position, and means actuated by the type arm moving means for locking the moved type arm in its horizontal printing position.

26. In a typewriting machine, the combination with a platen, of a plurality of type arms each pivoted to normally hang downwardly in front of the platen and adapted to be swung upwardly to an operative horizontal printing position with its free end in front of the platen, a movable type block mounted on the free end of each type arm, a plurality of key levers, operative connections between the respective key levers and type arms for moving a predetermined arm to its operative horizontal printing position during the first portion of the depression of its associated key lever, means operated by the same key lever during the latter part of its depression and while said arm is in its operative position to move the type block to print, said means including a reciprocatory impression member for moving the type block to print, a universal frame cooperating with said key levers, operative connections between the universal frame and said impression member, and means actuated by the type arm moving means for locking the moved type arm in its horizontal printing position.

27. In a typewriting machine, a carriage, a platen, and a plurality of type actions each comprising a pivoted type arm normally pendant and adapted to be swung upwardly to a printing position, a type block mounted on said arm for bodily movements in a plane substantially parallel to the longitudinal axis of the arm, key levers, and means operated upon depression of a key lever when the type arm is in printing position to move the type block to print.

28. In a typewriting machine, a carriage, a platen, and a plurality of type actions each comprising a pivoted type arm normally pendant and adapted to be swung upwardly to a printing position, a type block mounted on said arm for bodily movements in a plane substantially parallel to the longitudinal axis of the arm, means including a toggle for moving the type block relative to the type arm to print, key levers, and operating connections between the key levers and the toggle for operating the latter when the type arm is in printing position.

29. In a typewriting machine, a carriage, a platen, and a plurality of type actions each comprising a pivoted type arm normally pendant and adapted to be swung upwardly to a printing position, a type block mounted on said arm for bodily movements in a plane substantially parallel to the longitudinal axis of the arm, means including a toggle for moving the type block relative to the type arm to print, key levers, means for adjusting the effecting working position of the type block moving means, and operating connections between the key levers and the toggle for operating the latter when the type arm is in printing position.

30. In a typewriting machine, a carriage, a platen, and a plurality of type actions each comprising a pivoted type arm normally pendant and adapted to be swung upwardly to a printing position, a type block mounted on said arm for bodily movements in a plane

substantially parallel to the longitudinal axis of the arm, spring means for normally retaining the block against movement relative to the arm, key levers, and means operated upon depression of a key lever when the type arm is in printing position to move the type block to print.

31. In a typewriting machine, a carriage, a platen, and a plurality of type actions each comprising a pivoted type arm normally pendant and adapted to be swung upwardly to a printing position, a type block mounted on said arm for bodily movements in a plane substantially parallel to the longitudinal axis of the arm, key levers, and means operated upon depression of a key lever for first swinging the type arm to printing position and for subsequently moving the type block to print while said arm is in its printing position.

32. In a typewriting machine, a carriage, a platen, and a plurality of type actions each comprising a pivoted type arm normally pendant and adapted to be swung upwardly to a printing position, a type block mounted on said arm for bodily movements in a plane substantially parallel to the longitudinal axis of the arm, key levers, means independent of the type arm and including a toggle for moving the type block to print, and means operated upon depression of a key lever for first swinging the type arm to printing position and for subsequently actuating said toggle while said arm is in its printing position.

33. In a typewriting machine, a carriage, a platen, and a plurality of type actions each comprising a pivoted type arm normally pendant and adapted to be swung upwardly to a printing position, a type block mounted on said arm for bodily movements in a plane substantially parallel to the longitudinal axis of the arm, key levers, means independent of the type arm and including a toggle for moving the type block to print, and means for adjusting the effective working position of the type block moving means, and means operated upon depression of a key lever for first swinging the type arm to printing position, and for subsequently moving said type block to print while said arm is in its printing position.

34. In a typewriting machine, a carriage, a platen, and a plurality of type actions each comprising a pivoted type arm normally pendant and adapted to be swung upwardly to a printing position, a type block mounted on said arm for sliding movements in a plane substantially parallel to the longitudinal axis of the arm, spring means for normally retaining the block against movement relative to the arm, key levers, and means operated upon depression of a key lever for first swinging the type arm to printing position and for subsequently moving the type block to print against the tension of the spring retaining means while said arm is in its printing position.

35. In a typewriting machine, a carriage, a platen, and a plurality of type actions each comprising a pivoted type arm normally pendant and adapted to be swung upwardly to a printing position, a type block mounted on said arm for bodily movements in a plane substantially parallel to the longitudinal axis of the arm, normally ineffective means for locking the type arm in its printing position, key levers, and means operated upon depression of a key lever for first swinging the type arm to printing position and for subsequently moving the locking means to effective locking position and moving the type block to print while said arm is in its printing position.

36. In a typewriting machine having key levers and a platen, a type action including a movable type carrier, a type block movably mounted thereon, connections including a yieldable link between a key lever and the carrier for moving the carrier upon partial depression of the lever to a predetermined position in front of the impression point on the platen, and means independent of the type arm and connected to said key lever for moving the type block to print upon further depression of said lever.

37. In a typewriting machine having key levers and a platen, a type action including a movable type carrier, a type block movably mounted thereon, connections including a toggle and a yieldable link between a key lever and the carrier for moving the carrier upon partial depression of the lever to a predetermined position in front of the impression point on the platen, and means independent of the type arm and connected to said key lever for moving the type block to print after the toggle has been straightened and upon further depression of said lever.

38. In a visible, line print, ribbon typewriting machine having a ribbon, a platen, a key action including a key lever, a type bar and a type carried by the bar, operative connections between the key lever and type bar for moving the latter into a position before the ribbon adjacent the platen and for subsequently moving the type by a direct continuous thrust into printing engagement with the platen through a path which is at right angles to the platen axis.

39. In a typewriting machine having a platen, a key action including a key lever, a type bar and operative connections therebetween, a type carrier movably mounted in the type bar and lost motion toggle means controlled from the key lever for moving said type carrier against the platen.

40. In a visible, front strike, line print, ribbon typewriter including a platen, a key action including a type bar, a key lever and operative connections between them, a spring-retracted type-carrying plunger mounted for

axial movement in the key bar head, the connections being operative to move the key bar head to a position adjacent the platen with the plunger axis substantially at right angles to the platen axis, a pusher engageable with the end of the plunger to move the type against the platen.

41. In a typewriting machine having a platen, a key action including a series of key levers, a series of type bars, type carriers movably mounted in the heads of said bars, operative connections between the key levers and type bars for moving the type bars to a position where the type carriers are disposed adjacent the platen, operative connections from the key levers for subsequently moving said type carriers through a plane substantially at right angles to the axis of the platen until the type engages the platen.

42. A typewriter including a platen, a bank of key levers forming a key board, a basket of type bars arranged in conjunction with the key levers, movable type carriers mounted in the type bars for operation by corresponding key levers, said movable type carriers being constructed and arranged to exert printing pressure against the platen after the type bar has come to rest.

43. A typewriter including a platen, a bank of key levers forming a key board, a basket of type bars arranged in conjunction with the key levers, movable type carriers mounted in the type bars for operation by corresponding key levers, said movable type carriers being constructed and arranged to exert printing pressure against the platen after the type bar has come to rest, and a universal pusher arranged to move the type carriers in the type bars after the type bars have come to rest with the type carriers in printing position.

44. A typewriter including a platen, a bank of key levers forming a key board, a basket of type bars arranged in conjunction with the key levers, movable type carriers mounted in the type bars for operation by corresponding key levers, said movable type carriers being constructed and arranged to exert printing pressure against the platen after the type bar has come to rest, a universal pusher arranged to move the type carriers in the type bars after the type bars have come to rest with the type carriers in printing position, and means directly operable by the keys for moving the pusher.

In testimony whereof, I have hereunto subscribed my name.

EDWARD B. HESS.