

J. D. DAUGHERTY.
 TYPE WRITING MACHINE.
 APPLICATION FILED MAR. 18, 1911.

1,012,128.

Patented Dec. 19, 1911.

7 SHEETS—SHEET 1.

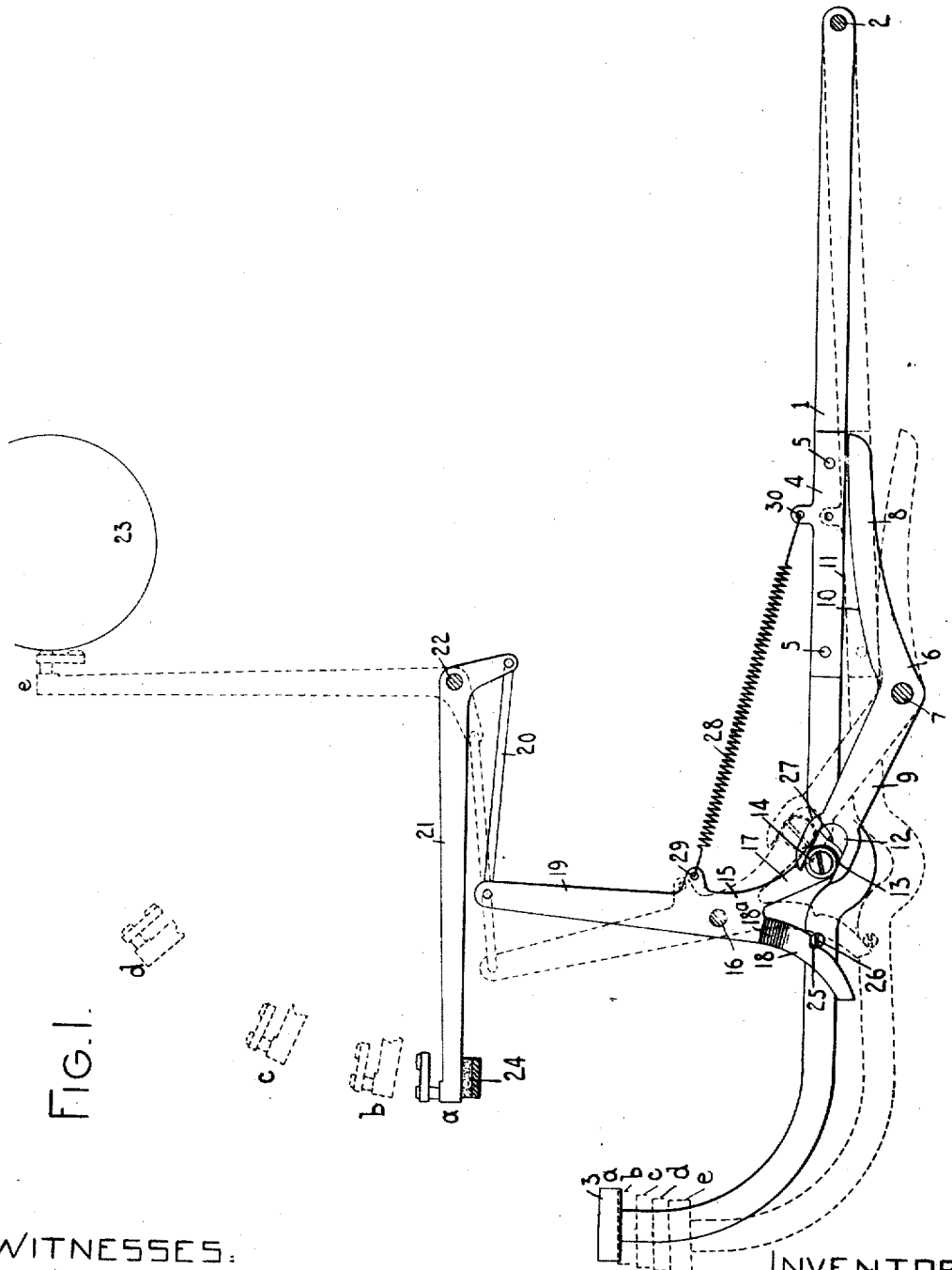


FIG. 1.

WITNESSES:

M. F. Hannan
Charles E. Smith

INVENTOR

James D. Daugherty
 By *James D. Daugherty*
 HIS ATTORNEY

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7 SHEETS-SHEET 2.

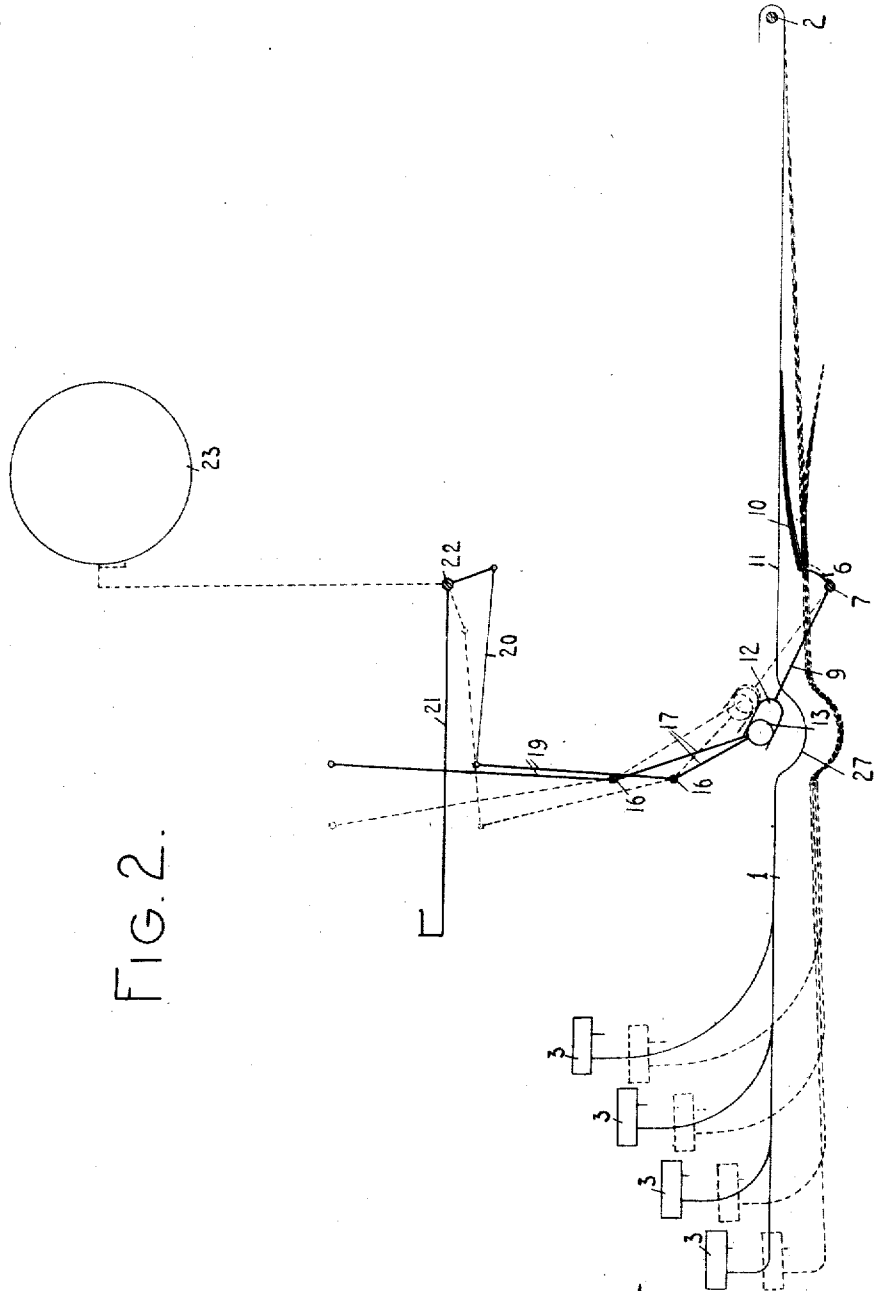


FIG. 2.

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INVENTOR:

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7 SHEETS-SHEET 3.

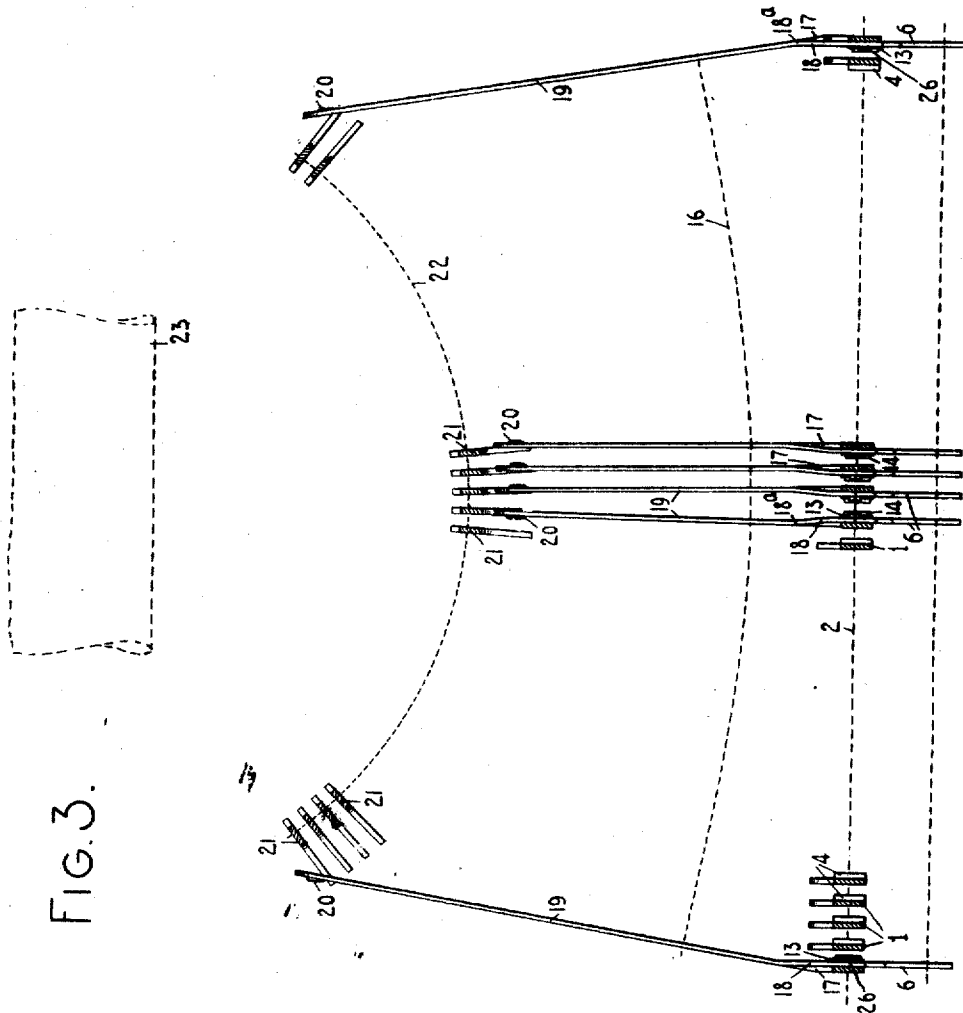


FIG. 3.

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7 SHEETS-SHEET 4.

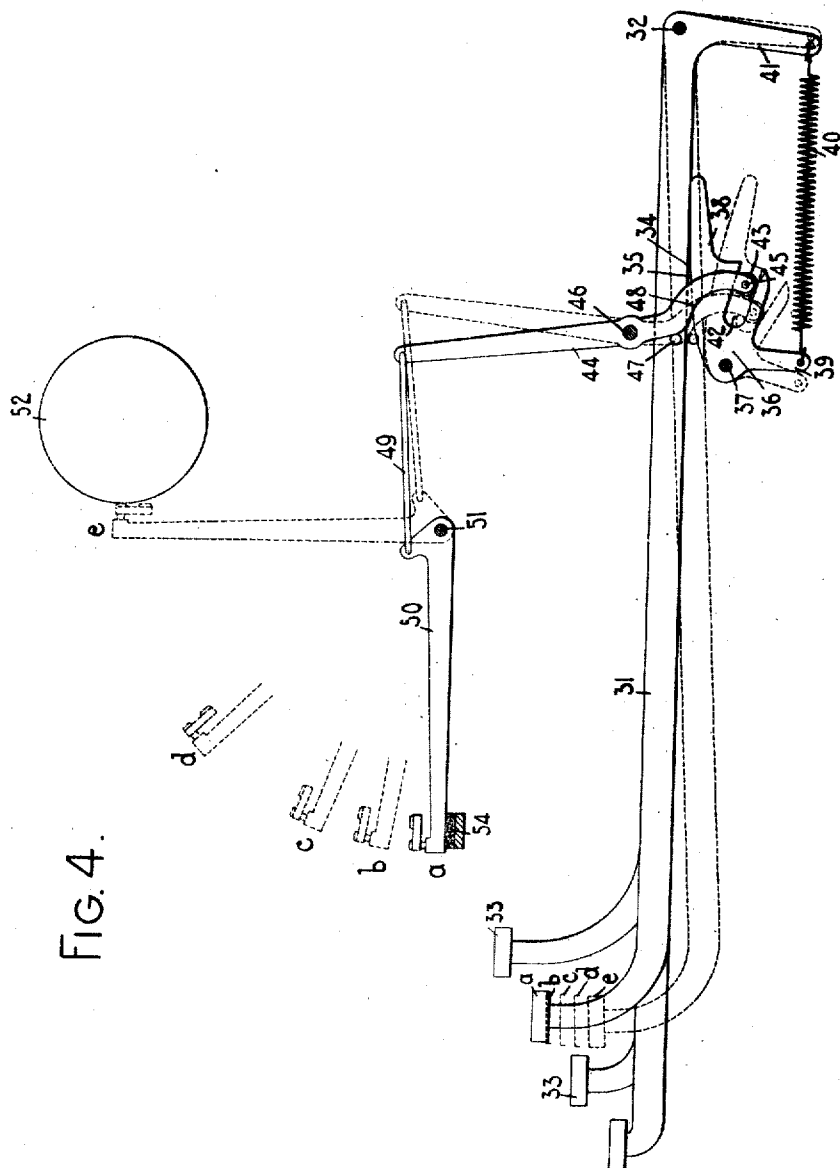


FIG. 4.

WITNESSES:

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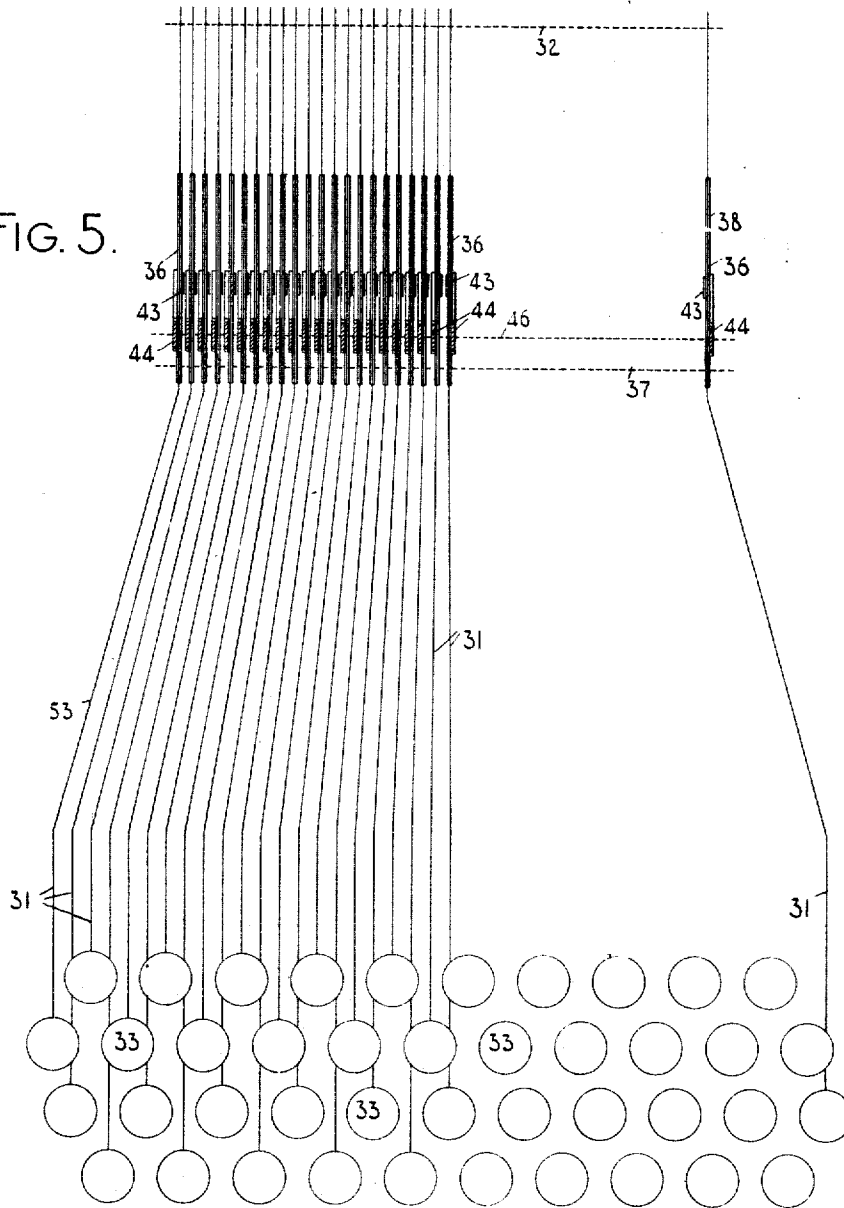
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1,012,128.

Patented Dec. 19, 1911.

7 SHEETS—SHEET 5.

FIG. 5.



WITNESSES:

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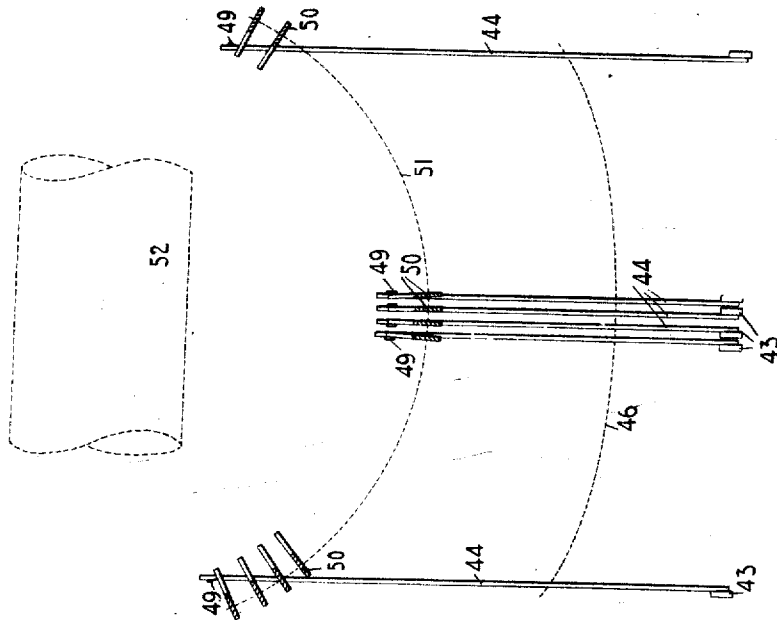
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7 SHEETS—SHEET 6.



WITNESSES:

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7 SHEETS—SHEET 7.

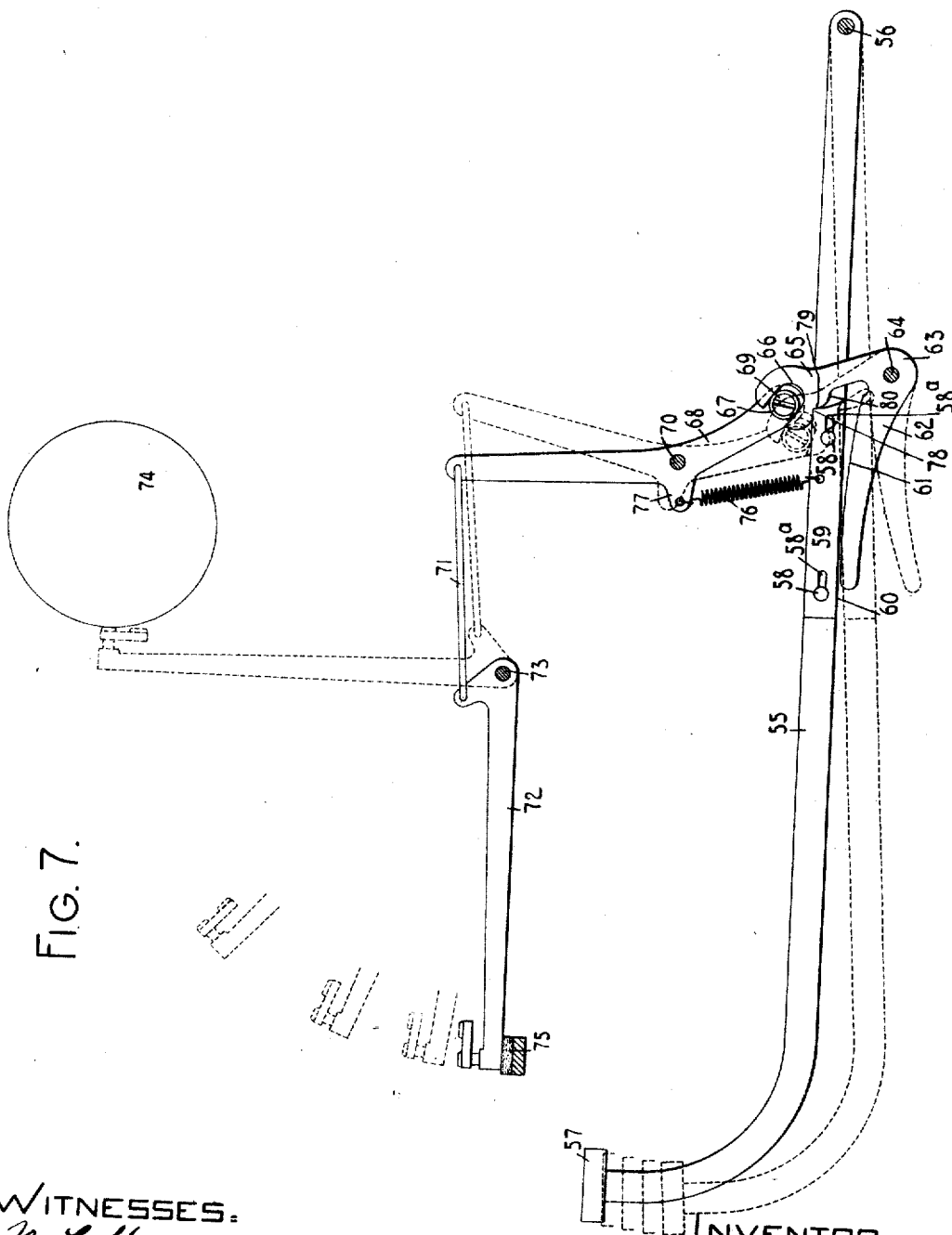


FIG. 7.

WITNESSES:

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INVENTOR:

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By James D. Daugherty
HIS ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES D. DAUGHERTY, OF KITTANNING, PENNSYLVANIA, ASSIGNOR TO UNION TYPE-WRITER COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,012,128.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed March 16, 1911. Serial No. 614,873.

To all whom it may concern:

Be it known that I, JAMES D. DAUGHERTY, citizen of the United States, and resident of Kittanning, in the county of Armstrong and State of Pennsylvania, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to type actions.

One object of my invention, generally stated, is to provide a simple and efficient front-strike type action.

A further object of my invention, generally stated, is to provide a type action which affords an easy start and in which the type bar receives an accelerated movement as it approaches the printing position.

A still further object of my invention is to provide a structure whereby a substantially uniform leverage, a substantially uniform touch and a uniform extent of dip of the different keys is provided throughout the system.

Another object of my invention is to provide a type action in which comparatively simple and efficient means are provided for preventing a rebound of the type bars from the type rest, thereby avoiding the liability of adjacent type bars colliding near the type basket under a rapid operation.

To the above and other ends which will hereinafter appear, my invention consists in the features of construction, arrangements of parts and combinations of devices to be described in the following specification and particularly pointed out in the appended claims.

In the accompanying drawings wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a skeletonized side elevation of one form of type action embodying my invention. Fig. 2 is a diagrammatic side elevation showing a number of the type actions. Fig. 3 is a diagrammatic transverse vertical sectional view showing a number of the type actions. Fig. 4 is a skeletonized side elevation showing a number of type actions embodying a modified form of construction. Fig. 5 is a diagrammatic horizontal sectional view of the construction represented in Fig. 4. Fig. 6 is a diagrammatic transverse vertical sectional view showing a por-

tion of the form of construction represented in Figs. 4 and 5. Fig. 7 is a skeletonized side elevation of a still further modification of the type action.

The present invention is in the nature of an improvement on a construction disclosed in my application, Serial Nos. 283,758 and 423,948, filed October 21st, 1905 and March 28, 1908 respectively, and has some of the same general objects in view. The claims in the present case, however, are restricted to features not disclosed in said prior applications. Some of the features disclosed herein are claimed broadly in my Patent No. 997,441, dated July 11, 1911, the claims herein to such features being restricted to a construction not shown in said patent.

Referring more particularly to Figs. 1, 2 and 3, key levers 1 of the second order are fulcrumed on a fixed pivot 2 at the rear ends thereof and are provided with the usual finger keys 3. Each key lever is preferably provided with a plate 4 screwed, riveted or otherwise fastened to one side thereof, as at 5. Each key lever coöperates with an angular sub-lever 6 fulcrumed on a fixed pivot 7 arranged beneath the system of key levers. Each sub-lever 6 has a rearwardly and upwardly extending arm 8 and a forwardly and upwardly extending arm 9. Each arm 8 is provided with a contact face 10 which coöperates with a contact face 11 on the lower edge of the associated plate 4. One of these contact faces, 10 in the present instance, is curved to provide a rolling contact or engagement between the key lever and its associated sub-lever 6.

From an inspection of Fig. 1 it will be observed that at the depression of a key the point of engagement or contact between the key lever and sub-lever 6 recedes from the fulcrum 2 of the key lever and approaches nearer to the pivot 7 of the sub-lever. Each sub-lever 6 is slotted at 12 to receive an anti-friction roller 13 carried by a shouldered screw or pin 14 which projects laterally from a second sub-lever 15. This second sub-lever is fulcrumed on a fixed pivot 16 arranged above the associated key lever and is bifurcated to provide a rearwardly extending arm 17 which carries the off-set anti-friction roller 13 and a forwardly extending arm 18. This second sub-lever has an upright arm 19 which is connected to the forward end of a pull link 20, which in

turn is connected at its rear end to the crank arm of a type bar 21. The arms 17 and 19 are arranged in the same plane as the associated key lever, whereas the arm 18 is bent slightly at 18^a so that said arm is slightly off-set and arranged beside the associated key lever. The forwardly extending arm 18 of each sub-lever 15 is provided with an abutment or shoulder 25 which, when the parts are in the normal position, as shown in full lines in Fig. 1, cooperates with a pin 26 which projects laterally from the associated key lever 1. Each key lever is formed with a recess or notch 27 provided to receive the arm 17 of the associated sub-lever 15.

The type bars are segmentally arranged and are pivoted at 22 to swing upwardly and rearwardly to strike against the front face of a platen 23; the type bars being normally supported on a type rest 24. A contractile restoring spring 28 is connected to the upright arm of the companion sub-lever 15 as indicated at 29, whereas the opposite end of the spring is connected at 30 to an upwardly extending ear formed on the plate 4 carried by the companion key lever.

From an inspection of Fig. 2 it will be seen that although the various sub-levers 6 are of the same size or substantially the same size, the various curved contact faces 10 on the sub-lever 6 vary according to the lengths of the different key levers so as to provide a uniform dip of the different finger keys 3 throughout the system and provide a substantially uniform leverage. This uniform dip of the keys is indicated by a comparison of the dotted line showing of the keys in Fig. 2 with the full line positions of the keys represented in this figure.

From an inspection of Fig. 3 it will be observed that the sub-levers 15 are gradually longer as the sides of the system are approached, and that the pivots 16 for the various sub-levers 15 are arranged in a curve so that the same ratio of lever arms is maintained above and below the pivots 16 throughout the system, in order that a substantially uniform leverage may be provided throughout the system. It will also be seen from an inspection of Fig. 3 that the sub-levers 15 at the sides of the system have a slight deflection inwardly to compensate for the variation in width between the system of type bars and the system of key levers. By this construction and arrangement a direct pull is exerted on each link 20 fore and aft of the machine and this pull is transmitted fore and aft of the machine to the type bar.

From an inspection of Fig. 1 it will be observed that a depression of the finger key is effective to transmit movement to the associated sub-lever 6 through the rolling contact or engagement therewith, and that this movement is transmitted to the second sub-

lever 15 by the pin or roller and slot or pin and slot connection between the two sub-levers, thereby moving the companion pull link 20 forwardly to move the associated type bar to the printing position. The depression of a finger key is effective to stretch the spring 28 and on release of pressure from the finger key this spring with the aid of the weight of the returning typebar is effective to return the parts to normal position. Moreover, the spring tends to maintain a constant engagement between the key lever and the sub-lever 15 and prevent the key lever from jumping. In some cases it may be found desirable to provide an additional restoring spring cooperative directly with the key lever. The rolling fulcrum or engagement between the key lever and the sub-lever 6 of each type action is effective to provide an easy start to the first part of the key depression and to gradually accelerate the type bar in its movement as it approaches the printing position. This is clearly indicated by a comparison of the different positions *a*, *b*, *c*, *d* and *e* of the finger key in Fig. 1 with the corresponding positions of the type bar indicated at *a*, *b*, *c*, *d* and *e*. It will be understood that the slot 12 and the pin 14 and its roller 13 virtually constitute a pin and slot or sliding connection between the sub-lever 6 and the sub-lever 15 of each type action. Moreover, it will be understood that this is a direct and positive connection between these sub-levers.

Upon reference to Fig. 1 it will be seen that the shoulder 25 on the sub-lever 15 cooperates with the pin 26 on the associated key lever when the parts are in the normal or full line position. This engagement is effective to prevent a rebound of the associated type bar from the type rest 24. Thus, any tendency of the type bar to rebound exerts a forward pressure on the link 20 and tends to turn the sub-lever 15 on its pivot 16 so that there is a tendency to move the upright arm 19 of this sub-lever forwardly and to move the arm 18 thereof rearwardly. This movement is opposed by the engagement between the shoulder 25 on the sub-lever and the pin 26 on the key lever. In other words, any rebound of the type bar from the type rest 24 tends to move the arm 18 rearwardly against the pin 26 so that pressure is exerted longitudinally and rearwardly on the key lever, and this is resisted by the fixed pivot 2 of the key lever.

In Figs. 4, 5 and 6 I have shown a slightly different form of the construction embodying my invention. In this modified form of the construction the type bars are moved to the printing position by a rearward pull on the actuating links and the upright sub-levers are arranged in the rear of the type bars instead of beneath them as in the previously described construction. The key

levers 31 are levers of the second order fulcrumed at their rear ends on fixed pivots 32 and provided with finger keys 33. The lower edge of each key lever constitutes a contact face 34 which is adapted to cooperate with a contact face 35 on a sub-lever 36 fulcrumed on a fixed pivot 37 beneath the key levers. This lever is provided with a rearwardly extending arm 38 on the upper edge of which the contact face 35 is formed. One of the two contact faces 34 and 35 is curved; 35 being so formed in the present instance. This arrangement affords a rolling or rocking contact between the key lever and the sub-lever 36 and provides for an automatic variation of the leverage of the key lever on the sub-lever. As a key is depressed the point of contact between the key lever and the sub-lever 36 recedes from the fulcrum of the key lever and gradually approaches the fulcrum 37 of the sub-lever, thereby affording a gradual acceleration of the movement of the type bar as it approaches the printing point as will hereinafter more clearly appear. As in the previously described construction, the contact faces 35 on the sub-levers 36 may be varied in order to compensate for the different lengths of key levers and to provide a uniform dip of keys and leverage throughout the system.

A depending arm 39 on each sub-lever 36 is connected by a contractile restoring spring 40 with a depending arm 41 on the companion key lever. Each sub-lever 36 is slotted at 42 for the reception of an anti-friction roller 43 arranged on one side of an upright sub-lever 44 and mounted thereon by a pivot 45. The sub-levers 44 are levers of the first order fulcrumed on a fixed pivot 46 which, as in the previously described construction, is a curved pivot or line of pivots situated above the key levers, as indicated in Fig. 6. Each key lever is provided with a laterally projecting pin 47 with which the lower arm of the upright sub-lever 44 engages when the parts are in the normal position, as shown in full lines in Fig. 4. The lower arm of each sub-lever 44 is curved rearwardly at 48 and it will be understood that during the depression of a key the pin 47 on the associated key lever is moved down to the curved portion 48 of the sub-lever during the depression of the key. In other words, the lower arm of each sub-lever 44 is formed so that bare contact between the pin 47 on the key lever and the lower end of the sub-lever is provided during the depression of a key. This arrangement enables the parts to lock the type bar against rebound from the type rest, as will hereinafter more clearly appear. The upper end of each upright sub-lever 44 is connected to a pull link 49, which in turn is pivoted at its forward end to the crank arm of a type bar 50. The type bars are segmentally arranged and are pivoted at 51 to

swing upwardly and rearwardly and to strike against the front face of a platen 52.

By arranging the sub-levers 36 and 44 in the rear of the type bars in the manner described, I am enabled to provide a straight connection fore and aft of the machine between the sub-levers 44 and the type bars without bending the sub-levers. This will be understood from an inspection of Figs. 5 and 6 from which it will be seen that the sub-levers 44 like the corresponding sub-levers in the previously described construction vary in length from the center to the sides of the system, but that the pivot or separate pivots 46 for the different sub-levers are arranged in a curved line, as indicated in Fig. 6, and that the same ratio is maintained between the upper and lower arms of the different sub-levers 44 to provide a substantially uniform leverage, as in the construction previously described. Moreover, it will be seen that these sub-levers 44 are each arranged to swing throughout their length in a single vertical plane, and to effect a pull on the type bars directly fore and aft of the machine. It follows therefore that the width of the system of sub-levers 44 corresponds substantially to that of the width of the type bars. The compensation for the difference in width between the system of sub-levers 44 and the key-board of the machine is effected by bending the key levers at the sides of the system or fanning them outwardly and forwardly from a line forward of the sub-levers 44 and 36 as indicated at 53 in Fig. 5. The rear end portions of the key levers, however, are arranged in parallelism so that the contact 34 on each key lever may properly cooperate with the contact face 35 on the associated sub-lever 36, and all side or lateral strain between the key lever and the type bar is avoided.

From an inspection of Fig. 4 it will be understood that a gradual acceleration in the movement of the type bar is effected during the depression of the finger key, and that the construction is such as to provide an easy start or to afford a light, resilient "touch" at the first part of the key depression. This will be clearly understood, it is believed, from a comparison of the different positions of the key during a depression thereof indicated at *a*, *b*, *c*, *d* and *e*. It will be seen from this that the last fifth of the extent of movement of the key in the depression thereof is effective to move the type bar from the position shown at *d* to that indicated at *e*, or nearly one-half the complete movement of a bar, whereas the other four-fifths of the extent of key depression is required to move the type bar through the first half of its movement. The restoring spring 40 of each type action is stretched during the depression of a key and the power of this spring, together with the

power exerted by the return movement of the type bar, is effective to restore the parts to normal position when pressure on the depressed finger key is released. Moreover, each spring 40 is effective to maintain constant cooperation between the associated sub-lever 36 and its key lever 31 during the operation of the action. In some instances, however, it may be found desirable to provide an additional restoring spring connected either to the key lever or type bar.

From an inspection of Fig. 4 it will be understood that any tendency of the type bar to rebound from the type rest 54, on which the type bars are supported in normal position, tends to force the associated link 49 rearwardly and to turn the sub-lever 44 connected therewith on its pivot 46. This movement is resisted by the pin 47 with which the lower arm of the sub-lever 44 co-acts, the strain exerted on the pin being transmitted longitudinally of the key lever against the fixed pivot 32 of said key lever. It will be understood that in the operation of each type action the depression of a finger key is effective to move the pin 47 downwardly and the path of movement of the surface on the lever 44 with which the pin co-acts is such that the pin does not obstruct the turning movement of the sub-lever at this time. This is clearly indicated by a comparison of the full and dotted line positions of the parts shown in Fig. 4.

In Fig. 7 I have indicated a still further modified form of type action embodying my invention. In this form of the construction a key lever 55 is fulcrumed on a fixed pivot 56 and is provided with a finger key 57. Each key lever has attached to one side thereof a plate 59. Each plate may be adjustably attached to its key lever by binding screws 58 extending through slots 58' in the plate. This connection affords an adjustment of the plate to different set positions longitudinally of the key lever, and also affords a slight up and down adjustment of the plate if desired. The lower edge of this plate forms a contact face 60 which coöperates with a contact face 61 on one arm 62 of an angular sub-lever 63. One of the contact faces, 61 in the present instance, is curved to provide a rolling fulcrum or engagement between the key lever and sub-lever 63. The various sub-levers are fulcrumed on a fixed pivot 64 arranged beneath the system of key levers. The angular lever also has an upwardly extending arm 65 slotted at 66 for coöperation with an anti-friction roller 67 mounted on one side of a second sub-lever 68 by a screw or pin 69 projecting laterally from one side of the sub-lever 68. Each upright sub-lever 68 is fulcrumed on a fixed pivot 70 above the key lever and has its upper end connected to a pull link 71 which in turn is connected at

its forward end to a crank arm of a type bar 72. The type bars are segmentally arranged and are pivoted at 73 to swing upwardly and rearwardly and to strike against the front face of a platen 74. The segmentally arranged type bars are all supported at their forward ends on a type rest 75 when the type bars are in normal position.

A counter restoring spring 76 is connected at one end to an off-set projection or arm 77 on the sub-lever 68 and at its opposite end to the key lever or to the plate 59 fixed thereto. The pull of this spring is exerted to maintain the engagement between the contact faces 60 and 61 on the key lever and sub-lever 63, respectively, at all times during the operation of the type action. This restoring spring, together with the weight of the returning type bar, is also effective to return the various parts of the type action to normal position as in the previously described constructions.

It will be observed that a shoulder 78 is formed on the rear upper corner of the plate 59 for coöperation with a shoulder or contact face 79 on the sub-lever 63 when the parts are in the normal position. The effect of this engagement between the key lever and sub-lever is to prevent the type bar from rebounding from the type rest 75. Thus any tendency of the type bar to rebound from the type rest exerts a longitudinal rearward strain on the link 71 and tends to turn the sub-lever 68 on its pivot 70. This tendency will be to turn the upper end of the sub-lever 68 rearwardly and the lower arm thereof forwardly. This turning movement of the sub-lever at this time is resisted by the engagement between the contact faces, shoulders or abutments 78 and 79. In short, the tendency of the type bar to rebound tends to exert a pressure to move the arms 65 of the sub-lever 63 forwardly and this strain is exerted longitudinally of the key lever against the fixed pivot 56 which resists any movement of the parts. A depression of the finger key, however, is effective to disengage the shoulders 78 and 79 to effect an actuation of the type bar, the shoulder 78 following the curved face 80 on the sub-lever 63 during the depression of the key. The adjustment of each plate 59 enables it to be set relatively to the other parts to properly co-act therewith under different conditions.

It will be observed that the depression of a key is effective to bring about a rolling or rocking contact or engagement between the contact faces 60 and 61 and to vary the point of this engagement; the contact approaching closer to the fulcrum of the sub-lever 63 as the key lever is depressed. This affords an easy touch at the first part of the key depression and effects a gradual acceleration in the movement of the type bar

as it approaches the printing position as in the previously described constructions. If desired, the upright sub-lever 68 may be mounted on a curved pivot or upon pivots arranged in a curved line to afford a substantially uniform leverage and the curved contact faces 61 on different of the sub-levers 68 may be varied to provide a uniform dip of the different keys throughout the system, and a substantially uniform leverage on the different type actions throughout the system, all as provided in the constructions previously described.

Various features disclosed in the different forms of the invention and illustrated in the different figures of the drawing may be used separately or combined; it being understood, for instance, that the plate 4 in the construction shown in Fig. 1 may be made adjustable as in the construction shown in Fig. 7. Moreover, the variation of the curved contact faces as shown in Fig. 2 may be employed in the other constructions illustrated.

Various changes may be made without departing from the spirit and scope of my invention.

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

1. In a typewriting machine, the combination of a key lever, an angular sub-lever, having a rolling contact with said key lever, a type bar, a second sub-lever, and an anti-friction roller carried by one of said sub-levers and working in a slot in the other of said sub-levers, the second mentioned sub-lever being operatively connected with said type bar.

2. In a typewriting machine, the combination of a key lever, an angular sub-lever pivoted on a fixed fulcrum beneath the key lever and having a rolling contact with said key lever, a type bar, a second sub-lever pivoted on a fixed fulcrum above the key lever, and an anti-friction roller carried by one of said sub-levers and working in a slot in the other of said sub-levers so as to constitute a direct connection between the sub-levers, said last mentioned sub-lever being operatively connected with the type bar.

3. In a typewriting machine, the combination of a key lever of the second order, a sub-lever having a rolling contact with the key lever, a type bar, and a second sub-lever of the first order operatively connected with said type bar and having a direct sliding engagement with said first mentioned sub-lever.

4. In a typewriting machine, the combination of a key lever of the second order, an angular sub-lever having a rolling contact with said key lever, a type bar, and a second sub-lever of the first order operatively connected with said type bar and having a

direct slot and roller engagement with said angular sub-lever.

5. In a typewriting machine, the combination of a key lever of the second order, an angular sub-lever pivoted on a fixed fulcrum beneath the key lever and having a rolling contact with said key lever, a type bar, and a sub-lever of the first order pivoted on a fixed fulcrum above the key lever and operatively connected to said type bar and directly connected with said angular sub-lever by a pin and slot connection.

6. In a typewriting machine, the combination of a key lever, a sub-lever having a rolling contact with said key lever, a type bar, a second sub-lever directly connected with said first mentioned sub-lever and operatively connected with said type bar, and means carried in part by the key lever and in part by one of said sub-levers for locking the type bar against rebound when the parts are in normal position.

7. In a typewriting machine, the combination of a key lever, an angular sub-lever having a rolling contact with said key lever, a type bar, a second sub-lever directly connected with said angular sub-lever and operatively connected with said type bar, and means carried in part by the key lever and in part by said second mentioned sub-lever for locking the type bar against rebound when the parts are in normal position.

8. In a typewriting machine, the combination of a key lever, an angular sub-lever having a rolling contact with said key lever, a type bar, a second sub-lever directly connected with said first mentioned angular sub-lever and operatively connected with said type bar, a stop or abutment carried by the key lever, and a coöperative stop or abutment carried by the second sub-lever, said abutments coöperating when the parts are in normal position to lock the type bar against rebound.

9. In a typewriting machine, the combination of a key lever, a sub-lever having a rolling contact with said key lever, a type bar, a second sub-lever directly connected with said first mentioned sub-lever by a pin and slot connection and operatively connected with said type bar, a laterally projecting pin carried by the key lever, and a shoulder or abutment carried by the second mentioned sub-lever and which is coöperative with the pin on the key lever to lock the type bar against rebound when the parts are in normal position.

10. In a typewriting machine, the combination of a series of type bars, a series of key levers, a series of sub-levers of uniform size each having a rocking contact with the associated key lever to afford an accelerated movement of the type bar as it approaches

the printing position, and a second series of sub-levers connected with said type bars and coöperative directly with said first mentioned series of sub-levers, said second series of sub-levers being pivoted in an arc.

11. In a typewriting machine, the combination of a series of type bars, a series of key levers, a series of angular sub-levers of uniform size each having a rocking contact with the associated key lever to afford an accelerated movement of the type bar as it approaches the printing position, a second series of sub-levers pivoted in an arc and connected with said type bars and directly connected with said series of angular sub-levers by pin and slot connections.

12. In a typewriting machine, the combination of a series of type bars, a series of key levers, a series of sub-levers of uniform size each having a rocking contact with the associated key lever to afford an accelerated movement of the type bar as it approaches the printing position, a second series of sub-levers connected with said type bars and co-operative directly with said first mentioned series of sub-levers, the connection between the two series of sub-levers being formed by an anti-friction roller carried by one of the sub-levers working in a slot in the associated sub-lever with which it is connected.

13. In a typewriting machine, the combination of a type bar, a sub-lever connected with said type bar, a key lever, a second sub-lever actuated from the key lever by a rolling contact therewith and operative to actuate said first mentioned sub-lever, and an abutment on the key lever with which said first mentioned sub-lever coöperates when the parts are in normal position to lock the type bar against rebound from the type rest.

14. In a typewriting machine, the combination of a type bar, a sub-lever connected with said type bar, a key lever, a second sub-lever actuated from the key lever by a rolling contact therewith and operative to actuate said first mentioned sub-lever, and a stop pin carried by and projecting laterally from the key lever and with which said first mentioned sub-lever coöperates when the parts are in normal position to lock the type bar against rebound from the type rest.

15. In a typewriting machine, the combination of a type bar, a sub-lever connected with said type bar, a key lever, a second sub-lever, a direct sliding connection between said sub-levers and by which one sub-lever is operative to actuate the other, and an abutment on the key lever with which one of said sub-levers coöperates to lock the type bar against rebound from the type rest.

16. In a typewriting machine, the combination of a type bar, a sub-lever connected with said type bar, a key lever, a second sub-lever, a direct pin and slot connection between said sub-levers, and a pin projecting laterally from said key lever and with which said first mentioned sub-lever coöperates when the parts are in normal position to lock the type bar against rebound from the type rest.

17. In a typewriting machine, the combination of a series of type bars, a series of sub-levers of the first order operatively connected with said type bars, said sub-levers varying in length but having the length of their arms on opposite sides of their pivots in the same ratio, a second set of sub-levers directly connected by pin and slot connections with said first mentioned sub-levers, and a set of key levers having a rolling engagement with said second set of sub-levers.

18. In a front strike typewriting machine, the combination of an upwardly and rearwardly striking type bar adapted to strike against the front face of the platen, a substantially horizontally disposed link connected with said type bar, a key lever, an angular or bell crank sub-lever arranged beneath the key lever and having a rolling contact with said key lever, an intermediate actuating connection between said angular sub-lever and link to effect a movement of the link fore and aft of the machine to actuate the type bar, and a contractile spring carried at one end by the key lever and at its opposite end by said sub-lever.

Signed at Kittanning, in the county of Armstrong, and State of Pennsylvania; this 8th day of March, A. D. 1911.

JAMES D. DAUGHERTY.

Witnesses:

HARRY P. BOARTS,

VERNA D. DAUGHERTY.