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PATENTED OCT. 29, 1907.

J. B. SECOR.
TYPE WRITER MECHANISM.
APPLICATION FILED OCT. 5, 1908.

2 SHEETS—SHEET 1.

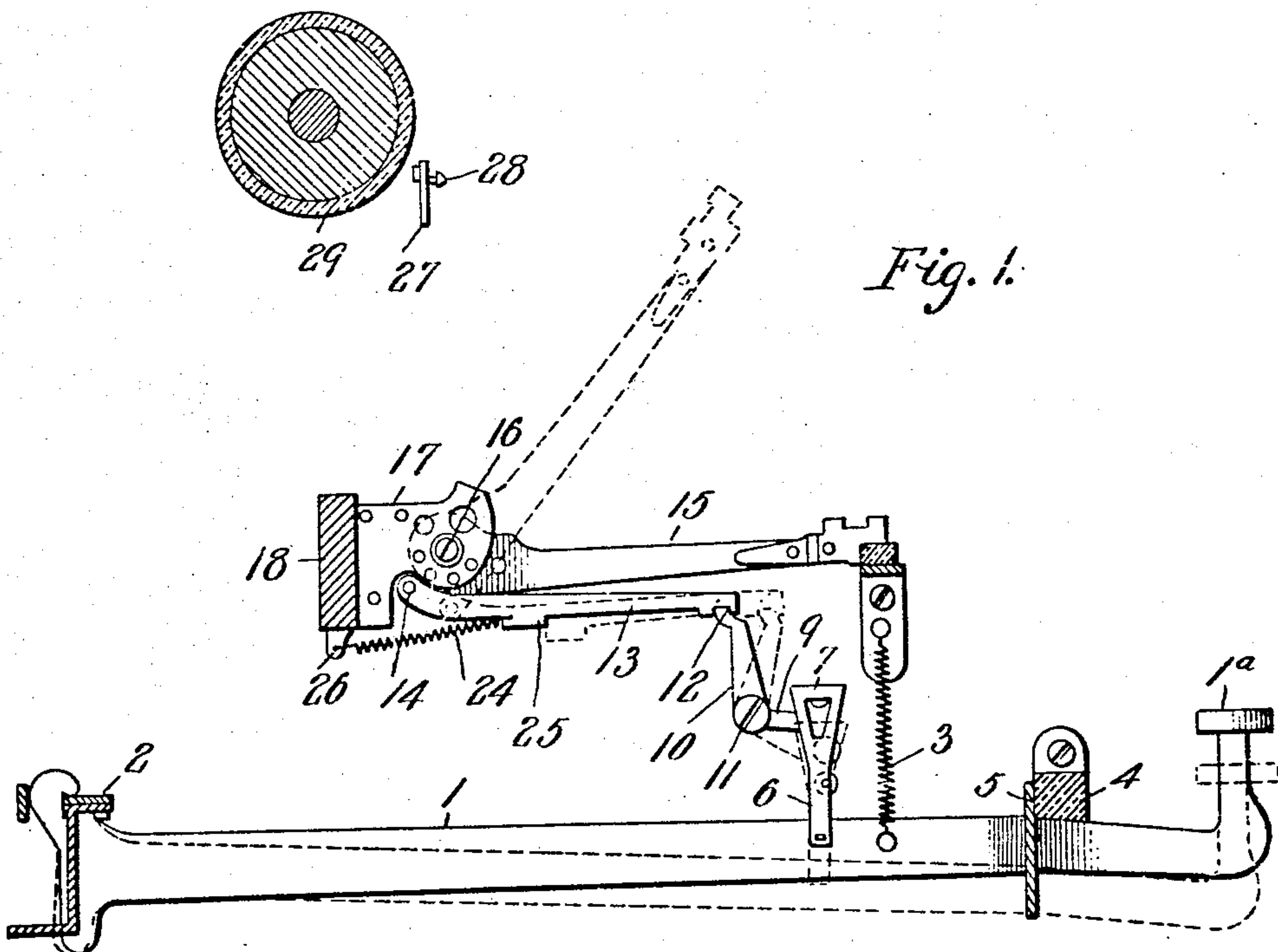


Fig. 1.

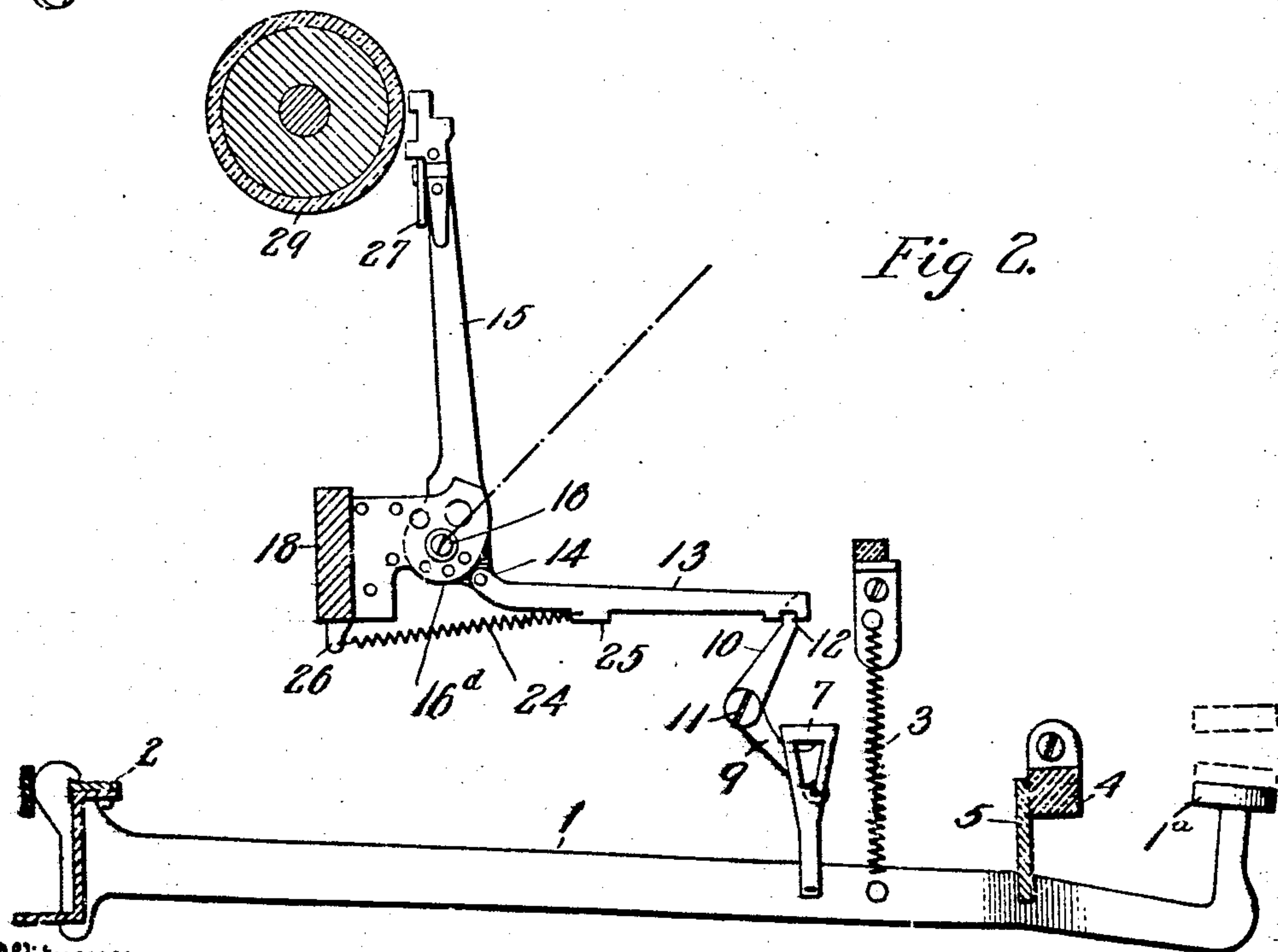


Fig. 2.

Witnesses

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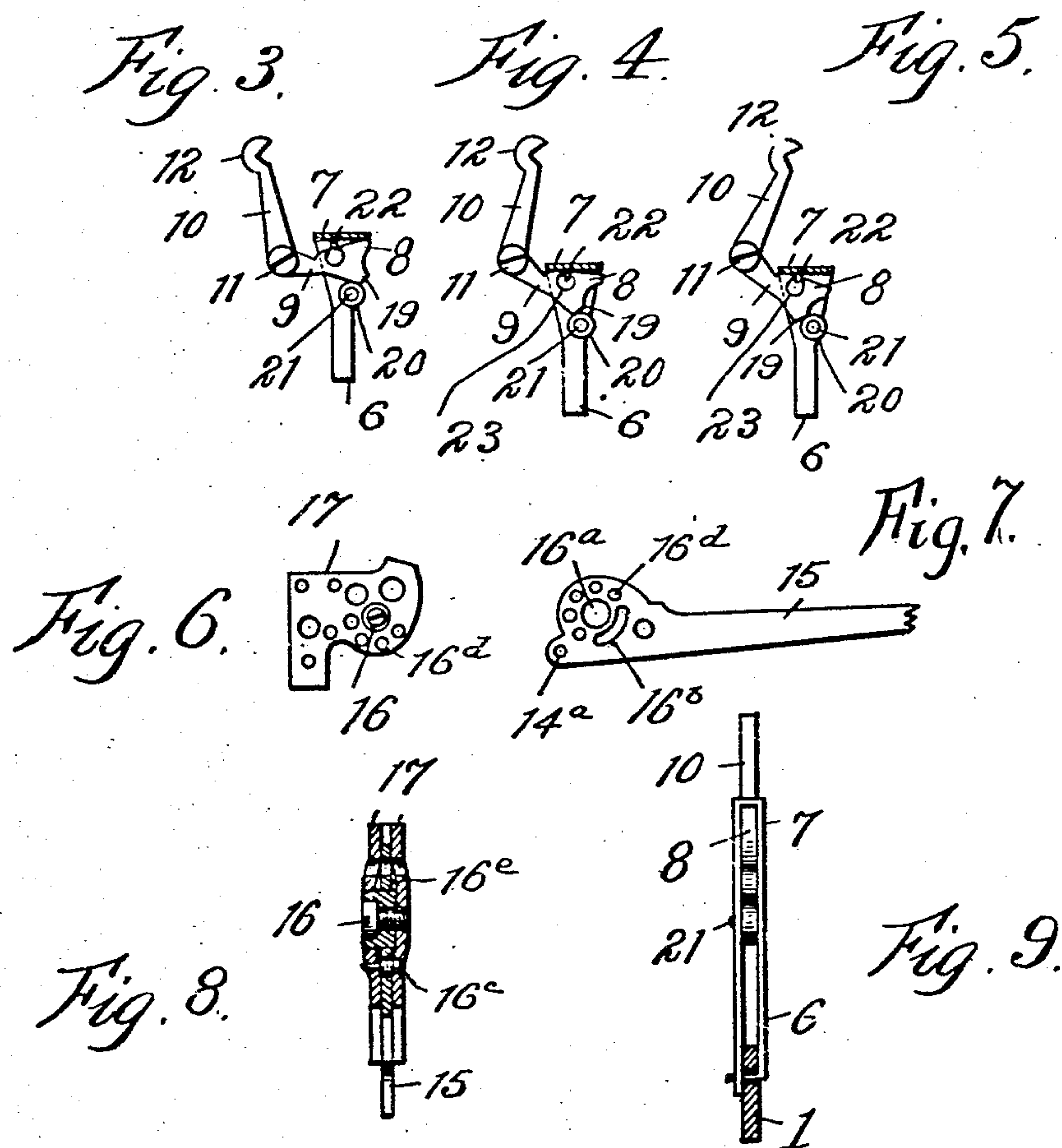
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2 SHEETS—SHEET 2.



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TYPE-WRITER MECHANISM.

No. 869,526.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed October 5, 1906. Serial No. 337,641.

To all whom it may concern:

Be it known that I, JEROME B. SECOR, a citizen of the United States, and a resident of Derby, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Type-Writer Mechanism, of which the following is a specification.

My invention relates to the class of type-bar movements in which the actuating mechanism acts on the type-bar with progressively decreasing leverage so as to afford an easy touch at the beginning and accelerated motion of the type-bar toward the end of the stroke.

The invention also relates to an improved construction in the fulcrum-joint of the typebars.

15 In carrying out the first part of my invention, to effect progressively decreasing leverage with accelerating motion in the typebar action, I employ, in combination with a key-lever of the second order, that is to say, fulcrumed at its rear end, a vertical link pivoted at bottom to the key-lever intermediately of the ends of the latter, looped at top and having a horizontally extended bearing surface engaging at successive points with the horizontal arm of a bell crank sub-lever rocking on a horizontal pivot and the upper end of which is connected by a link with the heel of the type-bar, the form and construction of the engaging parts of the top of the vertical link and the horizontal arm of the bell crank being such that in the beginning of the downward stroke of the key-lever, the vertical link engages with the bell crank at a point remote from the fulcrum thereof and subsequently at a point nearer the fulcrum so that three-fourths (more or less) of the entire motion of the key-lever may be expended in effecting the first half of the motion of the type-bar and the last fourth of the key-lever stroke will effect the latter half of the stroke of the type-bar.

In the accompanying drawing: Figure 1 is a side view of the type-bar operating mechanism of a front-strike typewriting machine illustrating my invention, showing in full lines the position of the parts before the type-bar is moved, and in dotted lines the position of the parts at half stroke. Fig. 2 is a side view of the same parts showing in full lines their position at the end of the stroke and indicating in dotted lines the position of the finger key at the beginning of the stroke and its position when one-half the movement of the type-bar has been effected. Figs. 3, 4 and 5 are detail views, partly in section, showing the relative positions of the vertical link and the bell crank sub-lever operated thereby at beginning of the stroke, at half stroke and at the completion of the stroke respectively. Fig. 6 is a side elevation of a type-bar bracket detached. Fig. 7 is a side elevation of the heel portion of a type-bar detached. Fig. 8 is a vertical transverse section on a larger scale of the type-bar bracket and

heel of the type-bar fulcrumed thereto. Fig. 9 is a front view also on a larger scale, of the vertical link and bell crank sub-lever at beginning of the stroke showing also the key-lever in transverse section.

1 represents one of a set of key-levers which may be of common form and (as here illustrated) fulcrumed at the rear end on a common transverse bar 2. 1^a represents the finger-key, 3 a tension spring by which the key-lever is drawn up after depression in printing and 4 a cushion bar against which the said key-levers are drawn and supported by said springs in their normal position of rest. 5 represents the customary comb-bar by which the key levers are guided and held against lateral motion.

At a suitable point between the ends of each key-lever, a vertical link 6 is pivoted or loosely jointed in suitable manner. A suitable connection is illustrated in Figs. 1, 2 and 9. This link, formed as shown in Fig. 9, constitutes a loop, the top 7 of which is extended in a horizontal direction, parallel with the key-lever or in the plane or oscillation of the bell-crank sub-lever, with which it coöperates, so as to adapt it to bear at successive points on a correspondingly extended bearing surface 8 of the horizontal arm 9 of bell crank sub-lever which turns on a fixed pivot 11. The vertical arm 10 of the bell crank lever is formed with a hook 12 to receive the forward end of a horizontal link 13, the rear end of which is pivoted at 14 to the heel of a type-bar 15 fulcrumed at 16 in a suitable bracket 17 mounted on the fixed bridge 18 of the frame. The fulcrum pin 16 has preferably the smooth hardened steel cup or washer 16^a around its head to give enlarged bearing for the type-bar.

The bracket here illustrated consists of two similar cheek plates, one of which is shown detached in Fig. 6, which confine between them the heel of the type-bar 15, which is shown detached in Fig. 7. In this Fig. 7, 16^a indicates the fulcrum aperture which receives the fulcrum-pivot-bushing. 14^a the aperture in the heel for reception of the pivot attachment to the rear end of the horizontal link 13 and 16^b a segment slot permitting passage of a pin 16^c having the screw-threaded portion passing through a similarly threaded hole in one cheek-plate, then through the slot 16^b in the type-bar heel, and shouldered at 16^d to engage the inner wall of the other cheek-plate—the reduced portion of the pin passing through the second cheek-plate being then riveted over. The screw may be adjusted therefore to act both as a separating and binding screw for the cheek-plates, holding them rigidly at exactly the right distance apart.

The cheek-plates of the bracket 17 and the heel of the type-bar which works between them are each perforated with registering apertures 16^e arranged concentrically around the axis in circle with slot 16^b and the

walls of the cheek-plates are stamped so as to bulge outward at center leaving a chamber 16^a for oil and to assist in clearing the bearing from dirt by communicating with holes 16^b and 16^c, and limiting the frictional bearing to the edges of the type-bar heel and cheek-plates, as indicated in Figs. 1 and 2, and shown particularly in Figs. 6, 7 and 8. By reason of these openings and the stamped recessing of the cheek plates the frictional surfaces are much reduced even though the bearing surfaces be extended to a wide radius.

The stamped recesses in the cheeks of the hanger, surrounding the fulcrum pivot of the typebar are shown in the sectional view, Fig. 8. The primary object and effect of these recesses in the hanger-plates are to remove the surfaces from contact near the center or fulcrum. The motion is so slight near the center that any accumulation of dirt or oil soon acts as a partial cement resulting in sluggish movement and liability of the bars to finally stick fast if in close contact with the hanger plates close to the fulcrum, whereas by removing the guiding contact between the typebar and hanger to a greater radius from the fulcrum I not only provide greater lateral steadiness in the typebars, but by the increased arc of movement between the friction surfaces enable them to constantly work themselves clean from dirt or viscid oil. By arranging the guiding surface in the form of a narrow concentric band remote from the axis the typebar is steadied without being pinched by the hangers and will run freely even though the joint be quite dirty.

Where the bearing surfaces are broad without recesses and openings oil applied to the joint and becoming viscid and gummy retards the free action of the parts.

Another important function of the registering openings referred to is to cut out and discharge any dirt which may get into the joint, thereby keeping the joint clean and free.

It has heretofore been proposed to aid the discharge of dirt and obstructions from the joints of the type bars by providing a series of apertures in the bracket and using therewith a type bar with a heel sufficiently narrow to unmask or expose these apertures at each movement, and providing a broad lateral bearing on one side only of the type bar heel.

My device differs from the above in that I completely cover both sides of the type-bar-heel between two cheek plates of which the bracket is in part constituted and provide a concentric series of registering apertures in the heel of the type bar and in both cheek plates of the bracket so that at each movement of the type bar a series of apertures are opened, extending completely through the opposite cheek plates and the inclosed heel of the type bar. I thus provide a bearing of large radial extent without objectionable increase of frictional resistance and at the same time provide for the free discharge of dirt, lint or other matter which might otherwise clog the joint.

The connection between the vertical link 6 and the horizontal arm 9 of the bell crank sub-lever by which the key-lever is made to act on the type-bar with progressively decreasing leverage and accelerated motion, is best shown in Figs. 3, 4 and 5. To permit proper movement between the parts with minimum friction and prevent relative displacement, the hori-

zontal bell crank arm 9 is formed at bottom with a cam shaped projection 19, bearing on a stop pin preferably carrying an anti-friction roller 20 confined between the walls of the link 6 and turning freely on its pivot 21. Beneath the top 7 of the link, a rib or lip 22 projects downward into a narrow slot, opening into an enlarged recess 23 within the bell crank arm 9, so as to prevent mutual disconnection between the said link and bell crank without interfering with the angular oscillatory movement of the latter.

By comparison of the several positions of the parts in successive portions of the stroke of the key-bar, shown in Figs. 1 and 2 and the relative positions of the engaging parts shown in Figs. 3, 4 and 5, it will be seen that at the beginning of the stroke the vertical link bears on the horizontal bell-crank arm 9 at a point most remote from the fulcrum 11, as shown in Fig. 3, so as to act with the greatest leverage, affording light action to the key-lever at beginning of the stroke and imparting at first comparatively slow movement to the type-bar. It results that about three-fourths of the complete key-lever movement, i. e., from the full line to the dotted line position shown in Fig. 1 or from first to second dotted position of the key 1^a shown in Fig. 2, will move the type-bar only 45 degrees or one-half its complete stroke as indicated in dotted lines in Figs. 1 and 2.

The position of the mutually engaging parts of the link and bell crank sub-lever at this half stroke position of the type-bar is shown in Fig. 4. By comparison of this with Fig. 5 showing the position at termination of the stroke, it will be seen that from the half stroke position the parts coast with rapidly decreasing leverage and accelerated movement of the type-bar, the latter half of the type-bar movement being effected by the last one-fourth of the key-lever movement, or from the second dotted positions of the key 1^a in Fig. 2 to the full line position of the key-lever in said figure.

24 represents a tension spring attached at 25 to the bottom of the horizontal link 13 and at 26 to a fixed point on the machine, to retract the type-bar 15 and bell-crank lever 9, 10 to normal position when the key-lever is released. Both springs 3 and 24 may be employed, or, by employing a slightly stronger spring in either place, the other spring may be omitted.

27 represents a spring bar to receive the impact of the type-bar, and 28 an alining stud carried thereby.

29 indicates the platen of a front strike machine, in connection with which I have illustrated my invention.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent.

1. In a type-bar operating mechanism for typewriting machines, the combination of a key-lever, a link pivoted by one end to the key-lever and formed at its other end with an extended bearing surface, a bell crank sub-lever pivoted at its elbow on a fixed fulcrum and having an arm with a bearing surface extending longitudinally of said arm and cooperating with the extended bearing surface in the end of said link, and a type-bar to which the other arm of the bell crank sub-lever is connected, whereby the angular motion of the bell crank sub-lever shifts the point of contact between it and the link, nearer the fulcrum of said bell crank sub-lever toward the end of the printing stroke.

2. In a type-bar operating mechanism for typewriting

machines, the combination of a key-lever, a vertical link pivoted by its lower end to the key-lever intermediately of the ends of said lever, and formed at its upper end with a horizontally extended bearing surface, a bell crank sub-lever pivoted at its elbow on a fixed fulcrum and having a horizontal arm with a bearing surface extending longitudinally of said arm and cooperating with the horizontally extended bearing surface in the upper end of said vertical link, a link jointed at one end to the other arm of the bell crank lever, and a type-bar to the heel of which the other end of the last named link is pivoted, whereby the angular motion of the bell crank lever shifts the point of contact between it and the vertical link, nearer the fulcrum of said bell crank lever toward the end of the printing stroke.

3. In a type-bar actuating mechanism for typewriting machines, the combination of a key-lever, a link jointed at one end to the key-lever, a bell crank sub-lever fulcrumed on a fixed pivot and having one arm on which the said link acts and another arm transmitting movement to the type-bar, the cooperating bearing surfaces of the link and the first bell-crank-arm being extended in the plane of oscillation of the bell crank lever, whereby the angular motion of said bell crank lever shifts the point of contact of the link therewith toward the fulcrum as the stroke progresses; and means for preventing the relative displacement of these cooperating parts in the printing stroke, substantially as described.

4. In a type-bar actuating mechanism for typewriting machines, the combination of a key-lever, a vertical link jointed at its lower end to the key-lever, a bell crank sub-lever fulcrumed on a fixed pivot and having a substantially horizontal arm on which the vertical link acts and a substantially vertical arm transmitting movement to the type-bar, the cooperating bearing surfaces of the vertical link and horizontal bell-crank arm being extended in the plane of oscillation of the bell crank lever, whereby the angular motion of said bell crank lever shifts the point of contact therewith of the vertical link, toward the fulcrum as the stroke progresses; and means for preventing the relative displacement of these cooperating parts, substantially as described.

5. In a type-bar actuating mechanism for typewriting machines, the combination of a key-lever, a link pivoted at one end to the key-lever and having at its other end a bearing surface extended in the plane of oscillation of the bell crank sub-lever with which it cooperates, a bell-crank sub-lever fulcrumed at its elbow on a fixed pivot and having one arm with an extended bearing surface cooperating with the extended bearing surface of the link so as to shift the contact point between said bearing surfaces toward the fulcrum of the sub-lever by the angular motion of the latter; a rib on one of the said bearing surfaces and a recess in the other bearing surface into which said rib projects to prevent the relative displacement of the parts in operation, substantially as described.

6. In a type-bar actuating mechanism for typewriting machines, the combination of a key-lever, a vertical link pivoted at its lower end to the key-lever and having at its upper end a bearing surface extended horizontally in the plane of oscillation of the bell-crank sub-lever with which it cooperates, a bell crank sub-lever fulcrumed at its elbow on a fixed pivot and having a horizontal arm with an extended bearing surface cooperating with the extended bearing surface of the link so as to shift the contact point between said bearing surfaces toward the fulcrum of the sub-lever by the angular motion of the latter, a rib on one of the said bearing surfaces and a recess in the other bearing surface into which said rib projects to prevent the relative displacement of the parts in operation, substantially as described.

7. In a type-bar actuating mechanism for typewriting machines, the combination of a key-lever, a link pivoted by one end to the key-lever and looped at its other end forming two parallel walls, a bell crank sub-lever having one arm received within the looped upper end of said link and actuated thereby, a rib on one of these cooperating members projecting into a recess in the other member to prevent their relative displacement in a horizontal direction, means for confining the said bell crank arm length-

wise of the link to prevent separation of said confining rib and recess, a type-bar and connecting means between the second arm of the bell-crank and the type-bar, for actuating the latter.

8. In a type-bar actuating mechanism for typewriting machines, the combination of a key-lever, a substantially vertical link pivoted by its lower end to the key-lever and having a looped upper end forming two parallel walls, a bell crank sub-lever having a substantially horizontal arm received within the looped upper end of said link and actuated thereby; a rib on one of these cooperating members projecting into a recess in the other member to prevent their relative displacement in a horizontal direction and means for confining the said bell crank arm vertically in the link to prevent separation of said confining rib and recess.

9. In a type-bar actuating mechanism for typewriting machines, the combination of a key-lever, a link jointed at one end to the key-lever and looped at its other end, a bell crank lever having one arm inclosed in the looped end of said link, a rib projecting inward from the end of the looped link into a recess in the bell crank arm to prevent relative movement transversely to the link and a transverse pin in the loop cooperating with a protuberance on the bell-crank-arm to prevent displacement of the parts longitudinally of the link while permitting oscillatory movement of the bell crank, substantially as described.

10. In a type-bar actuating mechanism for typewriting machines, the combination of a key lever, a substantially vertical link jointed at its lower end to the key-lever and having a looped upper end, a bell crank lever having a substantially horizontal arm inclosed in the looped upper end of said link, a rib projecting downward from the top of the looped link into a recess in the bell-crank-arm to prevent relative horizontal movement and a transverse pin in the loop cooperating with a protuberance on the bottom of the bell-crank-arm to prevent vertical displacement of the parts while permitting oscillatory movement of the bell-crank-lever, substantially as described.

11. In a type-bar actuating mechanism for typewriting machines, the combination of a key lever, a link jointed by one end to the key-lever and formed at its other end with a loop providing within its extremity a bearing surface, extended in the plane of oscillation of the bell-crank lever with which said link cooperates, a bell-crank sub-lever having one arm inclosed in the loop of said link and having an extended bearing surface cooperating with that within the extremity of the loop so that the angular motion of the bell crank lever causes the point of contact between the link and bell crank lever to approach the fulcrum of the latter during the progress of the stroke, a recess in one of the cooperating members and a rib on the other entering said recess to prevent relative displacement of said cooperating parts in a direction transverse to the link, an anti-friction roller pivoted within the loop and cooperating with a protuberance on the bell-crank-arm to prevent displacement of the parts longitudinally of the link while permitting the oscillatory motion of the bell-crank lever and a type-bar with which the second arm of the bell crank lever is connected.

12. In a type-bar mechanism for typewriting machines, the type-bar hanger having cheek-plates affording fulcrum support for the type-bar between them and a separating and binding screw engaging both cheek-plates, substantially as described.

13. In a type-bar mechanism for typewriting machines, the type-bar hanger having cheek-plates affording fulcrum support for the type-bar between them and a separating and binding screw having screw-threaded engagement with one cheek-plate and having rotatory support, but held from longitudinal movement in the other cheek-plate, substantially as described.

14. In a type bar mechanism for typewriting machines, the combination of a hanger and a type bar pivoted thereon, the said hanger and the heel of the type bar being both provided with apertures arranged on arcs concentric with the fulcrum so as to register with and pass one another in the movement of the type bar in order to cut out and discharge dirt from the joint, substantially as described.

15. In a type bar mechanism for typewriting machines,

- the combination of a hanger constructed with a pair of cheek-plates and a type bar pivoted therein, the heel of the type bar being embraced between the cheek plates of the hanger and the said hanger and the heel of the type bar being provided with apertures arranged equi-distantly from the fulcrum center, so as to register in the movement of the type bar in order to cut out and discharge dirt from the joint, substantially as described.
10. In a type bar mechanism for typewriting machines, the combination of a hanger constructed with a pair of cheek-plates having an interior recess, and a type bar whose heel is pivoted in said hanger and embraced between the cheek-plates thereof, the said cheek-plates of the hanger and the heel of the type bar being provided with registering apertures adapted to cut out and discharge dirt in the movement of the type bar, substantially as described.
15. In a type bar mechanism for typewriting machines the combination of a type bar and a hanger therefor, said hanger and the heel of the type bar being both provided with registering apertures and the apertures in at least one of said members being arranged in a series concentric with the pivot on which the type bar works, to reduce friction and facilitate the discharge of dirt from the joint, substantially as described.
20. In a type bar mechanism for typewriting machines, the combination of a type-bar and a hanger constructed with cheek plates embracing the heel of the type-bar and between which it is pivoted, the said type-bar heel and hanger cheeks being provided with registering apertures and the apertures in at least one of said members being arranged in a series concentric with the pivot of the type-

bar to reduce friction and facilitate the discharge of dirt in the movement of the type-bar, substantially as described.

19. In a typebar mechanism for typewriting machines, the combination of a typebar and a hanger therefor having registering apertures for discharge of dirt in the movement of the typebar and said hanger having on its face adjacent to the typebar an annular recess surrounding the pivot and a concentric guiding surface for the typebar remote from the fulcrum center, substantially as described.

20. In a typebar mechanism for typewriting machines, the combination of a typebar and a hanger constructed with cheek plates embracing the heel of the typebar and between which it is pivoted, said typebar and hanger being both provided with apertures for discharge of dirt in the movement of the typebar, and the hanger-cheeks having on their inner faces adjacent to the typebar recesses surrounding the pivot and providing concentric bearing surfaces for the typebar remote from the fulcrum-center, substantially as described.

21. In a typebar mechanism for typewriting machines, the combination with a typebar of a fulcrum hanger therefor formed of sheet metal with cheek-plates embracing the typebar heel on both sides and having stamped in their inner faces annular recesses forming concentric guiding surfaces for the typebar remote from the fulcrum-center, substantially as described.

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Witnesses:

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