No. 685,123. Patented Oct. 22, 1901.

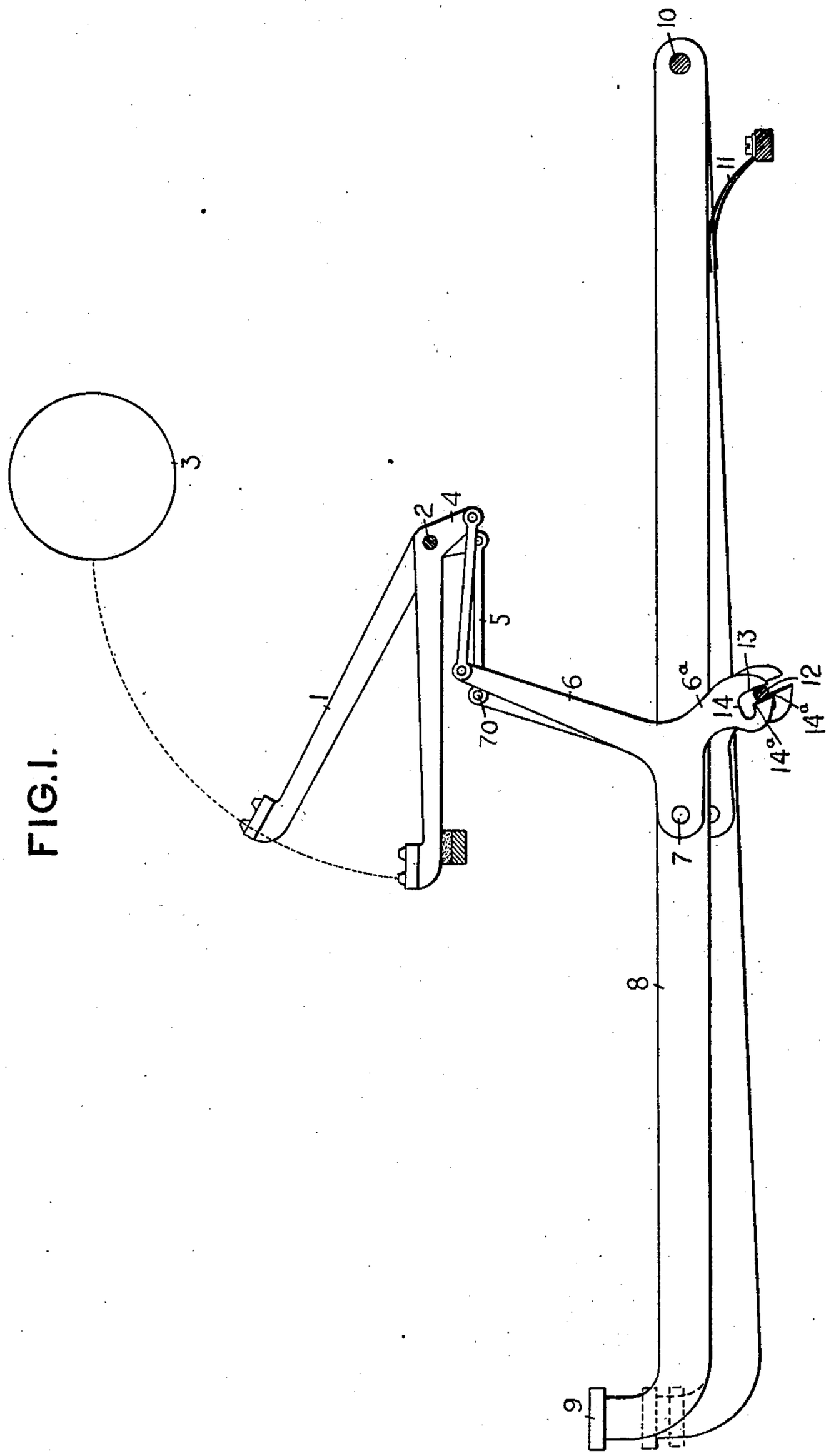
# J. FELBEL.

## TYPE WRITING MACHINE.

(Application filed Mar. 9, 1901.)

(No Model.) 7 Sheets—Sheet 1.

FIG. I.




WITNESSES:

K. V. Donovan.

Florence Keeling.

INVENTOR:

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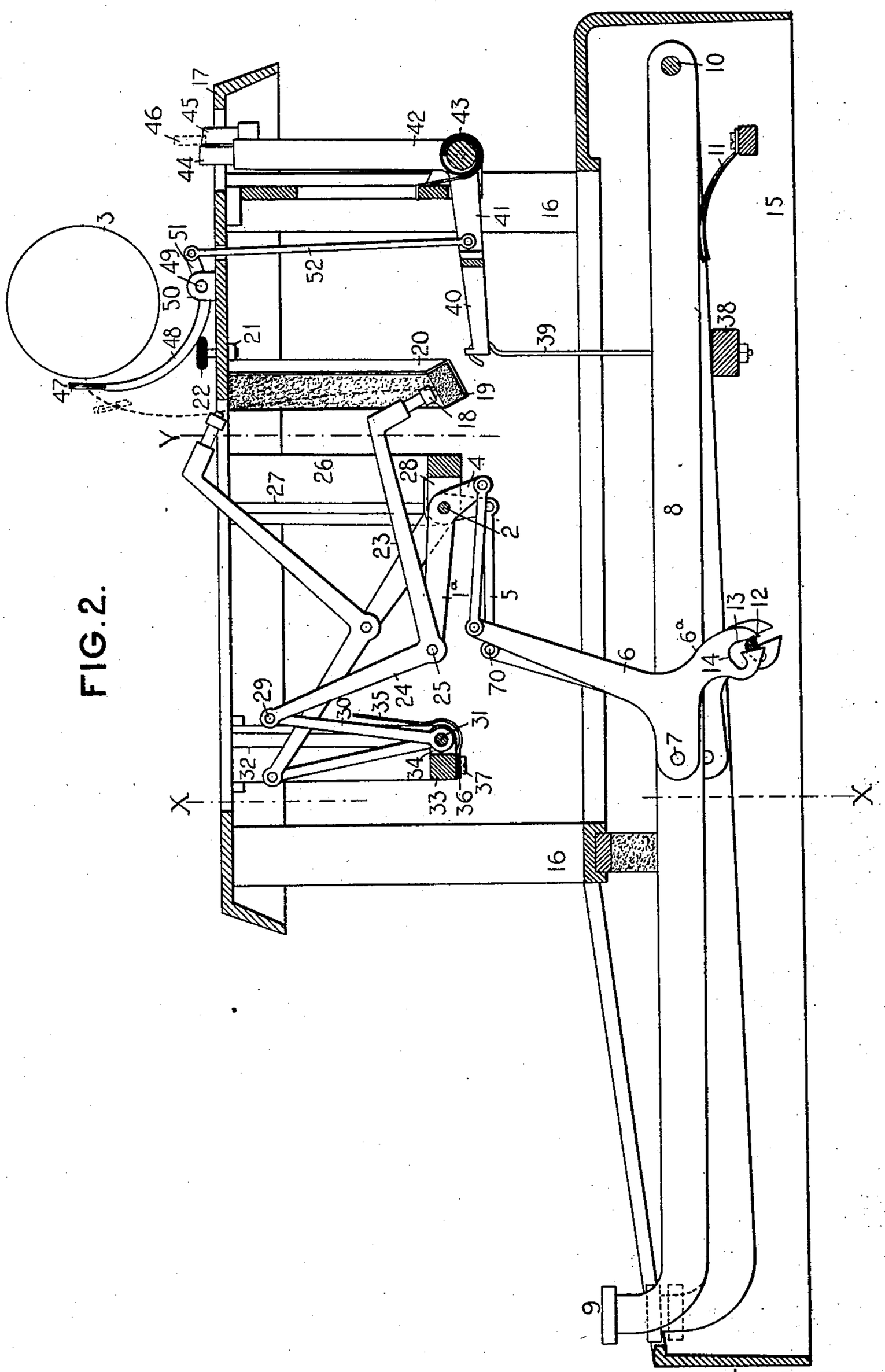
## TYPE WRITING MACHINE.

(Application filed Mar. 9, 1901.)

(No Model.) 7 Sheets—Sheet 2.

FIG. 2.

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## TYPE WRITING MACHINE.

(Application filed Mar. 9, 1901.)

(No Model.) 7 Sheets—Sheet 3.

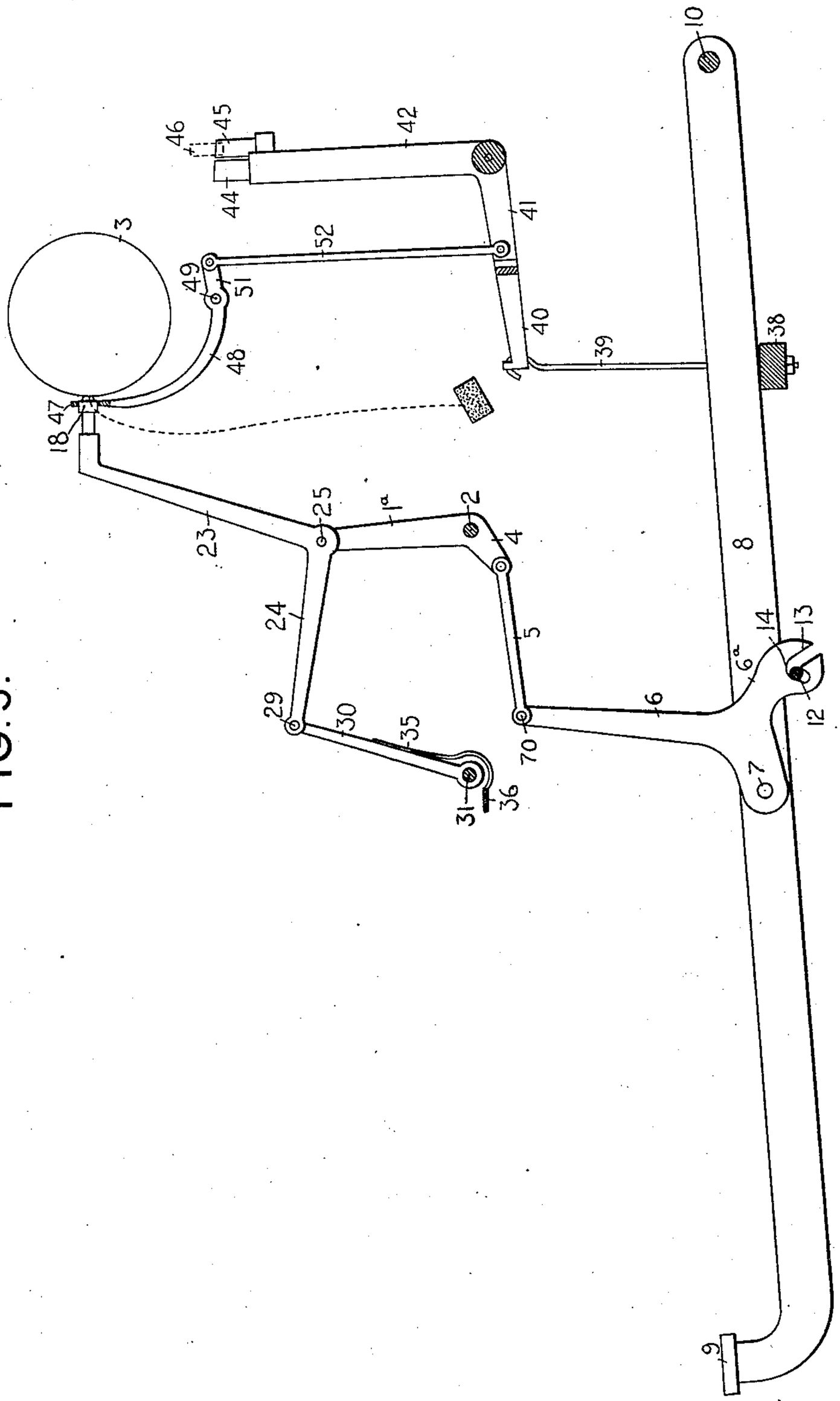


FIG. 3.

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## TYPE WRITING MACHINE.

(Application filed Mar. 9, 1901.)

(No Model.) 7 Sheets—Sheet 4.

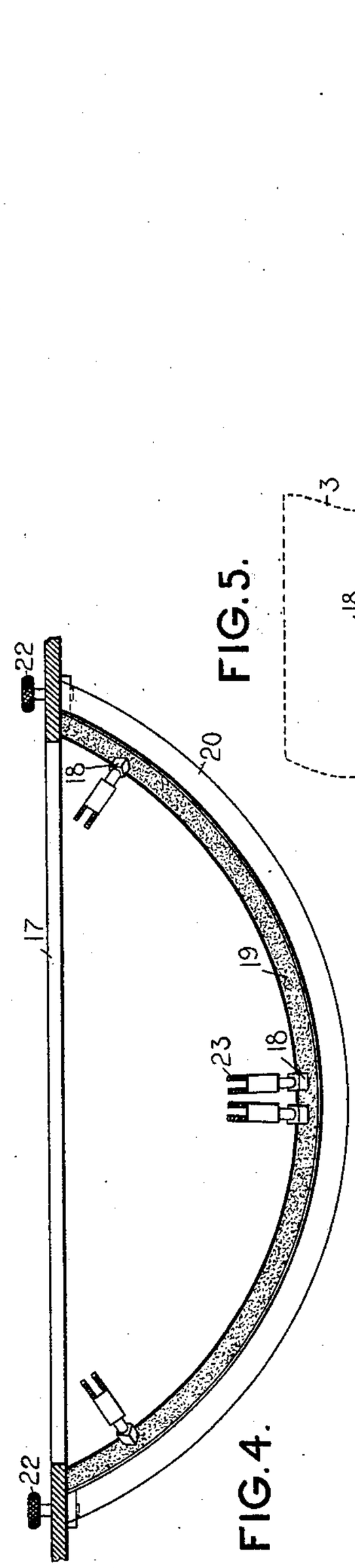


FIG. 4.

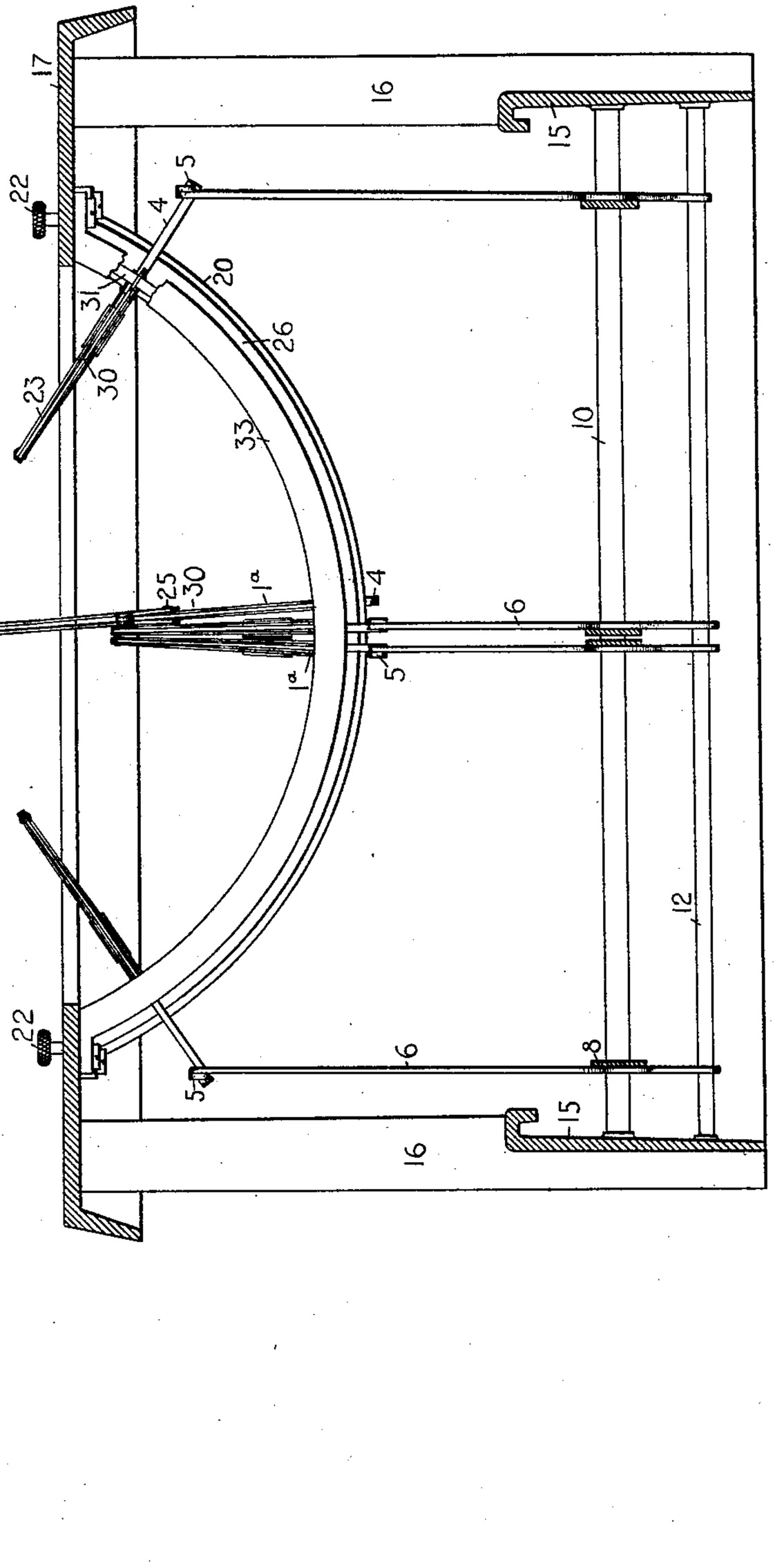


FIG. 5.

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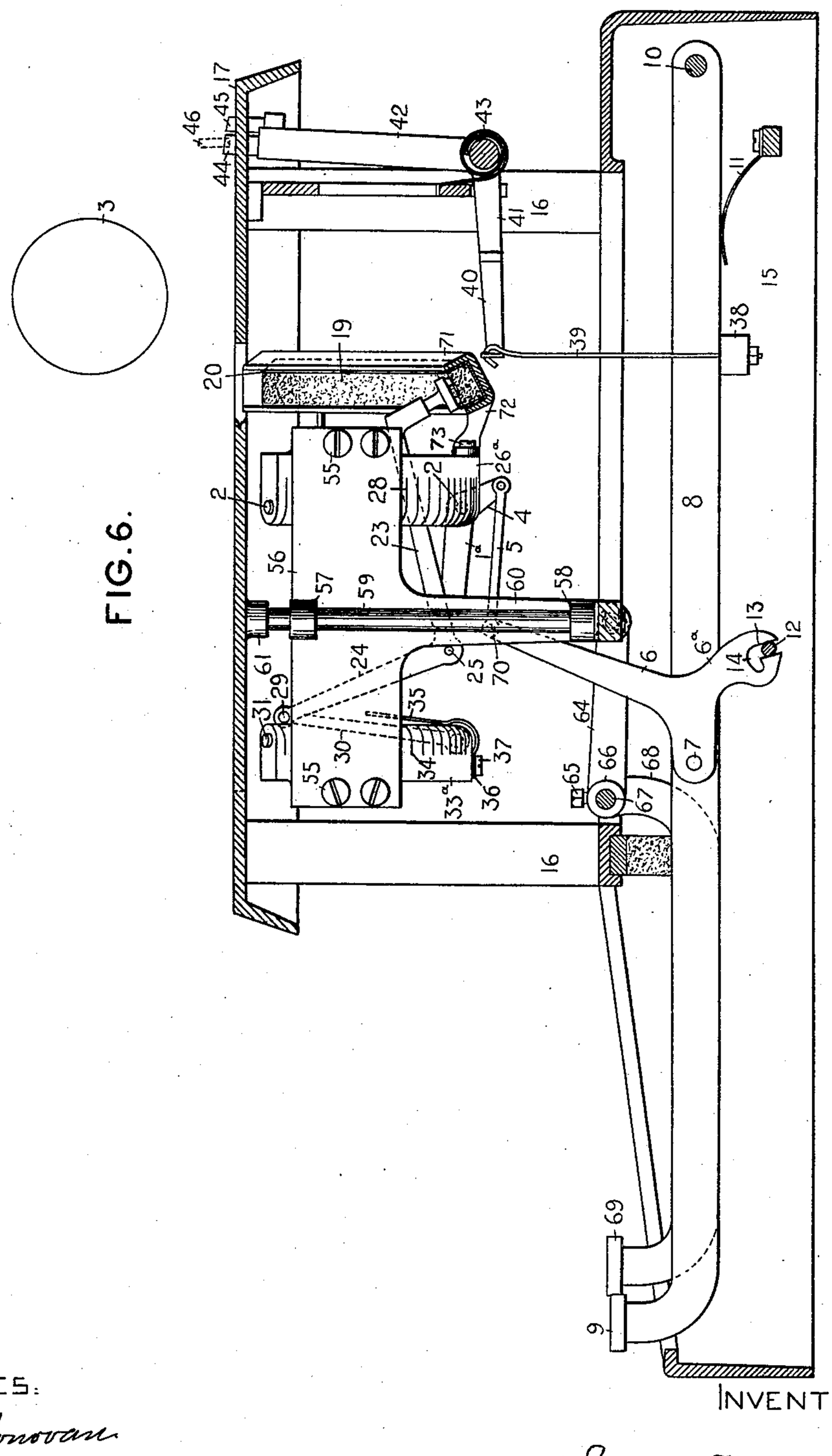
## TYPE WRITING MACHINE.

(Application filed Mar. 9, 1901.)

(No Model.) 7 Sheets—Sheet 5.

FIG. 6.

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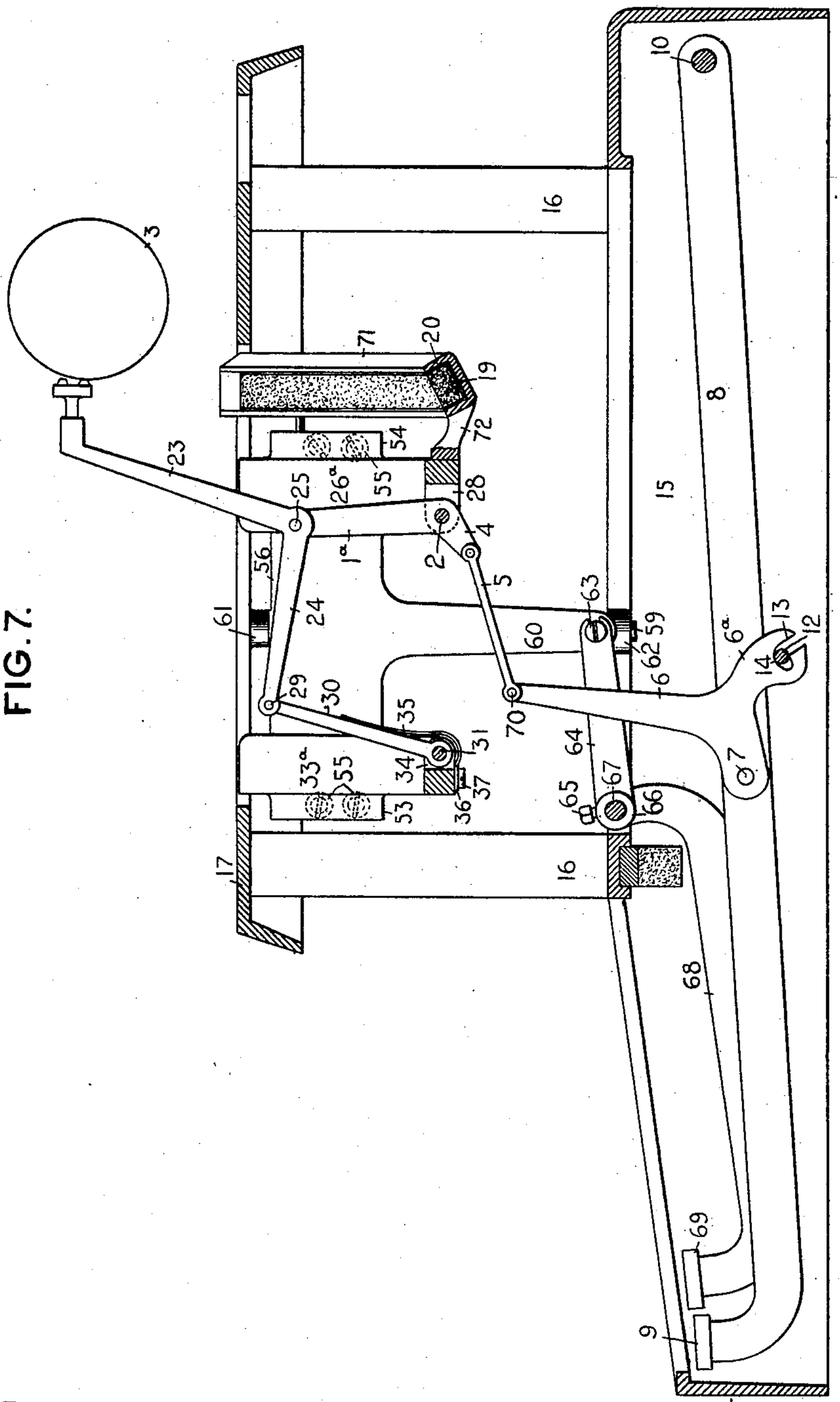
# J. FELBEL.

## TYPE WRITING MACHINE.

(Application filed Mar. 9, 1901.)

(No Model.) 7 Sheets—Sheet 6.

FIG. 7.

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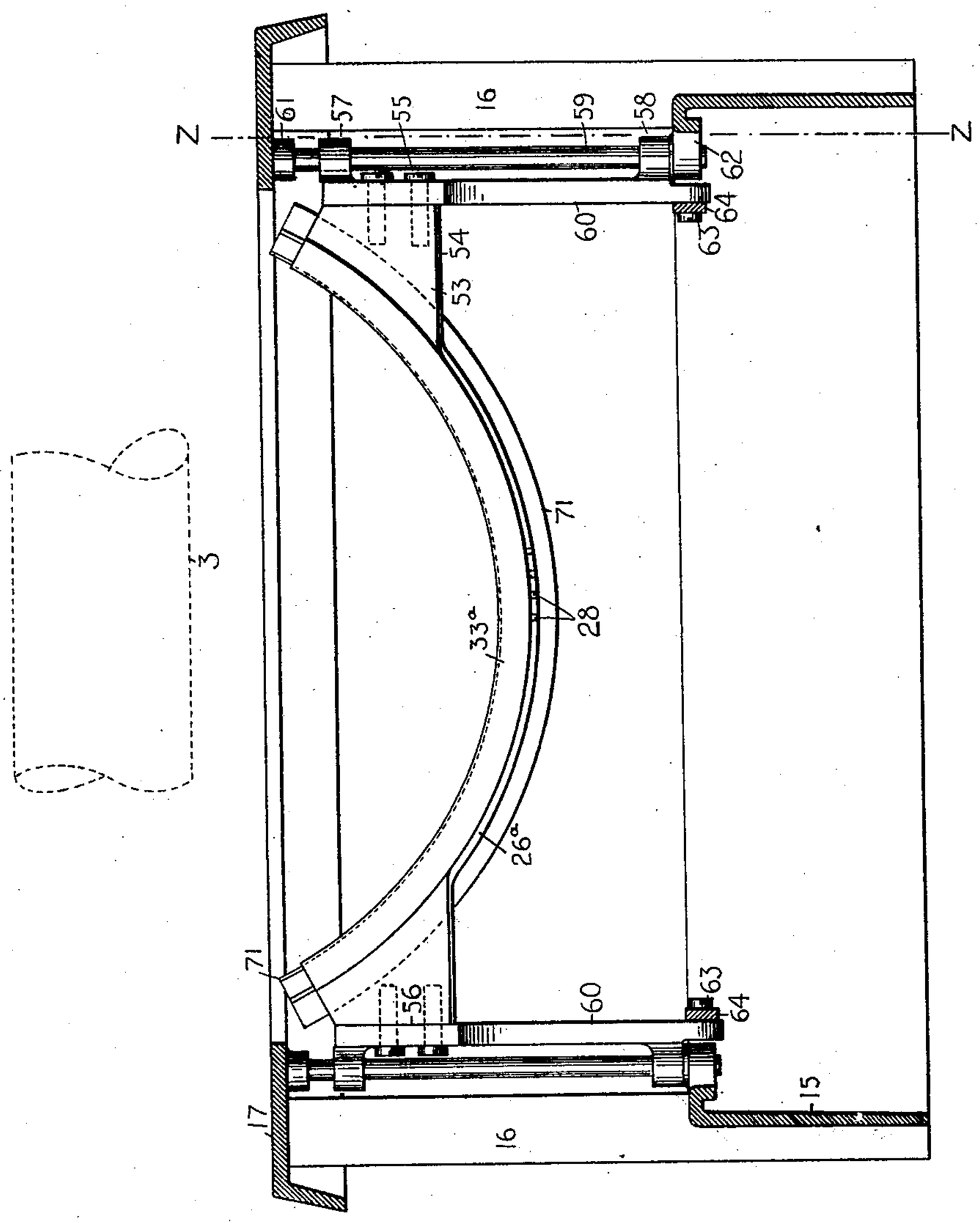
## TYPE WRITING MACHINE.

(Application filed Mar. 9, 1901.)

(No Model.) 7 Sheets—Sheet 7.

FIG. 8.




WITNESSES:

K. V. Donovan.

Florence Keeling.

INVENTOR:

Jacob Felbel

# UNITED STATES PATENT OFFICE.

JACOB FELBEL, OF NEW YORK, N. Y.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 685,123, dated October 22, 1901.

Application filed March 9, 1901. Serial No. 50,442. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB FELBEL, a citizen of the United States, and a resident of the borough of Manhattan, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This application relates to the type-actions of writing-machines, particularly "front-strike" machines.

The objects of my invention are to improve the connections between the keys and the type-bars, so as to minimize the shocks to the operator's fingers at both the beginning and completion of the key-strokes; to speed the type-bars as they approach the platen, thereby enabling them to make better impressions; to enable the type-bars to recede promptly from the printing-point, so as to avoid collision; to use an inking-pad instead of a ribbon; to mount the types upon compound or link-motion type-bars, and to shift the type-bars and their inking-pad vertically, so as to enable either set of types upon the bars to print.

Other objects will hereinafter appear.

In the accompanying drawings, Figure 1 is a diagrammatic sectional elevation showing my improved key connection applied to an ordinary front-strike type-bar. Fig. 2 is a sectional elevation taken longitudinally of a front-strike writing-machine made in accordance with certain of my improvements, each type-bar carrying only a single type or character. Fig. 3 is a skeleton view similar to Fig. 2 and showing the type in printing position. Fig. 4 is a front sectional fragmentary view taken at about the line Y of Fig. 2 and showing some of the types lying in normal position against the ink-pad. Fig. 5 is a front sectional elevation taken at the line X X of Fig. 2. Fig. 6 is a sectional side elevation taken on line Z Z of Fig. 8 and showing the preferred form of my invention, the type-bars and ink-pad being so mounted as to shift together in a vertical direction and the parts being shown in their normal position. Fig. 7 is a view similar to Fig. 6 and showing a type-bar in printing position and also showing the type-bar segments and ink-pad as shifted to the position for writing capital letters. Fig. 8 is a front sectional elevation showing the vertically-shifting frame illustrated at Fig. 6.

In the several views similar parts are designated by similar numerals of reference.

Referring more particularly to Fig. 1, in which a portion of my improvements are shown as applied to an ordinary front-strike machine, the rearwardly-striking type-bars are described as 1, their common curved fulcrum-rod as 2, and the platen as 3. The type-bars have downwardly-directed short arms 4, which are connected by forwardly-extending links 5 to the upper ends of upwardly-directed sublevers 6, which are pivoted at 7 upon levers 8 of the second order, bearing at their front ends keys 9 and fulcrumed at their rear ends upon a rod 10, each key-lever having a returning-spring 11 and the system of key-levers extending rearwardly from the key-board beneath the type-bars. The sublevers 6 have downwardly and rearwardly directed arms $6^a$, whose lower ends are slotted or forked to engage a common transverse fixed fulcrum-rod 12. Each slot has a downwardly and rearwardly inclined cam edge or surface 13, which works upon the rod 12 during the initial portion of the key depression. This edge 13 extends in a direction crosswise of the lever 8 or at an angle thereto and is so formed that at the early part of the key movement the sublever 6 may vibrate independently upon its pivot 7 only to a very slight extent, so that the movement of the type-bar may begin slowly, or, in other words, so that the type-bar may be started easily by the key, thus effectively cushioning the key-stroke at the beginning thereof. About two-thirds of the key depression is accomplished by the time the type-bar makes about one-third of its movement to the platen, as illustrated. Each slot is also provided with an arched cam edge 14, which forms a continuation of the oblique edge 13. When the edge 14 contacts with the fulcrum 12, as illustrated at Fig. 1, the independent movement of the lever 6 upon its pivot 7 is accelerated, owing to the abruptness of the edge 14, and hence the type-bar is speeded, the last two-thirds of the movement of the latter being accomplished during about the last third of the movement of the key. Owing to the gradual and material decrease in the

leverage of the key upon the type-bar, the key offers gradually-increasing resistance to the finger, thus to a great extent absorbing the momentum of the hand, and hence cushioning the key-stroke at the termination thereof and avoiding a final jar to the operator's finger. At the same time the type, owing to its increasing speed, is enabled to deliver a powerful blow.

In order that the return movement of the type-bar may correspond with the printing movement thereof, the opposite working edges of the fork in the lever 6 are made substantially so that when a key is relieved from pressure the lever 6 turns rapidly upon its pivot 7, and hence the type-bar recedes at comparatively high speed from the platen and completes two-thirds of its return movement by the time the key has made only one-third of its upward movement, thus minimizing the liability of clashing of the type-bars in the vicinity of the common printing-center. It will be seen that the corner $14^a$ opposite the abrupt portion 14 of the slot is the first point that bears upon the fulcrum-rod 12 during the return stroke, and hence the bell-crank is caused to vibrate rapidly during the first portion of the return stroke, as aforesaid.

Referring now particularly to Figs. 2, 3, 4, and 5, it will be seen that the fulcrum-rods 10 and 12 are mounted in the side walls of a base 15, from which rise corner-posts 16, surmounted by a top plate 17. The types, which are designated as 18, rest normally in contact with a concaved ink-pad 19, which is contained in a curved case 20, the latter being arranged forwardly of and below the platen and secured at its ends by ears 21 and screws 22 to the under side of the top plate. The types 18 are mounted upon the free rear ends of angular carriers, each comprising a rearwardly-extending arm 23 and an upwardly-extending arm 24. The carriers are pivoted at their angles or elbows at 25 to the forward ends of horizontal bars $1^a$, which correspond to the type-bars 1 at Fig. 1 and are pivoted upon a curved wire 2, carried in a segment 26, arranged forwardly of the ink-pad, said wire being seated in a curved groove 27, formed in the segment, and the hubs of the bars $1^a$ working in radial slots 28 and the bars extending forwardly from the hubs. This segment may be secured at its ends in any suitable manner to the under side of the top plate 17. The upwardly-directed type-carrier arms 24 are pivoted at their upper or inner ends 29 upon the upper or inner free ends of idle links 30, which are pivoted at their lower or outer ends upon a curved fulcrum-wire 31, seated in a groove 32, formed in a second segment 33, which is arranged forwardly of the segment 26 and is also mounted beneath the top plate and has radial slots 34 for receiving the hub ends of the links 30. When a key-lever is depressed, the lever 6, carried thereby, is caused to vibrate forwardly and independently upon its pivot 7 and through the link 5 swings the driving-arm $1^a$ of the compound type-bar upwardly and rearwardly through about one-quarter of a circle to the position shown at Fig. 3. The type-carrier is given a compound movement, resulting from its pivotal connection with the two vibrating arms $1^a$ and 30, the type 18 thereon moving upwardly or inwardly in a radial direction until about opposite the printing-point and then directly back to the platen. During the initial portion of the printing stroke the link 30 is vibrated forwardly until the toggle formed by the arms $1^a$ and 24 is straightened out, as illustrated at Fig. 2, and during the remainder of the printing stroke said link 30 is drawn rearwardly. During the major portion of the printing stroke, however, the type-carrier 23 is caused by the vibrating arm $1^a$ to swing upwardly about the pivot 29 upon the upper end of said link 30, thereby imparting to the type end of the carrier the radial movement referred to. During the last part of the printing stroke the arms 30 and $1^a$ vibrate together, so that the type-carrier is carried bodily toward the platen and with a practically straight-line movement. During its travel the type is given a turning movement, whereby the face that normally contacts with the pad is presented to the platen, the normal position of said face being oblique and nearly horizontal and its printing position being vertical.

It will be seen that the driving-arm $1^a$ of the compound type-bar moves through about one-third of its printing stroke while the key makes about two-thirds of its corresponding stroke, so that the type-bar considered as a whole is started in motion slowly, and hence offers comparatively little resistance to the touch of the finger upon the key, this slow movement being due to the provision of the oblique cam edge upon the lever 6, whose operation has already been described. The last two-thirds of the stroke of the driving-arm $1^a$ are accomplished during the last third of the key-stroke, so that the hand of the operator is gradually brought to a stop and the type is enabled to deliver a sharp blow upon the paper. When the key is released, the type moves promptly away from the platen, two-thirds of the return stroke of the driving-arm $1^a$ being accomplished during the first third of the upstroke of the key, thereby avoiding liability of the types to clash.

The reversal of the type-bar and key movements is assisted by a spring or elastic buffer 35, whose free end extends up in rear of the link 30 and is flexed by said link at the final portion of its printing stroke. It will be seen that this spring serves partly to cushion the key-stroke and partly to aid in starting the type-bar back. The series of springs may be formed as fingers upon a plate 36, which may be curved around the lower edge of the segment 33 and secured thereto by

screws 37, the fingers 35 extending rearwardly from said plate beneath the link-hubs and thence upwardly in rear of the links.

Extending transversely beneath the key-levers 8 is a universal bar 38, which is hung by hooks 39 upon branches 40 of an arm 41, extending forwardly from a dog-rocker 42, said rocker having a returning-spring 43 and carrying both a feed-dog 44 and a detent-dog 45, which are adapted to coöperate, as usual, with a feeding-rack 46, mounted upon the usual platen-carriage. (Not shown.)

Forwardly of the platen is arranged a perforated type-guide 47, which is carried upon the free end of a downwardly and rearwardly curved arm 48, which is pivoted at 49 upon ears 50, rising from the top plate, and is also provided with a short arm 51, which extends rearwardly from the pivot 49 and is connected by a link 52 to the arm 41 of the dog-rocker, so that as the latter is vibrated by the key-levers through the universal bar 38 the type-guide is swung upwardly and rearwardly from its normal position and into proximity with the platen, so as to direct the types accurately to the printing-center. In its normal position, which is indicated by dotted lines at Fig. 2, the type-guide stands forwardly of and below the printing-point, so as to afford a full view of the line of writing.

Referring now to Figs. 6, 7, and 8, the forward and rear segments $33^a$ and $26^a$, in which are pivotally mounted the idle links 30 and the driving-arms $1^a$, are secured at their opposite ends by means of ears 53, cast upon the forward segment, ears 54, cast upon the rear segment, and screws 55 to cross-heads or plates 56. The cross-heads are provided with upper and lower laterally-projecting perforated ears 57 and 58, which engage a pair of vertical guide-rods 59, the lower ears 58 being formed upon arms 60, depending from the cross-head 56, and the guide-rods being fixed at their upper ends in opposite bosses 61 on the under side of the top plate and at their lower ends in opposite ears 62, cast upon the upper portions of the side walls of the base, said bosses 61 and ears 62 also serving to limit the vertical movements of the shifting frame as a whole.

Screw-studs 63, tapped into the lower ends of the depending arms 60, are engaged by the rear slotted ends of a pair of rocker-arms 64, which are secured by set-screws 65 and hubs 66 upon a transverse rock-shaft 67, which is journaled in the side walls of the base and has an operating arm or lever 68, provided at its forward end with a shift-key 69. Each type is provided with both lower-case and upper-case characters, the former printing when the shifting frame is in its normal position and the latter printing when the shifting frame is elevated, as illustrated at Fig. 7.

The upward movement of the segmental frame is produced by a depression of the key 69, which rocks the shaft 67, thus vibrating upwardly the arms 64 and lifting the segments. During the shifting movement the links 5 vibrate idly upon their forward pivots 70, the sublevers or bell-cranks and key-levers remaining stationary. It will be seen that the type-arms $1^a$ may be operated by the links 5 in both shift positions of the former.

In order that the types may be properly inked at their upper-case positions as well as at their lower-case positions, I connect the ink-pad case 20 to the shifting frame, and said case is preferably contained in a curved box or channel 71, which is connected by brackets 72 and screws 73 to the rear segment $26^a$. The ink-pad is thus caused to shift vertically with the types, and hence the latter are fully supplied with ink at all times. The box or trough 71 is open at its ends, so that the pad-case may be readily inserted endwise into the box and pushed longitudinally into position.

It will be seen that the ink-pad is curved and that its inking-face is concaved; that the type bars or carriers have a concave arrangement, and that the faces of the types project downwardly and outwardly and substantially radially from the printing-point and when in normal position are in contact with the concaved face of the pad.

Many changes may be made in details of construction and arrangement without departing from the spirit of the invention and portions of my improvements may be used without others.

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

1. In a type-writing machine, the combination with a platen of a type-bar, a key-lever, a bell-crank having a cam-slot and connected to both said key-lever and said type-bar, and a fulcrum for said bell-crank, said cam-slot being at an angle to the key-lever and so formed as to secure an easy start of the type-bar toward the printing-point and thereafter a materially-decreasing leverage of the key upon the type-bar.

2. In a type-writing machine, the combination with a platen, of a type-bar, a key-lever, a sublever pivoted upon said key-lever and connected to said type-bar, and a fulcrum for said sublever, one of said sublever and fulcrum elements having a cam-surface at an angle to the key-lever and so formed that the leverage of the key upon the type-bar is materially decreased during the printing stroke.

3. In a type-writing machine, the combination with a platen, of a type-bar, a key-lever, a sublever pivoted upon said key-lever and connected to the type-bar, and a fixed fulcrum for said sublever, one of said sublever and fulcrum elements having a cam-surface, one portion of the cam-surface being so constructed that during a large part of the printing stroke, said sublever has but little independent vibration upon said key-lever, and said cam-surface having also an abrupt por-

tion for causing the sublever to vibrate rapidly upon its pivot during the latter portion of the printing stroke.

4. In a type-writing machine, the combination with a platen, of a type-bar, a key-operated lever connected thereto, and a fulcrum or bearing for said lever, one of said lever and fulcrum elements having an irregular cam-surface, one portion of the cam-surface being constructed to effect a slow movement of the type-bar at the initial depression of the key, and another portion thereof extending in such a direction as to effect a rapid movement of the type-bar during the final portion of the key depression.

5. In a type-writing machine, the combination with a platen, of a type-bar, a key-lever, a sublever pivoted upon said key-lever and connected to said type-bar, and a fulcrum or bearing for said sublever, one of said sublever and fulcrum elements having an irregular cam-surface, one portion of said cam-surface extending in a direction crosswise of the key-lever so that at the initial portion of the key-stroke said sublever may vibrate slowly upon its pivot, and another portion of said cam-surface forming an abrupt bearing, so that at the terminal portion of the key-stroke said sublever is caused to vibrate rapidly on its pivot.

6. In a type-writing machine, the combination with a platen of a type-bar, a key-lever, a sublever pivoted upon the key-lever and connected to the type-bar, a fulcrum or bearing for said sublever, one of said sublever and fulcrum elements having an oblique cam edge, as 13, which is called into play at the beginning of the key-stroke, and an abrupt cam edge, as 14, which is called into play at the latter portion of the key-stroke.

7. In a front-strike writing-machine, the combination with a platen, of a series of rearwardly-striking type-bars, a series of key-levers, a series of sublevers pivoted upon the key-levers and connected to the type-bars, a transverse rod or bar 12, and cam-slots formed in the sublevers and engaging said rod or bar, each of said cam-slots having a working edge 13, which is called into play at the beginning of the key-stroke and is so formed as to effect a comparatively slow movement of the type-bar, and also having an abrupt working edge, as 14, which is called into play at the last portion of the key-stroke and effects a rapid movement of the type-bar.

8. In a front-strike writing-machine, the combination with a platen, of a series of rearwardly-striking type-bars, a series of key-levers, a series of sublevers pivoted upon the key-levers and connected to the type-bars, a rod or bar 12 extending transversely beneath the key-levers, and slots formed in the sublevers and engaging said rod or bar, each of said slots having an obliquely-inclined portion 13, which first works upon said rod or bar and also an abrupt portion 14 which engages said rod or bar during the final portion of the key-stroke.

9. In a front-strike writing-machine, the combination with a platen, of a series of rearwardly-striking type-bars, a series of driving-arms 4, a series of links 5 extending forwardly from said arms 4, a series of sublevers 6 to whose upper ends said links are attached, a series of key-levers 8 extending rearwardly beneath the type-bars, said sublevers being pivoted to the key-levers and having rearwardly and downwardly extending arms $6^a$, a bar extending transversely beneath the key-levers, and cam-slots in the arms $6^a$ for engaging said bar.

10. In a front-strike writing-machine, the combination with a platen, of a type, a type-carrier, arms upon which said carrier is pivoted, said arms being arranged radially of the common printing-center, one arm being pivoted at its rear portion and serving as a driver, and the other arm being pivoted at its lower end, an upwardly-extending bell-crank connected to said driving-arm, a horizontal key-lever connected to said bell-crank, and an ink-pad having a concaved inking-face with which the type normally contacts.

11. In a front-strike writing-machine, the combination with a platen, of a type, an angular carrier upon which said type is mounted, said carrier comprising a rearwardly-extending arm and an upwardly-extending arm, and being pivoted at its angle or elbow to the forward end of a pivoted driving-arm, and being also pivoted at its free end to the upper or inner end of a radially-arranged idle link, a segment upon which said driving-arms are mounted, a second segment upon which said idle links are mounted, connections from said driving-arms to a series of keys, and an inking-pad for the types.

12. In a front-strike writing-machine, the combination with a platen, of a type, an angular carrier upon which said type is mounted, said carrier comprising a rearwardly-extending arm and an upwardly-extending arm, and being pivoted at its angle or elbow to the forward end of a pivoted driving-arm and being also pivoted at its free end to the upper end of a radially-arranged idle link, a segment upon which said driving-arms are mounted, a second segment upon which said idle links are mounted, an inking-pad common to the types, links connected to the driving-arms, sublevers to which said links are attached, and key-levers connected to said sublevers.

13. In a front-strike writing-machine, the combination with a platen, of a curved ink-pad arranged forwardly of and below the platen, a segment arranged forwardly of said ink-pad, forwardly-extending driving-arms pivoted on said segment, a second segment arranged forwardly of the first, upwardly and inwardly directed radial links pivoted upon said second segment, an angular type-carrier

pivoted upon both said link and said driving-arm, a series of key-levers, a series of sublevers pivoted upon the key-levers, a fulcrum-rod for the sublevers, and links connecting the sublevers to said driving-arms.

14. In a front-strike writing-machine, the combination with a platen, of a series of type-bars each comprising a driving-arm, an idle link, and a type-carrier pivoted upon said driving-arm and idle link, a series of key-levers, a series of sublevers pivoted upon said key-levers and connected to said driving-arms, and a fulcrum or bearing for said sublevers, each of said sublevers having a cam-surface for engaging said fulcrum, and said cam-surface comprising both a portion 13 which effects a comparatively slow movement of the type-bar at the beginning of the key-stroke, and an abrupt portion 14 which effects a comparatively rapid motion of the type-bar during the latter portion of the key-stroke.

15. In a front-strike writing-machine, the combination with a platen, of a series of compound or link-motion type-bars arranged forwardly of and below the platen, an inking-pad, a series of key-levers extending rearwardly beneath the type-bars, and a series of upwardly-extending sublevers connected to the type-bars and to the key-levers.

16. In a front-strike writing-machine, the combination with a platen, of a series of compound or link-motion type-bars arranged forwardly thereof, each type-bar comprising an angular type-carrier, a driving-arm, and an idle link, a segment upon which said driving-arms are mounted, a second segment upon which said idle links are mounted, an inking-pad, a series of key-levers extending rearwardly beneath said type-bars, a series of sublevers pivoted upon said key-levers and extending upwardly, a series of links connecting said sublevers to said driving-arms, and a fulcrum-rod engaged by said sublevers and extending transversely beneath the key-levers.

17. In a front-strike writing-machine, the combination with a platen, of a series of type-carriers each having a plurality of types, arms upon which said carriers are pivoted, said arms being grouped radially of the common printing-center, a series of key-levers, a series of intermediate bell-cranks connected to the key-levers and to said arms, an inking-pad with which the types normally contact, and means for shifting said type-carriers and inking-pad while the key-levers remain at rest.

18. In a type-writing machine, the combination with a platen, of an up-and-down-shiftable frame arranged therebelow, a concaved inking-pad supported upon and shifting with said frame, a series of type-carriers on said frame and having a concaved arrangement matching substantially the form of the pad and having a plurality of types, the faces of which project downwardly and radially and normally rest in contact with said pad, a series of key-levers, a series of connections between said key-levers and said type-carriers, and means for shifting said frame.

19. In a type-writing machine, the combination with a platen, of an up-and-down-shiftable frame arranged therebelow, a concaved inking-pad supported upon and shifting with said frame, a series of type-carriers on said frame and having a concaved arrangement matching substantially the form of the pad and having a plurality of types, the faces of which project downwardly and radially and normally are in contact with said pad, a series of horizontal key-levers, a series of intermediate upwardly-extending bell-cranks connected to the key-levers and to said type-carriers, and means for shifting said frame while the key-levers remain at rest.

20. In a front-strike writing-machine, the combination of a platen, a shiftable frame, an inking-pad on said frame, a series of types each having a plurality of characters, the faces of said types normally lying against said inking-pad, means for turning the faces of said types and presenting them to the platen, a series of key-levers, a series of bell-cranks connected to the key-levers, a series of links connecting said bell-cranks to said type-turning means, and means for shifting said frame, said links vibrating idly during said shifting movement, thereby enabling said key-levers to remain at rest.

21. In a front-strike writing-machine, the combination of a platen, an inking-pad, a series of types, the faces of said types normally lying against said inking-pad, means for turning the faces of said types and presenting them to the platen, a series of key-levers, a series of bell-cranks connected to the key-levers, and a series of links connecting said bell-cranks to the said type-turning means.

22. In a front-strike writing-machine, the combination with a platen, of a vertically-shiftable frame having two segments, a series of driving-arms mounted in one of said segments, a series of idle links mounted in the other of said segments, a series of type-carriers pivoted upon said driving-arms and idle links, an inking-pad carried by said shiftable frame, and means for shifting said frame.

23. In a front-strike writing-machine, the combination with a platen, of a vertically-shiftable frame having two segments, a series of driving-arms mounted in one of said segments, a series of idle links mounted in the other of said segments, a series of type-carriers pivoted upon said driving-arms and idle links, an inking-pad carried by said shiftable frame, means for shifting said frame, and a series of key-levers fulcrumed upon a fixed part of the machine and connected to said driving-arms.

24. In a front-strike writing-machine, the combination with a platen, of a series of rearwardly-striking compound or link-motion type-bars, a shiftable frame upon which said type-bars are mounted, an ink-pad having a

concaved inking-face and carried by said shiftable frame, the types upon said type-bars normally contacting with said pad, a series of key-levers connected to said type-bars, and means for shifting said type-bar frame.

25. In a front-strike writing-machine, the combination with a platen, of two segments united by a cross-head, radial links or arms pivotally mounted upon said segments, type-carriers pivoted upon said links or arms, means for shifting said segments and cross-heads in an up-and-down direction, an inking-pad shifting simultaneously with the segments and cross-heads, and a series of key-levers mounted in a fixed portion of the machine and connected to said links or arms.

26. In a front-strike writing-machine, the combination with a platen, of segment $26^a$, segment $33^a$, cross-heads 56 uniting said segments, means for shifting and guiding said cross-heads, links or arms $1^a$ and 30 mounted upon said segments, type-carriers pivoted upon said links or arms, an inking-pad shifting with the type-carriers, and keys connected to the links or arms.

27. In a front-strike writing-machine, the combination with a platen, of a segment $26^a$, segment $33^a$ arranged forwardly thereof, driving-arms $1^a$ pivoted in the rear segment, idle links 30 pivoted in the forward segment, angular type-carriers pivoted at their elbows upon the arms $1^a$ and at their free ends upon the links 30, types upon said carriers, an inking-pad supported upon the segment $26^a$, cross-heads 56 uniting said segments, means for vertically shifting and guiding said cross-heads, links connected to said driving-arms, key-levers extending rearwardly beneath the segments, sublevers 6 pivoted upon said key-levers and attached to said links, and a fulcrum-rod 12 engaged by said sublevers.

28. In a front-strike writing-machine, the combination with a platen, of an up-and-down-shiftable frame, a series of key-operated compound type-bars mounted upon said frame, and a segmental trough or box 71 mounted upon said frame and shiftable therewith and open at an end to receive an ink-pad, so that the pad may be inserted endwise into the trough or box and pushed longitudinally into position therein.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York, this 7th day of March, A. D. 1901.

JACOB FELBEL.

Witnesses:
K. V. DONOVAN,
E. M. WELLS.