

No. 685,122.

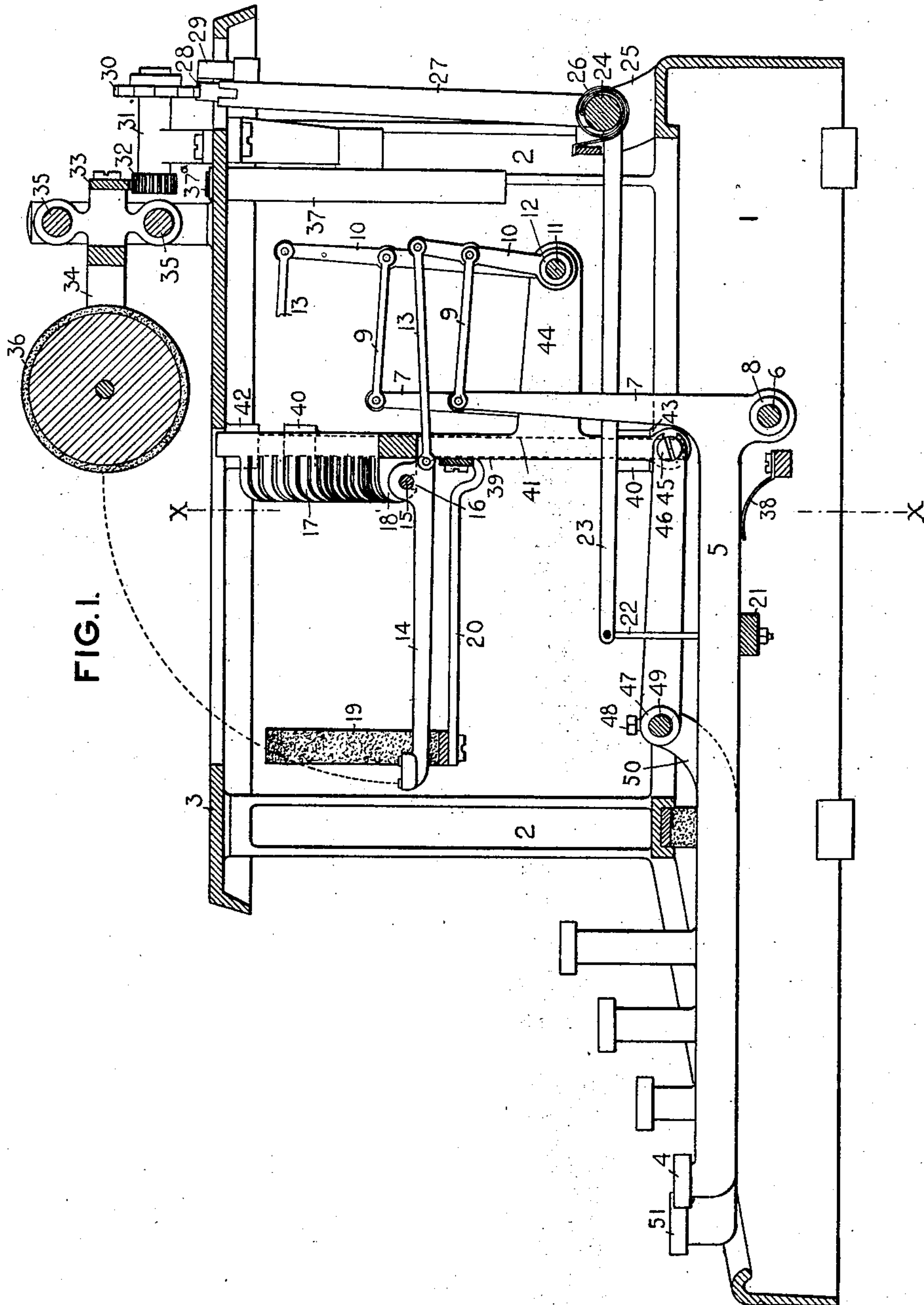
Patented Oct. 22, 1901.

J. FELBEL.
TYPE WRITING MACHINE.

(Application filed Feb. 11, 1901.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES:

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FIG. 2.

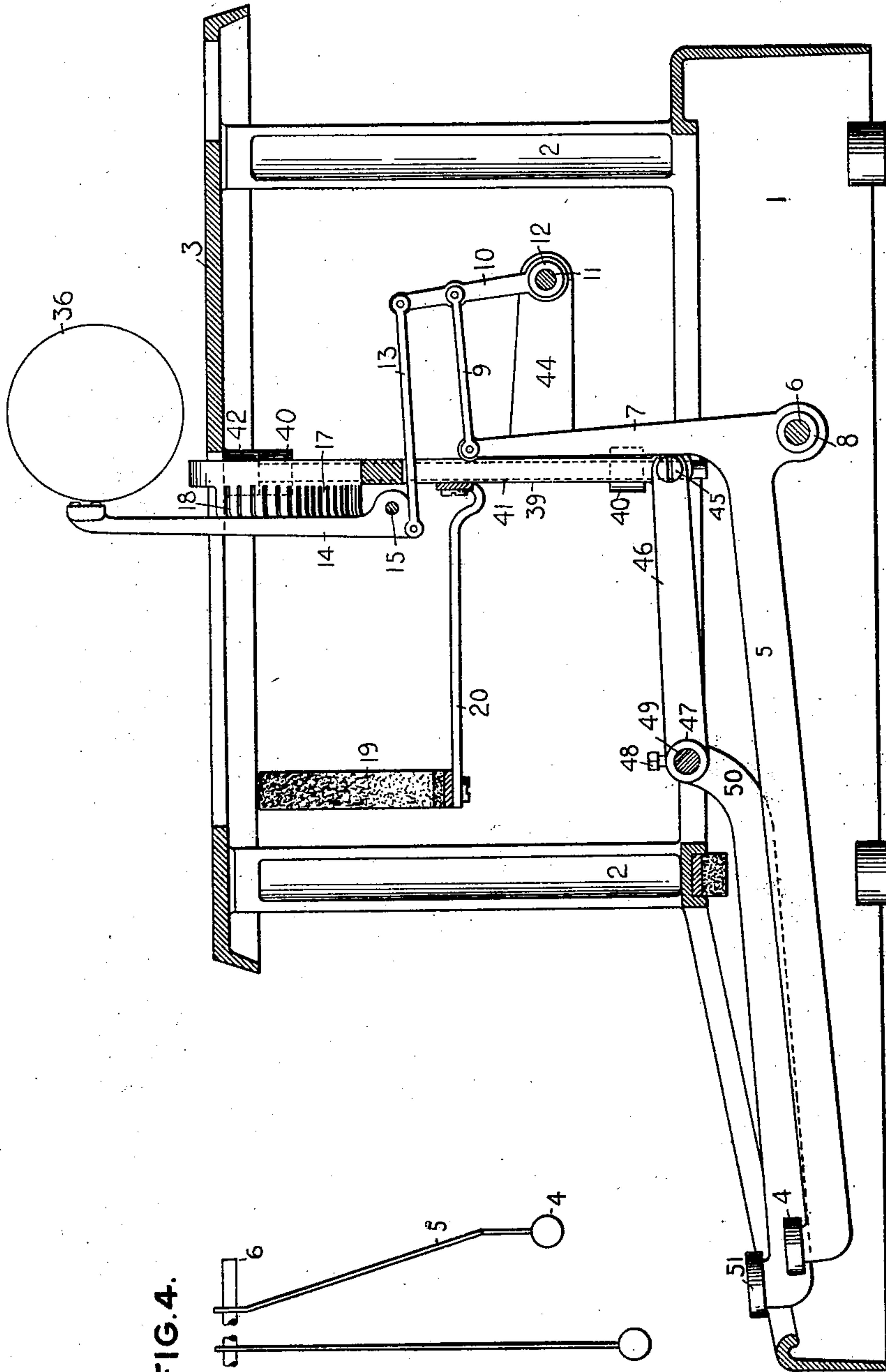
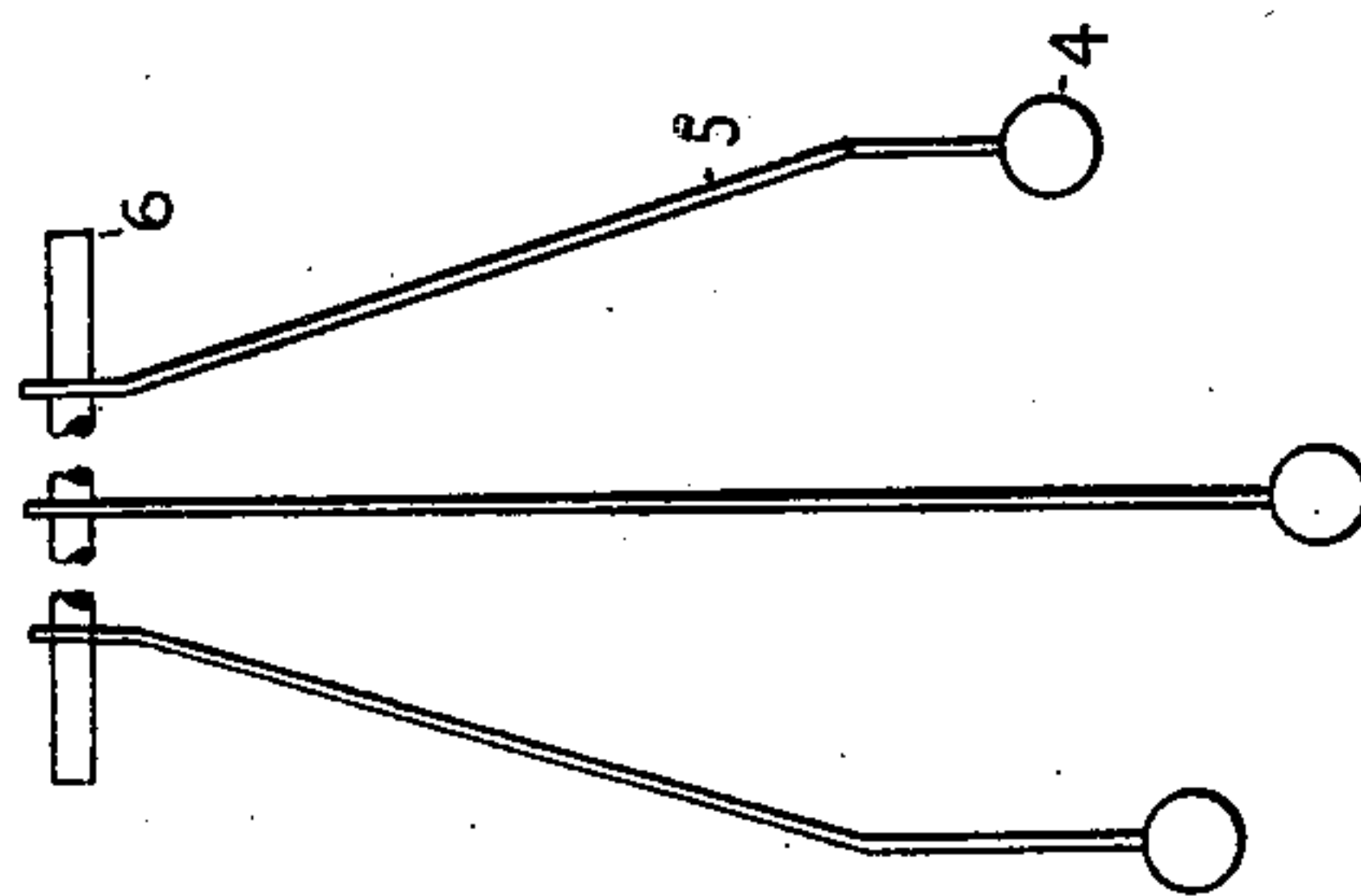


FIG. 4.



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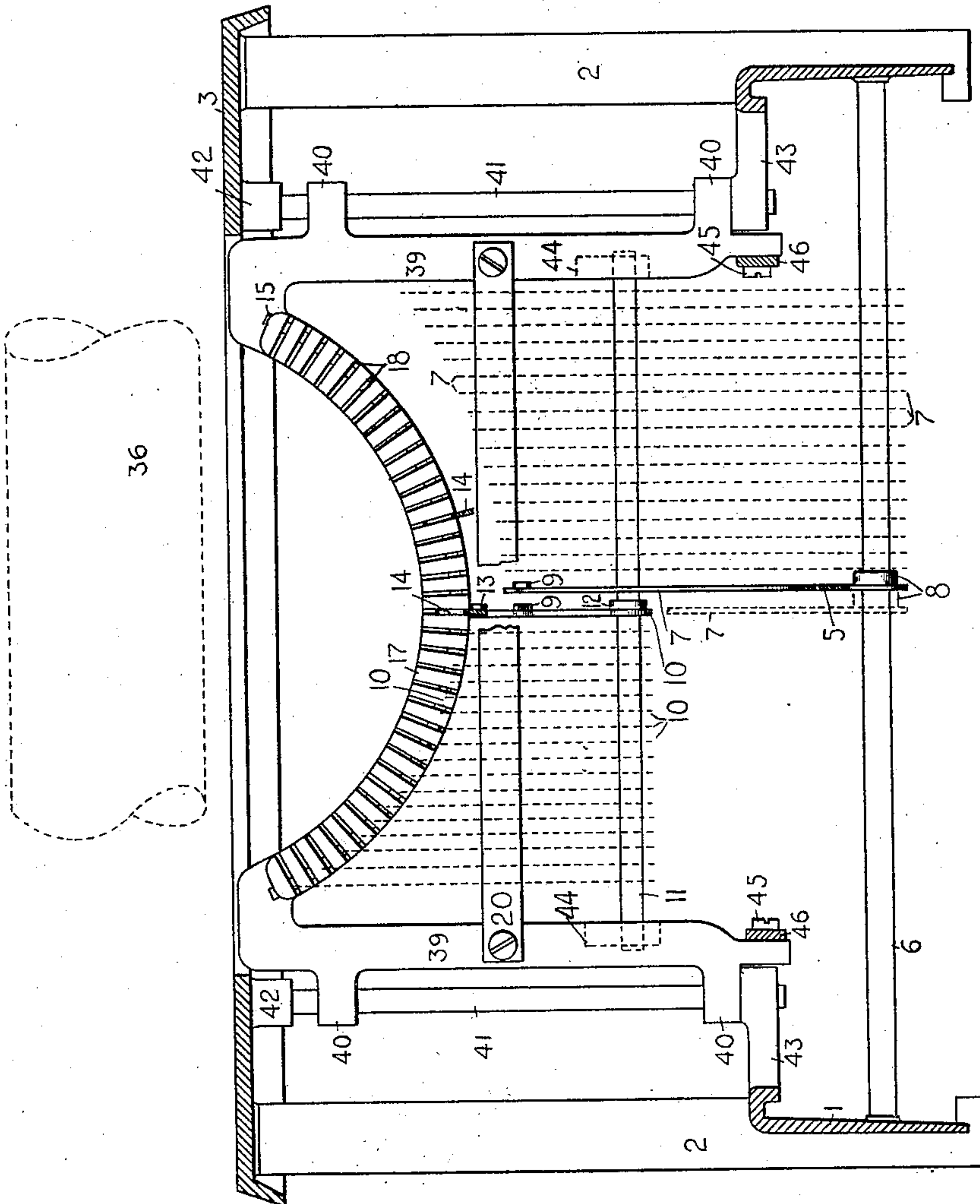
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FIG. 3.



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4 Sheets—Sheet 4.

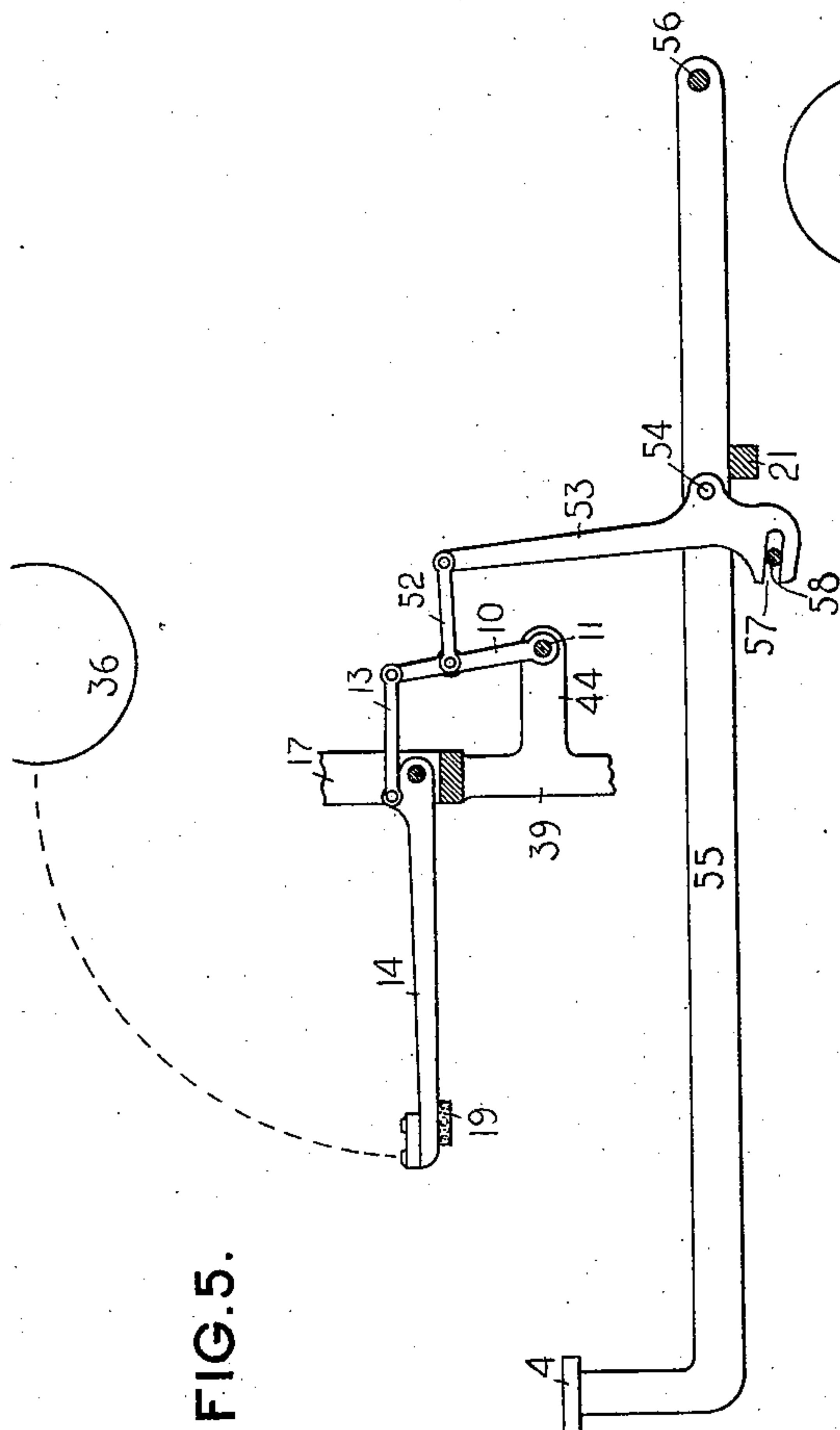


FIG. 5.

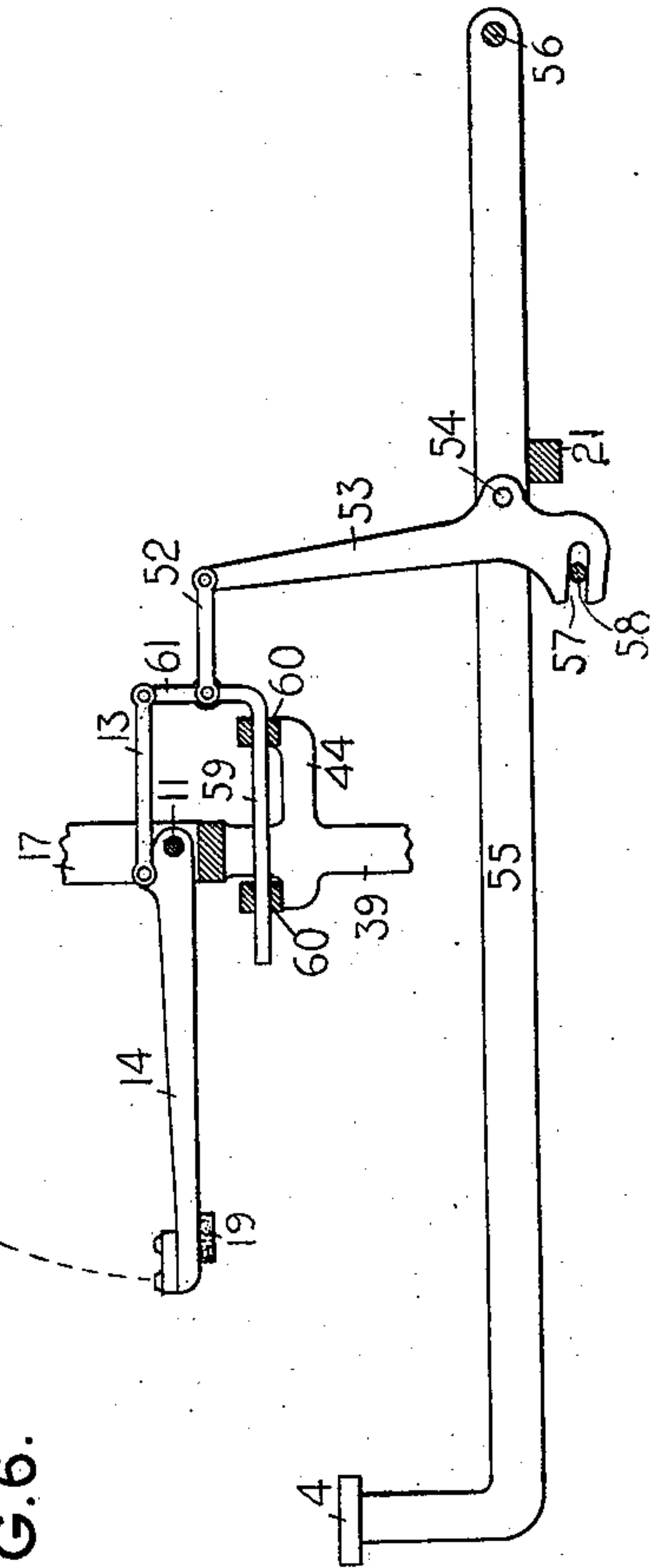
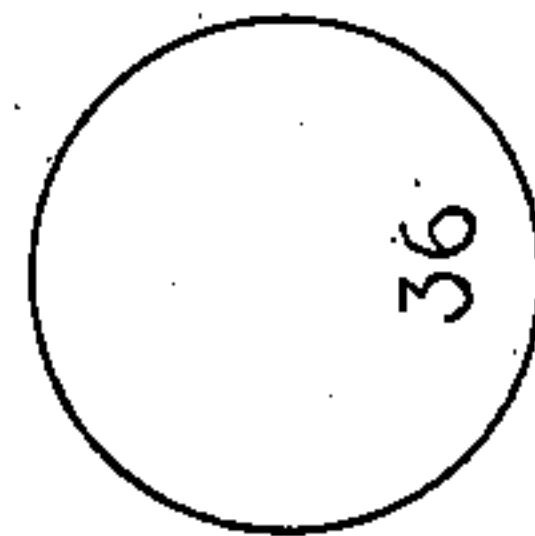


FIG. 6.

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UNITED STATES PATENT OFFICE.

JACOB FELBEL, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 685,122, dated October 22, 1901.

Application filed February 11, 1901. Serial No. 46,858. (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 and case-shift mechanisms of writing-machines.

The main object of the invention is to provide simple and efficient connections between the type-bars and the keys in machines in which the type-bars are shifted from lower-case to upper-case position.

The invention consists in certain combinations of devices, features of construction, and arrangements of parts, all as will be herein after fully set forth, and particularly pointed out in the concluding claims.

In the accompanying drawings, Figure 1 is a vertical section, taken longitudinally, of a front-strike writing-machine constructed in accordance with my improvements, showing the parts in normal position. Fig. 2 is a view similar to Fig. 1, but showing the system of type-bars as shifted to upper-case position and one of the type-bars as in printing position. Fig. 3 is a front sectional view taken just forwardly of the type-bar segment at about the line X X of Fig. 1. Fig. 4 is a diagram illustrating the fanning or diverging arrangement of the key-bearing bell-levers. Figs. 5 and 6 are views of modifications.

In the several views certain parts are omitted and others broken away to disclose the invention more clearly.

Similar parts are designated by similar numerals of reference.

The machine-frame comprises a base 1, corner-posts 2, and top plate 3. Keys 4 are borne by the forward ends of rearwardly-extending horizontal levers or arms 5, which are pivoted at their rear upon a transverse horizontal fulcrum-rod 6 and have at their rear ends upwardly-directed levers or arms 7, the latter, together with the arms 5, forming a system of bell-levers. These levers are spaced along the fulcrum-rod 6 by collars 8. To the tip of each arm 7 is pivoted the forward end of a rearwardly-extending link 9, whereby

said arm is connected to an upwardly-directed rocker arm or lever 10 of the third order. These levers or actuators 10 are pivoted at their lower ends upon a horizontal fulcrum-rod 11 and provided with spacing-collars 12. The upper ends of the levers 10, which, it will be noted, extend longitudinally of the arms or levers 7, are connected by forwardly-extending links 13 to the downwardly-extending short arms of rearwardly-striking radial type-bars 14, arranged over the key-bearing arms 5 and pivoted at their rear ends upon a curved fulcrum-wire 15, seated in a slot 16, formed in a segment 17, the latter being provided with radial slots 18, in which the type-bar hubs work. The type ends of the bars rest upon a cushion 19, which is supported by a forwardly-extending horizontal arm or frame 20, connected to the segment through downwardly-projecting bars 39 thereof. The system of vertical arms 7 is preferably of substantially the same width as the system of sublevers 10 and the system of type-bars 14, but of less width than the keyboard. Hence the arms 5 fan out or diverge forwardly from the rod 6 to the keyboard, as will be understood from Fig. 4, which illustrates the extreme right and left and central arms 5.

Beneath the system of key-levers 5 extends a transverse universal bar 21, which is hung by links 22 upon a pair of horizontal rocker-arms 23, mounted upon a rock-shaft 24, which is journaled upon opposite lugs 25, cast upon the base, said rock-shaft being provided with a returning-spring 26. Extending upwardly from said shaft is a rocker-arm 27, carrying at its upper end a feeding-dog 28 and a detent-dog 29, said dogs cooperating with escapement-wheel 30, which is mounted upon a bracket 31 and connected to a pinion 32. With the pinion meshes a rack 33, secured upon a carriage 34, which slides upon rails 35 and affords a traveling support for a platen 36. Said carriage is propelled by a spring-barrel 37, which is connected thereto by a strap 37^a.

Upon depression of any key its bell-lever is vibrated upon the rod 6, the upright arm 7 rocking forwardly and by means of the link 9 causing the sublever 10 also to rock forwardly, thus pushing upon the link 13 and swinging the type-bar up to print a lower-

case letter. At the same time the universal bar 21 is carried by the horizontal arm 5 of the bell-lever and through the links 22, arms 23, and upright rocker-arm 27 the feeding-dog 28 is moved out of engagement and the detent-dog 29 into engagement with the escapement-wheel. Upon relief of the key from pressure the dog-rocker is returned to normal position by the reaction of the spring 26 and in the usual manner the carriage is permitted to advance one step under the tension of the propelling-spring 37. At the same time the type bar and key return to normal position, partly under the influence of the dog-rocker spring 26 and partly by reason of the weight of the type-bar and key-lever, although, if desired, the latter may be provided with an individual returning-spring 38.

The segment 17 is provided at each end with integral downwardly-extending bars 39, which by means of perforated ears 40 may slide in an up-and-down direction upon vertical guide-rods 41, which are secured at their upper ends in bosses 42, formed upon the under side of the top plate and at their lower ends in inwardly-extending arms 43, cast upon the base, said arms normally sustaining the weight of the described frame 17 39 and the parts thereon and said bosses limiting the upward movements of the shifting frame. Extending rearwardly from the sliding arms 39 is a pair of horizontal arms 44, between which the sublevers 10 are confined and upon which the sublever fulcrum-rod 11 is mounted, so that when the segment is lifted said sublevers may rise bodily therewith. The lower ends of the sliding arms 39 are provided with screw-studs 45, with which engage the slotted rear ends of a pair of horizontal arms 46, which are fastened, by means of collars 47 and set-screws 48, upon a horizontal transverse rock-shaft 49, the latter being rocked by means of a forwardly-extending arm 50, provided with a shift-key 51. Upon depression of said key the shaft 49 is rocked and the rear ends of the arms 46 elevated, thereby pushing upwardly the shifting frame, together with the type-bars carried thereon, the sublevers 10, and the links 13. While the shift-key 51 is held down any of the type-keys 4 may be depressed and the capital types upon their connected type-bar caused to strike the platen, as illustrated at Fig. 2. Upon the relief of the shift-key 51 from pressure the shifting frame, type-bars, links 13, and sublevers 10 return by gravity to normal position.

During the shifting movements of the type-bars away from the key-levers the links 9 vibrate, their rear ends being carried upwardly by the sublevers 10, while their forward ends pivot on their key-levers 7, which remain motionless. Said links may, however, operate the type-bars at either shift position of the latter.

Since the type-bars, owing to their grouping in a curve about the common printing-

center, are supported at different heights, the forward ends of the type-bar links 13 are also necessarily arranged at different heights, and, if desired, the sublevers 10 may be made of gradually-increasing lengths, so as to support the rear ends of these links at gradually-increasing heights, whereby said links may be supported in substantial parallelism. The upright arms 7 of the key-levers may also be made of different lengths, it being desirable, however, that the links 9 connect the arms 7 to the sublevers 10 at such points that the dip of the keys may be uniform for the entire keyboard. To this end the rear attaching-points of said links may be gradually raised as the sides of the machine are approached, thereby compensating for the increasing length of the levers 10. At Fig. 3 the arms 7 and sublevers 10 are indicated by dotted lines, the arms 7 at the left-hand and the sublevers at the right-hand side of the machine being omitted. Thus it will be seen that the keys are connected to the type-bars by simple and freely-operating devices, while the type-bars are enabled to be readily shifted in order to bring the capital types to printing position.

Referring to Fig. 5, the shifting sublevers or type-bar actuators 10 are connected by rearwardly-extending pull-rods 52 to the upper ends of vertical levers 53, which are pivoted at 54 directly upon horizontal key-levers 55 of the second order, the latter being fulcrumed at their rear ends upon a fixed transverse rod 56. The levers 53 extend forwardly below the key-levers 55 and engage at their lower forked ends 57 a fixed transverse rod 58. Upon the depression of a key the lever 55 vibrates downwardly upon the pivot 56, while the upright lever 53 by reason of its engagement with the fixed rod 57 is caused to swing rearwardly, and thus through the links 52 pulls the actuator 10 rearwardly upon its pivot, which through the link 13 swings the type-bar up to print.

In the modification shown at Fig. 6 the vertically-shifting type-bar actuators are in the form of slides, each slide comprising both a horizontal arm 59, which has bearings 60 upon a shifting frame, and also an integral upright arm 61, which is connected by a link 52 to the bell-crank 53 and also by a link 13 to the type-bar 14. Upon the depression of a key the bell-crank 53 is swung rearwardly, and by means of the link 52 the actuator 59 61 is caused to slide rearwardly, thereby through the link 13 pulling the type-bar up to print.

The herein-described connections from the types to the keys may be employed whether or not the types are shifted, or sublevers or actuators of other design and differently connected to the type-bars may be mounted to shift therewith while connected to the keys.

Various other changes may be made within the scope of the invention.

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

1. In a front-strike writing-machine, the

combination of a platen, a series of rearwardly-striking type-bars mounted upon a shifting support, a series of actuators mounted upon said shifting support and connected to said type-bars, and a series of key-bearing levers connected to said shifting actuators.

2. In a front-strike writing-machine, the combination of a series of pivoted shiftable type-bars, a series of operating-links connected thereto, a series of actuators connected to said links and shiftable therewith and with said type-bars, a series of key-levers, and connections between said key-levers and said link-actuators.

3. In a front-strike writing-machine, the combination of a series of shiftable type-bars, a series of links connected thereto, a series of actuators connected to said links and shiftable therewith and with said type-bars, a series of key-operated levers, and a second series of links connected at one set of their ends to said levers and at the other set to said shifting actuators.

4. In a type-writing machine, the combination with a platen, of a system of shiftable type-bars, a system of key-levers, a system of shiftable sublevers connected to the type-bars and to the key-levers, and means for shifting the type-bars and sublevers toward and away from the key-levers.

5. In a front-strike writing-machine, the combination with a platen, of a system of rearwardly-striking shiftable type-bars, a system of key-levers, a system of shiftable sublevers connected to the type-bars and to the key-levers, and means for shifting the type-bars and sublevers vertically.

6. In a front-strike writing-machine, the combination with a platen, of a system of rearwardly-striking shiftable type-bars, upwardly-directed shiftable rocker-arms connected to the type-bars, key-bearing levers connected to rocker-arms, and means for shifting said type-bars together with said rocker-arms.

7. In a front-strike writing-machine, the combination with a platen, of a system of shiftable type-bars, a system of shiftable type-bar-operating levers connected to said type-bars, a system of key-operated levers extending longitudinally of the levers and connected thereto, and means for shifting the type-bars and levers.

8. In a front-strike writing-machine, the combination with a platen, of a system of rearwardly-striking shiftable type-bars, a system of key-bearing bell-levers, a system of shiftable sublevers connected to the type-bars and key-levers, and means for shifting the type-bars together with the sublevers.

9. In a front-strike writing-machine, the combination with a platen, of a system of rearwardly-striking shiftable type-bars, a system of upwardly-directed key-operated levers, a system of shiftable sublevers extending longitudinally of the levers, and means for shifting

said type-bars together with said sublevers.

10. In a type-writing machine, the combination with a platen, of a system of shiftable type-bars, a system of key-bearing levers, a system of shiftable sublevers, links connecting said sublevers to said key-levers, and means for shifting said type-bars together with said sublevers.

11. In a front-strike writing-machine, the combination with a platen, of a system of rearwardly-striking shiftable type-bars, a system of upwardly-directed key-operated levers, a system of upwardly-directed shiftable sublevers, links connecting said sublevers to said type-bars, links connecting said levers to said sublevers, and means for shifting said type-bars and sublevers.

12. In a front-strike writing-machine, the combination with a platen, of a system of rearwardly-striking shiftable type-bars, a system of key-bearing bell-levers having upwardly-directed arms, a system of shiftable sublevers of the third order arranged in rear of the type-bars and arms, links connecting the sublevers to the type-bars, links connecting the arms to the sublevers, and means for shifting the type-bars and sublevers.

13. In a front-strike writing-machine, the combination with a platen, of a system of rearwardly-striking shiftable type-bars, a system of key-bearing bell-levers, a system of sublevers connected to said type-bars and bell-levers, and means for shifting said type-bars and sublevers.

14. In a front-strike writing-machine, the combination with a platen, of a system of shiftable type-bars pivoted at their rear ends, a system of upwardly-directed shiftable sublevers of graduated lengths pivoted in line transversely of the machine and connected to said type-bars, a system of key-bearing bell-levers having upwardly-directed arms connected to said sublevers, and means for shifting said type-bars and sublevers.

15. In a front-strike writing-machine, the combination with a platen of a sliding frame, guiding devices whereon said frame may slide in up-and-down direction, a system of rearwardly-striking type-bars pivoted upon said frame, a system of key-operated levers also pivoted upon said frame and connected to the type-bars, and means for shifting said frame.

16. In a type-writing machine, the combination with a platen of a shiftable frame, a system of type-bars pivoted thereon, a system of levers pivoted upon said frame and connected to said type-bars, means for shifting said frame, and a system of key-bearing levers pivoted upon a fixed portion of the machine and connected to the levers upon said shiftable frame.

17. In a front-strike writing-machine, the combination with a platen of an up-and-down shiftable frame, a system of type-bars pivoted at their rear ends thereon, a system of

upwardly-directed levers fulcrumed upon said frame and connected to said type-bars, means for shifting said frame, and a system of key-bearing levers extending rearwardly beneath said type-bars and connected to the levers upon said frame.

18. In a front-strike writing-machine, the combination with a platen of a shiftable frame, a system of type-bars pivoted upon said frame, a transverse rod mounted upon said frame, a system of levers fulcrumed upon said rod, means for shifting said frame, and key-levers connected to the levers on said rod.

19. In a front-strike writing-machine, the combination with a platen of a shiftable frame, a system of type-bars pivoted upon said frame, a horizontal rod mounted transversely upon said frame, levers fulcrumed on said rod, means for shifting said frame, a fixed horizontal transverse rod, key-bearing bell-levers fulcrumed upon said fixed rod, and links connecting the levers upon the fixed rod to the levers upon the shifting rod.

20. In a front-strike writing-machine, the combination with a platen of a shifting frame comprising slides 39 and segment 17, type-bars 14 pivoted in said segment, arms 44 on said frame, fulcrum-rod 11 mounted in said arms, levers 10 arranged upon said rod and connected by links 13 to said type-bars, means for shifting said frame, and key-operated levers 7 connected by links 9 to the levers 10.

21. In a front-strike writing-machine, the combination with a platen of a series of rearwardly-striking type-bars, upwardly-directed levers 10, links 13 connecting said levers to said type-bars, upwardly-directed key-operated levers 7, and links 9 connecting levers 7 to levers 10.

22. In a front-strike writing-machine, the combination with a platen of a series of rearwardly-striking type-bars, upwardly-directed levers 10 arranged in rear of the type-bars, links 13 extending forwardly from said levers to said type-bars, upwardly-directed key-operated levers 7 arranged forwardly of said le-

vers 10, and forwardly-extending links 9 connecting levers 10 to levers 7.

23. In a front-strike writing-machine, the combination with a platen of a series of rearwardly-striking type-bars, a series of upwardly-directed levers of the third order connected thereto, and a series of key-bearing bell-levers having upwardly-directed arms which are connected by links to said levers of the third order.

24. In a front-strike writing-machine, the combination with a platen, of a series of rearwardly-striking radial type-bars, a series of upwardly-directed levers 10 of graduated lengths connected to said type-bars, links 9 attached to said levers at graduated distances from their fulcrums, and a series of upwardly-directed key-operated levers 7 connected to said links.

25. In a type-writing machine, the combination of a type-bar, a link connected thereto at one end, an actuator connected at one part to the other end of said link, a second link connected at one end to another part of said actuator, and a key-operated arm or lever to which the opposite end of said second link is connected.

26. The combination of a type-bar, a key-operated lever, an intermediate actuator, and a pair of substantially parallel links both connected to said actuator and one connected to the type-bar and the other to said key-operated lever.

27. The combination of a type-bar, a key-lever, a bell-crank, an actuator, a link connecting said actuator with the type-bar, and a second link connecting said actuator with said bell-crank.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York, this 9th day of February, A. D. 1901.

JACOB FELBEL.

Witnesses:

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