

No. 668,743.

Patented Feb. 26, 1901.

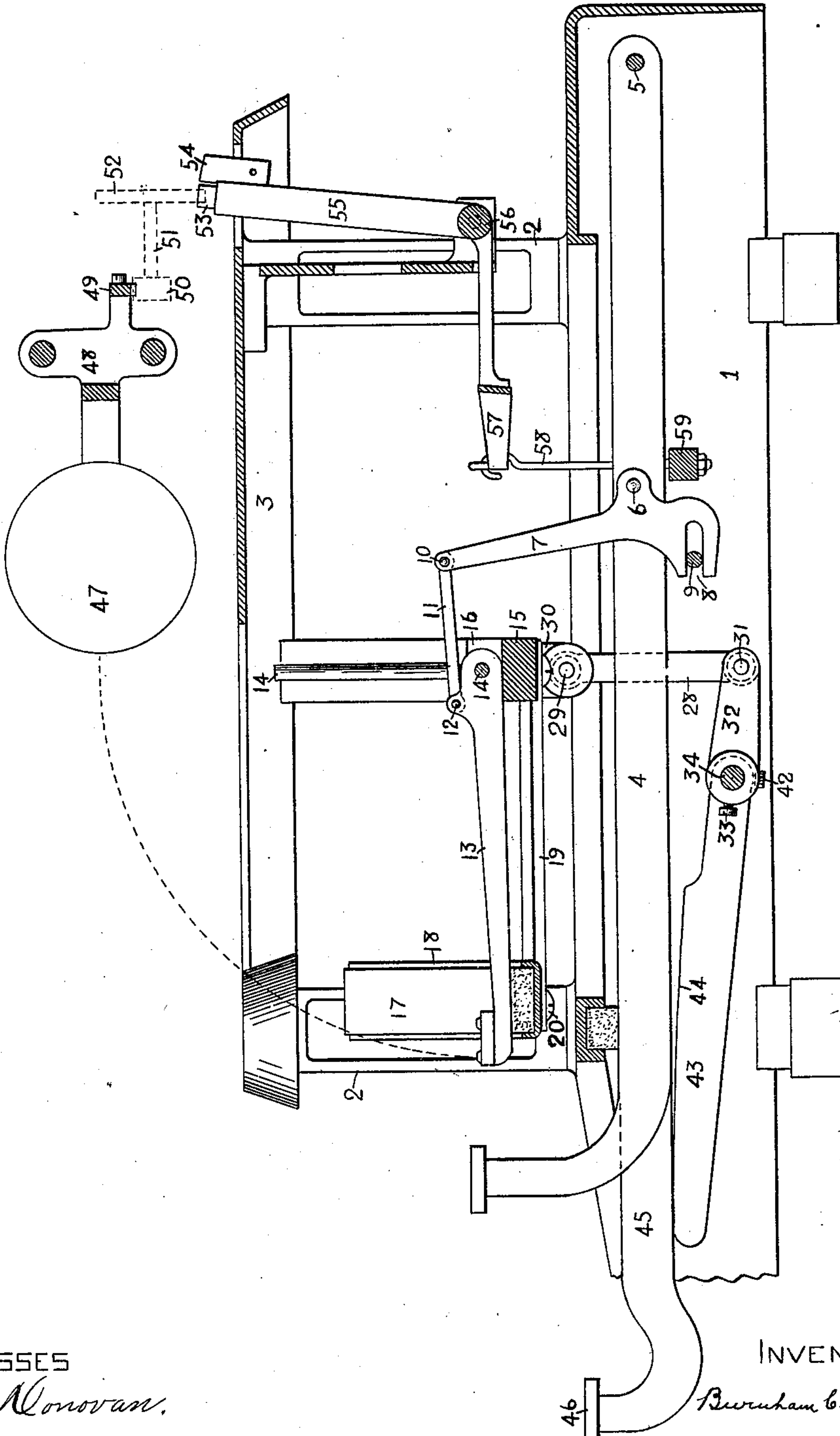
B. C. STICKNEY.  
TYPE WRITING MACHINE.

(Application filed Sept. 12, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



WITNESSES  
*K. V. Donovan.*  
*E. W. Wells.*

INVENTOR  
*Burnham C. Stickney*  
By *Jacob Felbel*  
HIS ATTORNEY

**No. 668,743.**

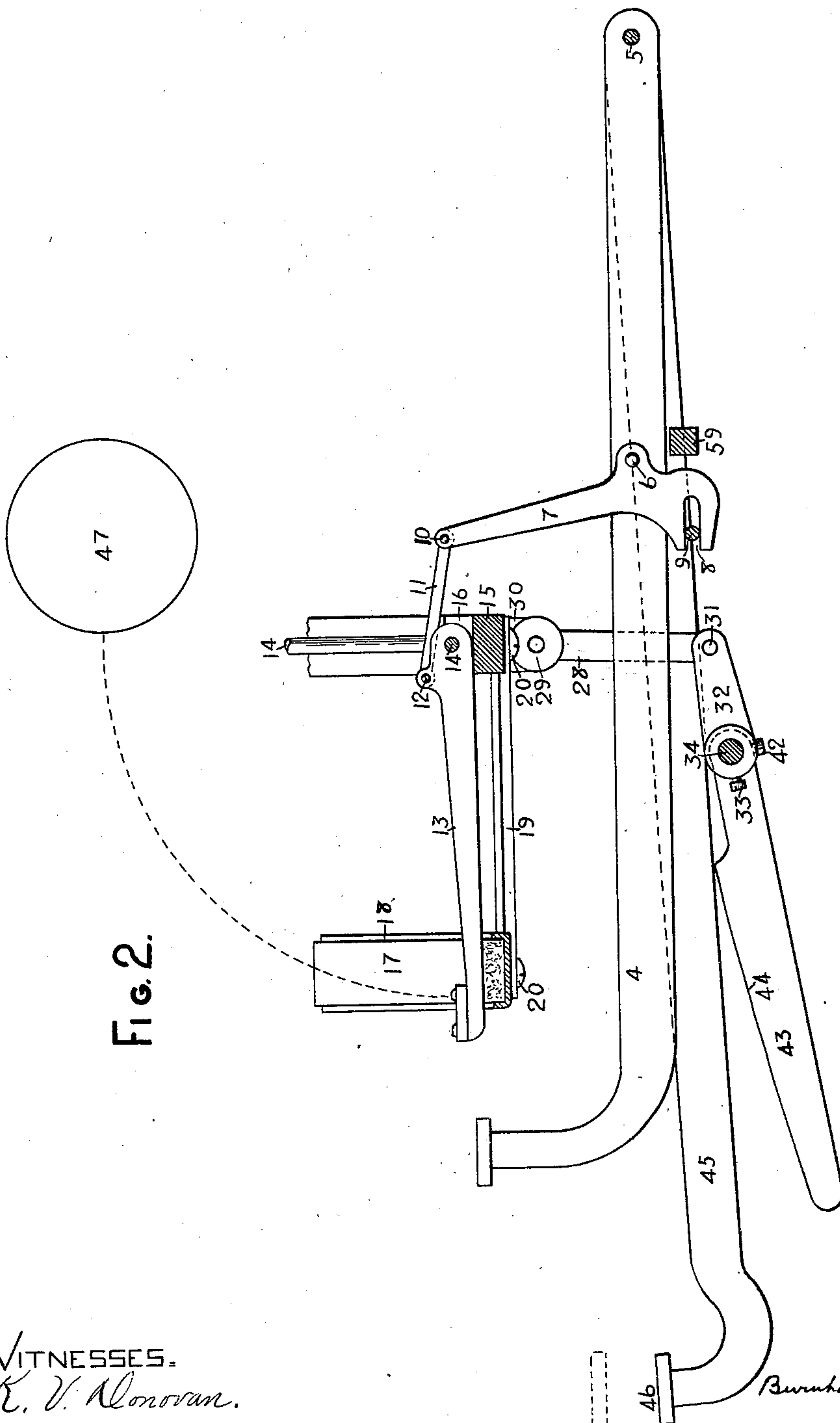
**Patented Feb. 26, 1901.**

**B. C. STICKNEY.**  
**TYPE WRITING MACHINE.**

(Application filed Sept. 12, 1900.)

(No Model.)

**3 Sheets—Sheet 2.**



WITNESSES.  
K. V. Donovan.  
E. M. Wells.

INVENTOR:  
*Burnham C. Stickney*  
by *Jacob Felbel*  
HIS ATTORNEY

No. 668,743.

Patented Feb. 26, 1901.

B. C. STICKNEY.  
TYPE WRITING MACHINE.

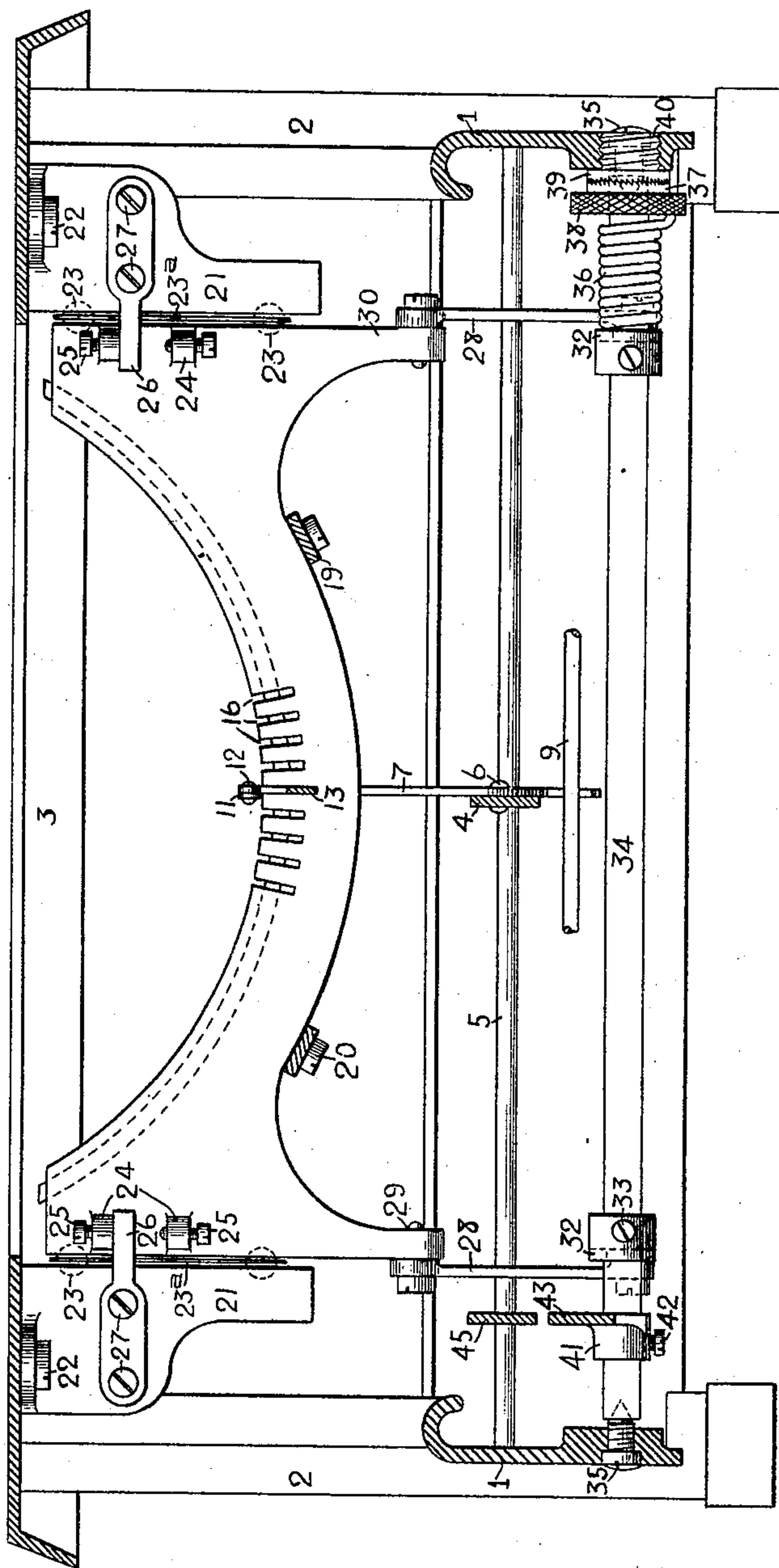
(Application filed Sept. 12, 1900.)

(No Model.)

3 Sheets-- Sheet 3.

Fig. 3.

47.



WITNESSES.

*K. V. Donovan.*

*E. M. Wells.*

INVENTOR.

*Burroughs C. Stickney.*

*by Jacob Felbel.*

HIS ATTORNEY



# UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO JACOB FELBEL, OF NEW YORK, N. Y.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 668,743, dated February 26, 1901.

Application filed September 12, 1900. Serial No. 29,758. (No model.)

*To all whom it may concern:*

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to the key-operated case-shifting mechanism of type-writing machines; and its object is to render the touch of the shift-key more agreeable than heretofore and to enable the shifting mechanism to operate more promptly.

Heretofore it has been the general practice to connect the shift-key to the shifting platen or to the shifting type-bars in such a manner that the speed of the shifting mass corresponds or is uniform with the speed of the shift-key, so that when the key is put suddenly in motion the shifting mass must also start suddenly, and owing to the inertia of the latter the resistance to the finger touch is very great. Hence the key must be depressed more slowly than is desirable in rapid work in order to avoid injury to the finger of the operator.

My invention consists in certain combinations of devices, arrangement of parts, and features of construction whereby a key may be given a sharp blow and the shifting mass move promptly to effect the shift without injury to the finger of the operator, all as will be more fully hereinafter set forth, and particularly pointed out in the concluding claims.

In the accompanying drawings, Figure 1 is a longitudinal central vertical section of a front-strike type-writing machine invented by Jacob Felbel and embodying my present improvements, the parts being shown in normal position. Fig. 2 is a skeleton view similar to Fig. 1, but showing the shift-key depressed and the types in position to print capital letters; and Fig. 3 is a front elevation of the machine, partly in section.

In the several views parts are omitted or broken away to more clearly disclose the invention, and similar parts are designated by similar numerals of reference.

The frame of the machine comprises a rectangular open base 1, corner-posts 2, rising

therefrom, and a top plate 3, supported upon the posts. Horizontal type key-levers 4 are pivoted at their rear ends to a horizontal transverse rod 5, fixed in the rear portion of the base. Pivoted at 6 to each key-lever, between the ends thereof, is an upright bell-crank 7, one arm whereof extends downwardly and forwardly and is slotted horizontally at 8 to fork a fixed horizontal fulcrum-rod 9, and the other arm whereof extends upwardly and its free upper end is pivoted at 10 to the rear end of a horizontal link 11, the forward end of the latter being pivoted at 12 to a horizontal type-bar 13. The type-bars are pivoted at their rear ends upon a curved fulcrum-rod 14 and strike upwardly and rearwardly. The fulcrum-rod is seated in a curved slot which is cut in a segment 15, the latter being also radially slotted at 16 to receive the hub ends of the type-bars. The free ends of the latter rest normally upon a pad 17, which is carried in a curved support 18, fixed upon the forward ends of a pair of horizontal arms or brackets 19, whose rear ends are secured by screws 20 to the said segment. Each of the type-bars is provided with a plurality of types, the types in the forward or outer set, or those farther removed from the type-bar pivots, being lower-case and striking the platen in the normal position of the shift mechanism and those of the inner set being upper-case.

The segment 15, together with the system of type-bars and the type-basket, is shiftable vertically, the links 11 vibrating upon the pivots 10 to accommodate the type-bar shift movement. The segment is guided in its vertical movements by means of depending brackets 21, which are secured by screws 22 to the under side of the top plate. Bearing-balls 23 in ball-separators 23<sup>a</sup> are interposed between the adjacent grooved faces of the segment and the brackets 21. Upon the segment are provided ears 24, which carry adjusting-screws 25, the latter being adapted to contact with arms 26, secured by screws 27 to the front faces of the brackets 21, thereby limiting the vertical movements of the segment and type system.

The mechanism for shifting the segment comprises a pair of vertical links 28, whose



upper ends are pivoted at 29 to arms 30, depending from the segment and cast integral therewith, and whose lower ends are pivoted at 31 to the rear ends of horizontal levers or arms 32, which are secured by means of hubs and set-screws 33 to a horizontal transverse rock-shaft 34. This shaft is pivoted at its ends upon pointed screws 35, of which the left-hand one is tapped into the side wall of the base 1. A spring 36 is coiled around the shaft at its right-hand end, one end of the spring catching under the right-hand arm or lever 32 and the other end thereof engaging a crown-ratchet 37, which is mounted loosely upon the end of the shaft 34 and is provided with a finger-wheel 38. A coacting crown-ratchet 39, provided with a threaded shank 40, is screwed against the inner vertical face of the said wall of the base. The purpose of the spring 36, which has a constant tendency to lift the segment, is to partially counterbalance the weight of the shifting mass and hence assist in the operation of raising the latter. The spring is made adjustable, so as to sustain as much as possible of the weight without rendering the return movement of the segment too sluggish. The right-hand pivot-screw 35 engages a threaded hole formed axially in the screw-shank of the fixed crown-ratchet 39.

At a point between the left-hand arm 32 and the side wall of the base there is fixed upon the rock-shaft 34 by means of a hub 41 and set-screw 42 a forwardly-extending operating-lever 43, whose upper edge is curved convexly at 44, and arranged directly over said lever and parallel therewith is a lever 45 of the second order, bearing at its forward end a shift-key 46 and pivoted at its rear end upon the fulcrum-rod 5. The lower edge of said key-lever is straight and horizontal and bears upon the forward end of the lever 43 when the latter is in normal position, as illustrated at Fig. 1, the tread 44 of said lever curving downwardly and rearwardly from the original contact-point between said levers.

The platen is designated as 47 and is supported upon any suitable carriage 48, which may be provided with a rack 49 to engage a pinion 50, the latter being connected by a shaft 51 to an escapement-wheel 52. The carriage may be provided with the usual propelling-spring, and its movements may be controlled by escapement-dogs 53 and 54, the latter being normally out of engagement with the wheel 52 and both being carried upon the upright arm 55 of a rocker pivoted at 56 in the framework of the machine and carrying a horizontal arm 57, the latter being connected by means of hooks 58 to a horizontal universal bar 59, extending transversely beneath the type key-levers.

In operation when a type key-lever 4 is depressed the downward movement of the pivot 6 thereon causes the downwardly-extending arm of the bell-crank 7 to turn upon the ful-

crum-rod 9, so that the upwardly-extending arm of said bell-crank is swung rearwardly and through the link 11 causes the type-bar to swing to the printing-point, the outer or lower-case type thereon making an impression, as indicated by a dotted curve at Fig. 1. At the same time the universal bar 59 is engaged by the key-lever and carried down, thereby operating the dog-rocker 55 to effect the first part of the operation of the feed mechanism in the usual manner. When the key is released, the parts resume their normal positions, owing to the action of gravity, assisted by the reaction of the usual dog-rocker spring, (not shown,) and during this movement the second part of the operation of the feed mechanism is effected and the carriage is advanced a step under the tension of its propelling-spring. When it is desired to write a capital letter, the key 46 is depressed, and the lever 45 is thereby caused to force down the lever 43, whereby the shaft 34 is rocked and the arms 32 lifted, pushing up the links 28 and the segment, including the entire type-bar system, as well as the forward ends of the links 11. While said shift-key is held depressed, the type-keys may be operated in the usual manner; but the lower or capital types—that is, those nearest the pivots or the type-bars—will strike the platen, as indicated at Fig. 2. Upon release of the shift-key 46 the type-bars and the segment drop together to normal position against the opposition of the spring 36. During the downward movement of the lever 43 about the axis 34 the curved tread 44 assumes different angular positions, so that different parts thereof are successively uppermost and are hence engaged by the lower edge of the key-lever 45, or, in other words, the point of contact between the two levers constantly moves rearwardly, so that, while at first the contact occurs at the forward end of the lever 43, at the end of the key-stroke the contact occurs at the rear end of the tread 44, as shown at Fig. 2. The purchase or leverage of the shift-key is thus greatest at the beginning of its downward stroke, so that a very slight pressure thereon will put the mass of type-bars, segment, &c., into motion. In other words, the shifting mass is gradually put into motion, even if the shift-key be given a sharp blow. As the key descends the leverage constantly decreases, owing to the rolling or creeping of the lower edge of the lever 45 upon the tread 44, so that the speed of the shifting mass constantly increases relatively to the movement of the shift-key, and hence at the last part of the key-stroke the speed of the shifting mass is comparatively great. The increased resistance due to the decreasing leverage is not, however, noticed by the operator. It will be perceived that the comparatively great dip of the key at the beginning of the stroke, whereby only a slight movement of the shifting segment is effected, is compensated by the comparatively rapid



movement of the segment at the end of the stroke—that is to say, the last part of the key-stroke effects a relatively great movement of the segment, and hence the dip of the key is not excessive and need not be in practice any greater than the usual dip. By reason of this construction the operator may touch the shift-key as sharply as the type-keys without experiencing an unpleasant sensation, and hence the speed of the operation of the shift mechanism may be increased. It is customary to hold down the shift-key at times while several of the upper-case characters are being printed; but it will be understood that no perceptibly greater exertion than heretofore is required on the part of the operator in doing this, although the finger-purchase is very small when the key is down. When the shift-key is released, the weight of the descending parts materially aids in a quick return of the key to normal position, since at the beginning of the downward movement of the segment its leverage upon the finger-key is greatest, and hence it assists the operator materially in effecting an upward movement of the finger. Thus it will be seen that not only is the touch of the shift-key rendered much more agreeable than heretofore, but also that both the downward and return strokes of the keys may be effected much more promptly.

Various changes may be made in details of construction and arrangement of parts without departing from the gist of my invention.

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

1. In a type-writing machine, the combination with a platen and a series of type-bars each provided with a plurality of types, of a case-shifting mechanism, including a key-lever and a lever contacting therewith and operated thereby, said levers being so constructed and arranged that the purchase of the first lever upon the second decreases during the key-stroke.

2. In a type-writing machine, the combination with a platen and a series of type-bars each provided with a plurality of types, of a case-shifting mechanism, including a key-lever and a lever provided with a curved edge contacting with said key-lever, the construction and arrangement being such that upon being depressed said key-lever rolls or creeps along the curved edge upon the other lever, whereby the purchase of the first lever is decreased.

3. In a type-writing machine, the combination with a platen, of a series of type-bars provided with a plurality of type, and a case-shifting mechanism, including a key-lever and a device upon which said key-lever bears and along which it rolls or creeps during the key-stroke, for the purpose of decreasing the purchase or leverage of the shift-key upon the shifting mass.

4. In a front-strike type-writing machine, the combination with a platen, of a series of type-bars, a segment upon which they are pivotally supported, and mechanism for shifting said segment, said shifting mechanism including a key-lever and a device upon which said key-lever bears and along which it rolls or creeps during the key-stroke for the purpose of decreasing the leverage.

5. In a front-strike type-writing machine, the combination with a platen, of a series of type-bars, a segment upon which they are pivoted, a rock-shaft, arms secured upon the shaft and connected to the segment at each side thereof, an operating-arm also secured to the shaft, and a key-lever bearing upon said operating-arm, said key-lever and operating-arm being constructed for a rolling or creeping contact during their combined operation, whereby the purchase of said key-lever is decreased.

6. In a front-strike type-writing machine, the combination with a platen and a series of type-bars, of a segment to which the latter are pivoted, a transverse rock-shaft operatively connected to said segment, an arm extending forwardly from said rock-shaft and provided with a curved upper edge, and a key-lever arranged over said arm and bearing upon said upper edge and constructed to roll or creep along the latter during the shifting operation.

7. In a front-strike type-writing machine, the combination with a platen and a series of type-bars each provided with a plurality of types, of a shifting mechanism constructed and arranged to be returned to a normal position by gravity and including two contacting operating-levers, one constructed to roll or creep along the other during the shifting operation for the purpose of decreasing the purchase of the shift-key, and a spring constructed to cooperate with the shift-key to lift the shifting mass.

8. In a front-strike type-writing machine, the combination with a platen, of a series of type-bars, a segment to which they are pivoted, mechanism for shifting said segment and type-bars upwardly, said mechanism including two contacting operating-levers, one constructed to roll or creep upon the other during the shifting operation to reduce the purchase of the shift-key, and a spring constantly tending to lift said segment.

9. In a front-strike type-writing machine, the combination with a platen, of a series of type-bars, a segment to which they are pivoted, mechanism for shifting said segment and type-bars upwardly, said mechanism including two contacting operating-levers, one constructed to roll or creep upon the other during the shifting operation to reduce the purchase of the shift-key, a spring constantly tending to lift said segment, and means for adjusting the tension of said spring.

10. In a front-strike type-writing machine, the combination with a platen, of type-bars 13, segment 15, shaft 34, rocker-arms 32, lever 43 having a curved upper edge 44, contacting key-lever 45, and spring 36.

11. In a type-writing machine, the combination with a platen and a series of types adapted to have a simultaneous upward movement, of two levers connected to shift said types upwardly and constructed to have a rolling or creeping contact, whereby the lev-

erage of one upon the other is decreased during the depression of the shift-key.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York, this 4th day of September, A. D. 1900.

BURNHAM C. STICKNEY.

Witnesses:

WM. E. COOK,  
K. V. DONOVAN.