

No. 827,805.

PATENTED AUG. 7, 1906.

G. M. KITZMILLER.
TYPE WRITING MACHINE.
APPLICATION FILED JUNE 18, 1902.

2 SHEETS-SHEET 1.

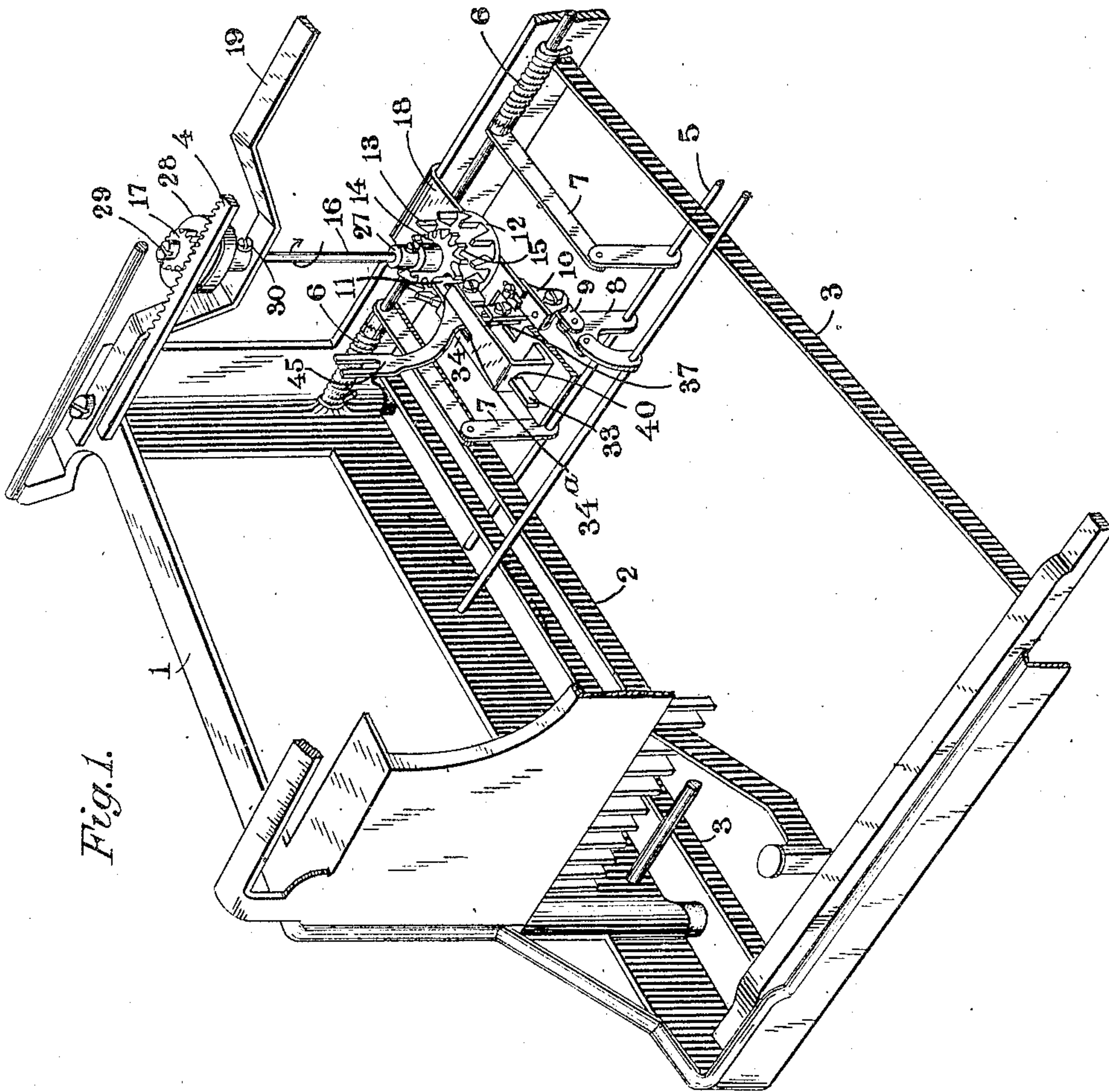


Fig. 1.

WITNESSES

Frank A. Howell.
Charles S. Howell

INVENTOR

George M. Kitzmiller

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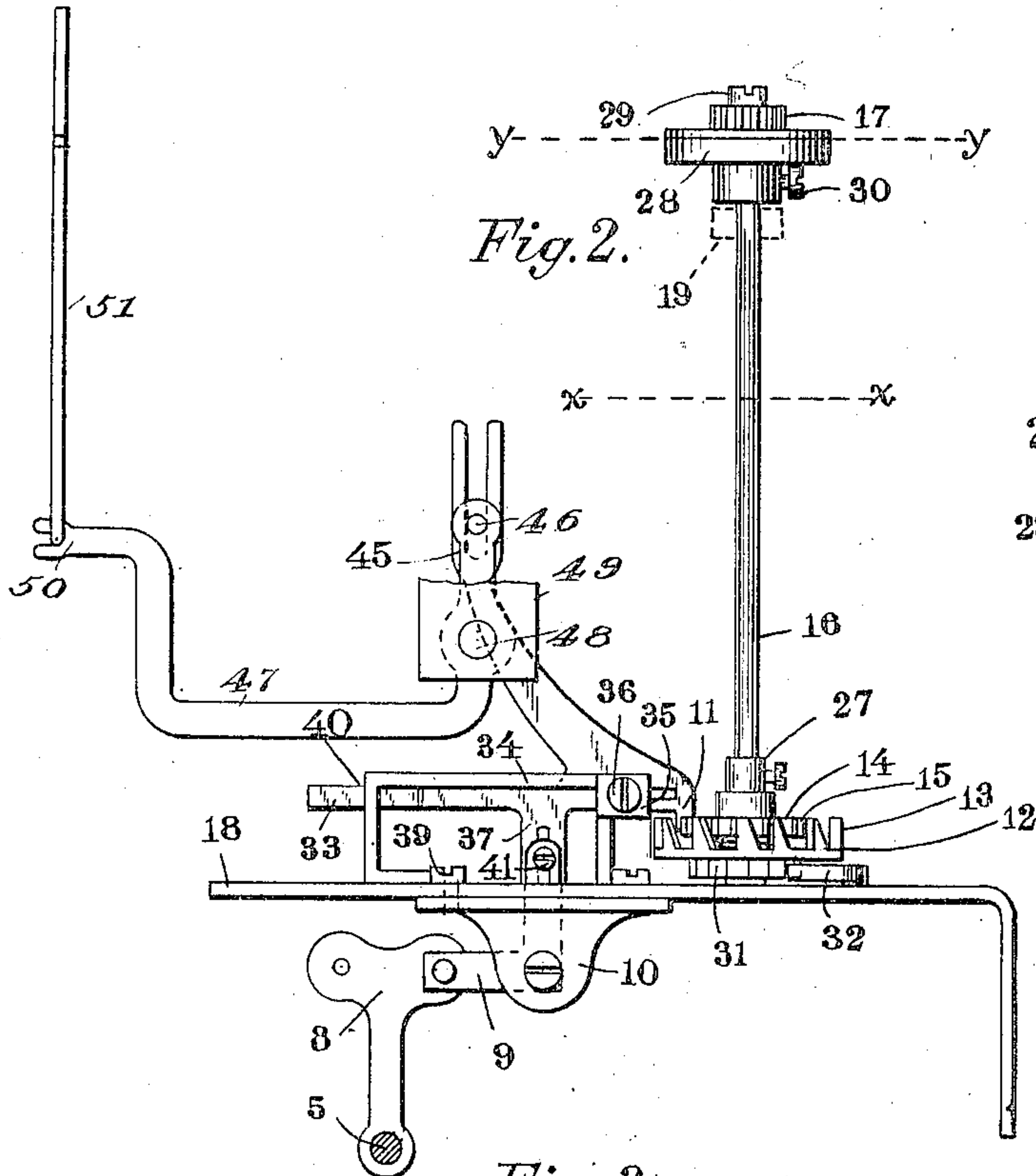


Fig. 2.

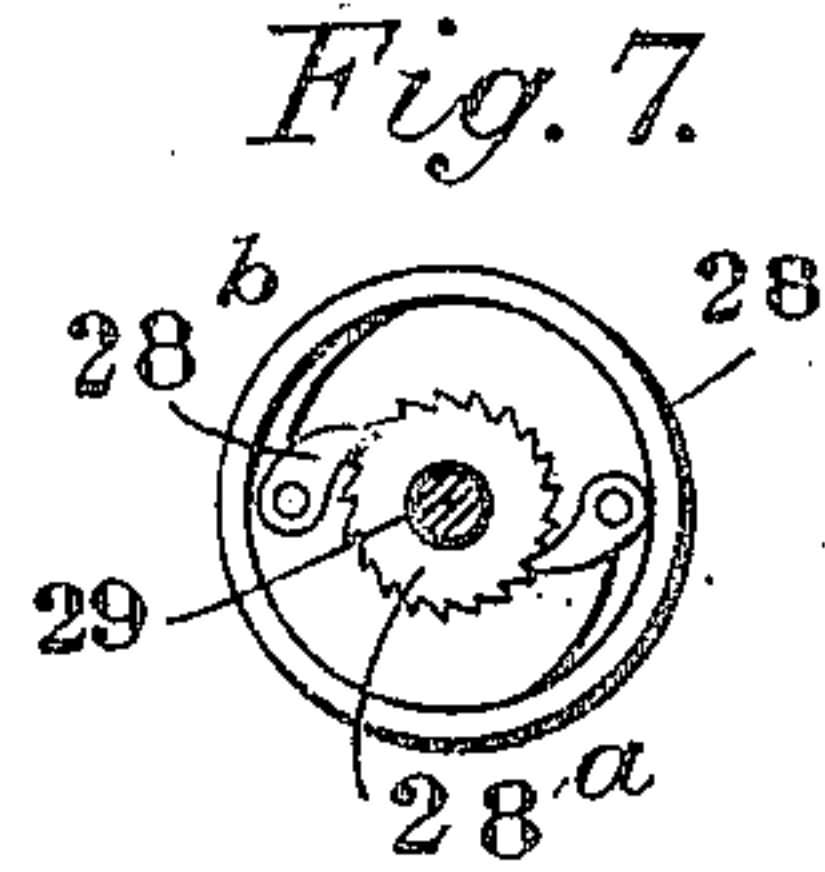


Fig. 7.

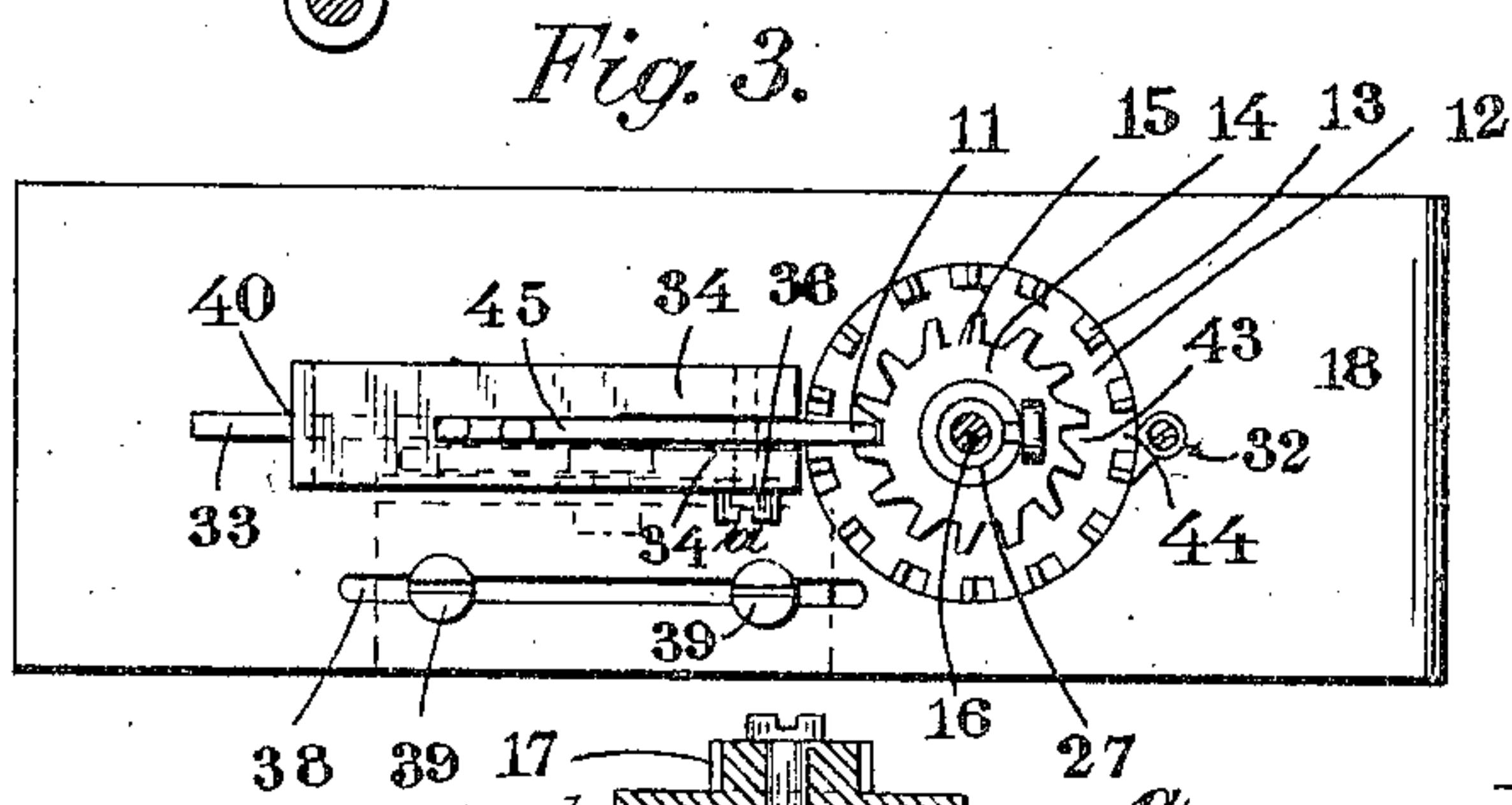


Fig. 3.

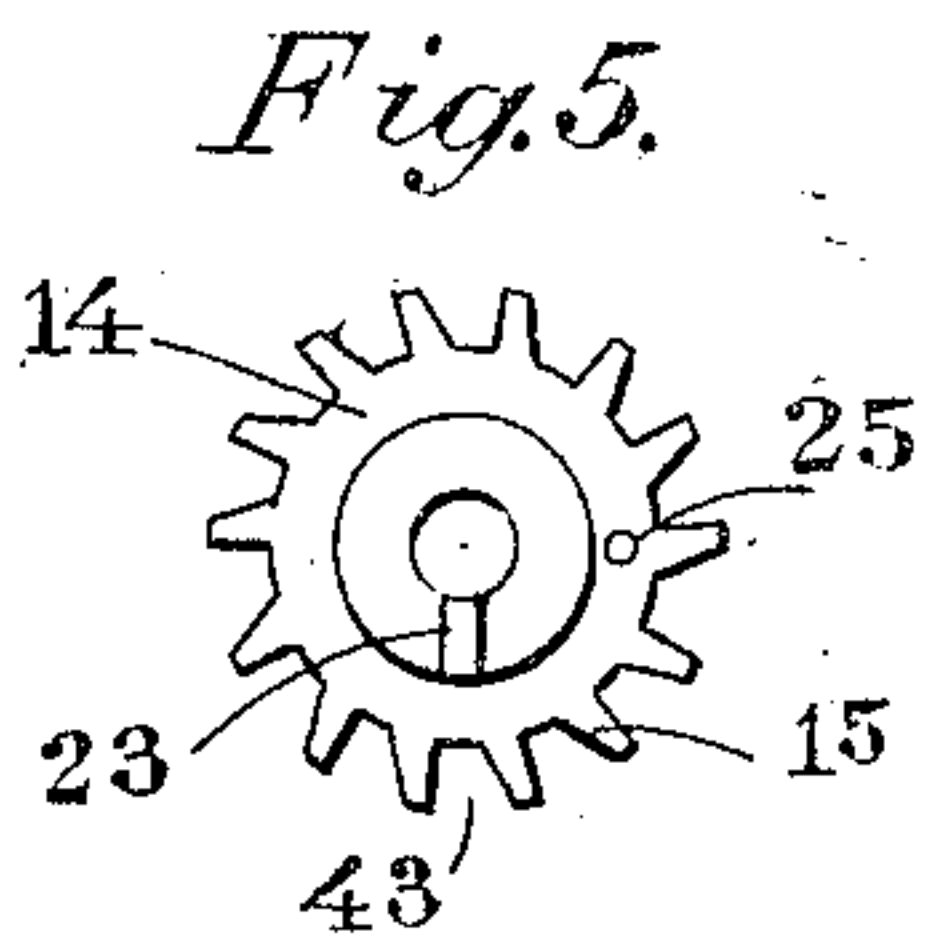


Fig. 5.

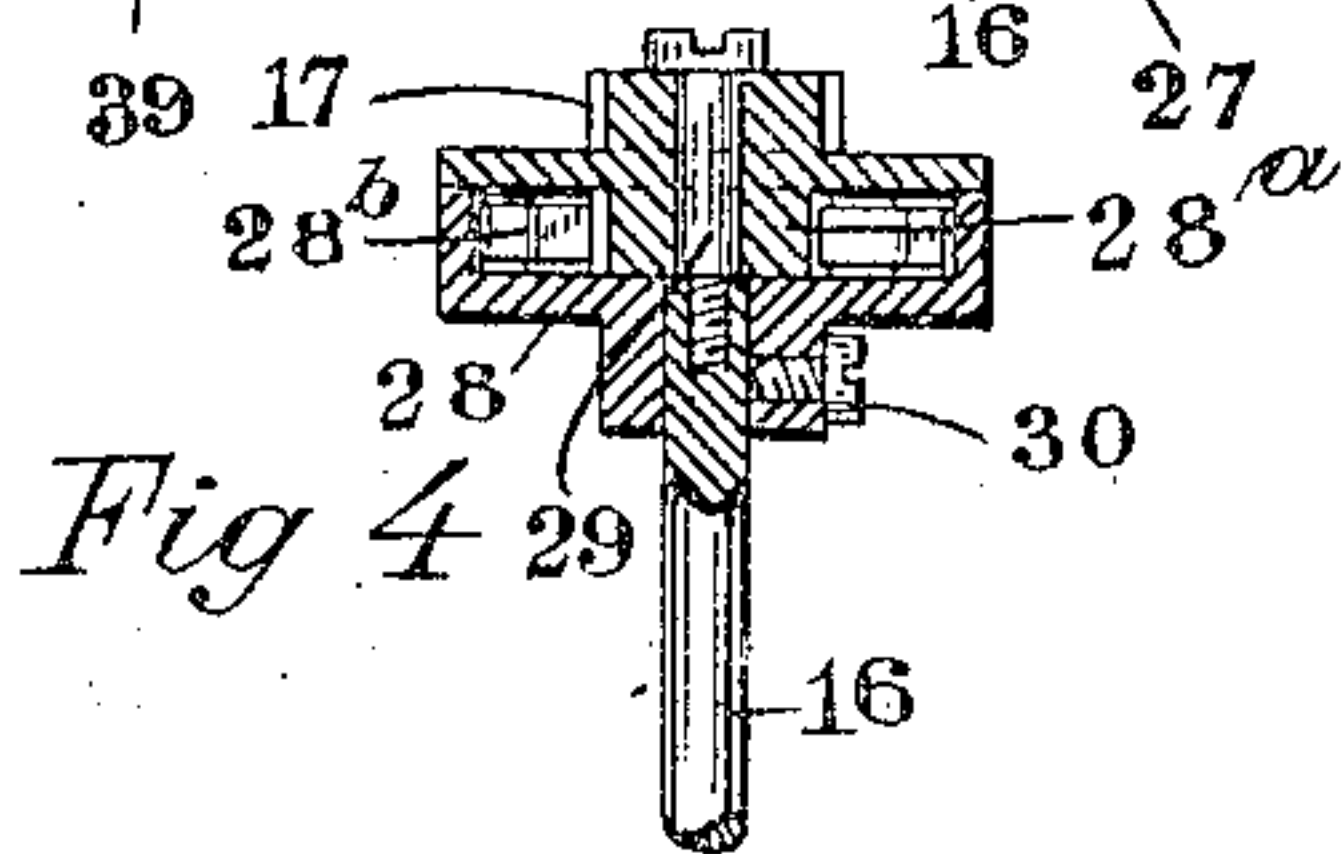


Fig. 4.

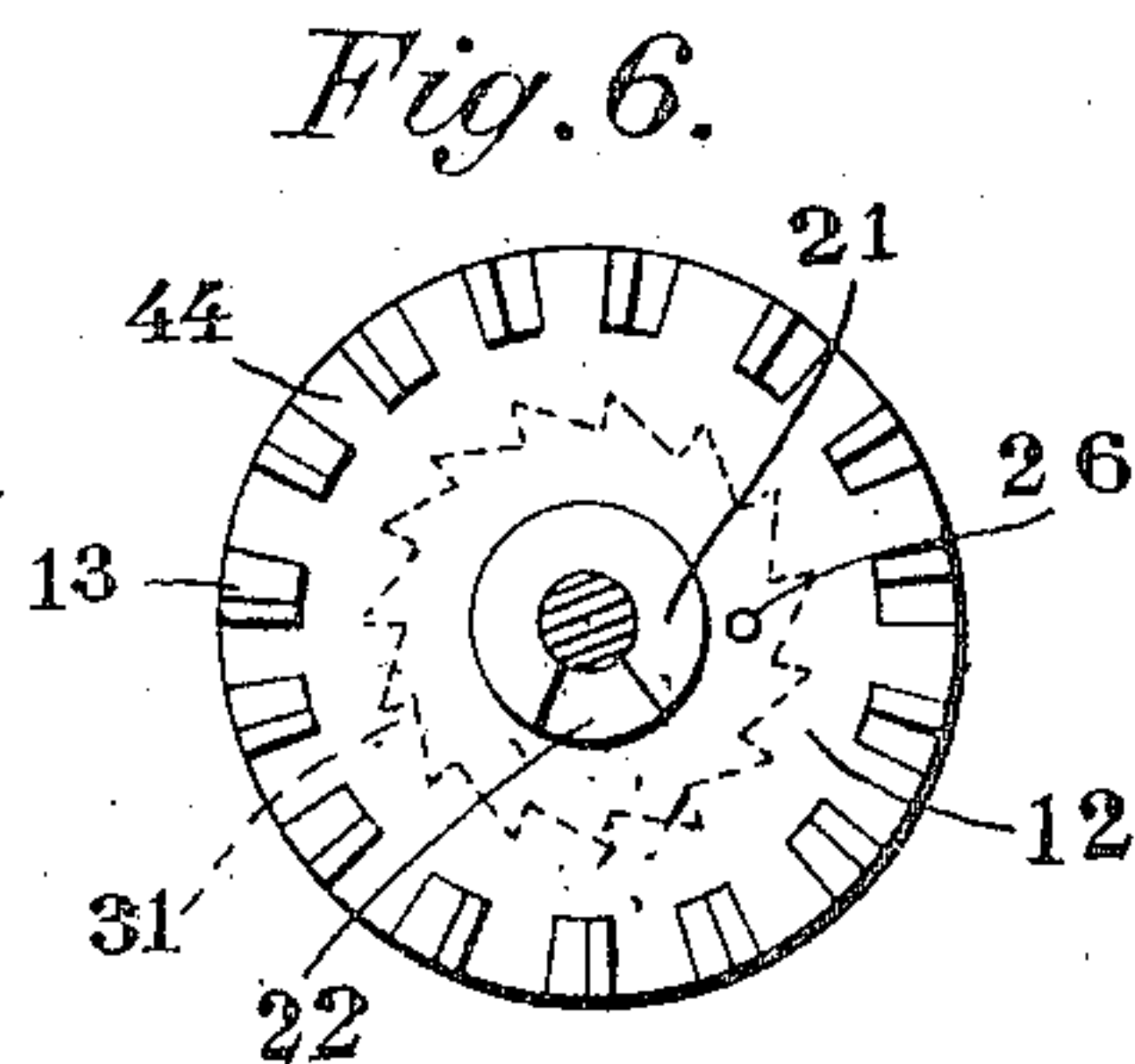


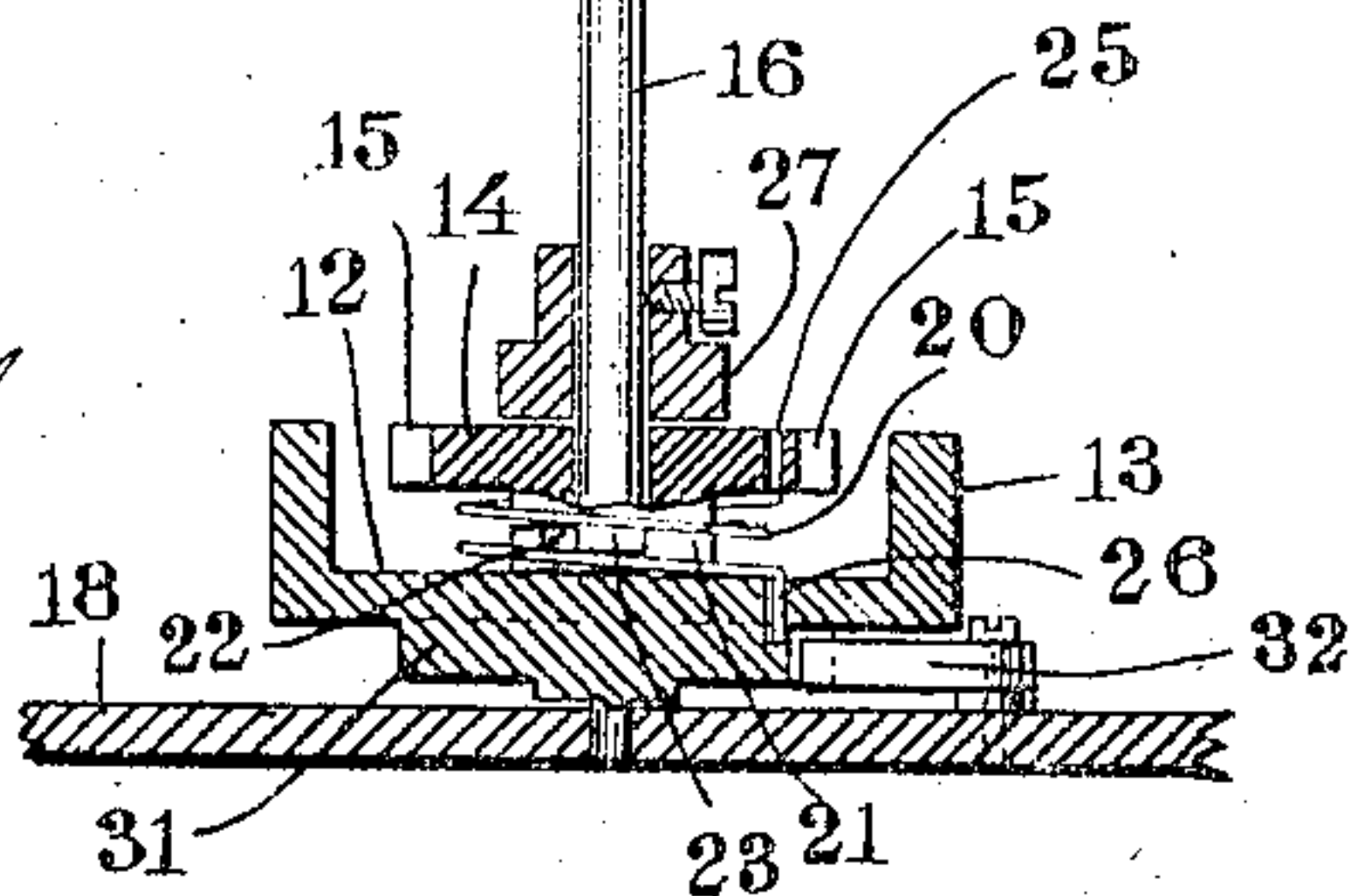
Fig. 6.

WITNESSES

Frank A. Howell.
Charles S. Howell.

INVENTOR

George M. Kitzmiller



UNITED STATES PATENT OFFICE.

GEORGE M. KITZMILLER, OF NORFOLK, VIRGINIA, ASSIGNOR TO
WYCKOFF, SEAMANS & BENEDICT, OF ILION, NEW YORK, A
CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

No. 827,805.

Specification of Letters Patent.

Patented Aug. 7, 1906.

Application filed June 18, 1902. Serial No. 112,199.

To all whom it may concern:

Be it known that I, GEORGE M. KITZMILLER, a citizen of the United States, residing at Norfolk, county of Norfolk, and State of Virginia, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to type-writing machines, and more particularly to letter-space-feed mechanism therefor, and has for its object to provide a novel construction of escapement mechanism by which the platen-carriage, impelled by the usual spring or other means, is caused to advance approximately a letter-space as each letter is printed.

It also has for its object to cause a uniform and certain feed or spacing at high speed and eliminates the jerk (commonly known as a "kick" to operators) at the instant the key-lever is depressed.

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

In the accompanying drawings, Figure 1 is a fragmentary perspective view of sufficient number of parts of one form of type-writing machine to illustrate my invention. Fig. 2 is a side elevation of the various parts of the escapement mechanism detached from the machine. Fig. 3 is a plan view of the same, taken on the line *x x* of Fig. 2. Fig. 4 is an enlarged vertical sectional view through the center of the shaft 16. Fig. 5 is a plan view of the under side of a loose escapement-wheel 14, showing the downwardly-projecting hub and lug thereon. Fig. 6 is a detail view showing the means for limiting the movement of the ratchet-wheel 14; and Fig. 7 is a detail plan view of the upper back ratchet, the view being taken on the line *y y* of Fig. 2.

It is a common practice to provide type-writing machines with a vibratory bar or rocker-arm, carrying a fixed or holding dog and a loose or spacing dog, coacting with a ratchet-wheel or a segmental toothed bar or rack to feed the carriage forward, which construction makes the machine relatively slow, owing to the carriage being held stationary for an undue length of time after the impact of the type upon the platen. Also in those

machines employing a beveled fixed dog to allow the carriage to begin its motion before it is wholly released there is usually a cam or rubbing action between the beveled dog and the face of the rack-tooth, offering undue resistance to the touch and causing a failure of contact between the type and the paper if the stroke upon the keyboard be light or hesitatingly done. By means of my invention each and all of the foregoing objections are avoided in a large measure.

While I have shown my invention applied to a front-strike machine, it should be understood that the invention is applicable to various forms of type-writing machines.

In the example herein shown 1 indicates the frame of the machine, in which are pivoted key-levers 2 and spacing-levers 3, connected by a spacing-bar. A rack 4 is carried by the carriage, (not shown,) and a universal bar 5 extends beneath the key-levers and space-levers, and restoring-springs 6 and crank-arms and links 7 are operatively connected to the universal bar.

The escapement mechanism proper comprises a horizontally-disposed ratchet wheel or disk 12, provided with crown-teeth 13, said ratchet-wheel being rigidly secured to a vertically-disposed shaft or spindle 16, journaled in a plate 18 and bar 19, rigidly secured to the frame of the machine. Mounted to turn or rotate in a horizontal plane on the shaft is a loose escapement-wheel 14, provided with peripheral ratchet-teeth 15, concentric with and contained within a line of circularly-arranged crown-teeth 13. The escapement-wheel 14 is impelled or driven around in the same direction that the shaft revolves by the action of a coiled spring 20, (see Fig. 4,) said spring being attached at opposite ends to the adjacent faces of the ratchets 12 and 14 by means of the small holes or sockets 25 and 26, the ends of the spring being bent at right angles for this purpose and being seated within said holes or sockets 25 and 26.

The escapement wheel or disk 12 is provided with an upwardly-projecting central hub or sleeve 21, integral therewith, which is mortised or recessed segmentally, as at 22, said recess having movably seated therein a lug 23, depending from the downwardly-projecting hub of the loose wheel 14. The lug 23 is smaller than the recess 22, which latter

is of sufficient width to permit the loose wheel 14 being rotated independently of the fixed escapement-wheel 12 by the action of the spring 20 a distance equal to the distance between each two adjacent teeth of said wheel 14, the ends of the recess 22 acting as stops for the lug 23, thereby limiting the independent rotative movement of the wheel 14 on the shaft 16. The wheel 14 lies with the operative surface of its projecting teeth 15 normally in the plane of the operative surface of the crown-teeth 13 of the disk 12 and is held in position by the adjustable collar 27, mounted on the shaft or spindle 16.

The shaft 16 carries a backing ratchet-wheel 28^a in a casing 28, which is made fast to the shaft 16 by means of the set-screw 30. Oppositely-disposed pawls 28^b are pivoted to said casing and engage the ratchet 28^a to afford a movement of the carriage from left to right without affecting the escapement mechanism. A pinion 17 has a bearing upon the end of the shaft 16 and is integral with the ratchet-wheel 28^a, contained in the casing 28, said pinion 17 and the integral ratchet-wheel in the casing being held in position by a shouldered screw 29, threaded into the end of the shaft 16.

Formed on the lower or under face of the disk or crown toothed ratchet-wheel 12 is a secondary back ratchet-wheel 31, and a spring-actuated pawl 32 is mounted on the plate 18 so as to engage with the teeth of the ratchet 31, said ratchet and pawl operating to take up all lost motion of the shaft 16 and prevent any backward rotation of the shaft 16 and the ratchet-wheels mounted thereon, which backward rotation would otherwise be caused by the spring 20 if the carriage-rack or toothed bar 4 should be raised out of mesh with the pinion 17 by the operator while the pawl 11 is in engagement with the teeth 15 of the loose wheel 14. Thus the shaft 16 is held in a substantially fixed position when the rack and pinion are disengaged.

The pawl or detent 11 is formed on or attached to the end of an arm 33 and is arranged to alternately engage the teeth 13 and 15 and arrest the movement of the wheels 12 and 14. The arm 33 is provided at one end with a horizontal slot and is longitudinally movable in a guide-bracket 34, attached to the plate 18. For this purpose one end of the guide-bracket is slotted, as at 40, and the other end of said bracket is provided with transversely-bored pendent ears 35. The arm 33 is movably arranged in the slot 40, and a pin or bolt 36 passes through the slot in the arm 33 and is transversely-fixed in the pendent ears 35. The arm 33 is provided with a pendent and vertically-slotted arm 37. Formed in the plate 18 parallel with the arm 33 is a slot 38, and passing through said slot are two adjusting-screws 39, which at their lower ends are screwed

into a hanger 10, which rests against the under side of the plate 18. By means of said screws 39 the hanger 10 may be adjusted longitudinally relatively to the plate 18 to regulate the stroke of the arm carrying the pawl or detent.

The numeral 9 indicates a bell-crank lever which is fulcrumed at its angle to the hanger 10, and carried by the vertical arm of said bell-crank lever is a pin 41, which loosely fits the slot in the pendent arm 37. The other end of the bell-crank lever is pivotally connected to a link 8, that is also connected to the universal bar 5.

The bracket 34 is slotted, as at 34^a, and formed integrally with the arm 33 and projecting upwardly through the slot is a forked arm or extension 45. A pin 46 projects laterally from one arm of a lever 47, pivoted at 48 to a member 49, which is connected to the platen-shifting mechanism. (Not shown.) The forward arm of the lever 47 has a forked end 50, by means of which said lever is connected to the lower end of a vertically-moving ribbon-vibrator 51 to elevate the ribbon a short distance every time the pawl 11 is reciprocated to permit the carriage to move forward a letter-space.

From the foregoing description it will be understood that the feed dog or pawl 11, with the member 33, that forms a part thereof, has a sliding reciprocating rectilinear movement toward and from the teeth of the two escapement-wheels and radially of said wheels.

In Fig. 1 of the drawings the parts are shown in their normal positions, the pawl 11 being in engagement with the teeth 15 of the loose or feed wheel 14 before the key-lever is depressed. The rack or toothed bar 4 being attached to the paper platen-carriage in the usual manner is impelled forward by the tension of a spiral spring or motor-spring, as usual, and imparts motion to the shaft 16 through the medium of the pinion 17 and the ratchet 28, turning the shaft in the direction designated by the curved arrow at Fig. 1 of the drawings. Upon the depression of a key-lever 2 or the space-bar attached to the levers 3 the universal bar 5 is lowered and rocks the bell-crank lever 9 by means of the connecting-link 8, said bell-crank lever imparting a horizontal longitudinal movement to the arm 33, which moves the pawl or detent 11 out of engagement with the operative face of one of the teeth 15 and into engagement with the operative face of one of the crown-teeth 13 and arrests or holds the latter tooth, whereupon the spiral spring 20 drives or rotates the loose wheel around until its action is stopped by the lug 23 abutting against the end wall of the recess 22, which brings the operative face of the next tooth 15 of the wheel 14 into position to again engage with the pawl 11 immediately the key-lever is re-

leased, thus imparting a step-by-step motion to the platen-carriage. Before the key-lever is depressed or while the parts are in their normal positions the space 43 between the teeth 15 and the space 44 between the crown-teeth 13 are directly opposite or in a radial line, as shown in Fig. 3, said space 44 being in the plane of movement of the pawl 11, which throws the operative face of the teeth 13 slightly away from the operative face of the pawl 11 and insures its entrance between said teeth without frictional or binding action. Inasmuch as the loose wheel 14 and the rigid wheel 12 are cut so as to converge to their centers and owing to the differences in size of the wheels, the shortest possible stroke will suffice to effect the desired result. It will be apparent that by the novel employment of a crown-toothed wheel I get a bearing on the teeth of the wheel 12 with a quick release, said bearing being equal to the distance between the inner wall of the wheel 12 and the periphery of the wheel 14. Another advantage is that by the use of a crown-tooth wheel with the loose spur-tooth wheel mounted within the inner walls of the teeth series I am enabled to reduce the diameter of the loose spur-wheel, thereby reducing the arc described by the loose wheel, and, furthermore, a more even bearing will be exerted upon both wheels by the pawl 11. I have found in actual practice that this could not be accomplished by two spur-wheels even if one were smaller than the other, as it would require a specially-designed pawl with results not so satisfactory as can be accomplished by the construction just described. By the use of my device, however, the disadvantages enumerated are overcome, and the instant the key-lever is released the pawl 11 will instantly and completely disengage.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A device for controlling the feed movement of a type-writer, comprising a rack-bar attached to the platen-carriage, a shaft carrying a pinion engaging said rack-bar, means for preventing backward movement of the shaft, a crown-toothed wheel fixed on the shaft, a spur-toothed wheel loose on the shaft, a coiled spring yieldingly connecting said toothed wheels, a reciprocating pawl arranged to alternately engage said teeth to permit a step-by-step rotation of said shaft and pinion, and means operated by the key-levers of the type-writer for actuating said pawl, substantially as described.

2. In a device for controlling the feed movement of a type-writer, comprising a rack-bar attached to the platen-carriage, a shaft carrying a pinion engaging said rack-bar, means for preventing backward movement of the shaft, a crown-tooth wheel fixed on the shaft, a spur-tooth wheel loose on the

shaft, a coiled spring yieldingly connecting said toothed wheels, a stop for limiting the movement of the loose wheel relatively to the fixed wheel, a reciprocating pawl arranged to alternately engage said teeth to permit a step-by-step rotation of said shaft and pinion, and means operated by the key-levers of the type-writer for actuating said pawl, substantially as described.

3. In a device for controlling the feed movement of a type-writer, comprising a rack-bar attached to the platen-carriage, a shaft carrying a pinion engaging said rack-bar, means for preventing backward movement of the shaft, a crown-tooth wheel fixed on the shaft, a spur-tooth wheel loose on the shaft, a coiled spring yieldingly connecting said toothed wheels, a stop for limiting the movement of the loose wheel relatively to the fixed wheel, a reciprocating pawl arranged to alternately engage said teeth to permit a step-by-step rotation of said shaft and pinion, and means operated by the key-levers of the type-writer for actuating said pawl, substantially as described.

4. In a device for controlling the feed movement of a type-writer, comprising a rack-bar attached to the platen-carriage, a shaft carrying a pinion engaging said rack-bar, means for preventing backward movement of the shaft, a crown-tooth wheel fixed on the shaft, a spur-tooth wheel loose on the shaft, a spring yieldingly connecting said toothed wheels, a segmental recess in the hub of the fixed wheel, a lug projecting from the hub of the loose wheel and loosely seated in said recess, a reciprocating pawl arranged to alternately engage said teeth to permit a step-by-step rotation of said shaft and pinion, and means operated by the key-levers of the type-writer for actuating said pawl, substantially as described.

5. In a device for controlling the feed movement of a type-writer, comprising a rack-bar attached to the platen-carriage, a shaft carrying a pinion engaging said rack-bar, means for preventing backward movement of the shaft, a crown-tooth wheel fixed on the shaft, a spur-tooth wheel loose on the shaft, a coiled spring yieldingly connecting said toothed wheels, a reciprocating pawl arranged to alternately engage said teeth, a bell-crank lever connected at one end to said pawl, and a link connecting the other end of said bell-crank lever to the universal bar of the type-writer, substantially as described.

6. A device for controlling the feed movement of a type-writer, comprising a rack-bar attached to the platen-carriage, a shaft carrying a pinion engaging said rack-bar, means for preventing backward movement of the shaft, a crown-tooth wheel fixed on the shaft, a spur-tooth wheel loose on the shaft, a coiled spring yieldingly connecting said toothed wheels, a reciprocating pawl ar-

5 ranged to alternately engage said teeth, a bell-crank lever connected at one end to said pawl, a link connecting the other end of said bell-crank lever to the universal bar of the type-writer, and a forked yoke carried by said pawl and arranged to engage and actuate the ink-ribbon movement substantially as described.

10 7. In an escapement mechanism for type-writers, the combination of a power-driven carriage and a rack-bar connected thereto, a revolving shaft mounted in stationary bearings carrying a pinion, a crown-toothed wheel connected rigidly thereto, and provided with a hub having a concentric groove or notch; a spur-toothed wheel mounted to turn loosely upon said shaft, having a lug projecting from the hub thereof, said lug being adapted to limit the rotary movement of said loose wheel upon the shaft, and a spiral spring applied to turn the loose wheel upon said shaft or spindle, substantially as described.

25 8. In an escapement mechanism for type-writers the combination of a power-driven carriage and a rack-bar connected thereto, a revolving shaft carrying a pinion, and a backing-ratchet upon one end thereof, a crown-toothed ratchet-wheel mounted rigidly upon said shaft, a loose wheel mounted to turn upon said shaft, said loose wheel being mounted in the plane of the working-surface of the teeth of lower ratchet or crown-toothed wheel and a spring adapted to turn same, a pawl adapted to engage either of said ratchet-wheels, and means for operating the parts, substantially as described.

40 9. In a type-writing machine, the combination with a carriage of two relatively movable concentric escapement-wheels, and a single cooperating feed-dog mounted to receive a reciprocating rectilinear sliding movement

radially of said wheels, and to afford a step-by-step feed movement of the carriage.

10. In a type-writing machine, the combination of a vertically-disposed shaft, a horizontally-disposed escapement-wheel fixed to said shaft, a second horizontally-disposed escapement-wheel loose upon said shaft and adapted to receive a limited movement independently of said first-mentioned escapement-wheel, and a feed-dog that is mounted to slide in a horizontal plane and to receive a rectilinear movement radially of the escapement-wheels and to cooperate with said escapement-wheels.

11. In a type-writing machine, the combination of carriage-feed devices comprising a plurality of escapement-wheels and a single feed-dog that cooperates therewith and which receives a rectilinear movement radially of said wheels, and means connected to and actuated by said feed-dog and adapted to elevate the ribbon at each operation of said feed-dog.

12. In a type-writing machine, the combination of carriage-feed devices comprising two escapement-wheels and a single reciprocating feed-dog that receives a rectilinear movement radially of said wheels and cooperates therewith, a universal bar connected to said feed-dog to reciprocate or slide it to effect the feed of the carriage, and means connected to and actuated by said feed-dog to elevate the ribbon at each operation of said feed-dog.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE M. KITZMILLER.

Witnesses:

CLARENCE S. HOWELL
JAMES A. HALLEY.