

No. 796,075.

PATENTED AUG. 1, 1905.

O. C. KAVLE.
TYPE WRITING MACHINE.

APPLICATION FILED NOV. 16, 1904.

4 SHEETS—SHEET 1.

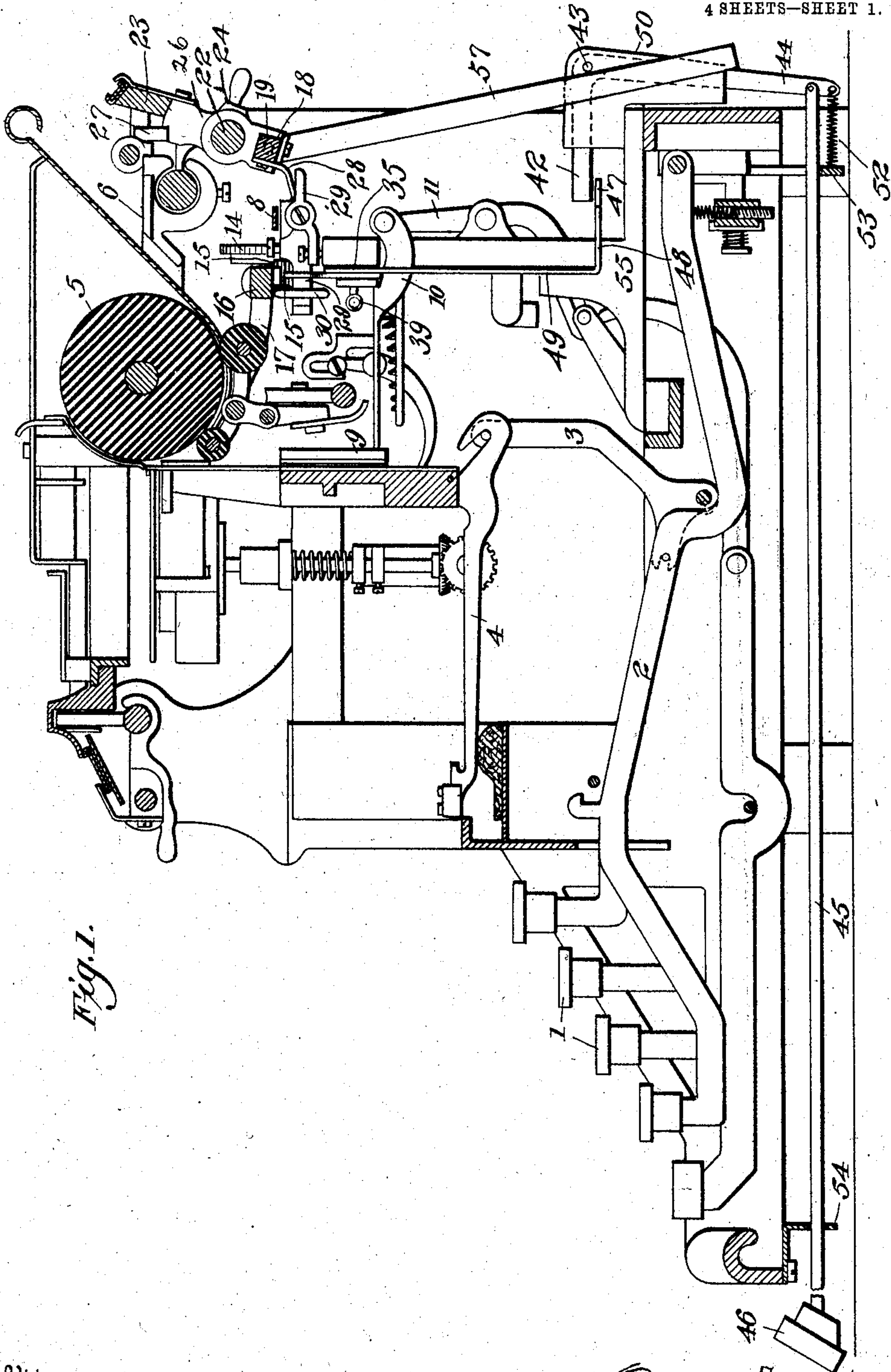


Fig. 1.

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Wm. D. MacLean
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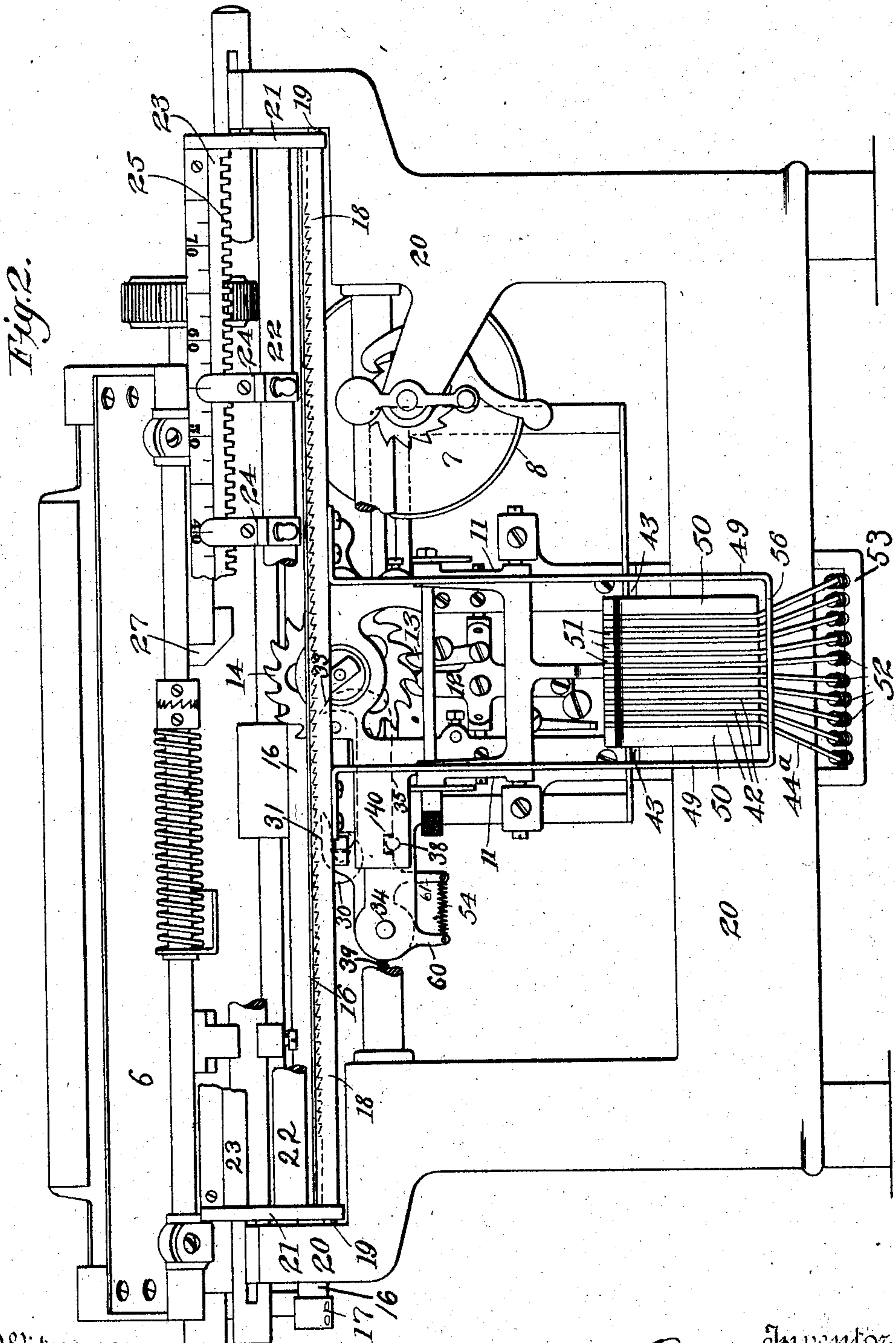
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By his Attorney
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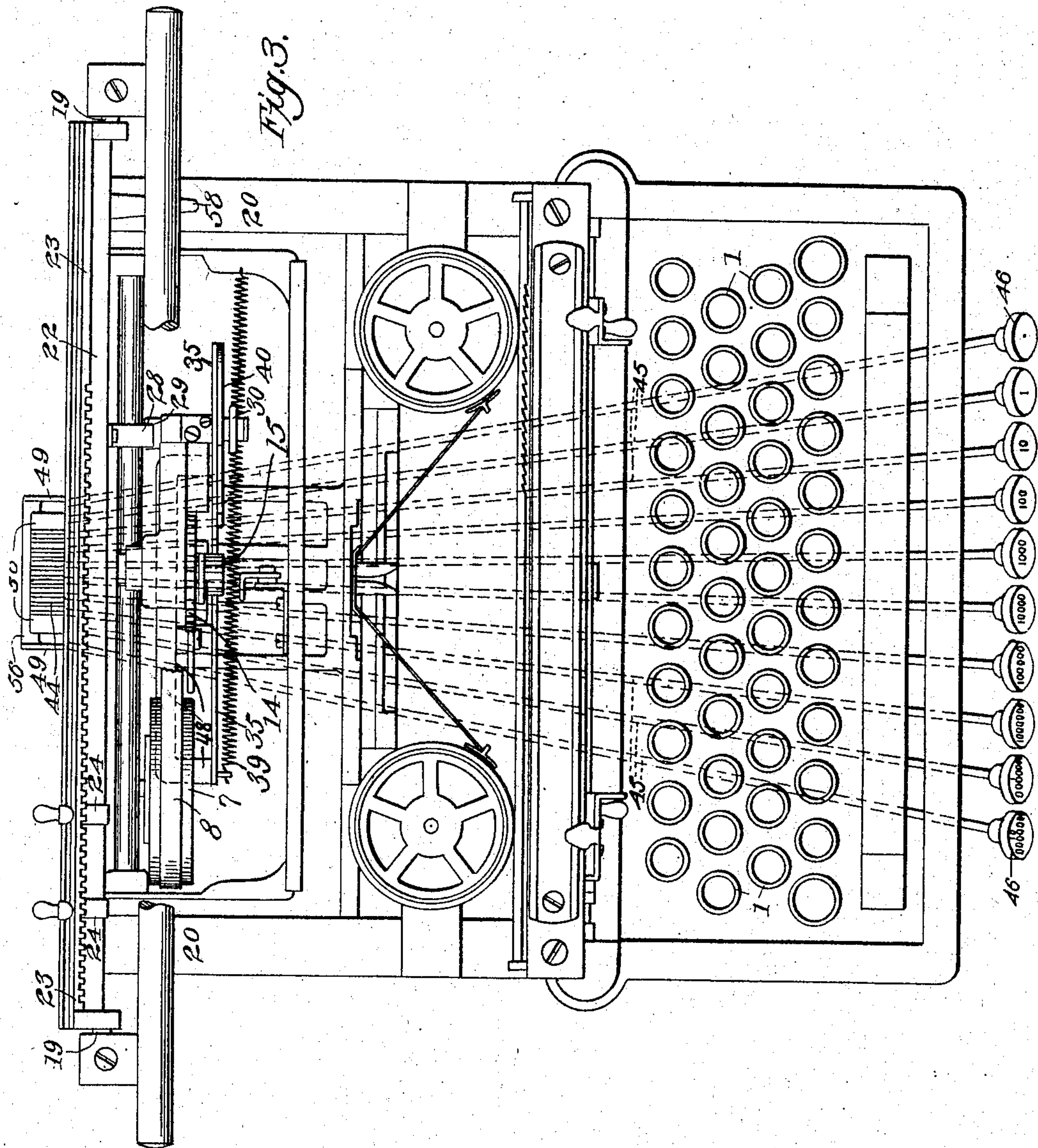
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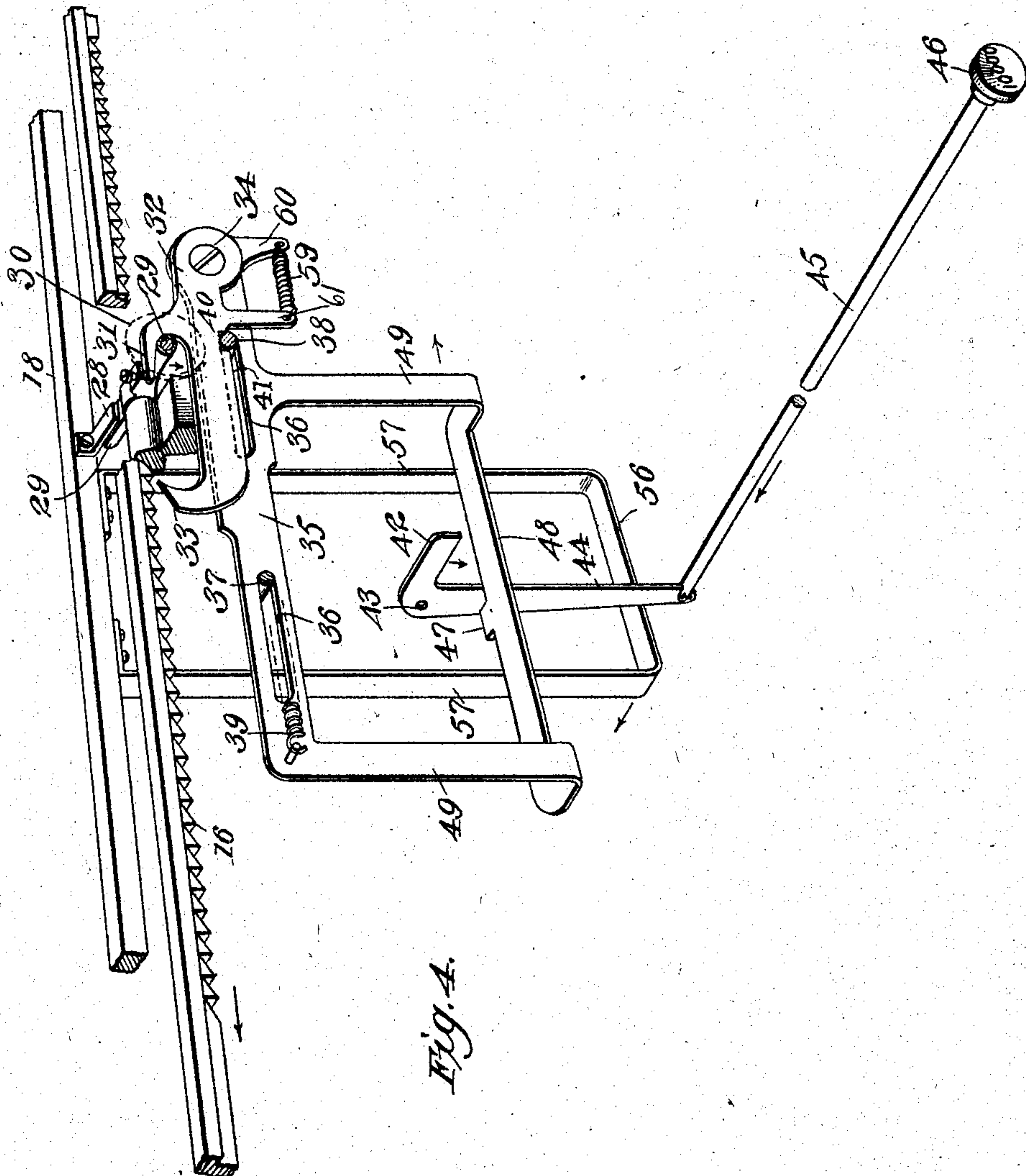


Fig. 4.

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UNITED STATES PATENT OFFICE.

OSCAR C. KAVLE, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

No. 796,075.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed November 16, 1904. Serial No. 232,992.

To all whom it may concern:

Be it known that I, OSCAR C. KAVLE, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to type-writer and other tabulators of the kind set forth in the patent to C. A. Joerissen, No. 728,170, of May 12, 1903, in which by the use of a column-stop mechanism the paper-carriage is advanced to the desired column and then by means of denomination-spacing mechanism the carriage is given an additional movement to a predetermined point, so that the writing of a number in the column may begin at the proper denomination or place.

The object of the present invention is to simplify, render more positive in action, and otherwise improve the tabulating mechanism, particularly the denomination-spacing portion thereof.

In the accompanying drawings, Figure 1 is a vertical section taken from front to rear of an "Underwood" type-writing machine and tabulator embodying my improvements. Fig. 2 is a rear elevation of the machine. Fig. 3 is a plan, omitting portions of the paper-carriage. Fig. 4 is a perspective view of parts of the tabulating mechanism.

Keys 1, operating through levers 2 and sub-levers 3, cause type-bars 4 to strike rearwardly against the front of a platen 5, mounted upon a carriage 6, which is propelled by a spring-barrel 7 and strap 8. Letter-spacing movements of the carriage are effected by a universal bar 9, frame 10, rigid therewith and pivoted to rock-arms 11, a pivoted dog carrier or rocker 12, connected to said arms 11, and carrying-dogs 13, which work in and out of an escapement-wheel 14, which is connected to a small pinion 15, the latter being rotated by a rack 16, pivoted by arms 17 upon the carriage, so as to be capable of lifting out of engagement with the pinion and permit the carriage to run freely to the left under the tension of the spring 7.

The column-stop bar or frame comprises a square rock-shaft 18, mounted upon pivots 19 in the main frame 20, rock-arms 21, fixed upon and rising from said rock-shaft, and two rods 22 and 23, connecting and fixed to said rock-arms, one or more column-stops 24

being pivotally mounted upon rod 22 and adjustable therealong and rod 23 having rack-teeth 25 engageable by said column-stops. The latter are formed with stop portions 26, which upon rocking the bar forwardly move into the path of a cooperating stop 27, fixed upon the carriage, so as to arrest the latter at the proper column. At the movement of the column-stop 24 into the path of the carriage-stop 27 release of the carriage from the escapement mechanism is effected by a finger 28, fixed upon rock-shaft 18 and projecting forwardly to bear upon one arm of a lever 29, the other arm whereof carries a roll 30, engaging the under side of the rack 16 to lift the same. After the carriage is arrested by the engagement of its stop 27 with one of the column-stops 24 the column-stop bar rocks back to normal position, effecting disengagement of stops 27 and 24; but the rack is not permitted to reengage the escapement mechanism until the carriage is given an additional spacing movement to adjust it to the proper denomination, this result being effected by means now to be described.

Hooking over the wheel-carrying arm of lever 29 is a lug 31, formed upon a pawl 32, which has a tooth 33 to engage the rack 16, but normally lies below the rack and out of use. This pawl is pivoted at 34 upon a slide 35, having horizontal guide-slots 36, whereby the slide is guided upon two fixed pins 37 38, said pins also limiting the movements of the slide in either direction. A long light-tension coiled spring 39 tends constantly to retract the slide—that is, to move the slide in a direction opposite to the letter-spacing movement of the carriage; but the pin 38, by engaging a notch 40, formed upon the under edge of the pawl, restrains the slide. The upward rack-lifting movement of the lever 29, however, acts upon the lug 31 to lift the pawl clear of pin 38, permitting slide and pawl to be drawn back by the spring 39, the lower edge 41 of the pawl riding upon said pin or rest 38. It will be understood that although the pawl-tooth 33 has thus been elevated it is still clear of the rack, the latter having been lifted sufficiently by the wheel 30 so that the backward movement of the slide is not impeded. The slide and pawl cooperate to prevent reengagement of the rack with its pinion 15 until the desired denomination-spacing

ing movement of the carriage is effected, and the extent of such movement is determined by the extent of the retraction of the slide by spring 39 from normal position, the carriage always operating to restore the slide to normal position from any point to which it may have been retracted and the rack 16 becoming reengaged to the pinion upon the instant that the slide reaches normal position. The retraction of the slide is variably limited by a series of stop-arms 42, extending forwardly from pivots 43, operating arms 44, depending from said pivots, and rods 45, extending forwardly from said arms and bearing keys 46 at the front of the machine. By a rearward movement of any key its pivoted stop is vibrated downwardly into the path of a lug 47, which projects rearwardly from a bar 48, connecting the lower ends of two pendent arms 49, formed upon the slide 35. The extent of the retraction of the slide is therefore dependent upon which key 46 is operated, the extreme right-hand key being used for the decimal-point, the extreme left-hand key for tens of millions, and the intermediate keys for intermediate denominations. The rods converge rearwardly from the keys to the pivoted stops, the latter being mounted, preferably, at letter-space intervals corresponding to the pitch of the teeth of rack 16. The stops may be pivoted upon a single rod extending across from one to the other of side pieces 50, between which are confined the stops and separators 51. The parts 50 and 51 may be integral—that is, a cast bracket having a contour corresponding generally to that of the angular stops may be formed with deep recesses to receive the stops. Below said casting the ends of arms 44 may fan out, as seen at Fig. 2 at 44^a, to connect to the rear ends of rods 45, and returning-springs 52 may extend from the arms 44 to the lower portion of a rod-guiding bracket 53. The front ends of the rods are guided in a bracket 54. It will be seen that the arms 49 depend one at each side of the carriage escapement devices and their appurtenances (seen at Fig. 2) and are sufficiently separated to permit the necessary movement of the slide without striking any portion of said devices. The angular pivoted stops and their confining devices overhang the rear edge of the base of the machine, and the side pieces 50 may be attached to or formed integral with the usual bracket 55, which carries the carriage escapement mechanism.

In operation the selected key 46 is pushed back, vibrating the arm 44 and setting its top 42 in position to intercept the lug 47 on the slide 35. By means of a universal bar 56, operable by any of said arms 44 and rigidly connected, by means of arms 57, to the rock-shaft 18, the latter is rocked, whereby column-stop 26 is moved forwardly into the path of carriage stop or lug 27 in position to intercept

the latter and arrest the carriage at the proper column. At the same time the arm 28 moves downwardly and vibrates the lever 29, whose forward arm by means of roll 30 lifts the rack 16 out of engagement with pinion 15, thus permitting the carriage to run freely along under the tension of spring 7. Simultaneously with said disengagement of the rack the lever 29 operates upon lug 31 to lift the pawl 32 and unlatch slide 35 from pin 38, permitting the spring 39 to draw back the slide until its lug 47 is arrested by the projected stop 42. All of this is effected by the backward stroke of the key, the rack remaining in its elevated position and the column-stop 26 in the path of stop 27 so long as the key is held back. Upon the release of the key from pressure the rock-shaft is by means of the usual spring 58 returned to normal position, disengaging column-stop 26 from carriage-stop 27, thereby permitting the spring 7 to draw the carriage still farther, while the lever 29 is relieved from the control of arm 28, so that the rack 16 is no longer held up by wheel 30, but may drop. The rack, however, does not reengage with pinion 15, being intercepted by the tooth 33 of pawl 32, said tooth having originally been elevated by lever 29 and having since ridden upon the fixed rest 38. The rack therefore rests upon the pawl-tooth, and the pawl or its bottom edge 41 rides upon the pin 38, and in this condition the carriage and rack run along, together with the pawl and slide, until the latter is arrested by the contact of the ends of the slots 36 with the pins 37 38, at which moment the notch 40 in the pawl directly overlies the pin 38, so that all obstacle to the descent of the rack 16 is removed and it consequently reengages the pinion 15. After the arrest of the slide the pawl does not offer any impediment to the advance of the rack and carriage, since the pawl is so formed and mounted that it is cammed downwardly (when free to move down) by the pressure of the rack-tooth thereon, the pawl for this purpose being pivoted well below the rack and extending from its pivot in the direction of the letter-feeding movement of the rack. A spring 59 may be provided to assist the downward movement of the pawl and to hold it down against the rest 38 during the retraction of the pawl and slide, said spring being caught upon an ear 60, formed upon the slide, and catching in an arm 61, depending from the pawl. By reason of the foregoing operation the carriage is arrested at the proper point to begin the writing of a number having a denomination corresponding to that of the operated key 46, the stroke of the carriage effected by the release of said key being equal to that of the slide 35, which was made at the pressing back of said key.

Having thus described my invention, I claim—

1. In a type-writing and tabulating mechan-

ism, the combination with the carriage and its escapement mechanism, of coöperative column-stops, means for releasing the carriage and projecting one of said stops into the path of the other, and means called into action upon the disengagement of said stops, for permitting the carriage to advance a predetermined number of letter-spaces before the restoration of said carriage-releasing means to normal position; said carriage-advancing means including a pawl, a carrier upon which said pawl is pivoted, means for retracting said carrier, and key-controlled means for variably arresting said carrier; said pawl being mounted to engage teeth connected to the carriage, whereby pawl and carrier are advanced by the carriage to normal position, and means being provided for thereupon automatically restoring the carriage-releasing mechanism to normal position and disengaging said pawl from said carriage-teeth.

2. In a tabulating mechanism of the kind described, comprising the coöperating column-stops, the carriage-releasing devices and the denomination-spacing devices to coöperate with the latter, the combination of a slide or carrier, a spring for retracting the slide, key-controlled devices for arresting the slide, a pawl pivoted upon the slide for enabling the carriage to advance the latter, and means connected to the slide for maintaining the release of the carriage while the latter is advancing the slide to normal position.

3. In a tabulating mechanism of the kind described, in which the carriage upon being released is arrested by coöperating column-stops and upon the disengagement of said stops is controlled by denomination-spacing devices, the combination with the slide and the pawl pivoted thereon, of means normally locking the slide against movement, means normally holding the pawl out of coöperation with the carriage, key-controlled means for releasing the pawl and slide and for variably arresting the slide, a spring for retracting the slide, and means connected to the slide for maintaining the release of the carriage while the latter is advancing the slide to normal position.

4. In a tabulating mechanism of the kind described, the combination with the carriage, the releasing mechanism and the coöperating column-stops, of the slide, the pawl pivoted thereon, the slide-retracting spring, the locking-pin, the notch in the pawl normally engaging the locking-pin, key-controlled means for lifting the pawl from said pin, and means for enabling said pin to coöperate with said pawl to maintain the release of the carriage while the latter is advancing the slide to normal position.

5. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of the means for disconnecting the rack from the escapement mechanism, the coöperating

column-stops, the denomination-spacing pawl normally out of engagement with said rack, key-controlled means for effecting variable retraction of the pawl and its engagement with said rack, and means coöperating with said pawl to hold the rack away from the escapement mechanism while the carriage is advancing the pawl to original position.

6. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of the means for moving the rack out of engagement with the escapement mechanism, the coöperating column-stops, the denomination-spacing pawl normally out of engagement with the rack, key-controlled means for effecting variable retraction of the pawl and its engagement with said rack, and a fixed bearing upon the framework of the machine, upon which said pawl rides while being advanced by the carriage to original position; said pawl serving as an interponent between said rack and said bearing, to hold the rack away from the escapement mechanism until the pawl trips off from said bearing.

7. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of the means for moving the rack out of engagement with the escapement mechanism, the coöperating column-stops, the denomination-spacing pawl normally out of engagement with the rack, key-controlled means for effecting variable retraction of the pawl and its engagement with said rack, a fixed bearing upon the framework of the machine, upon which said pawl rides while being advanced by the carriage to original position, and a stop for limiting such advance of the pawl; the pawl being pivoted in such relation to the rack that the latter tends to release the pawl, and the latter serving as an interponent between said rack and said bearing; the bearing serving both to prevent the pawl from being released by the rack and also to hold the rack out of engagement with its escapement mechanism, until said pawl is arrested by said limiting-stop.

8. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of the means for moving the rack out of engagement with the escapement mechanism, the coöperating column-stops, the denomination-spacing pawl normally out of engagement with the rack, key-controlled means for effecting variable retraction of the pawl and its engagement with said rack, said key-controlled means including a carrier upon which the pawl is pivoted, a spring for retracting the carrier, and means for variably arresting the same, a fixed bearing upon the framework of the machine, upon which said pawl rides while being advanced by the carriage to original position together with the carrier, and a stop for limiting such advance of the pawl and carrier; the pawl

being pivoted below the rack and extending from its pivot in the direction of the feed of the carriage and having a tooth at its free end to engage the rack, so that the latter tends to release the pawl, and the pawl serving as an interponent between said rack and said bearing; the bearing serving both to prevent the pawl from being released by the rack and also to hold the rack out of engagement with its escapement mechanism, until said carrier is arrested by said limiting-stop.

9. The combination with a carriage, a rack and escapement mechanism, of denomination-spacing mechanism comprising means for disengaging the rack from the escapement mechanism, means restraining the carriage while the rack is so disengaged, a normally idle pawl, key-controlled means for variably retracting said pawl, and causing it to engage the released rack, a fixed bearing upon which said pawl rides and whereby the pawl is enabled to prevent reengagement of the rack with the escapement mechanism, after the release of the carriage by said restraining means; means being also included for automatically tripping the pawl from said bearing and releasing it from the rack, whereby the rack is again brought under control of the escapement mechanism.

10. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of means for moving the rack out of engagement with the escapement mechanism, means for arresting the carriage mechanically at a predetermined column while said rack is still out of engagement, and means operating after the release of the carriage from said arresting means and before the restoration of the rack to engagement with said escapement mechanism, for giving the required denomination-spacing movement to the carriage.

11. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of means for releasing the rack from the control of the escapement mechanism, means for arresting the carriage mechanically at a predetermined column while so released, a slide, a spring for retracting said slide, a pawl pivoted upon said slide, a pin, said pawl having means to engage said pin for restraining said slide, means connected to said carriage-releasing means for releasing said pawl from said pin, a set of independently-movable stops that may be projected into the path of said slide, and means for enabling said pin to cooperate with said pawl to prevent reengagement between the rack and the escapement mechanism until said slide has been advanced to its original position by said rack.

12. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of a set of denomination-keys at the front of the

machine, converging rods extending rearwardly from said keys, means operable by said rods for releasing the rack from the control of the escapement mechanism, means for arresting the carriage mechanically at a predetermined column when so released, a slide, a spring for retracting said slide, a set of stops controlled by said rods and movable into the path of said slide, means for restraining said slide, said slide being releasable by said rods, a pawl being pivoted upon said slide for cooperation with said rack to advance said slide to original position, a slide-arresting stop, and means cooperating with said pawl to prevent the reengagement of said rack with the escapement mechanism until the slide engages said slide-arresting stop.

13. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of a set of denomination-keys at the front of the machine, converging rods extending rearwardly from said keys, means associated with said rods for releasing the rack from the control of the escapement mechanism, means for arresting the carriage at a predetermined column when so released, a denomination-spacing pawl normally disengaged from the rack, means associated with said rods for retracting said pawl, stops controlled by said rods for variably arresting said pawl, and means for enabling the pawl to be advanced by the rack and for enabling the pawl also to prevent reengagement between the rack and the escapement mechanism until the pawl reaches normal position.

14. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of a set of denomination-keys at the front of the machine, rods extending rearwardly from said keys, means associated with said rods for releasing the rack from the control of the escapement mechanism, means for arresting the carriage at a predetermined column when so released, a slide, a pawl pivoted upon said slide, a spring for retracting said slide, means releasable by said rods being provided for restraining said slide, pivoted stops movable by said rods into the path of said slide, and means for enabling the pawl and slide to be advanced by the rack and for enabling the pawl to prevent reengagement between the rack and the escapement mechanism until the slide reaches normal position.

15. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of a set of denomination-keys at the front of the machine, rods extending rearwardly from said keys, a set of pivoted stops comprising pendulous arms engaged by said rods and arms extending forwardly from the pivots, means associated with said rods for releasing the rack from the control of the escapement mechanism,

ism, means for arresting the carriage at a predetermined column when so released, a slide, a spring to retract said slide, means associated with said rods for releasing said slide so that it may be retracted by said spring, a part upon said slide in position to be intercepted by any of said forwardly-extending arms, and means connected to said slide for preventing the re-engagement of the rack with the escapement mechanism until the slide is advanced to normal position by the rack.

16. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of a set of denomination-keys at the front of the machine, a set of pivoted stops at the rear of the machine and comprising pendent arms operable by said keys and stop-arms extending forwardly from the pivots, means operable by said pivoted stops for releasing the rack from the control of the escapement mechanism, and for arresting the carriage at a predetermined column when so released, and means for additionally spacing the carriage, after such arrest, to an extent predetermined by the operated stop-arm.

17. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of a set of denomination-keys, a set of pivoted stops comprising arms connected to said keys and stop-arms, a column-stop bar pivoted upon the framework, a universal bar in the path of said key-connected arms and fixed to said column-stop bar, a cooperating stop upon the

carriage, carriage-releasing means operable by said column-stop bar, and means for additionally spacing the carriage, after its arrest by the column-stop, to an extent predetermined by the operated stop-arm.

18. In a tabulating mechanism of the kind described, the combination with the carriage and its rack and escapement mechanism, of a set of denomination-keys at the front of the machine, rods converging rearwardly from said keys, a set of pivoted stops comprising pendent arms connected to said rods and forwardly-extending stop-arms, a column-stop bar pivoted upon the framework, a cooperating stop upon the carriage, a universal bar operable by said pendent arms, arms rigidly connecting said universal bar to said column-stop bar, carriage-releasing means operable by said column-stop bar, a slide, means normally restraining said slide, a spring for retracting said slide, a part upon said slide that may be intercepted by any of said stop-arms, a pawl pivoted upon said slide and normally out of engagement with said rack, means operable by said column-stop bar for releasing both said rack and slide, and a fixed bearing to cooperate with said pawl to prevent reengagement of said rack with the escapement mechanism until said pawl and slide are advanced to normal position by said rack.

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