

No. 765,861.

PATENTED JULY 26, 1904.

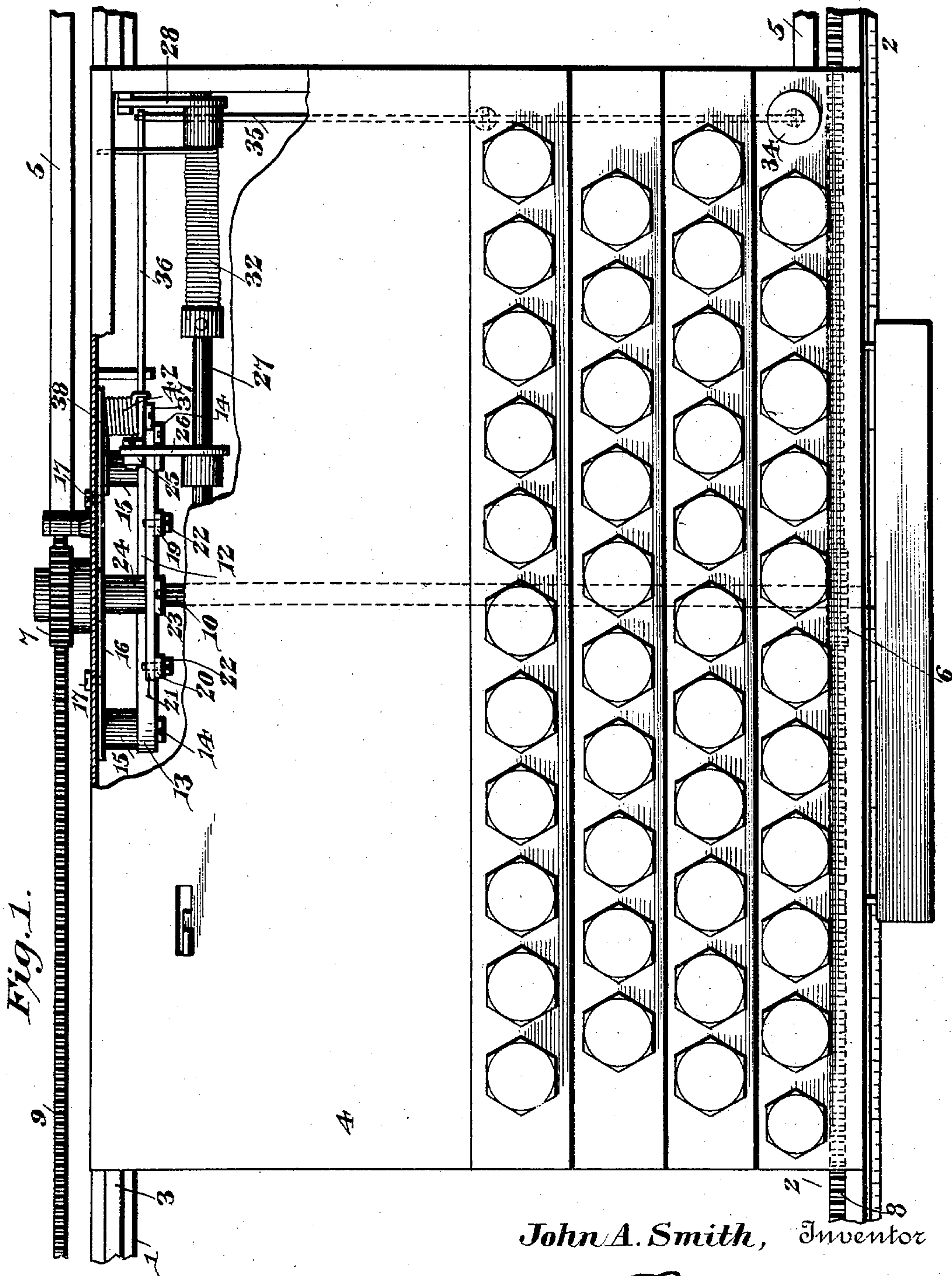
J. A. SMITH.

CARRIAGE FEEDING MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED JULY 31, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

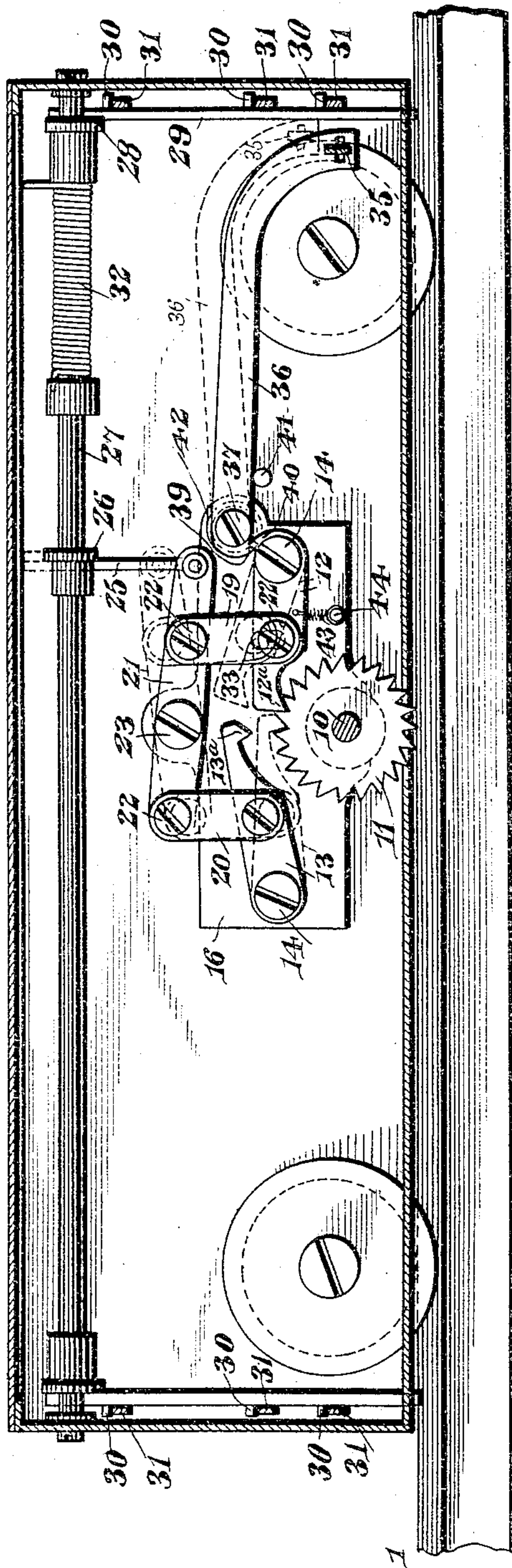


Fig. 6.

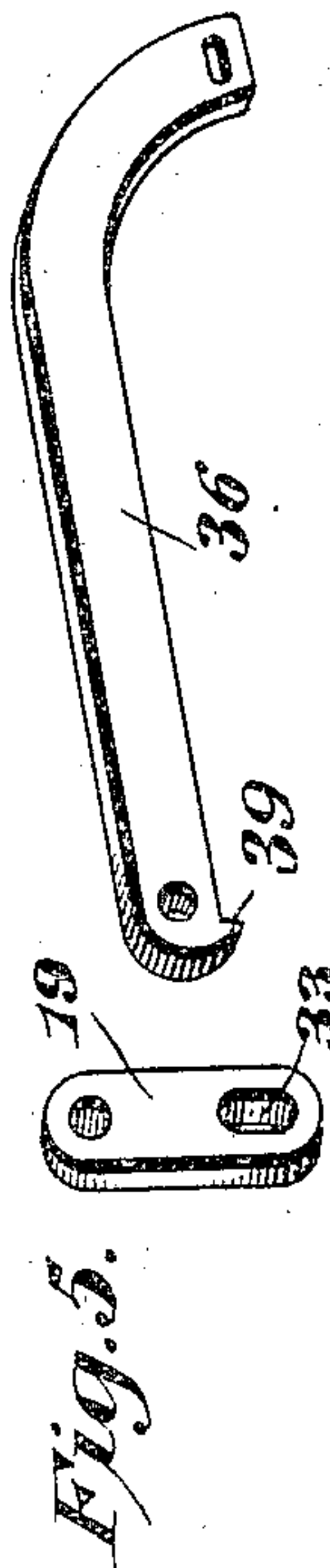


Fig. 5.

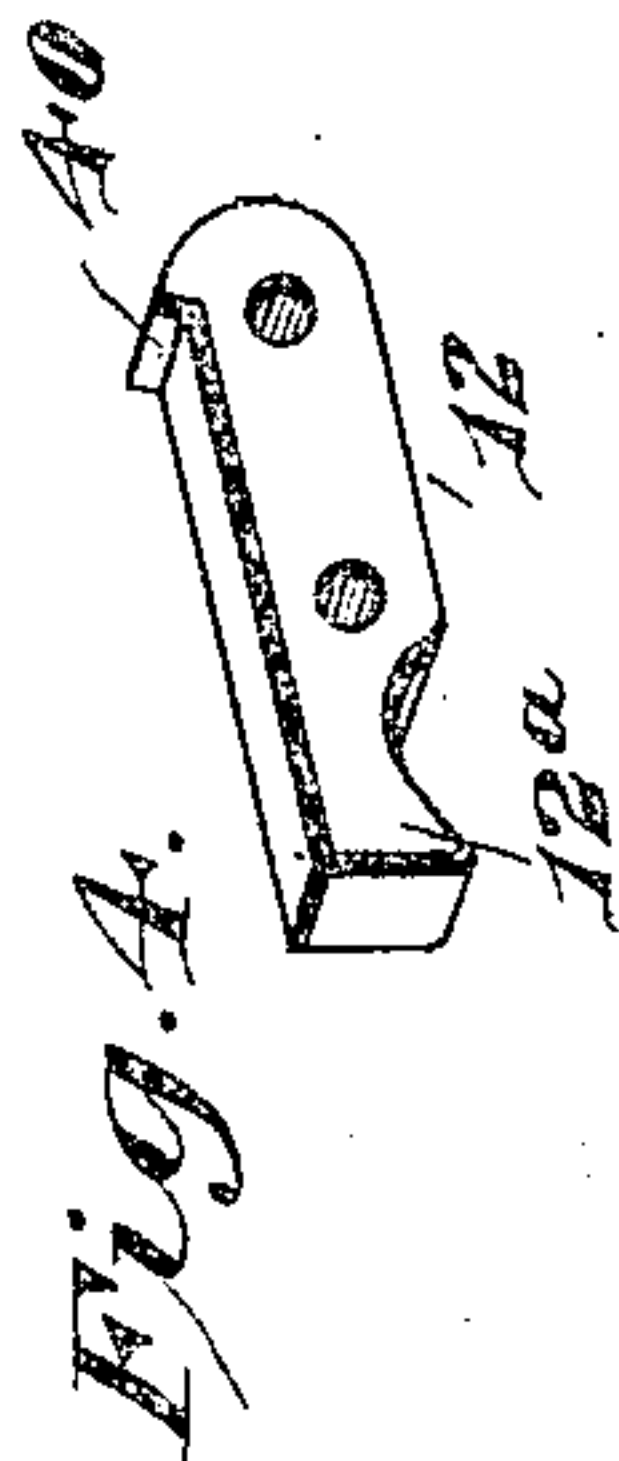


Fig. 4.

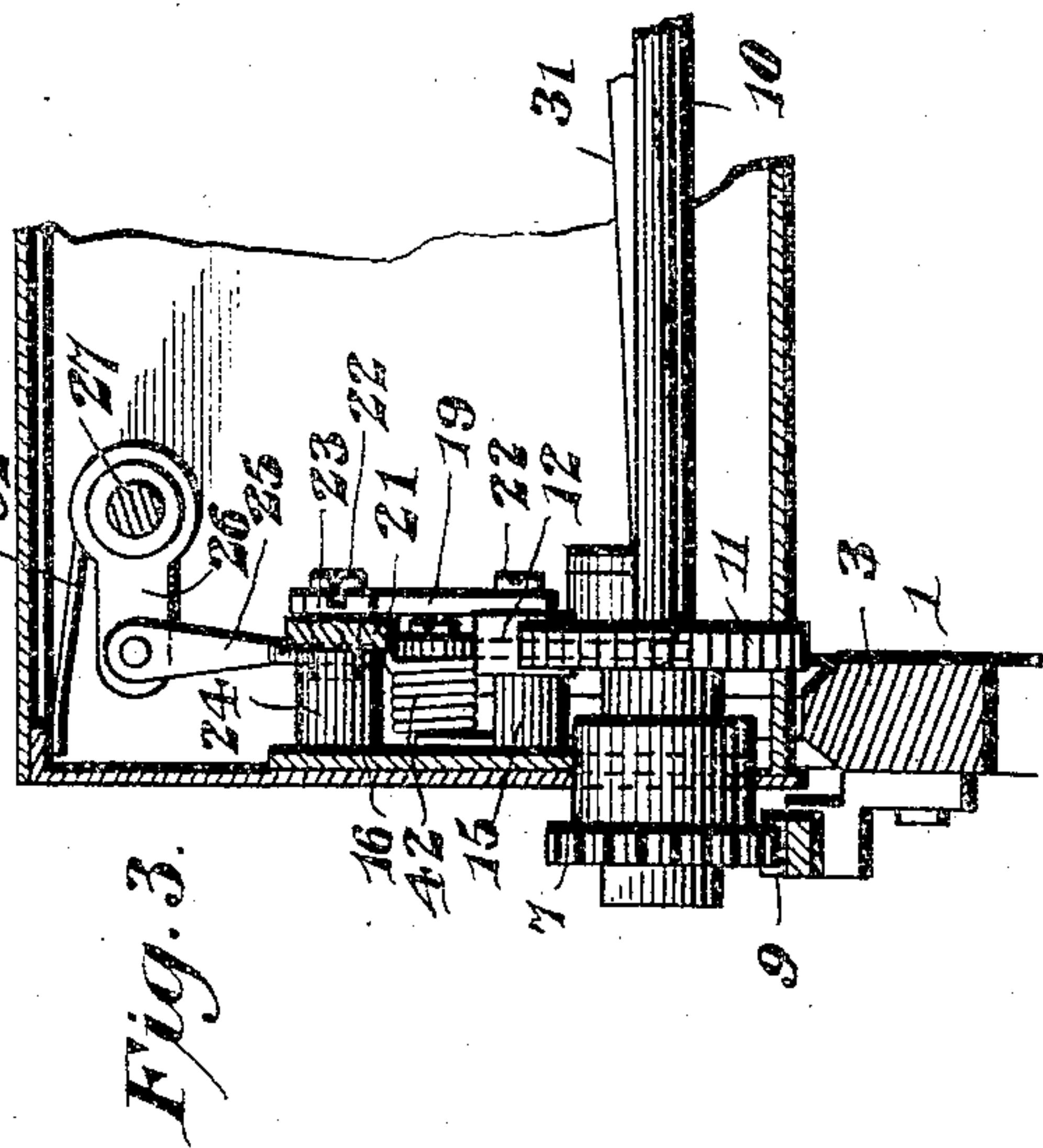


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN ASBURY SMITH, OF CLEVELAND, OHIO, ASSIGNOR TO ELLIOTT-FISHER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

CARRIAGE-FEEDING MECHANISM FOR TYPE-WRITING MACHINES.

SPECIFICATION forming part of Letters Patent No. 765,861, dated July 26, 1904.

Application filed July 31, 1903. Serial No. 167,762. (No model.)

To all whom it may concern:

Be it known that I, JOHN ASBURY SMITH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Carriage-Feeding Mechanism for Type-Writing Machines, of which the following is a specification.

This invention relates to improvements in carriage-feeding mechanism for type-writing machines, and more particularly to an escapement for controlling the step-by-step advance of the carriage in the direction of letter-spacing. This escapement while capable of general application is designed with special reference to the equipment of a Fisher type-writing machine, one form of which is disclosed in Patent No. 573,868, to R. J. Fisher. In the Fisher patent is shown an escapement, including a rotary rack or ratchet-wheel, which necessarily rotates as the carriage advances and the movement of which is controlled by a pair of pivoted dogs swung from a common center and engaging the wheel at diametrically opposite points. Upon the depression of any one of the keys of the type-writing machine the holding or retaining dog, normally engaging the wheel to prevent the advance of the carriage, is thrown out, and the other or spacing-dog is simultaneously thrown into engagement with the wheel. The relative arrangement of the ratchet-teeth and dogs is such that upon the release of the key the dogs will be swung back to their initial positions, the ratchet-wheel moving simultaneously to permit the advance of the carriage the distance of one letter-space, where it is held or retained by the engagement of the holding-dog with the tooth succeeding the one originally engaged by it. Since the distance advanced by the carriage upon each release thereof depends upon the distance between the teeth of the ratchet-wheel, it follows that in order to secure uniform letter-spacing the teeth of the wheel must be cut with absolute accuracy. This, however, is practically impossible, and while the variations of the immediately-adjacent teeth are

so slight as to be immaterial the multiplication of error in an extended series of teeth is liable to effect a material alteration of that relative arrangement of the teeth and dogs which is necessary for the perfect operation of the escapement.

The primary object of the present invention, therefore, is to produce an escapement of the general type shown in the Fisher patent and embodying escapement-dogs, which instead of engaging the ratchet-wheel at points separated by an intervening series of teeth will engage adjacent teeth of the wheel to the end that the multiplication of error in the teeth will not affect the relation of the dogs thereto, thus rendering it unnecessary to cut the teeth of the ratchet-wheel with that degree of accuracy which has heretofore been indispensable.

Another feature of the Fisher escapement includes a trip-lever disposed for actuation by a carriage-release key and having a trip-pin engaging a cam-face on the holding-dog to move the latter out of engagement with the ratchet-wheel independently of the spacing-dog to provide for the release of the carriage and its free advance upon the depression of the release-key. This arrangement while effective is open to certain objections, the principal of which is the wear incidental to the sliding contact between the trip-pin and the dog.

Another object of the present invention, therefore, is to provide a more durable and positively-operating connection between the trip-lever and the dog in order to avoid lost motion after continued use of the mechanism.

A further object of the invention is to facilitate the removal of the escapement from the carriage in order to permit the replacement of parts which may become worn or deranged, this end being obtained by mounting all of the escapement elements with the exception of the wheel upon a base-plate having means for detachably connecting it to the carriage.

Further objects and advantages of the invention will appear during the following de-

scription of the preferred embodiment thereof illustrated in the accompanying drawings and succinctly defined in the appended claims.

In said drawings, Figure 1 is a plan view of a portion of a Fisher type-writing machine equipped with my invention, a portion of the carriage being broken away to expose interior parts. Fig. 2 is a longitudinal sectional view of the subject-matter of Fig. 1, showing the escapement in elevation and indicating certain positions of the parts in dotted lines. Fig. 3 is a transverse section of a portion of the machine, showing the arrangement and mounting of the escapement. Fig. 4 is a detail perspective view of the holding-dog. Fig. 5 is a similar view of one of the links, and Fig. 6 is a similar view of the trip-lever.

Like numerals are employed to designate corresponding parts throughout the views.

The escapement and the various associated parts comprehended by the carriage-feeding mechanism coöperatively related and constituting the subject-matter of the present invention are capable of general application and of use in connection with various type-writing machines embodying a carriage designed to have a step-by-step movement. In order, however, to facilitate the disclosure of the invention in that connection for which it is particularly designed and is best adapted I have shown it associated with a machine of that type now in extensive use and known commercially as the "Fisher" type-writing machine. The Fisher machine is designed particularly for writing in books or upon letter-sheets, bills, cards, and other work elements supported in a flat spread-out condition upon a flat platen over which the printing mechanism is moved.

The machine illustrated involves in its general organization a carriage-supporting frame 1, designed to travel in the direction of line-spacing upon the main tracks or guides (not shown) and provided with parallel front and rear carriage-guides 2 and 3, upon which is mounted to travel in the direction of letter-spacing the carriage 4, usually provided with a pendent type-bar-supporting ring.

The carriage 4 is arranged to be drawn to the right or in the direction of letter-spacing by spring-actuated straps or tapes 5 and is provided with carriage-feeding pinions 6 and 7, which mesh, respectively, with the front and rear racks 8 and 9, arranged in parallelism with and secured to or formed upon the front and rear carriage-guides 2 and 3 of the machine-frame. The carriage-feeding pinions 6 and 7 are mounted on a common transversely-disposed feed spindle or shaft 10, upon which is mounted at a point within the carriage-casing a ratchet or escapement wheel 11, which constitutes the rack element of the escapement. Since the spindle 10 is geared to the fixed racks by means of the feed-pinions, it follows that the escapement-wheel

must rotate when the carriage is drawn forward. Therefore the advance of the carriage may be controlled by mechanism coöperating with the escapement-wheel and controlling the rotary movement thereof.

In the present embodiment of the invention the means for operating the escapement-wheel includes a pair of escapement-dogs—to wit, a holding-dog 12 and a retaining-dog 13—approximately horizontally disposed and pivoted at their outer or remote ends upon bearing-screws 14, screwed into the outer ends of a pair of posts 15, extending forwardly from the opposite ends of a base-plate 16, detachably secured, as by screws 17, to the inner face of the rear wall 18 of the carriage. The dogs are formed at their proximate free ends with noses 12^a and 13^a, the former of which is normally in engagement with a tooth of the escapement-wheel to hold the latter against movement. The other dog is normally disposed, as shown in full lines in Fig. 2, with its nose raised out of engagement with the wheel, but in position to engage the tooth succeeding the one in engagement with the holding-dog. The dogs 12 and 13 are designed to be swung simultaneously in opposite directions to effect their alternate engagement with the wheel. They are therefore connected, by means of links 19 and 20, with a rocker-arm or vibrator 21 at opposite sides of its axis of movement. The opposite ends of the links are pivotally connected to the dogs and vibrator, respectively, by means of bearing-screws 22, and the vibrator is mounted to rock upon a bearing-screw 23, screwed into the end of a post 24, projecting from the base-plate 16 at its upper edge and directly above the axis of the escapement-wheel.

The vibrator 21 is connected at one end, as by a link 25, to an arm 26, extending laterally from a rock-shaft 27. This rock-shaft is disposed longitudinally of the carriage within the same and is afforded bearing in the opposite walls thereof, as shown. Adjacent to the opposite ends of this shaft it is provided with additional arms 28, pivotally connected to the upper ends of slides 29, provided with projections 30. The projections 30 of the slides are disposed to be engaged by the swinging key-yokes 31, mounted on the carriage and disposed for actuation by the letter and space keys in the manner explained in the Fisher patent hereinbefore identified.

When a key is depressed, one of the key-yokes is swung, and its rear ends engaging certain of the projections on the slides 29 elevate the latter, causing the rock-shaft 27 to rock and the connected vibrator 21 to vibrate in an obvious manner. Thus upon the depression of a key the vibrator is swung to the dotted position in Fig. 2, the holding-dog 12 is moved out of engagement with the escapement-wheel 11, and the spacing-dog 13 is moved into engagement with the wheel. The en-

gagement of the spacing-dog is effected, however, before the disengagement with the holding-dog is complete, the result being that the carriage does not advance the distance of one letter-space during the described movement of the parts. The relation of the dogs to the teeth of the wheel is such that while the holding-dog is out of engagement with the wheel the latter is permitted to move an almost imperceptible distance, which, however, is sufficient to move the point of the lately-engaged tooth beyond the point of the nose 12^a, so that when the holding-dog again moves toward the escapement-wheel it will engage the next succeeding tooth thereof when the wheel has advanced one increment or letter-space.

As soon as the key is released the parts will be restored to their normal positions—that is to say, the key-yokes will swing back, permitting the slides 29 to drop, the shaft 26 and the vibrator 1 to swing to the full-line position indicated in Fig. 2, and the holding and retaining dogs to move into and out of engagement, respectively, with the escapement-wheel. During this restoration of the original positions of the dogs the advance of the carriage one letter-space will be effected, because by reason of the slight advance of the escapement-wheel, heretofore mentioned, while the holding-dog is out of engagement therewith the nose of said dog when the latter moves back to its engaging position will engage the rear inclined face of the tooth previously engaged by it, and the carriage will therefore be permitted to advance until the straight front face of the next succeeding tooth contacts with the end face of the holding-dog.

The prompt return of the rock-shaft and the connected parts to their initial positions upon the release of the key may be insured by the provision of a spring 32, encircling the shaft and having its opposite ends secured to the shaft and a fixed part, respectively, in a manner well understood in the art.

The carriage of course must be free at all times to move back to the left. The link 19 is therefore formed with a slot 33, receiving the bearing-screw 22 of the holding-dog and accommodating that independent vibratory movement of the dog incidental to the reverse rotation of the escapement-wheel 11 during the retraction of the carriage. This movement of the dog is obviously occasioned by the riding of the inclined rear faces of the ratchet-teeth along the inclined face of the nose 12^a during the backward rotation of the wheel.

So far as the step-by-step letter-space movement of the carriage is concerned the construction thus far described is effective and complete and possesses many advantages over the various escapements with which I am familiar. Inasmuch, however, as it is desired to provide for the complete release of the car-

riage in order to permit unrestricted movement thereof in the direction of letter-spacing I have made provision for the disengagement of the holding-dog independently of the spacing-dog by the depression of the carriage-release key 34. (Illustrated in Fig. 1.) This independent movement of the holding-dog is accommodated by the slot 33 in the link 19 and is transmitted from the release-key through the medium of a release-lever 35 and a trip-lever 36. The release-lever is mounted, as usual, within the carriage adjacent to one end thereof and is connected at its opposite ends to the release-key and trip-lever, respectively. The trip-lever is disposed at right angles to the release-lever and is fulcrumed adjacent to one extremity upon a bearing-screw 37, screwed into a post 38, projecting horizontally from the base-plate 16 adjacent to but above the mounting of the holding-dog. It will thus be seen that the trip-lever in addition to the escapement-dogs and vibrator is mounted upon the base-plate for removal therewith. The trip-lever is operatively connected to the holding-dog in a manner to swing the latter out of engagement with the escapement-wheel upon the depression of the release-key, and while the character of this connection may be varied within wide limits I prefer to form the lever and holding-dog with cooperating shoulders 39 and 40, disposed radially with respect to the axes of these elements. This character of connection permits the holding-dog to operate independently of the trip-lever under normal conditions, but effects an operative connection between the parts to release the carriage whenever the trip-lever is swung up by the depression of the release-key. The movement of the trip-lever toward its normal position is limited by a stop 41, and such movement is facilitated by a spiral spring 42, encircling the post 38 and having one end bearing against the adjacent post 15 and its opposite end in engagement with the upper side of the trip-lever.

By reason of the character of the connections between the holding-dog and the link and trip-lever, respectively, neither of the springs 32 nor 42 exert any influence upon the holding-dog, and as it is undesirable to depend upon the force of gravity for the engagement of the dog with the escapement-wheel the former is yieldingly urged toward the wheel by a light spiral spring 43, secured at one end to the dog and at the opposite end to a stud 44, projecting from the base-plate.

Briefly, the operation of the device is as follows: The carriage 4, which is under tension, is held against movement in the direction of letter-spacing by the engagement of the holding-dog 12 with a tooth of the escapement-wheel 11. Upon the depression of one of the letter or space keys of the type-writing machine one of the key-yokes 31 is vibrated, and the slides 29 are raised to rock the shaft 27.

This movement of the shaft is transmitted to the vibrator 21 through the medium of the link 25, and the escapement-dogs are simultaneously swung in opposite directions by reason of their link connection with the vibrator at opposite sides of its axis. This movement of the dogs effects the disengagement of the holding-dog from the escapement-wheel and the engagement of the spacing-dog therewith and permits slight advance movement of the escapement-wheel 30 to advance the point of the tooth lately engaged slightly beyond the nose of the holding-dog. Upon the release of the key the several parts will return to their initial positions, the spacing-dog moving out of engagement with the escapement-wheel to release the same and thus permit the advance of the carriage the distance of one letter-space. As the spacing-dog moves out of engagement with the wheel the nose of the holding-dog moves into engagement with the inclined rear face of the tooth lately engaged by it and arrests the carriage at the proper time by engaging the straight front face of the next succeeding tooth of the wheel. Thus the carriage is advanced one letter-space upon each depression of a key, and upon reaching the end of the line the free retraction of the carriage is permitted by reason of the pawl-and-ratchet relation of the holding-dog and escapement-wheel. If, however, it is desired to release the carriage for free advance movement—as, for instance, in shifting the carriage from one column to another of a tabulation—the holding-dog is swung out of engagement with the ratchet-wheel independently of the spacing-dog by depressing the release-key 34, and thus effecting the swinging of the release-lever 35 and the vibration of the trip-lever 36 in an obvious manner.

It is thought that from the foregoing description the construction, operation, and many advantages of the invention will be clearly understood; but while the illustrated embodiment of said invention appears at this time to be preferable I desire to reserve the right to effect such changes, modifications, and variations of the illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is—

1. An escapement including a rack under tension, a pair of dogs swung at their outer ends from independent axes and having their proximate ends disposed to engage the rack, and a vibrator connected to said dogs at points intermediate of their ends.

2. An escapement including a rack under tension, a pair of dogs swung at their outer ends from independent axes and having their proximate ends disposed to engage the rack, and a vibrator connected to said dogs at points intermediate of their ends, said connection permitting independent movement of one of the dogs.

3. An escapement including a rack under tension, a pair of dogs swung at their outer ends from independent axes and having their proximate ends disposed to engage the rack, a vibrator connected to said dogs at points intermediate of their ends, said connection permitting independent movement of one of the dogs, and means independent of the vibrator for imparting such independent movement to said dog.

4. An escapement including a rack under tension, a pair of dogs swung at their outer ends from independent axes and having their proximate ends disposed to engage the rack, a vibrator connected to said dogs at points intermediate of their ends, said connection permitting independent movement of one of the dogs, and an escapement-lever operatively related to the outer end of said independently-movable dog to move the same out of engagement with the rack.

5. An escapement including a rack under tension, a pair of dogs swung at their outer ends from independent axes and having their proximate ends disposed to engage the rack, a vibrator connected to said dogs at points intermediate of their ends, said connection permitting independent movement of one of said dogs, and an escapement-lever operatively connected to the outer end of said independently-movable dog to move the same out of engagement with the rack, the connection between the lever and the dog including abutting shoulders disposed tangential to the axes of said elements.

6. An escapement including a rack under tension, a holding-dog and a spacing-dog swung from independent axes at or adjacent to their outer ends and having their proximate ends disposed for engagement with the rack, a spring for urging the holding-dog into engagement with the rack, a vibrator having independent connection with the dogs intermediate of their ends, the connection between the vibrator and the holding-dog permitting the latter to be moved out of engagement with the rack by the vibrator or independently thereof, and means for imparting such independent movement to the holding-dog in opposition to its spring.

7. An escapement including a rack under tension, a pair of dogs swung at their outer ends from independent axes and having their proximate ends disposed to engage the rack, and a vibrator having a separate connection with each dog at a point intermediate of the ends thereof.

8. An escapement including a rack under tension, a pair of dogs swung at their outer ends from independent axes and having their proximate ends disposed to engage the rack, and a vibrator having permanent but flexible connection with both dogs at points intermediate of their ends.

9. An escapement including a rack under

tension, a pair of dogs swung at their outer ends from independent axes and having their proximate ends disposed to engage the rack, a vibrator, and an operative connection between the opposite ends of the vibrator and the dogs at points intermediate of the ends of the latter.

10. An escapement comprising a rack under tension, spacing and holding dogs swung from independent axes at their outer ends and having their proximate ends disposed for engagement with adjacent rack-teeth, and a vibrator having link connection with the dogs.

11. In a type-writing machine, the combination with a movable carriage, of a rack, a supporting-plate detachably mounted on the carriage, escapement-dogs independently mounted on the plate and engaging the rack to control the advance of the carriage, a vibrator arranged to operate the dogs, and a

trip-lever arranged to disengage one of the dogs from the rack, the vibrator and trip-lever being also mounted on the supporting-plate and detachable from the carriage therewith.

12. An escapement including a rack under tension, a pair of dogs swung at their outer ends from independent fixed axes and having their proximate ends disposed to engage the rack, and a vibrator having a fixed axis and having also, separate, operative connection at opposite sides of its axis, with the respective dogs.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN ASBURY SMITH.

Witnesses:

A. R. WARNER,
J. A. ZIEGLER.