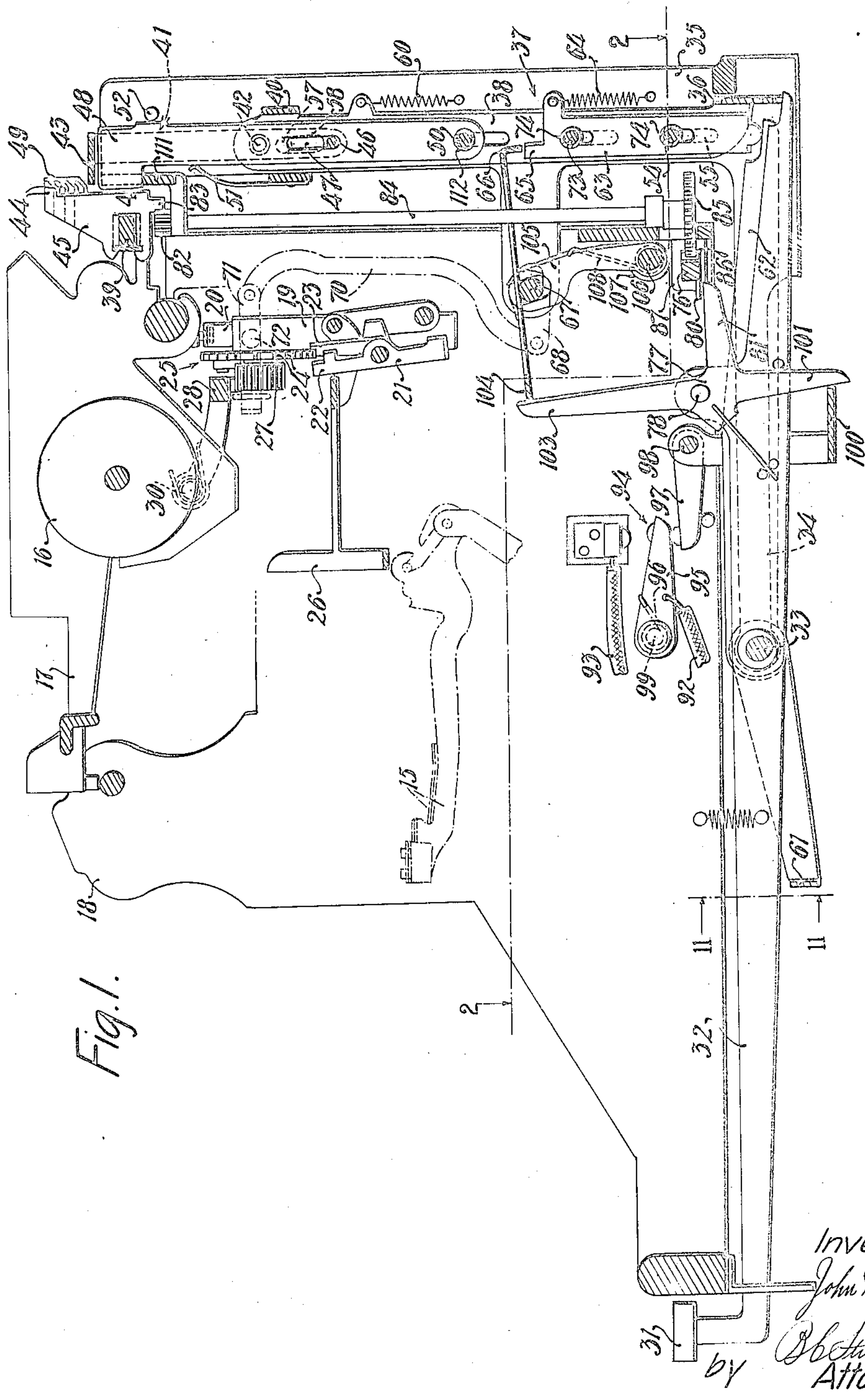


Jan. 2, 1923:

1,441,049.

J. WALDHEIM.  
TYPEWRITING MACHINE.  
FILED FEB. 19, 1921.

4 SHEETS—SHEET 1.



*Inventor:*

John Waldheim

by

*Victory Attorney*

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4 SHEETS—SHEET 2.

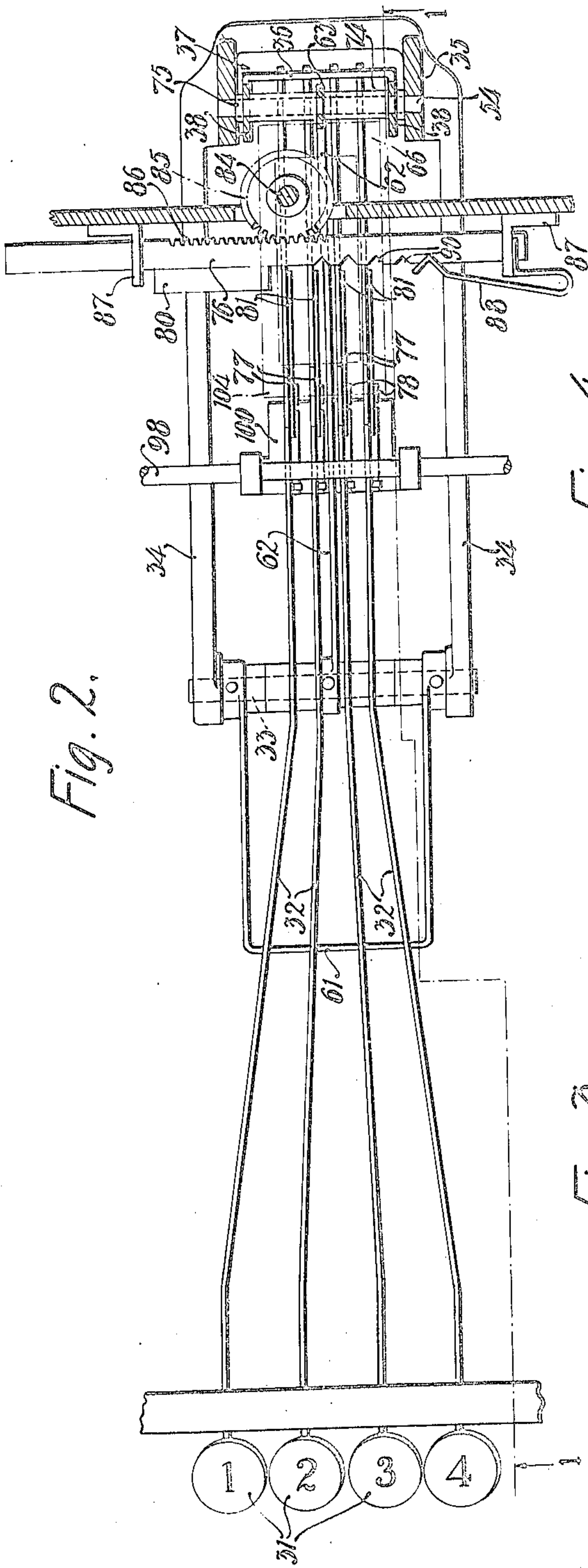


Fig. 4.

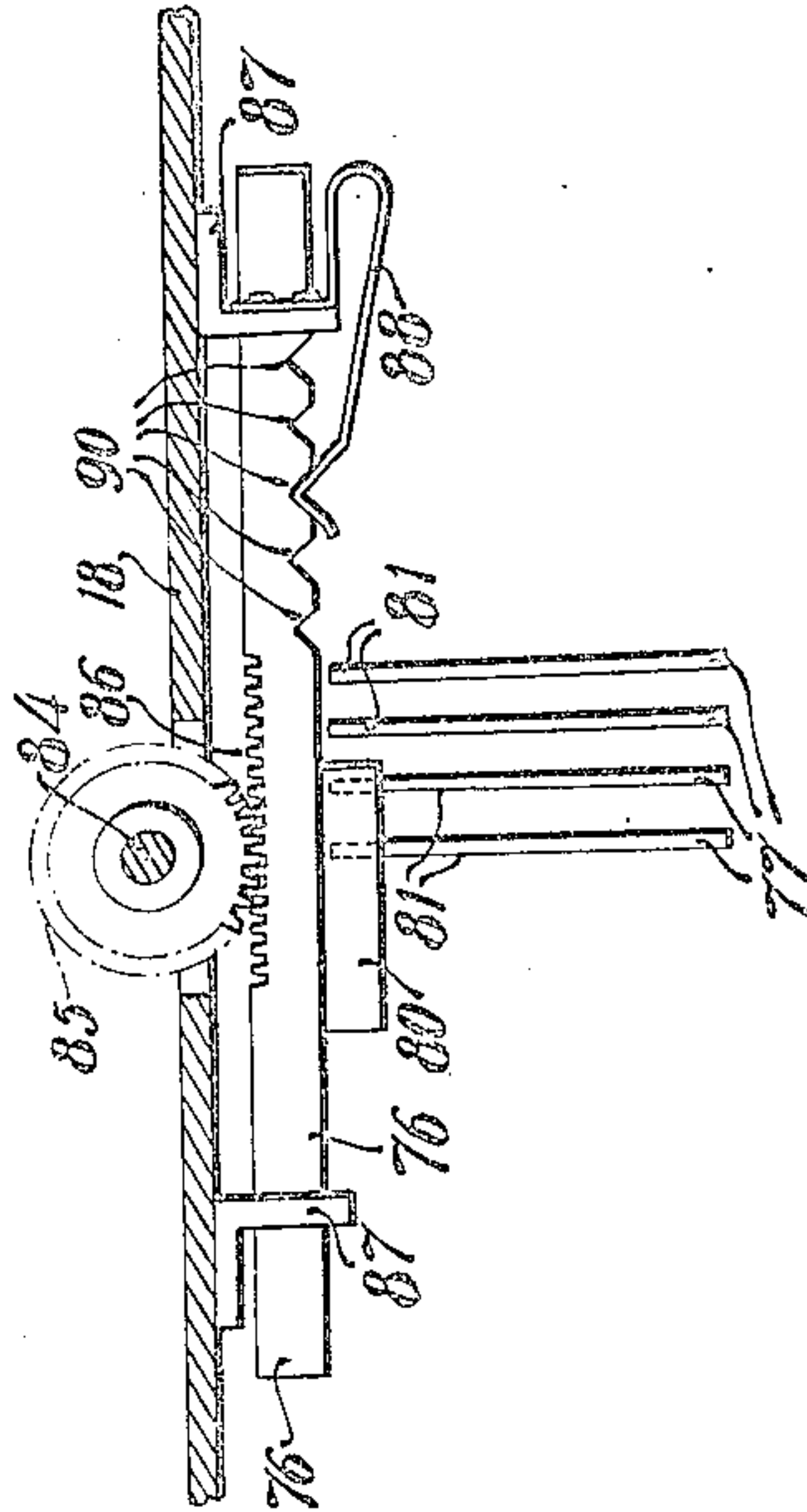
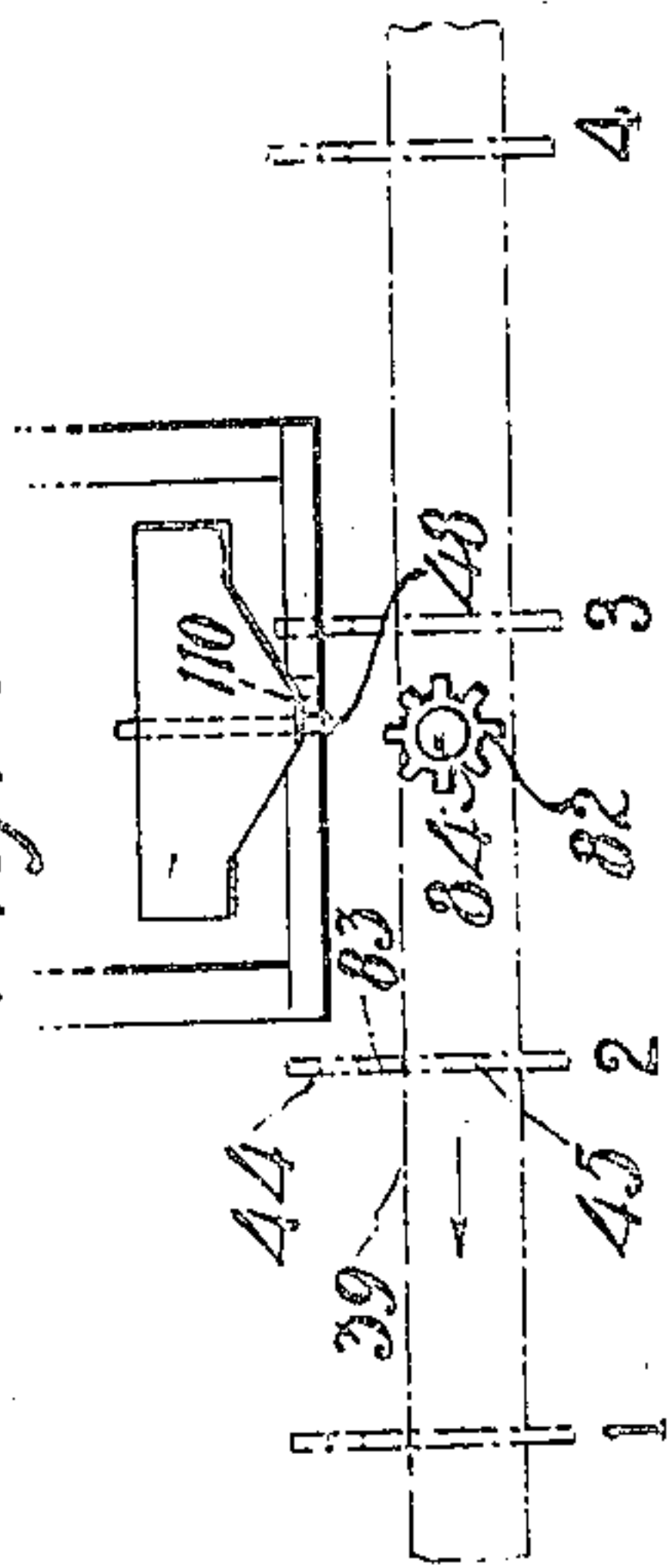


Fig. 3.





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Fig. 7.

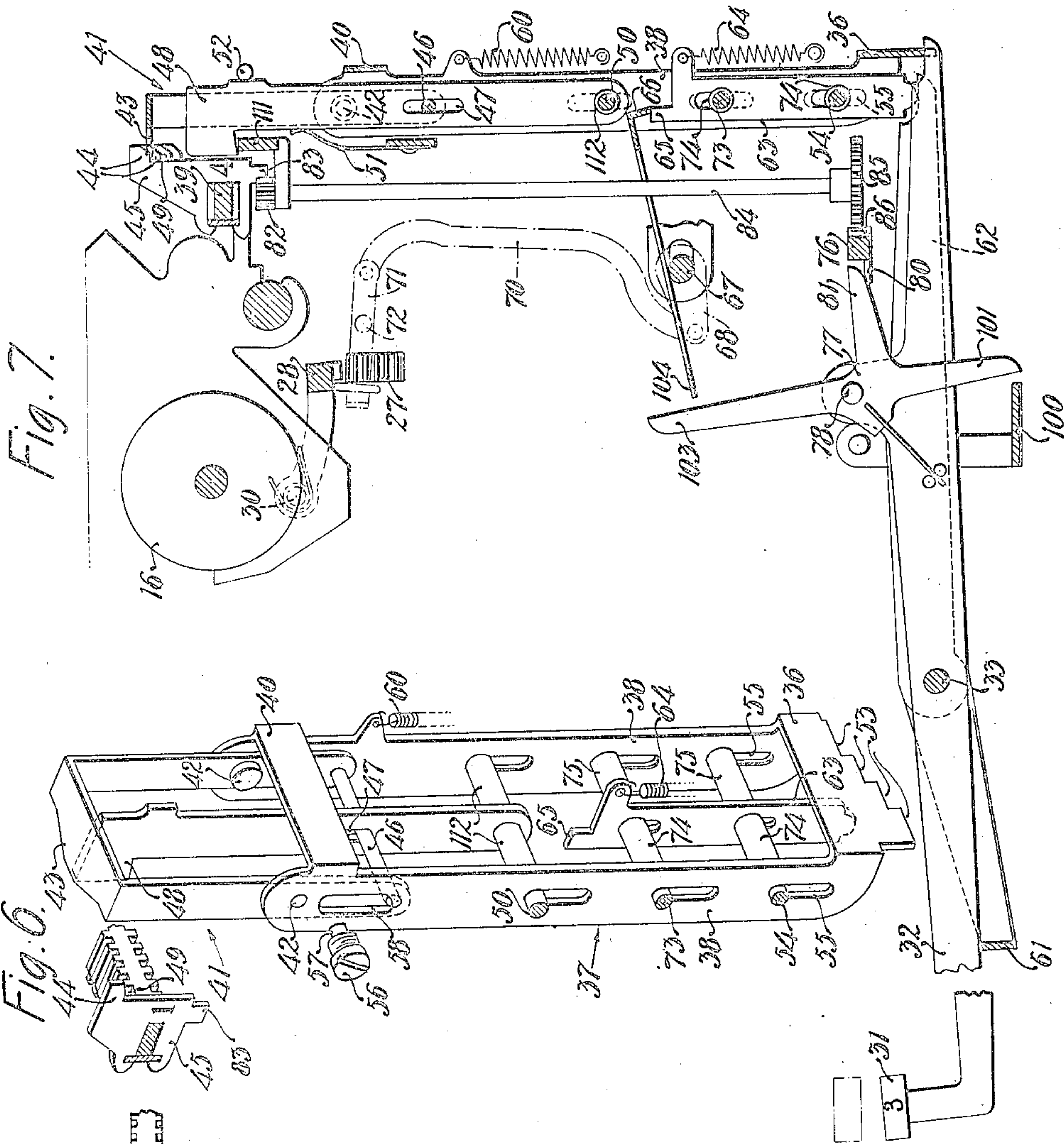


Fig. 6.

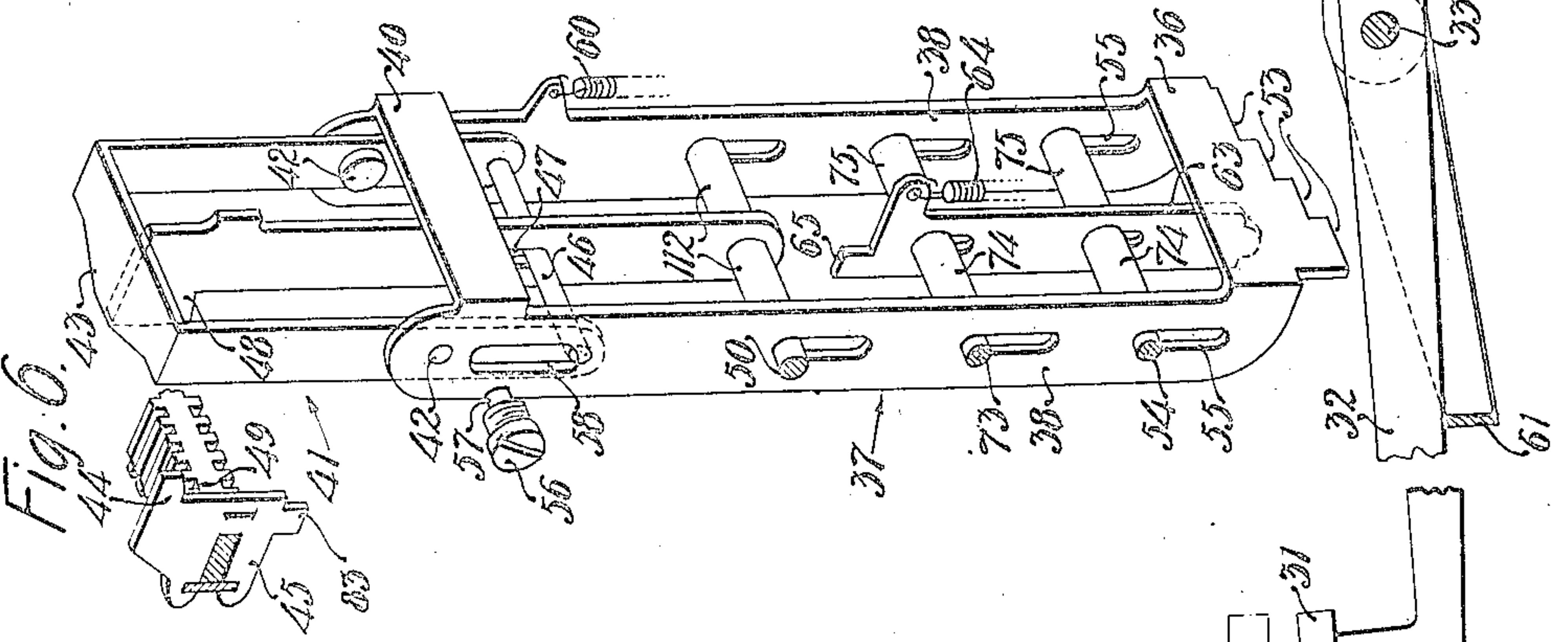
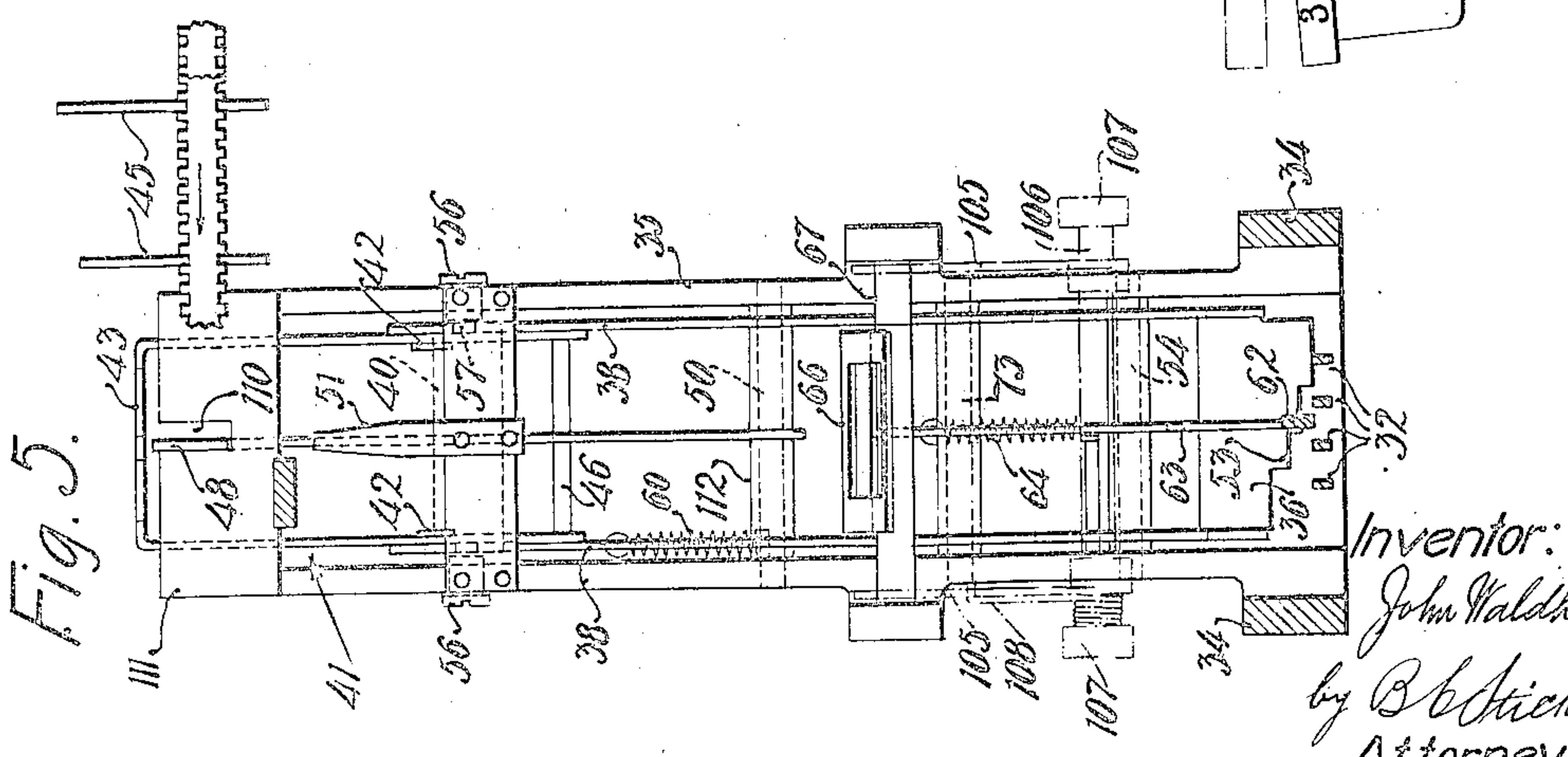


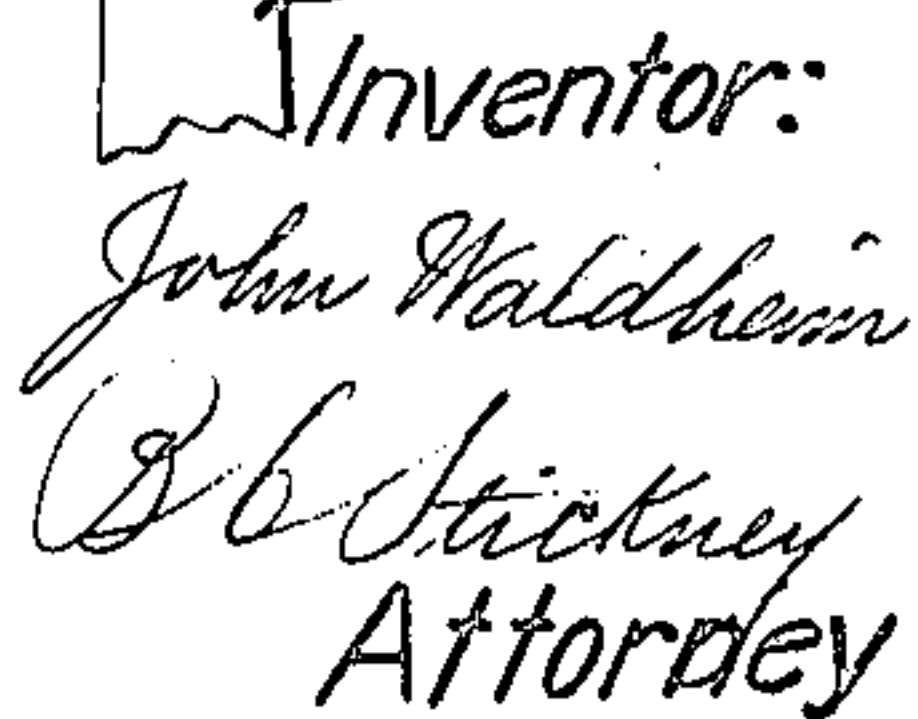
Fig. 5.



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Attorney

1,441,049.

4 SHEETS--SHEET 4.





## UNITED STATES PATENT OFFICE.

JOHN WALDHEIM, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO UNDERWOOD TYPE-  
WRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

## TYPEWRITING MACHINE.

Application filed February 19, 1921. Serial No. 446,259.

*To all whom it may concern:*

Be it known that I, JOHN WALDHEIM, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Typewriting Machines, of which the following is a specification.

This invention relates to typewriting machines, and more particularly to column-selecting tabulating mechanism therefor.

An object of the invention is the provision of mechanism to cause movement of the carriage either back or forth to a selected position or column by the depression of any one of a set of column-selecting keys. The keys operate to set a counter-stop actuator into effective relation with any one of a plurality of column-stops, and also to effect the movement of the carriage to the selected column; the selected column-stop being effective, upon the approach of the selected column, to operate the actuator; said actuator being effective to move an associated counter-stop into the path of the selected column-stop to arrest the carriage.

To move the carriage forwardly and backwardly to the selected position, there may be provided two driving elements, namely, the usual spring drum and a carriage-return motor. The driving elements may be rendered effective one at a time by the keys. In addition to setting the counter-stop actuator the keys are effective in a forward tabulation of the carriage to release the latter, so that it may be moved by the spring drum to the selected column. As the carriage advances and vacates the column, a reverse-feed-determining device is moved into effective relation with actuators associated with the corresponding column-selecting keys. If a key of a vacated column, which requires a backward tabulation of the carriage, is depressed, the associated actuator is operated, in addition to setting the counter-stop actuator; the associated actuator engaging with the reverse-feed-determining device to start the carriage-return motor to drive the carriage back to the selected column. The actuators associated with the keys are effective during a back tabulation of the carriage to render the carriage-releasing means ineffective.

Other features and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is a sectional side view of the machine, showing the invention applied thereto; the section being taken substantially in front of the "4" column-selecting key, as indicated by the line 1—1 in Figure 2; the parts being shown in their normal positions.

Figure 2 is a fragmentary top plan view of the machine; the section being taken on the line 2—2 of Figure 1.

Figure 3 is a diagrammatic top plan view, showing the relation of the column-stops, the counter-stop and the means for setting the reverse-feed-determining device

Figure 4 is a diagrammatic top plan view of the reverse-feed-determining device operable by the carriage, and shows the relation of parts when the carriage is positioned in the second column.

Figure 5 is a front view of a supporting bracket for the counter-stop and the column-selecting frame.

Figure 6 is a perspective view of the column-selecting frame and the counter-stop as seen from the rear and upper right-hand corner of the machine.

Figure 7 is a diagrammatic side view, showing the parts in position when the "3" column-selecting key is depressed, the carriage having not yet arrived at the selected column.

Figure 8 is a fragmentary diagrammatic side view, showing the parts positioned after the carriage is arrested in the selected column, the counter-stop actuator having been operated thereby to move the counter-stop into the path of the column-stops to arrest the carriage.

Figure 9 is a schematic view, showing the carriage-return motor connected with the carriage, and the motor-starting switch which is under the control of the keys.

Figure 10 is a diagrammatic view, showing the "1" column-selecting key operated and the motor switch closed to return the carriage to the first column; the carriage-releasing mechanism having been rendered ineffective.

The invention is in the nature of improvement which may be used in connection



with the device disclosed in my application No. 388,450, filed June 12, 1920, and is herein illustrated as applied to an Underwood typewriting machine, in which key-operated  
 5 type-bars 15 are swung upwardly and rearwardly to print against the front side of a platen 16. The platen may be rotatably mounted on a carriage 17, which may be fed step by step from right to left, during  
 10 type operations, on a main frame 18 by a spring drum 19 connected to the carriage by a strap 20.

To effect the step-by-step movements of the carriage, there is provided escapement  
 15 mechanism which may comprise a dog-rock-er 21 having a fixed dog 22 and a loose dog 23 thereon, to be reciprocated between the teeth 24 of an escapement wheel 25 at each type stroke by a universal bar 26 and a re-  
 20 turn spring (not shown). The escapement wheel has the usual one-way driving pawl connection with a pinion 27, which meshes with a feed-rack 28 pivoted at 30 on the carriage.

25 The carriage may be rapidly located in any one of a plurality of positions or columns by the depression of corresponding column-selecting keys 31 arranged at the front of the machine. When the carriage is  
 30 in its extreme right-hand position and it is desired to position it, for example, in the third column, the "3" column-key 31 is depressed (Figure 7) to swing its key-lever 32 about a fulcrum-rod 33 carried by arms 34  
 35 of a bracket 35 secured to the main frame 18. The rear ends of the key-levers engage a cross-bar 36 of a column-selecting frame 37 having two vertical sides 38 secured to each other at their upper ends by a cross-  
 40 bar or strap 40 (Figures 1, 5 and 6). The column-selecting frame 37 carries a counter-stop actuator 41, which may be pivoted on studs 42. The actuator 41 comprises a cam  
 45 of a projection 44 of a column-stop 45 in the third column, as indicated; the column-stops, of which there is one for each column, being adjustably mounted on a stop-bar 39 on the carriage. The carriage is also re-  
 50 leased at the same time, in a manner hereinafter described, and moved leftwardly by the spring drum 19. As the carriage approaches the selected column, the corresponding column-stop 45 engages, by means  
 55 of its projection 44, the cam 43 to swing the actuator 41 about its pivot comprising the studs 42. The actuator 41 is provided at its lower end with a cross-bar 46 extending through a slot 47 in a counter-stop 48 pivoted on a rod 50 supported in the bracket 35.  
 60 Thus, the actuator 41 when operated swings the counter-stop 48 about its pivot and into the path of the column-stop of the selected column. A return-spring 51 is provided for  
 65 the counter-stop 48 and normally holds the

latter against an abutment 52 (Figure 1). The projections 44 of the column-stops are provided with inclined faces 49 to assist the actuator in passing over, should there be a column-stop in its path when the actuator is  
 70 moved upwardly into the path of a projection higher than the one of the obstructing column-stop. The column-selecting keys 31 have a uniform depression and their associated levers 32 cooperate with engaging  
 75 portions 53 arranged in stepped relation on the cross-bar 36 of the column-selecting frame, so that the latter may be moved through varying distances by said keys to set the actuator 41 into effective relation with  
 80 the engaging portion 44 of any one of the column-stops 45 according to the desired column. The engaging portions 44 of the column-stops are also arranged in stepped relation, so that each may be in a separate path  
 85 into which the cam 43 of the actuator 41 may be moved.

The column-selecting frame 37 may be guided at its lower end on a rod 54 in the fixed bracket 35; said rod extending through  
 90 slots 55 in the sides 38 of said frame. The frame 37 may be guided at its upper end by screws 56 threaded into the bracket 35 and having reduced ends 57 received in slots 58 in the sides 38 (Figures 5 and 6). A spring  
 95 60 is provided to restore the column-selecting frame 37 to normal position.

To release the carriage from the escapement mechanism, while setting the actuator 41 by the column-selecting keys 31, there is  
 100 provided a universal bar 61 which underlies the column-selecting key-levers 32 (Figures 2 and 3), so that it may be operated by any one of them. The universal bar is secured to the fulcrum-rod 33, which is piv-  
 105 otally mounted in the arms 34 of the bracket 35. The rod then serves as a shaft to be rocked by the universal bar 61, and is provided with a rearwardly-extending arm 62 to raise a plunger or interponent 63 against  
 110 the tension of a return-spring 64. A projection 65 on said interponent 63 engages a release bar 66 to rock a shaft 67 in a counter-clockwise direction. The shaft 67 is provided with an arm 68 to pull a link 70 down-  
 115 wardly and swing a release lever 71 about its pivot 72 to raise the feed-rack 28 out of engagement with the escapement pinion 27. The carriage is then drawn to the left by the spring-drum 19 until arrested by the  
 120 counter-stop 48, as hereinbefore described. The interponent 63 may be guided vertically on the rod 54 and a rod 73 and laterally by means of sleeves 74 and 75 on each side of the interponent.  
 125

In some instances, a reverse tabulating operation of the carriage is necessary, as for example, when the carriage is in the third column and it is desired to move it back to the first column or second column. To effect  
 130



reverse or back tabulating operations of the carriage, there is provided a reverse-feed-determining device 76 (Figures 1, 2 and 4) which is operable by the carriage to move it into effective relation with intermediate devices or actuators 77 pivotally mounted at 78 on the column-selecting key-levers 32. The reverse-feed-determining device is normally to one side of the actuators 77, as indicated in Figure 2. Each time the carriage passes through a column in a latter-feed direction, said device 76 is operated to move a ledge or abutment 80 thereof into effective relation with an arm 81 on the actuator 77 associated with the key-lever 32 of the vacated column, thus rendering said actuator effective to be operated by the depression of the column-selecting key, to start the carriage-returning mechanism as will hereinafter appear.

The reverse-feed-determining device 76 is settable automatically by the carriage. To this end, a star-wheel 82 (Figures 1 and 3) may be operated by projections 83 on the column-stops 45 as they pass by, to impart a fractional rotation to a shaft 84 extending downwardly and having at its lower end a gear-wheel 85 meshing with a rack 86 on the reverse-feed-determining device 76 to move the latter back or forth, according to the movement of the carriage, into or out of effective relation with the actuators 77. The device 76 is guided in brackets 87 on the machine-frame 18. A detent 88 engages in notches 90 to hold the device 76 in the various positions to which it may be moved.

The carriage-returning mechanism may comprise a driving element, herein shown as an electric motor 91 which may be like that shown in the patent to A. G. Kupetz, No. 1,186,516, dated June 6, 1916. The motor may be secured to the right-hand side of the main frame 18 (Figure 9), and is connected in a circuit comprising conductors 92 and 93. A normally open switch 94 is connected in the motor-circuit, said switch comprising an element 95 pivoted at 99 on the main frame 18 and insulated therefrom. The element 95 may be operated against the tension of a spring 96, to close the circuit, by an arm 97 extending forwardly from a rock-shaft 98. The rock-shaft 98 has secured thereto a universal bar 100 (Figures 1 and 2), which may be operated by any one of the actuators 77, when the actuators are operated, due to the arms 81 engaging the abutment 80 by the depression of the keys 31. It will be seen that the arm 81 of the interponent engages with the abutment 80 of the reverse-feed-determining device to cause the actuator to swing about its pivot 78 and operate the universal bar by means of a downwardly-projecting arm 101 of the switch actuator 77, as in Figure 10. The switch 94 is thus closed, the counter-stop

actuator 41 having been set into the path of the "1" column-stop 45 by the "1" column-selecting key 31. The motor 91 then rotates to return the carriage 17 by means of a strap 99<sup>b</sup> which winds up on the motor-shaft 99<sup>a</sup>, and is connected to the typewriter carriage through the usual line-space handle 102. As the carriage approaches the selected column on its return, the projection 44 on the column-stop engages the cam 43 to swing the actuator 41 rearwardly and move the counter-stop 48 into the path of the selected column-stop, as previously described.

It is desirable to keep the feed-rack 28 in mesh with the pinion 27 during the backward tabulating operation of the carriage, so as to hold the carriage in the position to which it is moved after a key 31 is restored. To this end, the carriage-releasing mechanism is rendered ineffective during a back tabulating operation. Each switch actuator 77 is provided, for this purpose, with an arm 103, which may engage a universal bar 104 extending forwardly from the rock-shaft 67, to shift the release bar 66 out of effective relation with the projection 65 of the interponent or plunger 63 (Figure 10), so that the operation of said plunger will have no effect on said release bar. The release shaft 67 is embraced by two forked arms 105 extending from a rock-shaft 106 supported in brackets 107, to guide the release bar 66 in its shifting movements. A return spring 108 engages one of the arms 105 to restore the release bar 66 to effective relation with the plunger 63.

Since the counter-stop is engaged during a back tabulation of the carriage on the side opposite to that engaged during a forward tabulation, provision is made to permit a slight lateral displacement of the counter-stop rightwardly to arrest the carriage exactly in a letter-space position. For this purpose, the counter-stop 48 moves to the right-hand side of a slot 110 in a plate 111 (Figure 5) secured to the bracket 35. The counter-stop may be resilient to permit the lateral movement, and is provided with a hub 112 on each side to form a broad bearing therefor to normally hold the counter-stop against the left-hand side of the slot 110; the bearing also prevents twisting of the counter-stop in said slot when it is engaged by a column-stop.

The star-wheel 82 when rotated in either direction by a column-stop moves from the position in Figure 3, through an angular distance of one tooth space to move the reverse-feed-determining device 76 one space; consequently, there is always a tooth of the star-wheel in the path of the projections 83. On the return of the carriage to a selected column, the star-wheel is actuated at the end of the carriage movement, thus mov-



ing the reverse-feed-determining device leftwardly to take the abutment 80 thereof out of engagement with the actuator 77 of the operated column-selecting key. As a result, the switch 94 is opened to stop the motor.

It will be seen that the counter-stop is always effectively connected with the actuator 41, that the latter is pivotally supported on the column-selecting frame 37, and that the frame 37 may be set by the keys 31 to bring the actuator into effective relation with any one of the column-stops 45. Further, that movements of the carriage in either direction may be effected by the same keys to operate the actuator through the medium of the column-stops to move the counter-stop into the path of the column-stops to arrest the carriage.

It will readily be understood that the device may be used for quickly positioning the carriage when typing headings of letters and addressing envelopes, etc.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination of a carriage, column-stops on said carriage, a counter-stop having a slot therein, a key-actuated column-selecting frame, guiding means therefor, an actuator on said frame, said actuator being settable through the medium of said frame into effective relation with any one of the column-stops, so that it may be actuated by the column-stop of the selected column, and a cross-bar on said actuator extending through the slot in the counter-stop to move the counter-stop into the path of the selected column-stop to arrest the carriage.

2. In a typewriting machine, the combination of a carriage, column-stops on said carriage, engaging portions on said stops, said portions being arranged in stepped relation, a counter-stop extending downwardly from the column-stops and pivoted at its lower end, an actuator for said counter-stop, and key-operated means to move said actuator upwardly into effective relation with any one of the column-stops, said actuator being pivoted intermediate its ends, the upper end thereof being movable rearwardly by the selected column-stop, the lower end engaging the counter-stop to swing the latter forwardly about its pivot as the carriage approaches the selected position and into the path of the selected column-stop to arrest the carriage.

3. In a typewriting machine, the combination of a carriage, column-selecting mechanism comprising key-levers, a carriage-return motor, intermediate actuators operable by said key-levers, a universal bar operable by said actuators, a switch to be closed by

said universal bar to start said motor, escapement mechanism for said carriage, a carriage-advancing motor, releasing means operable by said key-levers to set the carriage free of the escapement mechanism, said means comprising a release bar, an interponent to operate said release bar, a universal bar to operate said interponent, said universal bar being operable by said key-levers, and intermediate levers operable by said key-levers to render the release bar and the interponent relatively ineffective to retain the carriage under the control of the escapement mechanism when the carriage is operated by the carriage-return motor.

4. In a type-writing machine, the combination of a carriage, column-selecting key-levers, actuators associated with said key-levers, a carriage-advancing motor, escapement devices for said carriage, carriage-releasing means operable by said key-levers to set the carriage free of the escapement devices, a carriage-return motor, means operable by said key-levers through the intermediary of the actuators to start the carriage-return motor, an element movable out of and into effective relation with the actuators by the carriage, to determine whether the carriage-advancing motor or the carriage-return motor shall be effective when one of the key-levers is actuated, and means to arrest the carriage.

5. In a typewriting machine, the combination of a carriage, column-selecting key-levers, actuators associated with said key-levers, a carriage-advancing motor, escapement devices for said carriage, carriage-releasing means operable by said key-levers to set the carriage free of the escapement devices, a carriage-return motor, means operable by said key-levers through the intermediary of the actuators to start the carriage-return motor, an element movable into and out of effective relation with the actuators by the carriage, to determine whether the carriage-advancing motor or the carriage-return motor shall be effective when one of the key-levers is actuated, column-stops, a counter-stop, and a counter-stop actuator, the latter being operable by the column-stops when the carriage is moved in either direction, the counter-stop actuator being effective to move the counter-stop into the path of the operating column-stop to arrest the carriage in the selected column.

6. In a typewriting machine, the combination of a carriage, column-selecting keys, carriage-advancing means, means operable by said keys to start said carriage-advancing means, carriage-returning means, means operable by said keys to start said carriage-returning means, key-operated devices, an element settable by the carriage relatively to said devices, said devices engaging said element, when operated by said keys, to render



ineffective the starting means for the carriage-advancing means, and to render effective the carriage-returning means when the carriage is to be returned to a vacated column, and means to arrest the carriage in the selected column.

7. In a typewriting machine, the combination of a carriage, column-selecting keys, carriage-advancing means, starting means for the latter operable by said keys, an element settable by the carriage, actuators to engage said element and operable by said keys to render said starting means ineffective when the carriage is to be returned to a vacated column, and means to arrest the carriage in a selected column.

8. In a typewriting machine, the combination of a carriage, column-selecting keys, carriage-returning means, a settable element, actuators to engage said element and operable by said keys to start the carriage-returning means, means to move said element out of effective relation with each of said actuators when the carriage is returned through the corresponding column, and means to arrest the carriage in the selected column.

JOHN WALDHEIM.

Witnesses:

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