

WITNESSES:

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Charles F. Smith

INVENTOR:

John Waldheim

By Jacob Feller
HIS ATTORNEY

Patented Dec. 13, 1910

978,522.

3 SHEETS-SHEET 2.

FIG. 2.

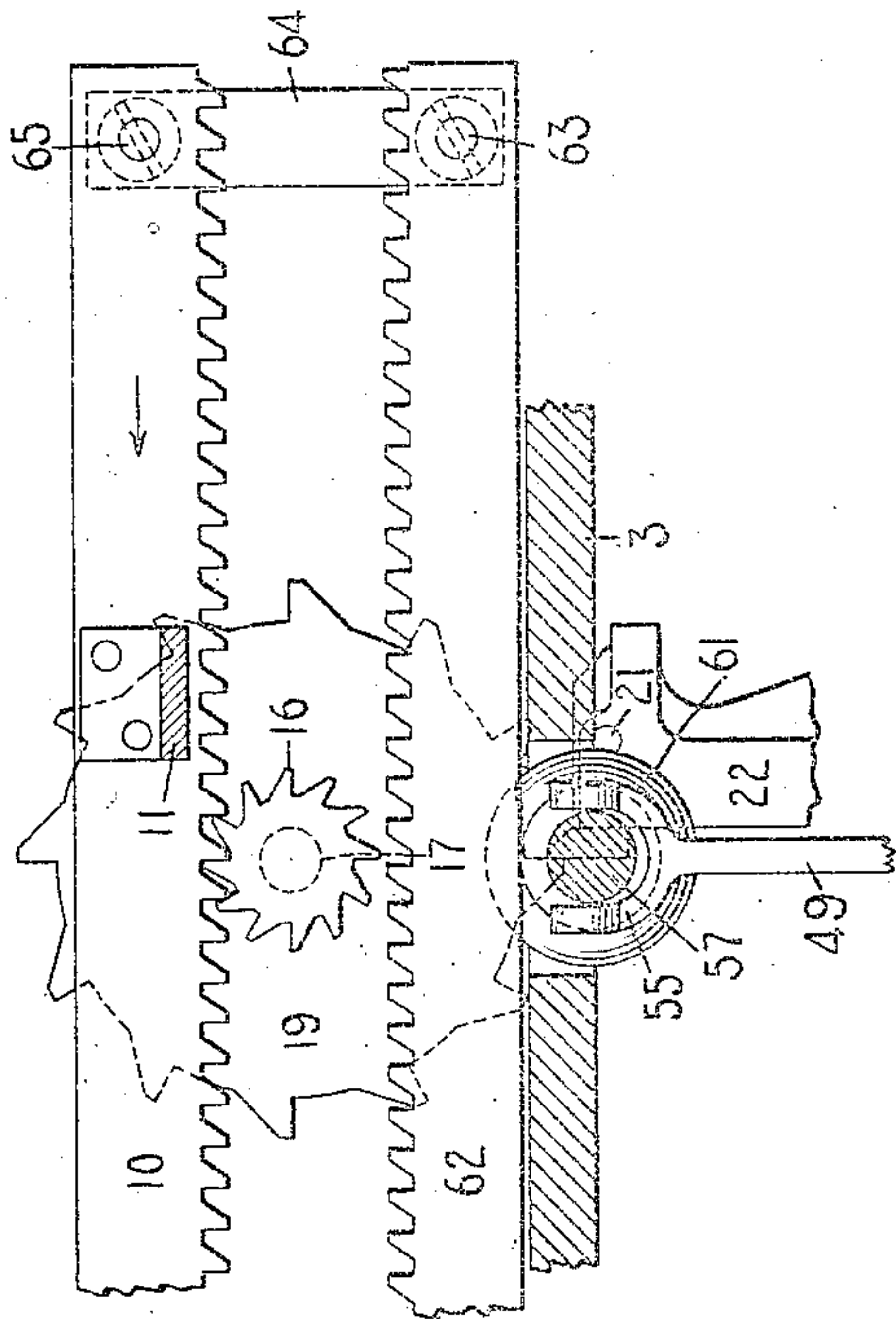


FIG. 3.

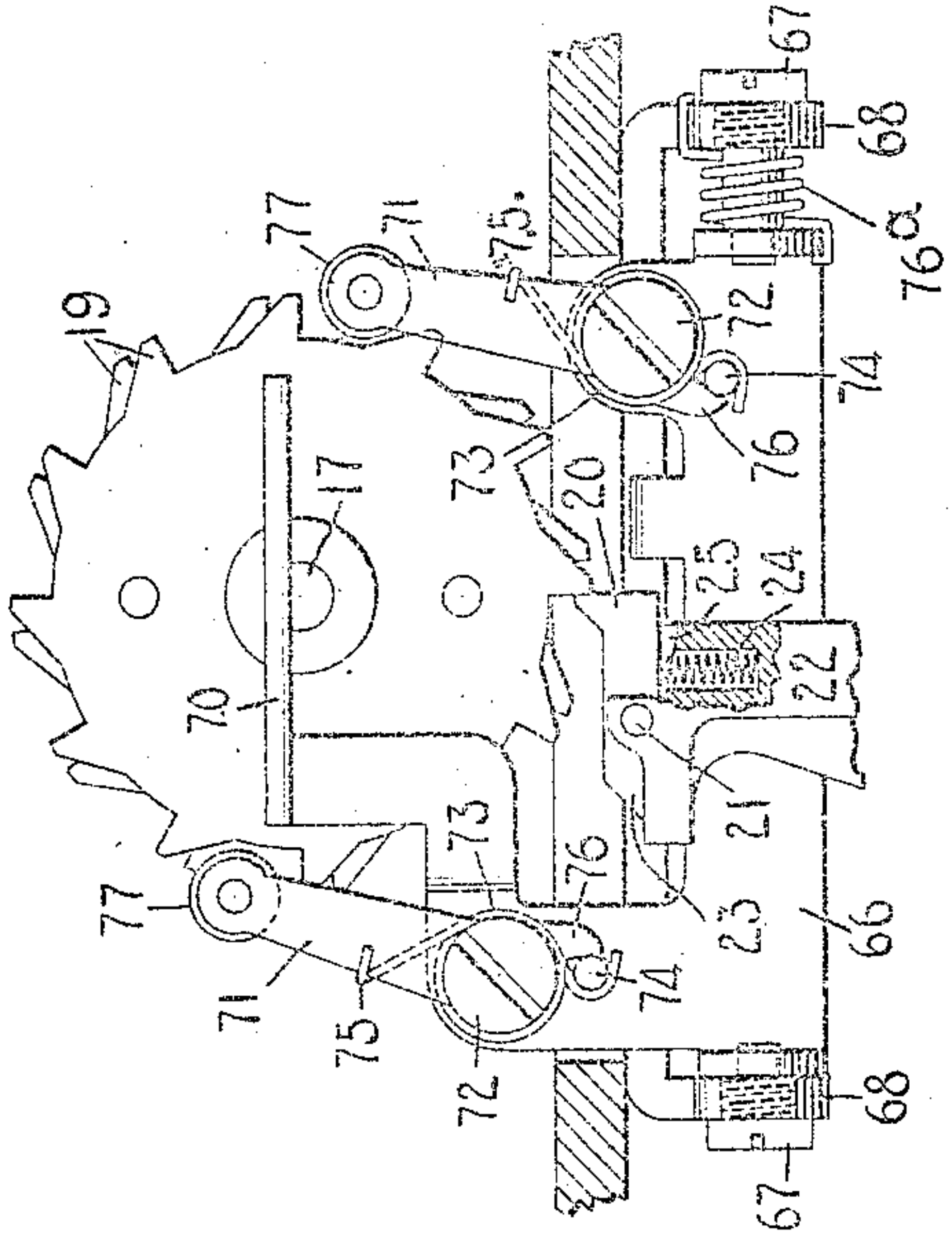


FIG. 4.

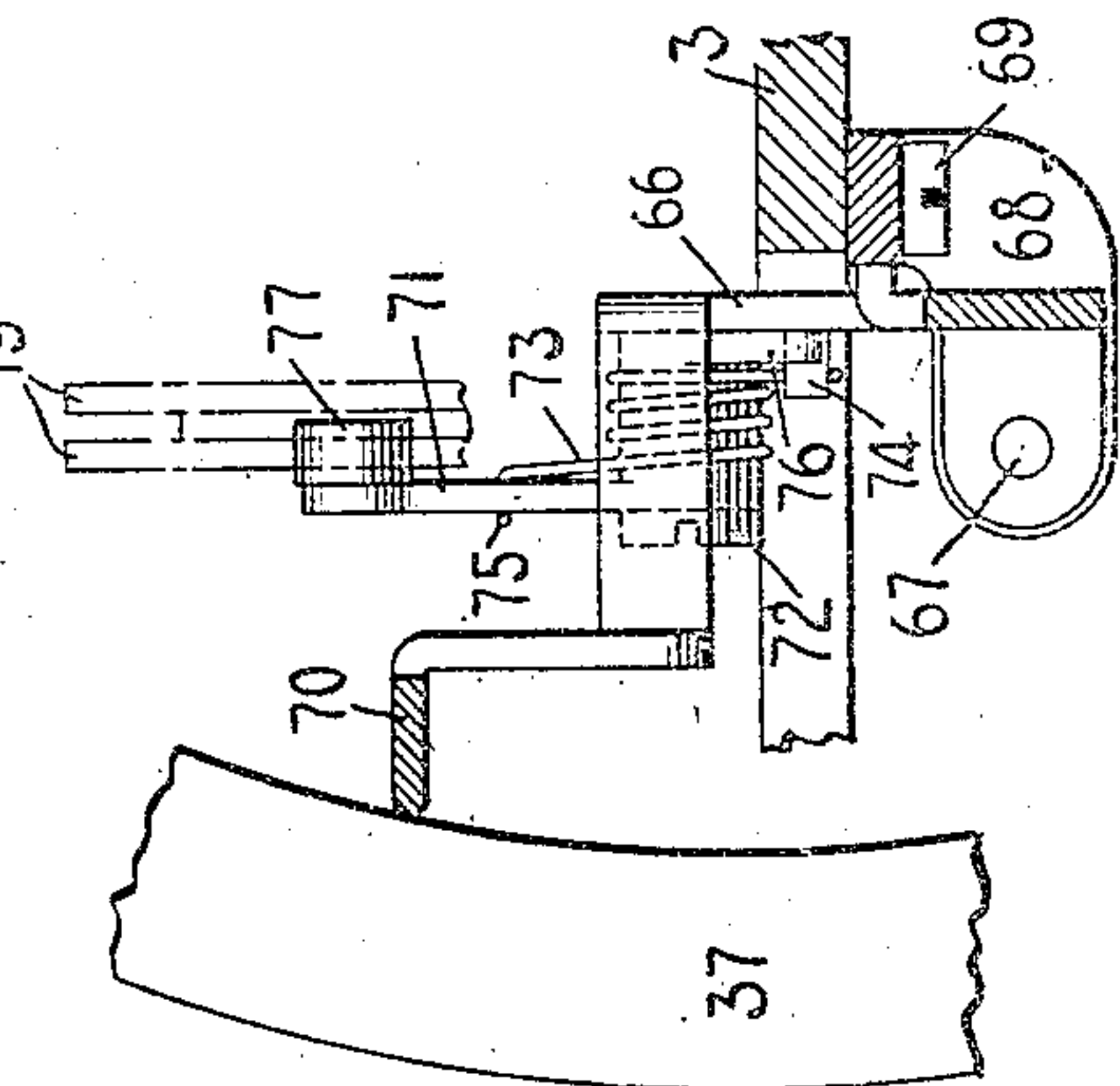


FIG. 5.

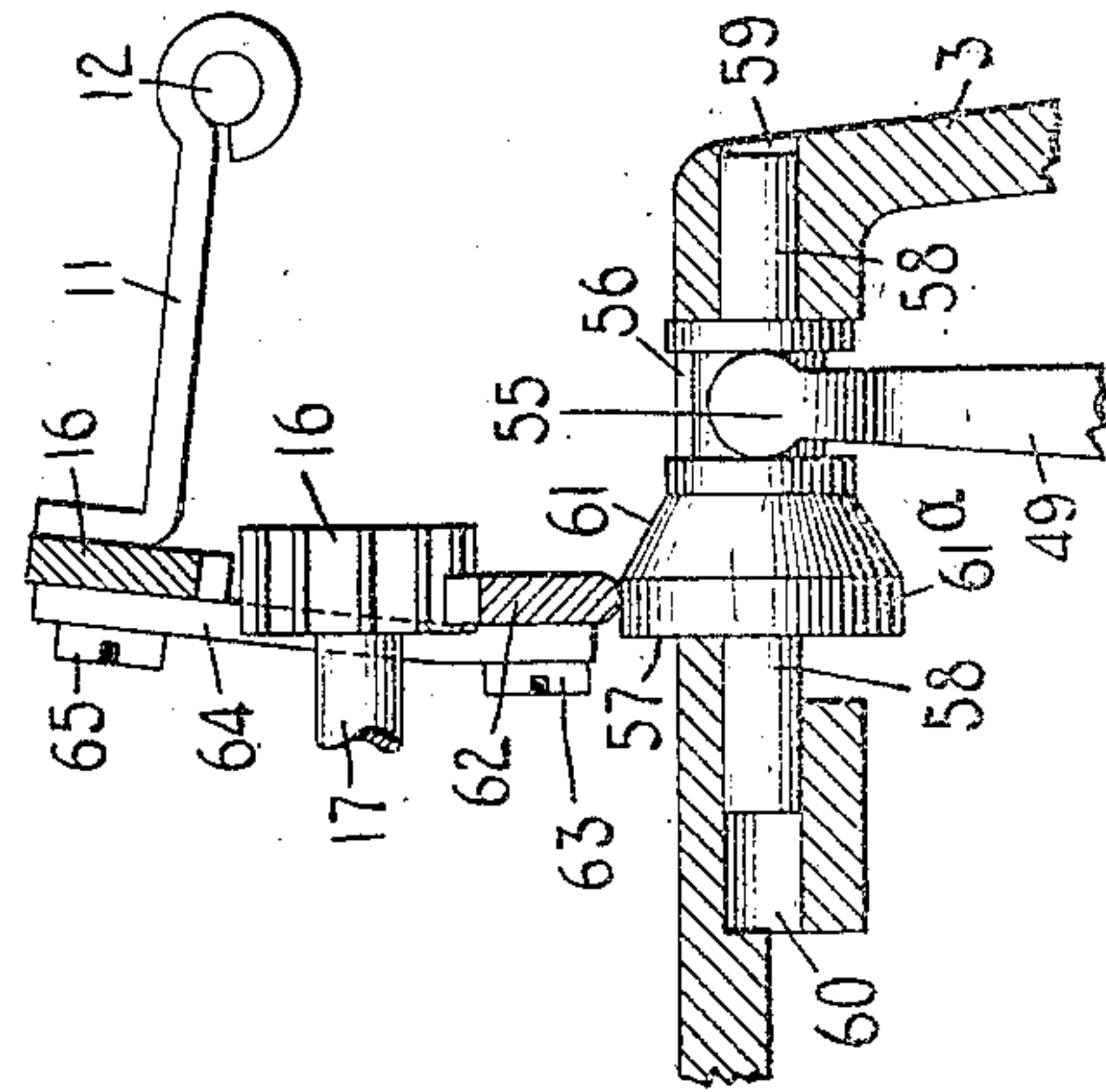
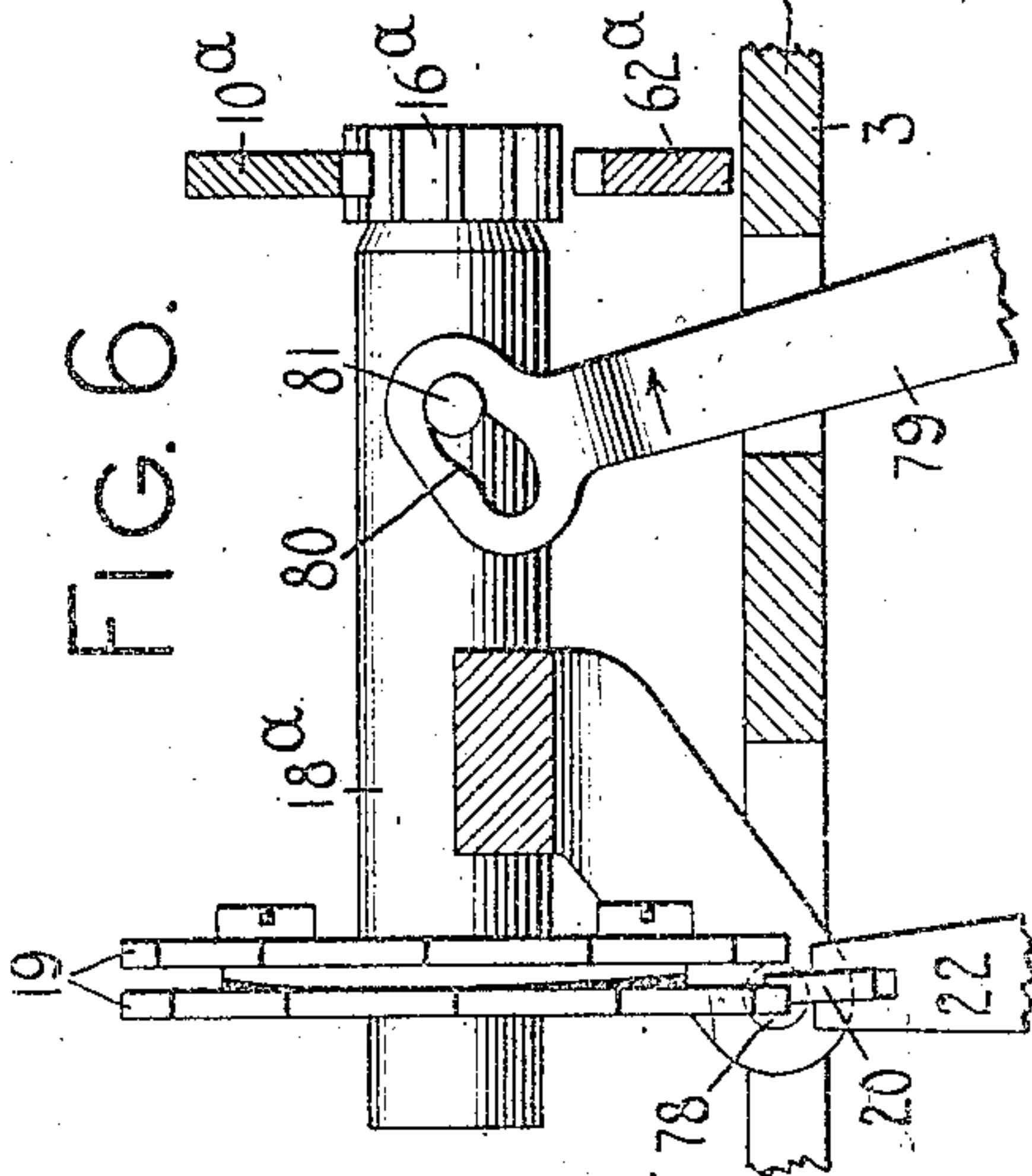


FIG. 6.



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TYPE WRITING MACHINE.
APPLICATION FILED, MAY 12, 1910.

Patented Dec. 13, 1910.

3 SHEETS-SHEET 3.

FIG. 8.

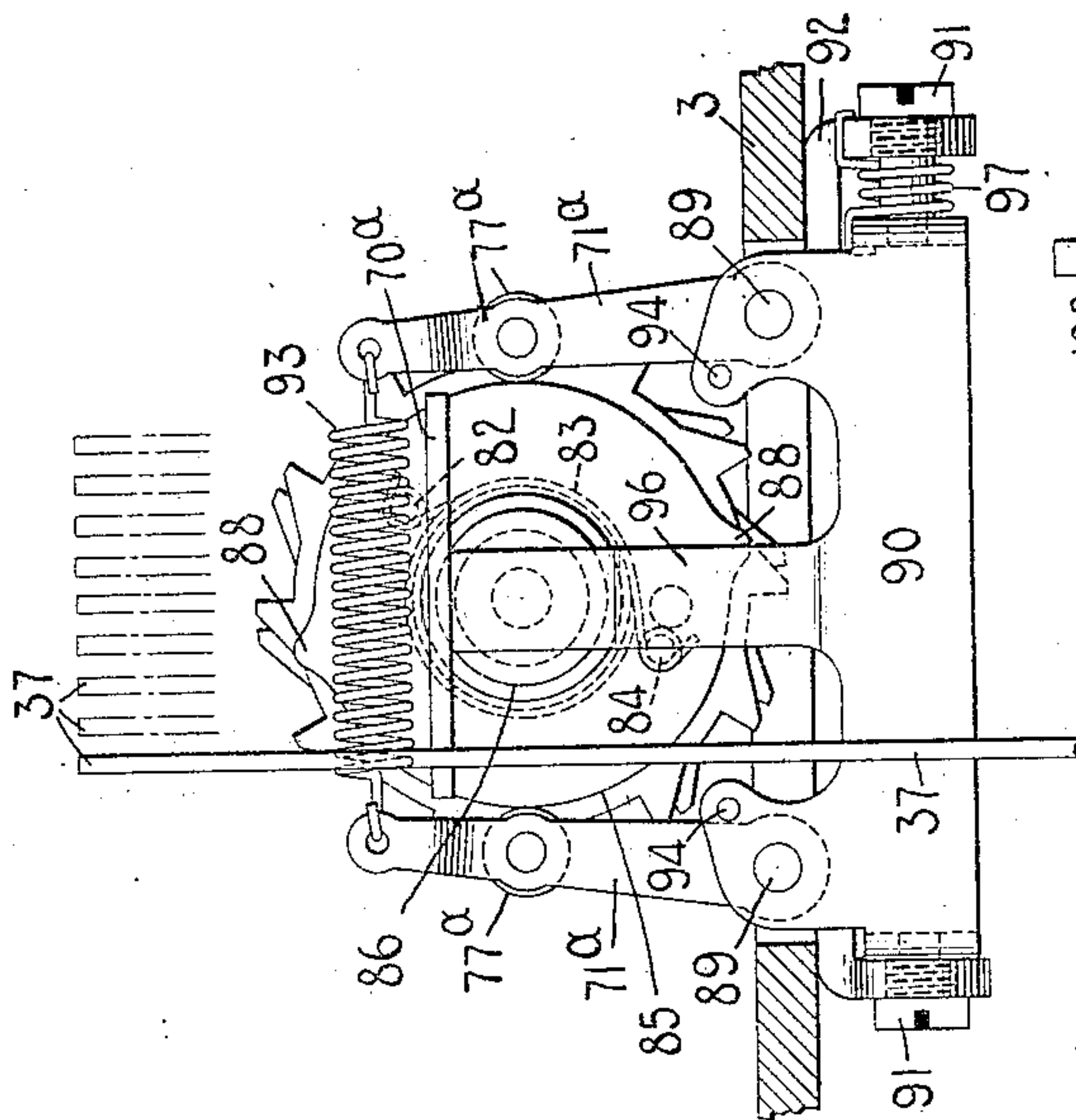


FIG. 7.

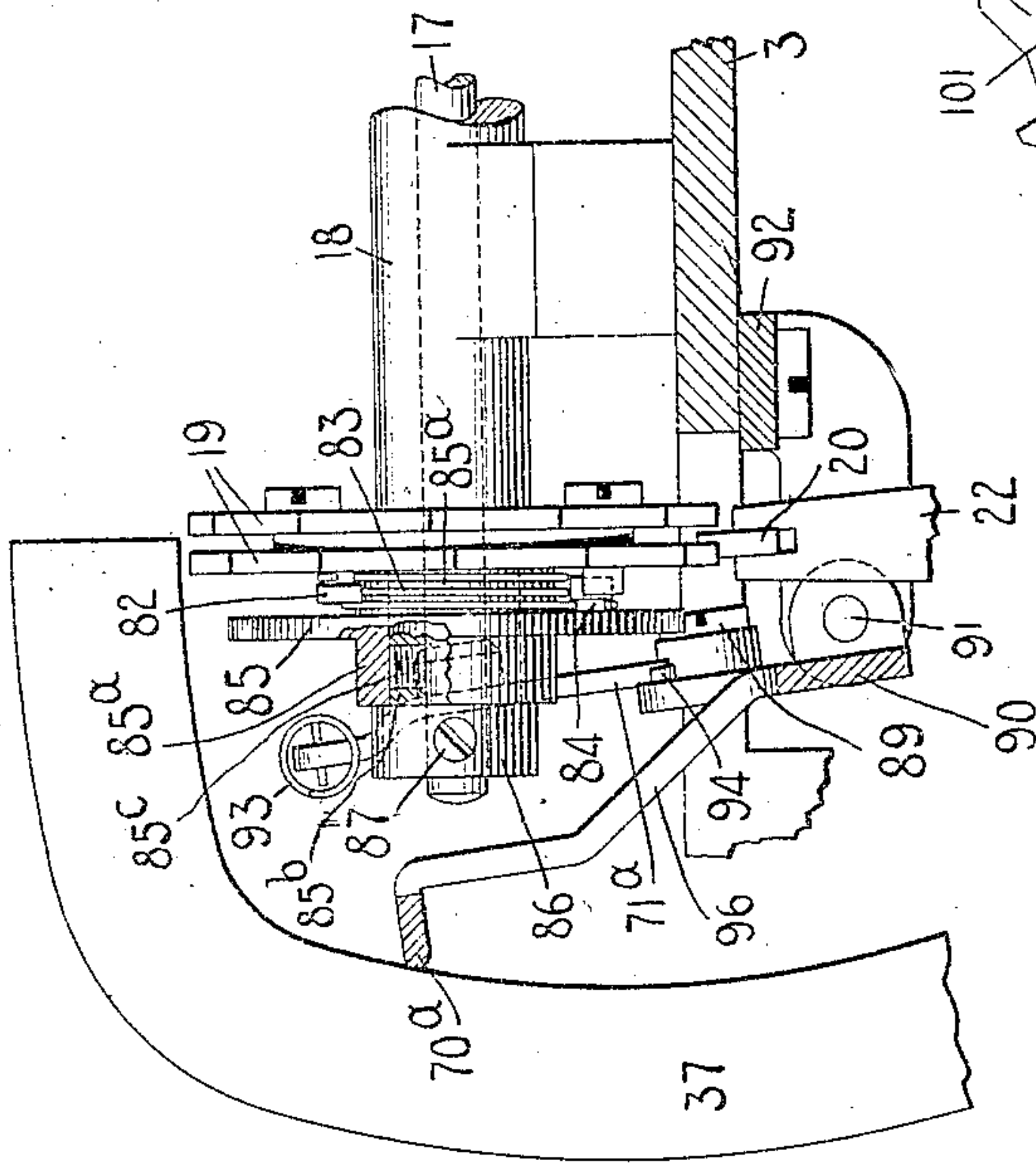


FIG. 11.

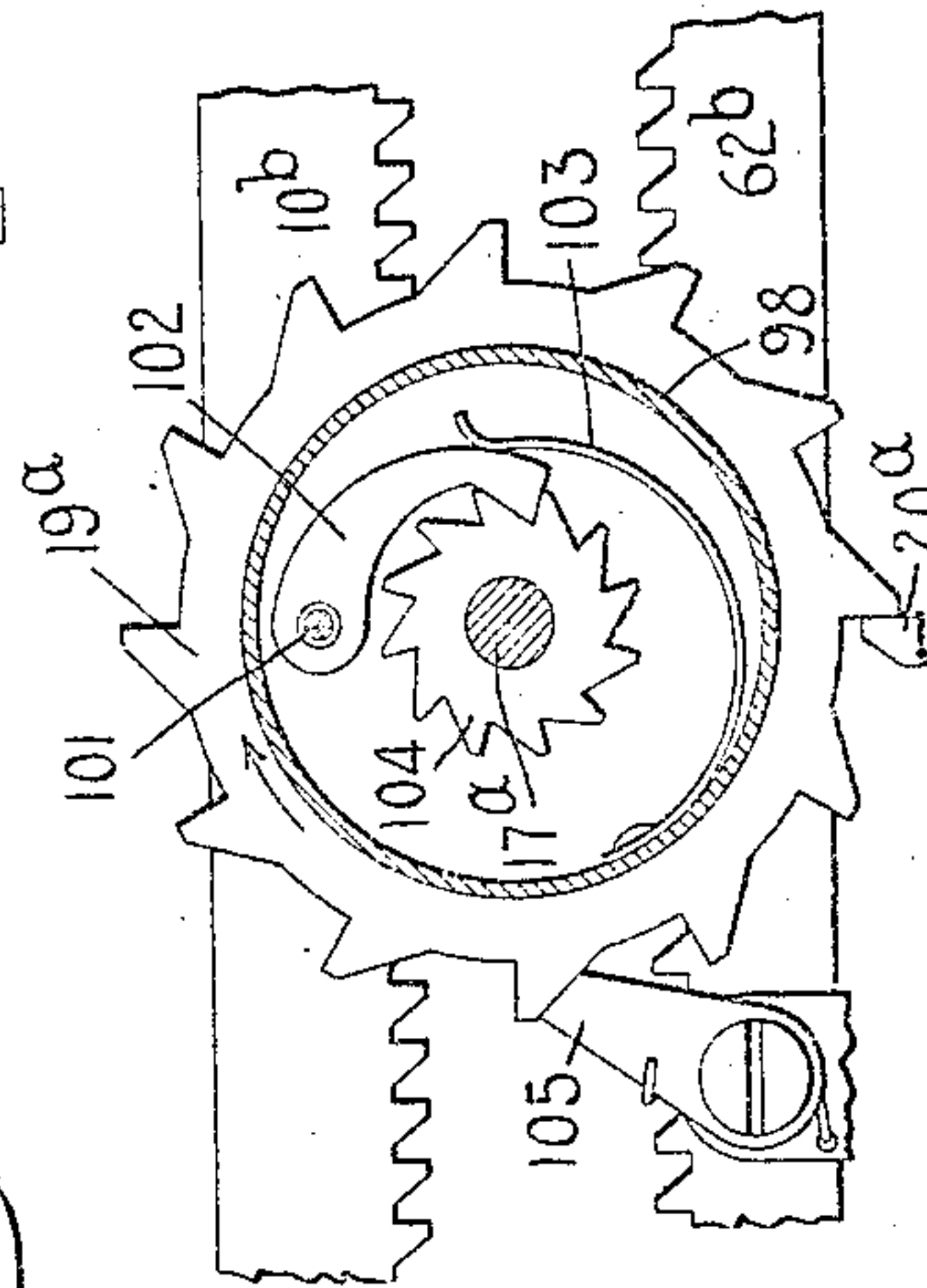
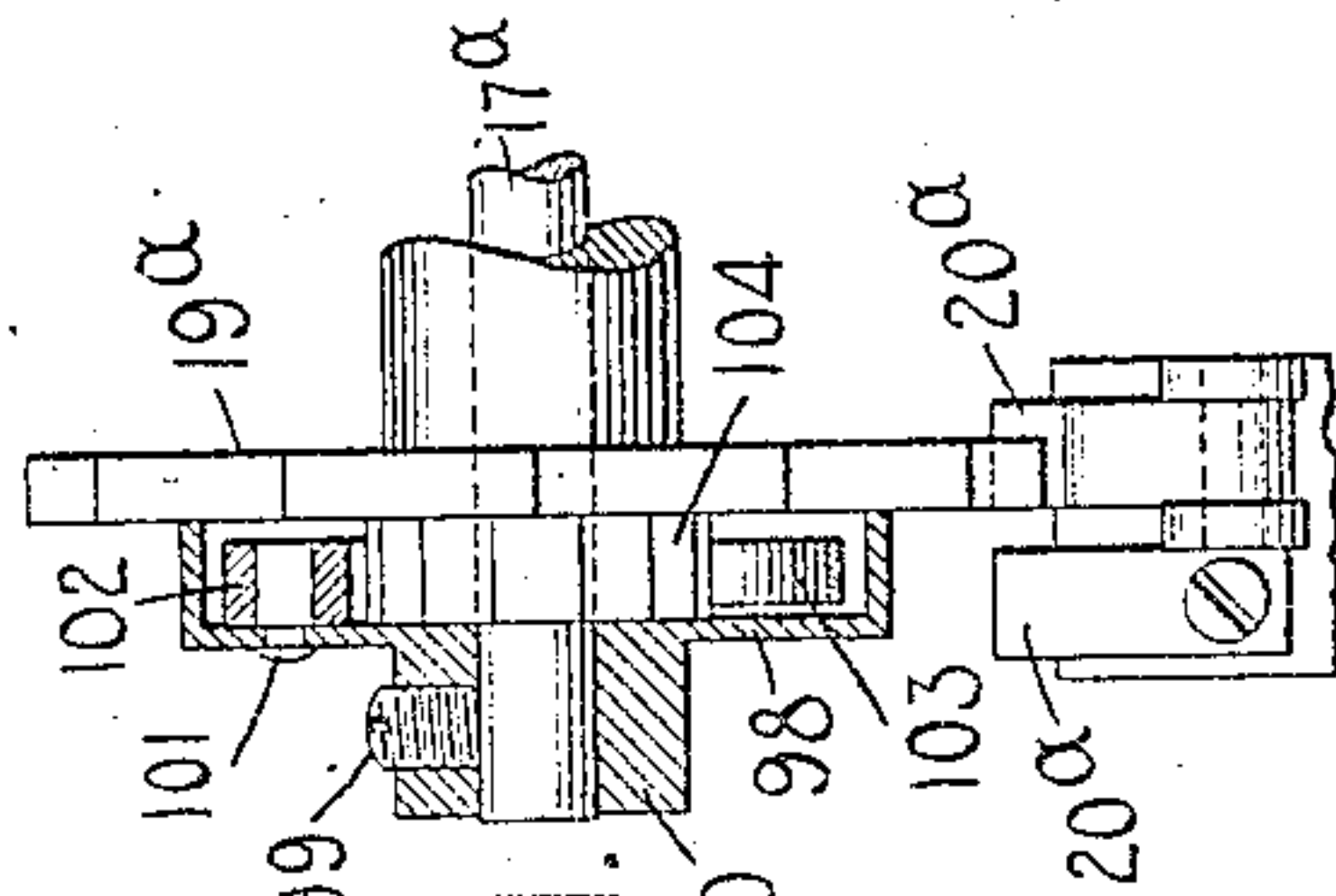
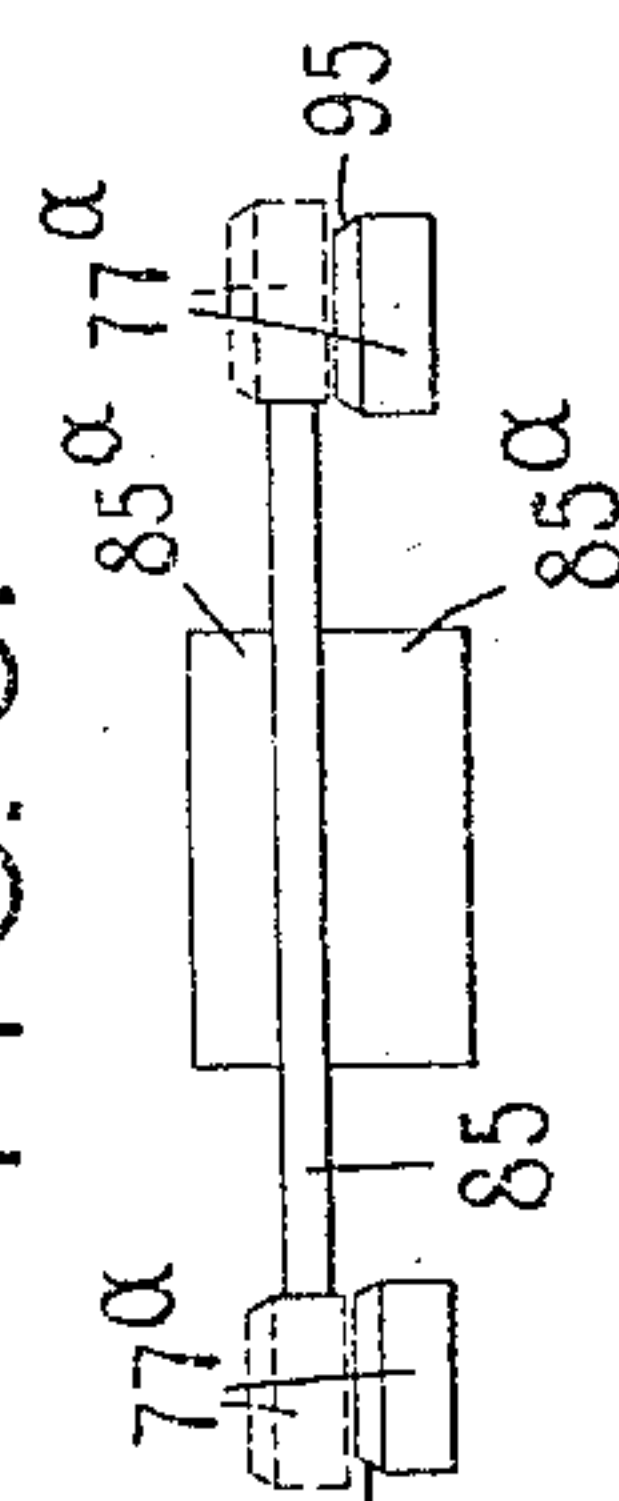


FIG. 10.

FIG. 9.



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UNITED STATES PATENT OFFICE.

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TYPE-WRITING MACHINE.

978,522.

Specification of Letters Patent.

Patented Dec. 13, 1910.

Application filed May 12, 1910. Serial No. 560,840.

To all whom it may concern:

Be it known that I, JOHN WALDHEIM, citizen of the United States, and resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to means for preventing a rebound of the carriage when it is arrested at the end of its travel, in a tabulating operation for example.

The invention also relates to means for retarding the movement of the carriage during such a travel thereof and when it is released from letter space control of the escapement mechanism.

To the above and other ends my invention consists in the features of construction, arrangements of parts and combinations of device to be hereinafter described and more particularly pointed out in the appended claims.

In the accompanying drawings wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a fragmentary vertical fore and aft sectional view of one form of typewriting machine embodying my invention, only sufficient of the machine being shown to illustrate my invention in its embodiment therein. Fig. 2 is an enlarged detail fragmentary vertical transverse sectional view looking from the front of the machine and showing certain of the devices to be hereinafter more fully described. Fig. 3 is an enlarged detail fragmentary rear elevation with parts broken away showing portions of the escapement mechanism and certain of the associated parts. Fig. 4 is a fragmentary detail side view with parts in section of the retarding device and some of the associated parts. Fig. 5 is a side view with parts in section of the carriage releasing mechanism and certain of the associated parts. Fig. 6 is an enlarged detail fragmentary side elevation with parts in section of the escapement mechanism and a modified form of construction for effecting a release of the carriage. Fig. 7 is an enlarged detail fragmentary side elevation with parts in section and parts broken away showing a still further modified form of retarder construc-

tion. Fig. 8 is an enlarged detail fragmentary rear elevation of the parts shown in Fig. 7. Fig. 9 is a detail plan view of the retarding device and associated parts shown in Fig. 8. Fig. 10 is a rear view with parts sectioned away of a still further modified form of anti-rebound construction embodying my invention. Fig. 11 is a side elevation of the same with parts in section.

I have only shown in the different figures so much of a complete typewriting machine as is necessary to an understanding of my invention.

In Figs. 1 to 5 and 7 and 8 I have shown my invention embodied in a machine similar to the No. 11 Remington machine, whereas in Figs. 10 and 11 I have shown my invention embodied in a machine resembling the No. 6 Remington machine. It will be seen from the following description that the invention may be embodied in either of these machines without modifying, or materially modifying, said machines as they now exist. It should be understood, however, that the invention may be embodied in various styles of typewriting machines.

Referring more particularly to Figs. 1 to 5 of the drawings, the frame of the machine will be seen to comprise a base 1, corner posts 2 and a top plate 3. Fixed, oppositely disposed, grooved guide rails 4 are supported on a top plate and receive anti-friction balls or rollers 5, said rollers being also received in oppositely grooved front and rear guide bars 6 and 7, respectively, of a carriage 8. The carriage supports a cylindrical platen 9 conventionally represented in Fig. 1.

The escapement mechanism which controls the carriage in its letter space movements, as shown in Figs. 1 to 5, comprises a feed rack 10 secured to the rear ends of arms 11 pivoted at their forward ends, as at 12, to brackets 13 fixed on the rear cross bar or guide rail 7 of the carriage. A leaf spring 14 is secured at one end by a screw 15 to the rail 7 of the carriage and bears downwardly at its free end on one of the arms 11 to press the rack 10 downwardly. A feed pinion 16 is fixedly mounted on the forward end of a shaft 17 which turns in a bearing 18 fixed to the top plate of the machine. The rear end of the rock shaft 17 has two relatively adjustable escapement wheels

19 secured thereto so that the escapement wheels are fixed relatively to each other and are fixed to turn with the feed pinion and its shaft 17 in both directions. The escapement wheels 19 are preferably adjusted so as to bring their teeth out of register, as shown in Fig. 3, and to provide a "drop" from one wheel to another. A feed dog 20 is pivoted at 21 to a dog rocker 22 and is adapted to cooperate first with one escapement wheel and then the other in the vibratory movement of the dog rocker back and forth and thus afford a letter feed movement of the carriage. The dog 20 is extended beyond its pivot as at 23 where it cooperates with the dog rocker to limit the upward movement of the dog into engagement with the escapement wheels. An expansion spring 24 is received in a cut-out in the dog rocker 22 and bears at its lower end against the bottom wall of the cut-out and at its upper end against the feed dog 20 to normally maintain it in the elevated position shown in Fig. 3. The dog rocker is cut away at 25 to afford a downward movement of the feed dog 20 around its pivot 21 against the spring 24; the feed dog being pressed downwardly by the engagement of one of the escapement wheels therewith during the reverse rotation of the escapement wheels. The escapement mechanism thus far described is practically the same as that embodied in the No. 11 Remington machine and is substantially the same as that shown in the patent to Yaw dated Dec. 28, 1909, No. 944,303. The dog rocker 22 is pivoted at 26 and is provided with a forwardly extending arm 27 connected to a downwardly extending link 28 which is actuated at each printing operation as in the No. 11 Remington machine. The dog rocker and the parts associated therewith are restored to normal position by a spring 29 connected at one end to a pin 30 which projects from the dog rocker and at its opposite end to a pin 31 which extends from a bracket plate 32 to which the dog rocker is pivoted. It should be understood that a step-by-step letter feed movement of the carriage in the direction of its feed is effected by the usual spring drum *a* at each forward and backward movement of the dog rocker in the usual manner, the feed dog 20 moving from one escapement wheel 19 to the next and back again. A disengagement of the carriage from step-by-step control of the escapement mechanism may be effected by lifting the feed rack 10 in the usual manner and may also be effected by means which will be hereinafter described.

I have shown embodied in the present construction tabulating mechanism similar to that employed in the No. 11 Remington machine. It should be understood, however,

that for the purpose of the present invention any tabulating mechanism may be employed. Rearwardly extending bracket arms 33 are secured to the carriage and support a toothed column stop bar 34 along which bifurcated column stops 35 may be adjusted. A series of denominational stops 36, each formed as a part of a downwardly extending stop-carrying lever 37, is provided. The levers 37 are pivoted at 38 on a pivot rod fixed at its ends in a tabulator frame 39 secured to the frame of the machine in the usual manner. The denominational stops 36 extend through openings in a guide plate 40 fixed to the tabulator frame 39. The lower ends of the denominational stop-carrying levers are connected to links 41 which in turn are connected at their forward ends to angle levers 42 pivoted at 43 to the base of the machine. Each lever 42 cooperates with a key stem 44 which carries a denominational key 45. Each angle lever 42 is also connected to one end of a contractile spring 46, the opposite end of said spring being connected to a plate 47 fixed on the frame. The key stems 44 are guided in guide openings in the plate 47 and in a plate 48.

The carriage releasing means controlled by an actuation of the tabulator mechanism comprises a lever-like carriage release frame 49—49^a pivoted by a rock shaft 50 to a depending bracket 51 secured by a screw 52 to the top plate of the machine. The lower part of the frame comprises two depending arms 49 arranged outside of the tabulator levers 37 and fixedly connected at their upper ends to the rock shaft 50. The lower ends of the arms are united by a cross-rod 54 which extends back of the lower end portions of the levers 37 so that a rearward movement of the lower ends of any of the levers 37 effects a corresponding movement of the lower end of the release frame. The upper part of the release frame comprises a crank arm 49^a fixed to and located centrally of the rock shaft 50. A spring 53 surrounds the rock shaft 50 and is connected at one end to the bracket 51 and at its opposite end to the crank arm 49^a so as to tend to force the upper end of the release frame toward the rear of the machine. The upper end of the crank arm 49^a is forked at 55, the forked ends being received in a circumferential groove 56 in a releasing device 57. The releasing device comprises a spindle 58 received in bearings 59 and 60 in the top plate of the machine so that the device 57 is supported for both a rotative movement and for longitudinal movement in its bearings. The releasing member 57 has a frusto-conical engaging portion 61 which is adapted to cooperate with the lower edge of a rack 62 connected by screws 63 to

depending arms 64 which are secured at their upper ends to the feed rack 10 by screws 65. The racks 10 and 62 are thus fixedly united at their ends and are oppositely disposed, as shown in Fig. 2, to cooperate with the feed pinion 16 on opposite sides thereof. The rack 62 is normally out of engagement with the feed pinion and is carried up into engagement with the feed pinion when the feed rack 10 is disengaged therefrom so as to effect an operative connection between the rack 62 and the escapement wheel when the feed rack 10 is disengaged from the pinion to release the carriage from a step-by-step control of the escapement mechanism.

The effect of disengaging the rack 10 from the feed pinion and engaging the rack 62 therewith is to cause the escapement wheels to be rotated in a direction opposite that which they ordinarily receive during the step-by-step feed movement of the carriage. This operative connection between the rack 62 and the escapement mechanism at the time when the feed rack 10 is disengaged from the escapement mechanism is effective to prevent a rebound of the carriage when it is arrested by the tabulating mechanism after a free travel of the carriage. Thus an actuation of a tabulator key 45 is effective to move the associated denominational stop 36 into the path of one of the column stops 35. This same movement is effective to move the cross-bar 54 rearwardly, thus moving the releasing device 57 forwardly to cam up the racks 62 and 10, releasing the rack 10 from its cooperative feed pinion and throwing the rack 62 into engagement with the pinion. The full extent of forward movement of the releasing device 57 is effective to bring the cylindrical portion or dwell 61^a of the cam into contact with the lower edge of the rack 62, thus holding it in effective engagement with the feed pinion until the releasing device is again moved rearwardly when pressure on the tabulator key is released. By releasing the feed rack 10 from the pinion in the manner described and engaging the rack 62 with the pinion, the escapement wheels are caused to rotate in a direction opposite to that in which they rotate during a step-by-step feed movement of the carriage. During this reverse rotation of the escapement wheels the feed dog, as hereinbefore pointed out, is moved away from the escapement wheels by contact between the rear faces of the teeth of the engaged escapement wheel and the inclined rear side of the feed dog. When the carriage is arrested by the cooperation of one of the column stops 35 with the projected denominational stop, the feed dog 20 will be in a position to engage with its working face a tooth of the normally engaged escapement wheel and will prevent a rotation of

the escapement wheels in the letter feed direction, thus resisting and preventing a rebound of the carriage. In other words, the connection of the rack 62 with the escapement wheel tends to turn it in the direction opposite that which it receives when it is engaged by the feed rack 10 and an impact between the tabulator stops would therefore tend to cause the escapement wheel to be turned in the direction of the movement of the escapement wheels during a letter space operation. This movement, however, is resisted by the feed dog 20 and the carriage is therefore prevented from rebounding.

It may be found desirable to provide retarding means which tend to retard the movement of the carriage when it is running free at tabulating operations. I have provided in the construction shown in Figs. 1 to 5, inclusive, retarding mechanism which comprises a bracket 66 pivoted at 67 to rearwardly extending bracket arms 68 secured to the top plate of the machine by screws 69. The bracket 66 has a cross bar 70 with which the denominational stop levers 37 cooperate. This bracket 66 is provided with arms 71 which are pivoted to the bracket on shouldered pivot screws 72. The arms extend upwardly from their pivots on opposite sides of the escapement wheel, as shown in Fig. 3, and are adapted to turn on their pivots toward and away from the center of the escapement wheels. A spring 73 surrounds the hub of each pivoted arm 71 and is connected at one end to a pin 74 carried by the bracket, the opposite end 75 of each spring being connected to the arm and tending to rotate it around its pivot toward the escapement wheel. A stop or arm 76 projects from each of the pivoted arms 71 and cooperates with the pin 74 to limit the movement of the free end of the arm 71 toward the escapement wheels. The free end of each arm 71 preferably carries an anti-friction roller 77 which is adapted to bear at its periphery against the teeth of the rear escapement wheel when a denominational stop is projected into the path of the column stops and the carriage is released from the step-by-step control of the escapement mechanism. Thus a depression of a tabulator key 45 is effective to move the upper end of the associated denominational stop lever forwardly, projecting the denominational stop 36 carried thereby into the path of a column stop on the carriage. The forward movement of the stop carrying lever 37 is effective to move the cross bar 70 forwardly from the position shown in Fig. 1 to that indicated in Fig. 4, thereby moving the spring pressed arms 71 forwardly to a position where the anti-friction rollers 77 will be brought into cooperation with the teeth on

the rear escapement wheel. The same movement of the denominational key effects a release of the carriage in the manner hereinbefore described, causing the rack 62 to be engaged with the feed pinion. The spring pressed arm 71 bearing against the periphery of the rear escapement wheel tends to retard the rotative movement transmitted to both escapement wheels by the rack 62 during the travel of the carriage when it is freed from the step-by-step letter space control of the escapement mechanism. When pressure on the depressed tabulator key is released, a spring 76^a, connected at one end to the swinging bracket 66 and at its other end to a fixed bracket arm 68, disengages the retarder and restores it to normal position.

From the foregoing description it will be understood that the escapement mechanism enters directly into and constitutes a part of a means of retarding the free travel of the carriage and for preventing a rebound of the carriage when it is arrested by the tabulator stops.

The construction shown in Fig. 6 is somewhat similar to that hereinbefore described except that in the modified construction the bearing 18^a instead of being fixed to the top plate of the machine is pivoted thereto at 78 at a point which is in line with the point of engagement between the feed dog and the rear escapement wheel, so that the bearing 18^a, carrying the escapement wheels and feed pinion, is adapted to turn on the pivot 78 to effect a relative movement between the feed pinion and the racks 10^a and 62^a, which in this case are fixed to the carriage. The swinging movement of the bearing 18^a and the parts carried thereby, may be produced by an arm 79 having a cam groove 80 therein for coöperation with a pin 81 which projects laterally from the bearing 18^a. A movement of the arm 79 is thus effective to bring about a disengagement of the feed pinion 16^a from the feed rack 10^a and to cause said pinion to engage the rack 62^a and vice versa. During the engaging and disengaging movement between the pinion and racks the feed dog 20 maintains its engagement with the rear escapement wheel. The engagement and disengagement between the feed rack and escapement pinion is effected in the general manner disclosed in the Webb Patent No. 567,799.

In the construction shown in Figs. 7 and 8 the double escapement wheel 19 is provided with a rearwardly extending pin 82 to which one end of a coiled spring 83 is connected. The opposite end of this spring is connected to a pin 84 which projects from the rear face of a disk 85. The disk is provided with a hub 85^a mounted to revolve freely on the hub 85^b of one of the escapement wheels. A set screw 85^c is received

in a tapped opening in the hub 85^b and bears at its inner end against the shaft 17. It is by this means that the escapement wheels are secured to the shaft. The disk 85 is held against outer displacement along the hub 85^b by a collar 86 fixed to the shaft by a screw 87. The periphery of the disk 85 has outwardly extending projections 88 thereon, two of such projections being shown in the present instance, though it should be understood that any suitable number of projections may be provided. Arms 71^a are pivoted at 89 to a bracket 90 pivoted upon screws 91 carried by a fixed bracket 92 secured to the top plate of the machine. The arms 71^a are connected by a contractile spring 93 which tends to draw the arms toward each other. Pins 94 are carried by the bracket 90 to limit the inward movement of the arms 71^a. Each arm 71^a carries an anti-friction roller 77^a which, as shown in Fig. 9, is preferably beveled on one edge thereof, as indicated at 95, so that a forward movement of the bracket 90 will force the arms slightly apart against the pressure of the spring 93 so as to cause the anti-friction rollers to engage the periphery of the disk 85 and as the disk rotates, to coöperate with the projections 88. A rearwardly projecting arm 96 extends from the bracket 90 and is provided with an arm or cross bar 70^a with which the denominational stop levers 37 are adapted to coöperate. A forward movement of any of the denominational stop levers is effective to move the bracket 90 forwardly around its pivots 91 and to force the anti-friction roller 77^a into coöperation with the disk 85 at the periphery thereof. The spring which connects the disk 85 with the escapement wheels constitutes a cushion spring which is rendered effective by the lost motion connection between the disk and escapement wheel. This cushion spring and lost motion connection absorbs the shock when the retarding mechanism is thrown into operation and prevents undue shock. The carriage may therefore be gradually retarded without giving an undue jerking motion to the carriage by the operation of the retarder. The elasticity of the connection between the retarding disk 85 and the carriage, effected through the spring 83, prevents an undue jar of the carriage when the spring-pressed arms 71^a are brought into coöperation with the projections 88 on the disk. A spring 97 is connected at one end to the bracket 90 and at its opposite end to the bracket 92 so as to restore the bracket 90 to its normal position when the actuated denominational stop lever is released and restored to normal position.

In the construction shown in Figs. 10 and 11 the escapement wheel shaft 17^a has positively connected thereto a drum or housing

98 which is fixed to the drum by a set screw 99, threaded into a tapped opening in the hub 100 of the drum and bearing at its inner end against the escapement wheel shaft. The drum carries a pivot 101 for a pawl 102 pressed by a spring 103 into engagement with a ratchet wheel 104 fixed to a single escapement wheel 19^a which affords a free rotation of the escapement wheel shaft 17^a in one direction. A pawl 105 is spring-pressed toward the escapement wheel and is adapted to engage the rear faces of the teeth thereof to prevent a backward rotation of the escapement wheel. In this construction a step-by-step feed movement of the carriage is effected during the engagement of the rack 10^b with a feed pinion, corresponding to the feed pinion 16, which is connected to the escapement wheel through the pawl 102 and ratchet 104 so that when the feed dogs 20^a are actuated the pressure of the carriage spring α is effective to move the carriage and turn the escapement wheel in the direction of the arrow in Fig. 10. When, however, the feed rack 10^b is disconnected from the feed pinion and the rack 62^b is engaged with the pinion, said rack 62^b will cause the drum 98 to rotate independently of the escapement wheel in a direction opposite to that indicated by the arrow in Fig. 10, the pawl 102 affording such independent movement of the drum. At this time the escapement wheel is held against backward rotation by the pawl 105. When the column stop is arrested by a projected denominational stop there will be a tendency of the carriage to rebound, which will tend to move the rack 62^b to the right. This backward or rebounding movement of the rack 62^b will be resisted and prevented in the following manner:—A tendency of the rack 62^b to rebound while it is in engagement with the feed pinion will tend to turn the drum 98, and the pawl 102 carried thereby, in the direction of the arrow in Fig. 10 and the ratchet wheel 104 being connected to the escapement wheel will be resisted in its movement in this direction by the engagement of a tooth of the escapement wheel with the normally engaged feed dog 20^a. It will therefore be understood that any tendency of the carriage to rebound, when it is arrested by its tabulator stops, will be resisted and prevented by the escapement mechanism controlled at this time through the rack 62^b.

Various changes may be made without departing from my invention and various features of the construction may be employed without others. Thus it will be understood that the retarding mechanism may be employed in connection with the anti-rebound construction or the devices may be used separately as desired.

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

1. In a typewriting machine, the combination of a carriage; escapement mechanism therefor including step-by-step feed devices; and means for enabling the carriage to run free of control by said step-by-step feed devices and for rendering the escapement mechanism operative to prevent a rebound of the carriage at the end of said free run thereof and before it is under control of the step-by-step feed devices to afford a step-by-step feed of the carriage.

2. In a typewriting machine, the combination of a carriage, and escapement mechanism therefor including means which prevent rebound of the carriage when it is arrested at the end of a free travel in the direction of its feed and when the carriage is free from control of the escapement mechanism for step-by-step feed.

3. In a typewriting machine, the combination of a carriage; escapement mechanism therefor including an escapement wheel and coöperative step-by-step feed means; and means whereby the escapement wheel and its coöperative step-by-step feed means are operative to prevent rebound of the carriage when the carriage is free from control thereof for step-by-step feed and is arrested at the end of a free movement in the direction of its feed.

4. In a typewriting machine, the combination of a carriage; escapement mechanism therefor including an escapement wheel and a rack, means for effecting an operative connection and disconnection between said rack and escapement wheel; a second rack; and means whereby an operative connection is established between said second rack and the escapement wheel when the operative connection between the first mentioned rack and the escapement wheel is broken.

5. In a typewriting machine, the combination of a carriage; escapement mechanism including a feed dog; means for releasing the carriage from step-by-step control of the escapement mechanism; and means whereby said feed dog is rendered operative to resist the rebound of the carriage when the carriage has been released from step-by-step control of the escapement mechanism.

6. In a typewriting machine, the combination of a carriage; escapement mechanism including an escapement wheel, a feed pinion operatively connected thereto and a feed rack meshing with said pinion; a second rack; and controlling means for effecting a disconnection between said first mentioned rack and the pinion and for effecting a connection between said second rack and the pinion.

7. In a typewriting machine, the combination of a carriage; escapement mechanism

including an escapement wheel; a feed pinion operatively connected thereto and a feed rack cooperative with said pinion; a second rack; and controlling means for effecting a disconnection between said first mentioned rack and the pinion and for effecting an operative connection between said second rack and the pinion, the racks and pinion being so arranged as to turn the escapement wheel in opposite directions during the travel of the carriage in a letter feed direction, the direction in which the escapement wheel is turned depending on the rack which is in engagement with the pinion.

8. In a typewriting machine, the combination of a carriage; escapement mechanism including an escapement wheel, a feed pinion operatively connected thereto, and a feed rack meshing with said pinion on one side thereof; a second rack adapted to mesh with said pinion on the opposite side thereof, and controlling means for effecting a relative engaging and disengaging movement between said racks and pinion, whereby when one rack is out of mesh with the pinion the other rack will be in mesh therewith.

9. In a typewriting machine, the combination of a carriage; escapement mechanism including an escapement wheel carried by the frame of the machine, a feed pinion operatively connected with said escapement wheel, and a feed rack carried by and pivoted on the carriage and adapted to be thrown into and out of mesh with said escapement wheel, a second rack carried by and pivoted on the carriage and cooperative with said pinion on the side thereof opposite that which is engaged by the first mentioned rack; and rack controlling means effective to engage one of said racks with the pinion when the other is disengaged therefrom.

10. In a typewriting machine, the combination of a carriage; escapement means therefor including an escapement wheel connected for backward and forward rotation, and a feed dog which is moved away from the escapement wheel during the backward rotation of the wheel; and means whereby the escapement wheel and dog resist a rebound of the carriage when the latter is free from a step-by-step control of the escapement mechanism.

11. In a typewriting machine, the combination of a carriage, cooperating devices for affording a step-by-step feed of the carriage, and means whereby said cooperating devices are rendered effective to prevent a rebound of the carriage when they are ineffective to control the step-by-step feed of the carriage.

12. In a typewriting machine, the combination of a carriage, escapement mechanism

therefor, tabulator mechanism, and means whereby said escapement mechanism is effective to prevent a rebound of the carriage when it is arrested by the tabulator mechanism and the escapement mechanism is ineffective to control the step-by-step feed of the carriage.

13. In a typewriting machine, the combination of a carriage, escapement mechanism therefor, tabulator stops normally one out of the path of the other, means for moving one of said stops into the path of the other and for simultaneously releasing the carriage from a step-by-step control of the escapement, and means controlled by the movement of the stops one into the path of the other for rendering the escapement mechanism effective to prevent rebound of the carriage at the impact between said stops.

14. In a typewriting machine, the combination of a carriage, escapement mechanism therefor, means for freeing the carriage from step-by-step control of the escapement mechanism, and a part on the carriage which is cooperative with a part of the escapement mechanism to prevent rebound of the carriage when it is freed from step-by-step control of the escapement mechanism.

15. In a typewriting machine, the combination of a carriage, escapement mechanism therefor, tabulator mechanism, means for freeing the carriage from step-by-step control of the escapement mechanism and for placing the carriage under control of the tabulator mechanism, and means which are rendered operative by the shifting of the control of the carriage to the tabulator mechanism for rendering the escapement effective to prevent a rebound of the carriage when it is arrested by the tabulator mechanism.

16. In a typewriting machine, the combination of a carriage, escapement mechanism therefor, tabulator mechanism, means for freeing the carriage from step-by-step control of the escapement and for placing the carriage under control of the tabulator mechanism, and means carried by the carriage and cooperative with a part of the escapement mechanism to prevent a rebound of the carriage when it is under control of the tabulator mechanism and is free from step-by-step control of the escapement mechanism.

17. In a typewriting machine, the combination of a carriage; escapement mechanism therefor including step-by-step feed devices; means for enabling the carriage to run free of control by said step-by-step feed devices and for rendering the escapement mechanism operative to prevent a rebound of the carriage at the end of said free run thereof and before it is under control of

the step-by-step feed devices to effect a step-by-step feed of the carriage; tabulator mechanism; and means controlled by the tabulator mechanism for controlling said first mentioned means.

18. In a typewriting machine, the combination of a carriage; escapement mechanism therefor including an escapement wheel and a rack; means for effecting an operative connection and disconnection between said rack and escapement wheel; a second rack, means whereby an operative connection is established between said second rack and the escapement wheel when the operative connection between the first mentioned rack and the escapement wheel is broken; tabulator mechanism; and means whereby said tabulator mechanism is effective to control said last mentioned means.

19. In a typewriting machine, the combination of a carriage; escapement mechanism including a feed dog; means for freeing the carriage from step-by-step control of the escapement mechanism; means whereby said feed dog is rendered operative to resist the rebound of the carriage when the carriage has been released from step-by-step control of the escapement mechanism; tabulator mechanism; and means whereby said tabulator mechanism is effective to control said previously mentioned means.

20. In a typewriting machine, the combination of a carriage; escapement mechanism including an escapement wheel, a feed pinion operatively connected thereto and a feed rack meshing with said pinion; a second rack, controlling means for effecting a disconnection between said first mentioned rack and the pinion and for effecting a connection between said second rack and the pinion; tabulator mechanism; and means whereby said controlling means are controlled by the tabulator mechanism.

21. In a typewriting machine, the combination of a carriage; escapement mechanism including an escapement wheel, a feed pinion operatively connected thereto and a feed rack cooperative with said pinion; a second rack; controlling means for effecting a disconnection between said first mentioned rack and the pinion and for effecting an operative connection between said second rack and the pinion, the racks and pinion being so arranged as to turn the escapement wheel in opposite directions during the travel of the carriage in a letter feed direction, the direction in which the escapement wheel is turned depending on the rack which is cooperative with the pinion; tabulator mechanism; and means whereby said controlling means are controlled by the tabulator mechanism.

22. In a typewriting machine, the combination of a carriage; escapement mechanism including an escapement wheel, a feed pin-

ion operatively connected thereto, and a feed rack meshing with said pinion on one side thereof; a second rack adapted to mesh with said pinion on the opposite side thereof; controlling means for effecting a relative engaging and disengaging movement between said racks and pinion, whereby when one rack is out of mesh with the pinion the other rack will be in mesh therewith; tabulator mechanism; and means whereby said controlling means are controlled by said tabulator mechanism.

23. In a typewriting machine, the combination of a carriage; escapement mechanism including an escapement wheel carried by the frame of the machine, a feed pinion operatively connected with said escapement wheel, and a feed rack carried by and pivoted on the carriage and adapted to be thrown into and out of mesh with said escapement wheel; a second rack carried by and pivoted on the carriage and cooperative with said pinion on the side thereof opposite that which is engaged by the first mentioned rack; rack controlling means effective to engage one of said racks with the pinion when the other is disengaged therefrom; tabulator mechanism; and means whereby said rack controlling means are controlled by the tabulator mechanism.

24. In a typewriting machine, the combination of a carriage; escapement mechanism therefor including an escapement wheel connected for backward and forward rotation, and a feed dog which is moved away from the escapement wheel during the backward rotation of the wheel; means whereby the escapement wheel and dog resist a rebound of the carriage when the latter is freed from a step-by-step control of the escapement mechanism; tabulator mechanism; and means under control of said tabulator mechanism for rendering said previously mentioned means effective.

25. In a typewriting machine, the combination of a carriage; cooperating devices for affording a step-by-step feed of the carriage; means whereby said cooperating devices are rendered effective to prevent a rebound of the carriage when they are ineffective to control the step-by-step feed of the carriage; tabulator mechanism; and means under control of the tabulator mechanism for controlling said previously mentioned means.

26. In a typewriting machine, the combination of a carriage; escapement mechanism therefor including an escapement wheel; means for turning said escapement wheel when the carriage is out of control of the escapement mechanism, and is free to run; and retarding means cooperative with said escapement wheel to retard the carriage.

27. In a typewriting machine, the combination of a carriage; escapement mechanism

therefor including an escapement wheel; means for freeing the carriage from control of the escapement mechanism and for affording a free travel of the carriage; means for turning the escapement wheel by the movement of the carriage when the latter is free from control of the escapement mechanism; retarding means; and means for throwing said retarding means into coöperative relation with the escapement wheel when the carriage is thrown out of the control of the escapement mechanism.

28. In a typewriting machine, the combination of a carriage, a feed pinion, a feed rack coöperative with said feed pinion, a rotative device adapted to turn with said feed pinion, means for disengaging said feed rack from the pinion to free the carriage from letter space control of the escapement, means for rotating the said pinion and the rotative device during the free movement of the carriage, and retarding means thrown into coöperation with said rotative device when the said feed rack is released from the pinion.

29. In a typewriting machine, the combination of a carriage, a feed pinion, a feed rack coöperative with said feed pinion, a rotative device adapted to turn with said feed pinion, means for disengaging said feed rack from the pinion to free the carriage from letter space control of the escapement, means for rotating the said pinion and the rotative device during the free movement of the carriage, and a spring-pressed retarding member which is thrown into coöperation with said rotative device when said feed rack is released from the pinion.

30. In a typewriting machine, the combination of a carriage, a feed pinion, a feed rack coöperative with said feed pinion, a toothed rotative device adapted to turn with said feed pinion, means for disengaging said feed rack from the pinion to free the carriage from letter space control of the escapement, means for rotating the said pinion and the rotative toothed device during the free movement of the carriage, and a spring-pressed retarding member which is thrown into coöperation with said rotative toothed device and with the tooth or teeth thereon when said feed rack is released from the pinion and thus retards the movement of the carriage when it is freed from letter space control of the escapement.

31. In a typewriting machine, the combination of a carriage, a feed pinion, a feed rack coöperative with said feed pinion, a rotative device operatively connected to turn with said pinion through an interposed spring, means for disengaging said feed rack from the pinion to free the carriage from letter space control of the escapement, means for rotating the said pinion and the

rotative device during the free movement of the carriage, and retarding means thrown into coöperation with said rotative device when the said feed rack is released from the pinion.

32. In a typewriting machine, the combination of a carriage, a feed pinion, a feed rack coöperative with said feed pinion, a toothed rotative device operatively connected to turn with said pinion through an interposed cushioning spring, means for disengaging said feed rack from the pinion to free the carriage from letter space control of the escapement, means for rotating said pinion and the rotative toothed device during the free movement of the carriage, and a spring pressed retarding member which is thrown into coöperation with said rotative toothed device and with the tooth or teeth thereon when said rack is released from the pinion and thus retards the movement of the carriage when it is freed from letter space control of the escapement.

33. In a typewriting machine, the combination of a carriage; escapement devices therefor including an escapement wheel shaft; and means for retarding the free run of the carriage, said retarding means comprising a rotative device on the escapement wheel shaft, and a coöperative retarding device thrown into and out of coöperation with said rotative device.

34. In a typewriting machine, the combination of a carriage; escapement devices therefor including an escapement wheel shaft; and means for retarding the free run of the carriage, said retarding means comprising a toothed rotative device on the escapement wheel shaft, and a coöperative spring-pressed retarding device thrown into and out of coöperation with said rotative device and with the tooth or teeth thereof.

35. In a typewriting machine, the combination of a carriage; escapement devices therefor including an escapement wheel shaft and a feed pinion; and retarding means comprising a rotative device on the escapement wheel shaft, a cushion spring intermediate said rotative device and the feed pinion, and a retarding device thrown into and out of coöperation with said rotative device.

36. In a typewriting machine, the combination of a carriage; escapement devices therefor including an escapement wheel shaft and a feed pinion; and retarding means comprising a rotative device on the escapement wheel shaft, a lost motion connection between said rotative device and pinion, a spring which tends to maintain a fixed relation between the rotative device and pinion and the power of which is overcome when the lost motion becomes effective, and a spring-pressed retarding device

movable into and out of coöperation with said rotative device to retard the movement of the carriage when it is free from letter space control of the escapement mechanism.

5 37. In a typewriting machine, the combination of a carriage; a feed pinion; shift-
able racks carried by the carriage and co-
operative with said feed pinion, one of said
racks being thrown into mesh with the
10 pinion when the other is thrown out of
mesh therewith; escapement devices; car-
riage retarding devices; and means where-
by the carriage is under control of the es-
capement devices and is out of control of the
15 retarding device when one of said racks en-
gages the pinion and whereby the carriage
is under control of the retarding devices
and is out of control of the escapement de-
vices when the other of said racks engages
20 said pinion.

38. In a typewriting machine, the combi-
nation of a carriage; escapement mecha-
nism therefor including an escapement
wheel; means whereby said escapement
25 wheel is turned in one direction during the
letter feed movements of the carriage un-
der control of the escapement mechanism
and is turned in the opposite direction when
the carriage is freed from letter feed control
30 of the escapement; and means coöperative
with said escapement wheel when it is turned
in the last mentioned direction to retard its
movement and the movement of the car-
riage.

35 39. In a typewriting machine, the combi-
nation of a carriage; escapement mecha-
nism therefor including an escapement
wheel; tabulator mechanism; means for
turning said escapement wheel when the
40 carriage is out of control of the escapement
mechanism and is under control of said
tabulator mechanism; and retarding means
controlled by the tabulator mechanism and
coöperative with said escapement wheel to
45 retard the carriage.

40. In a typewriting machine, the combi-
nation of a carriage; escapement mechanism
therefor including an escapement wheel;
tabulator mechanism including means for
50 freeing the carriage from control of the es-
capement mechanism and for affording a
free travel of the carriage; means for turn-
ing the escapement wheel by the movement
of the carriage when the latter is free from
55 control of the escapement mechanism, and is
under control of the tabulator mechanism;
retarding means; and means for throwing
said retarding means into operative connec-
tion with the escapement wheel when the
60 carriage is thrown out of the control of the
escapement mechanism and is in the control
of the tabulator mechanism.

41. In a typewriting machine, the combi-
nation of a carriage; escapement devices

therefor including an escapement wheel 65
shaft; means for retarding the free run of
the carriage, said retarding means com-
prising a rotative device on the escapement
wheel shaft, a coöperative retarding device
thrown into and out of coöperation with said 70
rotative device; tabulator mechanism; and
means controlled thereby for throwing said
coöperative retarding device into and out of
coöperation with said rotative device.

42. In a typewriting machine, the com- 75
bination of a carriage; escapement devices
therefor including an escapement wheel
shaft, and a feed pinion; retarding means
comprising a rotative device on the escape-
ment wheel shaft, a cushion spring interme- 80
diate said rotative device and the feed pin-
ion, and a retarding device; tabulator mech-
anism; and means controlled by said tabu-
lator mechanism for throwing said retard-
ing device into and out of coöperation with 85
said rotative device.

43. In a typewriting machine, the combi-
nation of a carriage; escapement devices
therefor including an escapement wheel
shaft, and a feed pinion; retarding means 90
comprising a rotative device on the escape-
ment wheel shaft, a lost motion connection
between said rotative device and pinion, a
spring which tends to maintain a fixed rela-
tion between the rotative device and pinion 95
and the power which is overcome when the
lost motion becomes effective, a spring-
pressed retarding device movable into and
out of coöperation with said rotative device
to retard the movement of the carriage when 100
it is free from letter space control of the es-
capement mechanism; tabulator mechanism;
and means under control of the tabulator
mechanism for throwing said spring-pressed
retarding device into and out of coöpera- 105
tion with said rotative device.

44. In a typewriting machine, the combi-
nation of a carriage; a feed pinion; shift-
able racks carried by the carriage and co-
operative with said feed pinion, one of said 110
racks being thrown into mesh with the pin-
ion when the other is thrown out of mesh
therewith; escapement devices; carriage re-
tarding devices; means whereby the carriage
is under control of the escapement devices 115
and is out of control of the retarding devices
when one of said racks engages the pinion
and whereby the carriage is under control
of the retarding devices and is out of con-
trol of the escapement devices when the 120
other of said racks engages said pinion; tabu-
lator mechanism; and means whereby the
tabulator mechanism is effective to control
said racks in their movements into and out
of mesh with said pinion. 125

45. In a typewriting machine, the combi-
nation of a carriage; escapement mechanism
therefor including an escapement wheel;

tabulator mechanism; means whereby said escapement wheel is turned in one direction during the letter feed movements of the carriage under control of the escapement mechanism and is turned in the opposite direction when the carriage is freed from letter feed control of the escapement and is under control of the tabulator mechanism; and means coöperative with said escapement wheel when it is turned in the last mentioned

direction to retard its movement and the movement of the carriage.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 11th day of 15 May, A. D. 1910.

JOHN WALDHEIM.

Witnesses:

CHARLES E. SMITH,
M. F. HANNWEBER.