Feb. 28, 1939. G. G. GOING 2,148,690

TYPEWRITING AND LIKE MACHINE

Filed Feb. 5, 1937 3 Sheets-Sheet 1

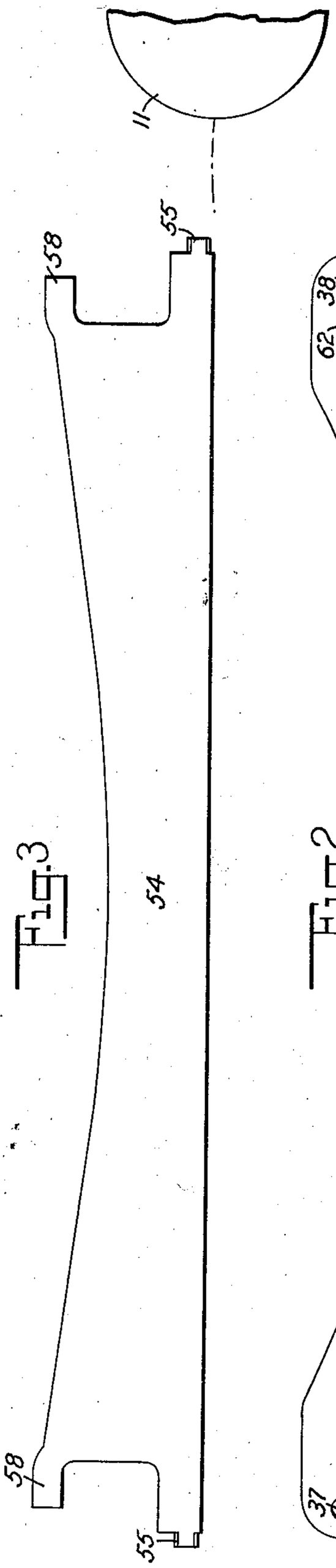

Fig. 3

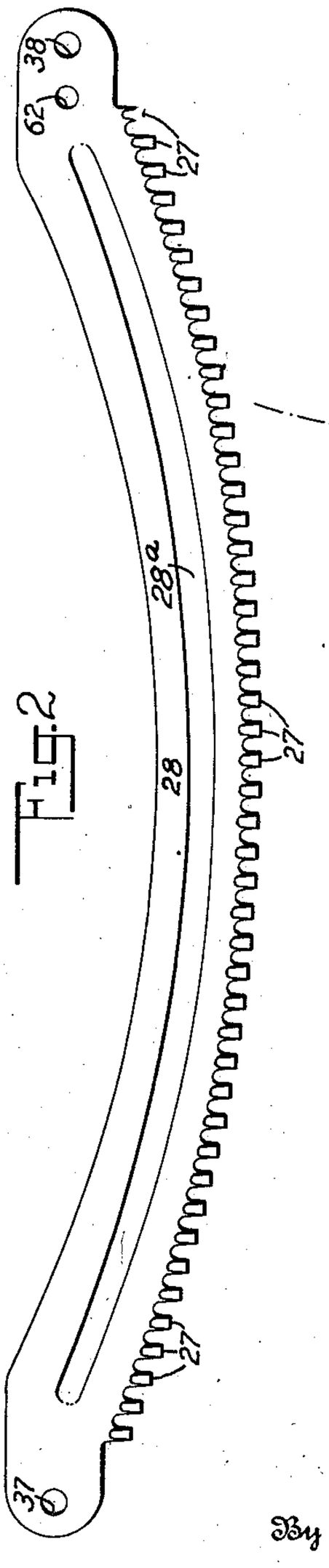

Fig. 2

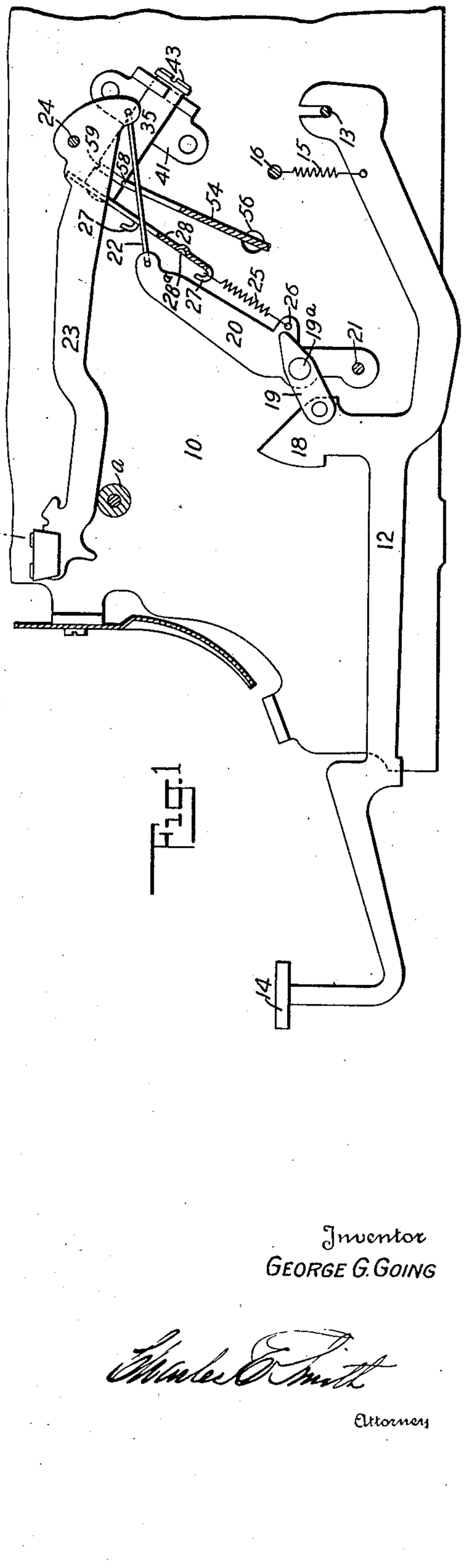

Fig. 1

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TYPEWRITING AND LIKE MACHINE

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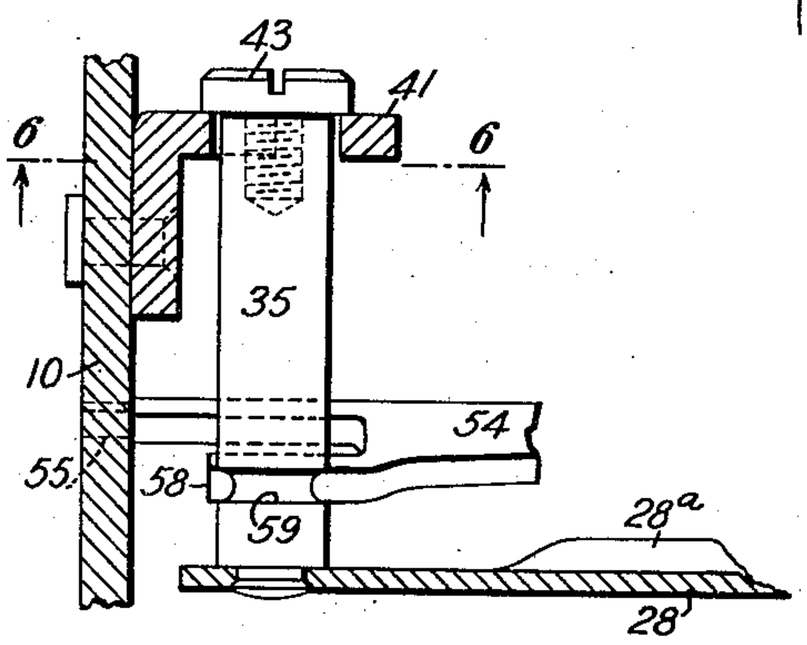
Fig. 4



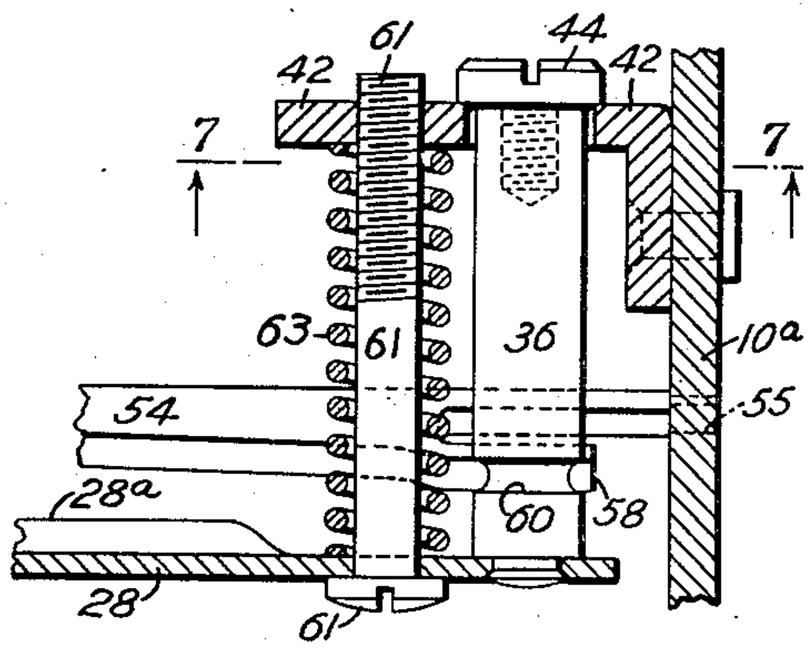
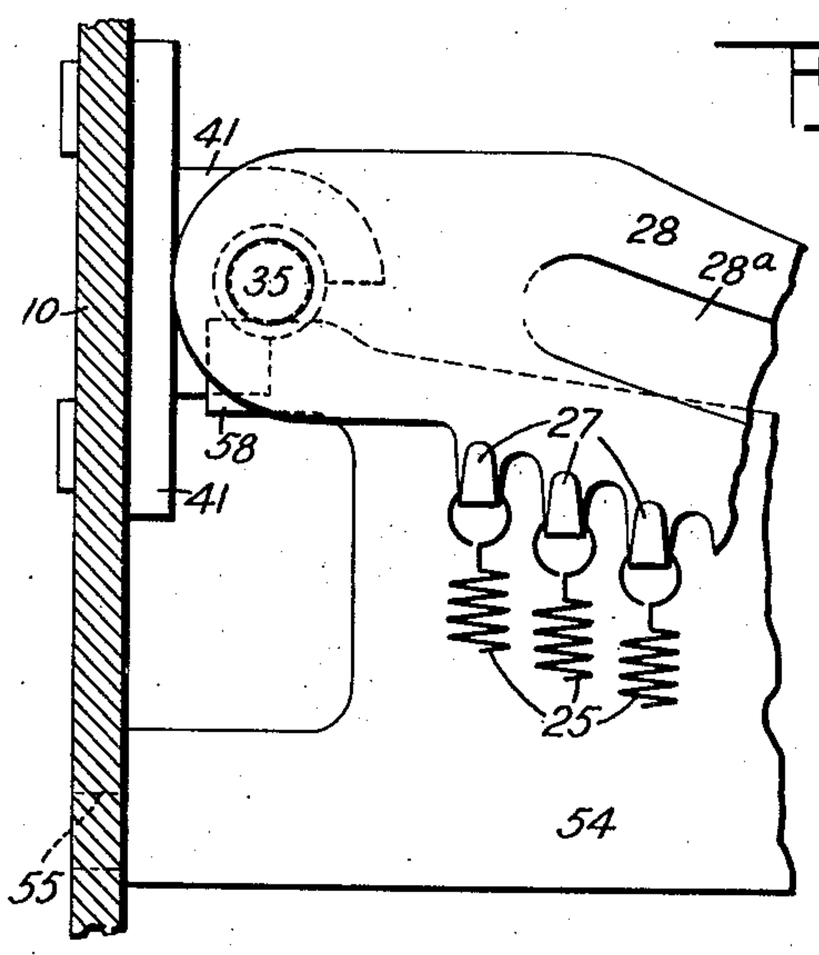


Fig. 5



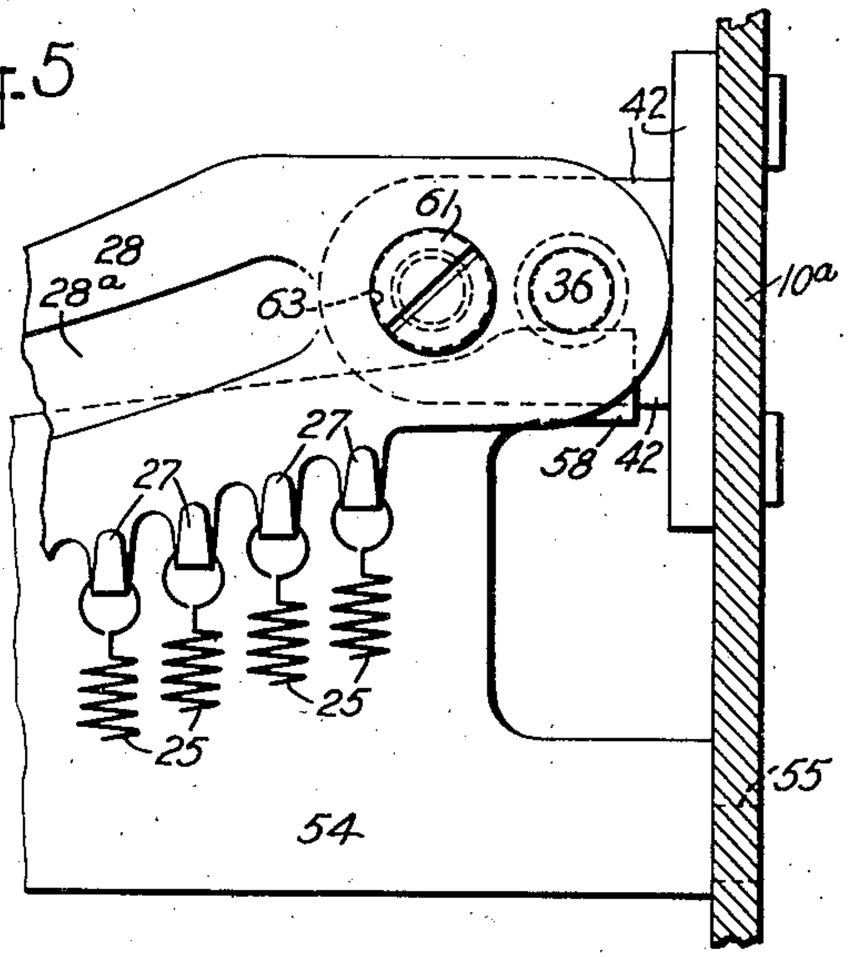


Fig. 6

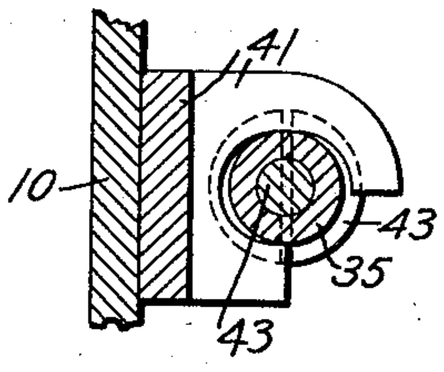
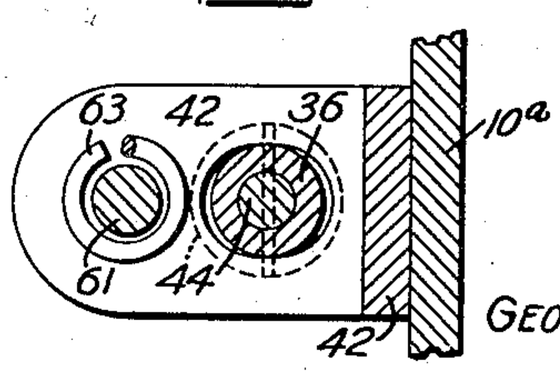


Fig. 7



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TYPEWRITING AND LIKE MACHINE

Filed Feb. 5, 1937 3 Sheets-Sheet 3

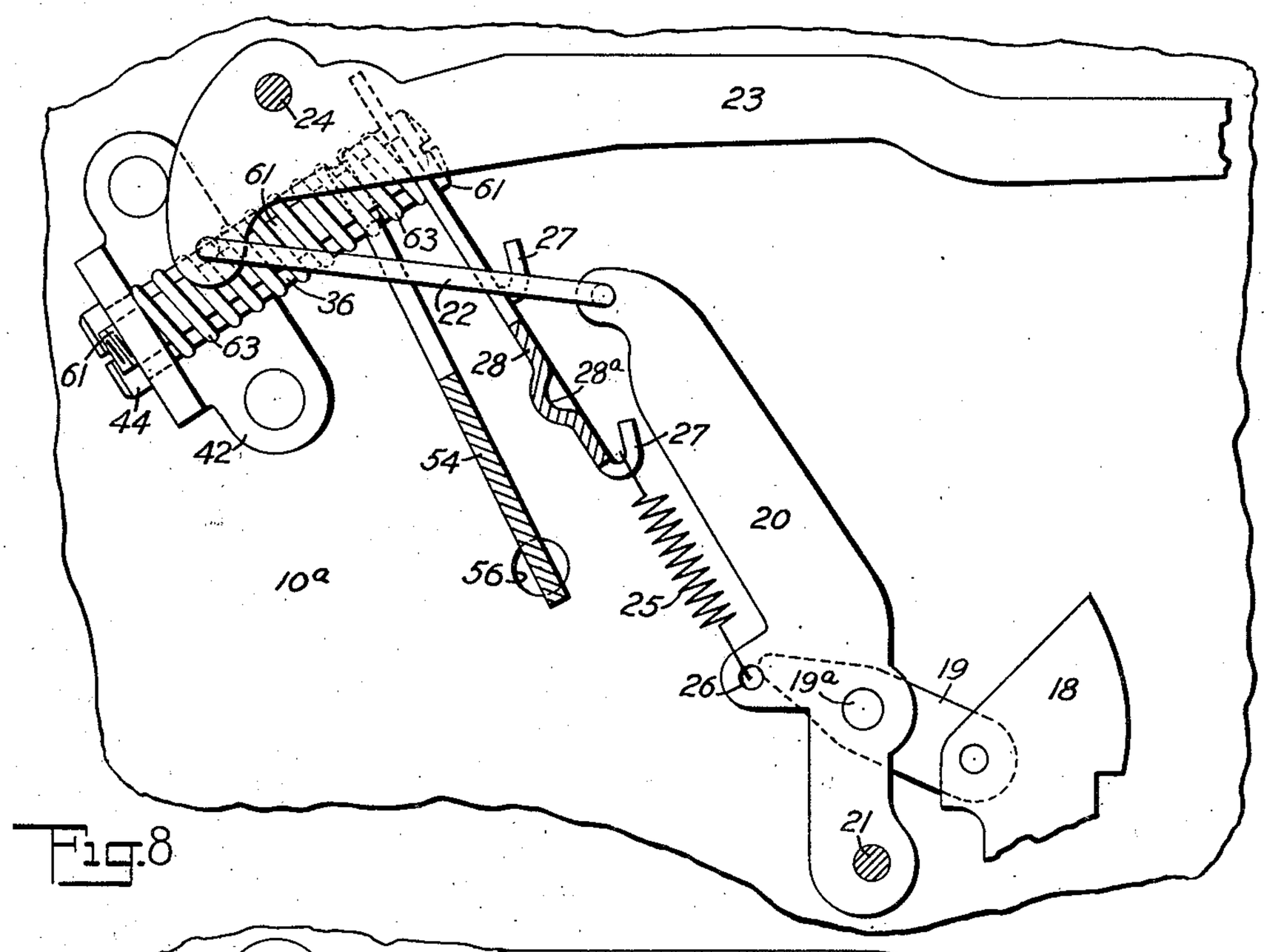

Fig. 8

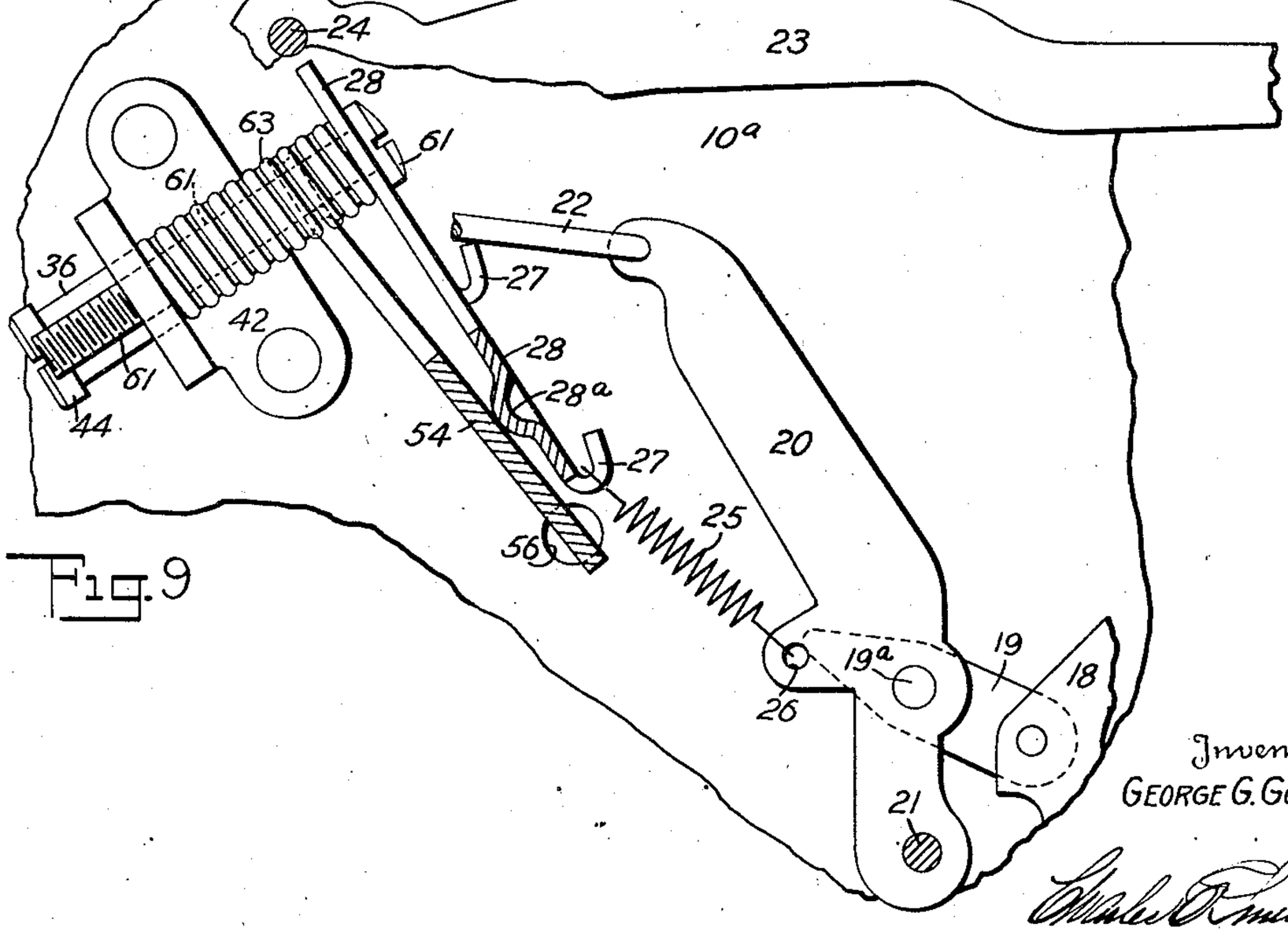

Fig. 9

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Patented Feb. 28, 1939

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UNITED STATES PATENT OFFICE

2,148,690

TYPEWRITING AND LIKE MACHINE

George G. Going, Stamford, Conn., assignor to Remington Rand, Inc., Buffalo, N. Y., a corporation of Delaware

Application February 5, 1937, Serial No. 124,287

18 Claims. (Cl. 197—33)

My invention relates in general to typewriting and like machines, and more particularly to improved means for varying the effective force of the spring returning means for the type actions thereby providing for varying the touch required to operate such type actions.

The main object of my invention, generally stated, is to provide improved means of the character specified which is simple and highly effective in operation.

A further object of my invention is to provide touch regulating means for simultaneously adjusting the effective force of the returning springs of all the type actions to meet the desires of various operators, and to so construct the touch regulating means that a light initial touch will be afforded regardless of the adjustment of such means.

A more specific object of my invention is to provide a construction wherein the resistance offered by the returning springs to operation of the type actions increases as the parts of the type actions move from normal position to the printing position, thus quickly returning the parts thereof from the printing position back to normal position and yet affording a light resistance to the initial operating movement thereof. There is provided by the present invention adjusting means whereby the rate, at which the resistance to operation of the type actions increases during the operating movement thereof, may be varied to thereby vary the touch and yet retain a light initial touch regardless of such adjustment.

To the above and other ends which will hereinafter appear, my invention consists in the features of construction, arrangements of parts and combinations of devices set forth in the following description and particularly pointed out in the appended claims.

In the accompanying drawings, wherein like reference characters indicate corresponding parts in the different views:—

Fig. 1 is a vertical, fore and aft sectional view of sufficient number of parts of a typewriting machine to illustrate my invention in its embodiment therein.

Fig. 2 is a detail, front view of a spring anchoring member employed in the form of my invention shown in Fig. 1.

Fig. 3 is a detail, front view of a universal bar or supporting member also employed in the form of my invention shown in Fig. 1.

Fig. 4 is an enlarged plan view with parts in section of the end portions of the spring anchoring and adjusting means assembly.

Fig. 5 is a front elevational view of parts shown in Fig. 4.

Fig. 6 is a sectional view of a detail of the assembly shown in Fig. 4, the section being taken on line 6—6 of Fig. 4 and viewed in the direction of the arrows at said line.

Fig. 7 is a sectional view of another detail of the assembly shown in Fig. 4, the section being taken on line 7—7 of Fig. 4, and viewed in the direction of the arrows at said line.

Fig. 8 is an enlarged transverse sectional view showing the mechanism as it appears when adjusted to afford a very light operating touch.

Fig. 9 is a like view of the same parts shown in Fig. 8 but shown adjusted to afford a heavier operating touch.

In the present instance, only so much of a typewriting machine has been shown as is necessary for a complete understanding of the touch regulating mechanism of my invention. It should be understood, however, that the features of the present invention are not limited to their embodiment in the particular type of machine illustrated herein, but may be employed in various kinds of typewriting or like machines, wherever found available.

The illustrated portion of the typewriting machine shown in Fig. 1 includes a usual frame comprising side plates 10 and 10a, said frame housing a complement of type actions, the front strike type bars of which coact with the usual platen 11 mounted on a suitable carriage supported to travel from side to side of the machine, which carriage has not been shown. Each type action includes a key lever 12 pivoted at its rearward end on a fulcrum wire 13 and provided with a finger key 14 at its forward end.

Each key lever 12 is returned toward its normal position by a contractile spring 15 connected to the key lever at a point comparatively close to the fulcrum wire 13 and extending upwardly to an anchor rod 16. Each spring 15 is primarily to counteract the weight of the companion key lever 12 and to insure its return to the definite normal position thereof, and being connected close to the fulcrum wire 13, the force exerted thereby is not sufficient to return the other members of the companion type action to normal position. Inasmuch as the spring 15 is accordingly not a factor which determines to any appreciable extent the touch or the force required to operate the type action, the effective force of this spring 15 is not changed by adjustment of the present touch controlling mechanism.

An upstanding central portion 18 of each key

lever 12 is pivotally connected to one end of a companion pull link 19, the other end of which is pivotally connected at 19a to a companion sub-lever 20. The sub-levers 20 are all pivotally mounted on a pivot wire 21 located below the pivotal connections 19a with the pull links 19 and suitably supported by the machine frame. The upper end of each sub-lever 20 is pivotally connected to one end of a companion pull link 22, the other end of which link is pivotally connected to the heel of a companion type bar 23, the type bars 23 being all pivotally mounted in a type bar segment on a segmental pivot wire 24 to impact against the front face of the platen 11 when actuated by a depression of the companion key lever.

The parts of each type action are returned to normal position by a contractile returning spring 25. The lower end of each returning spring 25 is connected in the present instance to the companion sub-lever 20, at 26, while the upper end of each spring 25 is connected to respective hook portions 27 of an anchor member or plate 28. It should be understood however, that each returning spring may be connected to any other suitable part of the companion type action.

The anchor member 28 when in a position shown in Fig. 1 alines the returning springs 25 radially, or substantially so, with the pivots 21 of the respective sub-levers 20 when said sub-levers are in normal position as shown. It is obvious therefore, that the springs 25 in such position act against the pivot 21 and substantially against the dead center of their respective sub-levers 20 when the latter are in the normal position, and accordingly the returning springs offer a very slight resistance to the initial operating movement of their respective sub-levers from this normal position. In other words, the force of each returning spring 25 which is effective to resist movement of the companion sub-lever 20 is very slight during the first part of the operating movement of the sub-lever but increases as the sub-lever travels during the approach of the companion type bar to the printing position. This increase in resistance of each of the springs 25 during this movement of the companion sub-lever is due wholly to the changing angle at which the spring acts and to the increasing effective force exerted by the spring during its elongation and during such change in its angular relation.

This change in the effective returning force of the springs 25 during the operating movement of the type actions is a particularly advantageous feature of the present construction as it affords a light initial touch in operating the type actions which, as is well understood, is a highly desirable factor. In other words, the inertia of the various parts of the type action must be overcome during the first part of the travel of the finger key, and in the present arrangement, the initial operating force required to overcome this inertia is not appreciably increased by the returning spring at this point. However, after the parts of a type action have been set in motion and the type bar is approaching the printing position, the effective force of the returning spring is increased sufficiently to effectively return the parts to normal position, due to the more advantageous angle of action of the returning spring on the sub-lever as well as the direct increase in force of the spring caused by its elongation caused by the printing movement of the type action. This increased effective force of the returning spring when the type action reaches the printing point is advantageous to rapidly return the various parts of the type action with the result that each type action is rapidly returned to normal position and yet the slight effective force of the spring when in normal position does not impose an unnecessary resistance to the initial portion of printing movement.

Inasmuch as this light initial operating touch afforded the type actions is highly desirable for the reasons set forth, I have provided adjusting means for controlling or varying the resistance to actuation of the keys thereby varying the touch to suit different operators and yet the construction is such that said adjusting means may be employed to vary the touch without, however, affecting the very desirable result of providing a returning spring which offers a resistance to initial movement of the type action which is very slight as compared with the force effective to return the type action from the printing position.

In other words, I have provided a construction for simultaneously changing the resistance offered by all of the returning springs during the latter portion of the operating movements of the type actions to obtain an effective touch adjustment without, however, changing to an appreciable extent the resistance offered during the first part of the operating movement of any of the type actions. In such touch adjusting means, I also provide for reducing the resistance to actuation of the keys still further than the comparatively slight resistance offered by the dead-center position of the returning springs shown in Fig. 1, thereby permitting an extremely light or feather touch to be afforded when desired, as will hereinafter more clearly appear.

Such a touch regulating or adjusting means is provided in the present embodiment by adjusting the spring anchor member 28 substantially around the points 26 where the springs 25 are connected to the sub-levers 20 in order to change the angular relation of the springs 25 to the sub-levers 20 substantially without changing the stress of the springs themselves. The method of adjustably mounting the anchor member 28 is shown particularly in Fig. 4 and Fig. 5 wherein it will be seen that the extreme left and right-hand ends of the anchor member 28 are provided with guide rods 35 and 36 respectively. The guide rods 35 and 36 are fixedly secured to the anchor member 28 by reduced diameter ends passing through holes 37 and 38 in the ends of the anchor member (see Fig. 2) and held therein by riveting over or flaring the protruding ends against the front surface of the anchor member 28. The other ends of the guide rods 35 and 36 pass loosely through holes in angle brackets 41 and 42 respectively, the left-hand angle bracket 41 being secured to the left-hand side plate 10 of the frame, whereas the right-hand angle bracket 42 is secured to a similar right-hand side plate 10a. The movement of the anchor member 28 away from the brackets 41 and 42 is limited by screws 43 and 44 threaded into the ends of the guide rods 35 and 36 respectively, which screws have enlarged heads engageable with the rear surface of the associated brackets 41 and 42.

A pivoted supporting bar or member 54 is provided to support the anchor member 28 by engaging the guide rods 35 and 36 beneath and near the front ends thereof. This bar or supporting member 54 is shaped as shown in Fig. 3, the lower extreme ends being provided with rounded pivot extensions 55 which enter holes 56 in the opposite side plates 10 and 10a, whereby said member 54 is supported for pivotal movement. The upper parts of each extreme end of the member 54 are

provided with ears 58 which enter annular grooves 59 and 60 in the guide rods 35 and 36 respectively of the anchor plate 28, the grooves of the guide rods receiving the ears 58 and the force of the returning springs 25 acting to thus maintain operative connection between the anchor plate 28 and the pivotal support 54 therefor.

An adjustment of the anchor member 28 is effected by a headed screw 61, the stem of which passes freely through a hole 62 in the right-hand end of the anchor member 28 (see Fig. 2) and is threaded into a tapped hole in the right-hand angle bracket 42. An expansion spring 63 surrounds the stem of the adjusting screw 61 between the bracket 42 and the anchor member 28 to hold the anchor member against the head of the screw 61 and in any position to which said anchor member may be adjusted. In adjusting the anchor plate 28 it receives a bodily movement with the upper end of the supporting plate 54 to any position between the two extremes shown in Figs. 8 and 9. It will be observed that in the Fig. 9 position a bead 28a on the anchor plate contacts the member 54 and prevents any further movement in that direction of the anchor plate.

It also will be seen that by supporting the anchor plate 28 on the pivoted supporting plate 54 as hereinbefore described a firm connection is effected between the two at opposite ends so that a uniform extent of adjustment of the anchor plate will be effected at both ends thereof notwithstanding the fact that a single adjusting screw 61 is provided at one end only of the anchor plate.

In the present instance, it is not intended that the touch control mechanism be adjusted by the operator, but rather it is considered advisable that such adjustment be made by a mechanic or skilled demonstrator to suit the individual operator for each machine. Accordingly, the adjusting means for the present touch regulator has been provided in the form of the screw 61 which is not readily accessible from outside the frame of the machine but which must be set by a mechanic, demonstrator or like person by means of a suitable tool such as a screw driver.

In Fig. 8, the anchor plate is shown adjusted by the screw 61 in a position providing the lightest operating touch afforded by the touch regulating means, while in Fig. 9, it is shown as set in a different position which provides the heaviest operating touch afforded herein. These two positions represent substantially the two extremes of the touch adjustment, and obviously the parts may assume any intermediate position to provide corresponding intermediate degrees of operating touch.

The anchor plate 28, when adjusted to its extreme forward and upward position shown in Fig. 8, shifts the returning springs 25 slightly forward of their dead-center alinement shown in Fig. 1, and accordingly each of the returning springs 25 under such Fig. 8 adjustment exerts a slight turning force in a clockwise or operating direction on its sub-lever 20 when in its normal position. This normal clockwise turning force exerted by each of the springs 25 in its position of adjustment shown in Fig. 8 obviously tends to lift the companion type bar 23 from its normal position, but such lifting action is not sufficient to move the type bar from its type rest *a* nor to prevent the parts of the type action from readily returning and remaining in normal position. It will accordingly be clear that any adjusted position of the anchor plate 28 beyond the position shown in Fig. 1 toward the position shown in Fig. 8 causes the returning springs to tend to counter-balance to various extents the weight of the type bars and actually to aid in the initial operating movements of the type bars.

It will be clear that in the present construction when the anchor member 28 is moved from its Fig. 8 position to its Fig. 9 position, the change in the angle at which the returning springs act on the sub-levers will result in a considerably greater total elongation of the returning springs during a complete operation of the type actions to printing position. Accordingly inasmuch as the force of such springs increases in proportion to their elongation, the resistance offered by the returning springs 25 to a clockwise movement of the sub-levers 20 will increase more rapidly during such movement when the anchor member 28 is positioned as in Fig. 9 than when positioned as in Fig. 8, this being due to the greater increase in force of the returning springs due to the greater elongation thereof and due to the more advantageous angle at which this force acts on the sub-levers.

However, it will be noticed that this change in the angular relation of the springs is substantially around their points of connection 26 with the sub-levers so that the length of each spring 25 in the initial position of the parts is substantially the same in Fig. 8 and Fig. 9. Accordingly it will be clear that the normal stress of the returning springs is not changed by the present method of adjusting the touch regulating mechanism, and accordingly the slight change in the angle at which this fixed normal force of the springs acts on the sub-levers when the touch regulating means is adjusted as shown in Fig. 9, for example, does not materially change the resistance offered to the initial actuating movement of the sub-levers.

From the foregoing description, it will be understood that I have provided simple and effective touch controlling means for varying the operating touch required on the printing keys to meet the desires of various operators, and have provided means affording a light initial touch regardless of the adjustment of the touch controlling means. In other words, I have provided an arrangement wherein the resistance offered by the returning springs to operation of each of the type actions increases as the parts thereof move from normal position to advance a type bar to the printing position, whereby a quick return of each of the type actions from the printing position to the normal position is effected and yet there is afforded a light resistance to the initial operating movement. I have provided means for adjusting the rate at which this resistance offered by the returning springs increases during the operating movement, thus obtaining the desired variation in the touch and yet retaining a light initial touch regardless of such adjustment.

An important feature of the present touch controlling means is extension of the range of adjustment of the effective force of the returning springs whereby an extremely light operating touch may be afforded by changing the direction of the normal effective force of the returning springs and thus tend to counterbalance the weight of the type bars when in normal position. This feature allows the machine to be adjusted to afford an extremely light touch to suit the desires of a beginner or learner having unusually weak fingers and wherein the question of speed is not an essential factor.

Various changes may be made in the construction, and certain features thereof may be employed without others, without departing from my invention as it is defined in the accompanying claims.

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

1. In a typewriting or like machine, the combination of a type action including a pivoted member, a returning spring connected to said pivoted member and exerting its force substantially against the dead center thereof when the parts are in normal position, thereby affording a light initial touch, and adjustable means for changing the angular relation of said spring relatively to said pivoted member substantially without stressing said spring, whereby the effective force of the spring may be varied to regulate the touch substantially without modifying the light initial touch due to the uniformly stressed condition of the spring under varying adjustments of said adjustable means.

2. In a typewriting or like machine, the combination of a series of type actions each including a pivoted actuating member, a series of contractile returning springs each connected at one end to one of said pivoted actuating members and exerting the effective force thereof substantially against the dead center of the companion pivoted actuating member when the parts are in normal position, thereby affording a light initial touch, an anchor to which the opposite ends of said springs are connected, and adjustable means for shifting said anchor to simultaneously shift all of said springs to change the angular relation thereof with reference to their pivoted members substantially without stressing said springs, whereby the effective force of said springs may be simultaneously varied to regulate the touch substantially without modifying the light initial touch due to the uniformly stressed condition of said springs under varying adjusments of said adjustable means.

3. In a typewriting or like machine, the combination of a series of type actions, a series of coiled returning springs each having an effective force acting in the direction of its length and each connected at one end to a member of the companion type action, an anchor to which the opposite ends of said springs are connected, and adjustable means for adjusting said anchor in a direction transverse to the direction of action of said springs and substantially about the point of connection of each spring with the companion type action to simultaneously vary the angular relation of the springs relatively to the said members to which they are connected substantially without changing the stress or tension of the springs, whereby the effective force of the springs may be simultaneously varied to regulate the touch substantially without modifying the light initial touch due to the uniformly stressed condition of said springs under varying adjustments of said adjustable means.

4. In a typewriting or like machine, the combination of a series of type actions, a series of coiled returning springs each having an effective force acting in the direction of its length and each connected at one end to a member of the companion type action, and means for simultaneously adjusting the opposite ends of said springs in an arc substantially around the ends thereof which are connected to members of the type actions for simultaneously varying the angular relation of said springs relatively to the members of the type action to which they are connected substantially without changing the stress or tension of the springs, whereby the effective force of the springs may be simultaneously varied to regulate the touch substantially without modifying the light initial touch due to the uniformly stressed condition of said springs under varying adjustments of said adjustable means.

5. In a typewriting or like machine, the combination of a type action including a pivoted sub-lever, a returning spring connected at one end thereto and in the normal position of the parts exerting its force substantially against the dead center of said sub-lever; and means for adjusting said spring at the opposite end thereof substantially around its point of connection with said sub-lever for changing the angular relation of the spring as a whole relatively to its sub-lever substantially without changing the stress or tension of the spring, whereby the effective force of the spring may be varied to regulate the touch without modifying the light initial touch due to the uniformly stressed condition of the spring under varying adjustments thereof.

6. In a typewriting or like machine, the combination of a type action including a pivoted sub-lever, a returning spring connected at one end thereto, and means for adjusting said spring at the opposite end thereof in an arc substantially around its point of connection with said sub-lever for changing the angular relation of the spring as a whole relatively to its sub-lever substantially without changing the stress or tension of the spring, whereby the effective force of the spring may be varied to regulate the touch without modifying the light initial touch due to the uniformly stressed condition of the spring under varying adjustments thereof.

7. In a typewriting or like machine, the combination of type bars, actuating means therefor, springs having an effective force acting in the direction of the length thereof for returning said actuating means to normal position, and touch regulating means comprising adjustable means for simultaneously varying the returning force exerted by all of said springs on the companion actuating means solely by changing the angular direction of action of said springs without varying the tension thereof.

8. In a typewriting or like machine, the combination of type bars, actuating means therefor, springs having an effective force acting in the direction of the length thereof for returning said actuating means to normal position, and touch regulating means comprising adjustable means for simultaneously varying the effective force of all of said springs by changing the direction of action thereof substantially without varying the initial tension thereof.

9. In a typewriting or like machine, the combination of type bars, key levers, pivoted sub-levers actuated by said key levers, returning springs attached to said sub-levers and each normally exerting its force substantially against the dead center of the associated sub-lever, and touch regulating means including adjustable means for adjusting said springs substantially about the points of connection thereof with the sub-levers substantially without varying the uniform tension exerted by said springs when the sub-levers are in normal position.

10. In a typewriting or like machine, the combination with type bars, key levers, and pivoted sub-levers; of returning springs, an anchor therefor, the returning springs extending in the normal

disposition of the parts between said anchor and sub-levers each in a direction to act substantially against the dead center of its associated sub-lever, and touch regulating means comprising a bar for supporting said anchor for movement in a direction to change the angle of action of said springs on said sub-levers without varying the tension of the springs, and adjustable means for moving said anchor.

11. In a typewriting or like machine, the combination of type actions, coiled returning springs therefor, and touch control mechanism therefor comprising an anchor to which one end of each of said springs is connected, means for supporting said anchor for bodily movement in a direction transverse to the lengths of said springs to change the angular relation thereof substantially without modifying the tension of said springs, a pivoted supporting plate on which said anchor is supported, and adjustable means cooperative with said anchor for adjusting it and holding it against accidental displacement from its adjusted position.

12. In a typewriting or like machine, the combination of type actions, contractile returning springs therefor, and touch control mechanism comprising an anchor to which one end of each of said springs is connected, a member supporting said anchor against the force of said springs and pivoted to allow bodily movement of said anchor member in a direction transverse to the lengths of said springs to change the angular relation thereof substantially without modifying the tension of said springs, and micrometer means for adjusting the position of said anchor.

13. In a typewriting or like machine, the combination of a type action including a pivoted sub-lever, a returning spring acting on said sub-lever at an angle to provide a resistance to movement thereof which increases as the type action moves from normal position to printing position, and adjusting means for adjusting the angle at which said returning spring acts on said sub-lever and thereby varying the rate at which the resistance of said spring to movement of the sub-lever increases as the type action moves from normal position to printing position, said spring having a substantially uniform normal stress irrespective of the adjustment of said adjusting means.

14. In a typewriting or like machine, the combination of a type action including a pivoted member, a returning spring connected to said pivoted member, and touch regulating means including adjustable means for changing the normal angle of action of said returning spring to and from the dead center of said pivoted member in a direction to exert a force tending to initially move the pivoted member from normal position.

15. In a typewriting or like machine, the combination of a type action including a pivoted member, a returning spring connected to said pivoted member, and touch regulating means including adjustable means for changing the normal angle of action of said returning spring to and from the dead center of said pivoted member in either of two directions, whereby the normal effective force of the spring may tend to return the pivoted member to normal position or exert its force to tend initially to move the pivoted member from normal position.

16. In a typewriting or like machine, the combination of type bars, springs having an effective force acting in the direction of the length thereof for returning said type bars to normal position, and touch regulating means comprising adjustable means for simultaneously varying the effective force of all of said springs on the companion type bars by merely changing the direction in which said effective force acts on the companion type bars and without appreciably changing the initial stress of said springs.

17. In a typewriting or like machine, the combination of type bars, type bar actuating devices, coiled contractile springs for returning said actuating devices and type bars to normal position, and touch regulating means comprising adjustable means for simultaneously varying the effective force of all of said springs on the companion actuating devices by merely changing the direction in which said effective force acts on the companion actuating devices and without appreciably changing the initial stress of said contractile springs.

18. In a typewriting or like machine, the combination of a printing key, a member actuated at each depression of said key, a returning spring connected at one end to said member, and touch regulating means for altering the touch on said printing key including means for adjusting said spring at the opposite end thereof in an arc substantially around its point of connection with said member for changing the angular relation of the spring relative to said member substantially without changing the normal stress or tension of the spring, whereby the effective force of the spring may be varied to regulate the touch on the printing key without modifying the light initial touch due to the uniformly stressed normal condition of the spring under varying adjustments thereof.

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