N. H. ANDERSON.

TYPE WRITING MACHINE.

APPLICATION FILED JUNE 12, 1914.

1,317,411.

Patented Sept. 30, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

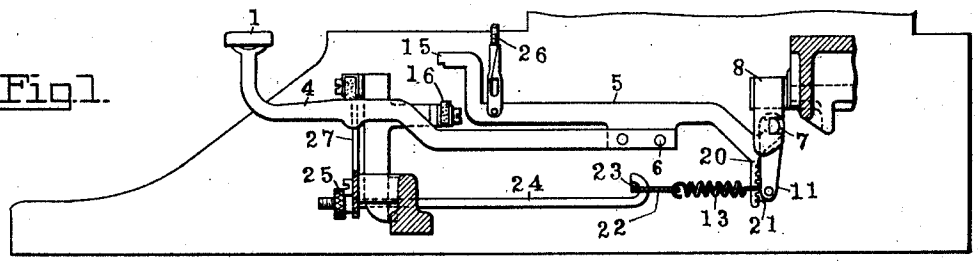


Fig. 2.

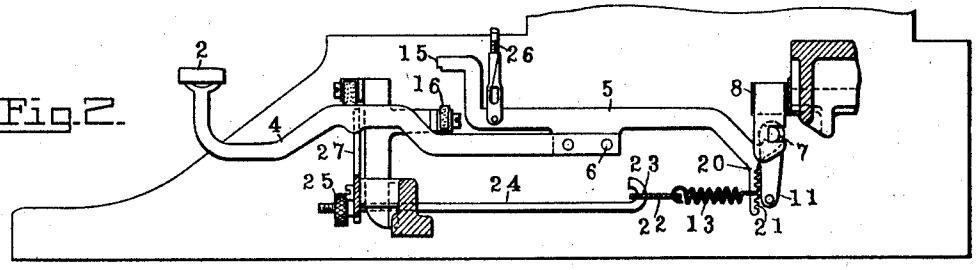
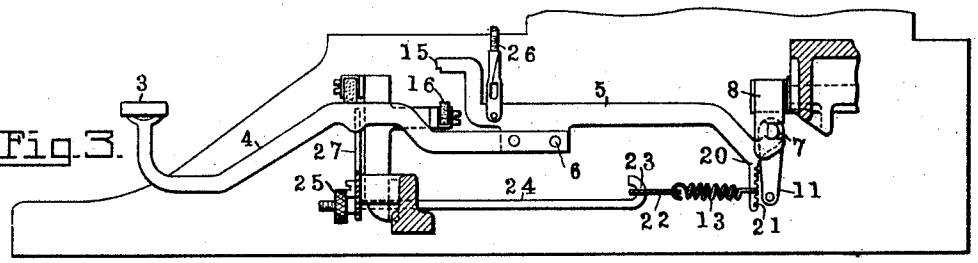


Fig. 3.



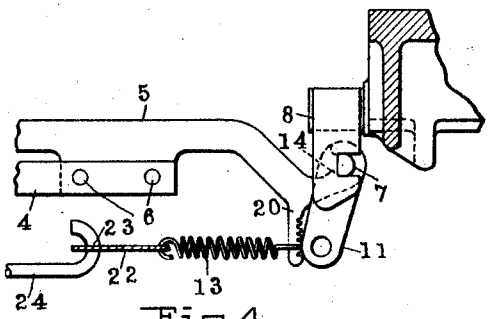


Fig. 4.

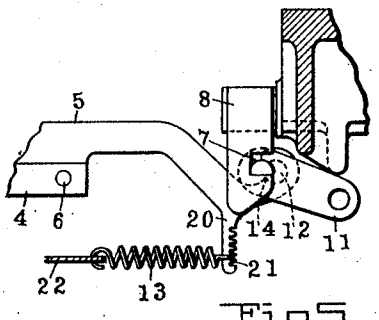


Fig. 5.

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2 SHEETS—SHEET 2.

Fig. 6.

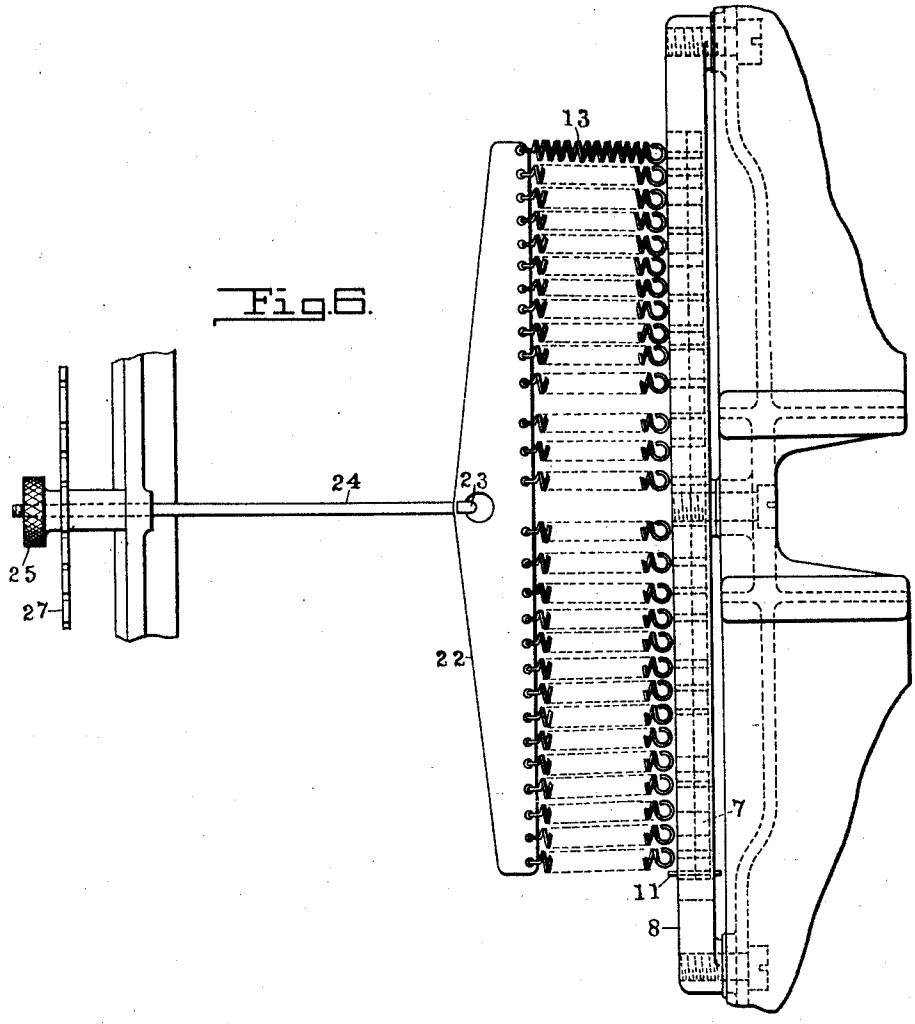


Fig. 8.

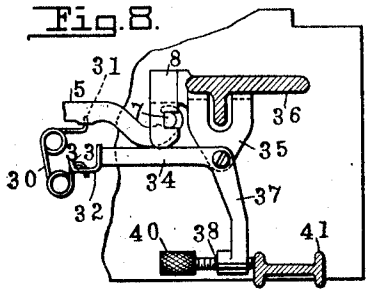
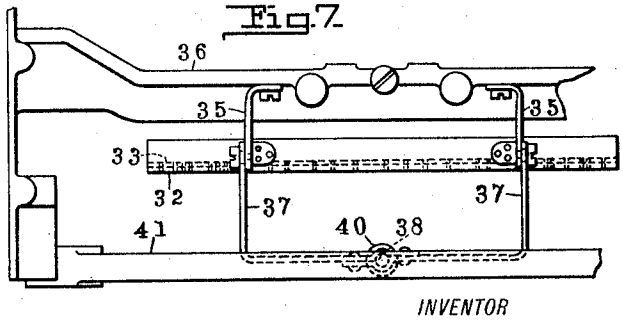


Fig. 7.



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UNITED STATES PATENT OFFICE.

NILS H. ANDERSON, OF MIDDLETOWN, CONNECTICUT, ASSIGNOR TO THE NOISELESS TYPEWRITER COMPANY, OF MIDDLETOWN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

TYPE-WRITING MACHINE.

1,317,411. Specification of Letters Patent. Patented Sept. 30, 1919.

Application filed June 12, 1914. Serial No. 844,657.

To all whom it may concern:

Be it known that I, NILS H. ANDERSON, a citizen of the United States, residing at Middletown, in the county of Middlesex and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to typewriting machines and with regard to certain more specific features thereof to improvements in key lever construction and mounting.

One of the objects of the present invention is to provide a simple and practical key lever having a desirable touch. Another object is to provide a mechanism of the above character which will be cheap to manufacture and install. A further object is to provide a bank of key levers of the first above mentioned character so positioned and mounted as to enhance their ease of movement and reduce wear. A further object is to provide a mechanism of the last above mentioned character with varying adjusting devices whereby the quality of touch may be conveniently varied to suit the peculiarities of the particular operator. A further object is to provide a key lever mechanism practically applicable to "Noiseless" machines which will be efficient in use and reliable in operation. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings wherein is shown two of the various possible embodiments of this invention,

Figures 1, 2 and 3 are side elevations of three key levers taken from three banks of keys in their normal or inactive position;

Fig. 4 is a detailed view showing the pivotal mounting and an adjusting mechanism of one of the key levers;

Fig. 5 is a similar view with the parts in releasing position;

Fig. 6, is a plan view of an adjusting device for the entire bank of levers;

Fig. 7 is an elevational view of the mechanism shown in Fig. 6; and

Fig. 8 is an elevational view of a modified form of adjusting mechanism.

Similar reference characters refer to similar parts throughout the several views of the drawings.

While the present invention is particularly adapted for use in a Noiseless typewriting machine and in relation to which it will be hereinafter described, it is, of course, to be understood that it is applicable to other forms of typewriting machines as well. In this connection it may be noted that the operating qualities of any machine are judged to a certain extent by the character and quality of the touch when the keys are depressed and brought to rest at the end of their path of travel. It is desirable that this touch shall be pleasing and free from apparent hardness or blow when the key lever is stopped, or in other words to provide a semi-resilient character to the touch which shall be less tiring upon the operator. While attempts may have been made to render the touch more or less elastic, they have been found to be unsatisfactory because of the fact that in actual use the impression on the operator is that a distinct effort has to be made to push the key downwardly at the end of the stroke against a considerable amount of elasticity. This results in the impression of materially increasing load on the finger at the end of the stroke, which is undesirable and tiresome. There is also a tendency for the pads to become packed after continued use and thus defeat their primary object. The present device is adapted to overcome the above objections and provide a more satisfactory mechanism, from both the mechanical and operating standpoints.

Referring now in detail to the accompanying drawings, and more particularly to Figs. 1, 2 and 3, each of the key levers 1, 2 and 3 taken respectively from three banks of keys of the machine, is composed of two parts. The lower part 4 is provided at its forward end with a finger key attached thereto in any desired manner while its op-

posite end is attached to an upper portion 5 of the key lever by suitable rivets 6 or if desired it may be electrically welded thereto. The upper part of the key lever is made of relatively heavier or thicker material than the lower part as it performs all the work or functions of the key lever, such as bearing on a fulcrum bar 7 at its rear end and forming a connecting point with the type action at its forward end, the lower part being only an actuating portion.

The rear part of the key lever is suitably fulcrumed as shown more clearly in Fig. 4. This construction involves a cast iron comb or bar 8 slotted to receive the key levers and in this slot is the fulcrum bar 7 formed from an irregular shaped wire which extends throughout the length of the comb. A lever 11 is fastened to this wire whereby it may be conveniently turned for disengaging the key levers, each key lever being provided with an opening 12 which fits the wire in normal position and is held in contact therewith by means of a spring 13 which also acts as a return spring for the key lever. It will be noticed from Fig. 5 that the release lever has been swung upwardly toward the rear of the machine substantially a quarter of a revolution and in this position the key lever may be conveniently removed by pressing the same rearwardly as shown, thus avoiding any lateral or vertical tilting movement. The key lever is provided with a small projection 14, which when the parts are in normal position, will prevent accidental displacement of the key lever and thereby normally relieve the return springs 13 from the rearward pressure exerted on the key levers.

When the key lever is operated in the usual manner, it moves downwardly as a unit until it reaches the position when the forward end 15 of the upper portion of the key lever engages a stop bar 16 and is arrested thereby. When the lever has thus been arrested its forward portion continues to be depressed slightly by the finger of the operator and the natural resiliency of the relatively light metal used in its construction supplies the feeling of softness or elasticity thereby eliminating the shock or jar usually felt by the operator's finger.

In order that the key board may have a uniform touch in this respect, it will be noted that in each of the three banks of keys, the lower portion of each key lever is of substantially the same length, but is attached to the upper part at varying distances from the fulcrum, so that when any of the three banks of keys is brought to rest by the stop bar, there exists the same qualities of resiliency.

In order that each bank may be provided with an equal dip, the distance between the silencing pad and the forward end or hook portion 15 and the upper part of each key lever is varied. Thus the shorter key levers have a greater angular travel and are therefore provided with a greater distance between the hook and pad than the longer key levers.

From the above it will be clear that each upper portion of the key lever is of sufficient stiffness and rigidity to work satisfactorily and produce the desired results in practice and at the same time the lighter portions possess such qualities of flexibility and elasticity as to render the action or touch pleasing and less tiresome. It should also be noted that with the lower portion of the key lever made of comparatively thin metal, there is a certain amount of flexibility in the keys if the same are hit sidewise or out of position which would not exist in a key lever made of heavier or less resilient material.

The downwardly extending portion 20 of each key lever to which the return spring 13 is connected is provided with a series of notches 21 permitting the spring to be connected at any one of several places to permit a very accurate balancing of all portions of the key board. The opposite ends of the springs are connected to a transverse horizontally disposed equalizing plate 22 which is attached by a swivel connection 23 with a pull wire 24 which is adjustable fore and aft of the machine by a threaded nut 25 acting on the front comb member 27. By means of these adjustments of the return springs it is possible to equalize the spring tension on the banks of keys as well as to equalize the tension on the individual keys or the keys of one bank. These adjustments are accessible from the underside of the machine and can be made without the use of any special tools. Most operators prefer a light touch to the machine, yet there are some who prefer a somewhat heavier touch and in order that the touch may be varied substantially at will from one to the other the entire keyboard may be adjusted simultaneously by adjusting the connecting link 24 fore and aft the machine. As above explained, the return springs of the several actions are connected to a plate which in turn is connected to the pull wire passing through a fixed portion of the machine such for example as the front comb member 27 and is adjustable by means of the nut 25. The plate to which the springs are connected being swiveled also permits a certain equalizing of the change of tension over the whole keyboard. From the above description it is thought that the operation and manner of use of this mechanism will be clear, although a brief statement thereof is substantially as follows:

When any key lever is depressed motion is

transmitted through the lower or more resilient part thereof to the upper or heavier part which is designed to perform the actual work. The upper part 5 moves downwardly under the movement of the operator's finger and acting on the pull wire 26 conveys the desired movement to the type action and effects the printing in the usual manner. The downward movement of the upper part of the key lever is positively arrested by the resilient stop or pad 16, while the lower part being of a more resilient and elastic material has a very slight downward movement which gives the desired softness or cushioning effect to the touch, rendering the same more agreeable and less tiresome.

When it is desired to change the key lever, the release lever 11 at the end of the fulcrum wire is given a quarter turn and the particular key lever to be changed is moved rearwardly after which it may be disconnected from its associated parts and removed, the other key levers being held in place by means of their respective return springs.

If one spring is found to be weaker than another thus producing an uneven touch to the entire machine when that particular key is actuated, the quality of its touch may be varied by raising or lowering the end of the spring 13 to engage a different notch 21 in the downwardly extending arm of the key lever. If, however, it is desired to change the strength or touch of the entire bank of key levers the adjusting nut 25 in the forward part of the machine is rotated in one direction or another to move the pull wire connected therewith fore and aft of the machine which, through the equalizing plate will relieve or increase the tension exerted upon all of the return springs.

Referring now to the modification shown in Figs. 7 and 8, the key levers 5 are fulcrumed on a fulcrum bar 7 attached to a relatively fixed transverse portion of a machine and are supported in their raised or normal position by return springs 30 engaging a small hole 31 in the under edge of the key lever. The opposite end of the spring is supported in a plate or bracket 32 and passes through a similar hole therein, it being prevented from sidewise or lateral movement by passing through a slot 33 in the forward edge of the plate. This plate is mounted on forwardly extending arms 34 pivotally mounted in depending brackets 35 from the transverse part 36 of a frame and their lower ends 37 are connected together as shown more clearly in Fig. 7 to provide a threaded opening 38 for receiving an adjusting screw 40 passing therethrough, the end of which bears against a second transverse portion 41 in the frame of the machine. It will thus be seen that the tension of all the return springs may be adjusted simultaneously by means of the adjusting screw 40, thus varying the touch of the keyboard of the machine as a whole, making it lighter or heavier as desired. A construction of this kind is of a particular value due to the compactness of the various parts and permits a relatively larger number of key actions to be placed side by side in a given space, since the springs are substantially the same width as the key levers and their ends engage holes in the key lever and supporting plate respectively in the same vertical plane. A double coil construction of these return springs provides sufficient resiliency for the efficient and reliable operation of the device.

The operation and manner of use of this construction is substantially the same as that above described and it is believed to require no further explanation.

It is thus seen that this invention provides a simple and practical device having few parts which will be cheap to manufacture and simple or easy to install. The invention is believed to accomplish among others all the objects and advantages above set forth.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a typewriting machine, in combination, a pivoted key lever comprising a relatively rigid fulcrumed portion and a relatively yieldable finger key portion, and means to arrest pivotal movement of said rigid portion.

2. In a typewriting machine, a key lever composed of two parts rigidly connected together and arranged substantially in parallel one above the other, a finger key mounted upon the lower part, a connecting member mounted upon the upper part, the upper part being fulcrumed at its rear end, and a stop positioned for engagement with the upper part in advance of the connection with the lower part.

3. In a typewriting machine, in combination, a key lever composed of two parts rigidly connected and arranged one above the other, a finger key mounted upon the lower portion, and a connecting member mounted upon the upper portion, one of said portions being of material relatively yieldable with respect to the other.

4. In a typewriting machine, in combination, a key lever composed of two parts, a finger key mounted upon one of said parts, a connecting member mounted upon the other of said parts, said first-mentioned part being of relatively lighter material than the other part, and a stop adapted to arrest the movement of said second-mentioned part.

5. In a typewriting machine, in combination, a key lever comprising a fulcrumed portion and a finger key portion, one of said portions being yieldable relatively to the other, and a fixed stop to engage and arrest said fulcrumed portion.

6. In a typewriting machine, in combination, a key lever composed of two pieces of sheet metal of relatively different thicknesses arranged edgewise one above the other, the lower of said parts being provided with a key, a fulcrum bar connected with the rear end of the upper part, and a fixed stop to coöperate with the forward end of the upper part.

7. In a typewriting machine, in combination, a key lever composed of two pieces of sheet metal of relatively different thicknesses and connected one above the other in edgewise relation, a connecting member secured to the upper part, a stop adapted to engage its forward end, and a fulcrum bar upon which its rear end is mounted.

8. In a typewriting machine, in combination, a pivoted key lever having a depending arm adjacent its axis and in the plane of its body portion, and a return spring beneath said key lever adjustably connected to said arm.

9. In a typewriting machine, in combination, a plurality of key levers, each being provided with a projecting arm, a return spring adjustably connected with each of said arms adapted to permit independent adjustment, and a common tension adjusting means for all of said key levers.

10. In a typewriting machine, in combination, a plurality of key levers, each being provided with a downwardly projecting arm, a return spring adjustably connected with each of said downwardly projecting arms adapted to permit independent adjustment, a common adjusting means for all of said key levers, a movable support to which the ends of said adjusting springs are connected, and means for bodily moving said support for adjusting the tension of said springs.

11. In a typewriting machine, in combination, a plurality of key levers, each being provided with a projecting arm, a return spring adjustably connected with each of said projecting arms adapted to permit independent adjustment, a common adjusting means for all of said key levers, a movable support to which the ends of said adjusting springs are connected, a connecting link between said support and the front part of the machine, and means associated with said link for moving the support and simultaneously changing the tension of all of the springs.

12. In a typewriting machine, in combination, a plurality of key levers composed of two parts arranged edgewise one above the other, a downwardly projecting arm on each of the upper parts of said key levers, a return spring adjustably connected with each of said downwardly projecting arms, a plate to which the opposite ends of said return springs are connected, and a swivel connection between said plate and the forward part of the machine whereby the tension of the springs may be simultaneously adjusted.

13. In a typewriting machine, in combination, a plurality of key levers, each comprising two parts arranged edgewise one above the other, the lower part being provided with an actuating key and the upper part having a connecting member, a stop for arresting the downward movement of the upper part, a fulcrum at the rear end of said upper part, an arm having a plurality of notches on one of said parts, and a return spring for each of said key levers engaging one of the notches.

14. In a typewriting machine, in combination, a plurality of key levers, each comprising two parts arranged edgewise one above the other, one part being provided with an actuating key and the other part having a connecting member, a stop for arresting the downward movement of one part, a fulcrum at the rear end of said part, an arm having a plurality of notches on one of said parts, a return spring for each of said key levers engaging one of the notches, a support for the opposite end of each of the return springs, and means for simultaneously adjusting the tension of all of said springs.

15. In a typewriting machine, in combination, a plurality of key levers, each comprising two parts arranged edgewise one above the other, the lower part being provided with an actuating key and the upper part having a connecting member, a stop for arresting the downward movement of the upper part, a fulcrum at the rear end of said upper part, an arm having a plurality of notches on one of said parts, a return spring for each of said key levers engaging one of the notches, a support for the opposite end of each of the return springs, and means for moving said support bodily with respect to said return springs whereby their tension is varied.

16. In a typewriting machine, in combination, a plurality of key levers having open

pivotal bearings, a common fulcrum bar seated in said bearings and movable to locking and releasing positions with respect thereto, and resilient means associated with each of said key levers for opposing removal thereof when said fulcrum bar is moved to releasing position.

17. In a typewriting machine, in combination, a plurality of key levers each having a hook portion at its rear end, a fulcrum member engaging the hook portion, means associated with one of said parts adapted to prevent a longitudinal movement of the key lever with respect to said fulcrum, and return springs coacting with said key levers normally urging said key levers in a direction whereby they are held securely in engagement with the fulcrum.

18. In a typewriting machine, in combination, a plurality of key levers each having a forwardly extending hook portion at its rear end, a fulcrum member engaging the hook portion, means associated with one of said parts adapted to prevent a rearward movement of the key lever with respect to said fulcrum, return springs coacting with said key levers normally urging said key levers in a direction whereby they are held securely in engagement with the fulcrum, and means for simultaneously changing the tension of all of said key levers.

19. In a typewriting machine, in combination, a plurality of key levers having forwardly extending hook portions and projecting arms at their rear ends, a fulcrum engaging the forwardly extending hook portion of each key lever, and a return spring connected to the extending arm of each key lever adapted to hold said key lever securely on the fulcrum.

20. In a typewriting machine, in combination, a plurality of key levers having hook portions and projecting arms at their rear ends, a fulcrum engaging the hook portion of each key lever, a return spring connected to the arm of each key lever adapted to hold said key lever securely on the fulcrum, and means for separately adjusting each return spring.

21. In a typewriting machine, in combination, a plurality of key levers having forwardly extending hook portions and downwardly projecting arms at their rear ends, a fulcrum engaging the forwardly extending hook portion of each key lever, a return spring connected to the downwardly projecting arm of each key lever adapted to hold said key lever securely on the fulcrum, and means for separately adjusting each return spring.

22. In a typewriting machine, in combination, a plurality of key levers having forwardly extending hook portions and downwardly projecting arms at their rear ends, a fulcrum engaging the forwardly extending hook portion of each key lever, a return spring connected to the downwardly extending portion of each key lever adapted to hold said key lever securely on the fulcrum, and a member to which the opposite ends of each of said return springs are connected, said member being pivotally supported whereby the tension of the key levers is equalized.

23. In a typewriting machine, in combination, a plurality of key levers having forwardly extending hook portions and downwardly projecting arms at their rear ends, a fulcrum engaging the forwardly extending hook portion of each key lever, a return spring connected to the downwardly extending portion of each key lever adapted to hold said key lever securely on the fulcrum, a member to which the opposite ends of each of said return springs are connected, said member being pivotally supported whereby the tension of the key levers is equalized, and means connected with said member for bodily moving the same for simultaneously varying the tension of all of said return springs.

24. In a typewriting machine, in combination, a plurality of key levers having open pivotal bearings, a common fulcrum therefor, a single spring for each of said key levers acting to hold the same in operative relation to said fulcrum and to return the same to normal position, and a single means to adjust the tension of all of said springs jointly.

In testimony whereof I affix my signature, in the presence of two witnesses.

NILS H. ANDERSON.

Witnesses:
JAMES K. GUY,
EDWARD F. SLAVIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."