June 6, 1961 W. RIELANDER 2,987,161

TOUCH ADJUSTMENT ARRANGEMENT FOR TYPEWRITERS

Filed March 16, 1960 2 Sheets-Sheet 1

Fig. 1

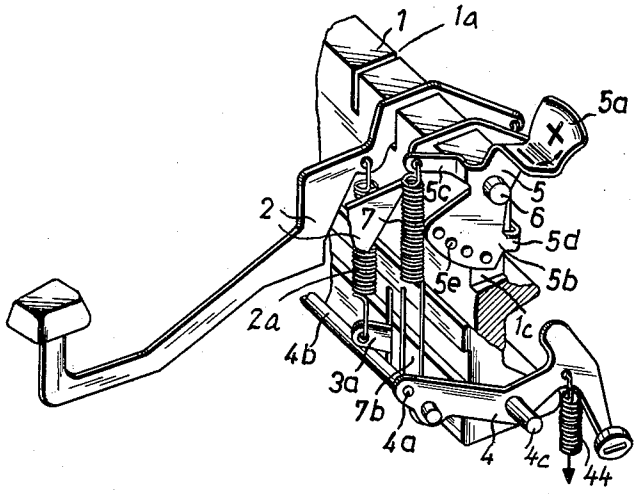
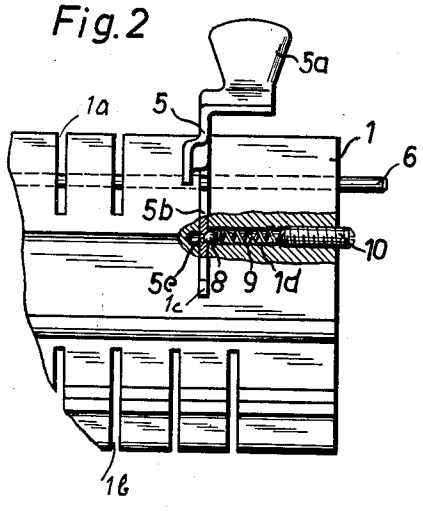


Fig. 2



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TOUCH ADJUSTMENT ARRANGEMENT FOR TYPEWRITERS

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Fig. 3

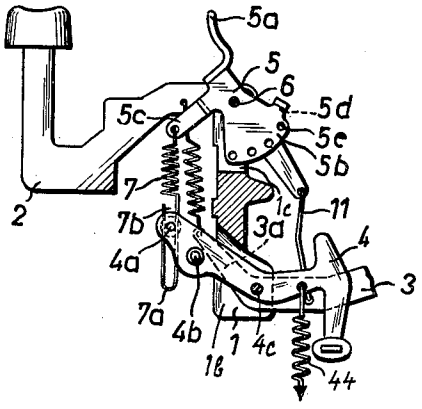
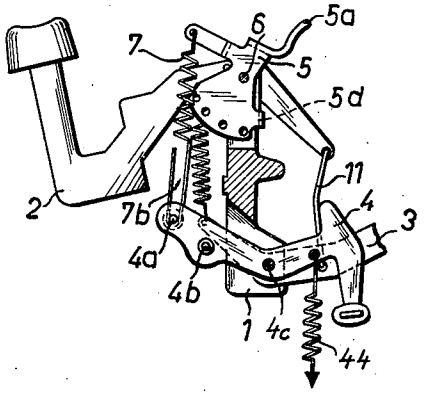


Fig. 4



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TOUCH ADJUSTMENT ARRANGEMENT FOR TYPEWRITERS

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15 Claims. (Cl. 197—33)

The present invention relates to a touch adjustment arrangement for typewriters, and more particularly to a touch adjustment arrangement for small portable machines.

It is known to provide typewriters with a touch adjustment arrangement which is manually adjustable to vary the resistance of the typelever actions against displacement. However, the touch adjustment devices according to the prior art are rather complicated, and take up a great deal of space which is generally not available in a small portable typewriter.

It is one object of the present invention to overcome these disadvantages of prior art constructions, and to provide a touch adjustment arrangement consisting of few simple and inexpensive parts which take up very little space in the machine so that the device is suitable for portable typewriters.

Another object of the present invention is to provide a touch adjustment device which is adjustable so that an actuated typelever action may encounter resilient resistance at different moments of its movement.

Another object of the present invention is to provide a touch adjustment arrangement which is manually adjustable so that the resilient resistance against displacement of a typelever action may be increased either during the entire operation of the typelever action, or only during a smaller or greater part of the movement of the typelever action.

Another object of the present invention is to provide a spring-loaded member which resiliently counteracts the movement of all typelever actions, and in addition thereto, a resilient means which can be adjusted to oppose movement of the typelever actions only during part of the movement thereof.

With these objects in view, the present invention relates to a touch adjustment arrangement for typewriters, and comprises a support; a plurality of typelever actions mounted on the support; a preferably spring-loaded member extending across the typelever actions and being displaced during operation of the same; a manually operated adjusting means movable between a plurality of control positions; and a resilient means connected to the adjusting means for movement with the same between a plurality of adjusted positions. The resilient means has a portion located in the path of movement of a part of the above mentioned member and is located at different places on the path in the adjusted positions thereof. Consequently, the resilient means is resiliently displaced at different moments of the movement of an actuated typelever action to oppose such movement.

In this manner, the resistance of the resilient means is added to the resistance of the spring-loaded member, but the moment in which such added resistance becomes effective can be selected by setting the manually operated adjusting means.

The adjusted positions of the resilient means may include a position in which it abuts the spring-loaded member, and the resilient means may be pretensioned in the abutting position so that a particularly great resistance is encountered by the operator as soon as the fingers actuate the keys of the typelever actions.

In the preferred embodiment of the present invention, the adjusting means is a lever mounted on the same shaft

which supports the key levers of the typelever actions. The spring-loaded member includes a bar extending in transverse direction across all typelever actions, and the resilient means is a coil spring having a loop-shaped end portion into which a pin on the spring-loaded member projects.

Arresting means are built into the support to arrest the adjusting lever means in the control positions thereof, and due to the fact that the arresting means are located within the support, no additional space is required in the typewriter.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a fragmentary perspective view illustrating a device according to the present invention;

FIG. 2 is a fragmentary front view, partly in section, and illustrating the arresting means;

FIG. 3 is a side view, partly in section, illustrating one operational position of the adjusting means; and

FIG. 4 is a side view, partly in section, illustrating another operational position of the adjusting means in which greater manual force is required for actuating the keys.

Referring now to the drawings, and more particularly to FIGS. 1 to 3 which illustrate the device in the normal inoperative position, a support **1** extends in transverse direction through the typewriter, and has a row of upper slots **1***a*, a row of lower slots **1***b*, and a deeper slot **1***c*. A shaft **6** passes through the slots **1***a* and supports the key levers **2** of a set of typelever actions for turning movement. Another shaft **4***c* passes through the slots **1***b* and supports the intermediate levers **3** of the typelever actions for turning movement. Each key lever **2** is connected by a spring **2***a* to an arm **3***a* of the respective intermediate lever **3**, and by a wire link **11** to the other arm of the respective lever **3**. Depression of the key lever **2** of each typelever action will effect turning of the intermediate lever **3** about shaft **4***c* in counterclockwise direction, resulting in the actuation of a typelever, not shown.

A pair of arm means **4** is mounted at the ends of shaft **4***c*, only one arm means **4** being shown. A bar **4***b* is mounted on the pair of arm means **4** and extends across all typelever actions. Members **4**, **4***b* is spring-loaded and tends to turn in counterclockwise direction so that bar **4***b* abuts arms **3***a* of the intermediate levers **3** of all typelever actions which are mounted on support **1**. When one of the key levers **2** is actuated, the respective intermediate lever **3** will turn, so that the respective arm **3***a* displaces bar **4***b* and thereby turns arm means **4** in counterclockwise direction against the action of spring means **44**, which act on arm means **4** and tend to turn arm means **4** in clockwise direction.

An adjusting means **5** is mounted on shaft **6** for turning movement between a plurality of control positions. Adjusting means **5** has a finger-engaging portion **5***a*, a sector-shaped arm **5***b* located in slot **1***c*, and another arm **5***c* to which a coil spring **7** is attached. The other end of coil spring **7** is loop-shaped and defines an elongated opening **7***b*. A part of the spring-loaded member **4**, **4***b*, illustrated to be a projecting pin **4***a*, is located in the opening **7***b*.

The support **1** has a bore **1***d* which extends transverse to the slot **1***c*. A catch member, illustrated to be a ball **8**, is located in the bore **1***d* and is urged by a spring **9** against the arm **5***b* of the adjusting lever means **5**. Arm **5***b* has a plurality of recesses **5***e* which are respectively located opposite catch member **8** in the control positions of adjusting means **5**. A threaded plug **10** is threaded into

a portion of bore 1*d*, and can be adjusted to vary the tension of spring 9. When the manually operated portion 5*a* of the adjusting means 5 is operated, adjusting means 5 will successively assume four different control positions, while catch 8 will snap into one of the recesses 5*e* in each control position of the adjusting means 5, and hold the same in the adjusted position. Finally, a transverse projection 5*d* of the adjusting means 5 will abut against the surface of support 1 and limit further turning movement of adjusting means 5. Similarly, arm 5*c* has a transverse portion abutting the support 1 in the other terminal position of adjusting means 5.

When adjusting means 5 is turned between its control positions, arm 5*c* moves and displaces spring means 7, and thereby the end portion 7*a* relative to the pin 4*a* which is located in the opening 7*b* of the loop-shaped end portion of spring means 7.

FIG. 3 shows a terminal position of the adjusting means 5 corresponding to a light touch, as indicated by the minus sign on the finger engaging portion 5*a*. Pin 4*a* is spaced a considerable distance from the end portion 7*a* when spring means 7 is lowered as shown in FIG. 3. When adjusting means 5 is turned in clockwise direction to the position shown in FIG. 4, spring 7 is raised and pin 4*a* will be located near the end portion 7*a*. It is possible to have pin 4*a* abut end portion 7*a* in the normal inoperative position shown in FIG. 3, or to even pretension spring 7 in the terminal position of adjusting means 5 indicated by the plus sign on finger engagement portion 5*a* and illustrated in FIG. 4.

The device operates as follows: In the inoperative position shown in FIG. 3, the spring-loaded member 4, 4*a*, 4*b* abuts against all arms 3*a* of levers 3 of the typelever actions, and consequently urges the typelever actions to the normal inoperative position shown in FIG. 3. When any one of the typelever actions is actuated by depression of key lever 2, the respective arm 3*a* moves downwardly and displaces bar 4*b* and thereby turns arm means 4 about shaft 4*c* against the action of spring 44.

During such turning movement of the spring-loaded means 4, 4*a*, 4*b*, projecting pin 4*a* moves in the loop-shaped portion of spring 7, and more particularly in the opening 7*b* if the adjusting means 5 is set as shown in FIG. 3. Near the end of the movement of the typelever action, pin 4*a* will abut end portion 7*a* of spring means 7, and encounter resilient resistance which is added to the resistance of the spring-loaded bar 4*b*. However, since this added resilient resistance becomes effective near the end of the movement of key lever 2, it does not substantially change the touch characteristics of the typelever action although slightly modifies the impression force. In the intermediate control position of adjusting means 5, portion 7*a* is moved closer to projecting pin 4*a*, so that the resilient force of spring 7 is sooner added to the resistance of the spring-loaded member 4, 4*b* so that the operator encounters greater resistance. In the position of FIG. 4, portion 7*a* may abut pin 4*a*, or be spaced only a very short distance from the same so that in the moment of depression of key lever 2, or very soon thereafter, the force of spring 7 is added to the resistance of the spring-loaded member 4, 4*b*. In this manner, considerable resistance is encountered by the operator.

It will be noted that the loop-shaped portion of spring 7 is located along the path of pin 4*a*, and is shifted along such path when adjusting means 5 is set to a different control position. Due to the fact that spring 7 is articulated to the arm 5*c* of adjusting means 5, the loop-shaped portion will be guided by pin 4*a* so as to be located along the path of movement of the same.

It is also possible to adjust the adjusting means 5 and spring means 7 in such a manner that in the position illustrated in FIG. 3, pin 4*a* does not engage portion 7*a* at all, while in the position of FIG. 4 portion 7*a* may abut with pretension on pin 4*a*. In this manner, a particularly wide range of adjustment of the touch of the key levers is assured with a very simple structure.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of touch adjustment arrangements differing from the types described above.

While the invention has been illustrated and described as embodied in a touch control arrangement including a spring which becomes effective at selected moments of movement of an actuated typelever action, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. Touch adjustment arrangement for typewriters, comprising, in combination, a support; a plurality of typelever actions mounted on said support; a member movably mounted on said support and extending across said typelever actions, said member being engaged and moved along a path by each typelever action when the same is operated, said member having a part; a manually operated adjusting means mounted on said support for movement between a plurality of control positions; and a resilient means having a portion located in said path and connected to said adjusting means for movement with the same between a plurality of adjusted positions in which said porportion is located at different places on said path so as to be spaced different distances from said member, said portion having an elongated opening in which said part is located whereby said portion of said resilient means in different adjusted positions is resiliently displaced by said part of said member at different moments of the movement of an actuated typelever action to oppose such movement.

2. Touch adjustment arrangement for typewriters, comprising, in combination, a support; a plurality of typelever actions mounted on said support; a member movably mounted on said support and extending across said typelever actions, said member being engaged and moved by each typelever action when the same is operated, said member having a projection moving along a path; a manually operated adjusting means mounted on said support for movement between a plurality of control positions; and a spring having one end portion attached to said adjusting means and another loop-shaped end portion in which said projection is located, said spring being movable with said adjusting means between a plurality of adjusted positions in which said projection is located at different places of said loop-shaped end portion whereby said loop-shaped end portion is resiliently displaced by said projection of said member at different moments of the movement of an actuated typelever action to oppose such movement.

3. Touch adjustment arrangement for typewriters, comprising, in combination, a support; a plurality of typelever actions mounted on said support; a member movably mounted on said support and extending across the typelever actions, said member being engaged and moved by each typelever action when the same is operated, said member having a projection moving along a path; a manually operated adjusting means mounted on said support for movement between a plurality of control positions; and a spring having one end portion attached to said adjusting means and another loop-shaped end portion in

which said projection is located, said spring being movable with said adjusting means between a plurality of adjusted positions including at least one position in which said loop-shaped end portion abuts said projection of said members, and other positions in which said projection is located at different places of said loop-shaped end portion whereby said loop-shaped end portion is resiliently displaced by said projection of said member at different moments of the movement of an actuated typelever action to oppose such movement.

4. Touch adjustment arrangement for typewriters, comprising, in combination, a support; a plurality of typelever actions mounted on said support; a spring-loaded member movably mounted on said support and extending across said typelever actions, said spring-loaded member being engaged and moved along a path by each typelever action when the same is operated while resiliently opposing such movement, said member having a part; a manually operated adjusting means mounted on said support for movement between a plurality of control positions; and a resilient means having a portion located in said path and connected to said adjusting means for movement with the same between a plurality of adjusted positions in which said portion is located at different places on said path so as to be spaced different distances from said member, said portion having an elongated opening in which said part is located whereby said portion of said resilient means in different adjusted positions is resiliently displaced by said part of said member at different moments of the movement of an actuated typelever action to oppose such movement.

5. Touch adjustment arrangement for typewriters, comprising, in combination, a support; a plurality of typelever actions mounted on said support; a spring-loaded member movably mounted on said support and extending across said typelever actions, said spring-loaded member being engaged and moved by each typelever action when the said is operated while resiliently opposing such movement, said member having a projection moving along a path; a manually operated adjusting means mounted on said support for movement between a plurality of control positions; and a spring having one end portion attached to said adjusting means and another loop-shaped end portion in which said projection is located, said spring being movable with said adjusting means between a plurality of adjusted positions in which said projection is located at different places of said loop-shaped end portion whereby said loop-shaped end portion is resiliently displaced by said projection of said member at different moments of the movement of an actuated typelever action to oppose such movement.

6. Touch adjustment arrangement for typewriters, comprising, in combination, a support; a plurality of typelever actions mounted on said support; a spring-loaded member including arm means mounted on said support for turning movement, a bar extending across said typelever actions and engaged and moved by each actuated type lever action while resiliently opposing such movement, and a projection on said arm means moving along a circular path when said member is moved; a manually operated adjusting means mounted on said support for movement between a plurality of control positions; and a spring having one end portion attached to said adjusting means and another loop-shaped end portion in which said projection is located, said spring being movable with said adjusting means between a plurality of adjusted positions in which said projection is located at different places of said loop-shaped end portion whereby said loop-shaped end portion is resiliently displaced by said projection of said member at different moments of the movement of an actuated typelever action to oppose such movement.

7. Touch adjustment arrangement for typewriters comprising, in combination, a plurality of typelever actions, each typelever action including a first lever and a second lever; a first transverse shaft supporting said first levers

for turning movement; a second transverse shaft supporting said second levers for turning movement; a spring-loaded member including a bar extending across said second levers, said bar being engaged and displaced by each second lever when the respective typelever action is actuated to oppose the movement of the typelever action and resiliently abutting said second levers; a manually operated adjusting means mounted on said first shaft for movement between a plurality of control positions; arresting means for detachably arresting said adjusting means in each of said control positions; and a resilient means having an engaging portion located in the path of movement of a part of said spring-loaded member and connected to said adjusting means for movement with the same between a plurality of adjusted positions in which said engaging portion is located at different places of the path along which said part moves during movement of said spring-loaded member whereby said engaging portion of said resilient means in different adjusted positions is engaged and resiliently displaced by said part at different moments of the movement of an actuated typelever action to oppose such movement.

8. Touch adjustment arrangement for typewriters comprising, in combination, an elongated support having a plurality of slots; a plurality of typelever actions, each typelever action including a first lever and a second lever partly located in said slots; a first transverse shaft mounted on said support extending through some of said slots and supporting said first levers for turning movement; a second transverse shaft mounted on said support extending through some of said slots and supporting said second levers for turning movement; a spring-loaded member including arm means mounted on said second shaft for turning movement, and a bar extending across said second levers, said bar being engaged and displaced by each second lever when the respective typelever action is actuated to oppose the movement of the typelever action and resiliently abutting said second levers; a manually operated adjusting means mounted on said first shaft for movement between a plurality of control positions; arresting means for detachably arresting said adjusting means in each of said control positions; and a resilient means having an engaging portion located in the path of movement of a part of said arm means of said spring-loaded member and connected to said adjusting means for movement with the same between a plurality of adjusted positions in which said engaging portion is located at different places of the path along which said part moves during movement of said spring-loaded member whereby said engaging portion of said resilient means in different adjusted positions is engaged and resiliently displaced by said part at different moments of the movement of an actuated typelever action to oppose such movement.

9. Touch adjustment arrangement for typewriters comprising, in combination, an elongated support having a plurality of slots and having a bore extending transverse to one of said slots; a plurality of typelever actions, each typelever action including a first lever and a second lever partly located in said slots; a first transverse shaft mounted on said support extending through some of said slots and supporting said first levers for turning movement; a second transverse shaft mounted on said support extending through some of said slots and supporting said second levers for turning movement; a spring-loaded member including arm means mounted on said second shaft for turning movement, and a bar extending across said second levers, said bar being engaged and displaced by each second lever when the respective typelever action is actuated to oppose the movement of the typelever action and resiliently abutting said second levers; a manually operated adjusting means mounted on said first shaft for movement between a plurality of control positions and including a portion located in said one slot of said support and having a plurality of recesses respec-

tively associated with said control positions; arresting means for detachably arresting said adjusting means in each of said control positions including a catch member located in said bore engaging said portion of said adjusting means, a plug closing said bore and a spring in said bore urging said catch member to engage one of said recesses and abutting said plug; and a resilient means having an engaging portion located in the path of movement of a part of said arm means of said spring-loaded member and connected to said adjusting means for movement with the same between a plurality of adjusted positions in which said engaging portion is located at different places of the path along which said part moves during movement of said spring-loaded member whereby said engaging portion of said resilient means in different adjusted positions is engaged and resiliently displaced by said part at different moments of the movement of an actuated typelever action to oppose such movement.

10. An arrangement as set forth in claim 9 wherein at least a portion of said bore is threaded, and wherein said plug is threaded into the threaded bore portion and can be adjusted for adjusting the tension of said spring.

11. Touch adjustment arrangement for typewriters comprising, in combination, a plurality of typelever actions, each typelever action including a first lever and a second lever; a first transverse shaft supporting said first levers for turning movement; a second transverse shaft supporting said second levers for turning movement; a spring-loaded member including a bar extending across said second levers, said bar being engaged and displaced by each second lever when the respective typelever action is actuated to oppose the movement of the typelever action and resiliently abutting said second levers; a manually operated adjusting means mounted on said first shaft for movement between a plurality of control positions; arresting means for detachably arresting said adjusting means in each of said control positions; and a coil-spring means having one end portion articulated to said adjusting means, and another elongated loop-shaped end portion, a part of said spring-loaded member being located in said loop-shaped end portion, said spring means being movable with said adjusting means between a plurality of adjusted positions in which said loop-shaped end portion is guided by said part and located at different places of the path along which said part moves during movement of said spring-loaded member whereby said loop-shaped end portion of said spring means in different adjusted positions is engaged and resiliently displaced by said part at different moments of the movement of the actuated typelever action to oppose such movement.

12. Touch adjustment arrangement for typewriters comprising, in combination, an elongated support having a plurality of slots; a plurality of typelever actions, each typelever action including a first lever and a second lever partly located in said slots; a first transverse shaft mounted on said support extending through some of said slots and supporting said first levers for turning movement; a second transverse shaft mounted on said support extending through some of said slots and supporting said second levers for turning movement; a spring-loaded member including arm means mounted on said second shaft for turning movement, and a bar extending across said second levers, said bar being engaged and displaced by each second lever when the respective typelever action is actuated to oppose the movement of the typelever action and resiliently abutting said second levers; a manually operated adjusting means mounted on said first shaft for movement between a plurality of control positions; arresting means for detachably arresting said adjusting means in each of said control positions; and a coil spring means having one end portion articulated to said adjusting means, and another elongated loop-shaped end portion, a part of said arm means of said spring-loaded member being located in said loop-shaped end portion, said spring means being movable with said adjusting means between a plurality of adjusted positions in which said loop-shaped end portion is guided by said part and located at different places of the path along which said part moves during movement of said spring-loaded member whereby said loop-shaped end portion of said spring means in different adjusted positions is engaged and resiliently displaced by said part at different moments of the movement of an actuated typelever action to oppose such movement.

13. An arrangement as set forth in claim 12 wherein said part is a pin secured to said arm means projecting parallel to said bar, and wherein said loop-shaped end portion is a U-shaped bent wire in which said pin is located.

14. Touch adjustment arrangement for typewriters comprising, in combination, a support; a typelever action mounted on said support and including a lever; a spring-loaded member engaged by said lever and being movably mounted on said support to be displaced by and to resiliently oppose movement of said typelever action, said spring-loaded member including a part moving along a path during movement of said spring-loaded member; a manually settable adjusting means mounted on said support for movement between a plurality of control positions; and a spring means having a portion formed with an elongated opening in which said part is located so that said portion is held by said part in said path of said part, said spring means being connected to said adjusting means for movement with the same between a plurality of adjusted positions in which said portion is located at different places of said path of said part whereby said portion of said spring means in different adjusted positions is engaged and resiliently displaced by said part of said spring-loaded member in different positions of the actuated typelever action to oppose movement of the same.

15. Touch adjustment arrangement for typewriters comprising, in combination, a support; a typelever action mounted on said support and including a lever; a spring-loaded member engaged by said lever and being movably mounted on said support to be displaced by and to resiliently oppose movement of said typelever action, said spring-loaded member including a pin moving along a path during movement of said spring-loaded member; a manually settable adjusting means mounted on said support for movement between a plurality of control positions; and a spring means having a portion formed with an elongated opening in which said pin is located so that said portion is held by said pin in said path of said pin, said spring means being connected to said adjusting means for movement with the same while being guided by said pin along said path between a plurality of adjusted positions in which said portion is located at different places of said path of said pin whereby said portion of said spring means in different adjusted positions is engaged and resiliently displaced by said pin of said spring-loaded member in different positions of the actuated typelever action to oppose movement of the same.

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