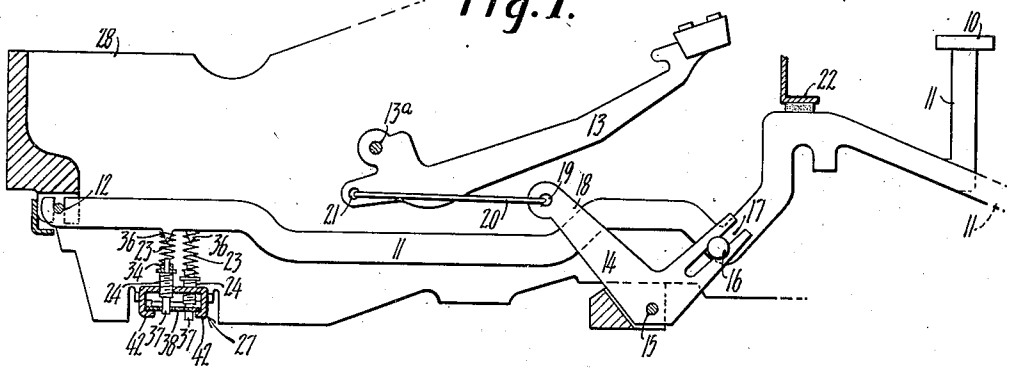
May 3, 1938. J. A. B. SMITH 2,115,920

TYPEWRITING MACHINE

Filed March 9, 1936

Fig. 1.



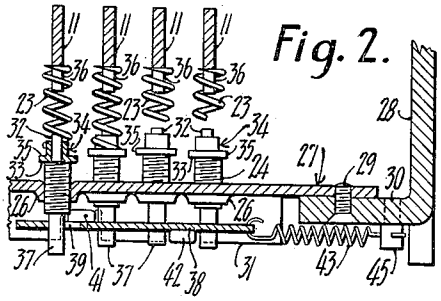


Fig. 2.

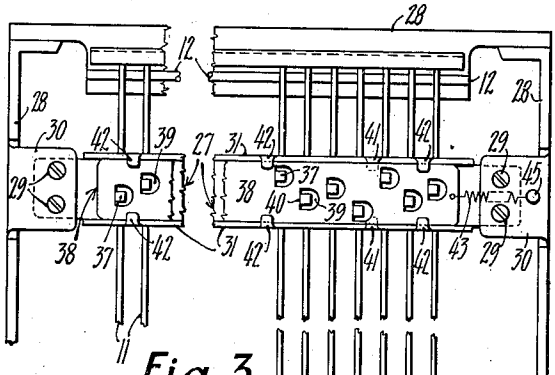


Fig. 3.

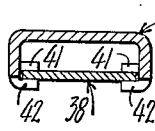
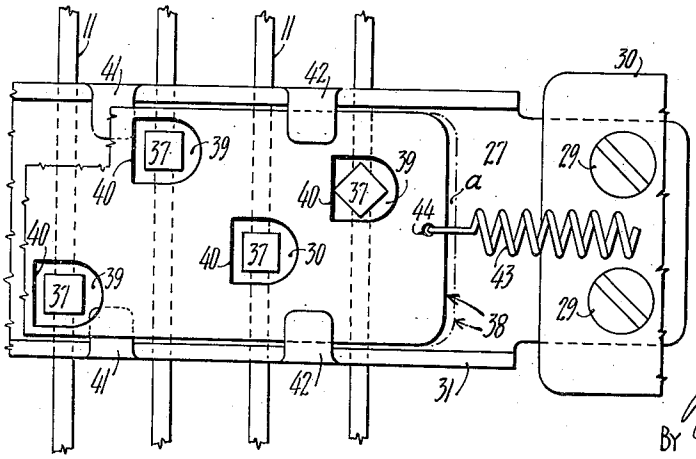
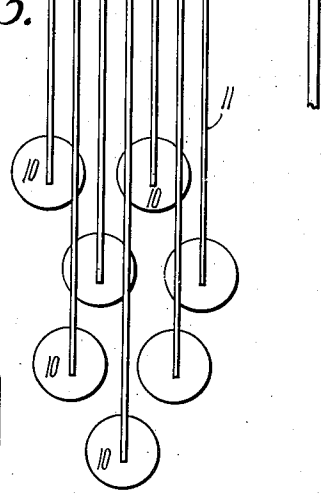


Fig. 4.

Fig. 5.





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Patented May 3, 1938

2,115,920

UNITED STATES PATENT OFFICE

2,115,920

TYPEWRITING MACHINE

Jesse A. B. Smith, Stamford, Conn., assignor to Underwood Elliott Fisher Company, New York, N. Y., a corporation of Delaware

Application March 9, 1936, Serial No. 67,875

12 Claims. (Cl. 197—33)

This invention relates to the tension-adjustment devices of typewriter key-lever-returning springs, and especially to adjustment means for said springs.

It is an advantage, especially in the compact portable machines, to place the springs in staggered rows corresponding to the arrangement of the keys in rows, thus compensating for the unequal leverage resulting from the difference in key-lever length, and permitting a wider spacing of the springs and studs. Larger diameter springs and studs may thereby be used, and the application of a wrench or tool to the adjustment studs is facilitated.

The previous type of stud-adjustment detent, which consisted of a form of continuous spring-member pressing against a flattened side of the adjustment-stud heads to prevent the accidental rotation thereof, was unapplicable to the staggered spring arrangement, and, as shown in the patent to W. A. Dobson, No. 1,713,075, dated May 14, 1929, a non-yielding, fixed, lock-plate, having rectangular holes within which flattened heads of the spring-adjustment studs were closely confined, was employed. It was impossible with this device even to forcibly turn an adjustment stud without first removing the entire lock-plate, and spring adjustment was thereby made a time-consuming task.

In this invention, a permanently but slidably mounted detent-plate is provided with a series of non-circular holes arranged in co-operative alignment with the spring-adjustment studs, the squared head of each stud projecting through one of said holes. Although the stud-heads may be forcibly rotated within the holes, the latter are formed with a uniformly located squared edge, which a tensile spring, exerting a pulling force on the detent-plate, draws into yieldable contact with one face of the associated stud-head across the full width of said face. The studs are thereby secured against accidental rotation.

It is a feature of this invention that the slidable mounting of the detent-plate permits it to yield under the camming action exerted by a corner of a stud-head against the restraining edge of the hole through which the stud-head projects as said stud is being forcibly rotated to effect spring adjustment. Any one of the returning springs may thus be adjusted without disturbing the others, or having to remove or otherwise manipulate the detent-plate.

It is a second feature that said detent-plate may be rendered completely inoperative by frictionally turning any one of the spring-adjustment studs, thus freeing the other studs for unrestrained adjustment when it is desirable to adjust a number of said studs at one time.

Other features and advantages will hereinafter appear.

In the accompanying drawing,

Figure 1 is a side view, in elevation, showing the application of the invention to the type-action of an Underwood portable typewriter.

Figure 2 is an enlarged partial front elevation, in section, showing the returning springs and adjustment studs, and the adjustment-detent means.

Figure 3 is a fragmentary bottom view, showing the detent-plate in operative position.

Figure 4 is an enlarged end view, in section, of the adjustment stud mounting member and the detent-plate, showing the guideways for the latter.

Figure 5 is a magnified bottom view of the invention.

This invention is illustrated as applied to the type-action of an Underwood portable typewriting machine, Figure 1, which has a series of keys 10, key-levers 11 fulcrumed upon a common shaft 12, and means for swinging type-bars 13 about a fulcrum 13a when the keys 10 are depressed. Said means may include a series of elbow-shaped members 14 fulcrumed upon a common shaft 15, and operatively connected to the key-levers by means of a pin 16 and a slot 17. The members 14 may include upwardly-extending arms 18, the ends thereof having holes 19 for receiving the ends of links 20, which are pivotally secured at 21 to the type-bars 13. After each depression, the key-levers are returned to normal position against a bumper 22 by means of springs 23, which are arranged in staggered rows beneath the key-levers 11 and exert an upward pressure thereon. Each spring bears against an adjustment stud 24, Figure 2, which passes through threaded bosses 26 formed in a pressed-metal cross-member 27, spanning the typewriter-frame 28 beneath the key-levers 11 and secured by screws 29 to lugs 30 formed in said frame. The cross-member 27 is channel shaped having downwardly-projecting sides 31 which impart rigidity and strength to the structure.

The studs 24 are reduced in diameter at one end, leaving a pin-like extension 32 projecting above a square-cut shoulder 33, as shown in Figures 1 and 2. The pin 32 receives a collar or bushing 34 over which the springs are slipped, said bushing having a flange 35 which serves as a base for the springs. An extension 36 is formed

in each key-lever to receive the other end of the springs **23**, and the springs are thereby held against accidental displacement.

Each stud has a preferably square head **37**. A plate **38**, having a series of non-circular D-shaped holes **39** arranged in conformity with the staggered arrangement of the springs and studs, is placed over the heads **37**, which, as shown in Figures 2 and 3, project through the holes **39**. As shown in magnified view in Figure 5, the holes **39** have an overall length and width greater than the maximum dimension taken across the heads **37**, and the holes thereby permit a rotation of said studs **24**. The holes **39** have a uniformly-placed, square, detent-edge **40** arranged, as shown in Figure 3, to co-operate with the faces of the stud-heads **37** to restrain the rotation thereof.

The detent-plate **38** fits slidably within the sides **31** of the cross-member, and may be guided by a series of inturned tabs **41**, **42**, which are formed as an integral part of the sides **31** during the formation of said cross-member. As shown in Figure 4, the plate **38** rides on the tabs **42** and is held in spaced relation to the web of the cross-member **27** by the cooperating tabs **41**.

The holes **39** may be sufficiently large to permit the passage of the entire stud therethrough, so that the studs can be screwed into the cross-member **27** from beneath. The assembly of said cross-member, the studs **24** and the detent-plate **38** may be made up in quantities at one time, and said assembly stocked for future use.

It will be observed that the space between the web and the plate **38** must accommodate the threaded portion of the studs **24** when the latter are adjusted to exert the minimum of pressure on the springs **23**. It is also evident that the stud-heads **37** must be long enough so that when said studs are screwed into the full range of adjustment, sufficient of the heads will project through the plate **38** to permit the engagement of a wrench or other adjustment tool.

Through the action of a tensile spring **43**, which at one end may be hooked through a hole **44** in the detent-plate **38**, and at the other end anchored about a pin **45** in the machine-frame **28**, said plate is drawn constantly to the right, as viewed in Figure 3, and because the holes **39** are arranged in exact cooperative relationship to the studs **24**, the detent-edge **40** of said holes bears against the full width of a face of its associated stud-head **37** with sufficient force to prevent the accidental rotation of said studs.

To make an adjustment of a spring **23**, it is only necessary to apply a key or wrench to the associated stud-head and turn the stud forcibly in one or the other direction, depending upon whether the pressure of the spring against the key-lever **11** is to be increased or diminished. As the stud-head is turned, a corner thereof, by bearing against the edge **40**, will cam the entire plate leftwardly, as viewed in Figure 5, against the tension of the spring **43**. The maximum displacement of the plate **38**, represented by the distance "*a*", Figure 5, is realized upon a one-eighth turn of the stud-head. During the succeeding one-eighth turn, the spring **43** will draw the plate **38** back into normal position, indicated by the dot-and-dash line, Figure 5, with the restraining edge **40** of all of the holes **39** in contact with a face of the various stud-heads, as shown in Figure 3.

Any one of the studs may be similarly adjusted. As shown in Figure 5, the detent-plate **38** may be rendered completely inoperative by the one-eighth turn of a single stud, which, by displacing the plate as previously described, will free the balance of the studs from the restraint of the plate **38** and tensile spring **43** and permit a free adjustment of the studs.

It will be apparent that after the adjustment of a spring, it is not essential that the stud-heads **37** be left exactly parallel with the restraining edge **40** of the holes **39**. The heads may in fact be left in any position short of or beyond the one-eighth turn position which represents "dead center", and the constant pressure of the detent-edge **40** against any stud so left unaligned, aided by the vibration of the machine during normal operation, will cam the stud-head into correct alignment.

It will be understood that the heads of the studs **24** need not necessarily be square. Any irregular shape which will provide a flattened surface which can co-operate with a restraining portion of a non-circular hole, and which will exert a camming action when forcibly rotated within said hole, may be used.

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

Having thus described my invention, I claim:

1. In a typewriting machine having pivoted key-levers and a series of returning springs therefor, means for adjusting the tension of said springs and securing the adjustment thereof, comprising, in combination, a cross-member spanning the machine frame, studs threaded through the cross-member and arranged to bear against said springs, said studs having non-circular heads, a slidable plate having holes through which the heads of said studs project, and a spring to cause said plate to exert yieldable pressure against the sides of said stud-heads, to prevent accidental rotation thereof.

2. In a typewriting machine, having pivoted key-levers, a series of returning springs and adjustment studs therefor, said studs having flattened heads, in combination, a detent-plate having a plurality of holes, one for each adjustment stud, each of said holes having a flat portion for co-operation with the heads of said adjustment studs, and means acting upon said plate to cause the flat portions of said holes to yieldably bear against the flattened heads of said studs.

3. In a typewriting machine, the combination with pivoted key-levers, tension-springs and adjustment studs therefor, said studs having flattened heads, of a detent-plate with a plurality of holes, one for each adjustment stud, said holes being non-circular and each having a flat portion, for cooperation with the flattened heads of said adjustment studs, means acting upon said plate to cause the flat portions of the said holes to bear against the flattened heads of the said studs, and means whereby the said detent-plate can be moved laterally to free the said studs for adjustment.

4. In a typewriting machine, the combination with pivoted key-levers, tension-springs and adjustment studs therefor, said studs having flattened heads, of a transversely movable detent-plate with a plurality of holes, one for each adjustment stud, said holes being non-circular and each having a flat portion, for cooperation with the flattened heads of said adjustment studs, and means acting upon said plate to cause the flat portions of the said holes to yieldably bear

against the flattened heads of the said studs, whereby a partial turn of any one of said studs will cause a transverse motion of said plate sufficient to render the latter inoperative as a locking device with respect to any of the other of said studs.

5. In a typewriting machine having pivoted key-levers and a series of returning springs therefor, means for adjusting the tension of said springs and securing the adjustment thereof, comprising, in combination, a channel-shaped cross-member spanning the machine frame beneath the key-levers, studs threaded through the web of said cross-member and arranged to bear against said springs, said studs having flattened heads, and a plate slidably housed within said cross-member, said plate having a series of detent-faces normal to the direction of sliding of said plate, one for each stud, operative against the flattened heads of said studs to prevent the accidental rotation thereof.

6. In a typewriting machine, the combination with pivoted key-levers, tension-springs and adjustment studs therefor, said studs having flattened heads, of a detent-plate with a plurality of holes, one for each adjustment stud, said holes being large enough to permit the rotation of said studs therein, said holes being non-circular and each having a flat portion, for cooperation with the flattened heads of said adjustment studs, and means acting upon said plate to cause the flat portion of the said holes to bear against the flattened heads of said studs.

7. The combination with key-lever returning springs and adjustment studs therefor, the said studs having non-circular heads, of a slidable plate having D-shaped holes through which the heads of such studs project, there being one hole for each stud, and each hole being large enough to permit the rotation of said studs therein; a spring enabling said plate to restrain the accidental rotation of the said studs, said spring operative to draw the flat side of said holes into contact with said stud-heads, but yieldable under the camming action exerted by the said stud-heads against the flat side of said holes during the forcible rotation of any of said studs for tension-spring adjustment.

8. In a typewriting machine, the combination with a series of springs and square-headed adjustment studs for regulating said springs, of a plate having non-circular holes within which the said stud-heads are individually caged, said holes having a flattened circumferential portion arranged to engage a face of the said stud-heads to prevent the accidental rotation thereof, and means whereby any stud may be forcibly rotated without the necessity of removing the said plate.

9. In a typewriting machine having key-lever returning springs and adjustment studs therefor, the said springs and studs being arranged in a plurality of rows, means for restraining the rotation of said studs, comprising a plate having holes encompassing the said studs, and means for holding the edges of said holes against said studs to prevent accidental rotation, said holding means being yieldable to permit a forcible rotation of any of said studs.

10. In a typewriting machine, a spring-pressed unitary plate having rows of staggered holes having flats operative on a plurality of rows of staggered spring-tension adjustment studs also having flats, to prevent the accidental rotation of said studs, said plate being yieldable to permit the forcible rotation of the studs, and the holes being staggered to afford room therefor in the plate.

11. In a typewriting machine having a series of rotatable studs arranged in a common field and coextensive with each other, each stud having a lateral face, locking means for holding said studs against rotation, comprising a lock-plate embracing the field of studs, mounted for sliding transversely of said field and including a series of detent-faces movable into and out of engagement with said stud-faces to lock and release same by sliding said plate, and means for holding said plate in locking position.

12. In a typewriting machine having a series of rotatable studs arranged in a common field and coextensive with each other, each stud having a lateral face, locking means for holding said studs against rotation, comprising a lock-plate embracing the field of studs, mounted for sliding transversely of said field and including a series of detent-faces movable into and out of engagement with said stud-faces to lock and release same by sliding said plate, and resilient means acting on said plate to yieldably hold the detent-faces thereof in engagement with said stud-faces.

JESSE A. B. SMITH.

CERTIFICATE OF CORRECTION.

Patent No. 2,115,920. May 3, 1938.

JESSE A. B. SMITH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 54, for the syllable "fric-" read frac-; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of June, A. D. 1938.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.