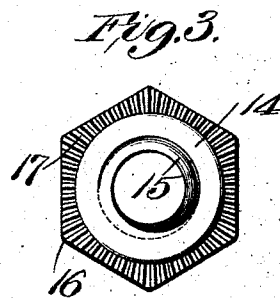
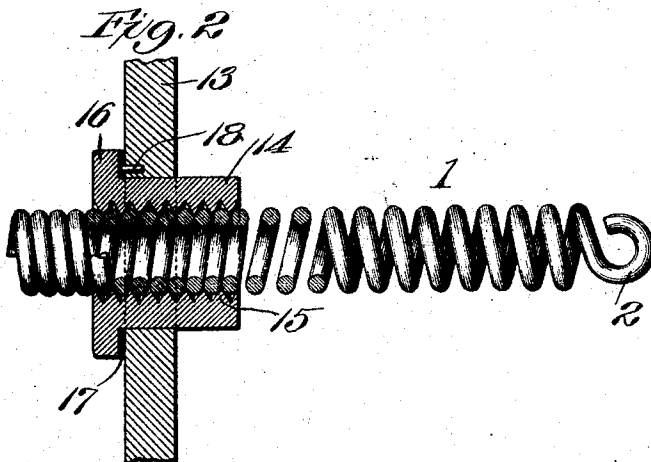
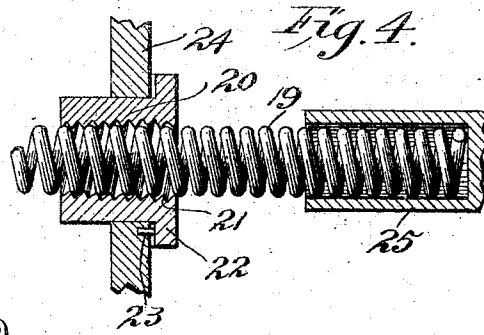
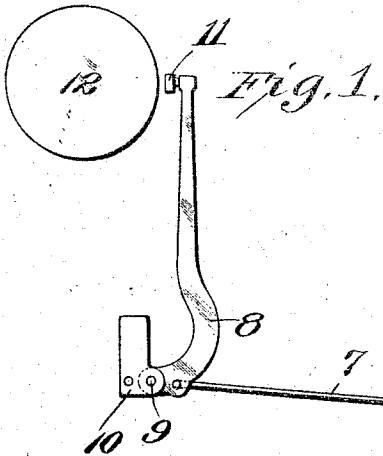


J. RABER.
 SPRING TENSION REGULATOR.
 APPLICATION FILED JUNE 11, 1908.

1,005,780..

Patented Oct. 10, 1911.



Attest:
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 atty.

UNITED STATES PATENT OFFICE.

JOSEPH RABER, OF POPLAR BLUFF, MISSOURI, ASSIGNOR TO DALTON ADDING MACHINE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

SPRING-TENSION REGULATOR.

1,005,780.

Specification of Letters Patent.

Patented Oct. 10, 1911.

Application filed June 11, 1908. Serial No. 437,832.

To all whom it may concern:

Be it known that I, JOSEPH RABER, a citizen of the United States, residing at Poplar Bluff, Missouri, have invented a new and useful Spring-Tension Regulator, of which the following is a specification.

This invention relates to spring-tension regulators of the type in which the tension or actuating power of the spring may be increased or reduced at will; and it consists of the novel construction, combination and arrangement of parts herein shown, described and claimed.

One object of the invention is to produce means operable in connection with springs, of either the retractile or expansion type, to increase or reduce the power of such springs to any desired extent.

Another object is to produce an element adapted to encircle the spring and having projections, such as threads, to project between the coils of the spring whereby, when said element is rotated, the spring will be expanded or contracted as required to adjust just the spring to any desired power of expansion or contraction. In any construction the regulating means constitutes the attachment for one end of the spring. A device of this character is very useful in many combinations, such as with the spring-actuated parts of all kinds of machinery, engines, motors, sewing machines, etc., and in typewriters in which embodiment I have shown it, for regulating the "touch" and rebound of the key levers, type-bars, etc., after operation; and another object of the invention is to produce improved means for use in such combinations whereby the tension of the restoring springs of the different parts may be adjusted uniformly to any desired degree of expansive or retractile power.

In the accompanying drawing forming part of this specification, Figure 1 is an illustration of a train of typewriting mechanism showing my invention embodied therein. Fig. 2 is an enlarged view partly in section illustrating the regulating means. Fig. 3 is an end view of the hollow element which encircles the spring and constitutes the adjusting or regulating device. Fig. 4 is a view of the tensioning device applied for compressing the spring.

The spring 1 is of the helical type and, in

the embodiment shown, is a retractile spring. An eye or hook 2 is formed on one end of the spring, and is intended to be engaged with a similar eye or hook 3 on the member 4 which is the member to be actuated by the spring. Specifically the member 4 is a typewriter key-lever which is pivoted at 5 and has a button or terminal 6 for well understood purposes. A link 7 connects the end of the lever 4 with a type-bar 8 which has pivotal extensions 9 operating in bearings in a supporting bracket 10. Depression of the front end of the lever 4 operates the type-bar effectively to cause the type 11 at the end thereof to record on paper supported by or against the platen 12. In this embodiment of the invention the spring 1 is connected to the key-lever 4 intermediate of its pivot 5 and the link 7 so that the spring acts to return the type-bar, and thereby the entire train, to idle position after each operation.

13 indicates a stationary member whereby one end of the spring is held. An internally threaded member 14 is held in a hole in said member 13. The spring 1 screws into the member 14, the threads or projections 15 therein engaging with the convolutions of the spring. These projections or threads are preferably of attenuated form so as to engage snugly between the spring coils, though it is obvious that they may be of any kind or form which will engage with the spring to operate as presently described. A flange 16 on the member 14 bears against the face of the support 13 to prevent the member 14 from being drawn through the hole in which it is mounted. The periphery or edge of the flange 16 is preferably polygonal so that a wrench may be engaged therewith to turn the member 14. It is obvious that turning the member 14 in one direction will extend or draw out the spring 1, and consequently increase the tension thereof, while rotation of the member 14 in the opposite direction will contract the spring and reduce the tension thereof, both adjustments being effected while the spring is in engagement with the lever, and without winding tighter or unwinding the spring coils to any extent.

While the member 14 is shown in the drawing with screw-threads, it is obvious that any projections for engaging the convo-

lutions of the spring to permit of their adjustment will do; and the term "thread" as herein used will broadly cover any such projection or projections as may serve the purpose.

The bearing surface of the flange 16 may be corrugated or spotted, as shown at 17, the better to hold it against accidental or undesirable turning. If desired a matching or engaging element 18 may be formed on or attached to the member 13, though under ordinary conditions these features are probably unnecessary.

An obvious modification of the device would be to apply it to a push or expansion spring. In Fig. 4 I have shown such an adaptation or modification of the invention. In this adaptation the spring, indicated by 19, is of the expansion type, and screws into threaded engagement with the member 20 which is provided with internal threads 21 of suitable pitch and contour. The member 20 is provided with a flange 22 which engages with an element 23 on the support 24 to prevent accidental turning or loosening of the said member 20. It will be noted that this adaptation or modification of the invention consists in a reversal of the member 14 (Fig. 2) so that the flange 16 (Fig. 2) will be pressed or pushed against the support by the expansion power of the spring instead of being drawn against the support by the retractile power of the spring. The member 20 (Fig. 4) may be manipulated, the same as the member 14 (Fig. 2), effectively to adjust or regulate the tension of the spring to any desired extent, thereby enabling the user to adjust a series of such springs to an exact and uniform tension throughout. In the case of expansion springs any suitable spring support or holder, such as shown at 25, may be utilized to connect the spring to the actuated element.

It will be noted that the important function of this device in any adaptation is to enable exact regulation of the tension of a spring and, when used in series, such, for instance, as in connection with typewriter keys, where exact uniformity of tension (to regulate the "touch") is desired. By this device the "touch" of all the keys can be regulated with exactness, thereby enhancing the value of these features.

I am aware that revoluble adjusting members have been used in connection with springs, but none which can be operated to adjust a spring with the desired accuracy and exactness from the minimum to the maximum.

I am also aware that there may be many variations in the construction, combination and arrangement of the parts comprising the invention without in the least departing from the spirit and scope of the invention.

Therefore I do not restrict myself to identical details or forms of arrangement, but

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

1. The combination of a support having a hole therein, an internally-threaded member revolubly mounted in said hole in said support, a flange on one end of said threaded member whereby said member is held in the hole in which it is mounted, and a helical spring having one end supported distant from said threaded member and the opposite end screwed into said member, substantially as specified.

2. The combination of a support having a hole therein, a hollow member mounted in said hole and being revoluble with respect to said support, a flange on one end of said member bearing against said support in idle position, and a spring of the helical type having one end supported at a point distant from said hollow member and its opposite end extending into and connected to the interior of said hollow member, substantially as specified.

3. The combination of a support having a hole therein, a member revolubly mounted in said hole in said support, a projection on said revoluble member in engagement with said support in idle position, a helical spring having one end connected with said revoluble member and the opposite end supported remote therefrom, and means holding said revoluble member against accidental rotation, substantially as specified.

4. The combination of a support, a coil spring having one end supported remote from said support, a tubular member held permanently against said support and encircling several coils of said spring connection between said support and tubular member whereby said tubular member will be held from accidental displacement, and threads in said tubular member engaging with the coils of said spring, substantially as specified.

5. The combination of a support, a member revolubly supported by said support, means holding said revoluble member from becoming disengaged from said support, a helical spring having one end connected with said revoluble member and the opposite end supported remote therefrom, and means holding said revoluble member against accidental rotation, substantially as specified.

6. The combination with a spring, of a support, an internally-threaded member encircling and engaging said spring, bearing against said support, and being operable effectively to vary the tension of said spring, and means holding said member in position against said support, substantially as specified.

7. The combination with a spring, of a

support, and a hollow member having interlocking connection with said support and being held by such connection from becoming displaced, said hollow member encircling and engaging a part of said spring, and being operable to vary the tension of said spring, substantially as specified.

8. The combination of a support, a spring having one end supported remote from said support, a tubular member incasing a part of said spring, bearing against said support, and being operable effectively to extend or compress said spring to any desired extent, and means preventing displacement of said tubular member from its proper position against said support, substantially as specified.

9. The combination with a spring, of a support, a hollow member incasing part of said spring and extending into said support effectively to prevent said member from moving off of said support, and a flange on

said hollow member engaging against said support, substantially as specified.

10. The combination with a spring, of a support having a hole therein, a hollow member incasing a part of said spring and extending into said hole effectively to prevent said member from moving laterally on said support, a polygonal flange on one end of said member having a corrugated surface bearing against said support, and an element on said support arranged to engage said corrugated surface effectively to prevent accidental rotation of said member, substantially as specified.

In testimony whereof, I hereunto affix my signature to this specification this 4th day of June, 1908, in the presence of two witnesses.

JOSEPH RABER. [L. s.]

Witnesses:

J. H. HOOVER,

NETTIE WINSTON.