

[54] **SPRING TYPE EXERCISING DEVICE**

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[22] Filed: **Dec. 18, 1972**

[21] Appl. No.: **315,862**

[30] **Foreign Application Priority Data**

Dec. 23, 1971 Japan..... 46-121809

[52] U.S. Cl..... **272/83 R, 272/DIG. 5, 235/1 C**

[51] Int. Cl..... **A63b 21/00**

[58] Field of Search..... 272/83 R, 82, 79 R, 79 B,
272/79 D, DIG. 5; 73/386, 379 R; 235/103, 1
C

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[57] **ABSTRACT**

An expander of two groups of tension springs and a counter disposed between the two groups of tension springs and so connected together that a pull on one of the groups of tension springs will operate the counter to indicate the number of times said tension springs are stretched by an external force, the outer ends of the respective tension springs of each group being fitted to one of paired grip members. The counter is caused to operate by a ratchet and stop member so that when one group of tension springs is pulled the ratchet will cause a shaft to rotate which in turn will cause a pointer on the counter to operate.

16 Claims, 3 Drawing Figures

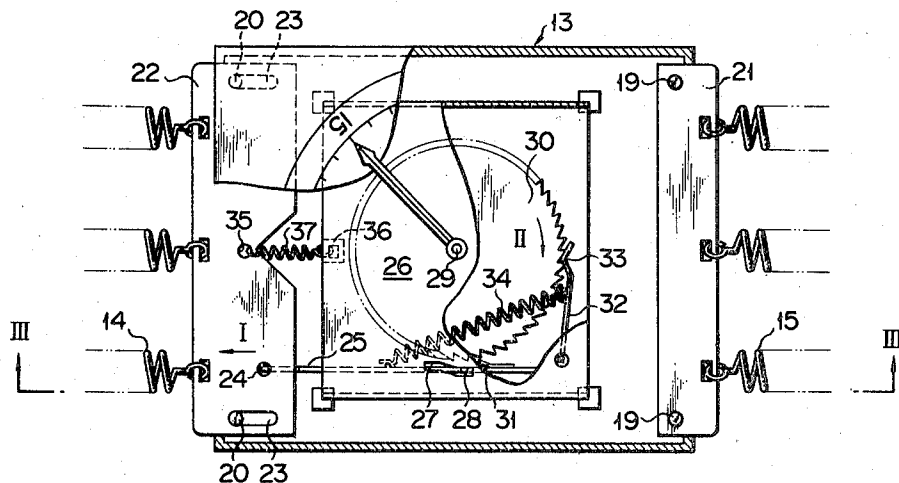


FIG. 1

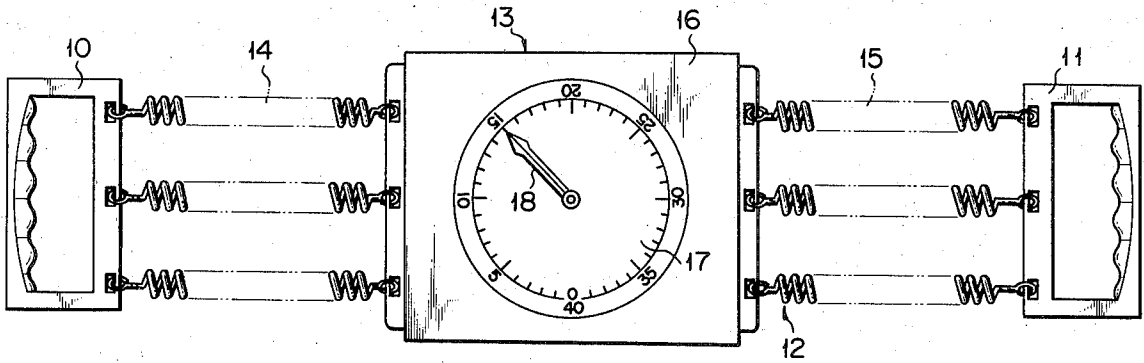


FIG. 2

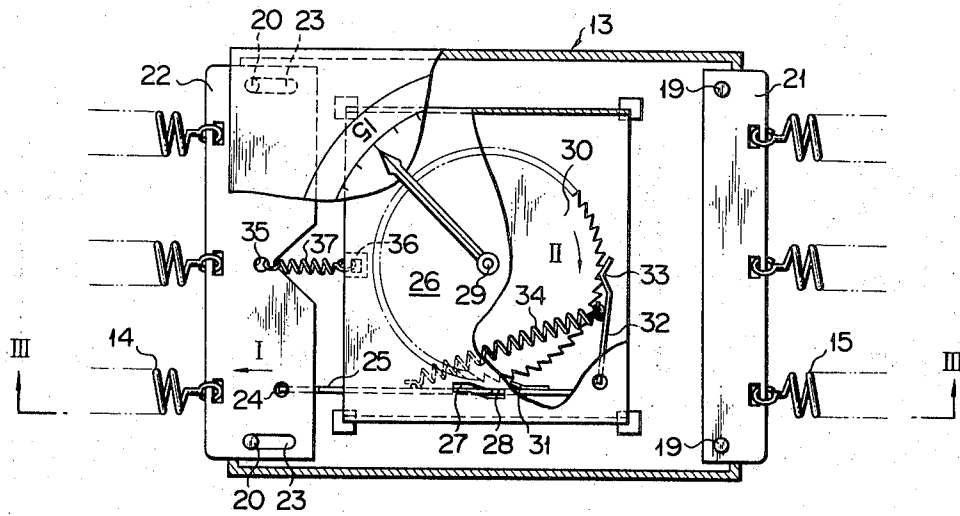
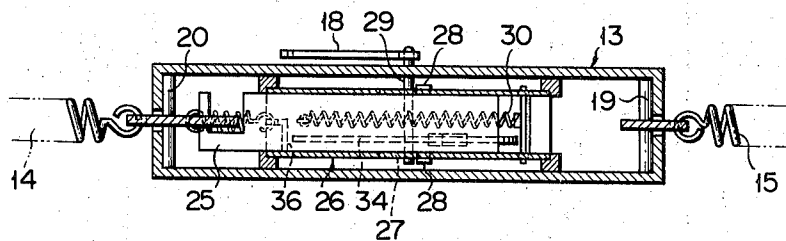


FIG. 3



SPRING TYPE EXERCISING DEVICE

BACKGROUND OF THE INVENTION

This invention relates to an expander and is intended to provide an expander which permits the easy indication of the number of times the tension springs included in said expander are stretched by an external force.

SUMMARY OF THE INVENTION

The expander of this invention comprises tension springs and a counter for indicating the number of times said tension springs are stretched by an external force. The present expander has the advantage of easily indicating the number of times the tension springs are stretched by an external force, without the necessity of making its user remember said frequency by himself.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a plan view of an expander embodying this invention;

FIG. 2 is an enlarged plan view, partly in section, of a counter used with the expander of FIG. 1; and

FIG. 3 is a cross-sectional view on line III—III of FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, the expander of this invention comprises a pair of grip members 10 and 11; pulling means for drawing inward said pair of grip members 10 and 11 when said members 10 and 11 are moved outward by an external force in the longitudinal direction; and a counter 13 for indicating the number of times at least one of said grip members 10 and 11 is moved outward. The counter is disposed in the middle of the pulling means to divide it into two pulling parts which comprise two groups 14 and 15 of tension springs connecting the grip members 10 and 11 to the counter 13.

The counter 13 has a housing 16, on the surface of which is mounted a graduated disk 17. Over said disk, a needle 18 is made to rotate along a circular scale. This arrangement will be later detailed.

Referring to FIG. 2, both sides of the housing 16 are fitted with two pairs 19 and 20 of pins. The paired pins 19 on one side of the housing 16 penetrate a plate 21 to fix it to the housing 16. The tension springs 15 are fitted to the housing 16 by having the inner ends attached to said fixed plate 21. The paired pins 20 on the opposite side of the housing 16 are fitted into a pair of guide slots 23 bored in a movable plate 22 to which there are fixed the inner ends of the tension springs 14 of the other group. Said slots 23 extend along both sides of the movable plate 22 in the direction of the arrow I, enabling the plate 22 to move in said direction. Near the inner side of the movable plate 22 is bored a hole 24, into which there is fitted the projection of a movable bar 25. This bar 25 is movably inserted into a casing 26 fixed to the inner wall of the housing 16. In the upper and lower walls of the casing 26 are cut out a pair of guide grooves 27 of the same shape and size so as to guide the bar 25 to a prescribed extent in the direction of the arrow I. With said paired guide grooves 27 are engaged the projections 28 formed on the upper and lower sides of the bar 25. The paired guide grooves are substantially as long as the guide slots 23 of the movable plate 22 and slightly incline toward the center of the casing 26.

To a rotatable shaft 29 disposed at the center of the casing 26 is fixed a ratchet wheel 30 received in said casing 26. From the bar 25 slantwise projects a pawl 31 inward of the casing 26 for engagement with the teeth of said ratchet wheel 30 to make it rotate only in one way. To the inner wall of the casing 26 is rockably fitted a stop 32 substantially at right angles to the bar 25. The engagement section 33 of the stop 32 at its remote end from the bar 25 meshes with the teeth of the ratchet wheel 30 to prevent it from rotating in the opposite direction under normal conditions. Since, however, said engagement section 33 has an obtusely open L-shape, and the outside of its gently bent portion abuts against the teeth of the ratchet wheel 30, said wheel 30 can make a reverse rotation when so compelled by a strong external force. The bar 25 and stop 32 are joined by a tension spring 34 which plays the part of normally keeping the bar 25 in the position shown in FIG. 2 and causing the stop 32 to engage the ratchet wheel 30.

The top end of the rotatable shaft 29 projects upward from the upper wall of the housing 13 and is fitted with the needle 18.

The movable plate 22 is bored with a hole 35 at the center. That side of the bottom wall of the casing 26 which faces the movable plate 22 is partly cut out and the cut out piece is formed into an integral riser 36. Across the hole 35 and riser 36 is stretched a tension spring 37 which assists the retreat of the movable plate 22 in cooperation with the tension spring 34 so as to control said retreat.

There will now be described the operation of the expander of this invention. When a user pulls the grip members 10 and 11 in opposite directions against the urging forces of the springs 14 and 15, the movable plate 22 is moved together with the bar 25 by the springs 14 in the direction of the indicated arrow I. At this time, the pawl 31 moves lengthwise slightly inward of the casing 26 for engagement with one of the teeth of the ratchet wheel 30. Accordingly, the ratchet wheel 30 is made to rotate by the pawl 31 in the direction of the indicated arrow II to an extent corresponding to the tooth caught by the pawl 31, causing the needle 18 to be moved clockwise by one division of the scale.

When the tension springs 14 are released from a user's force, the movable plate 22 is brought back to the original position shown in FIG. 2 by the joint action of the tension spring 34, bar 25 and tension spring 37. At this time, the ratchet wheel 30 is prevented from making any rotation by the stop 32.

As described above, the needle 18 rotates clockwise one division after another each time the two groups 14 and 15 of tension springs are stretched by a user, indicating the number of said stretching operations thus counted.

Return of the needle 18 to the point 0 on the scale can be effected simply by turning the needle 18 directly with an external force. When a strong force is applied to the ratchet wheel 30 from the outside, said wheel 30 can rotate either way against the force exerted by the engagement section 33 of the stop 32 and tension spring 34.

What is claimed is:

1. An expander comprising:

first and second grip members spaced from each other;
pulling means positioned between said grip members and acting to draw said grip members toward each

other when the grip members are moved away from each other by an external force in opposite directions; and

a counter for counting and indicating the number of times at least said first grip member is moved, said counter being positioned in the middle of said pulling means to divide it into first and second pulling parts on either side thereof, said first pulling part connecting the first grip member to the counter and said second pulling part connecting the second grip member to the counter, said counter including:

a housing, one side of which is fixed to one end of the second pulling part;

a first mechanism disposed on the opposite side of the housing and positioned at least partially within the housing to be operated by said first pulling part when said first grip member is moved by an external force, the first mechanism including a movable plate positioned at one end of said first pulling part, said plate being received at least partially within the housing and adapted to be moved by said first pulling part to a prescribed extent, a bar connected to said movable plate to move together with said movable plate during the pull on said first pulling part, and a first spring means connected to the bar to retract the bar together with the movable plate after the plate and bar have been pulled from one side of the housing during a pull on said first and second grip members;

a second mechanism operated by said first mechanism to make said second mechanism rotate, said second mechanism including a shaft rotatably disposed within the housing, a ratchet wheel fixed to the shaft, a pawl projecting from the bar to engage the ratchet wheel when the bar is moved thereby rotating the ratchet wheel only in one direction, and a stop having an engagement section formed at one end to mesh with the ratchet wheel, thereby preventing the ratchet wheel from rotating in the opposite direction under normal condition, when no pull is exerted on the grip members; and

an indicating mechanism connected to said second mechanism to indicate the number of times said first grip member is moved, away from said second grip member;

said first spring means being connected to said stop at the other end thereof for positive engagement of said stop with said ratchet wheel.

2. The expander according to claim 1 wherein the movable plate is provided with a second spring means operatively cooperating with the indicating mechanism and the first spring means to return said movable plate after being acted on by a pull on the first pull part.

3. The expander according to claim 1 wherein the engagement section of said stop has an obtusely open L-shape and the outside of the gently bent portion of said L-shape section abuts against the teeth of said ratchet wheel, thereby additionally permitting its rotation in a reverse direction when it is subjected to a strong external rotating force.

4. The expander according to claim 3 wherein said indicating mechanism comprises a scale provided on the surface of the housing; and a needle fixed to one

end of said rotatable shaft to be rotated over the scale.

5. The expander according to claim 1 wherein said indicating mechanism comprises a scale provided on the surface of the housing; and a needle fixed to one end of said rotatable shaft to be rotated over the scale.

6. The expander according to claim 5, said first and second pulling parts each including a plurality of tension springs.

7. An expander comprising:

first and second grip members spaced from each other;

pulling means positioned between said grip members and acting to draw said grip members toward each other when the grip members are moved away from each other by an external force in opposite directions; and

a counter for counting and indicating the number of times at least said first grip member is moved, said counter being positioned in the middle of said pulling means to divide it into first and second pulling parts on either side thereof, said first pulling part connecting the first grip member to the counter and said second pulling part connecting the second grip member to the counter, said counter including:

a housing, one side of which is fixed to one end of the second pulling part;

a first mechanism disposed on the opposite side of the housing and positioned at least partially within the housing to be operated by said first pulling part when said first grip member is moved by an external force, the first mechanism including a movable plate positioned at one end of said first pulling part, said plate being received at least partially within the housing and adapted to be moved by said first pulling part to a prescribed extent, a bar connected to said movable plate to move together with said movable plate during the pull on said first pulling part, and a first spring means connected to the bar to retract the bar together with the movable plate after the plate and bar have been pulled from one side of the housing during a pull on said first and second grip members;

a second mechanism operated by said first mechanism to make said second mechanism rotate, said second mechanism including a shaft rotatably disposed within the housing, a ratchet wheel fixed to the shaft, a pawl projecting from the bar to engage the ratchet wheel when the bar is moved thereby rotating the ratchet wheel only in one direction, and a stop having an engagement section formed at one end to mesh with the ratchet wheel, thereby preventing the ratchet wheel from rotating in the opposite direction under normal condition when no pull is exerted on the grip members the engagement section of said stop having an obtusely open L-shape and the outside of the gently bent portion of said L-shape section abuts against the teeth of said ratchet wheel, thereby additionally permitting its rotation in a reverse direction when it is subjected to a strong external rotating force; and an indicating mechanism connected to said second mechanism to indicate the number of times said

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first grip member is moved away from said second grip member.

8. The expander according to claim 7 wherein the movable plate is provided with a second spring means operatively cooperating with the indicating mechanism and the first spring means to return said movable plate after being acted on by a pull on the first pull part.

9. The expander according to claim 8 wherein said first spring means is connected to said stop at the other end thereof for positive engagement with said ratchet wheel.

10. The expander according to claim 9 wherein said indicating mechanism comprises a scale provided on the surface of the housing; and a needle fixed to one end of said rotatable shaft to be rotated over the scale.

11. The expander according to claim 10, said first and second pulling parts each including a plurality of tension springs.

12. An expander comprising:

first and second grip members spaced from each other;

pulling means positioned between said grip members and acting to draw said grip members toward each other when the grip member are moved away from each other by an external force in opposite directions; and

a counter for counting and indicating the number of times at least said first grip member is moved, said counter being positioned in the middle of said pulling means to divide it into first and second pulling parts on either side thereof, said first pulling part connecting the first grip member to the counter and said second pulling part connecting the second grip member to the counter, said counter including:

a housing, one side of which is fixed to one end of the second pulling part;

a first mechanism disposed on the opposite side of the housing and positioned at least partially within the housing to be operated by said first pulling part when said first grip member is moved by an external force, the first mechanism including a movable plate positioned at one end of said first pulling part, said plate being received at least partially within the housing and adapted to be moved by said first pulling part to a prescribed extent, a bar connected to said movable plate to

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move together with said movable plate during the pull on said first pulling part, and a first spring means connected to the bar to retract the bar together with the movable plate after the plate and bar have been pulled from one side of the housing during a pull on said first and second grip members;

a second mechanism operated by said first mechanism to make said second mechanism rotate, said second mechanism including a shaft rotatably disposed within the housing, a ratchet wheel fixed to the shaft, a pawl projecting from the bar to engage the ratchet wheel when the bar is moved thereby rotating the ratchet wheel only in one direction, and a stop having an engagement section formed at one end to mesh with the ratchet wheel, thereby preventing the ratchet wheel from rotating in the opposite direction under normal condition when no pull is exerted on the grip members; and

an indicating mechanism connected to said second mechanism to indicate the number of times said first grip member is moved away from said second grip member, said indicating mechanism comprising a scale provided on the surface of the housing, and a needle fixed to one end of said rotatable shaft to be rotated over the scale.

13. The expander according to claim 12 wherein the movable plate is provided with a second spring means operatively cooperating with the indicating mechanism and the first spring means to return said movable plate after being acted on by a pull on the first pull part.

14. The expander according to claim 13 wherein said first spring means is connected to said stop at the other end thereof for positive engagement with said ratchet wheel.

15. The expander according to claim 13 wherein the engagement section of said stop has an obtusely open L-shape and the outside of the gently bent portion of said L-shape section abuts against the teeth of said ratchet wheel, thereby permitting its rotation in a reverse direction when it is subjected to a strong external rotating force.

16. The expander according to claim 12, said first and second pulling parts each including a plurality of tension springs.

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