H. LANDIS.

SPRING ARRANGEMENT ESPECIALLY FOR CONTACT DEVICES.

APPLICATION FILED APR. 5, 1915.

1,215,665. Patented Feb. 13, 1917.

FIG. 1.

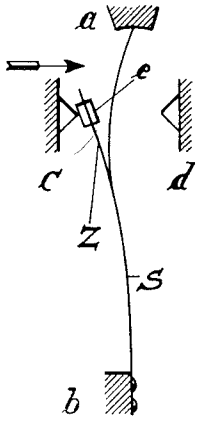


FIG. 2.

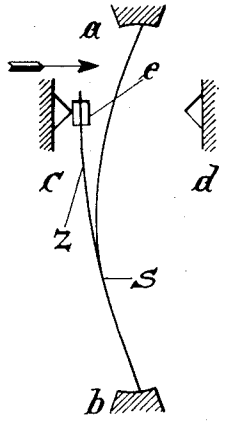


FIG. 3.

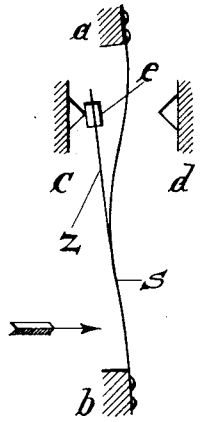


FIG. 4.

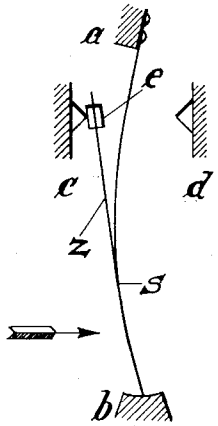


FIG. 5.

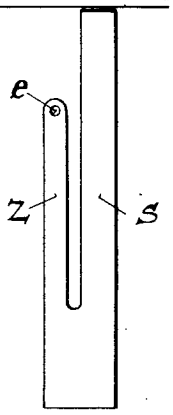


FIG. 6.

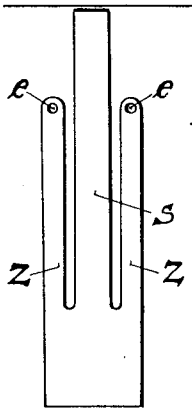


FIG. 7.

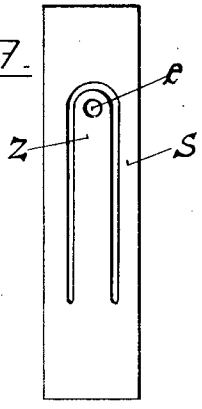
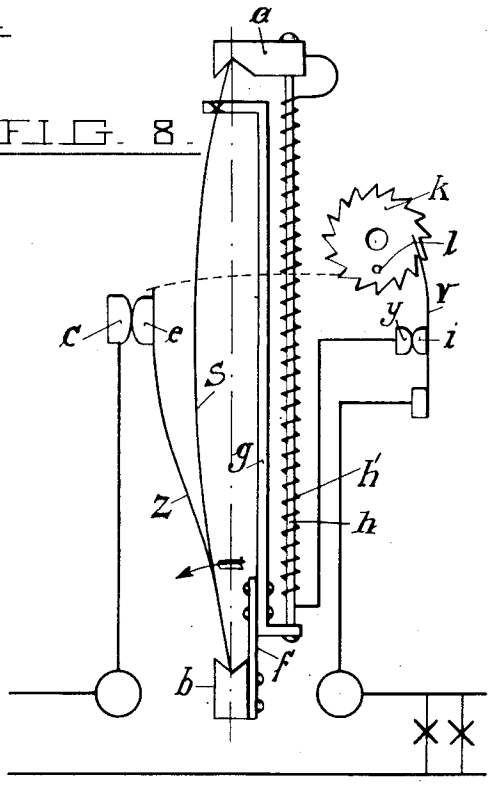


FIG. 8.



Inventor.

Heinrich Landis

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UNITED STATES PATENT OFFICE.

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SPRING ARRANGEMENT ESPECIALLY FOR CONTACT DEVICES.

1,215,665. Specification of Letters Patent. Patented Feb. 13, 1917.

Application filed April 5, 1915. Serial No. 19,403.

To all whom it may concern:

Be it known that I, HEINRICH LANDIS, electrical engineer, a citizen of the Swiss Confederation, residing at Zug, Canton Zug, Switzerland, have invented certain new and useful Improvements in Spring Arrangements Especially for Contact Devices.

The present invention relates to spring arrangement which for instance may be used for making and breaking circuits. The object of the invention is to provide a device by means of which a quick or jerky motion of an organ may be obtained by means of a slow moving driving organ.

I attain this object by means of springs or the like arranged between two rigid bearings or abutments in such a manner that the spring takes a bent or curved position and is held under tension. In such a position the spring may be shifted by a comparatively small force to a neutral position from whence the spring owing to its elasticity proceeds by a jerky movement to its end position.

The principle of the invention and the manner of carrying the same into practice will be more fully described in the following specification having reference to the accompanying drawings in which—

Figures 1 to 4 show in side elevations four springs attached in different manners to their holders and having contact pieces playing between fixed terminals.

Figs. 5 to 7 show different forms of the springs in front views.

Fig. 8 shows in a diagrammatical way a hot-wire-device for opening and closing a circuit making use of the principle mentioned above and of the heat generated by the current.

In the construction shown in Fig. 1 *s* denotes a blade spring which is riveted to a bearing or holder *b* at one end and which projects into a cavity of a stationary abutment *a*. The blade spring *s* may have any of the forms shown in Figs. 5–7. The blade spring *s* is provided with a tongue *z* branching off near one end of the spring *s*. On the free end of said branch there is a contact piece *e* which is in touch with a fixed piece *c* which may be a terminal. If a force is applied to the spring *s* in the direction shown by the arrow, the spring *s* will be brought first to a neutral position. As soon as the spring *s* has reached this position it will at once and by a jerky motion alter its position and throw the piece *e* to another fixed piece or terminal *d*. Until the spring *s* has reached its neutral position the contact piece *e* does not leave the terminal *c;* as soon as the spring passes the neutral position the contact *e* is rapidly thrown from the terminal *c* or to terminal *d*. The force which has to be applied to effect the bending of the spring *s* is comparatively small and if the force is applied near one end of the spring *s* it must be applied but for a short time to obtain a reversal of the position of the spring *s*. The pieces *c* and *d* may form terminals of circuits and the spring *s* may be connected to a source of electricity and the device may be used for changing the way of the current for any purpose.

The construction shown in Fig. 2 differs from that shown in Fig. 1 in that the spring *s* is not riveted to the piece *b* but is held at both ends in cavities of the pieces *a* and *b*. The spring operates in exactly the same manner as that shown in Fig. 1.

Fig. 3 shows a spring *s* both ends of which are fastened to two pieces *a* and *b* the spring being under tension. As shown in this Fig. 3 the force for reversing the position of the spring *s* may be applied near the lower end of the spring *s* which is farthest away from the contact *e* and nearest to the spot where the tongue *z* is branched off. The result is exactly the same as in the previous described constructions.

Fig. 4 shows a form of construction in which the upper end of the spring *s* is fixed and the lower end rests loosely in a cavity of the lower abutment. In this construction the initial force is applied at or near the free end and far from the contact piece *e*.

In all the constructions shown the tongue *z* carrying the contact *c* forms a tangent to the bend or curvature of the spring *s*

and it leaves this position only after the spring *s* has passed its neutral position, assuming again a tangential position. If the point where the force is applied to the spring *s* is near the spot where the tongue *z* branches off the latter point will move very little and the position of the contact on the piece *c* or *d* is therefore not changed in any appreciable measure until the tongue *z* is thrown over.

In the construction shown in Figs. 1–3 the spring *s* and thereby the tongue *z* will rest in any position resting either on terminal *c* or *d* after the force applied ceases to work. In the construction shown in Fig. 4 the spring *s* will always return to its initial position as the upper piece *a* is somewhat slanting.

From the foregoing it is clear that the force has to be applied but for a short distance.

As shown in the Figs. 5 to 7 one or two tongues *z* may be made the tongues being on one or on both sides of the spring *s* or a tongue may be stamped out of the spring *s* as shown in Fig. 7.

Devices constructed according to the principle described may be used for switches of any kind for instance in time switches, in hot wire instruments and so on.

As an example how the principle may be used a switch actuated by heat is shown in Fig. 8. The terminal *c* is connected to the main. The current passes through the contact piece *e* tongue *z* to the spring *s* and from thence to the bearing *a*. To the bearing *a* the rod *h* is fixed the lower end of which is fastened to the bearing *b* by means of a spring *f* and of a bar *g*. On the rod *h* a wire coil *h'* is arranged which is connected to the bearing *a* on the one side and to a contact *y* on the other side. Contact *y* rests on a contact *i* arranged on a spring *v* said spring *v* being connected to the main. The bar *g* reaches up to the bearing *a* and is provided with a slot through which the spring *s* passes. The spring *f* tends to move the bar *g* in a direction opposite to that indicated by the arrow in Fig. 8, the rod *h* resisting this tendency. If no or little current passes through the mains the parts assume the position shown in the drawing. If the rod *h* is heated by the current it extends and the spring *f* may now act on the spring *s* by means of the bar *g*. If spring *s* has been moved to a certain measure the tongue *z* is thrown from the terminal *c* and its free end comes in engagement with the teeth of a toothed gear *k* rotatably mounted on an axle. The gear *k* is provided with a pin *l* projecting sidewardly from the said gear. The spring *v* on which the contact piece *i* is fixed projects in the path of said pin *l* in such a manner that the pin *l* can break the circuit. The circuit is broken over the contacts *y*, *i*, each time the rod *h* gets hot. As soon as the circuit is broken the rod *h* cools and contracts closing thereby the circuit again. Each time the circuit has been opened the gear *k* has been moved forward by one tooth. After a certain number of switching in and out the pin *l* lifts the contact *i* off the contact *y* the circuit is broken and is not closed after the rod has cooled. The device needs readjustment by an operator. Various changes may be made without departing from the spirit of the invention; for instance:

The gear *k* may be replaced by a contact *d* (Figs. 1 to 4) which is connected to the main. If the tongue *z* rests on the contact *c* the circuit through the installation of the consumer is closed. If the current consumed exceeds a certain limit rod *h* and bar *g* throw the tongue *z* away from the contact *c* and press the tongue *c* on the contact *d*. The circuit is now interrupted.

Similar devices may be used for switching in or out heating devices if the substance to be heated has reached the desired temperature. In this case the rod *h* is heated by the substance to be heated for instance water, etc.

The device may be constructed in the following manner: If no current is used the consumer's circuit is open the contacts *c* and *e* being not in touch with each other. If current is wanted the tongue *z* is brought by hand, lever, etc., to bear on the contact *c* and the circuit is closed in this manner. At the same time current passes through the coil on rod *h* and the circuit is broken again after a predetermined time.

This device may be used with advantage in combination with the three-minute-time switches. Means to regulate the time for which the current is on may be used in combination with this device.

To compensate the influence of the variations of the temperature on the rod *h* the ground plate of the instrument is advantageously made of the same material as the rod *h*.

Having described my invention what I wish to secure by Letters Patent is:

1. A spring arrangement of the character described adapted for opening and closing circuits comprising in combination, a blade spring, a tongue on said spring, two bearings holding said spring under tension in bent position, means to act on said spring for reversing the curve thereof, and terminals of a circuit between which said spring plays, substantially as described.

2. A spring arrangement of the character described adapted for opening and closing circuits, comprising in combination, a blade spring, tongues on said spring, two bearings

holding said spring under tension in a bent position, a bar engaging said spring to open a circuit, means to heat said bar by the action of the current, said tongues being adapted to be shifted by hand for closing the circuit, substantially as described and for the purpose set forth.

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

HEINRICH LANDIS.

Witnesses:
FRIH. ICH,
M. C. PIERCE.