No. 755,739. PATENTED MAR. 29, 1904.

H. W. BROWN.

MAXIMUM DEMAND INDICATOR.

APPLICATION FILED AUG. 2, 1902.

NO MODEL.

Fig. 1.

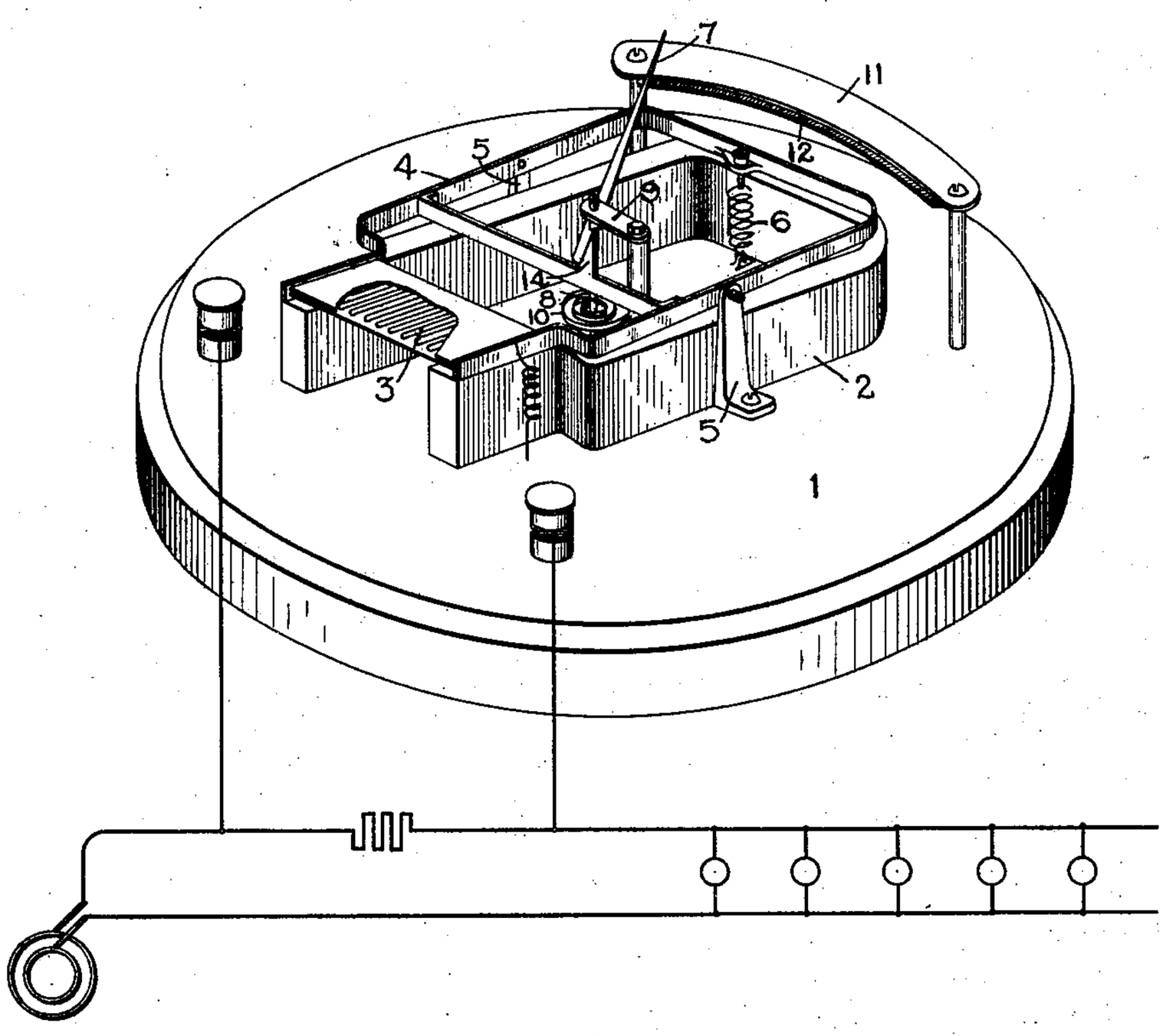
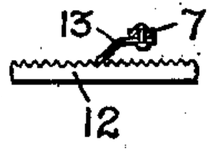


Fig. 2.



Witnesses.
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No. 755,739. Patented March 29, 1904.

UNITED STATES PATENT OFFICE.

HARRY W. BROWN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

MAXIMUM-DEMAND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 755,739, dated March 29, 1904.

Application filed August 2, 1902. Serial No. 118,112. (No model.)

To all whom it may concern:

Be it known that I, HARRY W. BROWN, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Maximum-Demand Indicators, of which the following is a specification.

This invention relates to apparatus for use in connection with electric-light circuits where the charge to any given consumer is based upon a predetermined maximum number of lights to be used at any given time.

The object of the invention is to indicate when this maximum is exceeded.

It has been discovered that an alloy of nickel and steel which is magnetic at certain temperatures becomes non-magnetic at a higher temperature, but regains its magnetic property when cooled again. The temperature at which the magnetism disappears increases with the proportion of nickel in the alloy and may attain or exceed 400° centigrade; but an alloy containing about twenty-five per cent. nickel loses its magnetism at a temperature under 100° centigrade. Nickel-steel alloys varying in nickel content from below twenty-five per cent. to a much higher amount therefore change from a magnetic to a non-magnetic substance at a temperature at which practically none of the rigidity of the alloy is lost. This, together with the fact that the loss in magnetism as the temperature is raised is gradual, makes it possible to use an alloy of nickel and steel where other metals which lose their magnetism only when brought to a much higher temperature are not well adapted for use. I take advantage of this property of nickel-steel, and arrange a certain length of fine wire of this alloy in shunt to a resistance in the main supplying a lamp-circuit. The alloy conductor is movably supported adjacent to a permanent magnet, and a pivoted pointer is arranged to be actuated by the conductor when the latter is moved by a spring or weight acting in opposition to the attraction of the magnet. So long as the current flowing through the alloy conductor remains below a predetermined maximum the heating effect on the conductor is not sufficient to impair its magnetism, and consequently the magnet attracts it and prevents it from moving; but if too many lights are turned on, causing an excessive current in the line and the conductor, the latter quickly becomes so hot as to lose its magnetism, and the permanent magnet no longer holding it the spring or weight moves it and actuates the pointer. I prefer to retain the pointer at its limit of movement by means of a stationary ratchet and a detent-pawl on the pointer engaging therewith. The connection between the conductor and the pointer is a loose one, so that the return movement of the conductor when it cools does not affect the pointer.

In the accompanying drawings, Figure 1 is a perspective view of my improved indicator, the lighting-circuit being shown in diagram. Fig. 2 is a cross-section of the end of the pointer, its detent-pawl, and a portion of the ratchet.

On a suitable base 1 is supported a permanent magnet 2, preferably of the horseshoe shape. A conductor 3 of nickel-steel wire, preferably in the form of a flat zigzag, is movably supported adjacent to the poles of said magnet, preferably by means of a light frame 4, pivoted to pedestals 5, erected on the base 1 at each side of the magnet. A spring 6 is attached to the base and to the end of the frame opposite the conductor and acts in opposition to the attraction of the magnet for the conductor, tending to separate them. A pointer 7 is mounted on an upright arbor 8, journaled in suitable bearings, such as 9, and provided with a coiled spring 10, tending to hold the pointer at one end of a segment 11. Adjacent to the segment is a ratchet 12, and on the pointer is a detent-pawl 13, engaging with the teeth of the ratchet and operating to hold the pointer at whatever point on the segment it may be moved to. The frame 4 carries an upright cam 14, engaging with the pointer, so that when the conductor rises the cam will move the pointer over the segment, but the conductor will be free to fall without affecting the pointer.

The operation of my device is as follows: So long as the number of lamps in use does

not exceed the maximum contracted for the nickel-steel conductor remains cool enough to be magnetic and is held down by the magnet; but if an unauthorized number of lamps is turned on the increased current heats the conductor to a temperature at which it becomes non-magnetic. The magnet can no longer hold it, and the spring 6 therefore lifts it, causing the cam to swing the pointer over the ratchet, the detent-pawl catching the teeth of the same and preventing the pointer from returning.

By means of this device an inspector or meterman can at once detect any excessive use of current by a consumer during the time since the previous inspection of the apparatus.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An electrical indicator, comprising a conductor which is magnetic at low tempertures but non-magnetic at higher temperatures, means for connecting the conductor in circuit, a scale, and means for causing the variation of magnetism to effect an indication on the scale.

2. An electrical indicator, comprising a conductor which loses its magnetism but retains its rigidity when its temperature is raised, means for connecting the conductor in circuit, and means for causing the variation of magnetism of said conductor to effect an indication.

3. An electrical indicator, comprising a conductor of nickel-steel, means for connecting the conductor in circuit, a magnet adjacent to said conductor, indicating mechanism, and means for operating the same when there is a decrease of magnetic attraction between said conductor and magnet.

4. An electrical indicator, comprising a conductor of nickel-steel, means for connecting the conductor in circuit, a magnet adjacent to said conductor, means for permitting a relative movement of said conductor and magnet as the conductor becomes non-magnetic, and a pointer actuated by said movement.

5. A maximum-demand meter, comprising a conductor of nickel-steel, means for connecting the conductor in circuit, an indicator, means for moving the indicator as the magnetism of the conductor decreases, and means whereby an increase in the magnetism of the conductor does not affect the indicator.

6. An electrical indicator, comprising a conductor of nickel-steel, a permanent magnet having its poles adjacent to said conductor, a pivoted frame on which said conductor is mounted, and a pointer adapted to be actuated by said frame.

7. An electrical indicator, comprising a conductor of nickel-steel, a permanent magnet having its poles adjacent to said conductor, a pivoted frame on which said conductor is mounted, a pointer adapted to be actuated by said frame, and means for retaining said pointer in the position to which it is moved.

8. An electrical indicator, comprising a conductor of nickel-steel, a permanent magnet having its poles adjacent to said conductor, a pivoted frame on which said conductor is mounted, a pointer adapted to be actuated by said frame, a ratchet adjacent to said pointer, and a detent-pawl on said pointer engaging with said ratchet.

In witness whereof I have hereunto set my hand this 25th day of July, 1902.

HARRY W. BROWN.

Witnesses:

D. R. BULLEN,

CHAS. B. BURLEIGH.