E. B. JACOBSON.

VIBRATOR FOR INDUCTION COILS.

APPLICATION FILED AUG. 31, 1910.

999,565. **Patented Aug. 1, 1911.**

Fig. 1.

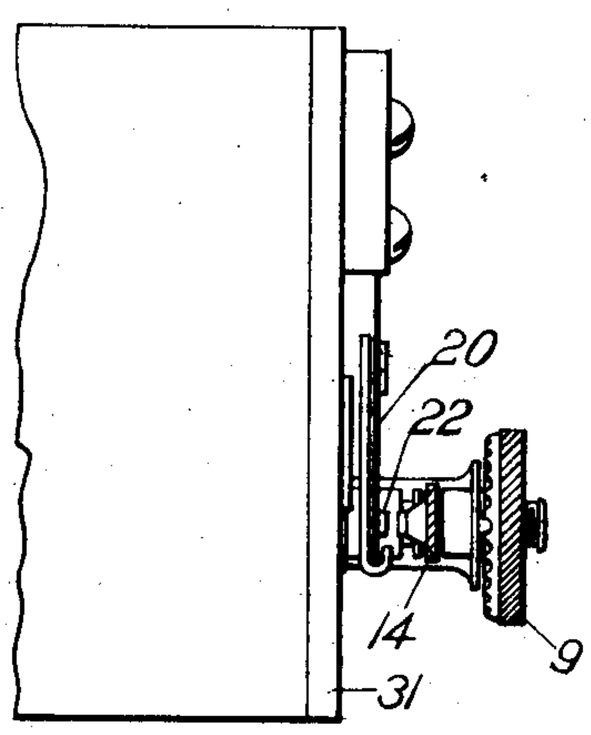


Fig. 2.

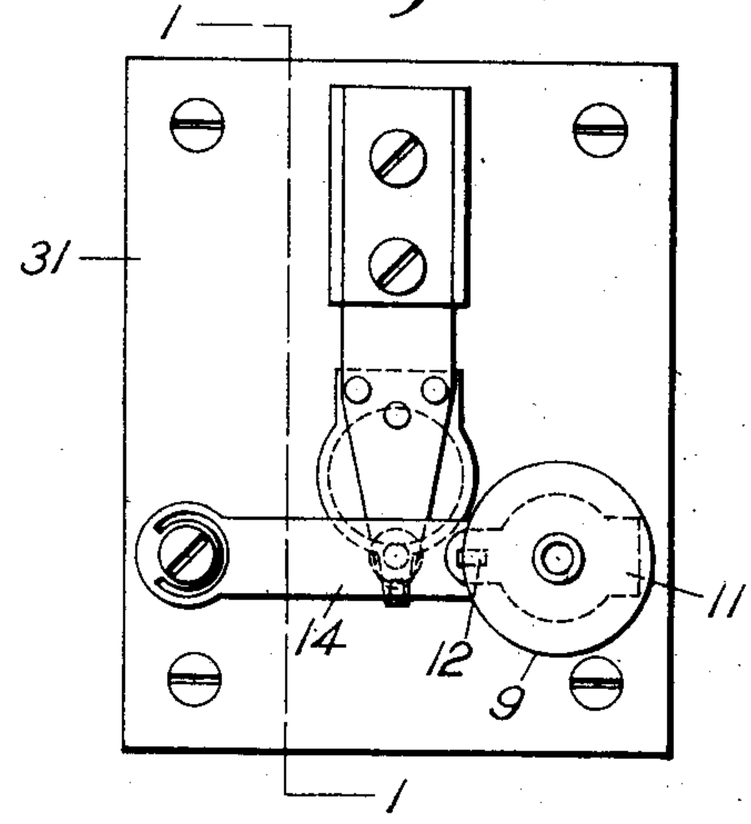


Fig. 3.

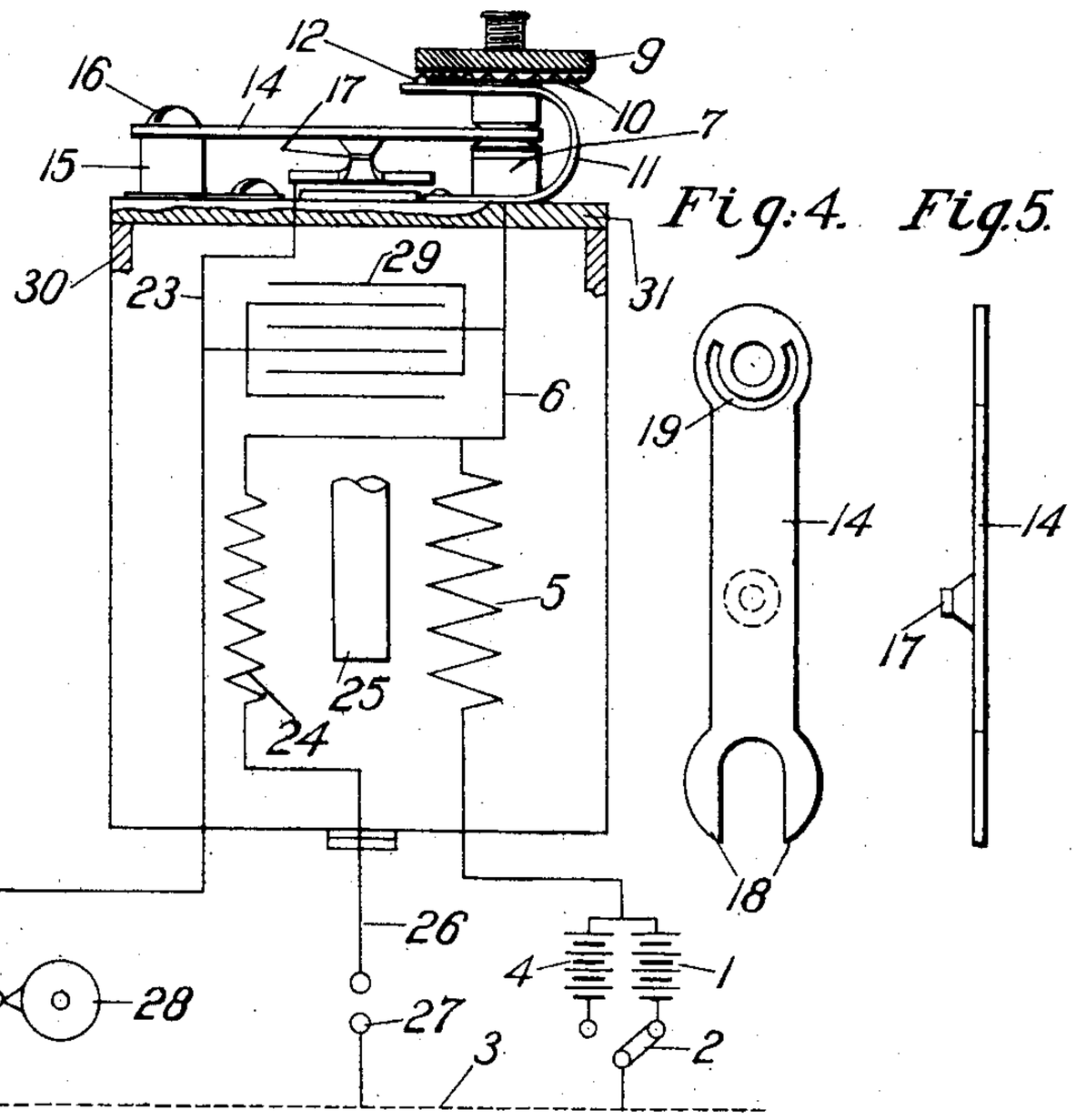


Fig. 6.

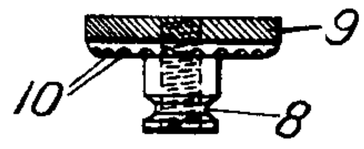
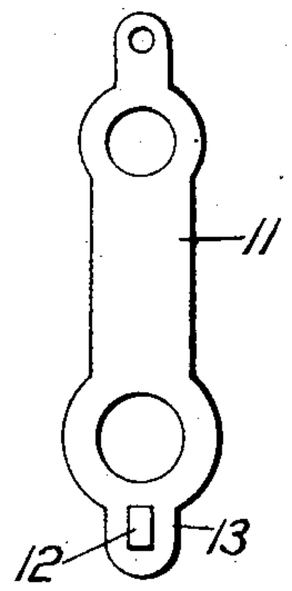


Fig. 4.

Fig. 5.

Fig. 7.



WITNESSES:

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VIBRATOR FOR INDUCTION-COILS.

999,565. Specification of Letters Patent. Patented Aug. 1, 1911.

Application filed August 31, 1910. Serial No. 579,944.

To all whom it may concern:

Be it known that I, EDWARD B. JACOBSON, a citizen of the United States, residing at Pittsfield, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Vibrators for Induction-Coils, of which the following is a specification.

My present invention relates to induction-coils as employed in ignition systems for internal combustion engines, and, more particularly, to that portion thereof designated as the vibrator, or vibratory mechanism.

The principal objects of my invention are to simplify the construction of this class of devices; to facilitate the correct adjustment of the vibrator for normal current consumption; to provide improved means for positively locking the adjustment mechanism; and, particularly, to provide improved means, in conjunction with the foregoing, for limiting the range of adjustment whereby the amount of current flowing through the primary winding cannot exceed what is required for the maximum operative efficiency of the device.

Reference may be had to the drawings, illustrating a preferred form of my invention, in which—

Figure 1 is a side view of an induction-coil with a vibrator, embodying the principle of my invention, mounted thereon, the vibrator being shown on the line 1—1 of Fig. 2; Fig. 2 is a top plan view; Fig. 3 is a diagrammatic front view of the parts shown in Fig. 2, with circuit connections for an ignition system; Fig. 4 is a top view of the bridge element in detail; Fig. 5 is an edge view of the same; Fig. 6 is a detail view of the adjusting-nut 9; and Fig. 7 is a developed view in detail of the adjustment spring 11.

A suitable case 30 has mounted therein the usual core, primary and secondary windings, condenser, and proper electrical connections. Upon an insulation cover 31 of the case is mounted the vibrator device.

The battery 1, or other source of electrical energy, is normally grounded through the switch 2 to the motor frame 3 and connected to the lower terminal of the primary winding 5 of the transformer. A second battery 4 is sometimes provided which is also connected to the primary winding 5 of the transformer. The other terminal of the primary winding is connected by wire 6 to the adjusting-stud 7 of the vibrator device, and thence through the adjusting-nut 9 to the bridge 14. The bridge 14 contacts with the armature spring 20, which is grounded by the conductor 23 through the timer 28. The current induced in the secondary winding 24 by the magnetized core 25 is carried by the conductor 26 to ground through the spark plug 27, the other terminal of the winding being connected to the wire 6, whence the circuit is completed through the vibrator and timer. A condenser 29 is shunted across the vibrator terminals.

Over the platinum-point 22, on the free end of the armature-spring 20, I provide a separate platinum-point 17 secured to the bridge 14 and normally engaged by the point 22. Said bridge is preferably constructed of a flat metallic strip or bar with enlarged ends, as shown in Fig. 4, and secured to opposite metal posts 15, 7, arranged on the cover 31 of the case 30. The fixed end of the bridge is provided with a suitable aperture to receive a screw 16, which, when screwed down, secures the bridge-end in rigid relation to the post 15. A separate annular aperture 19 is provided in the bridge about the head of the screw 16 to insure flexibility of the bridge when raised or lowered by the adjusting means provided at its opposite end. The post 7 is provided with an inverted stem of smaller diameter, threaded to receive an adjusting-nut 9, the lower portion or base of the post having a predetermined height so as to operate as a stop to the adjusting-nut and fixing its lower limit of movement at a point predetermined to be the point coincident with the maximum operative efficiency of the device.

The adjusting-nut 9, shown in Fig. 6, has a round body-portion provided at its upper end with a circular knurl flange or head and at its lower end with an annular groove 8, beveled outwardly to receive the jaws 18 of the bridge 14, which is bifurcated at the adjusting end. The adjusting-nut is held in any desired position by an elliptical tension spring 11, which is projected from the cover 31 upward against the underside of the head of the nut. Said spring 11 is preferably constructed of a resilient metallic strip suitably secured at its lower end to the cover 31 and provided at its upper end with

a boss or tooth 12 which slidably engages the underside of the head of the nut, the body-portion of the spring being bent centrally in the form of the letter U to afford the necessary tension and provided with apertures adjacent either end through which are projected the base of the post 7 and the body-portion of the nut 9, respectively. The boss 12 of the spring 11 is adapted to slip into the notches 10 provided at regular intervals around the margin of the head of the nut 9, the engagement thereof being maintained by sufficient tension in the spring 11 to prevent casual slipping of the nut out of adjustment but not interfering with a positive force applied in manipulating for adjustment. A self-locking construction is thus provided for the nut 9 at any point of adjustment. The rotation of the nut causes a click to be imparted by the engagement of the boss 12 with each of the notches 10 which is sufficiently audible to enable the operator to adjust with accuracy, each of the notches representing an equal subdivision of the total increase or reduction of current obtained by a complete revolution of the nut, which is a known quantity.

The adjustment of the vibrator is obtained, as will be readily understood, by raising or lowering the bridge 14 by means of the adjusting-nut 9. If the platinum-points 17, 22, are spaced, as shown in Fig. 1, the circuit is first established by the downward rotation of the nut until said points are barely in contact. This may be termed the zero position, at which the amount of current flowing through the primary winding is known. The nut 9 is then rotated downward until the total number of notches passed indicate that the desired quantity of current is attained. As previously stated, the total quantity of current to be obtained, however, cannot exceed the point of maximum operative efficiency, which is reached when the nut 9 comes in contact with the stop provided by the base of the post 7, this position being illustrated in Fig. 3 and wherein it is shown that at this point sufficient space intervenes the vibratile element and the top of the core to permit vibratory movement. Hence it will be seen that by the construction of my device it is impossible to "over-adjust" the vibrator, either by forcing the vibratile element down into fixed engagement with the core, a position in which it cannot vibrate, or by bringing the platinum-points into so close engagement that the amount of current flowing therethrough would be excessive of what is required and consequently a waste of battery strength.

I claim:—

1. In an induction-coil, a vibrator comprising a vibratile element fixed at one end and having a contact member on its free end, a bridge extending over the free end of the vibratile element and having a contact member thereon normally engaged by said other contact member, said bridge being fixed at one end and normally movable at its opposite end, means for raising or lowering the movable end of the bridge for the relative adjustment of said contact members, and fixed means for limiting the tension between said contact members whereby the consumption of electric current by said coil cannot exceed a predetermined maximum amount.

2. In an induction-coil, a vibrator comprising a vibratile element, a bridge extending over the vibratile element and normally engaged thereby, said bridge being fixed at one end and normally movable at its opposite end, means for raising or lowering the movable end of the bridge for adjustment with relation to the vibratile element, and fixed means for limiting the extreme movement of the bridge whereby the resulting displacement of the vibratile element will be less than the extreme limit of its movement.

3. In an induction-coil, a case, an insulation cover thereon, a magnet within the case and projecting through the cover, a vibratile element mounted on the cover and having a free end extending freely over the magnet, a bridge mounted on the cover and extending over the vibratile element for normal engagement therewith, means for adjusting the bridge relatively to the vibratile element, and fixed means for preventing the vibratile element from being depressed upon the magnet by the adjustment of the bridge.

4. In vibrators for induction-coils, the combination with a vibratile element and a bridge extending over the vibratile element and normally engaged thereby, said bridge being fixed at one end and normally movable at its opposite end, of means for adjusting the bridge relatively to the vibratile element and comprising a fixed post disposed adjacent the movable end of the bridge and having a threaded extension, a nut carried on said post extension and movably engaged with the movable end of the bridge, and a tension spring opposing the movement of the nut.

5. In vibrators for induction-coils, the combination with a vibratile element fixed at one end and having a contact member on its free end, and a bridge extending over the free end of the vibratile element and having a contact member thereon normally engaged by said other contact member, said bridge being fixed at one end and normally movable at its opposite end, of means for raising or lowering the bridge for normally adjusting the contact member thereon relatively to said other contact member and comprising a fixed post disposed adjacent the movable end of the bridge and having a body-portion of a predetermined height and

a threaded extension thereon of less diameter than the body-portion, and a nut carried on said post extension and movably engaged by the bridge, the body-portion of said post being adapted to limit the extreme movement of the nut whereby the electric current flowing between said contact members cannot exceed a predetermined maximum amount.

6. In vibrators for induction-coils, the combination with a vibratile element and a bridge extending over the vibratile element and normally engaged thereby, said bridge being fixed at one end and bifurcated at its normally movable opposite end, of means for adjusting the bridge relatively to the vibratile element and comprising a threaded post, a nut carried on the post, said nut being normally movable and provided with an annular groove engaged by the jaws at the movable end of the bridge and with an annular flange or head having a series of notches peripherally arranged on the underside thereof, and a tension spring yieldingly opposing the rotation of the nut and having a pawl or thrust adapted to register with said notches for locking the adjustment.

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

EDWARD B. JACOBSON.

Witnesses:

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