J. McINTYRE.

INDUCTION COIL.

APPLICATION FILED MAR. 21, 1908.

1,003,633.

Patented Sept. 19, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

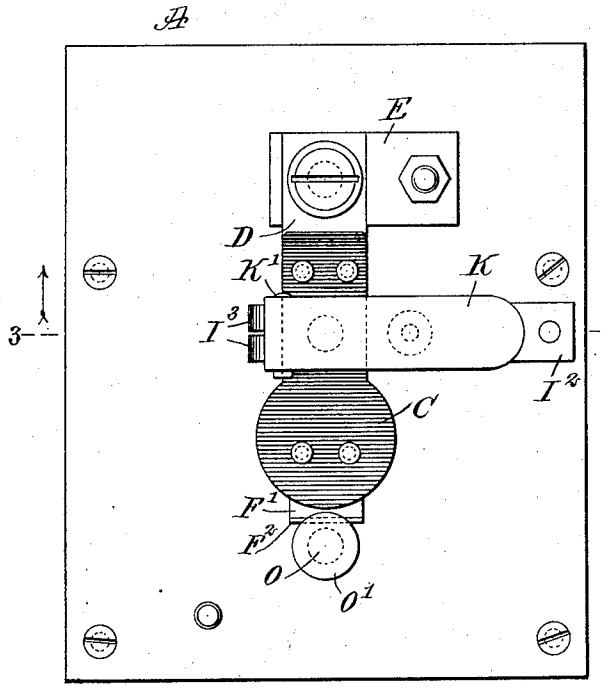


Fig. 2.

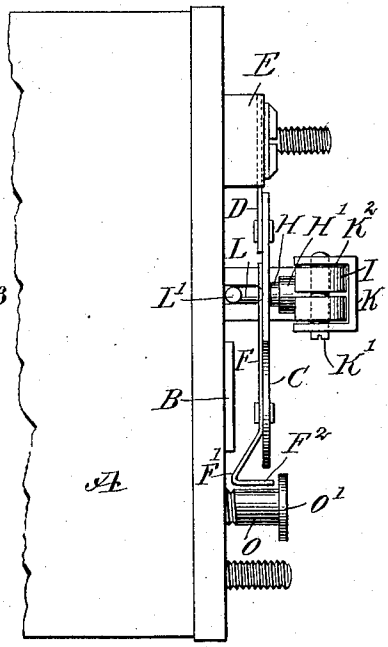


Fig. 3.

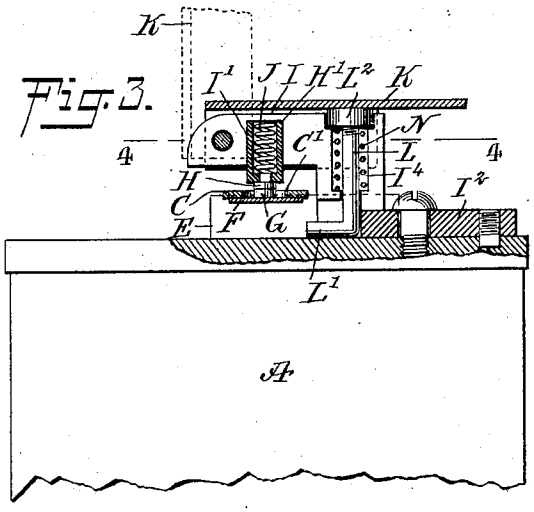


Fig. 4.

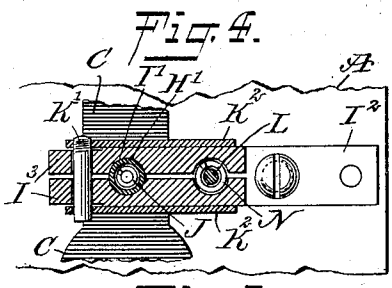
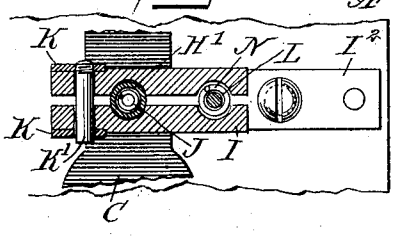


Fig. 5.



WITNESSES

William P. Goebel.

Rud. J. Hoosten

INVENTOR

John McIntyre

BY Munn & Co

ATTORNEYS

J. McINTYRE.

INDUCTION COIL.

APPLICATION FILED MAR. 21, 1908.

1,003,633. **Patented Sept. 19, 1911.**

2 SHEETS—SHEET 2.

Fig. 6.

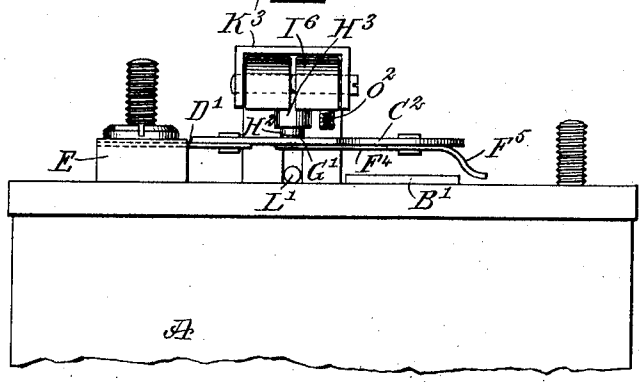


Fig. 7.

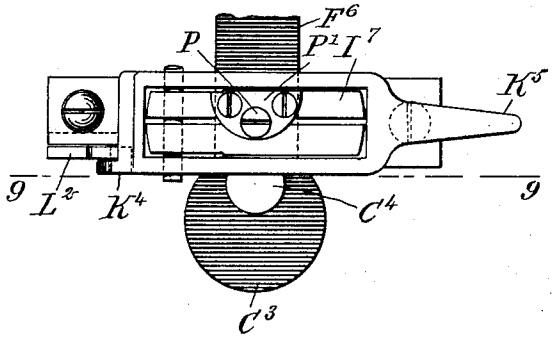


Fig. 8.

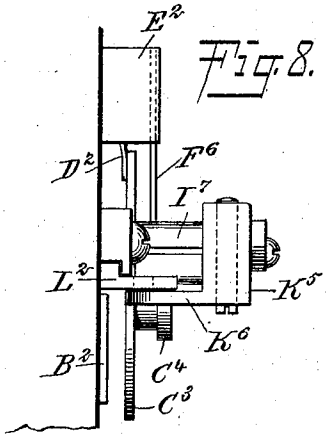
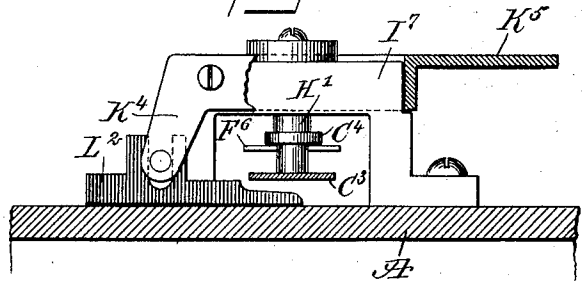


Fig. 9.



WITNESSES

William P. Goebel.

Rud. J. Hoster.

INVENTOR

John McIntyre

BY Munn & Co

ATTORNEYS

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN McINTYRE, OF JERSEY CITY, NEW JERSEY.

INDUCTION-COIL.

1,003,633. Specification of Letters Patent. Patented Sept. 19, 1911.

Application filed March 21, 1908. Serial No. 422,495.

To all whom it may concern:

Be it known that I, JOHN McINTYRE, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented new and useful Improvements in Induction-Coils, of which the following is a full, clear, and exact description.

The invention relates to electrical apparatus, such as shown and described in the Letters Patent of the United States, No. 796,851 and No. 868,468, granted to me on August 8, 1905, and October 15, 1907, respectively.

The object of the present invention is to provide certain new and useful improvements in induction coils, whereby a desired adjustment of the contacts is obtained in a very simple and effective manner, according to the use to be made of the apparatus and relative to the existing strength of the source of electrical energy, the arrangement rendering the employment of the expensive platinum contacts exceedingly economical.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of the improvement; Fig. 2 is a side elevation of the same; Fig. 3 is a sectional front view of the same on the line 3—3 of Fig. 1; Fig. 4 is a sectional plan view of the clamping device for holding the contact bar in place, the section being on the line 4—4 of Fig. 3; Fig. 5 is a similar view of the same in an open position; Fig. 6 is a side elevation of a modified form of the improvement; Fig. 7 is a plan view of another modified form of the improvement; Fig. 8 is an edge view of the same; and Fig. 9 is a sectional side elevation of the same on the line 9—9 of Fig. 7.

The casing A of the induction coil contains the usual coil cylinder (not shown), carrying primary and secondary wires and the core B, the outer end of which projects at the face of the casing A, to operate in conjunction with the vibrator having an armature C, secured at one end to a main spring D, attached by suitable fastening devices to a support E held on the face of the casing A.

On the under side of the armature C is secured one end of a spring F, carrying at its free end a contact G in register with an aperture C′ formed in the armature C, the said contact G being arranged for engagement with a contact H held on a contact bar H′, mounted in a smooth bore I′ formed in a split clamp I, the base I^2 of which is fastened to the face of the coil casing A. The contact bar H′ is preferably made hollow for containing a coil spring J for assisting the contact bar H′ to slide in its bore I′ whenever the split bearing I is in an open position, as shown in Fig. 5, it being expressly understood that the said contact bar H′ is also self-sliding by its own weight and capable of being manually rotated in the bore I′, when unclamped for the purpose hereinafter more fully disclosed.

The split bearing I is adapted to be closed by a friction clamping lever K, fulcrumed at K′ at the forward and somewhat reduced ends I^3 of the split bearing I (see Figs. 4 and 5) and the said clamping lever K is provided with side arms K^2, adapted to pass over the wider side portions of the split bearing I, so that when the lever K is swung downward from the position shown in dotted lines in Fig. 3 into the position shown in full in Figs. 1, 2, 3 and 4, then the said side arms K^2 in passing from the narrow ends I^3 onto the wider side portions of the split bearing I, cause the members thereof to move toward each other and thus clamp the contact bar H′ firmly in place.

Instead of the ends I^3 of the split bearing being reduced for the purpose described, the clamping lever K at its fulcrum end K′ may be enlarged so that when it is in the open position it will loosely embrace the sides of the split bearing and allow it to expand.

In the split bearing I is mounted to slide freely a retaining bar L having a foot L′ extending below the armature C and adapted to hold the armature against vibratory motion when adjusting the contact bar H′, as hereinafter more fully explained. The bar L is provided with a bead L^2 extending above the top of the bearing I, to be engaged by the lever K when the latter is swung downward into a closed position, so as to press the head L^2 and consequently the bar L downward into an inactive position, as shown in Fig. 3. A spring N is coiled around the bar L within a counterbore I^4

formed in the bearing I, the spring pressing against the under side of the head L^2, and bottom of the counterbore so that when the lever K is swung upward, the said spring imparts an upward sliding motion to the retaining bar L, to move the foot L′ of the retaining bar almost in contact with the under side of the armature C, thus holding the latter against undesirable vibratory movement toward the core B.

The spring F, of the vibrator as illustrated in the drawings, is provided with an extension F′, bent to form an arm F^2, the lower end of which is preferably adapted to engage the face of the casing A, while the upper end thereof is preferably adapted to abut against the head O′ of a screw O, screwing in the face of the casing A. Now by the arrangement described, the vibratory motion of the armature C in a downward direction or toward the core B is limited by the arm F^2 abutting against the face of the casing A, while the return movement of the armature C is limited by the end of the arm F^2 abutting against the head O′ of the screw O. Thus the extension F′ of the spring F attached to the armature C limits the vibratory movement of the armature C toward and from the core B.

When it is desired to adjust the contact H relative to the contact G of the vibrator, the operator swings the lever K upward into the position shown in dotted lines in Fig. 3 and in full lines in Fig. 5, so that the split members of the bearing I open by their own resiliency to release the contact bar H′ which by its own weight or aided by the spring J slides downward in the bore I′ until the face of the contact H is in engagement with the face of the contact G, the latter being held against downward vibratory motion by the foot L′ of the retaining bar L engaging in this instance, the armature C, and moved into a raised position by the action of the spring N on swinging the lever K upward. Thus by the arrangement described the contact bar H′ when unlocked is self-sliding and can be manually rotated to bring any desired portion of the face of the contact H into engagement with any desired portion of the face of the contact G.

It is understood that when the apparatus is new the entire faces of the contacts G and H are usually in engagement with each other, and when the apparatus is used the contacting faces are liable to burn angularly, that is, until each face has a high and low point, and it is then very desirable to rectify the said angular wearing, with a view to bring the high points of the faces of the contacts G and H opposite or in register with each other. This is done by the operator sliding the released or unlocked contact bar H′ up in its bore I′ a sufficient distance to move the contact H out of engagement with the contact G, and to then rotate the contact bar H′ in its bore I′ until the high point of the contact H is opposite the high point of the contact G. When this has been done the contact bar H′ is released by the operator, to allow the contact bar H′ to slide down in this instance, until the said high points are in contact. The operator now swings the lever K down and in doing so presses the members of the split bearing I toward each other, thus clamping the contact bar H′ in the adjusted position and at the same time the lever K presses the retaining bar L downward, to disengage the foot L′ from the armature C and thus release the vibrator.

As the contacts G and H are usually made of platinum or other expensive metal, the adjustment described compensates for the angular wear of the contacts G and H, and thus the whole of the contacts are utilized and no portion thereof needs to be filed away or otherwise wasted. It will be understood that if the position of the contacts, one relative to the other, is not changed, the electric spark is liable to burn away the metallic supports of the contacts, and the latter would drop off and be wasted and the apparatus rendered inoperative.

In its normal position and when lever K is raised, the armature C is slightly clear of the foot L′, thus allowing a slight movement of the armature C and contact G toward the core.

By having the foot L′ of the retaining bar L in position to be engaged by the armature C during the adjusting of the contact bar H′, the spring F and the armature C are held against undesirable movement caused by the attractive force of the core B, that is, when making the adjustment when the current is on. This adjustment may also be made with the current off by manually pressing the armature C against the foot L′ of the retaining bar L. Now when a harder contact than the normal one is not desired then the retaining bar L may be dispensed with, but in this case the current must be shut off. When the battery or other electrical source of energy for the induction coil is at its maximum strength, a very much lighter contact between the contacts G and H will suffice to deliver the necessary amount of electricity than when the battery has decreased in strength, and in this case the foot L′ of the retaining bar L being out of contact with the armature C allows a very slight movement more than the normal one of the contact G toward the core B and while the current is on; or the armature manually pressed against foot L′ of the bar L. In this instance, a harder contact or longer dwell of the contacts G and H is obtained and consequently more time is given to the weaker current to pass before the contact is

interrupted. The retaining bar L may also be dispensed with in case the armature C or the spring F carrying the contact G is stiff enough to resist undesirable movement or tension from the pressure of the unclamped or released contact bar H′, but in this case it is also necessary that the current be turned off or else the attractive force of the core B attracts the armature C, and the contact H carried by the unclamped contact bar H′ follows in contact with the contact G and thus short-circuits the electric current and thereby prevents a proper tension or adjustment of the contacts.

By arranging the bearing I with a split, and having the clamping lever K for opening and closing the bearing as described, it is evident that the contact bar H′ is securely locked in place by the laterally moving split members, without danger of the contact bar H′ being accidentally displaced or shifted in the direction of its length. The action of the clamping lever K on the split members of the bearing I, for locking the contact bar H′ in place or releasing it, is uniform, and hence it is only necessary for the operator to swing the lever K up or down.

When the vibrator is in the normal or inactive position shown in Figs. 2 and 3, the extension F′ is free of the face of the casing A, and the arm F^2 is free of the head O′ of the screw O, and when the vibrator is attracted by the magnetic force of the core B, the extension F′ strikes the face of the casing and thus prevents the vibrator from touching the core B. In a like manner the arm F^2 on the return stroke of the vibrator, engages the head O′ of the screw O, thus limiting the return stroke of the vibrator, and by adjusting the screw O the length of the return stroke of the vibrator can be minutely regulated.

By having the contact G attached to a light spring F mounted on the armature C, the latter on its back stroke can continue its movement after the faces of the contacts G and H have met, thus holding the said contacts a longer time in engagement, and thereby allowing more electric current to pass, and causing a stronger rebound of the armature toward the core. A further benefit of employing the spring F on the armature C is that in case the contacts G and H should fuse, the additional rebound given to the armature and consequently to the auxiliary spring F aids the attractive force of the core B, to separate the contacts G and H.

In the modified form shown in Fig. 6, the armature C^2 is mounted on the main spring D′ and carries the auxiliary spring F^4, supporting the contact G′ for engagement with the contact H^2 held on the contact bar H^3, adapted to be clamped in place by the split bearing I^6, controlled by the clamping lever K^3. The spring F^4 terminates in an extension F^5, for limiting the swinging motion of the vibrator toward the core B′ of the coil. The return swinging movement of the vibrator is limited by a stop screw O^2 screwing in the bearing I^6.

In the arrangement shown in Figs 7, 8 and 9, the retaining bar L^2 is mounted to slide on top of the casing A and is pivotally connected with an extension K^4 of the clamping lever K^5, controlling the split bearing I^7 used for holding the contact bar. The armature C^3 of the vibrator is provided with a button C^4 engaging the free end of the spring F^6, carrying the contact G (not shown) for engagement with the contact H (not shown) mounted on the contact bar H′ clamped in the bearing I^7. A spring F^6 is attached to the bracket E^2 on which is also secured the main spring D^2 carrying the armature C^3. When the lever K^5 is swung up to unlock the contact bar H′ then the retaining bar L^2 is moved under the vibrator, to hold the latter against movement toward the core B^2 until the desired adjustment is made, and the lever K^5 is returned to a locking position.

A screw P screws in a bonnet P′ held on one of the members of the split bearing I^7 to regulate the tension of a spring (not shown but similar to the spring J) pressing on the contact H held in the split bearing.

The induction coil is provided with the usual binding posts and wire connections, and further description of the same is not deemed necessary.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A vibrator of an induction coil comprising an armature, a main spring at one end of the armature, a support to which the main spring is secured, and a contact spring secured at one end to the other end of said armature.

2. A vibrator of an induction coil, comprising an armature having an aperture, a main spring at one end of the armature, a support to which the main spring is secured, and a spring connected at one end with the other end of said armature, and having a contact point in register with the aperture in the armature.

3. An induction coil having a clamped bar and a vibrator adapted to contact with the said clamped bar, said bar being slidable and rotatable when unclamped.

4. A vibrator of an induction coil having a spring on the said vibrator, and a stop for engagement by the said spring to limit the vibration of the said vibrator.

5. A vibrator of an induction coil having a spring on the said vibrator, and an adjustable stop for engagement by the said spring to limit the vibrations of the said armature.

6. An induction coil having a vibrating contact, a contact bar normally in contact with the said vibrating contact, a bearing in which the said bar slides and rotates, and means for preventing movement of the said bar in its normal position.

7. An induction coil having a vibrator, a contact bar for engagement with the said vibrator, a split bearing in which the said bar slides and rotates, and a clamping lever for engagement with the said bearing to clamp the said contact bar in position.

8. An induction coil having a vibrator, a contact bar for engagement with the said vibrator, a bearing in which the said bar slides and rotates, a retaining bar adapted for engagement with the said vibrator, and a clamping lever for clamping and unclamping the said contact bar in the said bearing, and for actuating the said retaining bar to engage and release the vibrator.

9. An induction coil having a split bearing provided with a smooth bore extending in the opposite faces of the split members of the bearing, a contact bar slidable and rotatable in the said bore, and a clamping lever for engagement with the said split members to move the same toward each other for clamping the said contact bar in place, the clamping lever when moved into open position allowing the said split members to open by their own resiliency.

10. An induction coil having a bearing split in the direction of its length to form split members, in the opposite faces of which is formed a bore, one end of the split members being reduced in width, a contact bar in the said bore, and a clamping lever fulcrumed on the reduced end of the split members, and having side arms for engaging the sides of the split members, to move the said split members toward each other, for clamping the contact bar in place, the said side arms when moved out of engagement with the said sides of the split members allowing the latter to open by their own resiliency.

11. An induction coil having a vibrator, provided with a spring, a contact on said spring, a contact bar provided with a contact for engaging the contact on said spring, a split bearing in which the said contact bar is adapted to slide and to rotate, a clamping lever for engagement with the said bearing to clamp the contact bar in position, and a retaining device adapted to be engaged by the vibrator.

12. A vibrator of an induction coil comprising an armature, a main spring to which one end of the armature is secured, and a spring secured at one end to the other end of said armature and having a contact point at its free end.

13. A vibrator of an induction coil comprising an armature provided with an aperture, a main spring to which one end of the armature is secured, and a spring secured to the other end of said armature and having a contact point at its free end in register with the aperture in the said armature.

14. An induction coil having a vibrator comprising an armature, and a main spring to which one end of the armature is secured, and a spring on the said armature, and carrying a contact at one end, the other end of said spring having an extension forming an arm arranged at an angle to the body of the spring.

15. An induction coil having a casing, a vibrator carried by the casing, a spring on the said vibrator, having a contact point, the said spring having an extension at one end forming an arm, one end of said arm being adapted to engage the face of the casing, and an adjustable stop for engagement by the other end of said arm.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN McINTYRE.

Witnesses:
THEO. G. HOSTER,
JOHN P. DAVIS.