H. F. MAXIM.

CONNECTOR FOR ELECTRIC CONDUCTORS.

APPLICATION FILED AUG. 4, 1911.

1,039,422.

Patented Sept. 24, 1912.

Fig. 1

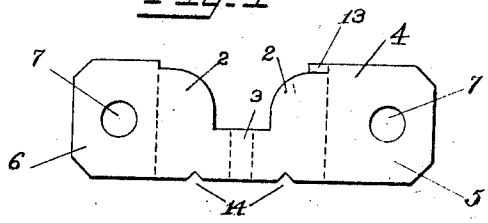


Fig. 2

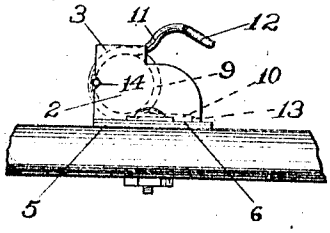


Fig. 3

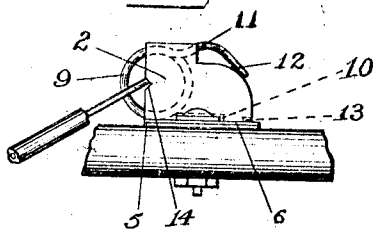


Fig. 4

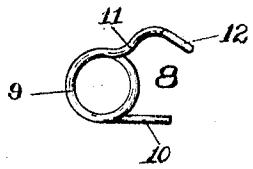


Fig. 5

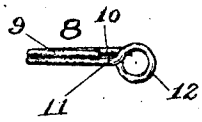


Fig. 6

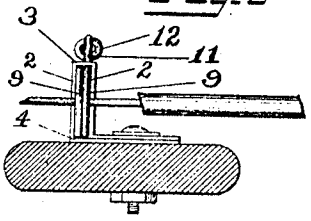


Fig. 7

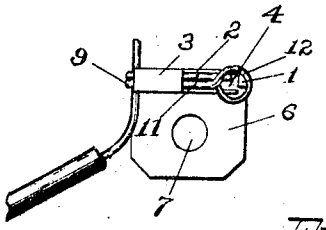


Fig. 8

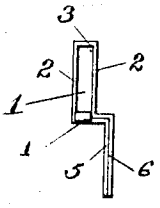


Fig. 9

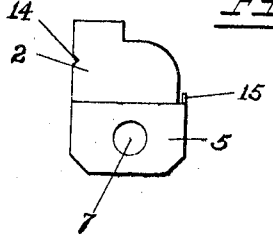
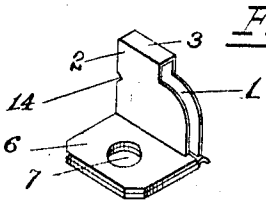


Fig. 10



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UNITED STATES PATENT OFFICE.

HOSEA F. MAXIM, OF NORFOLK, VIRGINIA, ASSIGNOR OF ONE-HALF TO OTTO WELLS, OF NORFOLK, VIRGINIA.

CONNECTOR FOR ELECTRIC CONDUCTORS.

1,039,422. Specification of Letters Patent. **Patented Sept. 24, 1912.**

Application filed August 4, 1911. Serial No. 642,396.

To all whom it may concern:

Be it known that I, HOSEA F. MAXIM, a citizen of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Connectors for Electric Conductors, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in connectors for electric conductors, and in particular to that type which may be permanently secured to a piece of electrical apparatus and for attaching to and detaching from a wire. The principal features to be considered in such a device are the ease with which a wire may be connected to a device, the rigidity with which the device grips the wire, and the expense of manufacture. In this connector the action of the spring in gripping or releasing the wire is instantaneous, the spring is so designed as to pull the wire rigidly against the frame of the device, and the cost of manufacturing is reduced to a minimum.

Referring to the drawing, Figure 1 is a plan view of the frame as stamped from a sheet of metal and before it is bent into shape; Fig. 2 is a side elevation of the connector attached to a carbon battery element; Fig. 3 is a side elevation of the device showing a wire secured within its grasp; Fig. 4 is a side elevation of the spring removed from the chamber in which it operates; Fig. 5 is a plan view of the spring removed from the device; Fig. 6 is an end view showing a wire secured to the device; Fig. 7 is a plan view showing a wire secured to the device; Fig. 8 is an end view of a modified form with the spring removed; Fig. 9 is a side elevation of the modification shown in Fig. 8; and Fig. 10 is a perspective view of a modified form of the device with the spring removed.

In the drawings the numeral 1 indicates in general the chamber or recess provided with two up-right walls 2, a top 3 and bottom 4. This chamber is formed from the blank, as illustrated in Fig. 1, by making the four right angle bends, as indicated by the dotted lines. The chamber thus formed is of rectangular shape, its long sides being perpendicular to the two extending tabs 5 and 6 in which holes 7 are formed for securing the frame to a piece of electrical apparatus. A spring indicated in general by the numeral 8 is in this, the preferred form of the device, shaped from a round piece of spring wire coiled once upon itself, forming a loop 9 from which one end 10 extends tangentially, the other end 11 extending radially from the loop 9 at a point approximately diametrically opposite the point at which the end 10 leaves the loop 9. This radial section of the end 11 projects a short distance away from the loop and is then bent at an obtuse angle into a finger-piece 12, which is made by bending the end into a loop in a plane perpendicular to the plane of the coil 9. A projection or stop is formed at one end of the bottom 4 of the chamber by any suitable means, as, for example, flattening the tab 13 over against the bottom 4. The spring 8 is then inserted by pressing the coil 9 first through the end in which the projection 13 is formed until the end 10 of the spring passes over the projection. The tangential portion 11 of the upper end of the wire will then press against the roof 3 and securely hold the spring within the chamber. By pressing downward on the finger-piece 12 the coil 9 will be slightly compressed and by the wedging action between the radial portion 11 of the spring and the roof of the chamber 3, the spring will be forced into the chamber until a portion of the coil 9 will extend beyond the walls 2. The wire can then be inserted across the ends of the walls and inside the coil 9 and will be securely gripped when the finger pressure is released and the coil expanding is retracted within the chamber.

A peculiar feature of this connector is the fact that due to the wedging effect of the radial portion 11 of the spring pressing outward against the end of the roof 3 the wire is drawn into contact with the ends of the walls instead of being pressed, as is the case of most connectors in this class, against a surface by direct action of a spring. The uncoiling effect of the spring is thereby multiplied causing the wire to be drawn more securely against the ends of the side walls than would otherwise be the case. Notches 14 are cut in the ends of the side walls 2 in direct line with the center of the coil 9 of the spring 8. The wire being gripped within the coil 9 is pressed within

these V-shaped notches and thereby more securely held than would be the case if the ends were perfectly smooth.

Figs. 8 and 9 show a modification in which the tabs 5 are bent downward so as to be more easily attached to the zinc shell of a dry battery. It will be noted also that in these two figures instead of forming a tab 13 over against the floor of the chamber, a projection 15 of the floor itself is bent upward to provide a stop for the end 10 of the spring.

Fig. 10 illustrates another modification in which the stop is formed by punching or pressing upward a portion of the floor itself. It is obvious that many other methods may be resorted to for forming this stop for the end of the spring and that other changes in the actual design can be made without departing from the spirit of the invention.

What I claim is:

1. In a device of the class described adapted to be attached to an electrical conductor, and to electrically connect a wire therewith, a metallic casing open at both ends, and a spring retained in said casing, said spring being formed with a coil normally within the casing but adapted on pressure being applied to one extremity to extend without the walls of the chamber and grip a wire between the walls of the chamber and the coil when pressure is removed.

2. In a device of the class described adapted to be attached to an electrical conductor, and to electrically connect a wire therewith, a metallic casing open at both ends, and a spring retained in said casing, said spring on being compressed, slidable longitudinally within the casing and adapted on being released to grasp a wire between the ends of the casing and a portion of the spring.

3. In a device of the class described adapted to be attached to an electric conductor, a wire, a metallic casing, and a spring contained therein, said spring being coiled at its intermediate portion, one end extending tangentially from the coil, the other end extending radially and positioned to be pressed against an edge of the casing, the coil being normally retained within the casing and when pressed at the top to encircle a wire and retain it against the ends of the casing.

4. In a device of the class described adapted to be attached to an electric conductor, a wire, a metallic casing, a spring contained therein, said spring being coiled at its intermediate portion one end extending tangentially from the coil, and a stop in said casing against which the longitudinal end of said spring abuts, the other end extending radially and positioned to be pressed against an edge of the casing, the coil being normally retained within the casing and when pressed at the top to encircle a wire and retain it against the ends of the casing.

5. In a device of the class described, an electric conductor, a wire, a casing, a coil spring slidably mounted within said casing along lines located in the planes of the coils, an extension on the spring formed at an acute angle to its line of motion and pressed into engagement with the said casing, a portion of the spring being adapted to engage the wire, the resiliency of said spring giving it a longitudinal motion and pressing the wire engaging portion of the spring against the wire.

6. The combination of a base, a member engaging the base and slidably mounted with respect to it, the said member being provided with a resiliently held upward inclined element, a stop for limiting the slidable movement of the member in one direction, a part mounted above the base in position to be engaged by the resiliently held element to maintain the said member in engagement with the base and normally in engagement with the stop, a stationary wire engaging means, a movable wire engaging means on the slidable member to coöperate with the stationary wire engaging means, and means for sliding the said member away from the stop to permit a wire to be inserted between the two wire engaging means, the said resilient element serving when the last said means is released to force the movable wire engaging means into engagement with the wire to hold it against the stationary wire engaging means.

7. In a device of the class described, an electric conductor, a wire, a casing of rectangular cross-section open at both ends, the lower portions of the longer walls of said casing extended at right angles to form tabs providing means for attachment to said electrical conductor, a spring slidably mounted within said casing, an extension on the spring formed at an acute angle to the line of motion and pressed into engagement with the said casing, a portion of said spring being adapted to engage the wire, the resiliency of said spring giving it a longitudinal motion and pressing the wire engaging portion against the wire.

8. In a device of the class described, an electrical conductor, a wire, a casing of rectangular cross-section open at both ends, the lower portion of the longer walls of said casing formed at right angles thereto to provide means for attaching to an electrical conductor, a spring slidably mounted within said casing, an extension on the said spring formed at an acute angle to its line of motion and pressed into engagement with the said casing, a portion of said spring being adapted to engage the wire, the resiliency of said spring giving it a longitudinal motion and pressing the wire engaging portion

of the spring against the wire, and means for limiting the longitudinal motion of the spring in both directions.

9. In a device of the type described adapted to be attached to an electrical conductor and to electrically connect a wire therewith, a casing, a coil spring retained in said casing, said spring when being compressed slidable bodily within the casing along lines located in the planes of the coils and adapted on being released to grasp a wire between a portion of the spring and the casing.

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

HOSEA F. MAXIM.

Witnesses:
N. CURTIS LAMMOND,
GEORGE E. EDELIN.