J. H. BECKER AND W. S. BELLOWS.

ELECTRICAL CONNECTOR.

APPLICATION FILED NOV. 30, 1917.

1,326,632. Patented Dec. 30, 1919.

Fig. 1.

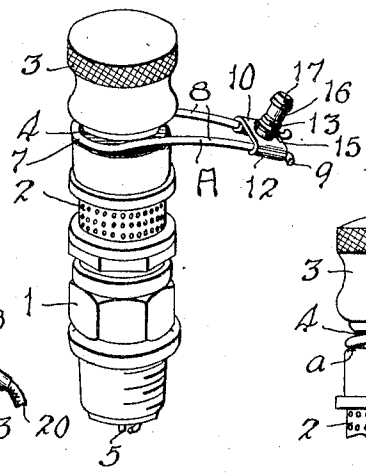


Fig. 3.

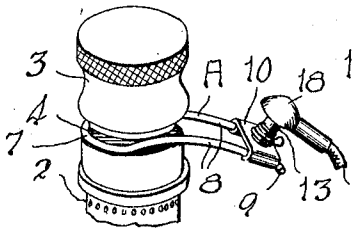


Fig. 2.

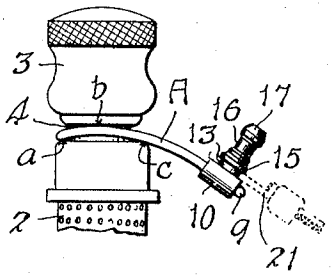


Fig. 6.

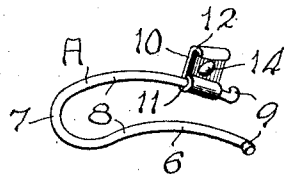


Fig. 4.

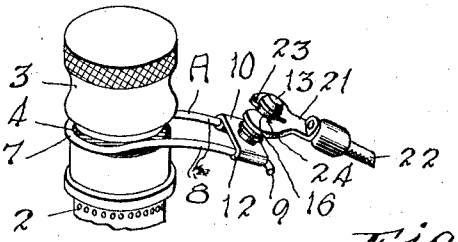


Fig. 5.

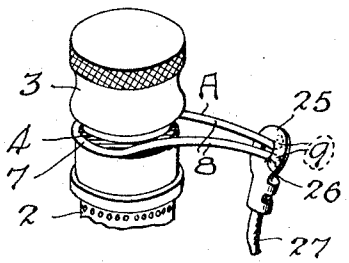
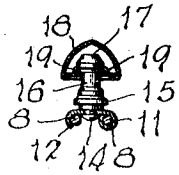


Fig. 7.



John H. Becker
Warren S. Bellows
Inventors

By William P. Hammond
Attorney

UNITED STATES PATENT OFFICE.

JOHN H. BECKER, OF PHILADELPHIA, PENNSYLVANIA, AND WARREN S. BELLOWS, OF WORCESTER, MASSACHUSETTS.

ELECTRICAL CONNECTOR.

1,326,632. Specification of Letters Patent. Patented Dec. 30, 1919.

Application filed November 30, 1917. Serial No 204,613.

To all whom it may concern:

Be it known that we, JOHN H. BECKER, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, and WARREN S. BELLOWS, a citizen of the United States, residing in the city of Worcester, county of Worcester, and State of Massachusetts, have invented certain new and useful Improvements in Electrical Connectors, of which the following is a specification.

The present invention relates in general to certain new and useful improvements in electric wire cord terminal attaching devices for electric machines, tools and instruments, and more particularly to a device for adapting electric wire cord terminals to be attached to spark plugs, one object of the invention being to provide a device of this character which embodies novel features of construction whereby a cord terminal of any conventional type can be attached to a spark plug of practically any modern construction.

Further objects of the invention are to provide a device of the character described which is comparatively simple and inexpensive, which can be applied to practically any conventional spark plug, and to which a cord terminal can be easily and quickly attached.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which:—

Figure 1 is a perspective view of a spark plug showing a device constructed in accordance with the invention applied thereto.

Fig. 2 is a side elevation of the upper end of the spark plug, with the device applied.

Figs. 3, 4 and 5 are perspective views of the upper end of a spark plug having the device constructed in accordance with the invention applied thereto, and showing the manner of attaching the various conventional types of cord terminals.

Fig. 6 is a detached perspective view of the device embodying the invention.

Fig. 7 is a transverse vertical sectional view through the clamping plate, and showing one form of cord terminal applied to the terminal stud.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The invention is especially intended for use with a particular construction of spark plug, as illustrated on the drawing, which owing to its peculiar design can not be provided with the usual wire cord terminal binding post, but it will be understood that the invention can be as readily used on other spark plugs and on the binding posts of other electric machines, tools and implements.

Referring to the drawings, the numeral 1 designates the body of a spark plug the upper end of which is provided with a spark adjuster and intensifier 2 which is operated by a rotatable finger piece 3. The construction of the spark plug is immaterial to the present invention, and it is accordingly not deemed necessary to further describe the same. The upper end 2 of the spark plug 1 is formed with an annular groove 4 which for convenience in the present instance is arranged between the finger piece 3 and the body of the spark plug, although it could as well be formed elsewhere on the spark plug so long as the part bearing the groove is in electrical contact with the sparking point 5 of the plug.

The device embodying the invention comprises a single piece of spring wire 6 which is looped at the center of its length, as indicated at 7, to form a substantially U-shaped spring clip A having two substantially parallel arms 8 normally tending to spring apart, the free ends of which are bent laterally at 9. This spring clip is adapted to be fitted within the annular groove 4 of the spark plug 1 with the arms 8 thereof straddling the plug. With reference to Figs. 2 and 6 of the drawings, it will be noted that the arms 8 of the clip A are also upwardly and longitudinally curved. With this construction when the clip is in operative position each of the arms 8 obtains a firm bearing upon both the upper and lower edges of the groove 4. The loop 7 of the spring clip firmly bears on the lower edge of the groove 4 at *a*, from which each arm extends diagonally upward across the groove 4 and tightly engages the upper edge of the groove at *b* then extending downwardly diagonally across the groove to obtain a bearing on the

lower edge of the groove at *c*, opposite the loop 7. Thus the clip is held by spring action and frictional engagement with the groove 4 in a snug engagement with the plug, and is prevented from accidental displacement or rattling.

A clamping or locking plate 10 is pivotally secured to one arm 8 of the clip A by means of an eye 11 formed at one edge of the plate which is adapted to loosely receive the said arm 8 of the clip. The opposite edge of the clamping plate 10 is bent downwardly to form a hooked flange 12 which is adapted to snap over the other arm 8 of the clip, as indicated by Figs. 1 and 7 of the drawing. The laterally bent ends 9 of the arms 8 prevent the plate 10 from sliding off the arms 8, while the spring action of the arms tending to spread them apart holds the clamping plate 10 rigidly thereon to prevent wabbling or swinging thereof. On the other hand, the plate 10 prevents the clip from being accidentally slipped off the plug, and draws the arms 8 into a snug engagement with the groove 4 on the plug.

A terminal stud 13 is rigidly secured to the clamping plate 10, said stud having its lower end inserted through an opening in the clamping plate and then upset, as indicated at 14. An annular rib or shoulder 15 is formed on the said stud and is slightly spaced from the top of the clamping plate 10, above which flange the stud is formed with a substantially cylindrical portion 16, the upper end of which terminates in an enlarged head 17. The stud 13 serves as a binding post for certain forms of electric wire cord terminals, and also as a handle for manipulating the clamping plate. In applying the device to a spark plug, the hooked portion of the clamping plate is disengaged from its corresponding arm 8 of the clip A and swung upwardly, as indicated by Fig. 6. The clip is then forced into the groove 4 of the spark plug with the arms 8 thereof straddling the plug, as indicated by Fig. 1, after which the clamping plate is swung down and the hooked flange 12 snapped over the arm 8 of the clip.

The enlarged head 17 of the stud 13 is adapted to receive the conventional cord terminal which is constructed to spring over a ball or enlarged end of the binding posts of certain conventional spark plugs. Such a cord terminal is illustrated by Figs. 3 and 7 of the drawing, and is provided with a conical or hemispherical shell or body 18 across the mouth of which extend two spring locking wires 19, the electric wire or cord 20 being attached in any suitable manner. The shell 18 is forced down over the enlarged head 17 of the stud 13, and the locking wires 19 spring over the head and snap under the same as shown by Fig. 7 to hold the terminal in position.

The usual split type of cord terminal, as illustrated by Fig. 4, may be fitted upon the cylindrical portion 16 of the stud 13, if desired, but it is preferable to attach the same to the stud between the annular rib 15 and the clamping plate 10, as shown by dotted lines on Fig. 2. This type of cord terminal comprises a plate 21 to one end of which the electric wire or cord 22 is attached, the other end of the plate being provided with a slit 23 of a width at its outer end slightly less than the diameter of the binding post to which it is to be applied, and at its inner end with an opening 24 which communicates with the slit 23, and is of a diameter substantially the same as the binding post. In applying this type of cord terminal the stud 13 is forced through the slit 23 and into the opening 24 of the plate, the metal springing outwardly to allow the stud to pass through the slit 23.

The standard type of cord terminal is attached to the device embodying the invention in the manner shown by Fig. 5. This type of cord terminal comprises merely a plate 25 having an opening 26 therein, the electric wire or cord 27 being secured to the plate in any desired manner. The ends of the arms 8 of the spring clip A are pressed together and inserted through the opening 26 of a terminal plate 25, the arms then springing outwardly against the sides of the opening 26, and the laterally bent ends 9 of the arms 8 serving to prevent the terminal plate from becoming disengaged from the clip. The clamping plate 10 can be entirely removed from the clip, as shown by Fig. 5, pushed upwardly from the ends of the arms 8 to allow the terminal plate 25 to be attached, or swung upwardly out of the way, as indicated by Fig. 6.

From the above explanation it will be seen that any conventional construction of cord terminal can be easily attached to a spark plug which is not provided with a conventional binding post, or that a spark plug provided with a specific construction of binding post adapted for use with only one kind of cord terminal can be readily adapted for use with any conventional type of cord terminal.

While we have shown several embodiments of the invention for the purpose of illustrating the principles thereof, we do not wish to be limited thereto, as the invention is susceptible of many modifications and changes without departing in any manner from the spirit thereof, and we desire to claim broadly the principles of the invention in whatever form they may be embodied.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent, is:—

1. A device of the character described, in-

cluding a spring clip having a U-shaped portion adapted to straddle and grip a binding post, a locking plate applied to the clip and engaging opposite sides thereof to hold the clip in position, and a stud projecting from the plate and adapted to detachably engage a wire cord terminal.

2. A device of the character described, including a resilient clip formed with a U-shaped portion adapted to straddle and grip a binding post, locking means connecting the ends of the clip to hold the clip in operative position, and means upon the connecting means for detachably engaging a standard wire cord terminal.

3. A device of the character described, including a resilient U-shaped clip adapted to straddle a binding post, the arms of the clip terminating in hooked extremities adapted to enter and yieldably engage the eye of a circular cord terminal, and connecting means joining the arms of the clip to hold it in position, said connecting member being provided with means for detachably engaging another form of cord terminal.

4. A device of the character described, including a resilient U-shaped clip adapted to straddle a binding post, the arms of the clip having hooked extremities which are adapted to enter and engage the eye of a circular cord terminal, a connecting member joining the arms of the clip and held in operative position by the resiliency of the clip, and a stud projecting from the connecting member for detachably engaging another form of cord terminal.

5. A device of the character described, including a resilient clip having a formed portion adapted to straddle a binding post and provided with portions adapted to detachably engage one form of standard wire cord terminal, and means carried by the clip for detachably engaging another standard form of cord terminal.

6. A device of the character described including a spring clip adapted to be applied to a binding post, said clip being of a U-shaped formation with its arms straddling the binding post, the said arms of the clip being adapted to receive one form of cord terminal, and a member carried by said spring clip and adapted to receive another form of wire cord terminal.

7. A device of the character described including a spring clip adapted to be applied to a binding post, said clip being of a U-shaped formation with its arms straddling the binding post and tending to spring apart, a plate mounted on said clip and held in position thereon by the spring action of the arms of the clip, and means carried by the plate for receiving a wire cord terminal.

8. A device of the character described including a spring clip adapted to be applied to a binding post, said clip being of a U-shaped formation with its arms straddling the binding post and tending to spring apart, a plate pivotally connected at one of the edges thereof to one of the said arms of the clip, and being provided at the other edge thereof with a hooked flange adapted to snap over the other of said arms of the clip, and means carried by the said plate for receiving a wire cord terminal.

9. A device of the character described including a spring clip adapted to be applied to a binding post, said clip being of U-shaped formation with its arms straddling the binding post and tending to spring apart, a plate pivotally mounted at one edge thereof to one of the said arms of the clip, and being provided at its opposite edge with a hooked flange adapted to snap over the other of said arms of the clip, and a terminal stud carried by said plate and adapted to receive a wire cord terminal.

JOHN H. BECKER.
WARREN S. BELLOWS.