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The present invention relates to receptacles for electrical attachment plugs and in particular to a connector body having an automatic locking means for holding a prong of an attachment plug therein. Thus, the plug may only be removed from the connector body by first manually setting the position of the locking means to release its hold, on the prong of the plug so that the plug may be withdrawn in the usual manner.

While the invention disclosed herein is believed to have general utility in the art of electric wiring devices where an electrical connection is to be made between an attached plug and a mating receptacle, it will be described and illustrated hereinafter as it is used in a grounding type cord connector body. However, it should be appreciated at the outset that the locking means of this invention may be used to advantage in many different applications which are not specifically mentioned herein without departing from the true spirit and scope of this invention.

In the past, the problem of preventing the separation of an attachment plug from a mating receptacle or cord connector body has been solved in most cases by using attachment plugs with special prongs and contact members respectively, and these have through the years proved to be very acceptable and reliable in operation. One of their biggest drawbacks, however, is that standard types of attachment plugs may not be used in such an arrangement in place of these special plugs. This fact emphasizes one of the main advantages in using a receptacle having the locking means of this invention for it is designed to accept a standard attachment plug which in the present example is a three-prong grounding plug, although it should be apparent that this invention would be of equal utility when used with other types of attachment plugs.

A cord connector body embodying the present invention comprises a hollow housing having a base member and a cover member with a plurality of contact members mounted in the base for making electrical connections with the prongs of an attachment plug. A recessed cover member is applied over the base to enclose the contacts therein, and one wall of the cover contains a series of apertures which are in alignment with the said contact members. The prongs of an attachment plug are inserted through the said apertures in the cover to be in electrical engagement with the underlying contact members.

The locking means for clamping the attachment plug in the connector body comprises a pivoted locking cam arranged within the housing with its inner end adapted for engagement with one of the prongs of the attachment plug. The outer end of the cam extends through a slot in one wall of the housing and a spring member is provided in the housing for normally biasing the inner end of the cam to overlie one of the prongs receiving apertures in the cover. As the attachment plug is inserted in the connector body through the apertures in the cover member one of its prongs will deflect the locking cam so that it rotates about its pivotal axis against the resistance provided by the spring. When a force is exerted against the attachment plug to withdraw it from the connector body, the inner end of the locking cam will be rotated in an opposite direction so that it wedges the prong of the plug against an inner wall of the housing. The greater the pulling force, the stronger the locking cam grips the prong, thereby providing a positive clamping action between the attachment plug and the connector body.

The cord connector body of this invention also provides a novel means for securing the cover member of the connector body to the base member. This means comprises a combined cord grip and assembly device for the connector body which will be explained in greater detail hereinafter.

The principal object of this invention is to provide an attachment plug receptacle with an automatic locking means for holding the attachment plug connected therein.

A further object of this invention is to provide an attachment plug receptacle with a locking cam that must be manually set before an attachment plug may be removed from the receptacle.

A further object of this invention is to provide a novel means for supporting a pivoted locking cam in an attachment plug receptacle.

A further object of this invention is to provide a simple and reliable means for holding the housing parts of a cord connector body in an assembled relation.

My invention will be better understood from the following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

Figure 1 is an enlarged view of a cord connector body embodying my invention with a grounding attachment plug inserted therein.

Figure 2 is a left-hand view of the cord connector of Figure 1.

Figure 3 is a side view of the cooperating cord connector and attachment plug of Figure 1.

Figure 4 is a right-hand end view of the cord connector of Figure 3 with the attachment plug removed.

Figure 5 is a cross-sectional view taken through the longitudinal center line of the cord connector of Figure 3 with the attachment plug removed.

Figure 6 is a cross-sectional view similar to Figure 5 showing in addition the action of the locking cam when the prongs of an attachment plug are inserted in the connector body.

Figure 7 is a cross-sectional view taken on the lines 7-7 of Figure 6.

Referring in detail to the drawing, Figure 1 shows a standard three-prong grounding plug 10 inserted in a cord connector body 11 which embodies the present invention. The cord connector body 11 comprises a hollow housing of suitable molded insulating material formed by a base 12 and a cover member 13. Securely mounted in the base member 12 are a pair of circuit contact members 14 and a grounding contact 15 as is best seen in Figures 6 and 7. The end wall 16 of the base 12 is provided with a central opening 17 so that an electrical cord may be inserted therethrough. The grounding contact 15 is secured in the base 12 by means of a rivet 18. The rivet 18 serves the double function of supporting the grounding contact 15 as well as serving as an anchor means for one segment 19 of a metal cam grip 20 provided on the end of the connector body 11 as best seen in Figure 2. The cord grip 20 consists of two segments 19 and 21 which are fastened together by means of the screws 22 so that an electrical cord (not shown) may be clamped therebetween. The outer surface of the end wall 16 of the base member 12 is
provided with a diagonal groove 23 to cooperate with the head of the rivet 18. Each segment 19 and 21 of the cord grip 20 is provided with a lateral extension, 24 and 25 respectively, to engage in the diagonal groove so that the single rivet 18 may extend through an elongated slot 26 in the lateral extension 24 whereby the position of the cord grip may be adjusted to accommodate different sizes and shapes of electrical cords.

The cover member 13 is of hollow construction to fit over the contact members 14 and 15 of the base for the base a hollow housing. The cover member 13 is generally circular in cross-section except that it has a pair of diametrically opposite flint side walls 30 extending for substantially the full length of the cover. As a result of the walls 30 a pair of shoulders 31 are formed on the cover member 13 adjacent the base 12. On the opposite ends of the segment 21 of the cord grip 20 are provided a pair of hook arms 32 which are adapted to extend over the shoulders 31 to support the cover 13 on the base 12 when the screws 22 are used to fasten the two segments 19 and 21 of the cord grip 20 in place. Thus, it will be seen that the cord connector 11 may be disassembled by first removing the screws 22 so that the segment 21 of the cord grip 20 may be separated from segment 19 and slid out of the groove 23 of the base 12 to disconnect the arms 32 from the shoulders 31 of the cover member 13. Then the cover 13 may be easily removed from the base 12 so that an electrical cord may be inserted through the opening 37 in the base and the bare conductors of the cord connected to the contact members 14 and 15 by the usual screw terminals 14' and 15'. After an electrical cord is connected to the contact members of the base 12 the cord connector is assembled by first placing the cover 13 over the base 12 and then sliding the segment 21 of the cord grip 20 into the groove 23 so that the arms 32 will engage around the shoulders 31 of the cover 13, and finally by threading the screws 22 through segment 21 and into the segment 19 of the cord grip.

Turning now to a more detailed description of the locking means within the cord connector body 11, particular attention is directed to Figures 5–7 of the drawing. A pair of two closely-spaced wall projections 40 are formed on the inner surface of the end wall 41 of the cover 13, while a pair of prong-receiving apertures 42 are formed in the end wall 41 to be in alignment with the inner wall projections 40 located therebetween. A third prong-receiving aperture 43 is situated in the end wall 41 to be in alignment with the grounding contact 15 of the base 12. The space between the parallel wall projections 40 may be considered as lying in a plane which also includes the longitudinal axis of the grounding contact 15. Parallel grooves 44 are formed on the inner surfaces of the wall projections 40 for a reason which will be further explained hereinafter.

The locking means of the present invention comprises a cam 45 provided with a pivot pin 46 adjacent the center thereof with the opposite ends of the pin serving as trunnions to support the cam in the cover member 13. To assemble the cam 45 in the cover 13, the pin 46 is placed in the grooves 44 until the pin is seated against the end walls of the grooves which act as bearings for the trunnion-like ends of the pin. A self-tapping screw 47 is then threaded into the grooves 44 until it bears against a rounded side edge 48 of the cam to permit the cam to freely pivot about the axis of the pin 46. Particular attention should be given to the fact that the inner end 50 of the cam 45 overlies the opening 43 for receiving the grounding prong of an attachment plug as is best shown in Figures 4 and 5. The outer end 51 of the cam 45 extends through a slot 52 in one side of the cover 13 so that the position of the cam may be manually set for effecting the withdrawal of the attachment plug from the connector body. A generally V-shaped spring member 53 made from strip material is seated between the projections 54 on the interior base of the end wall 41 so that the spring may press against the outer end of the cam 45 to normally bias the inner end 50 of the cam to overlie the opening 43 for receiving the grounding prong of an attachment plug.

Accordingly, it will be readily understood by one skilled in this art that when an attachment plug such as 10 is inserted into the cord connector 11 of the present invention, the grounding prong 60 of the plug will deflect the inner end 50 of the cam 45 in a clockwise direction as is seen in Figure 5 against the resistance provided by the spring 53 until the parts are as shown in their normal connected position of Figure 6. The inner end 50 of the pivoted cam 45 is provided with sharp projections 61 for gripping the surface of the prong 60. It should also be clear that when an attempt is made to withdraw the attachment plug 10 from the connector body 11 the outward movement of the prong 60 will tend to pivot the cam 45 in a counterclockwise direction which will only force the inner end 50 of the cam to wedge the prong against an inner side wall of the cover 13. As a practical matter, it is impossible to pull the attachment plug 10 from the connector body 11 without first setting the position of the locking cam 45 by pressing against the outer end 51 of the cam to hold it against the pivoting action afforded by the spring 53, and when the position of the locking cam 45 is manually set, the plug 10 may then be withdrawn from the connector body with ease.

Consequently, having described my invention of a locking means provided in an attachment plug receptacle well as a cord connector body, as it would be readily apparent to those skilled in this art that I have provided a reliable means for engaging one of the prongs of an attachment plug so that it may not be disengaged from the receptacle without first manually setting the position of the locking means. I have also provided a simple spring means for holding the locking cam in position to engage with the prong of the attachment plug so that the locking means is operated by merely inserting the plug into the receptacle. Likewise, I have provided a simple means for pivotally supporting and holding the locking cam in the connector body, although it should be recognized that it would not always be necessary to provide a separate cam member and spring member for in some applications the cam could be made of resilient spring material as long as it remained possible to manually set the position of the locking cam so that the plug may be easily withdrawn from the receptacle. The simplicity of the means for supporting the locking cam in the connector body is also carried through to the assembly means for the connector body which is formed as part of the cord grip mounted upon the end wall of the assembly, thereby eliminating the necessity of using several additional fastening screws and saving the cost of the labor necessary to assemble the connector body in such a manner.

Modifications of this invention will occur to those skilled in this art and it is to be understood, therefore, that this invention is not limited to the particular embodiments disclosed but that it is intended to cover all modifications which are within the true spirit and scope of this invention.

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

1. A receptacle for an attachment plug having a locking cam for wedging engagement with one of the prongs of the plug, a pair of partitions formed in the receptacle each with a complementary groove, a pair of trunnions on the cam which are positioned in the complementary grooves, and a fastening member assembled between the partitions to hold the trunnions in place so that the locking cam is limited to rotational movement.

2. A receptacle as recited in claim 1 wherein the fas-
A screw is a fastening member threaded between the opposed grooves of the partitions so that the rounded edge of the cam cooperates with the end of the screw so that the desired pivotal movement of the cam is not obstructed by the screw.

6. An electrical cord connector as recited in claim 5 wherein the locking cam has a rounded end that is generally concentric with its pivotal axis for cooperation with the said fastening member.

7. An electrical cord connector as recited in claim 6 wherein the said fastening member is a screw that is threaded between the opposed grooves of the partitions so that the rounded edge of the cam cooperates with the end of the screw so that the desired pivotal movement of the cam is not obstructed by the screw.

8. An electrical cord connector for an attachment plug comprising a hollow housing of insulating material formed by a base and a cover member, an aperture in the base for receiving an electrical cord that is to be fastened in the connector, and a combined cord grip and assembly means including two clamping members, one of which is attached to the outer surface of the base while the other clamp is arranged to be fastened to the first clamp so as to grip the cord therebetween, the second clamp also containing hook members which extend around shoulders formed on the cover member of the connector to hold the parts in an assembled relation.

9. An electrical cord connector for an attachment plug comprising a hollow housing with a base and a cover member having mounted therein a plurality of contact members for making electrical connection with the prongs of an attachment plug, the base of the housing having an aperture in one wall for receiving an electrical cord that is to be joined to the contact members within the housing, and a combined cord grip and assembly means positioned on the said wall of the base, said means comprising two clamping members, each with a cord engaging portion and a lateral extension, and a diagonal groove formed in the said wall of the base for receiving the lateral extensions of the two clamping members, and a fastening member extending through the lateral extension of one of the clamps for holding it in place on the base, the second clamp being fastened on the first clamp by a screw means extending through the cord engaging portions of the clamps, the second clamp also having hook arms which extend around shoulders formed on the cover member of the connector housing to hold the parts in an assembled relation.

10. An electrical cord connector as recited in claim 9 wherein the lateral extension of the first clamp has an elongated slot for receiving the said fastening member so that the cord grip is adjustable mounted on the base of the connector for accommodating different sizes and shapes of cords.

References Cited in the file of this patent

UNITED STATES PATENTS
1,891,153 Gates December 13, 1932

FOREIGN PATENTS
446,216 Great Britain April 27, 1936