July 7, 1942. J. F. BEAL 2,289,172

CONNECTOR

Filed March 9, 1940

Fig. 1.

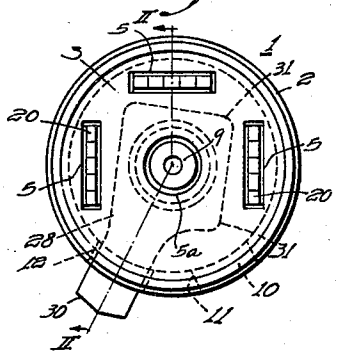


Fig. 2.

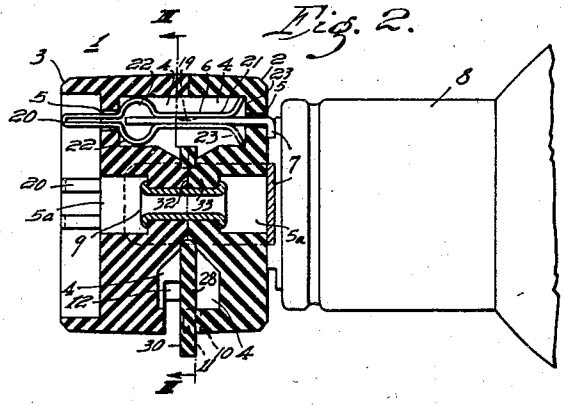


Fig. 3.

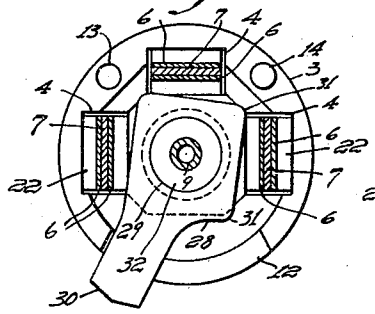


Fig. 4.

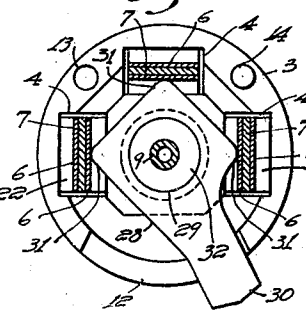


Fig. 5.

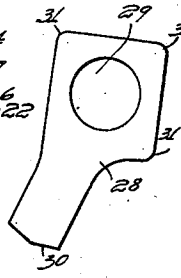


Fig. 6.

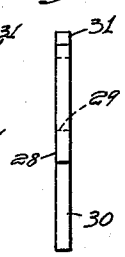


Fig. 8.

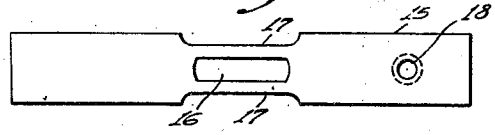


Fig. 11.

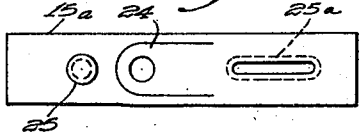


Fig. 9.

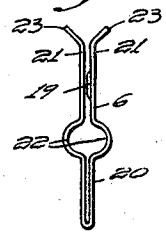


Fig. 10.

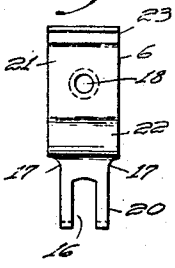


Fig. 7.

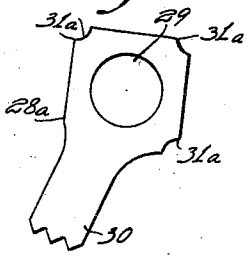
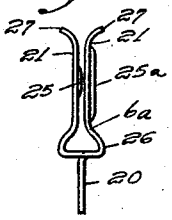


Fig. 13.

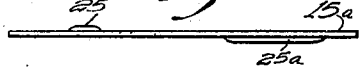


WITNESSES:

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Fig. 12



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Patented July 7, 1942 2,289,172

UNITED STATES PATENT OFFICE

2,289,172

CONNECTOR

James F. Beal, Bridgeport, Conn., assignor to The Bryant Electric Company, Bridgeport, Conn., a corporation of Connecticut

Application March 9, 1940, Serial No. 323,204

7 Claims. (Cl. 173—328)

My invention relates, generally, to connectors, and more particularly, to electrical connectors for automobile headlamps and the like.

The object of my invention, generally stated, is to provide an electrical connector which is of simple and rugged construction, inexpensive to manufacture, and which may be readily assembled and installed.

A more specific object of my invention is to provide an electrical connector for an electric lamp having contact terminals of the prong type which will securely hold the lamp in good electrical contact.

A further object of my invention is to provide an electrical connector having a contact locking device which securely locks the terminals of the lamp in the connector.

These and other objects of my invention will become apparent from the following description when read in conjunction with the accompanying drawing, in which

Figure 1 is a bottom plan view of a connector constructed in accordance with my invention;

Fig. 2 is a view, in section, along the line II—II of Fig. 1 of an assembled connector of a preferred embodiment of my invention showing a partial view of an electric lamp inserted into the connector;

Fig. 3 is a view in section along line III—III of Fig. 2 showing one element of the casing, the contact members in section and a contact actuating cam in the open position;

Fig. 4 is a view similar to Fig. 2 showing the actuating cam in the closed position;

Fig. 5 is a plan view showing a preferred construction of a cam utilized in the electrical connector of my invention;

Fig. 6 is a view in side elevation of the cam shown in Fig. 5;

Fig. 7 is a plan view of a modified form of the cam shown in Fig. 5;

Fig. 8 is a plan view of a blank, from which a contact member utilized in my connector is formed;

Fig. 9 is a view of the contact member formed from the blank shown in Fig. 8;

Fig. 10 is a view in side elevation of the contact member shown in Fig. 9;

Fig. 11 is a plan view of a blank, from which a modification of a contact member utilized in my connector is formed;

Fig. 12 is a view in side elevation of the contact blank shown in Fig. 11; and

Fig. 13 is a view of a modified form of contact member formed from the blank shown in Figs. 11 and 12.

Referring to Figs. 1, 2, 3 and 4 of the drawing, the connector, according to my invention, comprises a connector 1 of molded insulating material constructed in two portions, a cover portion 2 and a base portion 3. The cover portion 2 and the base portion 3 are provided with channels 4 and openings or cavities 5 and 5a molded in the bodies thereof for reception of contact members 6, contact-prongs 7 of a lamp 8 and an assembling rivet or bolt 9.

The cover portion 2 of the casing 1 is also provided with an arcuate slot 10 molded in the underside of the rim portion thereof. The slot 10 is provided with an integrally molded boss or lug 11, located intermediate the ends of the slot. The base portion 3 of the casing 1 is also provided with an arcuate slot 12 molded in the rim of the upper side thereof. The slot 12 registers with the slot 10 in the cover portion 2 when the two portions 2 and 3 of the casing 1 are assembled. The rims of the cover and base portions 2 and 3 of the casing 1 are also provided with holes 13 and bosses 14 molded thereon, the bosses 14 registering with the holes 13 when the two portions 2 and 3 are assembled in order to hold the two portions 2 and 3 in alignment.

The contact members 6 used in my novel connector and shown in Figs. 2, 3, 4, 9 and 10 may be formed from blanks 15 shown in Fig. 8. The blank 15 shown in Fig. 8 is provided with an elongated opening 16 in the center thereof and cutout portions 17 in each side or edge of the blank 15. At one end of the blank 15 there is formed an indentation 18, which forms a boss or protruding portion 19 on the other side of the blank 15. The blank 15 is bent or formed into a substantially U-shaped contact member 6. In forming the contact member 6 from the blank 15, the elongated opening and the cutout portions 17 form a terminal or soldering lug 20 at one end of the contact member 6. During the forming operation of the contact member 6, the side walls 21 are slightly bulged or deformed in an outward direction with respect to the space between the walls 21, as shown at 22. The bulge or deformation 22 is to provide resiliency of the contact walls 21. Also during the forming operation of the contact member 6, the ends of the walls 21 are bent or flared outwardly, as shown at 23. The flared portion is to facilitate the entrance of the prongs 7 of the lamp 8 into engagement with the side walls 21 of the contact member 6. The boss 19 in the side wall 21 of the contact member 6 is provided to register with a corresponding opening in the prong 7 of the lamp 8, the purpose of which will be more fully explained hereinafter.

This type of contact member is preferably used in my connector in conjunction with the form of cam member 28 shown in Figs. 1, 2, 3, 4, 5 and 6, wherein the cam member 28 is held in closed or locked position by the boss 11 in the slot 10 in the cover portion of the casing 1, as will be more fully described hereinafter.

A modified form of contact member 6a, as shown in Fig. 13, is formed in a similar manner as that previously explained, from the blank 15a shown in Figs. 11 and 12.

This modified form of contact member 6a is preferably used in my connector in conjunction with the form of cam member 28a shown in Fig. 7, the combined action of the modified form of contact member 6a and the cam 28a constituting a modified form of locking means as distinguished from that shown in Figs. 1, 2, 3, 4, 5 and 6 of the drawing.

There is, however, a slight departure in the modified form of contact member 6a from that shown in Figs. 8, 9 and 10, in that the soldering lug 20 is formed from a partially punched portion 24 in the body of the blank 15 and further that indentations or deformations 25 and 25a of dissimilar shapes are formed on opposite sides of the blank 15a, which, after the contact member 6a is formed, as shown in Fig. 13, appear in opposite walls 21 thereof. The elongated deformation 25a is provided to cooperate with the cam surfaces 31a in cam member 28a. This modified form of contact member also has a deformed portion 26 and a flared portion 27 formed therein for the purpose as explained in connection with the contact member shown in Figs. 9 and 10.

Either type of contact member 6 or 6a may be utilized in my novel connector, however, the type shown in Figs. 9 and 10 is shown in the sectional view of the assembled connector as shown in Fig. 2.

In order to actuate the walls 21 of the contact members 6 into good electrical contact engagement with the prongs 7 of the lamp 8 and further to lock the lamp prongs 7 into the connector 1, a cam member 28, shown in assembled position in Figs. 1, 2, 3 and 4, and in detailed views in Figs. 5 and 6, is provided.

The cam member 28 is provided with an opening or bearing portion 29 in the body portion thereof, a protruding or handle portion 30 and cam surfaces 31. The cam surfaces 31 on the cam 28 are shown in Figs. 5 and 6 as being formed by rounding the corners of the cam member 28 and thus presenting a continuous cam surface.

In assembling and operating my novel connector, the contact members 6 are inserted into the channels 4 of the base 3 of the casing 1, the terminal lugs 20 extending through the openings 5. The cam member 28 is then placed in position, the opening 29 registering with a corresponding bearing portion 32 on the base 3. In placing the cam member 28, the handle portion 30 is positioned in the arcuate slot 10 and extends beyond the base 3.

The cover 2 is then placed on top of the base 3 and is aligned therewith by the holes 13 and bosses 14. In this position the channels 4 in the cover 2 register with the channels 4 in the base 3 and with the upper portions of the contact members 6. The under surface of the cover 2 is provided with a bearing portion 33 similar to the bearing portion 32 and fits into the bearing 29 of the cam member 28, thus holding the cam member 28 within the casing. A suitable rivet or bolt 9 is then inserted through the central openings 5a in the two portions 2 and 3 of the casing 1, thereby securing the component elements into a unitary structure.

When using a connector constructed in accordance with my invention, utilizing the preferred type of contact member 6 shown in detail in Figs. 9 and 10, and the cam member 28 shown in detail in Figs. 5 and 6, an electric lamp 8 having prong-type terminals 7 is inserted into the contact openings 5 of the connector. The prongs 7 of the lamp 8 are provided with indentations or holes which, when the prongs 7 are inserted into the contact members 6, register with the indentations or deformations 19 in the contact members 6.

When the lamp terminals 7 are fully inserted into contact engagement with the contact members 6, the cam 28 is rotated in a counter-clockwise direction, as shown in the drawing, from the position shown in Fig. 3 to the position shown in Fig. 4. When the cam 28 is being rotated the cam surfaces 31 engage the inner walls of the contact members 6 and force them into engagement with the prongs 7 of the lamp 8. This operation causes the deformations 19 to engage the corresponding deformations or holes in the prongs 7 of the lamp 8 and thereby locks the lamp 8 in the connector as well as providing excellent electrical contact between the elements.

When moving the cam 28 from the open position shown in Fig. 3 to the closed position shown in Fig. 4, the cam 28 is moved through the arcuate slots 10 and 12 formed by the assembly of the casing portions 2 and 3 until it reaches the boss 11 extending downwardly from the arcuate slot 10 in the casing portion 2. The handle 30 of the cam 28 being of semi-resilient material, such as insulating fiber, is slightly bent in a downward direction with respect to the boss 11 and movement of the cam 28 continues in a counter-clockwise direction as shown in the drawing until the handle 30 of the cam 28 passes the boss 11. In this position the walls of the contact members 6 are completely compressed against prongs 7 of the lamp 8 and the cam 28 is locked in closed position by the boss 11, thereby locking the lamp 8 in the connector 1.

In order to remove the lamp 8 from the connector 1, the handle 30 of the cam 28 is bent downwardly and rotated in a clockwise direction as shown in the drawing, past the boss 11 to the open position, as shown in Fig. 3. In this operation the cam surfaces 31 of the cam 28 disengage the contact members 6, permitting free movement of the prongs 7 of the lamp 8 within the contact members 6, thus allowing the lamp 8 to be removed from the connector 1.

The modified form of cam member 28a shown in Fig. 7 is utilized with the modified form of contact member 6a shown in Fig. 13. The cam member 28a having arcuate shaped notches 31a in the body thereof is adapted to engage the elongated deformations 25a in the modified form of contact member 6a.

When using a connector constructed in accordance with my invention, utilizing the modified form of contact member 6a and the modified form of cam member 28a, as previously explained, the terminals 7 of the lamp 8 are inserted into the connector, the holes or deformations in the terminals 7 engaging the deformations 25 of the contact member 6a.

When the lamp terminals are fully inserted into contact engagement with the contact members 6a, the cam 28a is rotated in a counter-clockwise direction. When the cam member 28a is rotated, the cam surfaces 31a engage the elongated deformation 25a in the contact member 6a and thus lock the cam member 28a into closed or locked position.

When it is necessary to remove the lamp 8 from the connector 1, the operation is reversed,

the cam surfaces 31*a* of cam 28*a* disengaging the elongated deformations 25*a* of the contact member 6*a*, thus allowing the terminals 7 of the lamp 8 to be easily removed.

In this form of construction of my connector the boss 11 in the slot 10 of the member 2 of the casing may or may not be used, the cooperation of the cam surfaces 31*a* of the cam member 28*a*, with the elongated deformation 25*a*, of the contact member 6*a*, providing the desired locking action.

Although I have shown and described certain specific embodiments of my invention, I am fully aware that many modifications thereof are possible. My invention is, therefore, not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim as my invention:

1. An electrical connector comprising, a casing of insulating material having a circumferential slot in one side thereof, a plurality of contact members mounted within the casing, and a rotatable cam member axially mounted within the casing in circumscribed position with respect to said contact members, said cam member having arcuate portions on the periphery thereof for engaging said contact members and operable to simultaneously actuate said contact members, said cam member having an actuating handle extending through said circumferential slot to the outside of the casing.

2. An electrical connector comprising, a two-element casing of molded insulating material having a circumferential slot in one side thereof, said elements being provided with channels and openings molded therein for the reception of a plurality of contact members, a bearing portion on at least one of said elements, an insulated rotatable cam member disposed intermediate the contact members in coaxial relation to said contact members and in a plane at right angles to the longitudinal axis of the contact members, said cam member having an opening to register with the bearing portion of said elements and an integral handle extending through said circumferential slot, and means for securing the contact members, the cam member and the elements of the casing into cooperative relation.

3. An electrical connector for an electric lamp having contact elements of the prong type comprising, a split casing of molded insulating material, said casing having a cover portion and a base portion, said portions being provided with grooves and openings therein and having a circumferential slot in one side thereof, a plurality of resilient contact members disposed in said grooves and openings for the reception of said lamp prongs, a rotatable cam member of insulating material disposed axially in a plane at right angles to the longitudinal axis of the contact members intermediate said contact members, said cam member having cam surfaces on the exterior surface thereof and mounted intermediate the said cover and base portions in operative relation to said contact members, said cam member having an extension protruding externally of said casing through said circumferential slot, and a fastening device for securing the contact members, the cam member and the cover and base portions of said casing into an operative unitary structure.

4. An electrical connector for an electric lamp having contact prongs comprising a two-element casing of molded insulating material, said casing having a cover portion and a base portion, arcuate slots disposed in the rims of said cover and base portions, a boss or lug member disposed intermediate the ends of said arcuate slots in at least one of said cover or base portions, said portions being provided with grooves and openings molded therein, a plurality of resilient clamp contact members disposed in said grooves and openings, a cam member of insulating material disposed intermediate the said cover and base portions in operative relation to said contact members, said cam member having an extending portion protruding externally of said casing between the arcuate slots and adapted to be rotated within the casing between the limits of the arcuate slots and held on one side of the boss or lug member to actuate said contact members and securely lock them in closed position, and a rivet securing said casing, said contact members and said cam member into an operative unitary structure.

5. A socket for an electric lamp comprising a bi-element casing of insulating material, a plurality of contact members disposed within said casing, said contact members comprising a plurality of resilient blades provided with locking means for engagement of contact prongs inserted therebetween, terminal lugs on said blades, insulated actuating means partially disposed within said casing cooperating with the blades of said contact members, and latching means comprising a slot and a lug on one element of the casing and a slot on the other element of the casing, said slots and lug cooperating with said actuating means for effectively securing the contact prongs between said blades.

6. A connector for an electric lamp having contact terminals of the prong type provided with holes or deformations therein comprising, a multi-element molded insulating casing having disposed therein a plurality of resilient contact members, said contact members having deformations thereon adapted to engage the deformations in the prongs of said lamp, an insulated actuating cam member supported within the casing disposed to engage said contact members and having a portion thereof extending outside of the casing, said cam member being mounted for rotation through arcuate slots in the casing for effecting the compression of the walls of the contact members into engagement with the prongs of the lamp, said extending portion of the cam member being locked in closed position by an extending lug located intermediate the ends of the slot in one element of said casing.

7. An electrical connector comprising an insulating body member having a circumferential slot in one side thereof, a plurality of resilient contact members disposed to receive other contact members supported by said body member, a rotatable cam member axially disposed intermediate the contact members for actuating the resilient contact members, said cam member having an actuating handle extending through said circumferential slot to the outside of the body member, said resilient contact members having convex portions thereon and said cam member having concave surfaces thereon adapted to engage the convex portions on said contact members so that the cam member becomes locked when actuated to a predetermined position thereby retaining the resilient contact members in locked engagement with said other contact members.

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