Nov. 8, 1955 G. R. LAWSON 2,723,382

CURRENT TAP FOR ATTACHMENT TO THE END OF AN EXTENSION CORD

Filed March 19, 1954

Fig. 1.

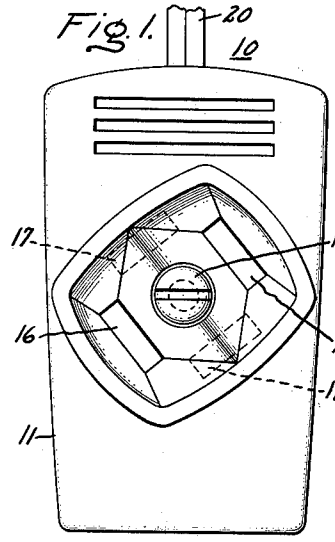


Fig. 5.

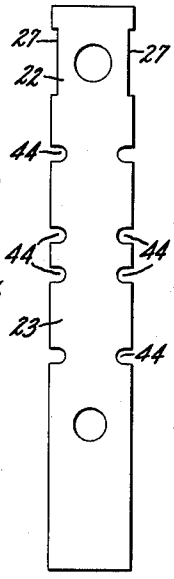


Fig. 6.

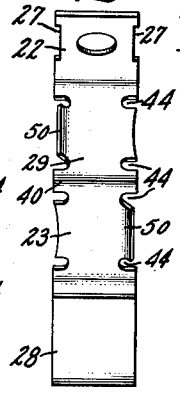


Fig. 3.

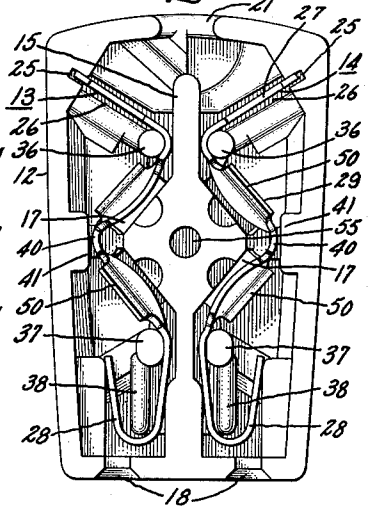


Fig. 2.

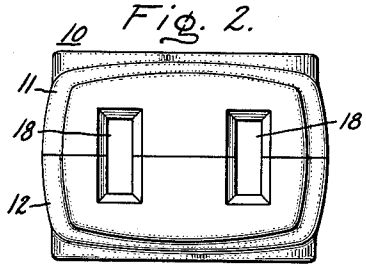


Fig. 4.

Inventor:
Gustaf R. Lawson,
by Richard L. Caslin
His Attorney.

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CURRENT TAP FOR ATTACHMENT TO THE END OF AN EXTENSION CORD

Gustaf R. Lawson, West Warwick, R. I., assignor to General Electric Company, a corporation of New York

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8 Claims. (Cl. 339—164)

The present invention relates to a current tap which is connected on the end of an electric extension cord or the like. This invention is concerned with the design of the contacts within a current tap so as to overcome the problems experienced by other devices in the prior art. First, and possibly foremost of these problems was the difficulty of economically manufacturing devices of this sort. They have always been large and bulky so that they would accommodate the intricate contacts used for gripping the prongs of the attachment plugs. The second problem to be overcome with a device of this type is that of holding the spring pressure of the contacts constant so that the pressure is not a function of the absence or presence of other attachment plugs in the current tap. The contact design of this invention accomplishes both of these objectives. The reduction of the size of the contacts with a consequent reduction of the scrap loss also permits a smaller and more compact design of the housing for the current tap. Also, because of the inner design of the housing, the presence of one or more attachment plugs in the current tap will not lessen the spring pressure of the contacts which acts against the prongs of the attachment plugs.

Accordingly, the principal object of this invention is to provide a current tap with contacts that would substantially eliminate any scrap loss.

A further object is to provide a current tap with contacts of extreme simplicity with spring portions for engaging one or more attachment plugs.

A further object is to provide a current tap with novel spring contacts so that the pressure against the attachment plugs inserted therein always remains constant.

A further object is to provide a current tap with a housing of a compact size and shape.

A further object is to provide a current tap with inner partitions for supporting a pair of spring contacts therein.

The present invention as herein described is embodied in a triple current tap which is to be mounted at the end of an extension cord. This current tap comprises a two-piece hollow housing for receiving a pair of spring contacts therein. There are a pair of openings in each housing piece which are disposed on opposite sides of the tap from each other, each pair being adapted to receive an attachment plug therein. The openings on one side of the housing are displaced nearly 90° out of alignment with the openings in the opposite side of the housing. There are also openings in the end of the housing for receiving the blades of an attachment plug. Therefore, it can be seen that I have devised a current tap which may receive three plugs simultaneously.

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.

In the drawing:

Fig. 1 is a full view of the current tap embodying my invention with an electric cord connected thereto.

Fig. 2 is an end view of the current tap of Fig. 1.

Fig. 3 is a plan view of one half of the housing of a current tap with the contacts mounted therein.

Fig. 4 is an exploded view of the current tap of Fig. 1.

Fig. 5 is a plan view of the blank which is used to form the contact member.

Fig. 6 is a side view of one of the contacts which are inserted in the tap.

Referring in detail to the drawing, **10** represents the entire housing of the current tap which is made of Textolite or any other suitable insulating material. This housing comprises an upper half **11** and a lower half **12**. The parts **11** and **12** are identical except for the hole **55** for receiving the fastening means **19**. The housing **10** is hollowed out so that it may receive a pair of similar contacts **13** and **14** therein. A central partition **15** is formed longitudinally within each part **11** and **12** to separate and insulate the contacts from each other. The mid-portion of this partition is enlarged so that the hole **55** may be formed in each of the housing pieces **11** and **12** to receive an assembly screw **19**. In the present design I have chosen to use a self-tapping screw **19** to attach the tap to the cord but this is not necessary for rivets or other well-known fastening means may be used in place of the screws. This screw **19** serves to hold the housing together and to clamp the end of an electric cord therebetween. In the upper half **11** are formed a pair of openings **16** for the reception of the prongs of an attachment plug (not shown). The lower half **12** has a similar pair of prong-receiving openings **17**, but these are turned so that they lie approximately 90° out of alignment with the openings **16**. A pair of prong-receiving openings **18** are also formed in the end of the housing so that it is clear that provision has been made for the reception of three attachment plugs in the current tap embodying this invention.

A two-conductor cord **20** is inserted through the access opening **21** in the cord-end of the housing which is opposite the pair of openings **18**.

The contacts **13** and **14** are also identical and are each formed with a terminal portion **22** and a body portion **23**. The terminal portion **22** acts to clamp the bare wires **24** of the cord **20** in one of the housing pieces; in this case the lower half **12** of the housing. A groove **25** is formed in the cord-end of each housing piece and in each corner thereof so that the tip of the terminal portion **22** of each contact **13** and **14** may be held therein. The remainder of the terminal portion **22** is located within a wider channel **26**. In addition, the edges of the terminal portion **22** are notched at **27** so that the bare wire **24** may extend under the terminal portion **22**, as can be clearly seen in Fig. 4 of the drawing. This is a well-known expedient for connecting an electric connector to a cord as can be seen in the Benander Patent No. 2,398,996, which is assigned to the same assignee as is the present invention.

The novelty in this invention resides primarily in the construction of the body portion **23** of the contacts **13** and **14**, and also in the cooperation of the housing parts **11** and **12** with the said contacts. The body portions **23** of the contacts **13** and **14** are so shaped that they will lie across one of the prong-receiving openings for each of the three receptacles. This permits the three separate circuits which may be connected in this current tap to be in parallel across the conductors of the power supply. The outer end of each body portion of the contacts **13** and **14** is folded back to form, in edge view, U-shaped portions **28** which are located within the openings **18** in the end of the housing to grip the prongs of an attachment plug that may be inserted therein. The remainder of the body portion **23** is generally of V-shape in its edge view and is numbered **29**. Therefore, it can be readily seen that the terminal portion **22** and the V-shaped section **29** of the body

portion 23 are generally of Z-shape while the end 28 of the body portion of each contact member is of U-shape. This relationship may be clearly seen in Fig. 3 wherein the contacts 13 and 14 are supported on their edges in the lower half 12 of the housing. The contacts 13 and 14 are held in place by the grooves 25, the posts 36 and 37, and the projection 38. Looking at Fig. 3, it can be seen that the post 36 is located at the junction between the terminal portion 22 of the contacts and the V-shaped section 29 of the body portion 23. Also, the posts 37 engage the adjacent contact between the U-shaped portion 28 and the V-shaped section 29 of each contact. Lastly, the projection 38 is positioned to engage with the bend in the U-shaped portion 28 of the contacts 13 and 14.

It should be particularly noted that the apex, hereafter numbered 40, of the V-shaped section 29 of the contacts is closely spaced from the edges of the housing. This apex 40 is adapted to bear against the projection 41 of the housing when an attachment plug is inserted into either one of the receptacles at the sides of the housing.

One of the requirements of the Underwriters Laboratories Inc. and of the National Electrical Code is that when an attachment plug is connected in a current tap of this type the contacts will grip with the prongs of the plug so that a minimum-standard force applied to the attachment plug will not separate the plug from the receptacle. In order to obtain this spring engagement with the prongs of an attachment plug the contacts within the tap are formed to overlie the prong-receiving openings in the housing. The V-shaped section 29 of the body portion 23 is notched at 44 along the side edges of the contacts to provide resilience and to facilitate the easy bending of the contact material, in the vicinity of the side openings 16 and 17, into the necessary shapes. The legs of the V-shaped section 29 are formed into a convex prong-engaging surface. In addition, one edge of each leg is rolled over to form an inclined surface 50 for guiding the entrance of the prong of an attachment plug into the housing. Because of the angular disposition of the openings 16 and 17 each contact 13 and 14 has a rolled-over edge, one on each edge of the contact.

When an attachment plug is inserted into one of the side receptacles of the current tap the opposing portions of the contacts 13 and 14 which are in engagement with the prongs of the plug will move apart. Since these opposing parts are bowed or convexly shaped they will tend to straighten out slightly which will affect the position of each apex 40 to bring them into engagement with the projections 41. This movement is necessary in order to obtain the necessary spring action for gripping the prongs of the attachment plug. Since the apex 40 of each contact shifts, the remaining legs of the V-shaped sections 29 will also pivot slightly; but this pivotal action is restricted by the projections 41 to be so slight that it does not adversely change the spring pressure afforded by the contacts.

If an attachment plug were located in one of the side receptacles of the current tap the apex 40 of each contact would be in contact with the adjacent projection 41. If an additional plug were inserted in the opposite side receptacle of the housing the spring pressure against this plug would not be reduced because of the interaction of the apex 40 and the projection 41. It is likewise true that if the prongs of a plug were forced into the end of the tap through the openings 18 the holding force of the contacts 13 and 14 relative to any side-mounted plug would not be reduced. In this case the prongs of the plug would merely tend to close the U-shaped portions 28 of the contacts and all movement of the contacts would be concentrated in said U-shaped portions.

The method of assembling this device is very simple. First, the end of an electric cord 20 must be split and stripped of the insulation to uncover the bare conductors. The bare conductors are laid in one of the housing pieces across the channels 26 provided for the reception of the terminal portion 22 of the contacts 13 and 14. Then, the said contacts 13 and 14 are mounted in the housing piece by forcing the conductors 24 down into the channels 26 to be wedged therein. Each contact 13 and 14 is supported by the slot 25, the posts 36 and 37 and the projection 38 in both of the housing pieces. Also, the U-shaped portion 28 is spring pressed between cooperating portions of the housing. After this has taken place the upper half 11 of the housing is fitted into place and the self-tapping screw 19 is driven into the aperture 55 to fasten the parts together.

While I have chosen to illustrate the present invention as being incorporated in a triple current tap which is made a part of an extension cord it should be well understood by one skilled in this art that as an alternative the electric cord could be eliminated and the same invention could be incorporated in a service block having male prongs. Also it is quite possible that other means may be devised for joining the contacts with the conductors of the electric cord.

Consequently, having described my invention of a novel electric connector it will be readily apparent to those skilled in this art that I have constructed a current tap having contacts which are for all practical purposes of constant cross-section. Notches 27 and 44 are formed in the edges of the contacts but they are of minute size as compared with the width of the contacts. Because the contacts are of constant cross-section the scrap loss in this part has been cut to a minimum. Also, because of the unique shape of the contacts it is possible to obtain a large and uniform gripping action for supporting attachment plugs in the tap. I have also reduced the thickness of my current tap to a minimum so that it is modern and pleasing in appearance as well as useful in crowded spaces which would prevent the use of some of the larger devices of this type now on the market. My invention, in addition, allows the spring pressure of the contacts to remain constant so that it is not overly difficult to insert an attachment plug in the tap in any one of the receptacles, nor is it possible for an attachment plug to fall out of the current tap upon the application of a small force. In summary, I have constructed a current tap having contacts of a minimum size and constant cross-section which are easy and economical to manufacture as well as easy to assemble with a minimum amount of hand labor and which in addition provides an improved holding action for securing attachment plugs therein.

Modifications of this invention will occur to those skilled in the art and it is to be understood therefore that that this invention is not limited to the particular embodiment 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. An electrical connector for the reception of a plurality of attachment plugs comprising a housing of insulating material having pairs of openings for the insertion of the prongs of the plugs, the openings on one side of the housing being substantially 90° out of alignment with similar openings on the opposite side of the housing, and prong-receiving openings in the end of the housing, a pair of contact members of strip material having a generally constant cross-section located in the housing, each contact comprising a terminal portion and a body portion, the body portion lying within one of the openings for each plug, the said body portion of each contact in the area adjacent the side openings of the housing being bowed to form an inclined surface for guiding the prongs as they enter the housing, and being further arched convexly on its prong-engaging surface to grip the prongs therein.

2. In an electrical connector as recited in claim 1 wherein the body portion of each contact is folded back

on itself in the area of the adjacent opening in the end of the housing.

3. In an electrical connector as recited in claim 2 wherein notches are formed in the edges of the body portion of each contact at the sides of the arched surfaces which grippingly engage the prongs within the housing.

4. A current tap for the reception of a plurality of electrical attachment plugs comprising a housing of insulating material having side and end openings for the insertion of the prongs of the plugs, the openings on one side of the housing being substantially 90° out of alignment with similar openings on the opposite side of the housing, a pair of contact members of strip material having a generally constant cross-section located in the housing, each contact comprising a terminal portion and a body portion, the body portion lying within one of the openings for each plug, the body portion of each contact in the area adjacent the side openings of the housing being arched to engage the prongs with a convex surface, and partitions within the housing for positioning the contacts so that the pressure applied to the prongs by the contacts is not affected by the presence of other attachment plugs inserted in the tap, while the end of the body portion of each contact is located in one of the end openings of the housing for grippingly engaging an attachment plug therein.

5. A triple tap for the reception of a plurality of electrical attachment plugs comprising a housing of insulating material having side and end openings for the insertion of the prongs of the plugs, the openings on one side of the housing being substantially 90° out of alignment with similar openings on the opposite side of the housing, and prong-receiving openings in the end of the housing, a pair of contact members located in the housing, each contact comprising a terminal portion at one end and a body portion at the opposite end, and partitions within the housing for supporting the contacts therein, the body portion lying within one of the openings for each plug, the outer end of the body portion of each contact being of U-shape to lie within one of the openings in the end of the housing, the contact members being of strip material having a constant cross-section except for notches formed in the edges of the body portion to facilitate the gripping engagement of the prongs by the contacts within the housing.

6. A current tap for the reception of at least three electrical attachment plugs comprising a two-piece housing of insulating material having openings for the insertion of the prongs of the plugs, the openings on one side of the housing being out of alignment with similar openings on the opposite side of the housing, and prong-receiving openings in the end of the housing, a pair of contact members of strip material having a generally constant cross-section seated within the housing and supported on their longitudinal side edges, and partitions within the housing for controlling the movement of the contacts therein, each contact comprising a terminal portion and a body portion, the body portion lying within one of the openings for each plug, the outer end of the body portion of each contact being of U-shape to lie within one of the end openings in the housing to grippingly engage the prongs of an attachment plug inserted therein.

7. An electrical connector for the reception of a plurality of attachment plugs, a housing of insulating material having side and end openings for the reception of the prongs of the plugs, the openings on one side of the housing being substantially 90° out of alignment with similar openings on the opposite side of the housing, a pair of contact members of strip material having a generally constant cross-section located in the housing, each contact comprising a terminal portion and a body portion, the body portion lying within one of the openings for each plug, the body portion of each contact in the area adjacent the side openings of the housing being arranged in a V-shaped facing inwardly of the housing and toward the other contact member, the outer end of the body portion of each contact being of U-shape to lie within one of the openings in the end of the housing, and a central partition extending longitudinally of the housing to separate the two contact members, the legs of the V-shaped section of the body portion of the contact members being bowed to form an inclined edge surface for guiding the prongs as they enter the housing and being further arched convexly on their prong-engaging surfaces to grip the prongs within the housing, and abutment means within the housing adjacent the apex of each V-shaped section of the contact members so that when an attachment plug is inserted into the side of the housing the contact members will flex slightly until they engage the said abutment means which serve as fulcrums to limit the movement of the opposite prong-engaging surfaces of the contact members away from each other.

8. An electrical connector for the reception of at least two attachment plugs, a housing of insulating material having opposite side openings for the reception of the prongs of the plugs, the openings on one side of the housing being substantially 90° out of alignment with similar openings on the opposite side of the housing, a pair of contact members of strip material having a generally constant cross-section located in the housing, each contact comprising a terminal portion and a body portion, the body portion lying within one of the openings for each plug, the body portion of each contact in the area adjacent the side openings of the housing being arranged in a V-shape facing inwardly of the housing and toward the other contact member, and a central partition extending longitudinally of the housing to separate the two contact members, the legs of the V-shaped section of the body portion of the contact members being bowed to form an inclined edge surface for guiding the prongs as they enter the housing and being further arched convexly on their prong-engaging surfaces to grip the prongs within the housing, and abutment means within the housing adjacent the apex of each V-shaped section of the contact members so that when an attachment plug is inserted into the side of the housing the contact members will flex slightly until they engage the said abutment means which serve as fulcrums to limit the movement of the opposite prong-engaging surfaces of the contact members away from each other.

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