The invention relates to detachable electrical connectors of the type commonly used for connecting various extension conductors of an electrical circuit and for connecting and disconnecting various electrical appliances with so-called wall receptacles or convenient outlets.

An object of the invention is to provide a detachable electrical connector of the character described which will provide for a fast and clean make and break of the electrical circuit and insure a positive high quality contact between the electrical contact members and thereby eliminate a source of loss and wear caused by poor, arcing, contact members.

Another object of the invention is to provide a detachable electrical connector of the character described which while affording a firm, forceful connection of the electrical contact members will be at the same time readily detachable under a relatively slight opening or separating force.

A further object of the invention is to provide a detachable electrical connector of the character above which, notwithstanding the inclusion of the features mentioned, may be constructed in a compact standard size unit as heretofore in use.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figure 1 is a cross-sectional view of a detachable electrical connector constructed in accordance with the present invention.

Figure 2 is an end view of one of the connector members.

Figure 3 is an end view of the other connector member.

Figure 4 is a transverse cross-sectional view of the connector member illustrated in Figure 3 and is taken substantially on the plane of line 4—4 of Figure 1.

Figure 5 is a cross-sectional view of a detachable electrical connector similar to Figure 1, but showing a modified form of the invention.

The electrical connector of the present invention and as illustrated in the accompanying drawing consists of detachable connector sections or members 6 and 7 which are provided with engageable electric contact members 8 and 9, and 11 and 12 respectively which are engaged in the attached position of the members 6 and 7 to complete an electric circuit through the connector. As here shown, the member 7 is substantially in the form of a more or less common type of wall receptacle and comprises a body or casing made up of half sections 13 and 14 and which is secured to a mounting plate or strap 16 for securing in a standard type receptacle box not shown. The contact members 11 and 12 are here shown reciprocally mounted in bearing portions 17 and 18 provided in the body portion of the member 7 and are positioned with the engageable sides 19 and 21 thereof at the base of openings 22 and 23 leading to the outer face 24 of the member for the receipt and guidance of the contact members 8 and 9 of the connector member 6. On attachment of the members the contacts 8 and 9 are extended through openings 22 and 23 and into engagement with the faces 19 and 21 of the contacts 11 and 12 and on movement of the members to a fully attached position the contacts 8 and 9 displace the contacts 11 and 12. Small helical springs 25 are secured to the contacts 11 and 12 to resiliently resist their displacement and to insure a firm positive contact of the contact members 8 and 9 with the contact members 11 and 12.

As a principal feature of the present connector 1 provide a magnetic means for holding the connector members 6 and 7 in attached position and for moving such members rapidly into an attached position and similarly causing a quick release of the members. In the form of the invention illustrated in Figures 1 to 4, a horse shoe magnet 27 is mounted in the connector member 7 and is positioned with the free magnetic ends 28 and 29 thereof exposed at the front face 16 of the member 7 and at opposite sides of the connector openings 22 and 23. The magnet may be mounted as here shown in opposed recesses formed in the half sections 13 and 14 of the member 7. For cooperation with the free ends 28 and 29 of the magnet 27, the other connector member 6 is provided with a magnetic keeper 32 which as here shown is in the form of an anular ring embedded in the forward face 34 of the member 6 opposite to the face 16 of the member 7, the ring 32 being so positioned around the contacts 8 and 9 as to engage squarely across the ends 28 and 29 of the magnet. In this manner, upon advancement of the member 6 towards an attached position, the bringing of the keeper 32...
into the field of the magnet 27 will cause a snapping of the member 6 into place and as a result a fast clean make of the electric circuit at the contacts 8, 9, 11, and 12 is effected. Also on engagement of the keeper 33 with the magnet the sections are firmly held in place and can be only forcibly separated. On detaching the sections, the magnet will hold the keeper up to a certain applied force and will then abruptly release so as to cause a rapid separation of the member 6 from the member 7 and a clean rapid disconnection of the electrical contact members as a result thereof. It will further be noted that the force of the springs 28 is opposed to the force of the magnet and keeper and in accordance with the present invention, the spring tension is such as to provide a relatively high contact pressure to insure a good quality contact between the contact members 8 and 9, and 18 and 21, and the magnetic strength is selected so as to slightly overcome the spring force. In this way the majority of the magnetic strength may be offset by the spring tension and only a slight opening force need be manually applied to break the magnetic grip. Thus while the electrical contact members are engaged with a relatively great pressure in the attached position of the coupling, they may be separated by the application of a relatively slight opening pressure to the coupling members.

In the form of the invention illustrated in Figure 5 the magnet 27 is in quality incorporated in the plug member 6 and the keeper 33 is mounted on the wall receptacle 7. Preferably, in both of the embodiments one or the other or both of the magnet ends and keeper extend slightly from the opposed abutting sides of the sections 6 and 7 so as to insure a positive engagement of the magnet and keeper.

While in the present embodiment of the invention a horse shoe type magnet has been used and such type is preferred, substantially any other type of magnet, either of a permanent type or electrically actuated, may be used and of the permanent magnet type I may use a straight magnet bar or a flat crescent type with an appropriate form of keeper of magnetic material on the opposite coupling sections. It will be further understood that while the present invention has been particularly illustrated in connection with a detachable plug and wall socket type of electrical connectors, the invention may be applied to substantially all types of detachable electrical connectors.

I claim:

1. A detachable electrical connector comprising, detachable coupling sections provided with electric contacts engaged in the attached position of said sections, means producing a pressure engagement between said contacts in the attached position of said sections, and urging the separation of said sections, and magnetic means for holding said sections in the attached position and exerting a force greater than said means by only a relatively small amount.

2. A detachable electrical connector comprising, a pair of sections movable along an axis to and from a member position, one of said sections having a pair of axially extending electrical contact members, the other section being provided with a pair of resiliently mounted axially displaceable contact members engaged and displaced by said first contact members, a magnet on one of said sections, and a keeper on the other of said sections engageable with said magnet in the attached position of said sections for holding said sections connected against the resilience of said contact members.

3. A detachable electric connector comprising, a pair of members cast from a plastic material or the like and having opposed plane abutting surfaces, a U-shaped recess in one member extending substantially normal to said surface and a permanent horseshoe magnet mounted therein and having the terminal ends thereof mounted at said surface, an annular recess in said plane surface of the other member in alignment with said first recess and a magnetic keeper mounted therein for engagement with the terminal ends of said magnet, a pair of electrical contacts mounted in one member within the area defined by said U-shaped magnet, and a cooperating pair of contacts in the other member and mounted in the area defined within said annular keeper and adapted to engage said first contacts on attachment of said members.

4. A detachable electric connector comprising, a pair of attachable members having opposed abutting surfaces in their attached position, one member being formed of a pair of half sections, each section provided with a U-shaped recess opening to and in registration with the recess in the other section to define a U-shaped enclosure and arranged with the opposite side portions of said enclosure terminating at said abutting surface, a U-shaped magnet in said enclosure and having its terminal ends extending to said abutting surface, electrical contacts carried by said member intermediate said terminal ends, the other member being formed with an annular recess in said abutting surface, electrical contacts carried by said last named member within the area defined by said recess and in alignment with said first contacts and engageable therewith in the attached position of said members, an annular keeper mounted in said last named recess and extending to said abutting surface and engageable with the terminal ends of said magnet to hold said pairs of contacts in engagement.

WALTER L. KINNEBREW.