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J. S. BERG

2,299,206

CABLE CONNECTORS

Filed Aug. 3, 1940

Fig. 1.

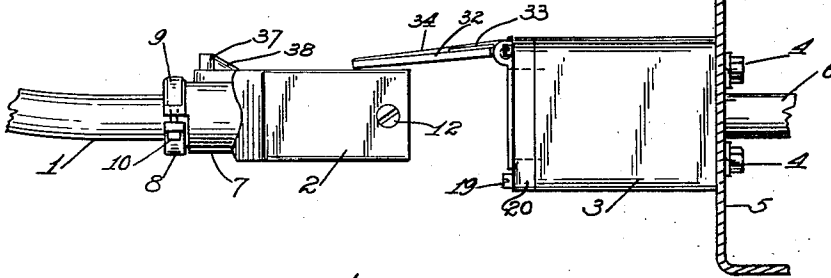


Fig. 2.

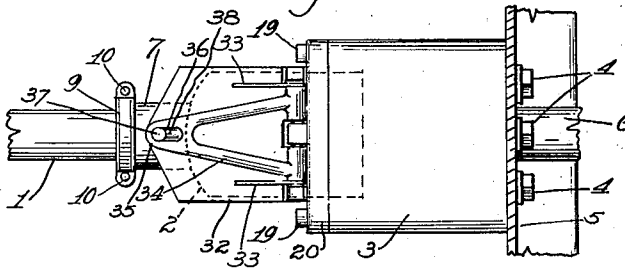


Fig. 3.

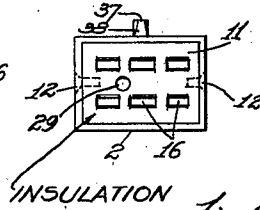


Fig. 4.

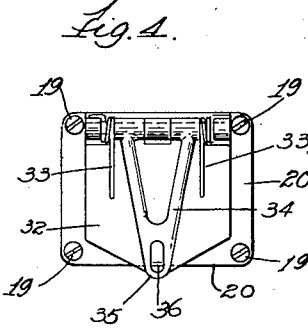


Fig. 5.

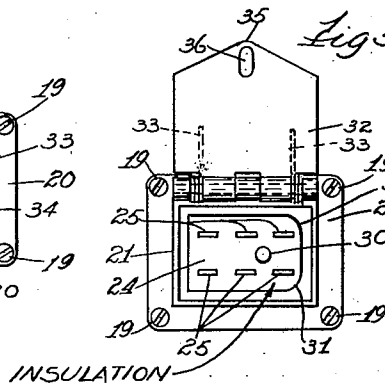


Fig. 8.

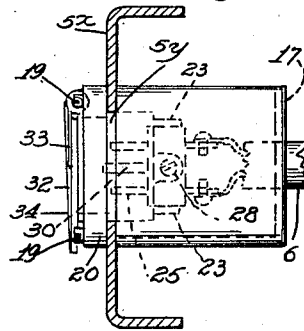


Fig. 6.

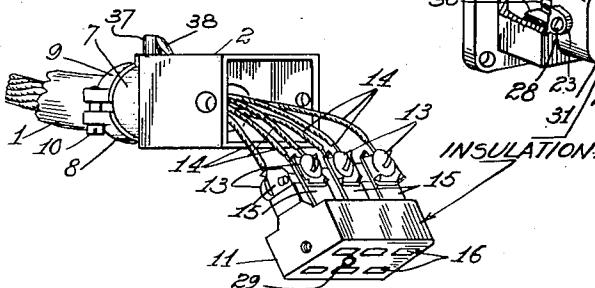
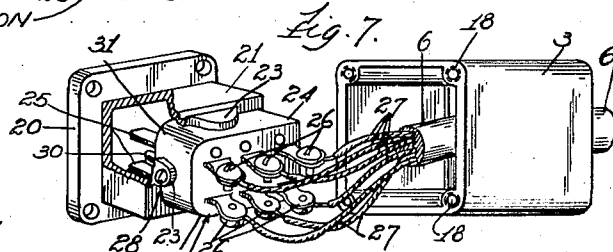


Fig. 7.



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UNITED STATES PATENT OFFICE

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CABLE CONNECTOR

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Application August 3, 1940, Serial No. 350,693

2 Claims. (Cl. 173-328)

This invention relates to electric circuit connectors, and particularly to the separable plug type. One object of the invention is to provide a sturdy and substantial construction for outdoor use, as on motor trucks and trailers. Another object is to provide a construction in which the receptacle fixture is automatically closed against the weather when the plug is removed. Another object is to provide an auxiliary coupling mechanism for holding the plug in the receptacle and to prevent loosening thereof by vibration. Other objects will appear as the description proceeds. The invention consists in certain features and elements of construction in combination, as herein shown and described and as indicated by the claims.

In the drawing:

Fig. 1 is a side elevation of the plug and receptacle positioned ready for inter-engagement, a portion of the vehicle frame on which the receptacle is mounted being shown in section.

Fig. 2 is a top plan view of the parts shown in Fig. 1, with the vehicle frame member in section and showing the plug and receptacle in fully coupled position.

Fig. 3 is an end view of the plug.

Fig. 4 is an end view of the receptacle with the cover closed.

Fig. 5 is an end view of the receptacle with the cover open.

Fig. 6 is a perspective view showing the plug partially disassembled for wiring.

Fig. 7 is a perspective view showing the receptacle partially disassembled for wiring.

Fig. 8 is a side elevation of the receptacle showing a modified method of mounting it on a vehicle frame, and showing a portion of the frame in section.

The plug and receptacle combination, which is the subject of this invention, is especially designed and constructed to withstand rough usage, and to be substantially weather-proof; it is therefore adapted for many purposes, and particularly for outdoor use, but is herein illustrated and described as employed for connecting the electrical circuits used on tractors and trailers, as, for example, on detachable semi-trailers, which are uncoupled from their tractor vehicles and left standing for loading or unloading. In Fig. 1 a portion of the electrical cable is shown at 1, which may be understood as leading from the tractor vehicle and terminating within the housing, 2, of the plug member. The housing, 3, of the cooperating receptacle is shown secured by screws, 4, to the front face of a transverse frame member, 5, of

the trailer, and with a cable, 6, leading through the frame member, 5, from the interior of the receptacle housing, 3. The housings, 2 and 3, are, preferably, of cast metal, such as bronze or aluminum.

The plug housing, 2, comprises a main portion of rectangular cross-section, with a cylindrical portion, 7, leading therefrom for supporting the cable, 1, and, preferably, this portion is provided with a separable half-round collar member, 8, connected to a cooperating half-round flange, 9, by clamp screws, 10, for gripping the cable, 1, so as to relieve the wiring connections inside the housing, 2, from any strain. A block of insulating material, 11, is removably secured in the rectangular body, 2, by means of screws, 12, and when withdrawn, as shown in Fig. 6, it exposes binding screws, 13, for the several wires, 14, of the cable, 1. Each wire is thus connected with a suitable terminal contact clip, 15, which is located within a slot, 16, formed in the insulating block, 11, and permanently secured therein by any suitable means. Thus, when the wires, 14, have been connected to the binding screws, 13, the block, 11, is replaced in the housing, 2, and secured by the screws, 12, which engage it at opposite sides.

The metallic housing, 3, is also rectangular in cross-section, though considerably larger than the plug housing, 2, and it includes an integral end wall, 17, which may be tapped for the screws, 4, or drilled to receive bolts with suitable securing nuts (not shown) inside the casting, 3. A central hole in the end wall, 17, is provided for the cable, 6, and it will be understood that a corresponding hole must be drilled in the frame member, 5, when the box, 3, is mounted, as shown in Fig. 1. The box, 3, is open at its opposite end, but provided with threaded holes, 18, at the corners to receive the fastening screws, 19, which secure a frame casting, 20, to the end of the housing. This casting includes an inwardly projecting flange, 21, with lugs, 22 and 23, which extend still farther inward into the cavity of the housing, 3, when the frame is secured thereto. A block, 24, of insulating material, supports a plurality of contact prongs, 25, with their associated binding screws, 26, as seen in Fig. 7, for attachment to the several wires, 27, of the cable, 6. The block, 24, is fitted snugly between the two lugs, 23, which embrace its opposite ends, and the two lugs, 22, which engage its opposite sides, and it may be secured by screws, 28, extending through the lugs, 23. With the block thus positioned the contact prongs, 25, which project from one face of the block, are still disposed well within the

cavity of the housing, 3, and its terminal frame, 20, and they are surrounded by the flange, 21, of the frame, 20. This flange is dimensioned to form an opening which fits the external outline of the plug housing, 2, so that when the latter is inserted through the frame, 20, it is guided into a position at which the several prongs, 25, will register with and enter the slots, 16, of the block, 11, in the plug, thus completing the several circuits represented by the wires, 14 and 27.

To insure engagement of the several prongs, 25, in the proper slots, 16, the block, 11, is formed with a guide hole, 29, and the block, 24, carries a guide pin, 30, positioned nearer one end of the block than the other and of sufficient length to prevent engagement of the prongs, 25, in the slots of the plug, except when the pin, 29, enters the hole, 30. And to insure a standardized arrangement of the terminals in the housing, 3, the corners, 31, at one end of the block, 24, are rounded, and the formation of the flange, 21, includes correspondingly rounded corners into which the block, 24, must be fitted, thus insuring that it can only be placed in the frame, 20, in a certain position.

Hinged to the frame, 20, I provide a cover, 32, with suitable springs, 33, normally urging it to closed position, as seen in Figs. 4 and 8. The cover is shown with reinforcing ribs, 34, extending from its hinge and converging at the lower tip, 35, of the cover, which, preferably, extends slightly below the edge of the frame, 20, so that it may be conveniently engaged by the finger in opening the cover preparatory to entering the plug, 2, in the housing, 3. Adjacent the tip the cover is formed with an aperture, 36, and the plug body, 2, has an upstanding lug, 37, projecting from its upper surface at a position to engage the aperture, 36, of the cover when the plug is fully entered in the housing, 3, in the position shown in Fig. 2. And, preferably, the lug, 37, is formed with an inclined approach, 38, so that the leading edge of the cover, 32, will be cammed over the lug as the parts slide together, and will then be forced down into locking position by the stress of its springs, 33. Thus, when the parts are engaged, as shown in Fig. 2, the cover acts as a coupling member to assume any longitudinal strain which would tend to separate the plug from the receptacle, and by virtue of the springs, 33, the cover is yieldingly held in coupling position over the lug, 37, even under the severe vibration which vehicles of this class often experience in travel.

When the coupling is to be separated, the cover is easily raised out of engagement with the lug, 37, and as the plug, 2, is withdrawn from the housing, 3, the springs, 33, will serve to automatically close the cover, 32, and retain it in this

position so as to protect the interiorly exposed contact prongs, 25.

Where condition permit, the housing, 3, may be mounted on the opposite side of a frame member, such as the container, 5*, shown in Fig. 8, and this may be done by cutting a rectangular opening, 5*, in the channel, of approximately the size of the plug housing, 2, and then drilling holes in the channel at the corners of this opening to receive the screws, 19, so that the frame casting, 20, can be secured against the outer face of the channel, 5*, while the housing, 3, is clamped against the inner face by means of the screws, 19, as seen in Fig. 8. This leaves only the frame, 20, and the cover, 32, projecting from the outer face of the frame member, and provides a somewhat safer mounting for the receptacle.

I claim:

1. A separable circuit connector comprising a housing having one side open, a separate frame element secured at the open side of the housing with fastening means therefor affording a range of adjustment of the frame toward and from the housing, said frame including an inwardly extending flange forming a socket, a block of insulating material secured in said socket with circuit terminal elements mounted in the block and supported thereby independently of the housing, a detachable plug carrying insulated circuit terminals positioned respectively to engage the terminals in the housing, and a cover hinged to the frame normally serving as a closure for the open side of the housing but adapted to swing about its hinge to permit attachment of the plug, said cover then extending laterally adjacent the plug, and said plug and cover having cooperative abutment features inter-engageable when the cover is so positioned and opposing withdrawal of the plug.

2. The combination of a circuit connector and a support therefor, said connector comprising a housing having one side open and a separate frame with adjustable clamping means securing said frame to the housing with the support interposed between them, said support being apertured and the frame having a flange extending through said aperture into the housing, a block of insulating material supported by said flange with circuit terminal elements mounted in the block, a detachable plug carrying insulated circuit terminals positioned respectively to engage the terminals in the housing, and a cover hinged to the frame normally serving as a closure for the open side of the housing but adapted to swing about its hinge to permit attachment of the plug, said cover then extending laterally adjacent the plug, and said plug and cover having cooperative abutment features inter-engageable when the cover is so positioned and opposing withdrawal of the plug.

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