Oct. 20, 1936. L. KELLNER 2,058,321

ELECTRICAL CORD CONNECTER

Filed Dec. 5, 1933

Fig. 1.

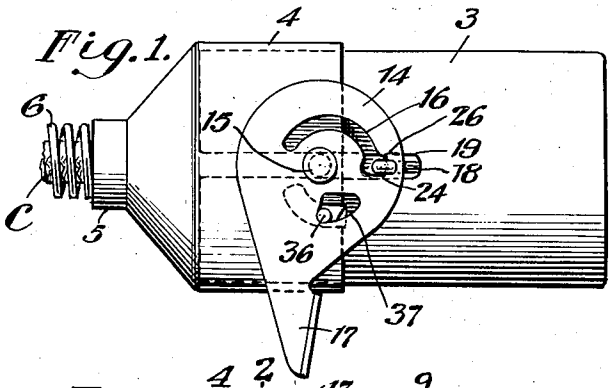


Fig. 2.

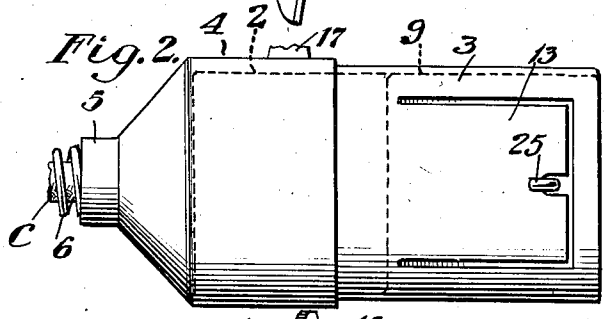


Fig. 3.

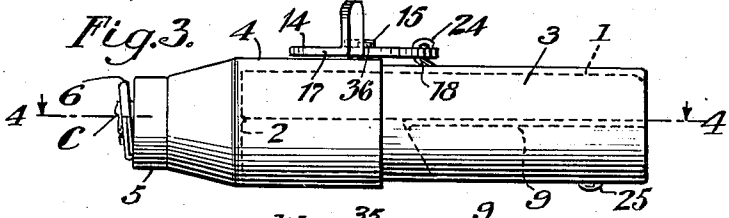


Fig. 4.

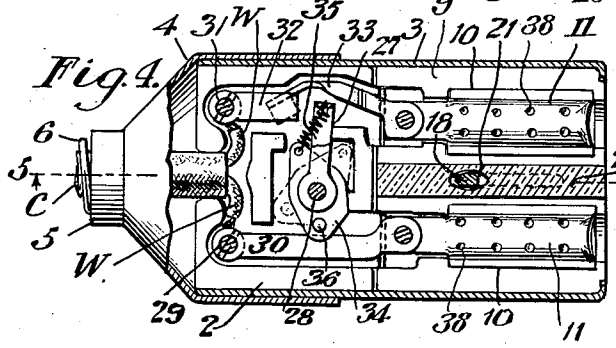


Fig. 6.

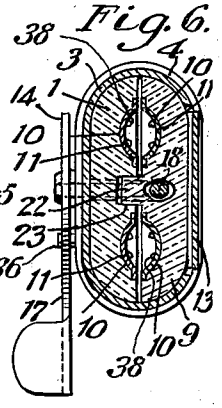
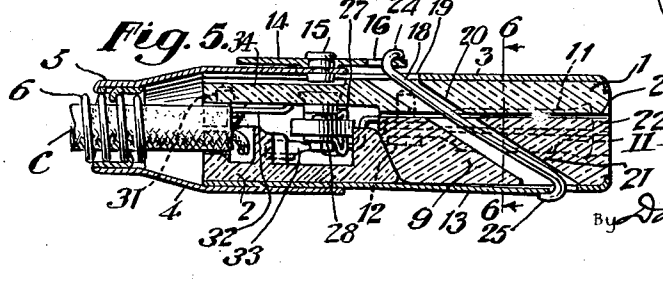


Fig. 5.



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2,058,321

ELECTRICAL CORD CONNECTER

Louis Kellner, Brooklyn, N. Y.

Application December 5, 1933, Serial No. 700,972

14 Claims. (Cl. 200—51)

The present invention relates more particularly to improvements in an electrical circuit cord connecter of the type commonly employed to attach a circuit cord to an electric iron or other electrical device. Such a connecter has twin terminal sockets to receive terminal pins on the iron. Often the connection between said sockets and pins is insecure and movement of the iron in service causes play between the sockets and pins and consequent arcing within the connecter. As a result the connecter and circuit wires deteriorate rapidly and often a fuse is burnt out.

Important objects of the invention are, to provide in such a connecter convenient manually operable means to clamp the terminal sockets to the inserted contact pins and maintain positive and secure electrical connections between them, and to provide for the convenient operation of said clamping means and also the operation of a circuit switch embodied in the connecter, by means of a common operating device.

Other objects of the invention will appear hereinafter.

In the drawing, Fig. 1 is a face view of an electrical cord connecter embodying the invention;

Fig. 2 an opposite face view of the connecter;

Fig. 3 a side elevation of the connecter;

Fig. 4 a longitudinal section approximately on the line 4—4 of Fig. 3;

Fig. 5 a longitudinal section approximately on the line 5—5 of Fig. 4; and

Fig. 6 a transverse section approximately on the line 6—6 of Fig. 5.

The structure of the cord connecter or "attachment plug", as such connecters are commonly called, includes an insulation body oblong in cross section and formed of opposed blocks or slabs 1 and 2 of hard rubber or other suitable insulating material. The slab 1 extends for most of the length of the connecter while the slab 2 is much shorter and terminates at a point spaced materially inward from the open end of the connecter. A metal sleeve 3 encases the slabs. The latter fit snugly in the sleeve and are held therein in face to face contact. A metal cap 4 fits snugly over the end of the sleeve in which the slab or block 2 is located and has a nipple 5 through which the circuit cord C extends into the connecter and in which the usual cord encircling spring 6 is anchored. The cap is anchored to the sleeve as will be described hereinafter. A block or slab 9 of hard insulation is disposed within the sleeve face to face with the slab 1 and extends from the slab 2 to the forward end of the sleeve. At their opposed faces the blocks 1 and 9 are formed with longitudinal grooves 10 which cooperate to define parallel longitudinally split sockets opening through the forward end of the connecter.

In each of said sockets in the insulation blocks there is a pair of opposed resilient metal contact strips 11. The latter are substantially semi-tubular in form and they define split terminal sockets. The inner ends of each pair of strips are flattened and secured to the slab 1 as at 12. At their forward ends the strips are flared to form the mouths of the terminal sockets. The strips are springy and they are normally spread slightly apart. The grooves 10 in the opposed blocks 1 and 9 are formed to snugly fit the semi-tubular strips, and the block 9 has clearance within the sleeve to shift transversely toward and from the block 1, to press one strip of each pair toward the other, or permit it to spring therefrom. The face portion of the sleeve overlying the block 9 has a substantially U-shaped slit defining a resilient tongue 13 to bear against the block 9. Manually operable means are provided to pull said tongue inward to press the shiftable block 9 inward and transversely compress and clamp the terminal sockets in tight gripping engagement with inserted terminal pins on an electric iron or other device.

At the opposite face of the connecter from that bearing the tongue 13 there is a cam member 14 pivotally mounted, as at 15, on the cap 4. Said cam member may be formed of a sheet metal stamping. It has an arcuate cam slot 16, eccentric with relation to the pivot axis, and a radial arm 17 formed with an upturned tab engageable by the thumb to rotate the cam. A tension link 18 operatively connects the cam member with the tongue 13 at the opposite side of the connecter. This link extends obliquely through a slot 19 in the sleeve 3 and through registering passages 20 and 21 in the blocks 1 and 9 respectively and located centrally between the terminal sockets. To fully insulate the link from the sockets the block 9 has a longitudinal central partitioning rib 22 fitted in a groove 23 in the block 1. The link passage 21 leads through this rib. At one end the link has a hook 24 anchored to the cam member within the cam slot and at its opposite end the link has a hook 25 anchored to the free end of the tongue 13 within a notch thereof.

When the cam member is in its normal or release position, shown in Fig. 1, the hook 24 of the tension link is disposed at a point in the cam slot farthest removed from the cam pivot. Rotation

of the cam in the direction indicated by the arrow causes the cam groove to pull the hook nearer to the cam pivot. Thereby tension is exerted on the tension link to pull the tongue 13 inward and press the shiftable block 9 inward, to transversely compress the terminal sockets. Upon shifting of the cam to release position the tension on the link is relieved and the tongue 13 springs back to normal position and permits the terminal sockets to expand. In the release position of the cam the link hook 24 is disposed in a notch 26 at the outer end of the cam slot and the cam is thereby latched in release position. Forcible clamping rotation of the cam member cams the hook out of said notch. There is sufficient clearance in the cam slot rearward of said notch, and also in the passage 20 in the block 1 to permit bending of the link for connecting the hook 24 to the cam member and detaching it therefrom. The link also, through its connection with the tongue 13 on the sleeve 3 and its connection with the cam member on the cap 4, serves to anchor the cap on the sleeve.

Within the connecter there is a snap switch to close and open an electric circuit through the line wires W and the terminal sockets. This switch is also operable by the cam member. The blocks 1 and 2 are recessed at their opposed faces to accommodate the switch. The switch comprises a yoke-shaped metal switch arm 27 pivoted, as at 28, on one of the insulation blocks, to rock in a plane parallel to that of the cam member. One of the circuit wires is anchored to a screw 29 on the block 1, and a metal connecting strip 30 also anchored to said screw connects said wire electrically to one of the terminal sockets. The other wire is anchored to a screw 31 on the block 2, and a metal switch contact strip 32 is also anchored to said screw. A companion spring contact strip 33 is connected to the other terminal socket and has a switch contact end spaced out of contact with the strip 32. In one position the rockable switch arm 27 bridges the space between the contact strips 32 and 33 to close the circuit and in another position of the arm the circuit is broken.

The switch arm 27 is rocked by means of a lever 34 preferably formed of insulating material. This lever is pivoted concentrically with the switch arm. A coiled compression spring 35 operatively connects the lever at one side of the pivot thereof, with the outer end of the switch arm. Normally the anchorage of the spring is out of alignment with the outer end of the switch arm and the pivot, to form a broken toggle. At the opposite side of its pivot the lever has an upstanding pin 36 which is engageable by the cam member 14 to rock the lever and operate the switch. Said pin projects outward through clearance slots in the block 1 and in the sleeve 3 and cap 4 and into an arcuate slot 37 in the cam member. Slot 37 is concentric with the cam axis and spaced therearound from the slot 16. It is so formed and located that when the arm is in its release position the pin 36 is at the rear end of the slot, as shown in Fig. 1, and the switch arm 27 is in circuit opening position.

When the cam is rocked to compress the terminal sockets there is at first no movement of the pin 36 by the cam. Later in the course of the cam movement the forward end of slot 37 engages the pin and the latter is shifted clockwise, with reference to Fig. 4. When the anchorage of the spring 35 with the lever 34 has been shifted past dead center the spring acts to snap the switch arm counter-clockwise to engage the contacts 32 and 33 and close the circuit. Upon reverse movement of the cam the rear end of the cam slot immediately engages the pin 36 and operates the switch to break the circuit, the snap action of the switch in opening being similar to that in closing.

It will be seen that the device is quite convenient to operate. The connecter is applied to the terminal pins of an iron or other device and the cam is rocked to first clamp the terminal sockets to the pins to obtain good secure electrical connections and next throw the switch to close the circuit. The closure of the switch does not occur until good electrical contact between the terminal sockets and inserted pins has been obtained. To further improve the electrical contact the strips 11 forming the terminal sockets may be dented inward slightly, as at 38, to make point engagements with the pins. The clamping means holds the connecter securely to the pins and effectually prevents internal arcing and consequent damage to the connecter and the wires. Mere reverse movement of the cam effects release of the clamping means and also opens the switch. The cam acts to open the switch before release of the clamping means. The cam is readily operable by the thumb of the hand which grasps the connecter. The rise of the cam slot, or its approach to the center of rotation is quite gradual so that great clamping force may be transmitted and so that the cam will remain locked in its clamping position and will hold the terminal sockets locked to the inserted contacts.

What I claim is:

1. An electrical cord connecter comprising opposed blocks of hard insulation; transversely compressible terminal sockets disposed side by side between said blocks to receive electrical contacts; a switch within the connecter to close and open a circuit through said sockets; a sleeve extending around said blocks and having a resilient member to bear against one of said blocks, the block engaged by said resilient member being shiftable within the sleeve toward and from the other block; a manually operable cam member rotatably mounted upon the opposite side of the connecter from said resilient member and having a cam slot; a tension link extending through said blocks, between the sockets, and anchored at one end to said cam slot and at its opposite end to said resilient member to draw the latter and the shiftable block inward to compress and clamp the terminal sockets into tight gripping engagement with the inserted contacts when the cam member is rotated in one direction and to relieve said compression when the cam member is rotated in the opposite direction; and an operative connection between the cam member and said switch to close the switch by rotation of the cam member in its clamping direction and open the switch by rotation of the cam member in the opposite direction.

2. An electrical connecter comprising opposed blocks of hard insulation; a transversely compressible terminal socket disposed between said blocks to receive an electrical contact, one of said blocks being shiftable toward the other to compress the terminal socket into tight gripping engagement with the inserted contact and being shiftable away from the other blocks for release of the contact; and means shiftably mounted on the connecter and operable at the exterior thereof to force and lock said shiftable block against the terminal socket to compress and lock the lat-

ter in tight gripping engagement with the inserted contact.

3. An electrical connecter comprising opposed blocks of hard insulation, transversely compressible terminal sockets mounted between said blocks to receive electrical contacts, one block being shiftable toward and from the other; and manually operable means carried by the connecter to force said shiftable block toward the other block to compress and clamp the terminal sockets in tight gripping engagement with the inserted contacts.

4. An electrical cord connecter comprising opposed blocks of hard insulation, transversely compressible terminal sockets mounted side by side between said insulation blocks to receive electrical contacts, a sleeve extending around said blocks, one of the blocks being shiftable within the sleeve toward and from the other block, and manually operable means borne by the connecter for forcing said shiftable block toward the other block to compress the sockets into tight gripping engagement with the inserted contacts.

5. An electrical cord connecter comprising opposed blocks of hard insulation; transversely compressible terminal sockets disposed side by side between said blocks to receive electrical contacts; a sleeve extending around said blocks and having a resilient member to bear against one of said blocks, the block engaged by said resilient member being shiftable within the sleeve toward and from the other block; a manually operable cam member rotatably mounted upon the opposite side of the connecter from said resilient member and having a cam slot; a tension link extending through said blocks, between the sockets, and anchored at one end to said cam slot and at its opposite end to said resilient member to draw the latter and the shiftable block inward to compress and clamp the terminal sockets into tight gripping engagement with the inserted contacts when the cam member is rotated in one direction and to relieve said compression when the cam member is rotated in the opposite direction.

6. An electrical cord connecter comprising opposed blocks of hard insulation; transversely compressible terminal sockets disposed side by side between said blocks; a sleeve extending around said blocks and having a resilient member to bear against one of said blocks, the block engaged by said resilient member being shiftable within the sleeve toward and from the other block; a cap fitted over one end of said sleeve; a cam member rotatably mounted on said cap at the opposite side of the connecter from said resilient member and having a cam slot; a tension link extending obliquely through said blocks between the sockets and anchored at one end to said cam slot and at its opposite end to said resilient member to draw the latter and the shiftable block inward to compress and clamp the terminal sockets into tight gripping engagement with the inserted contacts when the cam member is rotated in one direction and to relieve said compression when the cam member is rotated in the opposite direction, said link through its anchorages with the cam member on the cap and with said resilient member on the sleeve serving to hold the cap on the sleeve.

7. An electrical connecter comprising blocks of hard insulation disposed in opposed face to face relation and one shiftable toward and from the other, a transversely compressible terminal socket disposed between the opposed faces of said blocks, said block faces extending the entire length of said socket and having grooves to receive the socket and said shiftable block being shiftable toward the other block sufficiently to compress said socket, and manually operable means shiftably mounted on the connecter and operable at the exterior thereof to force and lock said shiftable block against the terminal socket to compress and bind the latter to a contact inserted therein.

8. An electrical connecter comprising blocks of hard insulation disposed in opposed face to face relation and one bodily shiftable toward and from the other, a plurality of transversely compressible terminal sockets disposed between said opposed block faces, said faces extending the entire length of the terminal sockets, said shiftable block being shiftable toward the other block sufficiently to compress the terminal sockets, and manually operable means shiftably mounted on the connecter and operable at the exterior thereof to force said shiftable block toward the other block to compress the terminal sockets and lock them compressed to bind them to inserted electrical contacts.

9. A unitary electrical connecter having cord connections and being freely shiftable bodily to make connections with electrical contacts on an iron or other device and comprising a housing, a pair of opposed slab-like blocks of hard insulation fitted in said housing, one of said blocks being divided transversely into two sections one of which is shiftable within the housing toward and from the other block, a pair of transversely compressible terminal sockets disposed between said shiftable block section and the other block, and said block section and said other block being grooved at their opposed faces to receive said sockets, and means borne by the connecter and manually operable at the exterior thereof to force said shiftable block section toward the other block to compress the terminal sockets and bind and lock them to contacts inserted therein.

10. An electrical connecter comprising a pair of clamping blocks in opposed face to face relation and one shiftable toward and from the other, a pair of transversely compressible terminal sockets disposed between said blocks to receive electrical contacts, a clamp-operating device rotatably mounted on the connecter and manually rotatable from the exterior of the connecter, and an operative connection between said operating device and said shiftable block to shift the latter toward the other block by rotation of the operating device to compress the terminal sockets and bind the latter to inserted contacts, said device and operative connection being adapted to lock the shiftable block in socket-compressing position.

11. An electrical connecter comprising a pair of clamping blocks in opposed face to face relation and one shiftable toward and from the other; a pair of transversely compressible terminal sockets disposed between said blocks to receive electrical contacts, a clamp-operating cam rotatably mounted on the connecter at the exterior thereof and having a cam slot extending around its axis of rotation, a tension member anchored in said cam slot, and an operative connection between said tension member and said shiftable block to force the latter toward the other block by rotation of the cam to compress the terminal sockets, and bind them to electrical contacts inserted therein.

12. An electrical connecter comprising a pair of clamping blocks in opposed face to face relation and one shiftable toward and from the other, a pair of transversely compressible terminal sockets

disposed between said blocks to receive electrical contacts, a clamp-operating cam rotatably mounted on the connecter at the exterior thereof and having a cam slot extending around its axis of rotation, and operative connection between said cam slot and said shiftable block to force the latter toward the other block to compress said terminal sockets to bind them to inserted contacts upon rotation of the cam, a switch within the connecter to open and close a circuit through the sockets, and an operative connection between the cam and said switch to close the switch by rotation of the cam in a direction to compress the terminal sockets and to open the switch by reverse rotation of the cam.

13. An electrical connecter comprising a pair of clamping blocks in opposed face to face relation and one shiftable toward and from the other, a pair of transversely compressible terminal sockets disposed between said blocks to receive electrical contacts, a clamp-operating cam rotatably mounted on the connecter at the exterior thereof and having a cam slot extending around its axis of rotation, an operative connection between said cam slot and said shiftable block to force the latter toward the other block to compress said terminal sockets to bind them to inserted contacts upon rotation of the cam, a switch within the connecter to open and close a circuit through the sockets, the cam having an aperture spaced from its axis of rotation, and the switch having an operating pin projecting into said aperture and having clearance therein to provide a lost motion operative connection between the cam and the switch, for the purpose set forth.

14. An electrical connecter comprising clamping blocks of hard insulation disposed in opposed relation, means holding said blocks assembled and permitting one block to be shifted toward and from the other block, a transversely compressible terminal socket disposed between said blocks said shiftable block being shiftable toward the other block sufficiently to compress said socket, and manually operable clamp-operating and locking means shiftably mounted on the connecter and operable at the exterior thereof to force said shiftable block toward the other block to compress and lock the terminal socket in tight gripping engagement with an inserted contact.

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