

**May 29, 1945.**

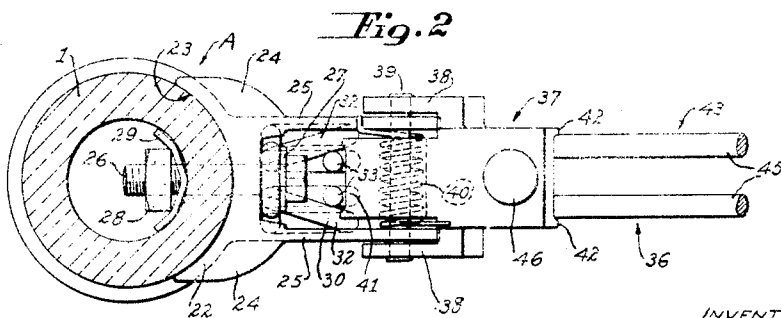
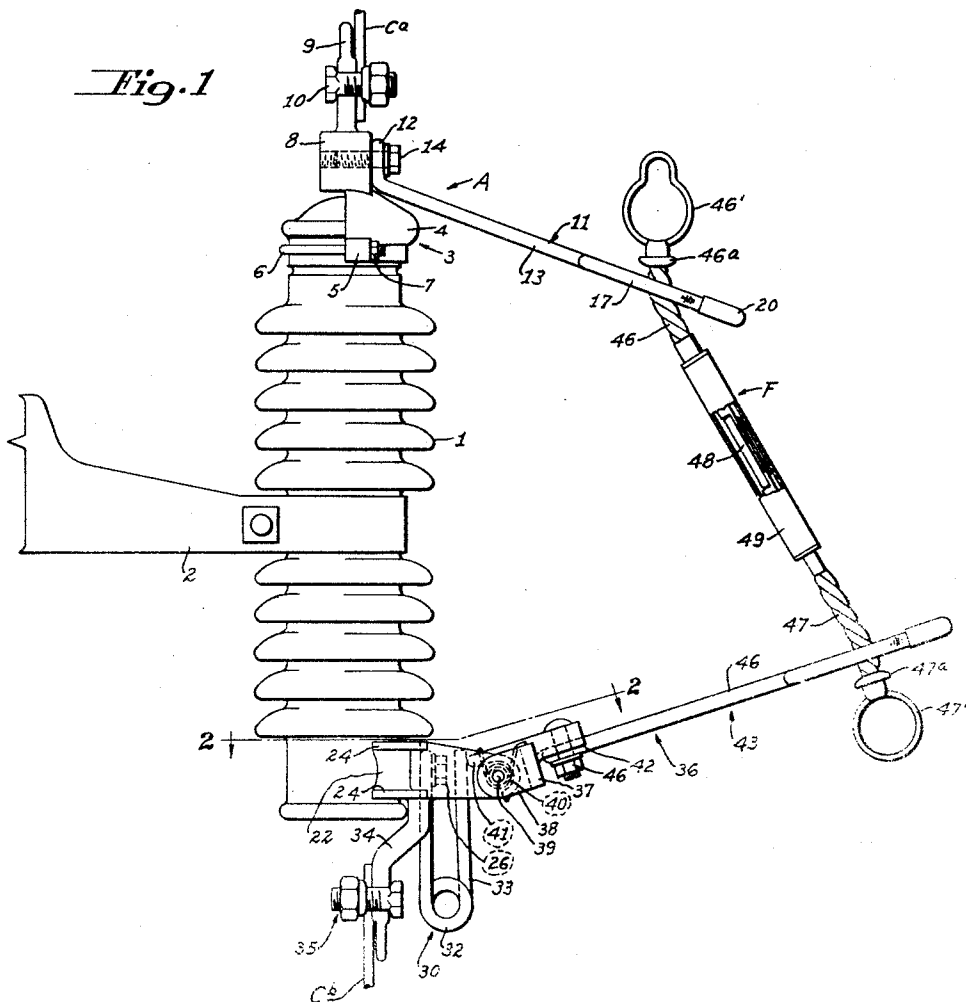
**C. A. FOX**

**2,376,996**

## ELECTRICAL CUT-OUT

Filed Jan. 30, 1942

2 Sheets-Sheet 1



INVENTOR  
CHARLES ADIN FOX

BY *Em Harrington*,  
ATTORNEY

**May 29, 1945.**

**C. A. FOX**

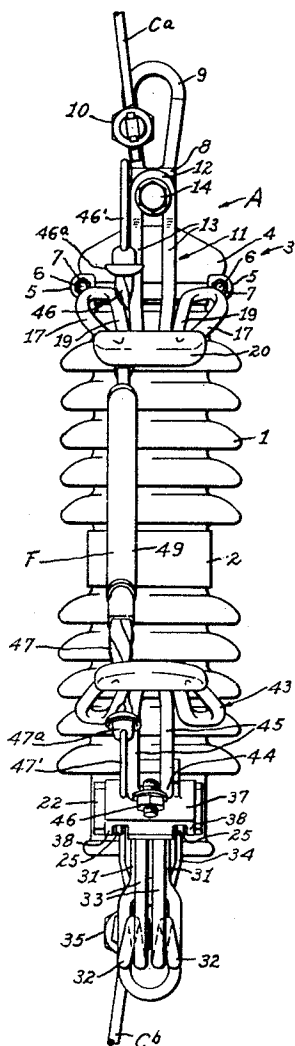
**2,376,996**

ELECTRICAL CUT-OUT

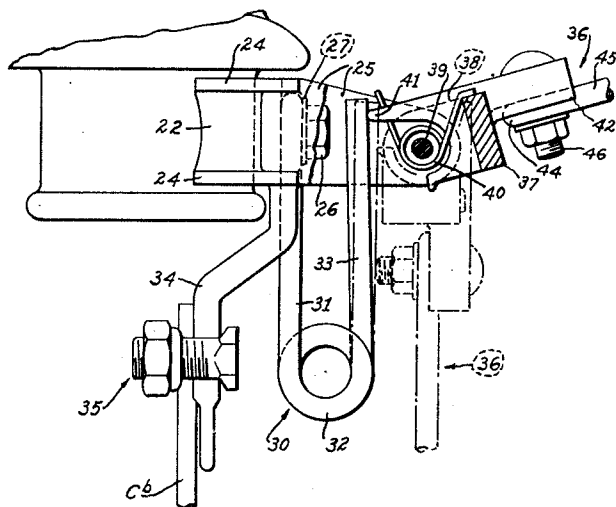
Filed Jan. 30, 1942

2 Sheets-Sheet 2

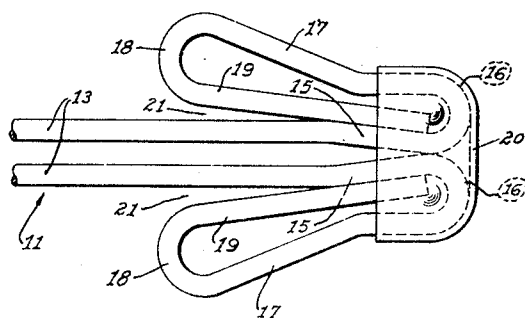
*Fig. 3*



*Fig.4*



*Fig. 5*



INVENTOR  
CHARLES ADIN FOX  
BY *Emmarrington*,  
ATTORNEY

## UNITED STATES PATENT OFFICE

2,376,996

## ELECTRICAL CUTOUT

Charles Adin Fox, Oakland Village, Mo., assignor  
to James R. Kearney Corporation, St. Louis,  
Mo., a corporation of Missouri

Application January 30, 1942, Serial No. 428,854

4 Claims. (Cl. 200—117)

This invention relates generally to electrical cutouts and more specifically to electrical cutouts of the type that include fusible elements adapted to be ruptured as a result of passage of abnormal electrical current therethrough to interrupt the electrical circuits with which the cutouts are electrically associated, the predominant object of the invention being to provide a cutout of the type referred to above which is of extremely simple construction and arrangement and is capable of performing its intended function in a highly efficient manner.

The cutout of the present invention in general is of the type of the device disclosed in United States Letters Patent No. 2,086,028, granted on July 6, 1937, in that it includes a simple fuse link structure for providing an interruptible current path through the cutout, instead of being provided with a relatively complicated mechanical structure providing a fuse cartridge for that purpose as was true of many switches and cutouts heretofore known. However, the cutout of the present invention differs mechanically from the structure of the device of the patent referred to above because of the fact that it was designed and is intended particularly for use with electrical circuits carrying currents of higher amperages.

Fig. 1 is a side elevation of the improved cutout of the present invention, a portion of the fuse link thereof being shown in section.

Fig. 2 is an enlarged, fragmentary horizontal section taken on line 2—2 of Fig. 1.

Fig. 3 is a front elevation of the cutout illustrated in Fig. 1.

Fig. 4 is an enlarged, fragmentary view, partly in elevation and partly in section, of the lower portion of the improved cutout.

Fig. 5 is an enlarged, fragmentary plan view of the outer portion of one of the contact arms of the improved cutout.

In the drawings, wherein is shown for the purpose of illustration, merely, one embodiment of the invention, A designates the improved cutout generally. The cutout A includes a suitable insulator 1 formed of porcelain or other suitable electrical insulating material to which is secured a suitable bracket 2 that aids in the attachment of the cutout to a crossarm or other support.

Supported by the insulator 1 at the upper end thereof is an upper terminal 3 which is formed of electrical conducting material and includes a segmental cap portion 4 that embraces a part of the upper portion of the insulator 1 as shown in Fig. 1. At its opposite sides the portion 4 of the

upper terminal 3 is provided with outstanding apertured lugs 5 through which end portions of a U-shaped rod 6 are extended, said rod 6 being drawn into embracing relation with respect to a part of the upper portion of the insulator 1 by nuts 7 which are applied to the outer ends of the rod and are jammed against the lugs 5 so as to securely clamp the upper terminal 3 to said insulator 1. The upper terminal 3 includes also a head portion 8 which is formed integral with the segmental cap portion 4, and extended upwardly from said head portion is an extension 9 of elongated, loop formation, said extension 9 having electrically and mechanically attached thereto by means of a suitable connector 10 a conductor Ca which forms a part of the electrical circuit with which the cutout A is associated.

Secured to and extended outwardly from the upper terminal 3 is an upper contact arm 11 which preferably, though not necessarily, is formed from a single length of heavy wire or rod of a material that is characterized by being a good conductor of electricity. At its rear end the upper contact arm 11 is provided with an upwardly extended loop 12 from the lower portion of which are extended a pair of parallel portions 13 of the upper contact arm, said upper contact arm being secured to the head portion 8 of the upper terminal 3 by a bolt 14 whose shank extends through the loop 12 and is seated in a screwthreaded opening formed in said head portion 8 and whose head portion engages a washer which contacts with the outer surface of the loop 12.

The outer end portion of the upper contact arm 11 is shaped and formed as shown to the best advantage in Fig. 5. That is to say, convergent portions 15 are extended forwardly from the outer portions of the parallel portions 13 of the upper contact arm 11. These convergent portions 15 merge into outwardly curved portions 16 having outer legs which extend rearwardly, and said outer legs of said curved portions 16 merge into divergent portions 17 which, at their rear ends, merge into inwardly curved portions 18. The curved portions 18 in turn merge into forwardly extended portions 19 which contact at their forward end portions with the convergent portions 15. The outer end portion of the upper contact arm 11 has applied thereto a cap 20 which fixedly embraces the curved portions 16 and adjacent portions of the upper contact arm so as to limit undue spreading of the outer end portion of said upper contact arm. Also, the material of which the upper contact arm is

formed is possessed of resiliency which tends to force the outer end portions of the portions 19 into close contact with the convergent portions 15 and therefore when portions of fuse links are drawn into the tapered crotches 21 between said portions 19 and adjacent portions of the parallel legs 13, as will be hereinafter explained, said fuse link portions will move the forward parts of the portions 19 away from the portions 15 so as to cause the fuse link portions to be securely gripped between the portions 19 and adjacent parts of the parallel portions 13.

Supported by the lower portion of the insulator 1 is a lower terminal which comprises a member 22 provided with an arcuate face 23 that contacts with a portion of the outer surface of said insulator 1. The member 22 is provided with upper and lower strengthening webs 24 and with a pair of outwardly extended, horizontally spaced arms 25. Also, the member 22 is secured to the insulator 1 through the instrumentality of connecting means of the type disclosed by United States Letters Patent No. 2,140,904, granted on December 20, 1938, said connecting means comprising a bolt 26 which passes through an opening formed through the member 22 and through an aligned opening formed through the wall of the hollow insulator 1. A washer 27, is engaged by the inner face of the head of the bolt 26, and a nut 28 is mounted on the inner, screwthreaded end portion of the bolt, said nut contacting with a washer 29 of substantially V-shape formation which is interposed between said nut and a portion of the inner face of the wall of the insulator 1. Interposed between the washer 27 and a forward face of the member 22 is the upper looped portion of a spring 30, said spring including portions 31 which extend downwardly from said upper, looped portion, a pair of coiled portions 32 at the lower end of the spring, and portions 33 that extend upwardly from said coiled portions and which are free for movement at their upper ends. It is obvious that the bolt, washer, and nut assembly 26-27-28 serves the dual purpose of securing the spring 30 in place and connecting the lower terminal to the insulator 1, the resilient washer 29 acting to absorb strains which in the absence of said washer might crack the material of the insulator.

The lower terminal member 22 has formed thereon a downwardly and rearwardly extended element 34 of loop formation which serves as a means for electrically and mechanically connecting to the cutout a conductor Cb which forms a part of the electrical circuit with which the cutout is associated. Connection of the conductor Cb to the element 34 is effected through the use of a suitable connector 35 which embraces a portion of said element and a portion of said conductor.

Pivotaly attached to the lower terminal member 22 is a lower contact arm 36 which includes a member 37 that is located at the rear end of said lower contact arm. The member 37 is provided with rearwardly extended, spaced apart arms 38 that are disposed in overlapping relation with respect to the spaced arms 25 of the member 22 which provides the lower terminal. The member 37 of the lower contact arm 36 is pivotally attached to the member 22 of the lower terminal by a pivot pin 39 which is extended through apertures formed through the spaced arms 25 of the member 22 and the spaced arms 38 of the member 37, said pivot pin preferably being upset at its opposite ends so as to retain it in place.

Also, a torsional coil spring 40 is arranged in embracing relation with respect to the pivot pin 39 which tends to swing the member 37 downwardly and rearwardly about the pivot pin 39, one end of said torsional coil spring engaging over one of the spaced arms 25 of the lower terminal member 22 and the other end of said torsional coil spring engaging over a portion of the member 37 to effect such pivotal movement of said member 37. In addition to the force exerted by the torsional coil spring 40 which tends to rotate the member 37, parts of the portions 33 of the spring 30 contact with the rear end of an extension 41 formed on said member 37. The upper end portions of the portions 33 of the spring 30 tend to move outwardly and therefore an outwardly directed force is exerted by said spring portions 33 against the extension 41 which likewise tends to swing the member 37 outwardly and downwardly about the pivot pin 39. Additionally, it is important to note that the spring 30 is in shunt with the pivotal joint provided between the spaced arms 25 of the terminal member 22 and the member 37 by the pivot pin 39, and that the upstanding portions 33 of said spring 30 make point pressure contact with the extension 41 of said member 37. Because of this arrangement a superior conductive path is provided for energy passing between the lower contact arm 36 and the terminal member 22.

The forward portion of the member 37 of the lower contact arm 36 is narrower than the portion of said member which provides the spaced arms 38, and the extension 41 is a continuation of said narrower, forward portion which is raised slightly above the upper edges of the spaced arms 38. Also, the forward, narrower portion of the member 37 is provided with downwardly projected flanges 42 which extend longitudinally at opposite sides thereof. The forward portion 43 of the lower contact arm 36 follows very closely the arrangement of the upper contact arm 11. In other words, the forward portion 43 of said lower contact arm is formed from a single length of heavy wire or rod shaped to provide a loop 44 at the rear end of said arm portion from which substantially parallel, forwardly projected portions 45 are extended. The arm portion 43 is secured to the member 37 by a bolt and nut assembly 46, the bolt of which extends through an opening formed through the loop 44 at the rear end of said arm portion 43, the loop 44 being disposed between the flanges 42 of the forward portion of the member 37. The outer end portion of the lower contact arm 36 is formed in accordance with the arrangement of the outer end of the upper contact arm 11, which arrangement is clearly shown in Fig. 5.

The improved cutout includes a fuse link F which comprises a pair of flexible cables 46 and 47 which are provided at their outer ends with suitable eyes 46' and 47'. The cables 46 and 47 are spaced apart at their inner ends and arranged in electrical connection with said cables and disposed in the space between the spaced inner ends thereof is a fusible element 48. The space between the inner ends of the cables 46 and 47 and the fusible element arranged therein are embraced by a tube 49 formed of suitable electrical insulating material which is suitably maintained in its assembled relation with respect to the cables of the fuse link to provide a unitary fuse link structure.

To assemble the fuse link F with the cutout the cable 47 of the fuse link is drawn deep in one

or other of the crotches of the lower contact arm which correspond to the crotches 21 of the upper contact arm and as a result a portion corresponding to a portion 19 of the upper contact arm which is located at a side of the crotch employed to receive the fuse link cable will engage said fuse link cable so that it is gripped between said portion and a portion of the adjacent contact arm portion which corresponds to a portion 13 of the upper contact arm. The fuse link is applied to the lower contact arm as described with the aid of a suitable tool in the form of a stick having a finger which is extended through the eye 46' at the upper end of the fuse link. With the finger of the stick still in engagement with the eye 46' of the fuse link, said fuse link is moved upwardly toward the upper contact arm 11 thereby moving the lower contact arm from the position in which it is shown by dotted lines in Fig. 4 to the elevated position in which said lower contact arm is shown by full lines in Fig. 1. When the fuse link has been elevated to the proper degree the cable 48 of said fuse link is drawn deep in one or the other of the crotches 21 of upper contact arm 11 where it will be engaged and gripped between the associated portions 19 and 13 of said upper contact arm as previously explained. The finger of the stick is then disengaged from the eye 46' of the fuse link and the cutout is in a fused condition and ready for use.

When, in the use of the improved cutout, a fault occurs in the circuit with which the cutout is associated which is of a character to blow the fuse link, the fusible element 48 of the fuse link F' will be ruptured. This will free the lower contact arm 36 from the restraint imposed thereon by the unruptured fuse link with the result that the coil spring 30 and the torsional spring 40 will swing the outer end portion of said lower contact arm 36 rapidly in a downwardly, extended arc of a circle to the position in which said lower contact arm is shown by dotted lines in Fig. 4. The described downward movement of the lower contact arm 36 will quickly pull the ruptured ends of the fusible element 48 apart whereby an arc formed between said ruptured ends of said fusible element will be extinguished within the tube 49 of the fuse link.

It is important to note that the lateral gripping action to which portions of the cables 46 and 47 of the fuse link F' are subjected by the portions 19 and 13 of the upper contact arm 11 and by corresponding portions of the lower contact arm 36, provide good electrical connection between said upper and lower contact arms and the fuse link F'. As a result of this situation it is not necessary to subject the fuse link to excessive tension in order to obtain the desired good electrical connection between the fuse link and the upper and lower contact arms as would be the case if it were necessary to draw the buttons 46a and 47a, or similar elements, at the outer ends of the cables 46 and 47 into close contact with the upper and lower contact arms to obtain proper electrical connection between said contact arms and the fuse link.

I claim:

1. An electrical cutout comprising a supporting structure including spaced terminals, spaced contact arms associated respectively with said spaced terminals, pivot means for attaching one of said contact arms to the terminal with which it is associated for pivotal movement, spring means for subjecting said pivotally supported contact arm to pivotal movement, said spring means being

characterized by being formed of material which is a good conductor of electrical energy and forming a part of the direct current path between the pivotally supported contact arm and its supporting terminal, and said spring means comprising a substantially vertically disposed resilient element of substantially U-shaped formation a portion of which is secured to the terminal with which said pivotally supported contact arm is associated and another portion of which contacts with a portion of said pivotally supported contact arm and exerts a force thereagainst which is directed tangentially of said pivot means, a torsional coil spring which embraces said pivot means and aids said spring means in subjecting said pivotally supported contact arm to pivotal movement, and a fuse link engaged by outer end portions of said contact arms and maintained under tension by the tendency of said spring means and said torsional coil spring to subject said pivotally supported contact arm to pivotal movement.

2. An electrical cutout comprising a supporting structure including spaced terminals, spaced contact arms associated respectively with said spaced terminals, one of said spaced contact arms being adapted for movement toward and away from the other of said spaced contact arms, each of said spaced contact arms being formed from resilient material shaped to provide a forwardly extended portion, a portion which extends rearwardly from the outer end of said forwardly extended portion, and a forwardly projected gripping portion which is disposed between said forwardly extended portion and said rearwardly extended portion for resilient movement toward and from said forwardly extended portion, and a fuse link engaged by the outer end portions of said contact arms and maintained under tension by the tendency of said movable contact arm to move in a direction away from the other contact arm, said fuse link having portions which are gripped between said forwardly extended portions of the contact arms and said forwardly projected gripping portions thereof.

3. An electrical cutout comprising a supporting structure including spaced terminals, spaced contact arms associated respectively with said spaced terminals, one of said spaced contact arms being adapted for movement toward and away from the other of said spaced contact arms, each of said spaced contact arms being formed from resilient material shaped to provide a pair of substantially parallel forwardly extended portions, portions which extend rearwardly from the outer ends of said forwardly extended portions, and forwardly extended gripping portions which are disposed between said forwardly extended portions and said rearwardly extended portions for resilient movement toward and from said forwardly extended portions, and a fuse link engaged by the outer end portions of said contact arms and maintained under tension by the tendency of said movable contact arm to move in a direction away from the other contact arm, said fuse link having portions each of which is gripped between one or the other of said associated forwardly extended portions and forwardly projected gripping portions of each of said contact arms.

4. An electrical cutout comprising a supporting structure including spaced terminals, spaced contact arms associated respectively with said spaced terminals, one of said spaced contact arms

being adapted for movement toward and away from the other of said spaced contact arms, each of said spaced contact arms being formed from a single length of resilient material shaped to provide a pair of substantially parallel forwardly extended portions, portions which extend rearwardly from the outer ends of said forwardly extended portions, and forwardly extended gripping portions which are disposed between said forwardly extended portions and said rearwardly extended portions for resilient movement toward and from said forwardly extended por-

tions, a fuse link engaged by the outer end portions of said contact arms and maintained under tension by the tendency of said movable contact arm to move in a direction away from the other contact arm, said fuse link having portions each of which is gripped between one or the other of said associated forwardly extended portions and forwardly projected gripping portions of each of said contact arms, and a cap applied to the outer end of each contact arm to prevent undue spreading thereof.

CHARLES ADIN FOX.