

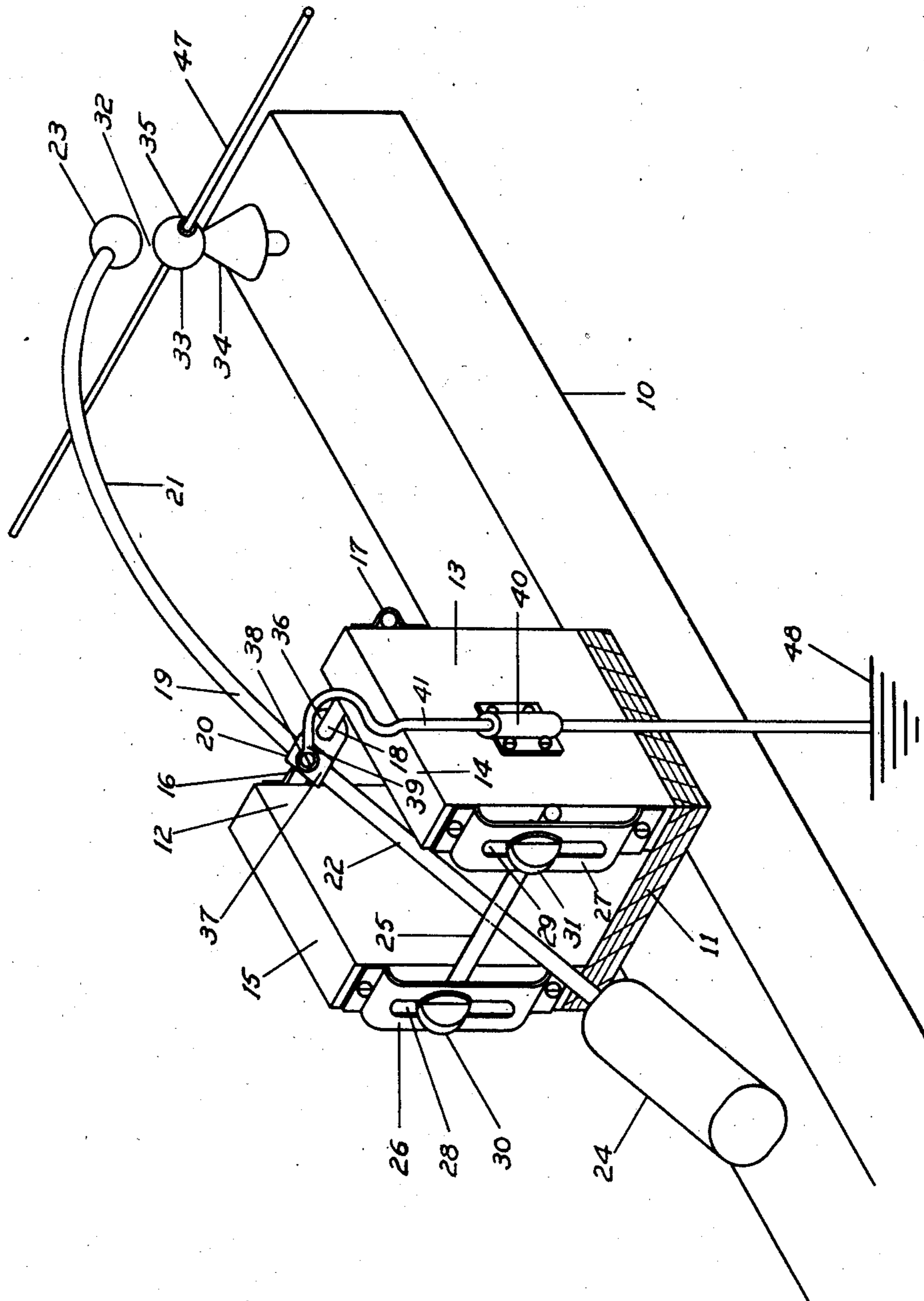
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ELECTRIC CURRENT ARRESTER

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ELECTRIC CURRENT ARRESTER

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1

My invention relates to electric current arrestors for line wires such as telegraph and telephone wires, whereby if for any cause an excess of current passes through the wire it will be caused to go to ground through the arrestor and the damage which otherwise might be done will be prevented.

In the maintenance and upkeep of telegraph and telephone lines it is well known that from unforeseen and unpreventable causes excessive electrical current may go through the line and into instruments or other connections causing very great damage. Two main causes of such excessive current are lightning and contact with the wires of power lines which for some reason have come loose and fall upon the telephone wires. Not only has there been grave damage caused from this source but not unfrequently telephone or telegraph line men, at work making repairs or checking the line wires, because of such unexpected increase of current have been electrocuted.

I have discovered that a very simple appliance supported by suitable means adjacent the line wire, such as the cross bar of the telephone or telegraph poles, may provide an open circuit running to ground with an electrically conductive member positioned adjacent a member in electric circuit with the line wire so as to leave a suitably proportioned gap between the two, such that when there is an increase of current in the line wire such increased current will arc across the gap and will be drawn off to ground. For such a device it is essential that means be provided to make a close adjustment of the width of the gap so that it will be wide enough to prevent the normal operating line current to arc across and yet narrow enough so that any dangerous increase in current will arc over and go to ground.

It is an object of my invention, therefore, to provide an arrestor device comprising a frame stand adapted to be positioned on a cross bar of a telegraph or telephone pole and to support on said stand wires or other conducting means for making a circuit to ground, and to have a point on said ground circuit adjacent a point in circuit with the line wire with a gap between the two suitable to permit arcing current to ground when dangerous current flows over the line wire.

It is a further object of my invention to mount on said stand for swinging movements thereon a conductor arm having a point thereon adapted to be brought into a position close to a conducting point on the line wire and being held so as

2

to form a gap between it and said line wire conducting point.

It is a further object of my invention to have said swinging arm connected by a flexible wire with a ground wire so that current arcing across the gap and passing through the swinging arm will be conducted to ground.

It is a further object of my invention to provide a cross rod on the stand adjustable vertically, against the under side of which the part of the swinging arm back of its pivot may be caused to engage by the overbalancing weight of the gap ball to limit the width of gap between conducting points on the swinging arm and the line wire respectively.

It is a further object of my invention to have on said rearwardly extending portion of the swinging arm a removable balance weight such as to nearly counterbalance the forward part of the swinging arm and the gap ball on its end so that the gap will remain normally fixed but may widen upon an arcing flash of excessive current.

It is a further object of my invention to mount the cross rod on the frame against the under side of which the rearwardly extending part of the swinging arm engages so as to provide means for adjusting said cross rod vertically up or down to narrow or widen the minimum gap between the conducting points on the swinging arm and the line wire respectively.

The full objects and advantages of my invention will appear in connection with the description given in the following specification, and the novel features of the invention by which the aforesaid highly advantageous results are obtained will be particularly pointed out in the claims.

The single figure of the drawing, illustrating an application of my invention in one form, shows in perspective a unit of my invention mounted upon a cross bar adjacent a line wire with a conducting ball on the end of a swinging arm held to form a predetermined gap between said ball and a similar conducting ball mounted on the line wire.

As illustrated, there is mounted upon a cross bar 10 of a telegraph or telephone pole, or on any similar support for a line wire or wires, a framework comprising a base member 11, which is directly secured to the top of the cross bar. The base member 11 carries a pair of upright brackets 12 and 13 which have their tops 14 and 15, and also their front and rear walls respectively, in common planes.

Upon the front of the brackets 12 and 13 is

journalled under keepers 16 and 17 a transverse shaft member 18. The shaft member 18 carries a swinging arm 19 secured to it by means of a clamp device 20 so as to leave a front part 21 of said swinging arm and a rear part 22 thereof extending in opposite directions from the shaft 18. Preferably, but not necessarily, the front part 21 of the swinging arm 19 will be curved as shown in the drawings and at its front end will be positioned a conducting ball 23. The front part 21 of swinging arm 19 is, of course, formed of electric conducting material, and the conducting terminal 23 thereof may be formed as a ball or the tip of an arm or of an angular shaped member as may be desired, it being understood that it is in fact a conducting terminal.

The rear part 22 of the swinging arm 19 is provided at its rear end with a weight 24. This weight may be of any desired form, but preferably will be made removable so that different weights may be substituted for it and it may be made adjustable on the rear end portion 22 of swinging arm 19. The combined weight of the rear portion 22 of swinging arm 19 and the weight 24 is less than the combined weight of the front portion 21 and the gap ball 23, but will be made only slightly less so that the balance may be forced outward and the gap widened under pressure of arcing from an excess current.

The rear portion 22 of swinging arm 19 being overbalanced by the front portion and gap ball 23 is held in desired position by contacting under a transverse rod 25. This rod is held for vertical adjustment along the rear faces of the supporting brackets 12 and 13 under keepers 26 and 27. These keepers are provided respectively with slots 28 and 29 which are vertical and parallel. Adjusting screws 30 and 31 hold the rod 25 in any desired vertically adjusted position. As it comes over the under-weighted rearward extension 22 of the swinging arm it will hold the front end of the swinging arm and the ball 23 in proper position to make the desired minimum gap.

This gap, indicated at 32, is between adjacent surfaces of the conducting point or ball 23 on the front part of the swinging arm 19 and a conducting point 33 secured in conducting relation in any desired manner to the line wire 47 and supported by an insulating stand 34 on the cross bar 10. As shown, the line conducting point 33 is in the form of a ball and has the line wire 47 pass through it and brazed to or otherwise united with it as indicated at 35. Obviously this conducting point may be entirely outside the limits of the line wire 47, may be of any other shape than that of a ball, and may be secured to the line wire as an electrical conductor therefrom in any other desirable manner.

The swinging arm 19, or at least the forward part 21 thereof, is made of good conducting material such as steel. Secured to the swinging arm is the connector bracket or clamp 20 having ears 36 that engage and are secured to the shaft 18 and pivot the swinging arm 21 on and by said shaft. Held upon the top 37 of bracket member 20 by means of a screw 38 is a terminal 39 of ground wire 41 which is held to the side of frame upright 13 by a keeper device 40. The ground wire 41, as heretofore pointed out, is carried to a ground connection indicated at 48 which may be at the base of the telegraph or telephone pole or at any other ground contact. The base 11 of the supporting framework is made of non-conducting material, such as Bakelite or rubber, so that the arm 19 is insulated from any possible

grounding of current, excepting through ground wire 41 and ground 48.

The operation and advantages of my invention, which have become fairly apparent from the foregoing description, are as follows:

By proper adjustment of weight 24 and bar 25 a fixed gap 32 is obtained which will effectively prevent arcing of normal line current but which will permit arcing across of any sudden and dangerous increase of current, such current following the path of least resistance through the forward part 21 of swinging arm 19, its arc across the gap 32, and through ground wire 41 to ground 48. Thus the arrangement will not affect the normal operation of the line wire. When, however, from lightning or other cause, such as contacting a high voltage wire, the current is substantially increased to an extent which might be injurious to the line wire and the instruments connected therewith, the gap 32 will be bridged by an electric arc which will take off the excess current and carry it safely to ground.

The entire construction, as can readily be seen, is very simple and may be easily attached at numerous places on standard cross bars of telegraph and telephone poles to protect all line wires for use in telephone or telegraph systems. The entire arrangement can be very simply supported upon and attached to the upper surfaces of the cross bars of telegraph or telephone poles, and the accurate adjustment of gap, determined as to width by suitable test, can be very quickly obtained. When so applied, the arrestor, as has been proved by its actual use, fully safeguards both materials and human life against injury from accidental flow of excessive electric current over the line wires.

In operative position the gap 32 will always be held at a minimum by contact of the rear end 22 of gap lever 19 against the under side of the transverse bar 25. Hence, the gap can not be made smaller or small enough to permit arcing from normal line wire current. When, however, an excess current from lightning contacting a high voltage wire or the like, as above noted, passes through the line wire not only will the gap be bridged by an arc but the pressure of the arc will widen the gap itself to adjust it to the strength of flash current and will return to minimum only when the excess current has been withdrawn from the line wire.

I claim:

1. In combination with a cross-bar and a line wire supported thereby, said support including a contact member in circuit with the line wire, a current arrestor comprising a frame supported by the cross-bar having a vertical standard, means on the frame for supporting the standard and insulating it from the cross-bar, a horizontal shaft mounted upon said standard, a conducting member mounted upon said shaft to swing in a vertical plane and having a conducting point on one side of it and an extension on the opposite side, the conducting point being positioned to come opposite the contact member with a gap between them, a horizontal bar vertically adjustable and extending above and contacting the extended part of said swinging member for adjusting the width of the gap to prevent arcing of normal line wire current but to permit discharge arcing of excess current, and a ground connection to said conducting member.

2. In combination with a cross-bar and a line wire supported thereby, said line wire support in-

5

cluding a contact member in circuit with the line wire, a current arrestor comprising a frame supported by the cross-bar having a pair of spaced standards, a horizontal shaft pivotally mounted upon said standards to bridge the gap between them, a member formed of conducting material mounted for swinging movements upon said shaft and having a conducting ball at one end thereof and a rearward extension to the opposite end, the conducting ball being positioned to come opposite the conducting member with a gap between them, a weight on the extension so the combined weight thereof with the extension will almost, but not quite, overbalance the swinging arm and conducting ball, a vertically adjustable bar above and contacted by the extension to vary the width of the gap so as to prevent arcing of normal line wire current but to permit arcing of excessive current, the balanced mounting of the swinging member being such that the pressure of excessive current will effect widening of the gap between the contact ball and the contact member, and a ground wire supported by the frame and having conducting connection with the swinging member for carrying said arcing excess current to ground.

3. In combination with a cross-bar and a line wire supported thereby, said support including a contact member in circuit with the line wire, a current arrestor comprising a frame having a pair of spaced standards, a base member for said standards supported upon and insulating the standards from the cross-bar, a horizontal shaft pivotally mounted upon said standards to bridge the gap between them, a swinging member on

6

said shaft formed of conducting material and adapted for swinging movements between said standards, a conducting ball at one end of the member and a rearward extension at the opposite end, a weight removably mounted upon said rearward extension to adjust its combined weight with the extension so as to nearly equal but be overbalanced by the weight of the forward part of the swinging member and the conducting ball thereon, a bar mounted upon the rear walls of the two standards so as to be engaged on its underside by the overbalanced rear portion of the swinging member, means for securing the bar in lifted or lowered horizontal position so as to effect widening or narrowing of the width of the gap to an adjusted width, said gap width being such as to prevent arcing of normal line-wire current but to permit arcing of excessive current, the slightly overbalanced mounting of the contact ball being such that pressure of excessive current will effect widening of the gap, and a ground wire supported by the frame and connected with said conducting member for carrying said arcing excess current to ground.

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The following references are of record in the file of this patent:

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