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FOREIGN MATERIAL ELIMINATOR AND AERIAL WARNING
MARKER FOR OVERHEAD CONDUCTORS
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Fig. 1.

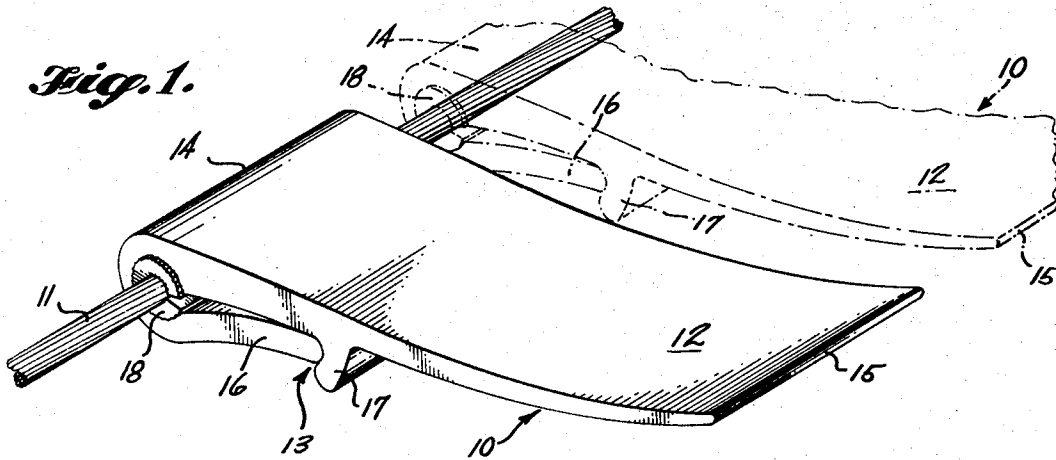


Fig. 2.

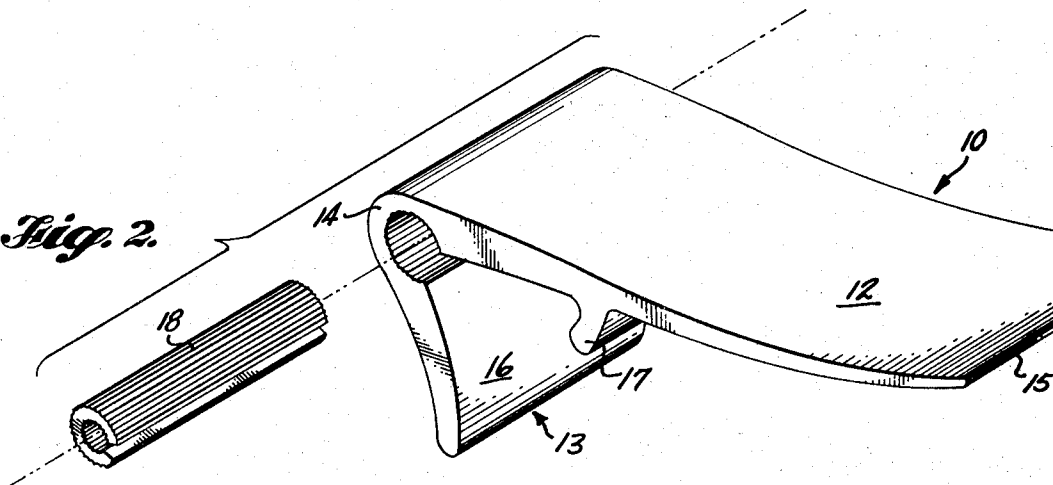
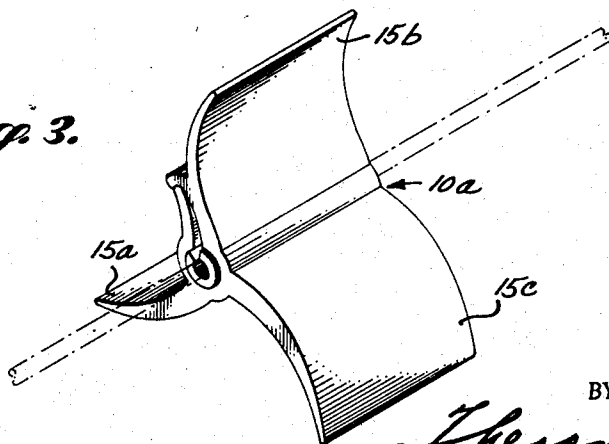


Fig. 3.



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FOREIGN MATERIAL ELIMINATOR AND AERIAL WARNING MARKER FOR OVER-HEAD CONDUCTORS

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ABSTRACT OF THE DISCLOSURE

A foreign material eliminator and aerial warning marker for an overhead electrical conducting wire exposed to the elements wherein snow, ice, or any other heavy material may collect on and overload the wire comprising a single vane device, or a plurality of elongated vanes devices rigidly clamped to the wire and axially spaced along the wire, whereby torque generated by the vane loaded with the foreign material overcomes the torque in the wire to accordingly swing downwardly to discharge the load, and then immediately returns to its original horizontal position for automatically and periodically discharging a predetermined load of the foreign material that has collected on the wire.

This invention pertains to a device for eliminating foreign material from collecting to a dangerous degree on wires exposed to the elements of weather.

More particularly this invention comprises a mechanical device for dislodging and unloading snow and therefore most instances of ice from off outside wires, or wires in such locations that they acquire accumulations of foreign materials.

The accumulation of snow on high lines and other outside wires will destroy or will cause damage to the wires and supporting structure amounting to thousands of dollars cost each year in the United States alone.

In all areas subject to snow and freezing temperatures, expensive cable and supporting tower constructions are required to withstand the excessive loading conditions due to occasional accumulations of snow and ice. And it is not uncommon for extra large and strong wires to break under the load of snow and ice while being whipped by a strong wind or mild gale. Accordingly, the breaking down of outside wires or transmission lines and/or the excessive reinforcing of these outside wires is an expensive problem to solve.

Accordingly, a principal object of this invention is to provide a simple, economical foreign material eliminator for wires so that lighter and less expensive wires and supporting tower constructions therefor may be utilized.

Another object of this invention is to provide a positive action and self-resetting device for unloading accumulations of foreign material, as snow or ice on snow from transmission cables, for example.

Still another object of this invention is to provide an automatic device for allowing a limited amount of accumulation of foreign material, as snow and ice, on an outside wire or cable, and periodically discharging the load prior to the wire reaching the breaking point.

A still further object of this invention is to provide a device for automatically discharging a predetermined load of foreign material from a wire, and which device is easily attachable and detachable from the wire with an integral locking device.

A still further object of this invention is to provide a non-oriented, automatic discharging and resetting foreign material eliminator for wires and having at least three vanes.

Other objects and various advantages of the disclosed

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foreign material eliminator for wires will be apparent from the following detailed description, together with the accompanying drawings, submitted for purposes of illustration only and not intended to define the scope of the invention, reference being had for that purpose to the subjoined claims.

Briefly this invention comprises a foreign material eliminator for a wire for automatically and periodically discharging a predetermined load of the foreign material as snow, ice, or any other heavy material that has collected on the wire. It comprises a single vane device, or a plurality of elongated vane devices rigidly clamped to a wire and axially spaced along the wire, each vane being clamped at a position on the wire whereby its static position is substantially horizontal whereby as the accumulation of foreign material builds up to the predetermined amount, the torque generated by the weighted vane overcomes the torque in the wire to accordingly swing downwardly to discharge the load, and then immediately returns to its original horizontal position. The preferred embodiment comprises a single vane. A modification comprises three vanes radiating from a common wire clamp which can be clamped at any position radially about the wire. The wire is accordingly maintained free of detrimental heavy loads caused by accumulations of foreign material.

The drawing diagrammatically illustrates by way of example, not by way of limitation, two forms of the invention wherein like reference numerals designate corresponding parts in the several views in which:

FIG. 1 is a perspective view of the foreign material eliminator for wires shown locked to a wire and before being released so that its weight rotates the vane to a horizontal position for collecting the foreign material;

FIG. 2 is a perspective view of the device per se of FIG. 1 in unlocked position in preparedness for insertion of a bushing and attachment to a wire; and

FIG. 3 is an end view of a modification of the device of FIG. 1.

The invention, the scope of which being defined in the appended claims is not limited in its application to the details of construction and arrangement of parts shown and described, since the invention is capable of other embodiments and of being practiced or carried out in various other ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

FIG. 1 illustrates the disclosed foreign material eliminator 10 rigidly clamped to a wire 11. While the primary purpose is to prevent a great detrimental buildup of snow and ice on the wires, the eliminator likewise prevents the precarious build-up of any other foreign material having a weight great enough to overload and break the wires.

FIG. 2 illustrates the foreign material eliminator 10 comprising principally vane 12 and locking means 13.

Vane 12 is formed of any suitable material such as, but not limited to extruded or injection molded plastic as Teflon, so that any foreign material will slide off when rotated to near the vertical position. Other usable materials would include nylon, polyethylene, etc. While only two short vanes are illustrated in FIGS. 1-3, to be positioned in the center of a span, obviously the vane may be very wide, extending substantially from pole to pole covering most of the wire, or any number of narrow vanes may be utilized as desired, all spaced equally or otherwise along the wire between the supporting poles.

The foreign material eliminator is impregnated with the desired color of a suitable dye or coloring material. The desired color is fluorescent orange or red. This, as a visual warning means will prevent low flying aircraft and helicopters from colliding with the lines or wires, particularly near airfields, crop dusting areas, etc.

The vane 12, FIG. 2 has the locking means 13 integral with the inner end 14 and the outer end 15 preferably being tapered and comprising an arcuate portion curved upwardly slightly for weight control and increased load carrying capacity.

Locking means 13 comprises preferably, but not limited to, a resilient locking lever 16 integral with the vane end 14, formed at an angle substantially between 60° and 90° with the vane, a catch 17 formed integral with the vane, and a split bushing 18, FIG. 1, for maintaining a rigid, fixed, or integral connection between the vane and wire. This split, serrated bushing 18 may be comprised of rubber or synthetic rubber and of various inside diameters to accommodate lines of different outside diameters. The internal arcuate surface of the inner end of the locking lever 16 is serrated to lock with serrations on the external surface of the bushing 18 therein, and serrations on the internal surface of the bushing increase the clamping action or friction between the bushing and the wire.

To insure removal of the snow or any other foreign material that may tend to adhere to the vane, the wind acting on the aerodynamically shaped vane will cause a flutter, vibration, and/or line oscillation for additional implementation of snow removal.

In operation, the foreign material eliminator 10 with the split bushing 18 therein is hooked over the wire in a tilted up position slightly above the horizon as shown in FIG. 1. Then the locking lever 16 is rotated inwardly and snapped under catch 17 to clamp the lever rigidly and firmly to the wire. The tilted up angle above the horizon was only such an amount that the torque generated by the weight of the empty vane rotates the wire and vane to a substantially horizontal or operating position of the vane. As the foreign material collects on the wire covering vane, the torque generated by the extra weight causes the vane to rotate downwardly. Just before the load becomes detrimental, the torque generated is sufficient to overcome the torque of the wire to rotate the wire to a downwardly extending near vertical position to accordingly discharge the foreign material. The residual torque of the wire then returns the empty vane to its original operating position for collecting more foreign material again.

A modification is disclosed in FIG. 3 of a foreign material eliminator 10a having three or more vanes 15a, 15b, and 15c, each integrally connected to a center portion having a split bushing similar to that of FIGS. 1 and 2, if so desired. All other parts of eliminator 10a are similar to the corresponding parts of the embodiment of FIGS. 1 and 2.

The main purpose of the symmetrical, three-vaned configuration is to provide an automatic foreign material eliminator that does not require orientation with respect to the horizon when clamped to the wire. This particular configuration may be installed on the wire on the ground, if so desired. This modification is very useful where the wire span is inaccessible from the ground, such as power lines strung over deep canyons or rivers, etc.

Since the foreign material eliminator of FIG. 3 may be fixedly secured to a wire in any position, the snow collects on the vane having the greatest vertical projected area on a horizontal plane for swinging or rotating that vane downwardly to a substantially vertical position for discharging the foreign material.

While only two embodiments of the invention have been shown in the accompanying drawings, it will be evident that various other modifications are possible in the arrangement and construction of the disclosed foreign material eliminator for wires without departing from the scope of the invention.

I claim:

1. A foreign material eliminator in combination with a wire in such a location that it may acquire an accumulation of foreign material comprising,

(a) a clean vane free of foreign material having an inner end and an outer end,

(b) vane locking means fixedly attaching said inner end of said vane to the wire with said vane and its outer end being in an outwardly protruding, substantially horizontal position,

(c) said wire having a torque just sufficient to maintain said clean vane horizontal whereby an additional torque applied to said wire would swing said vane through an angle approaching 90°, and

(d) said locking means being responsive to the additional torque generated in said wire by the accumulation of foreign material on said vane for swinging said vane downwardly for discharging said foreign material from said vane.

2. A device as recited in claim 1 wherein,

(a) said vane is curved upwardly adjacent its outer end when in said substantially horizontal position, and

(b) said vane is tapered toward its outer end.

3. A device as recited in claim 1 wherein,

(a) said vane comprises three equal length vanes radiating from said locking device means,

(b) said vanes being equally spaced around the periphery of said wire whereby at least one of said three vanes is always in position to accumulate the foreign material, and

(c) said locking device means being responsive to the torque generated by the accumulation of foreign material on said one of said three vanes for swinging said one vane with the accumulation downwardly for discharging said foreign material.

4. A device as recited in claim 1 wherein,

(a) a bushing is positioned around said wire,

(b) said locking means comprises a locking lever and latch on said inner end of said vane being locked around and grasping said bushing, and

(c) said bushing is held by said locking lever, whereby said vane may be fixedly attached radially about the wire in said outwardly protruding horizontal position.

5. A device as recited in claim 4 wherein,

(a) said locking lever has serrations internally thereof,

(b) said bushing has serrations on the external surface thereof cooperating with said locking lever serrations, and

(c) said bushing has serrations on the internal surface thereof gripping said wire.

6. A foreign material eliminator in combination with a wire in locations where they acquire an accumulation of foreign material comprising,

(a) a clean vane free of foreign material having an inner end and an outer end,

(b) vane inner end locking device means fixedly attaching said inner end of said vane to the wire with said vane and its outer end being in a first position located substantially on the horizon,

(c) said wire having a first torque just sufficient to maintain said clean vane in said first position whereby an additional torque applied to said wire would swing said vane through an angle approaching 90°,

(d) said locking device means being responsive to the additional torque generated in said wire by the accumulation of the foreign material on said vane for swinging said vane downwardly to a substantially vertical second position for discharging said foreign material from said vane, and

(e) said locking device means being responsive to said first torque for swinging said empty vane back to said original first position.

7. A device as recited in claim 6 wherein,

(a) said horizontal vane is tapered and curved upwardly toward its outer end.

8. A device as recited in claim 6 wherein said locking device means comprises,

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- (a) a resilient locking lever connected to said vane for moving into and out of locking position,
 (b) a bushing between said lever and said vane, and
 (c) a latch for maintaining said lever in locked position.
9. A device as recited in claim 8 wherein, 5
 (a) said lever, vane, and bushing have internal and external surfaces and said wire has an external surface,
 (b) serrations are formed in the surfaces between said lever, vane, and bushing, and 10
 (c) serrations are formed in one of said surfaces between said bushing and said wire.
10. A foreign material eliminator for a wire as recited in claim 6 wherein, 15
 (a) three vanes radiate from said locking device means, and
 (b) said vanes are equally spaced around the periphery of the wire.
11. A foreign material eliminator as recited in claim 6 wherein, 20
 (a) said vane comprises a material impregnated with a bright fluorescent color to form a visual warning device for low flying aircraft.
12. A foreign material eliminator in combination with a wire adapted to accumulate great and detrimental 25 amounts of foreign material comprising,
 (a) eliminator center portion means fixedly attached circumferentially to said wire,
 (b) a plurality of equally spaced, arcuate vanes fixed

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- to and radiating outwardly from said center portion means,
 (c) said wire having a first torque just sufficient to return the clean vanes to a first position wherein one of said plurality of vanes has the greatest vertical projected area,
 (d) said center portion means being responsive to a second torque generated in said wire by the accumulation of the foreign material on said vane with the greatest vertical projected area for swinging or rotating that vane downwardly to a substantially vertical second position for discharging said foreign material therefrom, and
 (e) said center portion means being responsive to said first torque for swinging or rotating said center portion means to said first position.

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