April 14, 1964 G. W. HARDIN 3,129,281

ELECTRIC FENCE INSULATOR AND POST

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Fig 1.

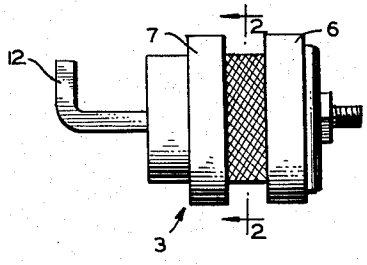


Fig 2.

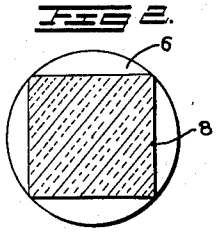


Fig 3.

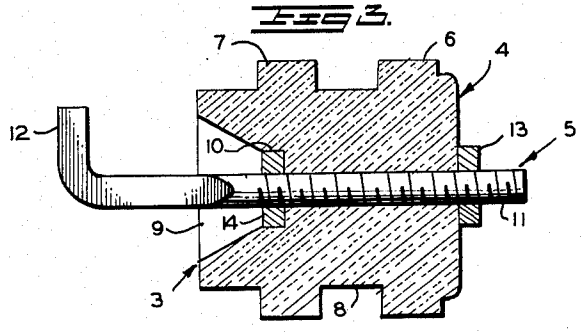


Fig 5.

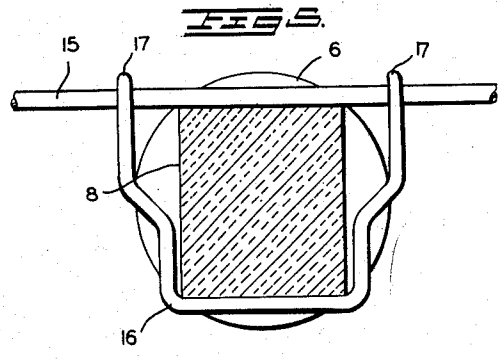
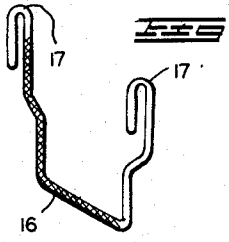


Fig 4.



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ELECTRIC FENCE INSULATOR AND POST

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Fig 6.

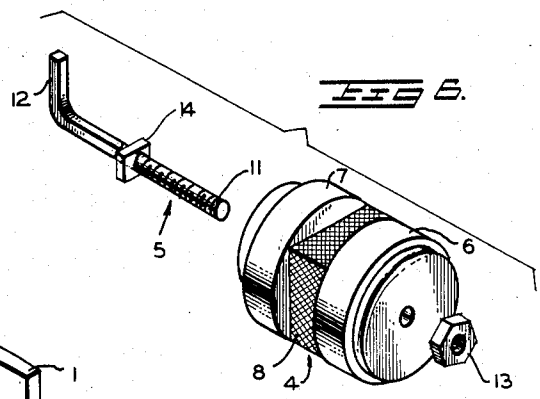
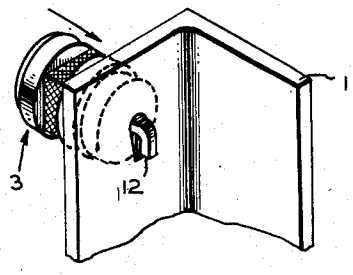


Fig 7.



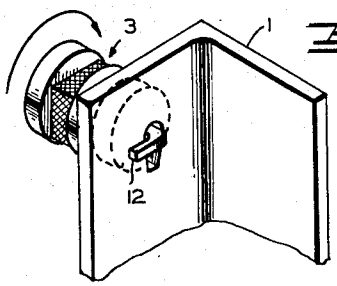


Fig 8.

Fig 9

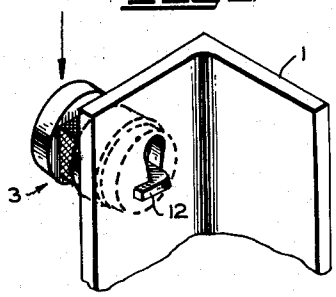
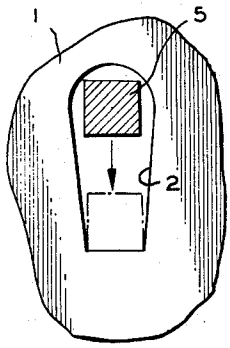


Fig 10



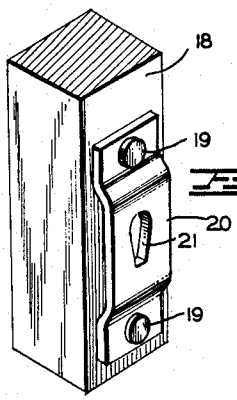


Fig 11.

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United States Patent Office 3,129,281 Patented Apr. 14, 1964

3,129,281

ELECTRIC FENCE INSULATOR AND POST

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Filed Sept. 25, 1962, Ser. No. 226,134
4 Claims. (Cl. 174—166)

The present invention relates to electric fences and provides a novel combination of cooperating post and insulator for mounting an electrically charged wire.

Electric fences are widely used to enclose pasturing and grazing fields for various kinds of livestock. They consist of a series of posts which support one or more conductor wires which are energized by an electric current designed to shock any animal coming into contact with the wire and thus tend to keep the animal from breaking through the fence. The posts are generally made of metal, although wood is sometimes used, and in either case it is necessary to insulate the wire from the posts.

An important object of the present invention is to provide an improved insulator for the foregoing purpose.

A related object is to provide an improved combination of fence post and insulator, cooperating in a new way to facilitate rapid mounting of the insulator on the post and rapid attachment of the wire to the insulator.

A further object is to provide a highly practical and efficient insulator which can be produced at a minimum cost.

A related object is to provide an insulator of the class described which comprises essentially a knob of non-conducting material and an element for mounting the knob on a post, with the knob and element so formed as to be capable of assembly by unskilled persons using only the simplest of tools, such as a pair of pliers or a hand wrench, and so shaped as to be capable of assembly in a correct relationship only, so that the parts can be sold to the farmer separately and unassembled and the labor of assembling left to spare time occupation by members of the household, including children, thus reducing the cost of the completed insulator.

A further related object is to provide a two-part combination of insulator knob and fastener element therefor in which either of the components can be replaced instantly and at minimum cost whenever broken, bent or otherwise damaged.

Another object is to provide a type of connection between the insulator and the supporting post which makes for rapid mounting and equally rapid disconnection by simple insertion and rotation of a hooked projection formed on the insulator and which includes specially treated surfaces on the insulator which preclude and prevent accidental and undesired rotation of the insulator to disconnecting position incident to unusual and abnormal contingencies, such as the application of tension stresses to the wire, thrusts against the posts, etc.

Other and further objects and advantages of the invention will be apparent to those skilled in the art from the following description of the preferred embodiment of the invention which is illustrated in the accompanying drawings.

In these drawings:

FIGURE 1 is an elevational view of an insulator constructed in accordance with the principles of the present invention;

FIG. 2 is a transverse or diametrical cross sectional view taken on the line 2—2 of FIG. 1;

FIG. 3 is an axial or longitudinal cross sectional view taken through the insulator of FIG. 1;

FIG. 4 is a perspective view of the wire-securing clip used with the insulator;

FIG. 5 is showing the clip mounted in wire-securing position on an insulator;

FIG. 6 is an exploded perspective view of the several parts forming the insulator;

FIGS. 7, 8 and 9 are perspective views of a portion of a metal fence post illustrating successive steps in the operation of mounting the insulator thereon;

FIG. 10 is a detail transverse cross sectional view through the fastener element of the insulator showing in full and broken lines respectively the initial and final positions taken by the fastener in relation to the fence post; and

FIG. 11 is a perspective view of a wooden fence post equipped with an insulator-mounting attachment.

In these figures the reference numeral **1** designates, in FIGS. 7, 8 and 9, a preferred and familiar type of metal fence post which consists of a simple length of angle iron stock of appropriate height and flange size. Neither of these dimensions is part of the present invention as long as one of the flanges is wide enough to be slotted with an opening **2** as shown in detail in FIG. 10. This slot includes an upper wide opening and a communicating lower narrower opening. That is to say, the slot is upright and tapers from top to bottom. The flange should be wide enough to leave sufficient area of metal around the slot to protect the slot from mutilation and to provide a reasonable bearing seat for the insulator which will now be described.

The insulator, designated generally **3**, comprises two principal parts: a knob **4** and a fastener element **5**. The knob is made of non-conducting material, such as porcelain or other ceramic material and is of generally cylindrical shape. Specifically, the knob is preferably made in what may be regarded as generally spool shape, with two cylindrical portions, one at substantially what may be considered the outer end designated **6**, and the other at or adjacent to the inner end designated **7**. Between these two portions **6** and **7** is a central zone **8** which is rectangular in cross section and of reduced size, being preferably made substantially square as shown in the drawings.

The knob is molded with an axial bore which is enlarged at its inner end by a flaring cavity **9** which tapers inwardly to a seating socket **10** which is rectangular and the four sides of which are parallel to the four sides of the central zone **8** of the knob.

The fastener element **5** is a simple length of heavy stiff wire stock, or very light rod material, comparable to that of which a ten penny nail would be made. In the illustrated embodiment of the invention the shank of this element is threaded at one end portion, as shown at **11**. The other end portion is rectangular, preferably square, in cross section, and the terminal is bent right angularly to form a hook **12**. The proportions of the fastener and the knob are such that the fastener can be inserted into the bore of the knob and both ends will project from the knob, the end portion opposite the hooked end protruding, far enough to receive a holding element, such as the nut **13** which can be threaded down a few turns on the shank of the fastener, and the hooked end projecting from the opposite, or inner, end of the knob by an appreciable spacing, as shown in FIGS. 1 and 3.

Cooperating with the nut **13** in holding the fastener in the knob is an abutment **14** which is securely fixed on the shank, against rotation thereon, at such a point that when the abutment is seated in the socket **10** the two ends of the fastener **11** and **12** will project the desired distances from the ends of the knob.

The shape of the abutment **14** is important, and so is its relation to the shank of the fastener, not only with respect to its distance from the two ends of the shank but also with regard to the orientation of the sides of the abutment and the plane of the hook **12**.

Thus the abutment **14** is of the same shape as the

socket 10, so that it seats snugly and non-rotatably therein. Moreover, the abutment is fixed on the shank of the fastener in such a position that two of its parallel sides are parallel to the plane of the hook 12.

The abutment may be fixed on the shank of the fastener in any of several ways. It can be threaded on and jammed tightly down at the end of the thread, or it might be affixed with a spot of solder, or peened in place.

As has been seen, the sides of the socket 10 are each parallel to one of the four sides of the rectangular zone 8. It follows that the fastener 5 can be inserted into the bore of the knob 4 only in such a way that the plane of the hook will be parallel to two of the four sides of the zone 8 of the knob (and of course normal to the parallel planes of the other two sides).

The fastener and knob being thus assembled, and being held securely together by turning up the nut 13, the insulator is mounted on the post 1 by the simple operation shown progressively in FIGS. 7, 8 and 9. The insulator is held so that the hook 12 is downwardly directed as shown in FIG. 7, in which position the hook can be passed through the slot 2. With the insulator held in the FIG. 7 position, with the straight portion of the shank in the upper, relatively wide part of the slot, the parts being in the full line position shown in FIG. 10, the knob is turned ninety degrees in either direction, to the horizontal position of the hook shown in FIG. 8. Then the insulator is lowered to seat the straight portion of the shank in the bottom of the slot, to the position shown in broken lines in FIG. 10. The parts are so proportioned that the nearly parallel sides of the slot will engage, or substantially engage, two of the parallel sides of the shank and prevent rotation of the shank. The parts are also preferably so proportioned that the shank jams in the slot and the inner end surface of the knob seats snugly against the face of the post.

Since the plane of the hook is parallel to two of the faces of the rectangular or square zone 8 of the knob, one of those faces will be disposed in a horizontal plane when the hook is in horizontal engaged position. Thus this face of the zone provides a horizontal seat on which an electric wire 15 may be supported, as shown in FIG. 5. The wire may be secured on this seat by a resilient clip 16, in the form of a simple length of spring wire bent into U-shape for embracing the zone 8 of the knob and having hooked ends 17 that can be sprung over the wire 15. It will be understood that in FIG. 5 the electric wire 15 is shown on top of the zone 8 of the knob and the clip 16 is slung beneath it, resiliently holding the wire down on one of the flat faces of the zone 8.

In order to militate against sliding movement of the electric wire along the supporting face of the zone 8 it is desirable to roughen the surface of that zone. This is best accomplished by corrugating or ribbing each of the four surfaces as best shown in FIGS. 1 and 6 by appropriately designing the mold surface in which the knob is cast.

FIG. 11 illustrates an expedient for making it possible to mount the new insulator on a wooden post. Here the post, indicated at 18, has attached to it, as by nails 19, screws or the like, a plate 20 of stout metal having its central portion stamped out so as to be spaced sufficiently from the plane of the end portions to admit the hook 12 of the insulator through the slot 21 formed in this central portion. This slot is identical with the slot 2 of the metal post 1, as will be understood.

An appreciable advantage of the manner in which the fastener element and the knob of the new combination are secured together resides in the fact that the fastener is not molded into the knob as proposed in certain of the prior art insulators of this general type. The firing of ceramic insulating knobs is best practiced at temperatures sufficiently high to damage metallic fasteners. It is obvious that in the present invention the knobs can be fired at any appropriate temperature with no harm to any of the metallic elements that are later to be assembled with them.

It is preferred to market the parts of the insulator separately and unassembled. This not only facilitates replacement of broken knobs and bent or otherwise damaged fastener elements, but it also materially reduces the farmer's costs by relegating the assembling operation to personal or family labor, such as part time work by children of the household.

It will be recognized that the insulator can be removed from the post only by rotation through a reversal of the mounting steps indicated in FIGS. 7, 8 and 9. But such rotation is rendered impossible of accidental occurence because the frictional grip of the clips on the electric wire at each insulator holds the wire from being pulled over the knob surfaces with which it is engaged. Such pulling, if permitted, might conceivably tend to rotate the insulators in much the manner that a rope rotates a pulley over which it is trained. But the roughened surfaces against which the wire is pressed, together with the flatness of those surfaces, makes each post hold its part of the wire, so that thrust against any one point on the wire is not likely to pull the wire along over a plurality of insulators with corresponding stretching of the wire and possible rotation of the knobs to detaching position.

It is believed that the numerous advantages of the invention will be apparent from the foregoing description of the preferred embodiment illustrated in the drawings. It is to be understood that other and further modified forms of the invention are possible within its broadly novel principles as defined by the appended claims.

Having thus described my invention, I claim:

1. An insulator for use in combination with an electric fence post provided with a generally upright slot having an upper wide opening and a lower narrower opening connected with the upper opening, said insulator comprising a knob of non-conducting material having an intermediate portion of reduced rectangular cross section and a substantially central metallic fastener element having a shank protruding from one end of the knob and terminating in a hook of rectangular cross section rightangularly directed in a plane parallel to one of the sides of said rectangular portion of the knob and so proportioned with relation to said slot as to be penetrable therethrough when the hook is in vertical position and to be held securely and non-rotatably on the post with one of the sides of the rectangular portion of the knob disposed in a plane transverse to the length of the post when the hook is turned to horizontal position after being inserted through the slot, the end of the knob from which the hook protrudes, which is adapted to be disposed adjacent the post, being formed with a recess of rectangular shape having sides disposed in planes parallel to the sides of the rectangular portion of the knob and the shank of the fastener element being provided with an abutment fixed thereon complemental in shape to the recess, and being seated therein, and having two parallel side parallel to the plane of the hook, the end portion of the fastener element opposite the hooked end protruding from the other end of the knob, and a holding element engaged with said last named end portion of the fastening element and holding the abutment seated in the recess and securing the knob and the fastening element together against relative rotation and against axial separation.

2. An insulator as claimed in claim 1 in which the end portion of the shank of the fastener element opposite the hooked end is threaded and in which the holding element is a nut engaged on said threaded end portion.

3. An insulator as claimed in claim 1 in which the knob is formed with a radially enlarged portion on each axial side of the intermediate portion for forming with one of the sides of said rectangular portion of the knob a channel for seating a length of fence wire.

4. An insulator as claimed in claim 3 in combination with a length of fence wire seated in the channel and a

generally U-shaped spring clip having an intermediate portion seated against the side of the rectangular portion of the knob opposite the bottom of the channel and having hooked ends engaged over the length of wire and holding the same securely in the channel.

References Cited in the file of this patent

UNITED STATES PATENTS

423,730	Charlton	Mar. 18, 1890
590,462	Peck	Sept. 21, 1897
879,033	Caldwell	Feb. 11, 1908
1,571,762	Driscoll	Feb. 2, 1926
1,816,694	Pope	July 28, 1931
1,867,206	Brady	July 12, 1932
2,222,810	Daily	Nov. 26, 1940
2,406,491	Johnson	Oct. 15, 1946
2,437,613	Redpath	Mar. 9, 1948
2,948,409	Wroblewski et al.	Aug. 9, 1960

FOREIGN PATENTS

10,116	Switzerland	Apr. 25, 1895
840,172	Germany	May 29, 1952