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[54] **ELECTRIC FENCE INSULATOR**

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[52] **U.S. Cl.** ..... **174/163 F,** D26/10, 24/73 AP, 24/129 R, 174/175, 174/211, 248/74 A

[51] **Int. Cl.** **H01b 17/16,** A01k 3/00

[58] **Field of Search** ..... 174/158 F, 161 F, 174/163 F, 168, 170, 174, 175, 211; 24/73 HR, 73 SA, 73 AP, 115 R, 115 G, 115 H, 129 R, 129 B, 129 D, 237, 255 C, 255 SL; 248/74 A, 353; 256/10, 47, 48, 52, 54; D26/10

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[57] **ABSTRACT**

Our all plastic insulator includes a body having two upwardly facing and forwardly projecting hook-shaped members with a sufficiently resilient central tongue therebetween so that the tongue can be flexed upwardly to permit insertion of the electric fence wire into the two hooks, the tongue thereafter preventing undesired removal of the wire. A threaded barrel extends rearwardly from the body and by reason of an elongated slot tapered at its forward end various diameters of fence posts can be accommodated, a nut on the threaded barrel providing the clamping action. The body is structured so as to shed water effectively and also to provide a relatively long non-conductive path between the charged fence wire and grounded post.

17 Claims, 5 Drawing Figures

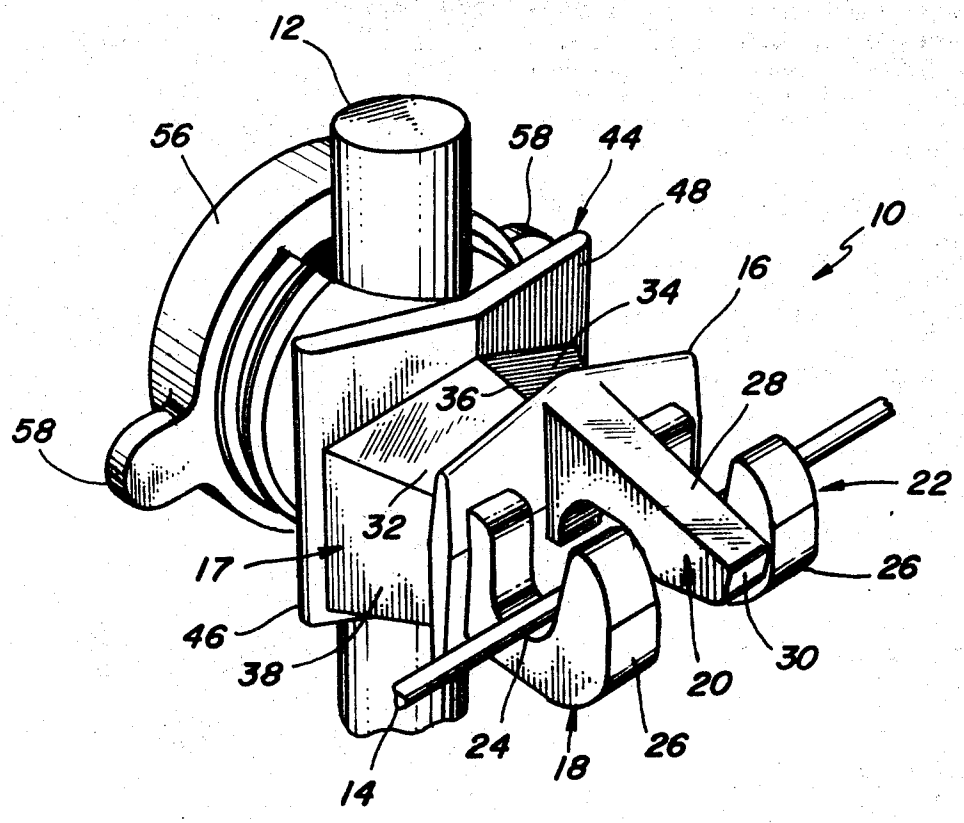


Fig 1

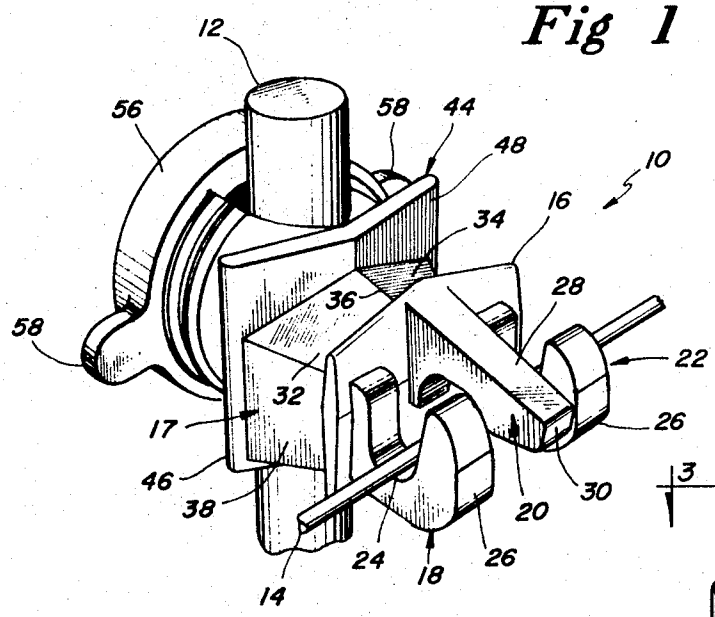


Fig 2

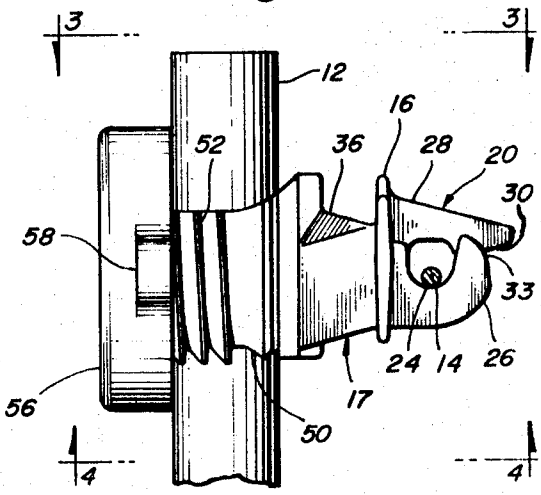


Fig 3

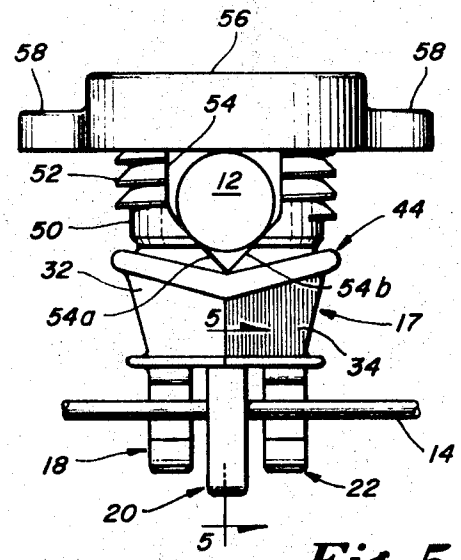


Fig 4

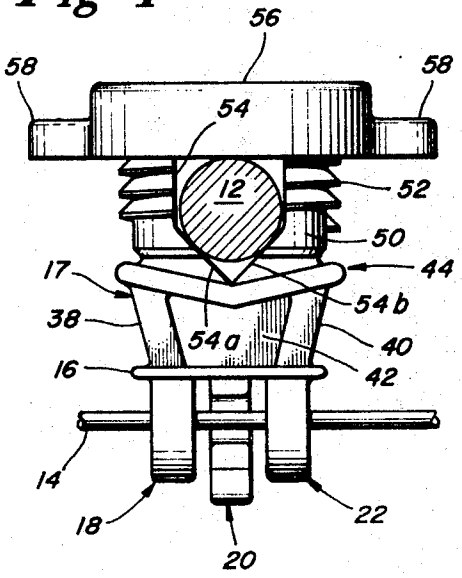
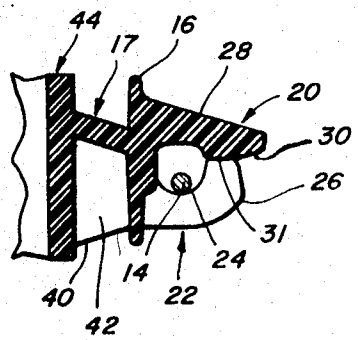


Fig 5



ELECTRIC FENCE INSULATOR

BACKGROUND OF THE INVENTION

This invention relates generally to electric fence insulators, and pertains more particularly to an insulator of this type having no metallic parts.

SUMMARY OF THE INVENTION

One object of the invention is to provide an all plastic electric fence insulator so that any arcing from the fence wire to a portion of the insulator is obviated by reason of the lack of any metal contained in the insulator.

Another object is to minimize the likelihood of arcing between the fence wire and the fence post, an insulator constructed in accordance with the teachings of out invention providing a relatively long dielectric path between the wire and post.

Not only is it an aim of the invention to avoid the use of any metallic parts in the construction of our insulator, thereby contributing to the insulating characteristics thereof, but the lack of any parts of a ferrous nature eliminates all chances of rusting.

Although the invention has for an object the minimizing of arcing possibilities by providing a tortuous and lengthy path, it is a still further object to provide a compact insulator of relatively small dimensions.

A further object of the invention is to provide an insulator that will readily shed moisture, the insulator being configured so as to provide an effective run-off of any water, which moisture, if allowed to collect, would provide a conductive path from the wire to the post.

Yet another object is to provide an insulator that can be easily and quickly attached to a fence post, the insulator being capable of being mounted at virtually any elevation thereon without the use of any metallic fasteners.

Still further, an object is to provide an insulator that will accommodate various sizes of posts, yet permit the secure clamping of the insulator thereto. Also, it is an aim of the invention to accommodate all wire sizes normally used in electric fence installations, including two-strand barbed wire.

Further, the invention has for an object an insulator involving simplified molding techniques.

An additional object is to provide an insulator that will permit the installer to attach an already tightened fence wire, yet effectively prevent its inadvertent release.

A further object is to provide a fence insulator that can be attached to a fence post without tools and in which the fence wire can in turn be attached to the insulator without tools.

Briefly, our invention envisages the employment of a threaded clamping means that enables the user to adjust the insulator vertically on a round post of any conventional size, the insulator being capable of accommodating posts of different cross sections. The body of the insulator is configured so as to provide sloping surfaces which readily shed water, thereby minimizing the chances of moisture collecting on the surfaces of the insulator. Extending forwardly from the body are two hook-shaped jaws and an intermediate resilient tongue for receiving the fence wire therein. The intermediate tongue, which faces downwardly, is sufficiently resilient so that it can be flexed upwardly to permit the insertion of the wire. More specifically, curved surfaces on the two jaw members permit an upward camming of the tongue when the fence wire is forced thereagainst.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of our insulator mounted on a fence post with a fence wire being gripped thereby, both the post and wire being fragmentarily pictured;

FIG. 2 is a side elevational view;

FIG. 3 is a top plan view of our insulator taken in the direction of line 3—3 of FIG. 2;

FIG. 4 is a bottom plan view taken in the direction of ling 4—4 of FIG. 2, and

FIG. 5 is a sectional view taken in the direction of line 5—5 of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The perspective view constituting FIG. 1 shows our electric fence insulator in its entirety, the insulator having been generally denoted by the reference numeral **10**. The insulator **10** is pictured as being clamped at a preferred elevation to the upper portion of a round post **12** and a section of fence wire **14** is shown as being held or gripped by the insulator. Although shown as a single unbarbed strand, it will be appreciated that it may be double-stranded barbed wire; also it may be of any conventional gauge.

Prior to describing the insulator **10** in detail, it is to be understood that the entire insulator is fabricated from plastic, preferably linear polyethylene. In other words, the insulator **10** includes no metallic parts whatsoever, the only metallic or conductive elements being the post **12** and wire **14**.

Describing the insulator **10** with greater particularity, it will be noted that the insulator **10** comprises a vertical panel **16** at the front of a body **17**. Projecting from the vertical panel **16** are three members **18, 20** and **22**. These members **18, 20** and **22** are molded integrally with the face plate or panel **16**.

The members **18, 22** constitute hook-shaped jaws which face upwardly, having semicircular grooves **24** therein which cradle the wire **14**. Attention is also directed to curved surfaces **26** on the forward or free ends of the jaws **18** and **22**. The intermediate or central member **20** is in the form of a tongue having a shank **28** which is fairly resilient. It will also be observed that the tongue **20** has a sloping end **30**. As best viewed in FIGS. **3** and **5**, it will be discerned that the sloping end **30** of the tongue **20** extends to an elevation somewhat lower than the upper portions of the curved ends **26** of the jaws **18, 22**, thereby forming a dog or latching portion at **31** (FIG. **5**). The tongue **20** also projects beyond the curved ends **26** of the jaws **18, 22**.

Owing to the convergence or tapering configuration of the ends **26** and **30**, the wire **14** can simply be forced inwardly against these end surfaces to flex the tongue **20** upwardly. Possibly it will be of help to assign the reference numeral **33** to the resulting notch that appears in FIG. **2**. This notch **33** permits a camming action to be derived when inserting the wire **14** that forces the tongue upwardly owing to the resiliency of its shank **28**. The overhang or projection of the end **30** beyond the ends **26** (as seen in FIG. **2**, and also FIG. **5**) facilitates the initial insertion or entry of the wire **14**.

Once inserted, the wire **14** is held captive by the three members **18, 20** and **22.** Obviously, if the wire **14** is to be intentionally withdrawn, one can simply force the tongue **20** upwardly with one's fingers and the wire **14** can be retracted past the thus raised dog **31.** However, any inadvertent detachment by cattle is made most difficult, especially when the wire is charged, and therefore the wire **14** is secured gripped for all intents and purposes.

The vertical wall **16** functions as a face plate for the body **17.** It will be noted that the body **17** comprises two top panels **32** and **34,** these panels inclining upwardly and rearwardly to form a peak or ridge **36** therebetween. The peak or ridge **36** is in alignment with the intermediate member or tongue **20.** The panels **32** and **34** also slope downwardly to either side from the peak **36.** Extending downwardly from the edges thereof which are remote from the peak **36** are side panels **38** and **40** which have their forward vertical edges generally aligned with the jaws **18** and **22.** The side panels **38, 40** reside in vertical but rearwardly diverging planes. The body **18,** formed by the panels **32, 34, 38** and **40** has a hollow interior which is open at the bottom as best understood from FIGS. **4** and **5.** The hollow interior has been given the reference numeral **42** in these figures.

The rear edges of the panels **32, 34, 38** and **40** connect integrally with a rear wall **44** composed of two panels **46** and **48** which angle outwardly and rearwadly from the rear end of the previously mentioned peak **36.** It will be noted that the front panel **16** extends upwardly above the top panels **32** and **34** and also extends past the side panels **38** and **40** as well as slightly beneath the lower edges of the side panels **38, 40** (see the relation appearing in FIG. **5** with respect to panel **40**). Somewhat similarly, the rear panels **46** and **48** extend above the top panels **32, 34** and also beneath the side panels **38, 40.** It is important to recognize that any path that leakage current from the highly charged wire **14** might traverse is quite lengthy, being rather tortuous in view of the panel construction that has just been alluded to. While contributing to an effective nonconductive path, it will also be appreciated that the box-like configuration imparted to the body **17** renders it quite strong, the panels all coacting to form a highly rigid body **17.**

A barrel **50** having threads **52** thereon extends rearwardly from the wall **44.** From FIGS. **3** and **4,** it can be seen that the barrel **50** has a vertically oriented slot **54.** The forward end of the slot **54,** this being the end thereof nearer the wall **44,** tapers in the direction of the wall **44.** The tapered wall portions or surfaces of the slot **54** have been labeled **54***a* and **54***b*. A nut **56** that need have only a single thread therein has diametrically projecting ears **58** which can be easily grasped by a person's hand when the nut **56** is to be tightened (or possibly loosened if the insulator **10** is to be removed from the post **12**). From FIGS. **3** and **4** it will be appreciated that a three-point clamping action is produced, this being at approximately 120° angularly spaced locations by reason of the taper or angularity given to the wall surfaces **54***a* and **54***b* of the slot **54.**

While a fence post **12** having a relatively large diameter has been pictured, it will be appreciated that a smaller cross section post can readily be accommodated in the slot **54** owing to the angularity of the wall surfaces **54***a* and **54***b*. All that is required is that the nut **56** be advanced farther along the barrel **50** to engage a smaller cross section fence post.

Although the foregoing description is believed adequate to provide a full comprehension of the benefits to be derived when practicing our invention, nonetheless a brief review of what is involved might be of some additional help. Therefore, with the nut **56** either removed from the barrel **50** or at least loosened sufficiently to enable the insulator **10** to be placed over the upper end of the post **12,** the insulator **10** can be lowered to the proper elevation that is required. When the correct positioning is achieved, then the nut **56** is manually tightened to hold the insulator **10** in place.

Although the wire **14** can be tightened or pulled taut after it is engaged and held by the members **18, 20** and **22,** it is advantageous to have an insulator that will receive a previously tightened wire. Therefore, assuming that the wire **14** has been pulled taut, then it need be only brought into juxtaposition with the curved surfaces **26** on the jaws **18, 22** and the sloping surface **30** on the tongue **20.** The notch **33** shown in FIG. **2** has already been alluded to and readily accommodates all conventional wire sizes, including double-strand barbed wire. It is believed obvious that the surfaces **26** and **30** enable a camming or flexing of the tongue **20** to take place, the sloping end **30** being forced upwardly by pressing the wire horizontally against the surfaces **26** of the more rigid hooks **18, 22.** The additional length imparted to the tongue **20** provides an overhang that enables the installer to readily effect the insertion, for he can initially raise the wire **14** somewhat so that it abuts the underside of the sloping end **30.** Having done this, he then pushes the wire **14** inwardly to produce the aforesaid camming, the wire reactively riding over the curved surfaces **26** in the process.

When the tongue **20** has been flexed upwardly enough, the wire **14** simply snaps into place and the sloping end **30** springs back to its normal or wire-retaining relationship. This wire-retaining relationship is such that the sloping end **30,** more specifically the dog **31** thereon, functions as a detent which prevents any inadvertent detachment of the now held wire **14.** Consequently, the wire **14** is held captive within the notches **24** of the jaws **18** and **22.** If for any reason, the wire **14** is to be released, the tongue **20** can be forced manually upwardly to raise the sloping surface **30** sufficiently so that the wire **14** can be withdrawn.

It might also be pointed out that the insulator **10,** if not accurately positioned initially on the post **12,** can be raised or lowered as circumstances require to obtain the proper elevation for the wire **14** without detaching the wire from the jaws **18, 22** and the tongue **20.** Loosening of the nut **56** is all that is needed.

It is very important to appreciate that the only metallic members are the posts **12** and the wire **14** which are not part of the insulator **10.** The insulator **10** has no metallic parts as has been necessary in some of the prior art insulator arrangements with which we are acquainted. Consequently, there can never be any arcing from the wire **14** to a metallic part of the insulator **10** (for no metallic parts are employed). The only possible path is from the wire **14** to the post **12.** However, an exceedingly lengthy and tortuous route must be traversed in order to provide any leakage or shorting. First, the current would have to flow from the wire over a portion or portions of the members **18, 20, 22** to the vertical panel or face plate **16,** then over the upper or lower

edges (or the side edges) to the various panels **32, 34, 38** and **40**. After flowing over the full fore-to-aft dimension of these panels, there would still be an additional electric hurdle by reason of the wall **44** composed of the panels **46** and **48**. The current flow would have to be over the upper edge of the wall **44** (or down beneath the lower edge or past one of the side edges) in order to reach the barrel **50**. Still further, it is necessary that the current flow over a curved portion of the barrel before it reaches the post **12**.

Not only do all of the panels provide an extremely long electrical path that must be followed, but the slope of these panels is such as to effectively shed any water that might otherwise collect and contribute to the shorting or leakage action. When it is appreciated that a large number of insulators are usually used in conjunction with an electrical fence, it becomes highly desirable that no individual insulator create a leakage path, for a number of leakage paths in parallel will provide an undue drain on the electrical charging system, which obviously is to be avoided if a high electrical potential is to be maintained between the wire **14** and ground; each fence post **12** being of metal is, of course, grounded.

Not only are the electrical insulating characteristics superb with our insulator **10**, but for the compact size thereof it is exceptionally sturdy and rugged, thereby resisting breakage by virtue of any impact loads that our insulator might be subjected to. Therefore, the insulator **10** is not only efficient but exceedingly long lasting as well. Still further, out insulator **10** can be held at any desired height on the fence post **12**. Furthermore, the cross section of the fence post **12** is not critical because the barrel **50** is structured so as to accommodate a reasonable range of post diameters.

We claim:

1. An electric fence insulator comprising dielectric body means adapted to be attached to a fence post, a pair of integral dielectric hook-shaped jaw members projecting generally horizontally from said body means at one elevation for receiving a fence wire therein, the forward ends of said jaw members sloping in one direction, and an intermediate resilient tongue member of plastic material projecting horizontally from said body means at a different elevation from said jaw members for retaining said wire in said jaw members, the forward end of said tongue member sloping in an opposite direction to the one direction in which the forward ends of said jaw members slope to form a dog portion, said tongue member being vertically thinner between said dog portion and the end thereof connected to said body means.

2. An electric fence insulator in accordance with claim **1** in which said tongue member projects farther from said body means than said jaw members.

3. An electric fence insulator in accordance with claim **1** in which said one elevation is below said different elevation and said jaw members are provided with horizontally aligned upwardly facing notches between said body means and their said sloping ends, said sloping ends sloping upwardly to form the upper edges of said upwardly facing notches, and the dog portion of said tongue member being horizontally aligned with said upper edges and said tongue member having an elongated shank curving upwardly to cause said tongue member to be vertically thinner between said dog portion and the end thereof connected to said body means, thereby rendering said tongue member sufficiently resilient so that the sloping end of said tongue member which is normally at said different elevation can be cammed upwardly by the fence wire to permit the reception thereof in the notches of said jaw members.

4. An electric fence insulator in accordance with claim **1** in which said body means includes a vertical panel of plastic material having an upwardly projecting marginal portion, said tongue member being integral with said upwardly extending marginal portion, said jaw members projecting forwardly from said panel, said one elevation being lower than said different elevation.

5. An electric fence insulator in accordance with claim **4** in which said body means includes additional panels extending rearwardly from said vertical panel.

6. An electric fence insulator in accordance with claim **5** in which said additional panels include a pair of top panels inclining upwardly and rearwardly from said vertical panel.

7. An electric fence insulator in accordance with claim **6** in which the adjacent edges of said top panels form a peak or ridge inclining rearwardly in a generally fore and aft alignment with said tongue member.

8. An electric fence insulator in accordance with claim **7** in which said additional panels further include a pair of said panels extending rearwardly from said vertical panel.

9. An electric fence insulator in accordance with claim **8** in which said side panels have their forward edges in general alignment with said pair of jaw members and their rear edges spaced farther apart to provide a pair of rearwardly diverging panels.

10. An electric fence insulator in accordance with claim **9** in which the upper edges of said diverging side panels are joined to the edges of said top panels remote from said peak.

11. An electric fence insulator in accordance with claim **10** including a dielectric vertical rear wall joined to the rear edges of said top panels and to the rear edges of said side panels, said rear wall extending above the rear edges of said top panels.

12. An electric fence insulator in accordance with claim **11** in which said vertical wall includes a pair of panels angling rearwardly from the rear end of said peak.

13. An electric fence insulator in accordance with claim **11** including a threaded barrel projecting rearwardly from said rear wall at an elevation beneath the upper edge of said rear wall, said barrel having a vertical slot therein for the accomodation of the fence post.

14. An electric fence insulator in accordance with claim **13** in which the forward end of said slot tapers toward said wall so that said rear wall is spaced forwardly from a fence post having a circular cross section.

15. An electric fence insulator in accordance with claim **14** including a nut threadedly carried on said barrel for engaging said post and pulling the tapered ends of said slot against said post.

16. An electric fence insulator of plastic material comprising a relatively thin vertical panel, integral body means extending rearwardly from the lower portion of the rear side of said vertical panel so as to provide said vertical panel with an upstanding marginal portion extending above said body means, a resilient tongue member projecting forwardly from the front side of said marginal portion, and a pair of hook-shaped jaw members projecting forwardly from the lower por-

tion of the front side of said vertical panel, said jaw members being substantially at the said elevation as the rearwardly projecting body means, said tongue member having a downwardly sloping surface extending from its foremost edge in the direction of said vertical panel and said jaw members having surfaces sloping upwardly toward said vertical panel to form a notch with the sloping surface on said tongue member so that a wire can be forced into said notch to cause said tongue member to be flexed upwardly.

17. An electric fence insulator in accordance with claim **16** in which the integrally connected end of said tongue member extends vertically throughout the height of said marginal portion, said tongue member curving upwardly away from said connected portion and then downwardly to form a downwardly facing notch, said tongue member having a dog portion between said downwardly facing notch and said downwardly sloping surface, and said jaw members having connected portions having a height corresponding to the height of said rearwardly projecting body means, said notches curving downwardly from the upper edge of the connected portion and then curving fowardly and upwardly to said upwardly sloping surfaces on the jaw members to provide upper edges which are in horizontal alignment with said dog portion and over which the wire rides when a wire causes said tongue member to be flexed upwardly, said upward flexing being caused by the wire camming against said dog portion.

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