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D. H. SMITH

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INSULATOR SHIELD

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FIG. 1

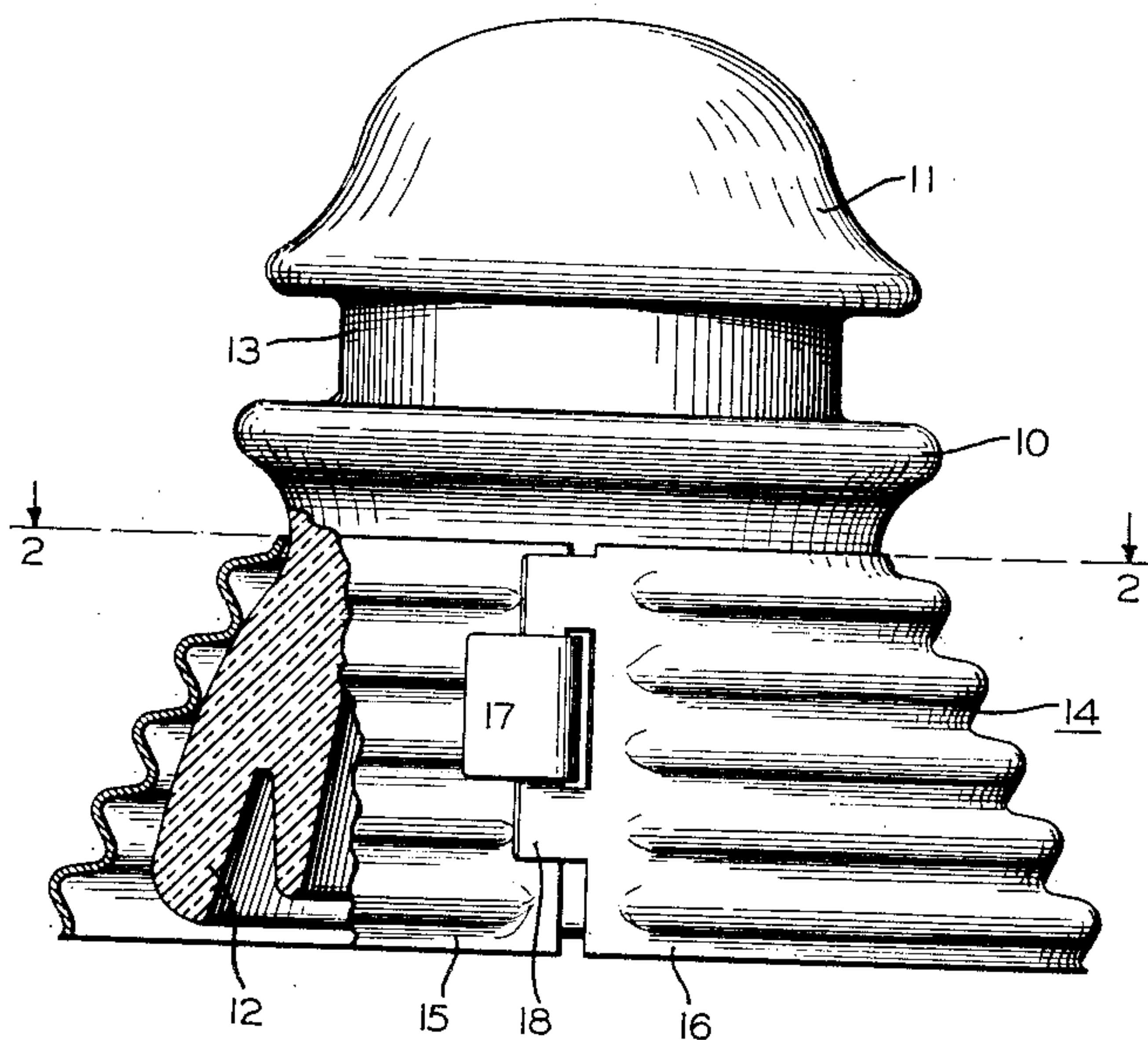
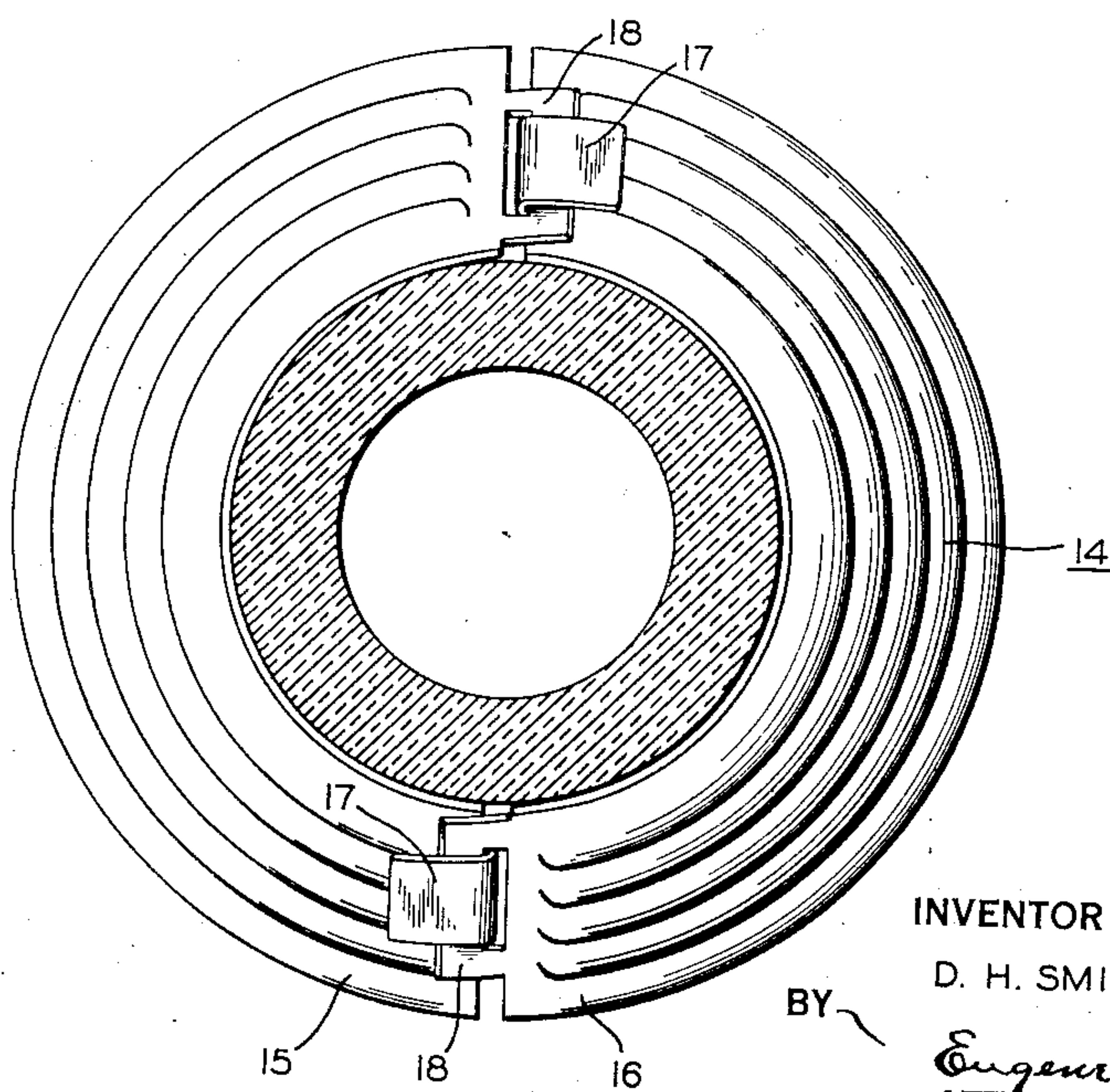


FIG. 2



INVENTOR

D. H. SMITH

BY

Eugene C. Brown
ATTORNEY

UNITED STATES PATENT OFFICE

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INSULATOR SHIELD

Donald H. Smith, Hempstead, N. Y., assignor to
The Western Union Telegraph Company, New
York, N. Y., a corporation of New York

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8 Claims. (Cl. 173—28)

This invention relates to insulator shields or guards and particularly to guards designed primarily to protect insulators or portions thereof from being broken by stones, missiles, or the like, directed at the insulator.

The principal object of this invention is to provide a shield which will effectively dissipate or absorb the shock of impact of missiles or the like in such a manner as to avoid the transmittal of any considerable portion of the shock to the insulator directly.

In certain areas or localities where telegraph, telephone or similar lines of wires are supported in the open upon poles in the well known manner, considerable difficulty has been experienced in having the insulators broken by stones or the like, thrown by persons indulging in malicious mischief. In certain particular localities where the restraint upon such persons is extremely lax the item of replacing insulators periodically has become not only one of particular annoyance but also one of considerable expense. Therefore, it is highly desirable in some localities to employ some type of protecting means for the insulators. Investigation of devices which have been designed for the protection of insulators has indicated that such devices have not, in general, been practical for use on telegraph, telephone, or similar lines. Among the objections which have been found in such devices are: (1) their cost, (2) the fact that they are not particularly effective, and (3) their adverse effect upon the insulating qualities of the insulator.

Having made this finding a new type of insulator shield was devised according to this invention which not only affords satisfactory protection for insulators but which may be inexpensively manufactured and readily installed upon insulators either before or after the insulators are in place.

Another object of this invention is to provide a shield of the type described herein which is attached loosely to the insulator instead of being affixed relatively rigidly thereto, so that a minimum amount of the shock or impact upon the shield will be transmitted through its mounting to the insulator body.

Another object is to provide an insulator shield which will turn upon its mounting so that the inertia of the shield itself may be effective in partially absorbing the shock or impact of glancing blows.

A further object is to provide corrugations in the body of the shield so that a missile on impacting the shield will in a majority of cases strike

upon the corrugated portions which are held out of direct contact with the insulator body and whereby the yielding or distorting of the corrugations will provide a cushioning effect to the impact.

These and other objects will be apparent from the following description and claims taken in connection with the accompanying drawing forming a part of this application, in which—

Fig. 1 is an assembled view partly in section, and

Fig. 2 is a sectional view on the line 2—2 of Fig. 1.

As shown in the drawing the insulator and shield combination embodies an insulator 10, shown as the ordinary double petticoat type of insulator used largely in the telegraph art. The insulator embodies a head portion 11 and a lower petticoat portion 12. Between the head and the petticoat is a wire groove 13 formed between upper and lower lips. Preferably the petticoat portion of the insulator flares outwardly from the root of the lower lip of the groove 13. The outer surface of the petticoat may be either frustoconical or spheroidal in outline. However, the application of the shield is not limited to this type of insulator. It may be applied to any other types of petticoat insulators which are supported on pins for the purpose of carrying telegraph, telephone, or other types of wires. Where, however, an insulator has a straight cylindrical petticoat, the shield can only be applied if the insulator has a supporting shoulder or bead to engage the upper portion of the shield.

Referring to Fig. 1 the insulator 10 has a shield 14 made of two identical halves 15 and 16. These halves are held together by a tongue 17 provided at one side of each half to pass through the slot of an ear 18 disposed at the other side to cooperate with the tongue. The general shape of each half is that of a truncated or frustated cone divided along its vertical axis. The outline of the half of the shield is more clearly illustrated in Fig. 2. The shield being made in two parts can be placed around the petticoat of the insulator even though the insulator is in service bearing a telegraph wire or the like upon the cross arm of a pole. When the two halves are placed around the petticoat of the insulator and the tongues inserted in the slots, the assembled form of the insulator is that of a truncated cone with its upper edge adjacent the top of the petticoat portion of the insulator and its lower edge just below the lower edge of the insulator as shown in Fig. 1.

The shield is designed so as to permit a moderately loose fit when clamped in place about the upper portion of the petticoat, the fit being such that when the insulator is held rigid, the shield may be readily turned. The advantage of this is that it permits the shield to rotate when impacted with a glancing blow. This assists the shield in warding off the blow and also in largely preventing the transmission of shock to the insulator. The conical dimensions or outline of the shield is such that the lower portion of the shield flares out away from the petticoat giving additional protection from a direct impact which might otherwise be transmitted to the lower or more vulnerable portion of the petticoat. The manner in which this protection is accomplished is due to the fact that while the shield is fitted loosely about the yoke or upper portion of the petticoat, it is preferable that little pivotal or tilting movement of the shield be permitted between it and the insulator. A stone or other missile directed at the shield in order to transmit its shock of impact directly to the petticoat must dent or bend the shield inward at the point of impact. The distance between the shield and the petticoat is preferably of such an amount as to require considerable bending or deformation in order to bring the impacted portion in contact with the petticoat. From the fact that the shield stands off from the petticoat with a flaring or annular separating space therebetween, it will be seen that the less rigid portion of the shield, the lower portion, is positioned farthest from the petticoat. On the other hand, the upper stiffer portion of the shield is positioned closest to the petticoat.

The shield is preferably made of sheet metal embodying corrugations covering substantially its entire surface. In its preferred form a series of corrugations are formed in the metal, by suitable stamping process or otherwise, running parallel to the base of the shield. It has been found in tests that corrugations improve the effectiveness of the shield over that of one not embodying corrugations. However, it has also been found that corrugations are most effective in the form of annular rings substantially parallel to the base of the shield.

Corrugations in the form of annular rings are most effective in that they provide more rigidity to the lower, unsupported portion of the shield than corrugations of other forms, and that they have a tendency to distribute the effect of the blow over a large area of the insulator.

The number and spacing of the corrugations and the rigidity of the metal is also of importance. The corrugations should be so closely spaced that the average missile or stone that may impact the shield will strike upon the outer ridge or body of the corrugations and thereby be prevented from impacting the groove portion of the shield which may be brought into immediate contact with the insulator. It has been found in regard to the rigidity of the metal that if the softness and the gauge of the metal renders the resistance to impact too light, the corrugations in the shield yield too readily and permit the shock to be transmitted directly to the glass at the point of impact. On the other hand, when the gauge is too heavy or the metal too hard the shock is transmitted with sufficient force to cause the insulator to be broken at the point which supports the shield. It was found that if the corrugations were of such size or depth and spaced at such a distance apart as to add materially to the stiff-

ness of the shield formed from a metal of a suitable thickness and hardness, the shield has a sufficient stiffness to stand up under impact and yet have a suitable resiliency to absorb a sufficiently large part of the impact to prevent the shock from being transmitted to the insulator with a force great enough to damage the same.

A specific example of a shield meeting the above requirements will serve to further illustrate the method of construction. It has been found that for a shield having the shape of a truncated cone $1\frac{3}{4}$ inches high and having radii of $2\frac{1}{8}$ inches and $1\frac{1}{4}$ inches respectively at the bottom and top, was required to be made of No. 20 U. S. S. gauge mild steel or No. 22 U. S. S. gauge cold rolled Monel metal. In this shield the corrugations were formed with $\frac{3}{8}$ inch outside radius spaced $\frac{3}{8}$ inch apart on centers. A shield made according to these specifications proved out repeatedly in tests of several samples to best meet the conditions set forth above.

Shields constructed in this manner proved in actual tests capable of withstanding a blow sufficient to shatter the wood cob which supported the insulator without any damage to the latter. In actual field tests the shielded insulators were subjected to as many as 40 to 60 blows with $2\frac{1}{2}$ inch stones thrown by persons from a distance of 5 feet without materially damaging the insulator and without impairing the insulating dielectric strength of the insulator. On the other hand, in the field test unprotected insulators were shattered upon the first direct hit.

Electrical tests made on shielded and unshielded insulators showed that the shielding did not increase the electrical leakage of the insulators.

In other words, insulators may be protected with shields constructed according to this invention without impairment of their insulating properties, and without in any way interfering with the method of installing insulators already in practice. A particular advantage of this type of shield is that it may be installed upon insulators which are in service without in the least disturbing the insulators or the wire or without discontinuing service over the wires while the installation is being made.

Insulator shields which protected the petticoat portion only were found, besides the advantages of installation already set forth, to sufficiently protect insulators from breakage by missiles or stones hurled against them without covering the entire insulator. It was found that no protection was needed for the portion of the insulator above the line of the petticoat. The shape and thickness of the parts of the insulator above this point appear to sufficiently withstand blows to make breakage in this area rather infrequent. It is therefore clearly indicated that if the most vulnerable portion of the insulator was protected, that the insulator as a whole stood up. From the above description it will be seen that a most effective means has been devised for protecting insulators of the pin type having depending petticoats. In addition this has been developed in a form which may be inexpensively manufactured and easily assembled.

It should be understood that the particular shape both of the insulator and the shield shown in the drawing is merely illustrative and that the same principles may be employed for fitting shields to any type of insulator having a vulnerable area which needs protection.

Although this invention has been shown in but one form it will be evident to those skilled in the

art that many other forms and modifications may be employed without departing from the spirit of this invention as described above or as set forth in the appended claims.

5 What is claimed is:

1. In combination with an insulator having a portion thereof subject to breakage by the force of impact of an object, a shield having a substantial portion thereof spaced from and extending over said breakable portion of the insulator to protect the latter from breakage, said shield being turnably mounted to cause the same to turn by the force of impact of an object glancing upon the shield whereby the shock of said impact will be partially absorbed by the turning movement of the shield.

2. In combination with an insulator having a petticoat portion, a shield formed to cover the petticoat portion, and resting upon the insulator adjacent to the upper portion of the petticoat, said shield hanging free about the waist of the petticoat and having an opening therein at the place where it rests on the insulator, said opening in the shield being sufficiently larger than the insulator to cause the shield to rotate under the force of impact by an object glancing upon the shield whereby the shock of said impact will be partially absorbed by the rotational movement of the shield.

3. In combination with an insulator having a petticoat portion, a shield having a frusto-conical shape and resting near its upper edge directly upon a shoulder formed on the insulator adjacent the upper portion of the petticoat, said shield being arranged to hang loosely and move freely about said shoulder and stand out from the petticoat to provide a free pivotal movement about the shoulder, whereby the force of impact of an object upon the shield will be partially absorbed by the inertia of the shield to the limited movement.

4. In combination with an insulator, a shield having the conformation of a truncated cone and arranged to rest adjacent its small end directly upon the insulator with a loose and unrestrained fit permitting free movement and to flare out from the insulator remotely from its resting point so that the shield will move against the petticoat under impact thereby to distribute the force of the blow through moving contact between the insulator and the shield.

5. In combination with an insulator having a petticoat, a shield for the petticoat having the conformation of a truncated cone and arranged to rest adjacent its upper end loosely upon the insulator adjacent the waistline of the petticoat, said shield being formed to flare out from the insulator remotely from said resting point and extend downwardly over the petticoat, said shield being formed of pliable but relatively resistant sheet metal and having substantially its entire surface corrugated to provide a cushioning effect for absorbing the shock of impact of blunt objects directed at the petticoat portion of the insulator.

6. In combination with an insulator having a petticoat portion the surface of which is smooth, a shield of corrugated metal supported upon the insulator and covering the petticoat, said corrugations providing a plurality of lines of contact with the insulator whereby the force of impact of an object directed at the shield will be distributed over an extended area of the insulator.

7. In combination, an insulator embodying an outwardly flaring petticoat portion and a wire groove disposed above said petticoat, a shield disposed entirely below said wire groove and formed to protectively encase said petticoat and arranged to be loosely supported upon the insulator below said wire groove adjacent the upper portion of said petticoat, said shield comprising a skirt member divided longitudinally to form two separate elements, said elements having cooperating tongues and slots at adjoining edges thereof for engagement with each other.

8. In combination, an insulator embodying an outwardly flaring petticoat portion and a wire groove disposed above said petticoat, a shield disposed entirely below said wire groove and encasing said petticoat, said shield being arranged to be loosely supported upon the insulator below said wire groove adjacent the upper portion of said petticoat, said shield comprising a skirt member divided longitudinally to form two separate engaging elements, said elements having cooperating tongues and slots disposed at the adjoining edges thereof so as to be engageable with each other, said tongue and slot arrangement providing the sole means for restraining the disengagement of said shield elements.

DONALD H. SMITH.

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