(No Model.) 2 Sheets—Sheet 1.

G. H. WINSLOW.

INSULATOR.

No. 524,659. Patented Aug. 14, 1894.

FIG. 1.

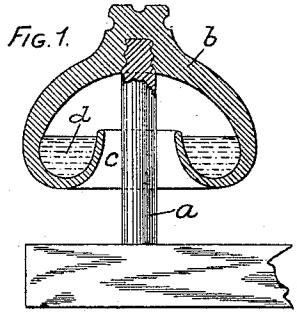


FIG. 2.

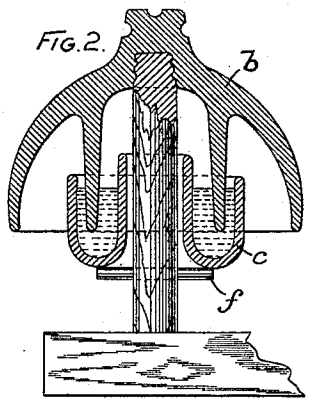


FIG. 3.

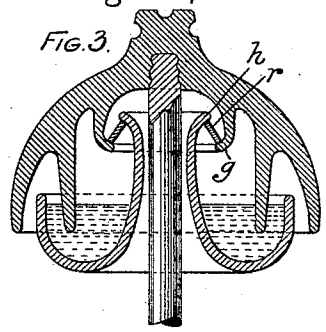


FIG. 4.

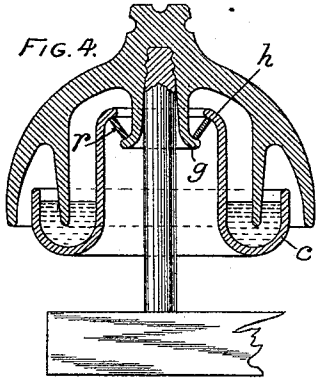


FIG. 5.

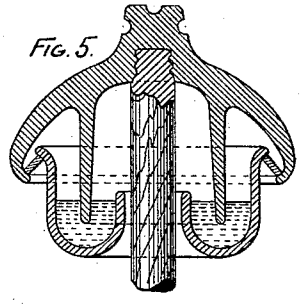


FIG. 6.

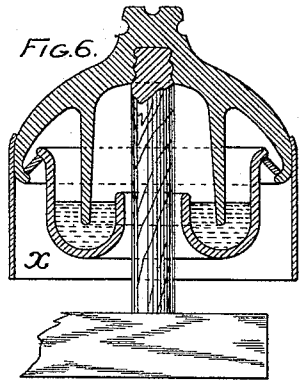
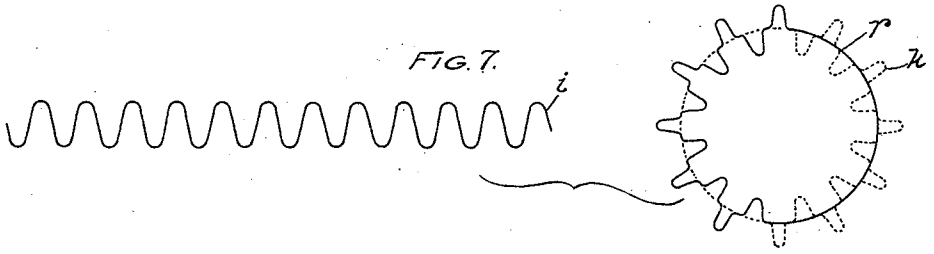


FIG. 7.



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ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

G. H. WINSLOW.

INSULATOR.

No. 524,659. Patented Aug. 14, 1894.

FIG. 8.

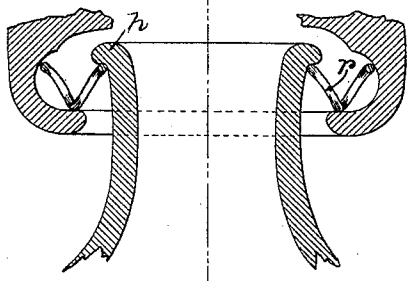


FIG. 9.

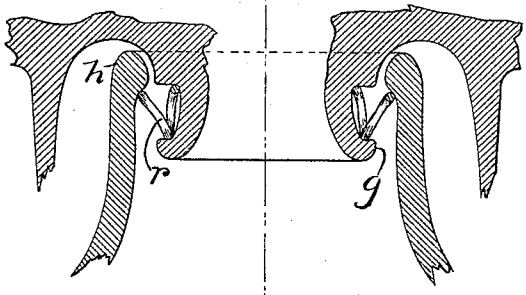


FIG. 10.

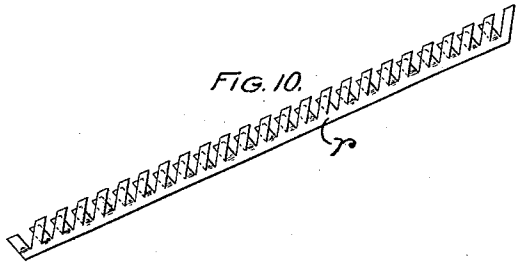


FIG. 11.

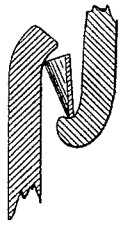


FIG. 12.

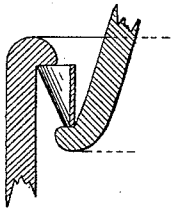


FIG. 13.

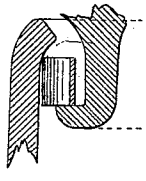
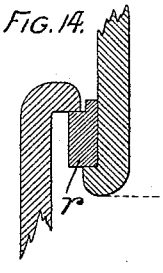


FIG. 14.



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UNITED STATES PATENT OFFICE.

GEORGE H. WINSLOW, OF PITTSBURG, PENNSYLVANIA.

INSULATOR.

SPECIFICATION forming part of Letters Patent No. 524,659, dated August 14, 1894.

Application filed December 8, 1893. Serial No. 493,085. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. WINSLOW, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Insulators, (Case No. 568,) of which the following is a specification.

My invention has relation to devices for the support of conductors carrying current, and particularly for conductors when used with currents of extremely high potential.

One of the objects of my invention is to provide an insulator having means for preventing the formation of a continuous conducting film of moisture between the point of attachment of the conductor and the point of support of the insulator, which shall be easily put together and shall be capable of ready separation of parts for the purpose of cleaning and renovation.

A further object of my invention is the provision of an insulator of this class composed of parts joined by an automatically operating lock or support.

A further object of my invention is to provide an insulator provided with an oil cup which shall be supported by the insulator itself, and not by the supporting pin thereof, in such a manner as to avoid weakening of the pin by the use of fastening devices requiring the removal of portions of the body of the pin itself, and thus permit the use of wooden instead of metallic supporting pins.

A further object of my invention is the provision of an insulator having an oil cup which is attached thereto by means sufficiently elastic to save the oil cup from damage due to shocks of all kinds.

A further object of my invention is to supply an insulator having an oil cup supported at isolated points and thus providing a very small cross-section for the leakage of current and accomplishing to a certain extent the dissipation of accidental moisture by the heating of the leakage current itself.

A further object of my invention is the provision of an oil cup insulator so constructed as to give no opportunity for the conduction of current from the body of the oil cup directly to the insulator pin.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of an old form of insulator provided with a body of oil for preventing the formation of a conducting film. Fig. 2 is a vertical section of another form wherein a separate removable oil cup is used, supported by a cotter pin passing through the insulating support. Fig. 3 is a vertical section of one specific form of my improved insulator. Fig. 4 is a vertical section of another specific form of my invention. Fig. 5 shows a vertical section of still another form. Fig. 6 shows a vertical section of the form shown in Fig. 5 with an additional protecting sleeve. Fig. 7 shows two positions of a wire in process of being made into a spring lock for use with my invention. Fig. 8 shows a portion of a vertical section of my invention illustrating one of its possible modes of co-operation with the spring lock. Fig. 9 shows a portion of a vertical section of my invention illustrating another possible mode of operation. Fig. 10 illustrates a spring lock straightened out and composed of sheet metal. Figs. 11 and 12 illustrate diagrammatically the two possible modes of co-operation between the cup and spring lock when the latter is composed of fluted metal. Fig. 13 shows in diagram another form of spring lock, and Fig. 14 shows in diagram a form of rigid lock.

The old form of insulator shown in Fig. 1 was composed of the supporting pin *a*, upon which was screwed an insulating head *b*, to which the conductor was intended to be fastened; which head was provided with upturned under edges in annular form shown at *c*, designed for the reception of a bath of insulating oil *d*. The object of this construction was to interpose an insulating surface of oil between the two parts of such a watery film as would form upon the surface of the insulator during the rain storms or in a fog.

In Fig. 2 another old form of insulator is shown, where the oil cup *c* is supported upon the stem of the insulator, for instance, usually by means of a cotter pin *f*, passing through the body of the support. The object of this construction was to enable the cup to be lowered by removal of the cotter pin and its contents to be replenished and the insulator to be cleaned.

The objections incidental to the use of the form shown in Fig. 2, convenient as that form obviously is, are numerous. The moisture which collects upon the outer surface of the

inner petticoat of the insulating portion *b* runs down upon the surface of or into the oil *d* and as the film forms on the outer surface of the oil cup as upon the insulator a continuous film is soon formed between the conductor and the support of the insulator across the dust and water collected on the top of the oil, thence over the outside of the oil cup and through the cotter pin to the support. It is therefore desirable to supply means whereby the oil cup may be supported from the insulator itself instead of from the support thereof.

A further objection incident to the use of the form shown in Fig. 2 is that the cotter pin necessarily requiring removal of material from the support, renders it necessary where any considerable strain is exerted through the conductor to employ iron or other metallic supports, thus greatly lessening the resistance to leakage.

The object of my invention is to do away with the use of the cotter pin or other devices tending to remove material from the support, and thus to permit of the use of a large wooden pin, which evidently increases the resistance to leakage. This will further avoid the difficulty incident to the loss of the cotter pin upon the removal of the cup.

A further difficulty, which has been found where the oil cup is placed upon the support of the insulator, is that vibrations of the pole due to climbing up of the lineman or to the effect of high winds subject the oil cup to shocks which sometimes break it and often result in spilling the oil. Furthermore, insects are apt to crawl up between the support and the oil cup and to drop into the oil cup between the support and the insulator body, thus decreasing the resistance of the oil.

By my invention I supply a flexible support independent of the insulator support and so placed as to preclude the possibility of the entrance of insects above the oil.

One form of my invention is shown in Fig. 3 wherein the oil cup is shown at *c* as provided with recurved flanges at its top shown at *h*, co-operating with corresponding flanges on the inside of the insulator body shown at *g*, for the purpose of supporting the cup through the medium of an elastic lock *r*. It will be seen that this form of insulator supplies an inner chamber above the oil which is almost entirely inclosed, and where a solid rubber lock is used, is entirely inclosed. This greatly lessens the tendency to evaporation of the oil and insures the prevention of a watery film.

Various forms of lock may be used for the purpose of supporting and holding in place the cup *c*, and a number of these will be described hereinafter. One form of lock may be a stout rubber ring or ring of other solid flexible material placed as shown in the figure. This may be permanently attached either to the insulator or to the cup or may be a separate part attached to neither. It will be seen that the cup is adjusted in place simply by first putting the rubber or other elastic lock in place on the flanges *g* and then thrusting the cup into place, the lock springing into proper position when this is done. The removal of the cup also implies the mere act of pulling it down and turning the rubber inside out or swinging it back into the recess over the flanges *g*. This will be made more clear hereinafter.

In Fig. 4 is shown another form of cup wherein the flange *h* is curved in the opposite direction from the oil holding lip *c*. In this form of insulator the flange *g* of the insulator proper turns outward and the lock *r* is as before held between the flanges *g* and *h*. This form is preferable to the form shown in Fig. 3 for the reason that water and vapor cannot gather above the lock *r* and tend to form a conducting connection between the inner surface of the oil cup and the under surface of the insulator and thence to the insulator support. Moreover it is easier to manufacture the form of oil cup shown in Fig. 4, as it can be pressed in one operation, and the only change required in the insulator itself after it comes from the press is the curving of the flange *g*. In Fig. 3 a flange must also be curved on the oil cup after it is pressed. Again, the ring or lock *r* is more easily reached in the form shown in Fig. 4 and can be taken out or put in by hand. Moreover the expansion and contraction of glass, where glass is used, are more equal.

In Fig. 5 the same method of supporting the oil cup is shown and the outside edge of the insulator proper is employed as a support. This is a modification of the form shown in Fig. 4 inasmuch as the oil cup has oppositely curved flanges.

In Fig. 6 is shown an excellent mechanical protection in the form of a sleeve *x* having an inturned flange *y* at the top for holding it in place. This is eminently adapted for use with the form of cup shown.

It is evident that the exact position of the flange *g* on the insulator is immaterial, as it may be as above shown either inside, outside, or between the depending flanges of the insulator which dip into the oil.

The nature of the lock ring *r* may be varied almost indefinitely. One form of lock ring is shown in Fig. 7 in process of construction. In the making of this form of lock, a wire *i* is bent into a wave form as shown and its ends then united and either attached together or merely juxtaposed, the whole forming a ring, the waves lying in the periphery of a cylinder as indicated in dotted lines upon the right of the figure. When in this position the alternate wave crests are bent in opposite directions out of the periphery so as to form a more or less crown-shaped figure. This is indicated on the right of Fig. 7 by the dotted lines *k*. The resulting crown-shaped ring may then be pushed into place above the supporting flanges *g* with the open part of the V upward. The co-operation of

such ring with the supporting flange *h* on the oil cup is shown in Figs. 8 and 9.

In Fig. 8 the shape of the flange *h* is such that upon withdrawal of the cup the spring ring lock *r* is turned inside out. This is a feasible form and the ring would take its original position when the cup was pushed up again.

In Fig. 9 the shape of the flange *h* is such that upon pulling down the cup those loops of the wire which make contact with the inside of the cup are thrown back into the space above the flange *g* and the cup thus allowed to pass out, the loops of wire springing back into place after the cup is removed.

Another form of ring may be made from a flat strip of springy metal slotted all along one edge and bent into a circle after having the alternate ends of the strips turned back as in making the wavy wire ring. This is shown in Fig. 10, where the strip is shown before it is bent.

Another form of ring may be made by cutting out a circular disk of thin springy metal and fluting its outer edge to such an extent as to bring the upper and inner waves of the fluting up until they form a circle of about the same size as the inner edge of the disk; the circle so formed being smaller or larger than the circle formed by the inner edge of the disk, according to whether the ring is to be used in the form shown in Fig. 3 or Fig. 4. This ring would be slotted at one point to permit of its being sprung into place.

Figs. 11 and 12 show the co-operation of the cup with the ring lock where fluted metal disks are used; Fig. 11 showing the form wherein upon withdrawal of the cup the metal is sprung back into the recess over the supporting flange *g*, and Fig. 12 showing the co-operation of the parts where it is intended to lock the oil cup permanently in place.

A much cheaper and equally serviceable ring may be made of a flat strip fluted transversely and then bent into a ring, which may either be sprung into place or slipped in by hand. This is shown in Fig. 13.

The use of springy metal or of a springy material is not essential, as even a lead ring may be used, if properly proportioned. This is shown in cross-section in Fig. 14, where the ring *r* is shown to be simply inserted between the two flanges on the cup and insulator. This form of ring would of course not extend entirely around the cup, but the two ends would project down so as to be reached by the fingers and the ring could be removed by pressing the ends apart and increasing the diameter of the ring. This is not as good a form as the spring lock, as it will not act automatically.

One of the advantages of the use of the spring locks above described is that they form a series of supporting points for the oil cup, thus increasing the resistance to leakage at such points, and where the leakage is temporarily considerable, the current would heat up the points to a certain extent and thus accelerate the evaporation of the conducting liquids.

Of course this invention is susceptible to many modifications immediately apparent to those skilled in the art, and I do not wish to be understood as limiting myself to the exact details herein shown.

What I claim is—

1. An insulating body, an oil cup cooperating therewith and means for supporting said oil cup directly from said insulating body, substantially as described.

2. An insulating body, an oil cup cooperating therewith and means for elastically supporting the cup directly from the body, substantially as described.

3. An insulating body and an oil cup co-operating therewith, in combination with an elastic lock arranged to support the cup immediately from the body at a series of isolated points.

4. An insulating body provided with a recurved flange, an oil cup provided with a flange adapted to cooperate with the flange on the insulating body, and a locking ring interposed between the flanges on the cup and body for the purpose of supporting the cup, substantially as described.

5. An insulating body provided with a recurved flange, an oil cup provided with a flange adapted to cooperate with the flange on the insulating body and an elastic locking ring interposed between the flanges on the cup and body for the purpose of supporting the cup, substantially as described.

6. An insulating body provided with an outwardly turned supporting flange, an oil cup having an oil holding lip and a supporting flange oppositely curved, and an elastic supporting ring interposed between the supporting flanges on the cup and body, substantially as described.

7. An insulating body, an oil cup adapted to be attached thereto, and a supporting lock for accomplishing this attachment composed of a strip of resilient metal having alternate portions bent in opposite directions.

8. An insulating body, an oil cup adapted to be supported therefrom, and a resilient lock for accomplishing this support composed of a recurved length of wire provided with waves bent alternately in opposite directions in crown form, substantially as described.

9. An insulator composed of a supporting pin, a concave insulating body supported thereby and an oil cup supported directly from the body and underneath its concavity independently of the insulator support, substantially as described.

In testimony whereof I have hereunto subscribed my name this 16th day of November, A. D. 1893.

GEORGE H. WINSLOW.

Witnesses:
THOS. H. LEGGARD,
HECTOR M. REED.