(No Model.) 2 Sheets—Sheet 1.

W. DIBB & A. VICKERS.

INSULATOR.

No. 546,585. Patented Sept. 17, 1895.

Fig. 1.

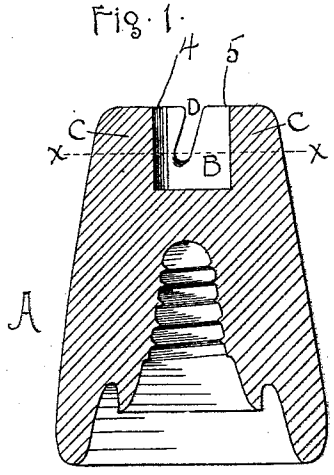


Fig. 3

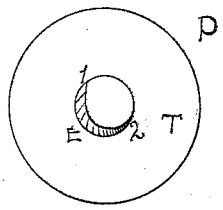


Fig. 4.

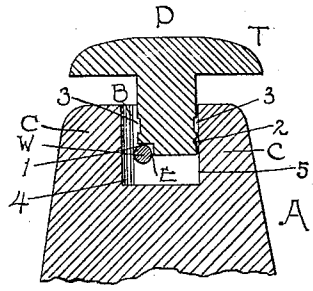


Fig. 2.

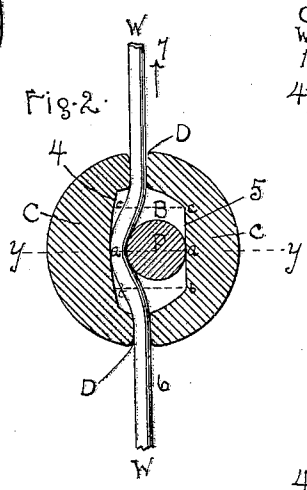


Fig. 5.

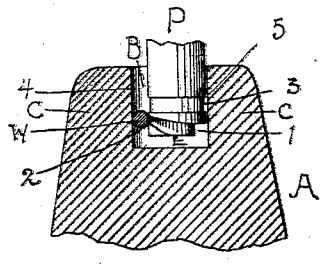
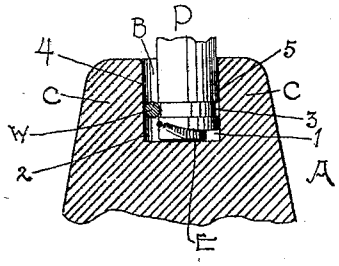


Fig. 6.



WITNESSES:

Fred C. Draper.

James Hays.

William Dibb INVENTORS

Albert Vickers

BY

Alfred Wilkinson

ATTORNEY

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

(No Model.) 2 Sheets—Sheet 2.

W. DIBB & A. VICKERS.

INSULATOR.

No. 546,585. Patented Sept. 17, 1895.

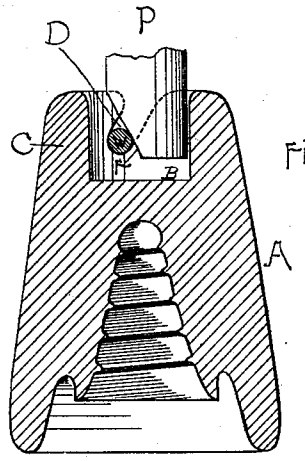
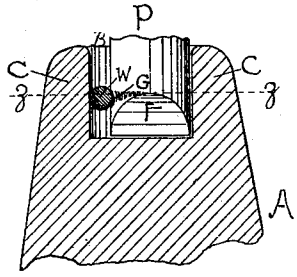


Fig. 7.

Fig. 8.



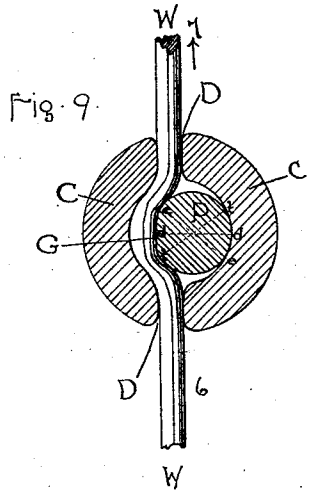


Fig. 9.

Fig. 10.

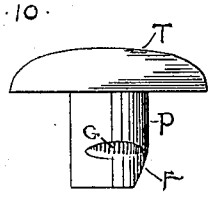
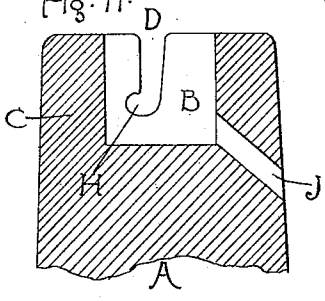


Fig. 11.



WITNESSES:

Fred C. Draper.

James Hays

William Dibb INVENTORS.
Albert Vickers

BY

Alfred Wilkinson

ATTORNEY

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

UNITED STATES PATENT OFFICE.

WILLIAM DIBB AND ALBERT VICKERS, OF SYRACUSE, NEW YORK.

INSULATOR.

SPECIFICATION forming part of Letters Patent No. 546,585, dated September 17, 1895.

Application filed March 12, 1895. Serial No. 541,426. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM DIBB and ALBERT VICKERS, citizens of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Insulator; and we do hereby declare that the following, in connection with the accompanying drawings, is a full, clear, and exact description of the invention.

Our invention relates to an insulator for telegraph and telephone poles, and has for its object to do away with tie-wires and to hold the line-wire with absolute firmness in position against any and all strains.

Our invention consists in constructing an insulator with an opening or cavity in its top, on opposite sides of which cavity are two corresponding grooves—one on each side—in which lie the wires, and using with the insulator so constructed a plug by which the wire is pressed to one side and kinked, so as to hold it firmly in position. The plug and the side of the depression between which and the plug the wire is gripped are so formed in relation to each other that they exert a cam action on the wire, so that a pull in one direction or the other tightens the hold. The plug and the side of the cavity between which and the plug the wire rests are so formed and proportioned in relation to each other that in the normal position of the plug—that is, in the position it naturally assumes when pressed home to hold the wire—the wire is kinked and substantially fills the space between the plug and side of the cavity; but when the plug is moved or rocked from its normal position toward one slot or the other, as by an extra strain on the wire in one direction, the space between it and the side decreases and the wire is pinched with increasing force, so as to be held in place. The greater the longitudinal strain on the wire the greater the pinch. This pinch applied to the wire automatically by a cam action between plug and side of cavity when a longitudinal strain is applied to the wire is the essence of our invention, whether accomplished by an irregular and eccentric formation of the cavity or of the plug.

Our invention will be better understood by reference to the accompanying drawings, in which the same letters and figures have reference to similar parts in all the views.

Figure 1 is a vertical section of a double-petticoat insulator embodying our invention. Fig. 2 is a cross-section on line $x\,x$, showing the plug and wire in position. Fig. 3 is an elevation of the plug seen from below. Fig. 4 is a vertical section on line $y\,y$, the lower part of the insulator being cut off, the plug being shown in its first position as it is being set in place. Fig. 5 is a similar view showing the plug partly rotated into the second position, the plug being in elevation. Fig. 6 is a similar view, the plug having been rotated and pressed home, so that the wire is in its normal position. Figs. 7 to 10 show a modification in form of plug and insulator. Fig. 7 is a vertical section of the insulator, the lower end of the plug being shown in elevation as it first engages the wire in process of insertion. Fig. 8 is a similar view, the plug having been pushed home and holding the wire in the normal position. Fig. 9 is a horizontal section on line $z\,z$ of Fig. 8. Fig. 10 is a side elevation of the plug seen at right angles to the position of Fig. 8. Fig. 11 shows another variation in the construction of the insulator.

The preferable construction of our invention is shown in Figs. 1 to 6. A is the insulator, formed below with a double petticoat and a screw-thread for attaching it to the brackets on the poles. This is provided at its upper end with a depression or cavity B, having strong side walls C C. In this wall are cut two slots D D opposite to each other and corresponding and of sufficient size to hold the line-wire. These slots are preferably made slanting and a little nearer one side of the depression than the other and are not as deep as the cavity itself. The walls C C of the depression B are formed on their interior, as shown in Fig. 2, with the sides not parallel, the side 5 made flat and side 4 curved, so that the greatest distance between the sides is at $a\,a$, at or near their middle, and this distance diminishes toward $b\,b$ and toward $c\,c$. The construction of the plug P is best shown in Figs. 4 and 6. It is provided at its lower end with a spiral groove E, beginning at 1 and extending upwardly and around the plug about one-half its circumference until it ter-

minates and disappears at 2. Just above this is a circumferential groove 3, which may extend entirely around the plug, as shown in the figures referred to, or around a small portion only of its circumference, but adjacent to the end 2 of the groove E.

The manner in which the line-wire is set and held in position is as follows: The wire W is dropped into the slots D D, where it rests freely. The plug P is then set into the depression B, which is formed of a size adapted to receive the plug and the wire in the position shown in Fig. 4, so that the wire rests in the groove E at its deepest point 1. The plug is then twisted, so that it rotates from the deepest end 1 of groove E to its shallow end 2, and the portion of the line-wire W lying in depression B, being constantly engaged in the slot E, is gradually pressed to one side by the eccentric form of the plug at that end. When the plug has been rotated against the wire to this point 2 into the position of Fig. 5, it is pressed home down to the bottom, and the wire W is thrown into groove 3 into the position of Fig. 6. The plug as it is rotated and pushed home naturally takes the normal position—that is, with its diameter coinciding with line *a a*, the line of greatest distance between walls 4 and 5—the wire being in this position kinked and held firmly against wall 4 at the point *a* as long as the strain on the wire in both directions is practically equal. When, however, a greater strain is applied to the wire on one side than on the other—as, for instance, in case of a break of the wire at the point 6—the strain in the direction 7 will tend to rotate or move the plug toward *c c*, and the distance between the two walls 4 and 5 at and near *c c* being less than the distance *a a*, while the diameter of the plug remains constant, a pinch will be applied to the wire with increasing force. This pinch is so quickly and positively applied that the wire is held by this pressure against the wall 4 without any possibility of escape, and it cannot be pulled out until sufficient power is applied to shatter or to crack the insulator. It is evident that the wall 4, against which the wire W is held, may be made flat and the opposite wall 5 curved.

In Figs. 7 to 10 is shown a somewhat different construction of plug and insulator, by which, however, exactly the same result is accomplished and the wire pinched by cam action between the plug and side wall of the cavity when the wire is subjected to a greater strain in one direction than in the other. The side walls of the cavity are here regular and similar on both sides; but the plug at the point where it bears on the wire in the normal position is provided with a flattened groove G. The plug is beveled at F and is pressed into position, as shown in Fig. 7, so that the lower end of the bevel first strikes the wire W, lying in the slots D D. As the plug is pushed farther into the depression B the wire is pressed to one side and kinked, and when the plug touches bottom it is given a quarter-turn, which throws the wire into the groove G, which is a short groove just above bevel F and at right angles to it and to the diameter *d d*. The plug is so proportioned to the size of the wire that, together with the wire, it substantially fills the cavity, and the wire, will rest in the flattened groove G, and, being kinked, will be held firmly against the side wall. This is the normal position of the plug. It will be seen that it naturally tends to take a position with its diameter *d d* at right angles to the wire and bearing against it at the point *d*, the diameter *d d* at the deepest point of the groove G being shorter than the diameters *e e* and *f f*. From this construction it happens that if a greater strain is applied to the wire W in one direction than in the other, as in the direction 7 by the breaking of the wire at the point 6, the plug will be rolled or drawn in the direction 7, and instead of pressing against the wire at its diameter *d d* it will tend to bear against it at or near its longer diameter *f f*, by which a cam action is applied to the wire and it is pinched and held with great force. This is exactly the same principle and result as is shown in the construction illustrated in Figs. 1 to 6, the cam action and pinch on the wire in that former construction being produced by an eccentric form of the walls of the cavity, while in this latter construction it is produced by an eccentric form of plug.

The plug is preferably made with a mushroom top, as shown in Figs. 3, 4, and 10, which covers over the cavity in the top of the insulator, excluding dust and moisture, and also affords a good handle for the lineman to grasp. In Fig. 11 we have shown a variation in the slot D. The slot is made straight and is provided with a notch H in the bottom, into which the wire is thrown when the plug is pressed home. An aperture J, as here shown, may be provided, where desirable, for draining off moisture from the cavity to prevent it injuring the device by freezing or otherwise.

The advantages of our invention are that it provides a simple positive means for holding long-distance wires in their insulators under all circumstances and all strains, and one which is easily used by the lineman. The use of tie-wires is obviated, which are expensive, and which do not hold the wire as firmly in position as does our device, and which have the disadvantage of injuring the line-wire, so that it never can be used over again. With our device the wire is sufficiently kinked to hold it firmly both in the normal position and under extraordinary strain; but it is not injured thereby, as it is by the kinking and the contact of the tie-wires. In applying tie-wires the careless workman often scratches the line-wire, which soon causes a break. This cannot be seen by the foreman, while with our device it is easy to see whether the wire

is being put properly in the insulators. Furthermore, our insulator, which is commonly made of porcelain, and our plug, made of wood, porcelain, metal, or other desirable material, are both cheap and simple to construct and will not cost any more, if as much, as insulators and tie-wires.

Having thus fully described our invention, what we claim, and desire to protect by Letters Patent, is—

1. An insulator provided with a cavity in its upper end, similar opposite slots in the wall thereof to receive the line-wire, and a plug to kink the wire.

2. An insulator having a central cavity in its upper end, in the wall of said cavity slots to receive the line-wire, and a plug to exert pressure on the line-wire substantially at right angles to its length and to kink the same, substantially as described and shown.

3. An insulator having a central cavity in its upper end, in the wall of said cavity slots to receive the line-wire, and a plug to kink the line-wire, the thickness of the plug being so proportioned to the thickness of the wire, that together they substantially fill the cavity on its diameter at right angles to the length of the line-wire, substantially as described and shown.

4. In combination with an insulator having a central cavity in its upper end, provided with similar opposite slots in the wall, a plug to kink the line-wire, and automatically to pinch it with gradually increasing pressure when strain is applied to the wire, substantially as described and shown.

5. In combination with an insulator having a central cavity in its upper end and similar opposite slots in the wall thereof, a plug so proportioned to the size of the cavity that in its normal position the distance between the plug and the side of the cavity is substantially equal to the diameter of the wire, but when the plug is rolled in either direction by a strain on the wire this distance decreases, substantially as described and shown.

6. In combination with an insulator having a cavity in its upper end and similar opposite slots in the wall thereof, a plug whose diameter added to the diameter of the wire to be held is slightly smaller than the greatest horizontal diameter of the cavity, substantially as described and shown.

7. In combination with an insulator having a cavity in its upper end provided with similar opposite inclined slots in the wall thereof, a plug to kink the line-wire and automatically to pinch it with gradually increasing pressure under strain, substantially as described and shown.

8. As an article of manufacture, an insulator having a central cavity B provided with slots D D, sides 4 and 5 not parallel to each other, in combination with a plug having eccentric groove E and groove 3, substantially as described and shown.

In witness whereof we have hereunto set our hands, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 7th day of March, 1895.

WILLIAM DIBB.
ALBERT VICKERS.

Witnesses:
LENA F. WEISBURG,
ALFRED WILKINSON.