No. 885,678. PATENTED APR. 21, 1908.

L. STEINBERGER.

INSULATOR FOR HEAVY CURRENTS.

APPLICATION FILED JAN. 26, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

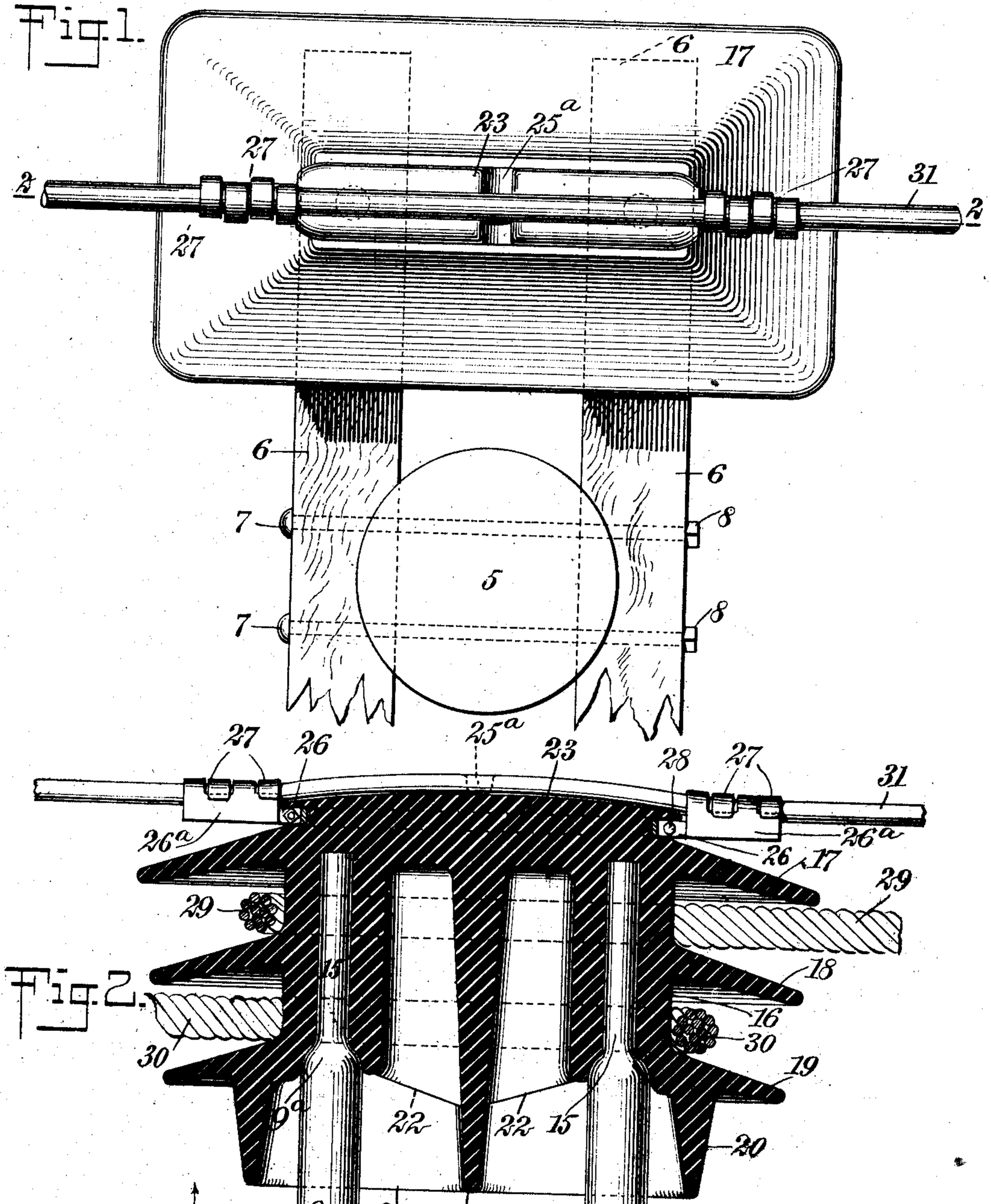

Fig. 2.

WITNESSES:

William P. Goebel.

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Fig. 3.

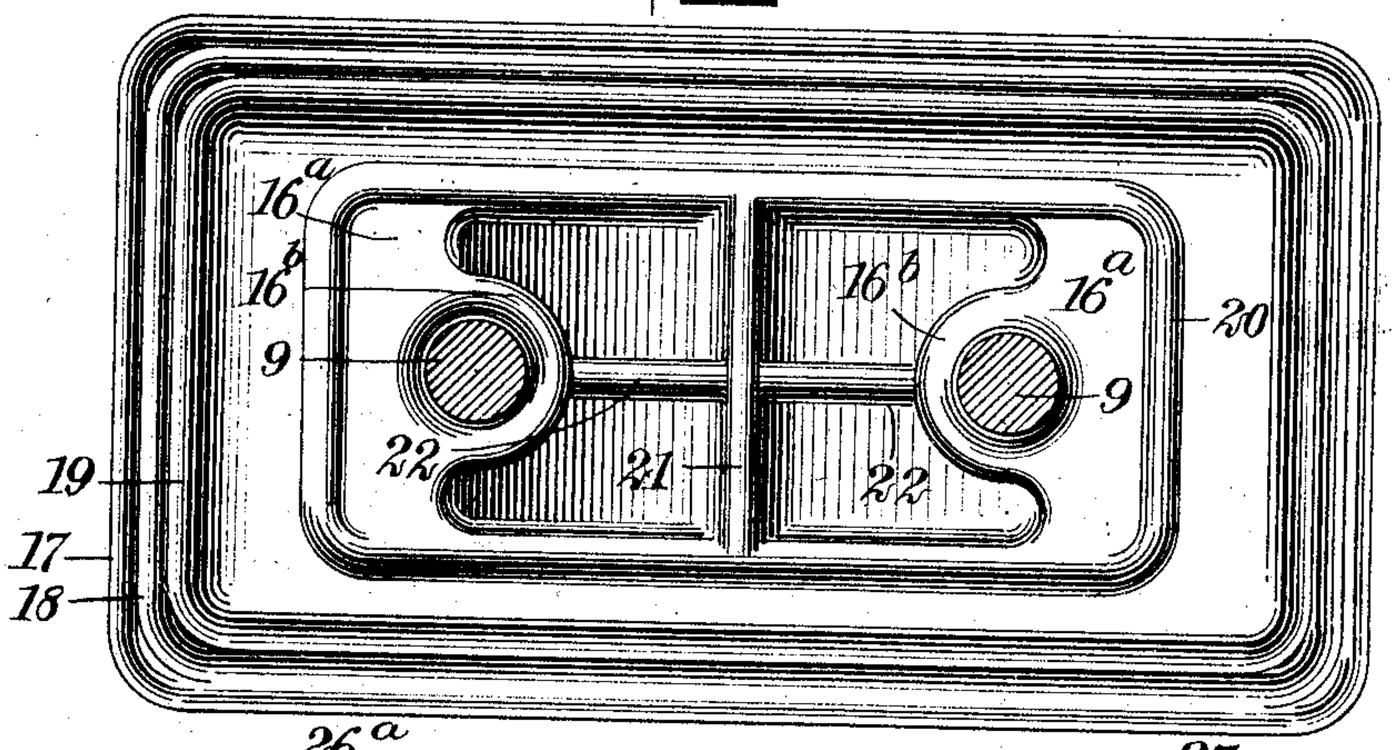


Fig. 5.

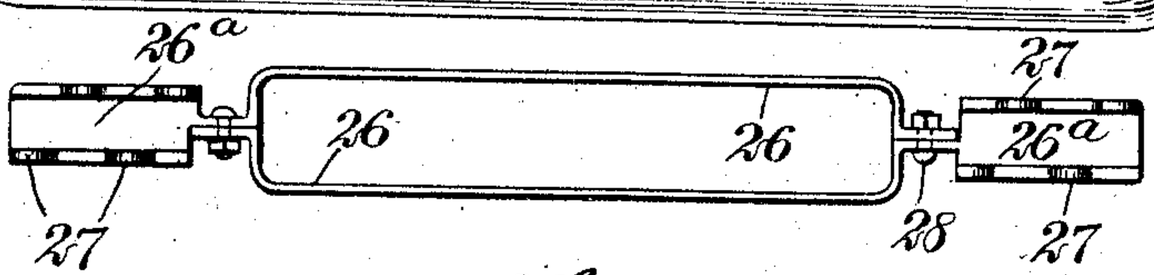
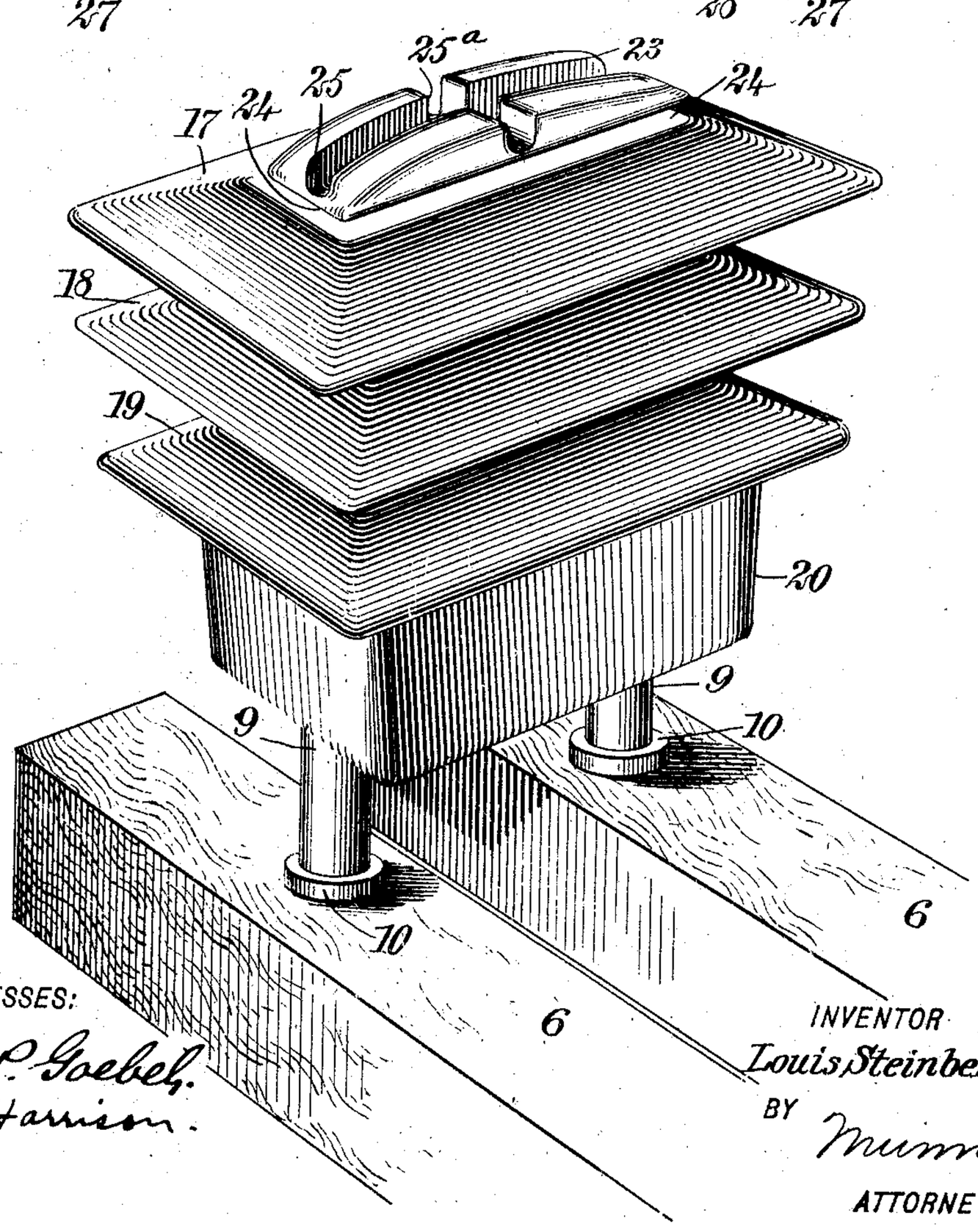


Fig. 4.



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UNITED STATES PATENT OFFICE.

LOUIS STEINBERGER, OF NEW YORK, N. Y.

INSULATOR FOR HEAVY CURRENTS.

No. 885,678. Specification of Letters Patent. Patented April 21, 1908.

Application filed January 26, 1906. Serial No. 297,991.

To all whom it may concern:

Be it known that I, LOUIS STEINBERGER, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Insulator for Heavy Currents, of which the following is a full, clear, and exact description.

My invention relates to insulators, and admits of general use, but embodies certain novel features of especial service to be used in insulators for heavy currents and for long spans between poles or towers.

The tendency at the present day along lines of electrical development is to use larger insulators possessing very high dielectric qualities. This calls for greater rigidity in the construction of the insulator in order that the support afforded for the insulator and the wire or cable may be adequate for the purpose and that the insulator may possess sufficient stability. In securing the necessary rigidity and stability, however, there is more or less tendency to make the insulators too heavy and cumbersome to be readily handled and also too expensive because of the excess of insulating material employed.

I find that an insulator may be provided with the requisite strength and the requisite dielectric qualities, without excessive weight or undue waste of material, and because of the rigidity and stability secured in improving the insulation, the insulator acquires properties which are of a special value in the matter of supporting the strain of cables or wires.

Among the objects which I attain by my improved insulator are the following: 1. a firm and substantial support for sustaining the insulator so as to distribute the mechanical strains upon it; 2. to provide a maximum of dielectric or insulating effect with a minimum of weight and a minimum of material employed in construction; 3. to enable the insulator to be readily removed from its support; 4. to provide an improved means for holding the wire upon the insulator; 5. to provide specially arranged spaces for receiving cables or other flexible members which may pull sidewise upon the insulator; 6. to enable lighter supporting members to be used by multiplying the number thereof; 7. to facilitate the ease with which a wire or cable may be applied to or removed from the insulator; 8. to provide improved means for preventing undue movement of the wire or cable relatively to the insulator; 9. to give each wire or cable a comparatively long stretch of surface upon which to rest; and 10. to provide internal braces for the insulator so as to reduce the weight without proportionately reducing the strength thereof. 11. to provide greater security and better facilities for the lineman when placing the insulators and cables into operative positions, repairing them, or removing them from the poles.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary plan view showing an insulator mounted upon twin cross arms 6 and supporting a wire; Fig. 2 is a vertical section through the same, upon the line 2—2 of Fig. 1 looking in the direction of the arrow, and showing in addition two cables dead-ended in opposite directions from the insulator and insulated from each other; Fig. 3 is a horizontal section, upon the line 3—3 of Fig. 2 looking in the direction of the arrow, and showing the insulator as it appears when viewed from its under side; Fig. 4 is a fragmentary perspective view showing the insulator as mounted upon the twin cross arms, and Fig. 5 is a plan view of a clamping device for engaging the conductor.

The supporting pole is shown at 5, and disposed upon opposite sides of it are twin cross arms 6 clamped together through the pole by means of bolts 7 provided with nuts 8 for the purpose. Twin pins 9 are provided with stems 11, the latter passing vertically through the twin cross arms. Disposed below the twin cross arms 6 are washers 12 held in position by nuts 13, the latter being clamped by nut-locks 14. Each pin 9 is provided with an annular boss 10 integral therewith and serving as a shoulder. The upper ends of the pins 9 terminate in smooth stems 15 upon which the insulator body 16 makes a neat fit. This insulator body is provided with a plurality of hoods 17, 18 and 19 of different sizes, the largest being at the top and the smallest at the bottom as shown in Fig. 2. Integral with the hood 19 and with the insulator body 16 is an oblong skirt 20 which en-

circles the pins 9 for a considerable distance below the stems 15. The insulator body 16 is hollow and is provided with a web 21 crossed by webs 22 integral therewith, as indicated in Figs. 2 and 3. These webs serve as braces or supporting ribs and prevent crushing or distortion of the insulator in case the latter is subjected to excessive strains. The upper end of the insulator body 16 terminates in a comparatively long head 23 and encircling this head is a groove 24. A groove 25 is disposed longitudinally of the head and bisects the same as indicated in Fig. 4, and this groove is crossed by a shorter groove 25ª. Either groove 25 or 25ª may be used for receiving the wire or cable. Mounted within opposite portions of the groove 24 are two oppositely disposed twin clamping members 26, preferably exactly alike, as indicated in Fig. 5. Each clamping member 26 is provided with fingers 27 carried by a supporting plate 26ª, the whole being made of malleable metal, such as iron or bronze. By means of bolts 28 the two clamping members are secured together. These bolts pass through opposite portions of the endless groove and bind the twin members together. By giving the twin clamping members a proper degree of resilience, undue strain upon the insulating body supporting the head 23 is prevented, and the latter is not so apt to be broken off. Two cables 29, 30 that are disposed between the hoods 17, 18, 19 may be secured to the insulator and thus be dead-ended in opposite directions from the strain, as indicated in Fig. 2. That is to say, the cable 29 serves to pull the insulator in one direction, whereas the cable 30 tends to pull it in the opposite direction, the movement of one cable opposing, or partially opposing, that of the other, so that little or no additional strain is placed upon the supporting pins 9 because of the presence of these cables. The wire 31 is partially buried within the groove 25 and is slightly curved, as indicated in Fig. 2, the fingers 27 of the twin clamping members 26 being bent downwardly so as to grip the wire and hold it in the position indicated in Fig. 2. By this means the part of the wire immediately within the groove 25 is slightly curved, as indicated in Fig. 2, and the wire is thus held securely in position.

It will be noted that the web or supporting rib 21 reaches to a comparatively low point in comparison to the supporting pins 9. This not only strengthens the insulator to a great extent but improves the insulation thereof, for the reason that if an arc should take place from the wire 36 to one of the supporting pins it cannot readily pass therefrom to the other supporting pin. Each pin 9 is provided with a rounded shoulder 9ª upon which a considerable part of the weight of the insulator rests.

The general conformity of the insulator as viewed from above is that of a rectangle. This shape is advantageous, for the reason that by it the insulation afforded by the body of the insulator stretches across the twin cross arms 6 in such manner as to project beyond these cross arms and thus more completely protect the same.

The webs 22 by strengthening the interior of the insulator tend to prevent the effect of crushing strains applied by means of either of the cables 29 and 30 or the wire 31; that is to say, if either of these cables or the wire draws upon the insulator so hard as to set up within the insulator a crushing strain, this strain is counter-acted by the webs 22, as will be understood from Fig. 2.

The spaces between the hoods 17, 18 and 19 serve excellently for receiving cables to be dead-ended, or for carrying cables or wires around corners or curves, thereby admitting the use of this form of insulator as a combined line and strain insulator.

It will be apparent that the two pins 9 are directly in the line of strain, being spaced from each other in the direction of the strain of the cables 29 and 30, and the same with respect to the conductor wire 31; thus an undue strain exerted on the insulator, for instance by the cable 29, is resisted directly by the pin adjacent to the point of strain, and also by the pin to the right. On the other hand, a strain exerted by the cable 30, is directly resisted by the pin 9 at the right and also by the pin 9 at the left. Similarly, a strain exerted by the conductor will be more directly resisted by that pin nearest the point of strain, and indirectly by the pin distant from the point of strain. Furthermore, by thus dividing and distributing the supporting elements, I am enabled to obtain increased dielectric results, since arcing is guarded against, without making the insulator of a size and mass that would be necessary for equal results with a single pin.

I do not limit myself to the particular form of insulator herein shown, nor to the exact form or number (2) of either of the separate members, nor to the use of any particular material. I prefer however, to employ the insulating material known in the art as "electrose".

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. An insulator, comprising a hollow member of insulating material provided with a portion for sustaining a wire, and also provided with webs whereby said member is strengthened, and a plurality of supports connected with said member and spaced apart.

2. An insulator, comprising a hollow member of insulating material provided inter-

nally with webs, supporting pins engaging said hollow member of insulating material and mounted upon opposite sides of said webs, and means for mounting an electrical conductor upon said body member of insulating material.

3. An insulator, comprising a member of insulating material provided with a plurality of hoods and with spaces intermediate of said hoods for the purpose of dead-ending cables, and a plurality of distinct supports engaging said member of insulating material for distributing the weight thereof.

4. An insulator, comprising a pair of twin cross arms, means for supporting said cross arms apart from each other, a pin mounted upon each cross arm, a body of insulating material engaging said pins, and means for supporting a conductor upon said body of insulating material.

5. An insulator, comprising a member of insulating material provided with means for supporting a conductor and also provided with a web, and a pair of pins connected with said member and spaced apart in a direction parallel with the plane of said web for the purpose of distributing to it the strains upon said pins.

6. The combination of a pole, twin cross arms clamped upon opposite sides thereof, twin supporting pins mounted upon said cross arms, and a single body of insulating material engaging said twin supporting pins and provided with a portion for engaging a conductor.

7. In an insulator, the combination of a plurality of cross arms, means for supporting the same, a plurality of supporting members, a body portion of insulating material mounted upon said supporting members, and means for supporting a conductor upon said body portion.

8. As an article of manufacture, a clamping member comprising two separate portions, each provided with gripping fingers for clasping a conductor, and mechanism connected with said portions and provided with means for gripping an insulator body independently of the engagement of said fingers relatively to said conductor.

9. An oblong insulator having its greatest length in the direction of the length of the conductor to be supported and formed with a groove for the conductor, said groove extending at the top of the insulator in the direction of length of the latter, and separate supports at the bottom of the insulator, the supports being spaced in direction of the length of the insulator and located at points in vertical line with points adjacent the ends of the longitudinal groove for the conductor.

10. An oblong insulator having its greatest length in the direction of the length of the conductor to be supported, and formed with a groove for the conductor, said groove extending at the top of the insulator in the direction of length of the latter, and separate supports at the bottom of the insulator, the supports being spaced in direction of the length of the insulator and located at points in vertical line with points adjacent the ends of the longitudinal groove for the conductor, the insulator further having a skirt at the bottom, of a shape following the general oblong shape of the insulator and extending around the said separate bottom supports in common.

11. An oblong insulator having a conductor support extending along the insulator in the direction of the greatest length of the latter, and separate supporting members for said insulator, the supporting members being spaced in the direction of the length of the insulator.

12. An insulator having a portion for engaging the element to be supported thereon and receiving the strain of the supported element, the said insulator having separate supporting members spaced apart in direction of the strain on the insulator.

13. An insulator having portions for accommodating dead-end cables extending in opposite directions, said insulator having supporting pins spaced from each other in the line of strain and located respectively adjacent to the points of contact of the respective cables.

14. An insulator having a supporting portion engaging the conductor, said portion being elongated in the direction of the length of the conductor, and separate pins supporting the insulator, said pins being located in line with each other in the direction of the length of the conductor and being located adjacent the ends of the said supporting portion for the conductor.

15. As an article of manufacture, an insulator having a portion for receiving a conductor, and having a plurality of supporting pins spaced from each other and arranged in the line of and perpendicular to the direction of the conductor.

16. As an article of manufacture, an insulator having surfaces at opposite points against which dead-ended cables may bear, and a plurality of vertical supporting pins, said pins being located one adjacent to each of said bearing points for cables.

17. As an article of manufacture, an insulator having a plurality of vertical supporting pins in alinement with each other and spaced apart in the direction of the line of strain.

18. An insulator comprising a body portion provided with means for sustaining a conductor, and a plurality of pins supporting said body portion and disposed substantially in alinement relatively to said conductor.

19. As an article of manufacture, a body portion of insulating material provided with a groove for a conductor, and further provided with a plurality of apertures disposed in a plane parallel with said groove for the purpose of receiving supporting pins.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS STEINBERGER.

Witnesses:
WALTON HARRISON,
EVERARD B. MARSHALL.