(No Model.) 3 Sheets—Sheet 1.

T. T. ECKERT.

CROSS ARM FOR CARRYING ELECTRICAL WIRES.

No. 539,123. Patented May 14, 1895.

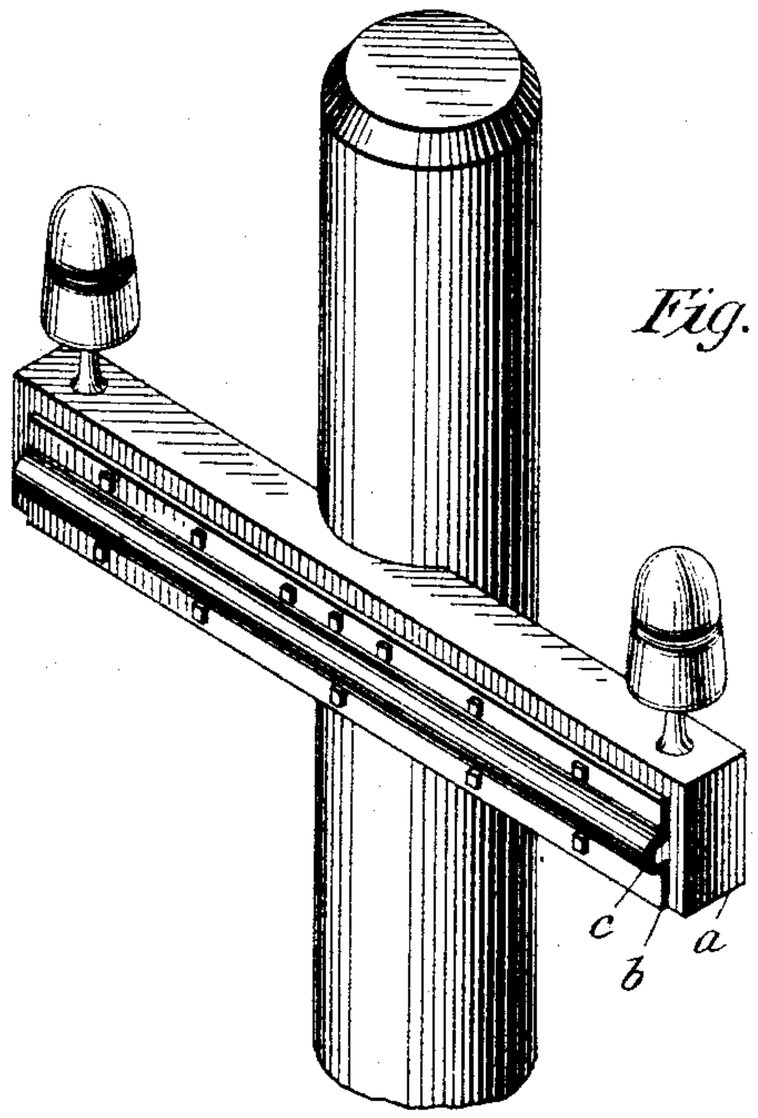

Fig. 1.

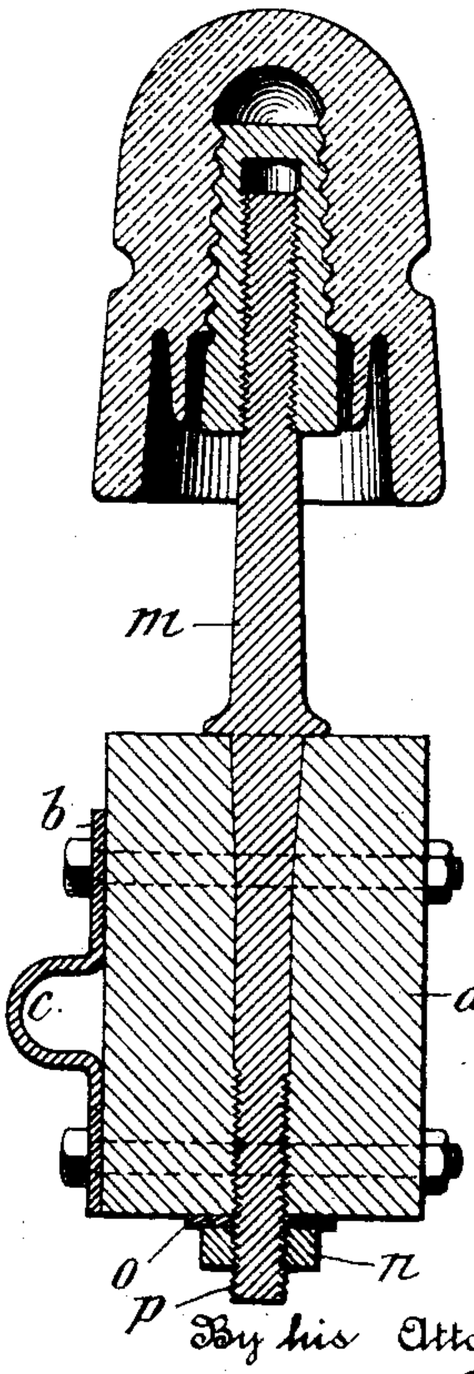

Fig. 2.

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Fig. 3,

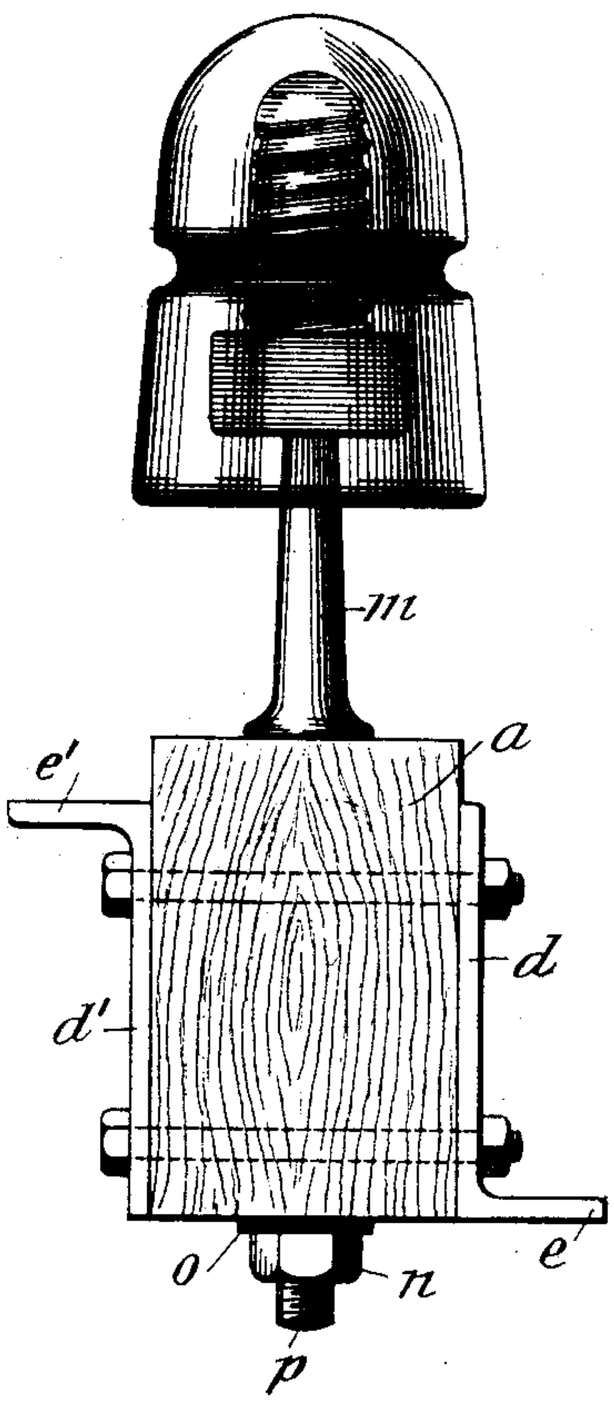
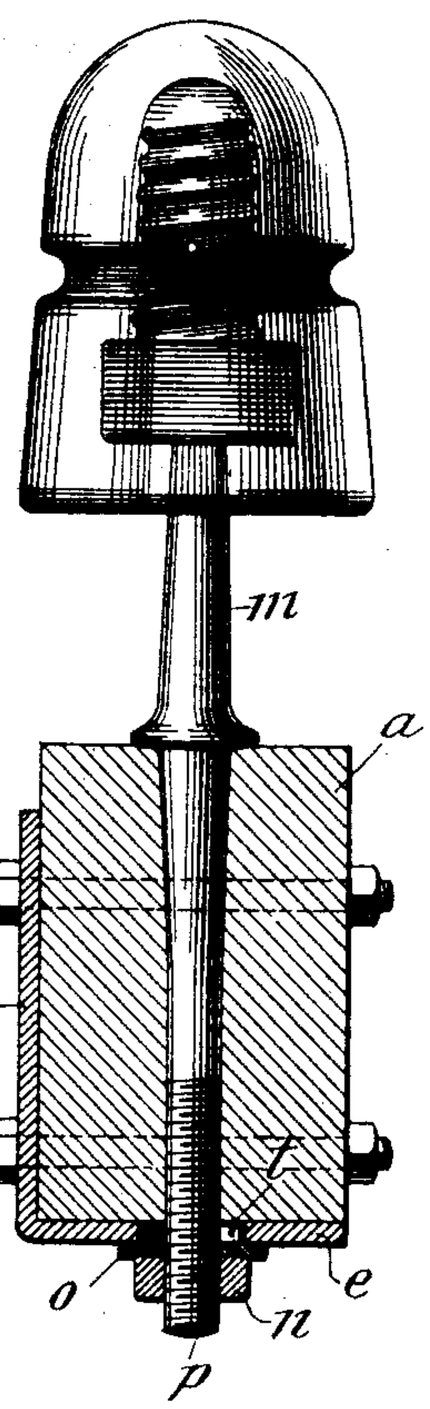


Fig. 4,



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(No Model.) 3 Sheets—Sheet 3.

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CROSS ARM FOR CARRYING ELECTRICAL WIRES.

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Fig. 6,

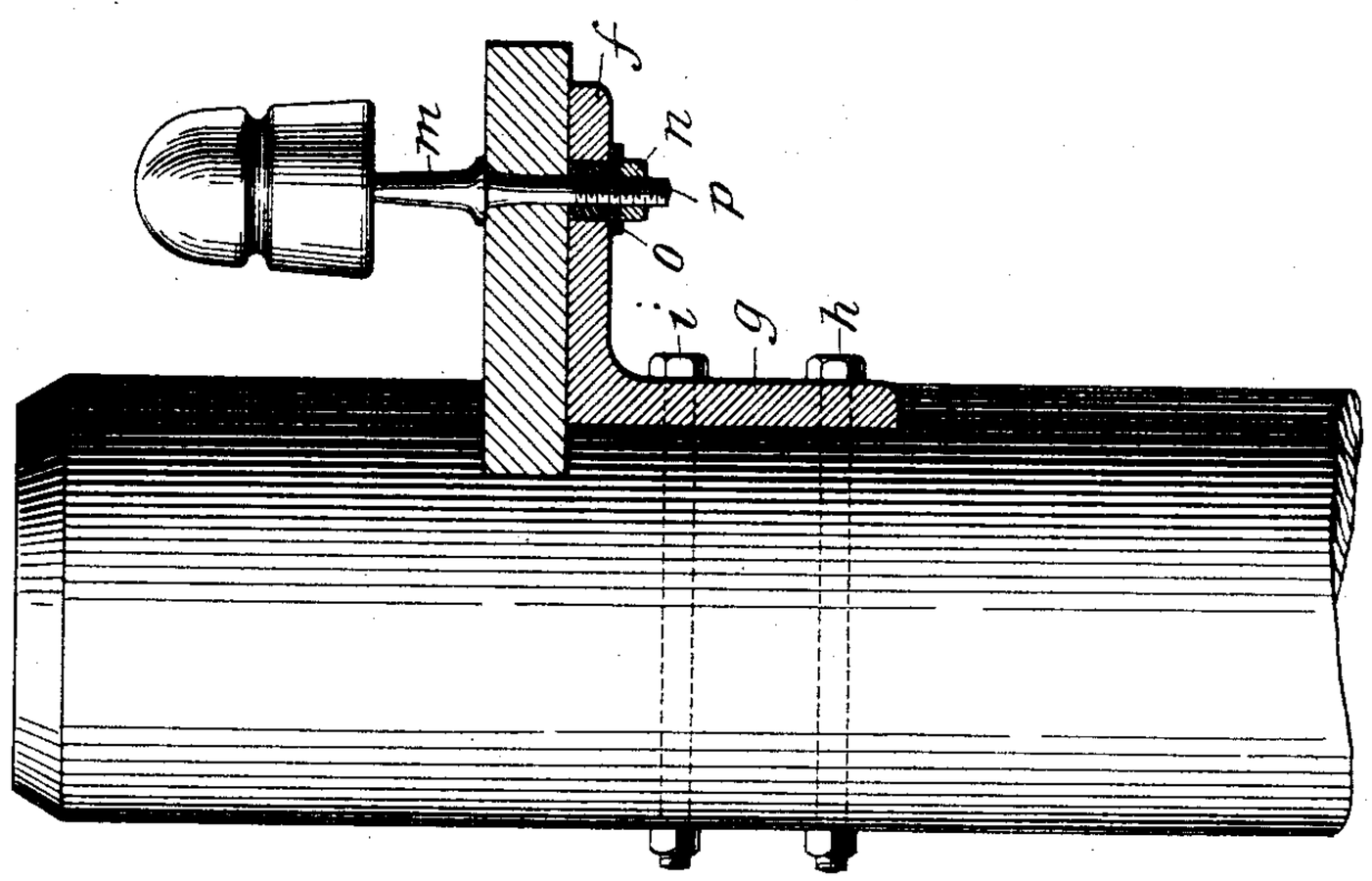
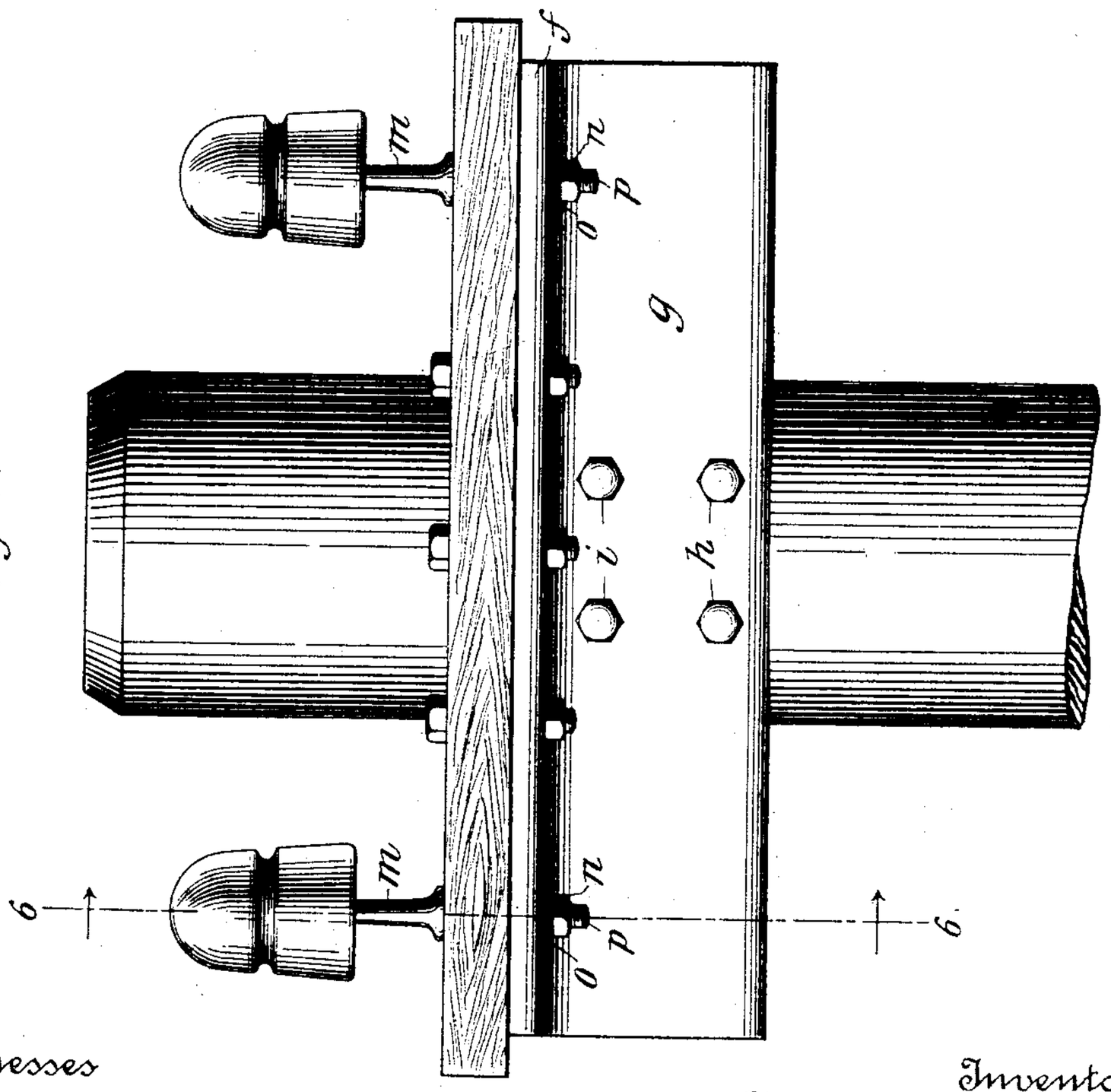


Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS T. ECKERT, OF NEW YORK, N. Y.

CROSS-ARM FOR CARRYING ELECTRICAL WIRES.

SPECIFICATION forming part of Letters Patent No. 539,123, dated May 14, 1895.

Application filed March 20, 1895. Serial No. 542,444. (No model.)

To all whom it may concern:

Be it known that I, THOMAS T. ECKERT, a citizen of the United States of America, residing in the city, county, and State of New York, have made a new and useful Improvement in Cross-Arms for Carrying Electrical Wires, of which the following is a specification.

The object of my invention is to produce a bar of small cross-section and great strength in which at the same time the qualities of insulation shall be present. To secure the required strength, wooden cross-arms, as commonly constructed, must be of such a cross-section as to expose large surfaces to the wind and for the collection of snow and ice. To avoid these difficulties, while preserving insulation and securing sufficient strength, I employ a small wooden bar to which is fastened a plate of iron having considerable horrizontal and vertical width, whatever the specific structure. In my preferred form I use a small bar of wood of a depth somewhat exceeding its width, to one of whose vertical sides is fastened a plate of iron having a central corrugation extending a considerable distance outward from the wood. I also fasten the plate with its upper edge somewhat below the upper surface of the wooden bar to the end that the wires, if displaced from their supports, shall not be connected together through the iron plate. By this means, substantially all of the insulating qualities of a wooden cross-arm are preserved, while great strength is obtained for supporting the weight of the wires and resisting lateral strains. Other forms of iron may be employed, such as an angle piece with one web fastened against a vertical side of the wooden bar and the other projecting horizontally therefrom; or the two wings of an angle iron may be made to cover the lower part of a vertical side and the under surface of the wooden bar; or a thin strip of wood may be placed horizontally upon one wing of an angle iron, the other wing being bolted to the side of the pole or support.

Figure 1 is a perspective view of the preferred form of my improved cross-arm, showing it mounted upon a pole, while Fig. 2 is a view showing a cross-section of the arm, a pin, and insulator. Fig. 3 represents a second form of cross-arm consisting of two angle-irons fastened, respectively, to the two vertical faces of the wooden bar, while Fig 4 is a form in which an angle-iron covers the lower surface and a part of one of the vertical sides of the wooden bar. Figs 5 and 6 show a cross-bar formed of an angle-iron, one wing of which is bolted to a pole or other support, while upon the upper surface is fixed a thin strip of wood.

In the organization of Figs. 1 and 2, the plane portions of the wrought-iron plate, *b*, which are fastened by bolts and nuts to the wooden bar, *a*, give strength to resist downward forces, while the central corrugation strengthens it against horizontal strains; and, as thus combined, the iron adds but little either to the cross-section or to the surfaces of the small wooden bar. In this design, however, the upper edge of *b* must not reach the upper surface of the wooden bar *a*, since two or more wires carried by the bar, if blown or otherwise removed from their supports, would be crossed.

In the arrangement of Fig. 3, substantially the same advantages are secured, although there is more danger from the crossing of wires owing to the presence near the upper surface of the bar of the horizontal wing, *e'*, of angle bar *e'*, *d'*. I find, however, that sufficient strength may be obtained by the employment of angle irons whose wings, *e'*, *e*, extend horizontally outward only one or one and one-half inches. Of course, the horizontal wing *e'* may, like *e*, be placed in the plane of the lower surface of bar *a*, but for the greatest strength the form shown in Fig. 3 is preferable.

The composite bar shown in Fig. 4 presents the most advantageous arrangement of iron and wood for securing small cross-sections and surfaces combined with great strength for resisting both lateral and vertical strains; but the presence of the lower iron wing upon the under surface of bar *a* involves the necessity of special devices, since the iron pins, *m*, which must be used with bars of such small cross-section, must be isolated from the iron bar. As shown in Figs. 1, 2, and 3, the iron pin *m* is merely provided with a nut, *n*, and thread, *p*, and washer, *o*, at its lower end;

but in the arrangement of Fig. 4, the washer *o* must be made thick and of insulating material, while a hole, *t*, large enough to leave a free space around *m*, must be cut in wing *e* of the iron.

Figs. 5 and 6 also show a form which is easy of construction and of great strength, but here, also, a large hole must be cut in the horizontal flange *f* of the angle iron, and a thick insulating washer, *o*, used. In this arrangement the vertical web, *g*, of the angle bar is bolted to the pole or other support by bolts and nuts, *h*, *i*. The wooden bar *a*, in this case, need not exceed two inches in horizontal width.

The ordinary form of wooden pin for carrying glass hoods would be quite impossible of use with cross-bars of any of the forms above described; the cross-bar of small cross-section, however, is entirely feasible when used with an iron pin of small cross-section.

An iron pin well adapted to my purposes is shown in cross-section in Fig. 2, including the wooden thimble and other details of construction shown and claimed in the United States patent of Dennis Doren, No. 472,529, dated April 12, 1892.

What I claim, and desire to secure by Letsers Patent, is—

1. An improved cross-arm for electrical conductors, consisting of the combination of a wooden bar of small cross-section and an iron plate or bar of considerable horizontal and vertical width combined into a structure of great strength, small cross-section and surfaces.

2. In a cross-arm for electrical conductors, the combination of a wooden bar and a metallic plate or bar having horizontal and vertical elements forming a structure of great strength, small cross-section and surfaces, and iron pins for carrying electrical conductors and suitable apertures in said bar for such pins.

3. In a telegraph cross-arm, the combination of a wooden bar of comparatively small cross-section and a metallic strip or bar of suitable vertical width and a corrugation or flange extending horizontally from said wooden bar, as and for the purpose set forth.

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