No. 751,831. PATENTED FEB. 9, 1904.

J. H. BULLARD.

INSULATOR PIN.

APPLICATION FILED AUG. 8, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

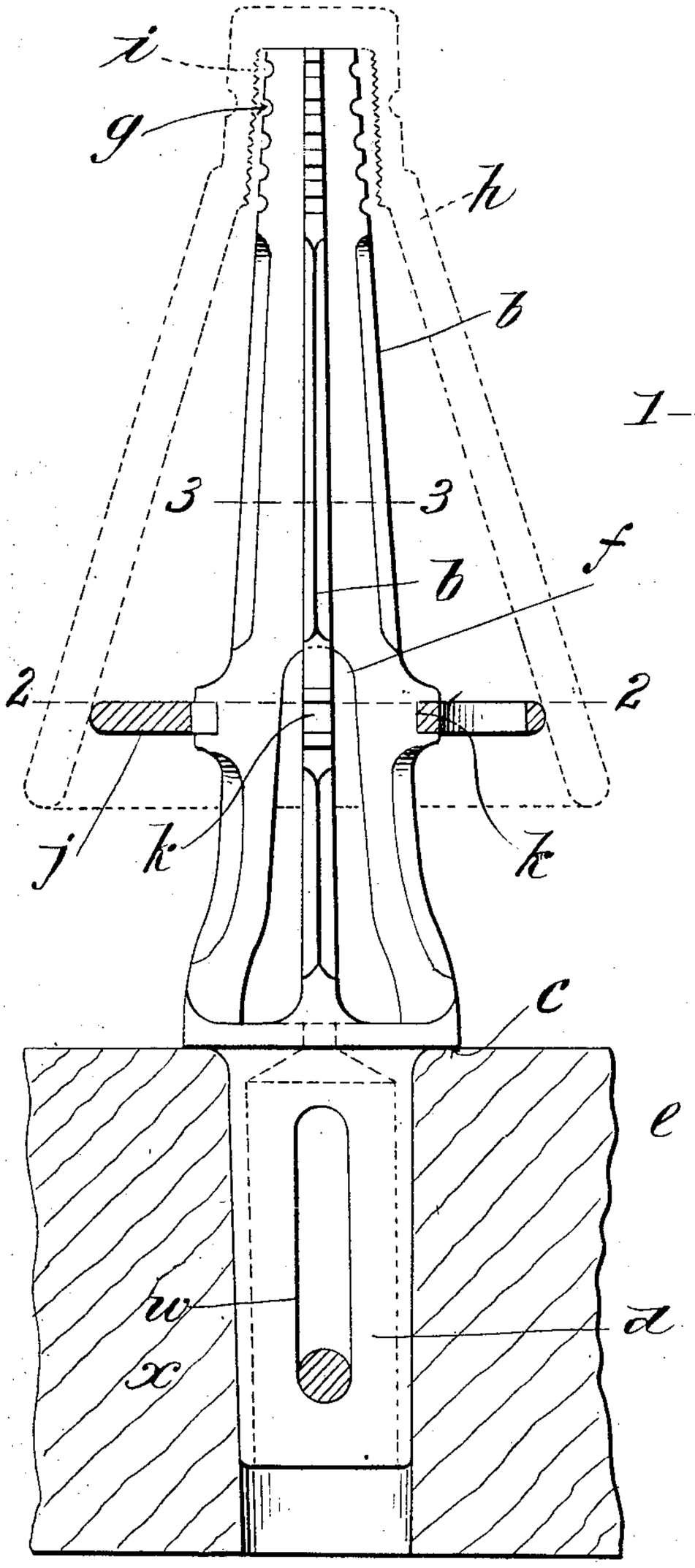


Fig. 2.

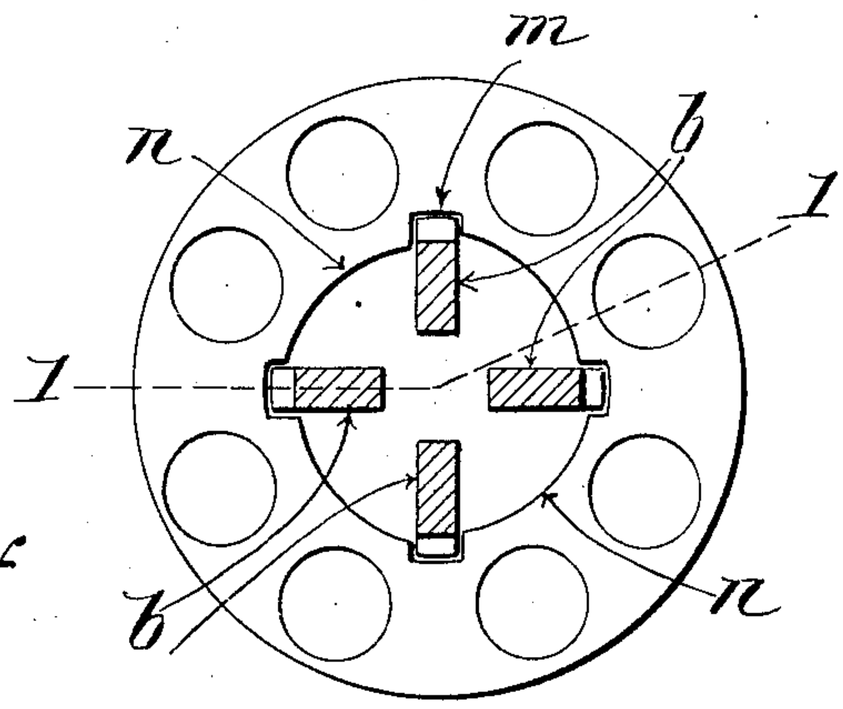
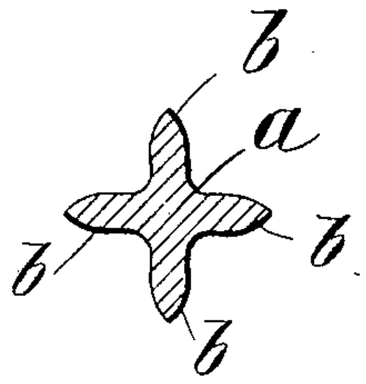


Fig. 3.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

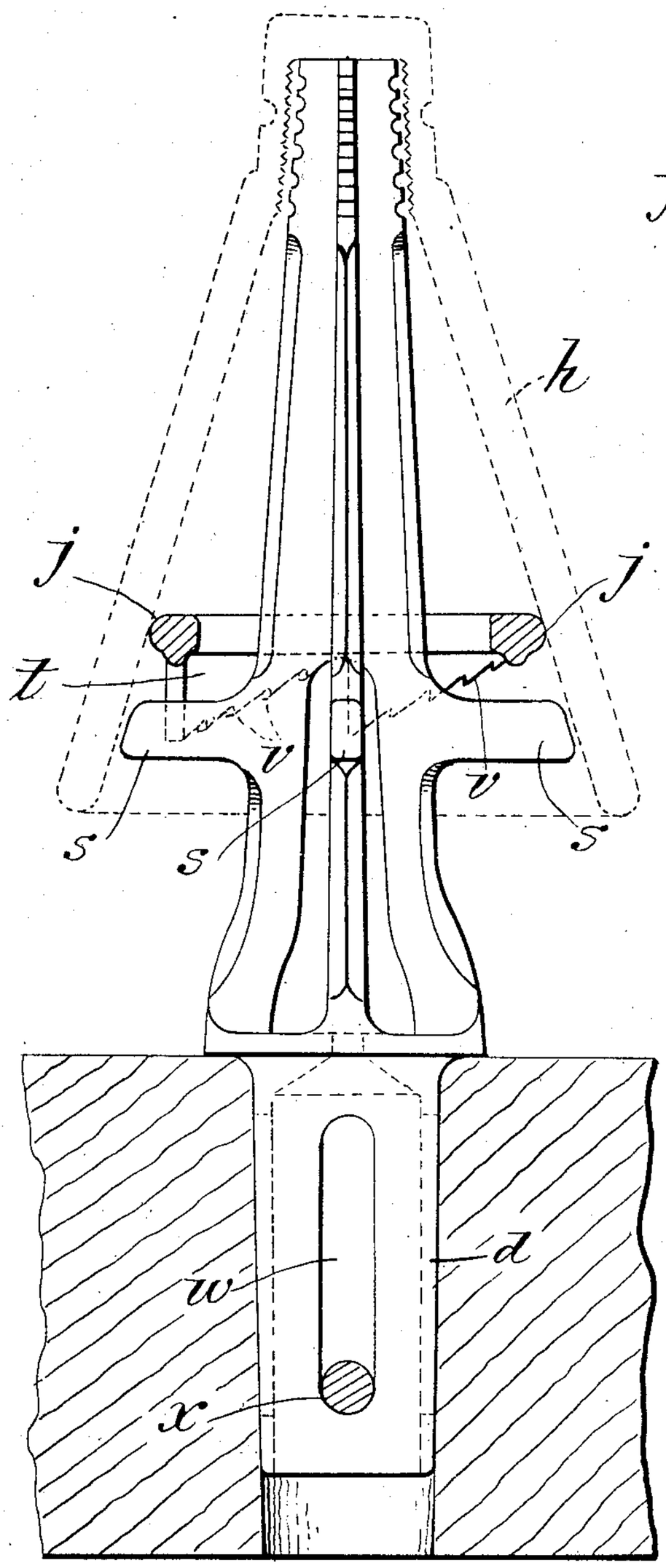


Fig. 5.

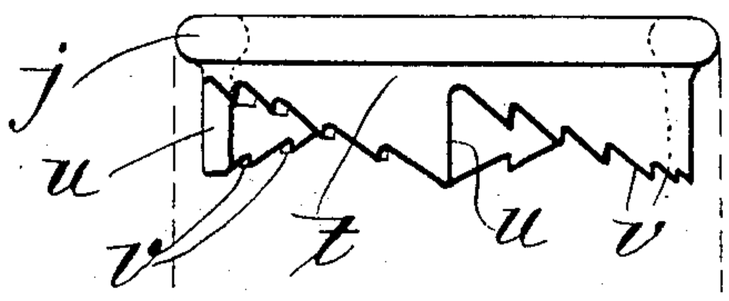
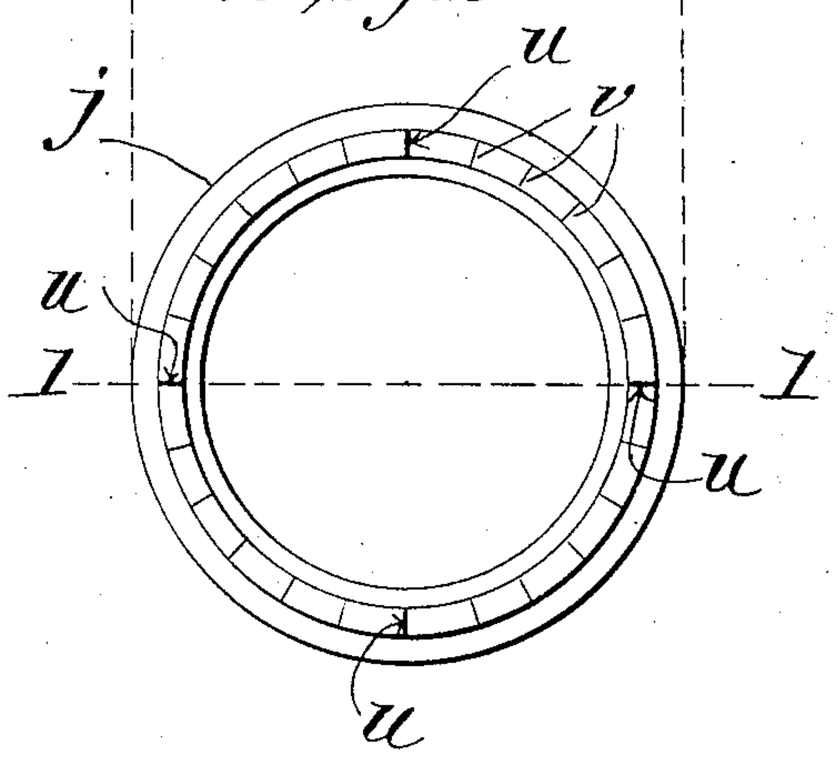


Fig. 6.



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No. 751,831. Patented February 9, 1904.

UNITED STATES PATENT OFFICE.

JAMES H. BULLARD, OF SPRINGFIELD, MASSACHUSETTS.

INSULATOR-PIN.

SPECIFICATION forming part of Letters Patent No. 751,831, dated February 9, 1904.

Application filed August 8, 1903. Serial No. 168,766. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. BULLARD, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Insulator-Pins, of which the following is a specification.

This invention relates to improvements in insulator-pins, and has special reference to pins adapted to support the heavy porcelain insulators required to carry wires in which high-tension currents are transmitted. Heretofore it has been customary to employ very largely wooden pins on account of their cheapness. It has been found, however, that these deteriorate very rapidly owing partly to climatic conditions, but principally to the fact that enough current leaks through the insulators to effect the rapid disintegration of that part of the post in contact with the insulator and near that point by electrolytic action. Metal pins have not come into general use as supports for the insulators owing to their relatively high cost as these pins have heretofore been made. When made of cast metal, the pins have been heavier than can be advantageously carried on the cross-bars of the poles. It was necessary, however, to make them heavy to withstand the great strain of the heavy cables in use and to meet the requirements of the purchasers who tend always to increase the distance between the poles, thus putting greater demands on the pins. Up to the present time no satisfactory metal pin has been produced within my knowledge possessing those qualities of lightness, strength, and low cost necessary to meet the requirements of the service. Furthermore, it is to be borne in mind that the insulators used in constructing high-tension lines must, to provide the requisite insulation, be attached firmly to the upper end of the pin only, thereby providing a relatively small contact with the pin and permitting independent expansion of the insulator and the pin without injury, and to properly secure the pins to the insulators that portion of the interior of the latter which fits over the pin has been roughened, serrated, or threaded, and the pin having been similarly prepared cement of some kind is poured into the apex of the insulator after the latter has been fitted over the end of the pin.

The insulators found by experience to be best adapted for use on high-tension lines consist of superposed cone-shaped portions secured together at the apex of each piece, the lowermost cone having a relatively long depending skirt inclosing a large proportion of the pin. This manner of supporting the insulators, and which is unavoidable, subjects the insulator and the end of the pin to a relatively great lateral strain when in use.

The object of this invention is to provide a metal pin especially adapted to carry the type of insulator above referred to, which shall have all of the necessary characteristics above enumerated, so constructed as to permit the easy application of the lowermost cone-shaped part of the insulator thereto; and the invention further consists in the provision of means to relieve the upper end of the pin and the insulators from much of the injury due to the great lateral strain which they are subjected to; and the invention consists in the construction described in the following specification and pointed out in the claims forming a part thereof.

In the drawings forming part of this application, Figure 1 is a side elevation of a pin embodying my invention, certain parts being in section. Fig. 2 is a sectional view of the same on line 2 2, Fig. 1. Fig. 3 is another sectional view on line 3 3, Fig. 1. Fig. 4 is a side elevation of a pin similar in its general aspect to that shown in Fig. 1, but embodying a slight modification. Fig. 5 is a side elevation of an annular support for the lower portion of the skirt of the insulator. Fig. 6 is a plan view of the under side of Fig. 5.

Referring to the drawings, it will be seen that that the pin consists, essentially, of a slightly-tapered vertically-trussed body portion, which in cross-section is cross-shaped, as shown in Fig. 3. The body portion is indicated by *a*, and the rectangularly-arranged trusses of the body referred to by *b*. These, it will be noted, are in the nature of vertical webs located at right angles one to the other

and flaring out somewhat at the base *c* thereof, the diameter of which is somewhat in excess of that of the stem *d* of the pin or that portion which enters the cross-bar *e*, whereby a shoulder is formed which bears upon the cross-bar when the pin is driven into the latter. At some distance above the base the trussed portions or webs *b* are separated, as at *f*, and flare outwardly, but the lower ends thereof are all united to the base *c*, whereby the weight of the pin is considerably decreased with no sacrifice of rigidity. The edges of the webs *b* of the pin at the upper end thereof are provided with serrations or notches *g*.

The lowermost member of the insulator is indicated in dotted lines only and is lettered *h*, Figs. 1 and 4. This is made of porcelain in the usual manner, the skirt or flaring lower portion thereof extending well down over the pin and inclosing the major part thereof. At the apex of this cone-like piece its interior diameter is slightly greater than that of the top of the pin on which it is to be secured, and that portion thereof which is substantially in contact with the pin is provided with serrations or notches in the inner edge thereof, (indicated by *i*.) After the lowermost part *h* of the insulator has been fitted over the end of the pin the pieces are then inverted and some suitable cement is then poured into the apex of the part *h* in a semi-liquid or plastic condition, which, finding its way between the serrated edges of the ribs and the serrated surface *i* of the part *h*, locks the latter securely to the pin when it hardens. These rectangularly-arranged webs provide suitable channels leading to the end of the pin through which the cement can be introduced to lock the part *h* to the pin. Upon this part *h* usually two others are mounted, on the upper end of the last one of which the conductor is secured. This brings the maximum strain on pins as heretofore constructed on the extreme upper end of the pin. To provide a better support in the nature of an interior brace for the lower end of the skirt of the part *h* to offset the strain in the opposite direction, there is located on the web *b* an annular brace *j*, which is preferably made in the form shown in Figs. 1 and 2, the webs *b* having notches *k* cut therein, preferably in a little boss extending somewhat beyond the edge of each web, and in providing the ring *j* with notches *m*, adapted to fit over the widest portion of the web, the inner edge of the ring being formed with eccentric portions *n*, whereby when the ring is slipped over the pin it may be turned to cause these eccentric portions *n* to bind in the bottom of the notches *k*. This manner of applying the brace-ring *j* leaves unobstructed the channels between the web portions *b* through which the cement must be poured to secure the part *h* to the pin. The ring *j* may also be lightened by boring holes *o* therein, as shown.

The entire pin is made of metal, preferably malleable iron. The ring *j* may be of any material, either metal, porcelain, or other suitable material.

If desired, instead of applying the ring *j* to the pin the bosses in which the notches *k* are formed may be extended outwardly to form four short arms *s*, Fig. 4, the ends of which may bear against the interior surface of the skirt of the part *h* and perform the same function as the annular ring *j*. This construction has also a further advantage of providing a suitable support for the modified construction of the ring *j*. (Shown in Figs. 4, 5, and 6, and indicated therein by the same letter.) This ring is provided on its under side with a downwardly-extending flange *t* in which steps *u* are cut, from the bottom of one of each of which the edge of the flange runs in a curved inclined plane to the lowermost point of the next step, said inclines being provided with notches *v*, as shown in Figs. 5 and 6 more particularly. These notches by rotating the ring *j* may be brought to bear on the upper edge of the arms *s*, thereby regulating the height of the ring above said arms, the engagement of the notches with the arms holding said rings in any adjusted position. If the ring is used in connection with a pin having the arms *s* thereon, the latter might be made somewhat shorter than in Fig. 4, or the ring can be used in connection with the arms, as shown in said figure, and may serve to act as a brace for the part *h* if the diameter of the lower portion of the latter be too great to permit the arms to come to a bearing thereon, in which case the ring *j* can be placed over the end of the pin before the part *h* is secured to it, and after said part has been made fast the ring may be then turned until the position of the inclined portions relative to the arms is such as to bring the edge of the ring to a bearing against the inner side of the part *h*, the notches *v* serving to hold the ring in its adjusted position. Where the nature of the construction will permit it, the braces for the lower end of the insulator may be omitted. A convenient method of securing the pins in the cross-bars is shown in said Fig. 4, and it consists in casting the stem *d* with a long slot *w* in opposite sides of said stem or, if desired, in casting the stem with a slot therein lying in the plane of each of the webs *b*. Then after the pin has been inserted in the hole in the cross-bar a pin *x* may be driven through the latter and through two of the slots *w* near the bottom thereof, whereby the pin will not only be held firmly in the cross-bar, but will also be prevented from turning therein.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A metal insulator-pin comprising a series of webs disposed at an angle one to the other and united near one end thereof along their

meeting lines, the opposite ends of said webs being separated and merging in a base, together with a stem portion of smaller diameter than said base, extending beyond the latter in axial alinement with the pin, and means to secure said stem in a cross-bar.

2. A metal insulator-pin comprising a series of flat webs disposed at an angle one to the other, and united along their meeting lines, together with a brace extending laterally beyond said web and adapted to bear on the inner surface of an insulator secured on the pin.

3. A metal insulator-pin comprising a series of webs disposed at an angle one to the other and united near one end thereof along their meeting lines, the opposite ends of said webs being separated and merging in a base, together with a stem portion of smaller diameter than said base, extending beyond the latter in axial alinement with the pin, said stem being perforated transversely thereof.

4. A metal insulator-pin consisting of a body having one or more channels therein extending longitudinally thereof, a cylindrical stem-piece integral with said body, together with a brace extending laterally beyond said webs and adapted to bear on the inner surface of an insulator secured on the pin.

5. A metal insulator-pin having one or more channels extending longitudinally thereof, a cylindrical stem integral with said body, and an annular brace fitting over the pin and removably secured thereto.

6. A metal insulator-pin having one or more channels extending longitudinally thereof, a cylindrical stem integral with said body, an annular brace loosely supported thereon, and means to adjust said brace vertically.

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