To all whom it may concern:

Be it known that I, Charles G. Ette, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Pole Cross-Arms, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to cross-arms such as are used on poles for carrying insulators. Various attempts have been made to reduce the weight and increase the efficiency of pole cross-arms by using a channel-shaped metallic cross-arm equipped with insulator-pins. Such structures have not gone into general use, however, owing to the high cost of manufacture and the amount of labor involved in connecting the insulator-pins to the cross-arm.

The object of my invention is to provide an inexpensive and durable means for supporting a large number of insulators which are spaced the required distance from each other.

Briefly stated, my invention consists in a channel-shaped metallic cross-arm and insulator-pins projecting upwardly and downwardly from said cross-arm and passing through the horizontal flanges thereof, said pins being preferably formed from iron rods which can be bent easily into the desired shape and provided with lugs or projections that prevent them from rotating and moving vertically in one direction relatively to the cross-arm. Such a structure is inexpensive to manufacture because the insulator-pins are formed from bar iron, preferably round rods, which can be bought in the open market in long lengths and severed into short sections that can be threaded at one end to receive the insulator heads and also pressed or punched at certain points so as to form lugs or projections which hold the pins in position. Holes are punched in the flanges of the cross-arm to receive the pins, and the lugs or projections on the pins are so disposed that they prevent the pins from rotating and moving vertically in one direction, a separate means being employed for preventing the pins from moving vertically in the opposite direction.

Figure 1 of the drawings is a front elevational view of a pole cross-arm constructed in accordance with my invention.

Fig. 2 is a perspective view of a portion of the cross-arm shown in Fig. 1; Fig. 3 is an enlarged side elevational view of one of the pins; Fig. 4 is a cross sectional view taken on the line 4-4 of Fig. 3; Fig. 5 is an enlarged side elevational view of a pin of slightly different construction; and Figs. 6, 7 and 8 are front elevational views illustrating other slight modifications of my invention.

Referring to Fig. 1 of the drawings which illustrate one form of my invention, A designates a pole cross-arm which preferably consists of a piece of commercially-rolled channel iron. Said cross-arm is provided with one set of insulator pins 1 that project upwardly from the cross-arm, and a separate set of insulator pins 2 that project downwardly from the cross-arm, the set of insulator-pins 2 on the under side of the cross-arm being arranged intermediate the pins 1 on the upper side of the cross-arm or in staggered relation to said upper pins.

By arranging the insulator-pins in this manner I am able to mount a large number of insulator-pins on a comparatively short cross-arm and still maintain the required distance of ten or twelve inches between the insulators. Both sets of pins are preferably formed from round iron rods, and the top and bottom flanges of the cross-arm are provided with holes through which said pins pass, as shown clearly in Fig. 2. The upper pins 1 are provided at their upper ends with threaded portions for receiving the insulator heads and lower pins 2 are bent laterally and turned upwardly so that the insulator heads may be mounted thereon will be arranged intermediate the insulators on the upper pins. Each pin passes through a pair of aligned holes or openings 3 and 4 in the top and bottom flanges of the cross-arm, and in the preferred form of my invention, as shown in Fig. 1, each pin is provided with a lug 5 and a key 100 that enters a notch or recess 6 in one flange of the cross arm and a lug or stop 7 that rests upon or bears against the other flange of the cross-arm. The lug 5 prevents the pin from turning or rotating in the cross-arm and the lug 7 prevents the pin from moving vertically in one direction. The notches 6 which cooperate with the lugs 5 on the upper pins 1 are formed at one side of the holes 3 in the top flange of the cross-
arm, and the holes in the bottom flange of the cross-arm are round or of the same cross-sectional shape as the pins. Consequently, when the upper pins are inserted in the openings in the top flange of the cross-arm and moved downwardly, the bottom flange of the cross-arm will act as a stop that cooperates with the lugs on the lower ends of said pins to limit the downward movement of the pins, the lugs or keys which project into the recesses preventing the pins from turning. After the upper pins have been arranged in operative position in the manner above described they are locked to the cross-arm, either by bending the extreme lower ends of the pins laterally, as shown in Fig. 1, or by screwing nuts onto the lower ends of the pins which project downwardly below the bottom flange of the cross-arm, as shown in Fig. 6.

The recesses which receive the lugs on the lower pins are formed in the bottom flange of the cross-arm so that said lower pins can be inserted from the under side of the cross-arm and pushed upwardly until the lugs at the upper ends of said pins butt against the top flange of the cross-arm, said lower pins being thereafter locked in position either by bending over the extreme upper end portions of the pins, as shown in Fig. 1, or by threading nuts onto the portions of the pins which project upwardly above the top flange of the cross-arm. The holes in the flanges of the cross-arm which receive the pins can be punched and the lugs on the pins can be formed by pressing or pinching the pins at the desired points so as to force some of the metal laterally. Consequently, the cost of manufacturing such a structure is very low.

While I prefer to provide each pin with a pair of lugs and , as previously described, the same result could be obtained by providing the pin with a rib, as shown in Fig. 5, of sufficient length to bear against one flange of the cross-arm and enter the recess in the other flange of the cross-arm. Still another slight change that could be made without departing from the spirit of my invention is to provide the pins with nuts, as shown in Figs. 7 and 8, for preventing vertical movement of the pins in one direction, said nuts being screwed onto the upper pins after they have been passed through the top flange of the cross-arm but before they are inserted in the lower flange and vice-versa with the lower pins.

In the structure shown in Fig. 1 the cross-arm is provided with ten insulator-pins, six being arranged on the upper side of the cross-arm and four on the under side of the cross-arm, but it will, of course, be obvious that the cross-arm may be provided with any desired number of insulator-pins without departing from the spirit of my invention. The particular shape and design of the keys and stops on the pins is also immaterial so far as my broad idea is concerned.

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

A pole cross-arm provided with laterally projecting flanges having alining openings formed therein, the opening in one of said flanges being provided with a notch or recess, an insulator pin passing through the openings in both flanges and consisting of a piece of round iron rod, an integral lug or displaced portion on said pin that projects into the notch in the opening in one flange, and means on the pin that cooperates with the other flange on the cross-arm to prevent the pin from moving vertically.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this twenty seventh day of September 1911.

CHARLES G. ETTE.

Witnesses:
WALTER C. RAITHEL,
EDWARD SCHWIDDE.