My invention relates to cross arms and pins for use on pole lines for carrying electric conductors.

Several objects are served by this invention: Among these is the production of an arm of a built-up construction, whereby stock of a smaller cross section may be used, thereby more fully utilizing the lumber contained in a log and also thereby enabling more quick drying of the lumber and drying without injury.

A further object secured by the built-up construction is an effective ventilation of the bar, so that when it becomes wet it will quickly dry out. One important advantage following from the use of thinner stock is quicker drying in the dry kiln with less probability of injury, thus furnishing a superior product.

A further object is to provide a type of construction which is cheap to manufacture, light in weight yet of equal strength with the solid bar, and one which, because of its thinner stock, may be more effectively inspected for faults and because of better drying and ventilation will last longer.

A further object of my invention is the provision of a pin of a peculiar construction and a complemental construction of the bars of the arm, whereby they cooperate to enable quick insertion of the pin and the pin serves as a stiffening and binding element, connecting the two bars of which the cross arm is composed, and whereby also, the pins may be quickly removed if desired.

A further object of one form of my invention is the utilization of the bolts, screws, or like members employed in binding the bars together, to accurately locate the pins and to hold in position the pins in upright position.

Other objects of my invention will be disclosed in the following specification.

The present invention consists of a cross arm composed of two bars, secured together by bolts, screws, rivets or like members, positioned at frequent intervals, which bars when manufactured and until the pins are placed therein, are held slightly spaced apart by temporary spacers, and in pins so designed that they may be inserted by driving out the temporary spacers, thereafter serving as permanent spacers, said pins and the bars being provided with interlocking members which hold the pins in place and serve as braces or dowels to stiffen the arm against side bending.

It also consists in a novel construction of pins adapted for use with cross arms of the above construction, which pins are characterized by having flat shanks designed to replace the temporary spacers and to also act as dowels connecting the spaced bars to thereby stiffen the composite structure and prevent relative longitudinal movement between the two bars.

The novel features of my invention upon which I ask for a patent will be pointed out in the claims.

In the accompanying drawings I have shown my invention in the specific form of construction which now seems to me to best meet the needs as above defined. It will, however, be evident, after but little study thereof, that variations upon the specific structure shown may be employed without changing the essential character of the invention.

Figure 1 shows a cross arm of the construction illustrated mounted upon a pole.

Figure 2 is a top view of one end of a cross arm showing only one pin in place, but with two temporary spacers at the pin positions.

Figure 3 is an inner face view of one of the bars of the cross arm, two pins being shown in their proper relation thereto.

Figure 4 is an end view of the cross arm.

Figure 5 is a side view of a pin of one type used.

Figure 6 is a cross section of the shank of this pin taken on the broken line 6—6 of Figure 5.

Figure 7 is a cross section of one of the temporary spacers used.

Figure 8 is a plan view of an end of a cross arm showing a modified construction of pin.

Figure 9 is a side view of the same arm with a section of the front arm member broken away at its outer end.
Figure 10 is a cross section taken on a plane at the adjacent edge of a pin in place.

The body of the cross arm is composed of two bars 1, 1, these being in combined cross section substantially less than the cross section of a solid cross arm for the same service. The over-all dimensions are substantially the same as used for a solid arm. Making the bar of stock of half the thickness or less, means a better utilization of all the lumber, as a good half may often be obtained from a stock which would not make a good solid or one-piece cross arm.

The halves are bound or held together by bolts, screws, rivets, or like binding members. I have illustrated screws 2 as used for this purpose. Of these I prefer to employ two or more for each pin position, these, when two are used, being placed, one near the upper edge of the bars and one near their lower edge, and when the metal pin is used, separated lengthwise of the arm just enough to receive the shank of the pin between them.

The bars as assembled at the mill are provided with temporary spacers 4, these being short pieces of wood of a length not exceeding the width of the bars, of a thickness corresponding with the thickness of the shank of the pins. One of these is provided at each pin position. With these in place the screws or like clamping members may be set down securely. The cross arm is shipped in this condition and so remains until put in use. The temporary spacers are intended to remain in place until removed by the placing of the pins.

In the construction illustrated in Figures 1 to 7 inclusive, the pins are of metal. One such pin is shown separate in Figure 5. This type of construction will first be described. The projecting upper end 3 may be round or of any other suitable shape and size best adapted to the mounting of the insulator thereon. One of the pins shown in Figure 3 has this end exteriorly threaded and a wood sleeve 5 threaded thereon and itself threaded to receive the insulator. The exact construction of this part of the pin is largely immaterial.

The shank 30 of the pin is of the same thickness as the temporary spacer, but has a rib 31 at each side adapted to enter and snugly fill the grooves 10 in the inner faces of the bars 1. A collar or shoulder 32 is preferably provided to engage the upper face of the cross arm bars.

When it is desired to place a pin in the cross arm, the lower end of the pin is placed against and aligned with one of the temporary spacers 4, and the pin is used as a punch to drive out the temporary spacer. This substitutes the shank of the pin for the temporary spacer. The side ribs 31 enter the grooves in the faces of the bars 1. The pin is thereby securely held in place. Because of the ribs and grooves, the pin shanks function as braces or dowels to stiffen the cross arm against side bending.

With metal pins such as just described, the binding or clamping screws or bolts 3 lie close against the side edges of the pin shank. I may provide these side edges with hook-like fingers 33 positioned to engage over the screws when in final position. These may function as stops, and be the only stops, limiting the driving of the pin and also to prevent side weaving of the pin. At the right hand end of Figure 3 a pin is shown without such hooks or fingers. These fingers may or may not be used as desired.

I prefer to shape the upper edges of the bars 1 so that they have a slight slope away from the gap between the bars. This is shown in Figure 4, in which such upper edge of the cross bar, has been rounded. This deflects rain away from the gap. What water enters such gap will be quickly evaporated because of the free circulation of air therethrough. This will greatly increase the life of the bar. Furthermore, because the thinner bars may be kiln dried without injuring the material thereof, the bars are better able to resist decay and climatic effects and consequently their service life will much exceed that of solid or one-piece cross arms. The material lacking when compared to a solid arm has been taken from the neutral axis where it contributes only a negligible amount to the strength of the arm.

If it be desired to positively secure the pin in place in the arm this may readily be done by driving a nail 5* through one of the bars 1 close alongside of the pin shank and above the projecting finger 32, which is toward the lower end of the pin shank.

In the modified construction shown in Figures 8, 9 and 10, the same principles have been applied to the use of a wooden pin. In this modification the shank 35 of the pin 34 is of a rectangular section and the transverse pin-receiving grooves 11 of the bar sections 1, are made of a width to snugly fit the shank. The temporary spacers 40 are made thicker than when an iron shank is employed, but need not be as wide as is the shank of the wooden pin to be used.

The use of wooden pins may often be preferred and such may be used whenever desired. The channel in the cross bars need be made no deeper than is needed to receive the rib 31 of the metal pin but must be made wider. The depth of the pin receiving channel may be determined by the desired width of the ventilating channel between the two bars 1, together with the thickness of the pin shanks. Such grooving does not greatly weaken the cross bar, as it is on the neutral axis. The insertion of a wooden pin is by using it as a punch to drive out the temporary spacer.

The pin may, and preferably will be, pro-
vided with shoulders 36, which will engage the upper edges of the cross arm bars. The wooden pins will act effectively as dowels to prevent relative longitudinal movement between the two bars and to resist side bending of the opposite arm. The two bars and the inserted pins together make a truss or box girder for resisting side strains. The material removed has been taken from the neutral axis.

In Figure 9 I have shown two securing screws or bolts at each side of each pin position. The number used may be anything desired or found necessary and when using the wooden pins their location may also be varied.

While the temporary spacers which have been herein referred to are the spacers which are displaced by the insertion of the pins, and which are therefore more or less temporary in character, it is evident that under certain conditions, as the non-insertion of the full complement of pins, certain of them may function as essentially permanent. It is also evident that truly permanent spacers may be employed positioned at other than pin-receiving positions, as for instance, in the central section where the cross arm is secured to the pole and where brace arms are secured thereto. My invention contemplates a two-bar cross arm with spacers and the ventilating space thereby formed, whether these spacers are temporary or permanent, or both temporary and permanent. In fact, the pins when inserted constitute permanent spacers.

What I claim as my invention is:

1. A cross arm pin having a flat shank, longitudinal ribs projecting from the faces of the shank and fingers projecting from the edges of the shank.

2. A cross arm pin having a shank adapted to be clamped between two bars, and having two fingers projecting from opposite edges of the shank, one finger being near the upper edge of the bars and the other near their lower edge.

3. A cross arm for telegraph poles and the like comprising a pair of spaced bars having oppositely positioned channels across their inner faces for receiving temporary spacer blocks, or insulator pins, temporary spacer blocks seated in the channels, means for clamping the bars upon the blocks, the channels and spacer blocks being shaped to permit the dislodgment of the blocks by the introduction of the pins, which replace them as spacers.

Signed at Seattle, Washington, this 26th day of July, 1926.

JOHN H. NEVILLE.