

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

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CABLE SPLICING—GENERAL

JOINING .375-INCH COAXIALS

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1. GENERAL

1.01 This section describes the method of preparing and joining .375-inch coaxials, and lists the special tools and materials that are needed for the operation.

2. TOOLS AND MATERIALS

2.01 The materials and tools listed below are required in addition to the splicing materials and tools generally carried by splicers.

2.02 Materials:

Bushing, Coaxial, B375	For supporting the rolled portion of the outer conductor. Two required per coaxial.
Disc, Coaxial, B375	Polyethylene disc with a .135-inch hole. Two required per coaxial.
Ring, Coaxial, B375	Ring for securing steel tapes. Four required per coaxial.
Sleeve, Brass, 100S	For connecting inner coaxial conductor. One required per coaxial.
Sleeve, Coaxial, B375	For connecting outer conductor. One required per coaxial.
Sleeve, Coaxial, C375	For securing steel tapes. Two required per coaxial.

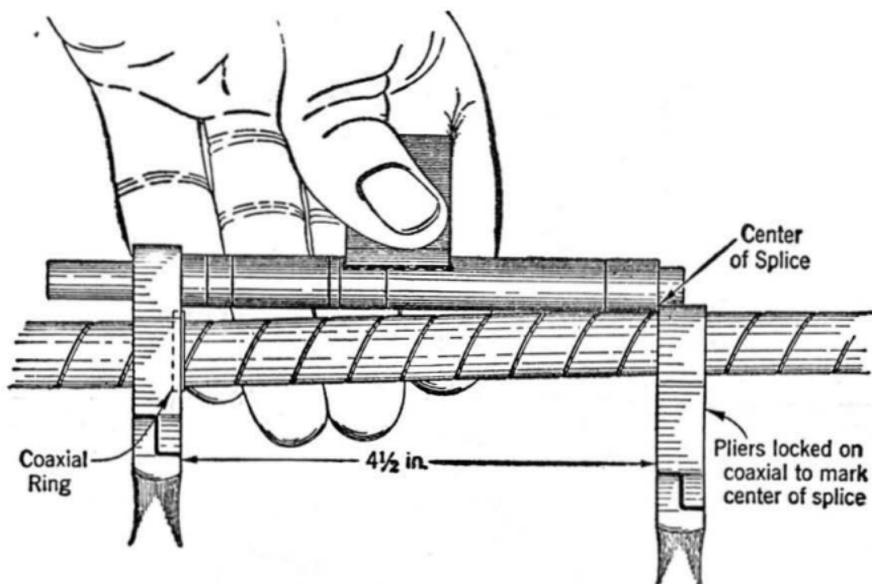
2.03 Tools:

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|--------------------------------------|---|
| Pliers, Coaxial, B375 | For crimping B375 rings and for tightening and holding the steel tapes. |
| Presser, Sleeve, C | For crimping S100 brass sleeves. |
| Roller, Sleeve, Coaxial, D375 | For rolling B375 and C375 coaxial sleeves. |
| Scale, Splice, Coaxial, C375 | For positioning insulating discs and reinforcing bushings and for making splice measurements. |

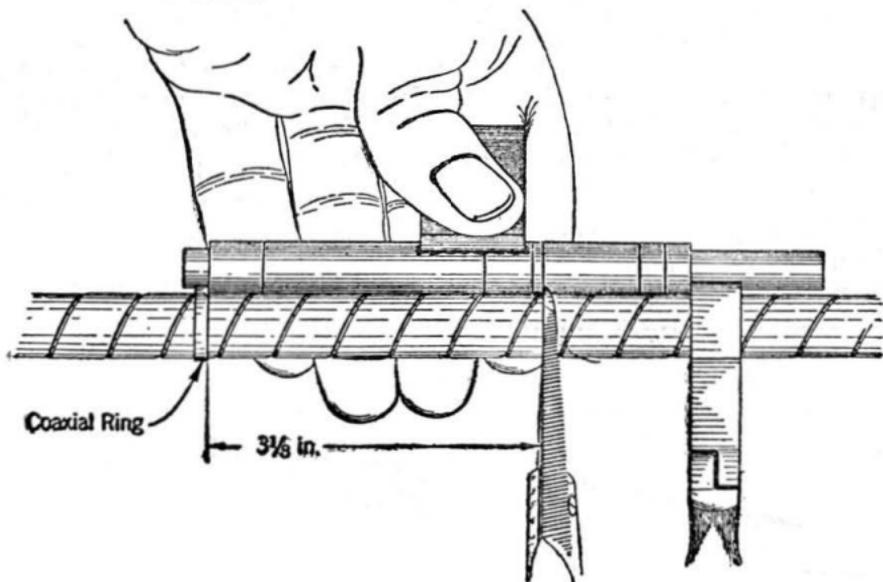
3. PREPARATION OF LEFT-HAND COAXIALS

3.01 Lock a pair of B375 Coaxial Pliers 3/4 inch from the cut end of the first coaxial selected for splicing. With a second pair of coaxial pliers round the end of the coaxial and smooth the steel tape ends by working the pliers around the end of the coaxial until a B375 Coaxial Ring can readily be placed over the coaxial. Slide the ring to the pliers first placed, then lock the other coaxial pliers at the end of the coaxial. Remove the pliers first placed and move the ring on the coaxial toward the left end of the splice. Measuring from the sheath with a rule, lock a pair of pliers on the coaxial with the edge of the pliers at the center of the sheath opening, as shown below.

3.02 Place the C375 Coaxial Splice Scale along the coaxial, as shown below, and with a pair of pliers, crimp the B375 ring on the coaxial 4-1/2 inches toward the sheath from the center line mark, i.e., at the shoulder of the scale. This ring should be located accurately, since it will be used as a guide in placing the B375 rings on the remaining coaxials. Hold the pliers so that the crimp in the ring will not bear against the muslin used to wrap the spliced coaxials.

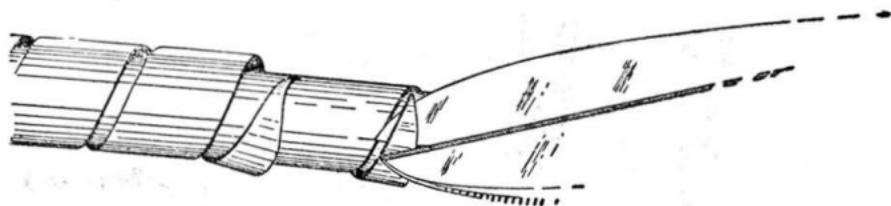


3.03 Place the scale along the coaxial, as shown below, and score the steel tapes around the coaxial with the scissors, 3-1/8 inches from the crimped ring, i.e., at the indicated mark on the scale.



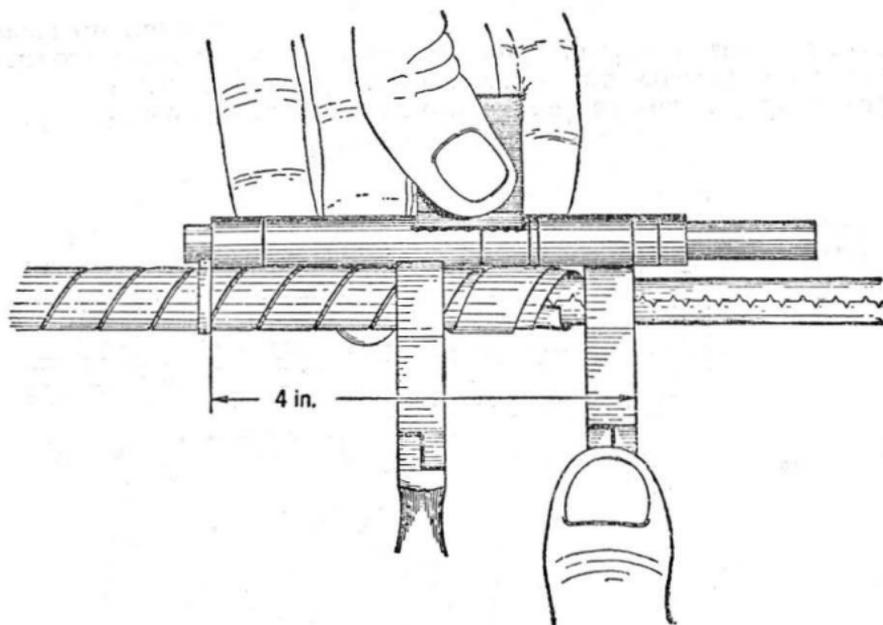
3.04 Place the coaxial pliers so that they grip the second full steel tape spiral on the sheath side of the mark; place the pliers so that their weight, when locked in place, tends to tighten the lay of the tapes.

3.05 Release the steel tapes. This should be done with a pair of scissors, as shown below, otherwise the fingers may be cut by the sharp tapes.

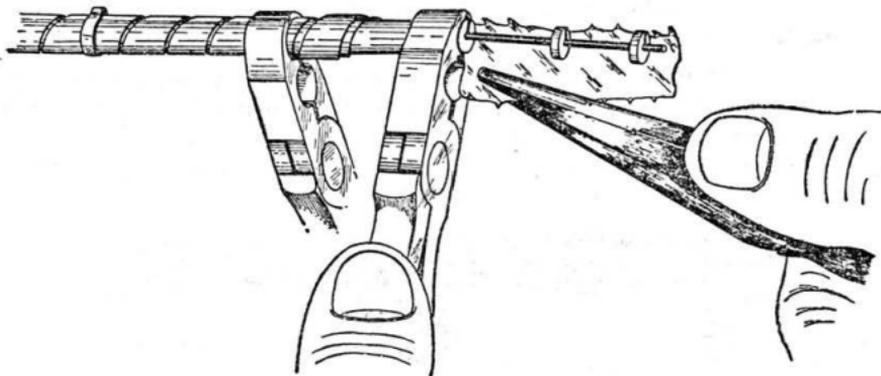


3.06 Cut the steel tapes parallel to the axis of the coaxial so that the forward edge of the outer tape, after cutting, is at the score mark. The forward edge of the inner tape should not extend beyond the outer tape. Cut off the corners of each tape.

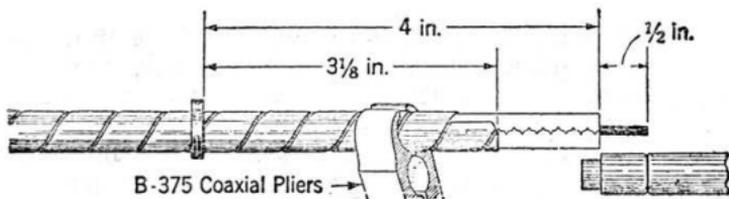
3.07 Place a pair of coaxial pliers on the outer copper conductor so that the edge away from the sheath is 4 inches from the crimped ring, using the scale to make the measurement, as shown below.



3.08 Hold the pliers firmly and at such an angle that the opening at the end of the jaws is not in line with the seam in the outer conductor. Using a pair of long nose pliers round out the end of the outer conductor and open the seam to the coaxial pliers. Grip one edge of the outer conductor with the long nose pliers as close to the coaxial pliers as possible, bending the conductor outward and toward the coaxial pliers until it begins to tear. Complete the tear along the edge of the coaxial pliers, as shown below, and trim off any projections with a pair of scissors.



3.09 Cut off the inner conductor $\frac{1}{2}$ inch from the end of the outer conductor, using the scale in making the measurement.

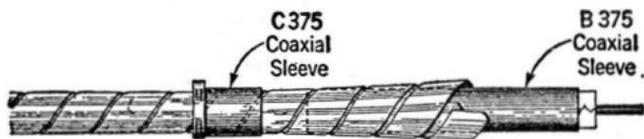


3.10 Examine the end of the coaxial and remove the insulating disc at the end if it is exposed. Insert the coaxial scale into the end of the coaxial up to the $1\frac{3}{8}$ -inch shoulder, pushing back any discs that are in the way. While the scale is in the coaxial, round out the end of the outer conductor with the coaxial pliers. Remove the scale and place a B375 Coaxial Bushing under the outer conductor, first inspecting the inside of the bushing to see that it is free of dirt. Push the bushing

in with the short end of the scale so that the bushing is 1/4 inch inside the end of the outer conductor. After placing the bushing, insert a single insulating disc under the outer conductor so that the outer edge of the disc is flush with the end of the outer conductor. See that the slot in the disc does not line up with the seam in the outer conductor. Squeeze the outer conductor with a pair of coaxial pliers to hold the disc in place firmly. It is important that the disc does not come in contact with the bushing previously placed.

3.11 Using a pair of coaxial pliers, tighten the ends of the steel tapes. Slide a C375 Coaxial Sleeve over the steel tapes, turning the sleeves in the direction that will tighten the lay of the tapes. When the sleeve is against the locked coaxial pliers placed as described in Paragraph 3.04, remove the pliers and continue turning the C375 sleeve until it is against the crimped ring, allowing the steel tapes to loosen, as illustrated below.

3.12 Slide a B375 Coaxial Sleeve over the outer conductor and under the steel tapes, turning the sleeve in the direction opposite to the lay of the tapes. Continue turning and sliding the B375 sleeve until the end of the outer conductor is exposed as shown below.



3.13 The remaining coaxials on the left-hand side of the splice should be prepared in a similar manner, using the B375 ring on the first coaxial as a guide in locating the ring to be placed on the coaxial under preparation.

3.14 When there is a cross-over of coaxials in a splice, the left-hand coaxials should be prepared in a similar manner except that the coaxial pliers should be locked 1-1/2 inches to the right of the center of the opening instead of at the center. The rings should be located from the pliers. This moves the splices 1-1/2 inches to the right and allows for the additional length required to make the cross-over in the coaxials.

4. PREPARATION OF RIGHT HAND COAXIALS

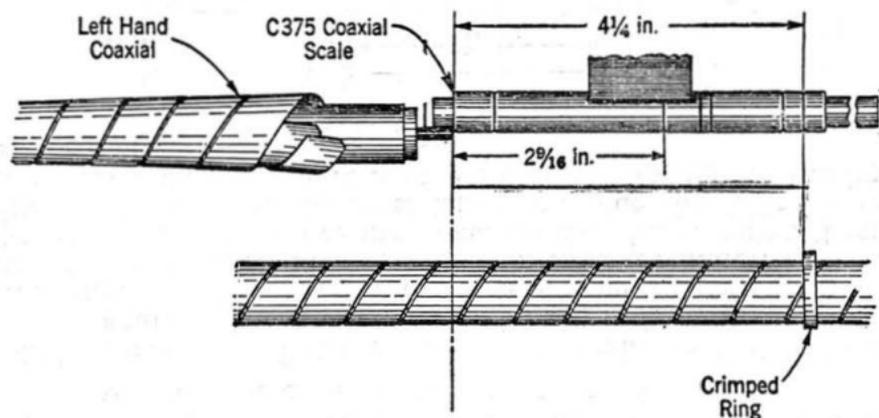
4.01 Check the coaxials and decide the order in which they are to be spliced (coaxials at the top and away from the splicer should be joined first). Do not set up the coaxials in their final splicing position at this time since this would

introduce unnecessary slack. In preparing for splicing, they are kept straight across the splice and the necessary slack is provided in making the measurements.

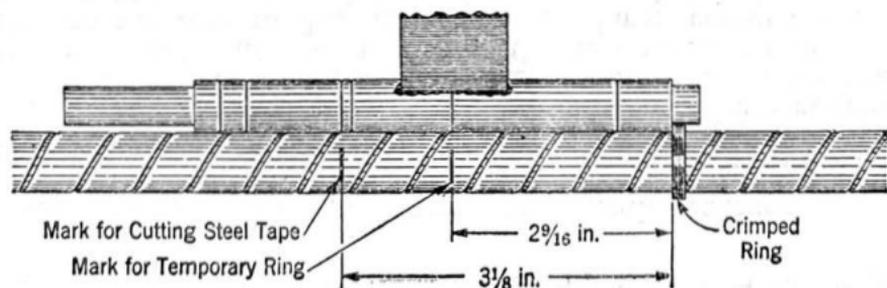
4.02 A coaxial on the right-hand side should be prepared and spliced to its mate before proceeding with the next coaxial. The method of preparing the right-hand coaxial is outlined below.

4.03 With the coaxials straight across the splice, place the unprepared coaxial on the right-hand side beside its prepared mate on the left-hand side and slide a B375 Coaxial Ring over the steel tapes, as shown in Paragraph 4.04.

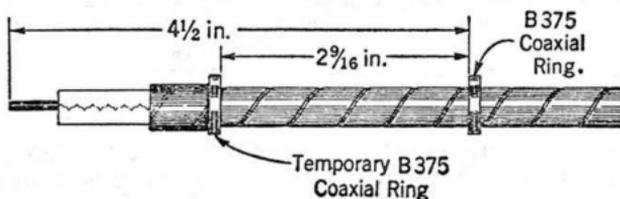
4.04 Using the coaxial scale for measuring, crimp the ring at a point 4-1/4 inches from the end of the inner conductor of the left-hand mate. **This dimension should be measured accurately**, as shown below, as it determines the amount of slack in the coaxials. Displacing the ring toward the sheath butt will decrease the amount of slack in the coaxial.



4.05 Using the crimped ring as a measuring point mark the steel tapes locating the position of the temporary ring, as shown below.



- 4.06 Mark the steel tapes for cutting as shown in Paragraph 4.05.
- 4.07 Lock on a pair of coaxial pliers with the edge of the jaws at the right-hand side of the mark for the temporary ring.
- 4.08 Cut the steel tapes. Mark and cut the outer conductor and inner conductor and place a B375 Coaxial Bushing and an insulating disc following the procedure outlined in Paragraphs 3.05 to 3.09 inclusive. The inner conductor will overlap the end of the left-hand coaxial by 1/4 inch with no setup in either coaxial. This overlap is necessary to ensure the proper amount of slack when the coaxials are joined.
- 4.09 Slide the temporary B375 Coaxial Ring over the tapes to the locked-on pliers and crimp the ring.
- 4.10 Place a C375 sleeve beside the coaxial so that it butts against the temporary coaxial ring. If the ends of the steel tapes project beyond the sleeve, trim the ends of the tapes; otherwise, rolling the added thickness of material under the center copper sleeve may damage the sleeve roller. Then tighten the ends of the steel tapes and slide the C375 sleeve along the coaxial, turning it in the direction to tighten the lay of the tapes.

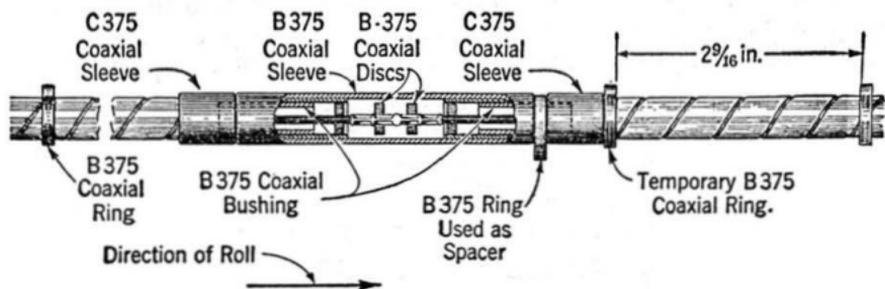


5. JOINING COAXIALS

5.01 Set up the prepared ends so that the center sections between the coaxial rings are straight and in line, with the ends of the inner conductors separated about 1/8 inch. Avoid sharp bends or kinks in making the setups. If the like-numbered coaxials do not line up, the setups should be such that when completed the coaxials will spiral around the splice. **Do not twist** the core to make the coaxials line up.

5.02 Slide an S100 Brass Sleeve over the end of the inner conductor at one side of the splice. Bow the coaxials and slip the inner conductor at the other side into the sleeve and then push the coaxial back into place. Using the C Sleeve Presser, press the S100 sleeve on the inner conductor at three

points on each side of the press mark on the sleeve, starting at one end of the sleeve and working toward the other end. Examine the ends of the outer conductor and make sure that the discs are in place. Over the S100 sleeve snap two B375 Coaxial Discs spacing them about one-third inch from the ends of the outer conductor. Make certain that the slots in these discs and the slots in the discs at the ends of the outer conductor do not line up. A splice with the discs in place is shown below.

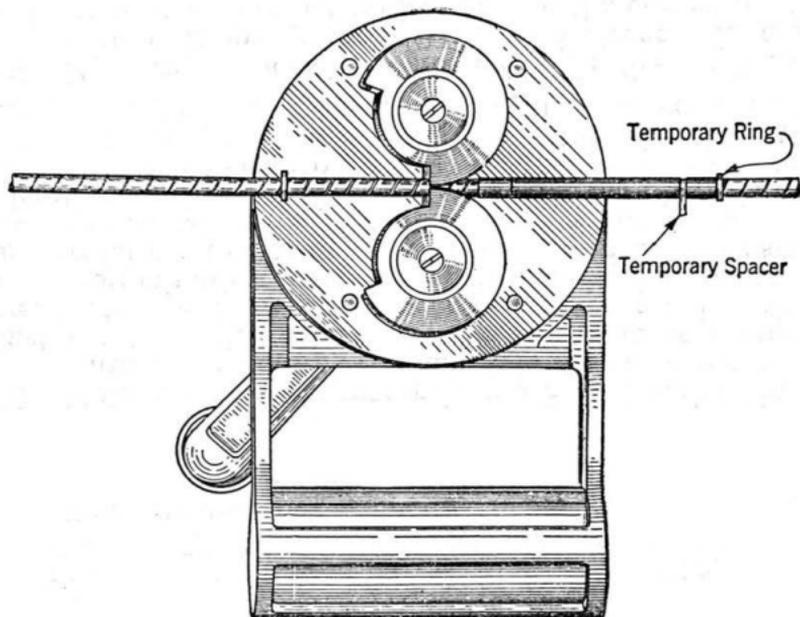


5.03 Make a temporary spacer from a B375 Coaxial Ring by cutting it. Open the ring and fold it around the coaxial against the C375 sleeve on the right-hand side as illustrated above. Slide the B375 sleeve over the outer coaxial with a turning motion until it fits firmly against the temporary spacer, being careful not to move or upset the discs on the S100 sleeve. Using the coaxial pliers, tighten the lay of the tapes on the left-hand side. When the lay is tight, lock the pliers in place at the ends of the tape to hold the lay. Move the C375 sleeve on the left-hand side by turning it in the direction which tightens the lay of the tapes until it is against the coaxial pliers.

5.04 Remove the locked pliers and slide the C375 sleeve until it is firmly against the B375 sleeve. Make sure that the steel tape does not project beyond the end of the C375 sleeve. Place the coaxial pliers over the C375 sleeve so that the edge of the pliers is in line with the end of the B375 sleeve. Squeeze the pliers, gently turning them at the same time in the direction which will tighten the lay of the tapes. The splice is now ready for rolling. It is important that the parts bear firmly against each other before the sleeves are rolled.

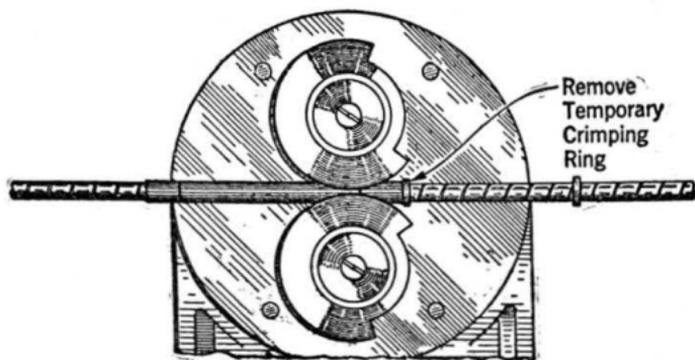
5.05 The B375 sleeve and the two C375 sleeves must be rolled in two operations. It is desirable that the two rolling operations be of approximate equal length so that the first roll will end at about the midpoint of the center sleeve. The roller handle is equipped for ratchet operation. The rolling

operations should be carried out as follows: Before starting the rolling operation place the tool on the left-hand side of the joint and turn the handle until the rollers are in the position shown in the sketch below. Then make 2 revolutions of the handle before engaging the rollers on the C375 sleeve. Move the tool up to the C375 sleeve with the crimped tip of the temporary ring in line with the slot in the rollers. If the crimped tip of the temporary ring is not in line with the slot in the roller, remove the sleeve roller and with two pairs of coaxial pliers turn the ring in a direction which will tighten the lay of the tapes.



5.06 Roll the left-hand C375 sleeve and continue the operation on the B375 sleeve. When the rollers are well on the left-hand end of the center sleeve, remove the ring used as the temporary spacer. Continue rolling until the flats are reached (about the center of the splice). Then start the second roll, overlapping the first slightly. Continue rolling until the rollers catch the left-hand end of the second C375 sleeve. Remove the temporary crimping ring and complete the roll.

5.07 See that the frame of the roller does not catch on the temporary coaxial ring as the rolling of the sleeve proceeds; if the roller catches on the ring, undue strain is placed on the tool, the coaxial may become kinked at the ring and the lay of the steel tapes may be disturbed.



5.08 The remaining coaxials should be set up and joined in the same manner.