This invention relates to new and useful improvements in wire rope machines, and the especial object of the invention is to provide simple and efficient means for preforming the wires or strands of a cable, so that their free ends will not unravel.

Another object is to provide wire preforming means which can be quickly and readily attached to the machine and easily adjusted to suit the class and size of wire and strand or rope under operation.

A further object is to provide wire preforming means which will be readily accessible and which will be open for inspection during the operation of the machine.

A still further object is to provide means which will preform wires or strands of a wire rope and lay them into rope form without exerting excessive strain on the preformed wires.

According to my invention I provide means for forming crimps or bends in the wires or strands before they are laid in a strand or rope respectively. The device is very easily adjusted to suit the type of wires or ropes under operation and is so positioned on the machine that there is no tendency for the wires or strands to straighten out once they have been crimped.

In the drawings which illustrate my invention:

Figure 1 is a side elevation of the wire rope making machine with my improved wire or strand preforming device attached thereto.

Figure 2 is an end elevation of the machine shown in Figure 1.

Figure 3 is an enlarged side elevation of my improved preforming attachment.

Figure 4 is an end elevation of the device shown in Figure 3.

Referring more particularly to the drawings, in these for illustrative purposes I have shown a stranding machine of common type with my invention applied for preforming a plurality of wires before they are laid in the form of a strand, but it will be readily understood that the device is also applicable to a rope machine in which the strands are preformed before they are laid in a rope. The preferred arrangement for making a rope is to first preform the wires before stranding, and then preform the strands whilst laying them in rope form.

In Figures 1 and 2, 11 designates the base or bed of the machine and projecting upwardly therefrom are the spaced brackets or bearings 12 and 13. Rotatably mounted in said brackets is the hollow spindle 14. Secured to this spindle 14 is the fly comprising spaced discs 15 and 16 having journalled therein the cradles 17 for carrying the bobbins 18. The cradles extend between the discs and are provided with extensions 19, each connected to the ends of connecting rods 20, the other ends of which are pivotally secured to a ring 21 carried eccentric to the axis of the disc, so that the bobbin journals are always parallel to one another and are maintained in a horizontal position, the cradles do not rotate in the direction of the fly. The internal edge of the ring 21 engages with the outer surfaces or faces of two diametrically opposite rollers 22 rotatably mounted on studs 23 secured to the bearing 12. The disc 15 is supported on rollers 24, rotatably mounted in bearings 25 formed in the base 11. A brake band 26 of the usual type encircling the disc 16 may be provided, and said brake band may be operated by the lever 27, an operating rod 28 and brake band 29 connections 29. A head 30 is secured to the end 31 of the hollow spindle and is journalled in the bearing 13. The wires from the bobbins pass through apertures 32 formed in the inner journals of the cradles and then through the apertures 33 formed in the head. Secured to the head is the toothed gear wheel 34 which engages with the wheel 35 secured to a driving shaft 36, upon which are mounted the fixed pulley 37 and running pulley 35, usually employed, and driven by a belt from a source not shown.

The foregoing description is of a machine well known in this art and my preforming devices are equally applicable to strand or rope making machines of other types.

Referring now to the crimping or preforming device embodying the invention, secured to a flange 39 formed on the head is the head casting 40 having a disc support.
ing section 41. Secured to the support 41 is the centre disc 42. The outer discs 44 and 45 are splined on the support 41 so as to be driven thereby but adjustable toward and from disc 42. Intermediate discs 47 and 48 are mounted on the support between the outer and the centre discs. The intermediate discs are so constructed and secured to the support 41 that they may be adjusted in both the lateral and rotary direction with respect to said support. The discs 47 and 48 are provided with the slots 49, the surfaces 50 of which have inwardly projecting teeth which engage with the teeth of pinions 52 secured to spindles 53 rotatably mounted in the outer discs. The spindles 53 are threaded for a lock nut 54, to lock the spindles for holding the intermediate discs in any desired rotary position. The outer and the intermediate discs are moved toward or away from the centre disc by means of the threaded spindles 53, which engage with threaded apertures formed in the outer discs and with threaded floating nuts 51, mounted in slots 58 formed in the intermediate discs. The nuts 51 are held in the intermediate discs by keeper plates 50 secured to the intermediate discs by screws. It will be noticed that the threads of the spindles on one side of the centre disc are right hand, while the threads on the other side of the centre disc are left hand, so that the intermediate discs and outer discs are moved simultaneously toward or away from the centre disc. The threads of the spindles 53 engaging with the nuts 51 have half the pitch of the threads engaging with the outer discs, so that the distances between the discs are at all times equal.

Suitable locking screws 61 are provided through the outer discs and engage with the spindles 55 to prevent rotation of same. The sides of the pinion teeth are held in engagement with the teeth in the slots by means of retaining flanges formed in the intermediate discs and at the sides of the teeth in the slots. A steel guide disc 60 having a round edge on which the wires run is secured to the lead-off end of the outer disc.

Grooved rollers 64 are mounted on pins 65 secured to the periphery of the outer and centre discs and in alignment with the guide apertures formed in the head of the machine. The rollers are preferably in pairs spaced evenly around the periphery of the discs as shown. The rollers 66 are rotatably mounted on pins 67 secured to the periphery of the intermediate discs and spaced evenly around the periphery of same. The wires pass around the rollers and are crimped thereby, as shown, and pass through the die 68 mounted on the supporting pins 69 projecting outwardly from the bracket 43. A crosshead is secured to the heads of the dies 68 and 69 and rotatably mounted in said crosshead is the adjusting screw 71, which engages with a threaded aperture 72 formed in the die. The screw 71, when turned, causes the die to move towards or away from the head of the machine for adjustment. A suitable locking nut 73 is provided to prevent rotation of the screw 71 after adjustment. The rope or strand 74 passes on to a drum 75 rotatably secured to shaft 76 passing through brackets 77 projecting upwardly from the base. The drum may be rotated by any suitable means to coil the strand or rope thereon.

In operation the bobbins are filled with wire or strands and are mounted in the cradles between the discs 15, 16. The discs, which are secured to the hollow spindle, are rotated and the ring secured to the bracket 12, in conjunction with the links or levers, holds the bobbins so that there is no twisting of the wires about their centre axes. The wires are led towards the head of the machine and are then passed on to the rollers on the discs which rotate with the support 41 projecting from the head casting. The discs are adjusted to crimp the wire as desired before it passes to the closing die and this crimping with the rotation of the head casting and wires, relatively to the closing die, preform the wires to secure the helix desired in the strand or rope. The rollers mounted on the discs and between which the wires pass, allow the wire to be drawn through the machine with little resistance, but other crimping devices may be used. The outer and intermediate discs are moved longitudinally of the machine by turning the screws provided therefor, and they are so arranged that they move simultaneously an equal distance from one another when said screws are rotated. The intermediate discs are moved in the rotating or anti-rotating direction, as desired, by means of the pinions and operating spindles, to suit the type of wire or rope under operation. The core of the rope or strand is fed through the centre of the hollow spindle and the preformed wires or strands are laid spirally thereon by the rotation of the preforming head. By crimping the wires in the manner herein described, they tend to hold towards the core and form what is commonly known as an unravelling strand or rope, that is, when the strand or rope is cut, no binding wire is required to hold the wires or strands around the core at the cut end of the rope. The device is easily attached to the ordinary types of machines at present in use and may be quickly adjusted to suit the class of wire used, or of the strand or rope to be produced. The preforming of the wires occurs at a point in the machine just before they are laid in the form of a strand or before the strands are laid in a rope, thereby eliminating any tendency for the helices to lose their form. It was also found that all crimping or preforming parts of the machine are open to inspection during the working of the ma.
chine. The device is efficient and simple in operation and provides a machine which is easily adjusted for forming strand or rope of the unravelling type, by preforming the component parts of a strand or rope into cooperative helices before laying the wires or strands into a strand or rope.

It will be understood that the invention is not limited to the special type of rope making machine in connection with which the invention is illustrated, and that many modifications may be made in the construction and arrangement of the parts embodying the invention, while retaining the invention defined by the claims.

Having thus described my invention, what I claim is:

1. A wire rope machine including a fly and a head secured to a spindle rotatably mounted, a die, a support rotating with the head, a central disc secured to the support, outer discs on opposite sides of the central disc slidably secured to the support, intermediate discs slidably secured to the support between the outer discs and the central disc and adjustable in the circumferential direction thereof, and wire crimping means on the periphery of each of the discs.

2. An attachment for wire rope machines comprising a support, a centre disc secured thereto, outer discs on opposite sides of the centre disc slidably secured to the support, intermediate discs slidably secured to the support between the outer discs and the centre disc and adjustable in the circumferential direction thereof, and wire crimping rollers mounted on pins projecting outwardly from the peripheries of the discs.

3. An attachment for wire rope machines comprising a support, a centre disc secured to the support and immovable thereon, a pair of outer discs slidably secured to the support on opposite sides of the centre disc for adjustment in the longitudinal direction thereof, intermediate discs between the outer and centre discs slidably secured to the support and adjustable in the circumferential direction thereof, means to simultaneously move the intermediate and outer discs longitudinally of the support, means to move the intermediate discs circumferentially of the support, and wire crimping rollers on the peripheries of the discs.

In testimony whereof, I have hereunto set my hand.

DAVID W. CLARK.