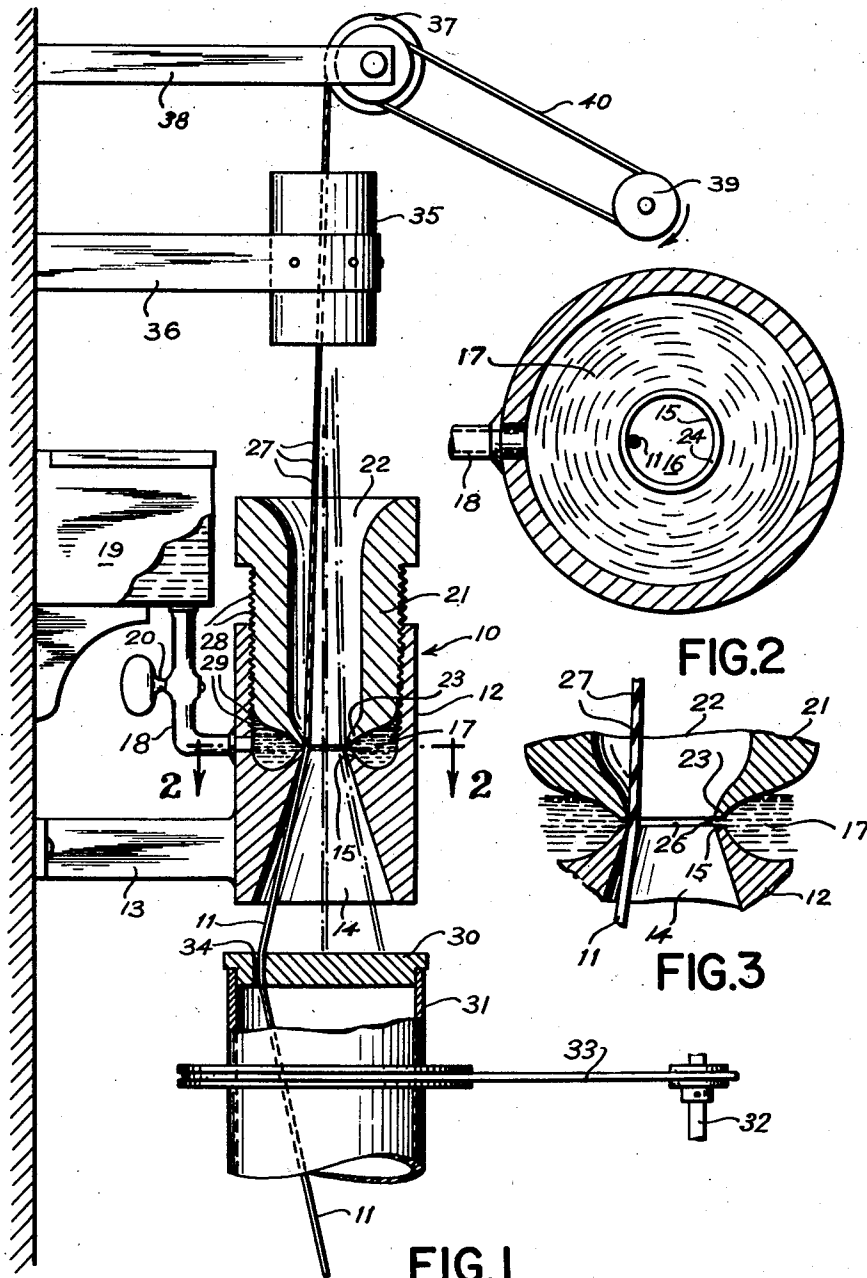


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A. P. LUNT ET AL
INKING DEVICE FOR MARKING THE SURFACE
OF ELECTRICAL CONDUCTORS
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INVENTORS
ALDEN P. LUNT
THEODORE R. NORTON
BY CARL P. ANDERSON
Arthur P. Cox
ATTORNEY

UNITED STATES PATENT OFFICE

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INKING DEVICE FOR MARKING THE SURFACE OF ELECTRICAL CONDUCTORS

Alden P. Lunt, Theodore R. Norton, and Carl P. Anderson, Ansonia, Conn., assignors to Noma Electric Corporation, New York, N. Y., a corporation of New York

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This invention relates to apparatus for marking the surface of electrical conductors and the like with ink or other colored marking liquid to distinguish between otherwise similar conductors, such for example as may be required for purposes of circuit identification in multiple conductor cables.

One of the objects of the present invention is to provide a simple yet highly efficient inking device of this character by means of which a stripe or other suitable marking of ink or other colored marking liquid can be applied to the surface of a wire conductor without the use of any applicator materials heretofore employed for this purpose.

Another object of the invention is to provide a novel inking device of this character in which the ink or other marking liquid is applied to the surface of a conductor by an annular inking section formed by a pair of opposed annular frusto-conical lips constructed and arranged to present the ink to the surface of the conductor in the form of an annular ring through which the conductor is fed.

A further object of our invention is the provision of an inking device of novel construction by means of which a stripe may be applied to the surface of a conductor either in a helical path about the periphery of the conductor or in a path running parallel to the axis thereof.

A still further object of the invention is to provide an inking device of this character in which the width of the stripe applied to the conductor can be controlled to very close limits.

Still another object of our invention is to provide an inking device of this character in which the viscosity of the ink or other marking liquid employed can be varied without affecting the operation of the device in maintaining a uniform stripe.

With the above and other objects in view which will become more apparent as the description proceeds, our invention consists in features of construction, combination of elements, arrangement of parts and mode of operation, hereinafter set forth in the following description, illustrated by way of example in the accompanying drawing, and more particularly pointed out in the appended claims.

Referring to the drawing in which like numerals have been used to designate similar parts throughout the several views,

Fig. 1 is a diagrammatic view of a wire-marking installation in which our improved inking device is employed to apply a helical stripe to the surface of an insulated wire;

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Fig. 2 is a horizontal section through the inking device taken on line 2—2 of Fig. 1, and

Fig. 3 is an enlarged fragmentary detail of the opposed frusto-conical lips of the inking device.

In the drawing, referring more particularly to Fig. 1, reference numeral 10 designates generally a preferred form of inking device embodying our invention for marking the surface of an insulated wire 11 as the latter is fed axially there-through. In the form illustrated, the inking device 10 comprises a cup-shaped applicator member 12 mounted on a suitable support 13.

The applicator cup 12 is provided in the bottom thereof with a conical bore 14 to permit oscillation of the wire 11 as the latter is fed axially therethrough as hereinafter described. The bore 14 extends upwardly from the bottom of the cup 12 and terminates at its upper or reduced end in an annular lip 15 having an inside diameter substantially greater than the diameter of the wire 11 so as to provide a circular wiping space 16 for the latter as shown in Fig. 2.

Surrounding the lip 15, the bottom of the cup 12 is annularly recessed to form a well 17 for ink or other suitable marking liquid supplied thereto by a conduit 18 from a reservoir 19 or other suitable source of supply. The conduit 18 is preferably provided with a valve 20 of any well known construction for regulating the rate of flow therethrough of the ink delivered to the well 17.

An annular plug member 21 having a central bore 22 extends downwardly into the cup 12 from the upper end of the latter and terminates at its lower or inner end in a reduced annular lip 23 coaxial with the lip 15. The lip 23 is oppositely disposed with respect to the lip 15 and cooperates therewith to form an annular inking section provided with an ink-receiving channel 26 in communication with the well 17. The opposed faces 24 and 25 of the lips 15 and 23, respectively, are formed as flat annular surfaces parallel to one another and normal to the axis of the cup 11 so as to insure uniform flow through the channel 26 of the ink from the well 17 and present the same to the wire 11 as a flat annular ring which protrudes slightly into the wiping space 16 as clearly shown in Fig. 3.

In order to vary the axial width of the ink-receiving channel 26 to compensate for changes in viscosity of the ink employed, the plug 21 is finely threaded along its outer periphery as at 28 for cooperative engagement with complementary threads 29 provided on the inner periphery of the cup 12. In this manner, upon screwing the plug 21 into the cup 12, the lip 23 will be

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moved progressively closer toward the opposed lip 15 of the inking section to reduce correspondingly the axial width of the ink-receiving channel 26. On the other hand, upon unscrewing the plug 21 relative to the cup, the lip 23 will be moved progressively away from the lip 15 of the inking section to increase correspondingly the axial width of the ink-receiving channel 26 formed between the opposed faces 24 and 25.

The wire 11 is fed from a suitable source (not shown) and is oscillated in a circular path in the wiping space 16 by any suitable means, that shown in Fig. 1 comprising a circular disc 30 arranged below the inking device 10 and mounted on the upper end of a vertical shaft 31 driven by a suitable variable speed driving shaft 32 through the medium of a belt 33. The disc 30 is provided with an orifice opening 34 extending transversely therethrough to receive and guide the wire 11, which opening is suitably disposed eccentrically with respect to the axial center of the disc to impart the necessary oscillatory movement to the wire in its passage through the wiping space 16 for engagement with the inner periphery of the annular inking section formed by the pair of opposed lips 15 and 23.

From the inking device 10, the marked wire 11 is fed through a suitable drier 35 mounted on a support 36 and is thereafter wound on a spool 37 rotatably supported in a frame 38 and driven by any suitable variable speed driving shaft 39 through the medium of a belt 40.

Having described the construction of our improved inking device 10 interposed between an oscillatory device 30-34 and a drier 35 in a wire-marking installation, its operation is as follows:

With the opposed faces 24 and 25 of the lips 15 and 23 properly spaced from one another to allow the ink from the well 17 to flow through the channel 26, the ink will present itself to the wire 11 to be marked as a convex ring protruding slightly into the wiping space 16. As the wire 11 is pulled axially through the wiping space 16 by the winding spool 37 and oscillated against the inner periphery of the inking section formed by the opposed lips 15 and 23, the wire will pick up the ink as a helical stripe 27, the pitch of which will depend upon the linear speed of travel of the wire through the wiping space 16 and the rate of speed of the oscillatory device 30-34. Consequently, by varying the linear speed relative to the oscillatory speed, the pitch of the helical stripe 27 can be varied correspondingly to meet any requirements.

While we have described our invention in connection with marking a conductor with a helical stripe for which purpose an oscillatory device has been employed, it is to be understood that our invention is not to be limited in this respect as the same may be used with equal effect in marking a conductor with a stripe parallel to its axis in which event the oscillatory device is locked against rotation.

It will thus be seen that we have provided a simple yet highly efficient inking device composed of only two parts by means of which the marking of insulated electrical conductors or the like is greatly facilitated and simplified in that not only can the viscosity of the ink be varied without affecting the operation of the device in maintaining a uniform stripe but the pitch of a helical stripe to be applied can also be varied to meet different requirements. Moreover, the inking device operates without the use of any special ap-

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plicator materials such as rubber, felt, imprinting inks, tapes for offset printing, etc.

It will also be noted that with our improved inking device, the ink can be applied to a hot surface such for example as an insulated wire coming directly from an extrusion machine die in a continuous process of manufacturing multi-conductor cables, or the ink can be applied to a cold surface such for example as an insulated wire fed from a spool in the step by step process of making cables.

From the foregoing, it is believed that the construction, operation and advantages of our invention will be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit and scope of the following claims.

20 What we claim is:

1. Apparatus of the class described comprising a cup-shaped member having a bottom wall formed with an annular upwardly extending frusto-conical lip, an annular member extending downwardly into said cup-shaped member and terminating at its lower end in an annular downwardly extending frusto-conical lip coaxial with said first-named lip and spaced axially therefrom to form therewith an annular inking section having an outer well for marking liquid, a central bore for passage axially therethrough of an insulated wire to be marked, and a channel for feeding marking liquid radially inwardly from said well to said bore, the diameter of said bore being substantially greater than the diameter of said wire whereby said wire may be moved orbitally against the inner periphery of said inking section in its passage axially therethrough, and means including a source of marking liquid in fluid communication with said well.

2. Apparatus of the class described comprising a cup-shaped member having a bottom wall formed with an annular upwardly extending frusto-conical lip, an annular member extending downwardly into said cup-shaped member and terminating at its lower end in an annular downwardly extending frusto-conical lip coaxial with said first-named lip and spaced axially therefrom to form therewith an annular inking section having an outer well for marking liquid, a central bore for passage axially therethrough of an insulated wire to be marked, and a channel for feeding marking liquid radially inwardly from said well to said bore, the diameter of said bore being substantially greater than the diameter of said wire whereby said wire may be moved orbitally against the inner periphery of said inking section in its passage axially therethrough, means including a source of marking liquid in fluid communication with said well, and means for drawing said insulated wire axially through and in contact with the inner periphery of said inking section.

3. Apparatus of the class described comprising a cup-shaped member having a bottom wall formed with an annular upwardly extending frusto-conical lip, an annular member extending downwardly into said cup-shaped member and terminating at its lower end in an annular downwardly extending frusto-conical lip coaxial with said first-named lip and spaced axially therefrom to form therewith an annular inking section having an outer well for marking liquid, a central bore for passage axially therethrough of an insulated wire to be marked, and a channel

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for feeding marking liquid radially inwardly from said well to said bore, the diameter of said bore being substantially greater than the diameter of said wire whereby said wire may be moved orbitally against the inner periphery of said inking section in its passage axially therethrough, means including a source of marking liquid in fluid communication with said well, means for drawing said insulated wire axially through said inking section, and means for moving said insulated wire orbitally against the inner periphery of said inking section.

4. In apparatus of the class described, the combination of a cup-shaped member having a bottom wall provided with an annular upwardly extending frusto-conical lip, an annular downwardly extending plug member in said cup-shaped member provided at its inner end with an annular downwardly extending frusto-conical lip coaxial with said first-named lip and cooperating therewith to provide an annular inking section having an outer well for marking liquid and a central bore for passage axially therethrough of a wire to be marked, said lips being axially spaced from one another to provide a channel for marking liquid in fluid communication with said well and said bore, the diameter of said bore being substantially greater than the diameter of said wire to enable said wire in its passage axially through said bore and in contact with the inner periphery of said inking section to pick up the marking liquid in the form of a stripe, said first and second named members being mutually threaded and in threaded engagement with one another whereby the axial width of said channel may be varied by rotation of one of said members relative to the other.

5. In apparatus of the class described, the combination of a cup-shaped member having a bottom wall provided with an annular upwardly extending frusto-conical lip, an annular downwardly extending plug member in said cup-shaped member provided at its inner end with an annular downwardly extending frusto-conical lip coaxial with said first-named lip and cooperating therewith to provide an annular inking section having an outer well for marking liquid and a central bore for passage axially

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therethrough of a wire to be marked, said lips being axially spaced from one another to provide a channel for marking liquid in fluid communication with said well and said bore, the diameter of said bore being substantially greater than the diameter of said wire to enable said wire in its passage axially through said bore and in contact with the inner periphery of said inking section to pick up the marking liquid in the form of a stripe, said first and second named members being mutually threaded and in threaded engagement with one another whereby the axial width of said channel may be varied by rotation of one of said members relative to the other, and means for moving said wire orbitally against the inner periphery of said inking section.

6. In apparatus of the class described, the combination of means including an annular upwardly extending frusto-conical lip, means including an annular downwardly extending frusto-conical lip coaxial with said first-named lip and cooperating therewith to provide an annular inking section having a central bore for passage axially therethrough of a wire to be marked, and means including an annular well for marking liquid surrounding said inking section, said lips being axially spaced from one another to provide an annular channel for the passage of marking liquid radially inwardly from said well to said bore, the diameter of said bore being substantially greater than the diameter of said wire to enable said wire in its passage axially through said bore and in contact with the inner periphery of said inking section to pick up the marking liquid in the form of a stripe.

ALDEN P. LUNT.

THEODORE R. NORTON.

CARL P. ANDERSON.

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