Sept. 10, 1946. R. M. KOLTER 2,407,337

WIRE ENAMELING DIE

Filed Jan. 14, 1943

Fig. 1.

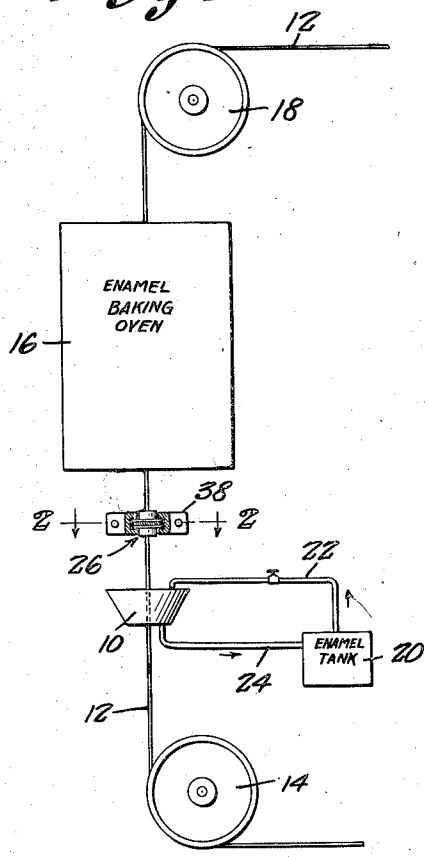


Fig. 2.

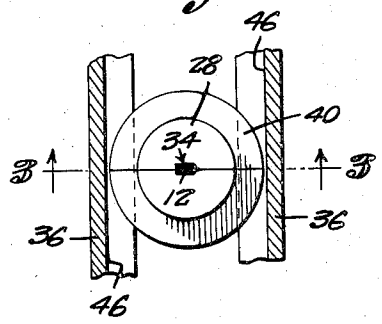


Fig. 3.

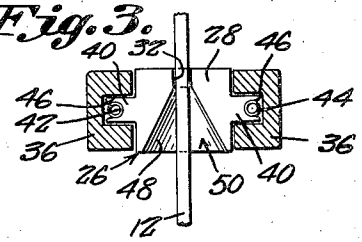


Fig. 4.

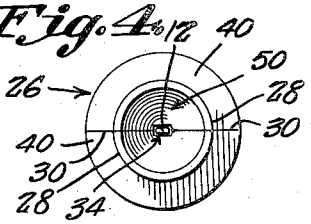


Fig. 5.

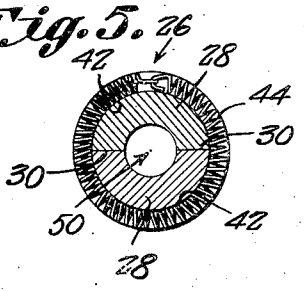
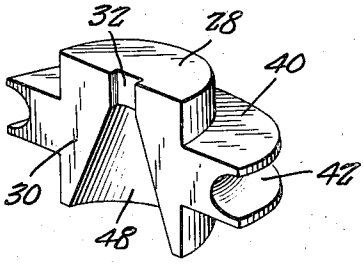


Fig. 6.



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WIRE ENAMELING DIE

Robert M. Kolter, Decatur, Ind.

Application January 14, 1943, Serial No. 472,367

2 Claims. (Cl. 91—53)

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My invention relates to the application of insulating enamel to wire, particularly wire which is noncircular in cross section, and has among its objects and advantages the provision of an improved enameling die.

Insulated wire of the foregoing type is manufactured by running the wire through a bath of enamel for coating purposes, after which the wire is run through a die to remove excess enamel and uniformly coat the wire. The coated wire is then run through an enamel baking oven.

Considerable difficulty has been experienced with conventional dies. Such dies are loosely supported in a holder, since it is necessary for the die to have at least a limited amount of freedom to prevent streaking of the wire. After a short period of use, the enamel spreads on the die and onto its holder, which causes the die to stick in its holder with consequent damage to a large amount of enameled covered wire.

While standard dies are mounted for limited lateral excursions, such dies lack free rotary movement about the axis of the wire. Many sizes of wire square in cross section and some sizes of rectangular wire become twisted and cause separation of the two spring constrained sections of the die. In some cases badly twisted wire has torn the die from its holder.

Accordingly, an object of my invention is to provide a die so shaped as to prevent enamel from spreading onto the holder, and in which the die is so shaped and structurally related to the holder as to have free relative rotary movement about the axis of the wire, thereby affording protection for the die and permitting a uniform coating to be applied to the wire, even when badly twisted wire is run through the die.

In the accompanying drawing:

Figure 1 is a diagrammatic view of a wire enameling system showing my invention applied thereto.

Figure 2 is an enlarged sectional view along the line 2—2 of Figure 1.

Figure 3 is a sectional view along the line 3—3 of Figure 2.

Figure 4 is a bottom face view of the die.

Figure 5 is a sectional view of the die illustrating the spring for holding the sections of the die in connected relationship, and

Figure 6 is a perspective view of one of the die sections, the sections being of identical size and shape.

In the embodiment of the invention selected for illustration, Figure 1 illustrates an enameling pan 10 through which is passed a vertical run of the

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wire 12 to be coated. This wire is run from a supply, not shown, around a pulley 14, through the pan 10, through an enamel baking oven 16 and around a pulley 18 for storage in the usual manner. The wire picks up a coating of thick and heavy enamel as it passes through the pan 10. Enamel is piped to the pan from a tank 20 through a pipe 22, and excess enamel is returned to the tank by way of a pipe 24 to prevent overflowing of the pan. The structure so far described is old and well known in the art.

Between the pan 10 and the oven 16 is arranged a die 26 to remove excess enamel on the wire emerging from its bath in the pan. The die 26 comprises two sections 28 of the same size and shape, each having a flat face 30 engaging the same face of the other section. The faces 30 meet in the plane of the wire 12 and are recessed at 32 to provide an opening 34 having a shape corresponding to the cross sectional contour of the wire 12, but somewhat larger to leave a coating of enamel of predetermined thickness on the wire.

When assembled face to face, the sections 28 define a cylinder having a diameter fitting loosely between the die holder members 36. These members have flanges 38 through the medium of which the members may be fixedly secured to a suitable support and at right angles to the axis of the die.

Each section 28 is provided with a semiannular flange 40, the two flanges lying in a common horizontal plane. A groove 42 is provided in the peripheral face of each flange, which grooves have end to end communication to house an endless coil spring 44. The spring 44 lies within the contour of the flanges 40, and the flanges fit loosely in grooves 46 in the members 36. Thus the die 26 has limited free lateral movement relatively to the members 36, in addition to free pivotal movement.

A semiconical recess 48 is provided in the bottom face of each section 28. The recesses 48 are of the same size and contour to provide a conical opening 50 in the die, with its apex running into the opening 34 in the top face of the die. Enamel stripped from the wire collects in the opening 50 and flows back to the pan 10.

The lower end of the die is located slightly below the bottom faces of the members 36 so that excess enamel stripped from the wire is returned to the pan 10 without touching the members 36. Thus the die 26 is kept in a clean condition so as to have free play with respect to the members 36, and the die has free rotary movement with respect to the members 36 to effectively handle twists in the wire.

While Figures 2 and 4 illustrate a rectangular opening **34** in the die **26**, the shape of the opening will depend upon the shape of the wire being run. Dies having openings of different sizes and shapes are interchangeable with the holder so that wires of different sizes and shapes may be run in the one system.

Without further elaboration, the foregoing will so fully explain my invention, that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

I claim:

1. In a wire enameling die, a cylindrical body, an annular flange formed about said body intermediate its ends, said flange having a relatively deep groove in its periphery, said body having a non-circular opening axially through its upper portion and a conically shaped opening increasingly tapered from the non-circular opening to the bottom end of the die, said body being axially divided to provide a pair of complementary sections, a resilient member fitted in said groove to encircle the body and releasably hold the sections in assembled relation, and a pair of channel shaped holder members disposed to receive the body flange therein.

2. In a wire enameling die, a cylindrical body, an annular flange formed about said body intermediate its ends, said flange having a relatively deep groove of circular cross-section in its periphery, said body having a non-circular opening axially through its upper portion and a conically shaped opening increasingly tapered from the non-circular opening to the bottom end of the die, said body being axially divided to provide a pair of complementary sections, a coil spring fitted in said groove to encircle the body and releasably hold the sections in assembled relation, and a pair of channel shaped holder members disposed with the channels facing each other to loosely receive the body flange therein.

ROBERT M. KOLTER.