Sept. 29, 1942. C. K. COOPER ET AL 2,296,983

MACHINE FOR ATTACHING EYELETS TO WIRES

Filed March 28, 1940 2 Sheets-Sheet 1

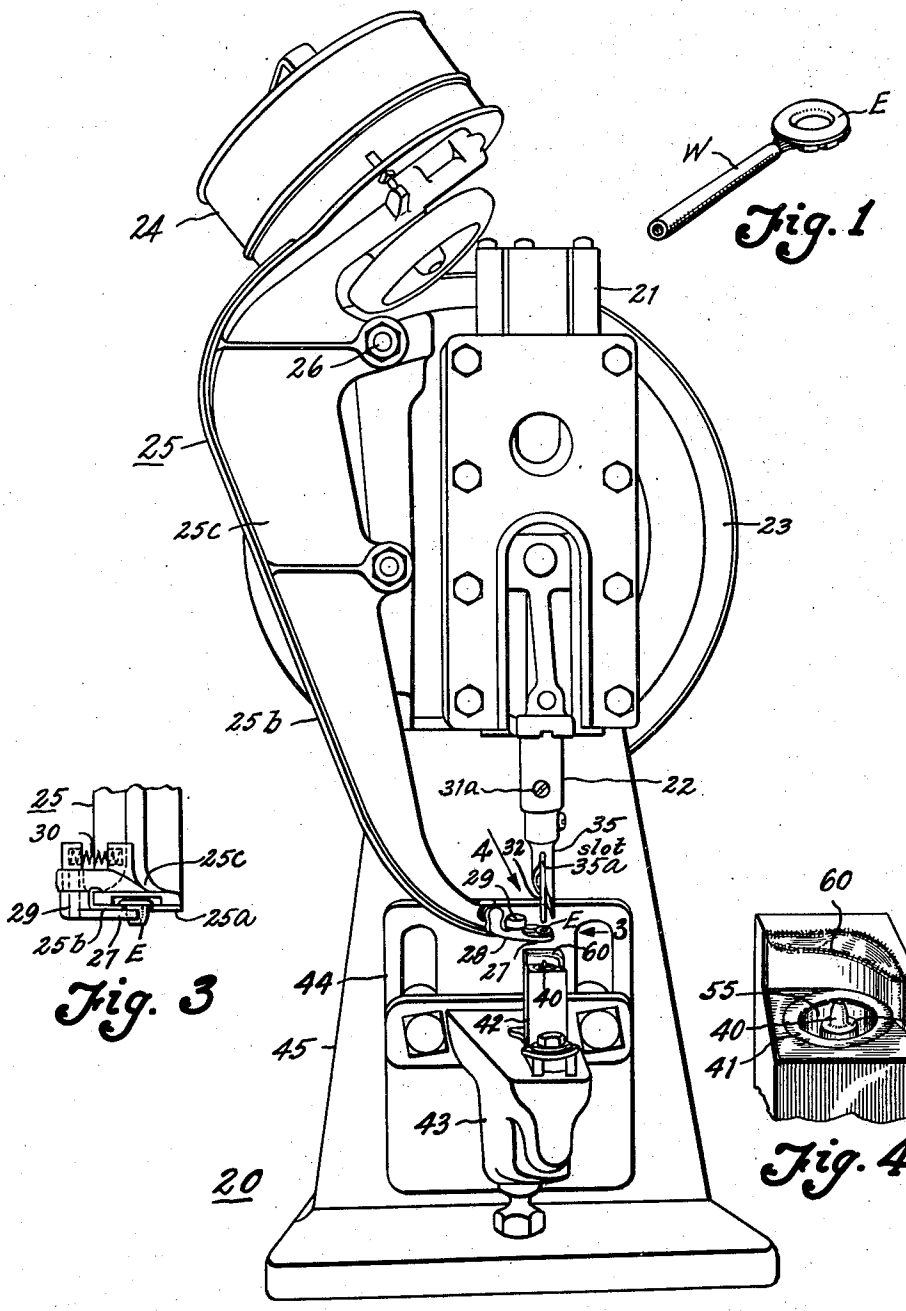


Fig. 2

Fig. 1

Fig. 3

Fig. 4

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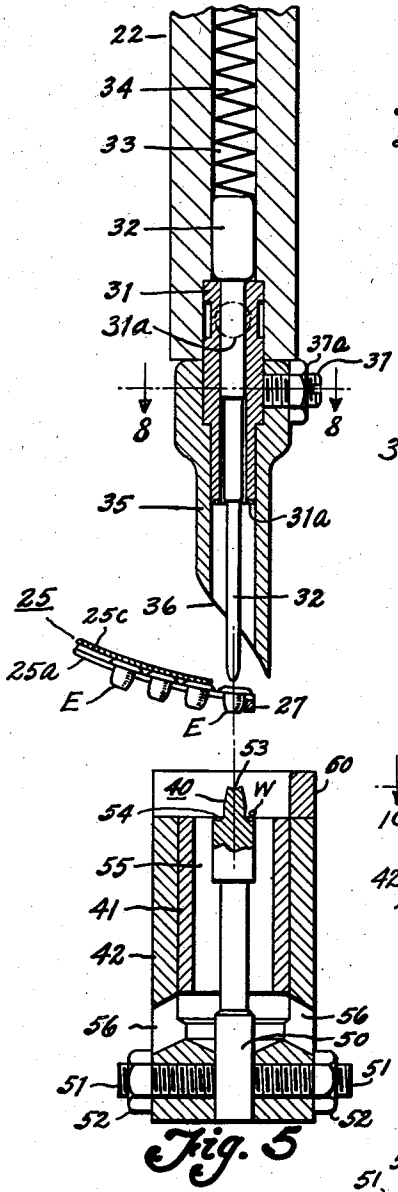


Fig. 5

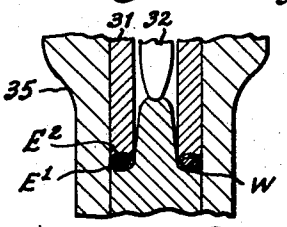


Fig. 9

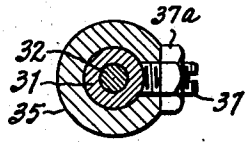


Fig. 8

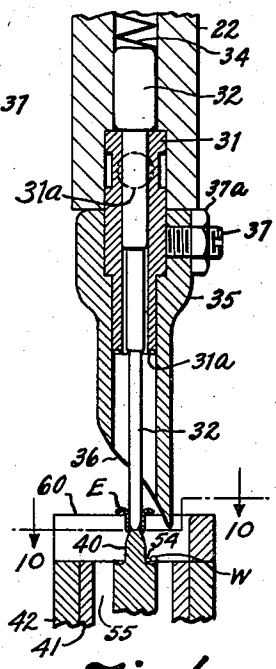


Fig. 6

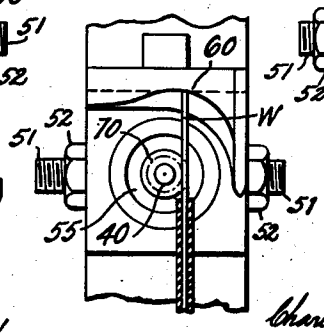


Fig. 10

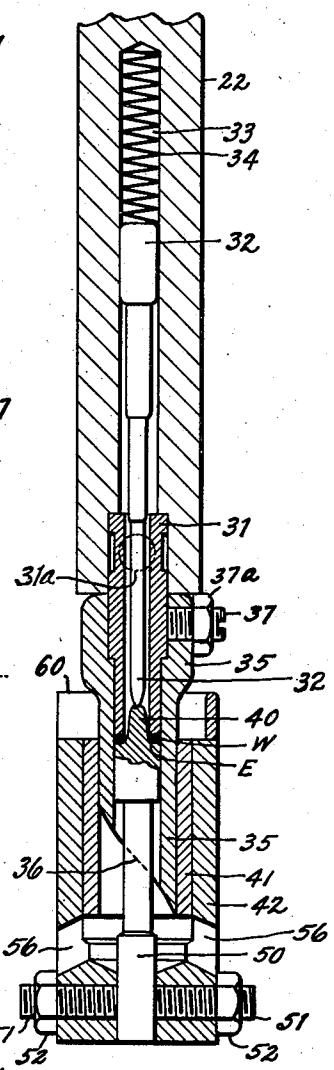


Fig. 7

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Patented Sept. 29, 1942 2,296,983

UNITED STATES PATENT OFFICE

2,296,983

MACHINE FOR ATTACHING EYELETS TO WIRES

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Application March 28, 1940, Serial No. 326,436

8 Claims. (Cl. 153—1)

This invention relates to the manufacture of electrical wiring and, more particularly to the assembly of wire with metal eyelets for making connection with a terminal. An object of the invention is to provide apparatus for forming a wire around the shank of an eyelet and for crimping the eyelet around the wire in one operation. To accomplish this object we provide tools which may be readily attached to a standard eyelet machine. These tools cooperate to provide a combination of means for removing an eyelet from the lower end of a chute leading from the magazine feed of the standard eyelet machine and for locating the removed eyelet upon an anvil preparatory to riveting, means for bending a bare wire around the anvil preparatory to receiving the eyelet and means for causing the eyelet to enter the loop of wire formed around the anvil and to cause the eyelet to be crimped around the wire, thereby permanently attaching the eyelet to a loop of bare wire at the end of an insulated conductor.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a perspective view of a fragment of wire having an eyelet attached thereto by the present machine.

Fig. 2 is a perspective front elevation of a standard eyelet machine to which the tools of the present invention have been attached.

Fig. 3 is a fragmentary view on an enlarged scale of the lower end of the chute looking in the direction of arrow 3.

Fig. 4 is a perspective view of the top portion of the anvil looking in the direction of the arrow 4.

Fig. 5 is a fragmentary longitudinal sectional view showing the tools of the present invention, the upper movable parts being shown in a position corresponding to that shown in Fig. 2.

Fig. 6 is a fragmentary sectional view of parts shown in Fig. 5, the upper tools having been lowered part way.

Fig. 7 is a view similar to Fig. 5, the upper tools having been lowered to the extreme lower limit.

Fig. 8 is a sectional view on line 8—8 of Fig. 5.

Fig. 9 is a fragmentary sectional view on an enlarged scale of parts shown in Fig. 7.

Fig. 10 is a fragmentary view on the line 10—10 of Fig. 6.

Referring to the drawings, the standard eyelet machine is described in its entirety by numeral 20. This machine comprises a vertically reciprocating member 21 carrying at its lower end a sleeve 22 to which certain tools of the present invention may be attached. The member 21 is reciprocable or cam operated by shaft not shown which is driven from a fly-wheel 23 operated by an electric motor. The eyelets to be attached to the work by this machine are fed automatically from a hopper 24 and are caused to slide down a chute 25 comprising aligned side plates 25*a* and 25*b*, Fig. 3, supported by a frame 25*c* which serves as a top or cover plate for the chute. The frame 25*c* is pivotally supported at 26 and is caused automatically to swing toward the left from the position shown in Fig. 2 once during every cycle of the machine as will be explained in detail later. The lowermost eyelet E in the chute 25 is yieldingly retained in position by a finger 27 provided by an arm 28 pivoted at 29 and yieldingly urged into eyelet retaining position by a spring 30.

Referring to Fig. 5 the sleeve 22 extending from the slide 21 supports an eyelet riveting punch 31 having a central bore for receiving an eyelet pilot pin 32 the head of which is received by the central bore 33 of the sleeve 22. A set screw 31*a* fastens the punch 31 to the sleeve 22. A spring 34 within the bore 33 yieldingly urges the pin 32 downwardly. The punch 31 supports a tubular, wire-bending sleeve 35 the lower edge 36 of which is shaped somewhat after the fashion of a long lead screw thread. The wire bending sleeve 35 is attached to the punch 31 by a set screw 37 locked by a nut 37*a*, see Fig. 8.

Vertically below the concentrically disposed eyelet pin 32, eyelet rivet punch 31 and wire bending sleeve 35, there is a centrally disposed anvil 40 located concentrically with respect to a sleeve 41 supported by a block 42 which, as shown in Fig. 2, is carried by a bracket 43 which is adjustably supported by a plate 44 carried by the frame 45 of the eyelet machine 20.

The stem 50 of the anvil 40 is fixed to the block 42 by set screws 51 located by nuts 52. The upper end of the anvil 40 is provided with a depression 53 for receiving the lower end of pin 32. Anvil 40 provides an annular groove 54 for forming the lower edge of the rivet E.

To use the device the operator places the bared end of an insulated wire W in the position shown in Fig. 10 with the bared end extending across the right hand side of the annular groove 54 the end thereof being received by a stop member 60 forming a part of the block 42. Then

the machine is started into operation by depressing a manually actuated pedal, not shown. As the sleeve 22 descends from the position shown in Fig. 5, the pin 32 will pass thru the lowermost eyelet E in the chute 25; and, before the pin 32 engages the upper end of the anvil 40, the chute frame 25c will have been moved clockwise about its pivot 26 thereby retracting the chute from the eyelet E then on the pin 32. As the chute 25 moves away from this eyelet E, the finger 27 is pulled open; and, after the eyelet E has been removed from the finger 27, it snaps back to receive the next eyelet in the chute. Finally the pin 32 engages the anvil 40 and locates the eyelet E upon it.

During further downward movement of the sleeve 22 the pin 32 remains stationary while the punch 31 and the wire bending sleeve 35 continue to move. The lower edge 36 of the wire bending sleve 35 engages the wire W and causes it to be formed into an annulus around the anvil 40 as indicated by the dot-and-dash line 70 in Fig. 10. During this operation the bending sleeve 35 is received in the annular space 55 between the anvil 40 and the sleeve 41. Finally the punch 31, which is provided at its lower end with an annular groove 31*a*, engages the rivet E to cause it to be moved from the position shown in Fig. 6 downwardly along the anvil 40 and to be received by the annulus of wire surrounding the anvil. During this movement of the eyelet its tubular skirt is flared and is caused to follow the contour of the anvil down into the annular groove 54 and then upwardly around the annulus of wire represented by the dot-dash line circle 70 see Fig. 10. Finally the eyelet E is completely formed around the annulus of wire as shown in Figs. 7 and 9. Fig. 9 shows that the bottom edge portion E^1 of the eyelet has been folded under that portion E^2 which originally was the top or flange of the eyelet.

Referring to Fig. 2 it will be observed that the wire bending sleeve 35 is provided with a notch 35*a* which clears that portion of the wire W extending from the insulation and crossing the space 55 to the anvil 40. Therefore when the sleeve 35 descends to bend the bared wire into the annulus represented by the dot-and-dash circle 70, this annulus will not be severed from the straight portion of the wire.

The core of the wire may be made up of stranded fine wires. If the annulus of wire is too long for the eyelet, some of the core strands may be cut off by the cooperation of the anvil 40 and the sleeve 35. Small bits of wire can descend thru the space 55 and find their way out of the block 42 thru the side passages 56 provided by the block 40.

The machine is operable to form a loop at the end of a solid wire whether or not an eyelet is attached thereto.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A machine for attaching an eyelet to a wire comprising an eyelet riveting anvil, an eyelet pilot pin for locating an eyelet central of the anvil, a tubular wire bending sleeve concentric with the pilot pin and having camming end-surface cooperating with the anvil to form a wire in a loop around the anvil, and a tubular eyelet-riveting punch between the pilot pin and wire-bending sleeve for engaging the flange of an eyelet upon the anvil and for causing the tubular shank of the eyelet to be forced through the wire-loop and cooperating with said anvil to fold together the eyelet-flange around the wire-loop.

2. A machine for forming a loop and for attaching an eyelet to a wire comprising a stationary anvil and a pair of sleeves arranged to cooperate progressively with the anvil, one of said sleeves being formed to bend a wire around the anvil and the other sleeve operating upon completion of the loop to force an eyelet over the anvil and through the loop, said last mentioned sleeve also cooperating with the anvil to fold the eyelet-flange about the wire-loop.

3. A machine for forming a loop and attaching an eyelet to a wire comprising a stationary anvil and a pair of concentric sleeves arranged to cooperate progressively with the anvil, the outer sleeve being provided with cam surfaces to bend gradually a wire around a reduced portion of the anvil and the inner sleeve operating coincident to the completion of the loop by the outer sleeve to force an eyelet over the reduced portion of the anvil and through the loop while the outer sleeve maintains the loop about the anvil, said inner sleeve also cooperating with the anvil to fold the eyelet flange about the loop.

4. A machine for attaching an eyelet to a wire comprising; a stationary anvil having a reduced portion to form a shoulder and a pair of sleeves arranged to move together but cooperating with the anvil at different times to deform a wire and an eyelet one of the sleeves being formed to bend a wire around the reduced portion of the anvil and the other sleeve operating at the completion of the loop to force an eyelet over the reduced portion of the anvil and through the loop, while the first mentioned sleeve is maintaining the loop, said last mentioned sleeve cooperating with the shoulder to clinch the eyelet about the loop-wire.

5. A machine for attaching an eyelet to a wire comprising, an anvil; means for piloting a flanged eyelet on the anvil; sleeve means for bending a stranded wire around the anvil to form a loop and for maintaining the loop so formed; an eyelet riveting punch movable with the sleeve and cooperating with the anvil for causing the tubular shank of the eyelet to be forced through the wire loop while so maintained and for folding together the extending tubular shank and the eyelet-flange around the wire loop.

6. A machine for attaching an eyelet to a wire in a single operation comprising, an anvil; means for piloting a flanged eyelet on the anvil; a sleeve having cam means for bendind a stranded wire around the anvil to form a loop and for maintaining the loop so formed; an eyelet riveting punch about the pilot means movable with the sleeve and cooperating with the anvil for causing the tubular shank of the eyelet to be forced through the wire-loop while so maintained and for folding together the extending tubular shank and the eyelet flange around the wire-loop.

7. A machine for attaching an eyelet to a wire in a single operation comprising; an anvil having a reduced portion to form a shoulder; a pilot for positioning a flange eyelet on the reduced portion of the anvil; sleeve means having provisions for gradually bending a stranded wire around the reduced portion of the anvil to form a loop and for maintaining the loop so formed; a sleeve riveting punch about the pilot means cooperating with the reduced portion of the anvil for causing the tubular shank of the eyelet to be

forced through the wire loop while so maintained and cooperating with the shoulder for folding the extending tubular shank and the eyelet flange around the wire-loop.

8. A machine for attaching a tubular member to a wire comprising, an anvil having a reduced tapered portion and arranged therewith to define a shoulder; pilot means for locating a tubular member on the upper end of the reduced portion; sleeve means having provisions at its free end for bending a stranded wire around the reduced portion of the anvil to form a loop below the lowermost end of the tubular member and for maintaining the loop so formed; a tubular sleeve punch cooperating with the tapered portion of the anvil for causing the tubular member to be forced through the wire loop while so maintained said sleeve punch also cooperating with the shoulder of the anvil for bending the ends of the tubular member around the wire loop.

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