April 13, 1948. S. L. GOOKIN 2,439,465

EYELETING MACHINE

Filed Sept. 14, 1944

Fig. 1

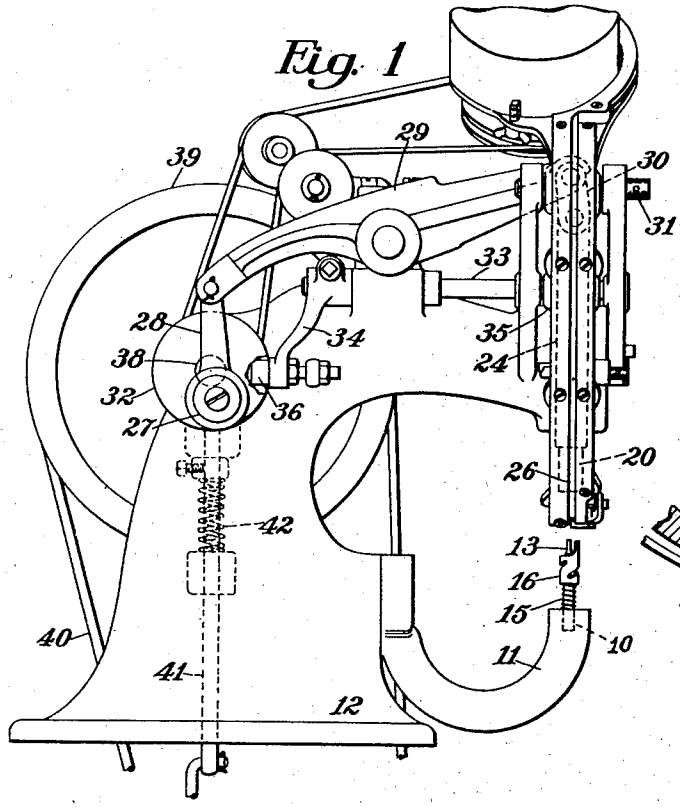
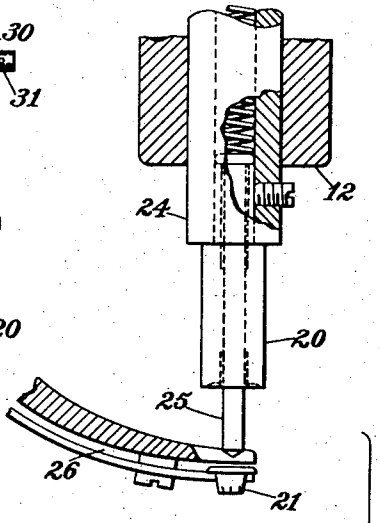


Fig. 2



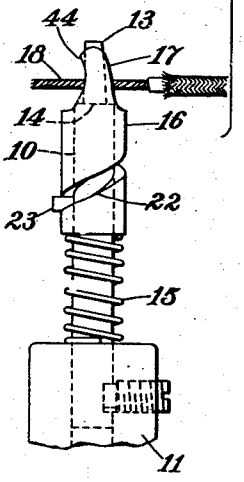


Fig. 3

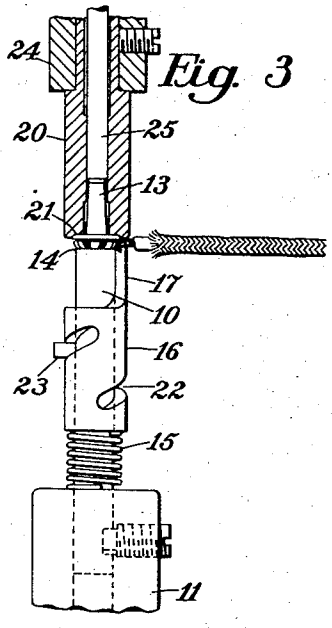


Fig. 4

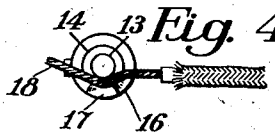


Fig. 5

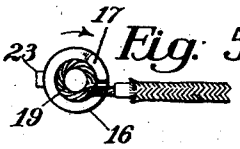
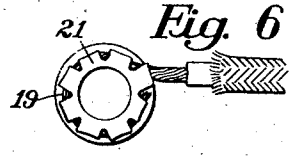


Fig. 6



Inventor

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By his Attorney

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UNITED STATES PATENT OFFICE

2,439,465

EYELETING MACHINE

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9 Claims. (Cl. 153—1)

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This invention relates to eyeleting machines and its purpose is to provide means for forming an eye of wire and affixing a common eyelet therein to maintain assembled relation of the parts. Assemblages of this type are used in electrical signaling apparatus and in the electrical equipment of automobiles, the eyes thus reinforced and secured by clenched eyelets being intended to be attached to binding posts.

The common practice prior to this invention has been to form an eye of wire apart from an eyeleting machine and thereafter place the eye on one of the eyelet-setting tools of the machine. If the wires are composed of many small strands, as they usually are, the ends of some of the strands commonly spring away from the others instead of lying in a circle small enough to be contained within the confines of an eyelet. Furthermore, if the wires are handled between the eye-forming stage and the eyelet-affixing stage, too many of the eyes become deformed in consequence of such handling.

To avoid defects due to such causes the present invention provides an improved eyeleting machine including means arranged to form an eye of wire at the eyelet-setting locality. To this end, one of the eyelet-setting tools, commonly termed "anvil," is provided with a central pilot portion that constitutes a mandrel around which the wire may be wrapped to form an eye. In addition, this tool is surrounded by a rotatable member of which a portion is arranged to wrap the wire and thus form the eye. As herein illustrated, means are also provided to impart rotation automatically to the wrapping member in consequence of operating the other eyelet-setting tool, but the utility of the novel assemblage comprising the anvil and the wrapping member is not limited to automatic operation of the latter, since manual rotation thereof, while less rapid and less convenient, would accomplish the desired result.

Referring to the drawing,

Fig. 1 is a side elevation of an eyeleting machine in which the present invention is embodied;

Fig. 2 is a front elevation, partly in section, of the eye-forming and eyelet-setting tools and the lower portion of the eyelet raceway in their initial positions;

Fig. 3 illustrates the relation of the tools at the conclusion of a terminal-forming operation;

Fig. 4 is a top plan view of the lower tool and a terminal portion of wire assembled as in Fig. 2;

Fig. 5 illustrates the elements of Fig. 4 at the conclusion of the eye-forming stage without insertion of an eyelet into the eye of wire; and

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Fig. 6 is an inverted plan view on a larger scale of a completed terminal.

The machine herein illustrated and described is of the same general design and type as that set forth in United States Letters Patent No. 1,823,894, granted September 22, 1931, on my application, except the special fittings thereof related to spinning eyelets. Those fittings, including a rotary anvil and means for driving it, are superseded for present purposes by fittings that embody means for wrapping a terminal portion of wire around the pilot of an anvil to form an eye.

The body 10 of the anvil is affixed to a horn 11 and the latter is affixed to the frame 12. The anvil is provided with an annular upsetting shoulder 14 and with an upstanding pilot 13 for guiding an eyelet 21 to the shoulder. A compression spring 15 surrounds the anvil below the shoulder 14 and is supported by the horn. The spring supports a rotatable sleeve 16 that surrounds the anvil and has a bearing thereon by which it is guided up and down in telescopic relation thereto and maintained in concentric relation to the pilot and the upsetting shoulder. The sleeve is provided with an upstanding finger 17 arranged to wrap a terminal portion of wire 18 around the pilot 13 in consequence of being rotated about its axis. The upper extremity of the finger normally stands in the path of the margin of a downwardly movable eyelet-setting tool 20, which, in the process of depressing an eyelet 21 along the pilot 13, will depress the flange of the eyelet against the finger and thereby depress the sleeve 16 and compress the spring 15.

Although manual rotation of the sleeve prior to downward movement of the tool 20 would wrap a wire 18 around the pilot (Fig. 5) and thereby form an eye 19 adapted to receive an eyelet, the invention provides means for utilizing the downward movement of that tool to produce rotation of the sleeve of the desired angular extent. For this purpose the sleeve 16 is provided with a helical slot 22 of steep pitch. A pin 23 affixed to the body of the anvil lies in this slot and cooperates with its walls to produce rotation of the sleeve in one direction in consequence of depressing it, and reverse rotation in consequence of reflex action of the spring 15. The range of rotation is about 270° of one revolution.

The tool 20 is carried by a plunger 24 and is provided with a bore containing a spring-pressed spindle 25 adapted to pick an eyelet from a raceway 26. The plunger extends through a bearing in the frame 12 and derives its motion

from a crank pin 27 and connections including a connecting rod 28, a lever 29, link 30 and a twin thereof. The bore in the tool 20 is large enough to receive the pilot 13 (Fig. 3).

The raceway 26 is connected to the frame 12 by a horizontal pivot pin 31. It derives its motion from a rotary cam 32 by which the crank pin 27 is carried. The connections for oscillating the raceway include a rockshaft 33, two arms 34 and 35 affixed thereto, a cam roll 36 carried by the arm 34, and a link (not shown) connecting the arm 35 and the raceway.

The cam 32 is affixed to a power-driven shaft 38 on which a driving pulley 39 is loosely mounted. This pulley, continuously rotated by a belt 40, constitutes the driving member of a clutch of well-known construction adapted to be tripped into operation by depressing a rod 41 against a lifting spring 42. When the rod rises after tripping the clutch, it disengages the latter and arrests rotation of the shaft 38 at the position represented in Fig. 1, the tool 20 then standing at the top of its stroke and the delivery end of the raceway lying in register with it. Starting and stopping mechanism of the same type is illustrated and described in United States Letters Patent No. 1,351,138, granted August 31, 1920, on application of R. B. Smith.

When the rotatable sleeve 16 occupies its initial position (Figs. 2 and 4) the space between the finger 17 and the pilot 13 is just enough to accommodate a wire 18 from which insulating material has been stripped. Since the flange of the eyelet remains above the tip of the finger 17 its diameter is not restricted. It may be greater than that of the anvil, and must be greater to overlap the tip of the finger 17 as shown in Fig. 3. Consequently, when such an eyelet has been installed in a loop of wire (Fig. 6) the flange of the eyelet will extend radially beyond the clenched prongs and thereby overlap and cover the ends of the prongs. Once the bared wire has been placed in that space it is held against the pilot by the finger 17 as shown in Fig. 4, and the operator has only to trip the clutch as by depressing a treadle (not shown) to draw down the controlling rod 41. If the treadle is released immediately after the clutch has been tripped, the shaft 38 will be arrested at the termination of one revolution during which the finger 17 will rotate and wrap the wire around and against the pilot as shown in Fig. 5, the spindle 25 will pick an eyelet 21 (preferably scored) from the raceway, the tool 20 will thrust the barrel of the eyelet through the eye 19 of wire and upset it against the shoulder 14 of the anvil, and the tool 20, the raceway and the sleeve 16 will thereafter return to their initial positions. The eye of wire, reinforced and secured with a clenched eyelet (Figs. 3 and 6), may then be lifted clear of the pilot 13 and removed, the terminal-forming operation having been completed.

If the spindle 25 does not receive an eyelet from the raceway when the tool 20 is operated, the tool itself will engage the finger 17 and thereby depress the sleeve 16, and an eye of wire will be formed without receiving an eyelet, but no harm will be done. The formed eye may remain on the pilot until it receives an eyelet during a subsequent operating cycle.

When the wire-wrapping member 17 is operated by the tool 20 as herein illustrated, its wrapping motion does not begin until its tip is engaged by that tool or by the intervening flange of an eyelet, as the case may be. In either event, the wire cannot slip off the tip of the wrapping member after the effective contact is made. Nevertheless, to compact the ends of individual strands of wire in advance of clenching the prongs or segments of an eyelet, the wrapping member may be provided with a hump or cam surface 44 (Fig. 2) near its tip end. The hump is arranged to deflect the ends of wire against the junction of the pilot 13 and the upsetting shoulder 14 and to confine them in compacted relation while the prongs of the eyelet are being clenched.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. An eyeleting machine comprising an anvil having an upsetting shoulder and a pilot projecting therefrom, an eyelet-setting tool arranged to co-operate with said anvil, and a sleeve surrounding and bearing on said anvil behind said shoulder, the sleeve being rotatable about the axis of said pilot and movable axially and having a finger in the path of the margin of said tool arranged to wrap a terminal portion of a wire element around said pilot in the form of an eye.

2. An eyeleting machine comprising an anvil having an upsetting shoulder and a pilot projecting therefrom, an eyelet-setting tool arranged to co-operate with said anvil, a sleeve surrounding said anvil behind said shoulder and having a finger in the path of the margin of said tool arranged to wrap a terminal portion of a wire element around said pilot in the form of an eye, and means arranged to rotate the sleeve around the axis of the anvil through a portion of one revolution to do the wrapping.

3. An eyeleting machine comprising an anvil having an upsetting shoulder and a pilot projecting therefrom, an eyelet-setting tool arranged to co-operate with said anvil, a rotatable sleeve surrounding the anvil behind said shoulder, the sleeve having a helical slot of steep pitch and a finger in the path of the margin of said tool arranged to wrap a terminal portion of wire around said pilot, and a fixed pin engaging the walls of said slot to rotate the sleeve around the axis of the anvil in consequence of moving it endwise.

4. An eyeleting machine comprising an anvil having an upsetting shoulder and a pilot projecting upwardly therefrom, an eyelet-setting tool arranged to co-operate with said anvil, a rotatable sleeve surrounding the anvil below said shoulder and bearing thereon, the sleeve having a finger projecting upwardly above said shoulder and arranged to wrap a terminal portion of wire around said pilot, resilient means arranged normally to raise the sleeve, and means arranged to rotate the sleeve about its axis in consequence of depressing it.

5. An eyeleting machine comprising an anvil having an upstanding pilot and an upsetting shoulder surrounding the base of the pilot, a downwardly movable eyelet-setting tool arranged to co-operate with the anvil, a member rotatable about the axis of the pilot and arranged to wrap a terminal portion of wire around the latter, said member being movable up and down with respect to the anvil, resilient means arranged normally to raise said rotatable member into the path of said downwardly movable tool, and means arranged to rotate said member as it is depressed.

6. An eyeleting machine comprising an anvil having an upstanding pilot and an upsetting

shoulder surrounding the base of the pilot, a downwardly movable eyelet-setting tool arranged to co-operate with the anvil, a compression spring surrounding the anvil below said shoulder, means for supporting the anvil and the spring, a member supported by the spring, said member having an upstanding finger arranged to be engaged and depressed by said setting tool, and means arranged to rotate said member around the anvil and thereby cause said finger to wrap a terminal portion of wire around the pilot.

7. An eyeleting machine comprising a fixed anvil and a rotatable sleeve assembled in telescopic relation, the anvil having an annular upsetting shoulder and a pilot for guiding an eyelet thereto, an eyelet-setting tool movable toward and from the anvil, means for reciprocating said tool, a portion of said sleeve being rotatable around said pilot and formed to wrap a terminal portion of wire around the pilot, said wrapping portion being movable into and out of the path of said tool wth movement parallel with the axis of the pilot, and means for rotating the sleeve in opposite directions in consequence of moving it along said axis in opposite directions.

8. An eyeleting machine comprising an anvil having an upsetting shoulder, a movable sleeve surrounding the anvil behind said shoulder and having a bearing thereon, an eyelet-setting tool arranged to cooperate with the anvil, and means for moving said tool toward and from the anvil-and-sleeve assemblage, the anvil having a pilot and the sleeve having a finger both projecting toward said tool and forming a gap just wide enough to receive a wire from which insulating material has been stripped, the sleeve being rotatable about its axis to carry said finger around the pilot, and the tip of the finger being located in the path of the margin of said tool but displaceable by the thrust of the tool toward said shoulder.

9. An eyeleting machine comprising an anvil having an annular upsetting shoulder and a pilot for guiding an eyelet thereto, a finger arranged alongside the pilot and spaced therefrom to hold an interposed terminal portion of wire initially against the pilot, means for carrying said finger in an arcuate path around the pilot to wrap the wire into the form of an eye, means arranged to install an eyelet in the eye of wire and thereby displace the finger from its position alongside the pilot, and a spring arranged normally to return the finger to said position.

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