Nov. 24, 1931. W. M. SPRY 1,833,268

EYELETING MACHINE

Filed April 1, 1929

Fig. 2.

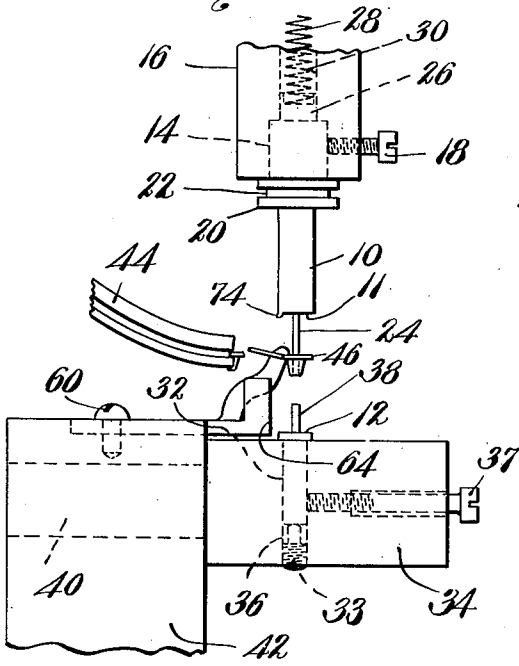


Fig. 1.

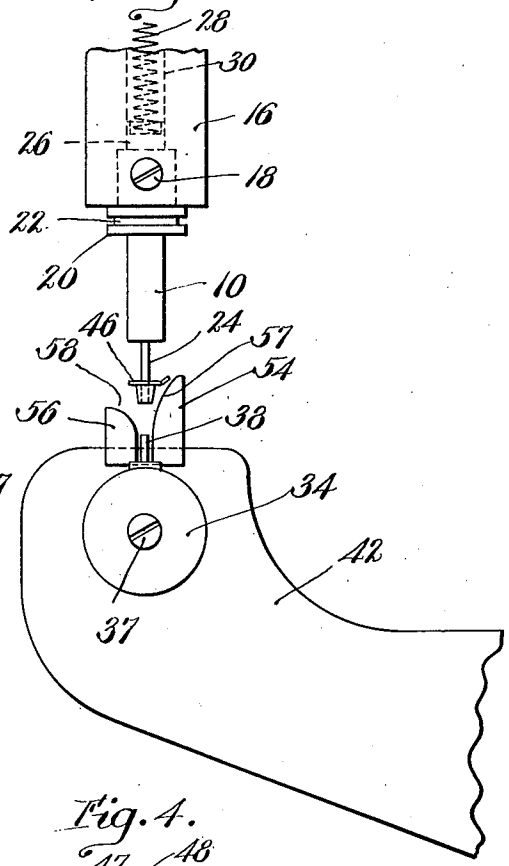


Fig. 3.

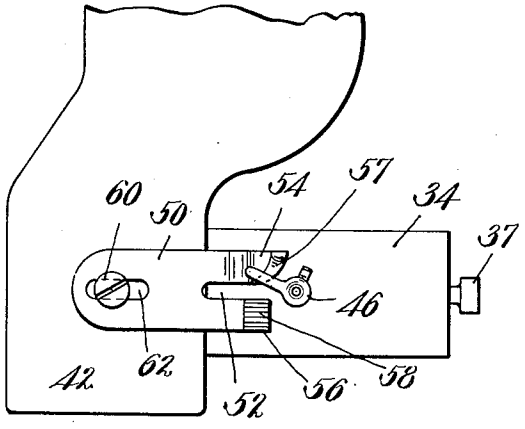


Fig. 4.



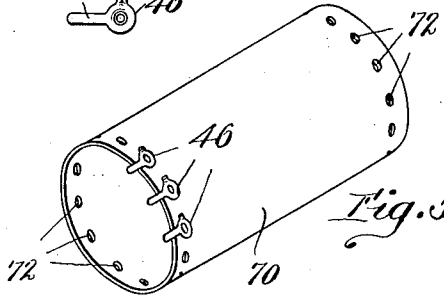


Fig. 5.

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UNITED STATES PATENT OFFICE

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EYELETING MACHINE

Application filed April 1, 1929. Serial No. 351,595.

This invention relates to eyeleting machines and more particularly to a machine of that character adapted for feeding and setting tongued eyelets automatically and although designed with particular reference to setting tongued eyelets for use in radio and similar apparatus as contacts, it is capable of general use.

In the manufacture of radio apparatus, various parts thereof are provided with a plurality of contacts fastened at the margins thereof for the attachment of wires. These parts are either in flat, sheet, cylindrical or other forms. Heretofore, it has been customary to use an elongated contact having one end expanded and provided with a hole to receive an eyelet whereby the contact has been fastened to the radio part near the margin thereof, sometimes with the free end of the contact overlapping the edge perpendicularly thereto. The work of so attaching contacts of this character to radio parts was slow and tedious because the operator was obliged to place in proper position each individual contact upon the spindle of the eyeleting machine over the punched work and then trip the machine to fasten the contact to the work by an eyelet. To prevent the contact being set askew the operator was generally obliged to hold it during the clenching operation which resulted in frequent injuries to the fingers. To avoid the difficulties of this method, the contact has been made having an eyelet formed in one end thereof, thereby constituting what may be termed a tongued eyelet, so that they may be fed in an eyeleting machine from a raceway to the setting means but the principal difficulty in this method is that the contacts or tongued eyelets which are fed through the raceway, eyelet end first, generally turn out of alignment either in the raceway or when they are withdrawn from the raceway by a setting tool with the result that thev are fastened to the work askew.

The main object of the present invention is the provision of an eyeleting machine for feeding and setting automatically tongued eyelets and for aligning the eyelets so that the tongue portions thereof lie in a predetermined relation to the work.

Another object is the provision of aligning means which is simple in construction and effective in operation.

Other objects of the invention will be more specifically set forth and described hereinafter.

In the drawings illustrating one form of the invention, Figure 1 is a front elevation of the operating instrumentalities of an eyeleting machine constructed and adapted to be operated in accordance with my invention and showing a tongued eyelet in position on the upper setting tool and about to be presented to the work; Fig. 2 is a side elevation of the same looking from right to left in Figure 1; Fig. 3 is a plan view of the work support and means for aligning the tongued eyelet or contact and Fig. 4 is a plan view of one form of tongued eyelet adapted to be set by the machine and used as a contact member, and Fig. 5 is a view in perspective of a radio part in the form of a cylinder of insulating material having a series of marginal holes at each end for the attachment of contacts and showing several contacts mounted thereon.

In the drawings only those parts of an eyeleting machine are shown which are necessary to illustrate the invention comprising work-supporting, eyelet delivering and setting means. The mechanisms for imparting the necessary movements to the eyelet delivering and setting means are old and well known to those skilled in the art.

Referring to the drawings showing one form of my invention, 10 indicates an upper set having its lower end 11 adapted to cooperate with a lower set or anvil 12 in clenching an eyelet on the work. The upper set has a shank portion 14 fitted in the bore of a punch-bar 16 mounted for a vertical reciprocating movement and is held therein by a set screw 18 threaded through the side of the punch-bar and bearing against the shank of the set. On the set is formed an annular enlargement or collar portion 20 which abuts the end of the punch-bar and is provided with an annular groove 22 for receiving the end of a tool for withdrawing the set from the

punch-bar. Within a longitudinal bore in the upper set is slidably mounted a spindle 24 of sufficient length to extend below the bottom of the set when its enlarged head 26 is in engagement with the top end of the set and the spindle is held normally in a lowermost position by a helical spring 28 mounted in a bore 30 in the punch-bar. The spring abuts at its upper end the closed end of the said bore 30 and at its lower end the head 26 of the spindle, which head is preferably cup-shaped to receive the lower end of the spring. The spring permits the spindle to be retracted into the set during the clenching operation.

The lower set or anvil 12 has a shank portion 32 fitting within a through and through bore 33 in the work-support 34 and may be adjusted vertically by a screw 36 threaded into the lower end of said bore. For holding the lower set in adjusted position, a set screw 37 is mounted in a bore in the work-support, the inner end of which is threaded, and bears against the said shank portion 32. The lower set is provided with a centrally disposed upright pin 38 for positioning the work and centering the eyelet.

Any suitable form of work support may be used but in the drawings the machine is shown as equipped with a cylindrical work-support 34 which is especially adapted for supporting work in the form of a cylinder and is provided with a shank portion 40 adapted to fit tightly within a transverse bore in the lower arm 42 of the frame of the machine. This form of work-support may be used for flat work if desired or a flat work-support may be substituted therefor and mounted upon the lower arm in the same manner.

For delivering to the setting means contacts in the form of tongued eyelets any suitable raceway 44 may be employed and one such is shown in an application for United States Letters Patent heretofore filed by me on August 2, 1928, Serial No. 296,886. In Fig. 4 of the drawings is shown one form of tongued eyelet 46 suitable for use in radio work as a contact comprising an eyelet portion having an elongated tongue 47 extending laterally from the flange of the eyelet portion and an upturned lug 48 also integral with said flange. The contacts 46 are fed by the raceway eyelet end first, the raceway being moved into a position where on the downward movement of the punch-bar the spindle 24 impales the eyelet and when the raceway is withdrawn the contact is left on the spindle which carries it downwardly to the work. To prevent the eyelet dropping off the spindle the surface of the latter is slightly roughened.

In setting contacts of this general character in insulating material for radio parts, it is necessary that the contacts be so attached that the tongues overlap the edge of the part in a perpendicular relation to said edge. To insure a setting in this relation to the edge of the material I provide means for aligning the tongues of the contacts as they pass from the raceway to the work and for holding them in that position during the clenching operation and one form of such means is shown comprising a plate 50 having one end bifurcated to form a longitudinal open slot 52 and the ends of the two bifurcations 54 and 56 turned upwardly with their inner edges 57 and 58 respectively curved. The plate is so positioned that when a contact is impaled by the spindle of the upper set and carried downwardly toward the lower set or anvil, the tongue of the contact will engage one or the other of the curved guiding surfaces 57 or 58 and be turned to lie in the slot 52 when it is being fastened to the work by the clenching of the eyelet portion. The plate 50 is mounted in a shallow recess in the top surface of the arm 42 which prevents lateral movement thereof and is fastened in place by a screw 60, the plate being provided with a slot 62 permitting adjustment in a longitudinal direction. This member may also be utilized as an edge gage and for this purpose the bifurcation 56 is squared at 64.

To illustrate the manner of attaching the contacts to the insulating material, there is shown in Figure 5 a radio part 70 of cylindrical form carrying on each end a series of contacts 46 having their tongue portions overlapping the edge perpendicularly thereto. These parts are generally molded of insulating material, the holes 72 being formed in the molding process. In attaching the contacts thereto by the use of an eyeleting machine constructed in accordance with my invention, the part 70 is positioned on the work support 34 with the central projection 38 of the lower set or anvil projecting up through the hole in which the contact is to be set and the operator trips the machine. The upper set starts to descend and the spindle of the upper set impales the eyelet portion of the outermost contact in the raceway which mean while has been moved inwardly into a position to permit this operation. After the contact has been impaled by the spindle, the raceway withdraws leaving the contact on the spindle which continues its downward movement. The surface of the spindle being slightly roughened the contact is held thereon and does not fall off. In the downward movement of the upper set the end of the spindle engages the top end of the center projection 38 of the lower set or anvil and remains stationary and the continued descent of the upper set pushes the contact off the spindle onto the projection 38, through the material until the end of the barrel of the eyelet contacts the setting surface on the lower set, is split and clenched upon the inner face of the part 70, the eyelet being firmly clenched upon the

material by the cooperative action of the upper and lower sets.

It will be observed that the tongue of the contact (Fig. 2) is turned up at a slight angle to the plane of the flange of the eyelet portion. It is necessary to make the contacts in this form in order to avoid the jamming and clogging of the contacts in the raceway.

I have found that if the contact is made with the tongue lying in the same plane as the flange of the eyelet portion of the contact it frequently happens that the contacts in the raceway crowd together and jam thereby blocking the raceway and preventing the feeding of the contacts but that if the tongue portion be turned up at a slight angle to the plane of the flange of the eyelet portion all jamming is prevented and the contacts pass through the raceway freely and are delivered automatically.

In order to straighten out the tongue of the contact when it is set in the material the upper set is provided with a minute boss or lug 74 on the periphery of its clenching end so arranged and shaped as to engage the tongue of the contact during the clenching process and bend it downwardly into the plane of the flange of the eyelet.

A machine constructed in accordance with my invention enables contacts to be set in radio parts with great rapidity and without any danger of injury to the operator. Since these parts carry a comparatively large number of contacts the saving of time due to the use of my invention is an element of considerable importance. In addition, the contacts are so firmly attached to the insulating material that they will remain in their aligned position even under strain whereas in work of this character heretofore performed cases of loose settings were very frequent and there was more or less movement of the contacts upon the eyelets which was a disadvantage in handling the radio parts.

Although the invention has been designed with special reference to work of this character, it will be observed that it is capable of a broad application for attaching elongated contacts to any kind of work where it is desirable or necessary to have the contacts fastened in a fixed relation to the work or to the margin of the work. In the embodiment of the invention shown, the aligning means for the tongue of the eyelet is shown as mounted on the work support but it is within the scope of my invention to mount it in any other suitable location on the machine and in some cases it may be found feasible to mount it upon the raceway.

It is to be understood that my invention is not to be limited to the precise form herein shown and described since it may be embodied in various other forms within the purview of the following claims.

What I claim is:

1. In an eyeleting machine, the combination of means for setting a tongued eyelet, means for delivering said eyelet to said setting means, and stationary means for engaging the tongue of said eyelet when out of alignment for aligning it in a predetermined position for setting.

2. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of stationary means adapted to engage the tongue portion of said eyelet when out of alignment and during the movement of said eyelet from said delivering means to the setting point for aligning and holding it in a predetermined position while being set in the work.

3. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of a stationary guiding member provided with guiding surfaces adapted for engagement with the tongue portion of said eyelet when out of alignment for aligning it in a predetermined position for the setting operation.

4. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of a guiding member provided with guiding surfaces for engaging the tongue of said eyelet when out of alignment for aligning it in a predetermined position and with a recess for holding said tongue in said aligned position during the setting operation.

5. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of a bifurcated member provided with an open recess for engaging the tongue of said eyelet when out of alignment for aligning and holding said tongue in a predetermined position during the setting operation.

6. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of a stationary plate having its end bifurcated to provide two guiding members for aligning the tongue of said eyelet when out of alignment and for holding it in a predetermined position for the clenching operation.

7. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of a stationary plate adapted to be mounted on the work support and provided with guiding surfaces for aligning the tongue of said eyelet when out of alignment and for holding said tongue in a predetermined position during the clenching operation.

8. In an eyeleting machine, the combina-

tion with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of a stationary plate set in said work support and provided with guiding surfaces for aligning and holding the tongue of said eyelet in a predetermined position during its movement from said delivering means to the point of setting and during the clenching operation.

9. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of a plate set in said work support and provided with guiding surfaces for aligning and holding the tongue of said eyelet in a position perpendicular to the edge of the work during the clenching operation; said plate having one edge serving as an edge gage for the work in which the eyelet is set.

10. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of a plate set in said work support and provided with two upturned bifurcations having each an inner guiding surface for aligning and holding the tongue of said eyelet in a position perpendicular to the edge of the work during the clenching operation.

11. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means of a fixed member having a grinding surface for engaging the tongue of said eyelet during its travel from the delivering means toward the work and for turning said tongued eyelet so that said tongue is perpendicular to the edge of the work when the eyelet is clenched therein.

12. In an eyeleting machine, the combination with means for setting a tongued eyelet and means for delivering said eyelet to said setting means, of a member having a guiding surface for engaging the tongue of said eyelet during its travel from the delivering means toward the work and for turning said tongued eyelet so that said tongue is perpendicular to the edge of the work when the eyelet is clenched therein and being provided with a slot for holding said tongue in fixed aligned position during the clenching operation.

13. In an eyeleting machine, the combination of means for setting a tongued eyelet, means for delivering said eyelet to said setting means, and fixed means intermediate said setting and said delivering means provided with curved guiding surfaces for aligning the tongue of said eyelet perpendicularly to the edge of the work.

14. In an eyeleting machine, a setting member having a central retractible spindle adapted, on the movement of said setting member toward setting position, to impale a tongued eyelet and to present it to the work, and a fixed member having upwardly turned bifurcations each provided with an inner guiding edge for engaging the tongue of said eyelet on its movement toward setting position to align said tongue perpendicularly to the edge of the work.

15. In an eyeleting machine, the combination with eyelet delivering means of an upper set having a central spindle adapted on the downward movement of said set to impale a tongued eyelet delivered by said delivery means and to present said eyelet to the work, and fixed means for engaging the tongue of said eyelet on its downward movement to align said tongue perpendicularly to the edge of the work.

In witness whereof, I hereunto set my hand this 27th day of March, 1929.

WILLIAM M. SPRY.