

Dec. 19, 1950

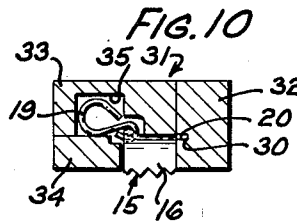
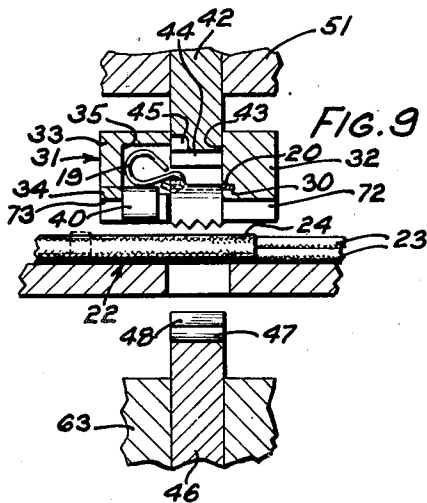
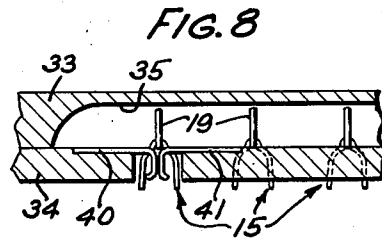
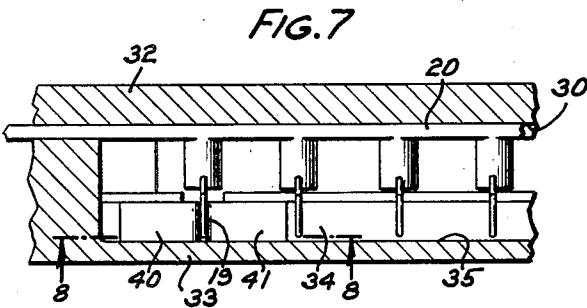
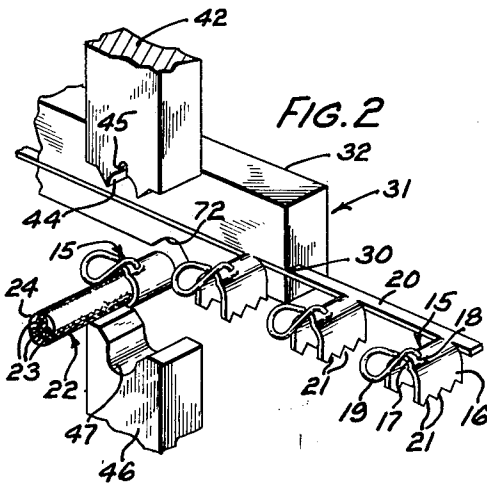
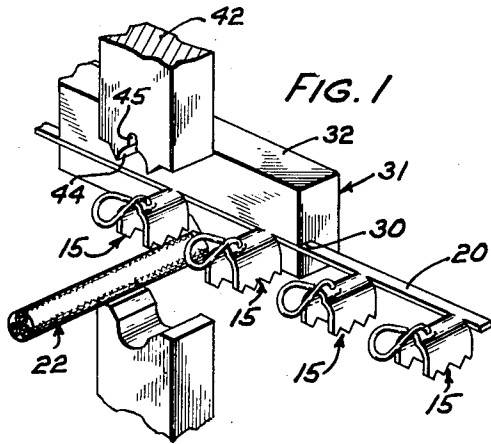
F. W. HENNESSEY

2,534,867

METHOD OF APPLYING BINDING ELEMENTS TO CORDS

Filed Jan. 11, 1945

2 Sheets-Sheet 1



INVENTOR
F.W. HENNESSEY
BY *Harry L. Duff*
ATTORNEY

Dec. 19, 1950

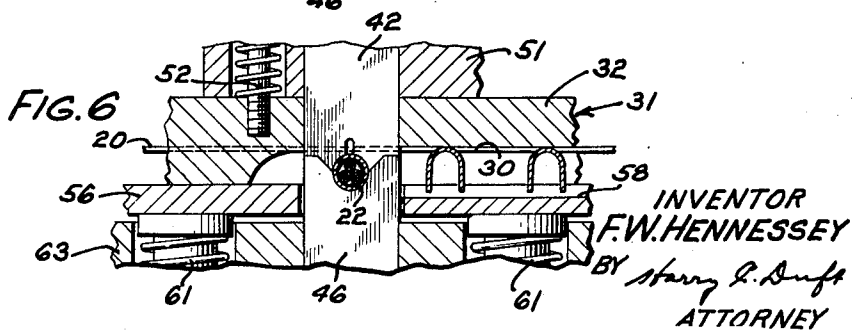
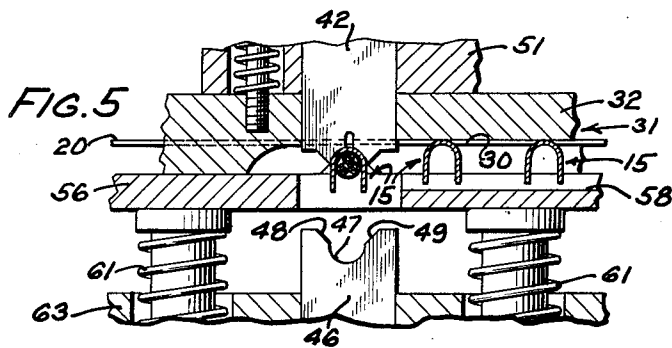
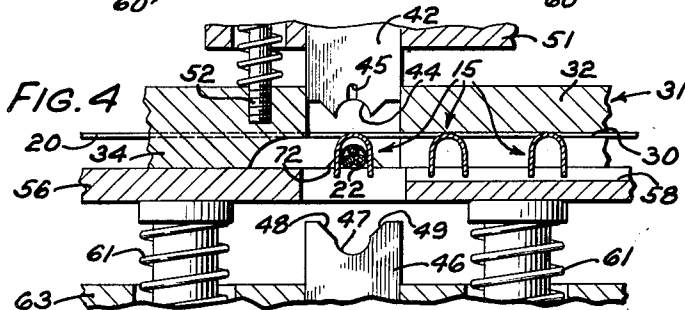
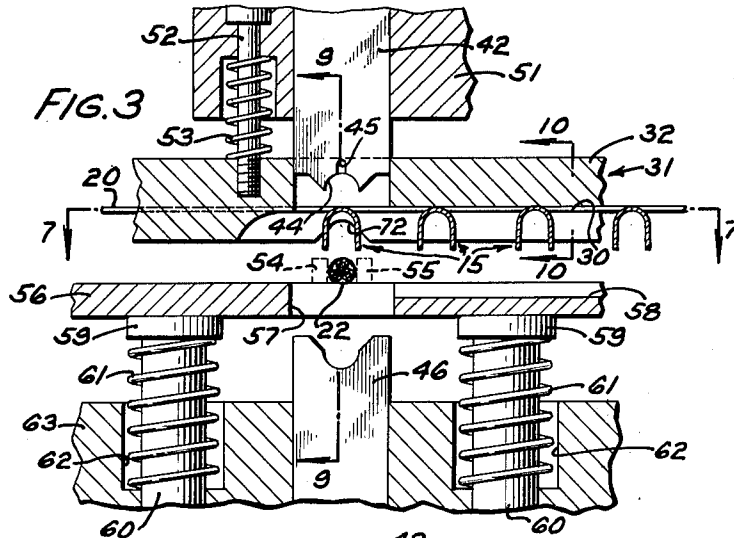
F. W. HENNESSEY

2,534,867

METHOD OF APPLYING BINDING ELEMENTS TO CORDS

Filed Jan. 11, 1945

2 Sheets-Sheet 2



INVENTOR
F.W. HENNESSEY
BY Harry L. Duff
ATTORNEY

UNITED STATES PATENT OFFICE

2,534,867

METHOD OF APPLYING BINDING ELEMENTS
TO CORDSFrancis W. Hennessey, Baltimore, Md., assignor
to Western Electric Company, Incorporated,
New York, N. Y., a corporation of New York

Application January 11, 1945, Serial No. 572,412

1 Claim. (Cl. 153—1)

1

This invention relates to a method of applying binding elements to cords and more particularly to a method of attaching "S-hook" type or other stay bands to telephone cords.

It is an object of the present invention to provide a simple and efficient method of applying binding elements to cords.

In accordance with one embodiment of the invention as applied to the attachment of "S-hook" type binding elements or stay bands to telephone cords for the purpose of preventing the end of the covering material on the cord from fraying or tearing and providing means for fixing the cord in place in a piece of electrical apparatus, the S-hooks are partially formed in any suitable forming apparatus wherein the separate binding elements are partially sheared from a continuous length of material and bent to semi-circular shape without completely detaching them from the strip of material. In this apparatus, hooks may be loosely attached to the formed portions of the strips, at the end thereof away from the continuous length of web or strip, by means of which the separately formed hooks or binding elements are interconnected one with another. After the strips of interconnected S-hooks are thus formed, they are fed into a punch press type of apparatus and guided to position above a length of cord while still interconnected one with another by the integrally formed web and then in a single stroke of the press a partially formed band is moved down to engagement with the cord and then the cord and S-hook or stay band are moved together as a unit during the shearing of the binding element from the web or strip. Continued movement of the cord with the binding element partially enclosing it will engage the free ends of the binding element with a forming tool which cooperates with a second forming tool moving with the binding element to completely attach the binding element onto the cord.

A complete understanding of the invention may be had by reference to the following detailed description when considered in conjunction with the accompanying drawing, wherein

Fig. 1 is a fragmentary detail perspective view showing a binding element positioned in alignment with a length of cord to which it is to be attached and showing some details of the tools which cooperate to shear the binding element from its web and clamp it tightly onto the cord, portions of the mechanism being omitted;

Fig. 2 is a view similar to Fig. 1, but showing a binding element attached to a cord prior to the feeding of a new binding element into position above a new length of cord;

2

Figs. 3, 4, 5 and 6 are fragmentary vertical sectional views through a punch press mechanism suitable for performing the method of the present invention and showing the progressive steps of the invention, Fig. 3 showing the press in its open inoperative position with a binding element positioned in direct vertical alignment with a length of cord, Fig. 4 showing the binding element in partial engagement with the cord while still connected to the web, Fig. 5 showing the binding element after it has been sheared from the web and transferred into position to have the final forming operation performed upon it, and Fig. 6 showing the binding element completely encircling the cord at the completion of the stroke of the punch press;

Fig. 7 is a plan sectional view taken substantially along the line 7—7 in Fig. 3 in the direction of the arrows and showing the method of guiding the binding elements into alignment with the cords;

Fig. 8 is a fragmentary detail sectional view taken substantially along the line 8—8 of Fig. 7 in the direction of the arrows;

Fig. 9 is a transverse vertical sectional view taken substantially along the line 9—9 of Fig. 3 in the direction of the arrows and showing the relative position of the forming dies of the punch press; and

Fig. 10 is a fragmentary transverse vertical view taken substantially along the line 10—10 of Fig. 3 in the direction of the arrows showing some details of the means for guiding the binding elements to position to be attached to the cords.

Referring to the drawings, wherein like reference characters designate the same parts throughout the several views, particular reference being first had to Figs. 1 and 2, it will be seen that the binding elements, here illustrated as S-hooks and designated generally by the numeral 15, each comprises a main body portion 16, which is U-shaped in configuration and which has a slight ridge 17 formed on it which terminates in an aperture 18 adapted to loosely receive a substantially S-shaped hook 19. A plurality of these S-hooks are formed in an interconnected strip from a single strip of metal and the body portions 16 are partially sheared from the strip, leaving a web 20 of the original strip to serve as a means for interconnecting the partially formed S-hooks 15. In the formation of this strip of interconnected S-hooks, serrations 21 are formed at the free ends of the body portion 16, which will intermesh to greater or less extent when the S-hooks have been sheared from the web 20 and attached to a cord designated generally by the numeral 22. While

the cord 22 may be one of a number of different forms without departing from the scope of the present invention, in the present instance it is disclosed as a cord comprising a core of three conductors 23, which are individually insulated one from another and which are enclosed in a braided or woven covering 24, preferably of fabric or a sheath of rubber compound, synthetic, plastic or other material.

In practicing the method of the present invention, the web 20 is fed into a processing apparatus to carry a partially formed S-hook 15 to position to be assembled to a cord 22, the web 20 being fed in a slot 30 of a stripper plate assembly designated generally by the numeral 31, parts of which have been omitted from the showing of Figs. 1 and 2 to more clearly illustrate other portions of the apparatus. This stripper plate assembly, as shown in Figs. 3 to 10, inclusive, comprises a guide bar or plate 32, in which the slot 30 may be milled to afford a guide passage for the web 20 through the stripper plate assembly. An upper guide member 33 (Fig. 10), suitably attached to the guide bar or plate 32, cooperates with a lower guide member 34 to define a passage through which the interconnected strip of S-hooks may be fed to position over a cord 22, the body portions 16 of the S-hooks 15 extending slightly below the bottom surfaces of the guide bar or plate 32 and lower guide member 35 in the feeding of the strip of interconnected S-hooks to the cord 22. The guide passage, designated by the numeral 35 and formed by the guide members 33 and 34, terminates as shown in Figs. 3 to 8, just beyond the position where the S-hooks are attached to the cord 22, and the surface of the upper guide member 33, which engages the guide bar or plate 32, cooperates with the guide bar or plate 32 to guide the web 20, from which the S-hooks 15 have been sheared, out of the apparatus. At the place where the S-hooks 15 are sheared from the web 20, the lower guide member 34 is cut away to permit the passage therethrough of the S-shaped hook 19 and a pair of bent leaf springs 40 and 41 are mounted on the plate 34 in position to retard the passage of the S-shaped hook downwardly so that the hook will not swing under the body portion 16 of the S-hook 15, but will be held by the springs in the position shown in Figs. 8 and 9 until the S-hook 15 is forced downwardly by a combined shearing and forming tool 42.

The shearing and forming tool 42 has a shearing edge 43, which cooperates with the abutting flat vertically disposed surface of the guide bar or plate 32 to shear an S-hook 15 from the web 20 when the web 20 is held against downward movement by the bar or plate 32 and the tool 42 is moved downwardly. In addition to the shearing edge 43, the tool 42 is provided with a rounded forming surface 44 and a hook-receiving notch 45. The tool 42 cooperates with a forming tool 46 having a formed surface 47 and tapered guiding surfaces 48 and 49 which will serve to guide the downwardly extending legs of the body portion 16 into engagement with the forming surface 47 when the S-hook is pushed downwardly after being positioned on the cord 22. The tool 42 is fixed in a press head 51, which may be actuated by the ram of a punch press or any other suitable actuating means (not shown). The press head 51 has the stripper plate assembly 31 suspended from it by retainer bolts 52—52, which are threaded into the guide bar or plate 32 and are slidably mounted in the press head 51, a compression spring 53 surrounding each of the bolts

52—52 being interposed between a lower surface of the press head 51 and the upper surface of the bar or plate 32. The springs 53—53 are of relatively light construction so that they will carry the stripper plate assembly 31 downwardly with them until a predetermined amount of resistance to the downward movement of the assembly 31 is encountered, whereupon the springs 53—53 will be compressed until the lower surface of the press head 51 engages the upper surface of the stripper plate assembly guide bar 32.

The cord 22 may be positioned to receive an S-hook 15 by positioning it between guide members 54 and 55, mounted upon a guide plate 56, which is cut out, as shown at 57, to receive the tool 46 and has a slot 58 formed in its upper surface to receive the downwardly extending ends of the body portion 16 of the S-hooks attached to the web 20. The guide plate 56 is supported upon the heads 59—59 of spring pressed plungers 60—60, which have relatively heavy springs 61—61 surrounding their shanks and interposed between the bottom surface of nests 62—62 in a base member 63 and the heads 59—59 of the plungers 60—60. The springs 61—61 are relatively stronger than the springs 53—53 and will serve to hold the guide plate 56 in its upper position, as shown in Figs. 3, 4 and 5, when the springs 53—53 are compressed and when an S-hook 15 is sheared from the S-hook 20. However, continued downward movement of the press head will cause the springs 61—61 to be compressed and will move the cord 22 with the S-hook body portion 16, partially encircling it downwardly to engage the downwardly extending ends of the body portion 16 with the forming tool 46. The guide bar or plate 32 and the lower guide member 34 are cut as shown at 72 and 73, respectively, to receive the cord 22 when the stripper plate assembly moves into engagement with the guide plate 32.

The method comprising the present invention will be more readily understood from the following brief description of the mode of operation of the structure described hereinbefore. In the practice of the invention, a cord 22, which has had its sheath or covering of textile severed to expose the insulated conductors 23, may be placed in position to receive an S-hook for assembly by placing it on the guide plate 56, as shown in Fig. 3, and an interconnected strip of S-hooks 15, interconnected by the web 20, may be positioned in the stripper plate assembly with the body portions 16 of the S-hooks 15 extending downwardly between the guide member 34 and guide bar or plate 32, as shown most clearly in Fig. 10, with the web 20 positioned in the slot 30. The interconnected strip of S-hooks 15 may be advanced to the position shown in Fig. 3, where the end S-hook 15 is in alignment with the cord 22. After the cord has thus been positioned to receive an S-hook and the interconnected strip of S-hooks 15 is positioned as shown in Fig. 3, the press head 51 may be moved downwardly in one continuous stroke to travel through the positions illustrated in Figs. 4 and 5 to the position illustrated in Fig. 6. In moving downwardly, the press head 51 will carry the stripper plate assembly 31 downwardly to engage it with the guide plate 56, as shown in Fig. 4. In moving to the position shown in Fig. 4, the stripper assembly will carry an S-hook into position to partially surround the cord 22. Due to the fact that the springs 61 are appreciably stronger than the springs 53, the stripper plate assembly 31 will be momentarily stopped in its downward

5

movement and the spring 53 will be compressed, thus to permit relative movement between the tool 42 and stripper plate assembly 31. When the tool 42 moves relative to the stripper plate assembly 31, its shearing edge 43 will shear the S-hook which partially surrounds the cord 22 from the web 20 and will transfer the rounded surface of the body portion 16 into intimate engagement with the upper surface of the cord 22. As the press head 51 continues its downward movement from the position shown in Fig. 5 to the position shown in Fig. 6, the springs 61-61 will be compressed and the guide plate 56 will be depressed to the position shown in Fig. 6 to carry the cord and S-hook in engagement therewith downwardly to a position where the guiding surfaces 48 and 49 will guide the downwardly extending parts of the body portion 16 into engagement with the forming surface 47 of tool 46, which is rigidly mounted and will extend through the cutout 57 in the guide plate 56 to cooperate with the tool 42 in tightly clamping the body portion of the S-hook 15 into gripping engagement with the cord 22.

As the shearing of the S-hook from the web 20 takes place during the movement of the press head from the position shown in Fig. 4 to the position shown in Fig. 5, that is, during relative movement in the tool 42 and stripper plate assembly 31, the S-shaped hook 19 will be forced to pass between leaf springs 40 and 41 and will be laid upon the upper surface of the cord 22, where it will be held by the notch 45 during the succeeding forming operation of the body portion 16 of the S-hook 15 to attach the S-hook 15 to the cord 22, as illustrated in Fig. 2.

What is claimed is:

The method of applying binding elements to

6

cords, which comprises locating a cord in a predetermined position, moving a strip of metallic elements interconnected by a web and having S-hooks pivotally attached to each of the elements to a position in which one of the elements is in transverse alignment with the cord, holding the S-hook in a position extending from said last-mentioned element, moving the element to partial engagement with the cord, simultaneously releasing the S-hook and shearing said element from the interconnecting web, and moving said element and said cord into engagement with a forming die to clamp the element around the cord.

FRANCIS W. HENNESSEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,743,364	Liss	Jan. 14, 1930
1,765,521	Barrans	June 24, 1930
1,836,503	Poole	Dec. 15, 1931
1,976,929	Elliott	Oct. 16, 1934
2,024,416	Allison	Dec. 17, 1935
2,024,880	Rydquist	Dec. 17, 1935
2,099,624	Robarge	Nov. 16, 1937
2,169,802	Keller	Aug. 15, 1939
2,225,739	Elliott	Dec. 24, 1940
2,357,902	Malhiot	Sept. 12, 1944
2,409,147	Neuhaus et al.	Oct. 8, 1946

FOREIGN PATENTS

Number	Country	Date
728,737	France	Apr. 18, 1932