

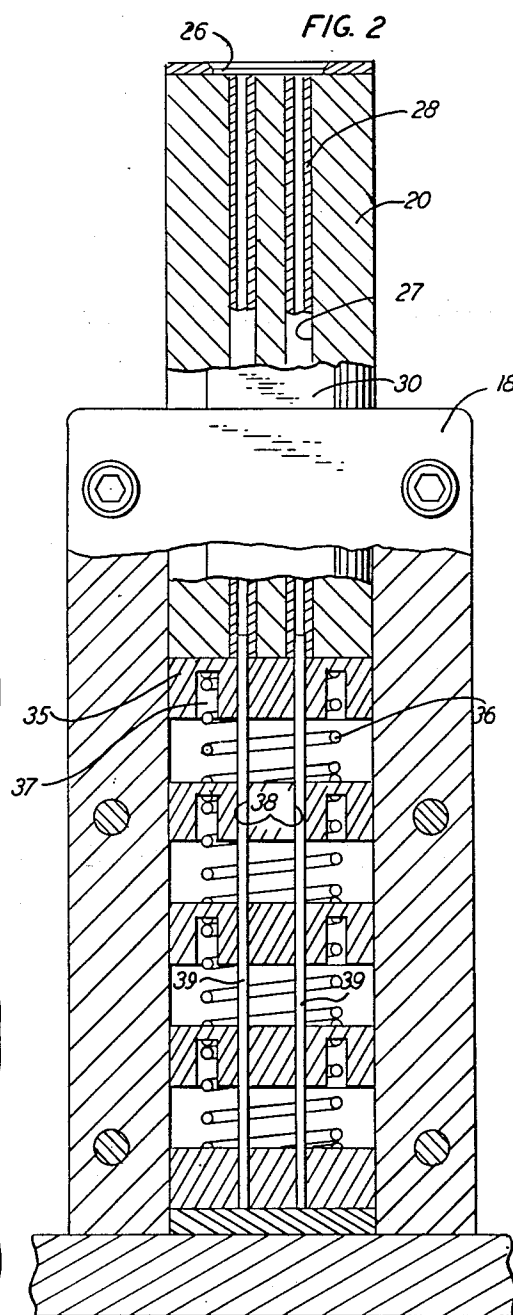
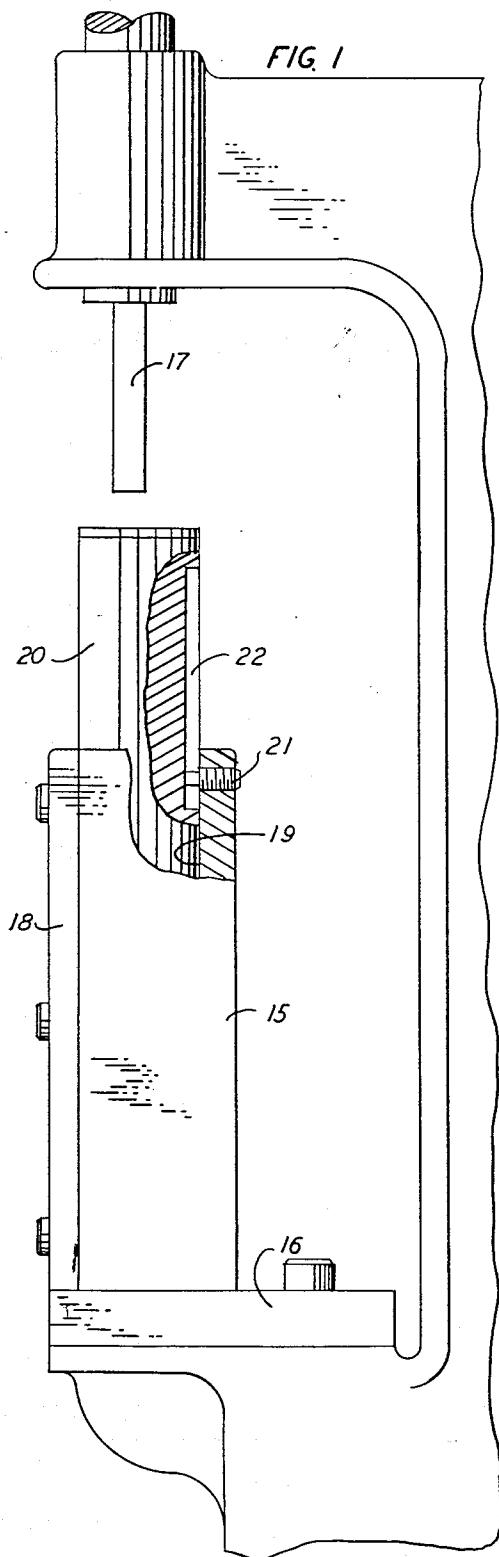
April 3, 1956

N. C. MOORE
ASSEMBLING APPARATUS

2,740,189

Filed June 7, 1951

2 Sheets-Sheet 1



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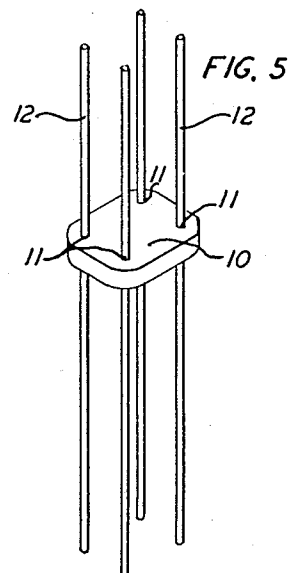
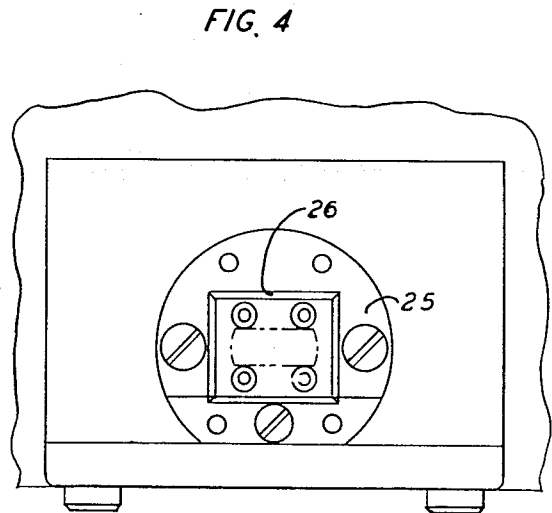
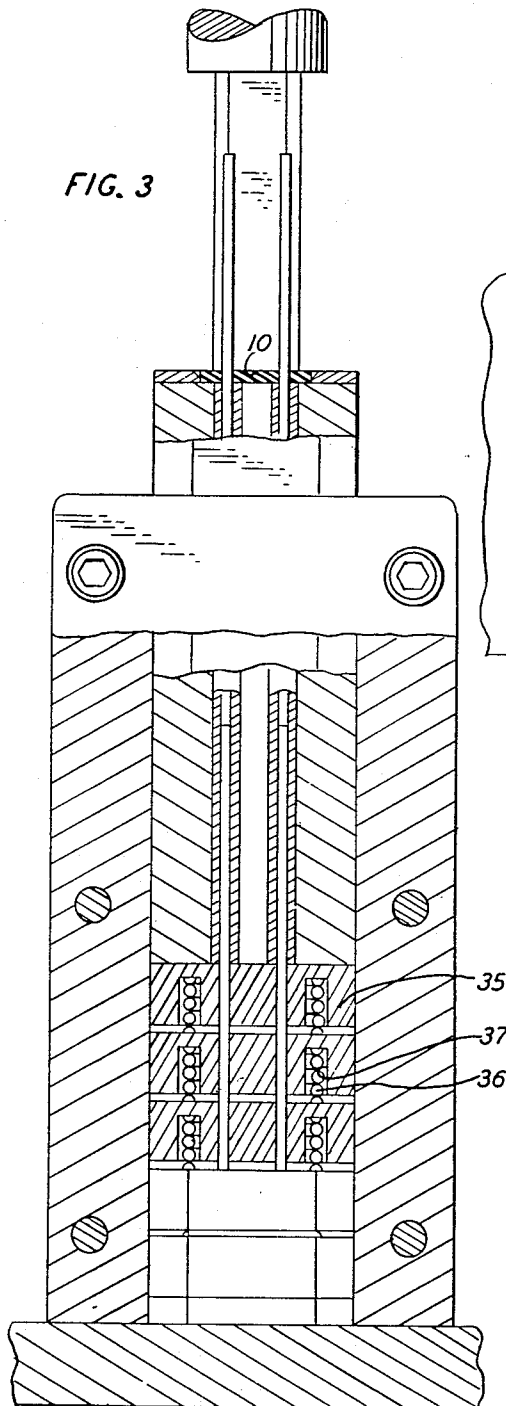
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ASSEMBLING APPARATUS

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Application June 7, 1951, Serial No. 230,379

3 Claims. (Cl. 29—203)

This invention relates to article assembling apparatus and more particularly to apparatus for forming an article of a wire and a part having an aperture of a cross sectional dimension substantially equal the cross sectional dimension of the wire to receive the wire therein.

In the manufacture of certain electrical units used in the field of telephony, various types of terminals are employed. For example, in the manufacture of one type amplifier it has been desirable to employ lengths of copper wire for the required terminals, the preferred structure including the projection of these wires through apertures in a fiber part which may serve as a cover for the electrical unit or amplifier. To produce a satisfactory structure it was necessary that the copper wires, to act as terminals, be held firmly in their respective apertures of the dielectric part. To accomplish this result, the apertures for the wires must of necessity be substantially identical in cross section to the cross sectional contours of the wires necessitating considerable force to extend the wires through the apertures in the dielectric part. The highly flexible nature of the copper wires made such an assembly impossible unless the wires could be held against flexing during the assembly operation.

The object of this invention is to provide an apparatus which is simple in structure and readily actuable to cause a wire to extend through an aperture of a part.

In the present embodiment of the invention, the apparatus is adapted to form an article of a wire and a part with an aperture of a cross sectional dimension substantially equal the cross sectional dimension of the wire, the apparatus including supports for the part and the wire with means to cause relative movement of the supports to cause the wire to extend through the apertures in the part while a guide is provided to hold the wire against flexing and in alignment with the aperture.

More specifically, the apparatus includes a holder which is hollow to receive the support for the part, the support including spaced tubes to receive the wires which are to serve as terminals when forced through aligned apertures in the dielectric part. The holder is provided with spaced rods mounted at fixed positions in alignment with the tubes and positioned with their free ends extending into the tubes to support their respective wires and to hold them against movement while a ram engaging the part moves it with the support and tubes downwardly to bring about the assembly of the wires in the part. A series of piston-like elements with individual springs function to normally hold the support in its upper or loading position and are provided with aligned apertures for the rods to hold the rods against flexing during operation of the apparatus.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings wherein:

Fig. 1 is a side elevational view of the apparatus;

Fig. 2 is a vertical sectional view of the apparatus shown in its normal position;

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Fig. 3 is a vertical sectional view of the apparatus shown in its operated position;

Fig. 4 is a top plan view of the main portion of the apparatus; and

Fig. 5 is an isometric view of the article formed by the aid of the apparatus.

Referring now to the drawings, attention is first directed to Fig. 5 which illustrates a dielectric part 10 provided with spaced apertures 11 to receive copper wires 12 which are to serve as terminals for an electrical unit. The apertures 11 are of such cross sectional dimensions comparable to the cross sectional dimensions of the wires that they must be forced into their respective apertures, but when assembled they will be firmly held against displacement.

The apparatus includes a hollow holder 15 mounted on a table 16 in general alignment with a ram 17 which is reciprocated by any suitable power means (not shown). The holder 15 includes a cover plate 18 completing a cavity 19 which is substantially circular in cross section excepting the flat portion provided by the cover plate. A support 20 is slidably disposed in a cavity 19 limited in its movement by a stop 21 carried by the holder 15 and extending into a longitudinal groove 22 in the support. The upper portion of the support 20 is provided with a cover plate 25 apertured at 26 to receive the dielectric part 10. The edges of the aperture 26 are tapered so that the part 10 may be readily disposed in place. Apertures 27 are formed in the support 20 to receive tubes 28 extending the full length of the support. The hollow portions of the tubes are substantially equal to or slightly larger than the wires 12 to readily receive the wires and to hold the wires against flexing during their assembly with the part 10. A flattened surface 30 of the support 20 engages the cover plate 18 to hold the support against rotation.

The ram 17 as illustrated in Fig. 4 has a cross sectional contour suitable for engaging the part 10 between the tubes 28 so as to apply suitable pressure to the part closely adjacent the apertures 11 through which the wires 12 will be caused to pass in assembly.

The support 20 is normally held in its upper position by a series of piston-like elements 35 and their springs 36, the elements having annular recesses 37 in their undersurfaces to receive the upper portions of their respective springs. All of these elements have sets of aligned apertures 38 to receive rods 39 which act as supports for the wires 12. The apertures for the rods in the lowermost element 35 are smaller in diameter than the apertures in all of the other elements so that the lower ends of the rods are firmly held against displacement by the lower element while all of the other elements are free to move relative to the rods during operation of the apparatus.

Considering now the operation of the apparatus, let it be assumed that the apparatus is in its normal position shown in Figs. 1 and 2. While in this position four of the copper wires 12 may be dropped into the tubes 28 where they will come to rest upon the upper ends of the rods 39. The dielectric part 10 may then be placed in the recess 26 of the holder 20 after which the conventional means may be actuated by the operator to cause operation of the ram 17 moving it downwardly so that it will strike the part 10 as shown in Figs. 3 and 4 and move the support 20 against the combined forces of the springs 36 to the position shown in Fig. 3. During this movement of the support, the part 10 is moved relative to the wires 12 causing the wires to extend through their respective apertures 11 to form the article shown in Fig. 5. The moment the upper ends of the wires are engaged by the part 10, there will be a tendency for the wires to flex, but they are held against any

possible flexing motion while every portion thereof is held in direct alignment with its respective aperture 11 by their tubes 28 to assure assembly of the wires and part. The rods 39 act as supports for their individual wires while the tubes are moved downwardly to the position shown in Fig. 3. The rods 39 are made of stiffer metals which add to their rigidity. Furthermore, the rigid rods 39 are supported against flexing at spaced positions by the elements 35. It will be apparent that before the greatest end thrust is applied to the rods, the greater portions of the rods will be under the control of the elements 35 to eliminate any possible flexing of the rods. The inherently flexible copper wires are therefore assembled or mounted in apertures of a dielectric part where they are firmly held in their respective positions.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. An apparatus for forming an article of a flexible wire and a part of a given thickness with an opening therein of a cross-sectional dimension substantially equal the cross-sectional dimension of the wire, the apparatus comprising a piston-like support for the part having an elongate aperture therein to receive the wire and of cross-sectional dimension substantially equal the cross-sectional dimension of the wire, a member substantially equal in thickness to the thickness of the part mounted on the support and apertured to receive the part thereby to locate the part on the support with the opening thereof in alignment with the aperture therein adjacent one end of the aperture, a fixed position rod having one end entering the aperture in alignment therewith to support the wire therein and hold it against longitudinal movement, a fixed member to hold the support for movement longitudinally of the rod and wire, and means to apply a moving force to the part and locating member to move them and the support longitudinally of the wire and rod to cause the wire to extend through the opening in the part, the portion of the support for the part at the aperture holding the wire against flexing when force is applied longitudinally thereto.

2. An apparatus for forming an article of a flexible wire and a part of a given thickness with an opening therein of a cross-sectional dimension substantially equal the cross-sectional dimension of the wire, the apparatus comprising a piston-like support for the part having an elongate aperture therein to receive the wire and of cross-sectional dimension substantially equal the cross-sectional dimension of the wire, a member substantially

equal in thickness to the thickness of the part mounted on the support and apertured to receive the part and thereby to locate the part on the support with the opening thereof in alignment with the aperture therein adjacent one end of the aperture, a fixed position rod having one end entering the aperture in alignment therewith to support the wire therein and hold it against longitudinal movement, a fixed member to hold the support for movement longitudinally of the rod and wire, means to apply a moving force to the part and locating member to move them and the support longitudinally of the wire and rod to cause the wire to extend through the opening in the part, the portion of the support for the part at the aperture holding the wire against flexing when force is applied longitudinally thereto and relatively movable apertured elements disposed in the holding member for the support to engage the rod at successive positions throughout its length to hold the rod against flexing.

3. An apparatus for forming an article of a flexible wire and a part with an opening therein of a cross-sectional dimension substantially equal the cross-sectional dimension of the wire, the apparatus comprising a support for the part having an elongate aperture therein to receive the wire and of cross-sectional dimension substantially equal the cross-sectional dimension of the wire, means mounted on the support to locate the part on the support with the opening thereof in alignment with the aperture therein adjacent one end of the aperture, a fixed position rod having one end entering the aperture in alignment therewith to support the wire therein and hold it against longitudinal movement, a fixed member to hold the support for movement longitudinally of the rod and wire, means to apply a moving force to the part to move it and the support longitudinally of the wire and rod to cause the wire to extend through the opening in the part, the portion of the support for the part at the aperture holding the wire against flexing when force is applied longitudinally thereto, and spring-pressed piston-like elements disposed at spaced positions in the holding member to urge the support into its normal position and having aligned apertures therein for the rod to hold the rod against flexing.

References Cited in the file of this patent

UNITED STATES PATENTS

782,644	Cleveland	Feb. 14, 1905
2,349,956	Gliss	May 30, 1944
2,403,443	Knab	July 9, 1946
2,536,677	Brunner et al.	Jan. 2, 1951