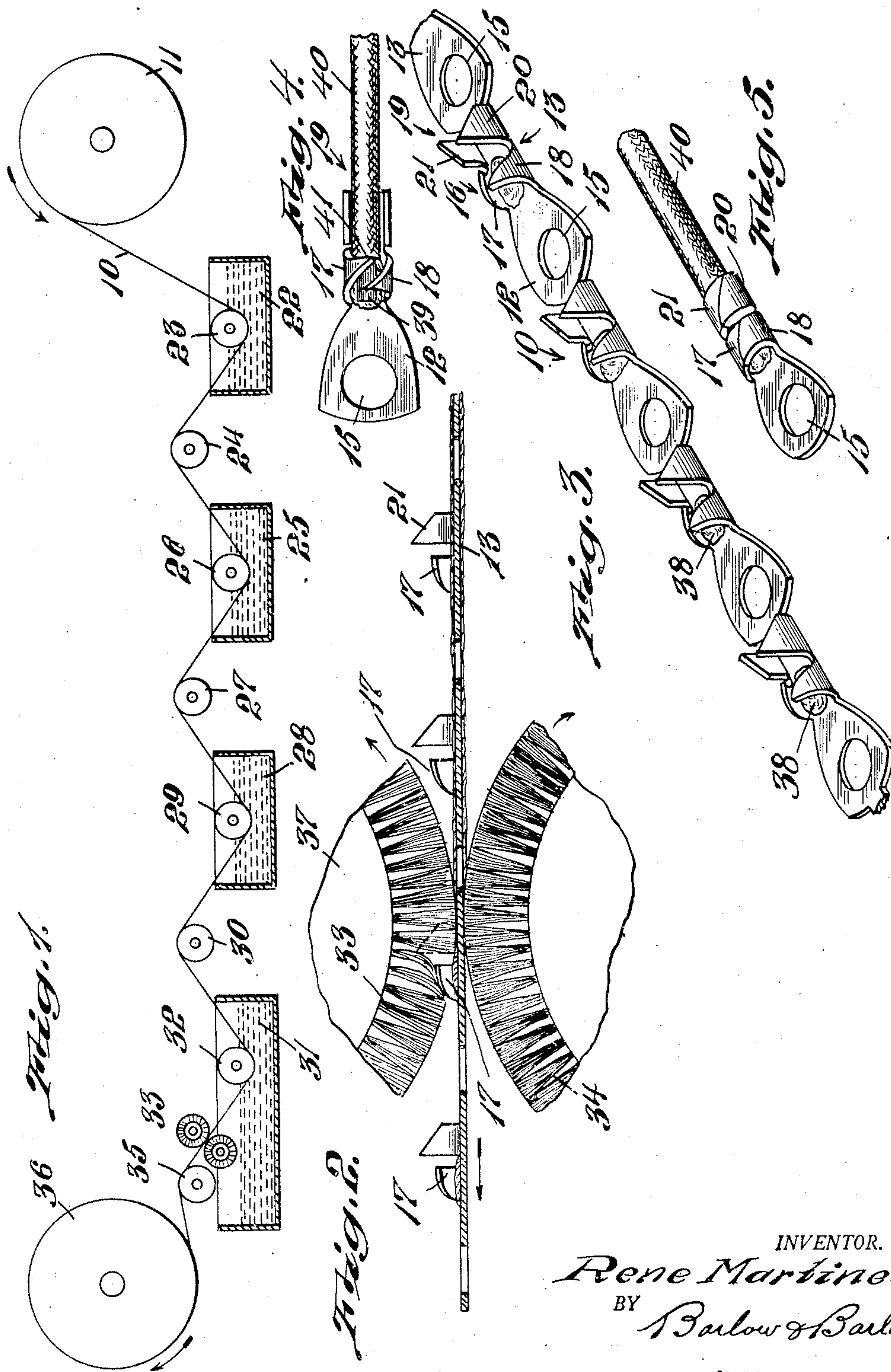


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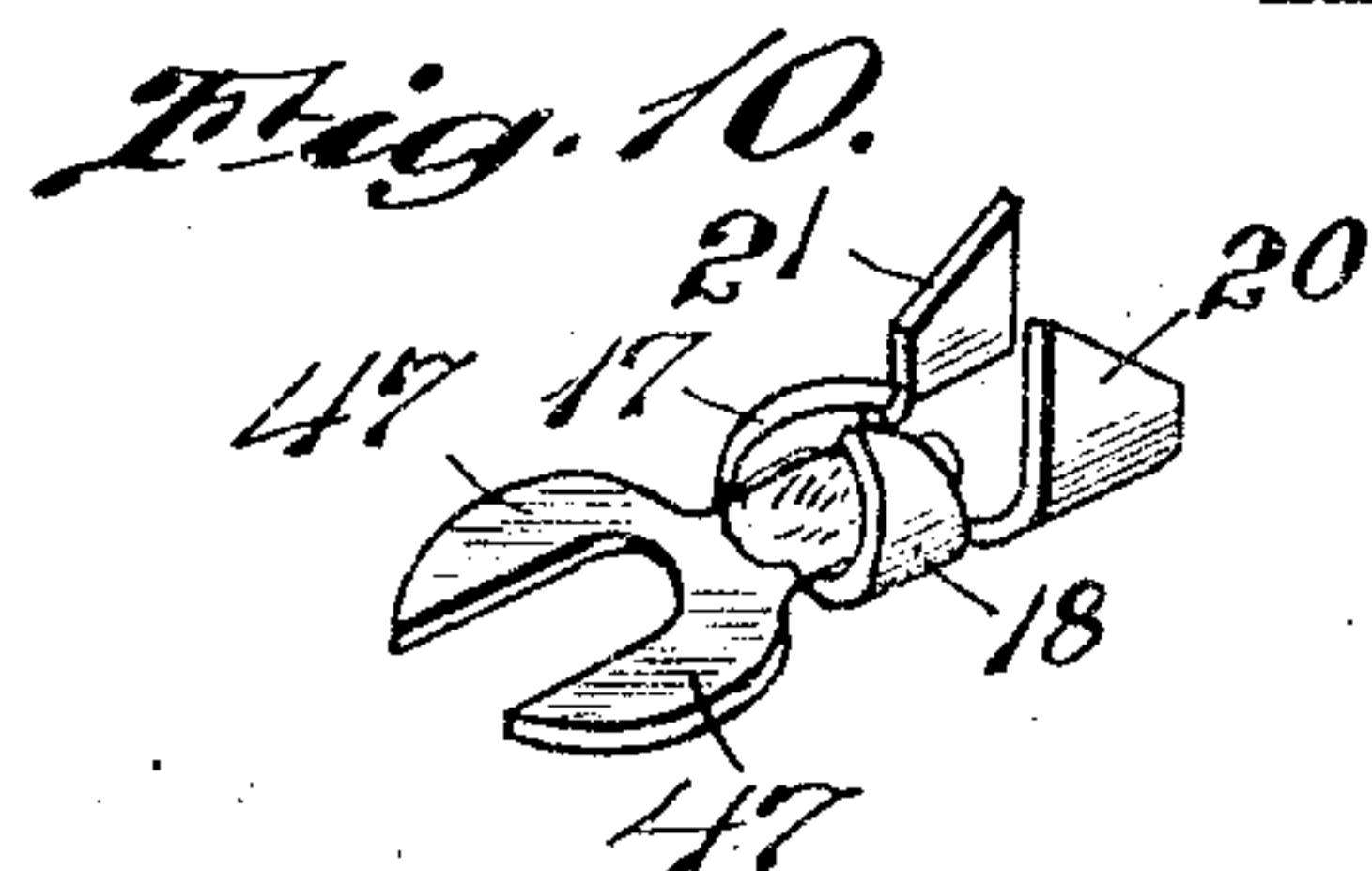
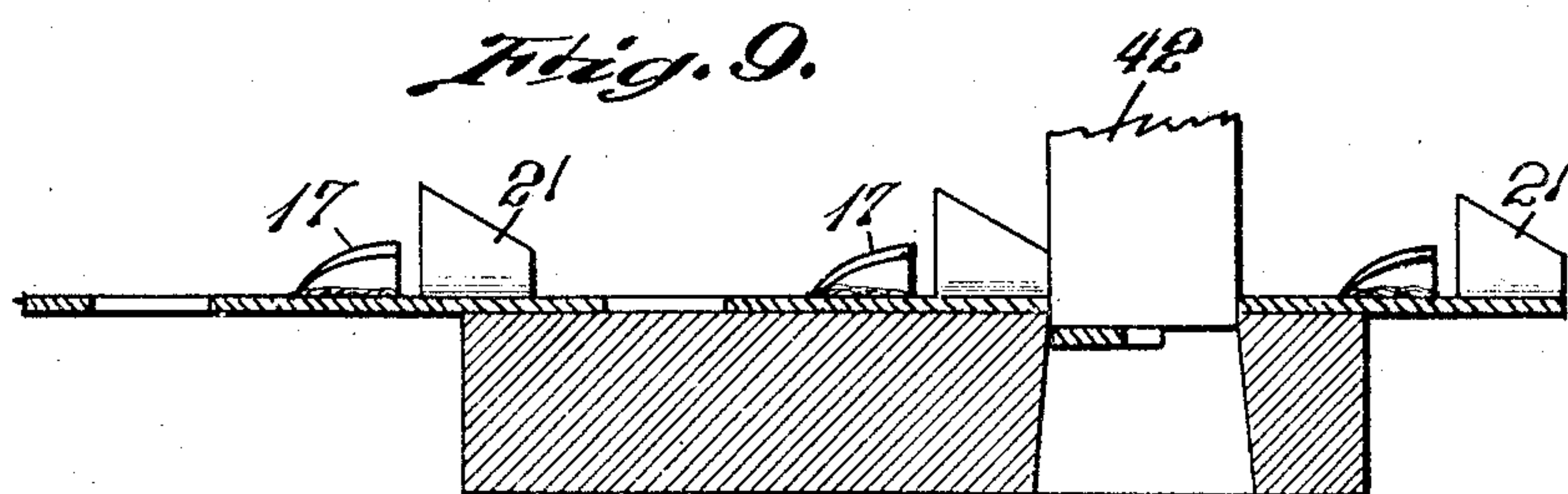
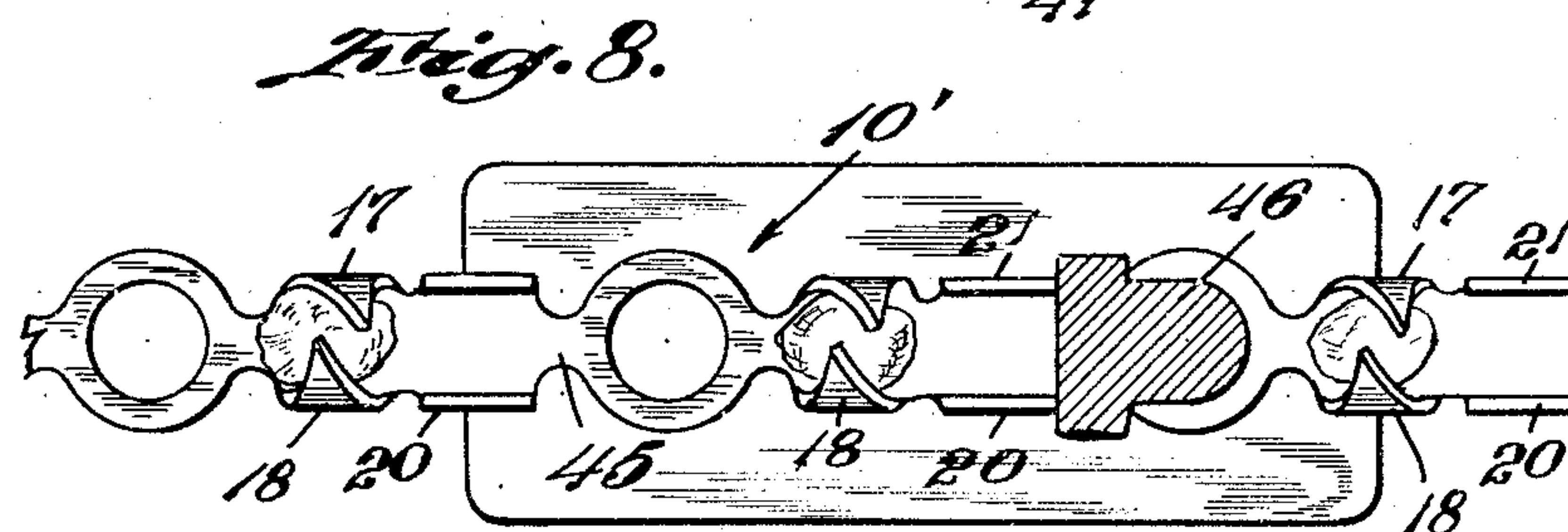
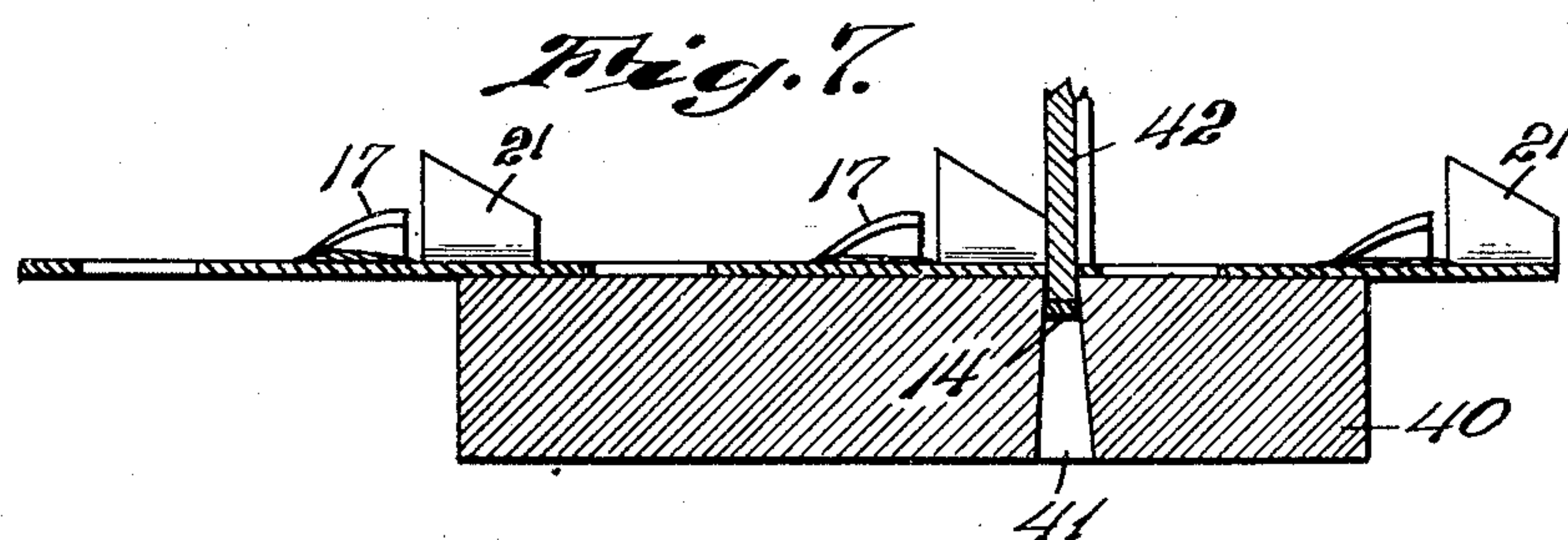
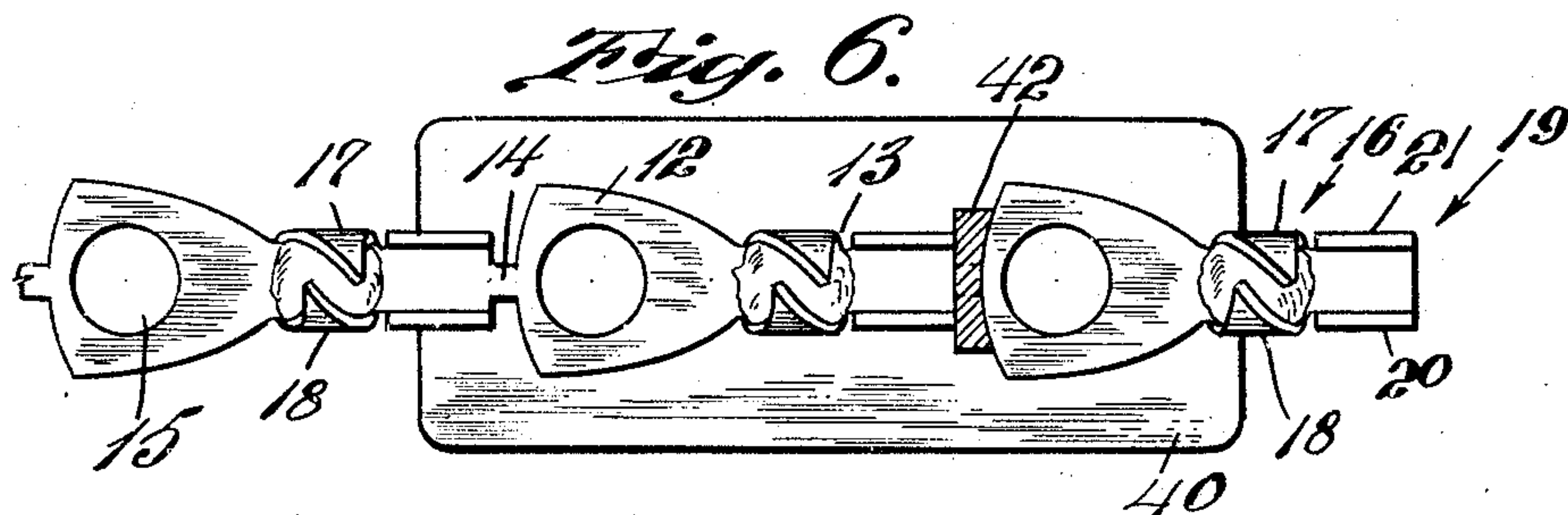
Oct. 4, 1949.

R. MARTINES  
METHOD OF SOLDERING TERMINALS  
FOR ELECTRICAL CONDUCTORS

2,483,424

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2 Sheets-Sheet 2



INVENTOR.  
*Rene Martines*  
BY *Barlow & Barlow*  
ATTORNEYS.



## UNITED STATES PATENT OFFICE

2,483,424

## METHOD OF SOLDERING TERMINALS FOR ELECTRICAL CONDUCTORS

Rene Martines, Cranston, R. I., assignor, by mesne assignments, to Electric Terminal Corporation, Providence, R. I., a corporation of Rhode Island

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3 Claims. (Cl. 117—102)

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This invention relates to a wire terminal such as may be attached to an electrical conductor for securing the conductor to some electrical binding post or other part. It is desirable in the securing of a terminal to the end of a wire that the terminal be soldered to the wire for a good electrical connection thereto; and, in many instances, it is necessary to apply solder as a separate operation to the wire and the terminal at the time of securing these together. Also, in many instances, the terminals are handled as individual units which is time consuming where large quantities are used.

One of the objects of this invention is to provide solder assembled with the terminal at a location where the solder is required and in an amount sufficient for securing the terminal to the wire.

Another object of this invention is to provide an improved method by which the solder may be easily and quickly applied and located at the point desired.

Another object of this invention is to provide a stop for the insertion of an insulated wire so that the wire itself will be located where the solder is provided.

Another object of this invention is the securing of the wire to the terminal and the insulation of the wire to the terminal in a manner so that the terminal is well supported on the end of the wire.

Another object of this invention is to secure the wire to the terminal by physically clamping the arms of the terminal on the wire and also by the use of solder.

Another object of this invention is to form the terminals in a tandem relation and so cut the terminals apart that a burred edge will not occur at the point of severing.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a diagrammatic view illustrating the travel of the terminals in the application of solder thereto;

Fig. 2 is an enlarged sectional view of one step in the procedure;

Fig. 3 is a perspective view of the strip terminals after having been passed through the various steps shown in Fig. 1;

Fig. 4 is a top plan view of the wire inserted in the terminal after severed from the strip;

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Fig. 5 is a perspective view of the wire completely attached to the terminal;

Fig. 6 is a top plan view showing the terminals as extending across a supporting surface with a punch or cutter in section for detaching one terminal from the series;

Fig. 7 is a section of the parts of Fig. 6;

Fig. 8 is a view similar to Fig. 6 of a modification;

Fig. 9 is a section of the showing in Fig. 8;

Fig. 10 is a perspective view of the terminal formed from the strip shown in Figs. 8 and 9.

In proceeding with the invention, I cut out from sheet stock, by suitable punch and dye operations, a configuration which will lend itself to the formation of terminals in end-to-end relation to be reeled; and, in a second step, I bend the arms from opposite sides of the body so that the arms will be in a form which is desired for the application of solder to the terminals. After this has occurred, the tandemly related terminals will be run through solder and the solder will adhere to the terminals, but will be removed from the terminals at all points except in a location where a quantity of solder sufficient for attaching a wire to the terminal is desired. By the bending inwardly of certain of the securing arms of the terminal, this relationship whereby the solder is retained at the location of the bend in the arms is provided, and this bend in the arms also serves the additional useful function of forming a stop to engage the insulation and limit the insertion of the insulated wire into the terminal to a position desired. In the severing of the terminals for after use, severing occurs by removing a quantity of stock so as to prevent the burring of the edge of the terminal.

With reference to the drawings, 10 designates generally a strip of terminals which is drawn from a supply package 11 of terminals for the application of solder thereto.

The strip of terminals 10 is formed as an integral strip of tandemly related terminals cut out so that each terminal will have a head portion 12 and a shank portion 13. The head portion 12 of one terminal will be joined to the shank portion 13 of the next terminal by means of a short section 14 (see Fig. 6) of sheet stock which will later be removed. Each head will have some opening or recess 15 for securing it to a binding post. Each shank 13 will have a pair of arms 16 consisting of arms 17 and 18 which will be bent inwardly to overly the shank 13, as shown in Figs. 2 and 3, while there will



be a second set of arms 19 consisting of arms 20 and 21 which will stand upwardly from the shank in parallel relation leaving an open top, such as shown in Figs. 2 and 3.

This tandemly related strip from the package 11 will then be passed through a bath of potash or some other cleaner 22 beneath the guide roll 23 then out over a guide roll 24 and through a bath of acetic or hydrochloric acid 25 beneath the guide roll 26 therein to remove the alkali. The strip will then pass over a guide roll 27 and into a bath of flux 28, such as zinc chloride, beneath the guide roll 29 therein and thence over a guide roll 30 and into a hot solder bath 31 beneath the guide roll 32; and then as the strip leaves the solder bath, it will pass between brushes 33 and 34 (see also Fig. 2) and thence over a guide roll 35 and be packaged upon the take-up roll 36.

The brushes 33 and 34 will be formed of some rather stiff material, such as wood fiber bristles or cellulose fiber bristles to which solder will not adhere. The bristles will be conveniently of 1½" long and radially inserted into a drum or hub 27 about 5" in diameter. The bristles will be sufficient to form a face about 2" wide. These dimensions, of course, are only illustrative. The action of the bristles is such as to wipe from the strip the solder which has accumulated thereon as the strip leaves the solder bath 31. However, in as much as the arms 17 and 18 of the strip extend inwardly overlying the shank 13, the bristles will be deflected upwardly, as shown in Fig. 2, at this location, and thus there will occur a globule of solder 38 beneath each of these arms which is the location where the solder is desired.

After a terminal is ready for use, wire 39 having insulation 40 thereabout is stripped so as to leave a bare portion of the wire extending beyond the part 41 of the insulation, and this wire is inserted between the arms 19 so that the insulation engages the edge of the arms 16 and the wire extending beneath these arms 16 and on the solder. At the time the arms are bent inwardly to grip the wire and its insulation, heat is applied so that the solder melts and secures the wire to the terminal as shown in Fig. 5, while the arms 19 are bent about and tightly grip the insulation 40 of the wire to hold the wire firmly secured to the terminal.

Usually a terminal will be attached to a wire prior to its being severed from the strip such as indicated in my copending application Serial No. 611,846, filed August 21, 1945, except, of course,

the solder is applied as herein above stated rather than as in such prior application.

The severing will occur immediately after the soldering operation while the strip of terminals are passing over the bed die 40 which has an opening 41 therein into which a punch or cutter 42 is received. This punch or cutter 42 removes the portion 14 of stock which connects the head of one terminal to the shank of the next terminal, and by removing this piece of stock both ends are left square with no burrs upon either edge such as might occur should the stock be sheared without removing a piece.

In some cases, instead of removing a piece, such as 14, a piece designated 45 in the terminals 10' will be removed by a cutter or punch 46 which at the same time removes a sufficient portion so as to leave spaced arms 47 and 48, as shown in Fig. 10, instead of the circular recess or opening such as 15 in the terminals heretofore spoken of. The terminals, such as shown in Figs. 6 to 9, will be stored on the reel 36 until ready for use.

I claim:

1. In a method of applying solder to a predetermined area on an element, the steps which comprise immersing an elongated metal article comprising a plurality of tandemly related elements each of which elements has been provided with upstanding arms overhanging the portion to be coated, in molten solder to encompass the area to be covered and at least a portion of the upstanding arms, brushing solder from the elements about and over said arms whereby the upstanding and overhanging arms deflect the brush bristles from the solder at the desired location beneath said arms to maintain the solder at this location while removing it from the surrounding area.

2. In a method as in claim 1 wherein said brushing is from opposite sides of the article.

3. In a method as in claim 1 wherein the element comprises an electrical wire terminal.

RENE MARTINES.

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