

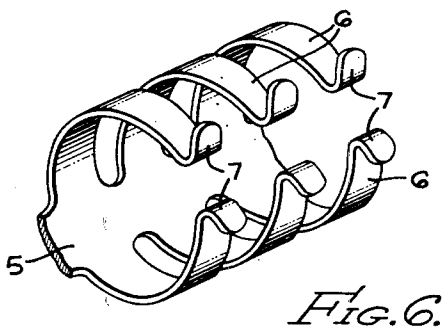
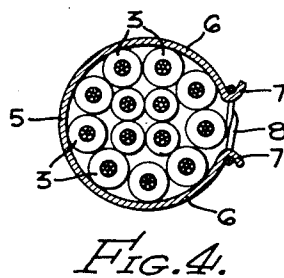
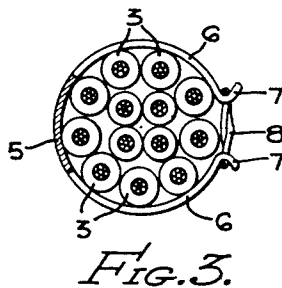
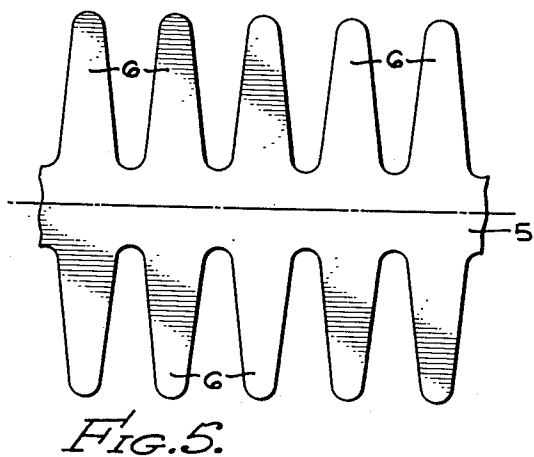
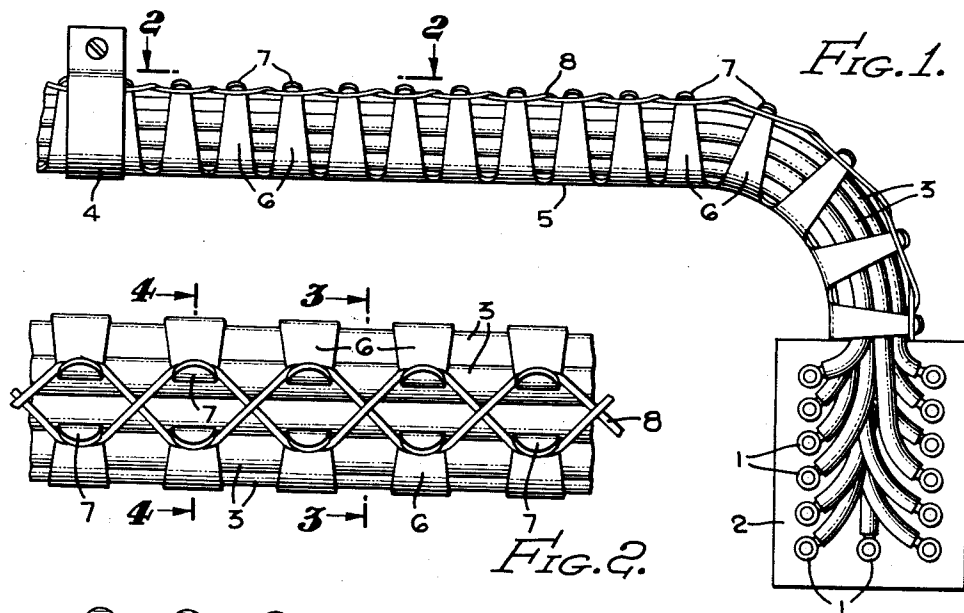
July 27, 1954

W. W. BEMAN
WIRE BINDER

2,684,512

Filed March 24, 1951

2 Sheets-Sheet 1



WARD W. BEMAN,
INVENTOR.

BY R. E. Seangue

ATTORNEY

July 27, 1954

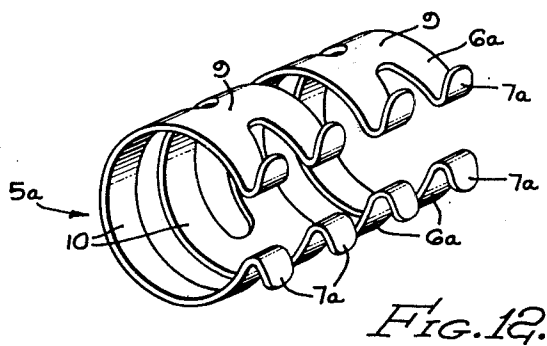
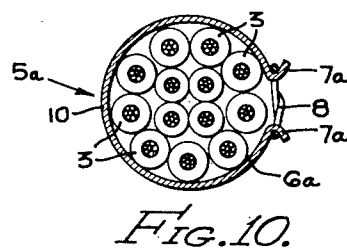
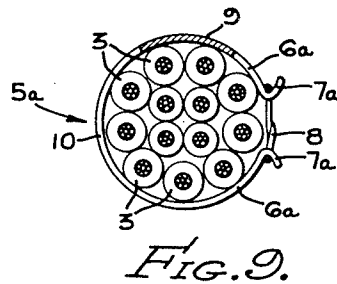
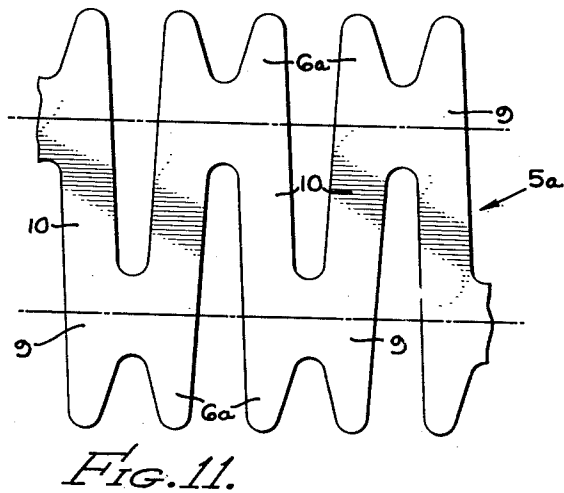
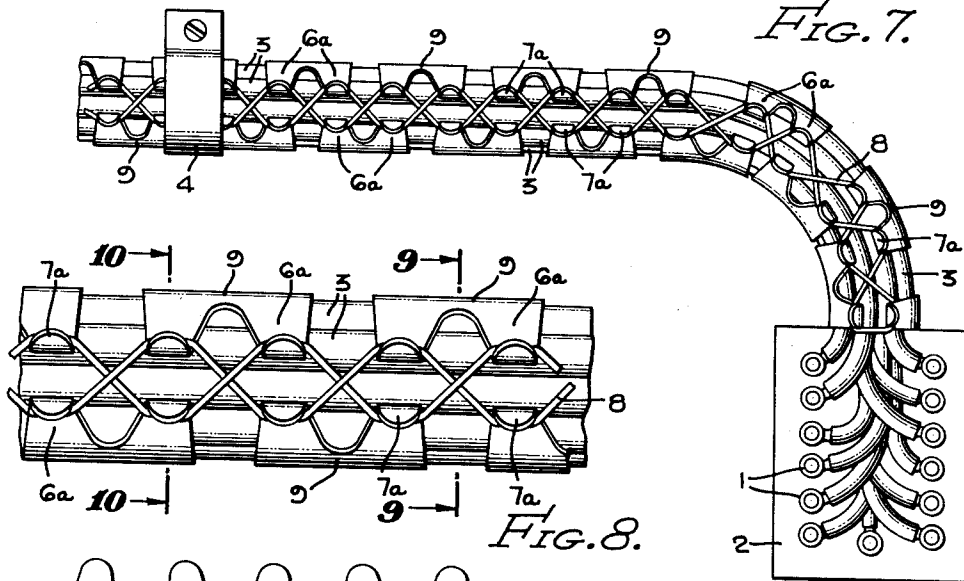
W. W. BEMAN

2,684,512

WIRE BINDER

Filed March 24, 1951

2 Sheets-Sheet 2



WARD W. BEMAN,
INVENTOR.

BY R. E. Geaume

ATTORNEY

UNITED STATES PATENT OFFICE

2,684,512

WIRE BINDER

Ward W. Beman, Glendale, Calif., assignor to
Telecomputing Corporation, Burbank, Calif., a
corporation of California

Application March 24, 1951, Serial No. 217,393

7 Claims. (Cl. 24—26)

1

This invention relates to a wire binder and more particularly to a device for binding together a number of wires which lead in the same direction from a group of closely spaced electrical terminals and which follow the same path over a considerable distance. This wire binding device is so constructed that the group of wires can be quickly bound or unbound so that additional wires can be added to or taken away from the group with a minimum of time and effort.

The device of the invention is flexible enough so that it can follow bends made in the path of the wires and is constructed of a material which is rigid enough to provide some support for the wires to reduce sagging of the wires between supporting points.

It has previously been the practice to bind together such a group of wires by a single continuous cord which is wrapped or laced completely around the wires at various intervals. The use of such a singular cord is time consuming and when a wire is added or taken away from the group, it is necessary to completely replace the group in order to bind the wires tightly together. Since it is necessary to pass this singular cord around the wires, it is often difficult to use this method of binding the wires without removing them from the mounting brackets which usually hold the group of wires against some structural member.

It has also been the practice to use individual pieces of cord which are wrapped completely around the group of wires at various intervals and this method of binding has many disadvantages that occur with the use of a singular cord wrapped at intervals around the group of wires. In addition, when a wire is added or taken away from the group, each of these individual cords must be cut and retied in order to reassemble the group.

The present invention overcomes these difficulties by providing a wire binder composed of a continuous flexible member which has flexible arms designed to partially surround the group of wires along their complete length. These flexible arms are provided with hooks which serve as a means for receiving a lacing which can be easily applied or removed without passing the lacing completely around the group of wires. Also, the lacing can be applied without removing the group of wires from the position in which they are held by the mounting brackets. Since the device of this invention is fabricated from a flexible material, it can closely follow all bends and turns made by the group of wires and still

2

provide a lacing means for these turns and bends. The arms of the subject device are spaced far enough apart so that individual wires can leave the group at various points along the wire binder by simply passing outwardly between these flexible arms.

The wire binder of this invention can be easily fabricated because it is composed of a continuous flexible member constructed of any suitable type of plastic or sheet metal. In the manufacturing process hooks are first bent on the ends of each of the flexible arms and then the flexible arms are curved around into the desired position. The flat, flexible sheet can be formed by a simple stamping process.

It is therefore an object of this invention to provide a wire binder which can be quickly secured to a group of wires by a lacing which does not have to pass completely around the group of wires.

A further object of this invention is to provide a wire binder device which is flexible enough to follow the bends and turns of the wires and still hold the wires tightly together.

A still further object of this invention resides in the fact that a wire can be quickly added or removed from the group in the space available while the group is still retained in its mounting bracket.

A further object is the provision of a wire binder which can be easily fabricated from a perfectly flat sheet of flexible material by the utilization of simple stamping and bending processes.

These, and other objects of the invention not specifically enumerated above, will become readily apparent from the following specification and drawings in which:

Figure 1 is an elevational view of one embodiment of the invention showing a group of wires connected with their electrical terminals and retained in position by a mounting bracket.

Figure 2 is a top plan view taken along line 2—2 of Figure 1 showing the manner in which the lacing cord is applied.

Figure 3 is a vertical sectional view taken along line 3—3 of Figure 2 and illustrating a securely bound group of wires.

Figure 4 is a vertical sectional view taken along line 4—4 of Figure 2.

Figure 5 is a top plan view of the flexible sheet from which the one embodiment of the wire binder of this invention is formed.

Figure 6 is a perspective view of the wire binder as formed from the sheet illustrated in Figure 5.

Figure 7 is an elevational view of a second em-

3

bodiment of the invention and illustrating a group of wires leading from their electrical terminals through a mounting bracket.

Figure 8 is an elevational view of the second embodiment showing the manner in which a lacing cord is applied.

Figure 9 is a vertical sectional view taken along line 9-9 of Figure 8 and illustrating a group of wires bound together.

Figure 10 is a vertical sectional view taken along line 10-10 of Figure 8.

Figure 11 is a top plan view of the flat, flexible sheet from which the second embodiment is formed.

Figure 12 is a perspective view of a second embodiment of the wire binder of this invention.

Referring to the embodiment of the invention illustrated in Figures 1 through 6, a number of electrical terminals 1 are secured to a supporting plate 2 and each terminal is connected with a supply of electrical energy. One end of each of the wires 3 connects with one of the terminals 1 and the wires join together to form a group as they lead from the plate 2. The group of wires can follow any desired path which may include bends and turns and are secured to mounting structures by means of a number of brackets 4.

The wire binder is originally formed from a thin, flat sheet of flexible material, such as, plastic or sheet metal, and is stamped from this sheet to obtain the form shown in Figure 5. The stamping has a continuous central strip 5 and arms 6 extending outwardly from each side of strip 5 to form a symmetrical pattern. The arms on opposite sides of the strip are positioned opposite each other and are of the same length, but, of course, the length of the arms could be made unequal. After the stamping process, hooks 7 are formed on the end of each arm by simply rolling back the end of each arm. The arms 6 and the strip 5 are then bent into any desired form, such as the circular form shown in Figure 6, so that the arms 6 can receive a group of wires. It is understood that the shape and the length of the arms can be varied to receive a group of objects of any shape which must be bound together. Since the arms 6 are shown to be of equal length, the arms will extend equal distances around each side of the group of wires held by the wire binder. Also, the arms can be spaced at equal intervals along the strip 5 as shown in Figure 6 or the spaces between the arms can be varied. Instead of forming the wire binder from flexible sheet material, it can be formed as a flexible wire frame wherein the wire of the frame will follow the outline of Figure 6.

When the wire binder is applied to a group of wires, the strip 5 is placed along the length of the group of wires and in a position adjacent to the surface. The arms 6 will pass around the sides of the group of wires in order to hold the wires together. Since the arms 6 are flexible, the number of wires in the group can be increased by simply springing the arms apart to provide additional space between the arms. If the number of wires in the group is decreased, the arms 6 will come together to reduce the space between the arms. The strip 5 can bend to follow the turns in the group of wires and the arms 6 can spread apart or come closer together at the turn, depending on whether the group turns downwardly in the transverse plane of strip 5 as shown in Figure 1 or upwardly. However, the wire binder is somewhat less capable

4

of following turns to one side or the other in the longitudinal plane of strip 5, as distinguished from the downward turn of Figure 1, but by twisting the strip 5 it can be brought into position to bend in response to the sidewise turns.

After the group of wires has been inserted in the wire binder, a cord 8 is laced around the hooks on arms 6 in the manner shown in Figures 1 and 2. The cord 8 is placed around the two end hooks of the wire binder and is thereby divided into two sections, each of which extends along the length of the wire binder. The sections pass back and forth across the group of wires and between the hooks, with each section passing around alternate hooks on each side of the wire binder. Of course, two separate cords could be tied to the end hooks and then laced in the same manner. This lacing can be interrupted at any point along the group by simply tying the ends of the cord 8 together and a new cord can complete the lacing. This type of criss-cross lacing can be quickly applied to the wire binder and the pressure exerted on the lacing will determine how tightly the group of wires will be bound together.

It is apparent that the group of wires can be laced together without passing the lacing cord completely around the group and this saves considerable time since the device can be laced and unlaced while held in position by the mounting bracket. The criss-cross type of lacing is particularly suitable since the arms are shown symmetrical about the strip 5 and the hooks on each pair of arms are spaced opposite each other. The length of the wire binder required for any group of wires can be quickly obtained by simply cutting strip 5 to the proper length. Also, several lengths of the wire binder can be used as separate units to bind a single group. As an alternative, cord 8 can be replaced by two sections of wire which are bent, prior to being applied to the binder, into shape to pass around the hooks in the same manner as the sections of cord 8. These two sections of wire can be quickly placed around the hooks or removed from the hooks as units and thus eliminate the lacing and tying operations involved when a flexible cord is used. Many advantages of this embodiment will be readily apparent, including the ease with which wires can be added to and removed from the group and the ease with which the wire binder can be laced and unlaced.

Referring to the embodiment of the invention illustrated in Figures 7 through 12, like numerals refer to parts identical with the previous embodiment. The electrical terminals 1 of this embodiment are mounted on the supporting plate 2 and one end of each of the wires 3 is secured to one of the terminals. The wires 3 are formed into a group as they leave the supporting plate 2 and this group of wires can follow any desired path, including bends and turns, and are secured to mounting structures by means of a number of mounting brackets 4.

The wire binder is originally formed from a thin, flat sheet of flexible material, such as plastic or sheet metal, and is stamped from this sheet to obtain the form shown in Figure 11. The stamping has a continuous central section 5a which has somewhat a crank-shaft shape and is composed of cross-sections 9 and legs 10. From each cross-section 9, there extends a pair of arms 6a and the arms are so positioned that each arm is opposite to the nearest arm carried by the adjacent section 9 on the opposite side

5

of the sheet. After the stamping process, hooks 7a are then formed on the end of each arm 6a by simply rolling back the end of each arm. The central section 5a and the arms 6a are bent into any desired form, such as the circular form shown in Figure 12, so that the sections 9 are placed approximately on opposite sides of the group of wires and the arms 6a are positioned to retain the wires. It is understood that the shape of the binder can be varied from the circular shape shown to receive any group of objects which have a substantially different overall shape. When the arms 6a have been bent into position, the hooks 7a will be positioned in pairs along the length of the group and the two arms extending from each cross-section 9 will form one arm of each adjacent pair of arms. The spaces between the arms can be varied in accordance with the purpose for which the wire binder is to be used. Instead of forming the wire binder from flexible sheet material, it can be formed as a flexible wire frame wherein the wire of the frame will follow the outline of Figure 12.

When the wire binder of this embodiment is applied to a group of wires, the central section 5a and the arms 6a will lie along the length of the group and the legs 10 will extend approximately transversely of the wires while the sections 9 will extend in the direction of the wires. Since the central section 5a and the arms 6a are flexible, the number of wires in the group can be increased by simply springing the arms apart to provide additional space between the arms. If the number of wires in the group is decreased, the arms 6a will come together to reduce the space between the arms. The wire binder can follow all turns in the group of wires because it is completely flexible in all directions. When the wire binder is bent in the longitudinal plane of legs 10 in the manner shown in Figure 7, the cross-sections 9 along the inner and outer radii of the turn will bend and the sections 9 on the inner radius will move closer together while the sections on the outer radius will move farther apart. When the group of wires is turned to one side or the other in the transverse plane of legs 10, as distinguished from the downward bend shown in Figure 7, the legs 10 will twist somewhat to allow the sections 9 on both sides of the wires to move closer together or farther apart, depending on whether the bend is made toward one side or the other. Of course, the wire binder will permit turning in all other directions because of its complete flexibility.

After the group of wires has been inserted in the wire binder, a lacing cord 8 can be laced in a criss-cross manner around the hooks 7a on the arms 6a, as shown in Figures 7 and 8. The cord 8 is passed around the end hooks of the wire binder and is divided into two sections which extend along the group of wires. These sections pass back and forth across the group of wires between the hooks and each section passes around alternate hooks on each side of the wire binder. The lacing cord can be interrupted at any point along the group by simply tying the ends of the cord together and a new cord can complete the lacing. This type of criss-cross lacing can be quickly applied to the wire binder and the pressure exerted on the lacing will determine how tightly the group of wires will be bound together.

Since it is not necessary to pass the cord 8 completely around the group of wires in order to bind them together, it is possible to quickly lace and unlace the wire binder while held in position

6

by the mounting brackets, even though the group of wires is held flush against a supporting member. This device is designed to have the hooks arranged in pairs so that the criss-cross type of lacing is possible even when the wire binder is applied to a turn in a group of wires. The wire binder can be cut to any length to meet the requirements of any installations and several sections of wire binder can be used adjacent to each other. If desired, the cord 8 can be replaced by two sections of wire which are bent, prior to being used with the binder, into shape to pass around the hooks in the same manner as the sections of cord 2. These wire sections can be applied to or removed from the hooks as units and thereby eliminate the lacing and tying operations necessary when a flexible cord is used. Many advantages of this embodiment will be readily apparent including its flexibility in any direction and the ease with which it can be applied to groups of wires of various dimensions.

Various modifications of the invention disclosed herein are contemplated and may obviously be resorted to by those skilled in the art without departing from the spirit and scope of the invention, as hereinafter defined by the appended claims.

What is claimed is:

1. A device for securing together a plurality of wires or other elongated members assembled in a flexible group comprising a continuous flexible member positioned adjacent said group with at least a portion of said member extending in the same direction as said groups, a series of flexible arms extending from opposite sides of said member and partially around said group, said arms being arranged in pairs along said group with the arms of each pair on opposite sides of said member, a hook formed at the end of each arm, and a cord passing in a criss-cross manner around said hooks to retain said group within the confines of said arms and said member, said member being flexible enough to follow the turns of said group.

2. A device for securing together a plurality of wires or other elongated members assembled in a flexible group comprising a continuous flexible member positioned adjacent said group along the length of said group, a number of flexible arms extending from opposite sides of said member and partially around said group, said arms being arranged in pairs along said group with the arms of each pair on opposite sides of said member, a hook formed at the end of each arm, and two sections of cord extending along the length of said group, said sections passing around every other hook on both sides of said member in order to confine said group between said arms and said member.

3. A device for tying together a group of wires or other elongated members comprising a flexible strip of uniform cross-section positioned adjacent to and extending along said group, a number of flexible arms extending from opposite sides of said strip, a hook positioned at the end of each arm, and a cord passing around said hooks to hold said arms against said group, said strip being flexible enough to follow turns in said group by either bending or twisting.

4. A device as defined in claim 3 wherein said cord consists of two sections extending along the length of said device, each section passing around every other hook on both sides of said member.

5. A device as defined in claim 3 wherein said arms are bent to extend partially around said

group and are arranged in pairs along said group with the arms of each pair arranged on opposite sides of said strip.

6. A device for securing together a plurality of wires or other elongated members assembled in a flexible group comprising integral means shaped to define a continuous central member and a number of members extending from opposite sides of said central member, fastening means secured to each of said extending members, and retaining means positioned around said fastening means to confine said group between said central member, said extending members and said retaining means, said retaining means being comprised of two sections which extend along said group and are positioned in a criss-cross manner around said fastening means.

7. In a device for tying together a group of wires or other elongated members, a continuous central section comprising a series of legs spaced from one another, cross-members extending between successive legs at alternate ends of said legs, a pair of arms extending outwardly from each of said cross-members, said arms being arranged in pairs along said group with one arm of each pair on alternate cross-members, a hook secured to each of said arms, and a cord passing around said hooks in order to confine said group

within the space defined by said legs, said cross-members and said cord, said cord consisting of two sections extending along said group with each section passing around only one hook of each pair of arms.

References Cited in the file of this patent

UNITED STATES PATENTS

	Number	Name	Date
10	209,887	Harmon	Nov. 12, 1878
	317,319	Davison	May 5, 1885
	754,884	McFarlane	Mar. 15, 1904
	825,332	Mack	July 11, 1906
15	1,221,006	Wessel	Mar. 27, 1917
	1,246,175	Smith	Nov. 13, 1917
	1,654,340	McIntosh	Dec. 27, 1927
	1,668,953	Erickson	May 8, 1928
	1,944,252	Mansbendel	Jan. 23, 1934
20	1,967,134	Short	July 17, 1934
	1,969,351	Caswell	Aug. 7, 1934

FOREIGN PATENTS

	Number	Country	Date
	90,268	Sweden	Sept. 21, 1937
25	508,806	Germany	Oct. 2, 1930
	731,350	Germany	Feb. 8, 1943
	584,721	Great Britain	Jan. 21, 1947