March 27, 1956 J. H. BIEG 2,739,558

FIXTURE FOR USE IN SOLDERING FUSE WIRES TO FUSE SPRINGS

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FIG. 2

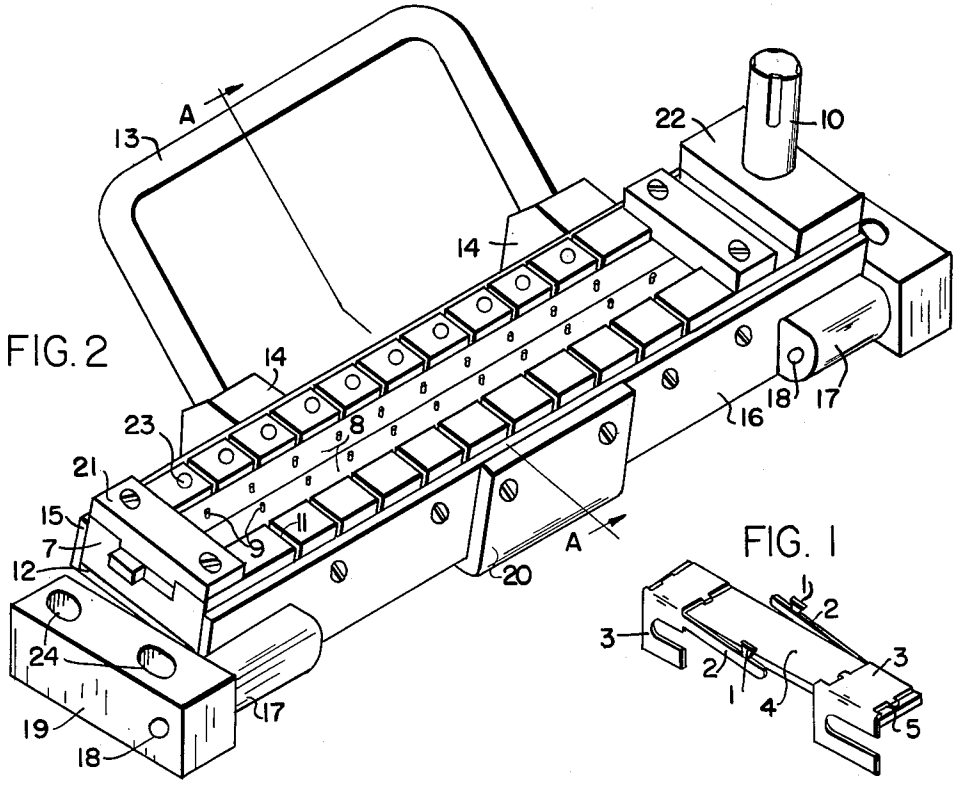


FIG. 1

FIG. 3

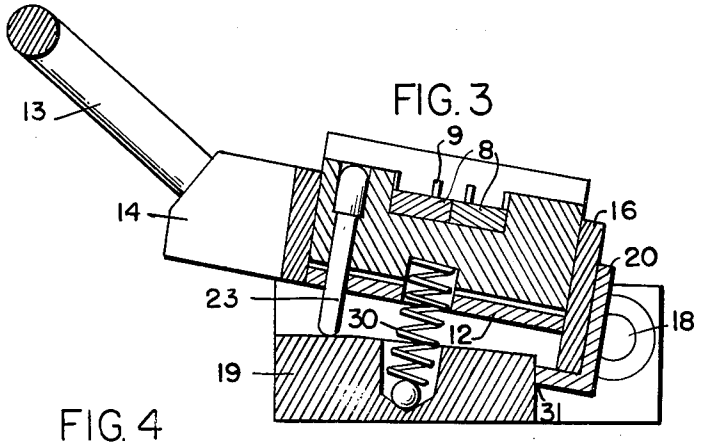
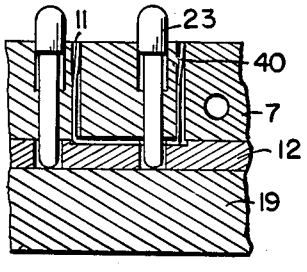


FIG. 4



INVENTOR.
JOHN H. BIEG
BY Wm. Walter Dewey
ATTY.

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FIG.5

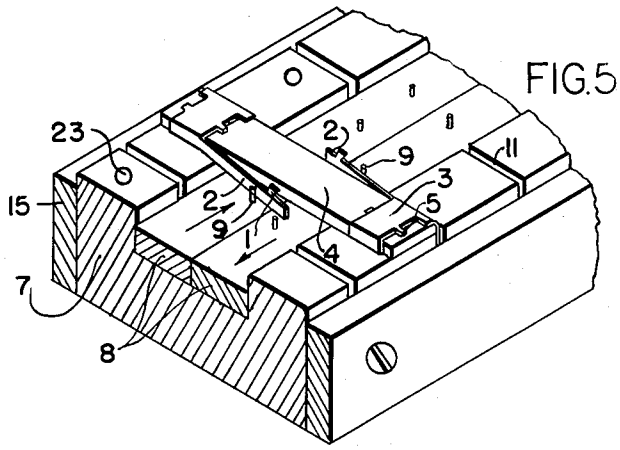


FIG.6

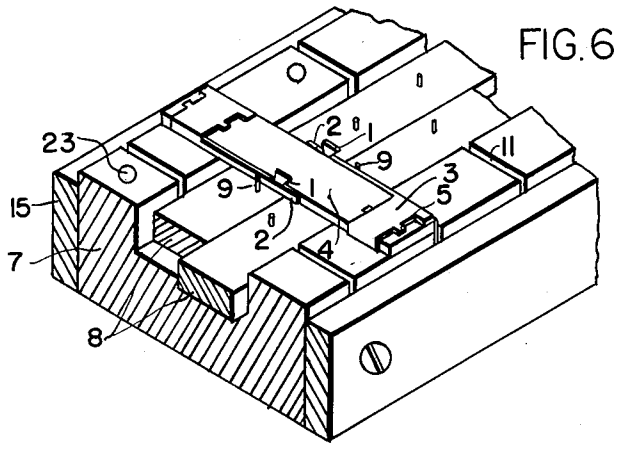
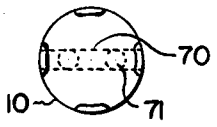


FIG.7



INVENTOR.
JOHN H. BIEG
BY Mc Watters Owen
ATTY.

United States Patent Office 2,739,558 Patented Mar. 27, 1956

2,739,558

FIXTURE FOR USE IN SOLDERING FUSE WIRES TO FUSE SPRINGS

John H. Bieg, Chicago, Ill., assignor to Automatic Electric Laboratories, Inc., Chicago, Ill., a corporation of Delaware

Application March 15, 1952, Serial No. 276,861

3 Claims. (Cl. 113—99)

This invention relates to a fixture which is used to hold fuse spring assemblies in the last stage of manufacture preparatory to soldering of fuse wire on each assembly.

It is the object of this invention to hold a number of fuse spring assemblies in such prepared position as to permit rapid stringing of fuse wire and its subsequent soldering to the assembly.

Such fuse springs are used in large quantities on power panels of various equipment used in telephone art. Their purpose is to protect the equipment from damages that may be sustained because of abnormal flow of electric current within circuits. Another purpose, in case such a fuse opens up because of abnormal flow of current, is to signal the proper personnel on an associated circuit and inform it of the malfunctioning of the apparatus and of the open circuit in which the fuse spring is serially connected. A blown fuse spring is easily detected by visual inspection by the fact that its spring fingers assume an outspread position.

The main feature of the invention lies in the method of stringing fuse wire across a series of fuse wire assemblies in a single operation and then soldering the fuse wire to each assembly.

Another feature is the use of retaining springs to hold securely the assemblies during the above operations, each of the retaining springs serving to hold the ends of two adjacent assemblies.

Other objects and features will be apparent from the following description taken in connection with the accompanying drawings.

Fig. 1 represents one type of a fuse spring assembly ready for fuse wire stringing and soldering.

Fig. 2 illustrates perspectively the fixture and its components.

Fig. 3 is a cross-section of the fixture taken along the line "A—A" as shown in Fig. 2.

Fig. 4 is a cut-away view across two ejector pins to show their construction and also the position of the retaining spring.

Fig. 5 is a perspective view of the fixture and a fuse spring assembly prior to actuation of the fixture.

Fig. 6 is a perspective view of the fixture and fuse spring assembly after the actuation of the fixture and the completion of stringing of fuse wire.

Fig. 7 is a view of the rotary lever looking from the top showing the slot in its bottom which engages with dowel pins mounted on the slider bars.

Fig. 1 represents a perspective view of a fuse spring assembly just before being placed in the fixture preparatory to soldering fuse wire stretched across the width of the assembly and wrapped around the two ears **1**. The ears **1** are situated toward the ends of the contact fingers **2** which are integral to the fuse springs **3**. The fuse springs **3** are made of Phosphor bronze or other similar material. Each fuse spring is attached to the insulator strip **4** by means of lugs **5** which extend through the holes in the strip and are firmly turned into the strip on the opposite side. Insulation strip **4** is made of suitable fiber

impregnated in proper agents to withstand moisture penetration which is responsible for electrical breakdowns.

The fixture is completely shown in Figure 2. The fixture consists of a channel base **7** resembling a U shaped form except that its vertical arms which form the walls of the channel are very short. Two long rectangular slider bars **8** are located within the channel of the channel base. The slider bars have sufficient clearance between themselves and the channel base to permit relatively free movement between themselves and the channel base. Each slider bar **8** has a series of pins **9** located along its entire length in a straight line. At the far right hand end of each slider strip, there is located a dowel pin (not visible) which is secured in the same manner as the pins **9**. These dowel pins **71** protrude into a slot **70** located in the bottom of the rotary lever **10** as shown in Figure 7. The slider bars **8** can be made to move relative to each other in opposite directions by rotating slightly the rotary lever **10** to which a handle may be affixed for ease of operation. As seen in Figure 2, the rotary lever **10** has grooves axially disposed on the peripheral surface of the cylinder comprising the lever proper, so that a handle, terminating in a proper fitting, may be engaged with the rotary lever for operating purposes.

The vertical walls of the U-shaped channel base **7** possess a series of vertical cuts which extend to the very bottom of the channel base. These cuts form the slots **11** which house within themselves flat retaining springs **40** as shown in Figure 4. The flat retaining spring **40** is U-shaped and is substantially as wide as the wall of the channel base. There is a hole in the bottom of the spring for the purpose of allowing the ejector pin **23** to rest on the base plate **19**. The function of the retaining spring is to hold securely the fuse spring assembly after its insertion into the slots. As seen in this view, each retaining spring serves two slots. Also shown in this view, the top surface of the bottom plate **12** is undercut so that the horizontal portion of the U-shaped retaining spring will seat itself therein. This bottom plate **12** extends under the entire bottom of the channel base **7** thus supporting all the retaining springs **40**.

The movable part of the fixture has a handle **13**, Figure 2, set in mounting blocks **14** which are securely fastened to the back plate **15**. The front plate **16** has integral to it, two bearings **17**, through which pass shafts **18** which are used as pivot shafts around which the movable part of the fixture operates. The shafts are driven into base plate **19** so that they are securely held to prevent axial and rotational displacements during pivoting operation.

The stationary part of the fixture consists of base plate **19** which has a pair of holes **24** at each end for the purpose of fastening the fixture to a work bench.

Fastened approximately midway to the front plate **16** is a stop plate **20**, as shown in Figure 2. The function of the stop plate is to limit the amount of the upward pivot induced by spring **30** as shown in the cross-sectional view of the fixture in Figure 3. In this view, the stop plate **20** limits the upward movement of the movable part of the fixture by obtruding on the base plate **19** at the point of contact **31**.

The slider bars **8**, Figure 2, are slidably mounted within the channel of the channel base **7** and are kept therein by means of the cross-plates **21**. Anchor plate **22** serves as a mounting plate for the rotary lever **10** restricting the latter only to rotary movements. The afore-mentioned components may be easily detached preparatory to removal of the slider bars for cleaning purposes.

Figure 2 shows the location of a series of ejector pins **23** which are used for up-lifting one end of each fuse spring assembly after all operations have been completed. In Figure 4 it is evident that the holes for housing these

ejector pins are drilled through both the channel base 7 and the bottom plate 12 so that the lower end of the inserted ejector pin 23 is forced against the top of the base plate 19 whenever the handle is depressed. Another view of the construction and operation of the pin may be had by reference to Figure 3 where a cross-section view of the fixture reveals the position of the ejector pin 23 in a non-operative position. Pressing downward on the handle 13 causes the movable part of the fixture to pivot around shafts 18 and compress the springs 30 whereby the capped heads of the ejector pins 23 are made to emerge through the top.

The entire fixture is made from corrosion resistant metal to offset deterioration of equipment due to deleterious substances found in soldering fluxes.

Method of operation

The operator grasps the fuse spring assembly midway along its length compressing the spring fingers against the insulator strip and inserts the fuse springs 3 into the slots 11 oppositely situated. The assembly is forced into the slots to overcome the resistance of the retaining springs 40 located therein. This is clearly shown in Figure 5. Similarly, other assemblies are placed in the fixture until all slots are occupied. Then the operator rotates the rotary lever 10 by means of a handle (not shown) causing the slider bars 8 to move in opposite directions with respect to each other thus effectively forming the pins 9 against the spring fingers 2 until the spring fingers are alongside of their respective insulator strips as shown in Figure 6. Motion of the slider bars is indicated by arrows in Figure 5.

The next operation entails the stringing of fuse wire across the assemblies. A special tool is used for this purpose. It resembles a lead pencil having the fuse wire pass through its center. The wire is wrapped around each ear located on its individual spring finger. The whole series of assemblies are wired together without cutting the fuse wire. Next, the flux is applied to each ear and then the wire is soldered to it. One assembly thus wired and soldered is shown in Figure 6. After the soldering operation is completed, the operator snips off the excess wire located outside of each assembly thus effectively severing the previously inter-connected assemblies. Then the operator pushes downward on the handle 13, Figure 3, causing the ejector pins 23, as previously described, to force out one end of each assembly thus enabling the operator to flip out the assemblies without resorting to forceful picking.

While there has been described what is at present considered to be the preferred embodiment of the invention it will be understood that various modifications may be made therein without departing from the invention.

Having described the invention, what is considered new and is desired to be protected by Letters Patent is set forth in the following claims.

I claim:

1. A fixture for holding a plurality of fuse spring assemblies, each assembly possessing outspread spring members across which a fuse wire is to be strung, said fixture comprising a channel base including uniformly spaced vertical side walls forming a channel and having a series of uniformly spaced slots which are in registry across the channel and pass through the width of said walls, a plurality of spring members, said spring members contained within said slots, a pair of flat slider bars lying longitudinally parallel adjacent to each other, slidably fitted and substantially filling said channel, with the bottom of each bar resting on the surface of the channel, a plurality of uniformly spaced pins secured to the top surfaces of said bars, the spacing of the pins being substantially equal to that of the slots in the side walls, means for confining said slider bars within said channel, a rotary lever slotted at the base along its diameter, a projection near one end of each slider bar, said projection operatively engaging said slot on opposite sides of the pivot point of said rotary lever, rotation of said rotary lever causing said slot and projections to cooperate to move the slider bars longitudinally and simultaneously in opposite directions after a plurality of fuse spring assemblies have been inserted in the fixture, said movement of said slider bars causing the pins upon said slider bars to press the outspread spring members toward each other thus preparing the assemblies for fuse wire stringing.

2. A fixture for holding a plurality of fuse spring assemblies, each assembly possessing outspread spring members across which a fuse wire is to be strung, said fixture comprising a base-plate to which is pivotally mounted a channel base with a handle attached thereto, said channel base including uniformly spaced vertical side walls forming a channel and having a series of uniformly spaced vertical slots which are in registry across the channel, passing through the width of said walls, a plurality of spring members, each of said spring members contained within each pair of said slots, a series of capped ejector pins, said ejector pins exceeding in length the depth of the channel base and slidably fitted in a series of uniformly spaced round holes, said holes adjacent to said slots in one of said vertical walls, said holes projecting through the wall and channel base, said holes counterbored from the top for a depth sufficient to permit the capped ends of the ejector pins to fall into the holes with their capped ends below the top surface of said wall and the other end projecting below said channel base, a pair of flat slider bars slidably fitted in parallel relationship within the channel with the bottom of each bar resting on the bottom surface of the channel, each bar including a plurality of uniformly spaced pins, the spacing of the pins substantially equal to that of the slots in the side walls, said slider bars lying longitudinally adjacent to each other within said channel and substantially filling said channel in said channel base, means for confining said slider bars within said channel consisting of bars bridging the channel and in slidable contact with the top surface of the slider bars, engaging means, said engaging means attached at one end of each slider bar, a rotatable shaft cam slotted at its base, said engaging means slidably fitted in said slot, rotation of said shaft cam causing said engaging means to move the slider bars longitudinally and simultaneously in opposite directions after a plurality of fuse spring assemblies have been inserted in the fixture, said movement of said slider bars causing the pins upon said slider bars to press the outspread spring members toward each other thus preparing the assemblies for fuse wire stringing, downward pressure on said handle, after the requisite operations on the fuse spring assemblies have been completed, depressing said channel base to cause said ejector pins to lift one end of said assemblies out of the fixture thus facilitating their removal.

3. A fixture for holding a series of fuses in position for applying a fusible link thereto, in which the fuses have a pair of mounting projections and a spring on either side thereof normally tensioned to spring apart and to which springs the fusible link is to be attached, said fixture comprising a pair of parallel rails each having a plurality of transverse slots equally spaced along the rail, the slots of each rail in register with the slots of the other rail, each slot having means for holding one of the projections of a fuse in place therein when a fuse is mounted on the fixture with its projections in opposite slots thereof, a pair of rods mounted in parallel relation between said rails, means for holding each rod against any sidewise or rotary motion while permitting endwise movement thereof, a series of pins extending upward from each rod and spaced apart thereon the same distance as the slots, one pin on one rod and the corresponding pin on the other rod normally standing outside of the spreading springs of one fuse, and means comprising a rotatable shaft for moving said rods simultaneously in opposite directions to cause the pins associated with

each fuse in the fixture to move the springs of that fuse together so that the fuse wire may be attached thereto while held in that position, said shaft having a pivot point and means on either side of the pivot point for engaging a projection on both of said rods to cause said simultaneous movement of the rods in opposite directions when the shaft is turned.

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