Dec. 23, 1958 G. R. MACHIAN 2,865,089

ARTICLE ASSEMBLING APPARATUS

Filed Jan. 31, 1955 3 Sheets-Sheet 1

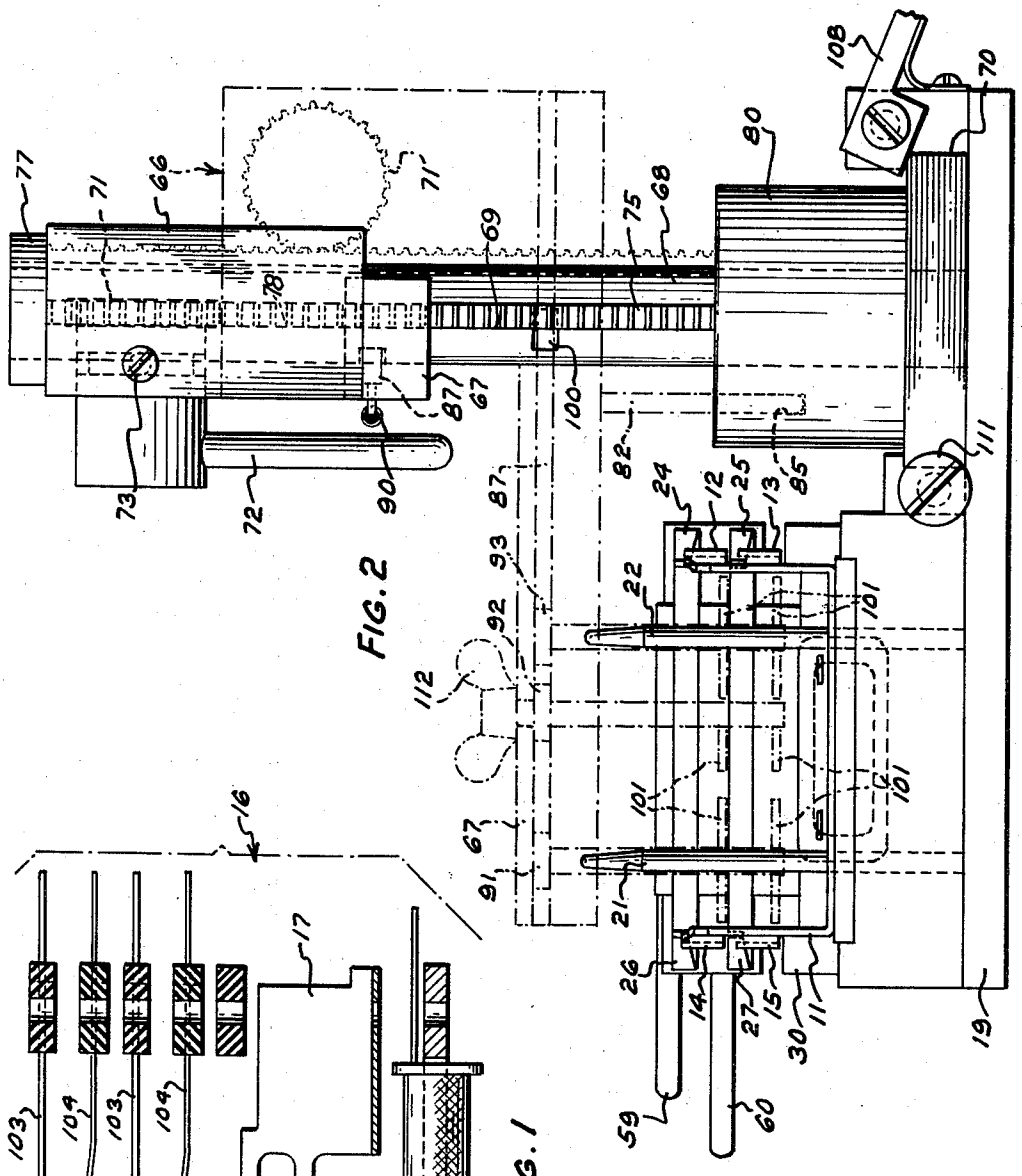


FIG. 2

FIG. 1

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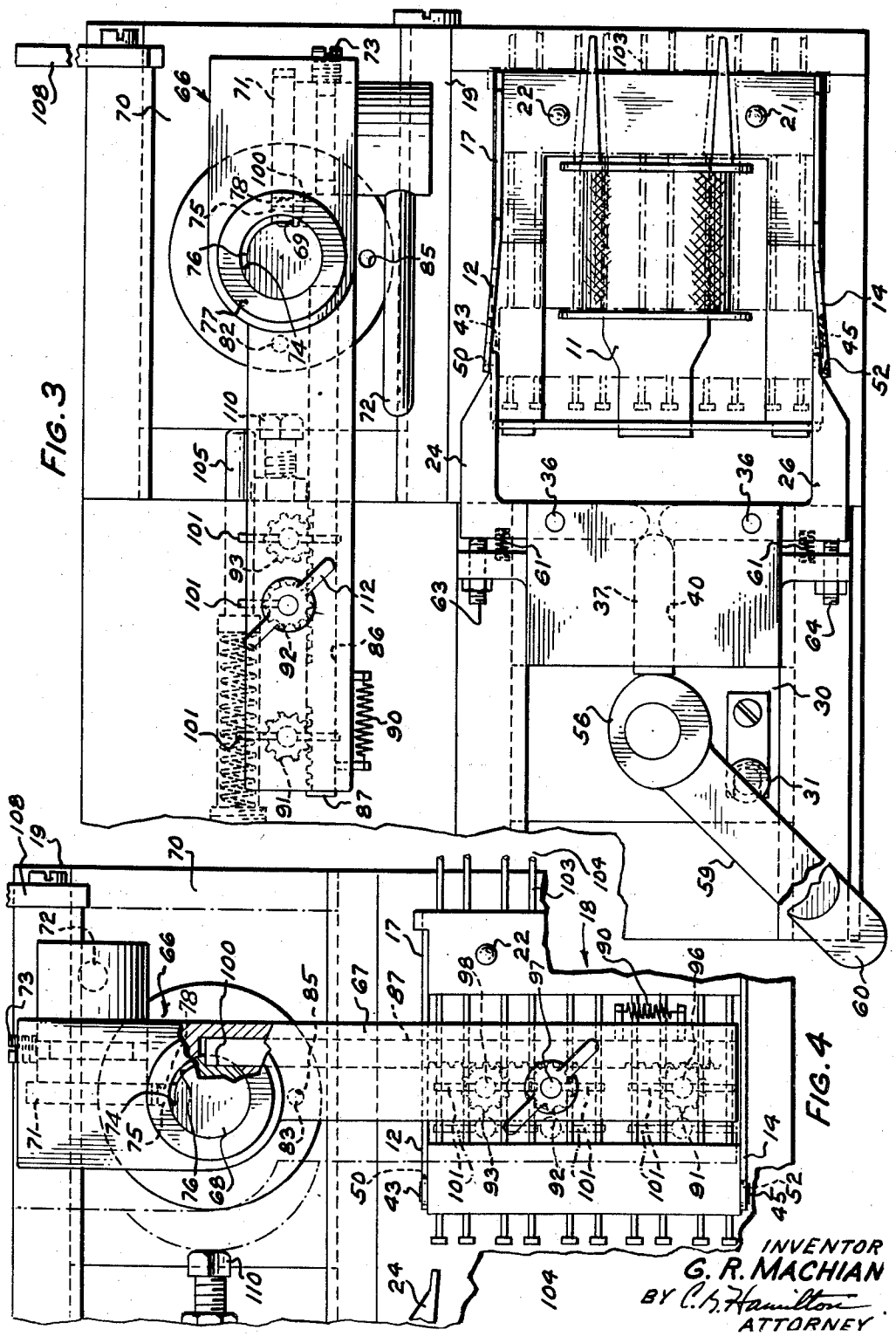


FIG. 3

FIG. 4

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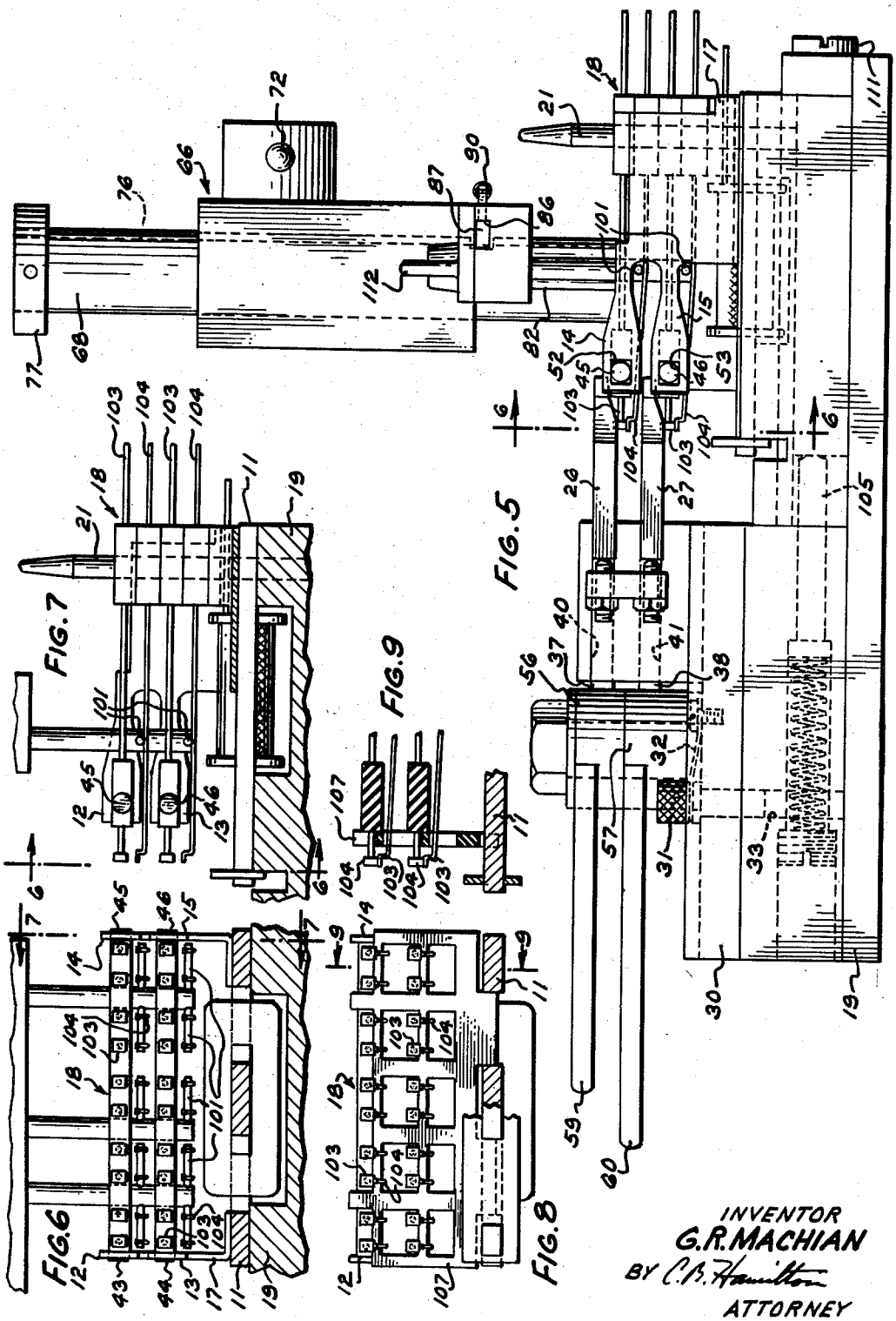


FIG. 5

FIG. 7

FIG. 9

FIG. 6

FIG. 8

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2,865,089

ARTICLE ASSEMBLING APPARATUS

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3 Claims. (Cl. 29—203)

This invention relates to article assembling apparatus and more particularly to devices for assembling wire spring relays.

An object of this invention is to provide a device for rapidly assembling wire spring relays.

Another object of this invention is to provide a device for holding and manipulating a wire spring relay bracket to permit an operator to easily insert a pileup of wire combs therein.

A further object of this invention is to provide a device for deflecting a plurality of wire springs of a pileup of wire combs to permit an operator to insert an actuating card therein.

A device illustrating a preferred embodiment of the present invention may include a base for supporting a wire spring relay bracket for receiving a pileup of wire combs, a plurality of levers slidably supported on the base for engaging and spreading a plurality of resilient fingers at one end of the bracket to permit insertion of the wire comb pileup whereupon the resilient fingers are released to grip the pileup, and means for deflecting a plurality of wire springs of the wire comb pileup to provide clearance for insertion of an actuating card therein.

Other objects and advantages of the invention will become apparent by reference to the following detailed description thereof and the accompanying drawings illustrating a preferred embodiment of the invention, in which—

Fig. 1 is an exploded view of a wire spring relay assembly showing the components thereof partly in vertical section;

Fig. 2 is an end elevation of the device for assembling wire spring relays, the parts of which are shown in Fig. 1;

Fig. 3 is a plan view of the device showing the resilient fingers of the wire spring relay bracket spread to permit insertion of a pileup of wire combs;

Fig. 4 is a fragmentary plan view of that portion of the device used in spreading the wire springs to insert the actuating card;

Fig. 5 is a front elevation of the device;

Fig. 6 is an end elevation of a portion of the device showing the wire springs of the wire comb pileup separated from the contact wires to permit insertion of the actuating card;

Fig. 7 is a front view of the disclosure of Fig. 6;

Fig. 8 is an end view of a wire spring relay assembly after an actuating card has been inserted therein; and

Fig. 9 is a portion of a section taken along line 9—9 of Fig. 8.

Referring now in detail to the drawings a core assembly 11 of a wire spring relay 16 such as the present device is adapted to assemble is shown held on a base 19 by alignment pins 21 and 22 which project upward from the base 19. A wire spring relay bracket 17 for holding a pileup of wire combs 18 is positioned on the core assembly 11 in alignment with a plurality of L-shaped levers 24, 25, 26 and 27 supported above the base 19 by a carriage 30. The carriage 30 is slidably supported on the

base 19 to permit an operator to manually move the ends of the levers 24, 25, 26 and 27 into and out of juxtaposition with the ends of the fingers 12, 13, 14 and 15 of the bracket 17. A latch 31 carried by the carriage 30 is urged by a spring 32 into an aperture 33 in the base 19 to retain the carriage 30 in a position to hold the levers 24—27 in engagement with the fingers 12—15 of the bracket 17.

The levers 24—27 are pivotally mounted on the carriage 30 by pivots 36 (Fig. 3) whereby one end of each lever will engage a corresponding finger of the bracket 17 when the carriage 30 is moved into work position and the levers are rotated about the pivots 36. Pins 37 and 38 are positioned in bores 40 and 41 in the carriage 30 to actuate the levers 24—27 to deflect the fingers 12—15 outward to permit the operator to manually insert a pileup of wire combs 18 therein, lugs 43, 44, 45 and 46 of the pileup of wire combs 18 entering apertures 50, 51, 52 and 53 in the fingers 12, 13, 14 and 15 respectively to hold the pileup of wire combs 18 in the bracket 17 when the fingers 12—15 are released. The pins 37 and 38 are actuated by cams 56 and 57 secured to handles 59 and 60 and are pivotally mounted on the carriage 30, one end of each pin being in abutment with a cam and the other end being in engagement with the closely positioned ends of two of the levers 24—27 as seen in Fig. 3.

Compression springs 61 are positioned between the levers 24—27 and the carriage 30 to urge the free ends of the levers 24—27 together (Fig. 3). Set screws 63 and 64 are secured to the carriage 30 to abut with the levers 24—27 to adjust the amount these levers may be moved to open the fingers 12—15 of the bracket 17.

A frame 66 having a horizontal arm 67 is slidably mounted on a vertical post 68 secured to a plate 70 which is slidably mounted on the base 19. A gear 71 held in the frame 66 by a screw 73 and rotated by a handle 72 engages a rack 75 positioned partially in a longitudinal slot 76 in the post 68 and partially in a slot 78 in the frame 66. The rack 75 is held in the slot 76 between the post 68 and the gear 71, the slot 76 being of sufficient width to allow the frame 66 and the rack 75 to pivot about the post 68 through an angle of approximately 90°. Movement of the rack 75 in the slot 76 is limited by walls 69 and 74 of the slot 76 (Figs. 2, 3 and 4), which walls 69 and 74 engage the rack 75 to stop its movement. A ring 77 at the upper end of the post 68 and a raised integral portion 80 of the plate 70 at the lower end of the post 68 prevent axial movement of the rack 75 relative to the post 68 as the gear 71 is rotated by the handle 72 to raise or lower the frame 66 on the post 68. A pin 82 depends from the frame 66 and engages and rests upon the top surface of the raised portion 80 of the plate 70 to support the frame 66 above the plate 70. A recess 85 in the raised portion 80 is adapted to receive the pin 82 to permit the operator to lower the frame 66 on the post 68 when the frame is pivoted about the post to a predetermined position where the pin 82 will enter the recess 85. Downward movement of the frame 66 is limited by abutment of the end of the pin 82 with the lower end of the recess 85.

The horizontal arm 67 of the frame 66 has a longitudinal aperture 86 for slidably supporting a second rack 87, one end thereof being urged into abutment with the post 68 by a spring 90 (Fig. 3). Gears 91, 92 and 93 in engagement with the second rack 87 are secured to depending rods 96, 97 and 98 to rotate them when the second rack 87 is moved in the arm 67, the spring 90 urging one end of the second rack 87 into a notch 100 in the post 68 when the frame 66 is lowered by the handle 72 to a predetermined position. As the frame 66 is lowered with the arm 67 above the bracket 17 into which has been manually inserted a wire comb pileup 18,

a plurality of parallel horizontal pins **101** secured to the depending rods **96**, **97** and **98** are carried by the rods downward into the pileup of wire combs **18**, the horizontal pins **101** being parallel to contact wires **103** and wire springs **104** of the pileup of wire combs **18**. When the frame **66** is lowered to a predetermined position the end of the second rack **87** reaches the notch **100** in the post **68** and is moved into the notch **100** by the spring **90** thereby rotating the gears **91**, **92** and **93** counter-clockwise through 90° to position the horizontal pins **101** perpendicularly between the contact wires **103** and the wire springs **104**.

Movement of the plate **70** and the frame **66** to the left (Figs. 4, 6, 7, 8 and 9) against a spring loaded plunger **105** causes the horizontal pins **101** to move into engagement with wire springs **104** and force them downward from the contact wires **103** to provide an opening between the ends of the wire springs **104** and the contact wires **103** (Fig. 7) to permit insertion of an actuating card **107** therein, a latch **108** operating to hold the plate **70** in this position.

An adjustable stop **110** secured to the base **19** (Fig. 3) of the device is provided to adjust the distance the frame **66** may be moved to open the contact wires **103** and the wire springs **104**, and a fixed stop **111** (Fig. 2) is provided to retain the plate **70** on the base **19**, the spring loaded plunger **105** urging the plate **70** against the fixed stop **111**.

A wing nut **112** is secured to the upper end of the rod **97** for rotating the gear **92** to remove the end of the second rack **87** from the notch **100** in the post **68** and to position the horizontal pins **101** parallel to the contact wires **103** and the wire springs **104** of the pileup of wire combs **18** so that the operator may turn the handle **72** to raise the frame **66** after the card **107** has been inserted in the pileup of wire combs **18**.

In operating the device to assemble the various parts of a wire spring relay, a bracket **17** is placed on a core assembly **11** positioned on the base **19** of the device and held in position by alignment pins **21** and **22** projecting upward from the base **19** while the carriage **30** is manually moved to the right (Fig. 3) until the L-shaped levers **24**, **25**, **26** and **27** are positioned to engage the fingers **12**, **13**, **14** and **15** of the bracket **17**, the latch **31** entering the aperture **33** in the base **19** to lock the carriage **30** in this position. The handles **59** and **60** are then pivoted counter-clockwise to cam the pins **37** and **38** to the right against the closely positioned ends of the levers **24—27**. Movement of the pins **37** and **38** against the ends of the levers **24—27** rotates the levers about the pivots **36**, the free ends of the levers spreading the stiffly resilient fingers **12**, **13**, **14** and **15** of the bracket **17** to permit the operator to manually insert a pileup of wire combs **18** therein. The handles **59** and **60** are then pivoted clockwise to allow the compression springs **61** to move the free ends of the levers together, permitting the lugs **43**, **44**, **45** and **46** on the pileup of wire combs **18** to enter the apertures **50**, **51**, **52** and **53** in the closing fingers **12**, **13**, **14** and **15** to lock the pileup of wire combs **18** in the bracket **17**, and the latch **31** is raised to permit manual movement of the carriage **30** to the left to clear the bracket **17**.

To separate the ends of the contact wires **103** and the wire springs **104** for insertion of the actuating card **107**, the arm **67** is pivoted counter-clockwise about the post **68** until the depending pin **82** enters the recess **85** in the raised portion **80** of the plate **70** and the frame **66** is lowered until the pin **82** abuts with the bottom of the recess **85**. The horizontal pins **101** are rotated into position perpendicularly between the contact wires **103** and the wire springs **104** by movement of the second rack **87** as it is moved into the notch **100** in the post **68** by the spring **90** (Fig. 4). The pins **101** are now positioned to separate the wire springs **104** from the contact wires **103**. The operator then moves the plate **70** and the frame **66** to the left to move the horizontal pins **101** to separate the wire springs **104** from the contact wires **103** (Fig. 7), the latch **108** operating to prevent backward movement of the plate **70** after the ends of the wire springs **104** have been separated from the ends of the contact wires **103**. An actuating card **107** is then inserted into the core assembly **18** (Figs. 8 and 9) and the latch **108** is released to allow the spring loaded plunger **105** to move the plate **70** and the frame **66** to the right into abutment with the stop **111**. The operator then rotates the wing nut **112** clockwise through an angle of 90° to remove the end of the second rack **87** from the notch **100** in the post **68** and to position the horizontal pins **101** parallel to the contact wires **103** and the wire springs **104** so that the frame **66** can be raised by rotation of the handle **72**. The frame **66** is raised and pivoted clockwise 90° about the post **68** and the assembled relay is removed from its position on the base **19** of the device. The above operations are then repeated to assemble another wire spring relay.

It is to be understood that the above-described arrangements of structures are simply illustrative of the application of the principles of this 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. A device for assembling wire spring relay brackets and wire combs having wire springs actuated by an apertured card, comprising a base for supporting the bracket, a carriage slidably mounted on the base, a plurality of levers pivotally mounted on the carriage for engaging a plurality of resilient fingers of the bracket to spread them to permit the insertion of a pileup of wire combs therein, a plurality of pins positioned in apertures in the carriage for actuating the levers to open the fingers of the bracket, a plurality of cams pivotally mounted on the carriage for moving the pins to actuate the levers, a plurality of handles secured to the cams for moving them, a frame mounted on the base, and means depending from the frame for engaging the wire springs of the wire combs to deflect them to permit the insertion of an actuating card into the pileup of wire combs.

2. A device for assembling articles having a plurality of parallel resilient elements engaging a plurality of parallel fixed elements, comprising a base for supporting the article, a movable frame mounted on the base, a plurality of rods depending from the frame, and a plurality of pins secured to the rods for engaging the resilient elements to deflect them whereby a member can be inserted between said resilient elements and said fixed elements, said rods being rotatable on the frame whereby after the movable frame carries the pins into position between the resilient elements and the fixed elements the rods can be pivoted to move the pins into position to engage the resilient elements upon further movement of the frame.

3. A device for assembling wire spring relays, comprising a base for supporting a wire spring relay bracket having a plurality of opposed resilient fingers, a carriage slidably mounted on the base, a plurality of levers pivotally connected to the carriage for engaging and spreading the fingers of the wire spring relay bracket to permit the insertion of a plurality of wire spring relay combs each having a plurality of spaced parallel wires, means on the carriage for actuating the levers, a plate slidably mounted on the base, a frame movably supported by the plate, a plurality of rotatable rods depending from the frame, a plurality of pins secured to the rods for engaging and deflecting the wires of the combs, means interconnecting the rods for rotating them simultaneously, and a latch on the base for holding the plate in position to hold the rods in engagement with the wires.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

1,290,399	Stevens	Jan. 7, 1919
1,601,549	Wurtenberg	Sept. 28, 1926
2,198,966	Herman	Apr. 30, 1940
2,289,849	Mallard	July 14, 1942
2,355,522	Garbe	Aug. 8, 1944
2,457,766	Young	Dec. 28, 1948
2,682,703	Schob	July 6, 1954