

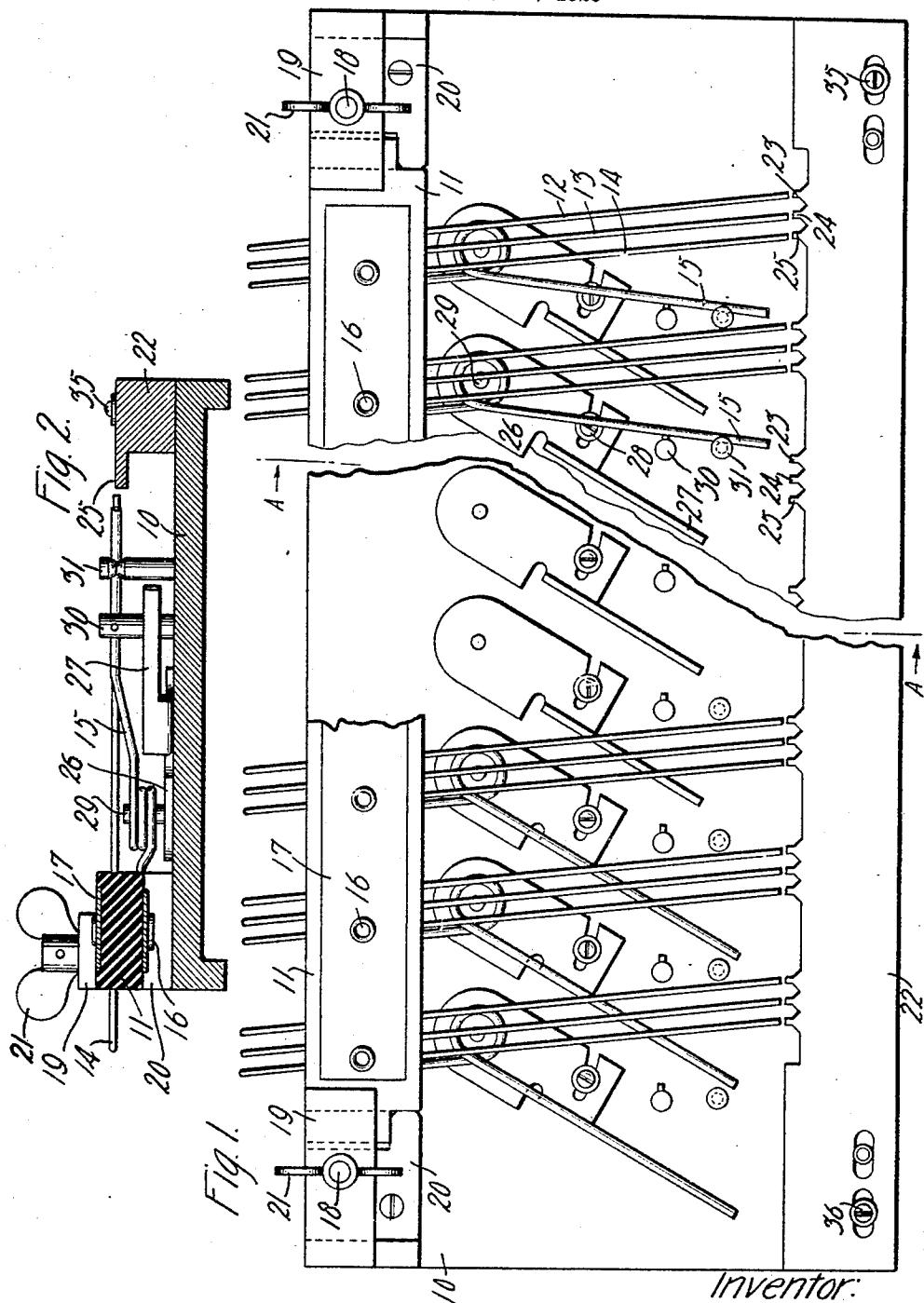
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O. F. FORSBERG

MEANS FOR ADJUSTING COORDINATE SWITCH PARTS

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## UNITED STATES PATENT OFFICE.

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## MEANS FOR ADJUSTING COORDINATE SWITCH PARTS.

Application filed January 19, 1923. Serial No. 613,570.

To all whom it may concern:

Be it known that I, OSCAR F. FORSBERG, a citizen of the United States, residing at Yonkers, in the county of Westchester, State of New York, have invented certain new and useful Improvements in Means for Adjusting Coordinate Switch Parts, of which the following is a full, clear, concise, and exact description.

10 This invention relates to means for positioning and tensioning the active contacts and operating spring members of a coordinate switch.

Switches of the coordinate type, as disclosed in Patent No. 1,524,344 granted to Henry F. Dobbin, on January 27, 1925, are characterized by the provision of operating cards which are employed for moving sets of active contacts into engagement with sets 20 of passive contacts, each operating card being supported on a flexible spring member and arranged to be moved in a suitable guide upon the conjoint operation of coordinately disposed actuating bars. The actuating bars 25 are respectively provided with camming surfaces and extending pivotal finger members, the latter being adapted to slide along the camming surfaces and engage the flexible spring members to move them vertically, thereby causing a similar movement of their 30 respective operating cards and a consequent wiping engagement between associated sets of active and passive contacts.

The particular construction of a switch 35 of this character and the necessary cooperation of the various elements require that the active contacts and the flexible finger members be properly tensioned and relatively disposed before a unit comprising a plurality of sets of active contacts and their associated flexible finger members be placed on the switch structure. Such a procedure results in the accurate cooperation of associated elements and a proper functioning 45 of the switch in general.

It is an object of this invention to accurately tension and relatively dispose a plurality of such flexible spring members prior to their assembly on the switch structure.

In accordance with the foregoing object, this invention provides a jig having means for securely accommodating a plurality of active contact sets and their associated flexible spring members, and a plurality of projecting elements serving as reference points by means of which the relative positions of the contacts and spring members are determined and their respective tensions obtained.

The invention will be readily understood from the following description made with reference to the accompanying drawing, in which Figure 1 shows the jig in detail with a coordinate switch unit comprising a plurality of sets of active contacts and their associated flexible finger members mounted thereon. Fig. 2 is a cross sectional view taken along the line A—A of Fig. 1.

The jig consists of a base or supporting 70 element 10 which is provided with clamping means for rigidly securing a coordinate switch unit thereon, which unit comprises an insulating mounting element 11 which has molded therein a plurality of sets of 75 spring wire contacts or conductors 12, 13 and 14, and an extending flexible member 15. The flexible member 15 is secured within the support 11 by means of an eyelet or rivet 16. The rivets 16 also secure a 80 clamping or bracing element 17 to the insulating support 11.

On each corner of one side of the base 10, projecting pieces 20 are located which are adapted to properly position the switch unit on the jig. A clamping plate 19 is loosely mounted on the bolt 18 and extends over the side of the member 20 in such a manner that when the winged nut 21 is made fast, the projecting end of the plate 85 19 holds the mounting element 11 firmly on the base 10. On the other side of the base 10 is a longitudinally movable strip 22 which may be adjusted to various positions on the base. The strip 22 is provided with 90 a series of projections such as 23, 24 and 25 which act as reference points for the active contacts or wire conductors 12, 13 and 14. Pivotally mounted on the support 10 is an irregular shaped member 26 which 95 100

has a lip or elongated projection 27 serving as a reference line for the spring member 15. In accordance with the tension of the spring member 15 desired, the member 26 5 may be adjusted to any angular position on the base 10 by manipulating the screw 28 and swinging the member 26 about the pivot 29.

The projecting studs 30 and 31 correspond 10 to certain reference points on the switch structure not shown, and their utility will be apparent from the following description of the application of the jig to a coordinate switch unit.

15 When a switch unit is received from the shop or manufacturer, the wire contacts such as 12, 13 and 14 and the spring members 15 have been molded within the mounting element 11 and the bracing plate 17 secured 20 thereto by rivets 16, but the relative positions of these various elements have not been accurately determined. In order to place the unit in condition to be assembled 25 on the switch structure, the supporting strip 11 is placed in position on the jig between projections 20-20 and is secured to the base 10 by means of the clamping plates 19 and the winged nuts 21. The reference strip 22 is then moved to a predetermined 30 position which will locate the reference points 23, 24 and 25 in positions which will accurately determine the tension which is required by the contacts 12, 13 and 14. The strip 22 is then made fast to base 10 by 35 means of the screws 35 and 36. The contacts 12, 13 and 14 are then flexed so that their ends when free will coincide with the reference points 23, 24 and 25. In this manner the tension and positions of the contacts are 40 determined so that when assembled on the switch structure they will accurately cooperate with other operating elements and function efficiently.

45 The reference member 26 is then moved about the pivot 29 to a predetermined position which determines the angle at which the spring member 15 must be bent in order to subsequently assume the position in 50 which it will possess the proper degree of tension. The spring member 15 is then bent or flexed so that it freely assumes a position immediately over the reference line or guide 27. The spring is then lifted manually over the studs 30 and 31 and allowed to rest 55 against them. The stud 31 corresponds to a point on the switch structure on which the spring member 15 rests when in its unoperated position, whereas the stud 30 corresponds to the point whereat the spring member 15 engages an operating lever (as 60 will be seen in the above mentioned Patent 1,524,344 granted to Henry F. Dobbin) to move it with its associated set of active contacts such as 12, 13 and 14. If, after having

been aligned with the lip 27 and subsequently moved to the studs 30 and 31, the spring 15 rests against the stud 31 and at the same time makes contact with the stud 30, it will be conclusive that the spring 15 has been properly positioned and tensioned so that the 70 card operated by spring 15 and which operates the contacts 12, 13, 14, will not only have the proper tension on it, but will also assume its proper normal position. If the spring member 15 rests against the stud 31 75 and fails to make contact with the stud 30 it is necessary to shape the spring manually until it aligns itself with both studs 30 and 31 as shown in connection with the two upper sets of contacts in Fig. 1.

80 After the switch unit is adjusted it is assembled in a switch frame (as disclosed in Dobbin, *supra*) having cooperating levers which operate one of the active sets of contacts 12, 13, 14 by pushing upwards on wire 85 15 which moves the card carrying the active spring wires and thereby releases the inherent tension of these active spring wires (12, 13, 14) so that they move into engagement with corresponding stationary wires 90 forming a multiple grid and through which they project.

What is claimed is:

1. A jig for a switch having a plurality of flexible elements, said jig comprising 95 means for securing the flexible elements thereto, a guide for regulating the tension of some of said elements and a plurality of reference markers for predetermining the relative positions and tensions of other 100 of said elements.

2. A jig for a plurality of flexible elements comprising means for securing the flexible elements thereto, a guide for predetermining the tension of some of said elements, means for determining the position of the last mentioned elements and a plurality of reference markers for predetermining the relative positions and tensions of other 105 of said elements.

110 3. A jig for a plurality of flexible elements comprising clamping means for securing the elements thereto, a pivotal guide adapted to be located in various angular positions which correspond to different values of tension to be acquired from some of said elements, means for locating the operating position of the last mentioned elements, and adjustable means for locating the normal position of the other of said elements.

115 4. A jig for a flexible spring member comprising means for securing the spring member thereto, a pivotal guide for aligning said spring member adapted to assume various angular positions on the jig which correspond to predetermined values of tension of the spring member, and means for locating 120 125

the spring member with reference to a plurality of predetermined fixed points subsequent to its alignment with said guide.

5. A jig adapted to mount a unit comprising a plurality of sets of active contacts for a coordinate switch, a resilient member for each of said sets securely embedded in said unit, said jig having means including

a pivoted member arranged to be positioned as a guide for the free end of each resilient member for securing uniformity of tension in said resilient members. **10**

In witness whereof, I hereunto subscribe my name this 16th day of January, A. D. 1923.

OSCAR F. FORSBERG.