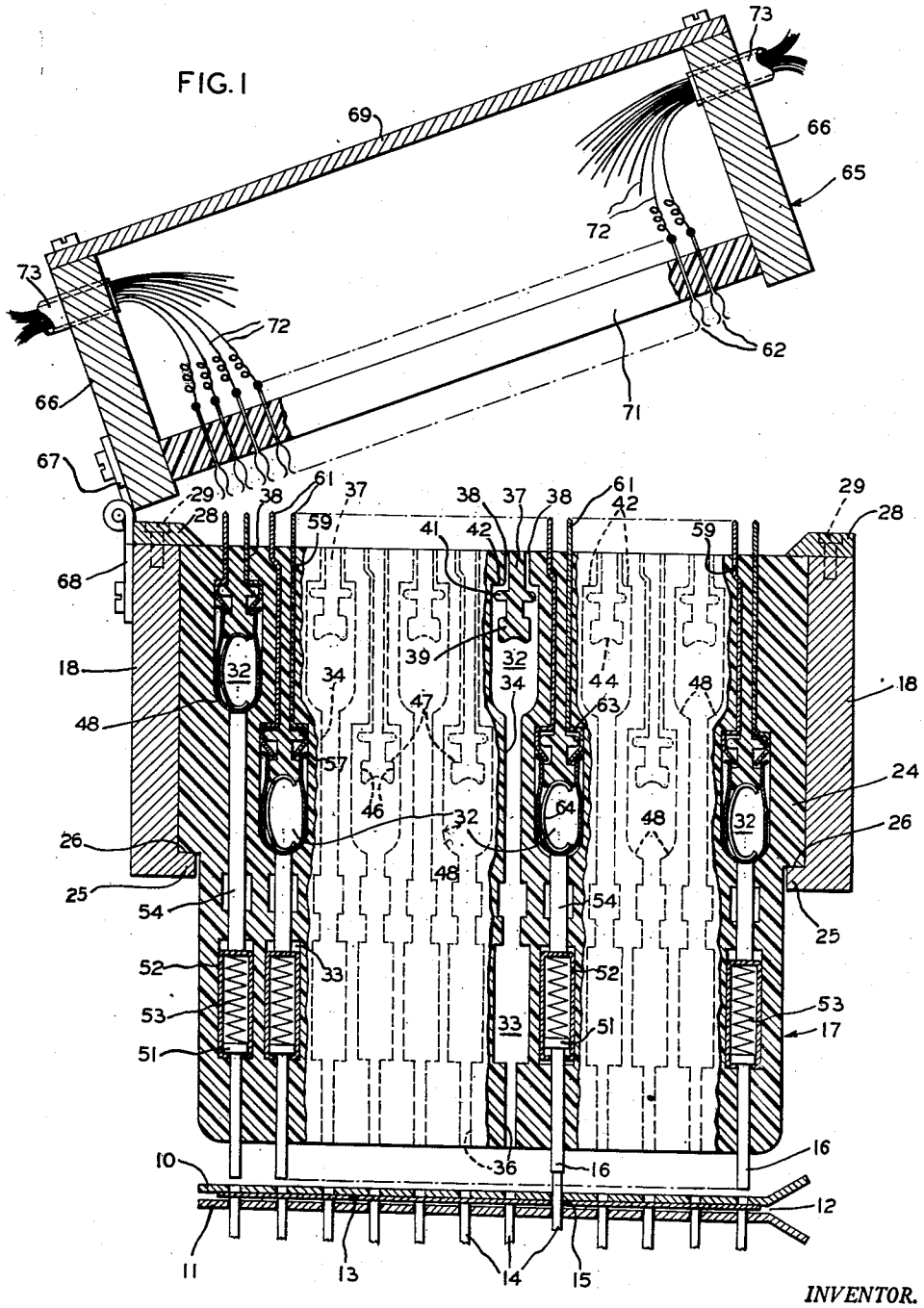
June 29, 1954 E. O. ROGGENSTEIN 2,682,581

GANG CONTACT DEVICE FOR RECORD CONTROLLED MACHINES OR THE LIKE

Filed Dec. 3, 1952

2 Sheets-Sheet 1

FIG. 1



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Filed Dec. 3, 1952 2 Sheets-Sheet 2

FIG. 2

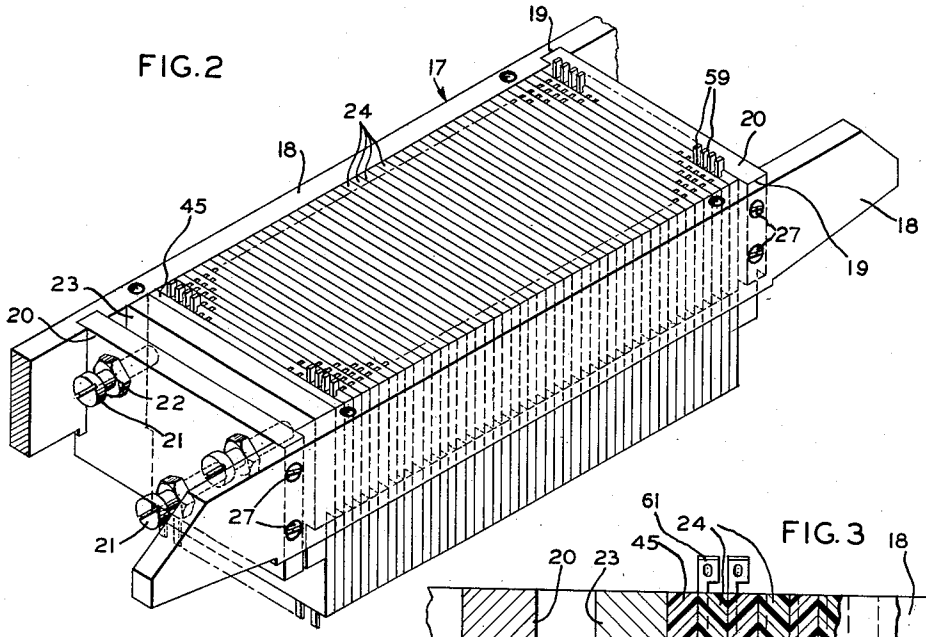


FIG. 3

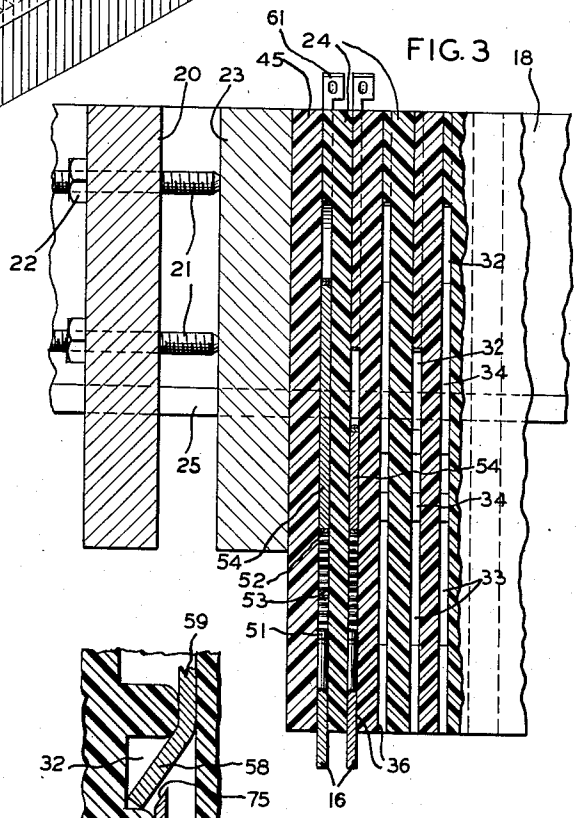


FIG. 4

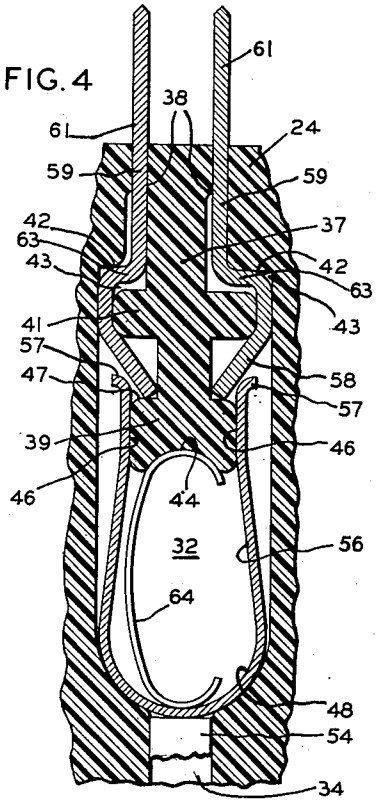


FIG. 5

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GANG CONTACT DEVICE FOR RECORD CONTROLLED MACHINES OR THE LIKE

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14 Claims. (Cl. 200—46)

1

This invention relates to a contact device, and particularly to one associated with a record sensing means.

In the sensing of business records such as cards the latter for example have five hundred and forty data index positions requiring an equal number of pins to sense perforations corresponding to said index positions. The amount of space that can be used for circuit closing contact means actuated by the sensing pins is limited approximately to the size of the record and one of the important objects of the invention is to provide for the mounting of circuit controlling means and the operating parts thereof within the confined space afforded by the foregoing limitations.

Another object of the invention is the production of a unit in which each row of contacts is insulated from the other and in which each individual set of contacts is insulated from the adjacent set.

A still further object of the invention is to provide for sliding contact of circuit closing parts to provide carbon free surfaces and wiping action that keeps the meeting parts smooth for better electrical connection.

Further objects of the invention are to provide mountings for contacts, corresponding to each row of sensing pins, that can be individually serviced without dismantling the entire unit; to provide mountings that can be easily assembled without the use of skilled labor or special tools; to provide for the successive closing of contacts to assure correct and easy alignment of the parts and to provide a device in which the parts are maintained at all times in yieldably cooperative relation without play or free movement.

Other objects and structural details of the invention will be apparent from the following description when read in connection with the accompanying drawing, wherein

Fig. 1 is a view in sectional elevation taken widthwise of a contact unit constructed in accordance with my invention;

Fig. 2 is a view in perspective of the unit showing the relative positions of the panels as assembled therein;

Fig. 3 is an enlarged fragmentary section taken longitudinally of the unit at one end thereof showing the relative positions of the columns of contacts;

Fig. 4 is an enlarged fragmentary section in elevation showing the upper part of a panel and the contacts contained in a cavity thereof; and

Fig. 5 is an enlarged fragmentary view in section showing a modified form of contact element end portion.

2

Referring to the drawing in detail, 10 and 11 indicate respectively upper and lower guide plates forming a card chamber 12 which has its counterpart 130 in Fig. 18 of Patent 2,323,816 issued to W. W. Lasker et al., July 6, 1943, wherein is shown the card feeding and sensing mechanism of a tabulator to which the present improvement may be applied. From the usual supply magazine one card 13 at a time is fed to, and held by a suitable stop in, the chamber 12 to be sensed by sensing pins 14 which yieldably engage the card to detect perforations 15 therein. The latter, in business machine controlling cards, are usually punched at data designation positions arranged columnwise of the card or record and in code form or combination. The cards have ninety columns of six positions per column or forty-five columns of twelve positions per column so that at least five hundred and forty pins are necessary for sensing, the pins 14 as shown in Fig. 1 being twelve in number and coinciding with the data designation positions in one column of a forty-five column card. Each time that a sensing action occurs the pins passing through the perforations in the record lift the pins 16 that protrude from the bottom of a contact unit 17 to produce electrical impulses to be used in devices to be controlled by the perforated records.

The contact unit 17 includes a frame composed of side members 18 rabbeted as at 19 to receive end members 20, one of which is provided with jamming bolts 21 carrying lock nuts 22. The jamming bolts are arranged to adjustably engage a movable pressure end plate 23. The latter engages a longitudinal pile of dielectric panel members 24 and holds the faces thereof in abutting relation under the pressure applied by said plate. The lower edges of the side members 18 are each shaped to provide a shoulder 25 upon which rest ledge portions 26 formed in the opposite vertical edges of the panels 24. The plates 20 and 23 may also be provided with ledges for engagement with the shoulders of the side members and the plates 20 are preferably secured to the side members 18 by screws 27 to give rigidity to the frame. With this structure, the loosening of the bolts 21 will allow any or all of the panels to be removed for replacement or repair of the parts and readily replaced and the frame can be removed from the machine as a unit if desired. Both side members 18 are provided with top bars 28 which overlie the upper edges of the panels 24 and are fixed to said side members by screws 29.

Each of the panels 24 is alike, and it is believed that a description of one, and its associated parts, will be sufficient. A panel is preferably molded or

cast of plastic or other suitable dielectric material furnishing electrical insulation between the elements of the panels and is shaped to provide elongated coplanar parallel cavities of equal depth in one face thereof. Each cavity provides an upper contact recess 32, and a lower spring recess 33 connected by a strip seat 34, the upper recess 32 being laterally offset from each other to save space, so that a panel of minimum width may be employed. Each cavity terminates at its lower end in a pin seat 36 extending from the bottom of the lower recess 33 to the bottom edge of the panel and axially aligned with both recesses and the strip seat 34. That portion of the cavity forming the upper recess 32 defines a tongue 37 (Fig. 4) and flanking contact strip grooves 38, the tongue, the recesses and the seats all having the same median line. The tongue is shaped to provide lower and upper winged sections 39 and 41 respectively, the latter of which coact with shouldered portions 42 of the recess 32 to provide locking areas 43 adjacent the inner ends of the contact strip grooves 38. The lower winged section 39 constitutes a guide and on its under face is formed with a concave seat 44 and has vertical parallel sides constituting slide faces 46, the upper edges of the wing portion providing seats or ledges 47. The bottom walls of the recesses 32 are semi-circular and provide seat forming walls. A plain panel 45 is used to seal the cavities of the end panel 24 adjacent plate 23. The cavities are relatively shallow in comparison with the thickness of the panels so that the contacts of abutting panels are well insulated from each other.

All of the elements can be assembled in each panel quickly and the panels mounted in the side members 18 and secured therein as above explained. Each lift pin 16, positioned in its pin seat 36 has a head 51 for moving fit within a guide 52 seated for limited sliding movement in the lower contact recess 32. A goffered spring 53 positioned between the head of the pin 16 and the closed upper end of said guide 52 yieldably resists upward movement of the pin 16, when the latter is raised by its associated sensing pin 14, to move a motion transfer strip 54, made of insulating material, upwardly along its seat 34. The upper recess 32 contains a U-shaped spring contact circuit completing element 56 whose rounded end constitutes a seat portion 43 resting on the seat forming wall of the recess 32 and on the upper end of the strip 54. The legs of the element 56 are tempered to hug the lower winged section 39 and slide on the faces 46 when the element is pushed upwardly by the strip 54. The ends of said legs are arcuately flared outwardly as at 57 to provide rounded end surfaces on said element for smooth rubbing contact with the outer surfaces of the obliquely disposed inner ends 58 of a pair of contact strips 59 positioned in said strip grooves 38 and presenting prongs 61 extending above the upper edge of the panel for contact with clips 62. This rubbing contact of the parts 56 and 58 keeps the surfaces of both parts smooth and by rubbing action prevents the accumulation of carbon. With the meeting parts engaging each other in point contact it is evident that the surface of 58 would be roughened and a poor electrical connection would result. With the relative sliding action, between the contact element 56 and the oblique ends 58 of the contact strips, the meeting surfaces are always maintained clean and smooth. The strips 59 each have their lower ends bent as at 63 to fit around the upper winged section 41 of the tongue 37 to be held by the latter in the locking areas 43. The strips terminate in said oblique portions 58 which converge to engage the ledges 47 of the lower winged section 41 of said tongue. In view of the laterally offset position of adjacent recesses 32, those contact strips 59 that extend from the lower recesses 32 are increased in length to compensate for the difference in vertical position of adjacent recesses and may be offset to preserve their paired spacings so that they will be properly engaged by the evenly spaced clips 62. The upward movement of the strip 54 and the U-shaped element 56 is yieldably resisted by a flexible elliptically shaped member 64 in the element 56 having one side open in the nature of a C, which acts to keep the seat part 48 of the element 56 against the wall of recess 32 and the upper arcuate ends 57 of said element spaced from the oblique ends 58 of the contact strips 59. The contacts 59 are yieldably forced into the corners of the locking areas 43 and securely held when the spring 64 is compressed by the upward movement of the member 54 to make contact with the strips 59. The spring 53, which is stronger than member 64, overcomes upon the initial rise of a lift pin, the resistance of member 64 until a sliding contact is made between the legs 46 of contact element 56 and strip ends 58, whereupon the added resistance against spreading by the contact element 56 overcomes the resistance of spring 53. Spring 53 thus serves to limit the extent of wiping action by the legs 57 so as to prevent unnecessary friction and wearing away of the contact surfaces.

The individual circuits thus completed may be detachably associated with any desired fixed machine control circuit by the optional use of a circuit closing member or contactor 65 made up of side strips 66 one of which is provided with a hinge 67 for pivotally mounting the contactor on one of the side members 18, which also carries a matching hinge part 68. The side strips 66 connect a top plate 69 with a clip supporting bottom wall 71 of insulating material so that when the contactor 65 is swung to position on top of the unit the spring clips 62, which are paired in circuit forming relation, engage the contact strip prongs 61 successively beginning at the hinged side of the unit. The successive engagement of the clips and prongs does not offer as much resistance as if the members were all engaged simultaneously. Each clip 62 is part of a circuit which also includes wires 72 leading from said clips through conduits 73 in the side walls of the contactor, a pair of the contact strips 59 and the circuit closing U-shaped element 56 that engages said pair. The wires from each pair of clips lead to an electronic tube, relay or other device to be operated by the electric impulse produced when a circuit is completed by the rising movement of a pin 14 that has sensed a perforation in the record 13. The clips 62 and wires 72 constitute a circuit forming means including a suitable source of current.

The upper ends or terminals 74 of the U-shaped contact element 56 may be modified as shown in Fig. 5 by being bevelled as at 75 instead of being shaped arcuately as shown in Fig. 4 and flat sliding contact of the terminals 74 on the oblique portions 58 of the contact strip 59 is possible due to the angle of bevel which substantially coincides with the oblique angle made by the portions 58.

While the device disclosed herein is illustrated in connection with the sensing of a record, it is

evident that it may be employed with any perforated control or as the result of the sensing of a control means other than those that are perforated. The advantages of the structure of the instant application are that; panels of minimum width and thickness may be employed and into each of which parts may be assembled as a unit so that, for repair or replacement, the removal of one or more individual panels will suffice without the necessity of completely dismantling the entire unit; the springs **53**, the elements **56** and the spring **64** require very little pressure for actuation; the mechanical stresses in the current carrying parts is of small degree; and with the wiping action afforded between the contact parts, accumulation of carbon is prevented and the meeting surfaces are maintained clean and smooth for good electrical connection. The contactor **65** need not be employed as a part of the unit and if desired the prongs **61** may be connected directly to circuit forming wires.

While there is above described but one embodiment of the invention, it is possible to produce still other forms without departure from the inventive concept herein disclosed, and it is therefore desired that only such limitations shall be imposed on the appended claims as are stated therein or required by the prior art.

What I claim as new, and desire to secure by Letters Patent, is:

1. In a contact device adapted to be actuated by record sensing means, a lift pin, movable guide means for said pin, a spring associated with the guide means for compression by said pin to move said guide means, movement transfer means actuated by said guide, contact means presenting prongs and obliquely disposed portions, U-shaped circuit completing means intermediate said transfer means and the contact means, and flexible means for yieldably separating said circuit completing means and said contact means.

2. The combination with the movable agent of a sensing mechanism and a circuit forming means; of a contact device positioned intermediate said agent and circuit forming means including movable means adapted to partake of the movement of said agent, contact means for engagement with said circuit forming means, U-shaped circuit completing means intermediate said movable means and the contact means and a flexible elliptical member for yieldably separating said U-shaped means and said contact means for keeping said circuit open.

3. A contact device comprising a recessed insulating panel presenting shoulder portions, contact strip means engaging said shoulders and extending beyond said panel, a U-shaped contact element movable to engage said strips with its terminal ends, flexible means between said contact strip means and said contact element for yieldably separating the same, means for moving said element into contact with the strip means against the resistance of said flexible means, and an insulating member associated with said strip means and constituting a seat for one end of said flexible means.

4. A contact device comprising a recessed insulating panel presenting shoulder portions, contact strip means engaging said shoulders and extending beyond said panel, a U-shaped contact element movable to engage said strips with its terminal ends, flexible means between said contact strip means and said contact element for yieldably separating the same, means for moving said element into contact with the strip means against the resistance of said flexible means, and an insulating member associated with said strip means and constituting a guide for the terminal ends of said contact element.

5. A contact device comprising a recessed insulating panel presenting shoulder portions, contact strip means engaging said shoulders and extending beyond said panel, a U-shaped contact element movable to engage said strips with its terminal ends, flexible means between said contact strip means and said contact element for yieldably separating the same, means for moving said element into contact with the strip means against the resistance of said flexible means, and an insulating member associated with said strip means and constituting a seat for one end of said flexible member and a guide for the terminal ends of said contact element.

6. A contact device adapted to be operated by sensing means including movable pins arranged in close columnar order for simultaneously sensing all of the data perforations in a record; including a panel of insulating material corresponding to each column of pins and shaped to provide cavities in one face thereof aligned with the pins of each column and adapted to be sealed by an abutting panel, contact strips in each cavity presenting prong portions and obliquely disposed ends, a movable contact element in each cavity having terminals for engagement with the oblique ends of said contact strips, spring means in the cavities intermediate said contact strips and the contact element for normally holding the latter out of engagement with said strips, means in said cavities partaking of the movement of said sensing pins for engaging the contact element with the strips against the resistance of said spring means, and means for holding all of said panels in abutting relation as a unit to close each of said cavities.

7. A contact device adapted to be operated by sensing means including movable pins arranged in close columnar order for simultaneously sensing all of the data perforations in a record; including a panel of insulating material corresponding to each column of pins and shaped to provide cavities in one face thereof aligned with the pins of each column and adapted to be sealed by an abutting panel, a tongue extending into each cavity and defining locking areas, contact strips positioned in said locking areas having obliquely disposed ends and prongs extending externally of said panel, a contact element having terminals for engagement with the oblique ends of said contact strips, flexible means intermediate said contact strips and the contact element for normally holding the latter out of engagement with said strips, means partaking of the movement of said sensing pins for engaging the contact element with the strips against the resistance of said spring means and means for holding said panels in abutting relation as a unit to close each of said cavities.

8. A contact unit comprising a frame; panels of insulating material each shaped to provide laterally spaced vertically parallel cavities in one face thereof opening at the top and bottom of said panels and presenting upper and lower recesses; a tongue in the upper recess of each cavity formed integral with the panel and defining, with the walls of said cavity, grooves and locking areas; said tongue being shaped to provide ledges and a seat portion; contact strips in said locking areas having oblique ends en-

gaging said ledges and prong portions in said grooves extending exteriorly of said panel; a U-shaped contact element having its ends slidable on said tongue for engagement with the oblique ends of the strips; a C-shaped spring intermediate the tongue and the contact element and under tension to yieldably maintain said contact element and the strips separated, a guide in the lower recess, a spring in said guide, pin means for compressing said spring to move said guide, a movement transfer means actuated by said guide for moving the contact element into engagement with the strips against the resistance of said C-shaped spring, and means for removably holding said panels in abutting relation in the frame to seal said cavities.

9. In a contact device adapted to be operated by the movable parts of a punched record sensing means, a plurality of panels of dielectric material each shaped to provide laterally spaced vertically parallel cavities in one face thereof opening at the top and bottom of said panel and presenting upper and lower recesses, a frame for removably holding said panels, pressure means in the frame adjustable to hold said panels in abutting relation to seal said cavities, contact strips in each cavity extending beyond the panels and providing pairs of spaced prongs, a contact element, flexible means yieldably separating the element and the strips, motion transfer means partaking of the movement of the movable parts of said sensing means, a contactor constituting a cover pivoted to said frame, and clips depending from said contactor and adapted to engage said prongs successively when the contactor is moved to covering position over said frame.

10. A contact device comprising a frame, end members in said frame, a plurality of thin panels of dielectric material each shaped to provide adjacent, relatively offset vertical cavities in one face thereof, switch means in said cavities for making and breaking a circuit, a pressure plate, means in one of said end members for adjusting said plate longitudinally of said frame to hold said panels in abutting relation against the other end member to seal said cavities and means in said frame for preventing vertical movement of the panels in one direction with respect to said frame.

11. A contact unit including a plurality of abutting panels of dielectric material each shaped to provide vertical cavities in one face thereof adapted to be sealed by the smooth face of an abutting panel; a tongue in each cavity formed integrally with the panel and presenting wing members defining strip grooves, locking areas and seats; contact strips in said grooves having obliquely disposed ends resting in said locking areas and abutting said seats and having prongs extending beyond said panel; a U-shaped contact element embracing said tongue; an elliptical flexible member between the tongue and said contact element for yieldably separating the ends of the legs of the contact element and the oblique ends of said contact strips; a motion transfer means engaging said element; pin means for moving said motion transfer means and a yieldable connection between the pin means and the transfer means.

12. In a contact device a circuit make and break means including a pair of contact strips having obliquely disposed ends, a U-shaped contact element having its ends arranged to engage the oblique ends of said strips, an elliptical shaped flexible member intermediate the contact strips and the element for yieldably maintaining the latter and the strips separated and movable means for forcing said element into contact with said strips against the resistance of said flexible member.

13. A contact device including a panel of dielectric material having a cavity therein opening at opposite edges of the panel, strip means extending from one end of said panel and presenting spaced ends having contact surfaces, a contact element having surfaces for engagement with the contact surfaces of the spaced ends of said strip means, flexible means in said contact element for normally keeping said surfaces of the latter out of engagement with the surfaces of said strip means, and movable means extending from the opposite edge of said panel for distorting said flexible member and moving the surfaces of said contact element into engagement with the surfaces of said strip means.

14. A contact device including a panel of dielectric material having a cavity therein opening at opposite edges of the panel, strip means extending from one end of the panel and presenting spaced ends, a contact element having spaced portions at one end thereof for engagement with the ends of said strip means and a seat portion at the opposite end, flexible means intermediate the seat portion and the ends of said contact element, and movable means extending from the opposite edge of said panel and engaging said seat means for distorting said flexible means and moving the spaced portions of said contact element into engagement with the ends of said strip means.

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