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CONTACTING DEVICE FOR ELECTRIC ELEMENTS

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Fig. 1.

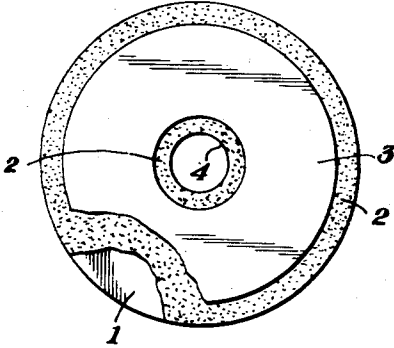


Fig. 2.

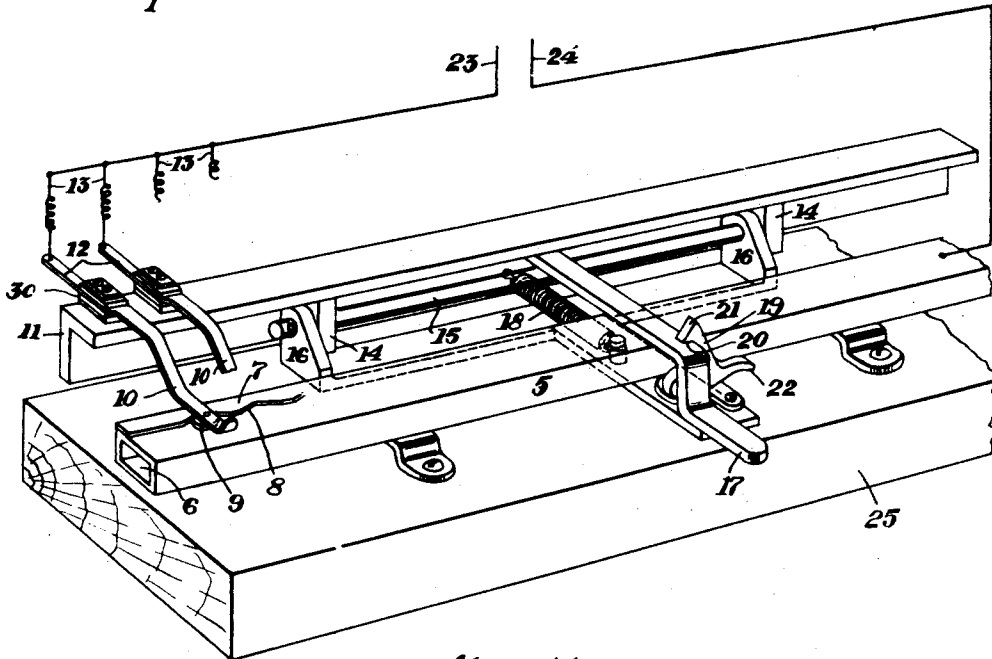
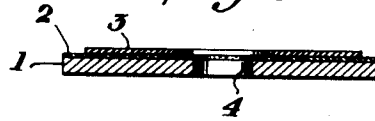


Fig. 3.

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CONTACTING DEVICE FOR ELECTRICAL ELEMENTS

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4 Claims. (Cl. 173—324)

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This invention relates to contacting devices for making contact with electrical elements such as rectifiers and photocells of the plate type, and particularly to contacting means useful in the electro-forming of such apparatus.

The object is to provide contacting means which can easily and quickly be moved into and out of contact with the surface of the element with a degree of pressure sufficient for good contact but not so high as to be injurious. A related object is quickly to make or release contact with any of a large number of such elements.

Plate-type rectifiers ordinarily comprise a base plate having thereon an adherent layer of a semi-conductor such as selenium, with a counter-electrode such as a sprayed alloy metal over the semi-conductor. Such devices are commonly electro-formed before use by applying to them a voltage which sends a current through them in the direction opposite to the direction of normal forward current flow. To do this it is required that electrical contact be made with the base plate and with the counter-electrode. It is commonly considered that the rectifying properties are due to the formation of a "barrier layer" at the selenium surface beneath the counter-electrode. The member making contact with the counter-electrode should exert sufficient pressure against the counter-electrode to make a good contact but not so much pressure as to injure the barrier layer at the selenium surface. It is, moreover, desirable that the contact shall be one which may readily be made or removed at will in order to remove elements being electro-formed.

In accordance with this invention I provide a movable contact member having a spring contact which is adapted to be moved into contact with the counter-electrode while the base of the element is resting on the other electrical connections. An advantage of the arrangement is that it enables a large number of contact members to make contact with their respective semi-conductor elements by movement of a single handle or lever.

The invention will be more fully understood from the following detailed description when considered in conjunction with the accompanying drawing of which:

Fig. 1 is a face view of a semi-conductor element to be electro-formed;

Fig. 2 is a side view in section of the element shown in Fig. 1; and

Fig. 3 shows the contacting means by which an element such as that of Figs. 1 and 2 may be electro-formed.

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Referring to Figs. 1 and 2 a rectifier or photocell may commonly comprise a base plate 1 which may be of any suitable conducting material such as iron or steel or aluminum or the like. Over the base plate there is placed a thin layer of a semi-conductor material such as selenium, and over the semi-conductor there is placed a thin coating of a counter-electrode 3 which may be an alloy sprayed on in molten form. In the case of a rectifier there is usually a hole 4 centrally located through disc 1 and the spray 3 is usually kept at some distance away from the central hole and the outer periphery of the disc so as to prevent short-circuiting from the counter-electrode to the base plate. According to theory, a minutely thin barrier layer is formed at the surface of the selenium between the selenium and the counter-electrode and this barrier layer is thought to give the element its rectifying property of readily transmitting current in the forward direction but having an extremely high resistance to current flow in the opposite direction. This barrier layer is easily susceptible to injury which would destroy the properties of the element. For example, a scraping or high pressure applied to it would injure it; consequently, contact members placed against the counter-electrode 3 should not make too heavy a contact pressure.

Before a semi-conducting element such as those shown in Figs. 1 and 2 will operate most effectively, it should be electro-formed by sending a current flow between base 1 and counter-electrode 3 in the direction opposite that of normal forward current flow. This will build up the voltage which it can withstand and improve its rectifying property. This is done by sending a unidirectional current flow between base 1 and counter-electrode 3 in the direction opposite that of normal forward current flow.

The arrangement according to my invention is designed readily to electro-form the element. Referring to Fig. 3 it comprises an elongated platform 5 of a conducting material such as brass or any other suitable metal, which may be mounted on a base board 25. If desired, platform 5 may be of a pipe-like construction as shown so that water or other cooling fluid may be made to flow through its interior 6 to conduct away heat developed during the electro-forming. A thin flat plate 7 having a serrated or sawtooth or similar shaped edge 8 is placed flat along the rear of platform 5. The arrangement is such that the rectifier plates or discs 9 may be placed individually in the serrations of plate 7 and flat on platform 5 with the base plate 1 against the platform, as shown. As

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the platform is elongated and there are a large number of serrations in sheet 7, a large number of semi-conductor elements may be accommodated.

The upper contacts against the counter-electrode surfaces of the elements 9 are provided by a corresponding number of spring contact members 10. These are mounted by screws or otherwise along a supporting member 11 shown as an angle member, and are insulated from the angle member by suitable insulation strips 30. Contact members 10 have protruding from the rear suitable lugs 12 to which connecting lines 13 may be soldered or otherwise attached. The supporting member 11 is mounted on lugs 14 adapted to pivot on a rod or bar 15 which in turn is mounted on support 16 supported by the base board. A handle 17 attached to member 11 is adapted to pivot the member on rod 15 and to pull down the contacts 10 against the tension of a spring 18 which is fastened at one end to the lower face of member 11 and at the other end to a pin in the base. Handle 17 is adapted to be held down in its lower position by a pivoted detent 19 having a hook or the like 20 which passes over handle 17. Thus, when the handle 17 is brought down it then passes along the oblique camming surface 21 of the detent, pivoting the detent against the tension of the spring which may be, for example, a helical spring at the pivot of the detent, one end of the spring being fastened to the detent and the other end to the base. Then when the handle 17 is below the hook 20 of the detent, the spring snaps the detent into its holding position.

In this position all of the contact members 10 are brought down into contact with the discs 9 with the proper amount of pressure to make contact. When it is desired to release the contacts from the discs, a handle 22 on the detent is pushed down to rotate it out of holding engagement with handle 17. Then the member 11 is pivoted by action of spring 18 to move the contact members 10 away from the discs 9.

This arrangement has the advantage of always providing the desired degree of pressure of the contacts against the discs sufficient to make good electrical connection but insufficient to harm the discs. Furthermore, it permits the placing of a very large number of the discs in position at one time and releasing them all at one time so that any of them may be withdrawn as desired.

Suitable electrical connection may be made to the contact members by connecting all of the contacts to one wire 23 of the voltage source and the other wire 24 of the voltage source to the platform 5. Thus, all of the discs 9 are connected in parallel across the forming voltage source.

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If desired, resistances may be inserted individually in the individual wires 13 connecting to the contacts so as to limit the current flowing through the individual elements.

What is claimed is:

1. Contacting means for a semi-conductor element comprising a conducting platform, on which a plurality of said elements are adapted to rest, positioning means for said elements comprising a serrated strip on said platform against which said elements are placed to engage the serrations of said strip, a plurality of spring contact members for making contact individually with the opposite electrodes of each element, a pivotally mounted supporting member on which said contact members are mounted, and a lever for moving said supporting member to move said contact members into or out of contact with said electrodes.

2. Means according to claim 1 in which said contact members are all connected to one terminal of a voltage source and the platform is connected to the other terminal of the voltage source.

3. Contacting means for a semi-conductor element comprising a conducting platform on which a plurality of said elements are adapted to be placed, a plurality of spring contact members for making contact individually with the opposite electrode of each element, positioning means for said elements comprising a serrated strip against which said elements are adapted to be placed to engage the serrations of said strip, a supporting member on which said contact members are mounted, a lever attached to said supporting member for pivoting said supporting member to move said contact members into or out of contact with said other electrodes, a detent adapted to engage said lever when said contacts are in contact, and spring means for urging said detent into engagement with said lever.

4. Contacting means as set forth in claim 1 in which said platform is of pipe-like construction to permit passage of cooling fluid therethrough.

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