

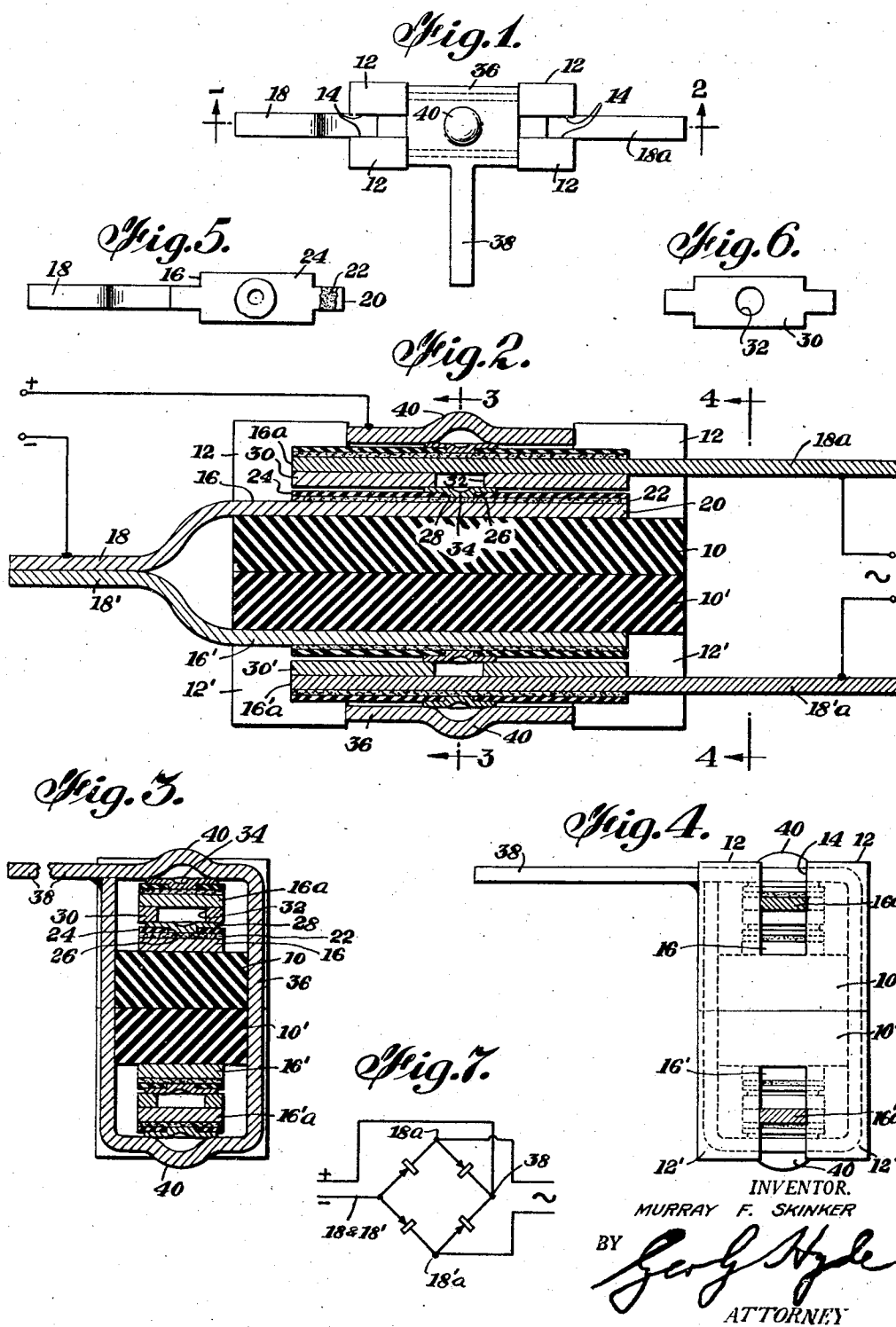
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RECTIFIER

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RECTIFIER

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This invention relates to improvements in rectifiers, and more particularly to full-wave rectifiers of the dry-contact type.

An object of this invention is to provide a novel, small, compact full-wave rectifier.

Another object of this invention is to provide a full-wave selenium type rectifier which can be manufactured and assembled from small, easily fabricated parts.

A further object of this invention is to provide a small full-wave selenium rectifier utilizing a minimum number of different parts.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed.

The invention has been illustrated in its preferred embodiment in the accompanying drawing wherein:

Fig. 1 is a top plan view illustrating the general appearance of a rectifier in accordance with the present invention;

Fig. 2 is a longitudinal cross-sectional view taken along the line 2-2 of Fig. 1 and drawn to approximately twice the scale of that figure;

Fig. 3 is a transverse cross-sectional view taken along the line 3-3 of Fig. 2;

Fig. 4 is an end view, partially in section taken along the line 4-4 of Fig. 2;

Fig. 5 is a top plan view of one of the rectifier parts, drawn to the same scale as Fig. 1;

Fig. 6 is a top plan view of another rectifier part; and

Fig. 7 is a circuit diagram illustrating the manner in which the construction in the previous figures is arranged to form a full-wave bridge rectifier.

As shown in the drawing, and particularly in Figs. 1 to 4 inclusive, the full-wave rectifier according to the present invention is preferably built up of two rectifier units placed back-to-back and respectively built up on identical insulating bases 10 and 10'. Since both units are identical, for the most part the description will be confined to one unit alone. It will be seen, for example, that the insulating base 10 formed of any suitable insulating material is preferably of generally rectangular shape having at its four corners, posts or vertical extensions 12 which define between them longitudinal grooves 14. These posts may also extend somewhat laterally of the main part of the base. Upon each insulating base is placed a base plate 16, also of generally rectangular shape having such a length

that it fits between opposite end posts 12 and is formed with opposite longitudinally extending tongues 18 and 20 adapted to pass through the longitudinal grooves 14. The tongue 20 may be formed relatively short for positioning purposes only, while the tongue 18 may extend outwardly beyond the rectifier unit to serve as a rectifier lead. The central rectangular portion of each base plate is covered with a layer of rectifying material such as selenium 22 which, in turn, is covered with an insulating layer 24 which may be formed, for example, of paper. The paper layer 24 is provided with a central opening 26 and counter-electrode alloy 28 is sprayed or otherwise applied to the paper and extends through this opening into contact with the selenium.

Above the counter-electrode alloy is placed a contact plate 30 which preferably has a central opening 32 aligned with the opening through the insulating paper 24. The central opening 32 is of such dimension that the plate contacts the counter-electrode alloy, but at the same time no contact pressure is applied to the central depressed portion 34 of the counter-electrode alloy, this being the point at which contact is made with the selenium layer. In other words, it is not desired to apply any extra pressure to the contact surface between the selenium layer and counter-electrode alloy.

Above the contact plate 30 is positioned a second metal base plate 16a of identical configuration with the base plate 16, but having its longitudinal tongue 18a extending in a direction oppositely to the tongue 18. A selenium layer, insulating layer and counter-electrode alloy are applied to the base plate 16a in a manner identical with the similar layer applied to the base plate 16. Base plates 16' and 16'a are built up with intermediate layers on the insulating base 10' in a similar manner to that described above but only in the opposite direction. The entire unit may then be held together by a metal clamp generally designated at 36. This metal clamp will contact the outer counter-electrode masses and may be formed with an integral extension 38 which will serve as a lead to the rectifier as a whole. It will be held against longitudinal movement by the lateral extension of the posts.

In order to complete the rectifier, I prefer to connect the two tongues 18 and 18' from the base plates 16 and 16' respectively together, and for this purpose they may be bent toward one another as is more clearly shown in Fig. 2. The tongues 18a and 18'a will be maintained sepa-

rate, while the fourth lead is formed by the integral extension 38 on the surrounding metal clamp. The circuit for such a full-wave rectifier is indicated more clearly in Fig. 7.

In order to prevent direct contact upon the central selenium-contacting portion of the outer counter-electrode masses, the surrounding metal clamp may be formed with hollow raised blisters 40 at these two points. Attention is directed to the fact that since both insulating bases 10 and 10' are of identical configuration, as are the individual metal base plates with their superimposed rectifying and insulating layers, and as also are the two intermediate contact plates 30, the rectifier according to the present construction is formed by a number of substantially identical parts thus keeping its cost to a minimum. The metal base plates can be stamped out as more fully disclosed in the copending application of Skinner et al., S. N. 507,671, filed October 26, 1943, while the insulating bases can be molded in strips as also disclosed in that application.

Variations in the afordescribed construction such as will be apparent to those skilled in this art are contemplated as being included in the present invention. For example, while the rectifier as a whole has been shown generally rectangular, it is obvious that other configurations may be used. Instead of utilizing two entirely separate insulating bases, the two could be formed as one piece with the posts or other holding members extending from the four corners in opposite directions. While it is convenient for the sake of making connections to the rectifier, to form some of said connections as leads extending outwardly, integral with the base plates, such tongues need not extend beyond the boundaries of the insulating base and wire leads could be soldered to the base plates in any desired manner. Similarly, the extension 38 need not be formed on the metal clamp, but a lead could be attached to this metal clamp directly at any suitable point.

Accordingly, while I have described above the principles of my invention in connection with a specific device, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of my invention as set forth in the objects and the accompanying claims.

I claim:

1. Full-wave rectifier comprising, in combination, common insulating base means formed on opposite sides with a central portion having a predetermined width and ends having upstanding portions forming a relatively narrow groove whose bottom lies in the same plane as the said central portion, a base plate mounted on each central portion and being formed with longitudinal tongues fitting into said grooves, one tongue of each base plate extending outwardly of the respective insulating base means at the same end of the rectifier, whereby said extended tongues may be connected together to form a common terminal, a layer of rectifying material on each base plate, a layer of insulating material having an opening therethrough covering each rectifying layer, a counter-electrode alloy mass on each insulating layer extending through said opening to contact the rectifying layer, lead means contacting the two counter-electrode alloy masses, and means holding the two rectifier units and their associated parts together.

2. The combination according to claim 1, in which said insulating base means is generally

rectangular, and in which the central portions, as well as the base plates are also generally rectangular.

3. Full-wave rectifier comprising, in combination, a pair of rectifier units placed back-to-back, each of said units including an insulating base formed with a central portion having a predetermined width and opposite ends having upstanding portions forming a relatively narrow groove lying in the same plane as the said central portion, a base plate mounted on each central portion and being formed with longitudinal tongues fitting into said grooves, one tongue of each base plate extending outwardly of the respective insulating bases at the same end of the rectifier, whereby said extended tongues may be connected together to form a common terminal, a layer of rectifying material on each base plate, a layer of insulating material having an opening therethrough covering each rectifying layer, a counter-electrode alloy mass on each insulating layer, extending through said opening to contact the rectifying layer, a contact plate on each counter-electrode alloy mass, said contact plate having an opening therethrough substantially aligned with the opening in said insulating layer, a second base plate of substantially the same configuration as the first base plate lying on each contact plate, both of said base plates having one tongue extending outwardly of the insulating bases in a direction oppositely to the extending tongues on the first base plates, a layer of rectifying material on each of the second base plates, a layer of insulating material having an opening therethrough covering each of these rectifying plates, a counter-electrode alloy mass on each of these insulating layers extending therethrough said opening and metallic clamping means contacting the last counter-electrode alloy masses and extending about both rectifying units.

4. The combination according to claim 3, in which said last clamping means is formed with an integral protruding contact lug.

5. The combination according to claim 3, in which said contact plates are each formed with a central section substantially identical with that of the base plates, and two integral short, longitudinal extending tongues projecting into the grooves in the insulating bases.

6. The combination according to claim 3, in which said metal clamping means is formed with raised hollow blisters substantially aligned with the openings through the insulating material above the respective counter-electrode alloy masses.

7. Full-wave rectifier comprising, in combination, a pair of rectifier units placed back-to-back, each of said units including an insulating base formed with a central portion having a predetermined width and opposite ends having upstanding portions forming a relatively narrow groove lying in the same plane as the said central portion, a base plate mounted on each central portion and being formed with longitudinal tongues fitting into said grooves, one tongue of each base plate extending outwardly of the respective insulating bases at the same end of the rectifier, whereby said extended tongues may be connected together to form a common terminal, a layer of rectifying material on each base plate, a layer of insulating material having an opening therethrough covering each rectifying layer, a counter-electrode alloy mass on each insulating layer, extending through said opening to contact the rectifying layer, a contact plate on each

counter-electrode alloy mass, said contact plate having an opening therethrough substantially aligned with the opening in said insulating layer, a second base plate of substantially the same configuration as the first base plate lying on each contact plate, both of said base plates having one tongue extending outwardly of the insulating bases in a direction oppositely to the tongues on the first base plates, a layer of rectifying material on each of the second base plates, a layer of insulating material having an opening therethrough covering each of these rectifying plates, a counter-electrode alloy mass on each of these insulating layers extending therethrough said opening, clamping means holding the two rectifier units and their associated parts together, and means forming a common contact for the two last counter-electrode alloy masses.

8. Full-wave rectifier comprising, in combination, a pair of rectifier units placed back-to-back, each of said units including an insulating base formed with a central portion having a predetermined width and opposite ends having upstanding portions forming a relatively narrow groove lying in the same plane as the said central portion, a base plate mounted on each cen-

tral portion and being formed with longitudinal tongues fitting into said grooves, a layer of rectifying material on each base plate, a layer of insulating material having an opening therethrough covering each rectifying layer, a counter-electrode alloy mass on each insulating layer, extending through said opening to contact the rectifying layer, a second base plate of substantially the same configuration as the first base plate, contacting each counter-electrode alloy mass, a layer of rectifying material on each of the second base plates, a layer of insulating material having an opening therethrough covering each of these rectifying layers, a counter-electrode alloy mass on each of these insulating layers extending through said opening to contact the rectifying layer, metallic clamping means contacting the last counter-electrode masses and extending about both rectifier units, and lead means connected to each of the four base plates.

9. The combination according to claim 8, in which said metallic clamping means is positioned between and is held against longitudinal movement by the upstanding portions of the two insulating bases.

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