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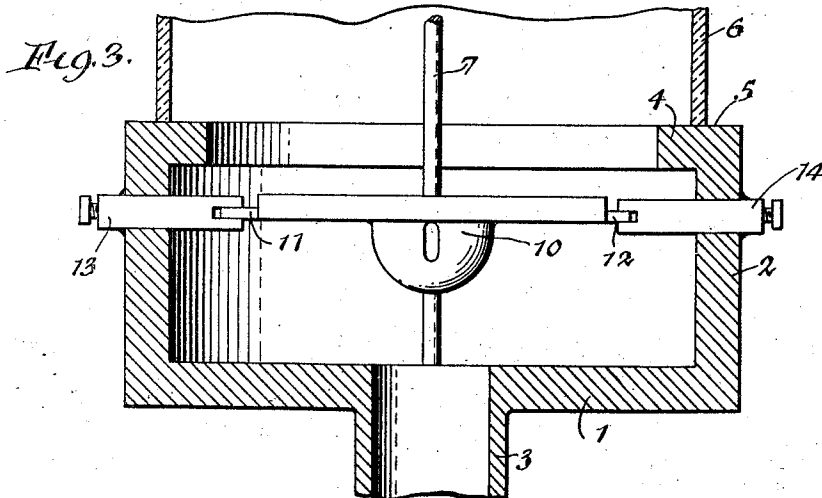
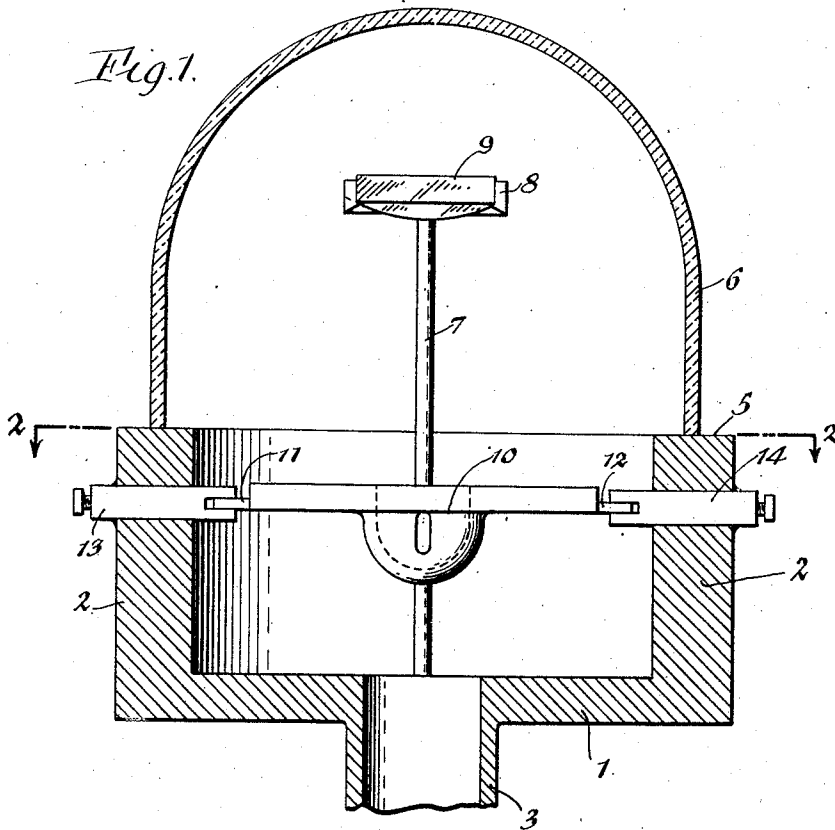
H. OSTERBERG

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APPARATUS FOR TREATING SURFACES

Filed Oct. 15, 1942

3 Sheets-Sheet 1



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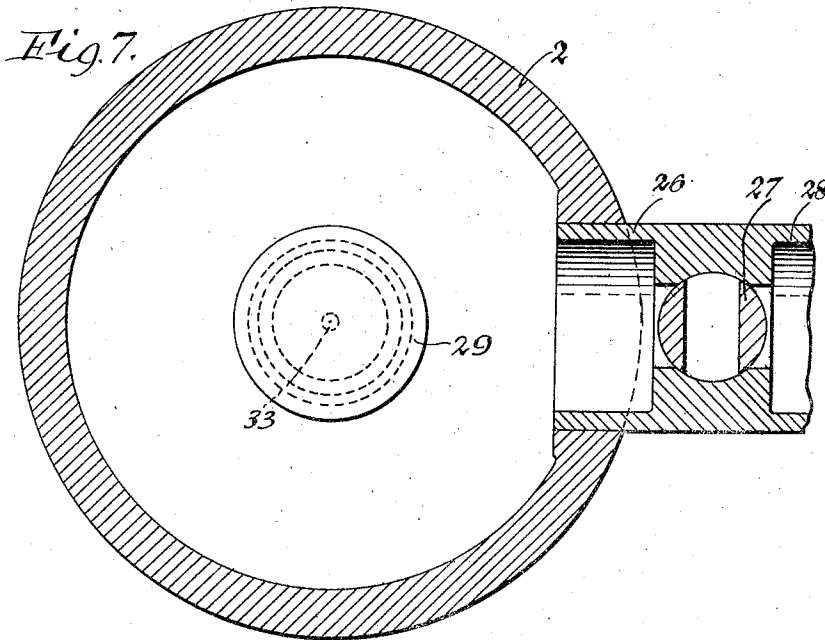
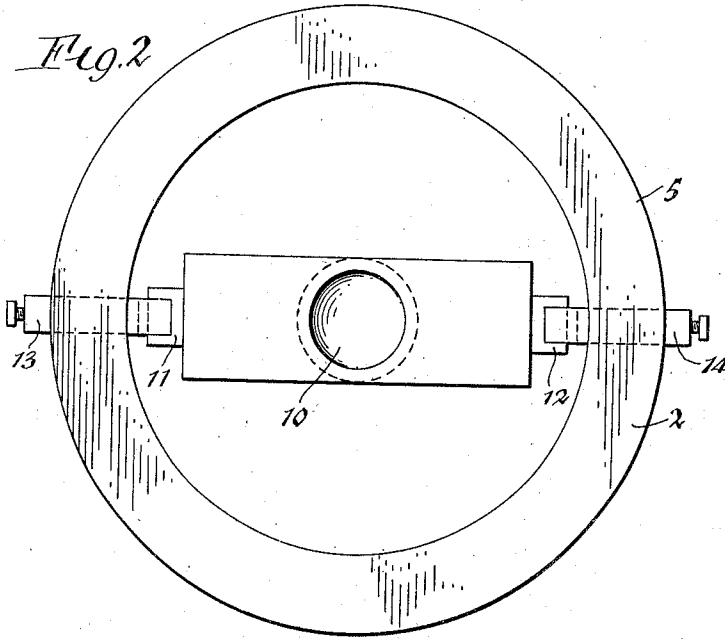
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APPARATUS FOR TREATING SURFACES

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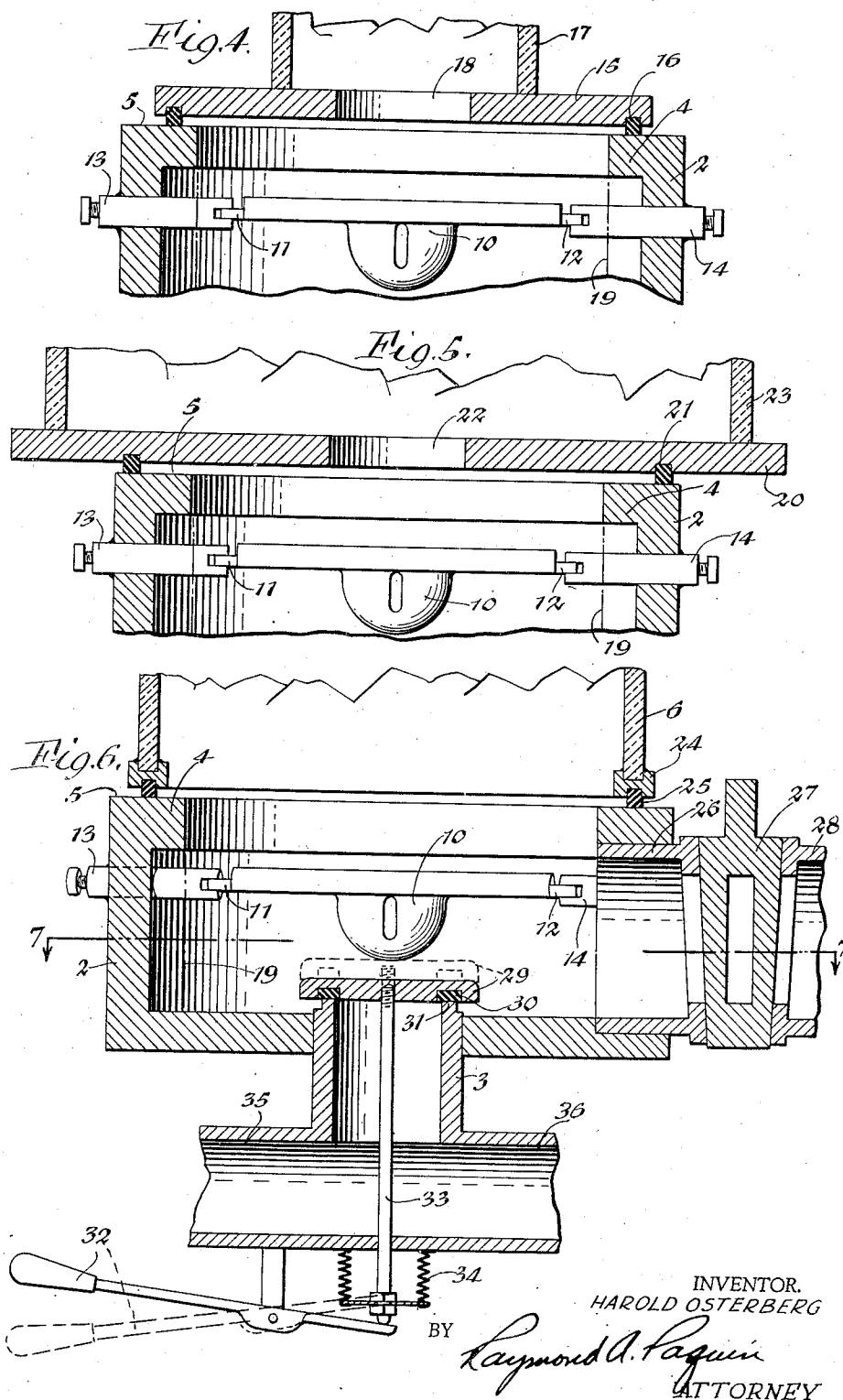
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APPARATUS FOR TREATING SURFACES

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UNITED STATES PATENT OFFICE

2,433,922

APPARATUS FOR TREATING SURFACES

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7 Claims. (Cl. 219—35)

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This invention relates to new and improved apparatus for treating the surface of an article and relates particularly to apparatus for the treating or coating of the surface of a light transmitting or light reflecting article to reduce or eliminate the reflection of light from such surface or to change the contour of the surface and thereby alter the light transmitting and/or light refracting properties of the article.

An object of the invention is to provide new and improved apparatus for treating or coating a surface of an article which is more simple, efficient and economical in construction and operation.

Another object of the invention is to provide a new and improved apparatus of the type set forth with which the size of the vacuum chamber may be easily and quickly varied to accommodate various sized articles or varying number thereof.

Another object of the invention is to provide new and improved apparatus of the type set forth with which it is more practical to form a vacuum chamber and to prevent the leaking of air into said chamber.

Another object of the invention is to provide a new and improved apparatus of the type set forth in which the vacuum may be formed more quickly and efficiently.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings. It will be understood that many changes may be made in the details of construction and arrangement of parts without departing from the scope of the invention as set forth in the accompanying claims. I therefore do not wish to be limited to the exact details of construction and arrangement of parts shown and described as the preferred forms have been shown by way of illustration only.

Referring to the drawings:

Fig. 1 is a sectional view of an apparatus embodying the invention.

Fig. 2 is a top plan view of the apparatus shown in Fig. 1.

Fig. 3 is a fragmentary view similar to Fig. 1 but showing a modified form of the invention.

Fig. 4 is a view similar to Fig. 3 but showing the apparatus adapted for a different size vacuum chamber.

Fig. 5 is a view similar to Fig. 4 but showing the apparatus adapted for a different size vacuum chamber.

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Fig. 6 is a view generally similar to Fig. 3 but showing a modified form of the invention; and

Fig. 7 is a sectional view taken on line 7—7 of Fig. 6 looking in the direction of the arrows.

In prior constructions of apparatus of the general type set forth it has been customary to place the terminals and other openings and members extending into the interior of the vacuum chamber through the bottom of said chamber. Because of the relatively small area of the bottom of said chamber the members were placed in very close relationship with each other, thus making it difficult to make and to keep the joints leak proof and also limiting the number of members which could be employed.

In the present apparatus the limitations in the prior art constructions, as set forth above, have been eliminated by the placing of the members extending into the vacuum chamber through the lower edges of the periphery of said member which allows ready excess to said members and which greatly increase the number of said members which may be employed.

Also, prior apparatus was constructed for a definite size vacuum chamber and did not allow a wide variation in the size of said vacuum chamber depending upon the number or size of the articles to be placed in said vacuum chamber. With the present apparatus it is possible to employ vacuum chambers varying over a wide range from a relatively small chamber to a relatively large chamber while using but a relatively small size base.

Referring more particularly to the drawings wherein similar reference characters designate corresponding parts throughout the several views, the device embodying the invention comprises the base member 1 having the upright side or wall portions 2 which can be formed integral therewith or formed separate and secured thereto. The exhaust opening or pipe 3 is provided to allow evacuating the vacuum chamber. The base 1 and wall 2 may be formed integrally by casting or other suitable process or as described above, they may be formed of separate members joined together with an air-tight connection. Also the exhaust member 3 may have a portion formed integral with the base 1 or may be separate pipe or the like connected to said base 1 by an air-tight connection. The walls 2 may be formed thick as shown in Fig. 1 or may be formed as shown in Fig. 3 of a relatively thin material having the overhanging flange 4 adjacent the upper edge thereof.

The upper edge 5 of said wall 2 or the upper surface of said flange 4 is adapted to receive the base of the bell jar or the like 6 to form the vacuum chamber.

In the vacuum chamber is provided the upright 7 which may be secured to the base 1 or the side wall 2 as desired, and which has adjacent its upper end the support 8 adapted to support the lens 9, the surface of which is to be coated by the coating material in the crucible 10. The crucible 10 has its ends 11 and 12 connected to the ends of the terminals 13 and 14. The said ends 11 and 12 may be connected to leads connected to said ends 11 and 12 and to said terminals.

The terminals 13 and 14 extend through the side walls 2 of said chamber and around each of said terminals is placed a ring of Glyptol or the like as shown to prevent the entrance of air between said terminals and the edges of the openings in said side wall through which said terminals are placed.

While said chambers are shown to be circular in shape it is, of course, to be understood that they may be formed square, rectangular or of any other desired shape.

In Fig. 4 the side walls are shown similar to that in Fig. 3, that is, of a thin wall with the overhanging flange 4 and on this overhanging flange 4 is placed an annular adapter member 15 which is adapted to be supported on the resilient washer or the like 16 which has one edge extending into a groove in the lower surface of said adapter ring 15 and its other edge seated on the upper surface of said flange 4 or the flat surface 5 of said wall and this allows the placing on said adapter 15 of a smaller bell jar or vacuum chamber member 17 which forms a smaller vacuum chamber than the bell jar or the like 6, shown in Figs. 1 and 3 and thus may be evacuated more quickly. This smaller vacuum chamber member 17 is particularly adapted for use where the number or size of the articles to be placed therein is relatively small.

Said adapter member 15 has the opening 18 to allow the material evaporated in the crucible 10 to reach the member to be coated.

In Figs. 4, 5 and 6 are shown the dotted lines 19 which indicate that the walls 2 may be formed thin with the overhanging flange 4 as shown in Fig. 3 or may be formed relatively thick as shown in Fig. 1.

In Fig. 5 is shown the annular adapter member 20, which is generally similar to the adapter member 15 in Fig. 4, except that said annular member 20 is of greater diameter than the diameter of the chamber 17 and has the resilient member 21 having one edge in a groove in said adapter member 20 and its other edge resting on the upper surface of said chamber 2. This adapter member 20 also has an opening 22 through which the material vaporized in the crucible 10 may reach the article to be coated.

It will be thus seen from Fig. 5 that the bell jar or other member 23 forming the vacuum chamber may be of larger diameter than the diameter of the chamber formed by the wall 2 to allow the placing of larger articles or a greater number of articles to be coated in said vacuum chamber. It is pointed out that while only a pair of said terminals 13 and 14 are shown as extending through said wall 2 at diametrically opposed points thereof that any desired number of said terminals may be placed through said wall as may also be placed on outlet for an ionization gauge outlet valve and outlet tube or other type gage

and that said terminals or other members may be placed at desired spacing or intervals in said wall 2.

In Fig. 6 is shown a form of the invention in which the supporting ring 24 has an annular slot or groove in the upper surface thereof to receive the bell jar or the like 6 and has on its opposite side a slot or groove adapted to receive the upper portion of the resilient washer or the like 25 which member 25 is adapted to rest on the upper surface of said chamber formed by the wall 2 to form an air-tight connection.

Said wall 2 has an opening therethrough in which is positioned the exhaust member 26 having the valve 27 and the pipe or the like 28 which is connected to a forepump. This allows the air in the vacuum chamber to be partially evacuated by said forepump before opening the exhaust 3 which is connected to the diffusion pump. In this arrangement the exhaust opening to the diffusion pump is provided with a closure member 29 having the resilient washer or the like 30 which is adapted to seat on the upper end 31 of said exhaust member 3 to prevent the passage of air through said exhaust 3 until the lever 32 is moved as shown in dotted lines in Fig. 6 to actuate the lever 33 which extends through the bellows member 34 to raise the closure member 29 to allow air to be evacuated through the member 3 and members 35 and 36 to diffusion pumps connected with said pipe members 35 and 36. By using the forepump which is connected to the vacuum chamber by the valve as shown in Fig. 6, it will be seen that a much larger opening to the forepump can be obtained than has been hitherto possible with prior constructions. This makes greater forepump speed possible and thereby facilitates rapid evacuation of the vacuum chamber.

It will be seen that by employing the construction of this apparatus that practically any desired size of vacuum chamber may be employed by using suitable adapters and the apparatus therefore lends itself to a wider range of usage, that is, it may be easily and quickly adapted for many variations to size or number of articles.

It is also pointed out that the interior of said casing 2 is preferably formed so as to present the least possible surface area to the vacuum and such that the surfaces are streamlined, smooth and readily cleaned.

From the foregoing it will be seen that I have provided simple, efficient and economical means for obtaining all of the objects and advantages of the invention.

Having described my invention, I claim:

1. In a device of the character described, a support member comprising a base having an upstanding flange adjacent the periphery thereof forming a hollow member, said support having an opening to allow the evacuation of air therefrom, and the upper exposed edge of said peripheral flange having a seat of sufficient area to receive and support a chamber member in such a manner that said chamber member and hollow member may be evacuated to provide a vacuum chamber whereby associated elements within the vacuum chamber may be supported from the side walls of the support member.

2. In a device of the character described, a support member comprising a base having an upstanding flange adjacent the periphery thereof forming a hollow member, said support having an opening to allow the evacuation of air therefrom, and the upper exposed edge of said peripheral flange having a seat of sufficient area to receive

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and support a chamber member in such a manner that said chamber member and hollow member may be evacuated to provide a vacuum chamber whereby associated elements may be supported internally of the vacuum chamber by means carried by the side walls of the support member and a plurality of terminals extending through said flange to provide a current supply within said vacuum chamber.

3. In a device of the character described, a support member comprising a base having an upstanding peripheral flange forming a hollow member, said support having an opening to allow the evacuation of air therefrom, a marginal flange on said upstanding peripheral flange adjacent the upper end thereof, said marginal flange forming a seat of sufficient area to receive and support a chamber member in such a manner that said chamber member and hollow member may be evacuated through said opening in said support member to provide an evacuated chamber whereby associated elements may project into said hollow member through the side walls of the support member.

4. In a device of the character described, a support member comprising a base having an upstanding peripheral flange forming a hollow member, said support member having an opening to allow the evacuation of air therefrom, a marginal flange on said upstanding peripheral flange, said marginal flange being adapted to support a chamber member whereby said chamber member may be evacuated through said opening in said support member to provide an evacuated chamber and a plurality of terminals extending through said upstanding flange to provide a current supply within said vacuum chamber.

5. In a device of the character described, a support member comprising a base having an upstanding flange adjacent the periphery thereof forming a hollow member, said support having an opening to allow the evacuation of air therefrom, and the upper exposed edge of said peripheral flange having a seat of sufficient area to receive and support a chamber member in such a manner that said chamber member and hollow member may be evacuated to provide a vacuum chamber whereby associated elements within the vacuum chamber may be supported from the side

walls of the support member and said upstanding flange having an opening therethrough for connection to a vacuum pump for aiding in evacuating said vacuum chamber.

6. In a device of the character described, a support member comprising a base having an upstanding flange adjacent the periphery thereof forming a hollow member, said support having an opening to allow the evacuation of air therefrom, and the upper exposed edge of said peripheral flange having sufficient area to receive and support a chamber member in such a manner that said chamber member and hollow member may be evacuated to provide a vacuum chamber whereby associated elements may be supported internally of the vacuum chamber by means carried by the side walls of the support member and an annular adapter member on the upper edge of said flange between said peripheral flange and said chamber member for allowing the use of various size chamber members as desired.

7. In a device of the character described, a support member comprising a base having an upstanding peripheral flange forming a hollow member, said support having an opening to allow the evacuation of air therefrom, a marginal flange on said upstanding peripheral flange, said marginal flange having sufficient area to receive and support a chamber member in such a manner that said chamber member and hollow member may be evacuated through said opening in said support member to provide an evacuated chamber and said upstanding flange having an opening therethrough for connection to a vacuum pump for aiding in evacuating said vacuum chamber.

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The following references are of record in the file of this patent:

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