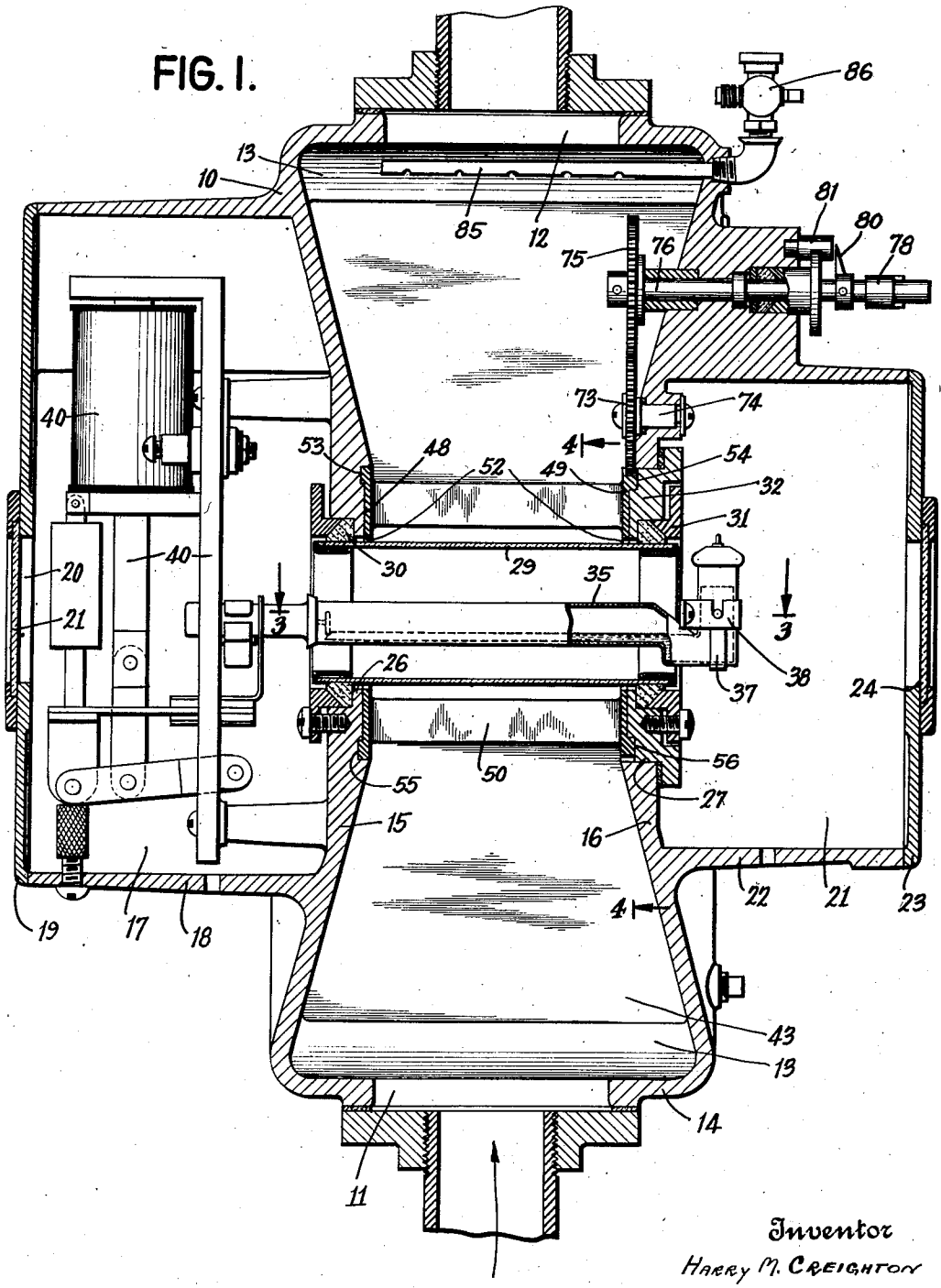
May 7, 1935. H. M. CREIGHTON 2,000,377

ACTIVE RAY TREATING DEVICE

Original Filed Feb. 1, 1929 3 Sheets-Sheet 1

FIG. 1.




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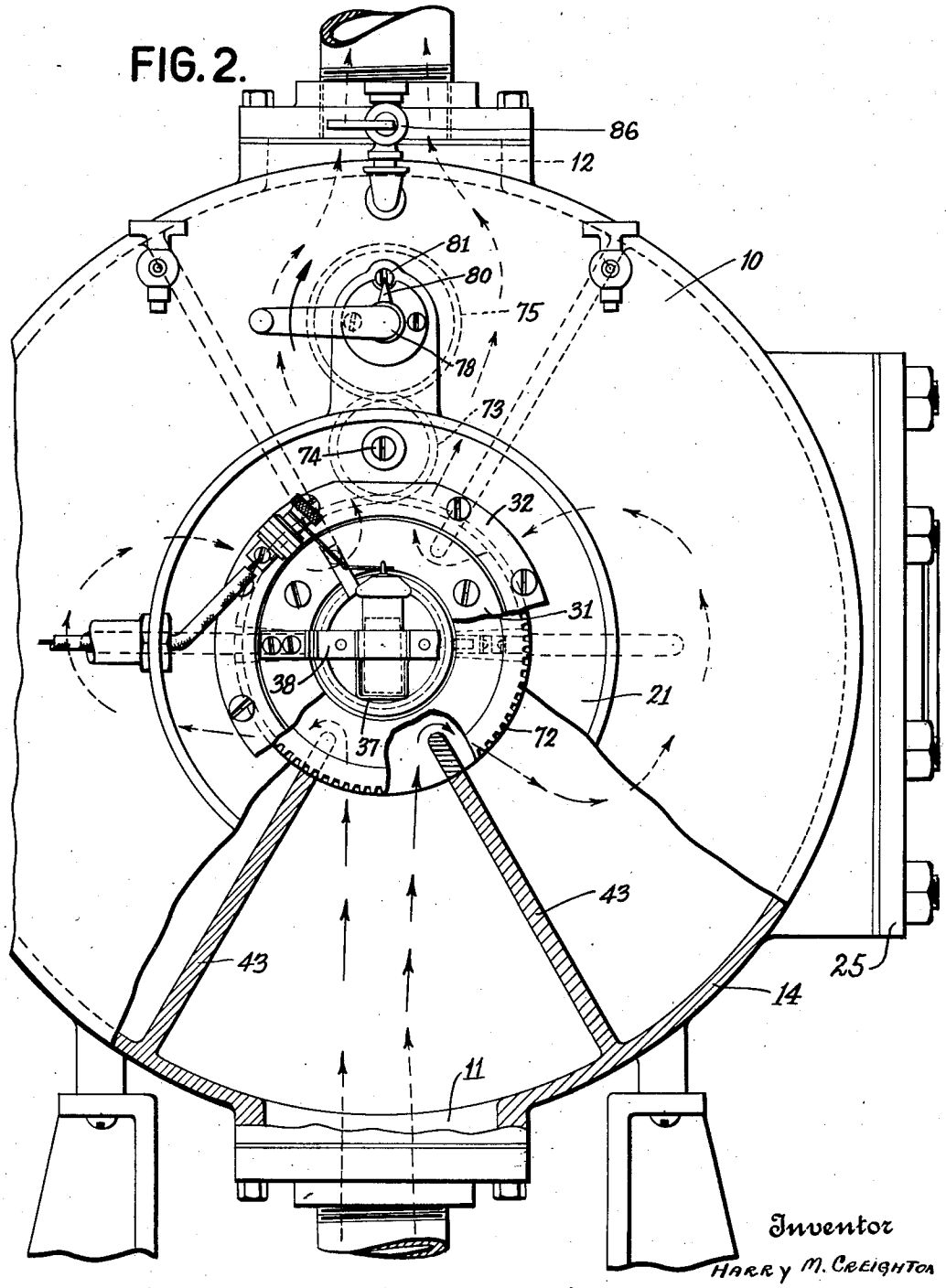
Bakeleber + Leabetter

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ACTIVE RAY TREATING DEVICE

Original Filed Feb. 1, 1929 3 Sheets-Sheet 2

FIG. 2.




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ACTIVE RAY TREATING DEVICE

Original Filed Feb. 1, 1929 3 Sheets-Sheet 3

FIG. 3.

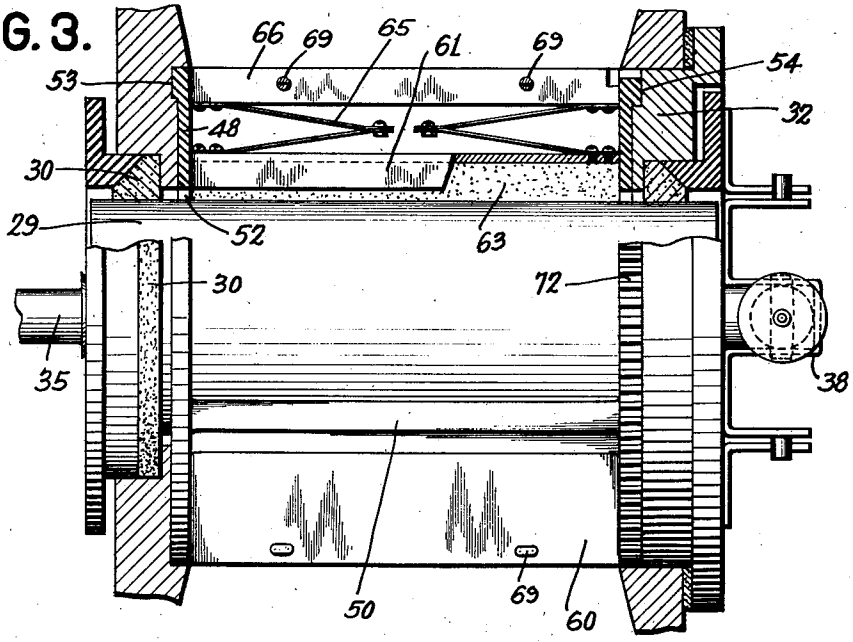
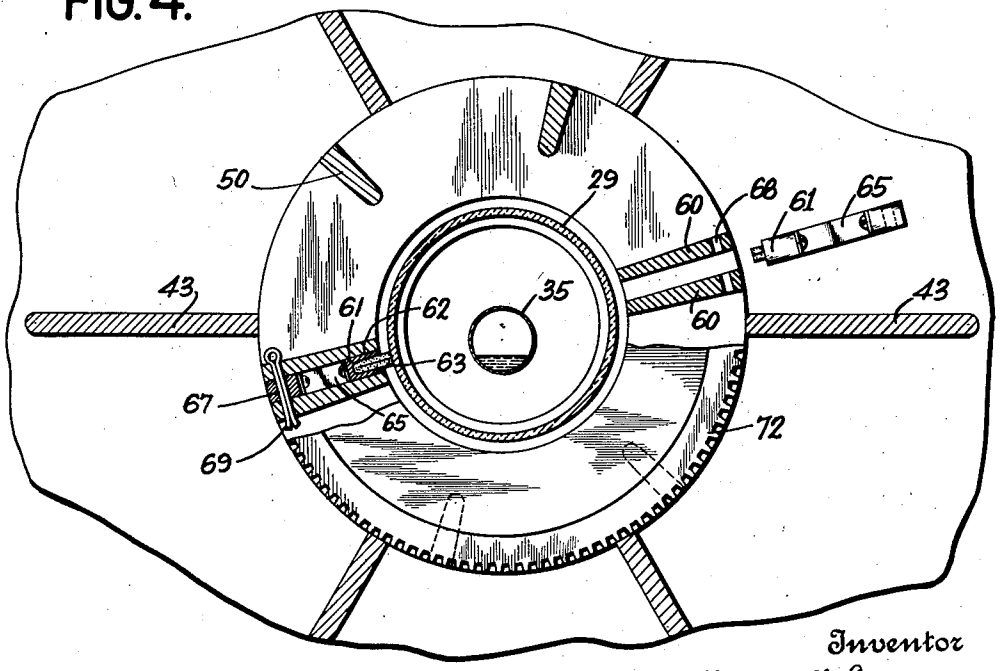



FIG. 4.




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# UNITED STATES PATENT OFFICE

2,000,377

## ACTIVE RAY TREATING DEVICE

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Application February 1, 1929, Serial No. 336,807
Renewed October 9, 1934

13 Claims. (Cl. 99—2)

This invention relates broadly to the treatment of substances, either fluid or solid, with light rays. More particularly, the invention relates to apparatus whereby fluids or solids as, for instance, finely comminuted matter may be subjected to rays emanating from a source, such as a mercury vapor lamp, as in the sterilization of water or the treatment of food products by ultraviolet rays.

Apparatus has been proposed in which material, either liquid or solid, has been directed in contact with or proximate to a transparent cylindrical casing enclosing a source of active rays. Difficulty has been experienced with such apparatus, however, in that, after a period of use, the passage of active rays through the transparent enclosure has been obstructed by deposits of the material being treated or foreign matter, for instance, dirt, upon the walls of the transparent enclosure.

The present invention seeks to provide means for removing deposits from the surface of the transparent enclosure surrounding the source of active rays. In accordance with the invention, a carrier, adapted to travel over the surface of the enclosure, is provided with means contacting with the surface to wipe off and remove any deposit thereon.

The invention also resides in a reconstruction of the treating apparatus to receive the cleaning device and to effect its travel.

The invention also has for its object the introduction of a fluid onto the surface of the transparent enclosure to treat the deposit so as, for instance, to facilitate the cleansing of the surface.

Still another object of the invention is the provision of a cleaning apparatus in which the parts contacting with the surface of the enclosure are readily removed for cleaning or replacement.

These and other objects of the invention and the means for their attainment will be more apparent from the following detailed description taken in connection with the accompanying drawings illustrating one modification by which the invention may be realized and in which:

Figure 1 is a view, in transverse vertical section, of the treating apparatus provided with the cleaning apparatus.

Figure 2 is a view in end elevation looking from the right in Figure 1, parts being removed in the interest of clearness.

Figure 3 is a fragmentary view, partly in horizontal section, on the line 3—3 of Figure 1.

Figure 4 is a vertical section in the planes indicated by the broken lines 4—4 of Figure 1.

The treating apparatus as a whole comprises a means or a casing, for instance, the casing 10 having the inlet 11 and the outlet 12. Between these two openings 11 and 12 extends the passage 13 defined by the cylindrical outer wall 14 and the transverse walls 15 and 16. With the wall 15 and outwardly of the passage 13, there is carried a chamber 17 defined by a generally cylindrical wall 18 which is adapted to be closed by a removable cover 19 formed with a peep hole 20 closed conveniently by a window 21. Upon the opposite side of the casing 10 and carried with the wall 16, is a chamber 21 defined by a cylindrical wall 22 closed by a removable cover 23 having a similar observation window 24. There is also a hand hole in the side of the casing 14 between the chambers 17 and 21 shown closed by the cover 25, see Figure 2. Wall 15 is formed with an aperture 26 preferably in the axis of the cylindrical chamber 13, and similarly the wall 16 is formed with an aperture 27. The aperture 27 is shown as of a diameter larger than that of the aperture 26, but, as will become apparent from the following description, both apertures may be of the size of aperture 27.

Extending through these apertures, axially of the chamber 13, is a transparent enclosure 29 which is illustrated as cylindrical and, if desired, may be supported at the one end by means of a packing gland 30 carried with the wall 15. At its opposite end the enclosure 29 is shown as supported in a packing gland 31 carried in a supplemental and removable wall member or portion 32 mounted in the larger aperture 27 in wall 16. Obviously, if both apertures are of the larger size, supplemental wall members are used at each end. Within the transparent enclosure 29 there is carried a source of active rays which is illustrated as a mercury lamp 35 having its one terminal located within the chamber 21 while the other terminal of the lamp extends into the chamber 17. The right hand terminal end of the lamp 35, as viewed in Figure 1, is carried in a stirrup 37 pivotally supported in the bracket 38 conveniently secured to the gland 31 so as to be removed therewith. In the chamber 17 there is mounted tipping mechanism shown as a whole at 40 adapted to be actuated when current is first supplied to the lamp to cause the left hand terminal end of the lamp to be raised so that the mercury therein will flow toward the right and break the liquid mercury bridge causing the arc to start. This is possibly due to the fact that the

right hand end of the lamp is pivotally supported by the stirrup 37 and bracket 38.

The tipping mechanism 40 being well known to those skilled in the art and forming no part of the present invention will not be described in detail.

Material, fluid or solid, to be treated by active rays is introduced, say, through the aperture 11 into the chamber 13 and passes through this chamber in a circuitous path about baffles 43, if present, as shown by the arrows in Figure 2. The material may thus be thoroughly agitated and every part of it brought close to the transparent enclosure 29 where the rays can fall upon and treat it.

In operation, a deposit sometimes eventually collects upon the walls of the transparent enclosure 29 obstructing the passage of the light rays and means are therefore provided to remove this deposit. Cleaning apparatus is illustrated as a generally cylindrical carrier or cage having annular ends 48 and 49 joined by fins or baffles 50. The annular ends 48, 49 are mounted over but out of contact with the transparent enclosure 29 within the passage 13 and the baffles 50 are adapted to register, when the cage is in operative position, with the baffles 43, if present, in chamber 10. These baffles 50 are also out of contact with the surface of the enclosure 29 so that the material may pass between said surface and the baffle in describing a tortuous path through the passage 13 and thus be agitated and mixed so that all portions of the material may be equally treated with the rays. These ends 48 and 49, being annular, are provided with the axially disposed apertures 52 which receive the enclosure 29 and, at the periphery remote therefrom, are formed with axially and outwardly extending bearing portions 53 and 54 which are adapted, in supporting the cage, to seat respectively in recess 55 in the wall 15 and in recess 56 in the supplemental wall member 32 so that the cage is freely rotatable in the passage 13 within the bearing formed by these recesses 55 and 56. This cage is thus movable over the surface of the enclosure and is preferably rotatable thereabout.

Cleaning or wiping elements are carried with the cage to contact with or wipe over the surface of the enclosure and remove deposits therefrom. In the illustrated embodiment, these cleaning members are included between a pair of diametrically disposed walls or fins 60 (see Figure 4) whereof each pair is adapted to register with certain of the baffles 43, if desired. Such cleaning members may comprise plungers 61 each formed with a recess 62 to receive a wiping element 63 say of felt. The plunger 61 is yieldingly supported, as by the springs 65, from a supporting member 66 formed with a passage 67 adapted to register with passages 68 in the fins 60 and to receive a cotter pin 69 removably securing the parts in position. Thus when the cleaning members 61—63 are in position they are secured to the cage and the wiping elements 63 are yieldingly held in engagement with the outer periphery of the transparent enclosure 29.

To cause these wiping elements to travel over the surface of the enclosure 29, the cage is rotated axially. To this end the annulus 49 is provided with teeth to form a gear 72 adapted to be engaged by a pinion 73 journalled on a shaft 74 mounted in the wall 16 of the casing 10 and this pinion 73 is rotated to turn the cage by means of a gear 75 secured upon the end of a shaft 76 journalled in the wall 16 and extending outwardly of the casing. There is shown, on the end of the shaft 76, a crank 78 by which the shaft may be rotated thereby rotating the gears 75 and 73 and in consequence, the cage whereby the cage may be caused to turn about the enclosure and carry the wipers 63 over the surface thereof. Any other means, automatic or otherwise, to rotate the annulus 49 is within the purview of the invention. In order that the fins 50 may register with the baffles 43 when material is to be treated, a pointer 80 is carried by the shaft 76 outwardly of the casing 10 and an index 81 is carried with the casing so that when the pointer is in register with the index, a visual indication is given that the fins 50 are in register with the baffles 43.

In situations where the deposit on the transparent enclosure 29 requires treatment such as softening before it can be scraped off by the wiping members 63, means are provided to introduce a treating medium into the chamber and upon the surface of enclosure 29. There is shown a perforated pipe 85 supported say in a wall of the casing 10 and connected, as by the valve 86, with a suitable source of the medium. When the deposit is to be removed, the passage 13 being free of material, a suitable medium such as a solvent may be sprayed onto the enclosure 29 while, if desired, the cage is being rotated.

It will be readily apparent that to replace the scraping elements 63, as occasion arises, it is merely necessary to remove one of the hand hole plates 25 for access to the interior of chamber 13. By turning the shaft 76, the cage may be turned sufficiently, as shown in Figure 4, to cause the plungers 61 to be out of line with the baffles 43 thereby permitting, after the cotter pins 69 are removed, the disengagement of the plunger members 61, 65, 66 which can then be withdrawn for the replacement of the scraping elements 63 etc.

It will thus be seen that cleansing means for a cylindrical surface such as the transparent enclosure surrounding the source of active rays in a treating apparatus is provided which is capable of operation from without the apparatus while the apparatus as a whole is so constructed and arranged as to permit the convenient servicing of the cleansing devices in an expeditious manner.

Various modifications will occur to those skilled in the art in the composition and configuration of the component elements going to make up this invention as a whole, and no limitation is intended by the phraseology of the foregoing description or illustrations in the accompanying drawings except as indicated in the appended claims.

What I claim is:—

1. In a device of the character described, in combination, a transparent enclosure for a source of active rays, baffles to direct substance proximate the enclosure, movable baffles in register therewith and means to clean the surface of said enclosure carried with said movable baffles.

2. In a device of the character described, in combination, a transparent enclosure for a source of active rays, means having a passage for material to be treated by active rays within which the enclosure is disposed, baffles in the passage, a cage surrounding said enclosure and rotatable thereabout and journalled in the walls of the passage, baffles carried with the cage adapted to register with the baffles in the passage, wiping means carried with the baffles of the cage and engaging the enclosure and means operable from

without said passage adapted to rotate the cage.

3. In a device of the character described, in combination, a transparent enclosure for a source of active rays, means having a passage in which said enclosure is disposed, stationary baffles in the passage, movable baffles therein adjacent the enclosure, wiping means carried with the movable baffles to engage the enclosure, and means to position the movable baffles in alignment with the stationary baffles.

4. In a device of the character described, in combination, a transparent enclosure for a source of active rays, means having a passage in which said enclosure is disposed, stationary baffles in the passage, movable baffles therein adjacent the enclosure, wiping means carried with the movable baffles to engage the enclosure, and means to index the movable baffles.

5. In a device of the character described, in combination, a transparent enclosure for a source of active rays, means having a passage in which said enclosure is disposed, stationary baffles in the passage radially disposed with respect to the enclosure, movable radial baffles therein rotatable about the enclosure, wiping means carried with the movable baffles to engage the enclosure, and means to index the movable baffles with respect to the stationary baffles.

6. In a device of the character described, in combination, a transparent enclosure for a source of active rays, means having a passage in which said enclosure is disposed, stationary baffles in the passage radially disposed with respect to the enclosure, movable radial baffles therein rotatable about the enclosure, wiping means carried with the movable baffles to engage the enclosure, and means external to the passage to index the movable baffles with respect to the stationary baffles.

7. In a device of the character described, in combination, a casing having a passage therethrough, a transparent enclosure for a source of active rays enclosed in the passage, at least one outwardly extending baffle means in contact with the transparent enclosure, at least one inwardly extending stationary baffle carried by the casing extending towards the transparent enclosure and having a space between the baffle and the transparent enclosure, and means for moving the portion of the baffle means engaging the surface of the transparent enclosure to clean the surface thereof.

8. In a device of the character described, in combination, a casing having a passage therethrough, a transparent enclosure for a source of active rays enclosed in the passage, at least one outwardly extending baffle means in contact with the transparent enclosure, at least one inwardly extending stationary baffle carried by the casing extending towards the transparent enclosure and having a space between the baffle and the transparent enclosure, the outwardly extending baffle means having a greater radial dimension than the space between the inwardly extending baffle and the transparent enclosure, and means for moving the portion of the baffle means engaging the surface of the transparent enclosure to clean the surface thereof.

9. In a device of the character described, in combination, a transparent enclosure for a source of active rays, a casing having a passage in which said enclosure is disposed, stationary baffles in the passage spaced from and movable wiping means in said passage in contact with the enclosure for directing the material to be treated towards and away from the transparent enclosure, and means for moving said wiping means with respect to said enclosure to wipe the surface thereof.

10. In a device of the character described, in combination, a transparent enclosure for a source of active rays, a casing having a passage in which said enclosure is disposed, stationary baffles in the passage spaced from and baffle means in said passage having a movable edge portion in proximity to the enclosure for directing the material to be treated towards and away from the transparent enclosure, wiping means carried on said edge portion to engage the surface of the enclosure and means to actuate the edge portion of the baffle means from without the device.

11. In a device of the character described, in combination, a transparent enclosure for a source of active rays, a casing having a passage for material to be treated by active rays within which the enclosure is disposed, baffles in the passage spaced from and baffle means in the passage in contact with the enclosure for directing the material to be treated towards and away from the transparent enclosure, said baffle means having movable parts in contact with the enclosure, a cage for supporting the movable parts of the baffle means, wiping means carried by the cage and adapted to engage the surface of the enclosure, and cage moving means operable from without said passage.

12. In a device of the character described, in combination, a transparent enclosure for a source of active rays, a casing having a passage for material to be treated by active rays within which the enclosure is disposed, baffles in the passage spaced from and baffle means in the passage in proximity to the enclosure for directing the material to be treated towards and away from said enclosure, parts of said baffle means being movable with respect to the enclosure, a cage on which the movable parts of the baffle means is supported, wiping means carried by the cage and engaging the enclosure and means operable from without said passage to rotate the cage.

13. In a device of the character described, in combination, a transparent enclosure for a source of active rays, a casing having a passage in which said enclosure is disposed, means movable along the surface of said enclosure disposed within the passage, cleaning means carried with the movable means to engage the surface of the enclosure, and spring means to press the cleaning means against the surface of the enclosure.

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