

[54] WEATHER-PROOF ENCLOSURE FOR VIDEO CAMERA OR THE LIKE HAVING CENTRIFUGAL ACTION WINDOW CLEANER

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[58] Field of Search 95/11 UW; 354/64

[56] References Cited

UNITED STATES PATENTS

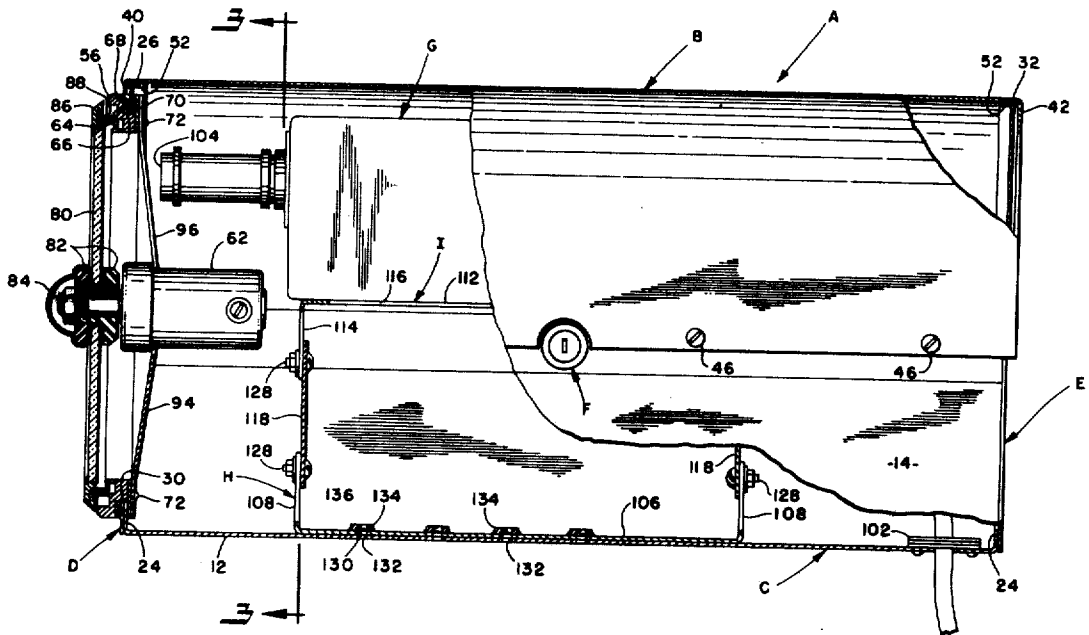
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Attorney, Agent, or Firm—Donnelly, Maky, Renner & Otto

[57] ABSTRACT

An enclosure for a camera or other surveillance device includes a housing having separable upper and lower housing parts and a front end. A transparent window is rotatably mounted at the front end of the housing and is rotated at a high angular velocity for housing off water or other matter by action of centrifugal force. Adjustable mounting means is located in the lower housing part for mounting a surveillance device at selected elevations for surveillance through the window.

4 Claims, 5 Drawing Figures



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FIG. 1

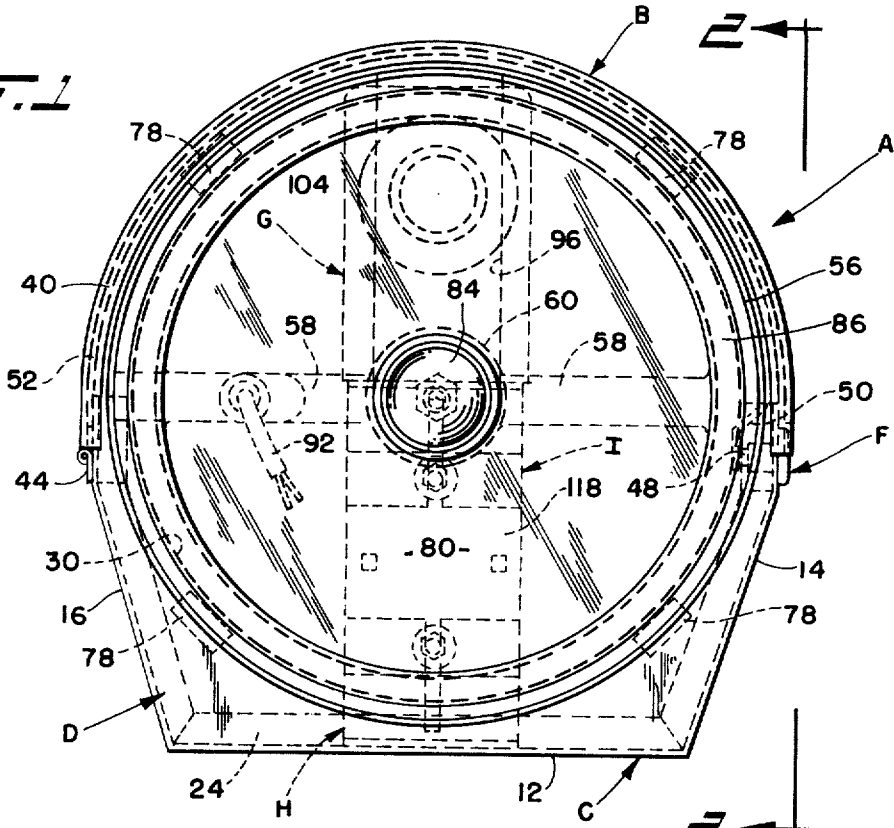
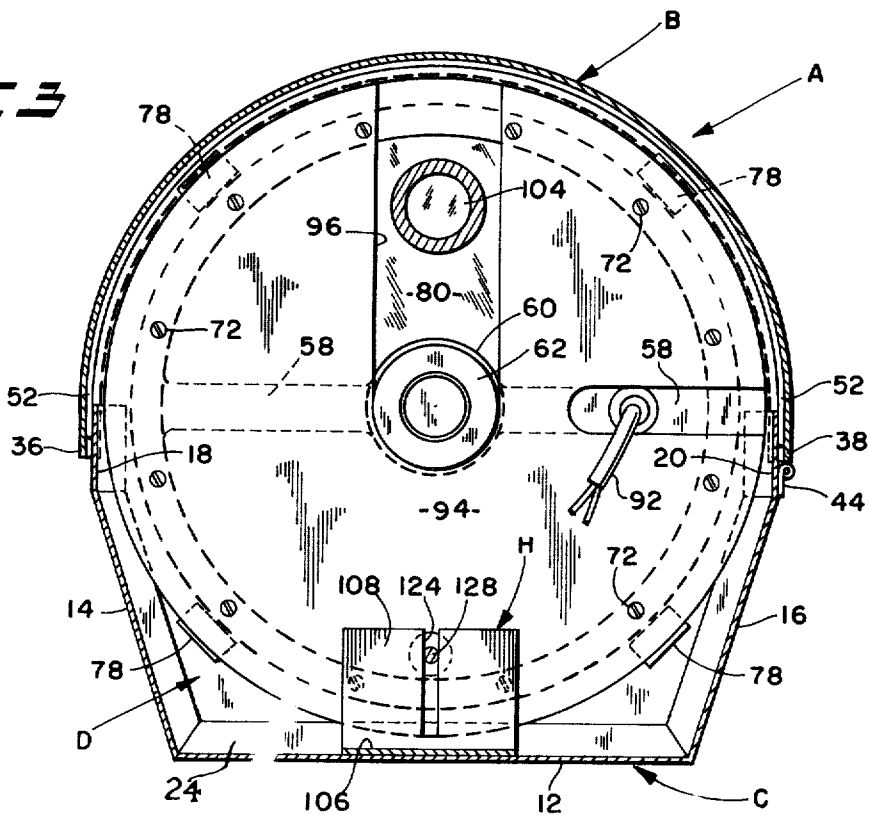


FIG. 3



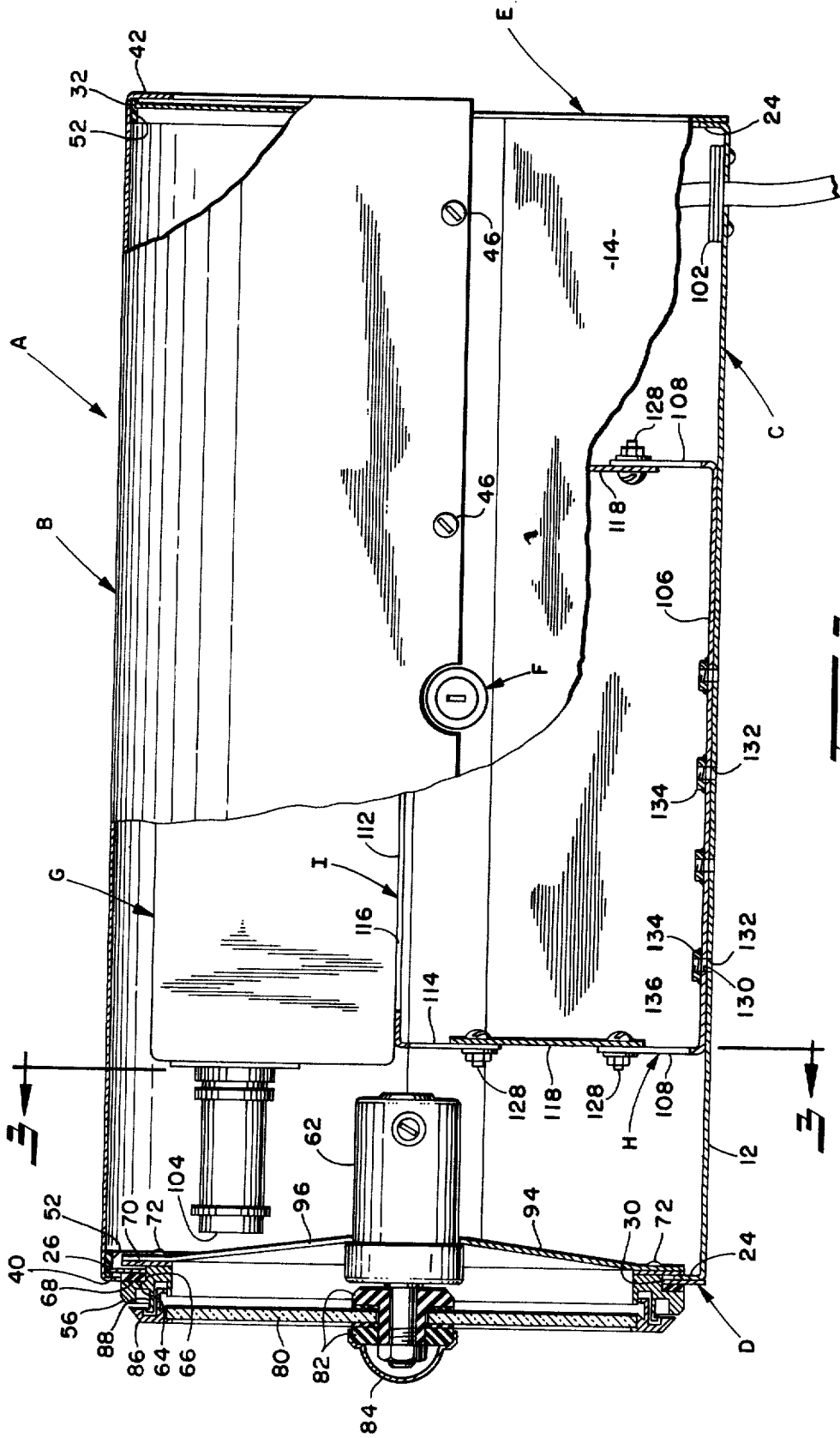
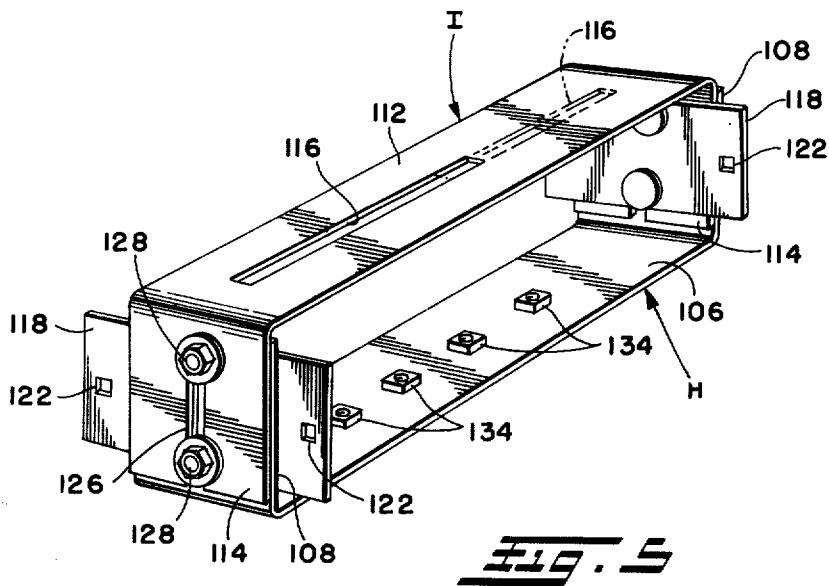
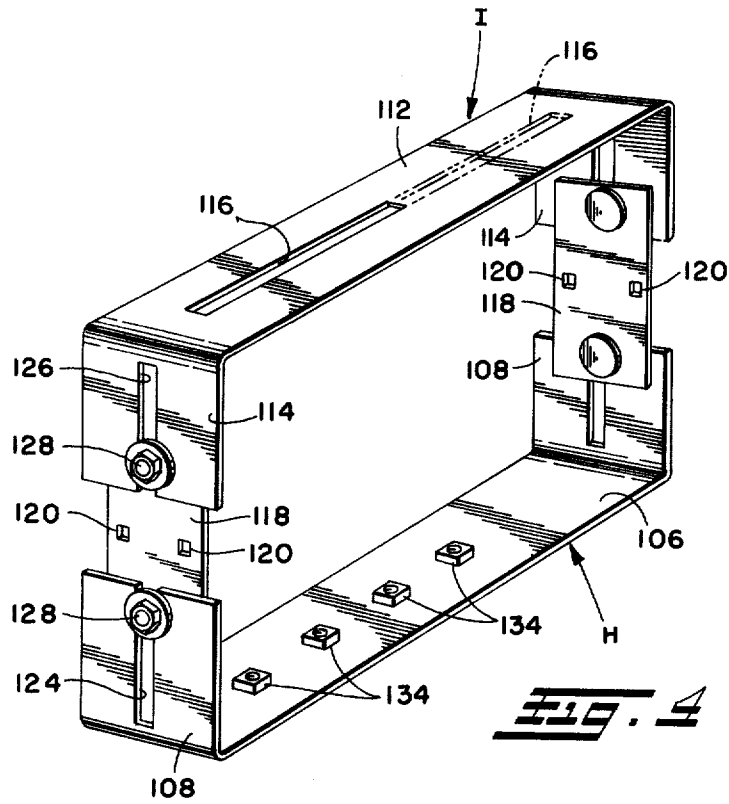


FIG. 2



WEATHER-PROOF ENCLOSURE FOR VIDEO CAMERA OR THE LIKE HAVING CENTRIFUGAL ACTION WINDOW CLEANER

BACKGROUND OF THE INVENTION

This application pertains to the art of enclosures, and more particularly to weather-proof enclosures for cameras and like surveillance devices.

Cameras and other surveillance devices located outdoors or near industrial operations are usually enclosed in a housing for protecting the surveillance device against adverse weather conditions or industrial contaminants. The housing has a transparent window through which the device views an area or an industrial operation. Rain, snow, dirt, industrial fumes and other contaminants coat the window and interfere with operation of the surveillance device. Frequent cleaning of the window is required and the surveillance device is essentially useless during periods of severe weather conditions. Mechanical wipers for the window wear out rapidly and require frequent replacement. Mechanical wipers also interfere with the view of the surveillance device and create shadows. Dirt particles acted upon by mechanical wipers often smudge or abrade the window.

Enclosures of the type described have also been of complex construction and do not provide a simple elevation adjustment for different types of surveillance devices.

SUMMARY OF THE INVENTION

In accordance with the present invention, an enclosure for a surveillance device includes a housing having a transparent window rotatably mounted at its front end. The window is rotated at a high angular velocity for throwing material therefrom by operation of centrifugal force. An adjustable mounting device is provided in the housing for mounting a surveillance device at a selected elevation for surveillance through the rotating window.

In a preferred arrangement, the housing includes separable upper and lower parts to provide easy access to the interior of the housing. The upper and lower housing parts are preferably hinged together along hinged edges extending between the front and rear ends of the housing. Elastomeric gasketing is positioned between the edges of the upper and lower housing parts to completely seal the housing. The upper housing part has longitudinal edge portions overlapping the longitudinal edge portions on the lower housing parts.

In a preferred arrangement, the lower housing part has a substantially flat bottom wall and opposite sidewalls diverging upwardly therefrom. The upper housing part is arcuately curved generally along the surface of a cylinder so that the housing presents a very low profile, and moisture or dirt easily rolls off.

The adjustable mounting device includes a first bracket secured to the bottom wall of the lower housing part and having upstanding first bracket flanges. A second bracket has downwardly extending second bracket flanges releasably clamped to the first bracket flanges for selectively positioning the second bracket at a selective elevation relative to the bottom wall.

It is a principal object of the present invention to provide an improved enclosure for a surveillance device.

Another object of the invention is to provide an enclosure for a surveillance device with a rotating viewing window to which moisture or dirt will not cling.

A further object of the invention is to provide an enclosure for a surveillance device with a highly simplified adjustable mounting means for a surveillance device.

An additional object of the invention is to provide a surveillance device housing which is very economical to manufacture.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a front elevational view of an enclosure for a surveillance device constructed in accordance with the present invention;

FIG. 2 is a side elevational view looking generally in the direction of arrows 2—2 of FIG. 1 and with portions cut away for clarity of illustration;

FIG. 3 is a cross-sectional elevational view looking generally in the direction of arrows 3—3 of FIG. 2;

FIG. 4 is a perspective illustration of an adjustable mounting device; and

FIG. 5 is a perspective illustration of the mounting device of FIG. 4 assembled in a different mode.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings, wherein the showings are for purposes of illustrating a preferred embodiment of the invention only and not for purposes of limiting same, FIGS. 1-3 show an enclosure for a surveillance device constructed in accordance with the present invention. The enclosure comprises a hollow housing A having separable upper and lower housing parts B and C. Housing A is preferably constructed of sheet metal, although it will be appreciated that other materials can be used.

Lower housing part C includes a flat rectangular bottom wall 12 having integral opposite sidewalls 14 and 16 diverging upwardly therefrom and terminating at vertical longitudinal edge portions 18 and 20. The opposite ends of lower housing part C are bent radially inward to provide a continuous peripheral flange 24 extending along bottom wall 12, sidewalls 14 and 16, and longitudinal edge portions 18 and 20.

A front end plate D has the outer peripheral edge of its lower half dimensioned and shaped to correspond with the cross-sectional configuration of lower housing part C. Plate D is positioned against peripheral flange 24 on lower housing part C and welded thereto. Suitable caulking may be applied along the joint if so desired. Top peripheral edge 26 of the upper half of front plate D lies on the periphery of a circle which terminates tangent to the outer surfaces of longitudinal edge portions 18 and 20 on lower housing part C. Front plate D has a circular hole 30 therethrough for mounting a rotatable transparent window to the front end of housing A. A rear plate E has the same shape as front plate D and is secured to the rear end of lower housing part C in the same manner as described with reference to front plate D. Rear plate E does not have a circular hole therethrough. Rear plate E has a circular top edge 32 lying on the surface of a cylinder which is also common to top edge 26 of front plate D.

Upper housing part B is formed into a generally semi-cylindrical shape which terminates at tangential longitudinal edge portions 36 and 38 parallel to longitudinal edge portions 18 and 20. The inner surface of upper

housing part B lies on the periphery of a circle having a slightly larger radius than top edges 26 and 32 of end plates D and E so that longitudinal edges 36 and 38 overlap longitudinal edges 18 and 20 outwardly thereof. The opposite ends of upper housing part B are bent radially inward to provide radially extending peripheral flanges 40 and 42 which overlies the upper peripheral portions of end plates D and E outwardly thereof.

A piano hinge 44 is welded to the outer surface of longitudinal edge portion 20 and the inner surface of longitudinal edge portion 38 for hingedly connecting upper housing part B to lower housing part C along one overlapped longitudinal edge of housing A. The opposite overlapped longitudinal edge of housing A defined by longitudinal edge portions 18 and 36 have suitable openings therethrough for mounting and receiving one-quarter turn type of fasteners 46 for securing edge portion 36 to edge portion 18. A moisture proof key-type of lock F is also mounted centrally of longitudinal edge portion 18 and has a keeper 48 cooperating with a latch 50 on upper housing part B. Lock F is a deterrent to vandals who might otherwise use a screwdriver for removing fasteners 46 to gain access to the interior of housing A. Key-type of lock F presents more difficulty to vandals and prevents unauthorized persons not having a key from gaining access to the interior of housing A.

Elastomeric strip gasketing 52, in the form of closed cell plastic or rubber foam, is adhesively secured to upper housing part B. Gasketing 52 is positioned to provide a good seal between upper housing part B and top arcuate edges 26 and 32 of end plates D and E. Gasketing 52 is also positioned to provide a good seal between overlapped edge portions 18 and 36, and 20 and 38.

A rotatable transparent window unit is mounted to front plate D. The window unit includes a circular frame 56 having a pair of opposite spokes 58 connected thereto and to a central hub 60 having an electric motor 62 mounted thereon. Circular frame 56 is stepped as at 64 for reception through opening 30 in plate D and to provide a circumferential shoulder 66. A circular gasket 68 is positioned between shoulder 66 and the outer surface of plate D adjacent opening 30. A circular securing ring 70 is secured to circular frame 56 by screws 72, securing ring 70 is positioned inside of front end plate D. Spacer pads 78 welded to the inner surface of plate D adjacent opening 30 bear against securing ring 70 so that tightening of screws 72 will draw shoulder 66 toward plate D and tightly compress gasket 68 to provide a good seal.

A circular transparent window 80 of tempered glass or other suitable material has a central hole therethrough. Center mounts 82 positioned on opposite sides of window 80 adjacent the central hole therethrough mount window 80 on the shaft of motor 62. A cap 84 is a snap fit on the outer one of center mounting members 82. Window 80 has a circular rim 86 secured to its outer periphery. Circular frame 56 and circular rim 86 have overlapping circumferential flanges 88 and 90 to provide a tortuous path for preventing moisture or dirt from passing between frame 56 and rim 86. At least one of spokes 58 is hollow and electrical wiring 92 extends therethrough for connection with motor 62.

A black disc 94 of hardboard or the like has a radial slot 96 therein receiving motor 62. The outer peripheral

portion of disc 94 is secured to securing ring 70 by screws 72. A camera or other surveillance device is positioned so that its lens views through slot 96. Black disc 94 blocks out the remainder of window 80 to minimize glare on the lens of the surveillance device. Disc 94 has a smaller slot spaced 90° from viewing slot 96 and positioned rearwardly of one spoke 58 in FIG. 1 for receiving wiring 92.

Motor 62 is operated for rotating window 80 at a high angular velocity, such as around 1500-2200 rpm. Moisture or dirt contacting the outer surface of window 80 is rapidly thrown outwardly therefrom. This maintains window 80 substantially clear of moisture or dirt to minimize any distortion or interference with the view presented to a surveillance device positioned within housing A.

Bottom wall 12 of lower housing part C has a suitable sealed entrance 102 adjacent rear plate E for an electrical cable connected with motor 62 and a surveillance device.

A closed circuit television camera, a motion picture camera, an infra-red sensor, or other types of remote surveillance devices may be positioned within housing A. A camera is shown at G in FIG. 2 and has a lens 104 positioned closely adjacent disc 94 for viewing through slot 96 and window 80. Surveillance devices of the type described come in many shapes and sizes, and an adjustable mounting means is provided in housing A for positioning various types and sizes of surveillance devices for viewing through slot 96. In one arrangement, the adjustable mounting means comprises a bottom or first generally U-shaped bracket H having a base 106 and opposite upright flanges 108. First bracket base 106 is spot welded generally centrally to bottom wall 12. An upper or second U-shaped bracket I has a base 112 and opposite depending flanges 114. Base 112 of second bracket I has an elongated slot 116 extending longitudinally thereof over less than two-thirds of the distance between flanges 114. A mounting bolt on a surveillance device is adapted to extend through slot 116 and be clamped to base 112 by a nut. Longitudinal adjustment of the surveillance device for positioning its lens or sensor closely adjacent plate 94 is made simply by shifting the mounting bolt relative to slot 116. For extremely long surveillance devices, bracket I may be reversely positioned so that slot 116 is located closer to rear plate E than front plate D. Having slot 116 extend no more than two-thirds of the distance between flanges 114 leaves base 112 relatively stiff to prevent its bending by heavy surveillance devices. At the same time, slot 116 effectively extends substantially the full length between flanges 114 for mounting purposes due to the reversability of top bracket I.

Rectangular spacer plates 118 cooperate with brackets H and I, and have opposite sets of spacer holes 120 and 122 therein. Flanges 108 and 114 have centrally located vertical slots 124 and 126 therein. Bolt and nut assemblies 128 cooperate with either set of spacer holes 120 or 122, and with slots 124 and 126, to releasably clamp brackets H and I together, with base 112 of bracket I located at any desired elevation relative to bottom wall 12 of lower housing part C. Spacer plates 118 may be positioned with their long dimension extending horizontal as shown in FIG. 5 for a very low profile. Adjustment upward may be made from this position by loosening bolt and nut assemblies 128 for sliding bracket I and plates 118 upwardly relative to bot-

tom bracket H. For higher elevations, plates 118 are positioned as shown in FIG. 4. Bolt and nut assemblies 128 then extend through set of holes 122 for increasing the elevation of base 112 relative to bottom wall 12. FIG. 4 shows base 112 in its maximum elevation, while FIG. 5 shows base 112 in its lowest elevation. Obviously, selective adjustment to any location between the minimum and maximum elevation shown is possible.

Base 106 of bottom bracket H has a plurality of longitudinally-spaced holes 130 therethrough aligned with a like number of longitudinally-spaced holes 132 in bottom wall 12 of lower housing part C. Nuts 134 are tack welded to the upper surface of base 106 with threaded holes 136 therein aligned with holes 130 and 132. These mounting holes receive bolts for mounting housing A to any desirable type of mounting member. The housing may then be secured to a fixed, adjustable, panning, or panning and tilting mount.

Although the invention has been shown and described with respect to a preferred embodiment, it is obvious that equivalent alterations and modifications will occur to others skilled in the art upon the reading and understanding of this specification. The present invention includes all such equivalent alterations and modifications, and is limited only by the scope of the claims.

The embodiments of the invention in which an exclusive property is claimed are defined as follows:

1. An enclosure for a surveillance device, comprising; a housing having separable upper and lower housing parts and a front end, a transparent window rotatably mounted at said front end, drive means for rotating said window at a high angular velocity, adjustable mounting means in said lower housing part for mounting a surveillance device at selected elevations for surveillance through said window, said lower housing part having a substantially flat bottom wall and opposite sidewalls extending outwardly and upwardly therefrom, said adjustable mounting means including a first bracket secured to said bottom wall and having upstanding first bracket flanges, a second bracket having downwardly extending second bracket flanges releasably clamped to said first bracket flanges for selectively positioning said second bracket at a plurality of selective elevations relative to said bottom wall, and bracket spacer plate means releasably clamped to said flanges.

2. The enclosure of claim 1 wherein said first bracket has a first bracket base secured to said bottom wall,

said bottom wall having a plurality of longitudinally-spaced mounting holes therethrough, and said first bracket base having a plurality of threaded holes aligned with said mounting holes.

3. An enclosure for a surveillance device, comprising; a housing having separable upper and lower housing parts and a front end, a transparent window rotatably mounted at said front end, drive means for rotating said window at a high angular velocity, adjustable mounting means in said lower housing part for mounting a surveillance device at selected elevations for surveillance through said window, said lower housing part having a substantially flat bottom wall and opposite sidewalls extending outwardly and upwardly therefrom, said adjustable mounting means including a first bracket secured to said bottom wall and having upstanding first bracket flanges, a second bracket having downwardly extending second bracket flanges releasably clamped to said first bracket flanges for selectively positioning said second bracket at a plurality of selective elevations relative to said bottom wall, said flanges having substantially vertical slots therein, and releasable clamping means extending through said slots for releasably clamping said first and second bracket flanges together.

4. An enclosure for a surveillance device, comprising; a substantially sealed housing having separable upper and lower housing parts of which the lower housing part has a front end having a circular frame with opposite horizontal spokes and a central hub, a transparent circular window rotatably mounted within said frame and in front of said spokes and hub, a motor supported in said housing by said hub having a drive shaft connected to the center of said window for rotatably driving said window at a high angular velocity, vertically adjustably mounting means in said lower housing part rearwardly of said motor for mounting a surveillance device at selected elevations for surveillance through said window above said motor, and means rearwardly of said window and frame for blocking transmission of light through said window to the interior of said housing except in a small open area above said motor, said means for blocking transmission of light comprising an opaque disc member rearwardly of said spokes and hub and having a central opening through which said motor extends rearwardly and said small open area comprising a generally vertical slot in said disc member above said motor.

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