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SIGHT FLOW BOX

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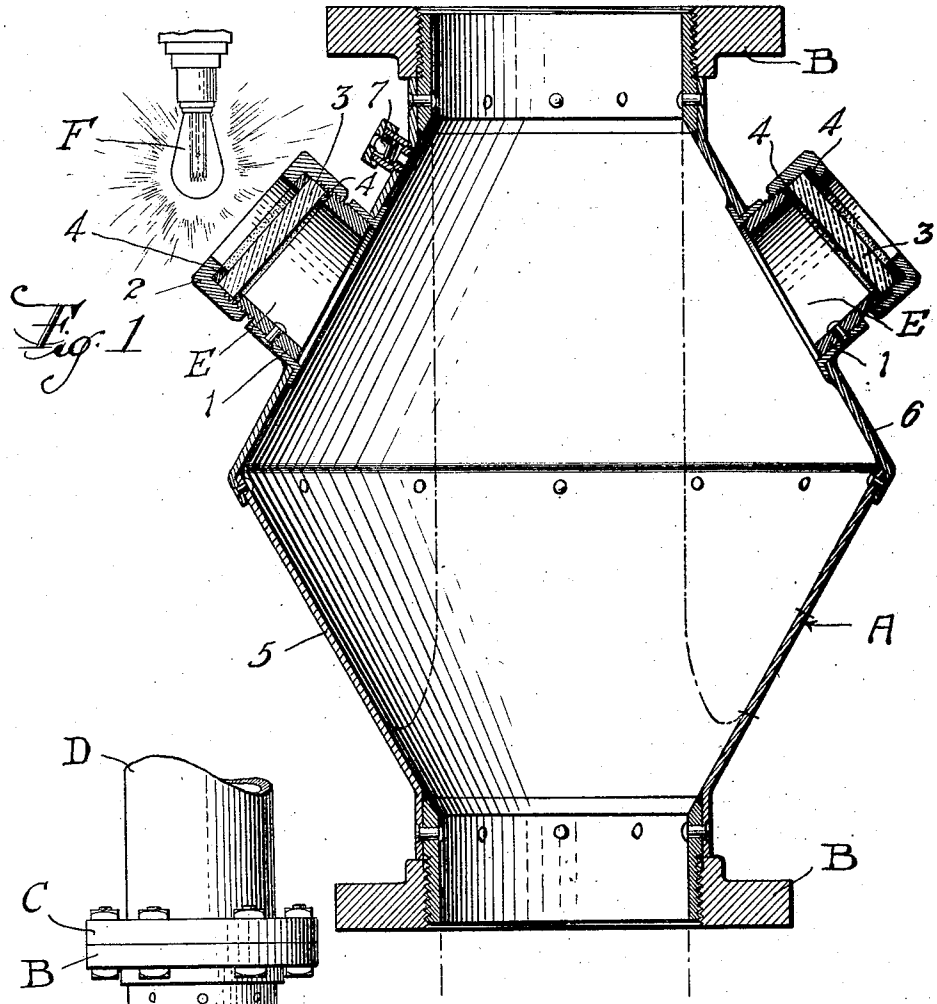



Fig. 1

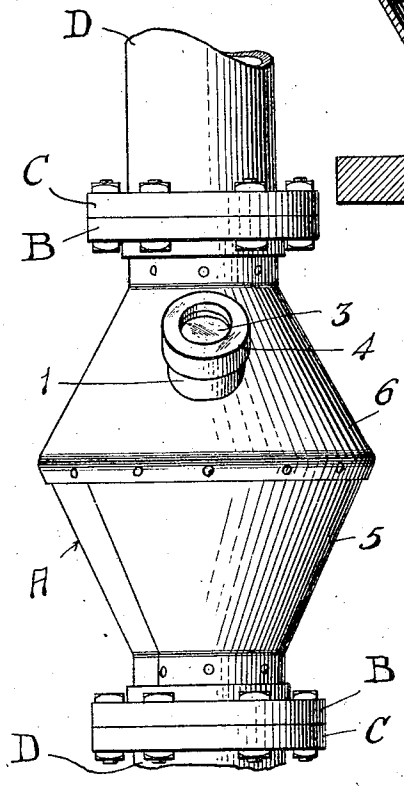



Fig. 2

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## SIGHT FLOW BOX.

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This invention relates to a device known in the art as a sight flow box which when connected in a liquid circulating pipe line affords means for visually ascertaining whether the required liquid flow obtains in the pipe line, and more particularly the invention is designed for use in water cooling systems for the bearings of turbo-generators whereby the magnitude of flow of water through the cooling system may be easily and quickly ascertained by a glance of the operator into the sight flow box.

One object of the invention is to provide a device of the character described embodying novel and improved features of construction whereby the stream or column of water flowing through the device may be clearly discerned even without careful scrutiny, the invention contemplating an arrangement of viewing or sight openings in the flow box casing in such relation to the path of flow of the water through the box that a large area of the stream or column of water is visible and whereby the reflection of light by the water column is effectively utilized for making the water clearly visible.

Another object is to provide a sight flow box having a plurality of sight openings arranged in such relation to each other and to the path of flow of water through the box that artificial light, such as an electric incandescent lamp, may be applied to one sight opening for illuminating the interior of the box and the stream or column of water without the glare or brilliancy of the light interfering with the sight of an operator looking through another of the sight openings.

Further objects of the invention are to provide a sight flow box comprising an enlarged chamber through which a stream of water may flow from one end to the other in spaced relation to the walls of the chamber with the sight openings arranged at opposite sides of the chamber and inclined downwardly at an angle to each other; to provide such a device in which the lower portion of said chamber serves as an overflow reservoir for the water in the pipe line to compensate for obstructions in the pipe line which reduce the flow of water therethrough and wherein the amount of the overflow and whether a flow of water continues through the box can at the same time be easily ascertained; to provide a sight flow box so constructed that the sight openings do not materially project beyond the outer surface of the box so that they are protected against being struck by moving objects passing the box, and to obtain other results and advantages as may be brought out by the following description.

Referring to the accompanying drawings, in which corresponding and like parts are designated throughout the several views by the same reference characters.

Figure 1 is a transverse vertical sectional view through a sight flow box embodying the invention, and

Figure 2 is a side elevation of the flow box on a reduced scale, viewing the same at a position at 90 degrees to that illustrated in Figure 1 and showing the box connected in a pipe line.

Specifically describing the illustrated embodiment of the invention, the reference character A designates a body or casing having a chamber and provided at opposite ends with means for connecting the body in a pipe line, in the present instance flanges B which are adapted to be bolted to corresponding flanges C on the ends of pipes D between which the box is to be connected. The portion of the casing intermediate its ends is larger in cross-sectional area than the ends thereof to form a chamber which is larger in cross-sectional area than the stream of liquid which flows through the pipes D. As illustrated on the drawings, the upper end of the casing A is the inlet end, and the liquid flows by gravity longitudinally of the chamber as indicated by dot and dash lines, and a small quantity of the liquid usually remains in the lower end of the chamber as indicated. The inlet and outlet are preferably substantially on the longitudinal axis of the casing so that the liquid is in spaced relation to the walls of the chamber as it falls therethrough.

Two sight openings E are provided in the upper portion of the casing and arranged substantially diametrically opposite and inclined downwardly and inwardly of the casing obliquely to the inlet and at an angle to or out of alignment with each other. These sight openings may be formed in any suitable manner, but in the present instance are shown as comprising nipples 1 secured to and projecting from the casing upon the outer ends of which are threaded flanged

caps 2 between which and the ends of the nipples are clamped glass plates 3. Preferably, packing rings 4 are interposed between the glass plates 3 and the caps and the nipples, both to provide resilient seats for the plates and to prevent leakage of liquid through the sight openings should the liquid flow in the pipe line so as to completely fill the casing A.

With this relative arrangement of the sight openings to the path of flow of liquid through the casing A, a larger area of the stream or column of liquid may be seen through the sight openings than if the said openings were arranged at right angles to the path of flow of the liquid, and furthermore, the stream of liquid is so viewed that the reflection of light therefrom materially assists in making the stream visible. Also, the particular arrangement of the sight openings at an angle to or out of alignment with each other, permits the application of a light such as an electric incandescent lamp F at one of the sight openings and an operator to look into the opposite sight opening so that the stream of water can be easily seen due to the illumination thereof by the light F, and the light is prevented from shining directly into the eyes of the operator so as to interfere with his sight. Another advantage of the downwardly inclined or oblique arrangement of the sight opening is that the flow of liquid through the box can be more effectively viewed from a distance so that an operator may slowly walk past the box and see the flow without stop or careful scrutiny, and this is particularly desirable where there are a large number of the boxes to inspect as is frequently the case in large plants. The construction also enables the operator to ascertain the level of the liquid in the lower end of the casing and at the same time ascertain whether and to what extent the liquid is flowing into the box, so that the necessary repairs or adjustments in the pipe line or flow of liquid may be made.

The casing A may be constructed in any suitable manner, but preferably comprises two frusto-conical sheet metal sections 5, 6 each of which has its small end connected to one of the flanges B and its large end connected to the large end of the other section; and the two sections 5 and 6 are preferably of the same length so that their large ends meet at substantially the center of the length of the casing. The sight openings E are arranged in the upper section, and it will be noted that they do not substantially project beyond the periphery of the large middle portion of the casing A, so that the nipples 1, caps 2 and glass plates 3 are protected against being struck by passing objects.

Preferably an inwardly opening check valve 7 is connected to the upper end of the chamber to automatically admit air into the chamber, said valve normally being open and closing under pressure within the chamber.

While I have shown and described the sight flow box as embodying certain details of construction, it will be understood that this is primarily for the purpose of illustrating the principles of the invention and that many modifications and changes may be made in these details by those skilled in the art, without departing from the spirit or scope of the invention. Therefore, I do not desire to be understood as limiting myself except as required by the following claims when construed in the light of the prior art.

Having thus described the invention, what I claim is:

1. A sight flow box comprising a body having a chamber provided with an inlet and an outlet, said body having a sight opening directed into said chamber obliquely to said inlet through which a column of liquid entering said chamber can be viewed obliquely to its axis and a large area made visible.

2. A sight flow box comprising a body having a chamber provided with an inlet and outlet, and a pair of sight openings directed into said chamber out of alinement with each other whereby a column of liquid entering said chamber can be viewed through one of said openings and light directed through the other opening upon said column so that visibility is enhanced without interference by glare with vision through the first-mentioned opening.

3. A sight flow box comprising a body having a chamber provided with an inlet and an outlet, and a pair of adjacently disposed sight openings directed into said chamber at an angle to each other whereby a column of liquid entering said chamber can be viewed through one of said openings and light directed through the other opening upon said column so that visibility is enhanced without interference by glare with vision through the first-mentioned opening.

4. A sight flow box comprising a body having a chamber provided with an inlet and an outlet, and a pair of oppositely disposed sight openings directed into said chamber at an angle to each other and one thereof obliquely to said inlet, whereby a column of liquid entering said chamber can be viewed through one of said openings and light directed through the other opening upon said column so that visibility is enhanced without interference by glare with vision through the first-mentioned opening.

5. A sight flow box comprising a body having a chamber provided with an inlet and an outlet, a pair of oppositely disposed

sight openings directed into said chamber at an angle to each other and each obliquely to said inlet, whereby a large area of a column of water in said chamber can be viewed through either of said openings and light directed into said chamber through the other opening to enhance visibility without interference by glare with vision through the first-mentioned opening.

6. A sight flow box comprising a body having a chamber provided with an inlet and an outlet, a portion of said chamber being substantially co-axial with and of larger cross-sectional area than said inlet, said body being provided with a sight opening directed into the enlarged portion of said chamber adjacent and obliquely to said inlet and toward the outlet, whereby a column of liquid entering said chamber and an accumulation of liquid in said enlarged portion can be viewed through said opening.

7. A sight flow box comprising a body having a chamber, an inlet and an outlet co-axially disposed, the walls of said chamber diverging from said inlet and said outlet toward the center of the length thereof, said body having a plurality of openings directed into said chamber one obliquely to the axis thereof and toward said outlet, whereby a stream of liquid flowing through said inlet may be viewed obliquely to its path of flow and any accumulation of liquid in said chamber can be seen through said one of said openings.

8. A sight flow box comprising a body having oppositely arranged coaxial frusto-conical portions to form a correspondingly shaped chamber within said body, the small end of each of said portions being formed with a coaxial opening, said body having a plurality of sight openings in one of said portions directed into said chamber, one of said openings being oblique to the axis of said body.

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