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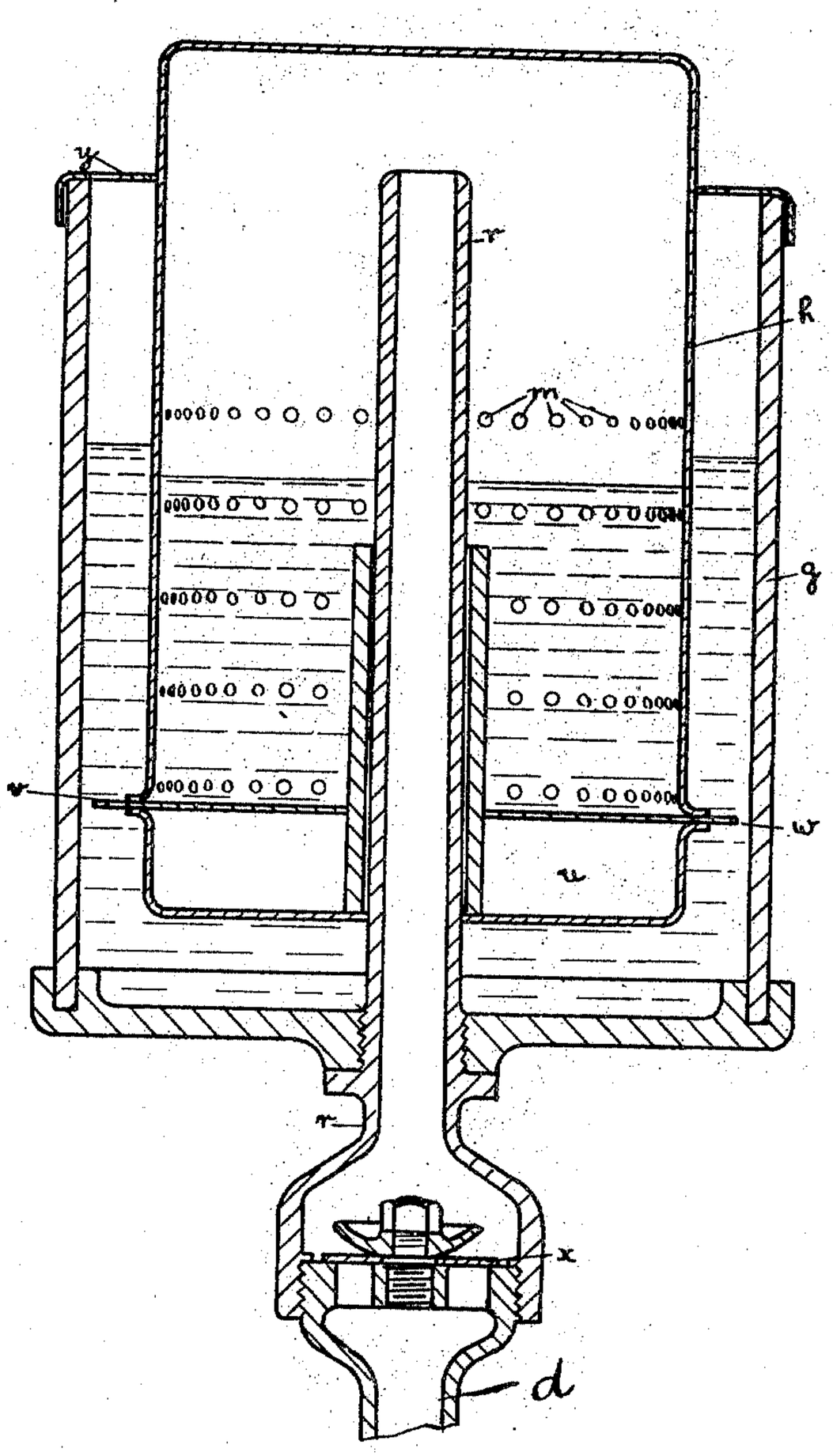
AIR INDICATOR FOR STEAM CONDENSING PLANTS.

APPLICATION FILED MAR. 31, 1908.

950,976.

Patented Mar. 1, 1910.



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UNITED STATES PATENT OFFICE.

ROBERT LUNAN WEIGHTON, OF NEWCASTLE-UPON-TYNE, ENGLAND.

AIR-INDICATOR FOR STEAM-CONDENSING PLANTS.

950,976. Specification of Letters Patent. Patented Mar. 1, 1910.

Application filed March 31, 1908. Serial No. 424,454.

To all whom it may concern:

Be it known that I, ROBERT LUNAN WEIGHTON, a subject of the King of Great Britain and Ireland, residing at Armstrong College, Newcastle-upon-Tyne, in the county of Northumberland, England, have invented certain new and useful Improvements in Air-Indicators for Steam-Condensing Plants, of which the following is a specification.

It is very desirable to ascertain the rate of discharge of air from an air pump discharging air from a steam engine condenser. The quantity of air gaining access to the condensing system materially affects the vacuum obtained, and it would therefore be of great practical value if some readily visible indication were given of the rate of discharge of air at different times or under different conditions.

My invention has for its object to provide an apparatus whereby such air discharge is so indicated that its relative or absolute amount can be readily observed, and I attain this object by means of an apparatus wherein the air escapes through ports so arranged and controlled that the aggregate area available for the escape of air automatically adjusts itself in a readily observable manner to suit the quantity of air to be discharged, within the predetermined range. This apparatus will be described in the following specification and its novel features more particularly pointed out in the appended claims.

The dimensions and design of the apparatus may advantageously be determined by the average rate of discharge of the air from the particular system on which it is intended to be employed. For example, in steam condensers in connection with one or more reciprocating engines, the normal air leakage may be greatly in excess of that in connection with a practically air-tight steam turbine; and, consequently, the apparatus for indicating the air discharged from either of these systems may advantageously vary in its sensitiveness from that used with the other.

The invention is shown in the accompanying drawing, which illustrates a sectional view thereof.

In this drawing, *g* is a receiver adapted to contain water, *h* is a bell placed within the receiver, the interior of the bell being in communication, by means of the pipe *r* with the air pump discharge pipe *d*. The bell is provided with holes *m*, *m*, situated at various heights.

The cylinder *h* is adapted to rise and fall within the receiver *g*. The height of the bell, when in equilibrium, depends on the rate of discharge of the air; but violent surging of the bell due to rapid changes in the rate of discharge of the air is prevented by the fact that the water can pass into and out of the bell only by way of the holes *m;* and therefore a rapid upward and downward movement of the bell tends to cause a great difference of level between the water on the inside and that on the outside of it, thus increasing the weight or the bouyancy of the bell, as the case may be, and so preventing further rapid movement in the same direction. The admission pipe *r* acts as a guide for the bell.

The weight of the bell is partly balanced by means of a closed buoyancy chamber, *u*. The motion of the bell is further damped by means of diaphragm *v* arranged to move with the bell and within the receiver *g*, only small areas such as the annular area *w*, being allowed for the escape of liquid past the diaphragm *v*.

I may, if desired, provide a non-return valve *x*, on the admission pipe *r*, outside the apparatus.

The receiver is provided with a removable annular cap *y* so arranged as to allow of the free escape of the air.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. An air indicator comprising a receiver open to the atmosphere and adapted to contain water, a bell provided with a buoyancy chamber and adapted to float in the water in said receiver and to contain water, and provided above the said buoyancy chamber with an air exit area adapted to be automatically adjusted by the height of the water within the said bell, and an air inlet pipe communicating with the interior of the bell.

2. An air indicator comprising a receiver open to the atmosphere and adapted to contain water, a bell provided with a closed buoyancy chamber and with a plurality of holes in its vertical walls above the buoyancy chamber, and an air inlet pipe communicating with the interior of the said bell, the said bell being adapted to float in the water in said receiver, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT LUNAN WEIGHTON.

Witnesses:

FREDERICK HAMILTON PRUEN,

ANNIE DAGLISH.