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The Action of an Orifice in an Acoustic Conduit and a Means of Determining the Effect of Viscosity

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THE ACTION OF CYLINDRICAL TUBES IN BRANCH
ACOUSTIC LINES

G. W. STEWART

(ABSTRACT)

Quincke's tube has long been known. A theoretical and experimental study of its action is herewith reported. Also the formulas for an open tube as well as a closed tube have been derived. The experimental results show unmistakable evidence of the viscosity. The selective property of Quincke's tube is ascertained both experimentally and theoretically for the first time.

STATE UNIVERSITY OF IOWA.

THE POSITION OF THE VIBRATING SOURCE IN THE
KUNDT'S TUBE EXPERIMENT

G. W. STEWART

(ABSTRACT)

Various textbooks are not in agreement as to whether the vibrating piston is at a node or "near a node." The theory shows that it is strictly at a node. The misstatement in regard to the location of the piston has probably been caused by a misunderstanding of the word "node." The piston is one-half wave-length from the nearest node and yet it is strictly not a point of rest.

STATE UNIVERSITY OF IOWA

THE ACTION OF AN ORIFICE IN AN ACOUSTIC CON-
DUIT AND A MEANS OF DETERMINING THE
EFFECT OF VISCOSITY

G. W. STEWART

It was shown in a previous communication that the transmission through an acoustic conduit could be computed if the components of the impedance of the branch line were known. In the case of the orifice when viscosity is considered the following are the values of the two components:

$$Z = \rho k^2 a / 2\Pi + (2\omega \rho \mu)^{\frac{1}{2}} (\Pi R^3)^{-1} L,$$

$$Z = \rho \omega / c + (2\omega \rho \mu)^{\frac{1}{2}} (\Pi R^3)^{-1} L.$$

An experimental and theoretical study has been made of orifices

in a transmitting conduit and the formula has been found to agree remarkably well with the experimental results. If the orifice is surrounded by a chamber, making a Helmholtz resonator, the influence of the viscosity is marked and it is possible to compute the equivalent channel of the orifice in the given frequency. If there is an orifice only, the effect of viscosity for any size opening is practically nil. The theory shows that there is very little escape out of the hole, the sound being transmitted along the tube. The vibration in the orifice is practically wattless and the reduction in transmission due to the orifice is caused by the reflected wave rather than by a loss.

STATE UNIVERSITY OF IOWA.

MAGNETIC PROPERTIES OF IRON FILMS ELECTRICALLY DEPOSITED

E. P. TYNDALL

(*ABSTRACT*)

The method of making the films is described. The magnetic measurements are made with an astatic magnetometer. Some preliminary results are reported and a survey of the results of previous workers is given, the problem of hydrogen absorption being especially considered.

STATE UNIVERSITY OF IOWA.

A NEW ELECTROSTATIC FRICTION MACHINE

JAY W. WOODROW

(*ABSTRACT*)

A short description of a new type of electrostatic friction machine which is small and compact and is easily operated. The machine gives a good short spark under rather adverse hygro-metric conditions.

IOWA STATE COLLEGE.