

AN IMPROVED FORM OF MERCURY VAPOR AIR PUMP.

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(Abstract.)

The mercury vapor pump described in this paper retains the same simple valve arrangement described recently by the writer,* but on the other hand replaces the umbrella that deflected the mercury vapor downward through an annular throat by the commonly used aspirator nozzle through which the vapor issues vertically upwards. This necessitates an interchange of connections leading to the supporting pump and the vessel to be exhausted.

This pump, single stage, will operate on any oil supporting pump of the grade of the Nelson pump. In addition to its speed, its simplicity of design and ease of construction are important points, and when constructed of pyrex glass is durable.

The paper also gives the data obtained when several of these pumps are placed in tandem. Again, a three-stage pump retaining the same general principle is described, designed to operate on a poorly working water aspirator as a supporting pump. The mercury vapor for each stage is supplied from the same boiler, yet at different pressures, the highest pressure to the first stage exhausting into the aspirator. Sample pumps and sketches were exhibited.

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A POSSIBLE STANDARD OF SOUND.

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(Abstract.)

The paper as presented described a source of sound recently brought to the writer's attention, while blowing a mercury vapor trap of pyrex glass, that bids fair to furnish a standard of sound of any desired pitch with no other apparatus than the trap and a bunsen burner. In its simplest form the apparatus is an ordinary trap as shown in Fig. 1, having the usual ring seal at M.

To operate, close A with a sliding piston of cork, let C remain open, and apply a bunsen burner (adjusted to give a fairly hot flame) at B. The tube AB should be held in the flame at an angle so that the central portion M is not unduly heated. When B begins to glow, a pure tone that is readily audible over a large room is emitted at C. The pitch of the sound is dependent upon the length of the vibrating column AB and also upon the length of the side tube MC. Attaching a horn at C intensifies the sound many fold. The only opening is at C, yet a candle placed at this point is instantly blown out. On closer examination it was noticed that a current of air *enters* the tube C around its edge, and another at the same time *escapes from it* along its axis.

There are other conditions that affect the pitch. Those noted thus far are: That heating the region about M destroys the sound; but on the other hand if the flame is removed from B, then C stopped and A opened, the tube will again operate on *heating M to redness*; that the pitch is raised by the addition of extra side tubes fused to the vibrating column at M, and is instantly lowered when these extra branches are in turn stopped.

Tubes having different dimensions were constructed. These can be adjusted over wide ranges—each an octave or more—and all give, apparently, clear tones particularly free from overtones. By supplying heat to the end B at a constant rate (as by an electric furnace) the pitch may be kept constant for an indefinite length of time. The apparatus should therefore furnish a standard source of sound.

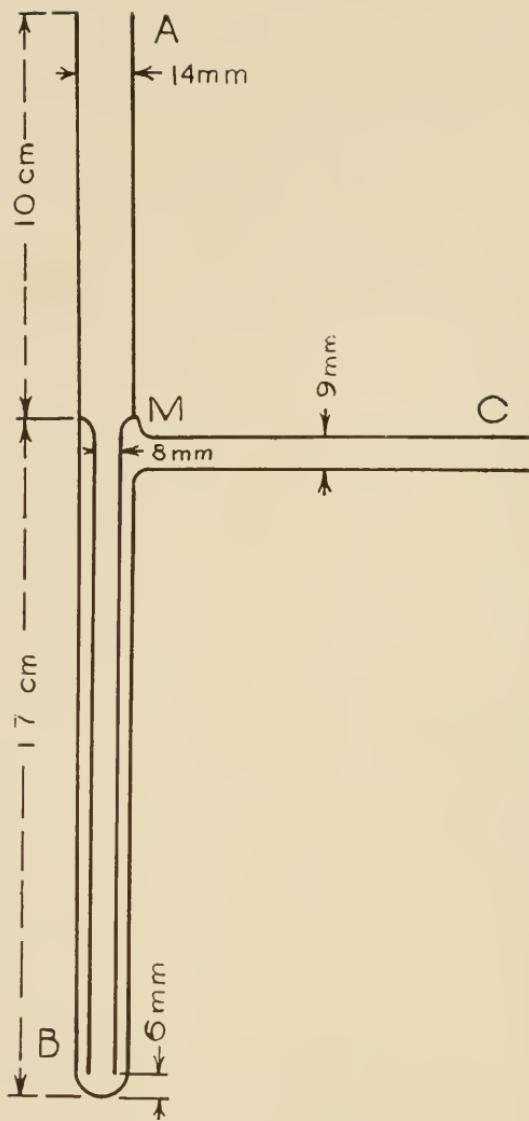


FIG. 1. A possible standard of sound.