

that rotation of the crystal through six minutes, completely changed the intensity from symmetrical to unsymmetrical. It seems from his paper that still lesser angles can be detected. For 2, among others, a screw-arrangement can be made for moving the crystal right up to the separation window, making the crystal flush with the window by proper rotation and then taking the crystal back. As already mentioned this setting can be dispensed with at the cost of mathematical computation.

Lahore,  
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R. PARSHAD.

Parthasarathy, *Proc. Ind. Acad. Sci. (A)*, 1936, 4, 213.  
Bergmann's *Ultrasonics*.

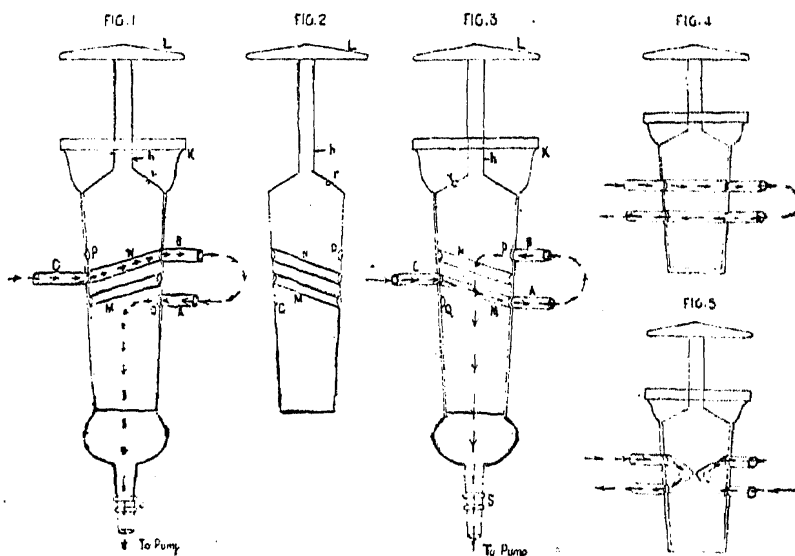
### A REVERSIBLE FOUR-WAY STOP-COCK USEFUL IN WORK CONNECTED WITH CIRCULATION OF GASES AND LIQUIDS

WHILE engaged in work connected with the measurement of the period of decay of active nitrogen the need for a four-way stop-cock capable of controlling the inlet and outlet of a chamber through which the gas is streaming was keenly felt. By suitable modifications in the existing three-way stop-cocks the author found that the above difficulty could be overcome, as also the stop-cock could be made a reversible one. As the new stop-cock proved of considerable use and as it would be of interest to workers in this and allied fields for circulation of gases and liquids, a short description of the stop-cock is given below along with a diagrammatic sketch of its working.

In Fig. 1 is shown an ordinary three-way mercury-sealed glass stop-cock. The plunger L is a hollow cylinder ground to fit the outer socket K. Two small glass tubes M and N are fused internally in L such that the side arm C of K could be connected with either A or B by proper manipulation of L. Normally S is closed with a pressure rubber tube fixed to a glass rod and mercury is poured into K when it fills up the hollow space in L through the hole *r* and covers the plunger a little above *r*. This so-called mercury-sealing gives further resistance to the entry of outside air into the stop-cock which the normal grease is unable to stop. Such a stop-cock can be easily converted into a four-way stop-cock. Bore a hole Q carefully through the wall of the plunger L so that when C makes connection with B, A is in communication with the hollow space in the plunger through the hole Q. The small hole *r* referred to above can be closed with sealing wax or any other cementing material. As an additional precaution mercury may now be poured above it to a small depth. S is extended by fusing an ordinary glass tube. Thus the stop-cock has now four arms, S, A, B and C. Supposing C is connected to the inlet of a gas reservoir and the chamber to A and B, and S to any suction pump. The gas now passes through from C into the chamber through N and leaves it through A and S, through the hole Q. The path of the stream-

ing gas is shown in Fig. 1 by arrow marks. When the plunger L is now turned through 90° the inlet and outlet to the chamber are cut off and the gas is imprisoned in the chamber.

In order to reverse the direction of the flow of the gas in the chamber in position, i.e., without changing the relative positions of the reservoir connected to C and the suction pump connected to S, bore another hole through the wall of the plunger L at a place P such that when C is in connection with A through M,



P connects B with S through the plunger. This is shown in Fig. 3. Now the gas passes through the chamber in the reverse direction as shown by the arrow marks. When the stop-cock is now turned through 180° the direction of the flow of gas through the chamber is once again reversed (cf. Fig. 1). The plunger with the proper holes P and Q bored as described above is shown in Fig. 2.

Thus the new type of four-way reversible stop-cock can be made by modifying the existing three way stop-cock as described above. If, however, the reversibility referred to above is not essential then the simpler types of four-way stop-cocks diagrammatically shown in Figs. 4 and 5 may conveniently be employed. The use of such four-way stop-cocks in work connected with the adsorption of gases and vapours by solids, decomposition of gases under electric discharges in ozonisers and other similar discharge tubes, measurement of the period of decay of after-glows, in interferometric work with gases, etc., wherein circulation of gas is of considerable importance, cannot be overestimated.

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