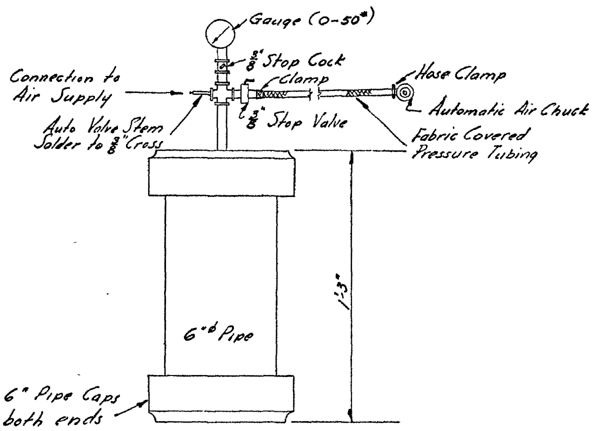

FIG. 1.

around, instead of through, the pad and so escape filtration. While the last charge is passing through the pad, it is best to release the air pressure in the filter chamber before all of the charge has passed through. With this technique, the pad remains moist and, since no air is forced through it, no foam is produced.

By the use of this apparatus, sterilization of protein solutions by Seitz filtration becomes rapid, noiseless, inexpensive and foam-free. The instrument can be made by any competent mechanic.

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AN ELECTRONIC RELAY WITH IMPROVED CHARACTERISTICS

THE electronic relay for heat control, reported by Hall and Heidt in a recent issue of SCIENCE,[1] is substantially identical with a circuit previously described.[2] The circuit was suggested as a variation, suitable for use with DC power lines, of another which applied about half as much voltage across the thermoregulator contacts when both were supplied from the AC mains.

There are now available new tube types which permit some improvement of this circuit, and which require about half as much power for operation. The latter is not negligible, since with continuous operation the power used costs roughly as much per year as the original price of the relay parts. Such a circuit is shown below. When AC operated, the current through the thermoregulator contacts is about one tenth of the peak current with the Hall-Heidt circuit and the maximum potential across the regulator is less than ten volts instead of 35.

The relay is adjusted by placing strap A about two thirds of the way up from the amplifier cathode on resistor R_1 (the adjustment is not critical) and straps B and C at the ground end of R_2. B is then moved toward the cathode until the relay closes. C is moved toward B and the regulator circuit alternately shorted

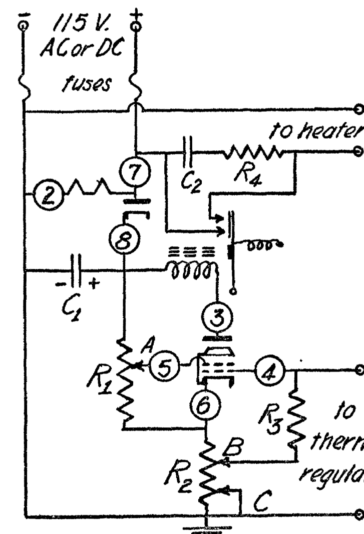

FIG. 1. Tube: 117N7–GT. Octal socket terminals are indicated by the encircled numerals. Terminal 1 has no connection. Relay: DC; 3,000. ohm, 20. milliampere coil (Leach #1201, or equivalent). R_1 4,000. ohms, R_2 1,000. ohms. Both 10. watt, adjustable. An extra strap should be bought for R_2. R_3 1. megohm, $\frac{1}{2}$ watt. R_4 100. ohms, 2 watt. C_1 8. microfarad, 200 v. electrolytic. C_2 0.5 microfarad, 400 v. paper.

and opened until C is as close to B as will permit the relay to open when the control circuit is shorted. Some leeway in these adjustments is advisable to allow for line voltage fluctuations. Care should be taken to connect the relay to the line with the proper polarity if, as is usual, one side of the line is grounded. The circuit may be used with a bimetal thermoregulator by interchanging the leads at B and C.

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[1] A. C. Hall and L. J. Heidt, SCIENCE, 92: 133, 1940.
[2] R. C. Hawes, *Ind. Eng. Chem., Anal. Ed.*, 11: 222, 1939.

BOOKS RECEIVED

HARRIS, SEALE and SEALE HARRIS, JR. *Clinical Pellagra.* Pp. 494. 66 figures. Mosby.

LEVINSON, NORMAN. *Gap and Density Theorems.* Vol. XXVI of the American Mathematical Society Colloquium Publications. Pp. viii + 246. American Mathematical Society, New York.

RIDER, JOHN F. *The Meter at Work.* Pp. 152. Illustrated. Author, New York.

WILSON, PERRY W. *The Biochemistry of Symbiotic Nitrogen Fixation.* Pp. xiv + 302. 34 plates. University of Wisconsin Press. $3.50.