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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON

MODIFICATION TO TRACERLAB AUTOMATIC SAMPLE CHANGER

by

F. J. Flanagan, J. M. Nelson, and J. J. Warr, Jr.

June 1950

Trace Elements Memorandum Report 142

51 153



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

JUN 18 1950

AEC- 627/0

Dr. Phillip L. Herritt, Assistant Manager
Raw Materials Operations
U. S. Atomic Energy Commission
P. O. Box 31, Ansonia Station
New York 23, New York

Dear Phil:

Transmitted herewith for your information and distribution are 5 copies of Trace Elements Memorandum Report 112, "Modification to Tracerlab Automatic Sample Changer," by P. J. Planagan, J. E. Nelson, and J. J. Warr, Jr., June 1950.

The modifications described in this report may be of interest to various people using this instrument. The report has been prepared specifically for publication in Re-Dev where it will probably come to the attention of many of those interested in different items of equipment. We are, in addition, making the regular distribution shown on the distribution sheet attached to the report.

Sincerely yours,

W. H. Bradley
for
W. H. Bradley
Chief Geologist

Enclosures 5

Noted
M. L. R.

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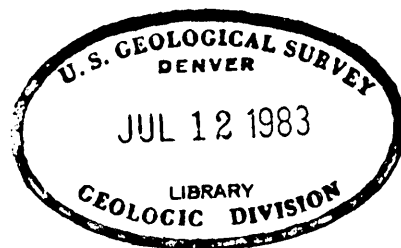
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ILLUSTRATIONS

- Figure 1. View showing racket attachment
after full travel In pocket
2. View showing racket attachment
returning to rest position In pocket
3. View showing racket attachment in rest
position and method of supplying
high voltage from the pre-amplifier . . . In pocket

MODIFICATION TO TRACERLAB AUTOMATIC SAMPLE CHANGER

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The U. S. Geological Survey has recently modified the Tracerlab Automatic Sample Changer so that the geometry is greatly improved for counting larger low-activity samples in finely ground form. The larger sample and larger Geiger Mueller tubes allow a greater number of samples to be counted per hour with the same statistical accuracy.

A brass disc about 10 inches in diameter is fixed on a shaft which in turn is mounted on the edge of the turntable so that the shaft may be rotated. Above the gear disc a stationary plastic disc of the same diameter is fitted around the shaft, and immediately above this disc a brush arm is mounted on the shaft and is controlled by it. A circular metal strip and a ring of 25 brass screws are embedded in the plastic disc concentrically near its edge. These serve as commutator segments upon which the two brushes of the brush arm slide as the shaft rotates. The high-voltage lead is connected to the strip and a separate G. M. tube is connected to each screw. The G. M. tube in the lead shield, conventionally used for counting samples, is disconnected and high voltage is supplied by plugging leads from the strip and from the

common ground for the G. M. tubes into the pre-amplifier. An attachment is fitted to the sample-loading mechanism which advances the brass gear by one tooth position for each in-and-out motion. Thus, each cycle of the sample-changing mechanism will rotate the brush arm a sufficient distance to connect the high voltage to a different G. M. tube. Empty Tracerlab sample holders must be left in the 25 positions on the turntable in order to actuate the microswitch on the rear of the lead chamber. The Autoscaler and Printing Interval Timer connections to the sample changer are conventional.

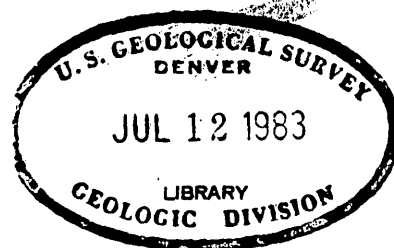
Twenty-five thin-walled G. M. tubes are used, the electrode end of each being fitted into a bored cork or rubber stopper which is then placed in one end of a piece of glass tubing (30 mm i.d. by 6 inches long). The glass tubing diameter is dependent upon the amount of sample available and, in this case, allows the sample to approach infinite β thickness. This holder requires about 25 grams of crushed rock whose effective density is about 2.4. In practice, the G. M. tubes are fitted into the glass tubing and the samples poured in.

Tubes having as nearly as possible the same threshold and plateau characteristics must be used if any degree of accuracy is to be obtained, or each tube must be calibrated separately at the operating voltage used. The G. M. tubes and sample holders must be cleaned occasionally in order to maintain a low background.



FIGURE 3

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PLEASE REPLACE IN DOCKET
IN BACK OF THIS VOLUME

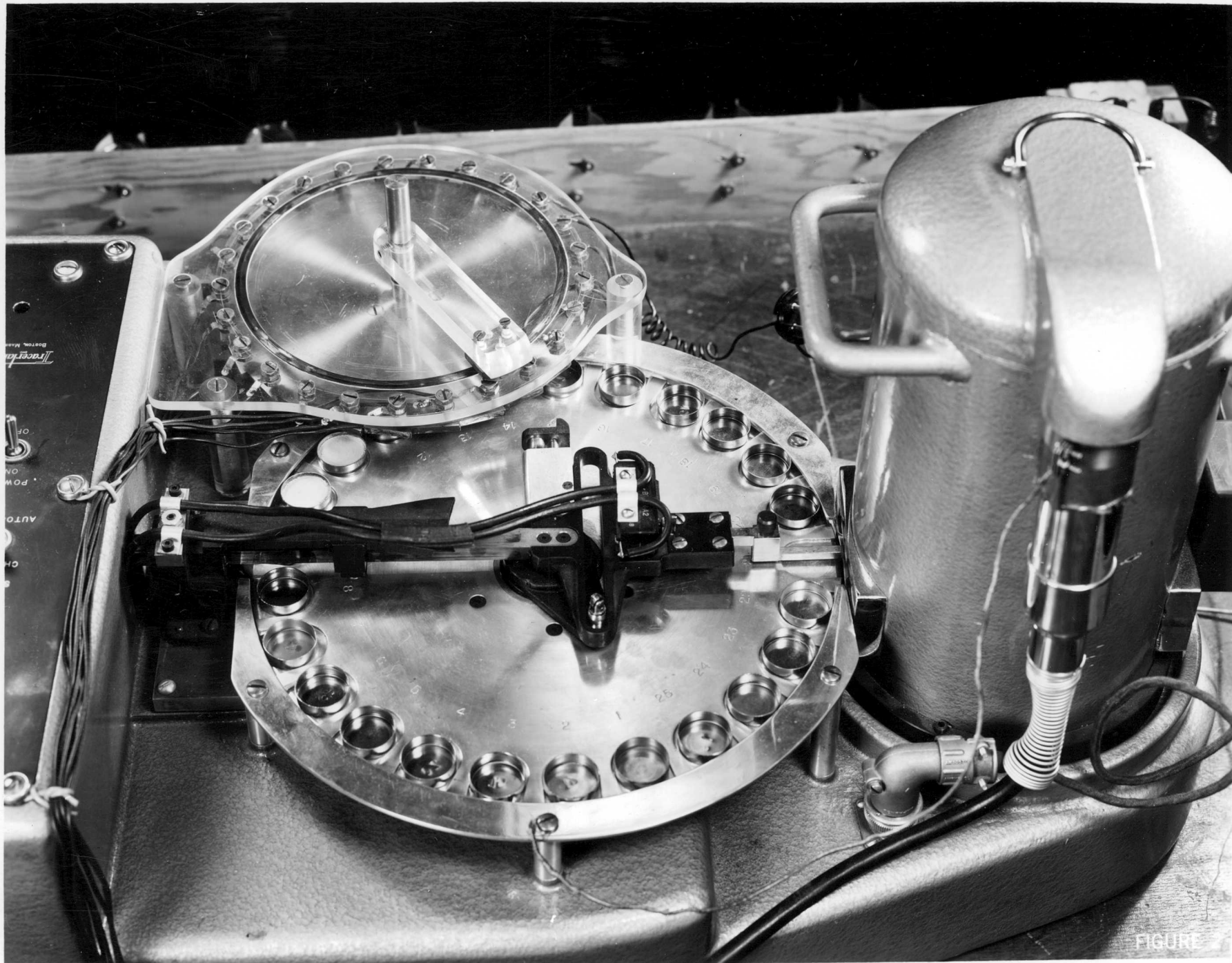
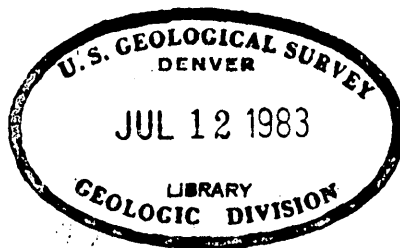


FIGURE 7

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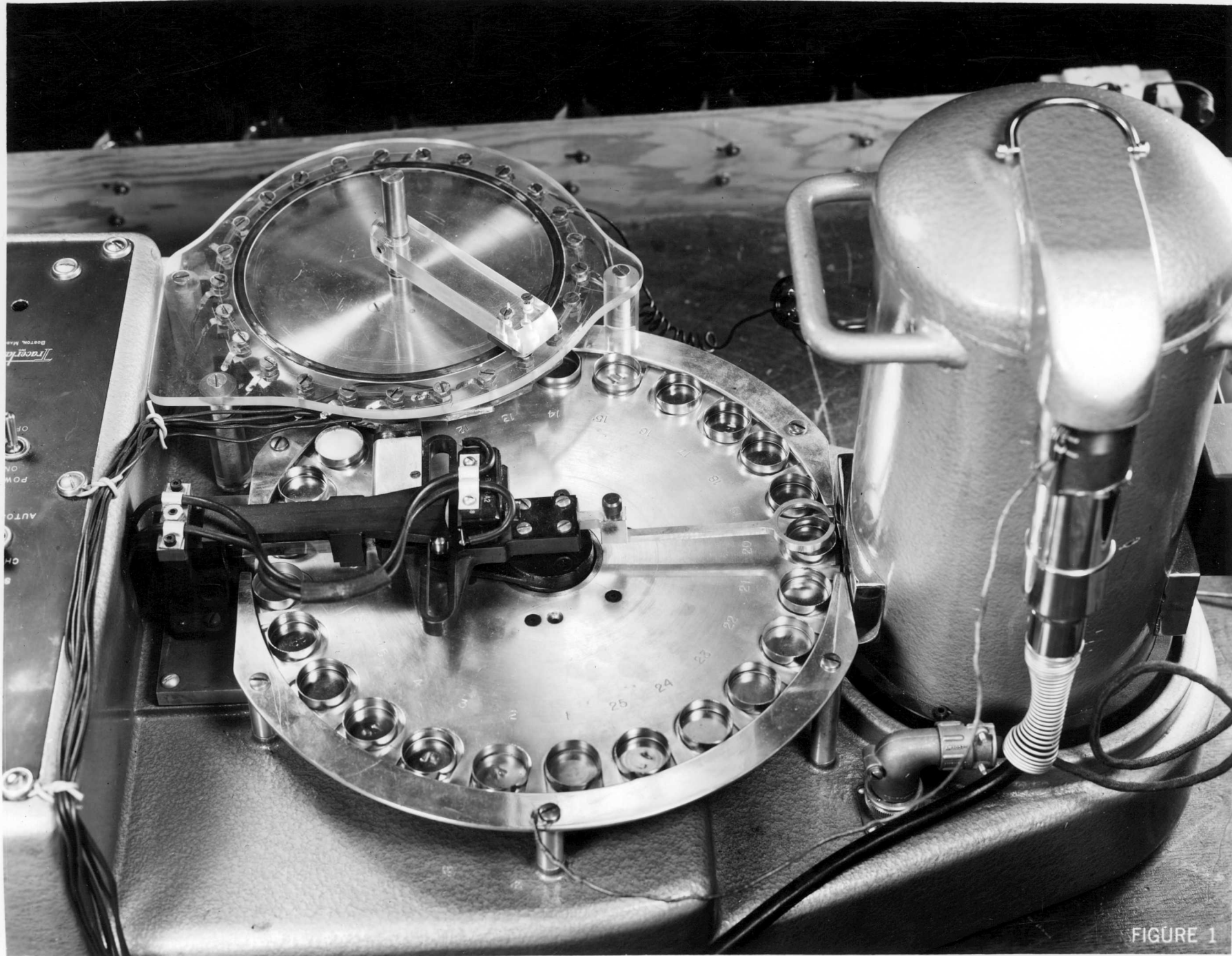
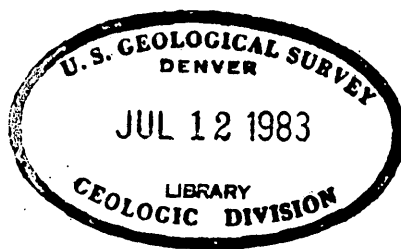


FIGURE 1

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IN BACK OF BOUND VOLUME