

A Machine for Reproducing Gadoid Scale-Tracings.

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In No. 4 of the first volume of this Journal I described how projections of cod scales are reproduced as "scale-tracings". (One of these is shewn in fig. 1). A page of tracings was shewn in that paper on p. 349. It has been found that similar sheets aid the mind materially in classifying and describing a large collection. To prepare these sheets accurately and neatly by hand is tedious and difficult, and the work has been facilitated by the use of a simple and accurate machine, designed for the most part by Mr. H. GARROOD, of Messrs. ELLIOTT and GARROOD, Ltd., Engineers, of Beccles, and Mr. H. J. B. WOLLASTON of this Laboratory. Others have also assisted.

Essentially it consists of:— a hammer (*H*), one end of which carries the marker (*M*), a small rod of steel with a screw-driver point, while the other end carries an index pointer (*P*); a carriage (*K*) on which the hammer is pivoted; a T-square (*T*) on whose long arm the carriage travels, and which has the scale-tracing held on the same arm at (*t*, *t'*); and a drawing-board fitted with brass edges on one of which the head of the T-square slides (figs. 1 and 2).

Practical devices are:— a weight (*W*) whose position on the marking end of the hammer is adjustable; a finger-push (*F*) on the index end of the hammer; a spring catch-release (*R*) on the carriage to hold the index arm of the hammer in the resting position; a screw (*S*) by which the carriage is moved along the long arm, working in a half-nut in the carriage which can be thrown out of gear by a small lever (*L*) so as to return the carriage to zero conveniently; two spring sliding arms (*A*) to hold the tracing, of which the ends are covered with rubber; a strip of paper pasted on the long arm carrying a tracing-line (*t*, *t'*), on which the index

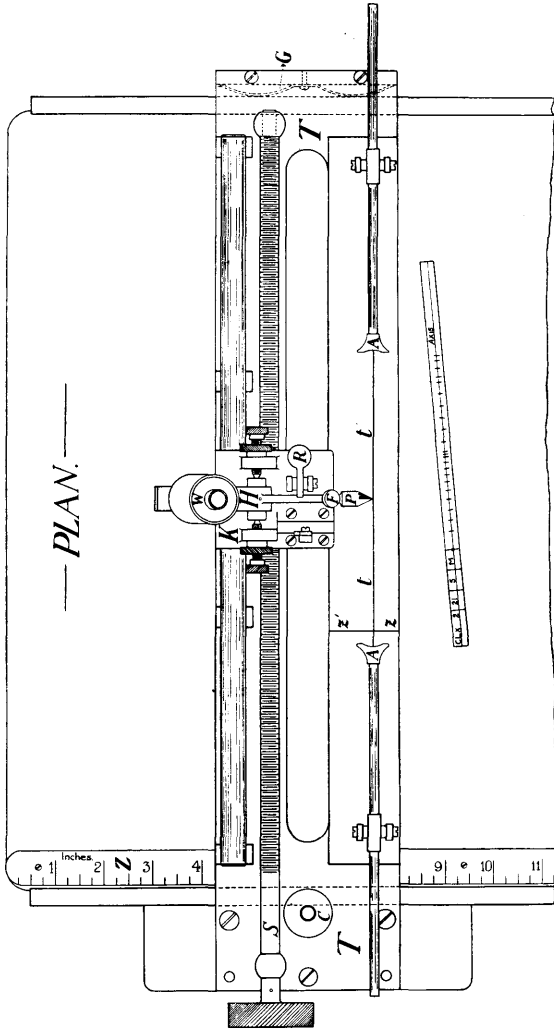
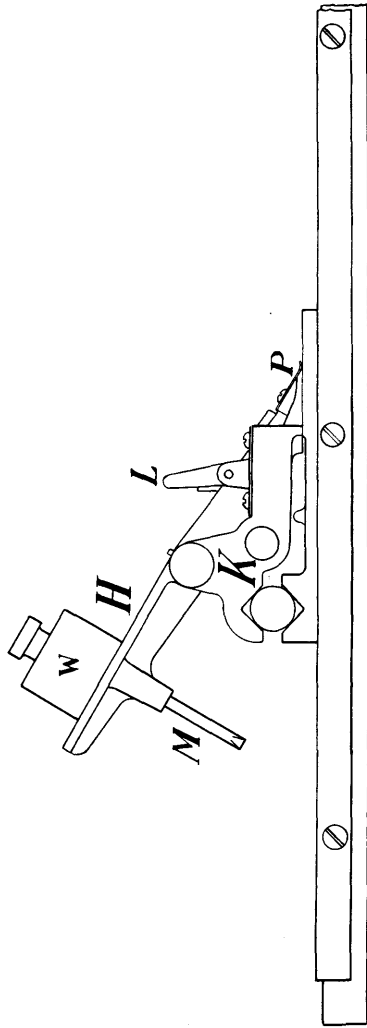


Fig. 1.

Fig. 1. A plan of the machine with a scale-tracing, not yet placed in position, lying on the board. The tracing bears an imaginary cruise no., serial no., length, station and sex. The black spot represents the centre of the scale, while the intervals between the marks on the line called the "axis" of the tracing, are, in the original, 100 times the sclerite widths measured on the long axis of the scale, or on a radius near to it. The letters on the machine refer to the description in the text.



ELEVATION. HAMMER IN RESTING POSITION

Fig. 2.

pointer moves, and a zero-line (z, z^1) at right-angles to it; a screw clamp (C) to secure the T-square in any position on the board; a leaf spring (G) at the end of the long arm to hold the head of the T against its slide; and a rule (Z) let into the surface of the board at one side.

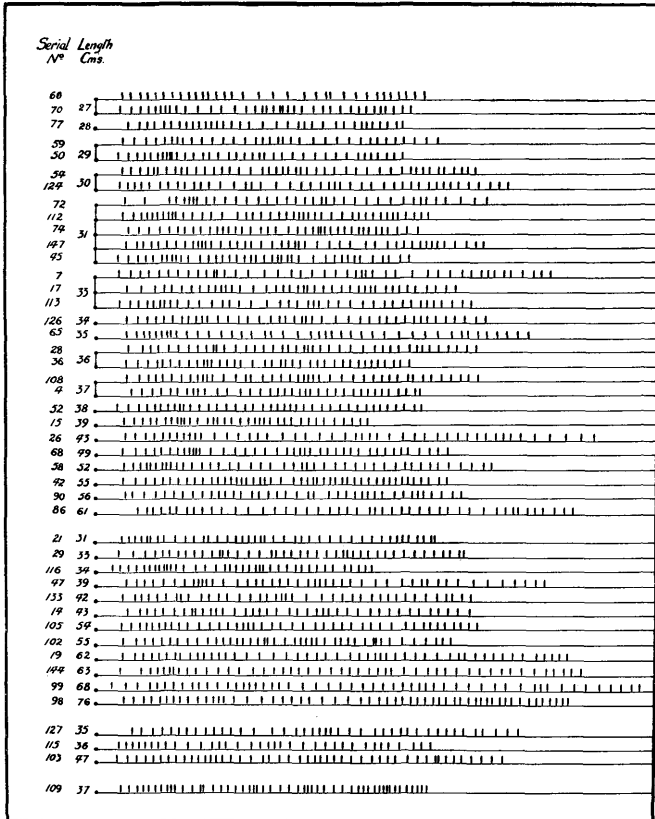


Fig. 3. A photograph of a sheet of scale-tracings shewing the actual marks made with the machine, as described in the text. The centre of the scale is represented by the black dot on the lefthand of the diagram. This reproduction is $\frac{2}{5}$ of the diameter of the sheets used, that is, a linear magnification of 40 times the cod's scale.

In use:— a sheet of drawing paper, a sheet of black typewriter carbon paper, a sheet of thin paper and another sheet of carbon paper are pinned, in that order, to the drawing board. The scale-tracing is placed on the long arm, with the vertical line of the tracing that passes through the point representing the centre of the scale on the zero-line, and the axis on the tracing-line. The position of the first sclerite mark is transferred to the reproduction by turning the screw with the left hand until the index pointer is on the mark, and pressing the catch-release with a finger of the right hand. The hammer being restored to the resting position with the thumb, the carriage is then moved until the index comes on the second mark when this is repeated, and so on until the tracing is completely transferred. The square is now moved down the desired interval, as measured on the rule, and the process is repeated for the next tracing and so on. The zero line is transferred opposite the first and last tracing, intermediate zero points being obtained by joining these.

The result is a page of uniform marks which do not need inking in, but will photograph directly. Two copies are produced, one of which is used as a working sheet while the other is kept for reproduction. An example of the second one is reproduced in fig. 3, reduced to $\frac{2}{5}$, that is giving an approximate linear magnification of forty times the cod scale.

Übersicht.

Es ist hier eine Maschine dargestellt, die eine genaue Reproduktion der "Scale-tracings", d. h. Projektionen eines Halbmessers der Schuppe, in welcher das Grössenverhältnis des Schuppenplättchens zur Altersbestimmung zu Grunde gelegt ist, ganz leicht ermöglicht.

