

(1161)

A COMPACT SCANNER FOR MEASUREMENT OF BONE MINERAL

Richard B. Mazess and Youssef Towliati

A small, light-weight mechanical scanner has been constructed as an engineering model for measurement of bone mineral content in astronauts during space flight; the scanner also may be used clinically and in field studies. The scanner was constructed to fold into a storage mode when not in use in order to conserve on space. In the storage mode the approximate dimensions are 200 x 150 x 75 mm; in operation an arm holding the radionuclide source folds out (Figure 1). The weight of the mechanical scanner is about 2000 grams, but it could be lightened considerably. This scanner is to be used with a lucite scanning platform currently under construction.

A reversible motor drives the detector-source yoke through drive gears; a rack gear is attached to the yoke. A full 10-cm path can be scanned, thereby allowing measurements across the forearm (radius and ulna). All long bones could be scanned, and it would also be possible to scan across the heel. Scan speed may be altered by changing the gears; we are currently scanning at 1.2-mm per second. A photomultiplier tube- scintillation detector is mounted on the bottom of the yoke; this protects the tube and keeps high voltage lines out of the way. In storage mode the radionuclide source is locked within the body of the yoke; a small lead disc over the source aperture prevents any of the beam from exiting through the folding arm which covers the source.

NOTICE

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Atomic Energy Commission, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

phd

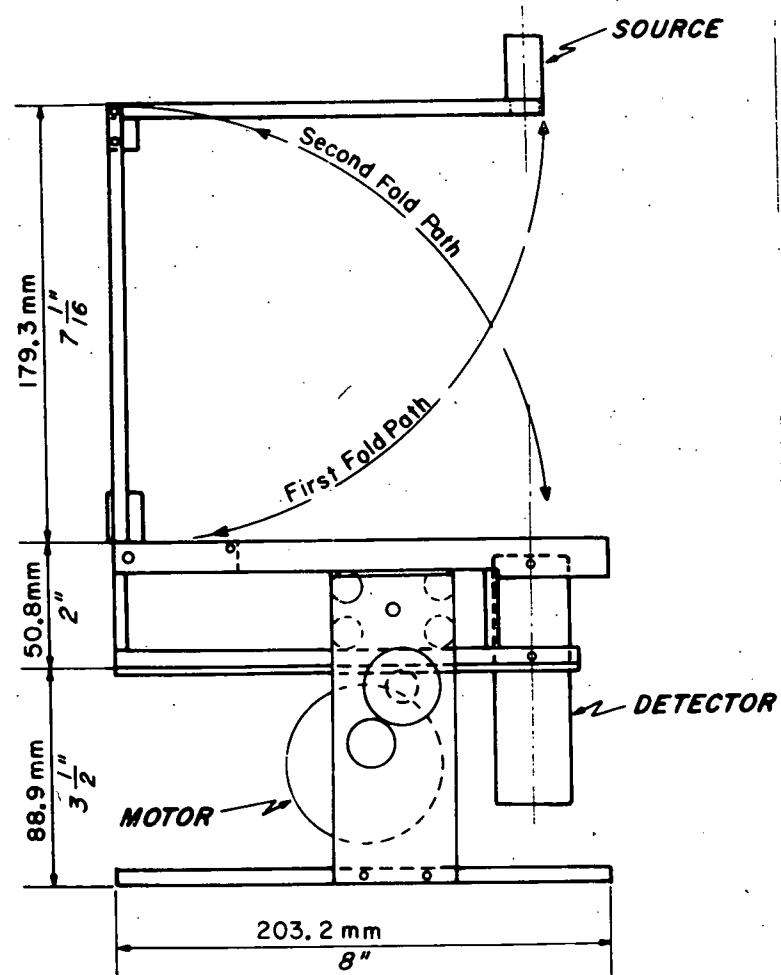
DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

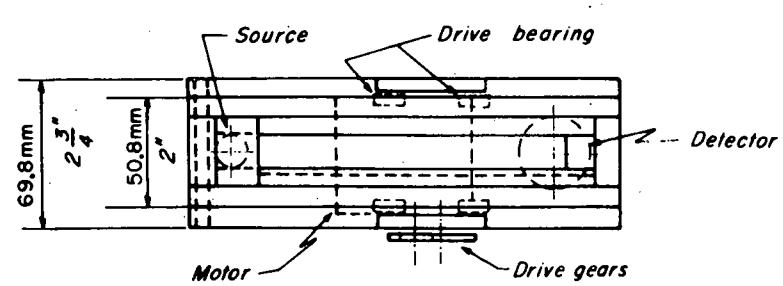
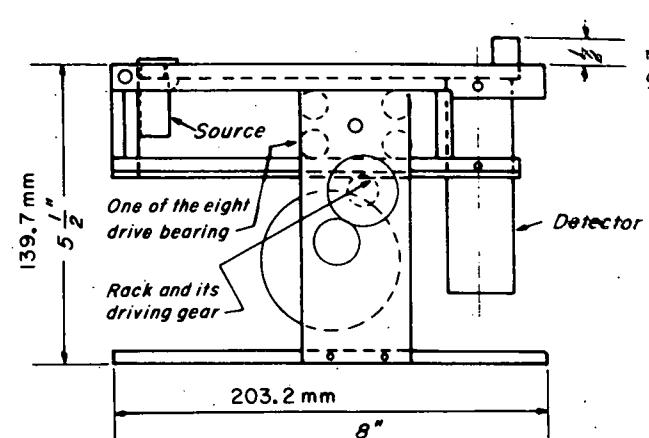
DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

COMPACT SCANNER



I OPERATION MODE



II SIDE AND TOP VIEW IN STORING MODE

Figure 1. Diagrams of the compact bone mineral scanner in operational and in storage modes.

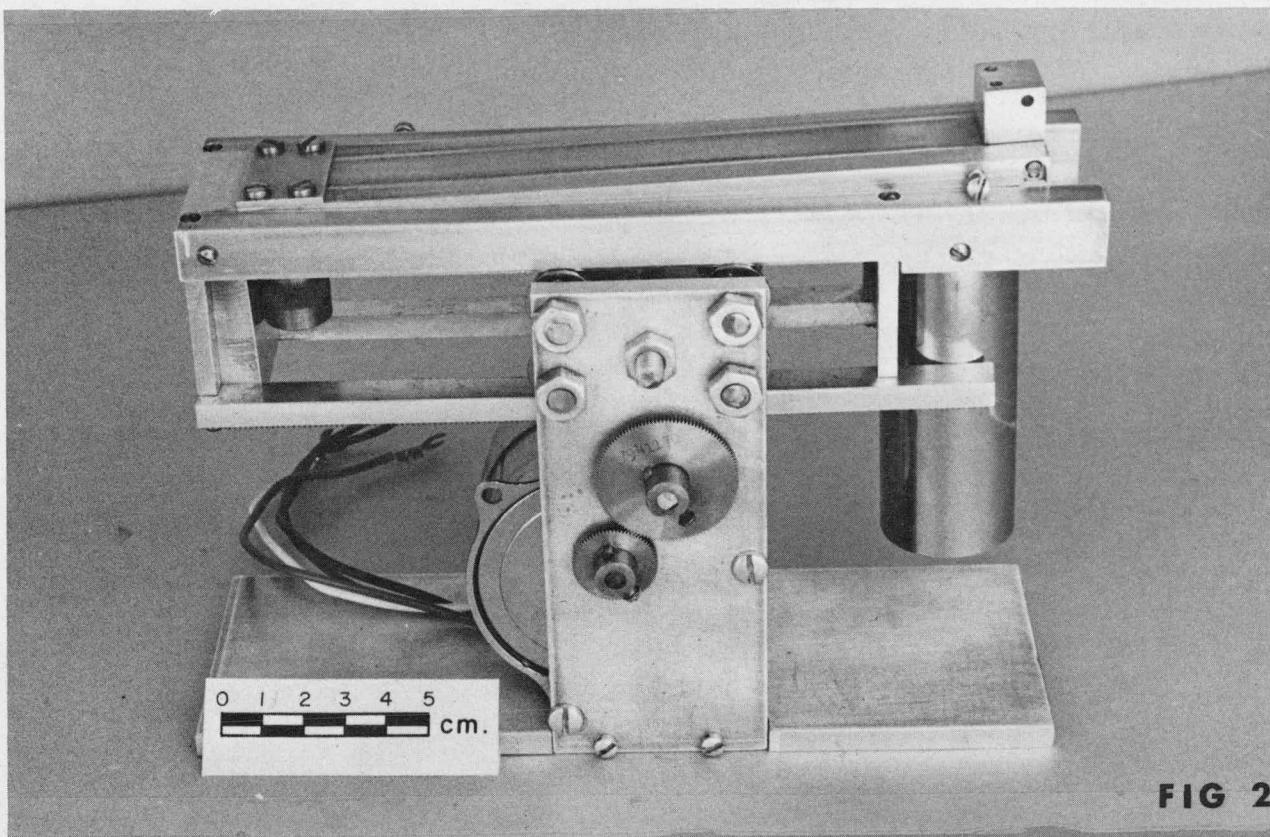


FIG 2

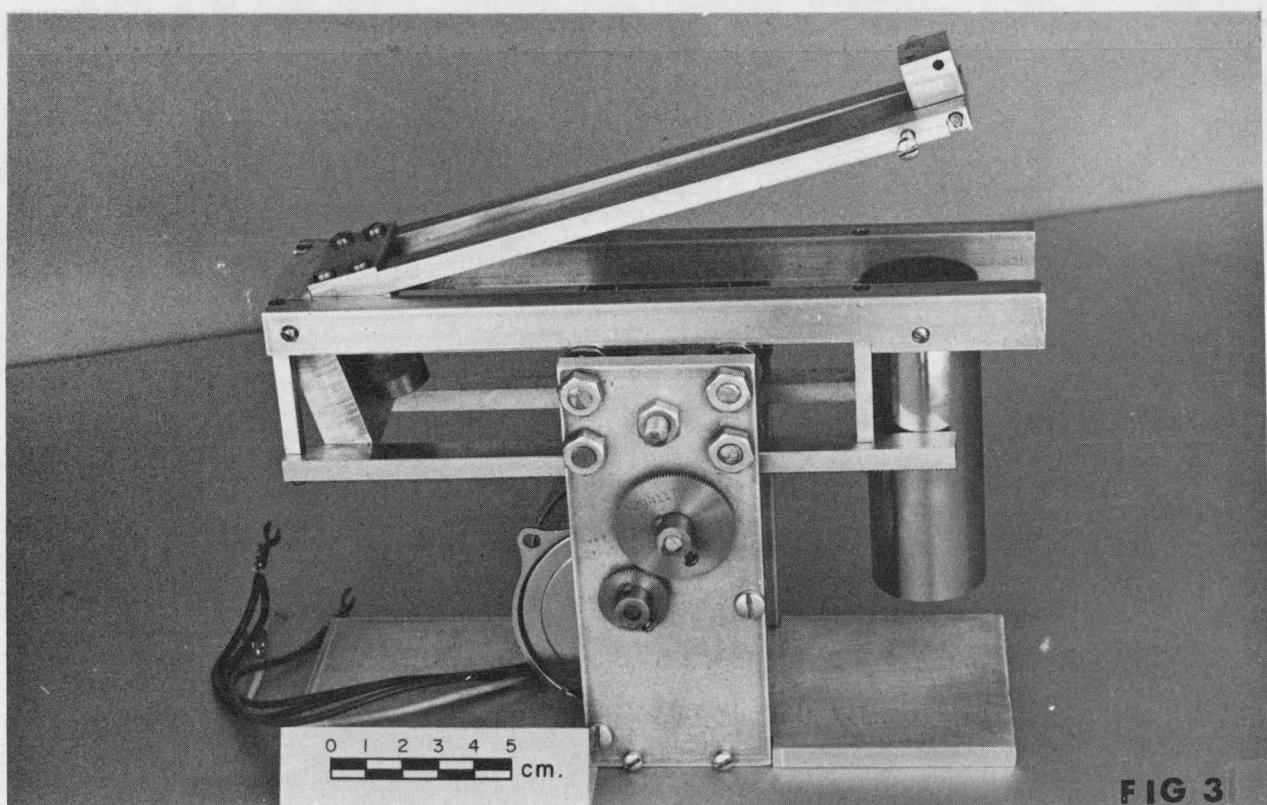


FIG 3

Figures 2 - 7. Progressive views of the folding bone mineral scanner as it is unfolded from its storage position to its scanning position.

