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ORNL-563
REACTORS
7A.

"GO-NO GO" PLATE SPACING GAGES FOR THE MATERIALS TESTING REACTOR FUEL ASSEMBLIES

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
CARBIDE AND CARBON CHEMICALS CORPORATION
FOR THE
ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

[redacted]

[redacted]

"This document consists of 8 pages.
No. 7 of 97 copies, Series A"

REPORT NUMBER: ORNL 563

ISSUED TO: _____

Contract No. W-7405, eng-26

METALLURGY DIVISION

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by

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DATE ISSUED
JAN 3 1950

O A K R I D G E N A T I O N A L L A B O R A T O R Y

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Abstract

Two types of 'go-no go' gages have been designed for the inspection of the deep, narrow interplate spacings of the Materials Testing Reactor fuel assemblies. One of these gages has been constructed and has proved satisfactory for the rapid inspection of these channels.

Introduction

A cross section of the Materials Testing Reactor (MTR) fuel assembly body is shown in Figure 1. The vertical plate spacing under consideration calls for a dimension of 0.117" ± 10% corresponding to maximum and minimum values of 0.129" and 0.105", respectively. Previous experience indicated that inspection of plate spacing along the assembly centerline alone is adequate, since variations are generally greatest in this region.

During the development of fabrication methods for the MTR fuel assemblies the cam-type plate spacing gage[1] proved to be very useful for rapid measurements. These measurements were essential as an aid in determining sources of excessive distortions. Some thought had been given to the possible use of metal spheres[2] or rods[3] for rapid inspection but consideration of the various types of longitudinal plate warping that can occur revealed the inadequacy of these methods. As the fabrication techniques improved, the problem of inspection of plate spacing was reconsidered and led to the design of two types of "go-no go" gages[4]. These gages would be especially useful in event that "hot" material is processed and remote control operation is required. With the availability of such gages the chief use of the cam-type measuring gage lies in the study of rejected fuel assemblies.

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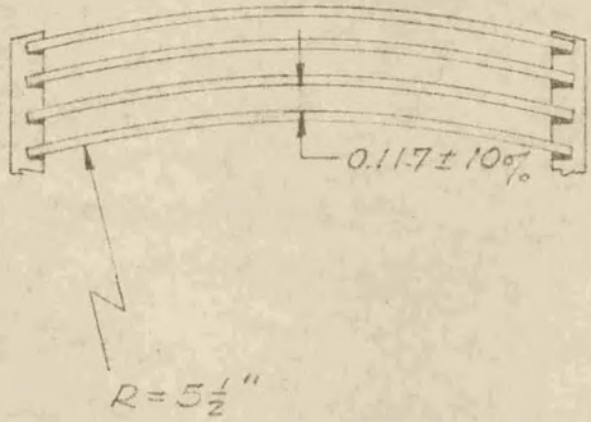

SECTION THROUGH MATERIALS
TESTING REACTOR FUEL ASSEMBLY

FIG. 1

Single Cam Gage

The single cam gage consists of a special cam attached to a thin rod and fitted with a handle as shown in Figure 2. The cam has a maximum (no go) and minimum (go) dimension fixed by the corresponding tolerances (0.129" and 0.105"). For simplicity the contacting surfaces have been indicated as circular in contour. The 'go' dimension radii are somewhat smaller than the plate curvature radius (5.5"). A channel is considered acceptable if the cam can be inserted fully but cannot be revolved at any location. This gage has been constructed and found satisfactory for rapid inspection.

Double Cam Gage

The double cam gage consists of individual cams mounted in a rod-in-tube arrangement as shown in Figure 3. Although it is not as simple as the single cam gage in design and operation, it has the advantage of permitting inspection of channel dimensions beyond constricted regions. In this case the 'go' and 'no go' dimensions are fixed by the maximum dimensions of the two cams. The minimum dimension of the cams is indicated as less than the 'go' dimension and is of no special significance here except insofar as it permits insertion of the gage past constricted regions. Actually if this dimension were used as a 'go' dimension the gage could cover two ranges instead of one. The handles are shown equipped with magnetic inserts for cam alignment and clutching action. This gage has not been constructed as yet.

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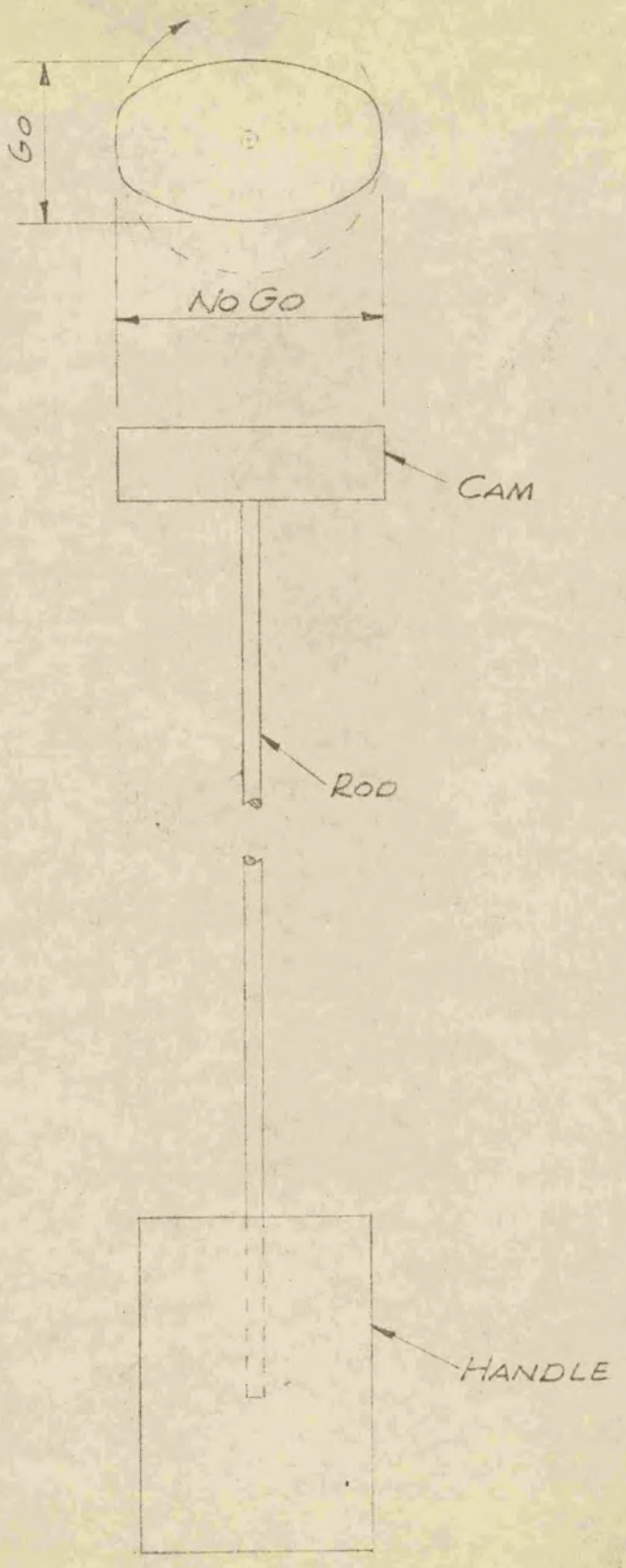

SINGLE CAM "GO-NO GO" GAGE

FIG. 2

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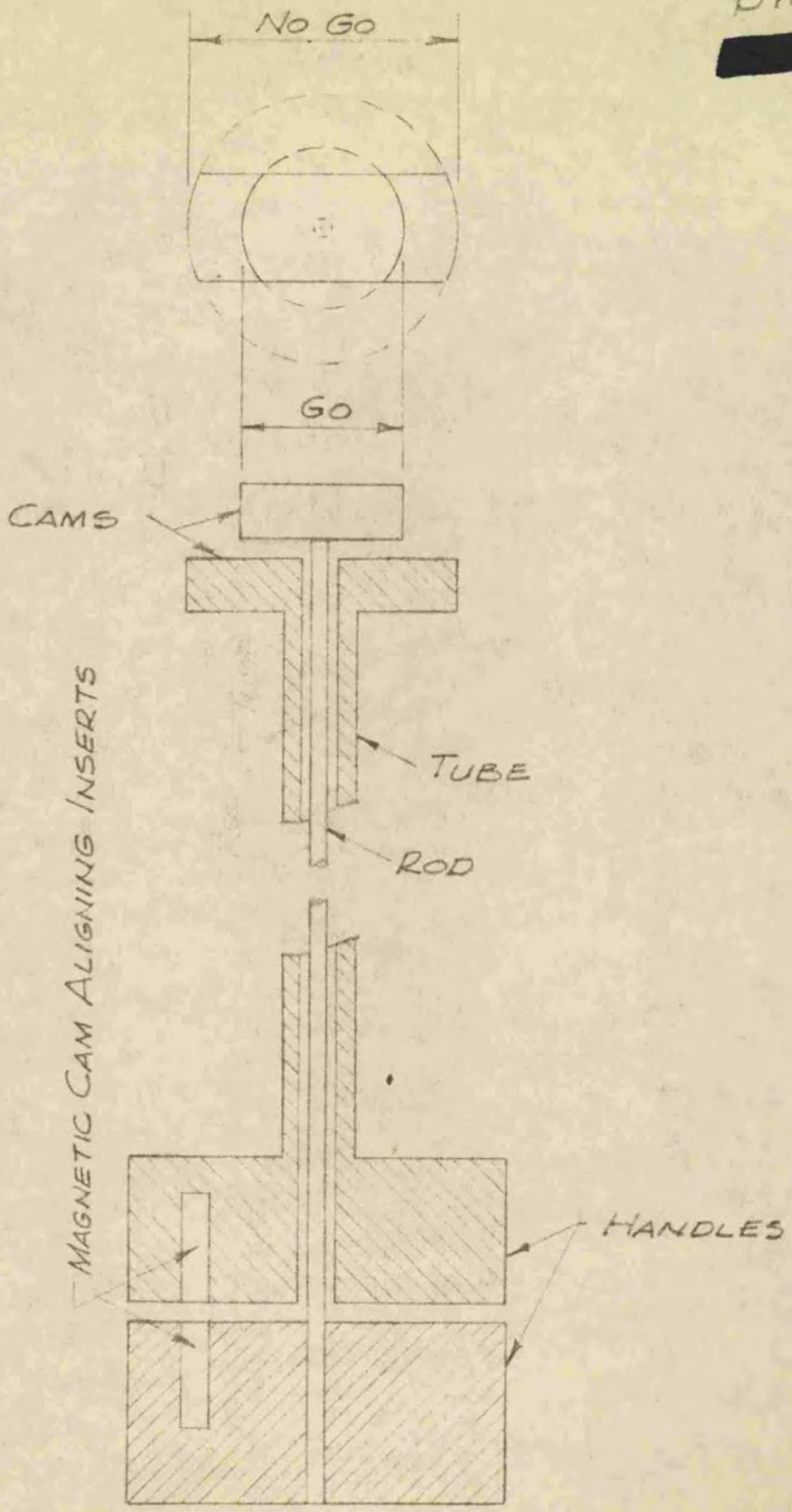

DOUBLE CAM "GO-NO GO" GAGE

FIG. 3

Acknowledgement

Appreciation is expressed for suggestions made by F. W. Drosten and E. C. Miller.

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