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CF 58-2-110

DATE: February 19, 1958
SUBJECT: A Portable Bandsaw for Hot Cell Use
TO: Listed Distribution
FROM: A. A. Abbatiello

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A Portable Bandsaw for Hot Cell Use

Abstract

A commercial light-weight portable bandsaw was fitted with a grip to permit it to be maneuvered remotely in a hot cell by means of a General Mills manipulator. The bandsaw was supported in various positions to make cuts on typical pieces. Photographs were taken to show the saw in operation.

Introduction

During studies on remote maintenance and disassembly of reactors, a need for a small portable cutting tool became apparent. Such a tool was considered necessary to cut apart reactor elements or associated radioactive equipment. A light-weight portable bandsaw which was commercially available was purchased and fitted with a hexagonal bar to provide a means for gripping the saw with a manipulator (see Fig. 1). The saw was set up in a cell at the Solid State building and pieces of pipe were mounted in a manner to permit cuts at various angles. Photographs were taken of the saw in several of the positions in which it may be used.

Apparatus

The saw tested was a Wallace "Speedy-cut"* Model 24 weighing about 18 lb and costing \$227.00. The handle was made of a hexagonal bar of steel $3/4$ in. across the flats and 12 in. long. It was bolted to the saw where the original knob handle had been located.

The General Mills manipulator was fitted with the hook band and used in cell No. 3. An arrangement of 1-in. sch 40 steel pipes (1.315 in. OD) was assembled to give the various angles and simulate the conditions for active cutting. Photographs were taken with the saw held in various positions as shown in Figs. 1, 2 and 3. The remote view of Fig. 4 was taken using the Kollmorgen wall periscope with telescope attachments (see Fig. 4).

Possible Improvements

During use it was found that a 1-in. hex bar would have fitted the hook of the manipulator better. Also, aluminum might have been preferable

* Available from Wallace Supplies Manufacturing Company, 1300 Diversey Parkway, Chicago 14, Illinois.

to minimize weight.

A means for providing a blade force in the 5- to 15-lb range would aid in keeping the blade teeth effectively loaded without requiring a constant adjustment of the manipulator control. This could be done by providing a hinge on the support bar with a spring load in the direction of cut. About 1/4 in. total travel of this spring load would be adequate and stops at either end of the travel would provide the positive support from the manipulator when desired.

Remote Changing of Blades

If it should become necessary to change blades remotely or if it should not be desirable to remove the saw from the cell, it is planned to change the blade remotely. The planned jig is a stainless steel support plate upon which a blade would be mounted on eight slotted tubes fitted with internal push rods actuated from a central jack screw (see Fig. 5). The blade would be prepared by stretching it into its elliptical form manually and placing it in the tube slots so that it would coincide with the saw track. The saw itself would be inverted and placed in front of the cell window for best visibility. Then the jig would be grasped by the manipulator, placed over the saw and the ejector pins forced down to push the blade into the saw track. The saw would then be returned to its horizontal position and the cam lever turned to tighten up the blade tension.

To lead the saw blade easily into its track, two bullet-shaped saw guides were made to replace the guide bearing screws (see Fig. 1). The usefulness of this aid has been demonstrated in manual blade changing. However, remote blade changing has not yet been necessary and the support plate portion of the mechanism has not been tested.

Disposition

The usefulness of this saw was immediately apparent, especially on pieces lacking rigid support. The variety of work encountered in the Solid State cells provided immediate application and the saw was put into service on completion of this test.

Summary

The results of this test are as follows:

- 1) The saw was successfully operated using the General Mills as the only support. One particular advantage of a bandsaw is that it does not deflect the parts alternately as a reciprocating saw would do. The constant tension on the blade causes the piece being cut to be drawn against the bracket (see Fig. 1) which is an integral part of the saw;

thus, the cutting thrust is taken by the saw itself and the manipulator must provide only support for the weight of the unit plus light blade loading.

- 2) The manipulator was capable of supporting the saw in practically all positions and, as shown in the photographs (Figs. 1, 2 and 3), parts may be cut in any position desired provided there is clearance at the ends for the bandsaw wheels.
- 3) The blade might be replaced remotely using the fixture shown in Fig. 5, but in cases where activity is sufficiently low, it is preferred to move the saw out of the cell and replace the blade manually.

Acknowledgements

The assistance of S. E. Dismuke and W. B. Parsley of the Solid State Division is gratefully acknowledged for the use of their cell and for the operation of the General Mills manipulator. We are also indebted to Mr. J. W. Kingsley for assistance in fabrication of the handle and fitting the guide bearings.

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Fig. 1. Remotely Operated Bandsaw Supported from Manipulator for a Vertical Cut.

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Fig. 2. Portable Bandsaw Supported for a Cut in the Horizontal Plane.

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Fig. 3. Saw Supported by the Manipulator for an Oblique Angle Cut.

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Fig. 4. Closeup of Saw Cut Taken Through Wall Periscope.

Fig. 5. Jig for Replacing Blade Remotely.