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U.S. Naval Air Development Center

Johnsville, Pennsylvania

AERONAUTICAL PHOTOGRAPHIC EXPERIMENTAL
LABORATORY

REPORT NO. NADC-AP-6309

SEP 1963

MODIFICATION OF THE DEVICE
FOR PRODUCING PLATES (DPP)

FINAL REPORT

WEPTASK FFRD00001/202 2/F001 04 02
Amendment No.131



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N O T I C E S

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AP-5
6471
20 SEP 1963

From: Commanding Officer, U. S. Naval Air Development Center,
Johnsville, Pennsylvania

To: Chief, Bureau of Naval Weapons

Subj: Report No. NADC-AP-6309, "Modification of the Device for
Producing Plates (DPP)," (Final Report, WEPTASK No.
FFRD00001/202 2/F001 04 02, Amendment No. 131)

Ref: (a) WEPTASK/Problem Assignment FFRD of 24 Jan 1963

Encl: (1) Figure 1. Original configuration of camera back with
dial indicators as measuring instruments.
Figure 2. Modified camera back showing horizontal
measuring device.
Figure 3. View showing modified camera and back.
Figure 4. Modified camera back showing vertical
measuring device.

1. Amendment No. 131 to WEPTASK FFRD00001/202 2/F001 04 02 was established by reference (a) to provide technical assistance to the U. S. Naval Photographic Interpretation Center (NPIC) in solving the camera-back problem associated with the DPP.

2. Amendment No. 131 was established at the Aeronautical Photographic Experimental Laboratory (APEL) as a result of prior consultation of NPIC personnel with APEL personnel to ascertain whether it was possible to improve the measuring accuracy of a device for producing plates 24 inch x 24 inch in size shown in enclosure (1), Figure 1. The original measuring arrangement which consisted of pin located dial indicators was cumbersome and inaccurate. The desired accuracy of measurement in both directions was to be 0.001 in. which could be achieved only through a continuous vernier system. The device is the back of a large camera which is used in conjunction with a 9 ft. x 9 ft. vacuum easel. At first, an automatic centering device such as employed on some jig bores was considered; but upon examination, it became apparent that the basic cause of inaccuracy was in the dials themselves which are inherently inaccurate and subject to damage. In addition, the horizontal sliding arrangement allowed an accumulation of foreign particles and, thereby, produced an up and down movement of the frame as it was moved across. Accordingly, APEL plans were centered first on the possible utilization of an optical measuring device such as used on the Bridgeport Milling Machine in conjunction with a lead screw to impart horizontal motion and an accurate sliding bearing arrangement to maintain precision alignment during horizontal translation. A

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rearrangement of the vertical movement to incorporate a locking device or brake to hold the frame firmly on the vertical tracks was also proposed.

3. NPIC cognizant personnel were in agreement with the proposed modification. Accordingly, the NPIC disassembled the camera back and shipped it to APEL during January 1963 where it was reassembled and firmly secured in the vertical position by mounting it on a 4 ft. x 8 ft. heavy plywood which was reinforced with 3 in. x 3 in. x $\frac{1}{4}$ in. angles and anchored to the floor and ceiling.

As soon as it was determined that Bridgeport could not supply optical scales in 24 inch lengths, another source was located and NPIC was advised to make the procurement.

4. In the course of the modification, the following was accomplished:

a. The horizontal track was straightened and chrome plated to provide a hard surface for easy movement. A horizontal lead screw with bevel gears and wheel for convenience of turning was installed to provide easier horizontal movement in place of the original rack and pinion arrangement. In addition, the rack and pinion arrangement did not permit installation of the optical measuring device. New brackets with porous bronze flat sliding bearings were developed and fabricated to assure smooth action. A new brake was incorporated to lock the glass plate frame on to the horizontal track assembly of the main frame. For details, see enclosure (1) figures 2 and 3. It should be noted that much of the original instrumentation, bracketry and controls were eliminated.

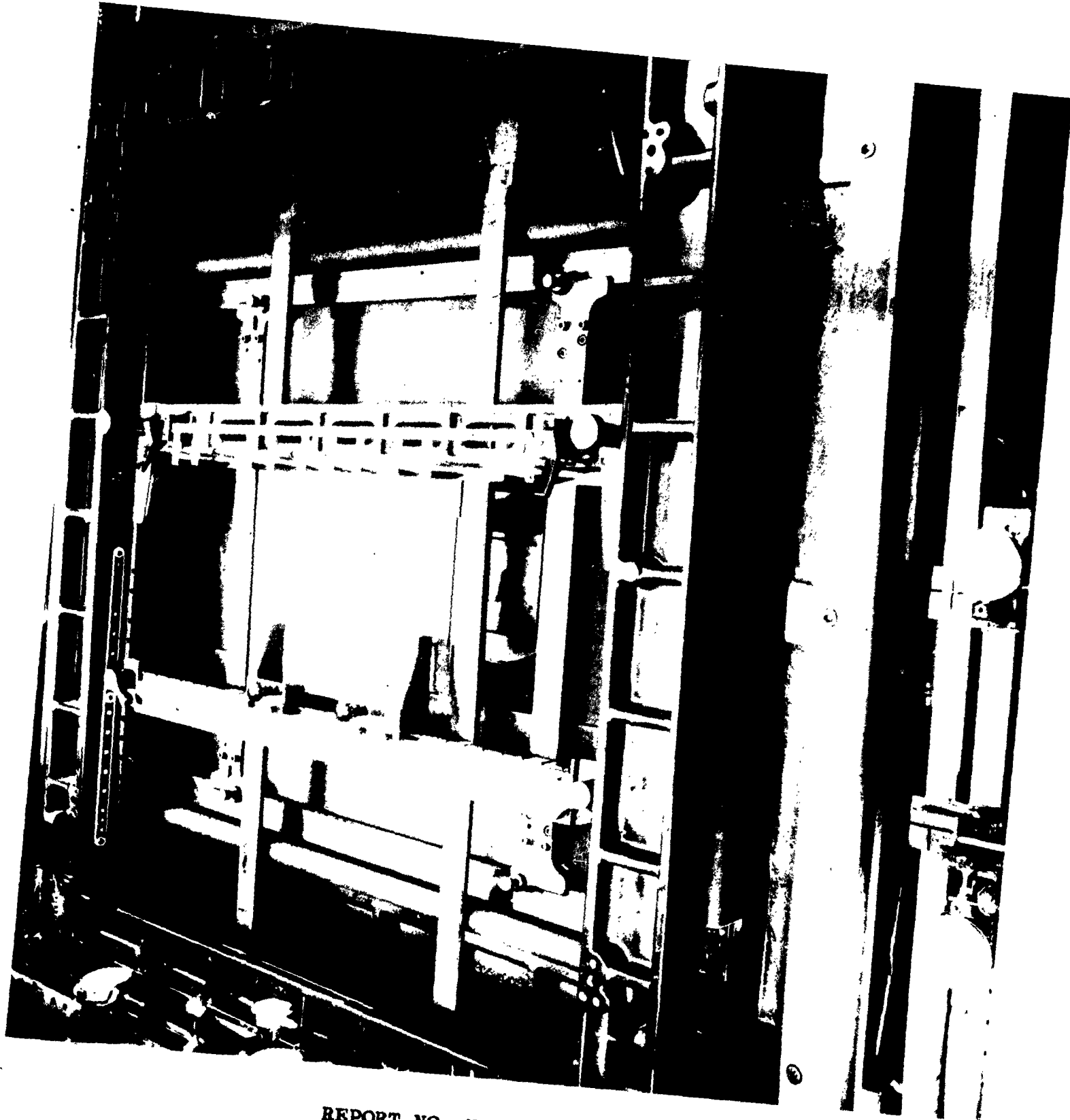
b. New bracketry for the vertical scale and the instrument were designed and fabricated. Also, a new vertical lock was provided. This locking arrangement was so designed as to permit locking and releasing with one hand. In addition, an electrical receptacle box was provided for connection of the optical instruments. Details pertaining to the vertical measuring device are shown on enclosure (1), figures 3 and 4.

5. On 27 May 1963, two representatives of APEL installed the camera back with the assistance of NPIC personnel.

6. Amendment No. 131 of WEPTASK No. FFRD00001/202 2/F001 04 02 is considered completed with this report.

Encl distribution:
See back cover


A. D. HEINZE
By direction

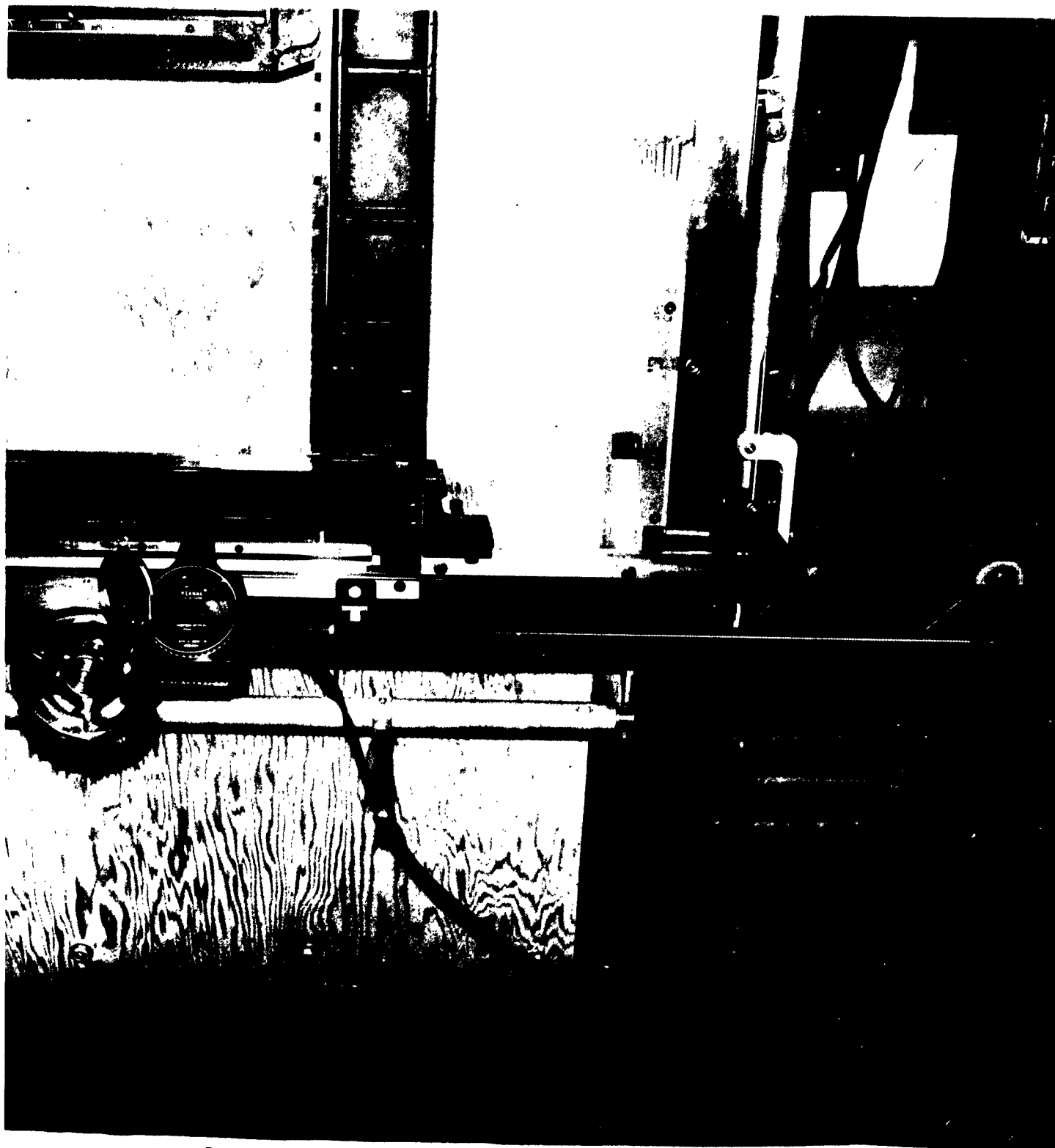


REPORT NO. NADC-AP-6309

ORIGINAL CONFIGURATION OF CAMERA BACK WITH DIAL INDICATORS
AS MEASURING INSTRUMENTS

ENCLOSURE (1)

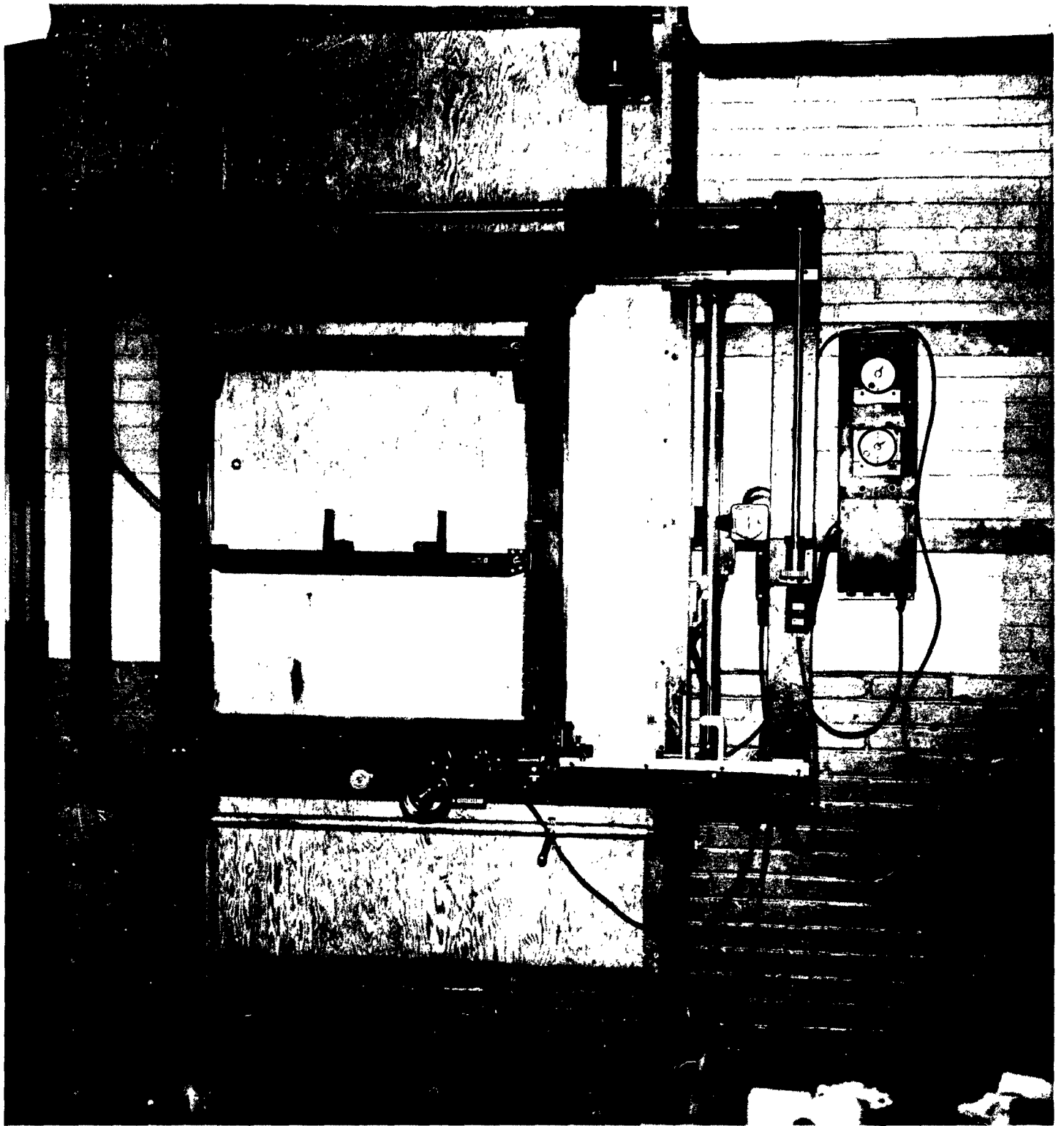
FIGURE 1



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MODIFIED CAMERA BACK SHOWING HORIZONTAL MEASURING DEVICE
ENCLOSURE (1)

FIGURE 2

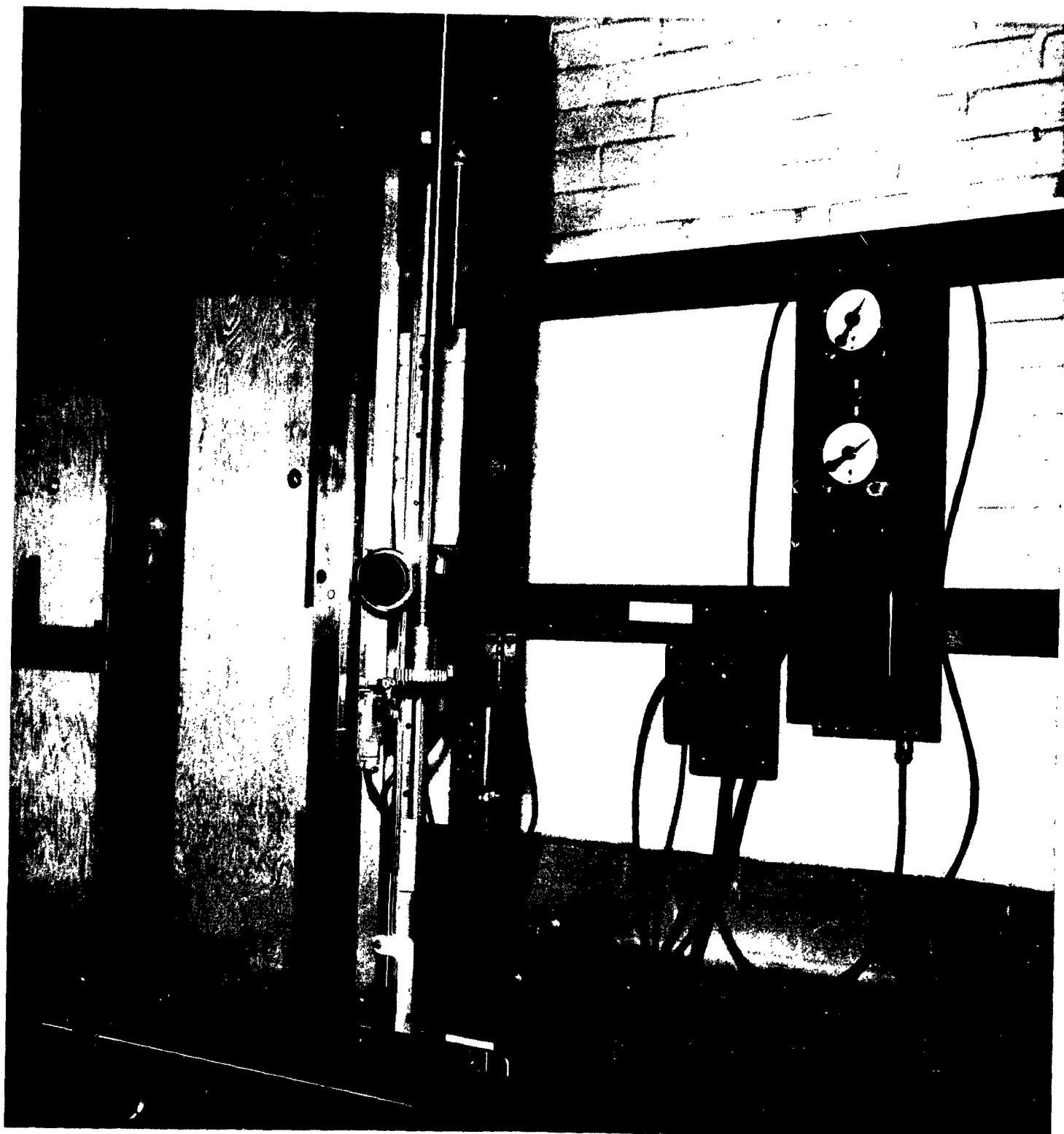


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VIEW SHOWING MODIFIED CAMERA BACK

ENCLOSURE (1)

FIGURE 3



REPORT NO. NADC-AP-6309
MODIFIED CAMERA BACK SHOWING VERTICAL MEASURING DEVICE
ENCLOSURE (1)

FIGURE 4

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MODIFICATION OF THE DEVICE FOR PRODUCING PLATES
(DPP): FINAL REPORT: 20 Sep 1963; 6 p.
Report: UNCLASSIFIED

The measuring accuracy of a device for producing plates 24 inch x 24 inch in size was accomplished through the incorporation of a continuous vernier system which was capable of 0.001 inch accuracy in both the horizontal and vertical direction. The horizontal track was straightened and chrome plated. New bracketry and supports were provided as found necessary.
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- II. WEPTASK FFD00001/202
2/FOO1 04 02
- III. Amendment No. 131

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