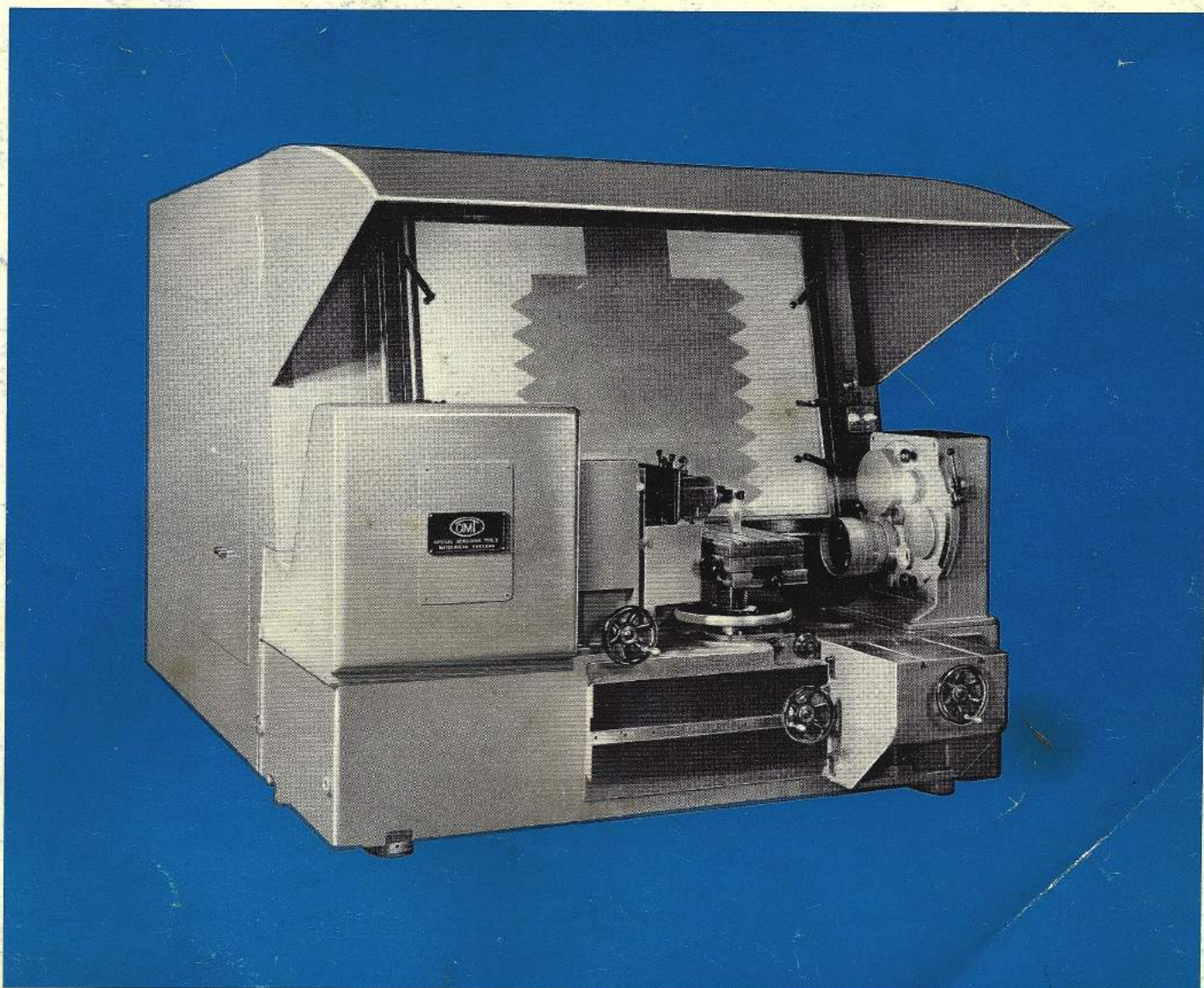




OMT

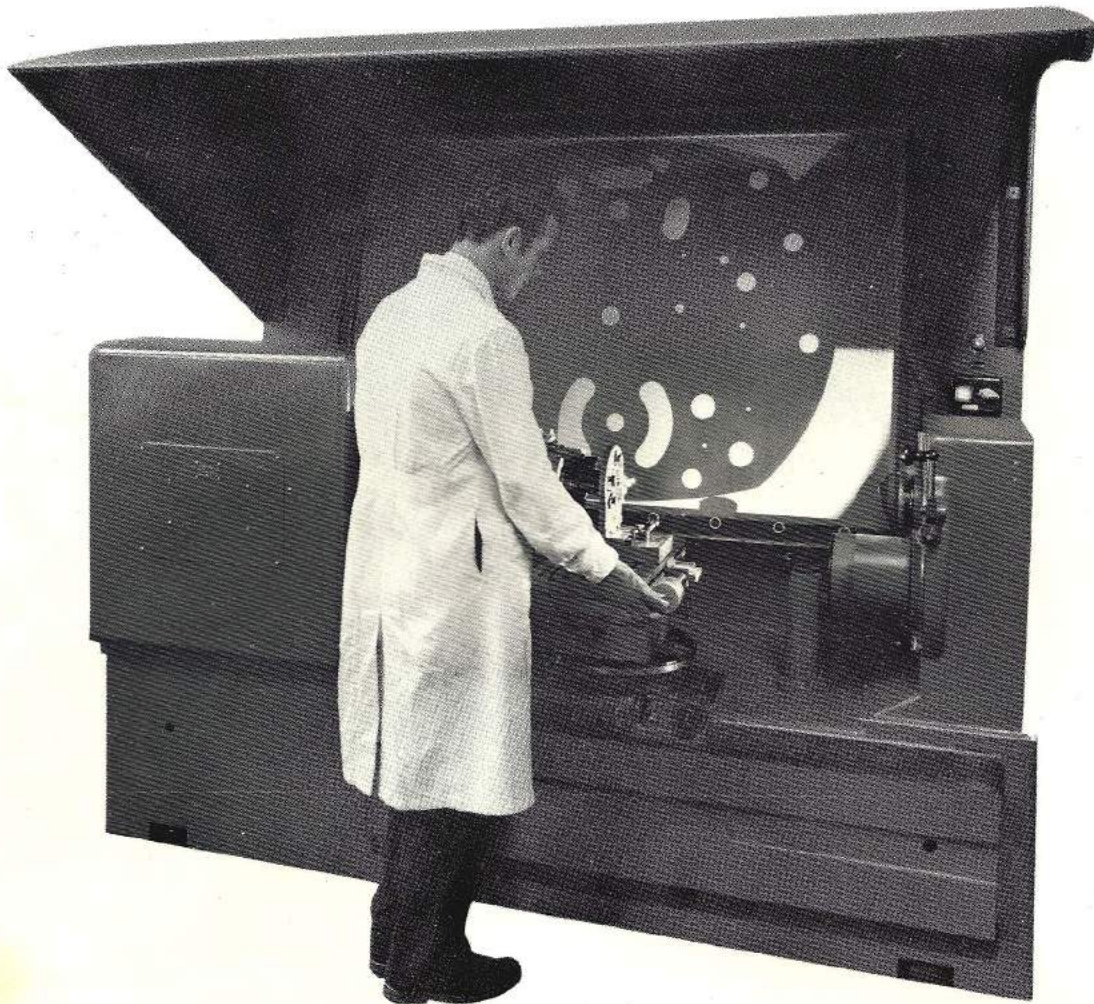
model **WP100**
large capacity
universal projector



A product of **Optical Measuring Tools Limited**



model **WP100** large capacity universal projector



Research and development

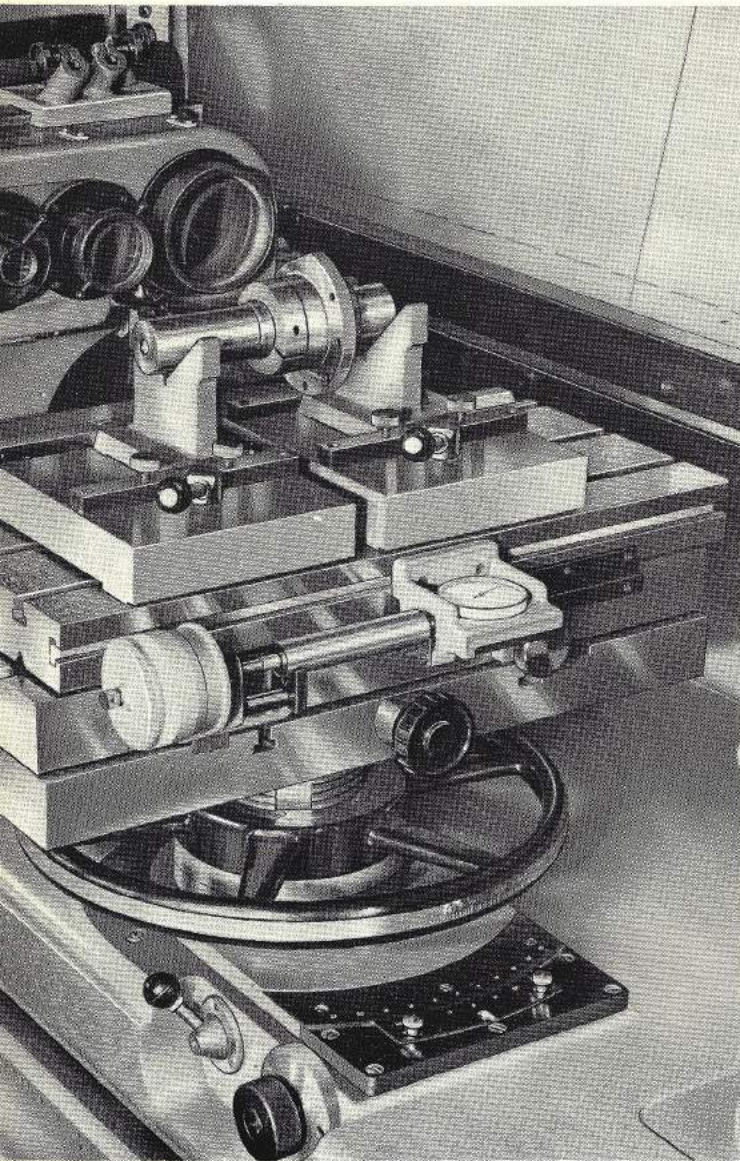
All illustrations, text matter and specification given in this brochure are applicable at the time of printing. The policy of OMT to continually improve products may, however, result in modifications to equipment subsequently manufactured.

The inspection of components for size and contour by means of projection has long been accepted as an adjunct to accurate, economical production in all branches of the engineering industry. Modern manufacturing methods, however, have materially increased the demand both in respect of capacity and applications of instruments installed for this purpose.

Extensive research into users' current and envisaged requirements, together with the considerable practical knowledge acquired by Optical Measuring Tools Ltd. through manufacture of a wide range of projectors over a number of years, has resulted in the development of the W.P. 100 — hailed as the finest type of this instrument in the world.

Basically, this new projector is designed for the inspection of contours such as templates, gears, cam forms, broached parts, screw threads, etc., and for the visual finishing of profile gauges while actually imaged on the screen. Its field of application is, however, made virtually universal through provision of auxiliary equipment such as the episcopic projection unit, die checking attachment and precision compound worktable.

Although an instrument of the highest precision and extensive application, design features of the projector simplify operation and permit magnification changes to be made almost instantaneously.



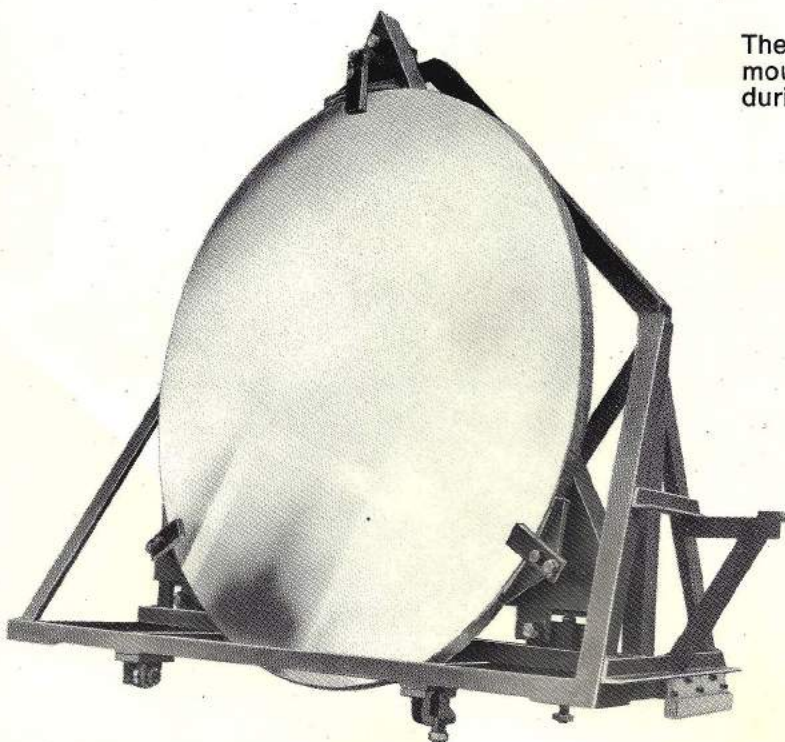
Construction

The front base of the projector, on which are mounted the lens and condenser turrets and worktable, is a high quality iron casting designed to provide maximum rigidity and stability. The rear extension of this base is a welded structure of heavy steel section with ball-bearing tracks for traversing the projection mirror during magnification adjustment.

The mirror system is totally enclosed in sheet steel and a floor is fitted to the projector to eliminate dust; in consequence the optical system requires the minimum of attention.

The 20" x 10" (508 mm x 254 mm) worktable, hand-scraped to close tolerances and Tee slotted for the attachment of fixtures, is mounted on a large diameter elevating screw operated by a capstan-type handwheel. A precision table (described on page 7) is available as auxiliary equipment.

Detail of the turret mounted gauge projection lenses capable of vertical and lateral adjustment. The illustration also shows the precision compound table with units for vertical and horizontal positioning to 0.0001" (0.002 mm). Also depicted are the vee blocks supplied as additional equipment.



The 46" (1168 mm) rear mirror is cradle-mounted on ball-bearing tracks for traversing during magnification adjustment.

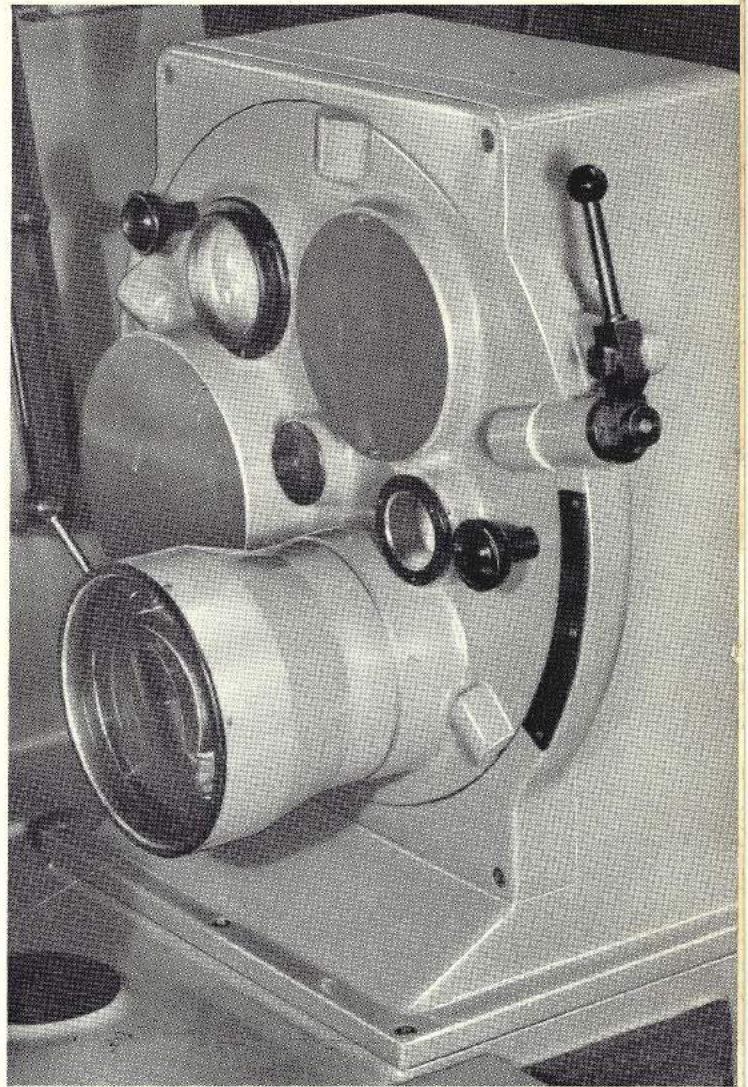
Optical system

Four gauge projection lenses giving a 6" (152 mm) field of view at 10x magnification and correspondingly smaller fields at 20x, 50x and 100x are provided. The lenses are all mounted in one turret which has both lateral and vertical adjustment for lens selection; no movement of the workpiece is necessary for focusing if the magnification is changed.

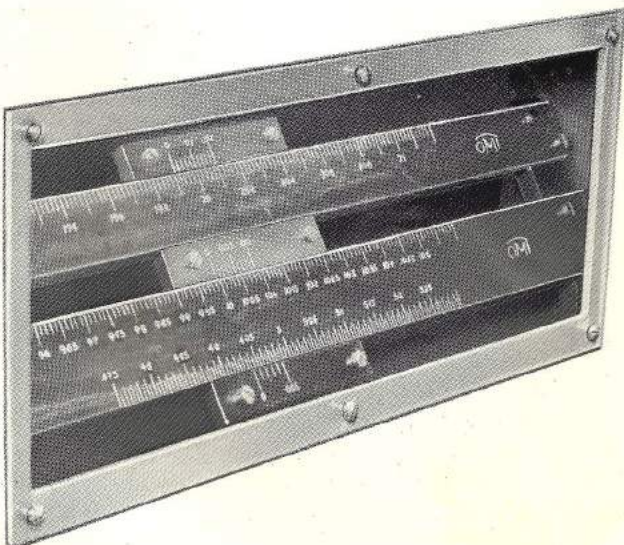
Condenser lenses are all housed in a rotary turret and are clearly identified, so that it is only necessary to select the condenser appropriate to the projection lens in use; the turret is then rotated to the correct position, which is determined by a hand-operated plunger.

The episcopic projection unit, supplied as extra equipment, is in the form of a mirror column swivel-mounted on the instrument base. This is brought into operation by swinging the column into the light path and attaching to the lens in use an applicable transmission mirror.

The mirror system, employed for projection of component image on to the viewing screen, consists essentially of a compound mirror unit which projects the image from the projection lens to a 48" (1219 mm) diameter mirror mounted on tracks in the rear of the projector, from whence it is finally transmitted on to the viewing screen. With all other optical components used in the instrument, this is manufactured by Optical Measuring Tools Ltd., to an extremely high order of precision in order to ensure accuracy of the projected image. This mirror is adjustable along the axis of the light path to decrease or increase magnification in order to compensate for expansion or contraction of materials when this factor is involved.



Close-up of condenser turret. Rotary movement facilitates rapid positioning of required condenser and blind bosses are provided for condensers employed with episcopic projection unit.



Scales and indicator used for adjustment of rear mirror to compensate for shrinkage of materials, etc.

The variation thereby obtainable for each lens is as follows :—

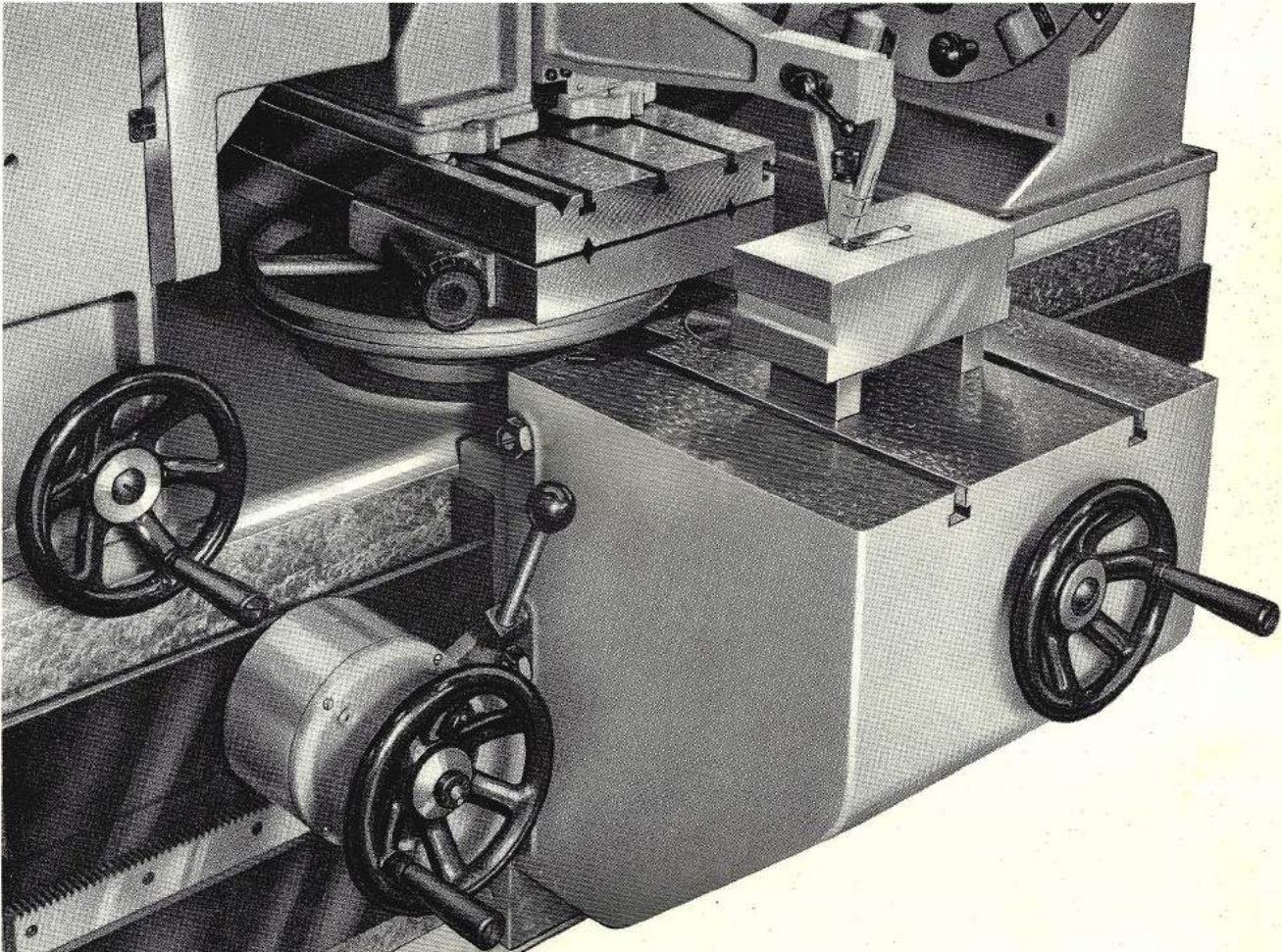
- 10x magnification $\pm \frac{1}{2}$ magnification
- 20x magnification ± 1 magnification
- 50x magnification $\pm 2\frac{1}{2}$ magnification
- 100x magnification ± 5 magnification

Scales and an indicator panel on the projector are employed for precise control of this adjustment.

The 60" x 40" (1524 mm x 1016 mm) projection screen is of clear glass supported in a cast aluminium frame inclined at 11° to the vertical plane for ease of viewing. Fitted to the frame

are vertical straight edges capable of horizontal movement across the screen; to these are attached locators for positioning a further straight edge horizontally or angularly. Spring clips on each straight edge provide means for affixing template drawings to the screen.

An important feature of the W.P. 100 Projector is that the optical path, from the light source past the workpiece and through the projection lens, is parallel to the screen. In addition, the optical system has been designed so that the screen image is in direct relationship to the component and not inverted as normally appertains to this type of projector.



Details of knee-bracket which is shown used in conjunction with the die checking attachment for inspecting a die form. The handwheel at the lower left operates the gear box to provide smooth 2-speed movement and precise location of the bracket.

Electrical equipment

To provide sufficient illumination for both diasopic and episcopic projection, a 250 volt, 1000 watt, high pressure mercury vapour lamp, cooled by a forced draught system, is utilized. Standard equipment is for 250 volts, single phase, 50 cycles but this can be varied in accordance with customers' requirements.

Additional equipment

To extend the employment of the projector in its basic form, the following equipment is available :—

Precision table (OP 2090)

This is a 20" x 10" (508 mm x 254 mm) compound slide, the upper section of which has a 6" (152 mm) precision movement at right angles to the optical axis and the lower part providing a $\pm 1"$ (25.4 mm) focusing movement. For precise control of transverse positioning of the upper slide a measuring system utilising setting bars and large diameter micrometer giving readings to 0.0001" (0.002 mm) can be fitted. Measurement to 0.0001" (0.002 mm) of the vertical movement is provided by a scale on the capstan handwheel and vernier.

As will be seen from the illustration on page 4, the upper surface of the table incorporates Tee slots and a Vee. Any of the former may be used for clamping a fixture; one is also employed in conjunction with the Vee for location and clamping of centres or Vee blocks.

Centres (OP 2290) and vee blocks (OP 2330)

Invaluable for the inspection of all types of bar work, the centres are independent of each other but their absolute alignment is ensured by location in the Vees of the precision table. Maximum diameter and length of work accommodated between centres is 10" (254 mm).

Precision Vee blocks, mounted in a similar manner to the centres, are also offered as auxiliary equipment (depicted on page 4).

A feature of paramount importance is that to compensate for helix when inspecting screw threads, hobs, etc., the complete worktable assembly can be rotated through 12 degrees either side of its normal position. Provision is made for measurement of this angular movement direct to 30 minutes and by vernier to 1 minute.

Vertical glass workplate (OP 2320)

In the form of a supported circular workholder, this incorporates spring clips for retention in the true vertical plane of flat form work such as punch products, cams, small gears, etc.

Knee-bracket (OP 2020)

This 14" x 16" (355 mm x 406 mm) cast iron auxiliary table, similar in principal to the knee-bracket of a milling machine, is mounted on dove-tail slides on the front of the projector base casting. Depicted on the opposite page, it is capable of horizontal movement by rack and pinion and vertical adjustment through lead screw and nut. The knee-bracket may be employed to advantage for supporting fixtures or large diameter work requiring projection of a form in the periphery.

Episcopic projection system

This most useful auxiliary equipment, designed for such applications as the measurement of blind holes by surface projection, also provides an accurate method of checking recessed components and work produced by die-sinking processes. In the form of a mirror column, it is mounted on a boss in front of the condenser turret and a swivel motion permits it to be moved to or from the operative position. Illustration on the right shows the unit aligned in the former position.

Die checking attachment (OP 2530)

This again has been developed to extend the field of employment of the projector and is recommended for very precise inspection of forging dies and similar work.

Special accessories

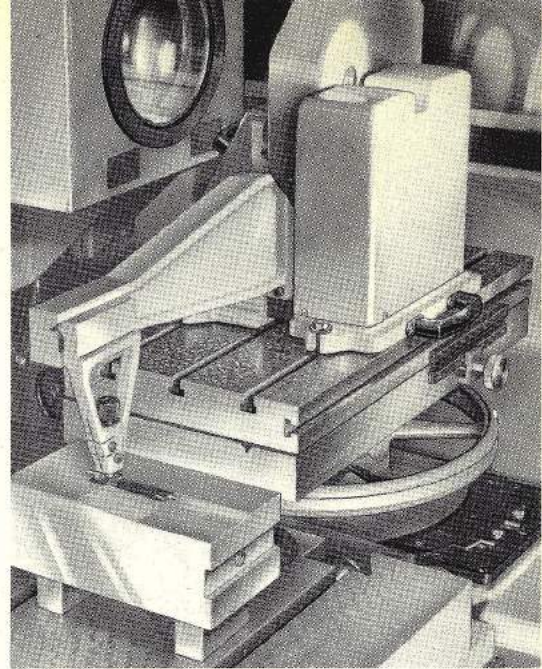
Although the manufacturers are of the opinion that the equipment described above is capable of accommodating the vast majority of projection problems encountered in industry today, consideration will always be given to the production of extra equipment to meet customers' special requirements.

Specification

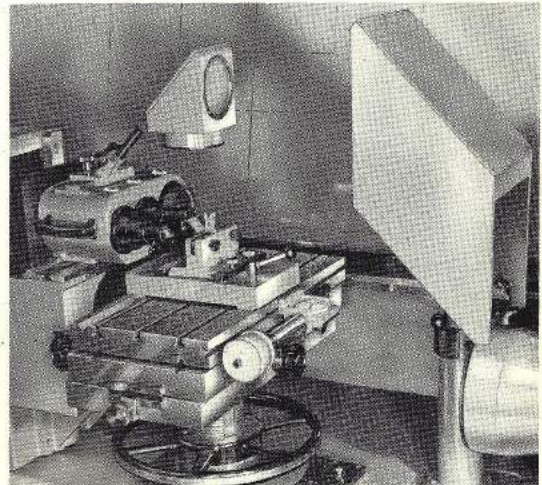
Projection lenses available :

- Screen size — 60" x 40" (1524 mm x 1016 mm)
- 18" Projection Lens covering 6" field at 10x magnification
- 9.7" Projection Lens covering 3" field at 20x magnification
- 4" Projection Lens covering 1.2" field at 50x magnification
- 2" Projection Lens covering 6" field at 100x magnification

Overall height	...	6' 11" (2108 mm)
Overall width	...	7' 6" (2286 mm)
Overall length (over screen hood)	...	11' 8" (3556 mm)
Overall length (over knee-bracket)	...	12' 4" (3759 mm)
Distance—Optical axis to nearest point of screen	...	15" (381 mm)
Distance—Optical axis to table top in lowest position	...	12½" (317 mm)
Distance—Optical axis to front edge of knee-bracket	...	23" (584 mm)
Vertical Adjustment of Worktable	...	6" (152 mm)
Weight	...	9,520 lbs. (4327 kgs)

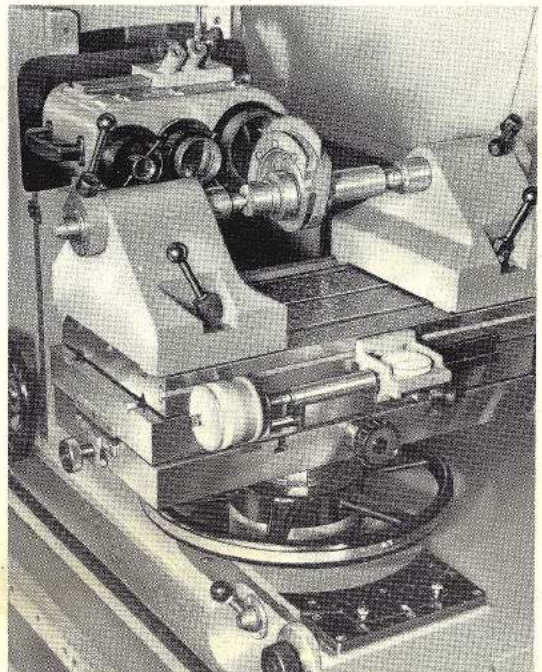


The die checking attachment.



The swivel-mounted episcopic projection unit shown in use for checking the form of a matrix from a type setting machine.

Centres shown in the illustration below are independent of each other and reversible.



OTHER PRODUCTS MANUFACTURED BY THE NEWALL GROUP OF COMPANIES

CYLINDRICAL GRINDING MACHINES, INTERNAL GRINDING MACHINES, UNIVERSAL GRINDING MACHINES, ANGLE HEAD GRINDING MACHINES, ANGLE APPROACH GRINDING MACHINES, MACHINE TOOL EQUIPMENT, SPECIAL PURPOSE GRINDING MACHINES, MULTI-WHEEL GRINDING MACHINES, UNIT-BUILT GRINDING MACHINES, CAMSHAFT GRINDING MACHINES, CRANKSHAFT GRINDING MACHINES, JIG BORING AND MILLING MACHINES — CONVENTIONAL AND NUMERICALLY CONTROLLED, JIG GRINDING MACHINES, SPARK EROSION MACHINES, NUMERICALLY CONTROLLED MULTI-SPINDLE MACHINING CENTRES, HYDRAULIC UNITS FOR MACHINE TOOLS, TOOLMAKERS' MICROSCOPES, OPTICAL COMPARATORS, WORKSHOP PROJECTORS, PROJECTION PANTOMETERS, ROUNDNESS MEASURING MACHINES, OPTICAL DIVIDING HEADS, ROTARY INDEXING TABLES, ELECTRO-PNEUMATIC AIR GAUGING EQUIPMENT, ELECTRONIC GAUGING EQUIPMENT.



OPTICAL MEASURING TOOLS LIMITED

HELSTON CORNWALL ENGLAND

TELEPHONE: HELSTON 3311
TELEX: 45295

Printed in England

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