

ARC THERAPY

BY W. D. CAIN

CLOSE CO-OPERATION with the medical profession has led to the design and construction of a new type of X-ray Apparatus by Marconi Instruments engineers. This is an Arc Therapy Unit, the first of its kind in this country, which has been installed at the Royal Northern Hospital, Holloway, N.7.

The purpose of this apparatus is to direct the X-rays to a given point, where treatment is required, while at the same time the unwanted skin dose is dissipated over a large area. This is accomplished by slowly moving the X-ray tube through a wide arc while treatment is in progress, keeping the beam directed steadily on to a focal point.

Mr. Anthony Green, M.B., Ch.B., F.R.C.S., D.M.R.E., F.F.R., who is both head of the Radiotherapy department at the Royal Northern Hospital and a Harley Street specialist, approached the Company about a year ago to enquire if we would construct an apparatus for this special technique. After a preliminary study of the project it was decided to adapt our TF 1554 Deep Therapy Gantry for the purpose, and details were thrashed out between ourselves and Mr. Green, with Dr. W. A. Jennings, the hospital physicist, and Mr. B. A. Spicer, of the Medical Research Council.

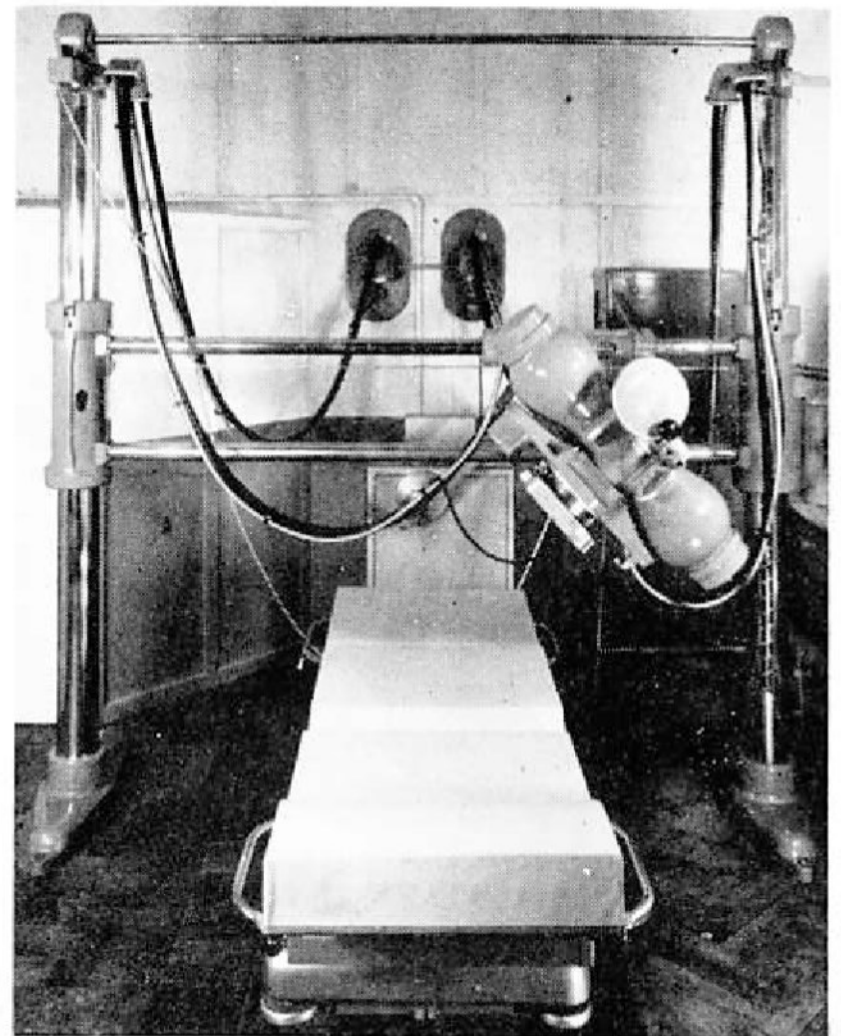
Various mechanisms were considered to drive the unit and we considered the relative advantages of hydraulic, electrical or cam driven mechanisms. It was decided that since reliability, simplicity, safety and long life with the minimum of attention were all important features to be desired, a simple cam mechanism would be the best way to obtain the motion required. The various dimensions and move-

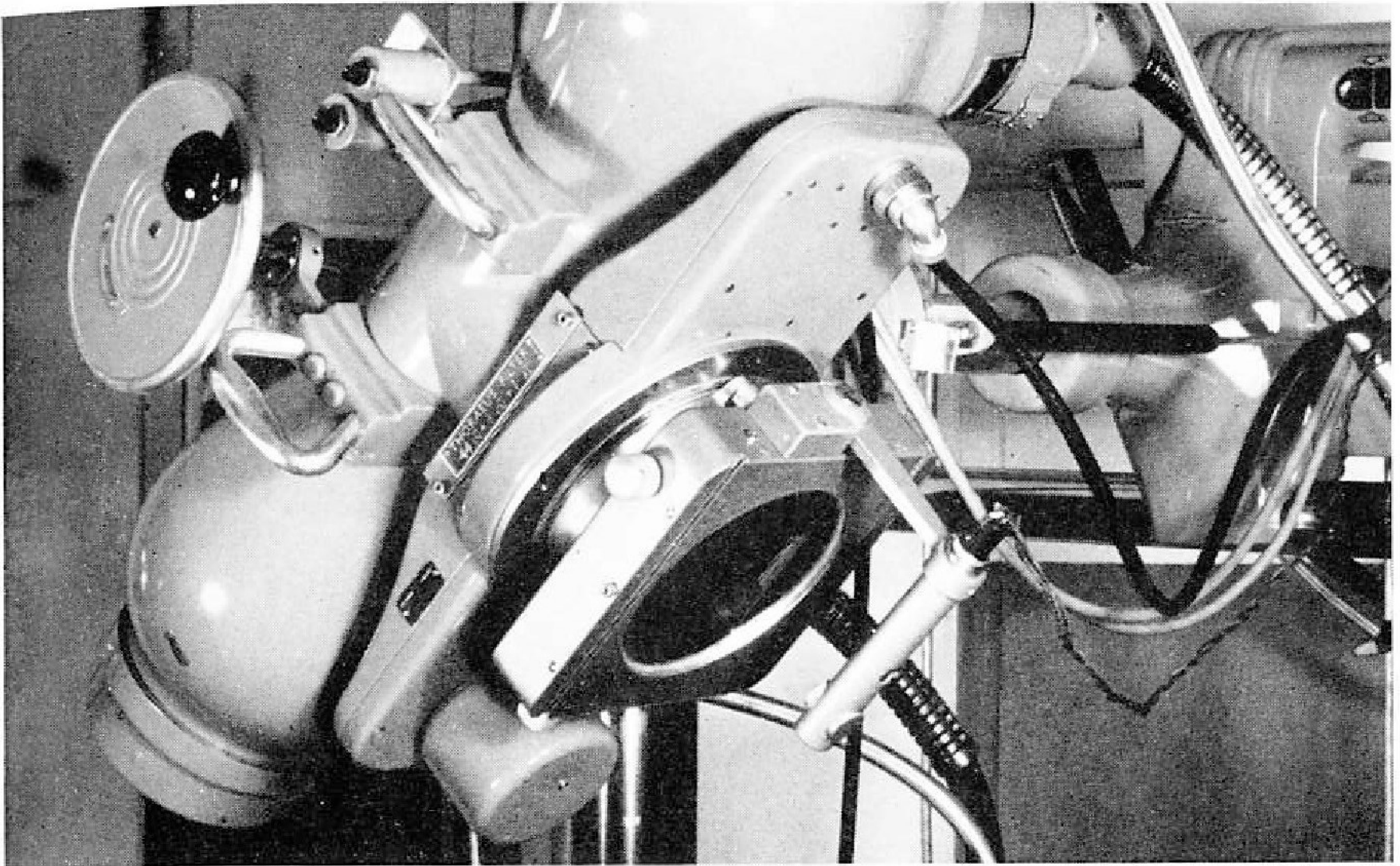
ments were agreed between ourselves and the hospital and it was decided to go ahead and construct the unit as soon as possible because the hospital wished to start treatments at the earliest opportunity.

The gantry is 30 in. wider than our standard type and we had to make the cross members much stiffer to withstand the extra strain. The normal tube head mounting has been replaced by one having a driving shaft which projects at the rear of the support tube and this connects with a radius arm mounted on the motor pedestal.

The radius chosen was 67 cms. but this is variable and allows a wide range of treatments to be undertaken.

The new Arc Therapy apparatus increases the scope of Deep Therapy equipment. All the equipment shown was made by Marconi Instruments





Close-up of the Deep Therapy Tubehead showing the special shutter with the light beam attachment—a very useful means of directing the X-rays to the desired part

All the driving mechanism is installed in the cabinet type pedestal at the rear of the gantry. A system of gears and a cam imparts a rotary motion to the radius arm of 180 degrees in each direction, the speed is constant except at reversal and the cycle time is 61 seconds. Fifty-seven seconds maximum treatment time and four seconds for reversal. Treatment can be continued at the same speed as long as is required. To avoid excessive exposure at the point of reversal, an automatic device closes the shutters at this point.

In the design of this kind of equipment care is always taken to protect the operator and the patient from danger, and also to relieve the operator's worries by making the operation as nearly automatic as is possible. The M.I. Arc Therapy unit has full protection devices which prevent X-rays from being on while the apparatus is being set up for a treatment. The equipment is operated from a simple push button

unit mounted at the side of the main therapy control, outside the treatment room.

The apparatus has been installed at the Royal Northern Hospital where it was eagerly received; a number of patients had been waiting for this treatment. It is already in operation and is being used in conjunction with another device recently developed at the M.I. factory. This is a special shutter which confines the X-ray beam to the desired shape and also, by means of a mirror and lens system, illuminates the patient's skin over the same area as that subsequently covered by the X-ray beam. This is a very useful means of directing the X-rays to the desired point.

It is the sincere hope of the Company that by implementing the ideas of the medical profession it will be of public service, and maintain its leadership in this newest of commercial ventures which it has long enjoyed in the more established communications field.