FLAWFINDER

The Need for X-ray in Industry

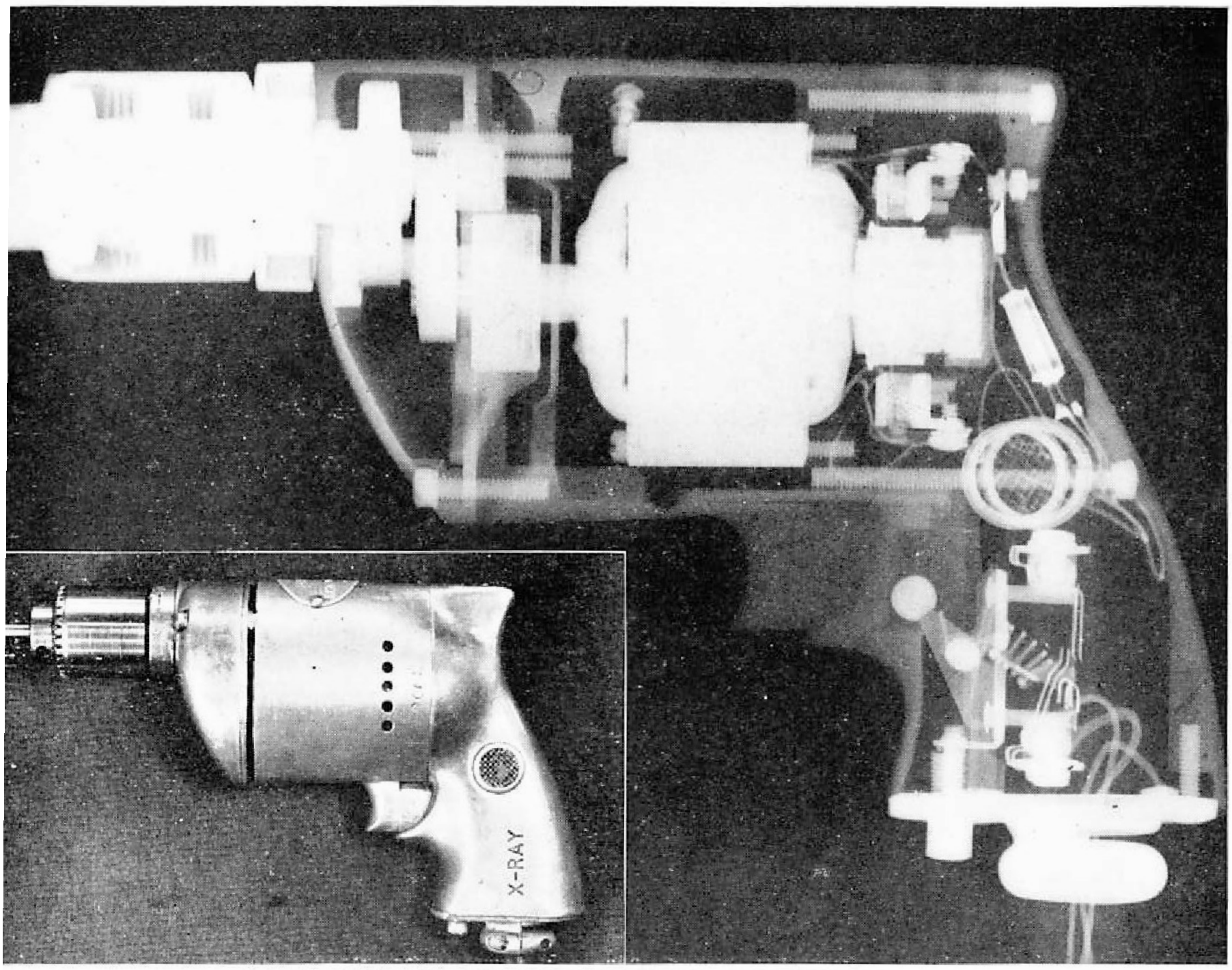
"I HAVEN'T got X-ray eyes, you know", is an expression many of us have heard from a worried inspector when confronted with some defective part which he has passed as satisfactory.

Industry has for some time suffered this deficiency in the human optical system and now a means has been found to rectify it.

X-ray equipment, so generally used by the medical profession, has made extensive progress in recent years in the industrial field, proving a great boon in inspection processes.

Marconi Instruments have made a great contribution to this work in developing and producing a complete industrial X-ray equipment. Its applications are very wide, including the inspection of such varied things as plastic mouldings, electrode assemblies in electronic valves, steel crankshafts, and even castings up to two and three quarter inches thick.

The equipment comprises four main units; the tube, housed in a shock-proof and ray-proof casing, and the tube-stand, which allows free movement of



Left: Preparing to take a radiograph of metal components. Any flaws in the material will be shown on the film beneath. Above: Gunning for trouble—a radiograph of an electric pistol drill. Inset: The drill

the tube and thus minimises the handling of large objects; the high voltage generating unit connected by shock-proof cable to the tube; the oil circulating and cooler unit, and the control unit, which can be used from a desk or mounted on the wall.

Although this X-ray could be used for fluoroscopy (visual screening) it is primarily intended for radiography, and a typical application is in the foundry. When a casting has been made on which lengthy and expensive machining is to be done, it is necessary to know that it is of high quality—in fact that it is perfect—before starting work on it. A small defect which may only come to light in the final machining operation means that the casting is useless. In the first instance, therefore, the pilot casting must be examined in great detail to ensure that the method of casting is correct. This can be done by cutting up the casting into sections and then polishing and etching the cut surfaces. But this is a long and tedious process which must be carried out many times on a large casting if the whole of it is to be examined. After all that it is possible to miss the main trouble areas.

Radiography, a non-destructive method of testing, on the other hand, makes a detailed examination, which can be carried out in a fraction of the time. Furthermore, if the casting is satis-

factory it is available, undamaged, for machining.

A radiograph is merely a shadow picture of both the surfaces and the inside of the material X-rayed. The X-rays penetrate to a greater or lesser extent according to the thickness of material between the source of X-rays and the film. If there is a cavity in the substance more X-rays will reach the film through this area because there is less material to absorb them. The result will be a dark patch on the radiograph corresponding to the position of the cavity.

When the nature and positions of the various defects (if any) have been determined, the task of altering the casting technique to produce good castings is very much easier.

Having produced a good pilot casting it is fair to assume that all castings produced in the same manner will be of similar quality. However, it is normal for a radiographic quality check to be maintained during the production run.

Welds are subject to quite as many types of defects as castings and radiography already enjoys wide applications in this field. The welding quality in the seams of a high pressure boiler, for example, must be perfect.

X-rays, so called because they were an unknown radiation, are now accepted as commonplace. As more and more applications are found for this invaluable method of testing and quality control, the demand for equipment will undoubtedly increase.

A radiograph of a test meter. The components and contacts are clearly visible