TECHNOLOGY

Dry Printing Process

Chief advantages of this revolutionary printing process will be the light weight of printing machinery and simplicity of plate-making.

See Front Cover

➤ A REVOLUTIONARY completely dry process for taking pictures and printing was revealed to the Optical Society of America meeting in Detroit.

Static electricity and dry powders take the place of the familiar chemical solutions used in photography, in the new process called "xerography." Xerography was described by Dr. R. M. Schaffert, head of graphic arts research at the Battelle Institute, Columbus, Ohio, and Joseph C. Wilson, president of the Haloid Company, Rochester, N. Y.

They explained that the fast, new, dry process promises to find uses in both the present fields of photography and printing.

A finished picture can be produced in less than a minute with xerography, they reported. The process is simple enough to be followed by an unskilled person, and prints can be made on a variety of materials, such as glass, cloth, metal or wood, in addition to ordinary papers. Because powder is used, it is possible to make the equipment simpler and less costly than in other methods, the meeting was told.

Here is how the new process can be used to take and print pictures:

A photoconductive plate, made by coating a backing material such as a metal sheet with a photoconductive insulating material, is electrically charged by rubbing it with a cloth or some other method in the dark. This makes the plate sensitive to light.

This plate is then exposed to light in a camera, the way that film is used to take pictures. The coating discharges the electrostatic surface charge into the backing wherever the light falls on it. This leaves a latent image on the surface of the plate.

Developing is done by flowing a powder over the surface of the plate as shown on this week's cover of the SCIENCE NEWS LETTER. This powder includes a superfine developing resin and a coarse carrier material. A mirror-reversed image, like a film negative, results. Printing is accomplished by charging the paper on which the picture is to be printed. The powder is attracted to the charged paper to form the image. Fixing is done by heating the paper print for a second or two.

Black developing powder on white paper will create a black and white print, but other colors may be made for multi-color printing, using separate plate images for each color.

Xeroprinting was described as a simpler variation of the xerographic process. It uses a xeroprinting plate on a rotating cylinder. The plate includes a charging device, a mechanism by which the image is developed with a powder developer, a mechanism for transferring the powder image to paper, a method for fixing the powder to the paper and cleaning or auxiliary devices as required.

The image plate is evenly charged by a corona discharge device, but the charge immediately passes off the conductive, nonprinting surface, while remaining on the printing surface. As the cylinder turns, the plate enters a developing chamber where powder is applied, and on to where the paper and plate are passed under corona discharge points. Here, the image is transferred to the paper, which passes through a heating unit to fix the image.

Xerography was invented by Chester F. Carlson, a New York patent attorney, who patented the process. He licensed the Battelle Institute to develop the process. Mr. Wilson reported that his company is preparing to market a xerocopying machine for reproducing copies of documents of various sorts. Continuing research on the process is also being sponsored by the Signal Corps, Department of the Army. A full scientific report of the work by Dr. Schaffert and C. D. Oughton of the Battelle Institute will be published later.

Science News Letter, October 23, 1948

ENGINEERING

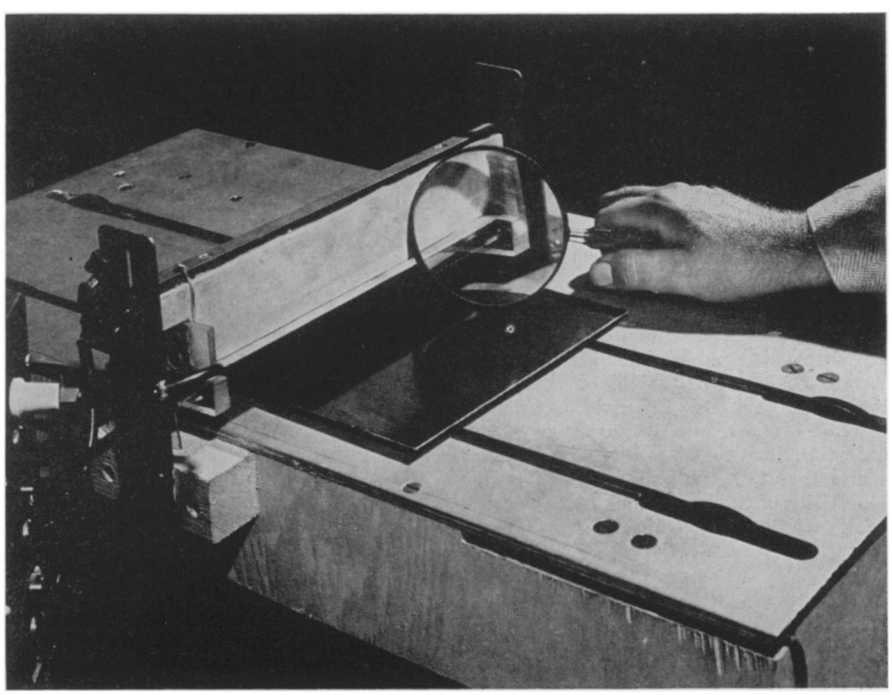
Man-Made Shock Waves Measured by New Device

➤ MAN-MADE SHOCK WAVES passing through the earth, resulting from underground explosions set off by engineers in connection with large construction projects, are accurately measured in velocity and acceleration by a new instrument revealed by General Electric.

The instrument is so designed that it can be buried near the scene of test explosions. It can register shocks up to 1,500 times the force of gravity, and as many as 10,000 impulses per second. The device, the size of a can of baby food, contains crystals which generate a voltage when stresses are applied to them. Signals from the crystals are carried through cables to amplifiers and recorders above ground.

In a recent test of four of these instruments, they gathered data on what sorts of shocks occur 130 feet below 500,000 pounds of high-explosives. The giant explosion was made on the site of Watauga dam, Tenn., to be constructed by the Tennessee Valley Authority.

Science News Letter, October 23, 1948



ELECTRON SPRAYER—This machine, the only specialized apparatus required for xerographic reproduction, is used both to sensitize the plate and to transfer the powder image from the plate to paper by "spraying" electrons from the fine wire visible through the enlarging glass.