

Jan. 25, 1966

R. P. BROWN ETAL

3,230,858

PHOTOGRAPHIC APPARATUS

Filed Jan. 2, 1963

FIG. 1.

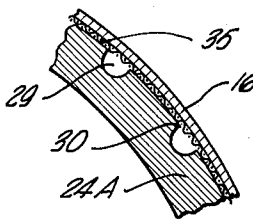
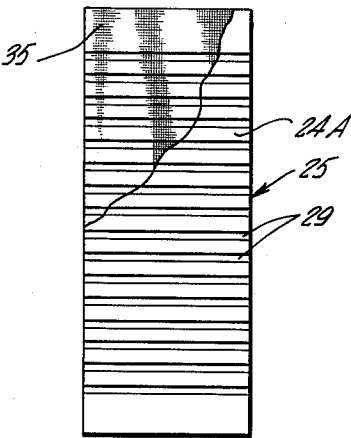
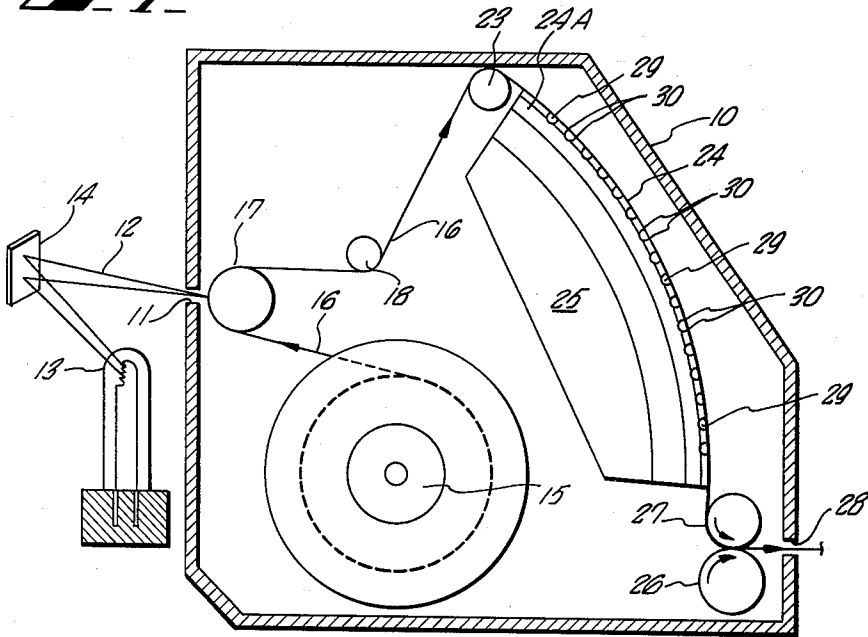


FIG. 3.

FIG. 2.

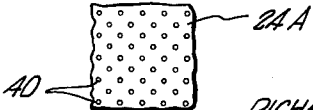


FIG. 4.

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PHOTOGRAPHIC APPARATUS

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2 Claims. (Cl. 95-89)

The present invention relates to a type of heating surface for use with heat-develop photographic emulsions.

Various types of photographic emulsions are utilized to provide rapid access to the record made on the emulsion. For example, in the process of oscillography, access time is extremely important in order that the record may be available for viewing immediately after the occurrence of the event being recorded. The two methods most commonly utilized to provide rapid access time in oscillography are the heating of a thin film of liquid developer applied to a develop-out emulsion and the forced latensification of print-out emulsions. An example of the former is described in U.S. patent application Serial No. 768,186, filed October 20, 1958, for Platen Structure, Charles F. Robinson, now U.S. Patent 3,074,332. The process of forced latensification of print-out type emulsions is described in a paper entitled "An Investigation of Print-Out Paper," by John H. Jacobs, presented at the annual conference of the Society of Photographic Scientists and Engineers at Santa Monica, California, on May 12, 1960, and published in volume 5, Number 1 of Photographic Science and Engineering, the January-February 1961 issue. In each of these methods, a heated platen surface is utilized in development in order to assist in providing rapid access time. In the develop-out emulsion process, the heated platen provides for rapid drying of the thin film of developer applied to the emulsion. In the print-out process, the heated platen raises the emulsion temperature to a temperature which inactivates the original recording sensitivity of the emulsion prior to the application of latensifying radiations. It has, in fact, been found that the same platen structure, that described in the aforementioned Robinson application, may be utilized in the practice of either of the aforementioned methods.

A third type of photographic emulsion, which also provides a rapid access time, has recently become of considerable importance. This is the heat-develop type of emulsion, commonly referred to in the trade as a PDH paper. Examples of heat-develop papers are given in U.S. Patents Nos. 2,410,644 and 3,041,170 and application Serial No. 777,613, filed December 2, 1958 for Photography, John H. Jacobs, inventor, and now abandoned, and are manufactured as Eastman Kind 1549 and Kind 1595 papers. In this type of emulsion, heat is utilized to activate a developing agent in the emulsion. Various types of heat-develop emulsion papers are available, and such papers may be grouped, as to development, into two general classifications, those papers which utilize the moisture already contained in the paper, which may or may not be in the emulsion itself, and those papers requiring further moisture enrichment in conjunction with heat in order to develop the recorded image. The present invention relates to the type of heat-develop papers which do not require further moisture enrichment.

According to the present invention, an improved platen surface for use with heat-develop papers is provided by forming a curved surface which consists of a plurality of closely spaced but separate cells. The cells are formed in the surface of the platen over which the heat-develop paper passes. In one embodiment of the invention, a platen, constructed as described in the aforementioned Robinson application, is utilized and the cells are formed

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by a combination of lateral recesses extending across the platen surface, as is described in the aforesaid application, and a layer of screening. The screening is placed over the platen surface, so as to separate the platen surface from the heat-develop paper. The passages in the screening, in conjunction with each lateral recess in the platen surface, form a series of lateral cells. Between adjacent lateral recesses in the platen surfaces the screen forms additional cells. These additional cells are of a comparatively small depth, being only the thickness of the screen; whereas the cells formed over the platen recesses are comparatively deep, being, for example, one-twentieth of an inch as compared to a screen thickness of six one-hundredths of an inch.

Thus, by utilizing the conventional platen surface of a develop-out oscillograph, the oscillograph can rapidly be converted to a heat-develop paper oscillograph by the addition of the screening and the elimination of the developer application apparatus. In fact, a platen with a smooth surface can be utilized in conjunction with the screening to form the plurality of platen surface cells utilized in the invention. However, it is preferable, when designing an oscillograph primarily for the utilization of heat-develop emulsions, to provide a platen surface of somewhat different structure, while embodying the same concept of a plurality of spaced cells in the platen. The requisite platen surface is preferably provided by recesses opening onto the platen face. The recesses may be circular, rectangular, or any other desired configuration, preferably of a width of approximately one-tenth inch and a depth of one-eighth inch. The recesses are disposed closely together, as, for example, circular recesses of one-tenth inch radius drilled on one-hundred twenty-five one-thousandths centers. To provide a small size of platen, the platen temperature should be heated to a temperature which will provide heat transfer between the platen and the heat-develop paper sufficient to produce the necessary development of the paper. Commonly used temperatures are in the neighborhood of three hundred degrees Fahrenheit.

The invention may be more readily understood by referring to the accompanying drawings, in which:

FIGURE 1 is a schematic elevation of an oscillograph unit in side view illustrating the general structure of the platen and its relative disposition according to the present invention;

FIGURE 2 is a plan view of one embodiment of the platen structure shown in FIGURE 1;

FIGURE 3 is a cross-sectional view of a portion of the platen of FIGURE 2; and

FIGURE 4 is a plan view of a portion of another embodiment of the platen according to the invention.

With reference to FIGURE 1, a record handling unit is enclosed in a magazine 10 having on one side a window 11 through which a light beam 12, produced in a conventional recording camera, enters the magazine incident on the record therein. The camera is illustrated schematically as a light source 13 and a modulator 14 represented as a galvanometer mirror. The magazine houses a supply roll 15 on which an unexposed PDH emulsion-surfaced paper 16 is mounted. The paper 16 is carried over a metering roller 17 driven by a conventional roller drive means (not shown) to control the speed of travel of the recording medium through the magazine. From the metering roller the paper 16 is carried around an idling or tension roller 18 and thereupon past a guide roll 23 and across a curved heat-transfer surface of a plate 24A in a platen structure 25. From the platen structure, the paper 16 is passed through compression rolls 26, 27 which are driven through a slip clutch (not shown) to maintain a constant tension on the record between the metering roll 17 and the point of contact

with the compression rollers. Thereupon the paper 16 is discharged from the magazine 10 through an exit slit 28.

In the embodiment of the platen according to the present invention shown in FIGURES 1 and 2, a plurality of spaced-apart slots 29 are disposed in longitudinal disposition across the face of the platen structure. The slots extend laterally across the width of the platen face and are transverse to the direction of travel of the record. Where the surfaces defining the slots intersect the face of the platen structure, a plurality of edges 30 are defined. By way of example, the platen face may be of any conventional metal and the slots approximately five-thirtieths of an inch width and one-twentieth of an inch depth, spaced about three-fifths of an inch apart. Screening 35 (FIGURE 2) covers the face of the platen so as to separate the platen from the heat-develop paper 16. The screening may be, for example, conventional screen formed of thirty-thousandths inch aluminum wire, giving rectangular passages of about fifty-thousandths of an inch width through the screening.

The face of the platen is its heat-transfer surface and is heated by insert heaters (not shown) mounted in the platen structure. The paper 16 drawn across the heat-transfer surface is heated to a temperature in excess of one hundred degrees centigrade and preferably at a temperature of one hundred forty degrees centigrade. It is, of course, necessary that relatively large quantities of heat be transferred from the heat-transfer surface of the platen structure to the paper to activate the development of the paper.

In the embodiment shown in FIGURE 4, the plate 24A has a plurality of recesses in the form of holes 40 drilled therein rather than having the laterally extending slots 29 of FIGURE 2. The holes are shown as circular, although they may be any desired shape and could also be formed by casting, if desired. By way of example, the holes may be drilled with one-tenth inch diameters to a depth of one-eighth inch on one hundred twenty-five thousandths centers, it being understood that no passage is provided through the platen by the holes. The remainder of the structure for the platen in the embodiment shown in FIGURE 4 is the same as that previously described, except it has been found that the screening 35 is not required since the holes 40 combine the functions of the screening 35 and the recesses 29. It should be noted that the holes are disposed laterally across the platen face so that a continuous passage, such as the slot 29, is not formed.

The actual operation of the device according to the invention will be apparent from the preceding description. The improved results obtained by use of the platen structure apparently result from the conservation of steam which the platen structure provides. Thus, when moisture enrichment is not to be used and the moisture contained in the paper is utilized to activate development, a better result is obtained from the most economical use of the moisture generated by the heat. The recesses apparently serve to trap moisture which would otherwise be lost to

the environmental surroundings, and thus provide better development of the emulsion upon the application of heat. Experimental substantiation of this explanation is furnished by the utilization of the platen shown in FIGURE 2 without the screening. If heat-develop paper is held against the platen, without paper movement, for the period required to develop the paper, it has been found that development is complete on those areas of the paper which cover the slots 29. However, in those portions of the paper in direct platen, development was incomplete, apparently as a contact with the surface of the result of the moisture in the paper being driven out before full development could take place. Therefore, by utilizing the improved moisture trapping structure of the invention, improved development of the emulsion is provided.

The invention claimed is:

1. In a structure for use in applying heat to an exposed, heat-developable photosensitive paper comprising a partially developed cylindrical platen fixed in position and adapted to have the photosensitive paper drawn over it, means for disposing the platen in the path of paper travel subsequent to recording exposure, and means for heating the platen to cause the release of moisture from the paper to thereby induce development, the improvement comprising a plate disposed in a heat transfer relation with the platen and having an array of bottomed small holes located in a mesh-like pattern on the surface thereof, the holes in conjunction with the paper defining a plurality of separate, closed cells to trap and hold moisture released from the paper in substantially uniform contact with the overlying surface of the paper.

2. In a platen structure for use in applying heat to an exposed, heat-developable photosensitive paper comprising a partially developed cylindrical platen having a substantially continuous imperforate surface, the cylinder being fixed in position and adapted to have photosensitive paper drawn over it, means for disposing said platen in the path of paper travel subsequent to recording exposure, and means for heating the platen to cause the release of moisture from the paper to thereby induce development, the improvement comprising a fine mesh screen disposed over and in contact with the platen surface, and means for drawing the photosensitive paper over the screen, the screen and imperforate platen surface in conjunction with the paper defining a plurality of separate closed cells to trap and hold moisture released from the paper in substantially uniform contact with the overlying surface of the paper.

References Cited by the Examiner

UNITED STATES PATENTS

2,074,455	3/1937	Carleton	34—110
3,073,038	1/1963	Dapses	34—110
3,074,332	1/1963	Robinson	95—13

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,230,858

January 25, 1966

Richard P. Brown et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 11, for "photograhpic" read -- photographic --; column 2, line 8, for "surfaces" read -- surface --; line 45, for "realtive" read -- relative --; column 4, line 11, strike out "contact with the surface of the", and insert the same after "direct" in line 10, same column 4.

Signed and sealed this 3rd day of January 1967.

(SEAL)

Attest:

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Commissioner of Patents