



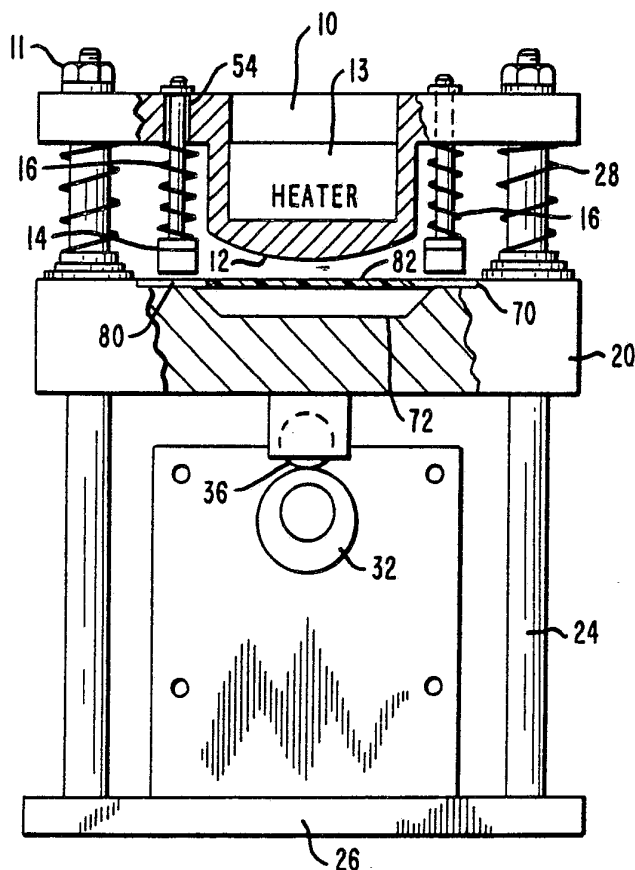
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁴ : G03D 13/00	A2	(11) International Publication Number: WO 88/ 08155 (43) International Publication Date: 20 October 1988 (20.10.88)
(21) International Application Number: PCT/US88/00656 (22) International Filing Date: 3 March 1988 (03.03.88) (31) Priority Application Number: 036,517 (32) Priority Date: 9 April 1987 (09.04.87) (33) Priority Country: US (71) Applicant: NCR CORPORATION [US/US]; World Headquarters, Dayton, OH 45479 (US). (72) Inventors: SPEKTOR, Semyon ; 724 34th Street, San Francisco, CA 94121 (US). VEPRINSKI, Michael ; 5014 Rio Verde Drive, San Jose, CA 95118 (US). RANGER, Michael, Harry ; 1056 Ondine Court, San José, CA 95132 (US). (74) Agents: JEWETT, Stephen, F. et al.; Assistant Chief Counsel, Intellectual Property Section, Law Department/NCR Corporation, World Headquarters, Dayton, OH 45479 (US).		(81) Designated States: DE (European patent), FR (European patent), GB (European patent), JP. Published <i>Without international search report and to be republished upon receipt of that report.</i>

(54) Title: A DRY FILM DEVELOPING APPARATUS

(57) Abstract

A dry film developing apparatus for developing images recorded on a frame of heat developable film (82) mounted in an aperture card (80) incorporates a holding mechanism (14, 16) for holding the aperture card (80) while a heating block (10) having an arcuate projecting surface (12) is urged against the undeveloped dry film (82) so as to insure a uniform contact of the undeveloped film (82) with the heating block (10) for a period of time sufficient to develop the film.



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A DRY FILM DEVELOPING APPARATUS

Technical Field

The present invention is related to the field of dry film processing and more particularly to a developing apparatus which heats a frame of film mounted in an aperture card to a developing temperature as the film is stretched against an arcuate projecting heating surface.

Background Art

Heat processable films are known wherein images recorded on the film can be developed by heating the film to its developing temperature and then cooling the film generally to room temperature. Such film may be of the type manufactured by the Kodak Co. of Rochester, New York.

U.S. Application No. 4,009,034 discloses a developing apparatus having a heating block provided with an arcuate projecting heating surface which is urged against the dry film, and a complementary surface heating block positioned adjacent the first heating block for directing heat to the back surface of the dry films. There is no mechanism in this apparatus for holding the film so as to stretch it into a uniform contact with the arcuate projecting heating surface.

Disclosure of the Invention

It is an object of the present invention to provide a developing apparatus for aperture card mounted dry film which insures better and more uniform contact of the film with the arcuate surface of the heating block.

Thus, according to the invention, there is provided a dry film developing apparatus for developing an image recorded on a frame of heat

developable film characterized in that said frame of film is mounted in an aperture card, and further characterized by a bearing block having a recessed area corresponding to the area of the heat developable film, said bearing block having guides thereon for guiding said aperture card so that a frame of heat developable film is positioned over the recessed area; a heater block for generating a temperature sufficient to develop said heat developable film, said heater block having a projecting arcuate surface; moving means for bringing about relative movement between said heater block and said bearing block so that the arcuate surface of said heater block is brought within the recessed area of said bearing block; and holding means secured to said heater block for holding said aperture card in such a manner that said frame of heat developable film is held over the recessed area of the bearing block while the arcuate surface of the heater block stretches and heats the heat developable film for a period of time sufficient to develop the film.

Brief Description of the Drawings

An embodiment of the apparatus according to the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a front elevation of the developing apparatus according to the invention.

Fig. 2 is a side elevation of the apparatus; and

Fig. 3 is a simplified, partially cut away, front view of the apparatus of Fig. 1.

Best Mode for Carrying Out the Invention

Referring to Figs. 1 and 2 wherein the dry film developing apparatus of the present invention is shown with a base member 26 supporting two rods 24.

each having threaded ends, a heater block assembly 10 is rigidly affixed to the threaded ends of the rods 24 by nuts 11. The central portion of the heater block assembly 10 houses a heater 13 (shown in Fig. 3) which is powered through a power plug 18.

The heater block assembly 10 is provided with an arcuate projecting heating surface 12. Referring momentarily to Fig. 3 which is a simplified drawing of the front of the dry film developer, four sleeve bushings 54 extend through the heater block assembly 10 on each side of the central portion.

Spring loaded fingers 16, having a gripping surface 14, are slidably mounted within the sleeve bushings 54.

A bearing block 20, having a recessed area 72, is slidably mounted on the two rods 24 with two springs 28 inserted on the rods between the heater block assembly 10 and the bearing block 20. The bearing block contains a set of guide surfaces 70 for receiving an aperture card 80 on which is mounted a frame of dry film 82 having an image recorded thereon.

The gripping surfaces 14 are positioned so as to contact the aperture card 80, on each side of the frame of dry film, when the bearing block 20 is urged toward the heater block assembly 10. The gripping surfaces 14 are triangularly shaped with the tips of the triangles positioned parallel to the arc of the arcuate surface 12. In operation, as the tips of the gripping surfaces 14 contact the aperture card 80 and are urged into further contact the tips bend outward stretching the card 80 and the film 82. The stretching provided by the gripping surfaces 14 is perpendicular to the stretching provided by the arcuate surface 12. The combined stretching insures good contact with the heated arcuate surface 12.

Referring back to Figs. 1 and 2 various mechanisms may be used to urge the bearing block 20

into the developing position. The preferred embodiment of the invention utilizes an eccentric cam 32, contacting a roller 36 mounted to the bearing block 20, which cam is driven by a motor 38. The motor 38 receives its power through the power cord 39.

In the preferred embodiment of the invention the heater is maintained at a temperature of 127°C and is maintained in contact with the dry film for a period of 3.5 seconds for film development. A timer (not shown) is actuated by the crescent wheel 34 along with an LED and photodetector mounted within the element 50. In the rest position the edge 42 of the crescent wheel 34 is on the left side of the LED beam. When the motor is started the beam is broken by the crescent wheel 34 until the edge 44 appears on the right side of the beam, at which time the bearing block is in its uppermost position. The bearing block remains in that position for the required development time and then is driven to its rest position awaiting the next aperture card.

A drive mechanism 60 is used to urge the aperture card into the correct position for developing. The drive mechanism 60 is comprised of two sets of spring loaded pinch rollers comprised of a first and second roller, 62 and 63, respectively loaded by springs 64. The bottom set of rollers 63 are driven by a shaft 67 which in turn is driven by a pulley 66 via a drive belt (not shown).

CLAIMS

1. A dry film developing apparatus for developing an image recorded on a frame of heat developable film characterized in that said frame of film is mounted in an aperture card, and further characterized by a bearing block (20) having a recessed area (72) corresponding to the area of the heat developable film, said bearing block (20) having guides (70) thereon for guiding said aperture card (80) so that said frame of heat developable film (82) is positioned over the recessed area (72); a heater block (10) for generating a temperature sufficient to develop said heat developable film (82), said heater block (10) having a projecting arcuate surface (12); moving means (32, 36) for bringing about relative movement between said heater block (10) and said bearing block (20) so that the arcuate surface (12) of said heater block (10) is brought within the recessed area (72) of said bearing block (20); and holding means (14, 16) secured to said heater block (10) for holding said aperture card (80) in such a manner that said frame of heat developable film (82) is held over the recessed area (72) of the bearing block (20) while the arcuate surface (12) of the heater block (10) stretches and heats the heat developable film (82) for a period of time sufficient to develop the film (82).

2. Dry film developing apparatus according to claim 1, characterized in that said holding means includes four spring loaded plungers (14, 16), one positioned at each corner of said aperture card (80), with each plunger having a gripping surface (14) which flexes to further stretch said heat developable film (82) as the arcuate surface (12) of the heater block (10) stretches said film (82).

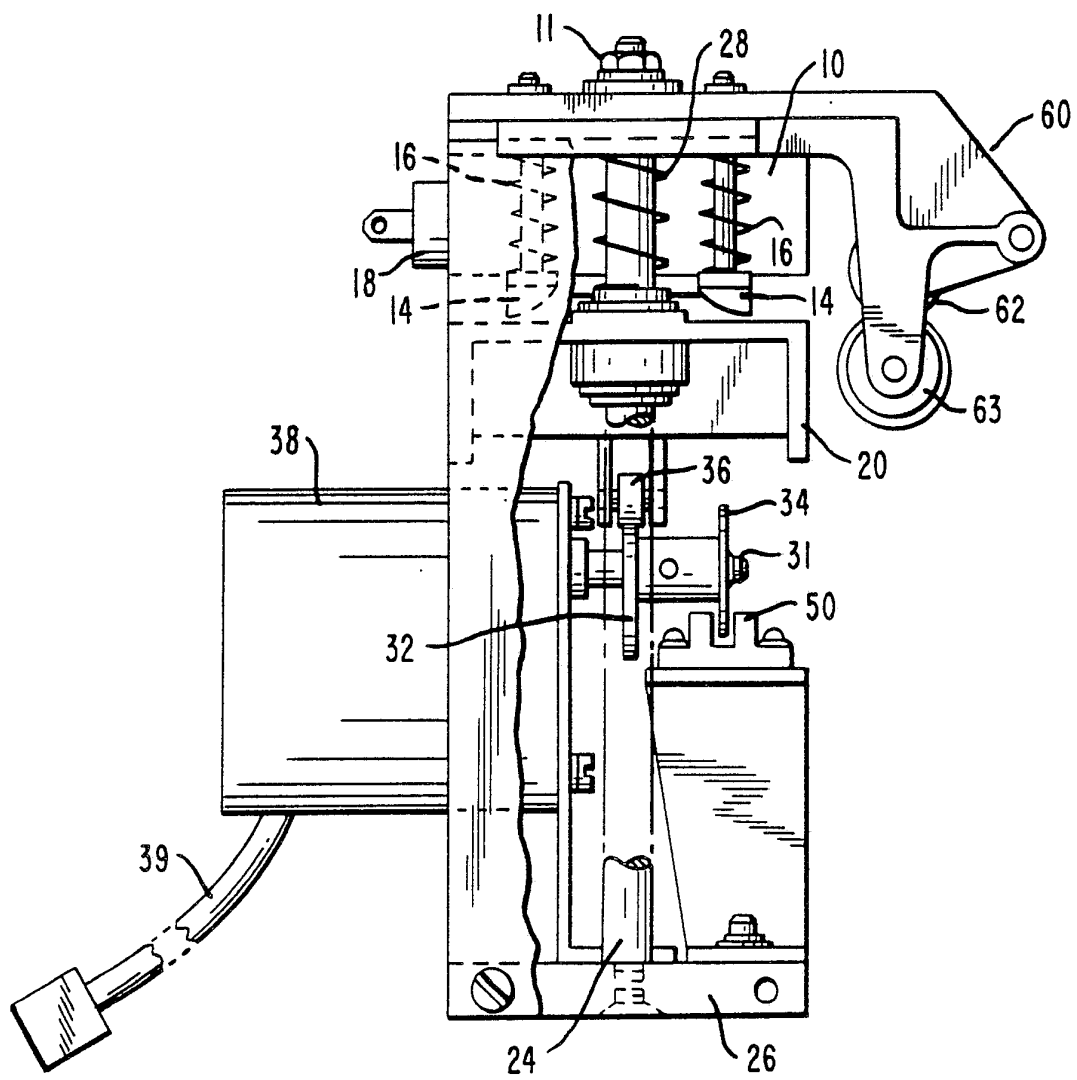
3. Dry film developing apparatus according to claim 1, characterized in that said moving means is an eccentric cam means (32, 36) operatively coupled to said bearing block (20) for urging said bearing block (20) into close proximity with said heater block (10) so as to stretch and heat develop said film (82), and release said aperture card (80) for each rotation of said eccentric cam means (32, 36).

4. Dry film developing apparatus according to claim 1, characterized in that the projecting surface (12) of said heater block (10) is shaped to provide uniform contact with the stretched film (82).

5. Dry film developing apparatus according to claim 1, characterized in that the temperature of the projecting arcuate surface (12) of said heater block (10) is approximately 127°C and said arcuate surface (12) is maintained in contact with the heat developable film (82) for approximately 3.5 seconds.

6. Dry film developing apparatus according to claim 1, characterized by driving means (60, 62, 63) mounted on said heater block (10) for moving an aperture card (80) so as to bring a frame of heat developable film (82) into alignment with the recessed area (72) of said bearing block (20).

FIG. 2



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FIG. 3

