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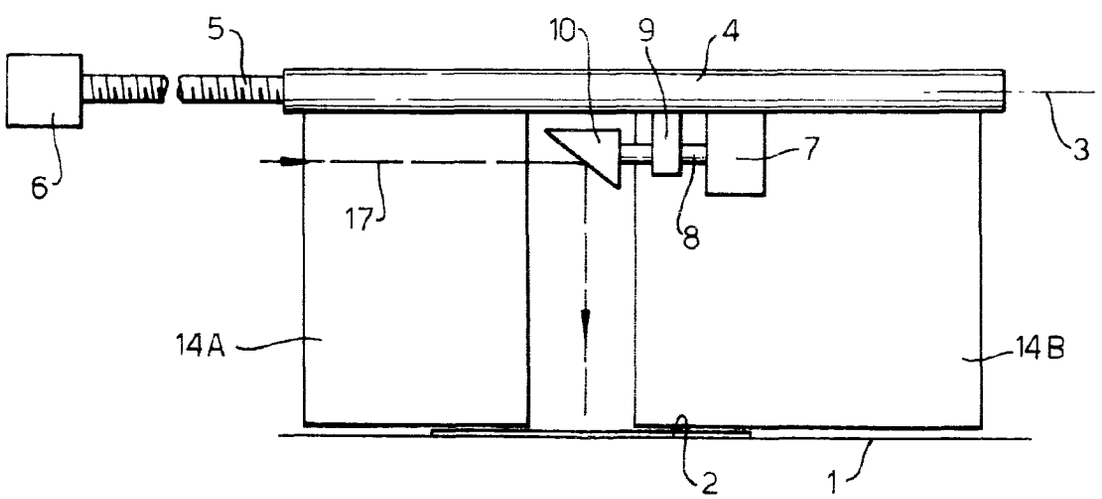
(54) Image scanning apparatus

(57) Image scanning apparatus comprises an elongate image support (1) having a curved cross-section. A scanning system (7-10) is positioned radially inwardly of the support for scanning a radiation beam (11) in a circumferential direction across a record medium (2) on the support. Relative movement is caused between the support and the scanning system parallel with an axis of the support. At least one pair of axially extending resilient baffles (12-16) is mounted on axially opposed sides of the scanning system and extends close to the support to as to impede radiation reflected by a record medium on the support impinging on another part of the record medium.

Fig.2.



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Description

The invention relates to image scanning apparatus and in particular to such apparatus including an elongate image support having a curved cross-section; and a scanning system positioned radially inwardly of the support for scanning radiation in a circumferential direction across a record medium on the support.

In such image scanning apparatus, often implemented in the form of an internal drum imagesetter, light reflected from the writing spot by the record medium, such as a film, will radiate back into the drum and add to the exposure of film on the other side of the drum. The integrated effect of this low level exposure can prefog the film and show up as visible darkening of half tones.

Conventional solutions involve arrangements of black baffles made of sheet metal, or similar material, which extend close to the drum surface and act to cover the film, apart from a slit along which the writing spot travels, thus preventing pre-exposure except in the vicinity of the exposing spot. Alternatively, fixed fan-like vanes have been used extending radially from the carriage effectively to enclose the scanning light beam within a thin disc-like volume across the axis of the cylindrical drum. Such baffles also are most effective if they extend close to the surface of the drum.

The above baffle arrangements conflict with the use of a film loading carriage in large internal drum configurations. The film loading carriage moves round the inside of the drum carrying the film as it is dispensed to the drum and ensures that the film does not buckle and fall back into the drum out of control. If the light baffles are limited in their proximity to the drum surface to allow the loading carriage to move beneath them, then there can be a direct path across the drum to the film on the other side and the baffles are less effective. Arrangements are known where the scan carriage moves to an extreme end of its travel to bring the baffles out of the way of the film loading arm before the film loading operation starts, but this extra traverse motion reduces the productivity of the imagesetter.

In accordance with the present invention, image scanning apparatus comprises an elongate image support having a curved cross-section; a scanning system positioned radially inwardly of the support for scanning a radiation beam in a circumferential direction across a record medium on the support; means for causing relative movement between the support and the scanning system parallel with an axis of the support; and at least one pair of axially extending resilient baffles mounted on axially opposed sides of the scanning system and extending close to the support so as to impede radiation reflected by a record medium on the support impinging on another part of the record medium.

In contrast to the known arrangements, we provide a pair of baffles which extend in the axial direction rather than orthogonal to the axial direction and the baffles are sufficiently resilient so as to flex to enable a film loading carriage to move around the record medium support but then will return to their normal orientation.

We have found that a single pair of baffles results in a significant improvement but conveniently more than one pair of baffles are provided circumferentially spaced about the axis of the support. In the most preferred arrangement, three pairs of baffles are used. Each pair of baffles may be physically separate or could be integrally formed by a single member.

Preferably, the baffles provide radiation absorbing surfaces and, in the case of visible light radiation, the surfaces are coloured black.

The baffles should extend as close as possible to the surface of the support. In practice a spacing between the support and the adjacent edge of the baffles in the range 10-20mm, preferably 15mm is sufficient.

Typically, the baffles are in the form of sheets made of a suitable resilient material such as polyester.

Conveniently the baffles are mounted on a carriage which also carries the scanning system and is movable relative to the support along the axis of the support.

An example of an internal drum imagesetter according to the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a schematic end view of the imagesetter; and,

Figure 2 is a schematic, longitudinal section through the imagesetter shown in Figure 1.

The optical components of the imagesetter have generally been omitted from the drawings apart from being shown schematically in Figure 2. The optical components will be conventional and well known to persons of ordinary skill in the art.

Figure 1 illustrates a semi-cylindrical drum 1 on the internal surface of which a film 2 (see Figure 2) to be exposed is mounted in a conventional manner. Mounted coaxially with the axis 3 of the drum 1 is a carriage 4 connected to a lead screw 5 which in turn is connected to a motor 6. On the underside of the carriage 4 is mounted a motor 7 which rotates a spindle 8 journalled in a support 9 and carrying an angled reflector 10. In use, the motor 7 causes the reflector 10 to rotate at relatively high speed causing an incident laser beam 11 from a source (not shown) to impinge and traverse in a circumferential direction along the film 2 which is exposed. The beam 11 will be modulated with image information in a conventional manner.

As so far described, the imagesetter is conventional.

As explained above, one of the problems with the conventional imagesetter is that the beam 11 impinging on the film 2 can be partially reflected onto another part of the film thereby partially exposing the film. In order to reduce this problem, a number of baffles are suspended from the carriage 4. In the example shown in Figure 1,

five pairs of planar baffles 12-16 are provided. Each member of a pair is axially spaced apart on either side of the reflector 10 while the pairs are substantially equiangularly spaced in the circumferential direction. The baffles 14 are shown in more detail in Figure 2 and comprise axially spaced, left and right baffles 14A,14B. As can be seen, the baffles 14A,14B are spaced apart about the reflector 10 so as not to impede the passage of the beam 11 onto the film 2. The baffles 14A,14B extend in a plane substantially bisecting the exposure angle of the writing beam 11. In practice, the beam 11 will be arranged to impinge on the film 2 in a non-orthogonal manner so that any reflections will be towards one of the baffles 14A,14B. These baffles are coloured black on their surfaces so as to absorb any incident light.

The baffles 12-16 are made of a resilient material such as polyester so that normally they maintain a flat form as can be seen in Figure 1. However, the baffles are sufficiently resilient that during passage of a film loading carriage 17 (Figure 1) during film loading, they will bend away from their relaxed position as shown by the baffle 13 in Figure 1 to allow passage of the carriage. Once the carriage has passed, the baffle will spring back to its rest position as shown by the baffle 12.

Although ideally the baffles should extend into contact with the drum 1, we have found that a spacing of 15mm away from the drum 1 is satisfactory to prevent significant problems from reflected light.

Although Figure 1 illustrates the use of five pairs of baffles 12-16, we have found that three pairs of baffles is sufficient and in some cases even a single baffle (or pair of baffles) is adequate providing they are wide enough in the direction of the drum axis to intercept the reflected light except at very high angles to the film normal.

Also, the invention is equally applicable to external drum imagesetters in which the film 2 is mounted on the outer surface of the drum 1 which is transparent.

Although a motor and lead screw arrangement is shown for moving the scanning system 7-10, in other arrangements the drum 1 could be moved, or both. Also, alternative drive arrangements could be used as is well known to persons of ordinary skill in the art.

Claims

1. Image scanning apparatus comprising an elongate image support (1) having a curved cross-section; a scanning system (7-10) positioned radially inwardly of the support for scanning a radiation beam (11) in a circumferential direction across a record medium (2) on the support; means (6) for causing relative movement between the support and the scanning system parallel with an axis of the support; and at least one pair of axially extending resilient baffles (12-16) mounted on axially opposed sides of the scanning system and extending close to the support so as to impede radiation reflected by a record medium on the support impinging on another part of the record medium.

2. Apparatus according to claim 1, wherein more than one pair of baffles (12-16) are provided circumferentially spaced about the axis of the support.

3. Apparatus according to claim 2, wherein three pairs of baffles (12-16) are provided.

4. Apparatus according to any of the preceding claims, wherein the baffles (12-16) provide radiation absorbing surfaces.

5. Apparatus according to any of the preceding claims, wherein the baffles (12-16) are spaced from the support in the range 10-20mm, preferably 15mm.

6. Apparatus according to any of the preceding claims, wherein the baffles (12-16) are made of polyester.

7. Apparatus according to any of the preceding claims, wherein the baffles (12-16) are mounted on a carriage (4) which also carries the scanning system (7-10) and is movable relative to the support along the axis of the support.

8. Apparatus according to any of the preceding claims, further comprising a loading carriage (17) movable circumferentially across the surface of the support (1) to load a record medium on to the surface, the baffles being sufficiently resilient to flex as the loading carriage moves under them but then to return to their original condition.

9. An internal drum imagesetter according to any of the preceding claims.

Fig.1.

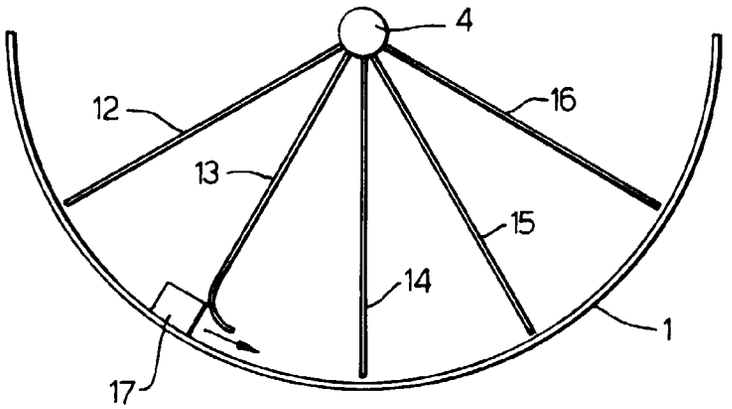
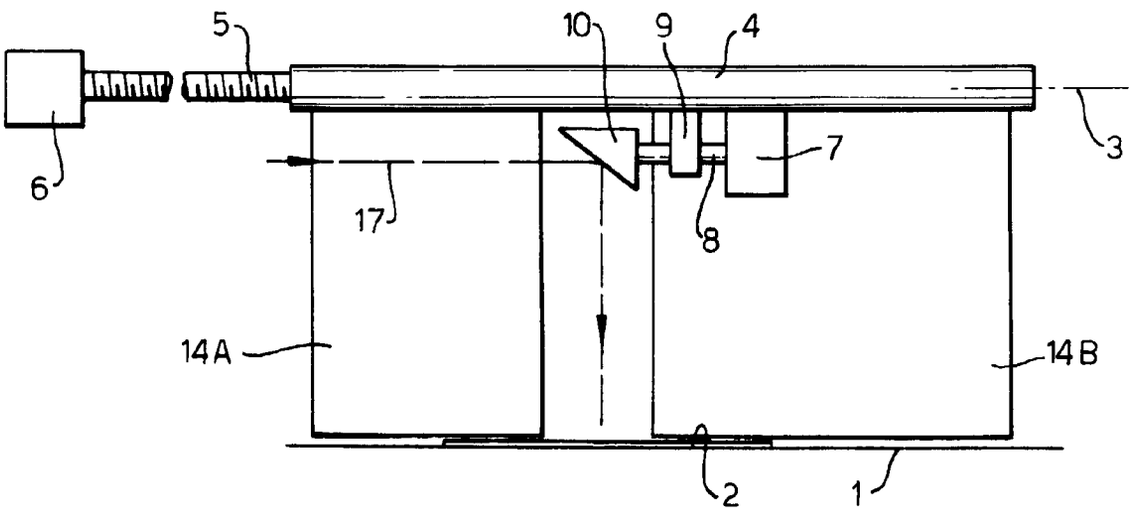


Fig.2.



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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 6698

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	GB 1 410 344 A (CROSFIELD ELECTRONICS LTD) 15 October 1975 * page 4, line 49 - line 100 * ---	1	B41B19/00 B41B21/18
A	WO 93 14441 A (EXXTRA CORP) 22 July 1993 * page 12, paragraph 3 - page 13, paragraph 2; figures 4,7 * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B41B
H04N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23 October 1997	Gélébart, Y

CATEGORY OF CITED DOCUMENTS

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