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D E C I S I O N
of 31 October 2002

Case Number: T 1069/00 - 3.5.1

Application Number: 92905826.1

Publication Number: 0566696

IPC: H04N 1/04

Language of the proceedings: EN

Title of invention:
Controller for spark discharge imaging

Patentee:
PRESSTEK, INC.

Opponents:
MAN Roland Druckmaschinen AG
Digitek System, Inc.

Headword:
Controller/PRESSTEC

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Inventive step (no)"

Decisions cited:
T 0026/81

Catchword:
-

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Case Number: T 1069/00 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 31 October 2002

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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 4 September 2000 concerning maintenance of European patent No. 0 566 696 in amended form.

Composition of the Board:

Chairman: S. V. Steinbrener
Members: R. S. Wibergh
E. Lachacinski

Summary of Facts and Submissions

I. On 4 September 2000 the Opposition Division decided that European Patent No. 0 566 696 in amended form met the requirements of the Convention. Against this decision the patent proprietor and the two opponents lodged appeals.

II. The opponents had opposed the patent on the grounds that the invention was not new or did not involve an inventive step (Article 100(a) EPC). Among the documents cited were:

D2: Optronics: 5040 Scanner/Plotter Installation & Maintenance Manual, Chapter 2, Revision C, March 1990;

D4: US-A-4 936 211.

III. According to the decision under appeal the invention as defined in independent claims 1, 11, 19 and 23 of the then auxiliary request 1 involved an inventive step due to the independent correction of each pixel in the circumferential direction.

IV. Following a communication pursuant to Article 11(2) of the Rules of Procedure of the Boards of Appeal, the patent proprietor filed with letter dated 27 September 2002 new independent claims according to a main request and an auxiliary request (submitted as "first" auxiliary request).

V. Independent claims 1, 19 and 23 of the **main request** read as follows:

"1. A press having multiple imaging stations, each station comprising an apparatus for controlling discharges which are used to form an image on a printing surface, said printing surface (12) being mounted on a rotatable cylinder (10), said apparatus comprising:
discharge means (8) for producing image spots on selected points of the printing surface (12);
means (7) for providing relative rotative motion between the cylinder (10) and the discharge means (8) to effect a scan of the printing surface (12) by the discharge means (8);
means (4), coupled to the discharge means (8), for storing image information representing the image to be formed on the printing surface (12); and
controlling means (6), coupled to the discharge means (8) and the storage means (4), for enabling the storing means (4) to transmit image information to the discharge means (8), to thereby generate discharges that produce an array of image spots corresponding to the image information on selected points of the printing surface (12);
characterised in that the apparatus further comprises:
sensing means (16), coupled to the cylinder (10), for generating a signal indicative of the angular position of the cylinder (10), said controlling means (6) being further coupled to said sensing means (16); and
storage means (30) for storing correction data relating to the positions of different image spots within the array in the circumferential direction;
and in that:
said controlling means (16) is operative for producing

the array of image spots in a series of axially sequential, circumferential imaging swaths, each swath comprising a series of circumferentially spaced-apart image spots formed during one revolution of said cylinder, successively produced spots being circumferentially spaced from one another by a distance determined by rotation of the cylinder (10) between successive discharges, and includes means for varying the intervals between discharges to thereby vary the circumferential spacing between successive spots independently of one another on said printing surface, based on stored correction data".

"19. A press having multiple imaging stations including at each station an imaging and printing system including a cylinder (10) and a lithographic plate (12) having a printing surface, said system comprising:
discharge means (8) for producing an array of image spots on the printing surface (12), said discharge means (8) being responsive to a discharge control signal;
means (7) for providing relative rotative motion between the cylinder (10) and the discharge means (8) to effect a scan of the printing surface (12) by the discharge means (8);
a computer (4) for storing image data specifying locations on the cylinder (10) at which image spots are to be placed;
controlling means (16), coupled to the computer (4), and the discharge means (8), for receiving image data from said computer (4) and responsively generating said discharge control signal;
characterised in that the apparatus further comprises:
sensing means (6), coupled to the cylinder (10), for generating position information indicative of the

angular position of the cylinder (10), said controlling means being coupled to the sensing means; and in that said computer also stores position-correction data specifying circumferential offsets for different image spots within the array, said controlling means being arranged to receive position-correction data from the computer and angular position information from the sensing means, and being further arranged to operate such that said discharge control signal is generated at angular cylinder positions corresponding to the locations specified by the image data as offset by the position-correction data, so that the circumferential spacing between successive discharges can be varied independently of one another".

"23. A method of imaging on a multiple station press including at each station a plate cylinder (10) and a lithographic plate (12) having a printing surface, said method comprising the steps of, at each station:
mounting said plate (12) on said cylinder (10);
storing image information specifying locations on the cylinder at which image spots are to be placed;
exposing the printing surface at selected points to discharges from an imaging device (8) to produce image spots on those points;
rotating the imaging device (8) and the print cylinder (10) relatively to effect a scan of the printing surface by the imaging device (8);
detecting the angular position of the print cylinder and generating angular position data; and
controlling the discharges in accordance with said image information so that they occur at positions on the printing surface corresponding to the locations specified by the image information;
wherein the method comprises the further steps of:

imaging and printing a standard test pattern at each station;
determining by how much the image sizes differ;
calculating how much to shrink or increase the image produced by each imaging station; and
for each imaging station, storing correction data specifying circumferential offsets to the position data; and
controlling the discharges to adjust on the basis of said correction data, the time interval between the discharges to the printing surface thereby to move the specified discharge locations forward or backward in the circumferential direction, so as to control the size of the image in the circumferential direction and compensate for variations in the dimensions of the plate cylinder, thereby directly producing on the lithographic plate (12) an array of image spots suitable for reproduction that corresponds to the image represented by the image information, in order to achieve images of the same size by each imaging station of the press".

VI. Claim 1 of the "first" **auxiliary request** read as follows:

"A press having multiple imaging stations, each station comprising an apparatus for controlling discharges which are used to form an image on a printing surface, said printing surface (12) being mounted on a rotatable cylinder (10), said apparatus comprising:
discharge means (8) for producing image spots on selected points of the printing surface (12);
means (7) for providing relative rotative motion between the cylinder (10) and the discharge means (8) to effect a scan of the printing surface (12) by the

discharge means (8);
means (4), coupled to the discharge means (8), for storing image information representing the image to be formed on the printing surface (12); and
controlling means (6), coupled to the discharge means (8) and the storage means (4), for enabling the storing means (4) to transmit image information to the discharge means (8), to thereby generate discharges that produce an array of image spots corresponding to the image information on selected points of the printing surface (12);
characterised in that the apparatus further comprises:
sensing means (16), coupled to the cylinder (10), for generating a signal indicative of the angular position of the cylinder (10), said controlling means (6) being further coupled to said sensing means (16); and
second storage means (30) for storing correction data relating to the positions of different image spots within the array in the circumferential direction;
and in that:
said controlling means (16) is operative for producing the array of image spots in a series of axially sequential, circumferential imaging swaths, each swath comprising a series of circumferentially spaced-apart image spots formed during one revolution of said cylinder, successively produced spots being circumferentially spaced from one another by a distance determined by rotation of the cylinder (10) between successive discharges, and includes means for varying the intervals between discharges by delaying or advancing the discharges by an amount specified by the correction data to thereby vary the circumferential spacing between successive spots independently of one another on said printing surface, so compensating for angular position error between said sensing means (16)

and said discharge means (8), and controlling the size of the image in the circumferential direction to achieve images of the same size at each imaging station of the press".

Independent claim 19 was also directed to a press.

VII. Oral proceedings before the Board were held on 31 October 2002.

The patent proprietor (appellant I) requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request comprising independent claims 1, 19 and 23 of the main request filed with letter dated 27 September 2002 or alternatively on the basis of the first auxiliary request filed with letter dated 27 September 2002.

VIII. Opponents I and II (appellants II and III) requested that the decision under appeal be set aside and that the European patent be revoked.

IX. At the end of the oral proceedings the Chairman announced the Board's decision.

Reasons for the Decision

The patent proprietor's main request

1. *The prior art*

D4 (cf fig.1 and associated text) describes a press having multiple imaging stations according to the preamble of claim 1 of the opposed patent. In such a

press an array of image spots is produced in a series of axially sequential, circumferential imaging swaths under the control of a controlling means 14. Each swath comprises a series of circumferentially spaced-apart image spots formed during one revolution of a cylinder 102, successively produced spots being circumferentially spaced from one another by a distance determined by rotation of the cylinder between successive discharges. Furthermore, angular position data specifying the location of the discharge means relative to the cylinder are provided by a magnetic detector 122 coupled to the controlling means 14 (cf column 10, lines 45 to 64). A look-up table storing the x and y coordinates (ie in the circumferential and axial directions) of all dots is used also to store x and y offsets for dots of individual colours in order to eliminate possible deviations of the colour lines from their theoretical true position (cf paragraph bridging columns 12 and 13). Such offsets are entered during a calibration step performed at the factory during the final check-out phase of press manufacture. Not explicitly mentioned is the problem that varying dimensions of the plate cylinders result in poor registration of the different colour plates.

2. The patent proprietor has argued that the invention according to claim 1 involved an inventive step when compared with D4 because, according to the invention, the storage means contained position correction data on the basis of which the intervals between discharges were varied. One aim of the invention was to provide an imaging apparatus capable of varying the circumferential size of the image applied to a plate while avoiding dimensional errors. In this way misregistration between colours could be avoided. D4

was concerned with cyclical mechanical errors (cf. D4, column 12, lines 62 to 64), which would be the same for all colours, whereas the invention provided a more general kind of correction.

3. In the Board's view, however, the kind of correction described in D4 (column 12, line 62 to column 13, line 13) corresponds closely to the one defined in claim 1. A dot position look-up table stores x and y coordinates of "all dot positions". Dot positions are corrected "for each colour". The corrections are based on "end-to-end tests" by printing test patterns and determining deviations of colour lines from their theoretical position. It appears that this correction can be applied to any type of positional error, including the "slanted swath" condition mentioned in the patent-in-suit which is "characterised by lines in the image which run in the axial direction as opposed to the circumferential direction, and which appear 'sawtoothed' or jagged instead of straight" (cf column 1, lines 44 to 48 of the patent-in-suit). In an on-press imaging system a positional correction necessarily corresponds to a variation of the intervals between discharges and will have an impact on the size of the image in the circumferential direction. Furthermore, a look-up table for all dot positions and for each colour permits mutually independent, dot-by-dot corrections.

Summing up, all features in claim 1 are covered by the disclosure of document D4. Claim 1 is therefore not allowable (Articles 52 and 54 EPC).

4. In claim 19, also directed to a press, the independence of the positional corrections is further emphasised.

Position-correction data specifying circumferential offsets are stored "for different image spots within the array" and "the circumferential spacing between successive discharges can be varied independently of one another". However, for the reasons already indicated, D4 is regarded as disclosing means providing independent corrections, namely a look-up table for every dot position. Thus, this claim is also not allowable (Articles 52 and 54 EPC).

5. Claim 23 is directed to an imaging method. The method comprises in particular the steps of printing a test pattern at each station (ie for each colour), determining how much their sizes differ, calculating how much to shrink or increase the image, storing suitable offsets, and adjusting the time interval between discharges to move the discharge locations forward or backward in the circumferential direction in order to achieve images of the same size.

D4 discloses printing a test pattern and measuring the differences of deviating colour lines from their theoretical true position (see the passages already indicated). The known method and the claimed method can be expected to yield the same result. The adjustment of the time interval between discharges is believed to be known from D4 since dot positions on a rotating drum can only be modified by varying the timing of the discharges. Furthermore, Claim 23 specifies that it is the *size* of the test pattern which is measured (rather than some other parameter) but this does not appear inventive for the following reasons. It was a known problem in the art that the size of the images will vary due to unavoidable differences in the radius of the respective cylinders. As is stated under the

heading "Discussion of the prior art" in the patent-in-suit (column 2, lines 17 to 23), "/m/anufacturing tolerances also produce variations in the dimensions (i.e. circumferences) of the printing plate cylinders. Thus, there is a likelihood that in a four-color imaging system which incorporates four separate cylinders (each which is paired with its own set of imaging devices) the four circumferences will not be the same. Accordingly, adjustments must be made... in order to produce four printing plates whose images are the same size in the circumferential direction". Also D2, a document relating to a scanning/plotting device of the rotatable drum type, mentions this problem (cf pages 2 to 9): "Thus, if the effective radius is different from ideal by length dr, the distance between pixels will vary... For an oversized drum... the result is an image which is too large; for an undersized drum the image is too small". The skilled person would expect such size errors to occur also in the press described in D4 (cf. the abstract of D4: "...the diameters of all of said plate and blanket cylinders being *substantially* the same...", italics added). Appropriate corrections would have to be determined and the obvious starting point would be first to determine the error in size.

Thus, the method of claim 23 does not involve an inventive step (Article 56 EPC).

The patent proprietor's auxiliary request

6. Claim 1 of the "first" auxiliary request differs essentially from the main request firstly in that the storage means (30) for storing correction data is explicitly referred to as *second* storage means, ie the

means are separate (in some meaning) from the means (4) "for storing image information representing the image". Secondly, a result to be achieved is specified at the end of the claim: "so compensating for angular position error between said sensing means (16) and said discharge means (8)".

7. As to the first addition, the Board cannot see that the provision of separate storage means for the correction data would in this case involve inventive considerations. Nor does the description suggest that this feature would solve a particular technical problem. Furthermore, as Opponent II has pointed out, the fact that in D4 calibration is performed only once may suggest that the look-up table containing the corrections is not identical with the memory used to store images, which will have to be rewritten each time a new image is to be printed.

The second addition, based on claim 2 as filed, refers to angular position errors between the sensing means (16 in Figure 1) and the discharge means. To elucidate the meaning of this feature the patent proprietor has referred to column 13, lines 13 to 15 of the description where it is stated that "/it/ is this skewing which effectively compensates for any error between the angular encoder 16 and the imaging devices". Similarly, at column 6, lines 5 to 24 it is mentioned that the electrodes (ie imaging devices) of the writing head should ideally be "matched" to the encoder (which is however impossible to achieve in practice). At column 2, lines 5 to 16 it is explained that if "multiple imaging devices are used for imaging, the circumferential distances between such devices must be precisely fixed to represent an integral number of

units of circumferential distance" (as determined by the sensing means), otherwise a slanted swath condition will result. The Board understands all these passages to refer to one and the same technical problem. Thus, in the light of the description, the "position error" mentioned in claim 1 necessarily involves the distance between two discharge devices of a writing head having *multiple* discharge devices (there are for example 16 discharge devices in a head according to the described embodiment; cf. Figure 2). Claim 1 however also covers presses comprising heads having a single discharge device (D4 might be of this kind). Thus, and leaving aside any objections against the claim under Article 84 EPC, claim 1 is formulated in such a way that it encompasses subject-matter which does not solve the above problem. It has not been argued and does not seem probable that the feature in question contributes to the solution of some other problem. But if a technical problem is not solved there can be no inventive step (cf. T 26/81 OJ EPO 1982, 211, point 9 of the reasons: "the inventive step may be considered as a step from the technical problem to its solution").

8. It may be added that even if claim 1 were limited to a press comprising a writing head having multiple discharge devices is it unlikely that its subject-matter would be inventive. In D4 the corrections applied will compensate for *any* errors which may be detected by inspection of test images (cf. paragraph 3 above). A slanted swath condition would be compensated for even if the reason for it was not known. Therefore the result specified in claim 1, viz to compensate for angular position errors between the sensing means and the discharge means, would be achieved as a matter of course when applying the teaching of D4 to a press with

writing heads having multiple discharge devices. It is noted that such heads are well known in the art (cf. patent-in-suit, column 1, lines 32,33: "Multiple imaging devices may be used to produce several lines of image spots simultaneously").

9. Thus claim 1 cannot be allowed (Articles 52 and 56 EPC) and the patent proprietor's auxiliary request must also be refused.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

M. Kiehl S. Steinbrener