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(72) KOIKE, Keiichi, JP
(72) TAKEDA, Takashi, JP
(72) YAMADA, Keiki, JP
(73) MITSUBISHI DENKI KABUSHIKI KAISHA, JP

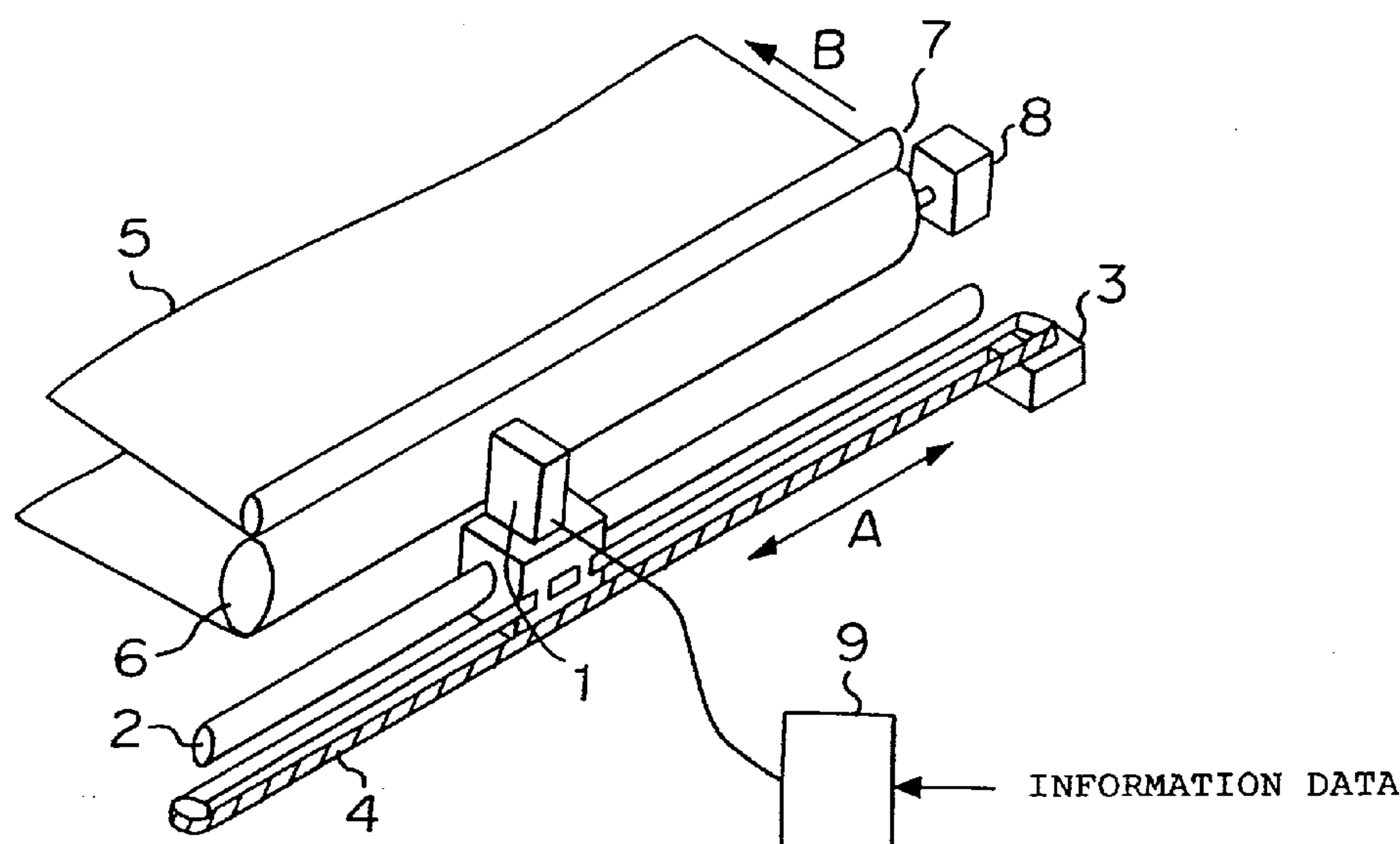
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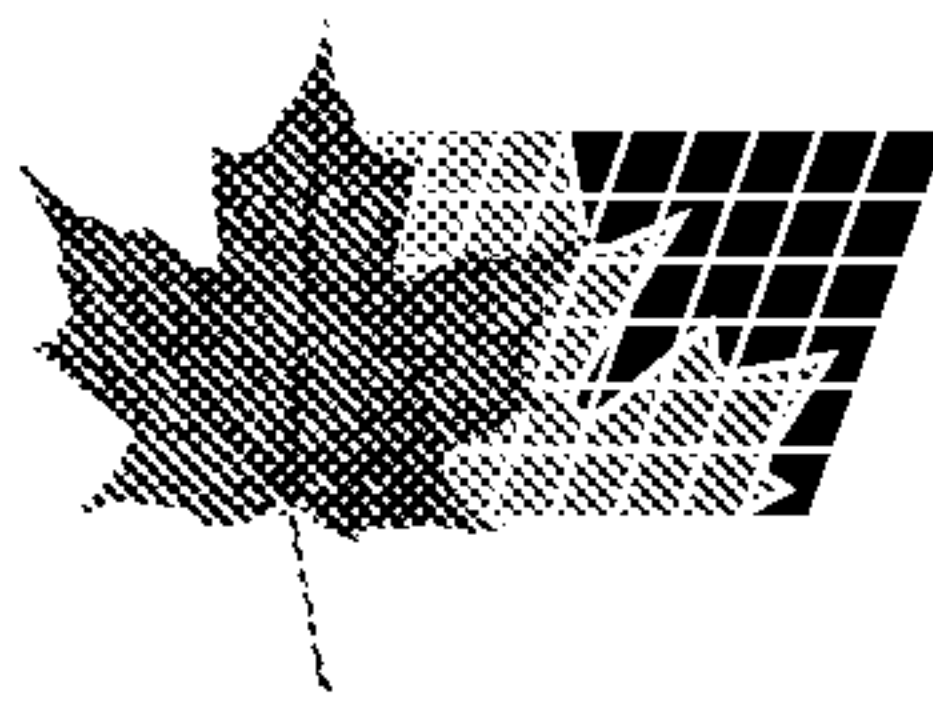
(54) **IMPRIMANTE A ELEMENTS MULTIPLES ET METHODE DE
REGLAGE DE CETTE IMPRIMANTE**

(54) **MULTIPLE ELEMENT PRINTER AND METHOD OF
ADJUSTING THEREOF**



(57) L'invention est une imprimante comportant les éléments suivants : une tête d'impression portant N éléments d'impression et servant à imprimer des points sur la surface d'un support de réception à intervalles de k points, k et N étant des entiers positifs primes l'un par rapport à l'autre, dans la direction d'alimentation de l'imprimante avec ce support d'alimentation, un premier dispositif d'entraînement servant à entraîner le support de réception dans la direction d'alimentation de l'imprimante avec ce support de réception; un second dispositif d'entraînement servant à déplacer la tête d'impression dans la direction des lignes d'impression,

(57) A multiple element printer including a printhead arranged with N of printing elements for printing dots on a surface of a receiving medium at intervals of k dots where k and N are positive integers mutually prime with each other, in a direction of feeding the receiving medium, first driving means for driving the receiving medium in the direction of feeding the receiving medium, second driving means for scanning the printhead in a direction of print lines orthogonal to the direction of feeding the receiving medium, data forming means for outputting previously stored information data for printing the information data onto a surface of the



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perpendiculairement à la direction de l'alimentation de l'imprimante avec le support de réception; un dispositif de production de données servant à produire les données d'information stockées auparavant pour l'impression de ces données d'information sur l'une des faces du support de réception; un dispositif générateur de signaux d'entraînement d'élément d'impression servant à produire les signaux d'entraînement des éléments d'impression de la tête d'impression pour entraîner ces éléments d'impression selon des données d'information telles que le l^e élément d'impression et le N^e élément d'impression impriment en alternance les points à des nombres ordinaux impairs et les points à des nombres ordinaux pairs sur les mêmes lignes d'impression substantiellement; et un dispositif de commande servant à commander le premier dispositif d'entraînement de façon que le support de réception soit déplacé d'une distance de P points, où $N=P+1$, à chaque impression et à chaque déplacement de la tête d'impression dans la direction des lignes d'impression.

receiving medium, printing element drive signal forming means for outputting to the printhead printing element drive signals for driving the respective printing elements based on the information data such that a l-th one of the printing elements and an N-th one of the printing elements alternately printing the dots at odd ordinal numbers and the dots at even ordinal numbers on substantially the same print lines and controlling means for controlling the first driving means such that the receiving medium is moved by a distance of P dots where $N=P+1$ at every printing and scanning of the printhead in the direction of the print lines.



ABSTRACT OF THE DISCLOSURE

A multiple element printer including a printhead arranged with N of printing elements for printing dots on a surface of a receiving medium at intervals of k dots where k and N are positive integers mutually prime with each other, in a direction of feeding the receiving medium, first driving means for driving the receiving medium in the direction of feeding the receiving medium, second driving means for scanning the printhead in a direction of print lines orthogonal to the direction of feeding the receiving medium, data forming means for outputting previously stored information data for printing the information data onto a surface of the receiving medium, printing element drive signal forming means for outputting to the printhead printing element drive signals for driving the respective printing elements based on the information data such that a 1-th one of the printing elements and an N -th one of the printing elements alternately printing the dots at odd ordinal numbers and the dots at even ordinal numbers on substantially the same print lines and controlling means for controlling the first driving means such that the receiving medium is moved by a distance of P dots where $N=P+1$ at every printing and scanning of the printhead in the direction of the print lines.

TITLE OF THE INVENTION

MULTIPLE ELEMENT PRINTER AND METHOD OF ADJUSTING THEREOF

BACKGROUND OF THE INVENTION5 FIELD OF THE INVENTION

The present invention relates to a multiple element printer conducting printing operation by relatively moving a printhead provided with a plurality of printing elements and a receiving medium in a main scan direction and in a sub scan direction, and a method of adjusting a multiple element printer.

Further, the present invention relates to a multiple element printer realizing high print density by controlling image printing operation of a plurality of printheads each including a plurality of printing elements.

DISCUSSION OF BACKGROUND

According to a print device conducting printing operation by relatively moving a printhead and a receiving medium, feed accuracy of the receiving medium and positional accuracy of a plurality of printing elements arranged at the printhead are pointed out as factors influencing on quality.

According to such a printhead, although excellent image quality can be obtained by arranging the printing elements in high density, the high density formation of the printing elements is actually limited. Hence, the

high density formation is realized by arranging a plurality of printing elements at intervals each of a printing resolution multiplied by an integer in a direction of feeding a receiving medium (referred to as sub scan direction) and carrying out plural times of scanning in a direction of moving the printhead (referred to as main scan direction) and feeding of a receiving medium in the sub scan direction by a unit of a minimum resolution. Figure 19 is an explanatory view for explaining arrangement of printing elements and printing operation of a conventional printhead with an example of a case where an interval between the printing elements is set as $k=4$ (dots) and a number of the printing elements is set as $n=5$. The receiving medium is fed by 1 dot in the sub scan direction at every scanning of the printhead in the main scan direction. In the case of this example, printed dots are formed at an interval of a unit of a minimum resolution, that is, at an interval of 1 dot by 4 times of the main scanning ($t=4$). When the 4-th main scanning ($t=4$) has been finished, the receiving medium is fed by $\{(n-1)k+1\}$ dots in the sub scan direction ($t=5$) and feeding operation of the printhead in the sub scan direction by 1 dot, that is, the operation of the $t=1$ through $t=4$ is repeated thereby achieving high density printing.

However, there actually is a very small dispersion in print positions of the respective printing elements in

the sub scan direction. The dispersion is caused by a deviation in arrangement of the printing elements per se or is caused by a deviation in forming dots on receiving medium. The deviation in the print position is

5 significantly manifested at portions of continuous print regions by one printing element coupled with portions of continuous print regions by other printing element whereby the image quality may be deteriorated. Further, in respect of the amount of feed in the sub scan

10 direction, the amount of feed by 1 dot and the amount of feed by $\{(n-1)k+1\}$ dots are mixed. The feed accuracy of the receiving medium is dispersed depending on the amount of feed in the sub scan direction and therefore, when the amounts of feed in the sub scan direction of two kinds or

15 more are mixed, the difference in the accuracy may influence on image quality and may deteriorate the quality.

Hence, there has been proposed an interlace printing method to reduce such a dispersion of printing elements

20 and the difference in the feed accuracy. An interlace printing method is described in, for example, U.S. Patent No. 4,198,642. The interlace printing method is a method where a relationship between an interval k of printing elements and a number thereof is specified and a

25 receiving medium is fed in the sub scan direction by a constant pitch. As conditions of this case, k and n are mutually prime with each other and the feed pitch is set

