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(71) Applicant: **MITSUBISHI STEEL MFG. CO., LTD.**
6-2, Ohtemachi 2-chome Chiyoda-ku
Tokyo(JP)

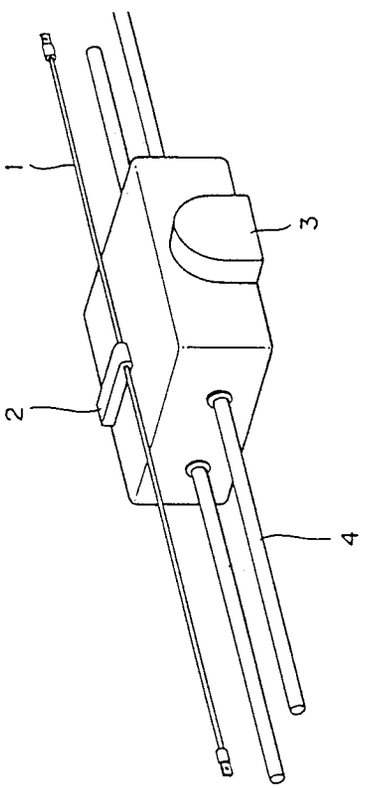
(72) Inventor: **Ishiyama, Noritaka**
c/o F M C Co., Ltd., 100-1 Sakato, Takatsu-ku
Kawasaki-shi, Kanagawa-ken(JP)

(74) Representative: **Wood, Anthony Charles**
Urquhart-Dykes & Lord 91 Wimpole Street
London W1M 8AH(GB)

(54) Printing machine.

(57) There is provided a printing machine for performing a positional control by a linear encoder, which comprises a linear encoder memory having a magnetic recording medium formed of an alloy containing iron, chrome and cobalt, and a magnetic head for detecting said magnetic record, and which is economical and has high reliability even under an environment in which the machine is easily contaminated.

FIG. 1



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BACKGROUND OF THE INVENTION

The present invention relates to a printing machine for a printer using a magnetic linear encoder.

In a conventional printer printing machine, there has been used an optical system having a scale in which an optical sensor and a slit band are combined as a linear encoder. In the optical linear encoder, the scale must be made with high precision in order to improve resolving power. Due to this, the manufacturing cost increases. Moreover, if dirt and dust of a printer ink are adhered to the surface of the scale, light is not easily transmitted, and an erroneous measured value of the linear encoder is obtained. Therefore, this causes erroneous operation and trouble of the printer printing machine.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a printer printing machine having high reliability even under an environment in which the machine is easily contaminated.

In order to attain the above object, the printer printing machine of the present invention, which controls the position by use of the linear encoder, uses a high resolving magnetic recording medium, which is formed of an alloy containing iron, chrome and cobalt (hereinafter simply called as an alloy), as a memory of the linear encoder, and detects the magnetic record by a magnetic head.

The composition of the alloy can be freely set in accordance with a requested magnetic characteristics. It is preferable that the composition of the alloy consist of chrome: 13 to 32%, cobalt: 5 to 20%, and iron: residue, by weight % (herein simply expressed as %). In particular, it is preferable that the composition of the alloy consist of chrome: 16 to 25%, cobalt: 7 to 16%, and iron: residue. Moreover, in order to improve machinability and a magnetic characteristic, 0.05 to 3% of each of titanium, vanadium, molybdenum, and tungsten may be added.

It is general that the magnetic recording medium is long-shaped such as a wire or a band.

It is preferable to make the shape of the cross section of the magnetic recording medium circular since an oil impregnated bearing can be used as a sliding mechanism of the magnetic head and a gap between the magnetic recording medium and the magnetic detecting head can be easily held constant.

The following meaning is found in that the cross section of the recording medium is formed such that a magnetic recording surface and a bottom surface thereof are parallel to each other:

The detecting head must be precisely moved to be parallel to the recording medium. If the magnetic recording surface is parallel to the bottom surface, the bottom surface which act as a fixing surface of the recording medium and the parallel movement mechanism are easily adjusted, thereby the recording surface and the detecting head can be automatically moved parallel to each other with precision. By use of the above-mentioned structure, assembly can be made easy.

The magnetic head to be used in the printer printing machine of the present invention may be a well known magnetic sensor of magneto-resistance effect type. It is preferably possible to use a magnetic sensor of magneto-resistance effect type, which can obtain an effective output even in a high temperature atmosphere as disclosed in Patent Application No. Hei 2-199123.

As a mounting mechanism of the magnetic head, it is preferable to use a mechanism in which the magnetic head is formed in a gap holding part, which is movably fitted to the long magnetic recording medium, and the gap holding part moves along the long magnetic recording medium.

Also, the gap holding part and the long magnetic recording medium may be relatively moved. In other words, the long magnetic recording medium may be movable.

BRIEF DESCRIPTION OF THE DRAWINGS

The embodiments of the printer printing machine of the present invention will be explained with reference to the drawings.

Fig. 1 is a perspective view of one embodiment of the present invention;

Fig. 2 is an exploded perspective view of a gap holding part of the other embodiment of the present invention; and

Fig. 3 is a perspective view of a gap holding mechanism of one embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

First embodiment

The first embodiments of the printer printing machine of the present invention will be explained with reference to the drawings.

Reference numeral (1) denotes a wire-shaped magnetic recording medium. The magnetic recording medium is formed by the way that an alloy material containing iron, chrome and cobalt is processed to be wire-shaped by the well-known method such as rolling and drawing, thereafter an N pole and an S pole are alternately magnetized.

Reference (2) denotes a gap holding part hav-

ing a magnetic head. The above part may be structured as specifically shown in Fig. 2. In Fig. 2, a magnetic element mount (11) whose cross section is U-shaped is mounted on the wire-shaped magnetic recording medium (1). A magnetic sensor (13) is fixed onto the magnetic element mount (11). Further, a bearing (14), which has a hole into which a round bar-like magnetic recording medium is inserted in its central portion, is fixed to both ends of the magnetic element mount (11). Since the magnetic element mount (11) slides along the rod-shaped magnetic recording medium (1), serving as an axis, together with the magnetic sensor (13), the rod-shaped magnetic recording medium (1) is arranged to be floated in the hollow.

Reference numeral (3) denotes a printing head. In the printer printing machine, various types of printing heads such as an ink jet type, a dot impact type, a laser printer, and a thermal transferring type may be used.

Reference numeral (4) denotes a slide guide shaft for guiding a printing head. In the present invention, the guide mechanism other than one shown in the drawing may be used.

Second Embodiment

Fig. 3 shows a gap holding mechanism (5) of the other embodiment of the present invention. In this mechanism, the magnetic head (2) is supported by a magnetic head support (6) so as to face the magnetic recording medium (1). The magnetic head support (6) is guided by a support guide (7). As a result, the gap between the magnetic head (2) and the magnetic recording medium (1) can be maintained to be a suitable value.

The magnetic recording medium is formed by that an alloy material containing iron, chrome and cobalt is processed to a bar-shape with a rectangular cross section by the well-known method such as rolling and drawing, thereafter an N pole and an S pole are alternately magnetized over the surface of the bar.

The magnetic head uses a magneto-resistance effect element, and is fixed to a printing head of a printer printing machine. The printer printing machine uses a printing head such as an ink jet type, a dot impact type, and a thermal transferring type. The printing mechanism moves in relative to a printing paper.

Since the magnetic head fixed to the printing head moves in relative to the printing paper, the magnetic recording medium is fixed to a body of the printer printing machine.

As shown in Fig. 3, the magnetic detecting surface of the magnetic head (2) fixed to the printing head and the magnetized surface of the magnetic recording medium (1) face each other, and are controlled through the gap holding mechanism (5) so as to maintain the gap having a constant distance.

According to the above structure, the magnetic recording medium (1) and the magnetic head (2) can be used in a mechanically non-contact state and no sliding resistance state.

As is obvious from the above explanation, the printer printing machine of the present invention brings about the following effects.

① As compared with the conventional printer printing machine using an optical linear encoder, the printer printing machine of the present invention is economical.

② The printer printing machine of the present invention is not influenced by a contamination environment such as a printer ink and paper fragments, and high reliability can be obtained, and time for maintenance can be reduced.

Claims

1. A printing machine for performing a positional control by a linear encoder, comprising:
   a linear encoder memory having a magnetic recording medium formed of an alloy containing iron, chrome and cobalt; and
   a magnetic head for detecting said magnetic record.

2. The printing machine according to claim 1, wherein said magnetic recording medium is a member having a circular cross section.

3. The printing machine according to claim 1, wherein said magnetic recording medium is a member having a cross section in which a magnetic recording surface and a bottom surface thereof are parallel to each other.

4. The printing machine according to claim 1, wherein said magnetic recording medium is a long member and said magnetic head is formed on a gap holding part movably fitted to said long member, and said gap holding part moves along said long member.

5. The printing machine according to claim 1, wherein said magnetic recording medium is a long member and said magnetic head is formed on a gap holding part movably fitted to said long member, and said gap holding part and said long member relatively move.

6. The printing machine according to claim 1, wherein said magnetic recording medium is a long member and a gap holding mechanism is formed on said long member, and said mag-

netic head and said long member relatively move while maintaining a gap.

7. The printing machine according to claim 1, wherein said magnetic recording medium comprises chrome: 13 to 32%, cobalt: 5 to 20%, and iron: residue by weight %.

8. The printing machine according to claim 7, wherein said magnetic recording medium further comprises 0.05 to 3 weight % of one or plural elements selected from the group consisting of titanium, vanadium, molybdenum and tungsten.

FIG. 1

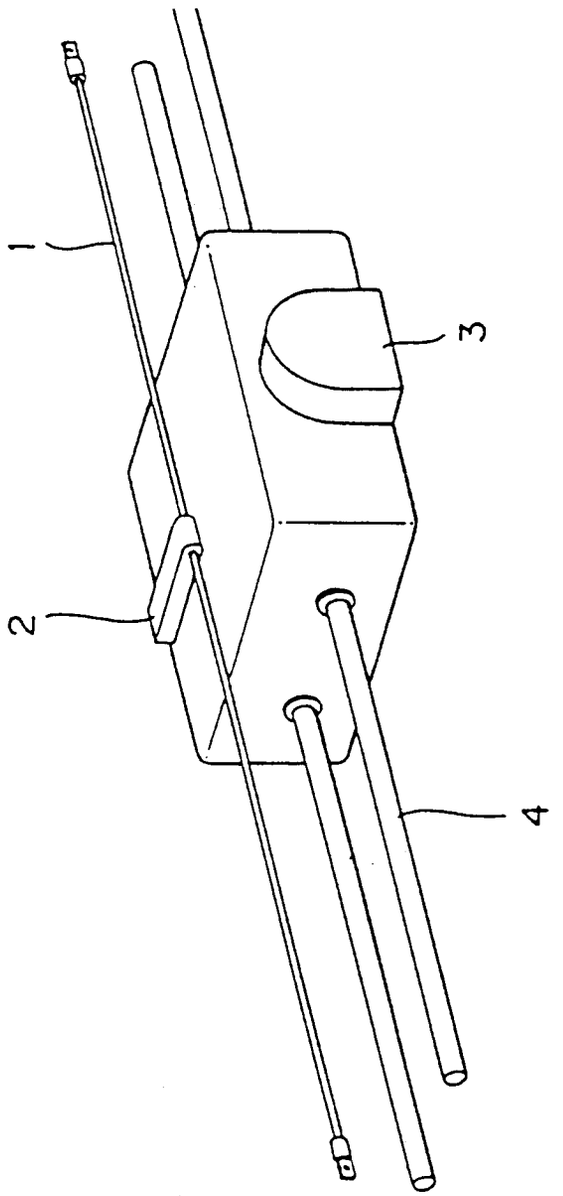

FIG. 2

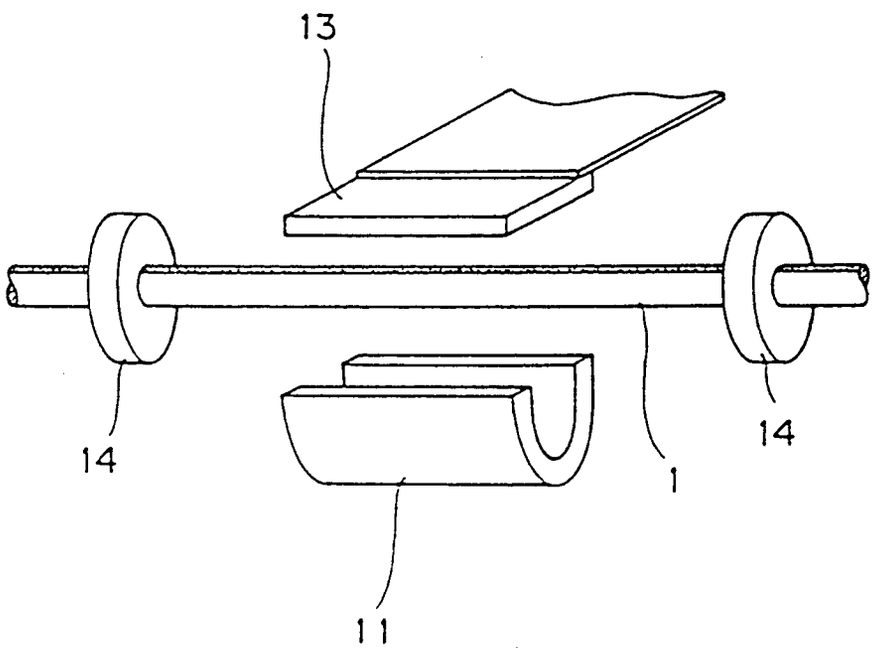

FIG. 3