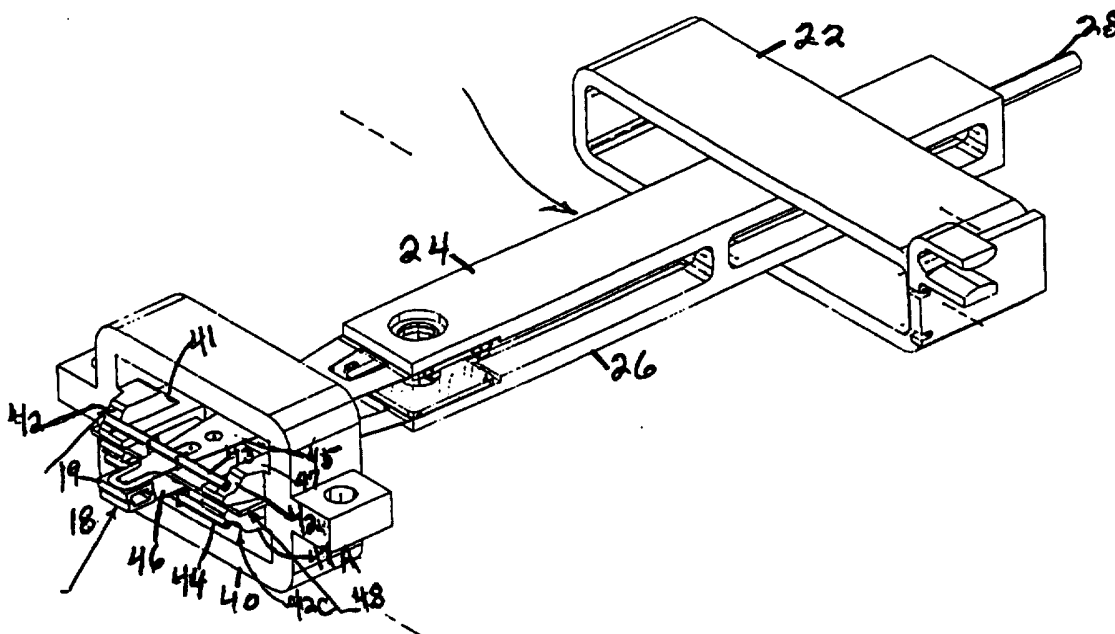


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International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US95/13349 (22) International Filing Date: 10 October 1995 (10.10.95) (30) Priority Data: 08/324,581 18 October 1994 (18.10.94) US (71) Applicant: IOMEGA CORPORATION [US/US]; 1821 West 4000 South, Roy, UT 84067 (US). (72) Inventor: SPENDLOVE, Jay; 5573 South 200 West, Ogden, UT 84405 (US). (74) Agent: KURTZ, Richard, E.; Woodcock Washburn Kurtz Mackiewicz & Norris, 46th floor, One Liberty Place, Philadelphia, PA 19103 (US).		(81) Designated States: CA, JP, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>With amended claims and statement.</i>

(54) Title: WING ATTACHMENT FOR HEAD LOAD/UNLOAD IN A DATA STORAGE DEVICE**(57) Abstract**

In a magnetic disk drive, heads (18, 19) are loaded and unloaded onto the magnetic disk (14) by wings (43, 44) attached in close proximity to the magnetic heads. The wings are cylindrical rods which ride on opposed ramps (41, 42) to separate the heads so they can travel on either side of the disk and the heads are then brought together properly onto the disk. The wings are attached to the suspension arms (45, 46) of a Winchester head assembly by an attachment device (50, 51) having a tapered notch with an interference fit which secures the rods.

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WING ATTACHMENT FOR HEAD LOAD/ UNLOAD IN A DATA STORAGE DEVICE

RELATED APPLICATIONS

"Head Load/Unload and Cleaning in a Data Storage Device", Serial
5 No. 324,895, filed concurrently herewith, is incorporated herein by reference.

BACKGROUND OF THE INVENTION

This invention relates to an actuator for carrying read/write heads into
engagement with a recording medium and more particularly, to a wing attachment device
for loading, unloading and cleaning of heads.

10 U.S. Patents 4,740,851 - Jones, et al and 4,663,677 - Griffith, et al show
removable media magnetic disk drives of the type made by the assignee of the present
invention. A cartridge having a flexible recording medium is inserted into the disk drive.
A motor rotates the disk which is engaged by magnetic read/write heads.

15 Out of plane flexible disk edge stability and flutter, as well as variations due
to assembly tolerances, causes difficulty in loading and unloading a pair of opposing heads
on to or off of a disk. Loading and unloading generally needs a large amount of vertical
displacement of the heads in order to avoid damaging the heads on the edge of the
spinning and fluttering disk. Also, reduction in the preload of the heads can occur as the
heads are loaded and unloaded at large vertical displacements.

20 An improved device for loading and unloading the heads and for cleaning
the heads is described in the aforementioned co-pending patent application. This head
load/unload system requires the attachment of a wing to the flexible head suspension arms.

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It is an object of the present invention to provide an improved attachment device for the wings used for loading and unloading the heads on the magnetic medium and for cleaning the magnetic heads.

SUMMARY OF THE INVENTION

5 In accordance with the present invention, a cylindrical rod is attached as a wing to the magnetic head suspension in close proximity to the head so that the motion of the head closely tracks the motion of the wing. The wing is attached with a device having a tapered notch with an interference fit to secure the rod. Two attachment devices are provided on either side of the head suspension arms. The rod extends transversely
10 across the head. The notch in each of the attachment devices extends upwardly and the wing is pressed into place in the notch. The wing is locked down to prevent the wing from coming out during operation. The notch is tapered to lock the wing down securely so that it cannot be removed without great force. The wing is constrained in the X, Y and Z axes without using glue or other secondary techniques to assure a secure attachment.

15 The foregoing and other objects, features and advantages of the invention will be better understood from the following more detailed description and appended claims.

SHORT DESCRIPTION OF THE DRAWINGS

Fig. 1 shows the disk drive of the present invention with the cover
20 removed;

Fig. 1A shows a cartridge of the type used in such a disk drive;

Fig. 2 shows the head loading/unloading mechanism of the related application;

Fig. 3 shows a plan view of the head suspension arm;

25 Fig. 4 shows a side view of the head suspension arm; and

Fig. 4A shows the wing attachment device of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 1 shows a disk drive of the type in which a cartridge 10 (Fig. 1A) contains a recording media 14. The cartridge is inserted into the drive at 11. A motor
30 is mounted on platform 12 at 13. The motor rotates the flexible disk in the cartridge.

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The cartridge shown in Fig. 1A has a disk 14 with a hub 16 rotatably mounted therein to be rotated by the motor.

The disk is engaged by opposed read/write heads 18 and 19 which are carried by the actuator. Opposed heads engage both sides of the disk.

5 The voice coil motor for driving the carriage into and out of engagement of the heads with the recording medium includes an outer return path member 20. Fig. 2 shows a coil 22 mounted on the carriage assembly. When the coil 22 is energized, it interacts with the magnets to move the carriage linearly so that the heads 18 and 19 engage concentric tracks on the disk. The carriage assembly includes two lightweight
10 arms 24 and 26. The carriage assembly travels on a central guide track 28 which is a cylindrical member, a small wire guide in the preferred embodiment. The carriage assembly has two bushings through which the cylindrical guide track passes.

The head load/unload device 40 is shown in Fig. 2. It includes first opposed ramps (41 is shown) and second opposed ramps (42, 42B and 42C are shown).

15 Wings 43 and 44 ride on the opposed ramps as the actuator carriage travels toward and away from the magnetic disk.

Magnetic heads 18 and 19 are flexibly mounted on the suspension arms 45 and 46. Fig. 3 is a plan view of suspension arm 45. Wing 43 extends transversely across the arm 45. It is held in place by the wing attachment devices 50 and 51. Fig. 4 is a side
20 view of the wing attachment device 51 and Fig. 4A shows the device in more detail. Wing attachment device 51 is a stainless steel member with a notch which has an interference fit for the rod 43. The bottom of the notch accommodates the diameter of rod 43. However, the notch narrows at the top to securely lock the wing in place after
25 without using glue or other secondary processes to assure a secure attachment. This prevents the wing from coming out during operation. The wing cannot be removed without great force.

While a particular embodiment of the invention has been shown and described, various modifications are within the true spirit and scope of the invention. The
30 appended claims are, therefore, intended to cover all such modifications.

WHAT IS CLAIMED IS:

1. In an actuator for carrying a read/write head into engagement with a recording medium comprising:
 - a carriage assembly, said head being flexibly mounted on said carriage assembly;
 - a wing mounted in proximity to said head;
 - a head load/unload device, said wing riding on said head load/unload device to position said head on said recording medium, the improvement comprising:
 - said wing being a cylindrical rod; and
 - a wing attachment device mounted on said carriage assembly in proximity to said head, said attachment device having a tapered notch with an interference fit which secures said rod to said head attachment device.
2. The device recited in claim 1 wherein said rod extends transversely across said carriage, and wherein there are two attachment devices, one on each side of said head.
3. The device recited in claim 1 wherein said notch has an opening facing upwardly, the bottom part of said notch being wide enough to accommodate the diameter of said rod, said attachment device having an upper portion which forms an opening for said notch which is less than the diameter of said rod to lock said rod down after it has been pressed into said notch.

- 5 -

4. The device recited in claim 1 wherein said wing attachment device is mounted on the flexible suspension arm of a Winchester head assembly.

5. The device recited in claim 1 wherein said wing attachment device is of stainless steel.

5 6. The device recited in claim 1 wherein said wing attachment device locks said wing in three axes of constraint to secure attachment.

AMENDED CLAIMS

[received by the International Bureau on 11 March 1996 (11.03.96);
original claim 2 cancelled; original claim 1 amended;
remaining claims unchanged (2 pages)]

1. In an actuator for carrying a read/write head
into engagement with a recording medium comprising:

a carriage assembly for carrying said head
5 into engagement with said recording medium;

means for flexibly mounting said head on said
carriage assembly;

a wing mounted in proximity to said head;
a head load/unload device, said wing riding
10 on said head load/unload device to position said head on
said recording medium and to unload said head from said
recording medium when said carriage moves away from said
recording medium, the improvement comprising:

said wing being a cylindrical rod which
15 extends transversely across said carriage; and

two wing attachment devices mounted on said
carriage assembly in proximity to said head, one on each
side of said head, each attachment device having a tapered
notch with an interference fit which secures said rod to
20 said head attachment device.

2. **[CANCELLED]**

3. The device recited in claim 1 wherein said
notch has an opening facing upwardly, the bottom part of
said notch being wide enough to accommodate the diameter of
25 said rod, said attachment device having an upper portion
which forms an opening for said notch which is less than the

diameter of said rod to lock said rod down after it has been pressed into said notch.

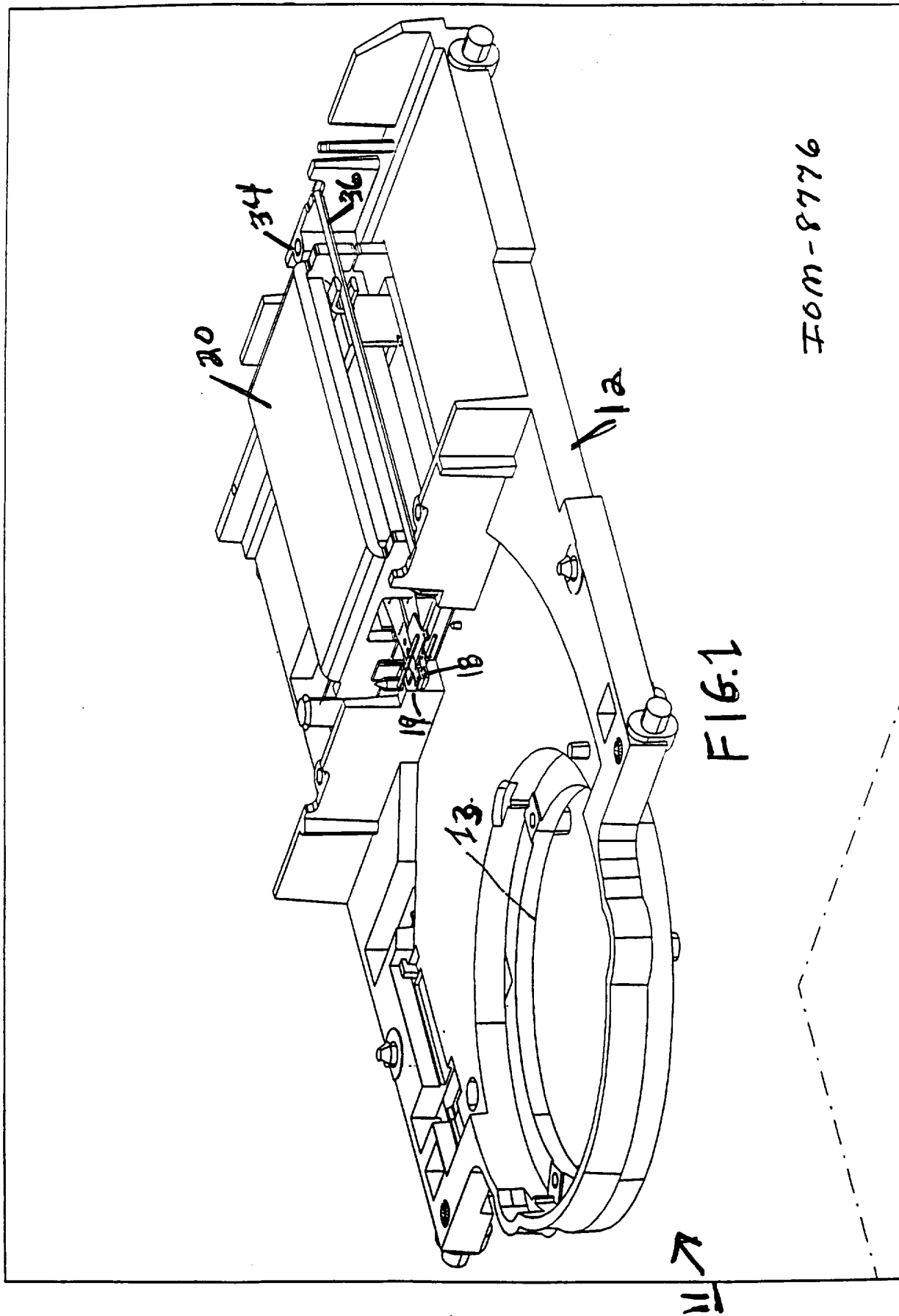
4. The device recited in claim 1 wherein said wing attachment device is mounted on the flexible suspension
5 arm of a Winchester head assembly.

5. The device recited in claim 1 wherein said wing attachment device is of stainless steel.

6. The device recited in claim 1 wherein said wing attachment device locks said wing in three axes of
10 constraint to secure attachment.

STATEMENT UNDER ARTICLE 19

The amendment of claim 1 and the cancellation of claim 2 is made in order to bring the application in compliance with changes made in the U.S. application. The amendment consisting of the amendment of claim 1 and the cancellation of claim 2 does not go beyond the disclosure of the International Application as filed since full support for these claims can be found in the description, as well as in the originally filed claims.



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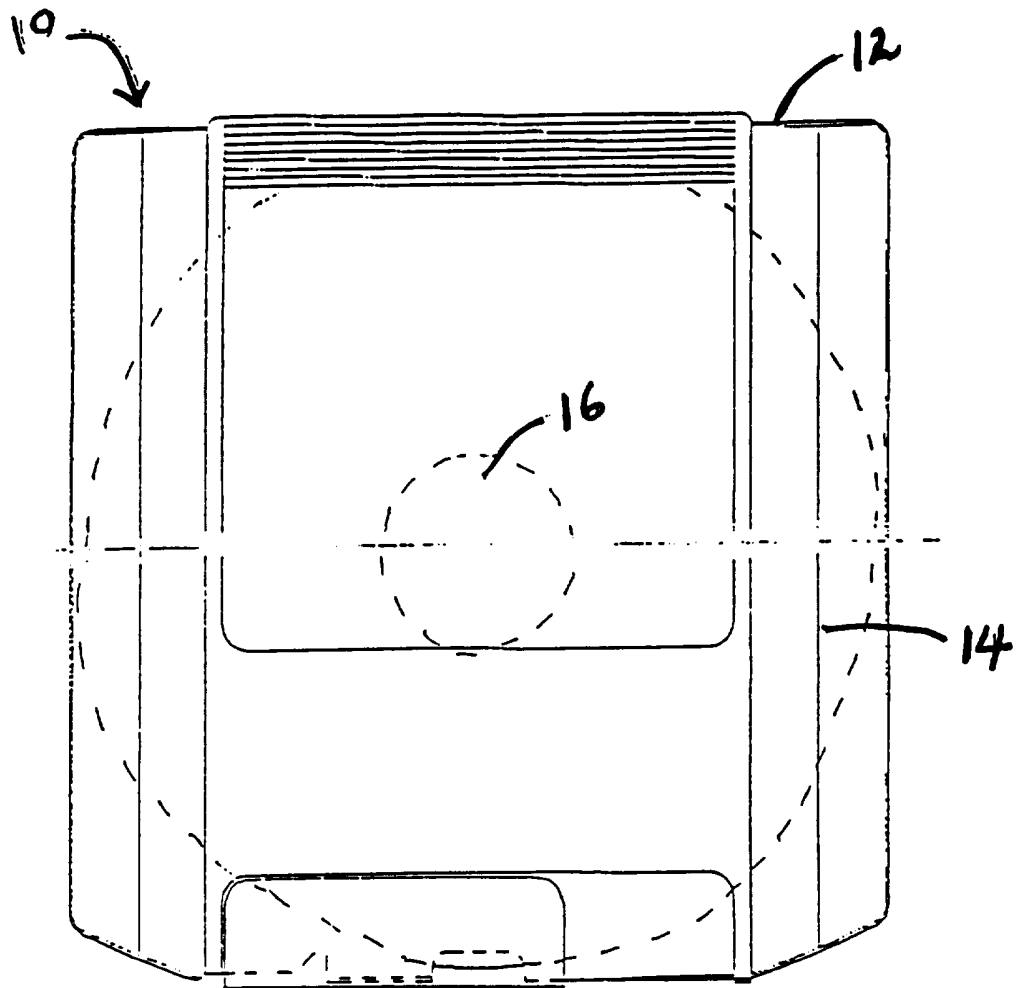
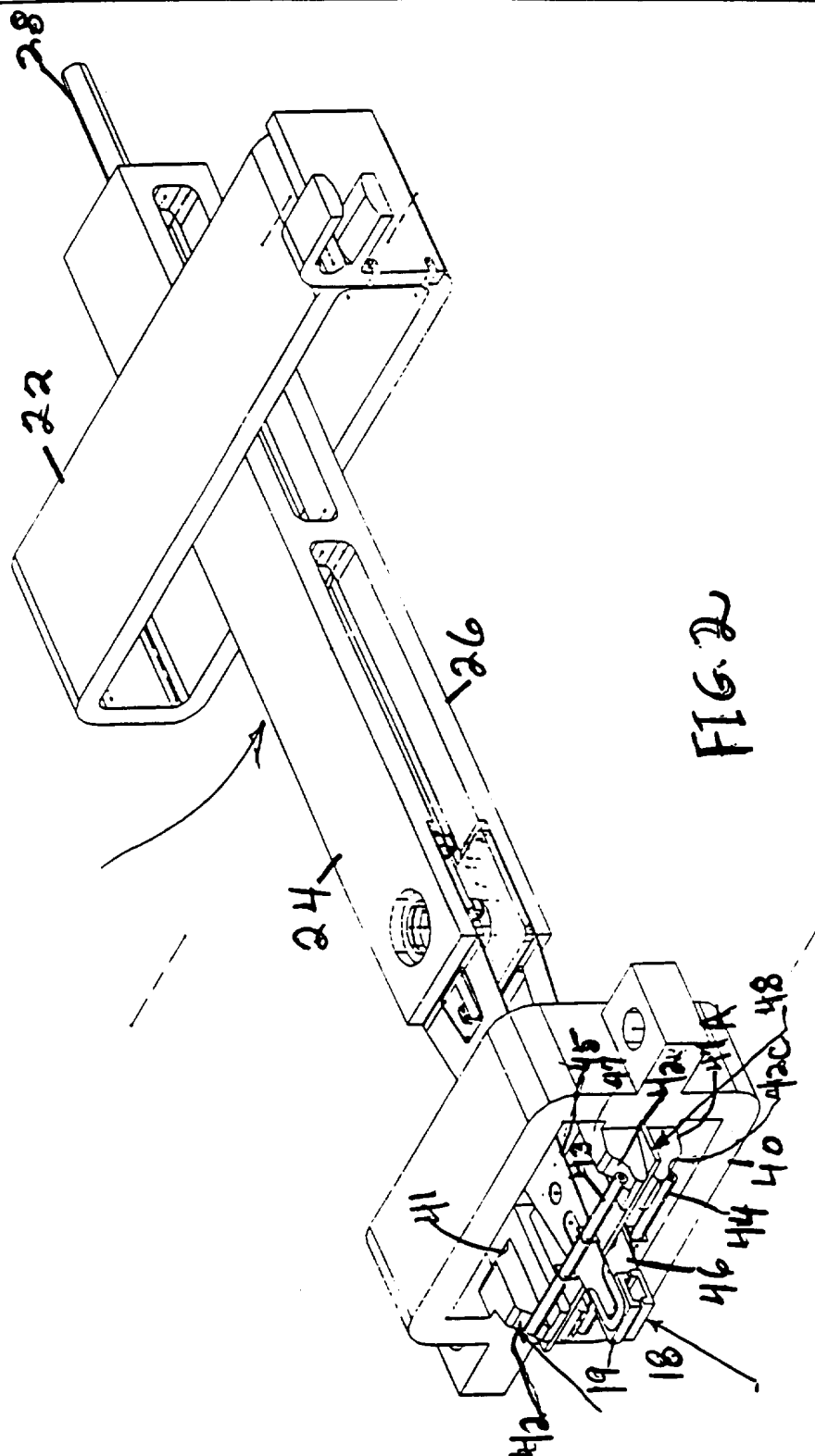
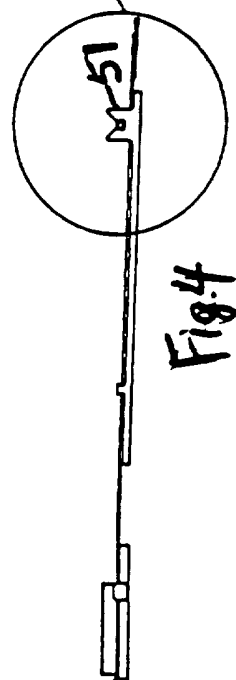
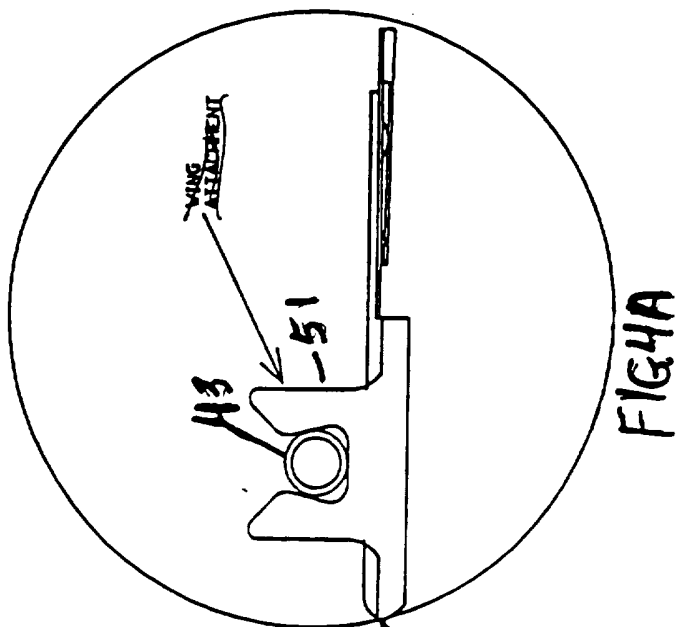
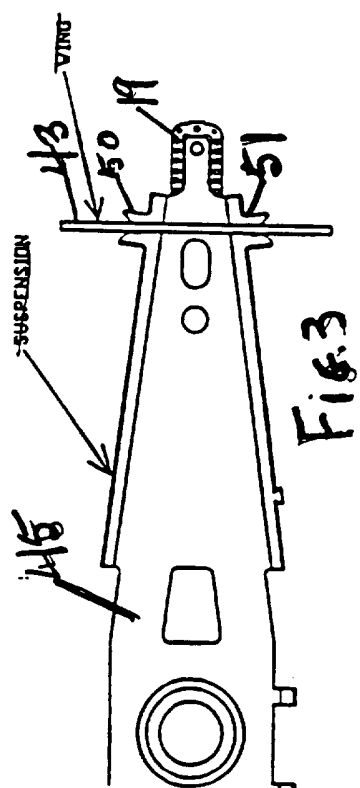


FIG. 1A





INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/13349

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G11B 5/54, 21/22

US CL : 360/105

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 360/105

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 5,309,624 (NISHIKAWA) 10 MAY 1994 see FIG.1	1-6
A	US, A, 4,663,682 (McNEIL) 5 MAY 1987 see FIG.1	1-6

☐

Further documents are listed in the continuation of Box C.

☐

See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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