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SPRING CLIP RETAINER MEANS FOR AIR BEARING MAGNETIC TRANSDUCER ASSEMBLIES

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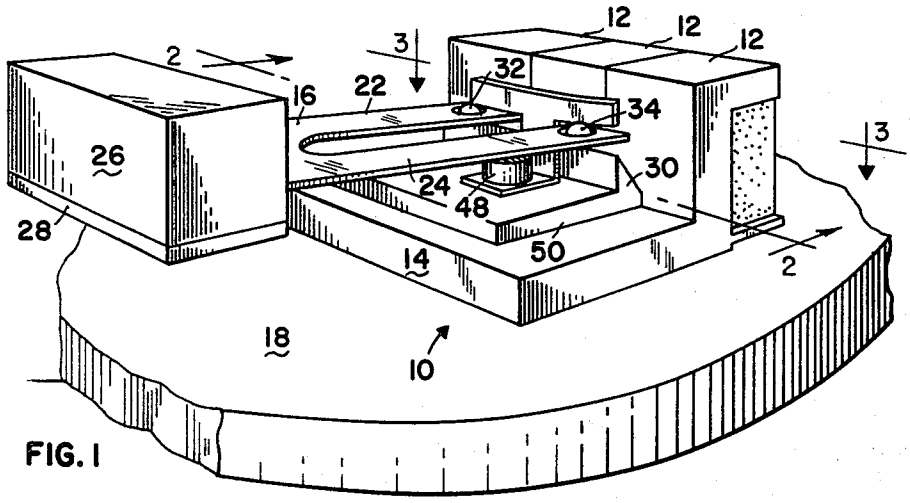

FIG. 1

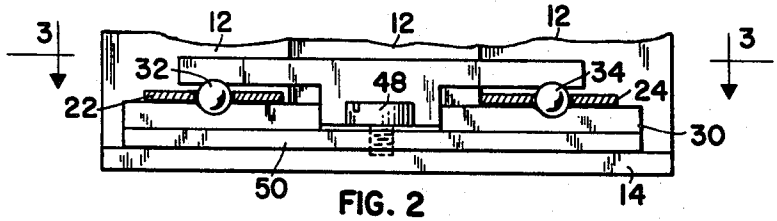

FIG. 2

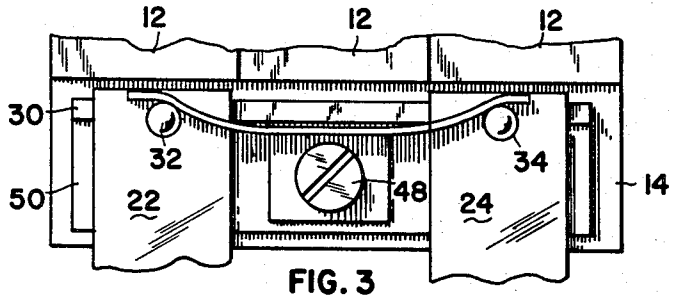

FIG. 3

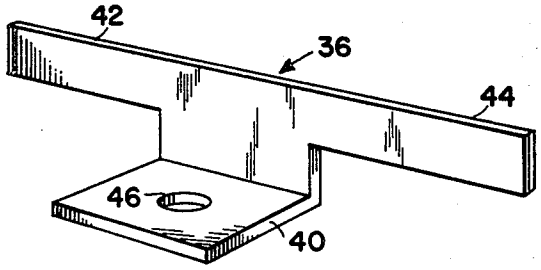

FIG. 4

INVENTOR.
CLARENCE R. LINSLEY
BY Joseph R. Dwyer
ATTORNEY

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SPRING CLIP RETAINER MEANS FOR AIR BEARING MAGNETIC TRANSDUCER ASSEMBLIES

Clarence R. Linsley, La Crescenta, Calif., assignor to General Precision Systems Inc., a corporation of Delaware

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8 Claims. (Cl. 340—174.1)

This invention relates to a retainer means which is useful in retaining the transducer assemblies used with rotating memories to their spring biasing means and supports thereof, and more particularly to a novel and improved spring clip which may be permanently affixed to a transducer assembly and adapted to retain the transducer assembly to a spring biasing means and support mounting and still allow pivotal movement between the spring biasing means and the transducer assembly. Further, the spring clip of this invention allows ease in removing and replacing the transducer assembly to the spring means.

The transducer assembly of which this invention is useful is of the type wherein a read/record head is mounted in a spring biased shoe which floats on a laminar air film between the shoe and the surface of a rotating memory member. Such a transducer assembly is explained in co-pending application for a United States Letters Patent of Clarence R. Linsley, S.N. 511,156, entitled, "Transducer Assembly," filed Dec. 2, 1965.

A problem which occurs in transducer assemblies of the type described is that when a retraction mechanism is used, which actually lifts the transducer assemblies from the surface of the rotating memory members, the laminar air film is no longer sufficient to secure the transducer assemblies to the spring means. One example of such a retraction mechanism is described in co-pending application for a United States Letters Patent of Clarence R. Linsley, S.N. 501,352, entitled "Dynamic Magnetic Memory Transducer Positioning Apparatus," filed Oct. 22, 1965.

Briefly described, the present invention provides a spring clip retainer means which is useful for retaining transducer assemblies to their spring biasing means. The spring clip comprises a main body which has a pair of resilient arms extending normal to the main body. The main body contains a 90 degree bend wherein this bend may be securely affixed to the transducer assembly, and the resilient arms may extend across the spring biasing means which may be in the form of a leaf spring and are brought to bear upon ball pivot means which may be employed therewith, thus retaining the spring means between the ball means and the spring clip.

It is one object of this invention to provide a spring clip useful with transducer assemblies for maintaining the spring biasing means to the transducer assembly.

Another object of this invention is to provide a spring clip useful with a transducer assembly which is easy to remove and replace the transducer assembly to the spring biasing means.

In the drawings which illustrate one embodiment of the invention:

FIGURE 1 is a perspective view of a transducer assembly incorporating one embodiment of this invention;

FIGURE 2 is an elevation view of the embodiment taken along the lines 2—2 of FIGURE 1;

FIGURE 3 is a plan view of this invention taken along the lines 3—3 of FIGURE 2;

FIGURE 4 is a perspective view of the spring clip embodied in this invention and apart from the transducer assembly.

Turning now to a detailed description of one preferred embodiment of this invention, a transducer assembly **10** comprises a plurality of read/record heads **12** mounted to shoe **14**. A leaf spring **16** resiliently bears upon the

shoe **14** forcing it toward the surface of a rotating recording member **18**, which is embodied herein in the form of a magnetic recording disc and will be referred to herein as disc **18**. Spring **16** may be of the bifurcated type which has a pair of tynes **22** and **24**. One end of the leaf spring is coupled to a stationary member **26** and may be clamped in place by a plate **28**. The other end of the leaf spring **16** bears upon the vertex of wedge **30** which is coupled to the shoe **14**. A pair of balls **32** and **34** placed upon the wedge **30** pivotally mount the shoe **14** to the spring **16** by having a pair of holes in the ends of leaf spring **16** to receive the balls **32** and **34**. Such physical and pivotal connection between spring biasing means **16** and the shoe **14** of the transducer assembly **10** is shown in co-pending application for United States Letters Patent for a "Transducer Assembly," S.N. 501,899, filed Oct. 22, 1965, in the name of John A. Felts, and assigned to the same assignee.

By this invention, a T-shape spring clip **36** comprises a main body portion **40** having a 90 degree angle therein comprising a pair of extension arms **42** and **44** extending above the main body portion **40** defining a T-shape configuration best illustrated in FIGURE 4. A hole **46** is placed within the main body portion **40** for securing it to the shoe **14** of the transducer assembly **10**. Particularly, the spring clip **36** may be affixed to the shoe **14** by a threaded member such as the screw **48**. By the particular embodiment shown, the wedge **30** has a flat body extension **50** which is used to secure the wedge **30** to the shoe **14** in a suitable manner. A hole may be provided within the flat body portion **50** having clearance therein for the screw **48** to be secured directly into the top surface of the shoe **14**. To assemble the transducer assembly, the 90 degree angle in the main body portion **40** of the spring clip **36** is positioned substantially on front of the balls **32** and **34** or on the side opposite the transducer **10** and the wedge **30**. Thus the balls **32** and **34** are positioned between the read/record heads **12** and the ends **42** and **44** of the spring clip **36**.

Next, the arms **42** and **44** are placed behind the balls **32** and **34** as shown in FIGURES 2 and 3, thereby necessitating a bend to be placed in the arms **42** and **44** of the spring clip **36** as shown in FIGURE 3. Thus, spring clip **36** being made of a resilient material is thereby caused to resiliently bear on the balls **32** and **34**.

For insertion and removal of the shoe **10** from the spring **16** relative movement is needed between the shoe **14** and the spring **16** whereby they are angularly separated, causing the lower end of the holes provided in the tynes **22** and **24** to clear the balls **32** and **34** and thereby allowing them to be drawn out. Insertion of the spring tynes **22** and **24** is the reverse operation. By maintaining the angle that was used to remove the spring clip **36**, the ends of tynes **22** and **24** are placed between the balls **32** and **34** and the arms **42** and **44** of spring clip **36**, and applying pressure, the balls **32** and **34** will be fitted into the holes provided in the tynes **22** and **24**.

Thus having explained one embodiment of this invention, what is claimed is:

1. A transducer assembly having:

a shoe being capable of floating upon a laminar air film which is created upon the moving surface of a rotating memory member;

a spring means for urging said shoe toward the moving surface;

at least one connecting means mounted to said shoe on the side opposite the moving surface, said connecting means being pivotally coupled to said spring means; and

a spring clip means for retaining said shoe to said spring means, said spring clip means being securely

mounted to said shoe and having at least one resilient arm which extends over said spring means and resiliently contacts said connecting means.

2. A transducer assembly as defined in claim 1 wherein said connecting means is a ball and said resilient arm of said spring clip means is capable of resiliently contacting said ball.

3. A transducer assembly as defined in claim 2 wherein;

said spring means has one end coupled to a member which is stationary relative to said moving surface, said spring means has a hole in the other end thereof which mates with said ball, and said resilient arm of said spring clip means is capable of extending over said spring means and is capable of resiliently contacting said ball.

4. A transducer assembly as defined in claim 1 and wherein:

said spring means is a bifurcated leaf spring having a pair of tynes on one end and the other end thereof is coupled to a member which is stationary relative to said moving surface, each tyne of said bifurcated spring having a circular hole;

said connecting means is a pair of balls laterally disposed and fixedly mounted to said shoe on the side opposite the moving surface, the holes in the tynes of said bifurcated spring being mated with said balls; and

said spring clip means has a pair of resilient arms extending across the tynes of said bifurcated spring capable of resiliently contacting said ball.

5. A transducer assembly as defined in claim 4 including:

means for maintaining the tynes of said bifurcated spring above the surface of said shoe and in contact with the resilient arms of said spring clip means, said means for maintaining the tynes above the surface of said shoe being coupled to said shoe and in contact with the tynes of said bifurcated spring.

6. A transducer assembly as defined in claim 4, said spring clip means being securely mounted to said shoe,

said spring clip means being disposed substantially along a center line extending between the laterally disposed balls, said spring clip means having a pair of resilient arms extending laterally with said shoe and parallel to the center line of said laterally disposed balls, and the resilient arms of said spring clip means being disposed substantially behind said balls and over the tynes of said bifurcated spring.

7. A spring clip useful in retaining the shoe of a transducer assembly which is adapted to float upon the surface of a rotating memory member to a spring biasing means which is used to force the shoe towards the surface of the rotating memory member comprising:

a main body portion capable of being coupled to the shoe and extending normal to a surface of the shoe on a side opposite the surface of the rotating memory member; and

at least one resilient arm extending from said main body portion lateral to the surface of the shoe which is on the side opposite the surface of the rotating memory member, said resilient arm being capable of extending across the spring biasing means and thereby retaining the spring biasing means to the shoe.

8. A spring clip as defined in claim 7 wherein the spring biasing means comprises a leaf spring and the shoe is pivotally mounted to the leaf spring by ball means, and said resilient arm extends across the leaf spring and resiliently bears upon the ball means.

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BERNARD KONICK, *Primary Examiner.*

A. I. NEUSTADT, *Assistant Examiner.*