June 19, 1956 J. E. DE TURK ET AL 2,751,440

MAGNETIC RECORDING-PLAY-BACK HEADS

Filed July 22, 1950 2 Sheets-Sheet 1

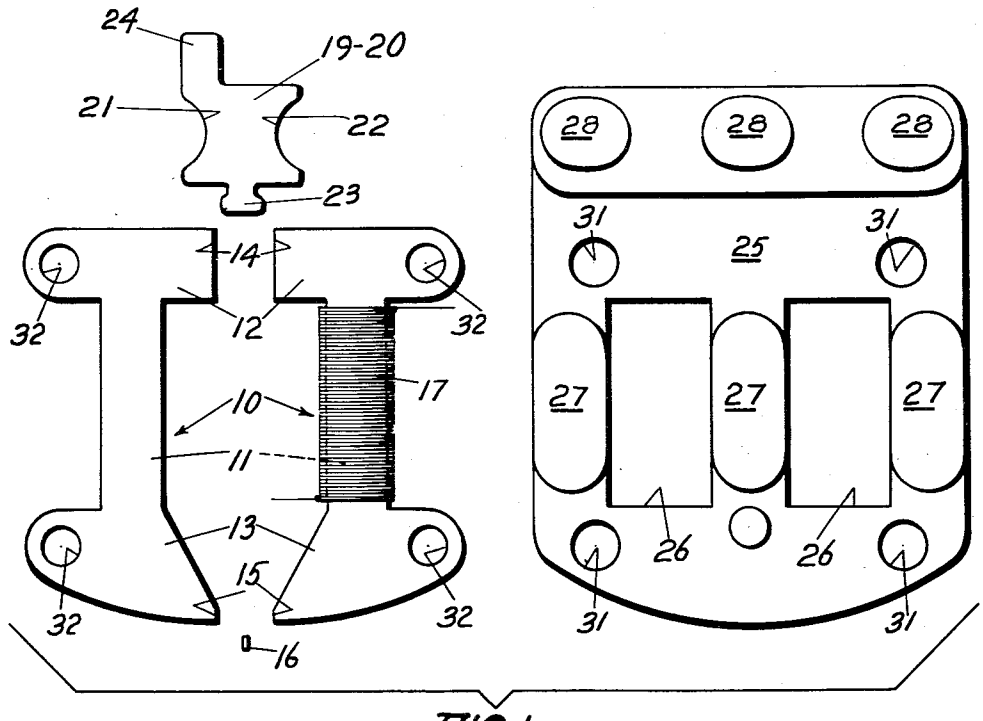
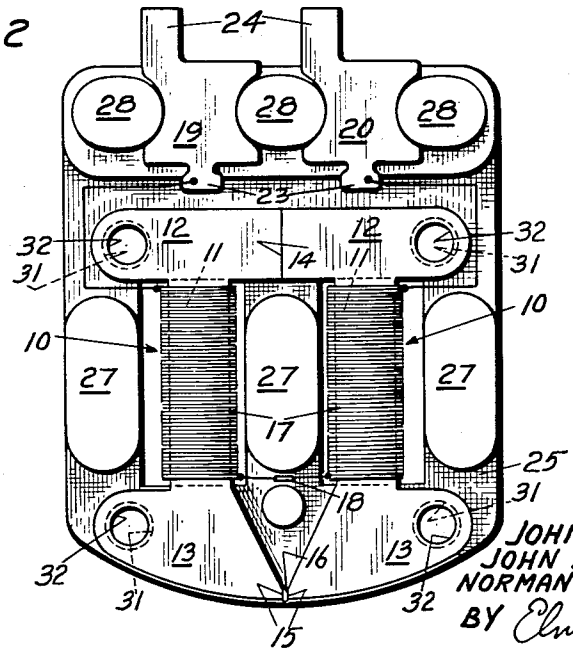


FIG. 1

FIG. 2



INVENTORS
JOHN E. DE TURK
JOHN H. MACNEILL
NORMAN ELIOT GIBBS
BY Elmer J. Gorn
ATTORNEY

June 19, 1956 J. E. DE TURK ET AL 2,751,440

MAGNETIC RECORDING-PLAY-BACK HEADS

Filed July 22, 1950 2 Sheets-Sheet 2

FIG. 3

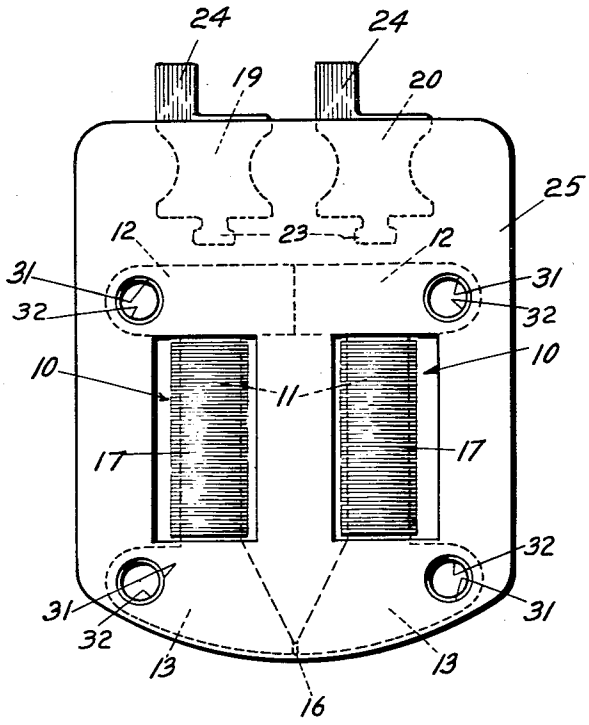
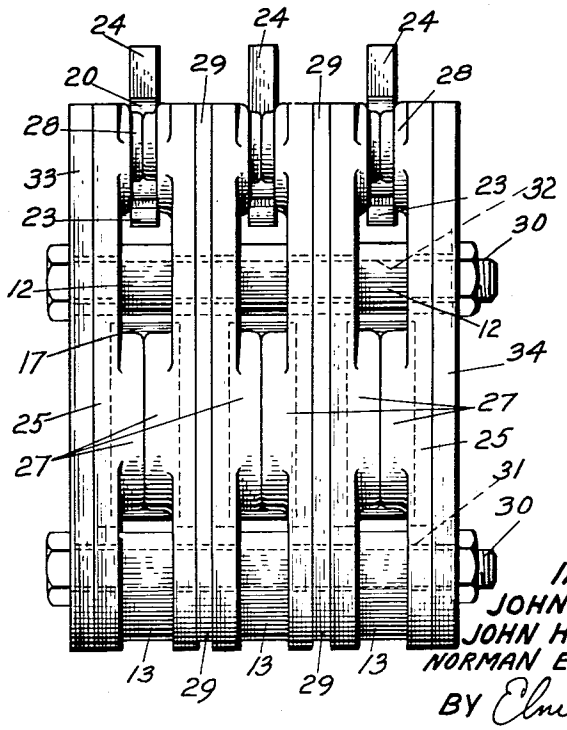


FIG. 4



INVENTORS
JOHN E. DeTURK
JOHN H. MacNEILL
NORMAN ELIOT GIBBS
BY Elmer J. Gorn
ATTORNEY

United States Patent Office 2,751,440
Patented June 19, 1956

2,751,440

MAGNETIC RECORDING-PLAY-BACK HEADS

John E. DeTurk, Cambridge, John H. MacNeill, Stoughton, and Norman Eliot Gibbs, Waltham, Mass., assignors to Raytheon Manufacturing Company, Newton, Mass., a corporation of Delaware

Application July 22, 1950, Serial No. 175,402

2 Claims. (Cl. 179—100.2)

This invention relates to magnetic recording and playback heads, and more particularly to devices of the general character indicated especially adapted for simultaneous multiple-channel operation.

Existing devices of this type possess certain disadvantages. For example, they are bulky; they require extreme accuracy in their fabrication and assembly; they are difficult to replace without risk of loss of synchronism of the information recorded on the various channels; and they are disturbed by an undue amount of cross-talk between said channels.

It is, therefore, the main object of the present invention to eliminate the foregoing disadvantages by providing a head which consists of a plurality of thin, stacked, single-channel units which are complete in themselves, which carry their own terminals, and which maintain proper inter-relationship for their entire useful lives.

It is another object of the present invention to provide a multiple head in which each single-channel unit is a duplicate of each other unit, whereby the single units are interchangeable within a particular multiple head, and the multiple heads are likewise interchangeable in the apparatus in which they are employed.

It is still another object of the present invention to provide a multiple head which requires greatly diminished accuracy in the mounts adapted to receive the same in the apparatus in which they are employed.

It is still another object of the present invention to provide a multiple head which is extremely compact and still incorporates effective shielding for reducing inter-channel interference to acceptable limits.

These and other objects of the present invention, which will become more apparent as the detailed description thereof progresses, are attained, broadly, in the following manner.

A magnetizable core provided with pole pieces spaced by a non-magnetic insert to define a working gap has a coil wound thereon. The coil has its ends electrically connected, respectively, to contact members. Bonded to the side surfaces of the core and contact members are duplicate plastic plates, said plates being provided with recesses receptive of the windings on the core and bosses engaging contact members. The units thus far described are stacked with magnetic shields therebetween and the assembly is held together and maintained in fixed inter-relationship by locating rods passing through apertures in the shields, side plates and cores.

Magnetic heads embodying the features of the present invention have been constructed and found to have the advantages previously referred to, said advantages having been long sought, for example, in digital computing equipment and data filing systems. The chief virtue of the heads of the present invention is their extreme thinness, heads of .070 inch having been constructed whih permit efficient employment of the medium on which the recording is accomplished.

In the accompanying specification there shall be described, and in the annexed drawings shown, an illustrative embodiment of the magnetic recording-play-back head of the present invention. It is, however, to be clearly understood that the present invention is not to be limited to the exact details herein shown and described for purposes of illustration only, inasmuch as changes therein may be made without the exercise of invention and within the true spirit and scope of the claims hereto appended.

In said drawing:

Fig. 1 is an exploded side elevational view showing the components making up each single-channel unit;

Fig. 2 is a side elevational view of a partially assembled single-channel unit;

Fig. 3 is a similar view of the same completely assembled; and

Fig. 4 is an edge view of an assembled multiple head incorporating a plurality of the single-channel units shown in Fig. 3.

Referring now more in detail to the aforesaid illustrative embodiment of the present invention, with particular reference to Figs. 1, 2 and 3 of the drawings, the numeral **10** generally designates a flat magnetizable core consisting of a main rectangular portion **11**, a transverse, substantially rectangular portion **12** at one end of said main portion, and a transverse, substantially triangular portion **13** at the other end of said main portion. As will hereinafter be more fully described, two such cores are employed, the rectangular portions **12** having abutting inner surfaces **14** to complete the magnetic circuit, and the triangular portions **13**, constituting pole pieces, having flattened portions **15** adapted to support an insert **16** of nonmagnetic material therebetween to define a working gap.

Each of the cores **10** has a coil **17** wound on the main portion **11** thereof, the coils being series-connected by splicing together the lower ends thereof, as at **18**, the upper, free ends thereof being connected, respectively, to contact members **19** and **20**. The members **19** and **20** are substantially rectangular in shape, except that their side edges are curved inwardly, as at **21** and **22**, lugs **23** depending from the lower edges thereof, and off-set tongues **24** extending from the upper edges thereof.

A pair of substantially rectangular plastic side plates **25**, having rectangular openings **26** separated by elongated bosses **27**, is bonded to the side surfaces of the cores **10**, the openings **26** being receptive of the coils **17** wound upon said cores. The plates **25** are also bonded to the side surfaces of the contact members **19** and **20**, and, through the bosses **27** and **28**, to each other, the curved edges **21** and **22** of said contact members engaging substantially elliptical bosses **28** formed on said plates, whereby said contact members are maintained in appropriate alignment.

Fig. 2 of the drawing most clearly shows the cores and contact members in position on one of the side plates, and it is to be noted that said cores and contact members lie in a common plane. The single-channel unit is completed by the addition of a second side plate, the completed unit being most clearly shown in Fig. 3 of the drawings.

As best seen in Fig. 4 of the drawings, a plurality of the units shown in Fig. 3 are stacked together with magnetic shields **29** between each pair, the assembly being held together and maintained in proper inter-relationship by locating rods **30** passing through openings **31** in the side plates **25**, openings **32** in the cores **10**, and, of course, aligned openings (no reference characters) in the shields **29**. The openings **32** are accurately located with respect to the surfaces **14** and **15**, the openings **31** are slightly larger than the openings **32**, and the rods **30** fit the openings **32** precisely, so that, when the units are stacked as aforesaid, all of the abutting surfaces **14** and the working

gaps become accurately aligned with respect to each other and with respect to the rods **30**. The assembly is completed by suitable end plates **33** and **34**.

If desired, the rods **30** may be extended beyond the end plate **33** or **34** and the extended portions utilized to effect precision location of the entire assembly in the apparatus with which it is intended to be used.

This completes the description of the aforesaid illustrative embodiment of the magnetic recording and play-back heads of the present invention.

It will be noted from all of the foregoing that the multiple head is extremely compact because of the extreme thinness of each single-channel unit; the single-channel units are so stacked and maintained in their assembly as to prevent misalignment; the individual units, being identical, are interchangeable; and the multiple heads themselves are of such construction as to enable interchangeability with like heads in the apparatus in which they are intended to be used.

Other objects and advantages of the device of the present invention will readily occur to those skilled in the art to which the same relates.

What is claimed is:

1. A multiple magnetic recording and play-back head comprising: an assembly of superposed units, each including a magnetizable core providing pole pieces spaced to define a working gap, a coil wound upon said core, contact members electrically connected, respectively, to the ends of said coil, and support plates, having substantially greater mass than said core, bonded, respectively, to opposite sides of said core and said contact members, said plates incorporating recesses receptive of said coil, and bosses engaging said contact members; a magnetic shield, substantially coextensive with said plates, disposed intermediate each pair of said units; and a plurality of guide rods passing through apertures in said cores, plates and shields to maintain said units in fixed inter-relationship, with said working gaps in alignment with each other.

2. A multiple magnetic recording and play-back head comprising: an assembly of superposed units, each including a magnetizable core providing pole pieces spaced to define a working gap, a coil wound upon said core, contact members electrically connected, respectively, to the ends of said coil, and support plates bonded, respectively, to opposite sides of said core and said contact members; and a plurality of guide rods passing through apertures in said cores and said plates to maintain said assembly of units in fixed inter-relationship; the apertures in said cores being smaller than the apertures in said plates and providing a precise fit with said guide rods.

References Cited in the file of this patent

UNITED STATES PATENTS

2,195,192	Schuller	Mar. 26, 1940
2,456,767	Camras	Dec. 21, 1948
2,493,742	Begun	Jan. 10, 1950
2,513,617	Begun	July 4, 1950
2,513,653	Kornei	July 4, 1950
2,517,808	Sziklai	Aug. 8, 1950
2,523,576	Kornei	Sept. 26, 1950
2,535,480	Begun	Dec. 26, 1950
2,536,272	Friend	Jan. 2, 1951
2,538,405	Zenner	Jan. 16, 1951
2,540,654	Cohen	Feb. 6, 1951
2,549,771	Camras	Apr. 24, 1951
2,551,935	Flood	May 8, 1951
2,563,445	Zenner	Aug. 7, 1951
2,574,707	Pettus	Nov. 13, 1951
2,574,898	Behren	Nov. 13, 1951
2,590,292	Anderson	Mar. 25, 1952
2,618,709	Eckert	Nov. 18, 1952