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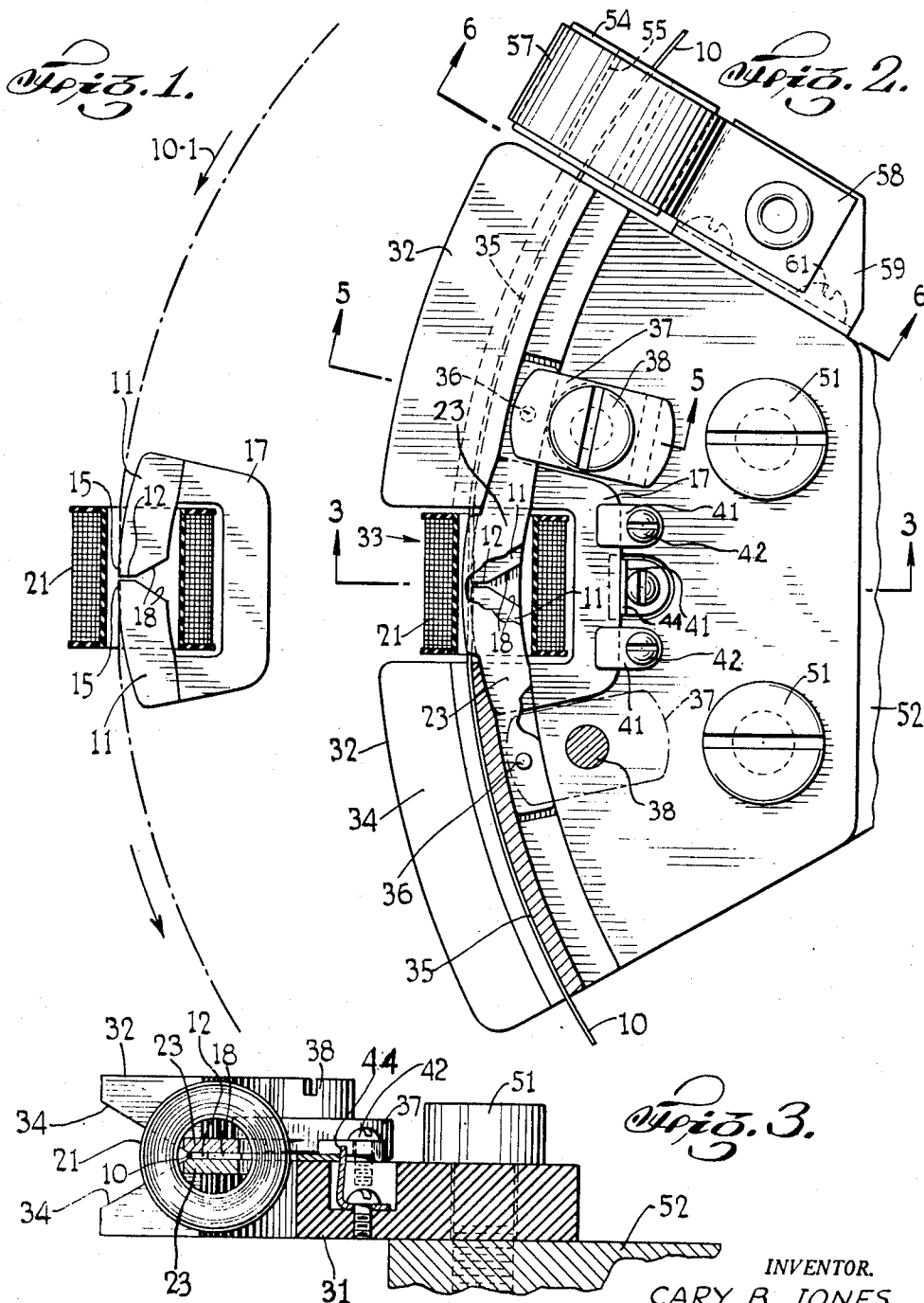
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2,432,162

REMOVABLE POLE PIECES FOR MAGNETIC RECORDING AND REPRODUCING HEADS

Filed March 11, 1944

3 Sheets-Sheet 1



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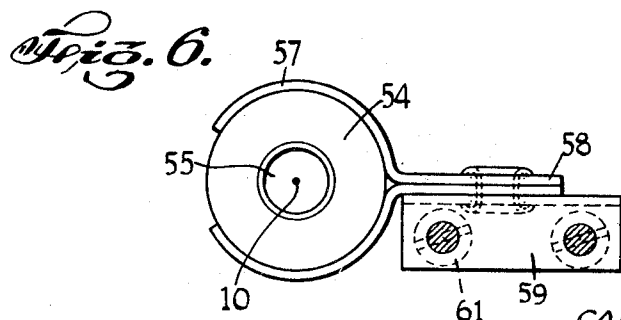
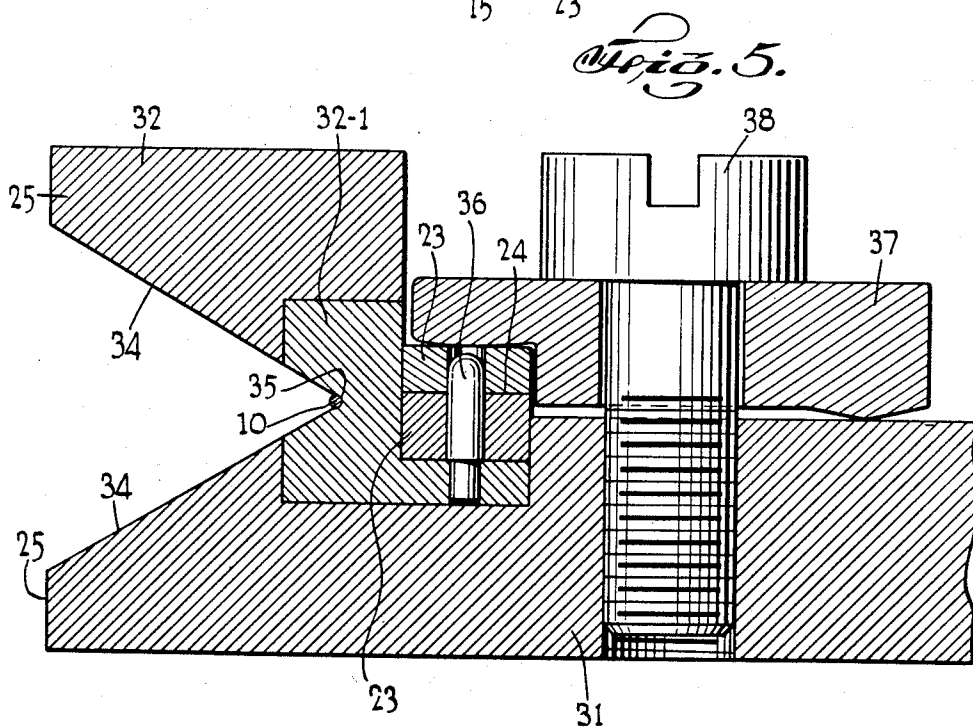
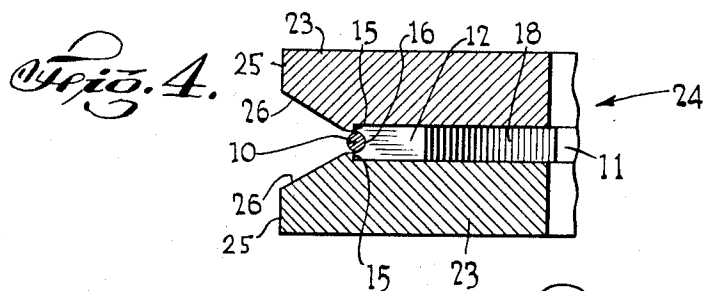
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REMOVABLE POLE PIECES FOR MAGNETIC RECORDING AND REPRODUCING HEADS

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3 Sheets-Sheet 2



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REMOVABLE POLE PIECES FOR MAGNETIC RECORDING AND REPRODUCING HEADS

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3 Sheets-Sheet 3

Fig. 7

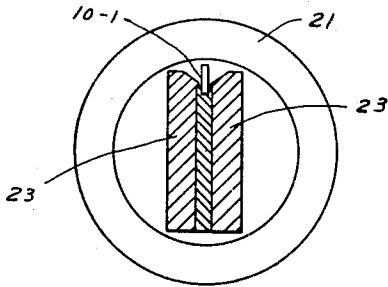


Fig. 7A

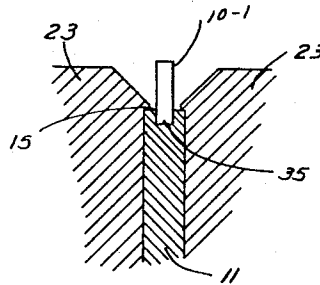


Fig. 8

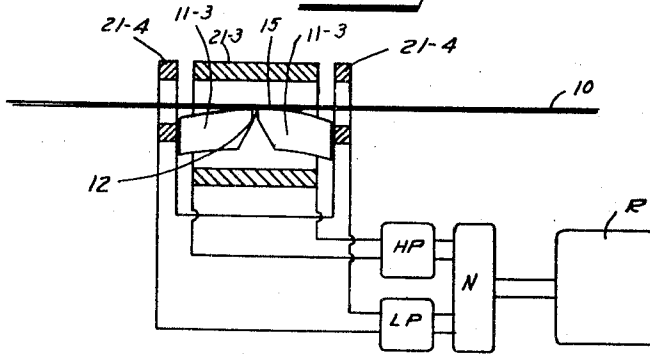
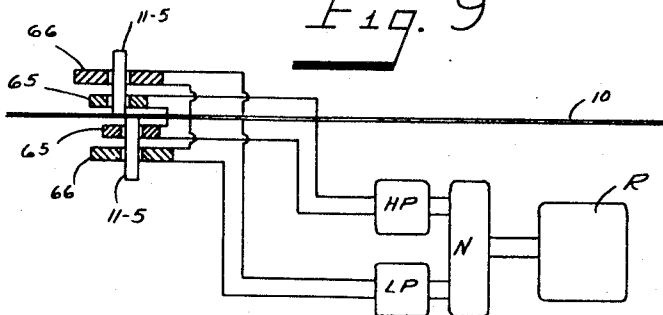


Fig. 9



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REMOVABLE POLE PIECES FOR MAGNETIC
RECORDING AND REPRODUCING HEADSCary B. Jones, Cleveland, Ohio, assignor to The
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Application March 11, 1944, Serial No. 526,006

9 Claims. (Cl. 179—100.2)

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This invention relates to magnetic recording and reproducing, and more particularly to magnetic recorder-reproducer head arrangements of the type in which a magnetic signal carrier, such as a very thin steel-wire filament, is moved tangentially along two aligned pole faces of a pair of pole pieces separated by a magnetic gap for recording magnetic signals on a signal-carrier filament element bridging the gap or reproducing therefrom a recorded magnetic signal, a transducer winding interlinked with the magnetic circuit of the core structure of the pole pieces carrying the signal currents to be recorded or reproduced.

Among the objects of the invention is a novel magnetic recorder-reproducer head of the foregoing type in which the transducer windings are placed around regions of the two aligned pole pieces adjoining the gap as well as the portion of the moving signal carrier bridging the magnetic gap and separating the pole pieces.

The foregoing and other objects of the invention will be best understood from the following description of exemplifications thereof, reference being had to the accompanying drawings wherein

Fig. 1 is a plan view illustrating the relationship of the magnetic core elements and the windings of a recorder-reproducer head exemplifying one form of the invention;

Fig. 2 is a plan view, with some parts shown in section, of a magnetic transducer head embodying the transducer elements of Fig. 1;

Fig. 3 is a cross-sectional view along line 3—3 of Fig. 2;

Fig. 4 is an enlarged cross-sectional view similar to Fig. 3 of the double-pole-piece unit;

Fig. 5 is a cross-sectional view along line 5—5 of Fig. 2;

Fig. 6 is a view of the obliterating coil assembly, along line 6—6 of Fig. 2;

Fig. 7 is a view similar to Fig. 3 showing a transducer head of the invention arranged for recording along a signal carrier track formed by the edge of a magnetic tape;

Fig. 7-A is an enlarged view of a portion of Fig. 7; and

Figs. 8 and 9 are diagrammatic views similar to Fig. 1 illustrating two different modified forms of recording systems exemplifying the invention.

The magnetic recorder-reproducer head shown in the drawings utilizes two relatively thin elongated pole pieces 11 of highly permeable magnetic sheet material, such as Permalloy or Mumetal, aligned in a plane on opposite sides of a very narrow magnetic gap only about .001 inch

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wide, extending for a relatively short distance inwardly from two narrow elongated pole faces 15 formed by the aligned, narrow, outer edge surfaces of the two pole pieces bordering the small gap 12 on the opposite sides thereof. The edges of the pole pieces 11 on which the two pole faces 15 are formed are shown slightly curved and are so arranged as to be tangentially engaged by a portion of the magnetic recording filament 10, such as a thin magnetic steel wire, which is impelled, for instance, in the direction of the arrow 10—1.

As shown in Fig. 4, the pole pieces 11 are somewhat thicker than the wire filament 10 and their two aligned pole faces are pre-shaped by forming thereon a shallow groove 16 for assuring that the moving wire filament 10 is guided along the central region of the narrow pole-face edge surfaces 15. When recording on a wire 10 which is about .004 to .006 inch thick, the pole pieces 11 may be made about twice the thickness of the wire.

As shown in Figs. 1 to 3, the transducer winding 21, which is traversed by the recorded or reproduced signal currents, is wound on a spool in the form of a coil, which is mounted so as to surround the gap region of the two aligned pole pieces 11 as well as the portion of the magnetic recording wire filament 10 which moves past and bridges the narrow gap 12 separating the aligned pole faces 15 for magnetically recording signals on the wire.

To increase the efficiency of the transducer head structure, the two pole pieces 11 may be designed to form part of a substantially closed-circuit magnetic core structure, for instance, by providing a yoke member 17, likewise of highly permeable magnetic sheet material, the two ends of which make magnetic contact with edge surface regions of the end portions of the two pole pieces in the manner shown in Figs. 1 to 3.

In order to secure good efficiency in the reproducing process and maintain uniform operating conditions for a long period of operation during which the pole-face channels 16 may be deepened as a result of wear by the moving wire 10, the parallel narrow magnetic gap 12, which is only about .001 inch wide and has a substantially uniform magnetic reluctance, extends for a short distance inwardly from the pole faces 15, for instance, for a distance of about four or five times the thickness of the recording wire filament 10, and the inner gap region is enlarged, as by tapering at 18 the inner regions of the pole-face ends facing the gap so that it has a magnetic reluctance which

is so high that the major part of the magnetic flux induced by a magnetized portion of the moving recording wire filament 10 is constrained to traverse substantially the full length of the pole pieces 11 and become effectively interlinked with transducer windings 21 surrounding the pole pieces 11.

The two pole pieces 11 are rigidly supported with their pole faces 15 and pole-face channels 16 aligned in their proper operative position across the narrow gap 12, by uniting them to a substantially rigid supporting structure which is shown formed of two substantially rigid bars 23 extending along the opposite flat sides of the two aligned pole pieces 11 and arranged to form with them a self-supporting rigid double-pole-piece unit 24. The two rigid supporting bars 23 may be made of a non-magnetic metal having high electric resistance or of a non-metallic rigid material, such as suitable synthetic resin material, for instance, a laminated fabric or fibrous body impregnated with a synthetic resin material, such as Micarta material manufactured by the Westinghouse Electric & Manufacturing Co. and used for making silent gears. If the mounting bars 23 are of metal, they may be united to the opposite sides of the two assembled, properly-aligned pole pieces by soldering or welding while held assembled in a suitable jig. When a soldering or welding process is used, it is important that it should be performed in such manner and at such temperatures as to assure that the magnetic qualities of the highly permeable magnetic material are not materially affected.

When the two pole pieces 11 are united to the two bar members 23 into a self-supporting, operatively-aligned rigid pole-piece unit 24, by a process, such as a welding process, the material of the two mounting bars 23 and the character of the uniting process are so selected and controlled as to make it possible to subject the united double-pole-piece unit 24 to an annealing process which imparts to the magnetic material of the pole pieces 11 its high magnetic qualities.

As shown in the drawings, the central outer region of the two pole-piece mounting bars 23 are shown provided with channel wall portions 25 extending beyond the front edges of the pole pieces along their central region, so as to provide two channel surfaces 26 tapering outwardly from a narrow inward channel region represented by the pole-face channels 16 of the two pole faces 15.

The transducer head shown is very efficient for recording with either A. C. or D. C. biasing current, as well as for reproducing recorded signals. To reduce eddy currents, each pole piece 11 as well as the yoke 17 may be formed of a plurality of very thin, magnetic laminations, which are united in their superposed relation, for instance, by cementing or soldering the superposed laminations to each other and to their rigid supporting structure. Alternatively, the superposed laminations may be held together in their aligned superposed relationship by thin watch screws or rivets extending through their central region and affixed to their rigid supporting structure, such as the bars 23.

As shown in Figs. 2 and 3, the rigid double-pole-piece unit 24, 11 is shown designed for mounting on a channel wall member 31 which serves as a support therefor. The channel wall member 31 has formed on the front side thereof two outwardly-opening channel sections 32 extending on both sides of a central region 33 shaped for receiving the forwardly projecting channel por-

tions 25 of the double-pole-piece unit so that when the double-pole-piece unit is mounted in its position on the channel wall member 31, the tapering channel surface walls of the double-pole-piece unit are aligned with the inner region of the tapering surfaces 34 of the two channel wall sections 32.

The tapered channel surfaces 34 of the two channel sections 32 form in their deepest region a narrow channel track 35, as indicated in Fig. 5, having a width of the order of the thickness of the wire filament 10 and so designed as to serve as a positive elongated guiding surface which engagingly supports and positively guides a substantial length of the recording wire filament 10 which moves towards and away from the aligned pole face channels 16 of the two pole pieces 15 bordering the gap 12.

The tapered guide surfaces 34 of the two channel sections 32 and the tapered surface 26 of the pole piece unit 24, 11 are so tapered and correlated to the shape of the narrow channel track 35 and the pole-face channel 16 as to cause a thickened filament element, such as a tie-knot joining the filament elements, to be lifted outwardly from the narrow channel track 35 and cause the thickened filament element to ride along the outward regions of the tapered surfaces 34, 26, while moving past the transducer head.

Furthermore, the tapered guide surfaces 26, 34 of the channel elements of the pole-piece unit and of the channel sections of the channel wall structure 31, are sufficiently tapered in outward direction and so correlated to the shape of the narrow pole-face channels 16 and the channel track 35 as to present to a wire protrusion deflected from the tapered surfaces 26, 34, respectively, a support which prevents forces exerted by the tensioned moving wire from wedging the wire protrusion within a portion of the narrow inward space of the pole-face channel 16 and the channel tracks 35.

In addition, the length of the narrow channel track 35 is made sufficiently greater than the length of the pole faces 15 and their pole-face channels 16, and their relative surface levels and shapes are so designed and correlated as to suppress vibrations of the filament element engaging the two pole faces 15 as well as the transmission of vibrations along the moving filament 10 toward the filament element bridging the gap 12.

To facilitate proper alignment of the double-pole-piece channel unit 24, with respect to the channel track 35 of the channel structure 31, the latter is shown provided with two upwardly projecting aligning pins 36 shaped for engagement with suitable aligning holes formed in the end portions of the pole piece unit 24.

The rigid double-pole-piece unit 24 may be suitably secured in its properly aligned position on the channel wall member 31 shown, as by making the upper ends of the aligning pins 36 in the form of threaded screw shanks shaped for receiving two clamping nuts by means of which the double-pole-piece unit is clamped in place.

In the arrangement shown, each end of the double-pole-piece unit 24 is held clamped in position by an elongated clamping bar 37 rotatably mounted on the shank of a screw 38 which engages a bushing embedded in the wall member 31 so that by tightening the screw 38 the two clamping bars 37 may have their forward ends firmly clamped over the upper side of the double-pole-piece unit 24 so as to hold it firmly secured in its proper operative position.

Upon loosening the screw 38, the two clamping bars 37 may be turned 90° to a position which permits ready removal of the double-pole-piece unit 24 from its operative position for checkup or replacement, and the replaced double-pole-piece unit may be quickly fixed in place by turning the clamping bars 37 back to their position shown and fastening their clamping screw 38.

As shown in Fig. 3, the rear portion of the wall member 31 is provided with two mounting holes by means of which it may be clamped as by screws 51 to a supporting arm 52, for instance, of a magnetic recorder-reproducer mechanism.

As shown in Figs. 2 and 6, a magnetic transducer head of the type shown in the drawing may be combined with obliterating means formed, for instance, by a spool coil 54 provided with a central opening 55 and suitably held against an end wall of the guide wall structure 31 so that the moving recording wire filament 10 passes through the coil opening 55 as it is being impelled along the track channel 35 toward the pole faces 15 of the transducer head. The obliteration may be carried on by passing through coil 54 either direct current or alternating current. The obliterating coil may be held in its position by clamping it between two arcuate mounting arms 57, 57 having lug projections 58, one of which is provided with a mounting lug 59 which is secured as by two screws 61 to an end surface of the channel wall member 31.

The yoke member 17 may be held in its proper position with relation to the pole pieces by pressing it as by means of two pressure arms 41 against the underlying surface of the supporting wall member 31 which is aligned with the plane of the pole pieces 11. The pressure arms 41 are shown rotatably held in the position shown by screws 42 so that by loosening the screws, the clamping or pressure arms 41 may be turned 90° for releasing the yoke 17. A biasing spring 44 serves to bias the front edge surfaces of the yoke member 17 toward the facing edges of the two pole pieces 11, the yoke member being held aligned on the surface of the wall member 31 in the same plane with the pole pieces 11.

As indicated in Fig. 5, the channel wall structure 32 may be formed of a substantially rigid synthetic resin material and it may be provided with a longitudinal reinforcing member 32—1 extending along the deepest region of its channel walls 32 in providing the walls of the elongated channel track 35. The reinforcing member may be made of a wear-resisting material, for instance, of a metal which is non-magnetic and has a high electrical resistance.

Because of the close intercoupling between the transducer winding coil 15 and the moving element of the magnetic signal carrier 10, which is bridging the magnetic gap, the transducer head arrangement of the type described above is very effective for recording and reproducing signals of the high frequency range and being in this respect superior to other magnetic transducer heads. Furthermore, a magnetic transducer head arrangement of the invention of the type described above is also effective in reducing disturbances occurring in the reproduction of audio-frequency signals of the lower frequency range. This may be explained as follows:

The longitudinal element of a magnetic signal carrier, having recorded on it a magnetic signal wave, constitutes a magnet of a length corresponding to the wave length of the recorded signal wave. If a magnetic core structure of a trans-

ducer head is of a size which is comparable to the length of the recorded magnetic signal wave, the reproduction of such signal wave will give distortion because the magnetic core structure of the transducer head will have induced therein a reproducing flux, not only by the magnetic potential of the signal carrier element bridging the gap, but also by the stray flux of the magnetic signal wave formed by the signal carrier.

Magnetic transducer heads based on the principles of the invention described above in connection with a particular exemplification thereof may be constructed with very small magnetic core structures. Thus, the length of their core structures may be reduced to the overall length of the two pole piece portions surrounded by the coil and bordering the narrow gap 12.

With such arrangement, the length of the magnetic core structure may be kept so small that it is only traversed by the flux induced by the magnetic potential applied across the magnetic gap of the transducer head while effectively reducing to a negligible value magnetic inductance by the full magnetic potential of the entire recorded magnetic signal wave. Accordingly, when high quality reproduction is required, the yoke 17 may be left out and the length of the pole pieces may be reduced so that each pole piece extends only for a short region of the coil on each side of the narrow magnetic gap 12.

Although the particular form of magnetic transducer head of the invention described above in connection with Figs. 1 to 6 is intended for cooperation with a filamentary magnetic signal carrier, such as a thin wire having a thickness of the order of a few mils, transducer heads of the invention are also ideal for use with magnetic signal carrier tracks such as formed by an edge of a thin tape. Figs. 7 and 7-A illustrate the cooperative relationship between a pole-face portion 15 and the pole-face channel 35 of a magnetic transducer head, such as described in connection with Figs. 1 to 6, when used for recording on a magnetic signal carrier recording track formed by a longitudinal edge region of a tape 10—1 the cross-section of which is comparable to the cross-section of a thin wire filament.

As shown in Figs. 7 and 7-A, the pole-face channel 35 serves to guide the magnetic carrier track formed by the edge of the tape across the narrow gap 12 for recording or reproducing on the tape edge recording track in the same manner as in conjunction with a wire filament.

As explained above, in making magnetic recordings of the low frequency range of the audio-frequency spectrum, distortions occur due to the appreciable size of the wave length of the recorded signal wave. These difficulties in the reproduction of such low frequency recordings may be overcome by utilizing the transducer head having in addition to the main winding section located immediately adjacent the region of the pole piece gap, which is essential for reproducing signals of the high frequency range, an additional winding section so arranged as to pick up more efficiently low frequency recordings. The additional winding section may be arranged in two sub-sections, one sub-section being ahead and one following the main winding section.

Fig. 8 illustrates one form of such magnetic transducer head arrangement comprising two pole pieces 11—3 aligned with their pole-tip ends on the opposite sides of a narrow magnetic gap and arranged in the same manner as the corresponding elements of Figs. 1 to 5 within the in-

terior of a main winding coil 21—3 which surrounds the pole piece portions bordering the magnetic gap and the elements of the moving signal carrier track 10 tangentially engaging the pole faces 15 and bridging the gap separating the pole pieces.

The transducer head arrangement of Fig. 8 has in addition to the main transducer winding section 21—3, two additional transducer winding sections 21—4 located ahead and behind the main transducer winding section in the direction of the motion of the signal carrier track 10. The number of turns of the main winding section 21—3 and the additional winding sections 21—4 may be so proportioned and they may be so located as to secure high-quality reproduction when the several windings are connected in series to impress their resultant voltage on the reproducing circuit including their usual amplifier networks.

Furthermore, as shown in Fig. 8, the several winding sections may be interconnected with the reproducing circuit through separate filters. Thus, as shown, a high-pass filter HP may be interconnected between the main winding section 21—3 and a combining network N and a low-pass filter LP may be interconnected between the two additional winding sections 21—4 and a combining network N which combines the signals passed by the high-pass filter and the low-pass filter in the proper proportions and impresses them on the reproducing circuit network R so as to secure high-quality reproduction of the signals. Such arrangement may be also utilized for recording, the network R, representing the recording network, including the microphone and amplifiers which supply the output of the recorder network, being impressed through a subdividing network including voltage-divider circuits which impress one component of the signal to be recorded through the high-pass filter HP on the main winding section 21—3 of the reproducer head and another component of the signal through the low-pass filter on the additional winding sections 21—4.

Fig. 9 illustrates another form of transducer head arrangement in which the two magnetic pole pieces are placed on the opposite sides of the moving signal carrier track 10 for magnetically interlinking an element of the signal carrier bridging the magnetic gap or slit between the pole tips of the pole pieces and the transducer winding placed on the core structure formed by the pole pieces.

I have found that in a transducer head of the type shown in Fig. 9, the width of the winding turns or the diameter of the coil constituting the transducer winding has an effect on the overall response of the recording system. In particular, I have found that the turns of the transducer windings which are near the pole tips and have a smaller width or diameter are more efficient in securing a high-frequency response, and that the turns which are farther away from the pole tips and have a greater width or diameter are highly efficient for securing a good low-frequency response. The turns of such windings may be combined into a single coil of conical shape so arranged on the individual pole pieces that the side of the coil having a smaller diameter is next to the pole-tip end facing the moving signal carrier.

In the arrangement of Fig. 9, the transducer windings associated with each pole piece are shown formed of a section 65 located near the pole tip of the pole piece and having turns of

small width or diameter and another section 66 located farther away from the pole tip and having turns of greater width or diameter, the winding section 65 being more efficient in the high-frequency range and the winding section 66 being more efficient in the low-frequency range. The winding section 65 of Fig. 9 corresponds to the main winding section 21—3 of Fig. 8 and the winding section 66 of Fig. 9 corresponds to the winding sections 21—4 of Fig. 8. The winding sections 65, 66 of the transducer head arrangement of Fig. 9 may be combined for reproducing and recording circuits in a manner analogous to the corresponding winding sections of Fig. 8.

It will be apparent to those skilled in the art that the novel principles of the invention disclosed herein in connection with specific exemplifications thereof will suggest various other modifications and applications of the same. It is accordingly desired that in construing the breadth of the appended claims they shall not be limited to the specific exemplifications of the invention described above.

I claim:

1. In a magnetic record transducing head for transducing magnetic records, such as recording or reproducing magnetic signals, by magnetic flux interlinkage with a relatively moving magnetic record track: magnetic core structure; transducer windings interlinked with the magnetic core structure and subjected to electric signals corresponding to the magnetic records; said core structure having two pole pieces of magnetic sheet material having exposed elongated surfaces constituting pole faces of opposite polarity held aligned longitudinally across a non-magnetic gap along one side of the record track so as to magnetically interlink said transducer windings with a portion of the record track bridging said gap; said transducer windings forming a coil structure having a generally central hollow coil space through which extend said two pole pieces; supporting means extending parallel to said pole pieces and attached thereto, to constitute therewith an elongated unitary assembly, said assembly having a cross-section less than the cross-section of said hollow coil space, and having free ends, whereby said assembly may be positioned in said hollow coil space by passing one of said free ends therethrough.

2. In a magnetic record transducing head for transducing magnetic records, such as recording or reproducing magnetic signals, by magnetic flux interlinkage with a relatively moving magnetic record track; magnetic core structure; transducer windings interlinked with the magnetic core structure and subjected to electric signals corresponding to the magnetic records; said core structure having two pole pieces of magnetic sheet material having exposed elongated surfaces constituting pole faces of opposite polarity held aligned longitudinally across a non-magnetic gap along one side of the record track so as to magnetically interlink said transducer windings with a portion of the record track bridging said gap; said transducer windings forming a coil structure having a generally central hollow space through which the pole piece portions bordering said gap and the portion of the record track bridging said gap extend; supporting means having a length at least equal to the combined lengths of the pole pieces attached to the said pole pieces to constitute therewith a unitary elongated member, said elongated member having a cross sectional area of smaller magnitude than

the cross sectional magnitude of said hollow coil space, and having free ends, whereby said member can be positioned in said coil space by passing one end therethrough, and supported in position in said coil space by said free ends.

3. In a magnetic record transducing head for transducing magnetic records, such as recording or reproducing magnetic signals, by magnetic flux interlinkage with a relatively moving magnetic record track: magnetic core material; transducer windings interlinked with the magnetic core structure and subjected to electric signals corresponding to the magnetic records; said core structure having two pole pieces of magnetic sheet material having exposed elongated surfaces constituting pole faces of opposite polarity held aligned longitudinally across a non-magnetic gap along one side of the record track so as to magnetically interlink said transducer windings with a portion of the record track bridging said gap, said transducer windings forming a coil structure having a generally central hollow coil space through which the pole piece portions bordering said gap and the portion of the record track bridging said gap extend; supporting means for said pole pieces comprising at least one elongated stiff member affixed to said pole pieces, said supporting means and said pole pieces constituting an elongated unitary member having free ends and having a cross section not exceeding that of the hollow coil space, whereby said member is adapted for insertion in operative relation with said coil by the insertion of one free end therethrough, and holding means adjacent at least one of said free ends for detachably engaging and holding said pole pieces in operative position relative to the moving record track.

4. In a magnetic record transducing head for transducing magnetic records, such as recording or reproducing magnetic signals, by magnetic flux interlinkage with a relatively moving magnetic record track: magnetic core structure; transducer windings interlinked with the magnetic core structure and subjected to electric signals corresponding to the magnetic records; said core structure having two pole pieces of magnetic sheet material having exposed elongated surfaces constituting pole faces of opposite polarity held aligned longitudinally across a non-magnetic gap along one side of the record track so as to magnetically interlink said transducer windings with a portion of the record track bridging said gap; said transducer windings forming a coil structure having a generally central hollow coil space through which the pole piece portions bordering said gap and the portion of the record track bridging said gap extend; the overall width of the pole faces being of the order of the width of the record track; a guide structure of non-magnetic material comprising an exposed outwardly opening elongated channel structure having at its bottom an elongated channel track of a width of the order of the record track and arranged to positively engage and guide a substantial length of the record track past said pole faces and two lateral guide wall portions having outwardly divergent guide surfaces extending from the opposite sides of the channel track for bringing a tensioned record track biased toward said channel structure into supporting engagement with the deepest region of the channel track; supporting means for said pole pieces comprising at least one stiff elongated member having a length at least equal to the combined lengths of said pole pieces in aligned position, and attached to said

pole pieces to constitute therewith a unitary assembly having a central portion and two free ends, and having a cross-section not exceeding the cross-section of the hollow coil space whereby the assembly may be cooperatively engaged with or disengaged from the coil by the passing therethrough of one of said free ends.

5. In a magnetic record transducing head for transducing magnetic records, such as recording or reproducing magnetic signals, by magnetic flux interlinkage with a relatively moving magnetic record track: magnetic core structure; transducer windings interlinked with the magnetic core structure and subjected to electric signals corresponding to the magnetic records; said core structure having two pole pieces of magnetic sheet material having exposed elongated surfaces constituting pole faces of opposite polarity held aligned longitudinally across a non-magnetic gap along one side of the record track so as to magnetically interlink said transducer windings with a portion of the record track bridging said gap; said transducer windings forming a coil structure having a generally central hollow coil space through which the pole piece portions bordering said gap and the portion of the record track bridging said gap extend; the overall width of the pole faces being of the order of the width of the record track; a supporting structure for holding said coil structure and said core structure in their operative relation relatively to the moving record track; said supporting structure including at least one detachable stiff mounting member having a length at least equal to the length of said pole pieces in aligned position, and being attached to said pole pieces to constitute therewith a unitary assembly having a cross-section of less magnitude than the cross-section of the hollow coil space, and having free ends, whereby said assembly is cooperatively engaged with said coil by the insertion therethrough of one free end, and whereby said assembly may be mounted on or removed from the remainder of said supporting structure; said supporting structure including a guide structure of non-magnetic material comprising an exposed outwardly opening elongated channel structure having at its bottom an elongated channel track of a width of the order of the record track and arranged to positively engage and guide a substantial length of the record track and two lateral guide wall portions having outwardly divergent guide surfaces extending from the opposite sides of the channel track for bringing a tensioned record track biased toward said channel structure into supporting engagement with the deepest region of the channel track; said pole faces being exposed along an intermediate portion of said elongated channel track so that two channel track portions extending on both sides of the aligned pole faces constitute two elongated supports for substantial lengths of the record track moving towards and away from the pole faces.

6. In a magnetic record transducing head for transducing magnetic records, such as recording or reproducing magnetic signals, by magnetic flux interlinkage with a relatively moving magnetic record track: magnetic core structure; transducer windings interlinked with the magnetic core structure and subjected to electric signals corresponding to the magnetic records; said core structure having two pole pieces of magnetic sheet material having exposed elongated surfaces constituting pole faces of opposite polarity held aligned longitudinally across a non-mag-

netic gap along one side of the record track so as to magnetically interlink said transducer windings with a portion of the record track bridging said gap; said transducer windings forming a coil structure having a generally central hollow coil space through which the pole piece portions bordering said gap and the portion of the record track bridging said gap extend; a supporting structure for holding said coil structure and said core structure in their operative relation relatively to the moving record track; said supporting structure having a first pair of aligning means and including at least one detachable stiff mounting member having a second pair of aligning means adapted to cooperate with said first aligning means, said two pole pieces being affixed to said mounting member to constitute therewith a unitary elongated pole piece assembly having free ends, and said assembly having a cross-section not exceeding the cross-section of said hollow coil space whereby said assembly is arranged to be engaged with or removed from the remainder of said supporting structure and said coil without disturbing the cooperative relationship of the pole pieces.

7. In a magnetic record transducing head for transducing magnetic records, such as recording or reproducing magnetic signals, by magnetic flux interlinkage with a relatively moving magnetic record track: magnetic core structure; transducer windings interlinked with the magnetic core structure and subjected to electric signals corresponding to the magnetic records; said core structure having two pole pieces each a single magnetic sheet element having exposed elongated surfaces constituting pole faces of opposite polarity held aligned longitudinally across a non-magnetic gap along one side of the record track so as to magnetically interlink said transducer windings with a portion of the record track bridging said gap; said transducer windings forming a coil structure having a generally central hollow coil space through which the pole piece portions bordering said gap and the portion of the record track bridging said gap extend; the overall width of the pole faces being of the order of the width of the record track; a supporting structure for holding said coil structure and said core structure in their operative relation relatively to the moving record track; said supporting structure including at least one detachable stiff mounting member; said two pole pieces being affixed to said mounting member and constituting therewith an assembly, having a cross-section not exceeding the cross-section of the coil, and having at least one free end for insertion through said coil, and for detachable engagement with the remainder of said supporting structure; a guide structure of non-magnetic material comprising an exposed outwardly opening elongated channel structure having at its bottom an elongated channel track of a width of the order of the record track and arranged to positively engage and guide a substantial length of the record track and two lateral guide wall portions having outwardly divergent guide surfaces extending from the opposite sides of the channel track for bringing a tensioned record track biased toward said channel structure into supporting engagement with the deepest region of the channel track; said pole faces being exposed along an intermediate

portion of said elongated channel track so that two channel track portions extending on both sides of the aligned pole faces constitute two elongated supports for substantial lengths of the record track moving towards and away from the pole faces.

8. In an electromagnetic transducer head for recording signals on a magnetizable record track, or for reproducing magnetic signals therefrom: transducer windings and a magnetic core structure interlinked with the transducer windings and including pole-piece portions of magnetic material having pole-face portions separated by a non-magnetic gap and arranged to magnetically interlink said transducer windings with an element of the carrier track moving along said pole-face portions and bridging said gap; said transducer windings including at least one winding section located immediately adjacent the region of said gap and at least one additional winding section spaced from the region of the gap; and signal reproducing means for reproducing the signals recorded on said carrier track including high-pass filter means interconnected with said one winding section for passing to said reproducing means a predetermined high-frequency band of signals induced in said one winding section and low-pass filter means interconnected with said additional winding section for passing to said reproducing means a predetermined low-frequency band of signals induced in said additional winding section.

9. In an electromagnetic transducer head for recording signals on a magnetizable record track, or for reproducing magnetic signals therefrom: transducer windings and a magnetic core structure interlinked with the transducer windings and including pole-piece portions of magnetic material having pole-face portions separated by a non-magnetic gap and arranged to magnetically interlink said transducer windings with an element of the carrier track moving along said pole-face portions and bridging said gap; said transducer windings including at least one winding section located immediately adjacent the region of said gap and at least one additional winding section spaced from the region of the gap, the winding turns of said one winding section being of smaller width than the winding turns of said additional winding section; and signal reproducing means for reproducing the signals recorded on said carrier track including high-pass filter means interconnected with said one winding section for passing to said reproducing means a predetermined high-frequency band of signals induced in said one winding section and low-pass filter means interconnected with said additional winding section for passing to said reproducing means a predetermined low-frequency band of signals induced in said additional winding section.

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REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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