SOUND TALK

FROM THE MAKERS OF "SCOTCH" BRAND MAGNETIC TAPE

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THE USE OF HIGH FREQUENCY BIAS IN MAGNETIC RECORDING

Every magnetic medium is essentially a very non linear medium. The solid curve in Figure 1 demonstrates this characteristic. The magnetization resulting from a given magnetizing field (such as produced by a recording signal) is not directly proportional to the original signal. This characteristic, if not corrected would result in very bad distortion of the recorded material. The corrective means now almost universally used is the use of what is called high frequency "bias". This is a high frequency (above the audible range, usually 30 to 80 KC/sec) current added to the audio current which is to be recorded. When this is done, the recorded audio magnetization may then be nearly linear to the audio signal as shown by the dotted curve of the figure. By the use of this bias current the output for weak signals is very greatly increased, and the distortion of the recording for all but saturating signals is decreased to a very acceptable value. So far as distortion is concerned, the frequency of the bias current is not critical, but it should preferably be at least five times the frequency of the highest audio signal recorded. This is primarily to prevent the appearance of unwanted notes arising from beats between the bias frequency and harmonics of the audio frequency. The amount of bias current is chosen by tests of distortion at various frequencies and recording levels, including measurements like those shown in the curves describing tape characteristics.

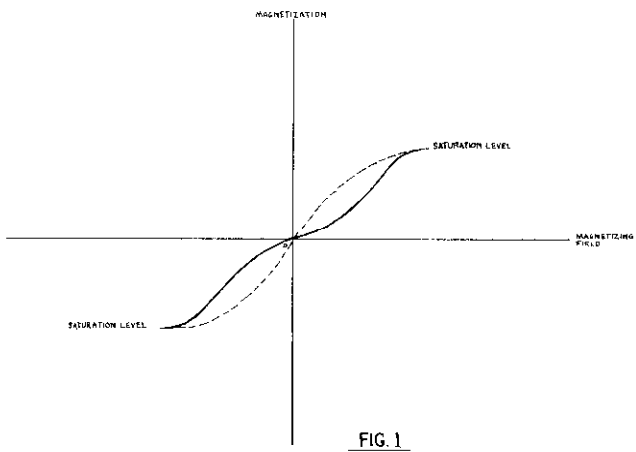

FIG. 1

(Bulletin continued on next page)

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THE USE OF HIGH FREQUENCY CURRENTS IN ERASURE

One outstanding feature of magnetic recording tape is that after having been recorded, the recording may be "erased" and the tape reused an unlimited number of times. This may be done by magnetizing the medium tosaturation with a very strong field by a direct current or a strong permanent magnet. This is not a very satisfactory method because such a direct field, while it obliterates the previously recorded signal, leaves the tape strongly magnetized. This will cause a large amount of noise and considerable distortion in the next recording. A better system is to demagnetize the tape by the use of an alternating field which drives the medium to saturation alternately in both directions and then gradually reduces in the course of many alternations to zero. In order to achieve many alternations in a small gap length and so that any residual fields will not cause an audible note, the frequency of the erasing current is usually from 30 to 80 KC/ sec. This erase current may be supplied by the same oscillator which supplies the bias current. In order that erasure may achieve fairly complete demagnetization the head must be free of permanent magnetization, there should be no D.C. fields in the vicinity (as from magnetized steel parts, meter movements, etc.), and the waveform of the erase current must not be asymmetrical (no D. C. component and equal positive and negative peaks).