

TALK

SOUND

FROM THE MAKERS OF "SCOTCH" BRAND MAGNETIC TAPE

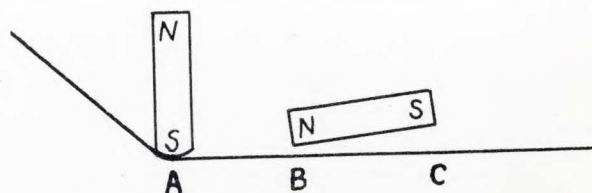
Bulletin No. 7

ERASURE BY PERMANENT MAGNETS

It is well known that in erasure of magnetic tape a satisfactory device is the usual type of erase head which employs high frequency alternating current. This type of head, when well designed, not magnetized, and operated from a good source high frequency A. C., will not only obliterate any previous recording on a tape but will leave the tape in a demagnetized condition. This demagnetization of the tape is important in keeping noise and distortion down to low values.

While this type of head is very fine from a magnetic point of view, there are practical considerations which make erasure by permanent magnets attractive, such as economy, dependability, freedom from servicing, etc. By using permanent magnets, one very easily accomplishes the obliteration of previous recordings, but it is not so easy to avoid leaving the tape magnetized in one direction. Since a single pole of a magnet will leave the tape fully magnetized to saturation, this type of erase will result in very high noise levels and serious even order harmonic distortion. (See Technical Bulletin #3).

To minimize this effect more than one permanent magnetic pole may be used so that the tape is left in a nearly demagnetized condition. A very large number of poles of successively opposite polarity and gradually decreasing strength is, of course,



equivalent to an AC erase, but a practical design may involve the use of a small number of poles as an approximation. One head in common use, the type in the Brush "Soundmirror", and the Wilcox Gay "Recordio" uses two magnets arranged to give essentially a three pulse erasure.

Successively opposite field maxima are experienced by the tape at points A, B, and C. At A the tape contacts the magnet and experiences a saturating field which obliterates previous recordings. The function of the fields at B. and C. is to leave the tape in such a condition that it is essentially

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demagnetized. To do this the fields must be of the correct strength. This is accomplished by adjusting the distance between the tape and the poles at B and C to the correct separation to give the best values of field.

In these machines, this spacing between tape and magnet is dependent upon the tape's path of travel being absolutely unvarying. In practice slight variations in tension of the tape, wobbling of the reels, etc., may cause the path to vary slightly. Under these conditions, performance may be improved by insuring that the tape to magnet spacings at B and C remain fixed at the best values. One good way to do this is to use non-magnetic shims attached to the magnet and then allow the tape to bear positively against these shims. Such shims can be

made of brass, paper, or any other non-magnetic material, including "SCOTCH" Tape. Whether or not "SCOTCH" Tape is used permanently it makes an excellent tool in finding the best shim thicknesses. A number of layers may be fixed at B and at C until the noise as heard in playback is a minimum. The tape may then be replaced with a more permanent shim of the same thickness if desired.

In one head it was found that a separation of about .003 inch (one layer of "SCOTCH" Tape) at B and about .028 inch at C gave the minimum of noise. These dimensions are probably fair for other heads, but with differences from magnet to magnet an individual head should be tested with the tape to be used to determine the spacings for best results.