$$K = (K_0 + 3\lambda_s\sigma/2)^{1/2}$$

where K_0 is the anisotropy constant, λ_s the saturation magnetostriction, and σ the tension.

In (4):

$$A = k\theta/a.$$

k is Boltzman's constant, θ the Curie temperature, and a the interatomic distance.

The term β can be expressed in terms of the domain wall thickness δ which is given by Bozorth[20] for a 180° wall parallel to a (100) plane in a material of the iron type as

$$\delta = 12(A/K)^{1/2}. \tag{6}$$

From (2) through (6), the distance of the wall motion d in terms of the wall thickness is obtained as

$$d/\delta = \frac{I_s\gamma^{*2}}{12\Lambda}\int_0^t (H - H_0)dt. \tag{7}$$

For a half sine-wave pulse of width τ and peak height H_p, (7) becomes

$$d/\delta = \frac{I_s\gamma^{*2}}{12\Lambda}\,\tau\left(\frac{2}{\pi}H_p - H_0\right). \tag{8}$$

γ is a constant independent of the material equal to $1.76 \cdot 10^7$. The value of Λ can be assumed to be close to the corresponding value for Supermalloy which can be deduced from the width of the ferromagnetic resonance line for that material as equal to approximately 200 mc.

For Molybdenum Permalloy $Hc \sim 0.07$ oersted and $I_s = 690$ emu. Table I shows the peak field for nondestructive read-out as $H_p = 0.63$ oersted for a 0.1-μsec half sine-wave pulse. Substituting these figures in (7) gives $d/\delta \sim 2.9$.

Appendix II

McColl[21] has shown that the effect of eddy currents in delaying the change in flux in an infinite sheet resulting from a stepwise change of applied field is

$$\frac{B(t)}{\mu H} = 1 - \frac{8}{\pi^2}\sum_{n=1}^{\infty}\frac{\sin^2(n\pi/2)}{n^2}e^{-n^2t/\tau}$$

or in series form

$$\frac{B(t)}{\mu H} = 1 - \frac{8}{\pi^2}\left(e^{-t/\tau} + \frac{1}{9}e^{-9t/\tau}\cdots\right), \tag{9}$$

where

$$\tau = \frac{4\sigma\mu d^2}{\pi},$$

d is the thickness of the sheet, σ the conductivity, and μ is the permeability which is assumed constant.

In the case under consideration here, the movement of domain walls makes a minor contribution to the magnetization change compared to the spin rotation. The relevant value of the permeability to be used in (9) is that for spin rotation rather than wall movement, *i.e.*, approximately 4000 emu. The resistivity of Molybdenum Permalloy is 55 micro ohm-cm and this gives the time constant of $\frac{1}{8}$-mil Molybdenum Permalloy as $\tau \sim 10$ mμsec.

This indicates that any eddy currents induced at the start of a 100-mμsec pulse will have decayed long before the end of the pulse, and therefore, will not contribute appreciably to the reset of the magnetization which occurs in the case of nondestructive read-out.

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[21] *Ibid.*, p. 784.

Correction

C. G. Peattie and J. R. Macdonald, authors of the Correspondence item, "Prediction of Semiconductor Surface Response to Ambients by Use of Lewis Acid-Base Theory," which appeared on page 1292 of the September, 1957 issue of these Proceedings, would like to point out that the last sentence of the second paragraph should read:

"The extent to which these mechanisms are obscured by the onset of ionic-like surface currents has yet to be determined."

As printed, "are observed" was used instead of the correct verb "are obscured."