

PATENT SPECIFICATION

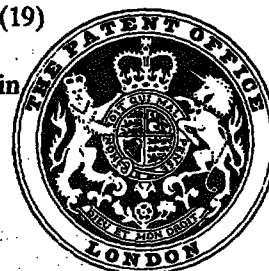
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(54) A DEGAUSSING DEVICE FOR MAGNETIC RECORDING HEADS

(71) We, TDK ELECTRONICS CO. LTD., a company organised and existing under the laws of Japan, 13-1 Nihonbashi, 1-chome, chuo-ku, Tokyo 103, Japan. Formerly of 14-6, Uchikanda 2-chome, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:-

This invention relates to electromagnets for degaussing, or rendering de-magnetised, record producing heads in machines such as tape recorders. This invention further relates to a degaussing device comprising an electromagnet as aforementioned together with a capacitor charging circuit therefor.

The record producing head of a tape recorder generally has a propensity for picking up magnetism, that is, becoming magnetised in the course of its service, so that its record producing characteristic deteriorates gradually on account of the unwanted magnetism growing in the head. In order to avoid this deterioration it is necessary to periodically degauss the head. Such degaussing is conventionally accomplished by using a head-degaussing electromagnet. In one method, the electromagnet is energised to generate a constant alternating magnetic field. This electromagnet is first located close to the head face, that is, the surface which is in sliding contact with the magnetic tape, and is then moved away from said face. In another method, the electromagnet is permanently located close to the head face; it is first energised fully to produce a strong alternating magnetic field and is gradually de-energised to atrophy its magnetic field to zero. These methods however, are accompanied by drawbacks on account of the fact that in the tape recorder and similar devices, a tape guide for guiding a running tape in the given path or track of sliding movement

along the head face is located in the vicinity of the head. The position of the guide relative to the head is necessarily such that it impedes the degaussing action if the yoke of the electromagnet is sized wider than the tape. On the other hand, if its yoke is sized narrower than the tape, the ends of the track part of the head face receive an inadequate degaussing action.

According to the first aspect of the invention there is provided a degaussing electromagnet for head demagnetisation in a recording machine accepting magnetic tape of a standard width, comprising a yoke having a gap and a coil or coils wound thereon said yoke having an electromagnetic face for presentation to the head of the recording machine and said gap being at the middle of said electromagnetic face, a middle portion of the electromagnet face adjacent to said gap being wider than the width of said standard magnetic tape and the side portions of said yoke face spaced from said gap being narrower than the tape.

In one embodiment the degaussing electromagnet is formed on a frame adapted for use with a reel-to-reel tape recorder so as to be capable of positioning adjacent the recording head thereof. In a second embodiment, the degaussing electromagnet is housed in a cassette for use in degaussing the recording head of a cassette recorder, the cassette including rails to guide the electromagnet with flanges on a frame of the electromagnet carrying the coil or coils, wherein the cassette has an aperture to receive the recording head of a cassette recorder and the degaussing electromagnet is guided in use, into resilient contact therewith.

A further aspect of this invention concerns a degaussing device comprising a degaussing electromagnet as aforementioned together with a capacitor charging circuit therefor.

A capacitor charging circuit for a degaus-

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5 sing electromagnet utilizes the electrical transient phenomena that occurs when a charged capacitor is discharged. In such circuits a reasonably high charging voltage is desired in order to secure a charge sufficiently large for driving the load, because the charge that the capacitor can hold is determined by the product of its capacitance and the voltage applied across it. Where a battery of cells is employed as the source of energy, stepping up of voltage is necessary for the voltage available from the battery terminals is generally not high enough for the purpose. A provision must be made, moreover, in order to stabilize the capacitor charge because the charging voltage necessarily changes as the battery in service progressively approaches the run-down condition. Even where energy is supplied from some other low-voltage source than a battery and is used by stepping up its voltage, the voltage stabilising provision is desirable.

25 These desirabilities are what this invention intends to satisfy by providing a capacitor charging circuit for stepping up such a supply voltage as is available from a battery or the like and for charging the capacitor in such a way that it will be charged to a constant level i.e., it will be made to hold the same amount of charge every time it is charged.

30 According to a second aspect of the invention there is provided a degaussing device for degaussing a record reproducing head in machines such as tape recorders, comprising an electromagnet as defined above together with a capacitor charging circuit wherein the degaussing electromagnet is arranged to be driven by the capacitor charging circuit for producing an alternating magnetic field, and the capacitor charging circuit is arranged to produce an alternating magnetic field which gradually decreases in intensity, said circuit comprising a switching circuit and a DC-DC converter for stepping up the voltage of the power supply source to charge a capacitor with the stepped up voltage, said DC-DC converter and switching circuit being so arranged that, when a predetermined level is reached by the output of the DC-DC converter by the voltage across said capacitor, the capacitor is electrically disconnected from the DC-DC converter and connected to the degaussing electromagnet by the switching circuit. Preferably said switching comprises a first switching element for on-off control over the connection between said DC-DC converter and capacitor and also a voltage detecting element responding to the voltage across said capacitor and, when said voltage reaches the pre-determined level, operating to turn off said first switching element. Alternatively, said switching circuit comprises a first switching element for on-off control over the connection between said DC-DC converter and capacitor and also a

voltage detecting element responding to the output of the DC-DC converter and, when said output reaches the predetermined level, operating to turn off said first switching element. In either case, said voltage detecting elements preferably responds to the voltage across said capacitor and operating upon the rise of voltage to said predetermined level, a flip-flop for controlling said first switching element, a light emitting element turned on and off by said flip flop and a second switching element turned on and off by said flip-flop, all being so connected and arranged that, as the predetermined level of voltage is reached, the voltage detecting element operates to set the flip-flop, thereby turning off and keeping in turned-off condition the first switching element to decrease the output of DC-DC converter and, at the same time, turning on the second switching element to supply the charge held by the capacitor to the load.

Embodiments of the invention will now be described by way of example only, with reference to the accompanying drawings in which:-

Figure 1 shows a degaussing electromagnet in perspective view;

Figure 2 shows a horizontal section taken through the embodiment of Figure 1;

Figure 3 shows a modification of the embodiment shown in Figure 1;

Figure 4 shows diagrammatically a first capacitor charging circuit for a degaussing device including a degaussing electromagnet shown in one of the above Figures;

Figures 5A to 5D show curves and waveforms illustrating the operation of the circuit of Figure 4;

Figure 6 shows diagrammatically a second capacitor charging circuit similar to Figure 4; and

Figure 7A to 7D show curves and waveforms illustrating the operation of the circuit of Figure 6.

In Figures 1 and 2, showing a degaussing electromagnet in perspective view and in a section taken through a mid-point thereof. Yoke 1 is made of such a magnetic material as ferrite and comprises core segments 1A, 1B, 1C and 2. Segment 1A is in a shape of letter "C" having two legs. Segments 1B and 1C form extension of these legs by being attached in firm face to face contact thereto. Between segments 1B and 1C are interposed segments 2 in opposed relation and presenting an air gap 3. Consequently, these segments present an electromagnetic face formed by segments 1B, 1C and 2 with an air gap 3 at its middle. Now consider the width of this face. Width A at segments 2 is greater than the width of standard magnetic tape, that is, the length of gap 11 provided in the face of recorded reproducing head 10 to be degaussed. Width B of the face at the ends of

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segments 1B and 1C spaced from gap 3 is dimensioned to be slightly narrower than magnetic tape. Coils 6 and 7 are wound on frame 5 and mounted on Yoke 1 according to the conventional electromagnet construction. A shock absorbing facing 8 made of a plastic or the like material covers the electromagnet face presented by segments 1B, 1C and 2.

In the above example, the face width at legs 4 is narrower than the tape so that tape guide 12 with its tape guiding recess does not prevent the electromagnet from being positioned near to record reproducing head 10 and thus allows the head face to experience full degaussing action. In other words, the wider than tape width of the electromagnet face at segments 2, directly opposite the active gap of head 10, subjects the entire sliding face of head 10 to strong degaussing action. The feature of the narrow face portions at ends 4 fitting into the recess 12a of tape guide 12 avoids the prior art problem that the tape guide 12 prevented the electromagnet from entering a normal degaussing position with respect to record reproduce head 10. When the electromagnet is brought against head 10 for degaussing operation, shock absorbing facing 8 prevents yoke 1 from coming into direct contact with the gapped sliding face of head 10 and thus protects this critical face from the deteriorating effect of two hard faces colliding with each other.

In the second embodiment of this invention shown in Figure 3, the flanges, front and rear, of frame 5A have a straightly protruding lug 20 formed of each flange end. These lugs 20 identically shaped and sized, fit snugly into between top and bottom rails 23 formed of or provided in cassette case 21. Two rails 23 on each side of the degaussing electromagnet allow the electromagnet to freely move toward and away from record reproducing head 10 and hold the electromagnet in register with an aperture 22 formed of cassette case 21. The aperture 22 is adapted to receive record reproducing head 10. It is pointed out here that cassette case 21 is of conventional construction, being in two split halves; part of the top half is indicated by dot and dash lines and the arrows indicate the directions in which the electromagnet and said top half are to be moved in assembling a degaussing electromagnet containing cassette case. All other features of the degaussing electromagnet are substantially the same as those of the first embodiment described in reference to Figures 1 and 2.

Since the second embodiment provides a degaussing electromagnet which is slidable back and forth with respect to the record reproducing head and is mounted in cassette case 21, it provides the advantage of allowing

the electromagnet to be resiliently urged against the gapped face of head 10 to be degaussed. With this advantage coupled to those advantages possessed by the first embodiment, the second embodiment serves as a simple and easy to use means of degaussing the record reproducing head in the cassette case tape recorder.

In the two embodiments described, shock absorbing facing 8 is shown as attached to the face of yoke 1 but instead of this facing, the same face may be coated with such as a synthetic resin so that the coating will act as a shock-absorbing overlay.

It will be seen from the foregoing description that there is provided an electromagnet capable of positively and reliably degaussing the record reproducing head in the existing tape recording machine because, according to this invention, the width of the middle face of yoke 1 is dimensioned wider and the width of the end portions of the same face is sized narrower than the magnetic tape. It should be appreciated, by those familiar with production of recording tape for reel to reel and cassette use, that the widths of these magnetic recording tapes has been standardized and that references herein to tape width and the dimensions of portions of the electromagnetic face of the degaussing electromagnet present no difficulty.

Next, referring to Figure 4 there is shown a capacitor charging circuit for driving the degaussing electromagnet of Figures 1 and 2 or Figure 3 above described. In this circuit a battery 1 as the power source is connected through switch 1 to DC-DC converter 3. Converter 3 comprises a transistor oscillator circuit including transistor Q1. Output of this oscillator is rectified by diode D1 and smoothened by capacitor C1. As a stepped up voltage, this output applied to switching circuit 4, in which transistor Q2 passes the stepped up and smoothened output of said DC-DC converter 3 to power capacitor C2. In circuit 4, constant voltage diode D2 drives transistor Q3 into conductive state when the voltage at the emitter side of Q2 rises to and above its breakdown level. By so switching on, Q3 drives down the base of Q2 to switch off this transistor: Q3 controls the base current of transistor Q2. It will be seen that Q2, Q3 and D2 constitute a constant voltage circuit of series controlled type, whose load is capacitor C2. To the collector side of transistor Q2 is connected light emitting diode D3 and transistor Q4. Of this series circuit of D3 and Q4, transistor Q4 forms a positive feedback loop with transistor Q3 mentioned above. In other words Q3 and Q4 provide a flip flop, whose outputs from their collectors control transistors Q5 and Q6, switching these transistors on and off respectively.

Degaussing oscillator circuit 5, driven by the charge of capacitor C2 through transistor

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Q5 is connected to this capacitor. Circuit 5 comprises capacitor coupled multivibrator consisting mainly of transistors Q7 and Q8, to which the winding of degaussing electromagnet M acts as the load. In operation degaussing electromagnet M is positioned close to the magnet record reproducing head as mentioned with reference to Figure 1, and then energised to degauss the head.

In the capacitor charging circuit constructed and arranged in Figure 4, closing switch 2 applies voltage to capacitor C2 but, at this stage, the voltage across the capacitor is low and, consequently, constant voltage diode D2 is in non-conductive state. Similarly, transistors Q3, Q4, Q5 and Q6 are off, so that light emitting diode D3 too is off. Under this condition, degaussing oscillator circuit 5 is electrically disconnected from C2, and DC-DC converter 3 is in maximum output condition. It should be noted that, immediately after closing switch 2, the terminal voltage of battery 1 gets stepped up by converter 3 in the above mentioned condition and applies to C2 through normally biased transistor Q2. As a result, the voltage across this capacitor starts rising in the manner represented by dot line curve A in graph (A) Figure 5. As this rising voltage reaches a level equal to the sum of D2's Zener voltage and the rising voltage between base and emitter of transistor Q3, D2 starts conducting to bias transistor Q3 into its active region. By the negative feedback action of Q3, the emitter voltage of transistor Q2 is controlled and kept at a constant level. It is by this voltage that power capacitor C2 becomes charged. With C2 fully charged, DC-DC converter 3 is now in lightly loaded condition, so that its output voltage rises faster and higher than before in the manner illustrated by curve B of graph (A), Figure 5. When this rising output voltage of converter 3 reaches a level equal to the sum of end of charging voltage (set voltage of the constant voltage circuit), base to emitter voltages of Q2 and Q4 and rise voltage of light emitting diode D2, transistor Q4 switches on to bias Q3 further in normal direction. By this biasing, the collector current of Q3 increases to drive down the base of Q4: this is a positive feedback for Q4. Consequently, transistors Q3 and Q4 are instantly biased into saturated region and, under this condition Q2 remains switched off and Q5 remains switched on. With Q5 conductive, the charge stored in capacitor C2 flows into degaussing oscillator circuit 5, causing it to oscillate by consuming the supplied energy. The excitation current flowing through the winding of degaussing electromagnet 5 owing to this oscillation becomes exponentially dampened in time in the manner represented by the waveform of (B), Figure 5. The waveform of (B) tells that the alternating magnetic field produced by

degaussing electromagnet M is initially intense enough to overcome the magnetism existing in the magnetised head to which the electromagnet has been brought, and subsequently decays to oscillatingly reduce the magnetism to zero.

Light emitting diode D3 lights up just when transistor Q4 switches on. The moment of this switching on corresponds to the start of operation of oscillator circuit 5. At the same time, transistor Q6 becomes biased in normal direction to lower the output of DC-DC converter 3, whereby the voltage for keeping diode D3 lighted at a level suitable for this diode. Thus, the drain on battery 1 is greatly reduced, as shown by the curve of (D), Figure 5 after capacitor C2 is charged, thus minimizing the energy consumption for the battery. It must be pointed out here that, on closer analysis, light emitting diode D3 lights up exactly when the degaussing action commences and that, since this action is completed within several tenths of a second, the lighting up of D3 under one's own eyes may be interpreted as meaning the end of degaussing action. Opening switch 2 after this lighting rests all transistors to the original state. Instead of opening switch 2, the base of Q3 may be driven down to produce the same result, that is resetting all transistors. From the foregoing description of the first circuit, it will be seen that power capacitor C2 can be charged up to a certain constant voltage regardless of the change in terminal voltage of battery 1. Therefore, with the output of degaussing oscillator circuit 5, the electromagnet can be expected to produce a constant strength degaussing magnetic field at all times. It will be also seen that after charging power capacitor C2, the output of DC-DC converter 3 is lowered to economize the drain of energy from battery 1. As battery 1 becomes so run down that electromagnet M fails to degauss, light emitting diode D3 does not light up and this failure of diode D3 signifies the battery being in run down condition to require replacement.

Referring to Figure 6, in which a second circuit is shown, battery 1 is connected through switch 2 to DC-DC converter 3. The voltage stepped up by this converter is applied to power capacitor C2 through switching circuit 4A. It is by the charge of capacitor C2 that degaussing oscillator circuit 5 is driven. Converter 3 and oscillator circuit 5 here are similar to those already explained in reference to Figure 4, but switching circuit 4A is different in arrangement from the switching circuit of the first circuit. The differences are these: constant voltage diode D2 is connected to the collector side of transistor Q2 which conducts the output of DC-DC converter 3 to power capacitor C2, so that whether the collector side voltage of transistor Q2 has reached the

predetermined level is detected by diode D2. Transistors Q3 through Q6, inclusive, are connected as in Figure 4.

In the capacitor charging circuit arranged as shown in Figure 4, closing switch 2 applies the terminal voltage of battery 1 to DC-DC converter 3 in maximum output condition, and this voltage is stepped up in the converter and then applies to power capacitor C2 through normally biased transistor Q2. Consequently, the voltage across C2 rises in the manner illustrated by dot line curve X of (A), Figure 7. As the output voltage of DC-DC converter 3 rises to a level equal to the sum of the Zener voltage of constant voltage diode D2 and the rising voltage between base and emitter of transistor Q3, this transistor becomes biased in normal direction through diode D2 and switches on. Since Q3 and Q4 are so connected as to constitute a positive feedback loop, these two transistors get instantly energised into the saturated region and, as a result Q2 switches off and Q5 and Q6 switch on, whereby the output of DC-DC converter 3 gets disconnected from capacitor C2 and then falls to a lower level. At the same time, the charge in capacitor C2 flows into degaussing oscillator circuit 5 to energise the winding of degaussing electromagnet M in the manner represented by the waveform of (B), Figure 7. On the other hand, light emitting diode D3 lights up when Q4 switches on: this sequence is illustrated by the waveform of (C), Figure 7. Since the output of converter 3 is controlled by Q6 as explained above, current I drawn from the battery is greatly minimized after capacitor C2 becomes fully charged.

It will be seen from the foregoing description of the second example that constant voltage diode D2 is made use of to detect the coming to the predetermined level, of the output voltage converter 3 and that, since the voltage drop of transistor Q2 is minimal during charging, it is possible to charge capacitor C2 up to a substantially constant voltage level. For this reason, the second circuit is capable of achieving the same end as the circuit of Figure 1.

WHAT WE CLAIM IS:-

1. A degaussing electromagnet for head demagnetisation in a recording machine accepting magnetic tape of a standard width, comprising a yoke having a gap and a coil or coils wound thereon, said yoke having an electromagnet face for presentation to the head of the recording machine and said gap being at the middle of said electromagnet face, a middle portion of the electromagnetic face adjacent to said gap being wider than the width of said standard magnetic tape and the side portions of said yoke face spaced from said gap being narrower than the tape.

2. A degaussing electromagnet as claimed in Claim 1, wherein the degaussing

electromagnet is housed in a cassette for use in degaussing the recording head of a cassette recorder, the cassette including rails to guide the electromagnet by engagement with flanges on a frame of the electromagnet carrying the coil or coils, wherein the cassette has an aperture to receive the recording head of a cassette recorder and the degaussing electromagnet is guided, in use, into resilient contact therewith.

3. A degaussing device for degaussing a record reproducing head in machines such as tape recorders, comprising an electromagnet as claimed in Claim 1 or Claim 2 together with a capacitor charging circuit, wherein the degaussing electromagnet is arranged to be driven by the capacitor charging circuit for producing an alternating magnetic field and the capacitor charging circuit is arranged to produce an alternating magnetic field which gradually decreases in intensity, said circuit comprising a switching circuit and a DC-DC converter for stepping up the voltage of the power supply source to charge a capacitor with the stepped up voltage, said DC-DC converter and switching circuit being arranged so that, when a predetermined level is reached by the output of the DC-DC converter by the voltage across said capacitor, the capacitor is electrically disconnected from the DC-DC converter and connected to the degaussing electromagnet by the switching circuit.

4. A degaussing device as claimed in Claim 3, wherein said switching circuit comprises a first switching element for on-off control over the connection between said DC-DC converter and capacitor and also a voltage detecting element responding to the voltage across said capacitor and, when said voltage reaches the predetermined level, operating to turn off said first switching element.

5. A degaussing device as claimed in Claim 3, wherein said switching circuit comprises a first switching element for on-off control over the connection between said DC-DC converter and capacitor and also a voltage detecting element responding to the output of the DC-DC converter and, when said output reaches the predetermined level, operating to turn off said first switching element.

6. A degaussing device as claimed in either Claim 4 or Claim 5, wherein said voltage detecting element operates upon the rise of voltage to said predetermined level and wherein there is provided a flip flop for controlling said first switching element, a light emitting element turned on and off by said flip flop and a second switching element turned on and off by said flip flop and a second switching element turned on and off by said flip flop, all being so connected and arranged that, as the predetermined level of



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predetermined level is detected by diode D2. Transistors Q3 through Q6, inclusive, are connected as in Figure 4.

In the capacitor charging circuit arranged as shown in Figure 4, closing switch 2 applies the terminal voltage of battery 1 to DC-DC converter 3 in maximum output condition, and this voltage is stepped up in the converter and then applies to power capacitor C2 through normally biased transistor Q2. Consequently, the voltage across C2 rises in the manner illustrated by dot line curve X of (A), Figure 7. As the output voltage of DC-DC converter 3 rises to a level equal to the sum of the Zener voltage of constant voltage diode D2 and the rising voltage between base and emitter of transistor Q3, this transistor becomes biased in normal direction through diode D2 and switches on. Since Q3 and Q4 are so connected as to constitute a positive feedback loop, these two transistors get instantly energised into the saturated region and, as a result Q2 switches off and Q5 and Q6 switch on, whereby the output of DC-DC converter 3 gets disconnected from capacitor C2 and then falls to a lower level. At the same time, the charge in capacitor C2 flows into degaussing oscillator circuit 5 to energise the winding of degaussing electromagnet M in the manner represented by the waveform of (B), Figure 7. On the other hand, light emitting diode D3 lights up when Q4 switches on: this sequence is illustrated by the waveform of (C), Figure 7. Since the output of converter 3 is controlled by Q6 as explained above, current I drawn from the battery is greatly minimized after capacitor C2 becomes fully charged.

It will be seen from the foregoing description of the second example that constant voltage diode D2 is made use of to detect the coming to the predetermined level, of the output voltage converter 3 and that, since the voltage drop of transistor Q2 is minimal during charging, it is possible to charge capacitor C2 up to a substantially constant voltage level. For this reason, the second circuit is capable of achieving the same end as the circuit of Figure 1.

WHAT WE CLAIM IS:-

1. A degaussing electromagnet for head demagnetisation in a recording machine accepting magnetic tape of a standard width, comprising a yoke having a gap and a coil or coils wound thereon, said yoke having an electromagnet face for presentation to the head of the recording machine and said gap being at the middle of said electromagnetic face, a middle portion of the electromagnetic face adjacent to said gap being wider than the width of said standard magnetic tape and the side portions of said yoke face spaced from said gap being narrower than the tape.

2. A degaussing electromagnet as claimed in Claim 1, wherein the degaussing

electromagnet is housed in a cassette for use in degaussing the recording head of a cassette recorder, the cassette including rails to guide the electromagnet by engagement with flanges on a frame of the electromagnet carrying the coil or coils, wherein the cassette has an aperture to receive the recording head of a cassette recorder and the degaussing electromagnet is guided, in use, into resilient contact therewith.

3. A degaussing device for degaussing a record reproducing head in machines such as tape recorders, comprising an electromagnet as claimed in Claim 1 or Claim 2 together with a capacitor charging circuit, wherein the degaussing electromagnet is arranged to be driven by the capacitor charging circuit for producing an alternating magnetic field and the capacitor charging circuit is arranged to produce an alternating magnetic field which gradually decreases in intensity, said circuit comprising a switching circuit and a DC-DC converter for stepping up the voltage of the power supply source to charge a capacitor with the stepped up voltage, said DC-DC converter and switching circuit being arranged so that, when a predetermined level is reached by the output of the DC-DC converter by the voltage across said capacitor, the capacitor is electrically disconnected from the DC-DC converter and connected to the degaussing electromagnet by the switching circuit.

4. A degaussing device as claimed in Claim 3, wherein said switching circuit comprises a first switching element for on-off control over the connection between said DC-DC converter and capacitor and also a voltage detecting element responding to the voltage across said capacitor and, when said voltage reaches the predetermined level, operating to turn off said first switching element.

5. A degaussing device as claimed in Claim 3, wherein said switching circuit comprises a first switching element for on-off control over the connection between said DC-DC converter and capacitor and also a voltage detecting element responding to the output of the DC-DC converter and, when said output reaches the predetermined level, operating to turn off said first switching element.

6. A degaussing device as claimed in either Claim 4 or Claim 5, wherein said voltage detecting element operates upon the rise of voltage to said predetermined level and wherein there is provided a flip flop for controlling said first switching element, a light emitting element turned on and off by said flip flop and a second switching element turned on and off by said flip flop and a second switching element turned on and off by said flip flop, all being so connected and arranged that, as the predetermined level of

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5 voltage is reached, the voltage detecting
element operates to set the flip flop, thereby
turning off and keeping in turned-off condi-
tion the first switching element to decrease
the output of the DC-DC converter and, at
the same time, turning on the second switch-
ing element to supply the charge held by the
capacitor to the load.

10 7. A degaussing electromagnet for use
with a recording machine accepting magnetic
tape of a standard width, arranged con-
structed and adapted to operate substantially
as hereinbefore described with reference to
Figures 1 and 2 or as modified in Figure 3 of
the accompanying drawings.

15 8. A degaussing device for degaussing a
record producing head in machines such as
tape recorders comprising a degaussing elec-
tromagnetic as claimed in Claim 6 and a
capacitor charging circuit arranged, con-
structed and adapted to operate substantially
as hereinbefore described with reference to
Figures 4 and 5 or Figures 6 and 7 of the
accompanying drawings.

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