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A DEVICE FOR CHARGING A CHARGING CAPACITOR

This invention relates to a device for charging a charging capacitor, comprising a transformer fed by an a.c. source and a rectifier.

In known devices of this kind, the a.c. source and the transformer must deliver the full charging energy in one step after each discharge of the charging capacitor. This is especially disadvantageous when the a.c. source is an oscillator fed from a low

voltage d.c. source, and the energy of the charged charging capacitor is used to operate a flash bulb. When the device is used for charging an accumulator a complicated regulating means is necessary to
5 regulate the charging current for the accumulator.

The object of the invention is to provide a device of the kind aforesaid, whereby energy loss in the transformer is minimized, costly regulating means are avoided, and in the case of operating a flash bulb, also
10 the energy loss in the oscillator is minimized and the flash frequency is adjustable within a comparatively large range.

According to the invention there is provided a device for charging a charging capacitor, comprising
15 a transformer fed by an a.c. source, a rectifier and at least one auxiliary capacitor via which the charging capacitor can be buffer-charged dependent on the capacity of the auxiliary capacitor or capacitors.

Buffer-charging is somewhat similar to the operation
20 of a diode pump, but the auxiliary capacitor(s) of a diode pump will always operate with alternating current, while the auxiliary capacitor(s) of a buffer-charging circuit will operate with a direct current component, due to the fact that the auxiliary capacitor(s) are directly coupled in
25 series with the charging capacitor.

In charging of an accumulator with the device of the invention it is possible to regulate the charging by change of the capacity or the number of the auxiliary capacitor(s).

A preferred embodiment of the invention will now be
30 described with reference to the accompanying drawing which is a circuit diagram.

The device according to the drawing comprises an oscillator 1, e.g. a multivibrator or Schmitt triggers, for instance of the type 4093, with an input for on and off switching of the oscillator by means of a daylight switch, which may be a light sensitive resistor, or by means of a magnetically operated switch, and an adjustable potentiometer connected over the terminals of the feed voltage source, input for start and stop of the oscillator 1 for each flash by means of the voltage across a charging capacitor 5, and an output for a start-signal to thyristor 7 for ignition of a flash light source 6.

The transistor 2 is controlled by the oscillator 1 and drives the primary winding of the transformer 3, the secondary winding of which via diodes and auxiliary capacitor or capacitors 4 charges the charging capacitor 5 which in this way only receives the energy which the auxiliary capacity is capable of. The charging continues until the charging capacitor 5 is charged to the set voltage, at which the oscillator 1 and the transistor 2 are stopped and the thyristor receives the signal for ignition of the light source 6.

As the auxiliary capacitor 4 charges the charging capacitor 5 with a determined energy quantum for each charging impulse, the charging of the

charging capacitor will be dependent of the oscillator frequency and the capacity of the auxiliary capacitor. This means that the flash frequency may be varied within a great range. Further variation of the flash frequency may be obtained by blocking the oscillator 1 by means of a resistor 10 a desired time after the discharge. These regulation possibilities involve that the intervals between the flashes may be varied in such a way that a programmed pattern, socalled flash characteristic may easily be obtained.

As the auxiliary capacitor or capacitors 4 are the limiting factor for the energy quantum the charging capacitor 5 receives in each charge impulse, the transistor 2 may be dimensioned for substantially lower power than known devices, and the transformer 3 can be given correspondingly small dimensions by means of a closed core and thereby have a minimal loss.

Parallel to the charging capacitor 5 and the light source 6 is a series connection containing a capacitor and the primary winding of a second transformer 8, the secondary winding of which when the thyristor 7 is ignited, delivers a high ionising voltage to the ionizing electrode

in the glow lamp, flash bulb 6, etc.

Further, the charging capacitor is connected in parallel with a voltage divider 12, 13 which, together with the number and capacity of the auxiliary capacitors, determine the change of the flash intensity by means 14. This makes identification encoding possible in that the flash characteristic is changed by changing the flash interval and intensity.

Both programming and on-off function may be effected by means of magnetically operated switches operated from outside the housing, so that the device is completely water tight and pressure safe.

The lower part of the device beneath the light source serves as a fastening haft and container for an accumulator or primary batteries, whereby the device easily may be maintained in upright position if it is used as a floating marker. The charging input terminals 11 which are used also for automatic start of the oscillator if the flashing device falls into the sea, are placed so that one terminal is external on the side of the haft, and the other terminal is placed in the centre of the lower end of the haft. The haft is used for charging of the interval accumulator in that the haft is placed in a fitted opening in a charging apparatus which is also used for storing the device.

The device suitable for maritime use may be enclosed in an at least partly translucent housing; and the oscillator preferably operates at a high frequency compared with the flash frequency, for instance at 5 40 kHz.



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CLAIMS

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1. A device for charging a charging capacitor, comprising a transformer fed by an a.c. source, a rectifier, and at least one auxiliary capacitor via which the charging
5 capacitor can be buffer-charged dependent on the capacity of the auxiliary capacitor or capacitors.
2. A device according to Claim 1, wherein the a.c. source is an oscillator fed by a d.c. source.
3. A device according to Claim 1 or 2, in which
10 the charge of the charging capacitor can be used for charging an accumulator, which device includes a plurality of auxiliary capacitors the number of which can be changed according to the desired charging of the accumulator.
4. A device according to Claim 2, in which the
15 charging capacitor via a thyristor is discharged through a flash light source, and the oscillator is a multi-vibrator which is blocked by the voltage over the charging capacitor and thereafter supplies ignition voltage to the thyristor for discharging the charging capacitor through
20 the flash light.
5. A device according to Claim 4, suitable for maritime use and which is enclosed in an at least partially translucent housing, and which includes magnetically operated switches, operable from outside the housing and
25 controlling the starting of the oscillator after the discharge of the charging capacitor.
6. A device according to Claim 4 or 5, wherein the capacity of the auxiliary capacitor is adjustable



for adjustment of the flash frequency.

7. A device according to Claim 4 or 5, which includes a voltage divider connected in parallel to the charging capacitor, which divider, together with the number or the
5 capacity of the auxiliary capacitor(s), enables the flash intensity to be adjusted.

8. A device according to any of Claims 4 to 7, characterised in that the oscillator operates at a high frequency compared with the flash frequency.

10 9. A device as according to Claim 8, wherein the oscillator operates at a frequency of 40 kHz.

10. A device according to any of Claims 4 to 9, characterised in that the interval and intensity of the flash light are controllable from outside the housing.

15 11. A device for charging a charging capacitor, substantially as hereinbefore described with reference to the accompanying drawing.

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