Patent claims:

1. A rechargeable battery discharge device ~~(10)~~ for discharging rechargeable batteries ~~(20)~~ with

(a) a first rechargeable battery connection ~~(12.1)~~ for connecting a first rechargeable battery ~~(20.1)~~,

(b) a second rechargeable battery connection ~~(12.2)~~ for connecting a second rechargeable battery ~~(20.2)~~,

(c) at least a third rechargeable battery connection ~~(12.3)~~ for connecting a third rechargeable battery ~~(20.3)~~ and

(d) a load connection ~~(14)~~ for a load ~~(16)~~ for dissipating an electric output during discharging of the rechargeable batteries ~~(20)~~,

characterized by

(e) a discharge circuit ~~(18)~~ comprising

(i) a first short circuit switch ~~(24.1)~~,

(ii) a first voltmeter ~~(22.1)~~ that is arranged to measure a first rechargeable battery voltage ~~($U_{20.1}$)~~ dropped across the first rechargeable battery connection ~~(12.1)~~,

(iii) a second short circuit switch ~~(24.2)~~,

(iv) a second voltmeter ~~(22.2)~~ that is arranged to measure a second rechargeable battery voltage ~~($U_{20.2}$)~~ dropped across the second rechargeable battery connection ~~(12.2)~~,

(v) a third short circuit switch ~~(24.3)~~,

(vi) a third voltmeter ~~(22.3)~~ that is arranged to measure a third rechargeable battery voltage ~~($U_{20.3}$)~~ dropped across the third rechargeable battery connection ~~(12.3)~~, and

(vii) a control unit ~~(27)~~,

(f) the control unit ~~(27)~~ being designed to automatically carry out a method comprising the steps:

(i) for all voltmeters ~~(22.i)~~, detecting the respective rechargeable battery voltage ~~($U_{20.i}$)~~,

(ii) when the respective rechargeable battery voltage ~~($U_{20.i}$)~~ exceeds a predetermined minimum voltage ~~(U_{min})~~, connecting the corresponding

rechargeable battery ~~(20.i)~~ into a series circuit with at least one other rechargeable battery and

(iii) when the respective rechargeable battery voltage ~~($U_{20.i}$)~~ does not exceed a minimum voltage ~~(U_{min})~~, removing the corresponding rechargeable battery ~~(20.i)~~ from the series circuit by means of the corresponding short circuit switch.

2. The rechargeable battery discharge device ~~(10)~~ according to claim 1, characterized by

a load ~~(16)~~ connected to the load connection ~~(14)~~ in the form

(a) of an inverter ~~(17)~~ for generating an AC voltage ~~(U_{AC})~~ of a predetermined frequency (f) and voltage and/or

(b) a DC voltage converter for generating a DC voltage of a predetermined voltage from a DC voltage acting on the load connection ~~(14)~~.

3. The rechargeable battery discharge device ~~(10)~~ according to one of the preceding claims, characterized by

a display ~~(28)~~ for displaying the rechargeable batteries ~~(20.i)~~ whose respective rechargeable battery voltage ~~($U_{20.i}$)~~ falls below the minimum voltage ~~(U_{min})~~ and/or the rechargeable battery connections ~~(14.i)~~ whose connection contacts ~~(26)~~ are short-circuited.

4. The rechargeable battery discharge device ~~(10)~~ according to one of the preceding claims, characterized by a polarity reversal protection circuit ~~(30)~~ for automatically

(i) detecting a rechargeable battery ~~(20)~~ connected with the incorrect polarity and emitting a polarity reversal warning and/or

(ii) connecting the incorrectly connected rechargeable battery ~~(20)~~ with the right polarity.

5. The rechargeable battery discharge device ~~(10)~~ according to one of the preceding claims, characterized in that the control unit ~~(27)~~ is configured to automatically carry out a method comprising the steps:

(i) determining changes in rechargeable battery voltages ~~(U_{20})~~ over time and

(ii) bridging the corresponding rechargeable battery ~~(20)~~ by means of the corresponding short circuit switch ~~(24)~~ and/or emitting a voltage disconnection warning when the change in rechargeable battery voltage over time ~~($\dot{U}$)~~ lies outside of a predetermined tolerance interval.

6. The rechargeable battery discharge device ~~(10)~~ according to one of the preceding claims, characterized in that the control unit ~~(27)~~ is configured to automatically carry out a method comprising the step:

connecting some of the rechargeable batteries ~~(20.i)~~ into the series circuit, so that a sum of the rechargeable battery voltages ~~($U_{20.i}$)~~ lies within a predetermined target voltage interval ~~(Z)~~, wherein the combination with the largest number of rechargeable battery voltages ~~($U_{20.i}$)~~ is selected when two or more combinations of rechargeable battery voltages ~~($U_{20.i}$)~~ lie within the target voltage interval ~~(Z)~~.

7. The rechargeable battery discharge device ~~(10)~~ according to one of the preceding claims, characterized by

at least one heat sensor ~~(34)~~, in particular a thermal imaging camera, that is arranged to detect a temperature ~~(T_i)~~ of at least one of the rechargeable batteries ~~(20.i)~~.

8. The rechargeable battery discharge device ~~(10)~~ according to one of the preceding claims, characterized in that the control unit ~~(27)~~ is configured to automatically carry out a method comprising the steps:

(a) detecting a rechargeable battery ~~(20.i)~~ that is connected to a rechargeable battery connection ~~(12.i)~~ and does not exceed the minimum voltage ~~(U_{min})~~,

(b) closing a first switch element ~~(36a.i)~~, especially a short circuit relay, of the short circuit switch ~~(24.i)~~ of the rechargeable battery connection ~~(12.i)~~, or keeping said element closed,

(c) closing a second switch element ~~(36b.i)~~, especially a connecting relay, of the short circuit switch ~~(24.i)~~ of the rechargeable battery connection ~~(12.i)~~, or keeping said element closed,

(d) emitting a signal that encodes that the rechargeable battery can be removed,

(e) detecting that no rechargeable battery ~~(20.i)~~ is connected to the rechargeable battery connection ~~(12.i)~~,

(f) opening the second switch element ~~(36b.i)~~ or keeping it open, then

(g) opening the first switch element ~~(36a.i)~~ or keeping it open, and then

(h) closing the second switch element ~~(36b.i)~~.

9. The rechargeable battery discharge device according to one of the preceding claims, characterized in that

(a) the inverter ~~(17)~~ is connected to a power grid ~~(38, 38')~~ to which electrical consumers ~~(40.j)~~ are connected,

(b) the control unit ~~(27)~~ is designed to automatically carry out a method featuring the steps:

(i) detecting a target power output ~~(P_{soll})~~ of the rechargeable battery discharge device ~~(10)~~ and

(ii) reducing a discharge output of the rechargeable batteries ~~(20)~~ when an actual power output ~~(P_{ist})~~ exceeds the target power output ~~(P_{soll})~~.

10. The rechargeable battery discharge device according to one of the preceding claims, characterized by

(a) an electrical buffer store ~~(42)~~,

(b) the control unit ~~(27)~~ being designed to automatically carry out a method comprising the steps:

(i) detecting the target power output ~~(P_{soll})~~ of the rechargeable battery discharge device ~~(10)~~ and

(ii) loading the buffer store ~~(42)~~ so that the actual power output ~~(P_{ist})~~ does not exceed the target power output ~~(P_{soll})~~.

11. A method for discharging a plurality of rechargeable batteries ~~(20)~~ comprising the automatically performed steps:

(a) continuously measuring one rechargeable battery voltage ~~(U_{20})~~ of a plurality of rechargeable batteries ~~(20)~~,

(b) connecting the rechargeable batteries whose rechargeable battery voltages ~~(U_{20})~~ do not fall below a predetermined minimum voltage ~~(U_{min})~~ into a series circuit, so that the rechargeable batteries ~~(20)~~ are discharged, and

(c) decontacting a rechargeable battery ~~(20)~~ whose rechargeable battery voltage ~~(U_{20})~~ falls below the predetermined minimum voltage ~~(U_{min})~~, so that it is no longer connected in series.

12. The method according to claim 11, characterized by the step:
emitting a notification that encodes the rechargeable batteries ~~(20)~~ whose respective rechargeable battery voltage ~~($U_{20.i}$)~~ falls below the minimum voltage ~~(U_{min})~~ and/or the rechargeable battery connections ~~(14.i)~~ whose connection contacts ~~(26.i)~~ are short-circuited.

13. The method according to claim 11 or 12, characterized by the steps:

(i) detecting a rechargeable battery ~~(20)~~ connected with the incorrect polarity and emitting a polarity reversal warning and/or

(ii) connecting the incorrectly connected rechargeable battery ~~(20)~~ with the right polarity.