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JP 63013427 A JP 61270967 A JP 10254445 A
US 4673826 A

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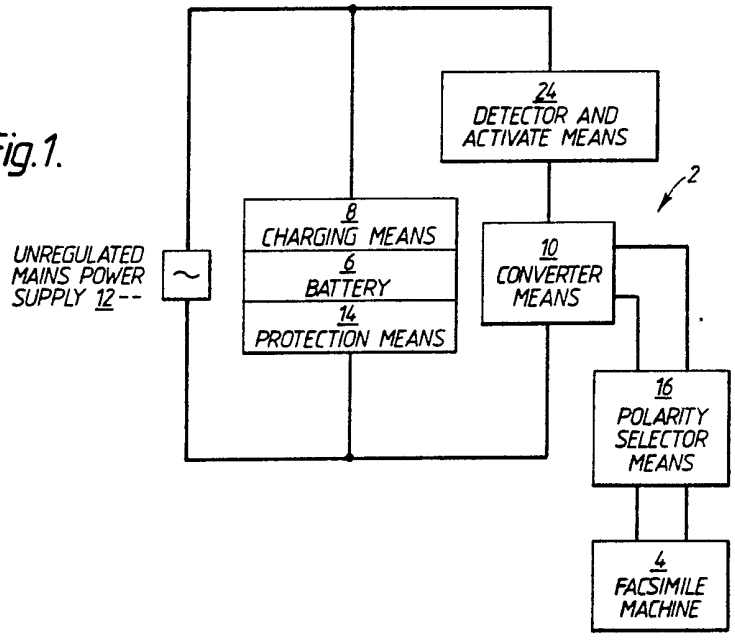
(54) An uninterruptible power supply for a facsimile machine

(57) The supply has a converter 10 for converting direct current from a battery 6 into the electrical power supply for the facsimile machine 4, and a charger 8 for the battery 6. The charger 8 may receive power from a generator, a solar or wind powered source or a mains supply 10. Protection means 14 disconnects the machine 4 from the battery 6 if the latter discharges to a predetermined voltage, and on restoration of the charger supply allows the battery 6 to be charged to 15V, whereafter the charger 8 is controlled to float the battery at 13.8V.

To conserve power, the machine 4 may be left in a non-standby mode, being turned on by a ringing signal detector 24 which is capacitively coupled to a telephone cable (46), (48), (Fig 4). The machine 4 may be permitted to operate only in predetermined time periods, being controlled by a timer linked with the different time zones in different parts of the world. Means responsive to power demand by the machine 4 may enable the latter to remain on beyond a timed period.

Fig.1.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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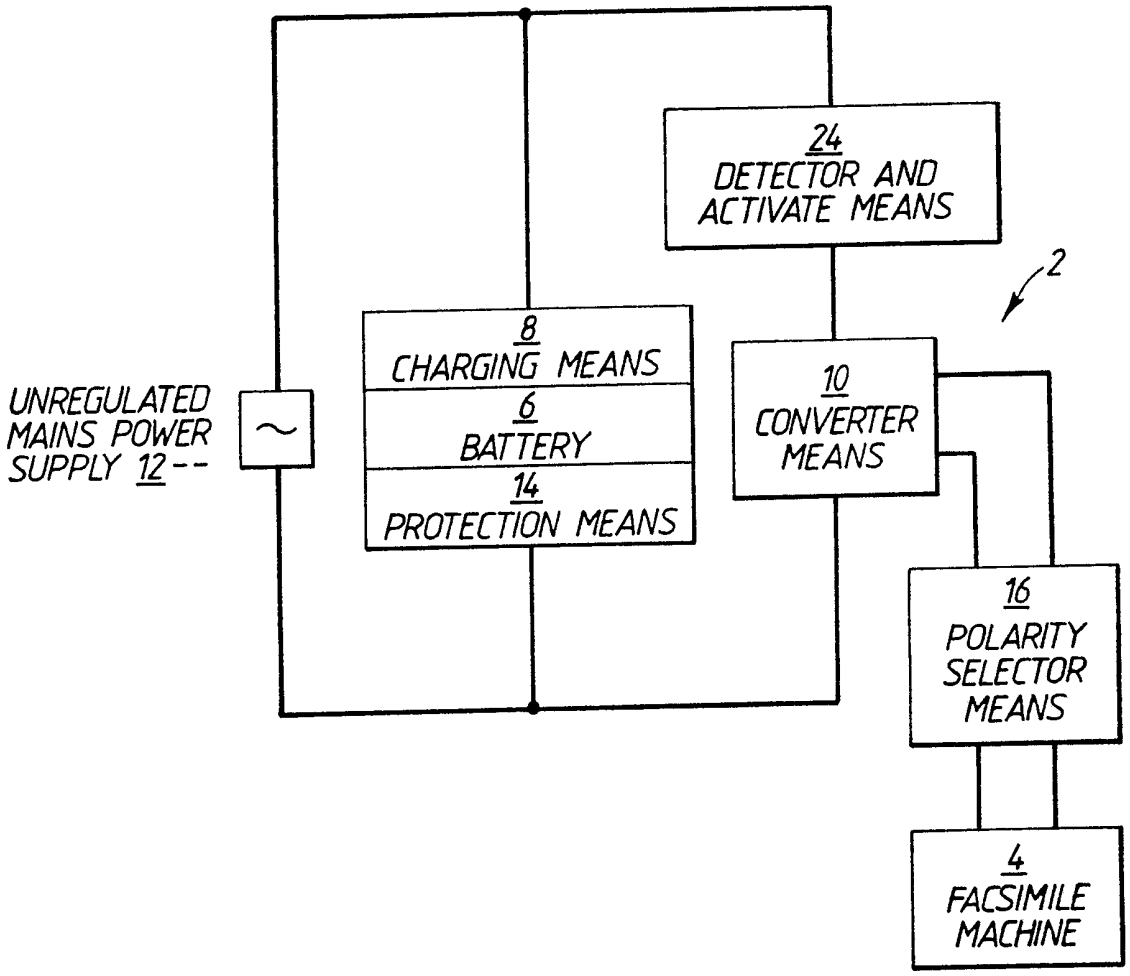
24
DETECTOR AND
ACTIVATE MEANS
2
8
CHARGING MEANS
6
BATTERY
14
PROTECTION MEANS
10
CONVERTER
MEANS
UNREGULATED
MAINS POWER
SUPPLY 12
16
POLARITY
SELECTOR
MEANS
4
FACSIMILE
MACHINE

Fig.1.

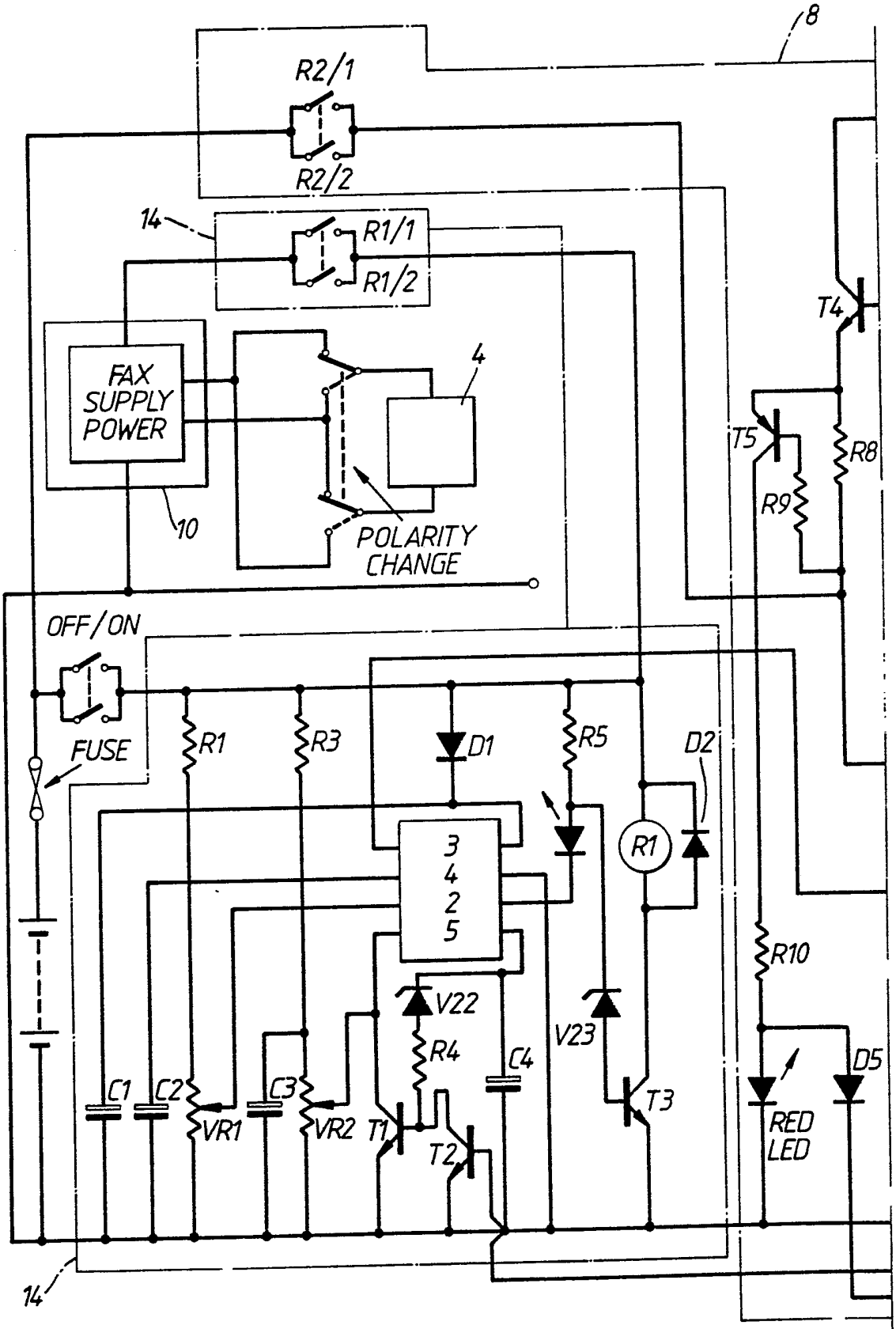
8
R2/1
R2/2
14
R1/1
R1/2
FAX SUPPLY POWER
4
10
POLARITY CHANGE
T4
T5
R8
R9
OFF/ON
FUSE
R1
R3
D1
R5
D2
3
4
2
5
R1
R10
V22
R4
C4
V23
C1
C2
VR1
C3
VR2
T1
T2
T3
D5
RED LED
14

Fig.2A.

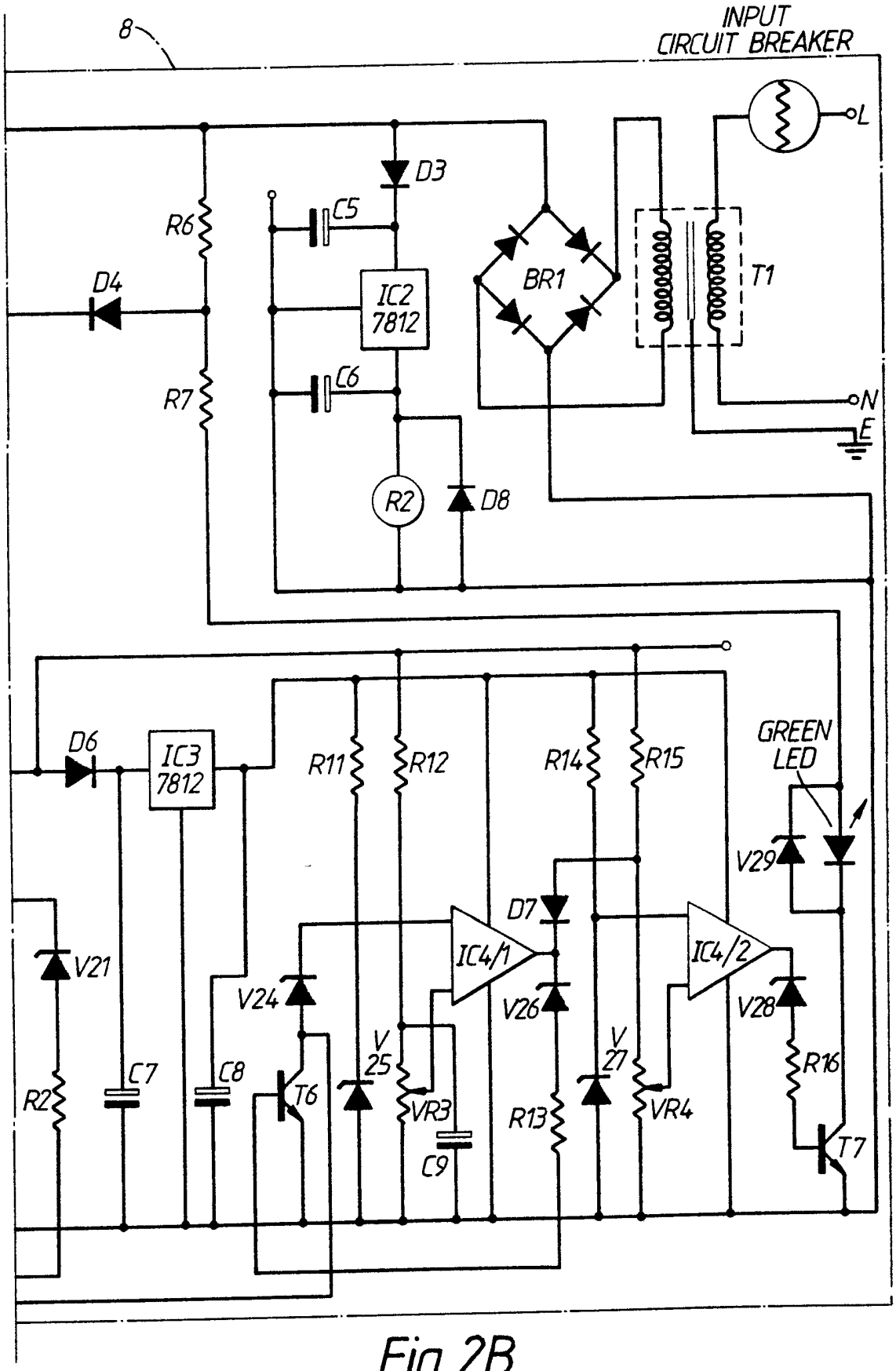
8
INPUT
CIRCUIT BREAKER
L
N
E
D3
C5
R6
D4
IC2
7812
C6
R7
BR1
T1
R2
D8
D6
IC3
7812
R11
R12
R14
R15
GREEN
LED
V29
D7
IC4/1
IC4/2
V21
V24
V26
V28
V
25
V
27
R16
R2
C7
C8
T6
VR3
C9
R13
VR4
T7

Fig.2B.

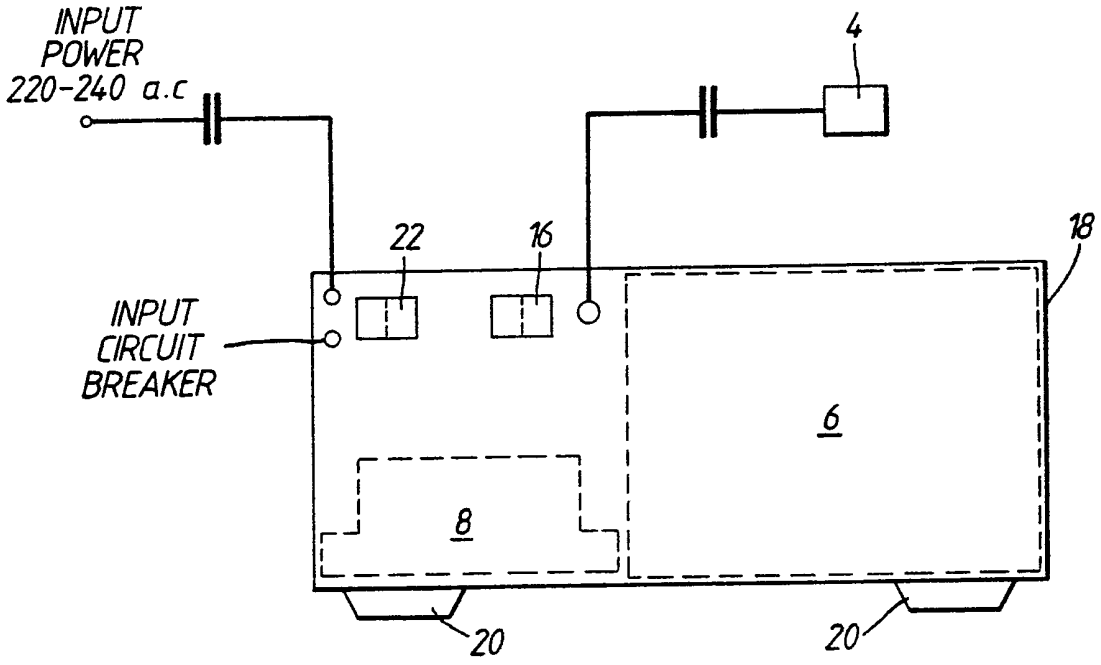
INPUT
POWER
220-240 a.c
4
22
16
18
INPUT
CIRCUIT
BREAKER
6
8
20
20

Fig.3.

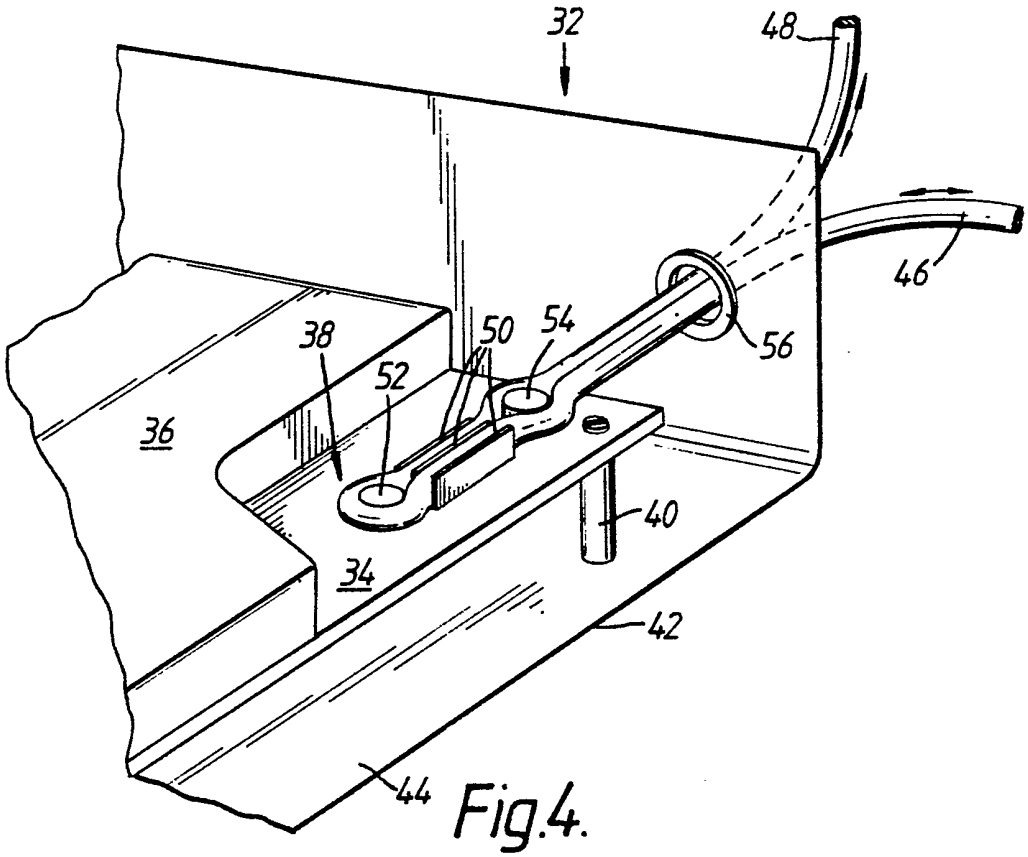
32
48
46
38
50
54
56
52
36
40
34
42
44

Fig.4.

APPARATUS FOR PROVIDING AN ELECTRICAL POWER SUPPLY FOR A FACSIMILE MACHINE

This invention relates to apparatus for providing an electrical power supply for a facsimile machine.

Facsimile machines are well known and they are currently being used more and more for the purpose of sending and receiving messages. If an electrical power supply for a facsimile machine is interrupted, then it is not possible to send or receive messages and this can be extremely serious commercially. Firms may lose business orders or may be unable to place business orders. Firms not receiving orders may go bankrupt and production deadlines may be lost.

It is an aim of the present invention to obviate or reduce the above mentioned problem.

Accordingly, this invention provides apparatus for providing an electrical power supply for a facsimile machine, which apparatus comprises at least one battery, charging means for charging the battery, and converter means for converting direct current from the battery into the electrical power supply for the facsimile machine.

The apparatus of the present invention is thus able to provide a back-up facility for providing power for the facsimile machine in the event of a mains failure.

The charging means will usually operate automatically so that the battery will always be kept fully charged.

Usually, the charging means will be mains operated so that it is able to charge the battery whilst the apparatus is connected to a source of mains electricity. This is quite satisfactory for countries where good sources of mains electricity are available. For countries where good sources of mains electricity are not available and where the mains may be subject to constant and/or prolonged periods of interruptions, the charging means may be generator solar or wind powered.

Preferably, the apparatus of the invention is one which operates such that mains electricity from a source of mains electricity is first received by the apparatus, the apparatus then providing the electrical power supply for the facsimile machine. Such apparatus is not only able to provide a back-up facility for providing power for the facsimile machine in the event of a mains failure, but it also able to provide a predetermined and required quality of supply for the facsimile machine. This is important in countries such for example as many third world countries where the power supply is unreliable and it tends to fluctuate.

Such fluctuating power supply may cause the facsimile machine to malfunction and the apparatus of the invention can thus be applied to prevent such malfunction.

The apparatus of the invention may include protection means for protecting the battery from over discharging. The use of the protection means may thus ensure that the power supply to the facsimile machine is always of the required quality. By avoiding the battery over dis-charging, the situation can be prevented from arising in which the battery is still sending power to the facsimile machine but because of the over discharging of the battery, the power sent to the facsimile machine is not up to the required specification.

The apparatus of the invention may include polarity selector means. Some facsimile machines require polarising one way or the other. The polarity selector means may be a switch enabling the polarity selection to be done manually.

The apparatus of the invention may include detector and activate means for detecting when a message is required to be sent to the facsimile machine and for activating operation of the facsimile machine so that it can receive the message, whereby the facsimile machine is able to be left in a non-standby mode when it is not

receiving messages and thereby saving on power consumption.

During normal operation of the facsimile machine, when it is not receiving messages, it is in a standby mode in which it is ready to receive messages. In the standby mode, the facsimile machine has a constant power requirement. The power which is required and consumed is relatively substantial and may be of the order of 12 watts continuous drain. It may be desired to save this continuous power consumption, thereby avoiding too much use of the battery in situations where the mains are not functioning. Also, the general saving of the current consumed with the facsimile machine in the standby condition helps to minimise on overall power consumed and therefore minimises on running costs of the facsimile machine.

The detector and activate means may comprise a capacitance coupling device.

The capacitance coupling device may be a mechanical holding arrangement for holding an electrical cable, for example a cable to a telephone socket.

The mechanical holding arrangement may comprise at least two plates. Preferably, the mechanical holding arrangement comprises three plates. More than three plates may be employed if desired. The plates will usually be made of a metal but other materials may be employed if desired.

The mechanical holding arrangement may alternatively comprise a tube. A tube is a presently preferred type of mechanical holding arrangement. The tube will usually be made of metal but other materials may be employed if desired.

The tube may be of any desired and appropriate length and cross section. Thus, for example, the tube may be of circular, square or rectangular cross section.

The mechanical holding arrangement may still further alternatively be a screw and clamp arrangement. The screw and clamp arrangement may be made of metal and/or non-metallic parts.

In another aspect of the present invention, irrespective of what type of detector and activate means is employed, the facsimile machine may be switched on for predetermined periods of time, for example, five, ten or fifteen minutes. It may sometimes occur that the facsimile machine still needs to operate at the end of the predetermined time period and this may present problems

and so switching off the electrical equipment after a predetermined time period by means of a time delay is not a preferred mode of operation. In a preferred mode of operation, the facsimile machine is enabled to remain in an operating condition for as long as is required.

Accordingly, in another aspect of the present invention, the facsimile machine is enabled to remain on for as long as required by response means which is responsive to the power demand from the facsimile machine.

The response means may operate to close down the power usage by reference to changes in current demand from inverter means.

Preferably, the inverter means is associated with time delay buffer means in order to prevent premature shut down of the facsimile machine.

The apparatus of the invention may include timer means for linking the apparatus with the time in different time zones in different parts of the world, and for permitting operation of the facsimile machine only in predetermined times, thereby to save power consumption caused by having the facsimile machine in a standby mode ready to receive messages at times when messages are not normally received, for example at night when people are asleep.

The apparatus of the invention may be employed to provide an electrical power supply to more than one facsimile machine if desired.

The apparatus of the invention may be a separate unit for connection to a facsimile machine. The apparatus of the invention may however be incorporated in a facsimile machine if desired.

Embodiments of the invention will now be described solely by way of example and with reference to the accompanying drawings in which:

Figure 1 is a block circuit diagram of apparatus for providing an electrical power supply for a facsimile machine:

Figure 2 is a detailed circuit diagram of the circuit shown in Figure 1;

Figure 3 is a rear view of the apparatus; and

Figure 4 shows call activate means.

Referring to Figures 1 and 2, there is shown apparatus 2 for providing an electrical power supply for a facsimile machine 4. The apparatus 2 comprises a battery 6 and charging means 8 for charging the battery 6. The apparatus 2 further comprises converter means 10 for converting direct current from the battery 6 into the electrical power supply for the facsimile machine 4.

As shown in Figure 1, the battery 6 is connected across an unregulated mains power supply 12.

The apparatus 2 also comprises protection means 14 for protecting the battery 6 from overcharging. The protection means 14 may include a monitor for monitoring the electrical state of the battery 6 and for turning off the output of the battery 6 in the event that the battery 6 should become discharged by more than a predetermined amount. This ensures that the battery 6 always provides power of a predetermined required specification to the facsimile machine 4. As will be appreciated, if the battery 4 were to become overcharged, this could adversely affect the quality of supply of the current for the facsimile machine 4.

As can be seen from Figure 1, the apparatus 2 also comprises polarity selector means 16. Some facsimile machines 4 require polarising one way or the other. The polarity selector means 16 will usually be a simple manually operated switch.

The apparatus 2 is such that the charging means 8 is mains operated so that it is able to charge the battery 6 whilst the apparatus 2 is connected to a source of mains electricity. The apparatus 2 operates generally such that mains electricity from a source of mains electricity is first received by the apparatus 2, the apparatus 2 then providing the electrical power supply for the fascimile machine 4. This ensures that the apparatus 2 not only provides backup-power for use in situations where a mains failure occurs, but also provides power which is for the facsimile machine 4 and which is also of a consistent and predetermined quality.

Thus power fluctuations which may be detrimental to operation of the facsimile machine 4 are avoided.

The operation of the apparatus 2 will now be described in detail with reference to Figure 2. For ease of comparison and understanding, the various parts shown in block diagram form in Figure 1 have been shown in dotted lines in Figure 2.

The battery 6 is preferably a 17 ampere hour fully sealed lead calcium battery with a normal voltage rating of 12 volts. The capacity can be extended to meet any requirements, with the normal capacity being such that approximately 15 hours of standby power is available for the facsimile machine 4 with the mains power supply 12 being completely cut off.

The protection means 14 is required, as mentioned above, to prevent the battery 6 from over discharging. For example, if the mains power supply 12 should be out of action for a prolonged period of the order of 24 hours, after 15 hours the battery 6 would normally be exhausted. Any further discharge could seriously affect the life of the battery, and there could also be a possibility of the supply of the electrical power to the fax machine 4 being not up to the required specification, due to the ever decreasing voltage from the battery 6. The protection means 14

is thus employed.

The protection means 14 employs a battery monitoring circuit. This battery monitoring circuit includes an integrated circuit in the form of an MC 3425 which is a supervisory integrated circuit and which operates as follows.

The positive supply to the integrated circuit is by a diode D1 and a de-coupling capacitor C1 to a pin 8. The negative supply to the integrated circuit is to a pin 7 to ground. The under voltage sensing is done at pin 4. This is supplied from a potential divider network R3, VR2. A capacitor C3 provides further decoupling.

When the voltage at pin 4 falls below 2.5 volts, a capacitor C4 begins to charge from pin 5. When the voltage reaches approximately 4 volts, a transistor T1 turns on and reduces the voltage at pin 4 to zero. This latches the integrated circuit under voltage output at pin 6 to zero volts, thereby turning on a battery low voltage indicator light emitting diode via a resistor R5. At the same time, via resistor R5, variable resistor VZ3 and transistor T3, a relay R1 is turned off, as it was previously on because pin 6 was at a high positive potential. Diode D2 which is connected across the relay R1 prevents any back electro motive force from

damaging the transistor T3.

Previous to the battery 6 becoming discharged and the voltage becoming excessively low, the relay R1 and hence R1/1 and R1/2 contacts were closed. This allows power to the fax power supply in the form of the converter means 10. The converter means 10 may operate in a known manner. Power from the converter means 10 can then be passed to the facsimile machine 4 when a user of the facsimile machine 4 places an on/off switch in the on position. When the battery voltage becomes too low, the relay R1 becomes de-energised, opening contacts R1/1 and R1/2 which thus removes power from the converter means 10 and hence from the facsimile machine 4.

The situation will now be considered when the mains power again becomes available. The battery 6 will immediately begin to charge via the automatic battery charging means 8. The voltage will begin to rise. An acceptable voltage level will be about 11.5 volts since the battery supply was cut off at about 10 volts. As soon as the voltage has risen to an acceptable level, the under voltage lock out circuit has to be removed and power has to be restored to the facsimile machine 4 via the relay R1 contacts. Therefore, the

other half of the integrated circuit which monitors over voltage is utilised to re-set the under voltage lock out circuit. This is achieved as follows. The pin 3 of the integrated circuit is connected to the potential divider R1 and VR1, and provided the voltage pin 3 is above 2.5 volts, the pin 1 is positive. This turns on the transistor T2 via VZ1 and R2, which in turn switches off transistor T1 via resistor R4. Thus when the battery voltage is 11.5 volts, 2.5 volts plus appears at the pin 3 on the integrated circuit, this being set by VR1. The lock out circuit T1 will be turned off and it allows R1 once again to be energised, closing the contacts R1/1 and R1/2 and therefore re-setting the system, and once again providing a supply to the converter means 10 and hence to the fax machine 4.

The facsimile power supply in the form of the converter means 10 consists of a conventional switch-mode power supply. This steps up the nominal 12 volt input from the battery to 307 volts d.c. in the case of supply voltages of 220 - 240 volts a.c. The 307 volts d.c. is in fact the peak voltage of a 220 volt route mean square a.c. supply which has been found to be quite adequate for both 220 - 240 volt a.c. facsimile machines. Although it may seem strange to supply a

relatively high level of direct current to what is conventionally thought of as an alternating current machine, this is possible because the facsimile machine 4 itself contains another switch mode power supply, which in effect under normal circumstances immediately changes the a.c. input into d.c. via internal rectifiers. So in fact to all intents and purposes, the fax machine 4 is a d.c. machine, and the internal switching mode power supply then reduces this voltage to an appropriate supply for the internal electronics of the facsimile machine.

The polarity selector means 16 is employed as indicated above because some facsimile machines 4 are sensitive to the polarity of the d.c. supply. Under normal mains operation, the polarity of the input changes 50 times a second, and the fascimile machine can take advantage of either polarity. The apparatus 2 is such that it supplies only one polarity at any one time. If the fax machine 4 were to be only suitable for the opposite polarity, then it would not work. Therefore the apparatus 2 includes for the convenience of users, a simple double pole change over switch which will reverse the polarity as required. It is only necessary to reverse

the polarity once upon initial installation of the apparatus 2, and thereafter the double pole changeover switch need not be touched again.

The automatic battery charging means 8 is required to give a long and trouble free life of the battery 6. The charging means 8 should be very accurate and capable of supplying the battery requirements, since the facsimile machine 4 is fed constantly from the battery system. Use of the battery 6 to constantly feed the facsimile machine 4 means that the facsimile machine 4 is totally isolated from any fluctuations in the mains power supply 12, in addition to being isolated from any complete failure in the mains power supply 12. This isolation from any fluctuations in the mains power supply 12 is especially important in countries where the power supply system is subject to severe variations, and the loss of mains power is common. There is also a constant drain from the battery 6 due to the standing power requirements of the facsimile machine 4. This constant drain may be approximately 12 watts. It will increase on transmission of a facsimile message, or on receiving a facsimile message.

In view of the above, the charging means 8 has to maintain the battery 6 fully charged, and to supply the standing power requirements of the facsimile machine, which

standing power requirements may be approximately 12 watts as mentioned above. The action of the charging means 8 and the battery 6 is known as floating the battery 6 across the supply.

The operation of the charging means 8 will now be described.

If there is no mains input, the charging means 8 is completely disconnected from the battery 6 via relay contacts R2/1 and R2/2. This prevents the battery charger circuit from discharging the battery itself, when the mains voltage of between 180 volts a.c. and 290 volts a.c. is applied to the transformer Tr1.

The reduced voltage at the secondary winding of the transformer Tr1 is full wave rectified via BR1. Hence a positive supply is available to the anode of D3. Therefore a supply to IC2 via de-coupling capacitors C5 and C6 is available to relay R2 which is now energised. Therefore contacts R2/1 and R2/2 are closed, connecting the battery 6 to the charging means 8 from the same BR1 supply. T4 is turned on via D4 and R6. Current now flows through R8 to the battery 6.

The voltage drop across R8 turns on T5 via R9 and the red light emitting diode is illuminated via R10, indicating that charging has commenced. Also, when R2/1 and R2/2 are closed, the battery 6 is connected to the

battery charging control circuit of the charging means 8. The supply for this is via D6, C7, IC3 and C8.

The two halves of IC4 are the main control elements for the battery charging. The requirements for the battery charging are as follows.

If the battery 6 has been fully discharged, the battery 6 will require to be charged up to 15 volts d.c. Upon reaching this voltage, the charge will be cut off, which results in the battery voltage beginning to fall and restored when the battery voltage is 13.8 volts and held at that level (floated). This is achieved as follows.

The battery charging monitor circuit works as follows. IC4/1 is supplied from the stabilised supply provided by IC3 and C8. The inverting input is supplied from R11 and VZ5 giving stable voltage reference at that pin. The non-inverting input is supplied from the battery positive voltage via R2/1 and R2/2 via R12, VR3 and C9.

The voltage VR3 is set so that the output on IC4/1 is low until the voltage of 15 volts is detected at the battery 6. With IC4/1 at this stage being low, D7 is forward conducting and reduces the voltage on the non-inverting input of IC4/2 to only slightly above zero. With the inverting input of IC4/2 being at Zenner reference voltage, with VZ7 approximately 5.1 volts on

C4/2 output is low, therefore T7 is off.

The positive supply is available to the base of the transistor T4 which is turned on allowing the battery to charge. Upon the battery voltage reaching 15 volts, the non-inverting input of IC4/1 will be higher with the inverting input. Therefore the IC4/1 output will go high. This reverse biases D7 but turns on T6 via VZ6 and R13, which reduces the Zenner reference voltage on the inverting input of IC4/1 from 6.2 volts to 5.1 volts, therefore latching IC4/1 output in the high position.

With the D 7 diode effectively out of circuit, the voltage on the non-inverting input IC4/2 will be dependent upon the potential divider network of R15 and VR4, and, as the battery voltage at this moment in time is 15 volts which is well above the setting of VR4 13.8 volts, this allows the IC to go high.

If the voltage of the battery 6 is above 13.8 volts, the output of IC4/2 is high. This turns on T7 via VZ8 and R16 which illuminates the green light emitting diode via the divider network R6 and R7. Therefore, at the same time, the voltage at the centre of the divider network R6, R7 is very much reduced, being only a few volts above ground potential which reverse biases D4 which turns T4 off, removing charge from the battery 6.

A Zenner diode BZ9 is connected across the green light emitting diode. This is in case the light emitting diode fails or is in some way disconnected. This will still allow battery charging to be stopped to prevent overcharging of the battery 6. Thus the battery charging has ceased.

The voltage of the battery 6 will automatically fall until a level set by VR4 is reached, this being 13.8 volts. The IC4/1 still remains in the high output position as the reference voltage on this inverting input has been very much reduced by VZ4. Thus upon arriving at 13.8 volts, the IC4/2 output will go low, allowing charge to re-commence again immediately the voltage rises a few m.v. which will be sufficient to turn IC4/2 off again. This effectively stops and starts the charge very rapidly and provides only enough power to make up the constant drain from the battery of the power supply for the facsimile machine 4. Thus, the battery 6 is floated at 13.8 volts. This maintains the battery 6 in a fully charged state, and at the same time provides the necessary standby power used by the facsimile machine 4.

The diode D5 is forward biased when T6 is turned on. This reduces the voltage across the red indicating light emitting diode to approximately 0.6 volts, which is

well below the operating voltage of approximately 1.2 volts. This is to prevent the light emitting diode being slightly illuminated, with the constant turning on and off the converter means 10. This is really only for aesthetic purposes.

If the mains power supply 12 fails, the facsimile machine 4 will be run directly from the battery 6. The battery 6 will gradually be discharged with its voltage gradually falling from the 13.8 volts that it was floated at. When the voltage has fallen to somewhere near 12.5 volts, the IC4/1 output will then be in a low position, if R2 is energised. Thus when the mains power supply 12 is restored, the IC4 output will again be low and the voltage on the battery 6 will once again be allowed to charge to 15 volts, and the sequence will now be repeated as previously described.

The apparatus 2 is thus a purpose designed apparatus for use with facsimile machines 4. The battery 6 may be expected to have a life of four years.

The apparatus 2 may be provided in a small rectangular casing 18 as shown in Figure 3. The casing 18 may be provided with feet 20. The casing may have an on/off switch 22 in addition to a polarity selector means switch 16. The casing 16 may be of any desired

size and shape but it is typically 185mm wide, 200mm deep, and 130mm high. The apparatus 2 may be arranged to be very light so that a typical weight may be 7Kg. The casing 18 may be made from powder coated aluminium throughout for giving good corrosion resistance. Installation of the apparatus 2 can be extremely simple. The apparatus 2 need only be plugged into the mains power supply 12, and the fascimile machine 4 then need only be plugged into the apparatus 2.

The apparatus 2 may give a stable and reliable source of power for standard facsimile machines. The apparatus 2 may be suitable for all popular makes of facsimile machines 4 and it may give complete protection against mains failure (which is known as blackout) or mains disturbance (which is known as brown out). If there is a mains failure, there is no interruption of the supply to the facsimile machine 4, even if the mains failure occurs during the receipt or the transmission of a message. Thus no data is lost and this may be extremely important to businesses.

Referring to Figure 4, there is shown apparatus 32 comprising a printed circuit board 34 and a printed circuit board cover 36. The printed circuit board 34 has an incoming signal amplifying section 38. The printed circuit board 34 is mounted on upstanding posts, one of

which is shown as post 40. The post 40 upstands from a base 42 of a body 44 of the apparatus 32.

A cable 46, which passes to a telephone socket (not shown), overlies the section 38 of the printed circuit board 34. A cable 48 to a facsimile machine (not shown) also overlies the section 38.

The cables 46, 48 are held in position by a capacitance coupling device comprising three metal plates 50 as shown. The plates 50 are effective to hold the cables 46, 48 in position and around cable securing posts 52, 54. The cables 46, 48 pass through the body 44 of the apparatus 32 via a grommet 56. The cables 46, 48 become looped around the call detect means.

During operation of the apparatus 32, an incoming call ringing signal, universally used in telephone systems throughout the world, is an alternating current. Voice, tone and data transmission signals are modulations of a direct current. The call activate means is able to sense the alternating current incoming call ringing signal as soon as it passes along the cable 46 to the apparatus 32 which may be a modem. The call activate means detects the ringing signal by amplifying the change in voltage which is caused by the electrical current passing through the apparatus 2 changing from

direct current to alternating current, and back to direct current at the time of the incoming ringing signal. The detection of this change in voltage is effected by means of the capacitance coupling device in the form of the mechanical holding arrangement constituted by the three metal plates 50. The three metal plates 50 are earthed and connected to the section 38 for giving signal amplification.

The section 38 amplifies the change in voltage flowing across the capacitance coupling and earth at the time of the incoming call ringing signal. This amplified voltage signal is then used to switch on the power supply to the apparatus 32.

It is to be appreciated that the embodiment of the invention described above with reference to the accompanying drawings has been given by way of example only and that modifications may be effected. Thus, for example, a capacitance coupling device may take other forms of mechanical holding arrangement. Thus, for

example, more than one battery 6 may be employed. Also, the apparatus 2 may supply more than one fax machine 4. If desired the charging means 8 could be generator or wind operated. Detector and activate means 24 may optionally be employed for detecting when a message is required to be sent to the fascimile machine 4 and for activating operation of the facsimile machine 4 so that it can receive the message. Thus the use of the detector and activate means 24 may enable the facsimile machine 4 to be left in a non-standby mode when it is not receiving messages, thereby saving on the power normally consumed when the facsimile machine 4 is in its standby mode. As an alternative to or in addition to the use of the detector and activate means 24, the apparatus 2 may also include timer means for linking the apparatus with the time in different time zones in different parts of the world, and for permitting operation of the facsimile machine 4 only in predetermined times, thereby to save power consumption caused by having the facsimile machine in a standby mode ready to receive messages at times when messages are not normally received, for example at night when people are asleep. The apparatus 2 may also be provided as an integral part of a facsimile machine 4. If desired, the capacitance coupling device may be other forms

of mechanical holding arrangement. Thus, for example, the mechanical holding arrangement may be a metal tube of any desired cross sectional shape and also of any desired length. The tube may have a regular cross sectional shape or an irregular cross sectional shape and the tube may be designed to accept different cable sections or to accept special designs of sub-structure for easing the task of fitting the cable into the call detecting means. The mechanical holding arrangement may alternatively be such that more or less than the three plates 50 are employed. Still further, other methods of holding the cables 46, 48 securely in position may be employed such for example as screws and clamps, made from metals and/or non-metallic materials.

The above described method of call signal detection is passive in the sense that it is unable to impart any characteristic, electrical signal, radio signal, magnetic signal or any impedance to the telephone cable 46.

CLAIMS

1. Apparatus for providing an electrical power supply for a facsimile machine, which apparatus comprises at least one battery, charging means for charging the battery, and converter means for converting direct current from the battery into the electrical power supply for the facsimile machine.

2. Apparatus according to claim 1 and including protection means for protecting the battery from over discharging.

3. Apparatus according to claim 1 or claim 2 and including polarity selector means.

4. Apparatus according to any one of the preceding claims and including detector and activate means for detecting when a message is required to be sent to the facsimile machine and for activating operation of the facsimile machine so that it can receive the message, whereby the facsimile machine is able to be left in a non-standby mode when it is not receiving messages.

5. Apparatus according to claim 4 in which the detector and activate means comprises a capacitance coupling device.

6. Apparatus according to claim 5 in which the capacitance coupling device is a mechanical holding arrangement for holding an electrical cable.

7. Apparatus according to claim 6 in which the mechanical holding arrangement comprises at least two plates.

8. Apparatus according to claim 6 in which the mechanical holding arrangement comprises a tube.

9. Apparatus according to claim 6 in which the mechanical holding arrangement is a screw and clamp arrangement.

10. Apparatus according to any one of the preceding claims and including response means for enabling the facsimile machine to remain on as long as required, the response means being responsive to the power demands from the facsimile machine.

11. Apparatus according to any one of the preceding claims and including timer means for linking the apparatus

with the time in different time zones in different parts of the world, and for permitting operation of the facsimile machine only in predetermined times, thereby to save power consumption caused by having the facsimile machine in a standby mode ready to receive messages at times when messages are not normally received.

12. Apparatus for providing an electrical power supply for a facsimile machine substantially as herein described with reference to the accompanying drawings.

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