July 9, 1963 C. W. MILLER 3,096,941

RECHARGEABLE FLASHLIGHT ASSEMBLY

Filed Jan. 20, 1960 4 Sheets-Sheet 1

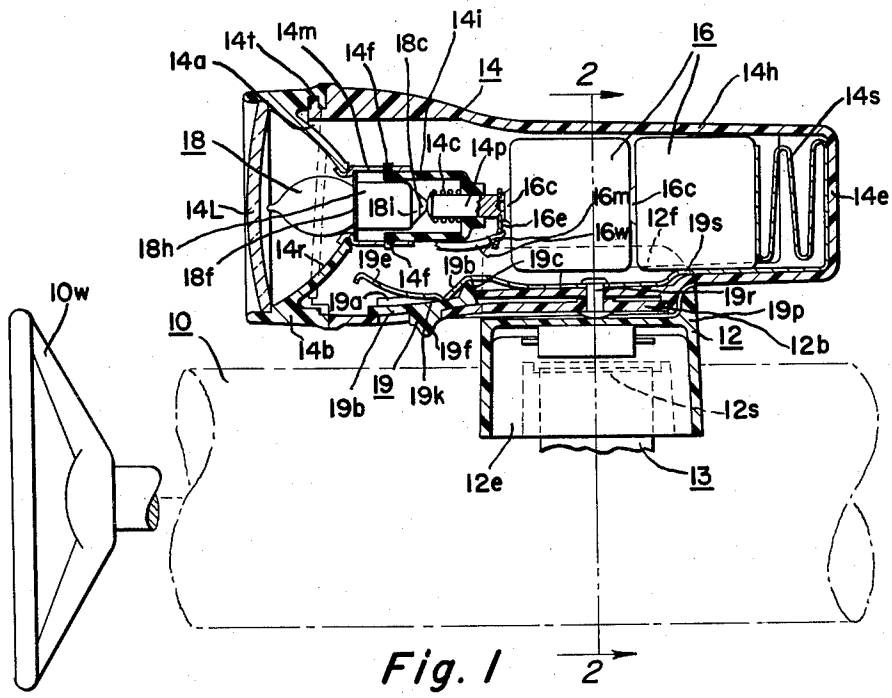

Fig. 1

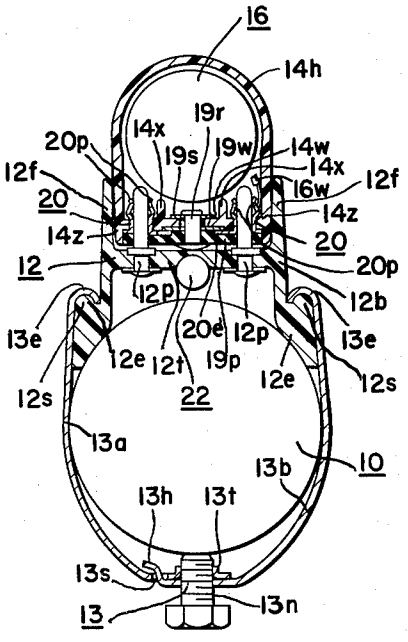

Fig. 2

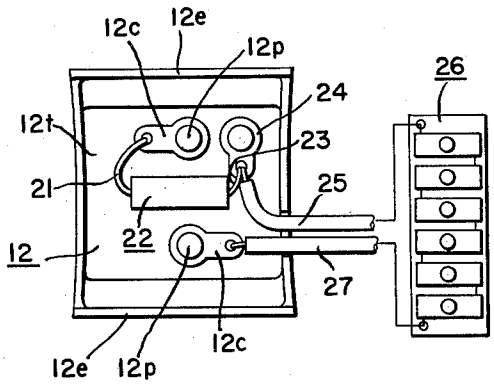

Fig. 3

INVENTOR.
Charles William Miller
BY
Albert H. Reuther
His Attorney

July 9, 1963 C. W. MILLER 3,096,941

RECHARGEABLE FLASHLIGHT ASSEMBLY

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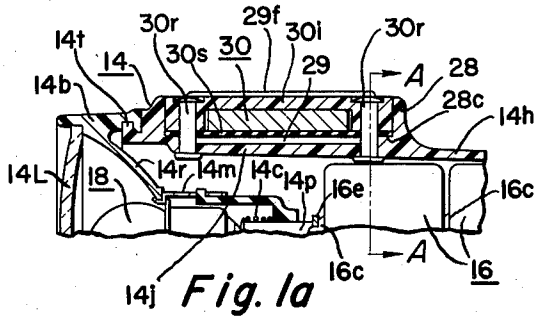

Fig. 1a

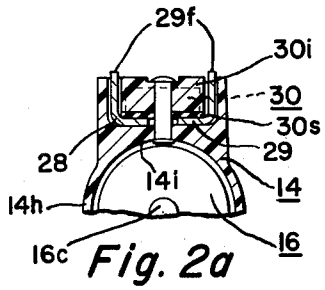

Fig. 2a

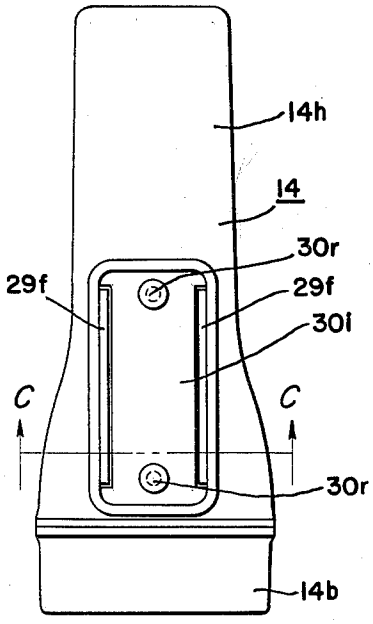

Fig. 7

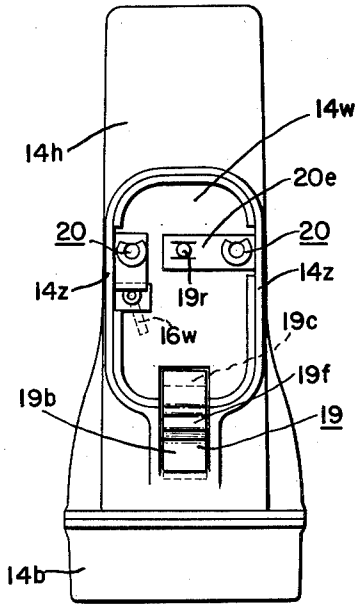

Fig. 7b

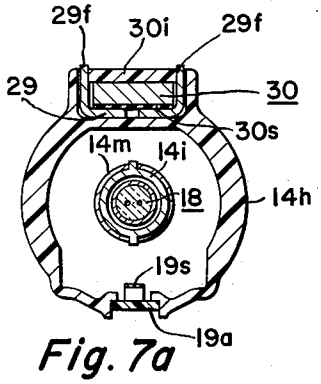

Fig. 7a

INVENTOR.
Charles William Miller
BY
Albert H. Rentter
His Attorney

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RECHARGEABLE FLASHLIGHT ASSEMBLY

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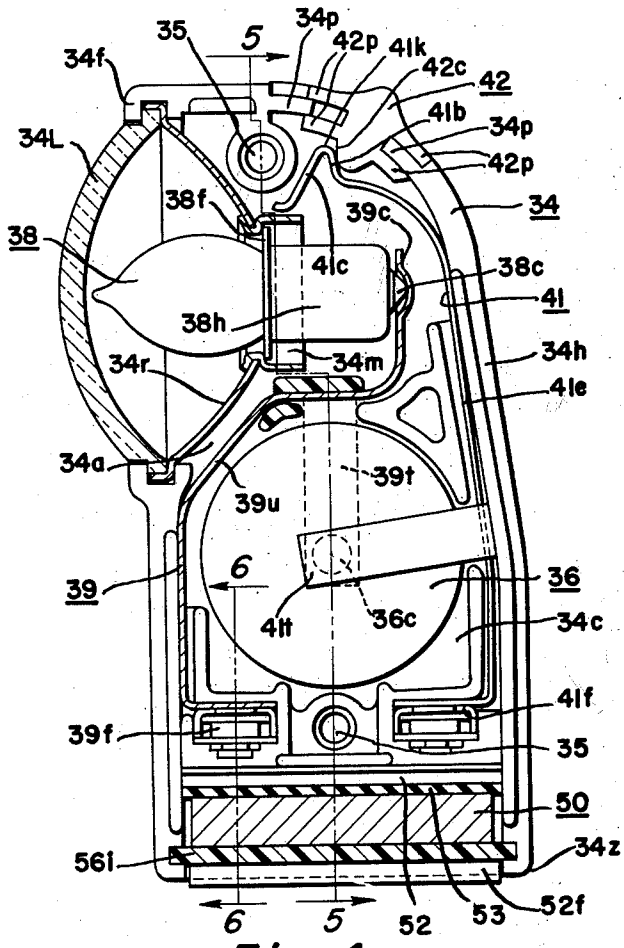

Fig. 4

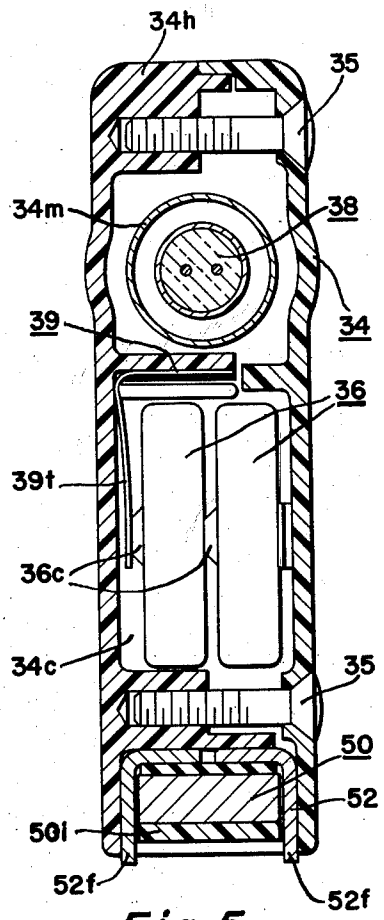

Fig. 5

INVENTOR.
Charles William Miller
BY
Albert H. Reuther
His Attorney

July 9, 1963 C. W. MILLER 3,096,941

RECHARGEABLE FLASHLIGHT ASSEMBLY

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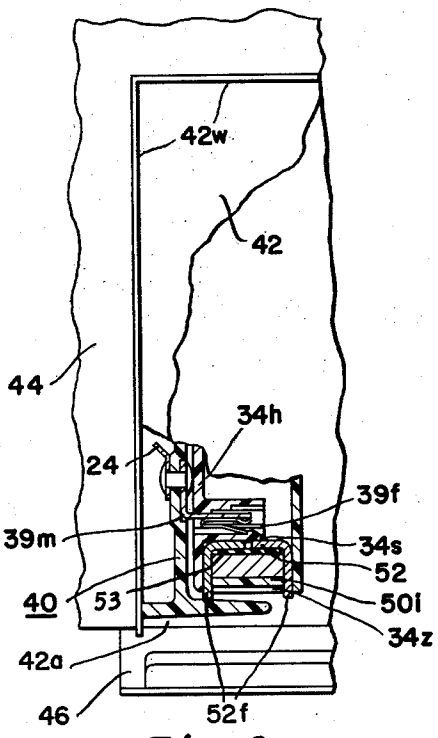

Fig. 6

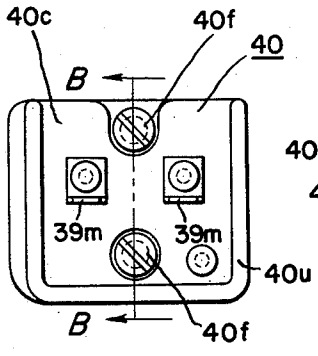

Fig. 6a

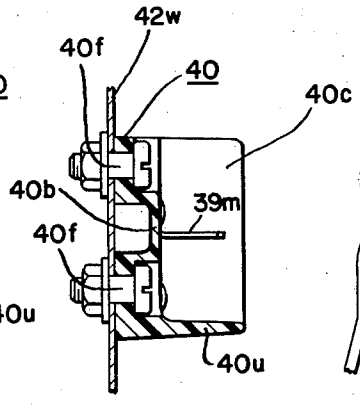

Fig. 6b

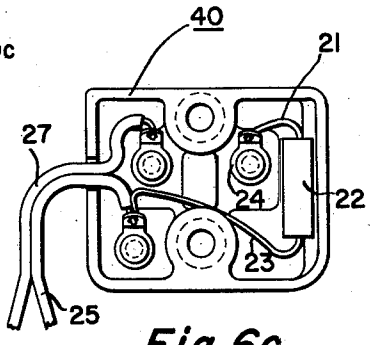

Fig. 6c

INVENTOR.
Charles William Miller
BY
Albert H. Renther
His Attorney

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3,096,941

RECHARGEABLE FLASHLIGHT ASSEMBLY

Charles William Miller, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed Jan. 20, 1960, Ser. No. 3,603
1 Claim. (Cl. 240—6.4)

This invention relates to vehicle flashlights, and particularly, to a rechargeable flashlight assembly for use in vehicles having a source of power available therewith.

An object of this invention is to provide a rechargeable flashlight assembly adapted to be portable as well as mountable relative to vehicle components such as a storage compartment for gloves, luggage and the like, a steering column, dash board and the like.

Another object of this invention is to provide a rechargeable flashlight assembly including a lamp bulb and lens carried by a housing for rechargeable battery means having a durable electrolyte therein such as nickel-cadmium material and the like and having battery-linked electrical connector means carried by the housing, adapted to be fitted relative to complementary plug means for energization by a source of power on a movable vehicle on which the flashlight assembly is adapted to be kept always ready for use.

Another object of this invention is to provide in combination a rechargeable flashlight assembly and mounting receptacle therefor on a motor vehicle in a location such as on a steering post, inside a dash board storage compartment, as well as at some other easily accessible point and the like where the rechargeable flashlight assembly is readily available for instant automotive use and optionally has provided therewith a mounting base portion such as a built-in permanent magnet means adapted for holding the flashlight assembly in a predetermined position to a surface of any magentic mounting material.

A further object of this invention is to provide in combination a rechargeable flashlight means in an assembly including a lamp bulb and lens portion on a housing for durable battery means normally available to energize the lamp bulb and stored ready for use by connection in a circuit through mating receptacle parts on the housing and vehicle adjacent to a steering post for example with common grounding of the durable battery means and vehicle source such as a main battery and with an impedance means such as a resistor and the like for limitation of charging curent in between the source and durable battery means at a location adjacent to mating electrical connector receptacle parts such as a pair of vehicle-mounted connectors for holding complementary housing-mounted connectors through which recharging connection in the circuit is established.

Another object of this invention is to provide in combination a rechargeable flashlight means in an assembly including a lamp bulb and lens portion of a housing for durable battery means normally available to energize the lamp bulb and stored ready for use by connection in a circuit through mating receptacle parts on the housing and vehicle in a storage compartment location such as in a luggage space as well as in a dash board glove compartment and the like having a terminal-type connector means for holding and establishing electrical engagement relative to ground and a vehicle source in series with an impedance such as a resistor for avoiding excess charging of the durable battery means.

Further objects and advantages of the present invention will be apparent from the folowing description, reference being had to the accompanying drawings wherein preferred embodiments of the present invention are clearly shown.

In the drawings:

FIGURE 1 shows a partially-sectioned plan view of a vehicle steering post and rechargeable flashlight assembly provided in accordance with the present invention.

FIGURE 1*a* is a fragmentary-sectioned view of a modification of the structure in FIGURE 1.

FIGURE 2 is a cross-sectioned elevational view taken along line **2—2** in FIGURE 1.

FIGURE 2*a* is a fragmentary, cross-sectioned elevational view taken along line A—A in FIGURE 1*a*.

FIGURE 3 is a schematic, electrical circuit connection diagram and bottom view of receptacle means for use in accordance with the present invention.

FIGURE 4 is a partially-sectioned plan view of another rechargeable flashlight assembly in accordance with the present invention.

FIGURE 5 is a cross-sectioned elevational view taken along line **5—5** in FIGURE 4.

FIGURE 6 is a fragmentary view of the vehicle storage compartment and rechargeable flashlight assembly taken along line **6—6** in FIGURE 4.

FIGURE 6*a* is a front view of a receptacle means shown in FIGURE 6.

FIGURE 6*b* is a sectioned side view taken along line B—B in FIGURE 6*a*.

FIGURE 6*c* is a rear view of the receptacle means of FIGURES 6 and 6*a*.

FIGURE 7 is a top view of a flashlight means of FIGURE 1*a*.

FIGURE 7*a* is a sectional view taken along line C—C in FIGURE 7.

FIGURE 7*b* is a bottom view of the flashlight means of FIGURE 7.

In FIGURE 1, there is a fragmentary illustration of a motor vehicle steering post generally indicated by numeral **10** enlarged relative to a steering wheel **10***w* adapted to be handled by a motor vehicle operator. To one side of the steering wheel **10***w*, there is a mounting receptacle means or plug means generally indicated by numeral **12** adapted to be complementary to a rechargeable flashlight assembly or flashlight means generally indicated by numeral **14**. The flashlight means **14** includes a housing **14***h* extending longitudinally and closed at one end **14***e* where there is a spring means **14***s* adapted to bias durable and rechargeable miniature battery means **16** relative to a movable contact pin **14***p* biased by a coil spring **14***c* to one side so as to engage a central contact **18***c* of a lamp bulb means generally indicated by numeral **18**. The pin **14***p* is reciprocally movable relative to an insulating sleeve **14***i* that is anchored by flange portion **14***f* relative to an annular metal extension **14***m* carried by a combination lens **14**L and reflector **14***r* of a cover portion or cap body **14***b*. The cap body or cover **14***b* is provided with bayonet-type or threaded fastening means **14***t* complementary to similar fastening means along an outer peripheral surface of an end aperture **14***a* in the housing **14***h* which is hollow.

The flashlight means **14** also includes a longitudinally slidable cam actuator or "on-off" button generally indicated by numeral **19**. The actuator or button includes a laterally, outwardly projecting finger portion **19***f* integral with an arcuate body portion **19***b* that has an integral inwardly projecting lug or cam portion **19***c*. This cam portion **19***c* is movable back and forth relative to an aperture **19***a* in the housing **14***h* in a location adjacent to a curved end **19***e* of a spring portion or resilient contact means **19***s* integral at one end with the spring means **14***s* that engages the durable battery means **16** as a ground connection. When the button or actuator **19** is in the "off" position, illustrated in the view of FIGURE 1, the cam portion **19***c* is in generally telescoped relation to an off-set bent portion **19***b* of the resilient strip extension **19***s*. A rivet **19***r* holds the strip extension **19***s* at the

spring means as well as a cover plate 19*p* for a portion of the opening 19*a* in assembled relationship to one side of the housing 14*h*. Movement of the actuator or button 19 to the left is limited by a peripheral edge of the opening 19*a* as the finger portion 19*f* engages the latter. Movement to the left by the actuator 19 also effects displacement of the resilient end 19*e* into engagement with an outer periphery of the metal sleeve 14*m* that is electrically in contact with a flange portion 18*f* of light bulb 18 having a metal housing 18*h* joined with filament wiring (not shown) inside the lamp bulb 18 that is also in electrical series relation to the central contact 18*c* which is separated from the metal housing 18*h* by an insulating portion 18*i*. A locking key portion or kink 19*k* is provided in between the bent portion 19*b* and resilient end 19*e* such that the cam portion 19*c* can be fixed in "on" position as desired by an operator when the light bulb 18 is to be energized continuously for an extended period of time.

The durable battery means 16 have central contact portions 16*c* axially in alignment with each other and one of these contact means engages the pin 14*p* at a location to one side of a metal ring or eyelet 16*e* held to the pin 14*p* by crimping of an outer edge of the pin or by soldering as well as other suitable electrical connection means. Connected to the ring or eyelet 16*e* there is an insulated wire 16*w* with a metal conductor 16*m* therein adapted to join the pin and durable battery means 16 to one of a pair of female terminal means generally indicated by numeral 20 and visible in FIGURE 2. The wire 16*w* is joined to terminal means 20 adjacent to one of a pair of resilient prongs 20*p* of one of the terminal means. It is to be understood that the particular fastening of the wire to the one terminal means does not form part of the present invention. The pair of terminal means 20 are separated from each other by an intermediate wall portion 14*w* integral with the housing 14*h* and having a pair of laterally, inwardly extending flanges or shields 14*x* on opposite sides of the strip extension 19*s* held by rivet 19*r* relative to the wall portion 14*w* and plate 19*p*. The wall portion 14*w* together with the pair of terminal means 20 and a lateral projection 14*z* of the housing 14*h* form part of connector means integral with the flashlight means adapted to be mounted and held in position relative to mating plug means or receptacle means 12 visible as carried on a steering post surface outlined in FIGURES 1 and 2. The receptacle means 12 includes an insulating body 12*b* provided with a pair of substantially parallel flange portions 12*f* that form a longitudinally open socket visible in the same views. The insulating body 12*b* also includes a pair of arcuate legs or extensions 12*e* adapted at least in part to conform to contour of the steering post 10 and held thereto by a pair of spring clips 13*a* and 13*b* having hooked ends 13*e* each engageable with shoulder means 12*s* provided integrally with the receptacle insulating body 12*b*. A nut 13*n* can be threaded into a tapped portion 13*t* adjacent to an end of the strap 13*a* remote from the flashlight means on an opposite side of the steering post 10 and the nut together with the straps form a fastening means generally indicated by numeral 13 whereby a hooked end 13*h* of strap 13*b* is locked into a slot 13*s* in between the tapped portion 13*t* and end 13*e* of strap 13*a*. Provision of the fastening means 13 makes the combination receptacle mounting and rechargeable flashlight assembly mountable in any suitable location longitudinally on one side of the steering post 10.

FIGURE 3 illustrates a schematic electrical circuit connection diagram and bottom view of receptacle means 12. Attached to the receptacle means 12, there are two male prongs 12*p* adapted to engage the pair of terminal means 20 separately as illustrated in FIGURE 2. One of the terminal means 20 includes a lateral extension 20*e* electrically in engagement with a metal washer 19*w* that contacts an intermediate portion of rivet 19*r* also electrically in contact with extension strip 19*s* of metal forming the ground connection relative to battery means 16. Each of the prongs 12*p* has an eyelet or contact means 12*c* in electrical engagement therewith adjacent to a transverse wall portion 12*t* of the receptacle means 12. One of the eyelets 12*c* is connected by a wire 21 to an impedance means generally indicated by numeral 22 such as a resistor having another wire 23 joined to another eyelet 24 relative to which a conductor 25 is attached from one side of a motor vehicle source generally indicated by numeral 26. This source 26 can be a 12 volt battery for example included as part of an electrical system on a motor vehicle. The electrical system of the motor vehicle can include a direct current as well as an alternating current rectified generating means (not shown) which form no part of the present invention. Also, suitable regulating means for control of the electrical system can be provided in conjunction with the vehicle source 26 though such regulating means is not shown because it forms no part of the present invention. The vehicle source 26 is joined by an insulated conductor 27 directly to another eyelet 12*c*. The purpose of the impedance such as resistor 22 in series with a line such as 25 from a vehicle source to the prongs 12*p*, relative to which the flashlight means is mountable for purposes of recharging battery means 16, is to limit charging current relative to the battery means 16 and to avoid over-charging thereof. It is noted that during charging of the flashlight means 14, the wire or conductor 16*w* establishes a circuit directly relative to one of the central contacts 16*c* and there is no possibility for energization of the lamp bulb 18 because the contact end 19*e* of the resilient strip 19*s* is spaced away from the metal sleeve 14*m* due to positioning of the actuator or button 19 in an "off" position.

A modification of the flashlight means 14 of FIGURE 1 is illustrated in a fragmentary section view of FIGURE 1*a*. The housing 14*h* in FIGURE 1*a* includes a socket portion 28 integral therewith and forming a cavity 28*c* adapted to receive a substantially U-shaped contact plate 29 having a pair of substantially parallel flange portions 29*f* projecting laterally outwardly on opposite sides of a permanent magnet means generally indicated by numeral 30 and visible in FIGURE 1*a*. The magnet means 30 is held in position between an insulating cover 30*i* and an insulating shim 30*s*. Rivets 30*r* hold the cover 30*i* as well as the shim and contact plate 29 for retention of magnet means 30 relative to a partition or juncture 14*j* of the housing 14*h* adjacent to socket 28 as visible in FIGURES 1*a* and 2*a*. The contact plate 29 in conjunction with the permanent magnet means 30 permits mounting of the flashlight means having electrical connectors thereon for recharging of battery means inside the flashlight in conjunction with a source on a motor vehicle to be mounted relative to any surface of a metallic panel such as a vehicle body door or fender where illumination is necessary to permit repair or inspection of vehicle parts. Thus the rechargeable flashlight assembly in accordance with the present invention can be used in combination with a steering post mounting receptacle means 12 and also has permanent magnet means 30 therewith to allow universal mounting relative to magnetic mounting surfaces.

FIGURE 7 is a top view of a flashlight housing 14*h* of flashlight means 14 provided with the permanent magnet means 30. FIGURE 7*a* is a cross-sectional view taken along line C—C in FIGURE 7. FIGURE 7*b* is a bottom view of flashlight means in accordance with FIGURES 1 and 7 and further illustrating the connector means for recharging purposes described in FIGURE 2. Views of FIGURES 7, 7*a* and 7*b* have been provided for purposes of clarity and to facilitate understanding of components of the flashlight means in the assembly of the present invention. The parts of the flashlight means as shown in the bottom view of FIGURE 7*b* are visible due to removal of the plate 19*p* not shown in the bottom view of FIGURE 7*b* for purposes of clarity.

FIGURE 4 is a partially-sectioned plan view of an-

other rechargeable flashlight assembly generally indicated by numeral **34** in accordance with the present invention. This assembly includes a housing **34***h* of complementary half portions that dove-tail together and are held in place by suitable fastening means such as screws, rivets and the like indicated by numeral **35** in FIGURE 5. Preferably, the housing **34***h* is made of insulating material such as Bakelite and the like and has provided therein a chamber portion **34***c* to receive rechargeable durable battery means generally indicated by numeral **36** and having central contact portions **36***c* best seen in FIGURE 5. A lens **34L** of material such as glass, clear plastic and the like has an outer periphery fitted in locking engagement behind flange means **34***f* surrounding a laterally extending aperture **34***a* in which reflector means **34***r* are also positioned. A metal sleeve member, **34***m*, attached to an inner periphery of the reflector **34***r* provides a mounting for lamp bulb means **38** having opposite internal wires (not shown) electrically in engagement with a metal housing **38***h* including outwardly extending flange **38***f* in engagement with the metal sleeve **34***m* as well as a central contact **38***c* that establishes electrical engagement relative to a C-shaped end **39***c* of first terminal means generally indicated by numeral **39**. The C-shaped end **39***c* of terminal means **39** is integral with an extended generally U-shaped body portion **39***u* having a female terminal portion **39***f* adjacent to an opposite end thereof and adapted to be engageable by an L-shaped male blade means **39***m* visible in FIGURES 6, 6*a* and 6*b*. Actually a pair of male terminal means **39***m* is preferably provided as mounted relative to connector or receptacle means generally indicated by numeral **40** and described in further detail below.

The flashing means **34** also includes a second terminal means generally indicated by numeral **41** having an extended body portion **41***e* and a female terminal means integral therewith at one end as indicated by numeral **41***f*. Integral with the extended body portion **41***e* at an opposite end is an outwardly extending bent portion **41***b* as well as a cam portion **41***k* engageable with a cam portion **42***c* of an actuator or button means generally indicated by numeral **42**. Integral with the extended body portion **41***e* at a location remote from the female terminal means **41***f* there is an inwardly extending contact end **41***c* adapted to engage an outer peripheral surface of metal sleeve **34***m* whenever the actuator or button means **42** is moved to the left as viewed in FIGURE 4. In effect, the button means or actuator **42** is reciprocably slidable in an arcuate path defined by a pair of projections **34***p* integral with the housing **34***h* and dove-tailing in between opposite pairs of projections **42***p* also integral with the actuator **42** as best seen in FIGURE 4. Thus the lamp bulb means **38** is energized whenever the actuator **42** is moved upwardly and toward the left in the direction near reflector means **34***r*. A lateral tab portion **39***t* integral with the extended U-shaped body portion **39***u* of terminal means **39** establishes electrical engagement relative to at least one durable battery means **36** as visible in FIGURES 4 and 5. Battery means **36** can be installed in either of opposite directions and as shown in FIGURE 5, the central contact **36***c* of one of the battery means engages the tab **39***t* and a casing of another portion of battery means is engaged by a lateral tab **41***t* integral with the extended body portion **41***e* of the strip or terminal means **41**. Female terminal means **39***f* and **41***f* are locked in position relative to a shoulder such as **34***s* integral with the housing **34***h* as illustrated in FIGURE 6.

The flashlight means **34** includes permanent magnet mounting means generally indicated by numeral **50** and visible in FIGURES 4, 5 and 6. The permanent magnet mounting means include a U-shaped contact plate **52** having a pair of substantially parallel flange portions **52***f*. A piece of insulation **53** separates a base portion of the contact plate **52** where the flanges **52***f* are joined such that permanent magnet means **50** are spaced a predetermined distance away from the base portion of the contact plate **52**. An insulating cover **50***i* visible in FIGURES 4, 5 and 6 is snap fitted into engagement with a bottom flange **34***z* of the housing **34***h* of flashlight means **34**. The flange portions **52***f* of the contact plate **52** are adapted to fit against a mounting surface of a metal member such as a vehicle panel or fender. The lateral disposition of the lens **34L** is such that mounting of the flashlight means **34** relative to a fender for example will result in having illumination directed toward a trouble spot such as a flat tire and the like.

In accordance with the present invention, the flashlight means **34** is particularly adapted for use in combination with a vehicle storage compartment such as in a luggage space as well as in a dash board glove compartment and the like relative to which the receptacle means **40** is provided. In FIGURE 6 there is illustrated a fragment of a vehicle storage compartment **42** such as a dash board glove compartment formed by walls **42***w* extending laterally relative to a body member such as a dash board **44**. Pivotally mounted relative to the dash board **44**, there is a movable panel or arcuate cover or closure member **46** adapted to fit relative to an opening or aperture **42***a* relative to one side of the storage compartment **42**.

The receptacle means **40** includes a U-shaped, flange portion **40***u* adapted to form a mounting cavity inside the storage compartment **42** relative to the flashlight means including the permanent magnet mounting portion **50** as well as the female terminal means **39***f* and **41***f* adapted to engage male contact blades **39***m*. Suitable fastening means **40***f* serve to hold the receptacle means **40** in position relative to a wall portion **42***w* as illustrated in FIGURE 6*b*. The U-shaped flange portion **40***u* as well as a base or body portion **40***b* of the receptacle means **40** form a laterally open cavity **40***c* relative to which the flashlight means is fitted inside a dashboard glove compartment, luggage space and the like. Mating male and female terminal and connector means serve both for holding the flashlight means **34** in position relative to the storage compartment **42** and also for establishing electrical engagement relative to a common ground connection and a vehicle source such as **26** referred to in the description of FIGURE 3. Accordingly, conductors **25** and **27** are shown in FIGURE 6*c* also together with an impedance means such as a resistor **22** mounted relative to receptacle means **40** and connected by wires **21** and **23** relative to an eyelet such as **24** and the like secured by fastening means like a rivet relative to male terminal means **39***m*. The terminal-type connector means formed collectively by the male terminals and female terminal portions of the flashlight means provide electrical connection relative to a vehicle source such as **26** for recharging of the durable battery means **36** including material such as nickel-cadmium and the like therein. Recharging of battery means is accomplished as previously described whereby the impedance or resistor **22** is provided for limiting charging current. Location of the flashlight means **34** in a storage compartment provides convenient access thereto when necessary. Also, location of the flashlight means inside the storage compartment conceals and protects the flashlight means against loss as well as theft and simultaneously assures recharging thereof due to connector mounting in the assembly of the present invention. The flashlight means **34** inside a storage compartment as supported by the receptacle means **40** permits ready access thereto without danger of bumping by knees of an operator as can occur when a flashlight means is mounted relative to a steering wheel post. The plug-in feature is particularly advantageous because recharging of durable battery means can occur at times when a lamp bulb is not energized though, at least in part, terminal means **39** and **41** are shared to serve the purpose of establishing a re-

charging circuit as well as serving a purpose of establishing normal flashlight circuitry for energization of lamp bulb means **38**. It is also to be noted that the U-shaped flange portion **40***u* of the receptacle means **40** extends laterally to one side of the base or body portion **40***b* on which the male terminal means **39***m* are mounted. The U-shaped flange portion **40***u* is greater in length than a lateraly projecting leg of the male terminal means **39***m* and thus the flange portion **40***u* provides a shield to guard against bending, deformation or damaging of the male terminal means **39***m*.

While the embodiments of the present invention herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

In a portable rechargeable flashlight assembly specifically for use in combination with a mobile vehicle and including a unitary housing portion of insulating material having a pair of female terminal connectors of conducting material mounted therein to be accessible during vehicle mounting thereof and possible power supply thereto, the improvement which comprises a vehicle-mounted socket-forming receptacle portion of insulating material having a pair of male terminal means also of conducting material projecting therefrom and carrying an impedance mounted within the protective covering of said receptacle portion of insulating material and joined directly electrically in series with the power supply to one of said male terminal means, and an integral laterally projecting wall having a pair of opposite substantially parallel walls between which said male terminal means are located, said parallel walls engaging and mounting said flashlight assembly and said male terminal means engaging said female terminal connectors, said parallel walls having a length greater than that of said male terminal means and shielding said terminals against bending and deformation and short-circuiting when said terminals are engaged.

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