Oct. 10, 1933. J. M. HAYWARD 1,930,270

PORTABLE TELEPHONE SET

Filed March 30, 1932 2 Sheets-Sheet 1

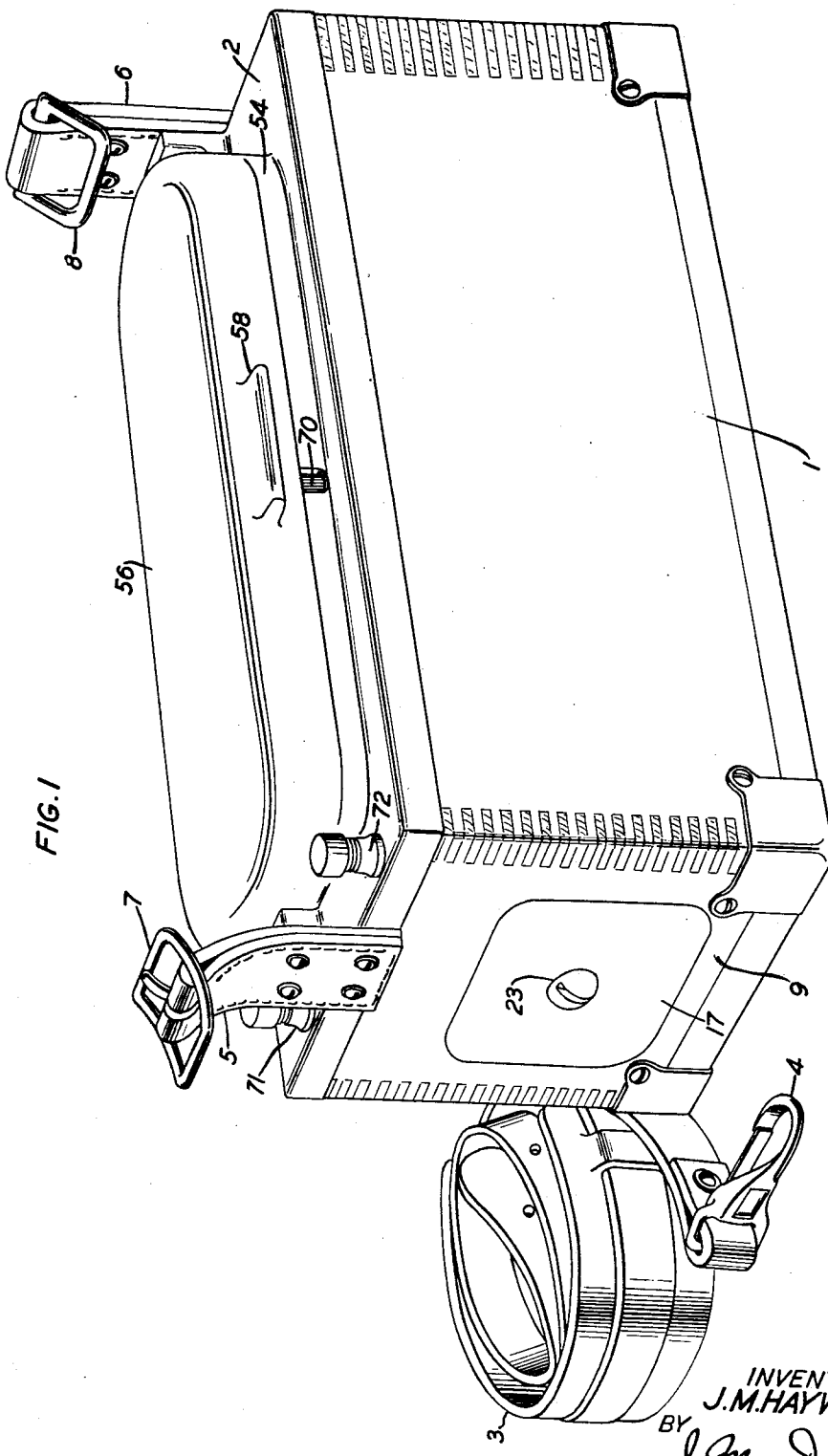

FIG. 1

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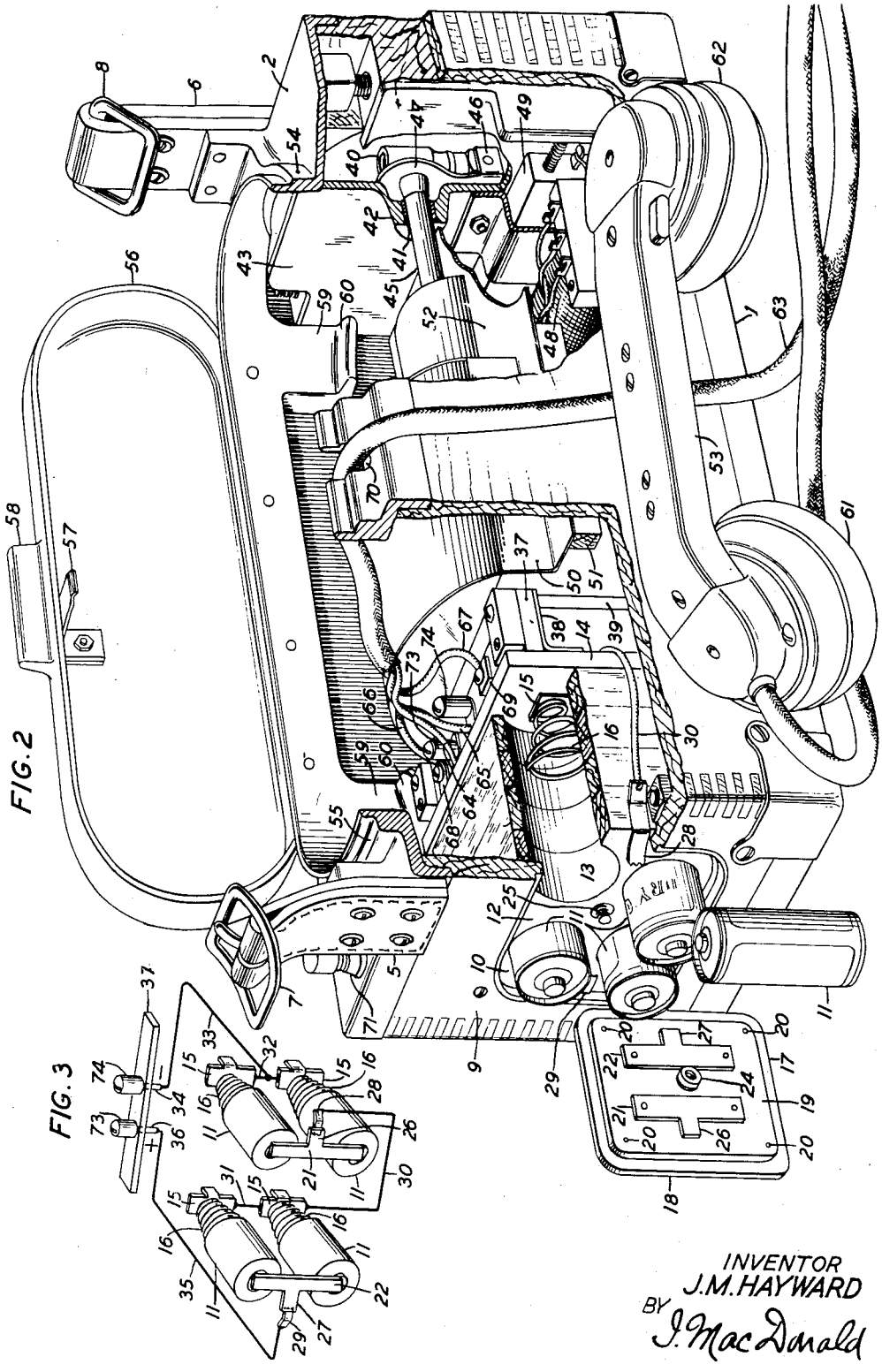

FIG. 2

FIG. 3

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1,930,270

PORTABLE TELEPHONE SET

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5 Claims. (Cl. 179—29)

This invention relates to telephone sets and more particularly to a portable telephone set which may be used in communicating between various points in a signaling system and a central station.

An object of this invention is to provide a comparatively light-weight portable telephone set which may be readily carried about from place to place and connected into a system and in which replacement of the batteries may be accomplished without exposing certain pieces of apparatus in the set to moisture or other injurious agencies.

A feature of this invention resides in a battery holder supported within the casing of the set and to which access may be had for replacement of battery cells without opening the casing proper.

Another feature resides in a cover plate for an aperture in the casing adjacent an end of the battery holder which, in addition to closing the aperture in the casing, supports contact members which serve to connect the battery cells contained in the battery holder.

Another feature resides in the provision of terminal members in the set for connecting an outside source of energy to the set when battery cells are not readily obtainable.

Another feature resides in the particular arrangement of the various pieces of apparatus in the set which makes the set well balanced, comparatively easy to carry, and provides room for the accommodation of a telephone handset.

In the drawings:

Fig. 1 is a view in perspective of the complete portable telephone set;

Fig. 2 is a view in perspective partly in section of the set showing the handset removed from the casing and with portions of the casing broken away to disclose various pieces of apparatus contained within the casing; and

Fig. 3 is a schematic of the battery arrangement employed in the set.

In portable telephone sets to be carried by train crews or linemen it is common practice to use comparatively large and heavy batteries for the source of current supply for the transmission of telephone messages. These comparatively large and heavy batteries may, for instance, be the common and well known large dry cells which because of their bulk and weight are very often carried in a battery casing separate from the portable telephone set. When a separate casing is provided for the battery, the separate casing of itself adds one more burden to be carried by the user of the set.

To facilitate carrying, it is important that the weight of a portable telephone set be reduced to a minimum commensurate with sufficient sturdiness to withstand the comparatively rough usage met with in service. It is also important from a transportation standpoint that the set be made as compact as possible, that the various pieces of apparatus in the set be so arranged and distributed as to make the set well balanced. The set should be constructed to be operable from a source of current supply which is readily obtainable in almost any locality, preferably some well known and widely distributed commercial product such, for instance, as a standard dry cell battery. Provision should also be made for the connection to the set of other sources of current supply when the standard battery is not readily obtainable. The set should also be so designed that quick and ready replacement of battery units may be accomplished without exposing other pieces of apparatus to moisture and other injurious agencies.

In the present invention, a set of small dry cells of the common and well known flashlight type, is employed as a local battery for the set. These flashlight cells are comparatively small and of light weight and are obtainable in almost any locality. The flashlight cells are housed within the casing of the set. They are, therefore, carried right in the set at all times and hence no separate casing for them is required. The flashlight cells are located in one end of the casing of the portable set. They may be reached for replacement through an aperture provided in an end of the casing by removal of an end cover plate. The comparatively heavy magneto generator employed for sending ringing current to the central station is located in the center of the casing. Other pieces of apparatus such, for instance, as the induction coil and condenser are located at the opposite end of the casing to that occupied by the battery cells. A well is provided in the top of the casing to receive a telephone handset, spaced lugs inwardly projecting from the walls of the well being provided as a rest for the transmitter and receiver ends of the handset.

To completely describe this invention reference will now be had to the drawings in which like parts bear like numerals and in which 1 is the casing which houses the various parts of the set, 2 is a top cover for the casing, 3 is the carrying strap having a snaphook 4 on one end and 5 and 6 are loop straps which are attached to opposite

ends of the cover 2. The loop strap 5 carries a buckle 7 to which one end of the carrying strap 3 may be adjustably attached and the loop strap 6 carries a ring 8 to be engaged by the snaphook 4 of the carrying strap 3.

An end wall 9 of the casing 1 is apertured at 10 as shown in Fig. 2 to provide access to a set of flashlight cells 11 which form the local battery for the set.

An insulating block 12, which may be of laminated wood or other insulating material is secured within the casing 1 adjacent the aperture 10 in the end wall 9. The block 12 is secured by screws to the inner face of the bottom of the casing 1 and has spaced bores 13 to receive the flashlight cells 11. The upper right hand corner of the block 12 has been broken away and one of the flashlight cells 11 has been shown removed from the block 12 in Fig. 2 to show the interior of one of the bores 13. The bores 13 extend all the way through the block 12. Secured to the inner end of the block 12 and closing one end of each of the bores 13 is an insulating plate 14. Supported by the insulating plate 14 in the inner end of each of the bores 13 is a conducting plate 15 attached to which at its smaller end is a conical spring 16 which makes contact with the lower wall of the flashlight cell 11 and constantly urges the flashlight cell towards a cover plate 17 in the apertured end 9 of the casing 1.

The cover plate 17 comprises a flat metal plate 18 carrying on its inner face a smaller flat plate 19 of insulating material. The plate 19 of insulating material is secured to the inner face of the metal plate 18 by pins 20 and carries spaced contact plates 21 and 22. A screw 23 as shown in Fig. 1 having an enlarged interiorly threaded inner end 24 as shown in Fig. 2, is swivelly supported in the center of the cover plate 17 to secure the cover plate 17 in place across the aperture 10 in the end wall 9 of the casing 1. The cover plate 17 and the aperture 10 in the end wall 9 of the casing 1 are slightly oblong to insure correct positioning of the cover plate 17 in the aperture 10. The swivelly supported screw 23 passes through the metal plate 18, insulating plate 19 and engages an externally threaded end of a bolt 25 which, as shown in Fig. 2, projects outward from the outer end of the laminated wood block 12. The spaced contacts 21 and 22 are flat metal strips secured to the insulating plate 19 and have centrally located lateral projections 26 and 27 respectively to engage fixed spring contacts 28 and 29 which are attached to the outer end of the laminated wood block 12. The fixed spring contact 28 is connected by a lead wire 30, as shown in Fig. 3, to the conducting plate 15 for the lower left hand boring 13 of the insulating block 12. The lower left hand conducting plate 15 is connected by a conductor 31 to the upper left hand conducting plate 15 for the upper left hand boring 13 of the insulating block 12. The upper and lower right hand conducting plates 15 for the upper and lower right hand borings 13 of the insulating block 12 are also connected by a conductor 32 which is connected by a conductor 33 to a minus terminal 34. The fixed spring contact 29 is connected by conductor 35 to a plus terminal 36. The minus and plus terminals 34 and 36 respectively are supported on an insulating shelf 37 which, as shown in Fig. 2, is supported by a pair of brackets 38, only one of which is shown on the rear face of the insulating sheet 14.

When the flashlight cells 11 are all in position in the borings 13 of the insulating block 12 with the lower plane faces of the cells engaging the large ends of the conical springs 16 and the end cover plate 17 is clamped by means of the screw 23 and the bolt 25 to the apertured end wall 9 of the casing 1 as shown in Fig. 1, the battery circuit is complete to the minus and plus terminals 34 and 36. The circuit may be traced in Fig. 3 as follows: Minus terminal 34, conductor 33, conductor 32, upper and lower right hand conducting plates 15, the upper and lower right hand conical springs 16 through the upper and lower right hand flashlight cells 11, contact plate 21, lateral projection 26, fixed spring contact 28, conductor 30, the lower left hand conducting plate 15, conductor 31, the upper left hand conducting plate 15, the upper and lower left hand conical springs 16, through the upper and lower left hand flashlight cells 11, contact plate 22, lateral projection 27, fixed spring contact 29, conductor 35 to the plus terminal 36.

To replace the battery cells in this portable set, screw 23 is turned in a counter-clockwise direction to bring it out of engagement with the bolt 25. The spring pressure exerted on the flashlight cells by the conical springs 16 thereupon forces the end cover plate 17 outward away from the apertured end wall 9 of the casing 1. The flashlight cells 11 are also forced outward by the conical springs 16 so that the outer ends of the flashlight cells project beyond the outer end of the insulating block 12. The flashlight cells 11 may then be readily withdrawn from the borings 13 of the wood block 12 and replaced by new flashlight cells. The end cover plate 17 is then clamped back in place by means of the screw 23 and the bolt 25 and the portable set is again ready for use. Replacement of the flashlight cells 11 has therefore been accomplished without opening the main portion of the casing 1 and without exposing other parts of the portable set such, for instance as the generator, induction coil and condenser or even the handset telephone to moisture or other injurious agencies which might cause some impairment in the operation of the portable telephone set.

To balance the portable telephone set and thereby render it more easy to carry, the generator 39 which is a comparatively heavy piece of apparatus and of which the only part visible in the drawings Fig. 2 is an edge of one of the horseshoe-shaped magnets is located in the center of the casing 1. In order that the handle 40 from the generator 39 may be located at an end of the casing 1 where it will be out of the way and not in a front or back wall of the casing 1 where it would be likely to catch onto and cause tearing or undue wear of the clothing of the person carrying the portable set, the generator 39 has been set within the casing 1 so that the operating shaft extends longitudinally of the casing 1. Extending from the operating shaft of the generator 39 through a journal bearing 41 which is supported in an inwardly projecting boss 42 in an end plate 43 which is attached to the inner face of an end wall 44 of the casing 1 is an extension shaft 45. The shaft 45 is removably attached to the operating shaft, not shown, of the generator 39. The end wall 44 is comparatively thick and has a large aperture of sufficient diameter to accommodate the handle 40 of the generator 39. The handle 40 is hinged at 46 to a crank hanger 47 supported on the outer end of the extension shaft 45. When the handle 40 is folded as shown in Fig. 2 it does not project beyond the outer face of the end wall 44, the handle 40, there-

fore, being folded down against the crank hanger 47 and not projecting beyond the outer face of the apertured end wall 44 is protected against accidental movements. Locating of the handle 40 in the position mentioned leaves the front and back walls of the casing 1 free of projections which would tend to be an annoyance and a possible hazard to the person and clothing of anyone transporting the set. To operate the generator 39 the handle 40 is moved to a 90° position relative to the crank hanger 47 and turned within the confines of the aperture in the end wall 44.

The induction coil 48 and condenser 49 are located beneath the extension shaft 45 and at the end of the casing opposite to that occupied by the battery cells 11.

The generator 39 is protected by a cover 50 which spans the space between the front and back walls of the casing 1 and is supported by strips 51, only one of which is shown and which are attached to the inner surfaces of the front and back walls of the casing 1. The cover 50 extends over the permanent magnets of the generator 39 and also over the gears for driving the generator. A flat portion 52 of the cover 50 also extends over the induction coil 48 and the condenser 49.

To provide a receptacle for the handset telephone 53 which forms part of the portable telephone set, the cover 2 of the casing is provided with a well formed by the upwardly extending wall 54. The wall 54 extends upward from the top of the cover 2 and forms a substantially oval opening in the cover 2 of sufficient length and breadth to allow passage therethrough of the handset 53. The wall 54 is reduced in thickness at its upper edge portion to provide an exterior ledge 55 which extends completely around the upper edge portion of the wall 54. An oval-shaped lid 56 provided with a downwardly extending flange portion is hingedly attached to the cover 2. The lid 56 serves as a covering for the well and is provided with a spring latch 57 which, when the lid 56 is closed, engages a projection located on the inside of the front portion of the wall 54 but which is not shown. A hand grip 58 is also provided to facilitate raising of the lid 56. Extending downward within the casing 1 from the wall 54 are spaced projections 59, two at each end of the well, having inwardly projecting shoulders 60 forming rests for the transmitter 61 and receiver 62 respectively of the handset 53. When the handset 53 is placed in the casing 1, the transmitter 61 rests on two of the inwardly projecting shoulders 60 in one end of the casing. The receiver 61 rests on two like inwardly projecting shoulders 60 at the other end of the casing.

A four-conductor flexible cord 63 connects the handset 53 to the portable set, two of the conductors 64 and 65 being connected to the plus and minus terminals 36 and 34, respectively, on the insulating shelf 37, the remaining two conductors 66 and 67 being connected to terminals 68 and 69, respectively, which are supported on the insulating shelf 37 and serve as connecting points between the handset 53 and the induction coil 48. When the telephone set is being used the handset 53 is removed from the casing 1. In order that the lid 56 may be closed during the use of the telephone handset 53 a slot 70 is provided in the front portion of the wall 54. This slot 70 is large enough to allow passage therethrough of the extension cord 63 and extends below the ledge 55 of the wall 54 so that the lid 56 may be entirely closed with the downwardly extending flange of the lid resting on the shoulder 55 of the cover 2.

To connect the portable telephone set to transmission lines of a communication system, extensions are made usually from the transmission line to the portable telephone set by means of an extension cord. The cord may be connected to the portable telephone set by means of the binding posts 71 and 72 which are connected by conductors, not shown, to the induction coil 48.

To provide for connecting to the portable telephone set a source of current supply other than the flashlight cells 11, in the event that the flashlight cells became too weak for operation of the portable set and no new cells of the particular type used could readily be obtained, binding posts 73 and 74 are provided on the shelf 37 and are connected to the plus and minus terminals 36 and 34 respectively in the local battery circuit.

It is obvious that various changes may be made in the structure disclosed and the particular arrangement shown for the apparatus parts without departing from the spirit of this invention.

What is claimed is:

1. A portable telephone set comprising a casing having an apertured end wall, telephone apparatus within the casing, battery cells for energization of the apparatus, a recessed block secured within the casing adjacent the apertured end wall to hold the battery cells, a removable cover plate to close the aperture in the end wall, strap terminals in said cover plate and other terminals individual to said cells within recessed portions of the block, said strap terminals and said other terminals engaging conductive end portions of the cells.

2. A portable telephone set comprising a casing, telephone apparatus within the casing, an apertured wall forming an end wall of the casing, a block member secured within the casing adjacent the apertured end wall, said block member having formed therein a plurality of recesses, battery cells within the recesses in the block member, a removable cover plate for the apertured end wall, spring terminals in the bottom of the recesses in the block member, and terminals in the cover plate, said spring terminals and terminals in the cover plate each engaging separate conductive portions of the battery cells.

3. A portable telephone set comprising a casing having an apertured end wall, an apertured block of insulating material secured within said casing adjacent the apertured end wall, an insulating plate secured to one end of said apertured block, a set of flashlight cells supported within said block to serve as a local battery for the telephone set, a removable cover plate to close the aperture in said end wall, spaced terminals in said cover plate and spring terminals supported by said insulating plate within apertures in said block to press the flashlight cells against the spaced terminals in said cover plate.

4. A portable telephone set comprising a rectangular shaped casing, telephone apparatus including a magneto generator, a telephone handset, an induction coil, a condenser and a battery unit within the casing, a cover at the top of the casing having wall portions forming a receptacle of the handset, said generator disposed longitudinally of the casing and centrally located therein, said battery unit disposed between the generator and one end of the casing and said induction coil and condenser disposed between

the generator and the other end of the casing so that balancing of the weight of the various parts of the set is accomplished and space is provided for accommodation of the transmitter and receiver ends of the handset.

5. A portable telephone set comprising a casing having an apertured end wall, telephone apparatus within the casing, an insulating block within said casing adjacent said apertured end wall, a set of flashlight cells removably supported within said block and terminal means supported by said block for connecting to the portable set a source of energy other than the flashlight cells.

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