May 8, 1945. H. F. OBERGFELL 2,375,681

TELEPHONE SET

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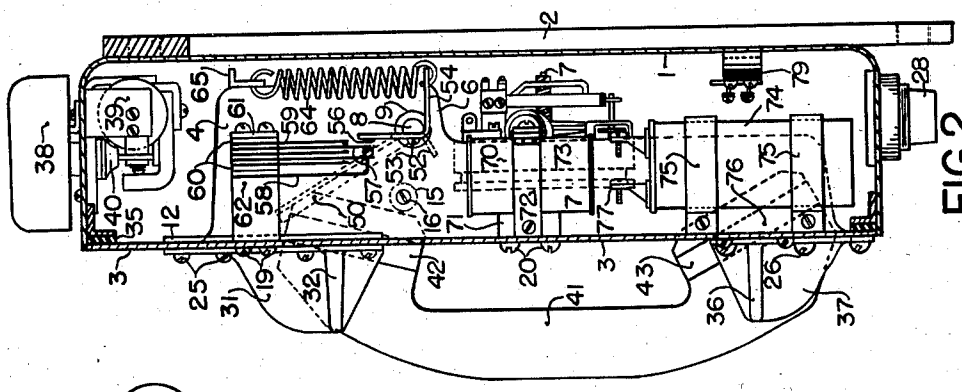


FIG.2

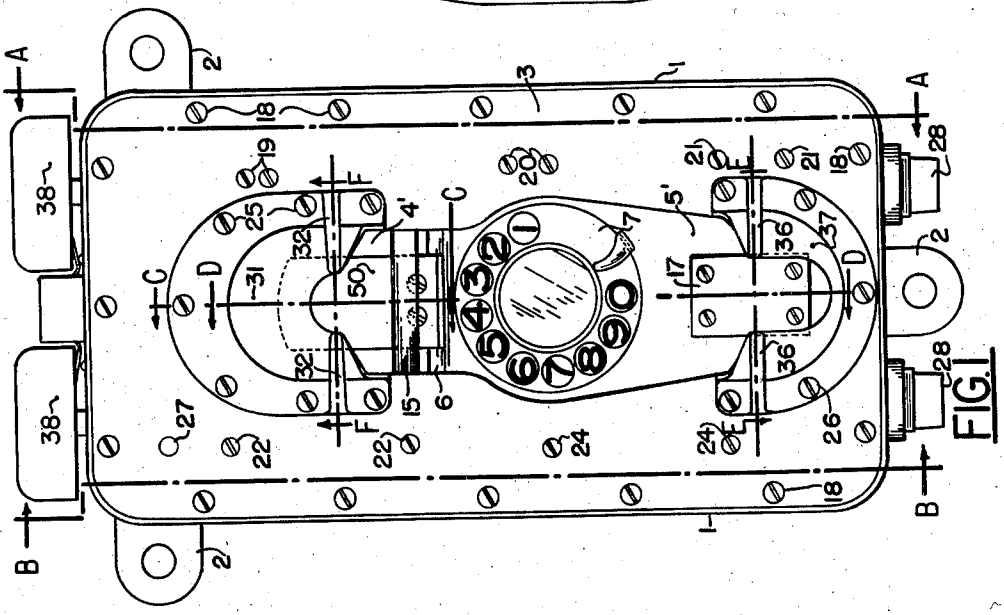


FIG.1

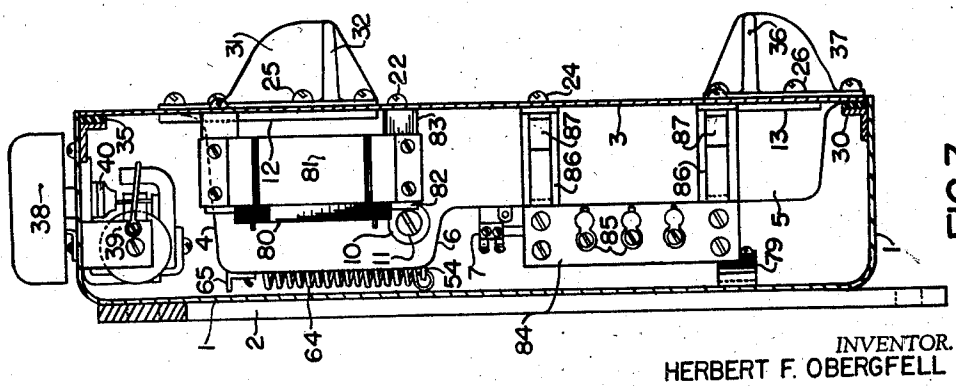


FIG.3

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FIG.5

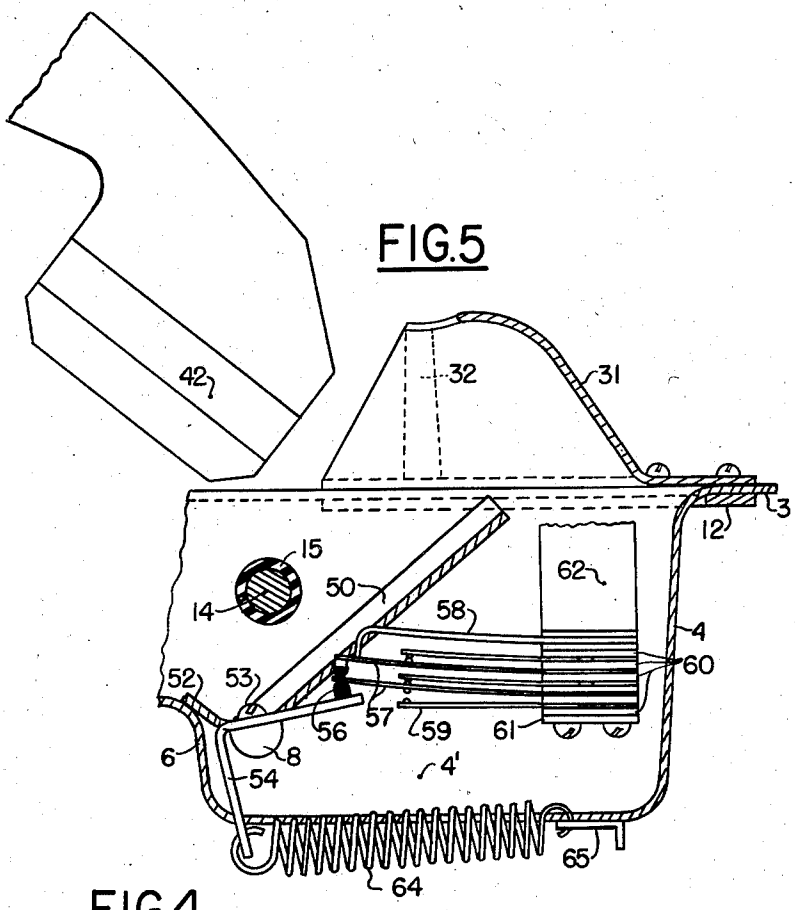
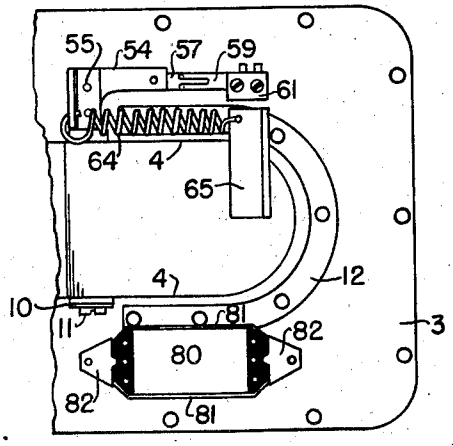


FIG.4



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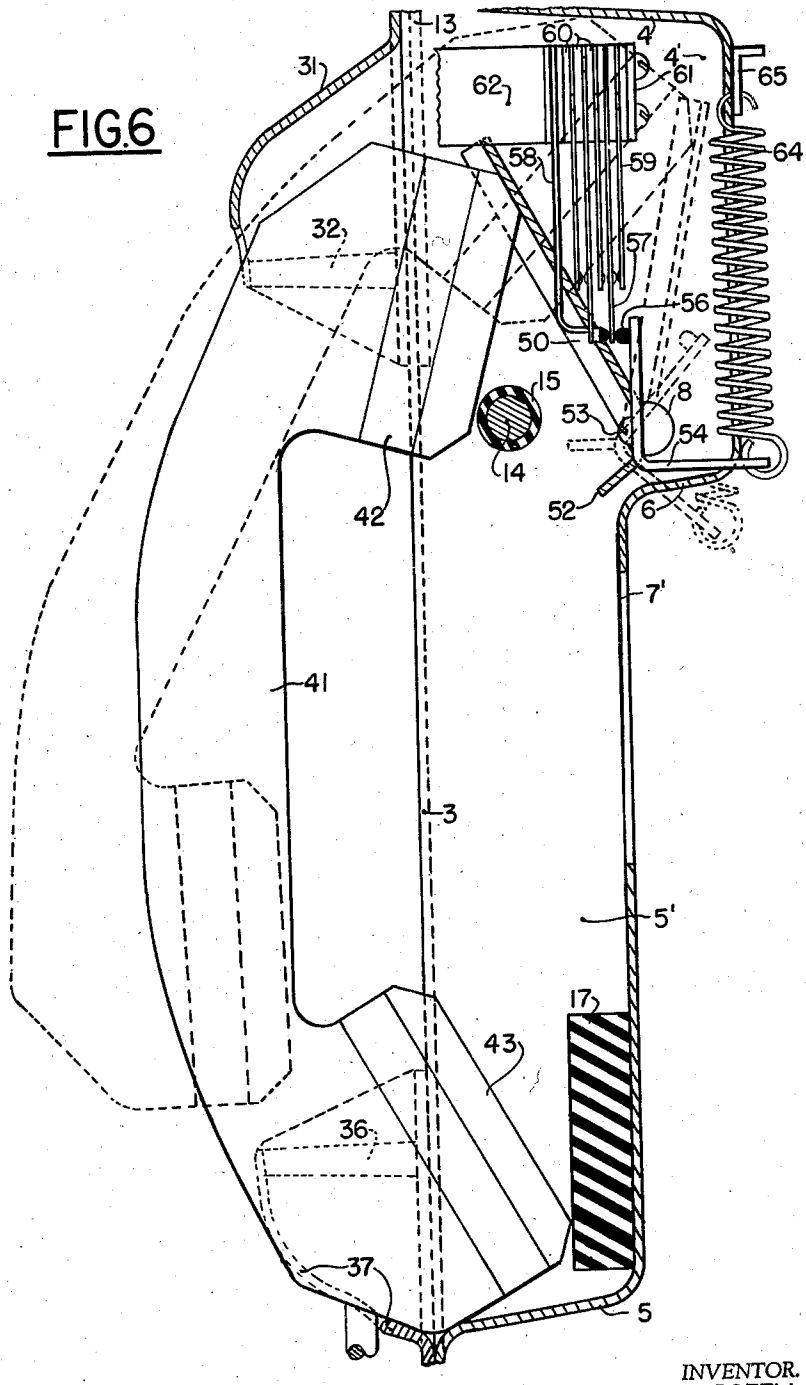
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FIG.6



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FIG. 9

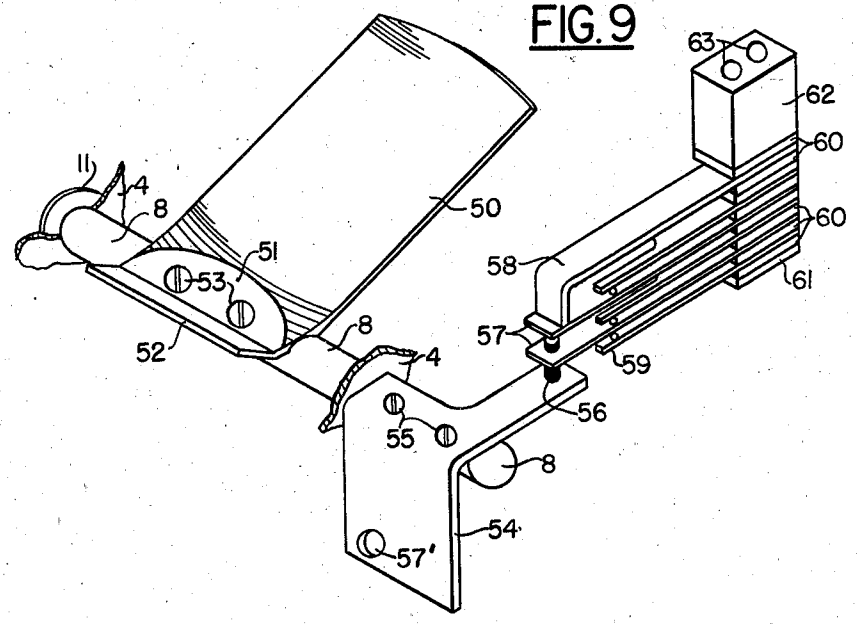


FIG. 7

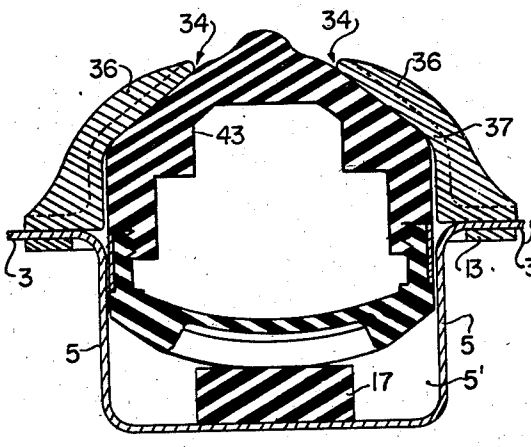
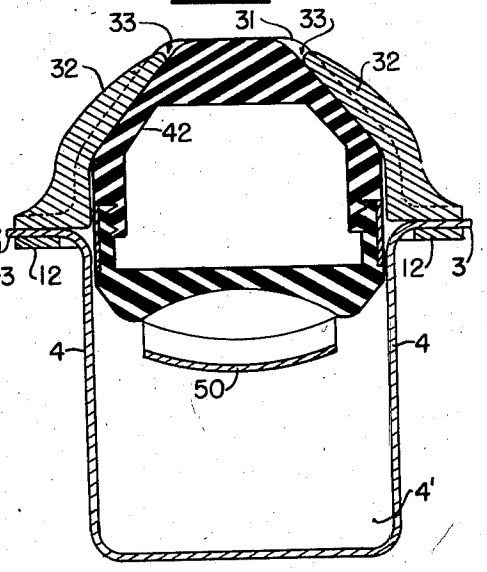


FIG. 8



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Patented May 8, 1945

2,375,681

UNITED STATES PATENT OFFICE

2,375,681

TELEPHONE SET

Herbert F. Obergfell, River Forest, Ill., assignor to Automatic Electric Laboratories, Inc., Chicago, Ill., a corporation of Delaware

Application May 30, 1942, Serial No. 445,129

12 Claims. (Cl. 179—100)

This invention relates in general to telephone sets and in particular to telephone sets for use on board ships.

The telephone set of this invention was designed especially for use on ships and in the Navy, where it is subject to rough usage and severe shocks. This set was also designed to withstand a two-thousand foot pound shock and still be in working order.

The principal object of the invention is to provide a telephone set capable of withstanding a severe shock without rendering the set inoperative.

Another object of the invention is to provide an improved mounting means for the handset telephone of the set so that the handset will not be dislodged or removed from its mounting in response to shocks or concussions thereby causing false operation of the switchhook contacts, while at the same time the user may easily remove such handset from its mounting in the normal use thereof.

A feature of the invention relates to the improved switchhook assembly for operating the switchhook switching contacts in combination with the shock-proof mounting arrangement.

Other features relate to the means for mounting the remaining apparatus of the telephone set so as to withstand severe shocks and to make the same splash-proof.

The above features and others not specifically mentioned are illustrated in the accompanying drawings comprising Figs. 1 to 9, inclusive.

In the drawings Fig. 1 illustrates a front view of the substation set with the handset removed therefrom.

Fig. 2 shows a sectional view on the line A—A of Fig. 1 with the handset added.

Fig. 3 shows a sectional view on the line B—B of Fig. 1.

Fig. 4 shows a partial rear view to more clearly show the location of the switchhook contacts and actuating means therefor.

Fig. 5 shows a sectional view of part of the apparatus on the line C—C of Fig. 1 with the switchhook contacts and actuating means added in order to show the operation which takes place when the handset is removed from its mounting.

Fig. 6 shows a sectional view of part of the apparatus on the line D—D of Fig. 1 with the addition of the handset in its mounting in order to show the normal position of the switchhook assembly and spring contacts. The dotted lines indicate one of the positions the handset and switchhook assembly must be operated to before the handset can be removed from its mounting.

Fig. 7 shows a sectional view on the line E—E of Fig. 1 with the corresponding section of the transmitter housing of the handset added to more clearly show how the contours of the retaining member fit the contour of the transmitter housing to maintain the handset in its mounting.

Fig. 8 shows a sectional view on the line F—F of Fig. 1 with the corresponding section of the receiver housing of the handset added to more clearly show how the contours of the retaining member fit this housing in normal position when the spring-actuated switchhook plate presses the housing against its retaining member.

Fig. 9 shows a perspective view of the switchhook assembly and spring contacts.

Referring to the drawings, the casing 1 comprises a metal base to which are welded the metal arms 2 to form a T-shaped member for mounting the substation set on the wall. At the bottom end of casing 1 are provided screw plugs 28 which upon removal provide openings for connecting with conduit or cable containing the telephone line wires. On the inside of casing 1 is provided a terminal block assembly 79 upon which the telephone wires terminate for interconnection with the substation apparatus. On the top of casing 1 is mounted the ringer mechanism 39, the waterproof clapper rod assembly 40, and ringer gongs 38. An angle iron 30 is welded to the casing 1 to form a shelf for mounting the face plate 3. A rubber gasket 35 is cemented to the angle iron 30 to form a watertight enclosure when the face plate 3 is fastened by means of screws 18 screwed into the tapped holes in the angle iron 30 of casing 1.

The face plate 3 comprises a flat metal plate which has its center portion depressed inwardly at 4 and 5 to form a depression, or recess, extending into the base 1. This depression extends longitudinally almost the entire length of the face plate and has a deeper depression point, or recess at 4' than at 5' as may be readily seen in Figs. 6, 7 and 8. The depression is longer than the handset and of substantially the same width as the handset except where it has been enlarged to provide space for mounting the calling device 7 in the opening 7' provided in the recess 5' shown in Fig. 6.

A pair of retaining members 31 and 37 are fastened to the top of the face plate 3 by means of screws 25 and 26 extending thru holes in the flanges of the retaining members and screwed into the tapped holes in the face plate 3 and re-

inforcing metal strips 12 and 13; the strips 12 and 13 being welded to the face plate 3 before the holes are tapped. These retaining members 31 and 37 are in general cup-shaped and have an inner contour conforming fairly closely to the outer contour of the receiver and transmitter housings of the handset. The retaining members are positioned near the ends and above the recesses 4' and 5' in the face plate and extend outwardly therefrom thereby forming a partial enclosure having an opening between the two retaining members 31 and 37 which is less than the overall length of the handset 41.

The retaining member 31 has reinforcing ribs 32 and the retaining member 37 has reinforcing ribs 36 at the points where the receiver housing 42 and the transmitter housing 43 of the handset 41 normally engage their respective retaining members. This is fully shown in the cross sections shown in Figs. 7 and 8 where it will be seen that the inner contour of the retaining members at lines 33 and 34 conform to the contour of the handset housings. These reinforcing ribs have been placed at this location to prevent bending or breaking of the retaining means at a time when the substation set is subjected to a heavy shock or concussion.

The recesses 4' and 5' extending inwardly from the face plate 3 and the cup-shaped retaining members 31 and 37 provide a partial enclosure which is large enough to easily accommodate the handset and permit both longitudinal and radial movement of the handset into the deeper recess 4' even though the restricted opening between the retaining members is less than the overall length of the handset. The recess 4' is deeper than the recess 5' to permit both longitudinal and radial movement of the handset within the enclosure and to provide space for the switchhook plate 50 which controls the operation of the switchhook spring contact assembly dependent upon whether the handset is in its mounting enclosure or removed therefrom.

An insulating block 17 is secured in the recess 5' and is of the proper thickness to hold the transmitter housing 43 of the handset in engagement with its retaining member 37 and still permit removal and withdrawal therefrom as shown in Fig. 7. A calling device 7 is also mounted in the recess 5' at the opening 7' shown in Fig. 6.

A stop member comprising the rod 14 and insulating sleeve 15 extends transversely across the recess 4' to guide the handset and to prevent inward movement of the receiver housing 42 of the handset until the same has been longitudinally moved into the recess 4' far enough to allow the receiver housing 42 to clear the stop member 14—15. The metal rod 14 is secured to the side walls 4 by means of screws 16.

A switchhook assembly, shown in Fig. 9, is rotatably mounted on the side walls 4 by means of a shaft 8 extending transversely thru the recess 4'. One end of the shaft 8 extends thru a bushing (not shown) in the side wall 4 and is rotatably mounted thereto by means of washer 11 and screw 10 screwed into the shaft 8. The center portion of shaft 8 located within the recess 4' has been notched to permit the curved switchhook plate 50 to be secured thereto by means of screws 53. Portion 51 of plate 50 has been flattened to fit snugly against the notched portion of the shaft 8. The plate 50 is curved slightly to conform to the contour of the receiver housing 42 as shown in Fig. 8. An extension 52 on plate 50 is provided to limit the movement of plate 50 by spring 64 when the handset is removed from its mounting as shown in Fig. 5 where it is seen that this limiting extension 52 engages the curved portion 6 to limit further rotation of the shaft 8 and incidentally further operation of the switchhook switching contacts. The other end of shaft 8 extends thru a bushing (not shown) in the side wall 4 into the hollow space in the base casing 1. This end of shaft 8 is also flattened and to this flattened surface the angular member 54 is secured by means of screws 55. A hole 57' is provided in one arm of member 54 for anchoring one end of spring 64. An insulating bushing 56 is provided on the other arm of member 54 for contacting and operating the switchhook spring contacts.

The switchhook spring contact assembly comprises the usual stationary contact springs 59 and actuating contact springs 57. A heavy spring 58 is also provided in the spring assembly to normally maintain the actuating spring contacts 57 disengaged from contacts 59. This heavy spring 58 also prevents vibration of springs 57 when subjected to extreme shocks or concussions. The contact spring assembly also comprises the usual metal plate 61, insulators 60 separating the adjacent springs, the metal block 62 and screws (shown in Figs. 2, 4 and 6) for securing this assembly to the block 62. The block 62 has tapped holes 63 into which screws 19, extending thru face plate 3, are screwed to fasten the spring assembly to the face plate. An angle iron 65 is welded to the wall 4 for anchoring the other end of spring 64. The spring 64 is tensioned to rotate shaft 8 and thereby operate the switchhook contacts when the handset is removed from its mounting.

A pair of condensers 70 and 74 (Fig. 2) are secured to the face plate 3. Metal bands 75 extend around condenser 74 and are secured to the metal bar 76 which in turn is secured to face plate 3 by means of screws 21. Metal straps 72 and 73 enclose condenser 70 and are secured to metal bar 71 which in turn is secured to the face plate 3 by means of screws 20.

The induction coil 80 is enclosed by two side plates 81 and two end members 82 and is secured to the face plate 3 by means of screws 22 extending thru the face plate 3, collars 83, and into tapped holes in the end members 82. The two side plates 81 are shaped to fit over the Bakelite ends of the induction coil 80 and firmly hold the induction coil while the end members 82 fit over a cut-away portion of the Bakelite ends of the induction coil as shown in Figs. 3 and 4.

An insulated terminal block 84 having terminals 85 for internal wire connections is secured to brackets 86 which are in turn secured to face plate 3 by means of screws 24. A bracket 87 is also provided for fastening the telephone cord (not shown) which extends thru the hole 27 in the face plate and which is looped in the U-shaped portion of the brackets 87.

When the handset 41 is in its mounting the spring-actuated plate 50 holds the handset against the retaining members 31 and 37 as shown in Figs. 6, 7 and 8. Due to the retaining members 31 and 37 and the stop member 14 and 15 the handset is retained within the enclosure formed by the retaining members and recess 4' and 5' when the substation set is subjected to severe shocks or concussions such as exploding bombs or the firing of large guns.

In order to remove the handset from its enclos-

ure it is first necessary to move the handset 41 longitudinally by moving the receiver portion 42 further into the top portion of the enclosure, formed by the retaining member 31 and recess 4', until the transmitter portion 43 is clear of the retaining member 37 and the receiver portion 42 is beyond the stop member 14—15. After this the receiver portion 42 is pushed further into the recess 4' in a radial movement until the handset is in the position shown by the dotted lines in Fig. 6. After this position is reached the handset can then be removed from its mounting.

During the longitudinal and radial movement of the handset, the receiver portion of the handset moves the switchhook plate 50 and member 54 to the dotted line position shown in Fig. 6. As the member 54 is moved away from the switching contacts during this movement the switching contacts are not actuated until the handset is completely removed from its mounting as shown in Fig. 5. The extension 52 on plate 50 engages the curved portion 6 to limit further movement of member 54 and the switchhook spring contacts.

In order to replace the handset in its mounting the reverse order of movements as above set forth are required due to the opening formed by the retaining members 31 and 37; such opening being less in length than the length of the handset. The handset is first pushed into the upper portion of the enclosure, formed by the retaining member 31 and recess 4', at an angle until the handset is in the position shown in dotted lines in Fig. 6. After this movement, the transmitter portion 43 is moved in a radial movement into the recess 5'. The hand pressure by the user may now be removed and in response thereto the plate 50 and spring 64 moves the handset 41 to the position shown in full lines in Fig. 6 with the transmitter housing 43 engaging its retaining member 37 on line 34, as shown in Fig. 7, and the receiver housing 42 engaging its retaining member 31 on line 33, as shown in Fig. 8. In this position the retaining members 31 and 37 prevent outward movement of the handset and the stop members 14—15 and 17 prevent inward movement of the handset when subjected to shocks.

From the foregoing description it will be seen that certain prescribed movements of the handset are necessary before the same can be removed thru the restricted opening in its mounting and therefore a shock-proof mounting has been provided to maintain the handset in its mounting and to prevent false operation of the switchhook spring contacts due to shocks or concussions.

What is claimed is:

1. In a mounting for a telephone receiver, a shockproof mounting means comprising a recess and retaining means for preventing dislodgement or removal of said receiver from its mounting in said recess in response to severe shock or concussion, means including said retaining means for requiring first longitudinal movement and then radial movement of said receiver into said recess before said receiver can be manually removed from said retaining means, and switchhook switching contacts operated only in response to the completion of said movements of said receiver from said retaining means and recess.

2. In a mounting for a handset telephone, mounting means comprising a recess and a pair of retaining members for maintaining said handset telephone in its mounting, means including said retaining members for requiring forward longitudinal movement of the handset telephone into the recess in order to remove a portion of the handset telephone from one of said retaining members and then radial and backward longitudinal movements of the rest of the handset telephone from said recess and the other retaining member in removing the handset telephone from its mounting, a set of switchhook switching contacts, and means for actuating said contacts only in response to said latter backward longitudinal movement of the handset telephone from its mounting.

3. In a mounting for a handset telephone, mounting means comprising a recess and a pair of retaining members for maintaining said handset telephone in its mounting, means including said retaining members for requiring forward longitudinal movement of the handset telephone into the recess in order to remove a portion of the handset telephone from one of said retaining members and then radial and backward longitudinal movements of the rest of the handset telephone from said recess and the other retaining member in removing the handset telephone from its mounting, a set of switchhook switching contacts, and means whereby said forward longitudinal movement of said handset into said recess is ineffective to operate said contacts and said backward longitudinal movement of the handset from its mounting actuates said contacts.

4. In a mounting for a handset telephone, mounting means comprising a recess and a pair of retaining members for maintaining said handset telephone in its mounting, means including said retaining members for requiring forward longitudinal movement of the handset telephone into the recess in order to remove a portion of the handset telephone from one of said retaining members and then radial and backward longitudinal movements of the rest of the handset telephone from said recess and the other retaining member in removing the handset telephone from its mounting, a set of switchhook switching contacts, an arm for actuating said switching contacts, and means for operating said arm in one direction away from said contacts in response to said forward longitudinal movement and for operating said arm in the opposite direction towards said contacts in response to said backward longitudinal movement whereby said contacts are operated by said arm when the handset is completely removed from its mounting.

5. A mounting for a hand telephone set comprising a hollow base, a face plate secured to said base and having a recessed portion extending within said base for receiving both the receiver and transmitter portions of the handset, a shaft pivoted in said face plate and extending thru said recessed portion into said hollow base, a handset actuated lever located in said recessed portion and secured to said shaft, a member located in said hollow base and secured to said shaft, a spring fastened at one end to said face plate and at the other end to said member for actuating said shaft, lever and member, and means including said lever under tension from said spring and shaft assembly for maintaining the hand telephone set in said recessed portion.

6. A mounting for a hand telephone set comprising a hollow base, a face plate secured to said base and having a recessed portion extending within said base for receiving both the receiver and transmitter portions of the handset, a shaft pivoted in said face plate and extending thru said recessed portion into said hollow base, a handset actuated lever located in said recessed portion and secured to said shaft, a member lo-

cated in said hollow base and secured to said shaft, a spring fastened at one end to said face plate and at the other end to said member for actuating said shaft, lever and member, and switchhook contacts secured to said face plate for actuation by said member when the handset is removed from said recessed portion.

7. A mounting for a hand telephone set comprising a hollow base, a face plate secured to said base and having a recessed portion extending within said base for receiving both the receiver and transmitter portions of the handset, a shaft pivoted in said face plate and extending thru said recessed portion into said hollow base, a handset actuated lever located in said recessed portion and secured to said shaft, a member located in said hollow base and secured to said shaft, a spring fastened at one end to said face plate and at the other end to said member for actuating said shaft, lever and member, means including said lever under tension from said spring and shaft assembly for maintaining the hand telephone set in said recessed portion, and switchhook contacts secured to said face plate for actuation by said member when the handset is removed from said recessed portion.

8. A mounting for a hand telephone set comprising a hollow base, a face plate secured to said base and having a recessed portion extending within said base for receiving both the receiver and transmitter portions of the handset, spring-actuated switchhook assembly means located partly within said recessed portion and partly within said hollow base, and means including said last means for maintaining the hand telephone set in said recessed portion.

9. A mounting for a hand telephone set comprising a hollow base, a face plate secured to said base and having a recessed portion extending within said base for receiving both the receiver and transmitter portions of the handset, spring-actuated switchhook assembly means located partly within said recessed portion and partly within said hollow base, means including said last means for maintaining the hand telephone set in said recessed portion, and switchhook switching contacts secured to said face plate for actuation by said assembly means when said hand telephone set is removed from said recessed portion.

10. A mounting for a hand telephone set comprising a hollow base, a face plate secured to said base and having a recessed portion extending within said base for receiving both the receiver and transmitter portions of the handset, spring-actuated switchhook assembly means located partly within said recessed portion and partly within said hollow base, manual replacement of said handset into said recessed portion operating said assembly means against spring tension, and means including said tensioned assembly means for maintaining said handset in said recessed portion.

11. A mounting for a hand telephone set comprising a hollow base, a face plate secured to said base and having a recessed portion extending within said base for receiving both the receiver and transmitter portions of the handset, spring-actuated switchhook assembly means located partly within said recessed portion and partly within said hollow base, manual replacement of said handset into said recessed portion operating said assembly means against spring tension, means including said tensioned assembly means for maintaining said handset in said recessed portion, and a stop located within said recessed portion necessitating longitudinal movement of said handset into said recessed portion against said tensioned assembly means before said handset can be removed from said recessed portion.

12. A mounting for a hand telephone set comprising a hollow base, a face plate secured to said base and having a recessed portion extending within said base for receiving both the receiver and transmitter portions of the handset, spring-actuated switchhook assembly means located partly within said recessed portion and partly within said hollow base, manual replacement of said handset into said recessed portion operating said assembly means against spring tension, means including said tensioned assembly means for maintaining said hand-set in said recessed portion, a stop located within said recessed portion necessitating longitudinal movement of said handset into said recessed portion against said tensioned assembly means before said handset can be removed from said recessed portion, and switchhook switching contacts secured to said face plate actuated by said assembly means in response to the removal and replacement of said handset in said recessed portion.

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