

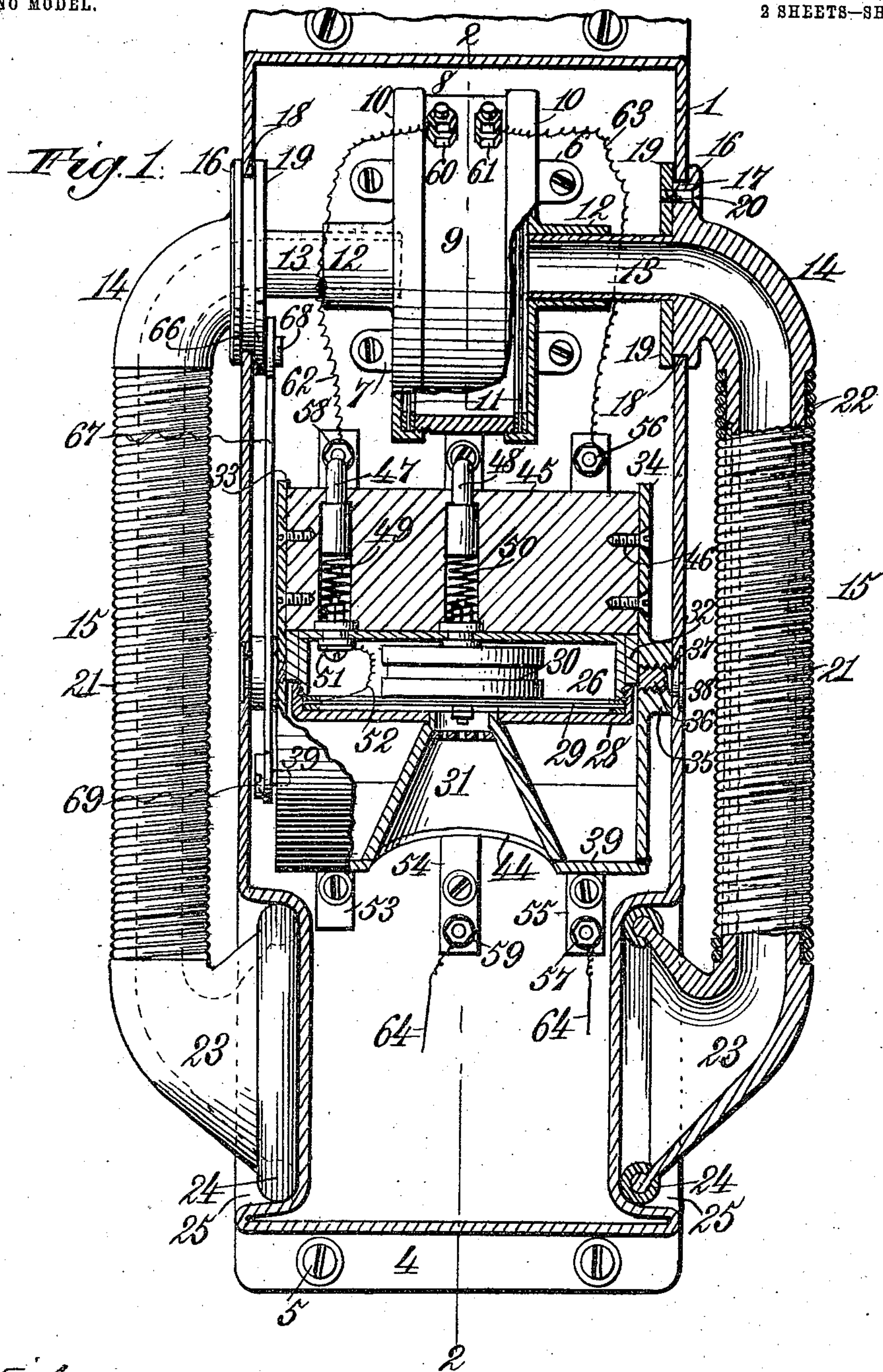
No. 726,836.

PATENTED APR. 28, 1903.

F. W. WOOD.  
TELEPHONIC APPARATUS.  
APPLICATION FILED AUG. 7, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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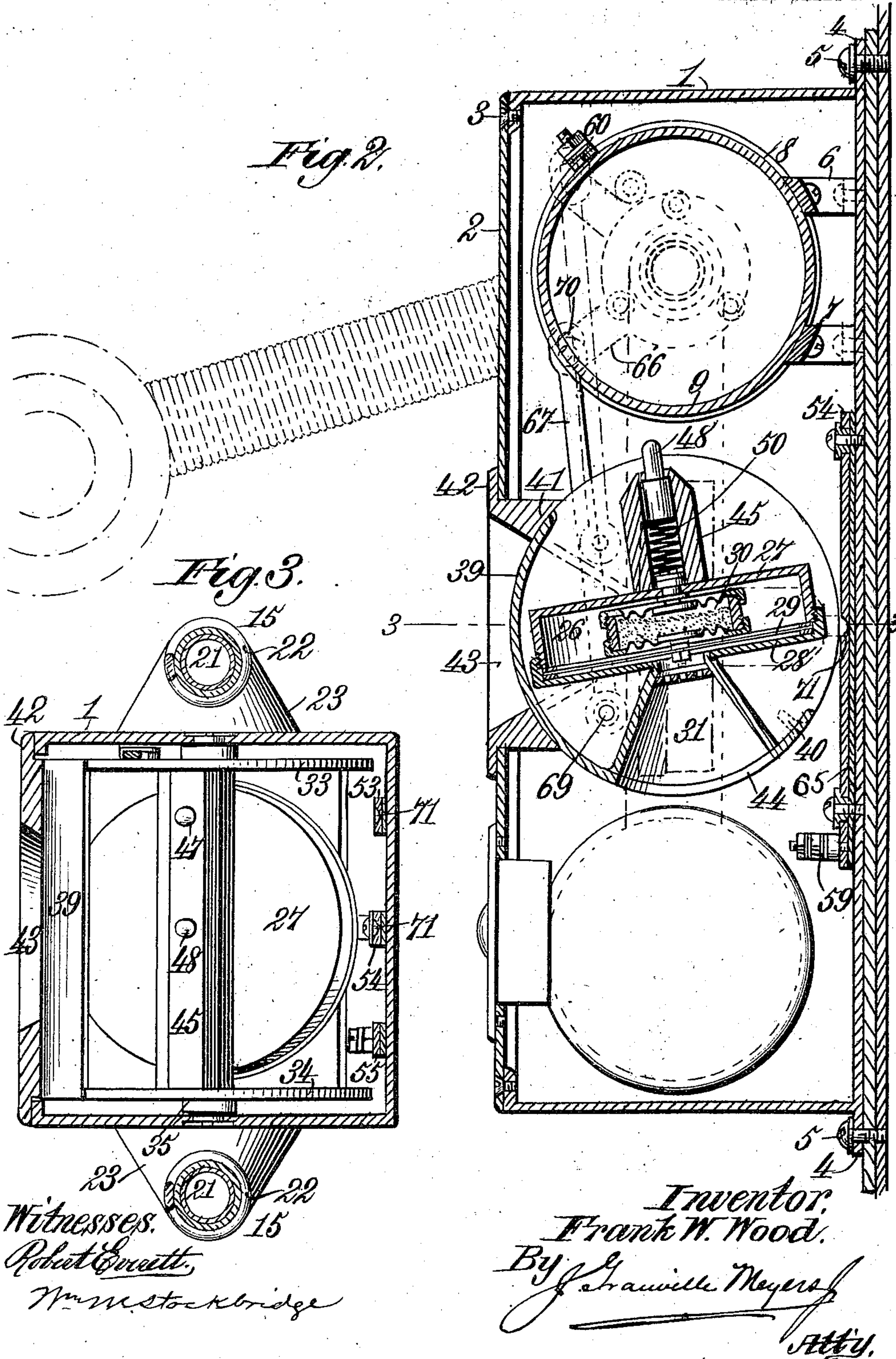
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2 SHEETS—SHEET 2.





# UNITED STATES PATENT OFFICE.

FRANK W. WOOD, OF NEWPORT NEWS, VIRGINIA, ASSIGNOR TO CHARLES CORY & SON, OF NEW YORK, N. Y.

## TELEPHONIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 726,836, dated April 28, 1903.

Application filed August 7, 1902. Serial No. 118,824. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK W. WOOD, a citizen of the United States, residing at Newport News, in the county of Warwick and State of Virginia, have invented new and useful Improvements in Telephonic Apparatus, of which the following is a specification.

My invention relates to telephonic apparatus, and especially to a form of apparatus designed for use upon vessels where certain contingencies arise and have to be met in the successful use of a telephone which do not present themselves in the operation of the instrument on land. Two main objections attending the use of an ordinary form of telephone on vessels are, first, the corroding effect of the damp salt air upon the delicate parts of the receiver and transmitter soon destroys the usefulness of the instrument, and, second, if there be a great deal of noise in the vicinity of the instrument it is very difficult to hear distinctly the words sought to be transmitted. This latter condition may exist if the instrument be located in the engine-room or if it be located in an exposed part of the vessel—as, for instance, on the bridge—and a heavy wind be blowing or a storm be in progress.

To overcome the above objections incident to the use of telephones on shipboard, I have devised the apparatus forming the subject-matter of the present application. Many other advantages, however, are afforded by my invention which are due both to the special construction of apparatus herein disclosed and to the broad underlying principle of the invention, of which such apparatus is to be considered as only one illustration. The advantages claimed for my invention, however, will be fully set forth in the detailed description thereof and need not be recited in detail at this point.

In a companion application, filed August 1, 1902, and serially numbered 117,943, I have illustrated and described a form of apparatus designed to be mounted on a suitable standard and in which a transmitter and receiver mounted on a movable support are inclosed in a casing having an opening, a closure-plate is mounted on said support, and ear-tubes are pivotally mounted in opposite ends of the

casing in a manner to communicate with the receiver and are adapted to be raised and lowered to actuate said movable support, and thereby bring the mouthpiece of the transmitter into or out of coincidence with the opening in the casing and at the same time actuate said closure-plate to uncover or cover said opening, as the case may be. The present invention is in the form of an apparatus intended to be secured to a bulkhead and differs from the construction of apparatus shown in my said application mainly in the essential that the receiver is immovably fixed within the casing and the transmitter alone is adapted to be rotated. While the principle of operation, the object sought to be attained, and the advantages derived in connection with the present invention are all substantially the same as obtain with the construction of apparatus of my said application, the different arrangement of the receiver involved in the present case necessarily involves other differences in the form, construction, arrangement, and operation of parts over what is shown in the prior construction, all of which will more clearly appear in the detailed description to follow and will be specifically indicated in the claims.

In addition to the above the present case embraces certain novel features of construction not necessarily required by the change in the arrangement of parts from that of the apparatus forming the subject-matter of my pending application, which are to be regarded in the light of additional improvements in this art and among which may be mentioned the provision of two diaphragms in the receiver, which coöperate with the respective ear-tubes, and the provision of novel means for closing the ear-tubes.

The objects of the invention, indicated specifically, are to provide a telephone apparatus in which the receiving and transmitting instruments and certain parts directly coöperating therewith shall be inclosed in a water and air tight casing and only be exposed to the action of the atmosphere at the moment of actual use; to provide a telephone apparatus which shall be strong and durable and one that cannot be readily damaged or deranged by the shock of gun fire, impact of



missiles, heavy rolling of the ship, or the like; to produce a "loud-talking" telephone and one that will permit of location in any part of the ship and enable conversation to be distinctly heard under all conditions of local disturbances or noise; to provide for putting the instrument into position for use (which would include opening the inclosing casing and turning the transmitter to a position opposite the opening in the casing) in a single movement; to provide for automatically cutting out the instrument and closing the casing after use; to provide for automatically closing the ear-tubes after use and when the same are released; to provide for directly or positively rotating the transmitter through the medium of the ear-tubes, so that the carbon particles in the microphone shall be shaken up each time the instrument is used, thus preventing the granules from packing or caking, and finally to dispense with the ordinary flexible conductors connecting the receiver to the instrument.

In order that the invention may be clearly understood, I have illustrated the same in the accompanying drawings, in which—

Figure 1 is a central vertical sectional view through the apparatus. Fig. 2 is a longitudinal section on the line 2 2 of Fig. 1; and Fig. 3 is a sectional plan view on the line 3 3 of Fig. 2, the view assuming both ear-tubes to be in the position shown in Fig. 1.

Referring now to the drawings, 1 indicates a metal casing, preferably rectangular in shape and having a removable front 2, held to the casing by screws 3, and on its rear side top and bottom extensions 4, by means of which it may be secured to the bulkhead through the medium of screws 5. In the upper end of the casing 1 and secured to the rear wall thereof by means of brackets 6 and screws 7 is the receiver 8, which comprises a cylindrical shell 9, having its opposite ends closed by means of screw-covers 10, which clamp between them and the respective ends of the shell two diaphragms 11. Each of these diaphragms passes across and in close juxtaposition to a central opening formed in each end or cover 10 of the receiver, which openings are surrounded by cylindrical extensions or thimbles 12, formed integral with the respective covers 10. These thimbles are in the nature of journal-bearings and are adapted to receive snugly the inner ends of extensions 13 of the upper metal curved arms 14 of the ear-tubes 15. Each ear-tube 15 is pivotally mounted in one side of the casing 1 in the following manner: The arm 14 has an annular flanged portion 16, an annular shouldered portion 17, and the extension 13, before mentioned. The casing is provided in each side wall with a circular opening 18, which is of a size to receive snugly, but so as to allow of its readily turning therein, the shouldered portion 17 of the arm 14.

19 indicates a metal ring mounted upon the

extension 13 and secured, by means of screws 20, to the shouldered portion 17. The flanged portion 16 is of somewhat greater diameter than the opening 18, and consequently will lie against the outer face of the casing. The ring 19, which, as shown, is also of greater diameter than the opening 18, will lie against the inner face of the casing. The connection between the ring 19, the wall of the casing 1, and the annular flange 16 is very close, but not to such an extent as to cause binding. In other words, this ring 19 and flange 16 form, with the shoulder 17, an annular groove, which receives the edge portion of the opening 18, the shoulder being journaled in said opening, while the ring and flange operate as the walls of the groove to prevent lateral play. The extension 13 extends to the inner edge of the opening in the cover 10 and is free to revolve in the thimble 12.

Secured on each arm 14 is a flexible tube 21, the outer portion of which is of coiled spring-wire 22, the ear-tubes in this respect, as well as in their entire construction, being the same as shown and described in my companion application aforesaid. In the outer end of each tube is secured an earpiece 23, the annular edge surrounding the opening in which is incased in a rubber guard 24. The opposite side walls of the casing 1 are each provided near the bottom of the casing with a depression or recess 25, which recesses are adapted to receive the rubber-protected edges of the earpieces which lie flush against the bottoms of said recesses and fit somewhat snugly in the latter, as shown, being normally held in such position by the spring of the flexible part 21 of the ear-tubes. When lying in these recesses, the opening in the earpieces will be securely sealed to the entrance of moist air by the frictional engagement of the rubber guard 24 with the bottoms and sides of said recesses. As a result, when in this position no moist air can pass through the ear-tubes to the receiver.

The transmitter is shown mounted below the receiver and is indicated by the numeral 26. Said transmitter comprises a circular casing 27, having a screw-cover 28, which clamps between it and the edge of the casing a diaphragm 29 in such a manner as to render the casing water and moisture proof.

30 indicates the microphone of the transmitter, which may be of any preferred construction and is operatively connected with the diaphragm 29.

Projecting from the cover 28 is the usual tapering mouthpiece 31.

At opposite sides of the transmitter are two lugs 32, formed integral with the casing 27 and by means of which the transmitter is secured at opposite sides to two circular disks 33 34, respectively, by screws passed through said disks and screwing into said lugs, the nature of the views selected not permitting said screws to be shown. Each of the disks 33 34 has on its outer side at the



center a lug 35, which is provided with an outer flat end adapted to lie flush against the inner side of the casing 1 and with a screw-threaded aperture. A screw 36, passed through an opening in the side wall of said casing, is screwed into said aperture and has a head 37 journaled in said opening. A plate 38, inserted or screwed into a recess of larger diameter than said opening and surrounding the same, serves as a protection for this journal-bearing. Extending part way around the peripheries of the disks 33 34 is a curved closure-plate 39, which is secured at one end portion only to the edges of said disks by the screws 40, so that the greater portion of said closure-plate is left free or unconnected to the disks 33 34, and this free portion of the plate has a tendency to spring away from said disks, so as to press closely against a smooth bearing-surface afforded by an annular projection 41, forming part of a mouthpiece 42, secured in the front wall 2 of the casing and affording the opening 43. As clearly shown by Fig. 2, the closure-plate 39 will operate normally to close the opening 43 securely. In that end or portion of the closure-plate 39 which is secured to the disks 33 34 is provided an opening 44, which is of the same size as the opening 43 and adapted to be brought into coincidence with said opening when the instrument is to be used. The mouthpiece 31 projects outward to the closure-plate 39, of which it may form a part, if desired, and its opening coincides with the opening 44.

Mounted on the base of the transmitter and extending between the disks 33 34 is a block 45, of insulating material, which is secured at opposite ends to said disks by means of screws 46. Suitably confined within this block are movable metal contact-pins 47 48, the points of which project outward beyond the edge of the block and are normally pressed outward by means of coiled springs 49 50. These springs also serve as conductors, the spring 49 connecting the pin 47 with a binding-post 51 on the base of the transmitter, but insulated therefrom, and the spring 50 being electrically connected with the microphone 30. From the binding-post 51 a conductor 52 leads to the diaphragm 29 of the transmitter.

Secured on the inner side of the rear wall of the casing 1 are three parallel metal strips 53, 54, and 55, respectively, two of which strips, 53 and 54, are in the path of movement of the contact-pins 47 and 48, respectively, and may be termed "contact-strips." The other strip 55 serves merely as a conductor and has at its upper end a binding-post 56 and at its lower end a binding-post 57. At the upper end of the contact-strip 53 is a binding-post 58, and at the lower end of the contact-strip 54 is a binding-post 59. On the receiver are two binding-posts 60 61. A conductor 62 connects the binding-posts 58 and 60, and a conductor 63 connects the bind-

ing-posts 56 and 61. From the binding-posts 57 and 59 lead the line-wires 64. Each of the metal strips 53, 54, and 55 is insulated from the casing 1 by means of suitable insulating material 65, interposed between said strips and the wall of the casing. As shown by Fig. 2, when the telephone is not in use the contact-pins 47 and 48 are in a position considerably removed from the contact-strips 53 and 54, and of course the circuit through the apparatus is broken. In order to use the apparatus, the contact-pins must first be brought into contact with the respective contact-strips 53 54 to close the circuit, and the mouthpiece 31 of the transmitter must be brought opposite the opening 43 in the casing. Both of these results are simultaneously effected at the same time that the ear-tubes are raised to the ears by the following mechanism: On one of the rings 19 (that shown at the left of Fig. 1) is provided an arm 66, (shown by dotted lines in Fig. 2,) with the outer end of which the upper slotted end of a link 67 is pivotally connected by means of a journal-screw 68. The lower end of said link is pivotally connected to the disk 33 a considerable distance to one side of the center of the same by a journal-screw 69. This connection can be made with both of the disks 33 34, if desired. The upper end of the link 67 is slotted, as stated, and this slot 70 permits of a movement of the screw 68 therein without actuating the link 67, for a purpose to be presently described. Each of the contact-strips 53 54 is provided about centrally of its length with a shallow recess 71, one of which is shown in Fig. 2, into which the contact-pins 47 48 are adapted to spring to arrest the movement of the transmitter.

The operation of the apparatus will now be given, first premising that the transmitter, with its mouthpiece and microphone, the block 45, with its contact-pins, the closure-plate 39, and the disks 33 34 all revolve together as a single structure upon the heads 37, journaled in the side walls of the casing 1 as bearings. To use the telephone, an ear-tube 15 is taken in each hand and pressed outward to remove the earpieces 23 out of the recesses 25 and then raised, which movement of the ear-tubes through the connection of the link 67 with the arm 66 and the disk 33 causes the disks 33 34 to revolve, and this action is continued until the contact-pins 47 48, which will thereby be brought into engagement with the contact-strips 53 54 and pressed inward, spring out into the recesses 71, which will offer sufficient resistance to the further upward movement of the ear-tubes to indicate to the user that the mouthpiece of the transmitter has been brought into coincidence with the opening 43 in the front wall of the casing. As the ear-tubes are raised from their lowermost position the screw 68 will first rise in the slot 70 and then engage the upper end of said slot to raise the link 67 and produce the move-



ment of parts just described. The relative arrangement of the parts is such that the ear-tubes have to be raised somewhat higher than is necessary for their use before the contact-pins will be brought into engagement with the recesses 71. The ear-tubes are now slightly lowered and applied to the ears. In this movement the screw 68 will be carried away from contact with the upper end of the slot 70 and will occupy a position intermediate the ends of the slot, so that the movements of the head, which will naturally occur during the use of the telephone, will not cause the screw 68 to strike against either end of the slot, and thereby produce an unpleasant sound or possibly move the contact-pins out of their recesses. The ear-pieces are sufficiently large to entirely inclose the ears, so that all local noises are shut out. The spring of the ear-tubes will cause the rubber guards 24 to press lightly against the side of the head, but at the same time with sufficient force to prevent the ear-tubes from falling, so that after having once adjusted the tubes the user may employ his hands in holding onto some part of the vessel to steady himself, as is frequently necessary during rough weather. It will be understood, of course, that when the contact-pins engage with the contact-strips the circuit through the instrument will be closed. The length of the ear-tubes 15 is such that when adjusted to the ears the mouth will be brought into the proper position relative to the opening 43 for conversation. When through using the instrument, the ear-pieces are removed from the ears and the ear-tubes turned down until the earpieces spring into the recesses 25, when the movement of the ear-tubes will be arrested. If the user neglects to turn the ear-tubes downward, their weight is such as to overcome the frictional contact of the pins 47 48 in the recesses 71 and the ear-tubes will fall by gravity. This movement will, of course, carry the contact-pins out of engagement with the contact-plates and break the circuit and concurrently move the closure-plate 39 over the opening 43 and carry the mouthpiece of the transmitter away from said opening. In each use of the telephone, therefore, the transmitter will be revolved, and this will necessarily cause a movement of the carbon granules in the microphone, and thus prevent caking or packing of the same. The use of two diaphragms in the receiver insures a clear reproduction of the sounds and their distinct transmission through the ear-tubes.

I have herein shown and described one form of apparatus for carrying out the objects and purposes of the invention; but I do not wish to be understood as limiting myself to this form or construction, as changes or modifications may be made without departing from the spirit of the invention. Likewise I do not wish to be understood as limiting myself to the particular combination of parts herein disclosed, and I reserve the

right to use the various novel elements of the structure separately or in other equivalent combinations.

While I have described the form of apparatus shown herein as being especially adapted for use on board ships, it will of course be obvious that the apparatus may advantageously be employed in any and all places where local noises are prevalent or the conditions of the atmosphere are such as to injuriously affect instruments of this kind—as, for instance, in factories, noisy engine-rooms, power-houses, docks or wharves, and like places.

Having thus fully described my invention, what I claim as new is—

1. In a telephone apparatus, a stationary receiver, movable ear-tubes communicating therewith, a movable transmitter, and means actuated by one of said ear-tubes for moving said transmitter.

2. In a telephone apparatus, a stationary receiver, movable ear-tubes communicating therewith, a rotatable transmitter, and means actuated by one of the ear-tubes for rotating said transmitter.

3. In a telephone apparatus, a stationary receiver, ear-tubes rotatably mounted therein, a movable transmitter, and means actuated by one of the ear-tubes for moving said transmitter.

4. In a telephone apparatus, a casing having an opening, a stationary receiver mounted within said casing, movable ear-tubes communicating with said receiver, a transmitter also mounted within said casing, a movable closure for said opening and means connected with one of said ear-tubes for actuating said closure.

5. In a telephone apparatus, a casing having an opening, a stationary receiver mounted within said casing, movable ear-tubes communicating with said receiver, a movable transmitter also mounted within said casing, a closure for said opening, and means connected with one of said ear-tubes for moving said transmitter and simultaneously actuating said closure.

6. In a telephone apparatus, a casing having an opening, a stationary receiver mounted within said casing, ear-tubes journaled in said casing and communicating with said receiver, a rotatable transmitter also mounted within said casing, a closure for said opening, and means connected with one of said ear-tubes for rotating said transmitter and simultaneously actuating said closure.

7. In a telephone apparatus, a transmitter and a stationary receiver, a casing inclosing the same and having an opening, movable ear-tubes communicating with said receiver and a movable closure for said opening adapted to be operated by one of said ear-tubes.

8. In a telephone apparatus, a transmitter and a stationary receiver, a casing inclosing the same and having an opening, movable ear-tubes communicating with said receiver,



and a closure for said opening movable with said ear-tubes to cover or uncover the opening.

9. In a telephone apparatus, a transmitter and a stationary receiver in electrical connection with the line-wires and battery, a casing inclosing the same and having an opening, movable ear-tubes communicating with said receiver, a movable closure for said opening adapted to be operated by said ear-tubes, and means for making or breaking the connection with the line-wire and battery in the movements of said ear-tubes.

10. In a telephone apparatus, a stationary receiver, movable ear-tubes communicating therewith, a series of insulated contact-strips, a conductor connecting one of said contact-strips with the receiver, a line-wire connected with the other of said contact-strips, a conductor connecting the receiver with the other line-wire, a movable transmitter carrying a series of contact-pins in electrical connection therewith, and means actuated by one of said ear-tubes to move said transmitter and thereby carry said contact-pin into or out of engagement with said contact-strips, respectively, to close or open the circuit through the instrument.

11. In a telephone apparatus, a casing having an opening, a stationary receiver located within said casing, movable ear-tubes communicating with said receiver, a closure for said opening movable with one of said ear-tubes to cover or uncover the opening, and a transmitter also located within said casing and movable with said ear-tube to have its mouthpiece brought into or out of coincidence, respectively, with said opening at the same time that the opening is uncovered or covered by said closure.

12. In a telephone apparatus, a casing having an opening, a stationary receiver located within said casing, movable ear-tubes communicating with said receiver, a slidable closure-plate for said opening and itself having an opening and movable with one of said ear-tubes to have its opening brought into or out of coincidence with the opening in the casing, a transmitter also located within said casing and movable with said ear-tube and having a mouthpiece disposed opposite to the opening in said closure-plate.

13. In a telephone apparatus, a casing having an opening, a movable member located within said casing and carrying a transmitter, a stationary receiver also located within said casing, movable ear-tubes communicating with said receiver, means connected with one of said ear-tubes for actuating said movable member to bring the mouthpiece of the transmitter into or out of coincidence with said opening, and means for covering and uncovering said opening.

14. In a telephone apparatus, a casing having an opening, a rotatable member located within said casing and carrying a transmitter, a stationary receiver also mounted within the

casing, pivotally-mounted ear-tubes communicating with said receiver, means connected with one of said ear-tubes for actuating said rotatable member to bring the mouthpiece of the transmitter into or out of coincidence with said opening, and means for covering and uncovering said opening.

15. In a telephone apparatus, a casing having an opening, a rotatable member located within said casing and carrying a transmitter, a stationary receiver also located within said casing, pivotally-mounted ear-tubes communicating with said receiver, means connected with one of said ear-tubes for actuating said rotatable member to bring the mouthpiece of the transmitter into or out of coincidence with said opening, said ear-tubes having a movement independent of said rotatable member, and means for covering and uncovering said opening.

16. In a telephone apparatus, a casing having an opening, a rotatable member located within said casing and carrying a transmitter, a stationary receiver also located within said casing, pivotally-mounted ear-tubes communicating with said receiver, means connected with one of said ear-tubes for actuating said rotatable member to bring the mouthpiece of the transmitter into or out of coincidence with said opening, said ear-tubes having a movement independent of said rotatable member, and means carried by said movable member for covering and uncovering said opening.

17. In a telephone apparatus, a casing having an opening, a movable member located within said casing and carrying a transmitter, a stationary receiver also located within said casing, movable ear-tubes communicating with said receiver, means connected with one of said ear-tubes for actuating said movable member to bring the mouthpiece of the transmitter into or out of coincidence with said opening, and means carried by said movable member for covering and uncovering said opening.

18. In a telephone apparatus, a casing having an opening, a rotatable member located within said casing and carrying a transmitter, a stationary receiver also mounted in said casing, pivotally-mounted ear-tubes communicating with said receiver, means connected with one of said ear-tubes for actuating said rotatable member to bring the mouthpiece of the transmitter into or out of coincidence with said opening, and a plate carried by said rotatable member for covering and uncovering said opening.

19. In a telephone apparatus, a casing having an opening, a rotatable member located within said casing and carrying a transmitter, a stationary receiver also mounted within the casing, pivotally-mounted ear-tubes communicating with said receiver, means connected with one of said ear-tubes for actuating said rotatable member to bring the mouthpiece of the transmitter into or out of coincidence



dence with said opening, and a plate carried by said rotatable member for covering and uncovering said opening, said plate having a free or unconnected portion adapted to press outward toward said opening.

20. In a telephone apparatus, a casing having an opening, a mouthpiece secured in said opening and presenting on the interior of the casing a concaved bearing-surface, a rotatable member located within said casing and carrying a transmitter, a stationary receiver also mounted within the casing, pivotally-mounted ear-tubes communicating with said receiver, means connected with one of said ear-tubes for actuating said rotatable member to bring the mouthpiece of the transmitter into or out of coincidence with the mouthpiece of the casing, and a curved plate carried by said rotatable member for covering and uncovering the latter, said plate having a free or unconnected portion adapted to press outward against said bearing-surface.

21. In a telephone apparatus, a casing having an opening, a movable member located within said casing and carrying a transmitter, a stationary receiver also located within said casing, ear-tubes communicating with said receiver, means for actuating said movable member to bring the mouthpiece of the transmitter into or out of coincidence with said opening, and means for covering and uncovering said opening.

22. In a telephone apparatus, a casing having an opening, a movable member located within said casing and carrying a transmitter, a stationary receiver also located in said casing, ear-tubes communicating with said receiver, means for actuating said movable member to bring the mouthpiece of the transmitter into or out of coincidence with said opening, means for automatically stopping the transmitter in the former position, and means for covering and uncovering said opening.

23. In a telephone apparatus, a casing having an opening, a stationary receiver mounted in said casing, ear-tubes communicating with said receiver, a rotatable member also located within said casing and carrying a transmitter, means for actuating said rotatable member to bring the mouthpiece of the transmitter into or out of coincidence with said opening and means carried by said rotatable member for covering and uncovering said opening.

24. In a telephone apparatus, a stationary receiver, ear-tubes pivotally connected thereto and communicating therewith, a movable member carrying a transmitter and a connection between one of said ear-tubes and said movable member.

25. In a telephone apparatus, a stationary receiver, ear-tubes pivotally connected there-

to and communicating therewith, a movable member carrying a transmitter and a link connection between one of said ear-tubes and said movable member.

26. In a telephone apparatus, a stationary receiver, ear-tubes pivotally connected thereto and communicating therewith, a rotatable member carrying a transmitter and a link connection between one of said ear-tubes and said rotatable member.

27. In a telephone apparatus, a stationary receiver, ear-tubes pivotally connected thereto and communicating therewith, a rotatable member carrying a transmitter, and a link pivotally connected to said rotatable member and having a pivoted and slotted connection with one of said ear-tubes.

28. In a telephone apparatus, a stationary receiver, ear-tubes pivotally connected thereto and communicating therewith, an arm carried by one of said ear-tubes having a pin, a rotatable member carrying a transmitter, and a link pivotally connected to said rotatable member and having a slotted connection with said pin.

29. In a telephone apparatus, in combination with a casing provided on opposite sides with depressions, and having a closable opening, a transmitter and a receiver mounted in said casing, flexible spring-tubes pivotally mounted in opposite sides of the casing and communicating with said receiver and having a normal tendency to spring toward each other, and earpieces at the outer ends of said tubes adapted to be received in said depressions.

30. In a telephone apparatus, a casing having a closable opening and provided in opposite side walls with depressions, a transmitter and a receiver mounted therein, tubes pivotally mounted in opposite sides of the casing and communicating with the receiver, and earpieces on the outer ends of said tubes adapted to be received into said depressions.

31. In a telephone apparatus, a casing provided in opposite sides with depressions, and resilient ear-tubes journaled in said casing and having earpieces normally acting to enter said depressions.

32. In a telephone apparatus, a casing inclosing a receiver and transmitter and provided in opposite sides with depressions, and resilient ear-tubes communicating with said receiver and having earpieces normally acting to enter said depressions.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK W. WOOD.

Witnesses:

J. E. WARREN,  
G. F. MASON.