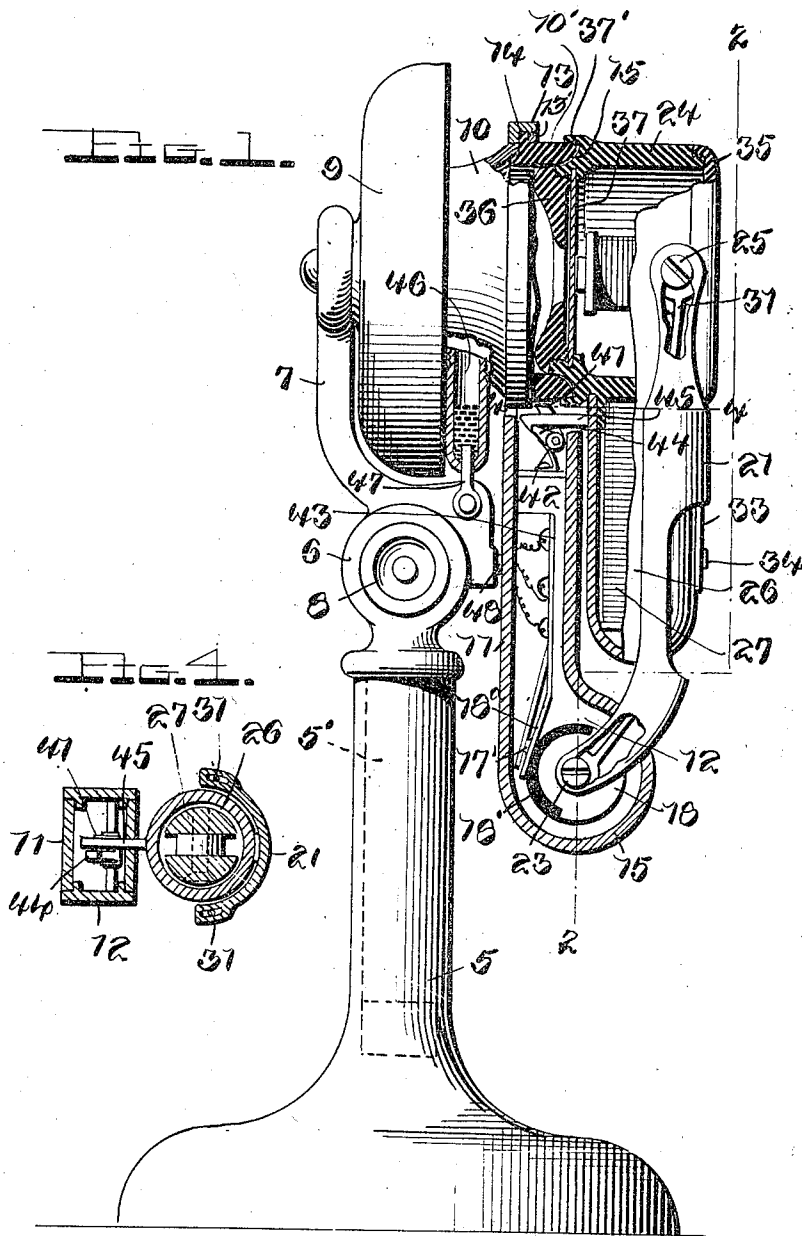


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TELEPHONE.
APPLICATION FILED SEPT. 7, 1910.

1,001,685.

Patented Aug. 29, 1911.

3 SHEETS—SHEET 1.



Inventor

A.G. Remhilt.

Witnesses

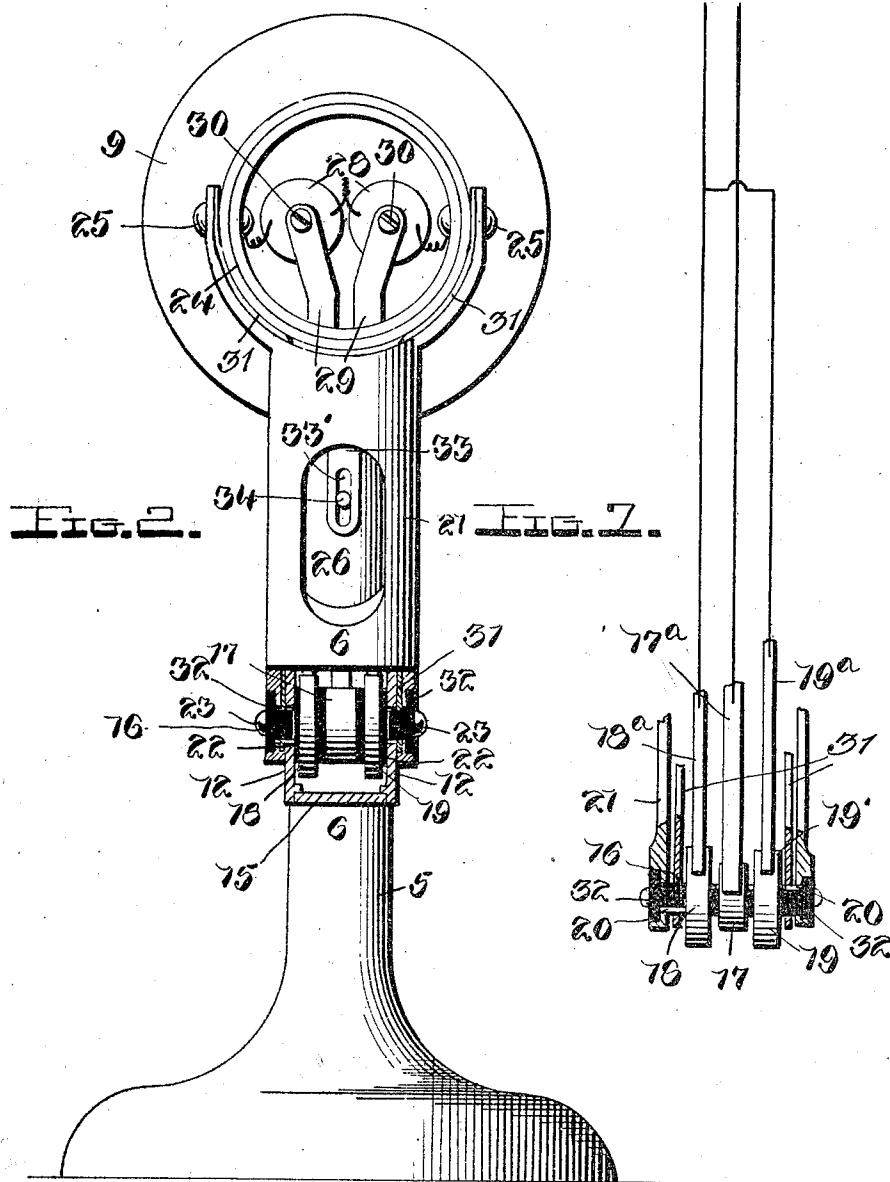
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3 SHEETS—SHEET 2.



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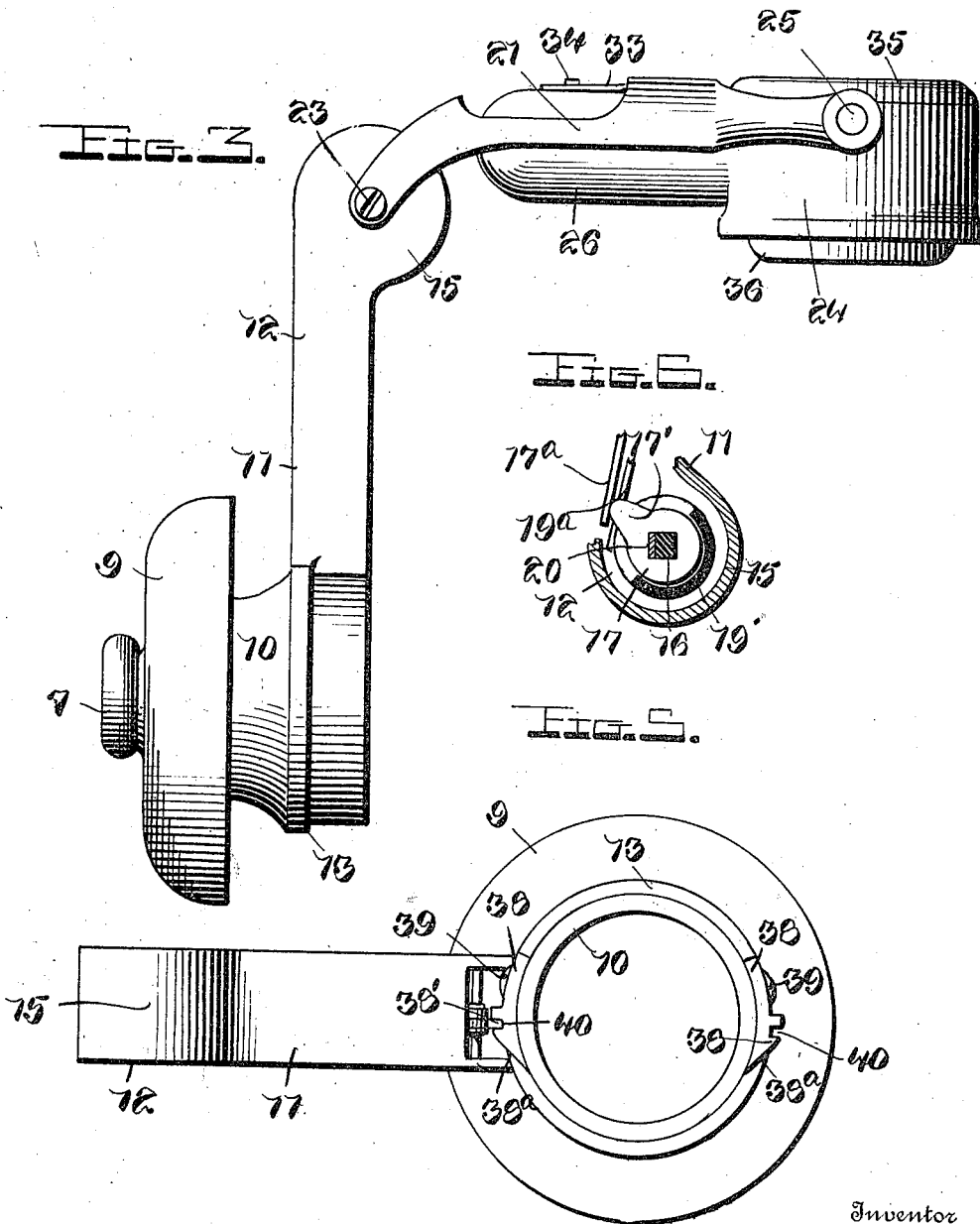
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ARTHUR G. REMHILT, OF PHILADELPHIA, PENNSYLVANIA.

TELEPHONE.

1,001,685.

Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed September 7, 1910. Serial No. 580,822.

To all whom it may concern:

Be it known that I, ARTHUR G. REMHILT, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Telephones, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in telephones and more particularly to means for mounting and supporting a telephone receiver whereby the same may be readily adjusted so that it can be applied to either ear and is so arranged with relation to the transmitter that the user is prevented from bringing his mouth too close to the diaphragm, whereby the objectionable muffling of the voice tones is eliminated, thus conducing to the perfect elucidation of the message by the receiver at the other end of the line.

A further object of the invention is to provide new and novel means for movably mounting the receiver upon the mouthpiece of the transmitter and for locking the receiver in its adjusted position for use by the operator, and means for automatically connecting and disconnecting the line and bell circuits when the receiver is moved into position for use and returned to its inoperative position.

Another object of the invention is to provide a convenient and easily operated telephone receiver which is light in weight, may be inexpensively constructed and is absolutely dust-proof and sanitary.

A still further object of the invention resides in the provision of a telephone transmitter having a tubular arm movable thereon and a telephone receiver pivoted in the end of said arm and movable into the mouthpiece of the transmitter to close the same, said transmitter arm and the receiver carrying co-acting elements to support the receiver in its inoperative position, and means on the mouthpiece of the transmitter engageable with the locking element in the transmitter arm to automatically release the receiver when the arm is swung to a lateral position so that the receiver may be dis-

posed for application to the ear of the operator.

Still another object of the invention is to provide means whereby the bell circuit is automatically connected and disconnected when the receiver is moved to its operative and inoperative positions.

With these and other objects in view, the invention consists of the novel features of construction and the combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, showing a telephone receiver and transmitter constructed in accordance with the present invention; Fig. 2 is a section taken on the line 2—2 of Fig. 1, the end cap of the receiver being removed; Fig. 3 is a top plan view of the transmitter showing the receiver in its operative position; Fig. 4 is a section taken on the line 4—4 of Fig. 1; Fig. 5 is a front elevation of the transmitter showing the movable arm in locked engagement therewith; Fig. 6 is a section taken on the line 6—6 of Fig. 2; and Fig. 7 is a diagrammatic view showing the line and bell circuit connections.

In the embodiment of my invention illustrated in the accompanying drawings I have illustrated the same as applied to the ordinary desk telephone, but it will be understood that the invention is also applicable to the ordinary wall telephone or phones mounted in any other desirable manner.

5 indicates the stand of a telephone of the above well known character. A rod 5' is telescopically mounted in the stand 5 so that the transmitter may be adjusted to any desired height. Upon the upper end of this rod the spaced ears 6 are formed. A supporting arm 7 is positioned at one end between these ears and is adapted to be rigidly secured against movement by a set screw 8. Upon the upper end of the supporting arm 7 the transmitter 9 is mounted. It will be obvious that by loosening the set screw the transmitter may be arranged in any desired angular position for convenience in speaking. The transmitter 9 is provided with the usual mouthpiece 10 upon

which is mounted for swinging movement a hollow arm 11. This arm comprises a main body portion which is provided with the removable side plates 12, the purpose of which will be apparent from the following description: The mouthpiece 10 of the transmitter is provided with an annular extension 10' which is threaded or otherwise secured thereto. This extension has a circumferential rib 14 formed thereon with which an angular flange 13 formed upon the body of the arm 11 engages as shown in Fig. 1 of the drawings. A ring 13' has threaded engagement in the flange 13 to retain the same upon the rib 14. The arm is thus mounted for free swinging circular movement on the mouthpiece and at its other end is forwardly projected and circularly formed, as shown at 15. In the side plates of the arm at its free end the ends of a shaft 16 are mounted. The intermediate portion of this shaft between the side plates is squared and upon the same the contact disks 17, 18, and 19 are mounted. The shaft 16 is formed of hard rubber or other suitable non-conducting material and is provided at each end with a contact plate 20, said plates being arranged upon opposite faces of the insulating shaft. The current is adapted to be transmitted through the disks 17, 18 and 19 and the plates 20 to the magnets carried by the receiver, as will presently appear.

The receiver arm 21 is curved at its lower end and bifurcated to engage upon the opposite side plates of the transmitter arm. This bifurcated end of the receiver arm receives the ends of the shaft 16, suitable non-conducting washers 32 being disposed against the ends of the shaft to insulate the contact plates 20 from the heads of the screws 23. Thus, it will be seen that upon the swinging movement of the receiver arm, the shaft 16 will be rotated together with the contact disks 17, 18 and 19. The contact disk 19 is provided with an insulated peripheral portion 19' which is adapted to engage a contact spring 19^a when the receiver is in its operative position to disconnect or break the bell circuit. The other disk 18 is provided with a similar insulated portion 18' which engages a contact spring 18^a of one of the line circuit wires to which the bell wire is joined. The other line wire is connected to a contact spring 17^a which bears upon the periphery of the disk 17. The other end of the receiver arm 21 is also bifurcated, or forked to receive a receiver head 24, said arm being secured to opposite sides of the head by means of the screws 25. A cylindrical elongated casing 26 is carried by the receiver head and is disposed within the semi-cylindrical receiver arm 21. This casing carries a magnet 27 which is of the

double pole variety and is connected to the electro-magnet coils 28 arranged in the receiver head 24. The magnet 27 and the core of the coils 28 are connected through the medium of the conducting arms 29 extending from the double pole magnet 27 and fixed at their upper ends to the ends of the magnets 28 by means of suitable screws 30. A conducting rod 31 extends along each side of the semicylindrical receiver arm 21 and have their ends mounted upon the shaft 16 in engagement with the contact plates 20, and their other ends secured to the receiver head by means of the screws 25. Washers 32 are arranged between the ends of the shaft 16 and said conducting rods. A spring plate 33 is secured to the inside of the receiver arm 21 and is provided with a longitudinal slot 33' to receive a pin 34 fixed in the magnet casing 26. The receiver head is thus yieldingly held against swinging movement between the upper ends of the arms 21. Said slotted spring plate will, however, permit of the convenient adjustment of the receiver head to the ear of the operator.

The receiver head 24 is, of course, formed of insulating material and has arranged on each end a removable cap 35 and 36. The cap 36 secures in one end of the receiver head a diaphragm 37, as is usual in the construction of telephone receivers. The end of the receiver head is formed with an annular reversely curved surface for engagement with one edge of the enlarged annular end of the receiver arm 11. A circular lip 37' is formed on the receiver head and engages upon the outer edge of the annulus 13, said edge being convexed and slightly spaced from the surface of the receiver head so as to permit of the easy movement of the receiver into and out of the extension of the mouthpiece of the transmitter.

Upon the opposite sides of the mouthpiece extension 10' of the transmitter, a plate 38 is secured by means of the screws 39 and has formed on one end a lug 38' having a beveled edge 38^a. Immediately above this beveled edge of the lug a notch or recess 40 is formed therein. This notch is adapted to receive a locking dog 41 pivotally mounted in the hollow transmitter arm 11 and yieldingly held against movement by means of a leaf spring 42 fixed at one end to one of the flanged edges of a plate 43 carried by one of the removable side plates 12 of the arm 11. It will be obvious that when the receiver arm is swung laterally to either side of the transmitter mouthpiece, the dog 41 will engage the beveled edge of the lug 38' and be forced outwardly against the tension of the spring 42. After passing the lug 38' this spring forces the locking dog into the notch 40, thus securely locking the receiver

arm in its adjusted position. Upon the dog 11 a lug 44 is formed which is engaged by a latch finger 45 carried by the magnet casing 26 which is secured to the receiver head. Simultaneously with the locking of the transmitter arm, the receiver is released by the disengagement of the lug 44 from the end of the latch finger 45. Thus as the receiver arm moves to the desired position, the operator swings the receiver head out of the mouthpiece extension 10' of the transmitter so that it extends forwardly from the free end of the transmitter arm and is disposed in position for application to the ear of the operator. As before stated, this movement of the receiver arm breaks the bell circuit and connects the line circuit, after the usual connections have been properly made at the central office. It will be observed from reference to Fig. 7 that the disks 17 and 19 are arranged upon one of the contact plates 20 of the shaft 16 and that the other disk 18 is arranged upon the other of said contact plates, whereby the disk 18 is at all times insulated from the disks 17 and 19. When in operative position, the spring 19^a is engaged with the insulated portion of the disk 19, thereby breaking or disconnecting the bell circuit and stopping the ringing of the telephone bell. At the same time the receiver and transmitter are placed in the circuit through the intermediate disk 17, disk 18 and the contact spring and magnets 27 and 28. The movement of the receiver head into position for use after the locking of the swinging receiver arm is accelerated by means of the contact spring 17^a which engages a lug 17' formed on the intermediate contact disk 17. It will thus be seen that when the receiver head is in its inoperative position, the bell circuit is connected through the disks 17 and 19 and when said head is in its operative position the line circuit is connected through the disks 17 and 18. After the receiver has been used and it is again moved to its inoperative position in the mouthpiece of the transmitter the latch finger 45 extends into the arm 11 and engages the lug 44 on the locking dog 41, thereby forcing said locking dog out of the notch 40 and permitting of the gravity movement of the receiver and transmitter arms, the end of said latch finger engaging over said lug after the locking dog passes the lug 38' on the transmitter. This connection securely locks the receiver head in the mouthpiece extension 10' of the transmitter, such movement breaking the circuit connections to the receiver and transmitter. The magnet 27 and the coils 28 operate in a similar manner to those which are employed in the ordinary construction of telephone receivers, said magnet and coils forming the magnetic field to magnetize the

coils and vibrate the diaphragm 37 whereby the sound waves are produced. The peculiar arrangement of the double pole magnet 27 is rendered necessary, owing to the fact that a magnet of sufficient size is necessary to prevent the same being demagnetized. This is also the reason why the magnet is not arranged directly in the receiver as it has been demonstrated that the straight form of magnet is preferable to the bent or curved form. In order to arrange the magnet in the receiver head it would be necessary to very much restrict its size and arrange the same in such manner that the efficiency of the device would be materially affected. It will be obvious, however, that other forms of double pole magnets may be utilized and that my invention is by no means restricted to the specific form shown in the drawing. By thus locking the receiver head securely in the mouthpiece and providing the overhanging annular lip 37', the entrance of dust or other foreign matter into the transmitter which would render the same insanitary is prevented. As a further preventative against insanitary conditions, I provide a disinfectant receptacle 46 which is supported upon the lower end of the arm 7 by means of a bifurcated vertical arm 47 which is rigidly secured to the transmitter arm 7. The upper end of the receptacle 46 is open and extends through the wall of the transmitter mouthpiece. This receptacle may be easily and quickly removed so that from time to time the disinfectant can be renewed.

From the foregoing it will be seen that I have devised a telephone transmitter and a very novel form of receiver and means for mounting the same whereby the objectionable insanitary features of the telephones as at present constructed is entirely eliminated. By mounting the receiver in the manner above described so that it is necessary to extend the same outwardly and forwardly from the transmitter before the circuit connections are made, the ear of the operator must be disposed at all times at a certain distance from the transmitter so that in talking the mouth of the speaker is not disposed in close relation to the transmitter diaphragm. This will, to a great extent, overcome the muzzling of the voice tones as received by the user at the other end of the line, which is entirely due to the fact that the speaker has his lips positioned too closely to the transmitter mouthpiece. The spring contact plates 17^a, 18^a and 19^a are fixed to the plate 43 arranged upon one side of the receiver arm 11 and extending into the same. The circuit wires are connected to the screws which secure this spring plate and are connected or joined to form a single cord 48. A telephone constructed in the

manner above described is extremely light so that the receiver may be easily and quickly handled. It may also be manufactured at a greatly reduced cost over tele-
 5 phones of the common construction and is extremely serviceable, durable and efficient in practical use.

While I have shown and described the preferred construction and arrangement of the
 10 various elements, it will be understood that the invention is susceptible of a great many minor modifications without departing from the essential feature or sacrificing any of the advantages thereof.

15 Having thus described the invention what is claimed is:

1. In a telephone; a transmitter having a mouthpiece, an arm movable on the mouth-
 20 piece, a receiver connected to said arm and movable with respect thereto, means for locking the receiver and arm together, and means for locking the movable arm on the transmitter mouthpiece and simultaneously
 25 unlocking the receiver to permit of its movement to operative position.

2. In a telephone, a transmitter having a mouthpiece, a tubular arm circumferentially
 30 movable on the mouthpiece, a receiver connected to the arm and movable with relation thereto, said receiver being adapted to be positioned in the mouthpiece in its inoperative position, means controlled by the
 35 movement of the receiver to make and break the bell and line circuits in the movement of the receiver to its operative and inoperative positions, means for locking said arm upon the transmitter mouthpiece, and means
 40 for locking the receiver in the mouthpiece in its inoperative position.

3. In a telephone, a transmitter having a mouthpiece, a tubular circumferentially
 45 movable arm on said mouthpiece, a locking element carried by the arm, means arranged on opposite sides of the mouthpiece to engage a locking element carried by the arm
 50 and lock said arm against movement, a receiver independently movable of said arm into and out of the transmitter mouthpiece, and means for locking said receiver and arm together against relative movement in the inoperative position of the receiver.

4. In a telephone, a transmitter having a mouthpiece, a swinging arm arranged on the
 55 mouthpiece, a locking device carried by the arm, means arranged at diametrically opposite points on the mouthpiece to engage said locking device and support the arm in a laterally extending position relative to the
 60 mouthpiece, a receiver connected to said arm and movable independently of the same, into and out of the mouthpiece, means carried by the receiver engaging said locking device to release the arm when the receiver is moved to an inoperative position, and means

controlled by the movement of the receiver 65 for making and breaking the electric circuits.

5. In a telephone, a transmitter having a mouthpiece, a movable element on the
 70 mouthpiece, a receiver pivotally connected to said element and movable into and out of the mouthpiece to its operative and inoperative positions, means for supporting said
 75 element on the mouthpiece in a lateral position with relation thereto; and means for locking the receiver in the mouthpiece, said supporting means engaging said locking
 80 means in the movement of said element to its lateral position to release the receiver and permit the same to be moved out of the
 85 mouthpiece to its operative position, said locking means being actuated in the movement of the receiver to its inoperative position to release said element and simultaneously lock the receiver in the mouthpiece.

6. In a telephone, a transmitter having a mouthpiece, a hollow arm circumferentially
 90 movable on the mouthpiece and normally depending from the same, a receiver arm pivotally mounted in the free end of said transmitter arm, a receiver head yieldingly
 95 mounted for pivotal movement in the other end of the receiver arm, an annular lip formed on the receiver head engageable over the outer edge of the transmitter mouth-
 100 piece, a spring pressed locking dog in said transmitter arm, lugs arranged on opposite sides of the transmitter mouthpiece to engage said dog and support the arm in a lateral
 105 position with relation to the mouthpiece, means carried by the receiver engageable with said dog in the movement of the receiver to its inoperative position to release the transmitter arm and permit of its
 110 gravity movement, and means controlled by the movement of the receiver to its operative and inoperative positions to make and break the electric circuit.

7. In a telephone, a transmitter having a mouthpiece, a circumferentially movable arm
 115 arranged on the mouthpiece, a shaft mounted in the free end of the arm, a receiver arm secured upon the ends of the shaft, contact disks on said shaft, spring contact plates in the arms engaged with said disks, a receiver
 120 head mounted in the other end of said arms and movable into and out of the transmitter mouthpiece, a magnet casing carried by the head, a magnet arranged therein, magnets in the receiver head, electrical connections
 125 between said magnets, a spring plate secured at one end to the receiver arm and movably connected at its other end to the magnet casing, lugs secured to opposite sides of the transmitter mouthpiece, a
 spring pressed locking dog in the transmitter arm engageable with said lugs to support the arm in a lateral position with rela-

tion to the transmitter, means carried by the magnet casing engageable with said locking dog in the movement of the receiver into the mouthpiece to release the arm, and conducting elements between the shaft and the free end of said arm and the magnets in the receiver head, the movement of said receiver to its operative and inoperative positions making and breaking the electric circuits.

8. In a telephone, a transmitter having a mouthpiece, an arm circumferentially movable on the mouthpiece, a shaft rotatably mounted in the free end of the arm, a receiver arm secured to the ends of the shaft, contact plates arranged in the opposite sides of the shaft, spaced contact disks on said shaft having insulated peripheral portions, an intermediate contact disk having a lug formed thereon, spring contact plates in the arms engaging said disks, a receiver head mounted for pivotal movement in the other end of the receiver arm, magnets arranged therein, a connecting rod extending between the pivots of said head and said shaft, circuit wires connected to the contact plates, locking means carried by the transmitter arm, means arranged on opposite sides of the transmitter mouthpiece engageable with said locking means to support the arm, and means carried by the receiver engageable with said locking means in its movement to an inoperative position to release said locking means and permit of the gravity movement of the transmitter arm, the movement of the receiver to its operative and inoperative positions making and breaking the electric circuits.

9. In a telephone, a transmitter having a mouthpiece, a pivotally mounted receiver positioned in the mouthpiece in its inoperative position to close the same, means for locking the receiver in its inoperative position, said receiver being rotatable in the mouthpiece, means on the mouthpiece to engage said locking means and release the receiver as the same is rotated to permit of the outward movement of the receiver to an operative position, and means controlled by the movement of the receiver to its operative and inoperative positions to connect and disconnect the electric circuits.

10. In a telephone, a transmitter having a mouthpiece, an arm movably mounted on the mouthpiece, a receiver movably associated with said arm, and disposed within the mouthpiece in its inoperative position to close the same, means for locking the receiver in its inoperative position, and means arranged on the mouthpiece of the transmitter to engage the locking means and support said arm in a lateral position relative to the mouthpiece and to simultaneously release the receiver to permit the same to be moved to an inoperative position.

11. In a telephone, a transmitter having a mouthpiece and an arm normally depending from said mouthpiece and movable thereon, a receiver disposed in the mouthpiece in its inoperative position to close the same, means for locking the receiver in the mouthpiece, and means for actuating said locking means upon the movement of said arm to a lateral position with relation to the mouthpiece to release the receiver and permit of its outward movement to an operative position.

12. In a telephone, a transmitter having a mouthpiece, an arm mounted for swinging movement on the mouthpiece; a receiver carried by the arm and movable independently of the same to its operative position, and means for supporting the arm in a horizontal position on the mouthpiece when the receiver is in operative position.

13. In a telephone, a transmitter having a mouthpiece, an arm mounted for swinging movement on the mouthpiece, a receiver movable with said arm and independently thereof, said receiver being positioned in the mouthpiece of the transmitter to close the same when in its inoperative position, means for supporting the arm in a horizontal position on the mouthpiece, said receiver being movable out of the mouthpiece to a position at right angles to said arm to its operative position.

14. In a telephone, a transmitter having a mouthpiece, a receiver pivotally supported upon said mouthpiece and disposed within the same in its inoperative position, said receiver being movable with relation to the mouthpiece to its operative position in which the longitudinal axis of the receiver is disposed at right angles to the longitudinal axis of the transmitter, and means for supporting the receiver upon the mouthpiece in its operative position.

15. In a telephone, a transmitter having a mouthpiece, a receiver disposed in said mouthpiece in its inoperative position to close the same, means for locking the receiver in the mouthpiece, and means to engage said locking means and release the receiver for movement out of the transmitter mouthpiece to its operative position.

16. In a telephone, a transmitter having a mouthpiece, a receiver rotatably mounted on the mouthpiece whereby said receiver may be moved to its operative position, said receiver being disposed in the mouthpiece to close the same when in its inoperative position, means for locking the receiver in the mouthpiece, and means arranged on the mouthpiece to engage said locking means to release the receiver and support the same in its operative position.

17. In a telephone, a transmitter having a mouthpiece, an arm movable on the mouthpiece, a receiver carried by said arm, and

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movable independently thereof, co-acting
locking elements carried by the receiver and
arm to lock the receiver in the mouthpiece
when in its inoperative position, means ar-
5 ranged on the mouthpiece to engage said
locking means and release the receiver in
the movement of the arm on the mouthpiece,
said latter means supporting the arm and
receiver in the position to which they have

been moved, and means controlled by the 10
movement of the receiver to its operative
position to connect the line circuit.

In testimony whereof I hereunto affix my
signature in the presence of two witnesses.

ARTHUR G. REMHILT.

Witnesses:

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GEORGE BOEHMLER.