No. 791,892. PATENTED JUNE 6, 1905.

M. J. FLETCHER.

TELEPHONE TRANSMITTER.

APPLICATION FILED MAR. 3, 1904.

Fig. 1.

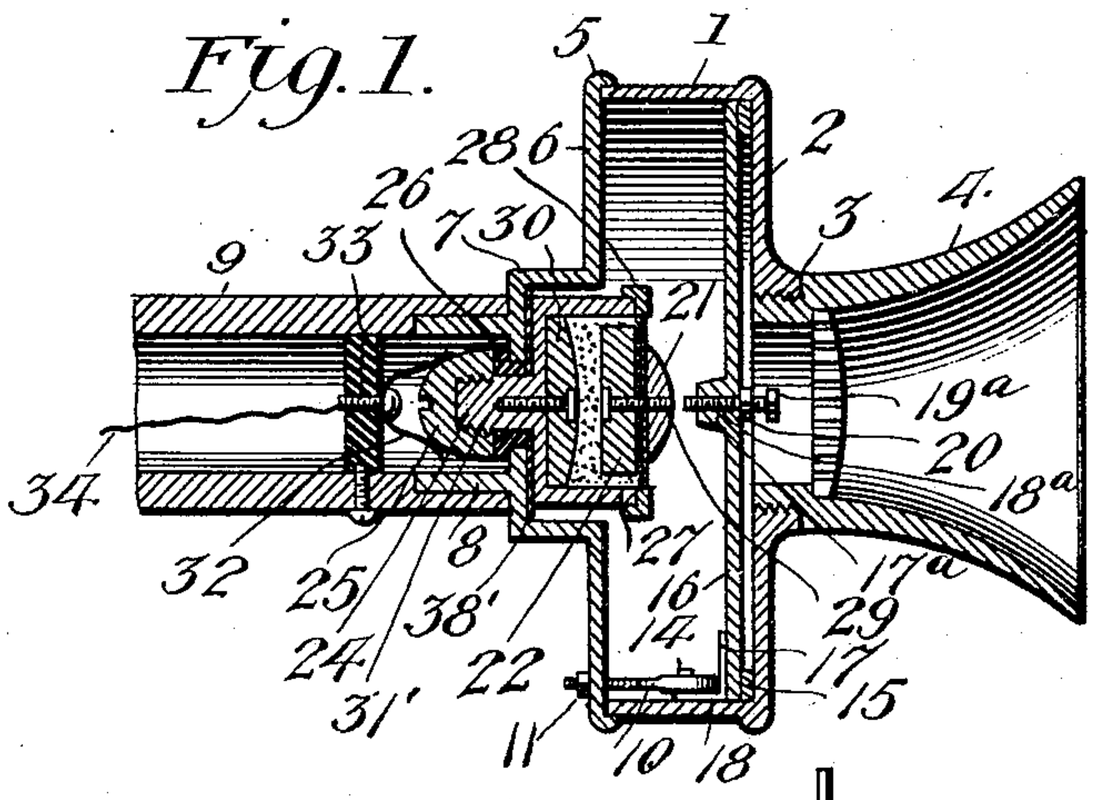


Fig. 6.

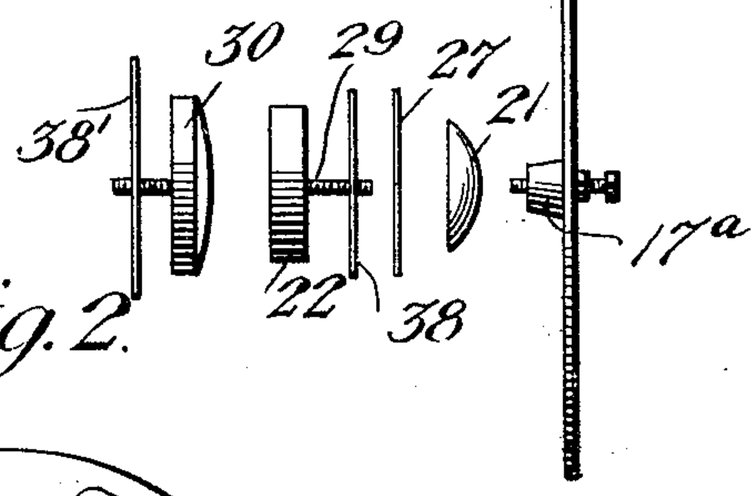


Fig. 2.

Fig. 3.

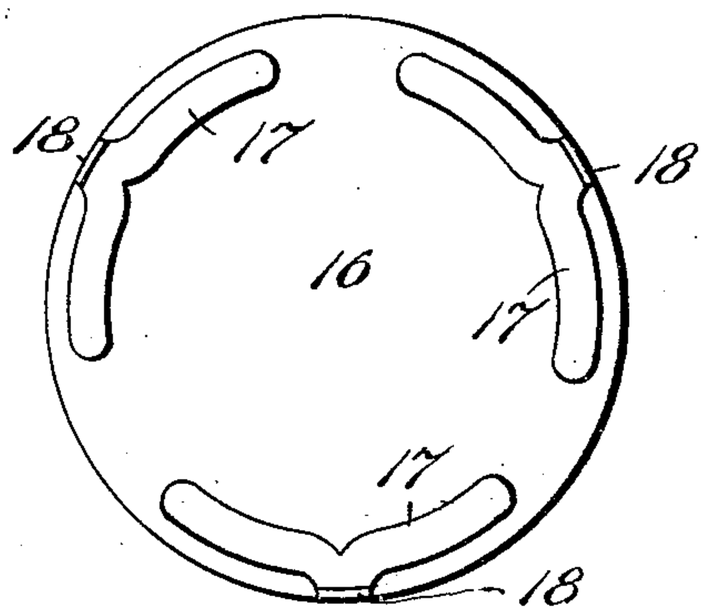
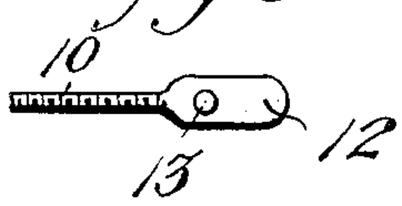


Fig. 5.



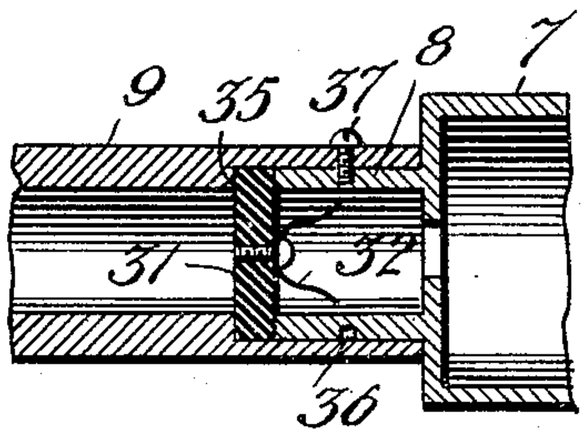
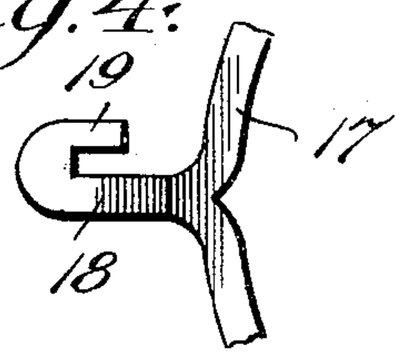


Fig. 4.



Inventor

Milton J. Fletcher,

By Victor J. Evans

Attorney

Witnesses

Geo. Ackmann Jr.

W. H. Clark.

No. 791,892. Patented June 6, 1905.

UNITED STATES PATENT OFFICE.

MILTON J. FLETCHER, OF SAN ANTONIO, TEXAS.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 791,892, dated June 6, 1905.

Application filed March 3, 1904. Serial No. 196,338.

To all whom it may concern:

Be it known that I, MILTON J. FLETCHER, a citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented new and useful Improvements in Telephone-Transmitters, of which the following is a specification.

This invention relates to improvements in that class of telephone-transmitters known as "variable-contact" transmitters; and the objects thereof are the provision of means for the ready detachment and assemblage of its parts with the least possible chance of injury thereto, simplicity of construction and expedition in the adjustment of the parts, and to vary the granular resistance and reduce to a minimum the displacement of the carbon granules, which in transmitters of this class often causes a partial, if not complete, failure of the instrument to perform its function.

With these and other objects and advantages in view the invention consists in the construction and arrangement of the parts, which will be more fully hereinafter set forth.

In the drawings, Figure 1 is a longitudinal vertical section of a transmitter embodying the features of the invention. Fig. 2 is a plan view of the diaphragm. Fig. 3 is a detail longitudinal section of a portion of the transmitter. Fig. 4 is a detail plan view of a portion of one of the diaphragm-holding springs. Fig. 5 is a detail plan view of one of the cam-bolts used in connection with the diaphragm-springs. Fig. 6 is a detail view showing parts of the improved transmitter in separated position.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

It is generally assumed that a telephone-transmitter seldom gets out of order; but if treated roughly, as is often the case, with portable telephones especially, it frequently becomes disabled and ordinary adjustment will not suffice to restore it to working order. When it becomes necessary to open a transmitter, it should be so constructed that it may be quickly and conveniently opened by a person who may not be familiar with its working parts with the least possible chance of injury. If too many screw-heads or nuts be in sight or if the diaphragm be in any way connected to the front electrode, the wrong fastenings are apt to be removed first or the delicate parts injured by removal of the diaphragm. With these disadvantages in view and after considerable experience with split granules in some and torn mica in other transmitters the present form of transmitter has been devised to overcome tendency to injury thereto under the conditions just set forth.

In the present construction the case is preferably of metal and consists of a front circular wall 1, having an integral front plate 2 with a central screw-threaded orifice 3 to removably receive the inner reduced extremity of a hard-rubber mouthpiece 4, which may be provided with the usual apertured or grated occluder. The wall 1 rests against a shoulder formed by a flange 5, surrounding the periphery of a back plate 6, which has at its center a rearwardly-projecting cavity 7, provided with a rear cylindrical extension 8 for connection to a tubular supporting-arm 9. The back plate is held firmly against the wall 1 by bolts 10, having screw-threaded extremities projecting through said back plate to receive readily-removable nuts 11. The extremities of the bolts 11 within the body of the transmitter are enlarged to form cam-heads 12, having near their inner terminals openings 13, one in each head, as clearly shown by Fig. 5, and extending through the said openings are fulcrum-screws or analogous fastenings 14. When the bolts 10 are disposed as shown by Fig. 1, the parts of the case will be held in firm assembled condition and the cam-heads of the bolts perform another function, which will now be described. A ring 15, of blotting-paper or other suitable resilient material, is arranged against the inner rear side of the front plate 2, and engaging said ring is a diaphragm 16, having bearing thereon at regular intervals damping-springs 17. (Clearly illustrated by Fig. 2.) Each of the damping-springs has oppositely-extending arms and a central angularly-disposed connecting member 18, with a slot 19 opening out through

one side. The slots of the connecting members 18 are caused to engage the fulcrum-screws 14, and said connecting members are interposed between the heads 12 of the bolts 10 and the inner surface of the wall 1, as shown by Fig. 1. When the bolts 10 are arranged as shown by Fig. 1, the heads 12 thereof press against the springs 17 and force the diaphragm 16 closely and firmly into engaging relation to the ring 15. If it is desired at any time to remove the diaphragm, an operator understanding the arrangement of the parts will remove the bolts 10 inwardly to cause the cam-heads 12 thereof to become disengaged from the springs 17 and relieve the diaphragm of securing pressure, and the said diaphragm may be removed by disengaging the connecting members 18 of the springs from the fulcrum-screws 14. If the parts of the case are separated by one not understanding the construction and mode of separating and assembling the springs or the cam function of the bolts, injury to or irregular adjustment of the diaphragm will be prevented. The heads of the fulcrum-screws 14 are located on the interior of the case, and this disposition prevents said screws from being molested by an attempt to open the case from the exterior, the nuts 11 being the only exteriorly-accessible fastenings.

The diaphragm 16 is formed from any desirable material applicable for the purpose, and projecting rearwardly from the center thereof is a boss or lug 17^a, having a finely-screw-threaded opening 18^a in the center thereof to receive a small thumb adjusting-screw 19^a, provided with a lock or jam nut 20. This adjusting-screw 19^a is disposed in operative relation to a cap 21, governing a front electrode 22 to bring the latter under the influence of the vibrations of the diaphragm. The electrode 22 is supported in a cup 23, secured in the cavity 7, the cup being formed with a central rearwardly-projecting stem 24, extending through a central opening in the rear wall of the cavity and engaged by a cap-nut 25. Between the stem 24 and the wall of the opening in the rear side of the cavity 7 is an angularly-shaped insulating-sleeve 26, the front end of the cap-nut 25 closely impinging against the said sleeve and forcing it to its place. The electrode 22 is formed from carbon and the cap 21 of metal, and between the cap and the electrode is a mica disk 27, which is held firmly on the cup 23 by a ring 28. The diameter of the electrode 22 is considerably less than the inner diameter of the cup, and the metal cap 21 is held in connected relation thereto by a center screw 29, having its head countersunk in the rear side of the electrode. Against the back of the cup 23 is a stationary electrode 30, which is held in place by a screw 31′, having its head countersunk in the front face of said electrode and its shank ejected into the stem 24. The electrode 22 is free to vibrate, and between the two electrodes in the chamber of the cup 23 a granular carbon 31 is disposed, the said cup being lined with suitable paper. The electrode 22 and mica disk carrying the same are made readily removable from the cup, and the electrode 30 is replaceable by other electrodes differing in depth for the purpose of regulating the quantity of carbon granules between the two electrodes to accommodate a current of higher or lower potential. The carbon disk forming the electrode 22 is of simple contour, so that it may be easily replaced when necessary under adverse conditions without delay incident to forming or procuring a particular-shaped electrode. In the tubular supporting-arm 9 a disk 31, of insulating material, is permanently fastened by any suitable means, and projecting from the center thereof is a contact-spring 32 of U-shaped form, which embraces and bears against the cap-nut 25, said spring being held in connection with the disk by a screw or analogous fastening 33, to which is also fastened the usual flexible insulated conductor 34. Fig. 3 shows a modification of the structure just explained and consists in disposing the disk 31 against a shoulder 35, formed in the tubular arm 9 and held in place by the rear end of the cylindrical extension 8 of the cavity 7, the disk 31 in this arrangement carrying the same parts as heretofore described. The cylindrical extension 8 in the modified construction shown by Fig. 3 is circumferentially grooved, as at 36, and is held in place by set-screws 37 engaging said groove, three of these screws being used, but only one shown in the drawings. It will be understood that the adjusting-screw 19^a is brought into contact with the cap 21, and as this screw is exteriorly accessible after the mouthpiece 4 is removed adjustment thereof may be readily effected to vary the pressure of the end of the screw on the cap to affect the diaphragm, as will be readily understood. This working electrode 22 is governed by the vibratile action of the diaphragm upon the cap or disk 21, and the diameter of said cap or disk is slightly less than the electrode 22 to cause the mica disk 27 to have more flexibility. Between this mica disk 27 and the electrode 22 a circular piece of silk of the same diameter as the electrode is interposed, as at 38, the outer edge of said silk being preferably fringed to prevent the granules of carbon entering between the same and the mica disk or washer. Mica will adapt itself better to the surface of the silk than it would to the carbon of which the electrode 22 is composed, and, furthermore, the use of mica in constructing the disk or washer 27 is preferable, as it is more susceptible to the vibratile action of the diaphragm and the delicate adjustment. The mica disk or washer, however, will be thicker than that

usually employed consistent with the best results. The cap or disk 21, mica disk 27, silk piece 38, and the carbon electrode 22 are firmly bound together by the center screw 29, arranged as heretofore set forth. By having the electrode 22 slightly less in diameter than the inner diameter of the cup 23 a space of sufficient width between the periphery of the electrode and the cup is provided to prevent the carbon granules from binding.

In a transmitter constructed in accordance with the foregoing description the electrical current passes from one side of the line or battery through the supporting-arm 9 to the case or shell, and in the latter the current divides, equal portions passing through the damping-springs to the diaphragm, thence to the adjusting-screw 19^a, and from the latter to the screw 29, carbon disk 22, granulated carbon 31, stationary electrode or carbon disk 30, and from the latter to the usual insulated conductor 34 in the supporting-arm 9, which conducts said current to the other side of the battery or line. The damping-springs, case, diaphragm, adjusting-screw 19^a, and cap or disk 21 all being of metal, it will readily be seen that where one of these parts comes in contact with the other an electrical contact is formed which permits the passage of the current of one of said parts to the other. The use of the adjusting-screw 19^a and cap or disk 21 in the relation set forth obviates the necessity of the usual flexible conductor leading from the cap to some point on the case.

In view of the foregoing construction the transmitter if roughly handled, as usual in portable telephones, the working elements will be preserved in operative relation and will not become deranged or damaged no matter how rough the treatment thereof may be, and when it becomes necessary to examine the elements the latter will be protected if one performing the examination be unfamiliar with telephone construction.

The several metallic parts on the transmitter will be provided with insulating sheets, washers, or other analogous devices commonly used in the art, and the cup 23 has its rear wall or terminal insulated from the cavity 7 by a sheet or washer 38′, of suitable insulating material.

Having thus fully described the invention, what is claimed as new is—

1. A telephone-transmitter, having a cup carrying a fixed and a movable electrode, the two electrodes being held in spaced relation, an integral stem on said cup, a cap on said stem, a spring contacting with said cap, a granular resistance substance interposed between the two electrodes, a diaphragm having an adjustable device coöperating with the movable electrode, and electrical connections.

2. In a telephone-transmitter, the combination of a casing, a tubular support for the casing, a cup disposed in the casing and having a rearwardly-projecting stem, electrodes mounted in the cup and held spaced apart from each other, one of the electrodes being vibratile, a granular resistance substance interposed between the electrodes, a metallic cap on the rear terminal of the stem, an insulating-disk in the tubular support having a contact-spring to engage said cap, a metallic contact carried by the vibratile electrode, a diaphragm having an adjusting-screw extending therethrough to coöperate with said contact on the vibratile electrode, and electrical connections.

3. In a telephone-transmitter, the combination of a casing, a diaphragm disposed in the casing, electrodes in operative relation to the diaphragm, and fastening means pivotally mounted within the casing and having enlarged extremities to exert a securing pressure against the diaphragm and screw-threaded portions projected through the casing and exteriorly accessible.

4. In a telephone-transmitter, the combination of a casing composed of separable parts, electrodes in the casing, a diaphragm arranged in operative relation to the electrodes, damping-springs bearing against the diaphragm, and fastening devices having inner enlarged extremities engaging the said damping-springs and the opposite extremities projecting through a portion of the casing and exteriorly accessible, said fastening devices being pivotally mounted within the casing.

5. In a telephone-transmitter, the combination of a casing composed of separable parts, electrodes disposed in the casing, a diaphragm in the casing in operative relation to the electrodes, damping-springs applied to the inner side of the diaphragm and having rearwardly-projecting portions, and fastening devices pivotally disposed in the casing and having cam enlargements to engage the damping-springs and screw-threaded shanks which extend through the casing to receive nuts, the projecting portions of the damping-springs engaging parts of the fastenings.

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

MILTON J. FLETCHER.

Witnesses:
THOMAS FARNSWORTH,
NELSON GOROM.