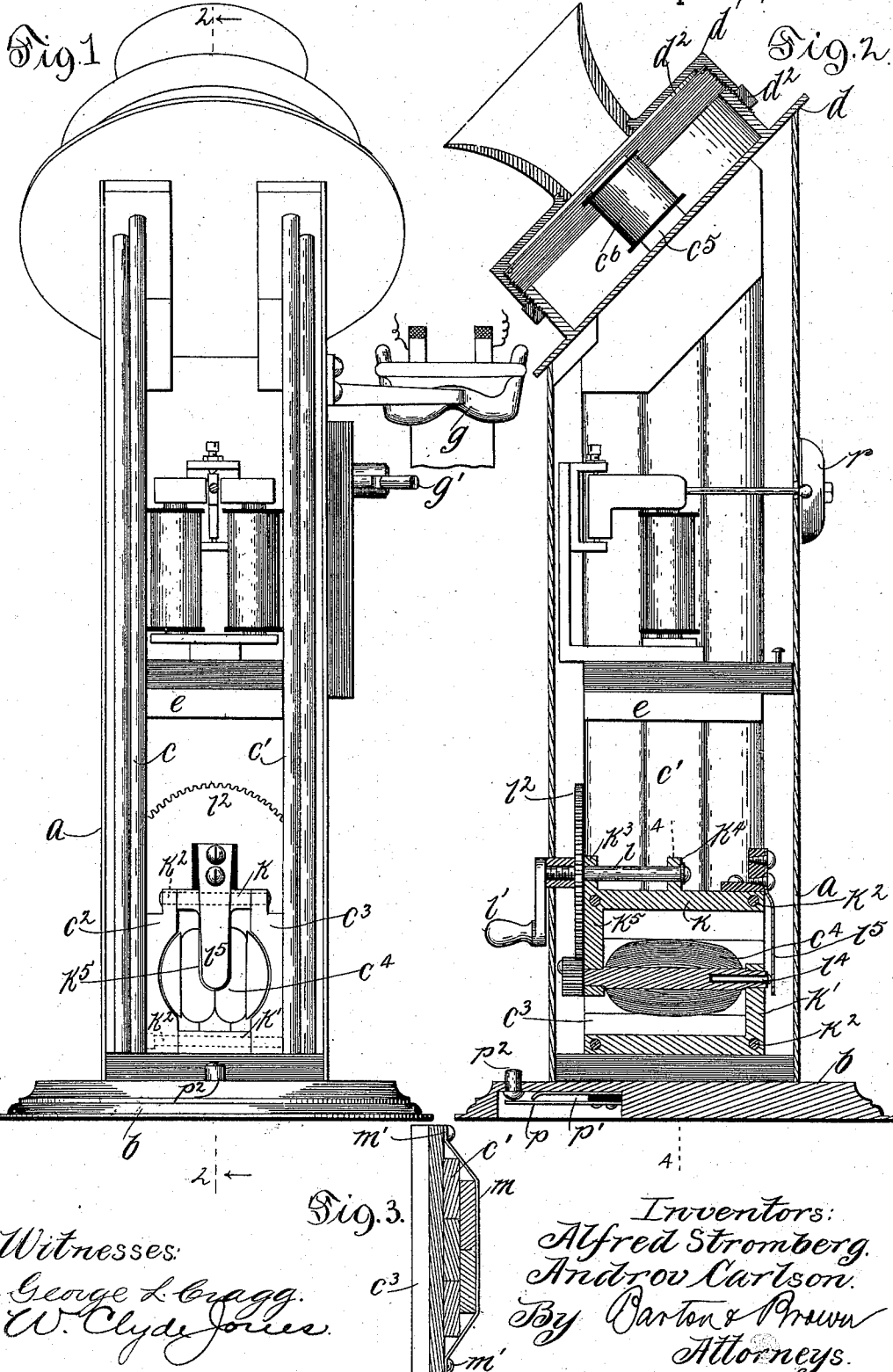


A. STROMBERG & A. CARLSON.
TELEPHONE APPARATUS.

No. 558,859.

Patented Apr. 21, 1896.



Witnesses:
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W. Clyde Jones.

Inventors:
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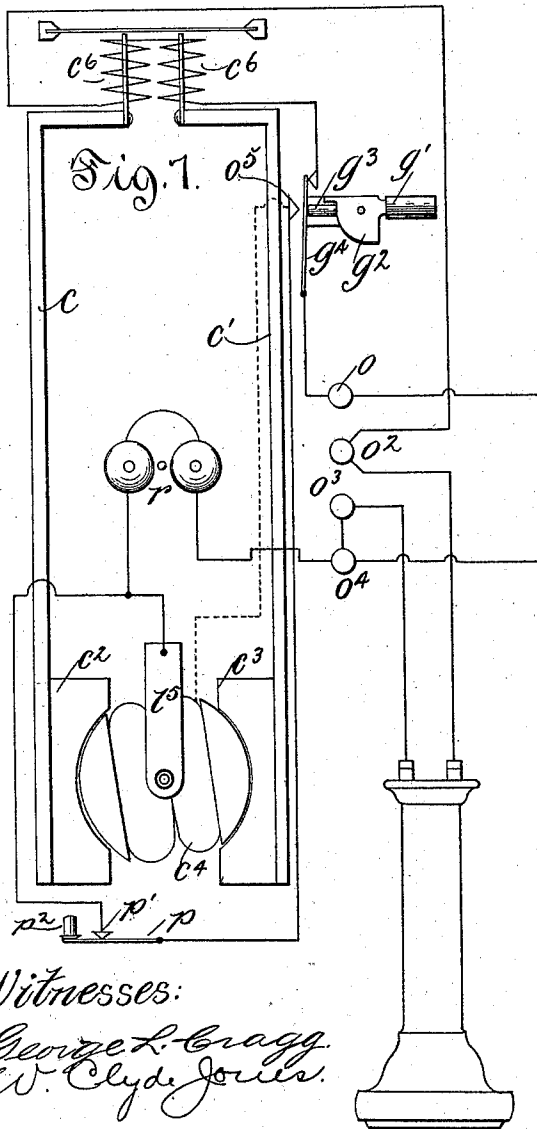
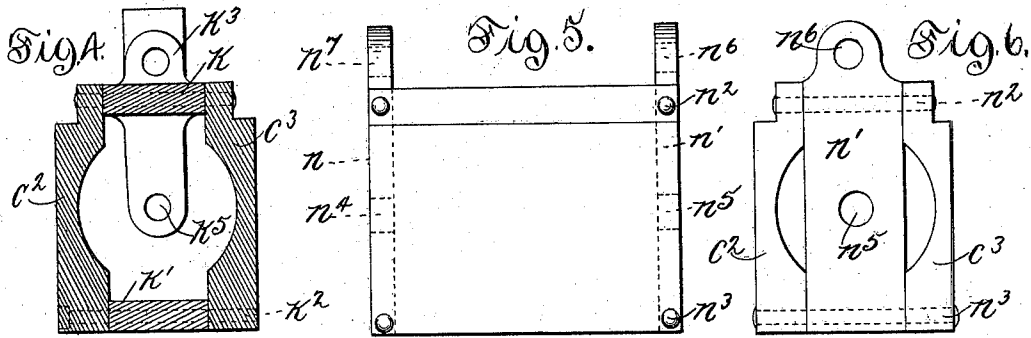


Fig. 8.

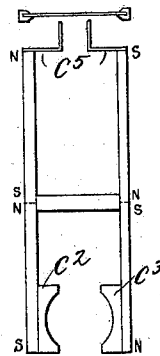
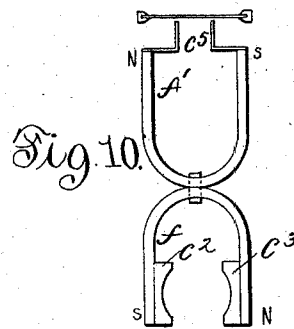
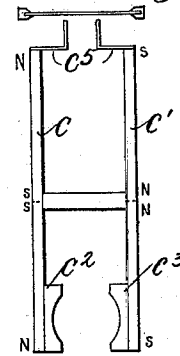


Fig. 9.



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UNITED STATES PATENT OFFICE.

ALFRED STROMBERG AND ANDROV CARLSON, OF CHICAGO, ILLINOIS.

TELEPHONE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 558,859, dated April 21, 1896.

Application filed October 9, 1894. Serial No. 525,387. (No model.)

To all whom it may concern:

Be it known that we, ALFRED STROMBERG and ANDROV CARLSON, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Telephone Apparatus, (Case No. 16,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to telephone apparatus; and its object is to provide a more compact telephone set than has been produced heretofore, and to improve and cheapen the construction of the various parts.

We will describe our invention in connection with the accompanying drawings, in which—

Figure 1 is a view in elevation of a telephone set embodying our invention, a portion of the casing being removed. Fig. 2 is a sectional view thereof on line 2 2, Fig. 1. Fig. 3 is a detail view showing means for securing the permanent magnets to the pole-pieces of the generator. Fig. 4 is a sectional view of the generator on line 4 4, Fig. 2. Fig. 5 is an elevation of a modified form of generator. Fig. 6 is an end view thereof. Fig. 7 is a diagrammatic view illustrating the circuit connections. Figs. 8, 9, and 10 are views illustrating modifications of the telephone and generator magnets.

Like letters refer to like parts throughout the different figures.

The casing or tube *a* is mounted upon a base-board *b*. Within the tube *a* are provided two bar-magnets *c c'*, provided at the lower end with pole-pieces *c² c³*, between which the armature *c⁴* of the generator revolves. Upon the upper ends of the magnets *c c'* are provided the cores *c⁵* of the telephone-coils, the cores extending through the bottom of the transmitter-casing *d* and carrying upon their ends within the casing the telephone-coils *c⁶*. The casing *d* is mounted oblique to the tube *a*, so that the mouthpiece of the transmitter may occupy a convenient position. A cap *d'*, upon the under surface of which is secured the diaphragm *d²*, is adapted to be screwed upon the casing *d*. A locking-ring *d³* is adapted to be

screwed upon the casing *d* against the cap *d'* to lock the same in any adjusted position.

A cross-piece *e* of magnetic material extends between the middle portions of the bar-magnets *c c'*, the magnetic field of the telephone-transmitter being thus rendered entirely independent of the magnetic field of the generator, so that the operation of the generator in no manner affects the transmitter.

In Fig. 8 is illustrated in outline one form of construction in which the bars *c c'* are permanently magnetized north and south at their ends in manufacture, so that when the cross-piece *e* is placed in position each of the bars *c c'* is in effect divided into two smaller magnets, the north pole of the one being placed in contact with the south pole of the other.

Instead of making the bars *c c'* each of a continuous piece the same result may be secured by placing two smaller magnets end to end, as indicated by the dotted lines; or, where desired, horseshoe instead of bar magnets may be employed, as shown in Fig. 10, in which the magnet *f* affords the field for the generator and the magnet *f'* that for the telephone.

A further modification is shown in Fig. 9, in which the bars *c c'* are magnetized with consequent poles at the middle, the bar *c*, for instance, having north poles at the ends and a south pole at the middle, while the bar *c'* has south poles at the ends and a north pole at the middle. The effect thus produced is the same as though shorter magnets were placed with like poles in contact, as indicated in dotted lines.

Between the pole-pieces *c² c³* are placed distance-pieces *k k'* of non-magnetic material, bolts or screws *k²* being passed through the pole-pieces *c² c³* and the distance-pieces to complete the structure. The upper distance-piece *k* carries upon its upper surface two projections or blocks *k³ k⁴*, in which is mounted the shaft *l*, which carries the handle *l'* and the gear-wheel *l²* of the generator. The distance-piece *k* is also provided at the end with a downwardly-extending limb *k⁵*, in which the other end of the armature-shaft is journaled. One end of the armature-coil is electrically connected with the armature-shaft in a well-

known manner, while the other end of the coil is connected with an insulated screw or pin l^4 , which makes contact with a spring l^5 , mounted upon but insulated from the distance-piece k . The permanent magnets may be mounted upon the pole-pieces as illustrated in Fig. 3, in which a metallic strap m passes over the tops of the magnets and is secured by its ends to the pole-piece by screws or bolts m' .

A modification of the generator embodying the above general principles is shown in Figs. 5 and 6, in which two vertical distance-pieces n n' are interposed between the pole-pieces and secured in position by bolts or screws n^2 n^3 , the distance-pieces being provided with holes n^4 n^5 to serve as bearings for the armature-shaft and with holes n^6 n^7 to serve as bearings for the shaft upon which the handle is mounted.

The operating mechanism of the call-bell r is located with the tube a between the magnets c c' and above the cross-piece e , the hammer of the bell extending through the wall of the tube a and adapted to strike the gongs r placed upon the outside of the tube.

Upon the side of the tube a is mounted the support g , adapted to hold the receiver when not in use. The telephone-switch is illustrated as composed of a pivoted lever g' , adapted to be rotated when the receiver is placed upon the support, the lever carrying upon its end a cam g^2 , which moves a plunger g^3 inward to thereby move a spring g^4 to alter the circuit connections. This switch forms no part of the present invention, being fully described and claimed in Patent No. 530,208, dated December 4, 1894.

The circuit connections are illustrated in Fig. 7. When the telephone is off its support, circuit may be traced from the binding-post o , to which one side of the telephone-line is connected, to the spring g^4 , the telephone-coils c^6 c^6 to binding-post o^2 , through the receiver to binding-post o^3 , binding-post o^4 to opposite side of the line. When the telephone is hung up, circuit may be traced from binding-post o to spring g^4 , contact o^5 , spring p , contact p' , bell r to binding-post o^4 , and to opposite side of the line. When it is desired to send calling-currents from the generator, push-button p^2 is depressed, thus opening the circuit between spring p and contact p' . The circuit

of the calling-currents may then be traced from the armature-coils to spring l^5 , through bell r to one side of the line, back to binding-post o , spring g^4 , contact o^5 , which is in electrical connection through the permanent magnets, pole-pieces, and distance-pieces with the armature-shaft, to which one end of the armature-coil is connected. The spring p and contact p' are mounted on the under side of the base-board b , the end of the push-button extending through the base-board, whereby it may be conveniently reached.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination with permanent bar-magnets, of pole-pieces mounted upon the ends of said magnets between which the armature is adapted to rotate, soft-iron cores extending from the ends of said magnets opposite those upon which said pole-pieces are mounted, the ends of said cores lying in proximity and carrying telephone-coils, a diaphragm mounted opposite the ends of said cores, and a bar of magnetic material connecting the middle portions of said permanent bar-magnets to afford a path for the lines of force and render the magnetic fields of the generator and of the telephone independent and distinct, substantially as described.

2. In a magneto-generator, the combination with the pole-pieces c^2 c^3 , of the distance-piece k interposed between the same at the lower end and carrying an upwardly-extending arm formed integral therewith and adapted to receive one end of the armature-shaft, a distance piece k' interposed between the pole-pieces at the upper end and carrying a downwardly-extending arm formed integral therewith and adapted to support the opposite end of the armature-shaft, said distance-piece k carrying upon its upper face two upwardly-extending arms k^3 k^4 adapted to support the counter-shaft carrying the handle, substantially as described.

In witness whereof we hereunto subscribe our names this 3d day of October, A. D. 1894.

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ANDROV CARLSON.

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HARRIET G. TEMPLETON.