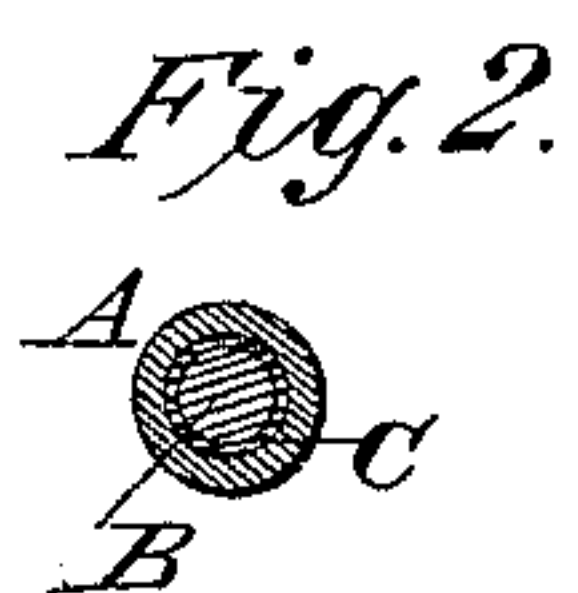
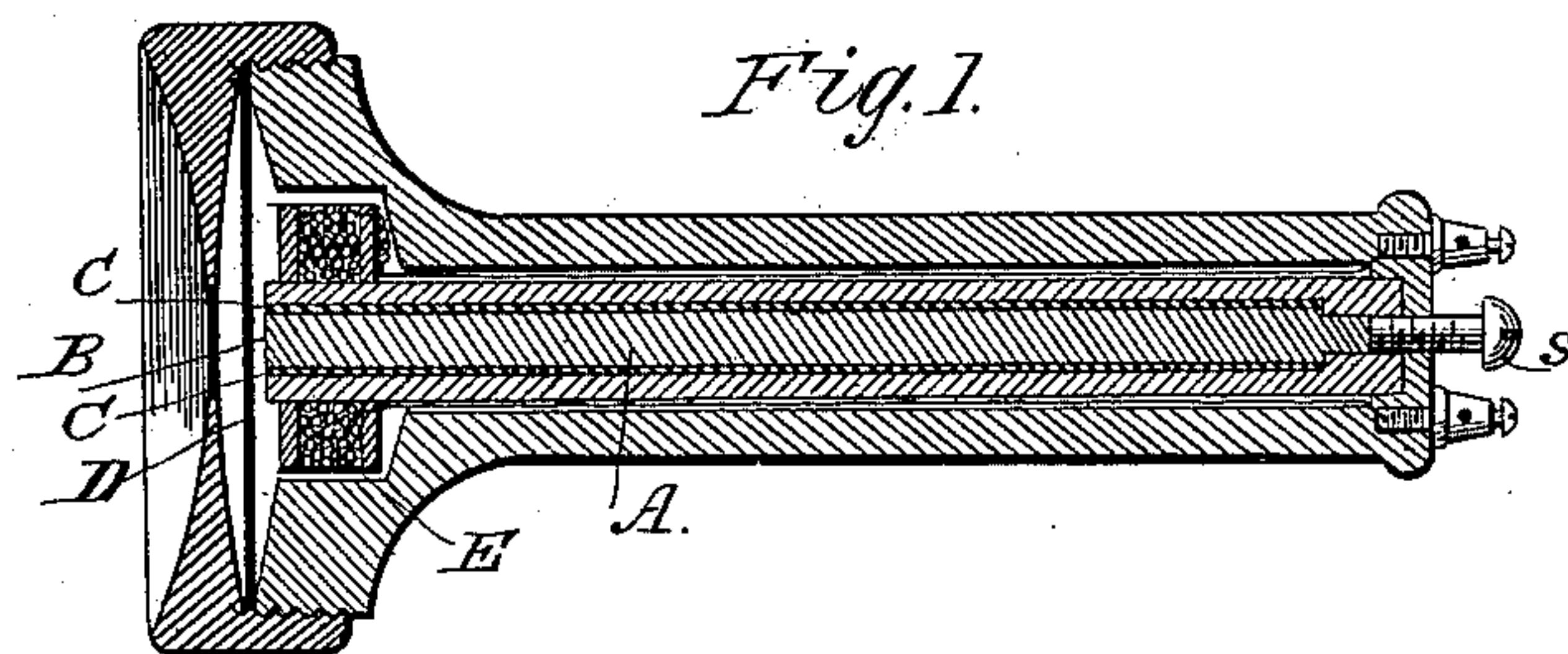


(Model.)

C. S. BELL.  
TELEPHONE.

No. 361,481.

Patented Apr. 19, 1887.



WITNESSES:

*Fred G. Dieterich*  
*Amos W. Hart*

INVENTOR:

*Chas. S. Bell*  
BY *Munn & Co*

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

CHARLES STUART BELL, OF COLUMBUS, OHIO.

## TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 361,481, dated April 19, 1887.

Application filed October 2, 1886. Serial No. 215,172. (Model.)

*To all whom it may concern:*

Be it known that I, CHARLES STUART BELL, of Columbus, in the county of Franklin and State of Ohio, have invented a new and useful Improvement in Telephones, of which the following is a specification.

It is a well-known fact that the two poles of a magnet when combined will sustain by their attractive force many times the weight of the magnet, whereas this weight is nearly the limit of the lifting power of a single pole. By use, therefore, of a multipolar magnet the effect of the magnetic force on the diaphragm of a telephonic transmitting or receiving instrument may be increased far beyond the degree indicated by the sum of the forces which a like number of isolated poles are capable of exerting when taken singly; but, for the best effect, the magnetic energy must be concentrated within a very narrow field. In other words, it should be brought to bear as nearly as practicable in the center of the diaphragm. With these principles in view, I have devised and successfully employed an improved form of multipolar magnet, whose construction I will proceed to detail by reference to the accompanying drawings, in which—

Figure 1 is a central longitudinal section of a telephonic instrument embodying my improvement. Fig. 2 is a cross section of the compound magnet.

A indicates a permanent bar-magnet, B a soft-iron core, and C a non-magnetic cylinder or sleeve. The permanent magnet A is bored longitudinally, and the soft-iron core B is inserted therein. The cylinder or sleeve C surrounds the latter, B, and is therefore interposed between it and the inclosing permanent magnet A, thus insulating one from the other. It is made of non-magnetic material, such as brass. The ends of the said parts A B C, which are contiguous to the diaphragm D, are flush, and constitute either the north or south pole of the magnet, and the opposite end of the core B is shown reduced and fastened in a corresponding socket formed in the permanent magnet A. A screw, s, is applied to the lat-

ter for adjusting the magnet as a whole relative to the diaphragm in the usual way. Surrounding this compound magnet near its inner end is a helix, E, with which the conducting-wires are connected in the usual way.

The conjunction of the permanent magnet with the soft-iron core having an intervening non-magnetic sleeve converts the two arms into a true magnet having distinct north and south poles, as may be demonstrated by the galvanometer. The electrical current traversing said helix varies the intensity of both the north and south poles in this new construction of magnet to such a degree that it far exceeds the power of any other telephonic magnet of which I have knowledge. The force of two magnetic poles is therefore concentrated on the diaphragm at each pulsation of the current. In brief, by the above described construction and arrangement of parts A B C, I provide a simple, cheap, and compact form of multipolar magnet which is very efficient in action.

The use of the battery is not requisite with a transmitter or receiver provided with this magnet.

What I claim is—

1. The improved multipolar magnet for use in a telephonic instrument, the same being composed of the permanent magnet A, having a longitudinal bore, the soft-iron core B, inserted therein, and the insulating cylinder C, made of non-magnetic material and surrounding said core, and a helix, applied as shown and described.

2. The combination, with the diaphragm D of a telephonic instrument, of the permanent magnet A, having a longitudinal bore, the soft-iron core B, inserted therein, the non-magnetic cylinder C, surrounding and thereby insulating the core, as specified, and the helix applied exteriorly to and surrounding said parts, as shown and described.

CHARLES STUART BELL.

Witnesses:

S. E. BELL.

J. A. KIGHT.