

(No Model.)

J. E. DANN & J. LAPP.  
TELEPHONE RECEIVER.

No. 338,491.

Patented Mar. 23, 1886.

Fig. 1.

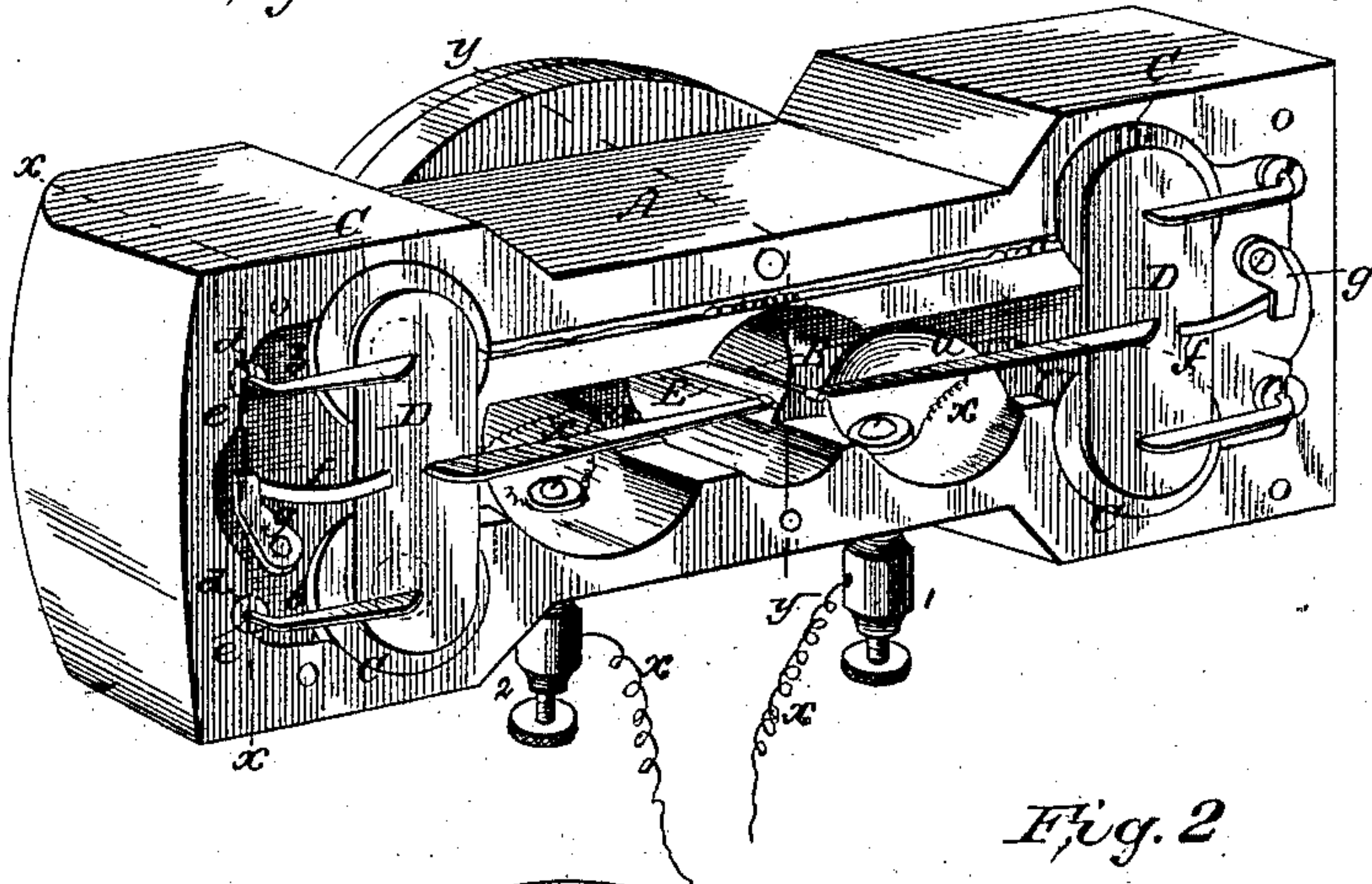


Fig. 2

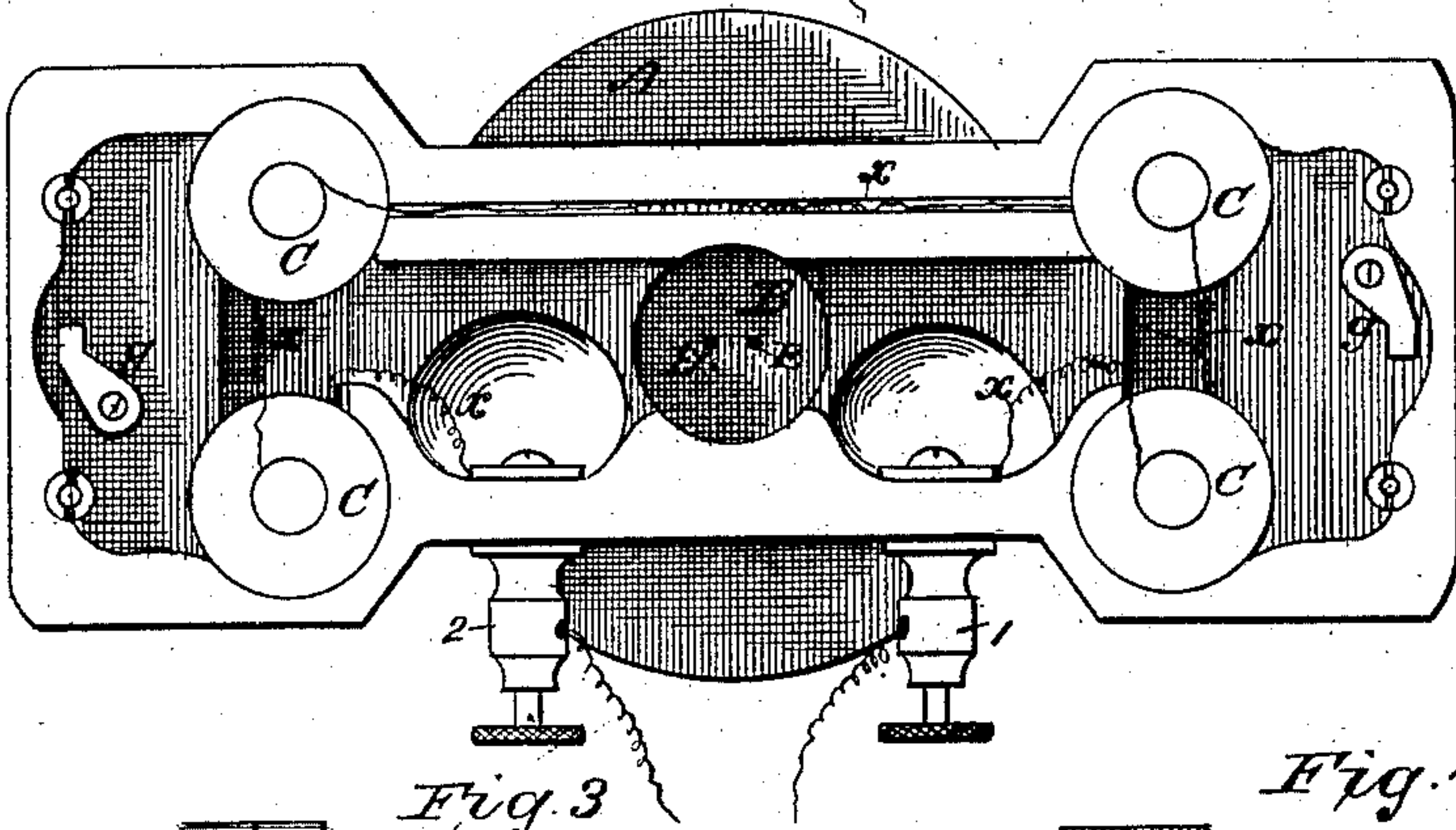


Fig. 3

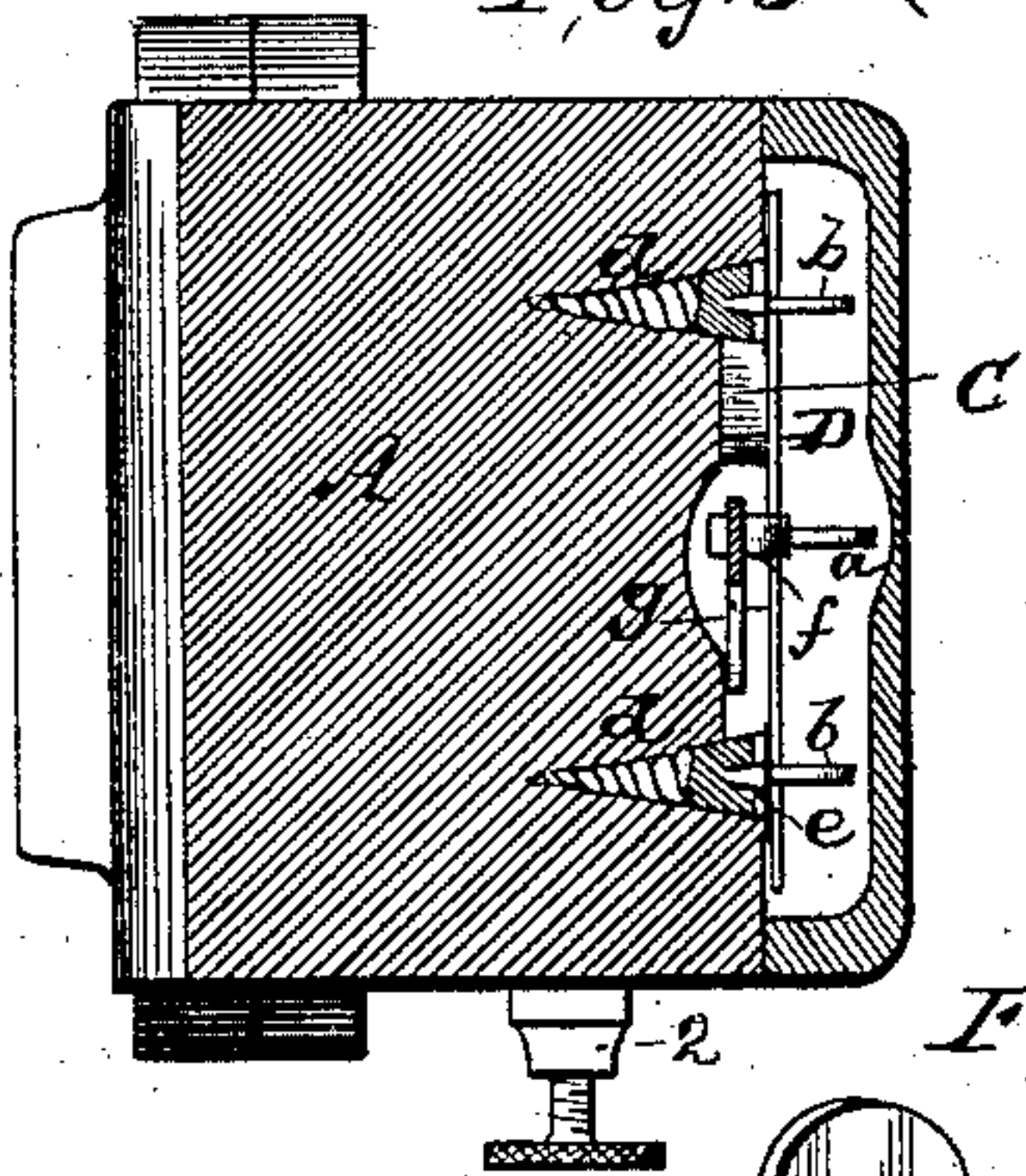


Fig. 4

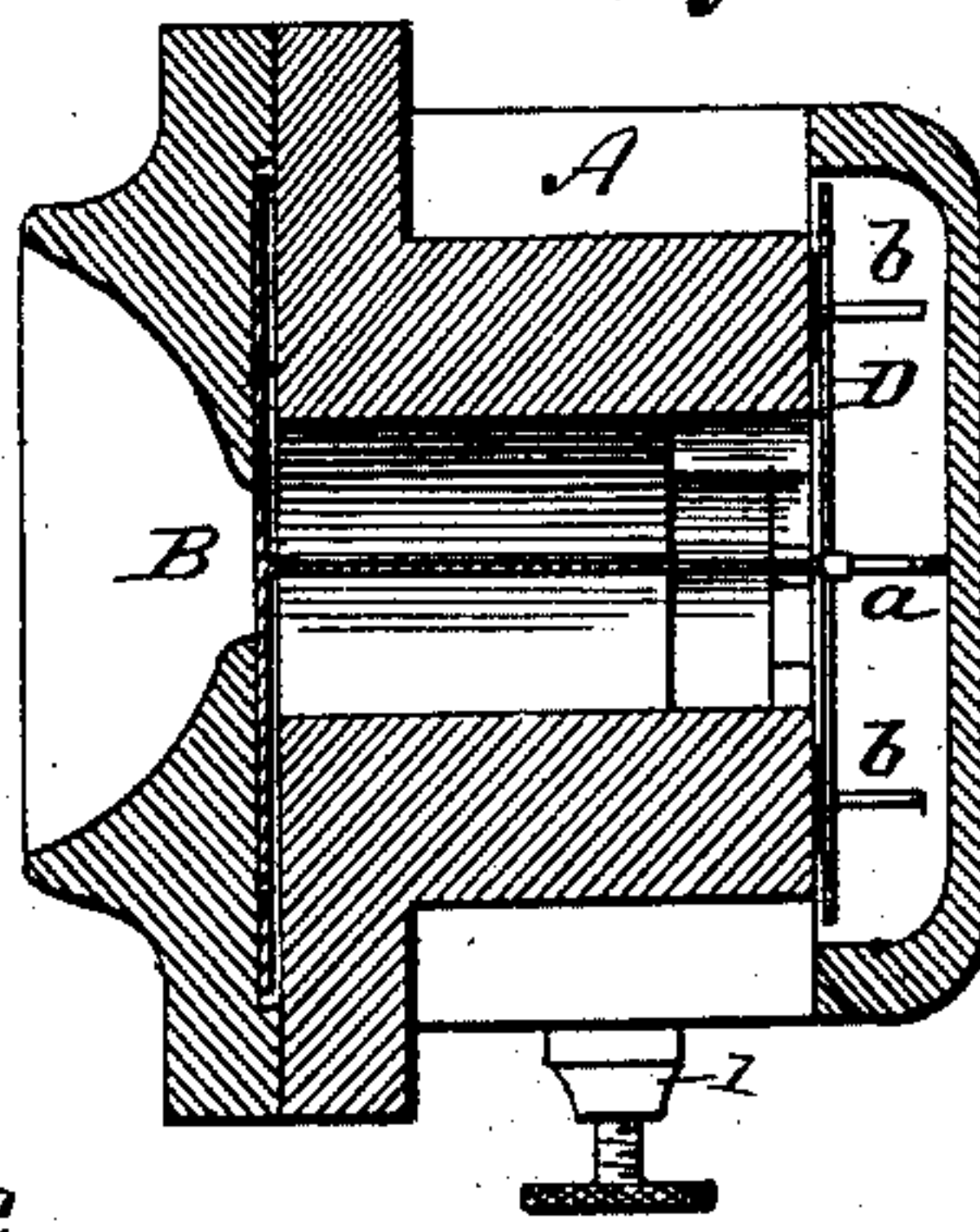
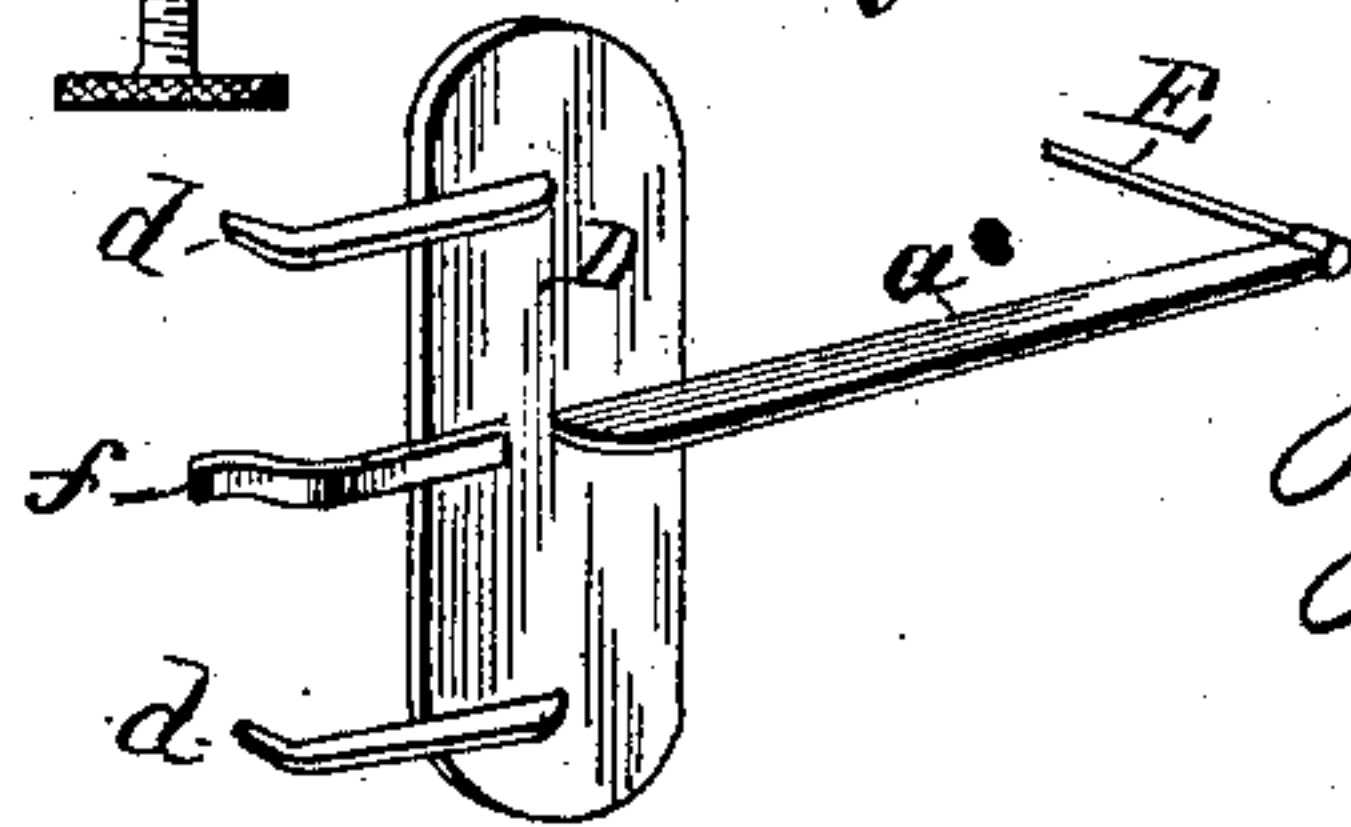


Fig. 5.



WITNESSES:

Fred. E. Dieterich  
Amos W. Hart

INVENTOR:

J. E. Dann  
J. Lapp  
BY Munn & Co.

ATTORNEYS.



# UNITED STATES PATENT OFFICE.

JOHN E. DANN AND JOHN LAPP, OF HONEOYE FALLS, NEW YORK.

## TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 338,491, dated March 23, 1886.

Application filed October 31, 1885. Serial No. 181,531. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN E. DANN and JOHN LAPP, of Honeoye Falls, in the county of Monroe and State of New York, have invented a new and useful Improvement in Telephonic Receivers, of which the following is a description.

Our invention is an improvement in telephonic receivers of the Reis type—that is to say, such as depend for their operation upon the coaction of an electro-magnet and an armature arranged in front of it, and whose vibrations are synchronous with those of the diaphragm of the transmitting-instrument. It is more particularly an improvement upon receivers whose diaphragm is connected by a rigid rod with the armature of an electro-magnet which is in the line-circuit. We employ two horseshoe electric magnets arranged opposite each other—*i. e.*, respectively right and left from the diaphragm, and on the rear side of the same—and we connect both armatures of said magnets with the diaphragm by rigid rods, so that both shall simultaneously act on the latter to vibrate it as forcibly as possible. We have found by experiment that this arrangement produces a very marked effect in loudness of tone, and a better one than can be secured by employing a single magnet of double the size of one of ours. The improvement is doubtless attributable mainly to this cause—namely, the + and — poles of each magnet react on each other and intensify their respective polarities, and the same is true of the polarities induced in each armature, so that the force of the current is converted into a strong magnetic attraction that acts powerfully on the diaphragm. Some importance may also be attached to the effect of two armatures acting at once, since they mechanically neutralize each other in so far as they would tend, if acting separately, to distort the diaphragm by reason of moving in an arc and not in a plane at right angles to the same.

Figure 1 is a perspective view of our receiving-instrument, the back or cover being detached. Fig. 2 is a rear elevation of the same, the armature being removed. Fig. 3 is a cross-section through *x x*, Fig. 1. Fig. 4 is

a vertical section through *y y*, Fig. 1. Fig. 5 is a perspective view of one of our armatures detached.

The letter A indicates the body of the receiving-instrument.

The diaphragm B is arranged as usual in telephonic receivers, and may be made of metal, membrane, or other suitable material. Laterally from the diaphragm are arranged two horseshoe-magnets, C C—one on each side—their feet pointing backward. The flat-bar armatures D D of said magnets have rigid horizontal arms *a*, which project toward each other, so that their free ends nearly meet at a point directly opposite the center of the diaphragm B, with which they are connected by means of small but rigid rods E. The latter are in this instance soldered to the diaphragm, it being of metal; but when made of membrane it is obvious that some other suitable means of connection will be necessary. Short rigid arms *b b* also project backward from the armatures D D, and have points *e*, that rest in sockets in the heads of screws *d*. The latter serve as adjustable bearings or supports for the armatures, by which their proximity to the magnets (which they are never in actual contact with) may be easily regulated at will. In place of these screws, various devices for supporting and holding the ends of arms *b b* may be employed. It will be seen that the armatures have thus two points of support—namely, the diaphragm and the screws; but they are held attracted by magnets whose cores are polarized, so that the diaphragm is thereby pressed outward or held under tension to a degree corresponding to the constant attractive force of the magnets. In place of the latter being of the permanent type, we may employ soft-iron cores energized by a local circuit; but the former arrangement is the more economical.

To supplement the action of the polarized magnets' cores on the armatures, and to better hold them in due position, they are provided with plate-springs *f*, extending rearward, and whose free ends are held under a pivoted catch, *g*, or other suitable device. It will be noted that the point of contact of such springs and catches is in alignment both ways with the heads of screws, which local relation is es-

55

60

65

70

75

80

85

90

95

100



sentia] to vibration of the armatures with the least friction and greatest freedom and accuracy.

5 The connection with the line-wire *x* is from binding-post 1, Fig. 2, to the center of the coil around the adjacent leg of the nearer magnet, and from the outer coil of such leg to the center of the coil on the other leg, thence to the opposite magnet, and then to the other binding-post, 2.  
10 It will be apparent from this arrangement that both magnets are energized simultaneously by the line-current, and simultaneously demagnetized more or less when the circuit is lessened, (save of course the constant attraction  
15 proceeding from polarized cores.) Both armatures are therefore attracted and released at the same instant, so that their push-rods *E* act together on the diaphragm *B*, throwing it into vibrations corresponding to the impulses  
20 of the current, and effecting the desired transmission of sound loudly and accurately.

What we claim is—

1. In a telephonic receiver, the combination, with the diaphragm *B*, of the two horse-shoe electro-magnets *C* and *C*, arranged on the 25 rear side of and in laterally-opposite directions from the diaphragm, the two armatures *D D*, having arms *a* projecting toward each other, and the two rigid rods *E E*, connecting these arms with the center of the diaphragm, 30 as shown and described, for the purpose specified.

2. In a telephonic receiving-instrument, the combination of the socket-screws with the armature-arms having points that constitute 35 bearings or fulcra for said armatures, as shown and described.

JOHN E. DANN.  
JOHN LAPP.

Witnesses:

AMOS W. HART,  
SOLON C. KEMON.