

(No Model.)

O. A. DANIELSON.
DROP SIGNAL APPARATUS.

No. 601,222.

Patented Mar. 22, 1898.

Fig. 1.

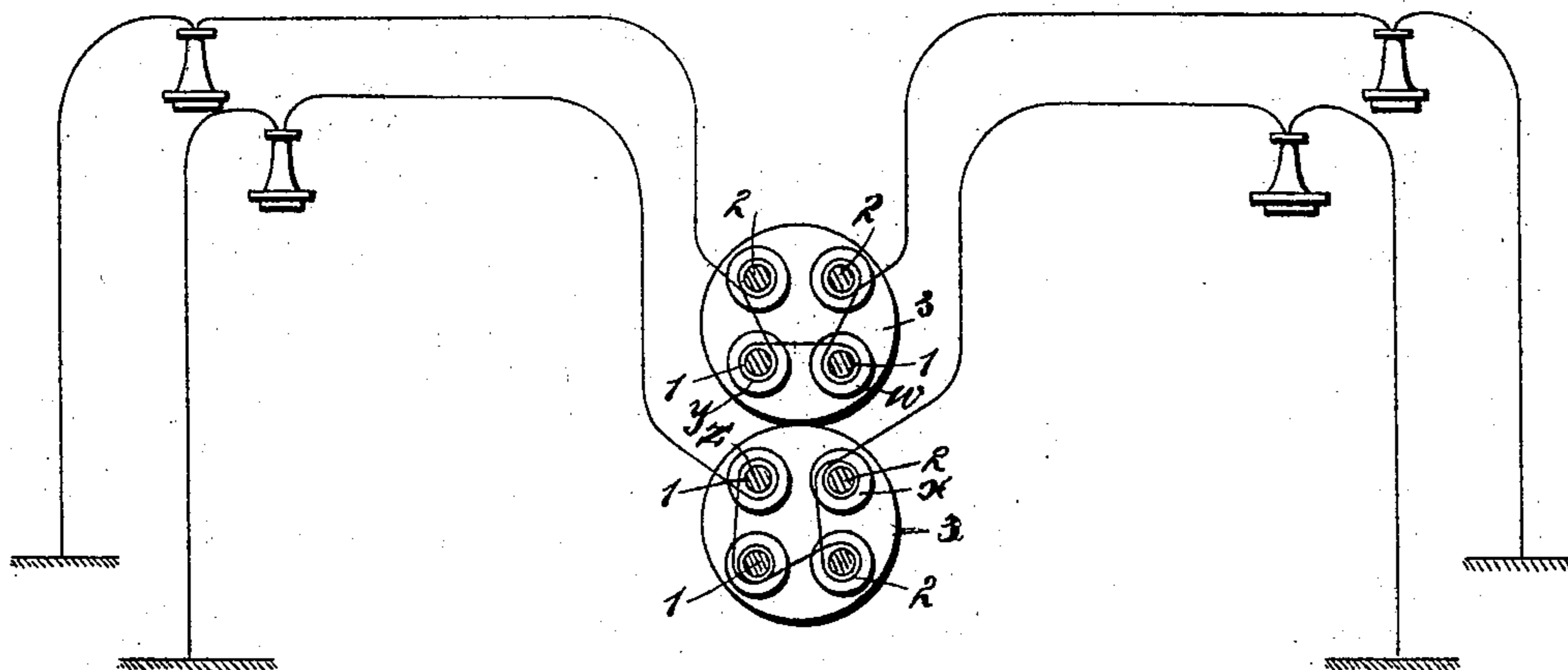


Fig. 2.

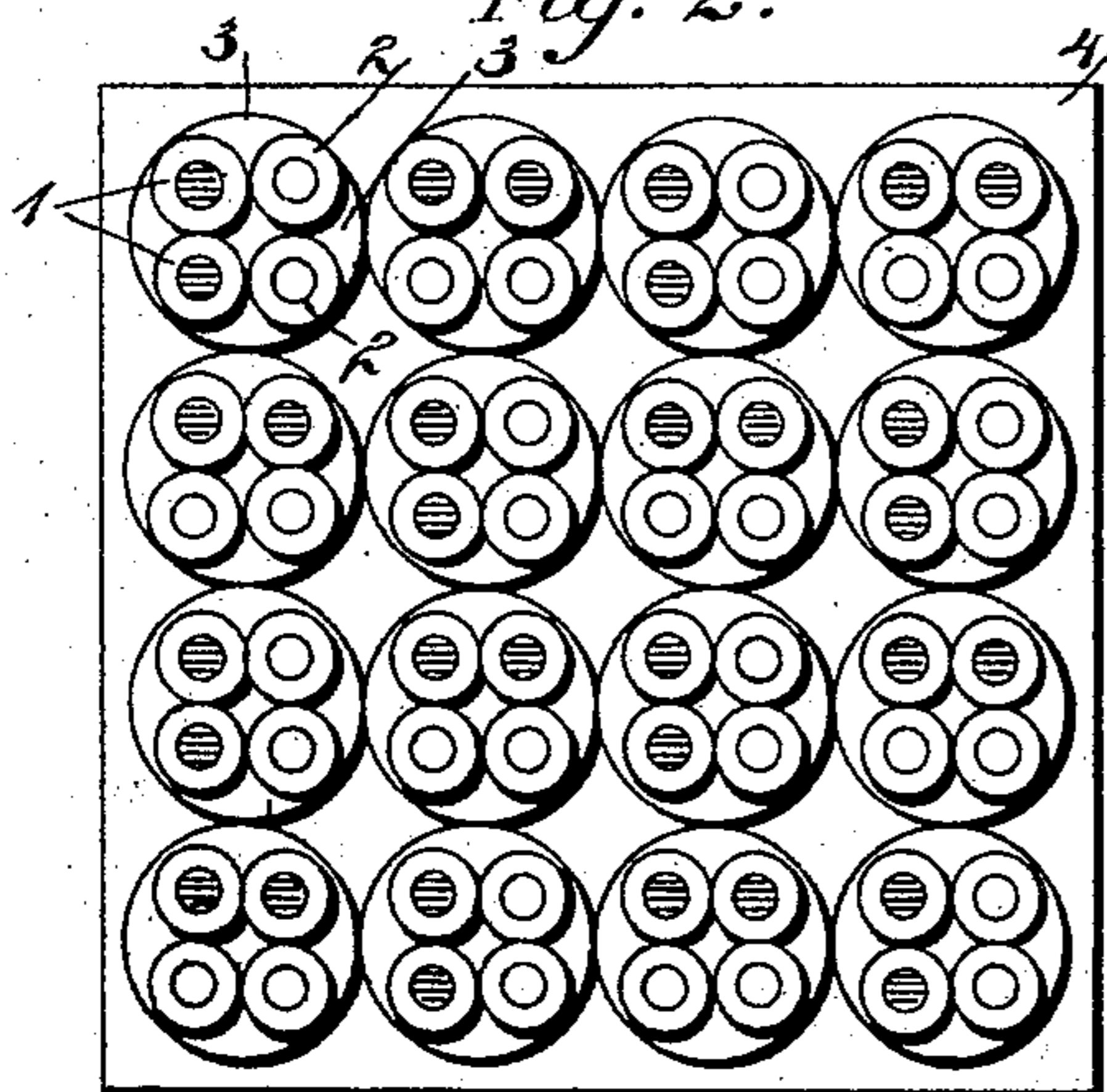


Fig. 3.

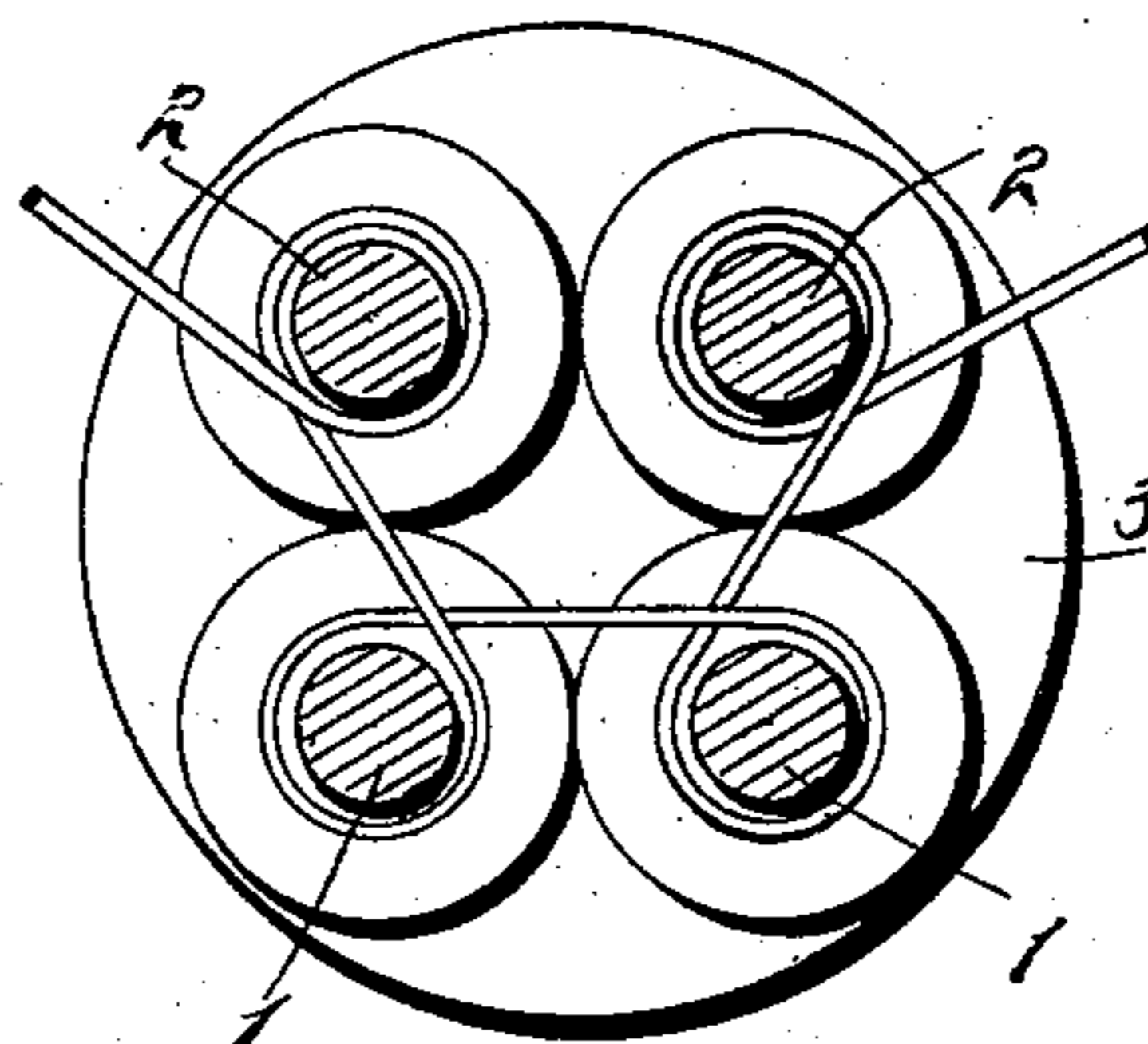


Fig. 4.

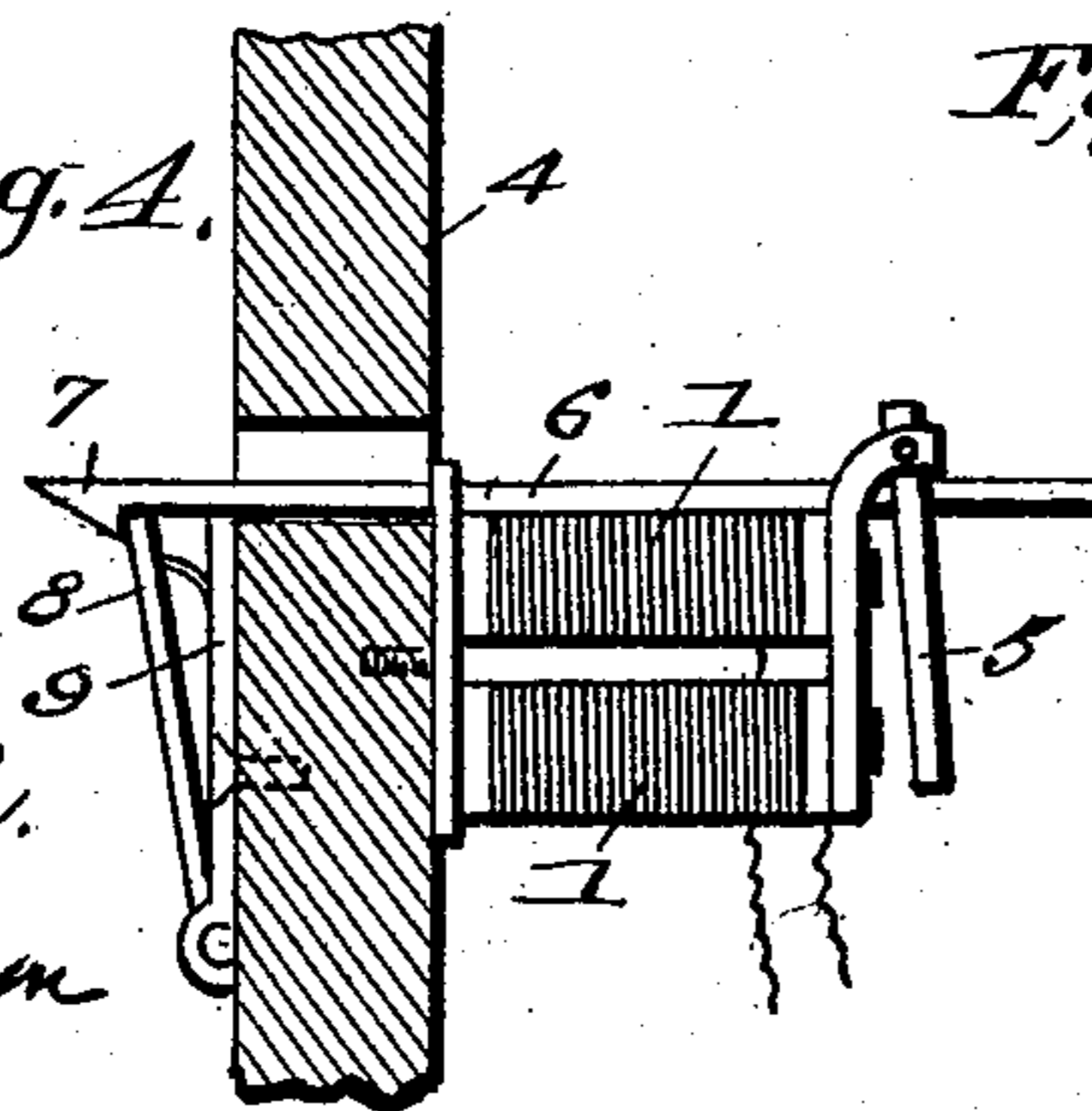
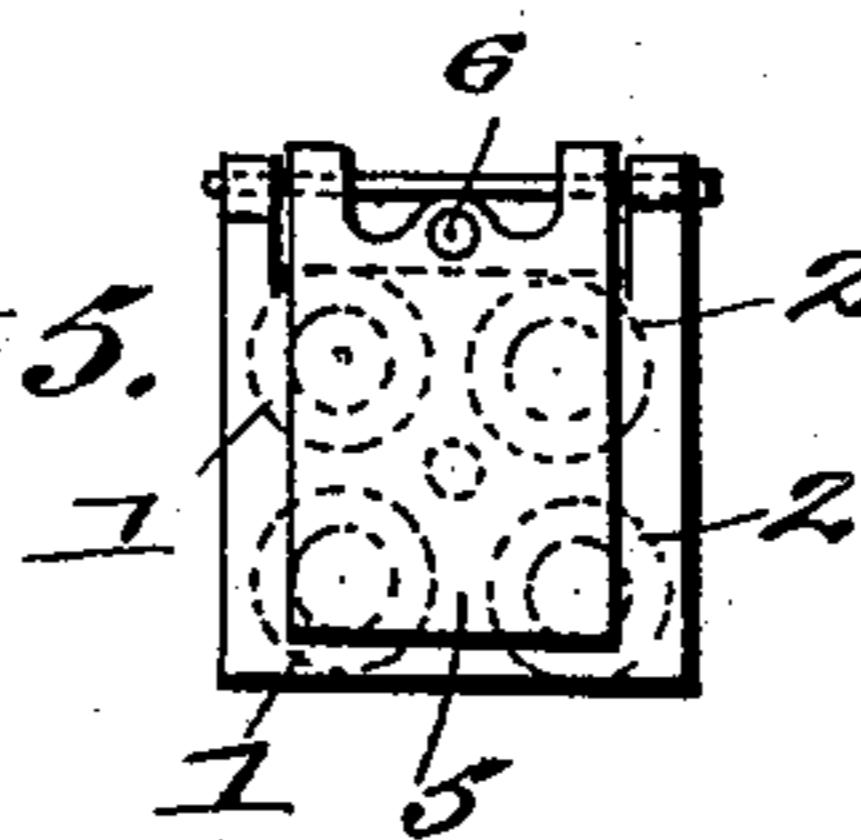


Fig. 5.



WITNESSES :

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DROP-SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 601,222, dated March 22, 1898.

Application filed May 13, 1897. Serial No. 636,350. (No model.)

To all whom it may concern:

Be it known that I, OSCAR ALVIN DANIELSON, of Owatonna, in the county of Steele and State of Minnesota, have invented a new and Improved Drop-Signal Apparatus for Telephone Systems, of which the following is a full, clear, and exact description.

This invention relates to drop-signal apparatus used in connection with telephone-exchange switchboards.

In operating manual switchboards it is necessary to leave a drop-magnet in the circuit between two telephones through which conversation is held. In order to accommodate a sufficient number of these magnets on a board, it is necessary to place them close together, and when so placed they are affected by induction—that is, a conversation-circuit passing through one magnet sets up induced currents in surrounding magnets—thus producing what is termed “cross-talk” in the system. The object of my invention is to provide a simple means to prevent the induction and consequently prevent cross-talk.

I will describe my invention, and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a diagrammatic view of a telephone system embodying my invention. Fig. 2 shows a switchboard with several drop-magnets arranged thereon. Fig. 3 shows the manner of winding one of the drop-magnets. Fig. 4 is a sectional view showing magnets as applied to an annunciator, and Fig. 5 is a rear view of a drop-releasing armature.

In carrying out my invention, instead of using a single magnet for each drop, I employ a series of magnets for each drop. As shown in the drawings, four electromagnets or two horseshoe-magnets are used for each drop, the positive magnets being indicated by 1 and the negative magnets by 2. The four magnets of a set are mounted on a soft-iron base 3, and the several sets are arranged closely together on a switchboard. Each set of electromagnets is connected up in series, and the several sets are so arranged on the board that the positive magnets of one set oppose the negative and positive magnets of an adjacent set.

The effect upon adjacent sets of magnets may be described as follows, referring particularly to Fig. 1: Assuming the two telephone-lines to be in use the inductive effect of the magnet x upon the magnet w is counteracted by the effect of z upon y , because x and z , being unlike, induce currents of opposite direction in w and y , which are wound alike. Therefore the currents induced in w and y meet and neutralize each other, likewise the cross effect of x upon y is balanced by z upon w . Of course it will be understood that these opposing effects are due to the different direction of winding of the magnets.

I have mentioned the magnets as being in series, but it is obvious that they may be connected in multiple.

In Figs. 4 and 5 I have shown the connections operated by a set of magnets for releasing a drop in which it will be seen a pivoted armature 5 coacts with the several magnets of a set. The armature carries a rod 6, having a hook 7 at its outer end to engage with the upper edge of a drop 8. When the armature is attracted, the hook will be raised out of engagement with the drop, allowing said drop to swing down to disclose the call on the plate 9.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a drop-signal apparatus, a series of sets of magnets, a set for each drop, each set comprising a multiplicity of magnets, adjacent sets being so arranged that magnets of one set will oppose magnets of the adjacent set, substantially as specified.

2. In a drop-signal apparatus for telephone systems, a series of magnets for each drop, the magnets of a set being variously wound, and the said set being so arranged with relation to an adjacent set that magnets of the first-named set will oppose magnets of the adjacent set, substantially as specified.

3. In a drop-signal apparatus, a series of groups or sets of magnets, a group for each drop, each group comprising a multiplicity of magnets, the magnets of each group being oppositely wound, adjacent groups being so arranged that magnets of one group will oppose magnets of the adjacent group, substantially as specified.

4. In a drop-signal apparatus, a series of

groups of magnets, a group being arranged for each drop, each group comprising a multiplicity of magnets and the magnets of each group being oppositely wound, a soft-iron
5 plate for each group of magnets, and a board upon which the several groups are arranged, the groups being so arranged on the board

that the positive magnets of one set oppose negative and positive magnets of an adjacent set, substantially as specified.

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Witnesses:

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