(No Model.)

W. E. DAVIS.

TELEGRAPH SOUNDER.

No. 273,264. Patented Mar. 6, 1883.

fig. 1.

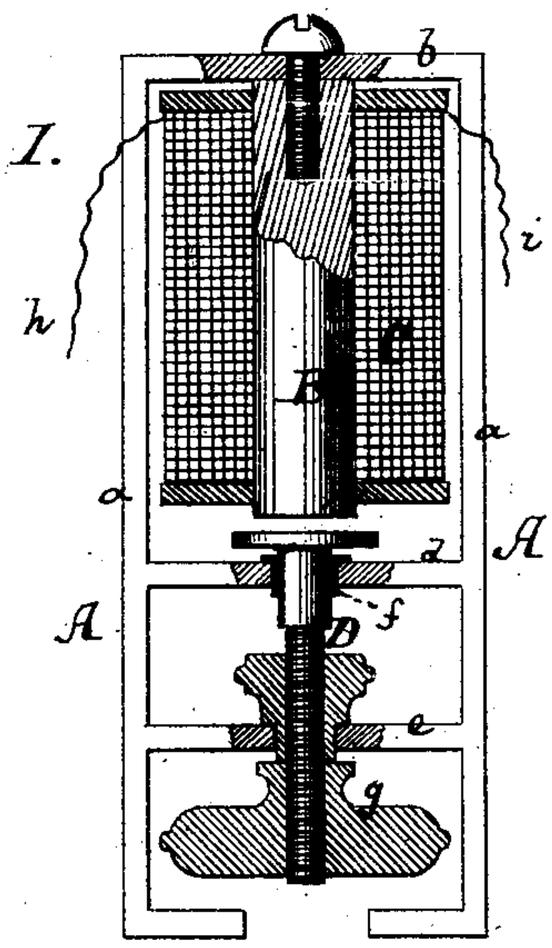

fig. 2.

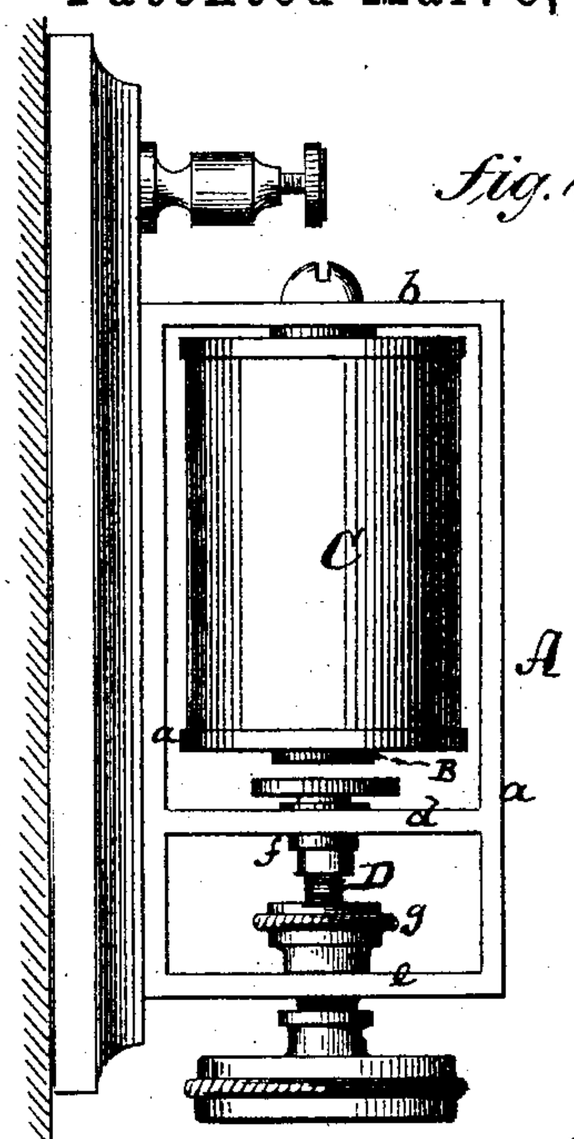

fig. 3.

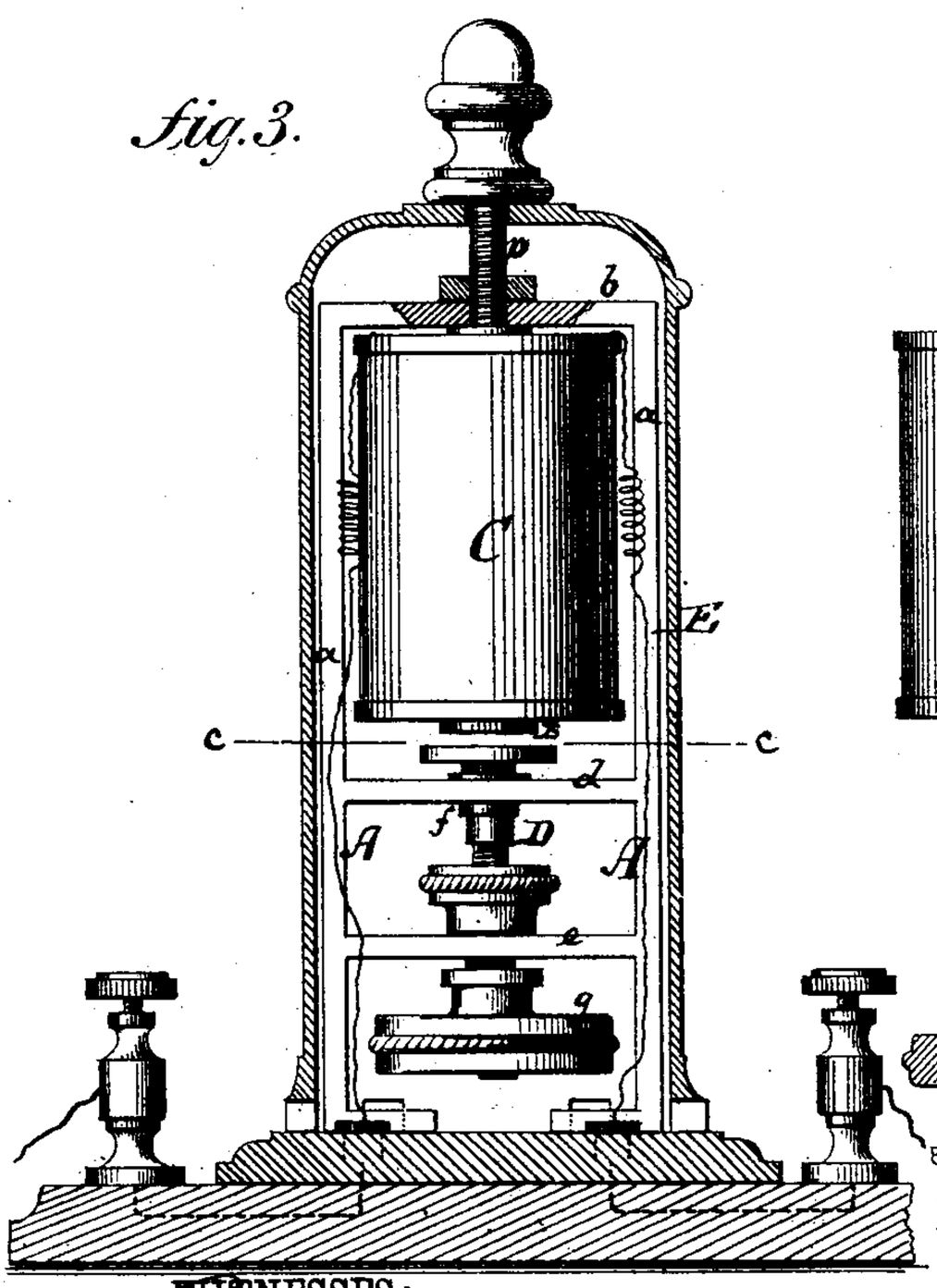

fig. 4.

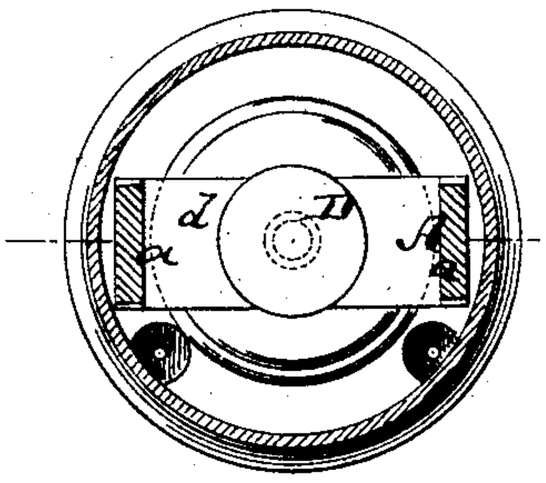

fig. 5.

WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM E. DAVIS, OF JERSEY CITY, NEW JERSEY.

TELEGRAPH-SOUNDER.

SPECIFICATION forming part of Letters Patent No. 273,264, dated March 6, 1883.

Application filed December 8, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EDWARD DAVIS, of Jersey City, in the county of Hudson and State of New Jersey, have invented an Improved Telegraph-Instrument, of which the following is a specification.

Figure 1 is a sectional elevation of my improved telegraph-instrument; Fig. 2, a side view of the same, showing it attached to a wall-bracket; Fig. 3, a sectional elevation of the same, showing it in a protecting-housing; Fig. 4, a horizontal section thereof on the plane of the line *c c*, Fig. 3; and Fig. 5, a side view, partly in section, of another modification of the same.

This invention relates to a new telegraph-instrument which can be used as a receiving-instrument or sounder, and for analogous purposes; and it consists principally in placing an electro-magnet having a fixed core within a soft-iron frame, in which the movable armature is also guided. The armature is vertically beneath. The electro-magnet is magnetized by the surrounding soft-iron framing, and therefore the more readily attracted to the electro-magnet when the current is established, dropping away from the same when the current is interrupted.

The invention also consists in other details of improvement, that are hereinafter more clearly pointed out.

In the accompanying drawings, the letter A represents a frame, made of soft iron, preferably of two upright bars, *a a*, of a top cross-bar, *b*, and lower cross-bars, *d* and *e*, as shown in Figs. 1 and 3 and also in Fig. 2, and to the upper cross-bar, *b*, of this frame A is secured the fixed core B of an electro-magnet, C. Directly below this fixed core B is placed the movable armature D, which is also made of soft iron. The stem of this movable armature D is guided in the cross-bars *d e*, and is free to move up and down therein, but is insulated therefrom by intervening bushing *f*, of brass or other unmagnetizable material, as shown in the drawings. The insulating bushing in the lower cross-bar, *e*, may, if desired, be in form of a nut, *g*, which is screwed upon the threaded lower portion of the stem of the armature D, as more clearly shown in Fig. 1. The insulating parts interposed between the stem of the movable armature D and the soft-iron frame A are for the purpose of preventing the iron of the frame from coming in contact with the iron of the movable armature, and to prevent sticking of the movable armature, giving it full freedom to drop by its own gravity off the electro-magnet, whereas without these interposed bushings the armature D and iron frame A, being in contact, would cause the armature to stick, and not allow it to drop freely when the circuit was interrupted.

Although in the accompanying drawings I have shown the movable armature D to be capable of moving in an up-and-down direction only, yet the same principle of invention can be applied to an armature having a vibratory motion instead of a rectilinear motion, so long as its gravity can be utilized for carrying it away from the electro-magnet.

The conductors from the battery connect with the electro-magnet B C, as indicated in Fig. 1, where the letters *h* and *i* represent these conductors, and when the circuit is closed and the electro-magnet charged the result will be that the stationary core B, and also the soft-iron frame A, and likewise the armature D, will be magnetized, so that the south pole of the armature will be near to the north pole of the fixed core, or vice versa, thus facilitating the lifting of the armature by the mutual attraction of the two. Were it not for the placing of this armature D into the soft-iron magnetized frame, the power required for lifting it would have to be greater, and a stronger battery-power would be required. When the current is interrupted the armature D instantly drops by its own weight away from the fixed core B, and thus, by proper manipulations of the key of the transmitting-instrument, the armature D can be caused to ascend and drop with pulsations of the requisite extent and relative duration, and in dropping, as well as in ascending, the same will produce the clicking noises common to telegraph-instruments for the purpose of allowing the message to be understood by the ear.

The play of the armature D can be regulated by the nut *g*, which, when turned, will cause the upper enlarged end of the armature D to be normally nearer to or farther away from the lower end of the fixed core B; but this nut *g*

can only be manipulated when the instrument is stationary or not in use.

If it is desired to apply means for adjusting the stroke of the armature D during the action of the instrument, it can be produced in the form indicated in Fig. 5—that is to say, by means of a spring-bar, *j*, engaging under a shoulder or enlargement, *l*, of the nut *g*, or of one of the bushings, and forced down upon another shoulder, *o*, by a screw, *m*, to a greater or less extent. The screw *m*, being supported by a post, *n*, which is at a short distance from the frame A and its attachments, can be moved during the play of the instrument, and when moved will either relax the spring-bar *j* so as to normally lift the armature higher or depress it so as to keep it farther away normally from the electro-magnet; or substantially such a spring, or a weaker one than that shown in Fig. 5, may be supported on a post and depressed by a screw upon the head of the nut *g*, with substantially the same effect, it being understood that when the electro-magnet attracts the armature the force of said spring has to be overcome.

The operation of the instrument is as follows: When the circuit is closed the fixed core B, the armature D, and the frame A are all magnetized together, and the armature D, passing through the brass bushings, being the only movable part of the mechanism, is drawn upward toward the fixed pole of the core B, making a clicking noise. When the circuit is broken the armature D falls freely down by its own weight until arrested by one of the cross-bars *d e*, producing thereby another clicking noise, and thus, as the establishment and interruption of the current are repeated, this clicking noise is produced at proper intervals. The distance between the poles can be regulated by the lower nut, *g*, or by the upper bushing, if desired, and, in connection therewith, by the spring *j* and screw *m*, as hereinbefore stated.

The entire instrument may be inclosed in a shell, E, as shown in Fig. 3, which shell can be held fast to the instrument by a screw-connection, *p*, running up from the top of the framing A. The lower part of this inclosing-shell E may be perforated; or any other part thereof may be perforated to let the sound produced by the motion of the armature D be freely heard. The lower part of the nut *g*, or a separate nut, (Fig. 1 shows the said nut made in two parts,) constitutes a weight to the armature D, to assist in pulling it down; but, instead of that weight alone, a slight spring, regulated by a suitable thumb-screw, may be used to assist it, which spring would bear upon said weight or lower enlargement.

I claim—

1. The combination of the soft-iron framing A, having one or more cross-bars, *d e*, for guiding the movable armature, with the fixed core B, that is attached to said framing, fixed electro-magnet C on said core, and with the movable armature D, which is guided in said soft-iron framing A, below said electro-magnet, and with the insulator *f*, substantially as herein shown and described.

2. The combination of the soft-iron frame A, carrying the fixed electro magnet C and its fixed core B, with the movable armature D, which is guided in said frame A, below said electro-magnet, and with the bushing *f* and nut *g*, substantially as described.

3. The combination of the soft-iron frame A and fixed electro-magnet B C with the movable armature D, guided in said frame A, and with a spring and adjusting-screw, said spring bearing upon an enlargement or shoulder of the movable armature D, substantially as described.

4. The combination of the soft-iron frame A, carrying the fixed electro-magnet B C, with the movable armature D and with the perforated shell E, inclosing the said parts A, B, C, and D, substantially as herein shown and described.

This specification of my invention signed by me the 2d day of December, 1882.

WILLIAM EDWARD DAVIS.

Witnesses:

WILLIAM H. C. SMITH,

JULIUS HUELSEN, Jr.