

(No Model.)

F. W. CUSHING.
REED FOR HARMONIC TELEGRAPHS.

No. 308,754.

Patented Dec. 2, 1884.

Fig. 1.

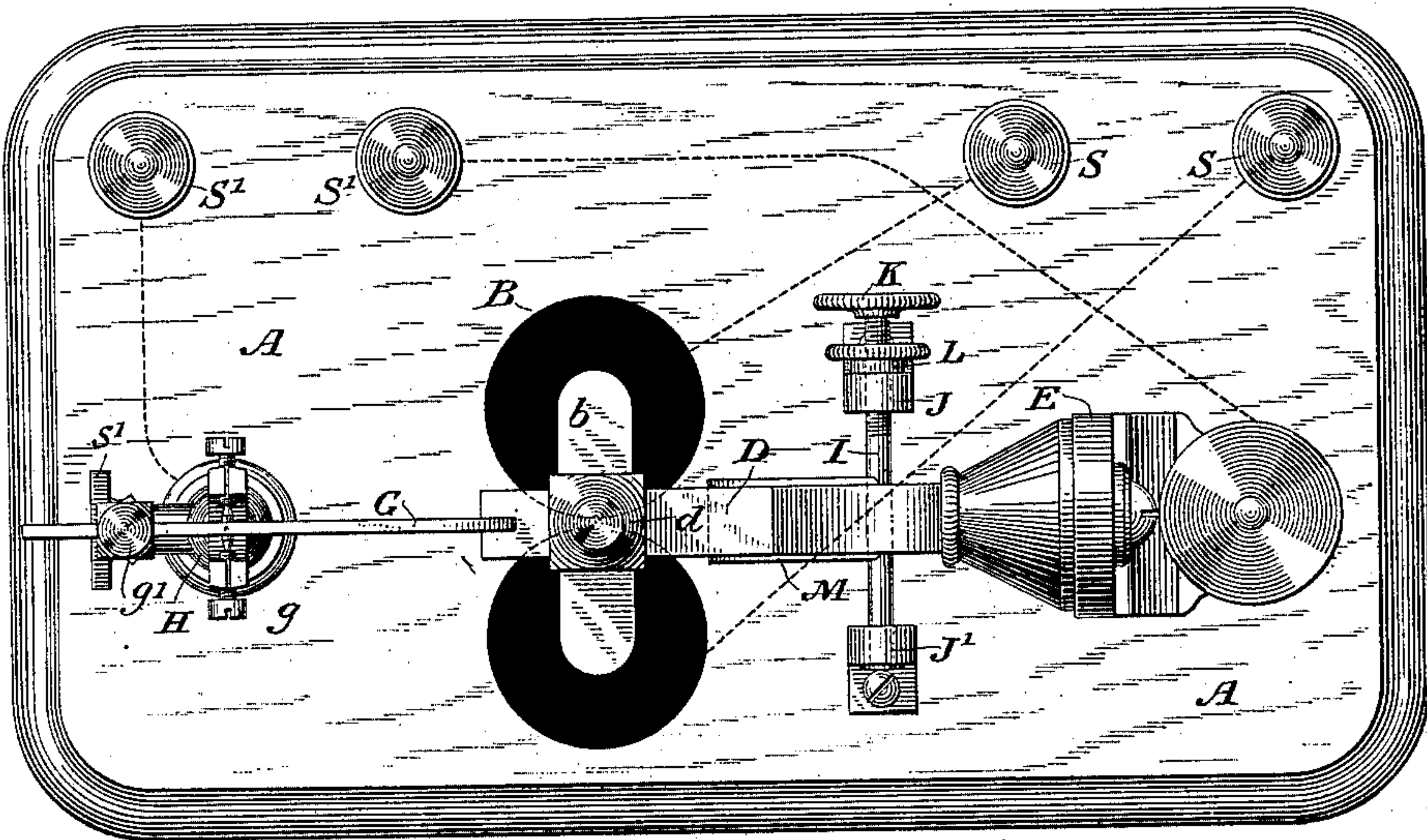
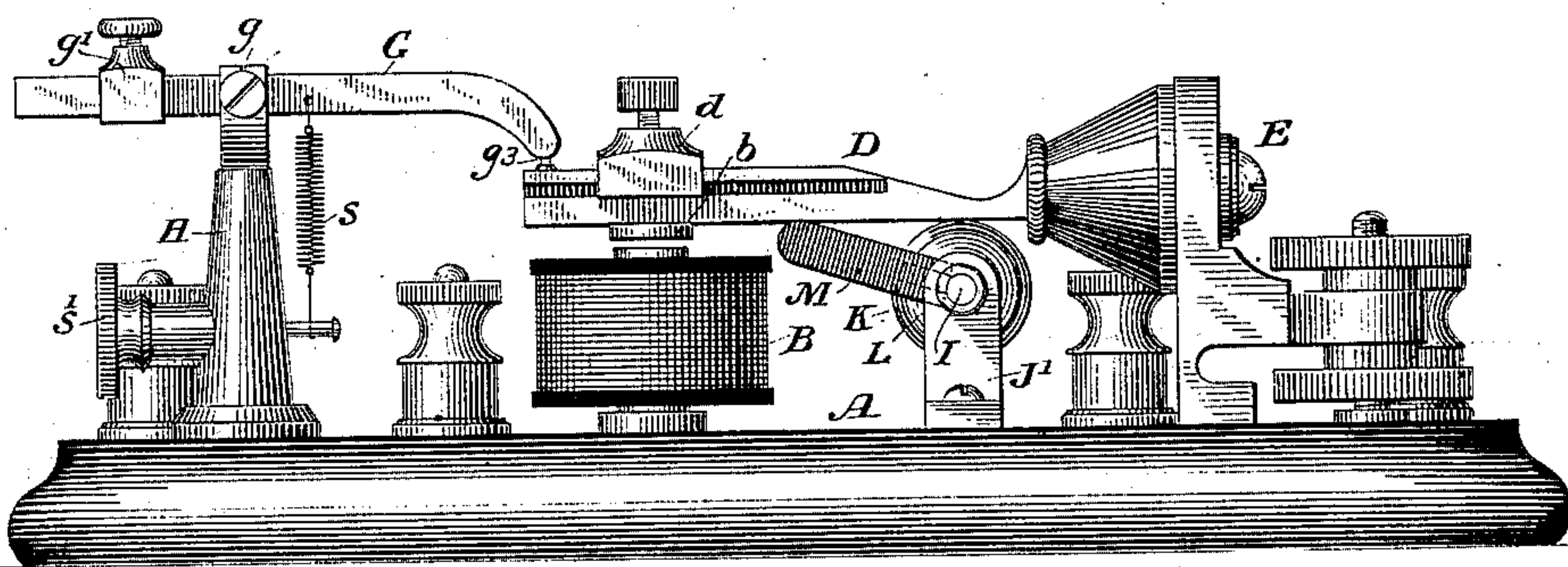


Fig. 2.



Witnesses

Wm. A. Slinko
Carrie E. Ashley

Inventor

Frederick W. Cushing

By his Attorneys

Poppe & Edgcomb

UNITED STATES PATENT OFFICE.

FREDERICK W. CUSHING, OF NEW YORK, N. Y.

REED FOR HARMONIC TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 308,754, dated December 2, 1884.

Application filed June 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. CUSHING, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Adjusting Devices for Electro-Harmonic Telegraph-Receiver, of which the following is a specification.

My invention relates to the class of telegraphic apparatus by means of which a series of electrical vibrations corresponding to different musical tones or notes are transmitted over the conducting-line, and a series of vibrating reeds respectively organized to respond to the different classes of vibrations or undulations thus transmitted are actuated thereby. Such instruments are usually denominated "harmonic telegraphs." The vibrating reeds in these tone-relays or analyzers are arranged in such a manner with reference to corresponding local circuits that the vibrations of the same and the cessation of such vibrations caused by the operation of the transmitter are made to record the telegraphic communications in Morse or other similar characters or signals by means of an instrument included in the local circuit.

It is found in practice that the successful operation of the tone-relays is seriously impaired by extraneous influences—such, for instance, as atmospheric electricity, induction from neighboring conducting-wires, &c. These influences manifest themselves in interruptions of or increases in the magnitude of the vibrations, whereby the false signals are produced by the receiving-instruments in the local circuits. I have found that these effects may be counteracted and the false signals almost entirely avoided by the employment of a yielding cushion held against the vibrating reed in a suitable position with reference to its vibrating end, and provided with adjustments whereby its pressure against the reed may be conveniently modified as required by changes in the strengths of the currents employed and the other causes affecting the amplitude of the vibrations.

In the accompanying drawings I have illustrated an analyzer or tone-relay with an adjusting device arranged to carry out my in-

vention, Figure 1 being a plan, and Fig. 2 a side elevation, of the instrument.

In the drawings, A is the base of the instrument; B, the electro-magnet, and *b* its armature. A vibrating reed, D, is fastened securely to the standard E at one end, and carries the armature *b*, fastened at its other extremity, which is the free or vibrating end. An adjustable weight, *d*, is carried upon the reed D, and this weight may be moved lengthwise for the purpose of adjusting the latter to the proper pitch. A curved arm, G, turning upon the bearings *g* and carrying an adjustable weight, *g'*, rests upon the reed D. A spring, *s*, adjustable by means of the thumb-screw *s'*, turning in the standard H, is applied to the arm G for the purpose of adjusting the pressure against the reed. At the end *g*² of the arm G there is placed a platinum contact-point, *g*³, which rests upon a similar contact-point on the end of the reed D. Suitable binding-posts, SS, are designed to receive the main-line conductor, and these posts are connected with each other through the coils of the electro-magnet B. Two binding-posts, S' S', are employed for connecting the local circuit through the arm G and reed D. For this purpose a conductor leads from one of the posts S' to the standard H, and thus to the balanced arm G, and a second conductor leads from the other binding-post, S', to the standard E, which sustains the reed D. When the reed D is vibrated by reason of the transmission over the main line of a series of impulses corresponding to its fundamental note or tone, the lever G, which is so adjusted that its vibrations must be much less than those of the reed D, is not able to follow the vibrations of the latter, and thus preserve a continuous contact, as would be the case if its rate of vibration were as great or greater than that of the reed D; but it is made to jar or rattle at the point of contact, and for all practical purposes it keeps the local circuit open so long as the reed D continues to vibrate. The instant, however, that the vibration ceases the contact-points upon the two levers come to rest, the local circuit is established, and the magnet in the local circuit is operated. Hence it will be readily understood that the continuance

and interruptions of the vibrations over the main wire which operate the reed D may be used to operate the magnet in the local circuit, and to thereby record Morse or other signals. It will be seen that a delicate adjustment of the lever G is necessary to thus obtain the record of the break and continuance in the vibrations of the reed D; and it thus results that the local circuit, of which it forms a part, will be readily affected by slight extraneous causes. An increase in the current upon the main wire, such as might be caused by atmospheric electricity, may either stop the vibrations of the reed entirely or suddenly increase the amplitude of its vibrations, so as to prevent the proper recording upon the local magnet of the signals actually transmitted. So, also, the presence of other conductors in the immediate neighborhood over which the make-and-break signals are being sent may and does affect the regular operation of the reed and the correct recording of the signals which it is designed to give. Again, when the main-line conductor over which the harmonic waves are sent is used at the same time as a common conductor for transmitting the signals of other systems, such as ordinary Morse, then when the independent battery for this second system is thrown upon the line a jar is produced upon the reed, caused by the sudden increase in the attractive power of the magnet, and false signals in the local circuit are frequently the result. To overcome these difficulties I have invented a device shown in the drawings, and which will now be described. Immediately underneath the vibrating reed D, and at a point not far from the end at which it is fastened to the standard E, I place a rod, I, which turns in bearings within the uprights J and J', on opposite sides of the reed D. By means of a thumb-screw, K, and setting-screw L, the rod I can be turned and held in any desired po-

sition. To this rod I there is attached a piece of rubber, M, or other similar yielding material, at right angles to it, and at a point immediately under the reed D, so that it can be pressed against the under side of the reed with any desired force by means of the screw K. This yielding material or cushion, while it does not materially impair the vibration of the reed, serves to prevent the reed from responding to false currents.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, in a harmonic-telegraph receiving-instrument, with the vibrating reed, of a yielding elastic cushion pressing against the reed, substantially as described.

2. The combination, substantially as hereinbefore set forth, in a harmonic-telegraph receiving-instrument, with the vibrating reed, of a yielding elastic cushion pressing against the reed, substantially as described, and means, substantially such as described, for adjusting the pressure of said cushion.

3. The combination, substantially as hereinbefore set forth, with the vibrating reed of a harmonic-telegraph receiving-instrument, of a contact-arm resting upon one side of the same, an elastic cushion pressing against said reed upon the opposite side, and means, substantially such as described, for adjusting the pressure of said cushion.

4. The combination, substantially as hereinbefore set forth, with the vibrating reed of a harmonic-telegraph instrument, of the elastic cushion M and screws K and L, and the rod I, organized substantially as described.

In testimony whereof I have hereunto subscribed my name this 28th day of June, A. D. 1884.

FREDERICK W. CUSHING.

Witnesses:

DANL. W. EDGECOMB,
CHARLES A. TERRY.