No. 882,329. PATENTED MAR. 17, 1908.

J. A. LIEB.

TELEGRAPHONE.

APPLICATION FILED MAR. 25, 1907.

Fig. 1.

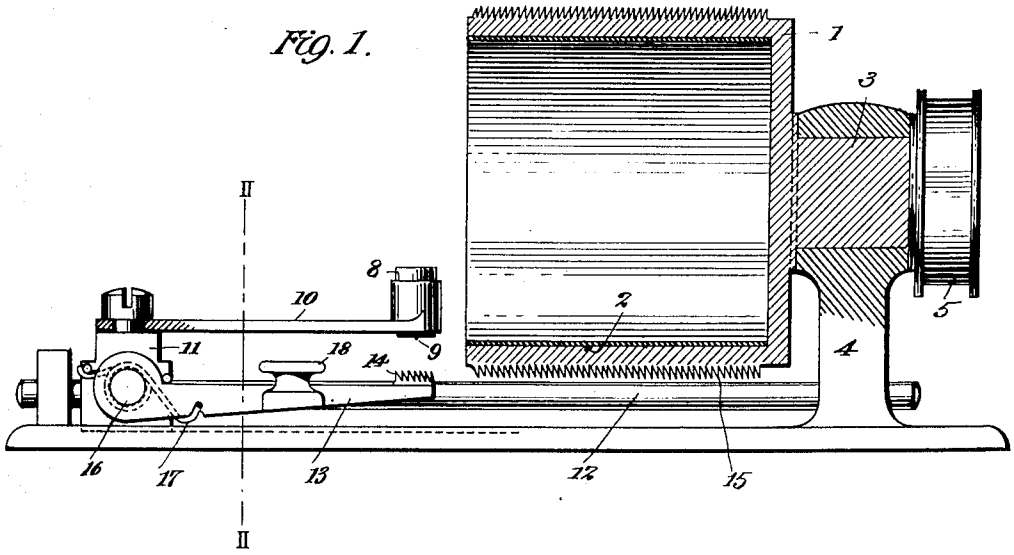


Fig. 2.

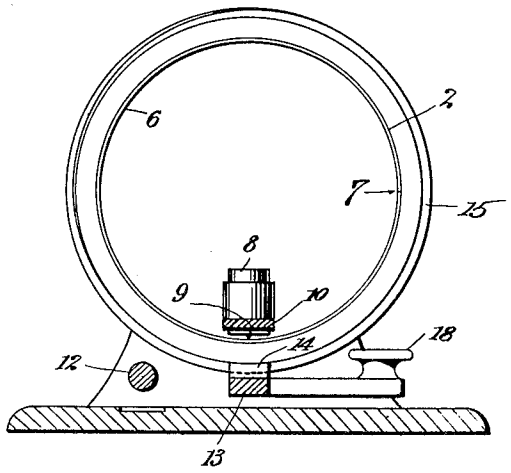


Fig. 3.

Witnesses:
Frank A. Obar
Chas. Hector

Inventor
John A. Lieb
By his Attorneys
Rosenbaum & Stockbridge

UNITED STATES PATENT OFFICE.

JOHN A. LIEB, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN TELEGRAPHONE COMPANY, A CORPORATION OF THE DISTRICT OF COLUMBIA.

TELEGRAPHONE.

No. 882,329. Specification of Letters Patent. Patented March 17, 1908.

Application filed March 25, 1907. Serial No. 364,508.

To all whom it may concern:

Be it known that I, JOHN A. LIEB, a citizen of the United States, residing at the city of New York, in the borough of Brooklyn and State of New York, have invented certain new and useful Improvements in Telegraphones, of which the following is a full, clear, and exact description.

My invention relates to a form of apparatus for magnetically recording and reproducing sound undulations. One form of apparatus in actual use is the telegraphone, and the features of the present invention are applicable thereto in certain of its forms.

In order to make a magnetic record of sound undulations, it is necessary to have a steel body passing in a continuous movement with respect to a given point at which the recording and reproducing devices are located. This has been accomplished by steel wires, by steel plates or disks and in other ways.

By the present invention I make use of a hollow drum or body upon the interior surface of which the record is made. In practice the sheet or plate of steel is sprung into the hollow interior of the drum so as to produce a removable surface therein on which the record may be made and afterwards withdrawn and replaced by another. This arrangement is particularly advantageous because a steel plate may be sprung into a hollow drum so as to become firmly affixed thereto in proper contacting relation by no means or force other than its own resiliency. It will be evident that there is a constant speed of travel of the recording surface, that the entire surface is available for use, and the record can be stored or shipped compactly in rectangular boxes or packages. The steel sheet or plate may be of uniform thickness but the best practical results are obtained by having it thicker at the middle than at the ends, as will later more fully appear. It is obvious that when a plate of this form is sprung into a hollow drum that its ends may fail in either abutting or overlapping relation without producing a seam or ridge of sufficient size to noticeably interfere with the action of the instrument. The recording and reproducing magnet may be moved with respect to the medium or the medium with respect to the magnet, or both may have a movement so as to produce a different relative resulting movement. In the practical apparatus forming the subject of the present case, the last arrangement is the one used.

In the drawings: Figure 1 is a side view partly in section of an apparatus embodying the principles of my invention; and Fig. 2 is a sectional view of the same on the line II—II of Fig. 1, looking in the direction of the arrows; and Fig. 3 is a sectional view showing a form of the recording plate or medium.

Referring to the drawings in which like parts are designated by the same reference sign, 1 denotes a hollow cylindrical drum or member, the interior surface 2 of which is finished to a perfect surface of revolution. The member 1 has a trunnion 3, constituting a shaft or spindle therefor, the axis of which is exactly concentric to the interior surface 2. 4 denotes a journal or bearing for the spindle 3, and 5 indicates a pulley by which the frame 1 is rotated. It is to be understood that the means by which the frame 1 is supported and rotated are merely examples of a very simple practical way of securing the desired functions.

Within the frame 1, and supported against the interior surface 2 thereof, is placed the steel sheet or band 6, which constitutes the most essential feature of the present invention. As already stated, this sheet or band is normally rectangular, with a width corresponding to the length of the elements of the cylindrical surface 2, and a length corresponding to the circumferential extent of such surface, or possibly slightly less than such circumferential extent. The end edges of the plate 6 are finished square and true. This plate is bent so that it can be inserted into the interior of the drum 1, and then springs or expands outward until its edges pass from overlapping into abutting relation, as shown at 7, in Fig. 2. The resiliency of the plate 6 locks it securely within the drum 1. This engagement is made so tight and firm in practice that an exactly true cylinder of revolution is produced. When the plate is properly contained within the drum 1 in this way, the strains due to its elasticity cause it to cling closely to the surface of the drum. In one form of my invention later described the strains are all circumferential and equal at all points, so as to insure the formation of the perfect cylindrical outline required.

The interior surface of the plate 6, which

is thus constrained into a perfectly cylindrical form, is made use of as the recording and reproducing medium. For this purpose it is merely necessary to move the drum rotarily and spirally with respect to the device which produces the magnetization.

8 denotes a magnet for this purpose, having a pole 9, and which is mounted on an arm 10, projecting from a carriage 11, movable on the rods 12.

13 denotes an arm projecting from the carriage 11, and which has teeth 14, adapted to engage and mesh with spiral threads 15, on the exterior surface of the drum 1. In order to have the carriage freely movable independent of the threads, the arm 13 is not rigidly held to the carriage, but is capable of spring resisted movement thereon by virtue of the pivot 16, and the spring 17.

18 denotes a handle for moving the arm 13. It is obvious that these details of the carriage and parts for supporting and moving the reproduction device are merely a convenient practical construction, and may be widely varied to suit different requirements.

The operation will be sufficiently understood from the preceding description. The drum 1 rotates and the carriage 11 is drawn into the same by the engagement of the threads 14, 15. In this movement the pole 9 pursues a helical path on the interior cylindrical surface of the plate 6, and in case the magnet 8 is in a circuit traversed by a fluctuating current, a magnetic recoil of the undulations is made. In reproducing the record it is merely necessary to repeat these movements with the magnet 8 in circuit with a telephone receiver.

In some cases it is preferable to have the plate 6 of unequal thickness in a longitudinal direction being thicker at the middle than at the two extremities. This construction is illustrated in Fig. 3. The idea of this form is to insure its bending nicely into the cylindrical outline required by its own elasticity acting against the containing walls of the hollow drum in which it is received. With this form of the invention it is immaterial whether the end edges abut or lap over one another within the drum.

What I claim, is:—

1. In an apparatus for magnetically recording and reproducing sound undulations, a hollow drum or member, and a steel plate sprung into said drum or member and retained therein by its own resiliency.

2. An apparatus for magnetically recording and reproducing sound undulations, comprising a hollow drum or member having a steel plate fitted to its interior surface and forming an interior surface of revolution, and a recording and reproducing device cooperating with such surface.

3. A means for magnetically recording and reproducing sound undulations comprising a steel plate sprung into a hollow supporting drum or member and constrained into cylindrical outline therein by its own resiliency.

4. A means for magnetically recording and reproducing sound undulations comprising a hollow drum having an interior surface of revolution, a steel plate closely received against said surface of revolution and held thereto by its own resiliency.

5. In an apparatus for magnetically recording and reproducing sound undulations, a hollow drum having an interior face of steel, means for rotating said drum on its axis, a carriage movable in a direction parallel to the axis of said drum, a recording and reproducing device connected with said carriage and coöperating with the interior surface of said drum, and means of coöperating with the outside of said drum for feeding said carriage with respect thereto.

6. In an apparatus for magnetically recording and reproducing sound undulations, a hollow drum or body and a steel sheet or plate sprung therein, said plate being of diminishing thickness towards its ends.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

JOHN A. LIEB.

Witnesses:

WALDO M. CHAPIN,

MAY BIRD.