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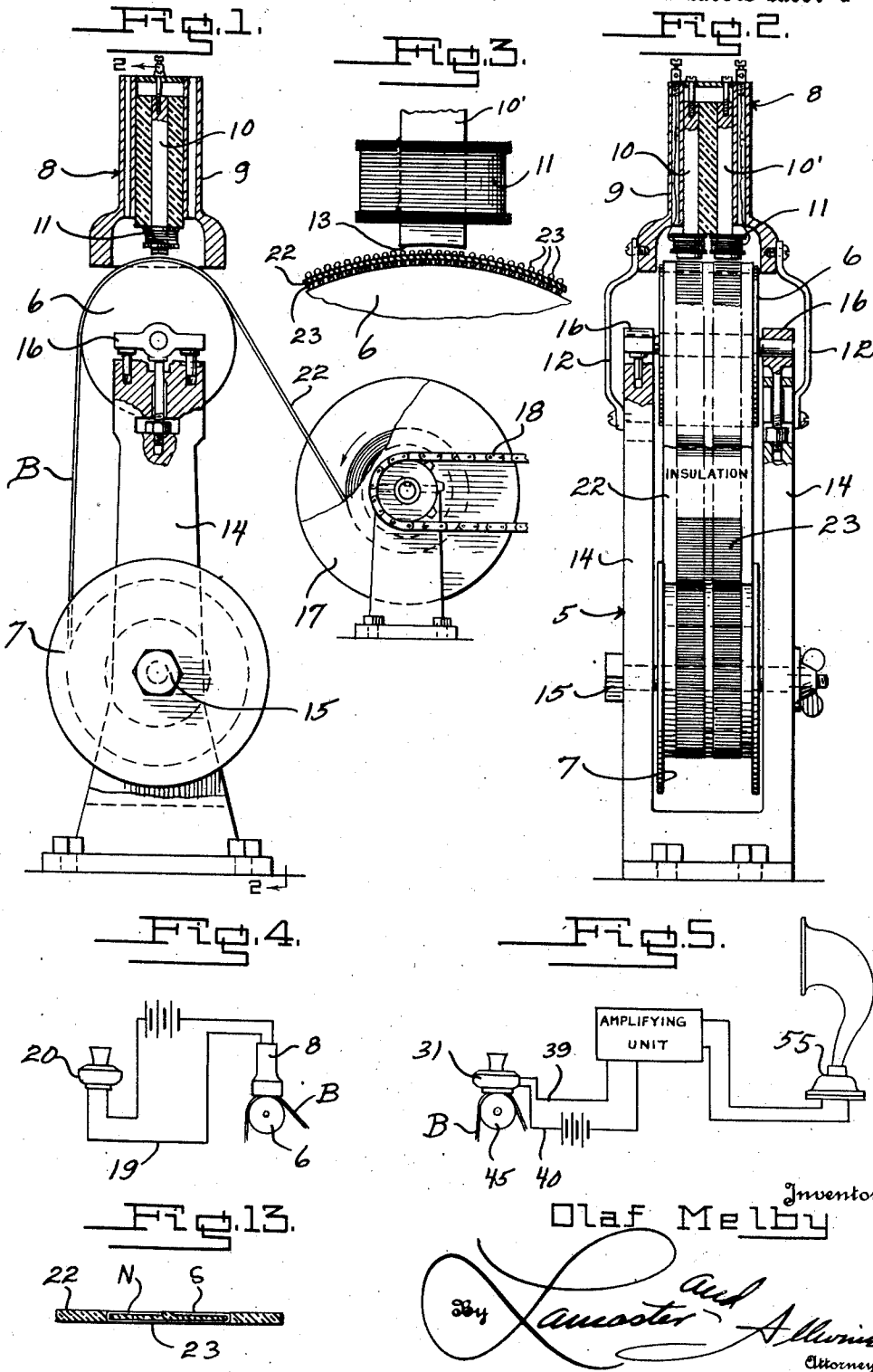
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TELEGRAPHONIC APPARATUS

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2 Sheets-Sheet 1



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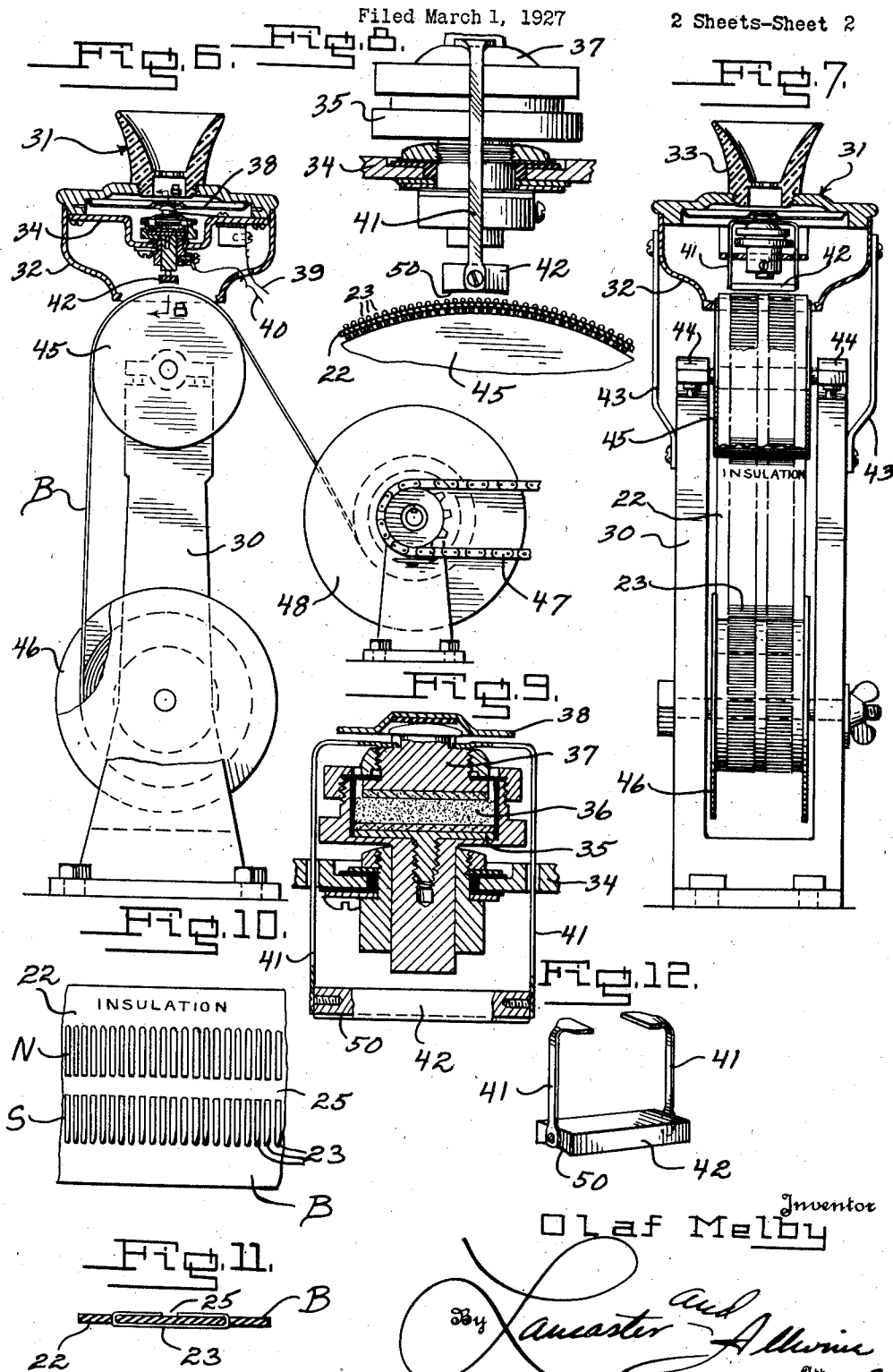
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TELEGRAPHONIC APPARATUS.

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The present invention relates to improvements in apparatus for recording and reproducing sound electromagnetically, and relates to that class of apparatus known as the telegraphphone.

The primary object of the invention resides in the provision of apparatus of this character wherein magnetic impressions of sound waves made upon a moving recording medium by undulating electric currents, will possess great magnetic qualities for actuation of the reproducing apparatus with great volume and definiteness of tone when reproducing the recorded sounds.

A further object of the invention resides in the provision of apparatus for electromagnetically recording sound waves, wherein the magnetic impressions are recorded by means of a series of independent paramagnetic bodies adapted to be moved in rapid succession past electromagnetic means of the recording apparatus.

A further object of the invention resides in the provision of apparatus for electromagnetically recording sound waves, wherein successive variations in the strength of the electromagnet of the receiving circuit of the apparatus are imparted to independent magnetizable bodies, and which magnetic impressions are retained by the bodies for actuation of the reproducing apparatus at a future time.

A further object of the invention resides in the provision of apparatus as set forth, wherein the recording medium is adjustable with respect to the receiving and reproducing devices for allowing the varying of the magnetic shield between the devices and the recording medium during recording and reproducing of the sound waves.

A further object of the invention resides in the provision of apparatus for electromagnetically recording sound, wherein the recording medium embodies a series of independent magnetizable bodies, a number of which are intended to be acted upon at one time by the receiving device, and which bodies are adapted to act in equal numbers upon the reproducing device for actuation thereof.

Other objects and advantages of the invention will be apparent during the course of the following detailed description, taken in connection with the accompanying draw-

ings forming a part of this specification and in which drawings:

Figure 1 is a view part in section and part in elevation of the recording apparatus, and showing by way of example one manner in which the recording medium may be moved past the receiving device.

Figure 2 is a view part in section and part in elevation on line 2-2 of Figure 1, and showing the manner in which the recording medium moves past the receiving device for having magnetic impressions recorded thereon.

Figure 3 is an enlarged fragmentary view illustrating the manner in which the paramagnetic bodies of the recording medium are moved past the poles of the receiving device.

Figure 4 is a diagrammatic showing of the apparatus for the recording of sound waves.

Figure 5 is a diagrammatic showing of the apparatus for the reproduction of the recorded sound waves.

Figure 6 is a view part in section and part in elevation of the reproducing apparatus.

Figure 7 is a view part in section and part in elevation of the reproducing apparatus, the view being taken at substantially a right angle to that of Figure 6.

Figure 8 is an enlarged fragmentary view on line 8-8 of Figure 6 and illustrating the manner in which the paramagnetic bodies of the recording medium are moved past the armature of the reproducing device.

Figure 9 is a fragmentary detail sectional view through a portion of the reproducing device and illustrating the manner in which the armature is carried thereby.

Figure 10 is a detailed view of a fragmentary portion of the recording medium or belt.

Figure 11 is a transverse section through the belt and showing the manner in which the paramagnetic bodies are secured thereto.

Figure 12 is a perspective view of the armature of the reproducing device.

Figure 13 is a sectional view showing a slightly modified form of recording belt.

Referring to the drawings in detail, and wherein similar reference characters designate corresponding parts throughout the several views, the letter A designates a receiv-

ing and recording apparatus by means of which variations in an electric current caused by sound vibrations, cause corresponding magnetic impressions to be recorded upon a recording medium B, and which recorded magnetic impressions of the recording medium serve for subsequent operation of reproducing or translating apparatus C.

Referring first to the recording apparatus A, the same embodies a mounting or frame 5 for rotatable mounting of the drum 6 and a reel 7, and a receiving device 8. The receiving device 8 is in the form of a telephone receiver and embodies a casing 9 in which is mounted the pole pieces 10 and 10' and around each of which windings 11 are wound and connected in series so that the received current passes through both of the windings. The receiving device 8 is mounted by means of the arms 12 upon the frame 5 with the pole pieces 10 and 10' arranged transversely of the drum 6, and as will be observed in Figure 3, the end faces 13 of the pole pieces have a curvature corresponding to the cylindrical surface of the drum 6.

The reel 7 is preferably mounted between the uprights or standards 14 of the frame 5 by means of a removable shaft 15 for permitting of ready removal and replacing of the reel which serves as a carrier for the recording medium B. The drum 6 is mounted in adjustable bearings 16 mounted in the uprights 14 for permitting of the circumferential face of the drum to have adjustment toward and away from the end faces of the pole pieces 10 and 10' for varying of the air gap between the pole pieces and the recording medium B.

The recording medium B may be moved past the receiving device 8, about the drum 6, in any preferred manner, and in the example shown the receiving reel 17 has been provided with a drive means 18 for movement of the recording medium past the pole pieces of the receiving device 8.

The electromagnetic receiving device 8 operates under the principle of the usual telephone receiver, and by observing Figure 4 it will be seen that variations of the electric current in the circuit 19, corresponding to the sound vibrations acting upon the transmitter 20, cause variations in the current in the receiver windings 11 and produce corresponding variations in the magnetic field of the pole pieces 10 and 10' in accordance with the sound vibrations acting upon the transmitter. These variations in the magnetic field of the pole pieces of the receiving device 8 are recorded in the form of magnetic impressions upon the recording medium B.

Referring now to the recording medium B, the same embodies a carrier belt or tape 22 which may be formed of an insulating material such as paper, rubber, cloth, or the like, and carried in spaced apart relation

throughout the length of the belt, is a series of paramagnetic bodies 23 which may be formed of steel wire or any other suitable metal suitable for receiving and retaining magnetism. These paramagnetic bodies 23 are in the form of C shaped magnets, and each forms in effect, a horse-shoe magnet the poles N and S of which are disposed in spaced relation at one side of the carrier belt 22. By so having the poles N and S approach one another as illustrated in Figures 10 and 11, it will be seen that a strong magnetic field will be created in the space 25 between the terminals of the poles. As will be observed in Figures 10 and 11, the bodies 23, and which extend transversely of the belt 22, are of wire like formation and project through the belt with their terminals clinched about the opposite face of the belt in the form of staples. It will be seen that the recording medium may be economically manufactured, since the bodies 23 may be placed along the carrier belt by means of an ordinary type of stapling machine.

The recording medium moves about the drum 6 with the terminals N and S of the bodies 23 in confronting relation with the receiver pole pieces 10 and 10', and by observing Figure 2 it will be seen that the terminals N and S pass one beneath each of the receiver pole pieces. As the carrier belt is moved past the electromagnets of the receiving device, successive variations in the strength of the electromagnets will be imparted to successive bodies 23 and retained thereby in the form of magnetic impressions to serve for operation of the reproducing or translating apparatus C. By observing Figure 3 it will be seen that a number of the C shaped bodies 23 are in confronting relation with the receiver pole pieces at one time, and that the varying magnetic field of the pole pieces intersect a number of the bodies for creating varying magnetic impressions upon the bodies when passing the receiver pole pieces.

Referring now to the reproducing apparatus C, the same embodies a mounting or frame 30 upon which is mounted a microphonic device 31 intended to be operated by means of the magnetic impressions recorded upon the recording medium B.

The device 31 is of ordinary construction and embodies a shell 32 and mouth piece 33 forming a housing within which is mounted a brace 34 for rigid supporting of the usual metal cup 35 in which is disposed the carbon granules 36. Mounted in the cup 35 and contacting with the carbon granules 36, is the usual button 37 having contact at its outer end with the diaphragm 38. In practice, one conductor 39 is connected with the button 37, while a second conductor 40 has connection with the metal cup 35 and pressure on the carbon granules 36 is varied by sound

vibrations acting upon the diaphragm 38. Connected at one end with the button 37, is a pair of arms 41 which extend downwardly through the brace 34 and are connected at their opposite ends by means of a soft iron block 42 which serves as an armature for actuation of the button 37 when acted upon by the magnetic impressions recorded on the recording medium B. The device 31 is rigidly mounted upon the frame 30 by means of arms 43 which serve for retaining the armature 42 in fixed relation with respect to the supporting frame 30.

Mounted in adjustable bearings 44 supported by the frame 30, is a drum 45 of like dimensions as that of the drum 6, and which drum 45 by reason of the bearings 44 may be adjusted toward and away from the armature block 42. The reel 46 may also be supported by the frame 30 for receiving the belt 32, and any suitable means such as the drive chain 47 may be employed for driving of the reel 48 for movement of the recording medium about the drum 45.

The armature 42, and which as will be observed extends transversely of the circumferential face of the drum 45, has a transversely concaved face 50 disposed in confronting relation to the drum 45, and this face 50 preferably has a curvature corresponding to that of the circumferential face of the drum. This armature block 42 is of a width equal to the width of the receiver pole pieces 10 and 10', in order that a like number of the bodies 23 will be disposed under the armature block for reproduction of the sounds, as were under the receiver pole pieces during recording of the sounds.

As in Figure 5, the wires 39 and 40 may lead to a suitable amplifying unit and then to an amplifying reproducer 55 which may be located at any remote point from that of the reproducing apparatus C.

During movement of the recording medium over the drum 45 and past the armature 42, the magnetized bodies 23 will act with varying degrees upon the armature 42 for varying the pressure on the carbon granules 36 and thus produce a corresponding variable current for operation of the electromagnetically operated amplifier 55. Since the magnetic attraction of the magnetized bodies 23 varies in accordance with the variation of the sound waves acting through the receiving device for magnetizing of the bodies, the bodies will act with varying magnetic attraction upon the armature 42.

By so having the independently spaced bodies 23 substantially in the shape of horse shoe magnets, with the poles N and S approaching one another, an advantage is gained in that both poles will attract the armature 42 and the force with which the armature is attracted to the bodies will be greater and resulting in greater compression

of the carbon granules 36 and consequently greater variation of the electric current serving for operation of the translating device 55. By so having the drums 6 and 45 adjustable, will allow for the recording medium to be moved toward and away from the receiver poles 10 and 10' and the armature 42 so that a greater magnetic force may be transmitted to the bodies 23 when recording sound, and allowing for the bodies 23 to have greater magnetic attraction for the armature 42 during reproduction of the recorded sounds. This adjustment of the magnetized bodies 23 toward and away from the armature 42 will also permit of volume and clarity of tone being obtainable during reproducing of the recorded sounds.

In the slightly modified form of recording medium as illustrated in Figure 13, it will be seen that the bodies 23 have been so positioned upon the carrier belt as to be disposed flush with the opposite faces of the belt and which will result in more compact winding of the belt upon the supporting reels.

From the foregoing description it will be apparent that a novel and improved apparatus for recording and reproducing sound electromagnetically has been provided, embodying a recording medium of improved construction whereby the magnetic impressions recorded will possess great magnetic attraction for actuation of reproducing apparatus with great volume and definiteness of tone when reproducing the recorded sound.

Various changes may be made to the specific arrangement and formation of parts of the invention as herein shown and described, without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. In telegraphic apparatus including magnetically operable recording and reproducing devices, a recording medium embodying a carrier and a series of elongated independent magnetizable bodies supported by the carrier for receiving magnetic impressions from the recording device for subsequent actuation of the reproducing device.

2. In telegraphic apparatus including magnetically operable recording and reproducing devices, a recording medium embodying a carrier and a series of elongated independent magnetizable bodies supported in spaced relation to extend transversely of the carrier for receiving magnetic impressions from the recording device for subsequent actuation of the reproducing device.

3. In telegraphic apparatus including magnetically operable recording and reproducing devices, a recording medium embodying a flexible carrier and a series of in-

dependent magnetizable bodies supported in spaced relation transversely of the carrier and with their terminals approaching one another at one face of the carrier.

5 4. A recording medium for telegraphonic apparatus comprising a flexible carrier belt and a series of magnetizable bodies carried by the belt, said bodies being in the form of staples passed through the belt with their
10 ends directed toward one another at one face of the belt.

5. A recording medium for telegraphonic apparatus comprising a flexible carrier belt and a series of magnetizable bodies carried
15 by the belt, said bodies being passed through

the belt and having their ends directed toward one another but spaced apart at one face of the belt.

6. A recording medium for telegraphonic apparatus comprising a flexible carrier belt 20 and a series of magnetizable bodies carried by the belt, said bodies being arranged in spaced relation and extending transversely of the belt with the ends of the bodies approaching one another at one face of the
25 belt whereby each body will constitute in effect a horse shoe magnet for receiving and retaining magnetic impressions.

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