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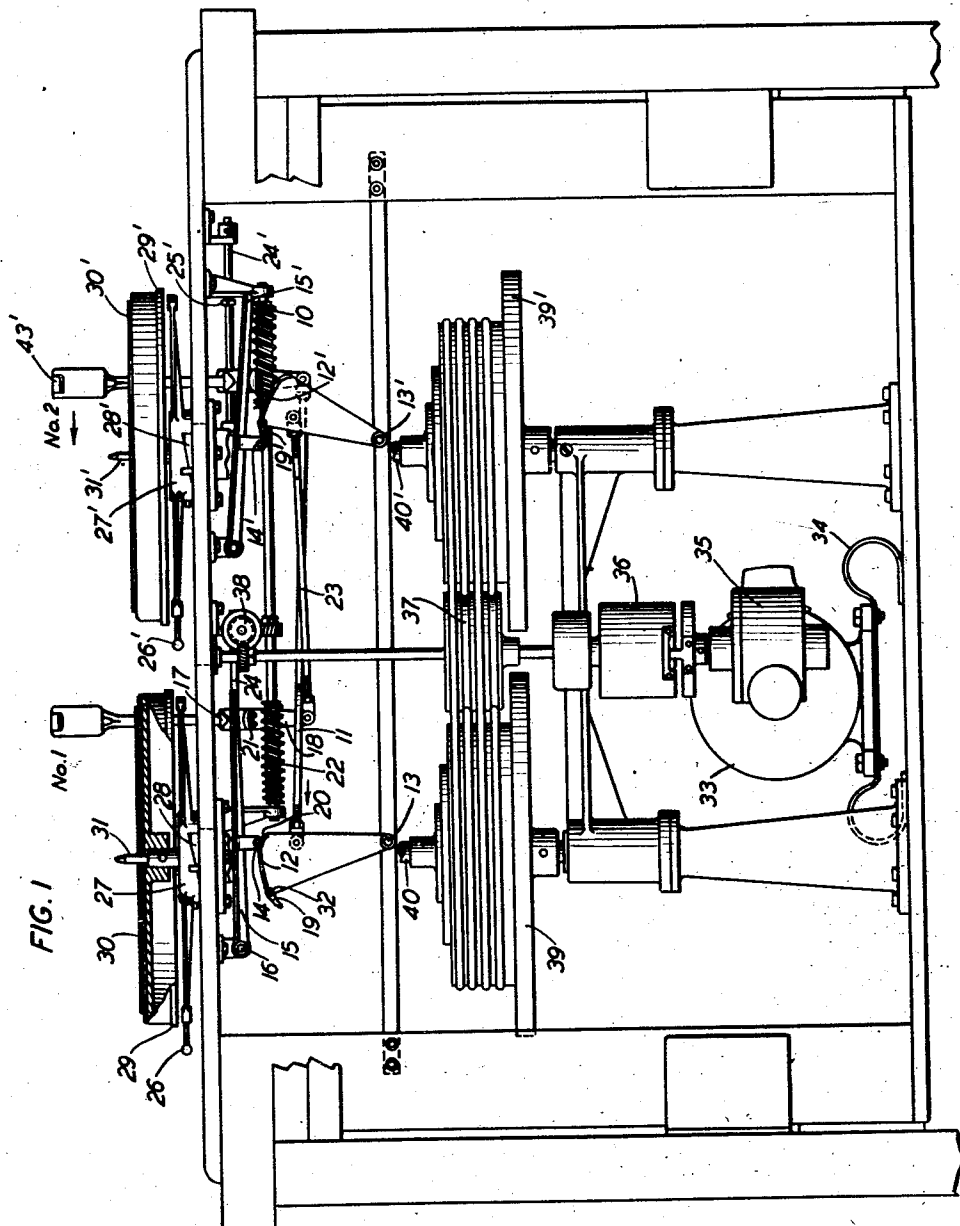
R. F. MALLINA

1,939,072

PHONOGRAPH RECORDING MACHINE

Filed April 1, 1931

2 Sheets-Sheet 1



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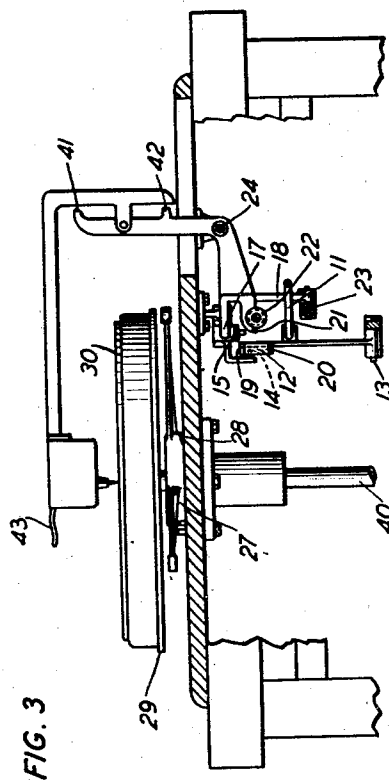
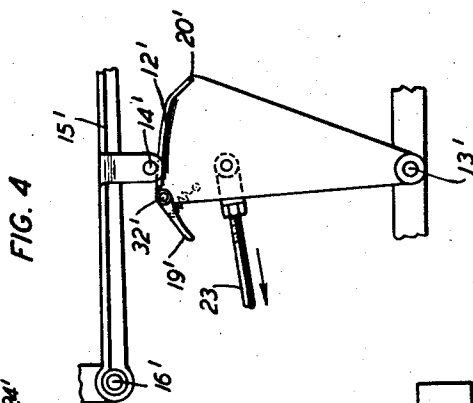
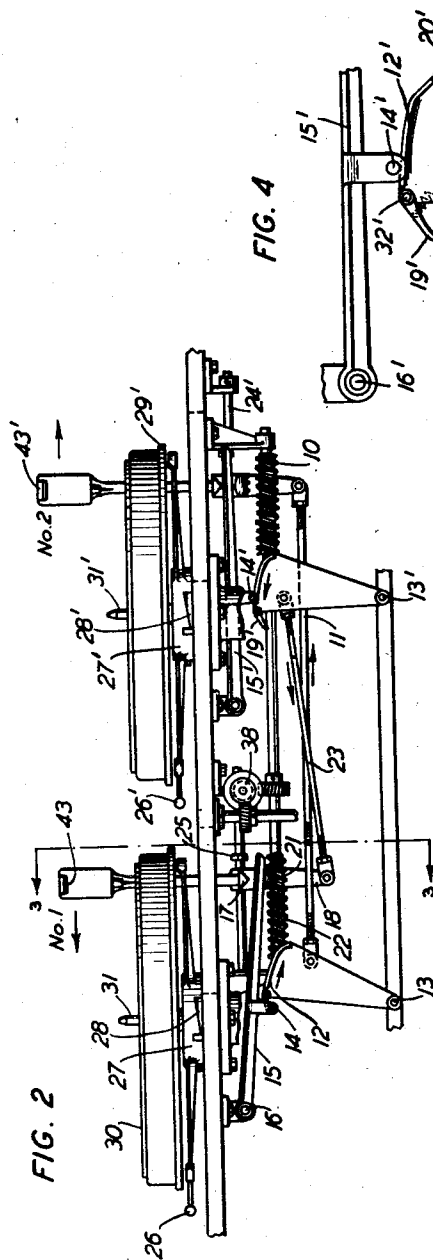
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2 Sheets-Sheet 2



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1,939,072

PHONOGRAPH RECORDING MACHINE

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Application April 1, 1931. Serial No. 526,907

5 Claims. (Cl. 274—10)

This invention relates to continuous sound recording machines and in particular to those adapted to telephone voice recording.

In my copending application filed October 29, 1930, Serial No. 491,844, I described a phonograph recording machine whose operation is automatic save for the changing of the records. A series of function cams operating in cyclic sequence are used to perform the automatic operations and in addition an elaborate vibration damping system is used in connection with the driving motor to insure good recording. A machine of this type sometimes gives much better service than is required and it becomes desirable to simplify and perform manually some of the operations done automatically in order to reduce its cost.

It is the object of this invention to provide a simple continuous recording machine which is semi-automatic in operation and adaptable to such applications as telephone voice recording.

The machine in its preferred form is comprised of two recording units mechanically linked to permit an automatic changeover from the operating unit to the idle unit. In carrying out the general idea of simplicity the automatic operations are reduced to those of engaging the recorders at the proper instants, while the remaining operations, such as changing the records, moving the recorders back to their initial positions and starting and stopping the machine, are left to be performed by an attendant. Although the invention herein described resides chiefly in the means for effecting the changeover between the units, a less elaborate vibration damping system is also described to better illustrate the particular form of continuous recorder to which the invention is adapted.

A feature of the invention is a lead screw which serves the triple function of driving its cooperating recorder and initiating and terminating the operation of its adjacent recorder.

Referring now to the drawings:

Fig. 1 is a front elevation of the machine with portions cut away to show the changeover mechanism. In this figure recorder No. 2 is nearing the end of its track and recorder No. 1 is about to be lowered onto its record blank;

Fig. 2 is a front elevation of the changeover mechanism showing recorder No. 1 in playing position and recorder No. 2 ready to be set down again;

Fig. 3 is a side elevation of the changeover mechanism; and

Fig. 4 shows more clearly the cam used in the changeover mechanism.

In general the operation of the machine is as follows:

The turntables are provided with record blanks, preferably of the flexible type. A flanged support between the record and turntable facilitates their handling. Recorder No. 1 is moved to the right to its starting position, the driving means actuated, and recorder No. 2 engaged with its record blank upon which the incoming telephonic signals are then impressed. Just before the record is finished, recorder No. 1 is automatically lowered and started so as to provide a small speech overlap which is necessary to insure against loss of any part of the signals. After recorder No. 1 has been in operation a few seconds, recorder No. 2 is automatically raised. The completed record is removed by the attendant and replaced with a blank. Stopping the turntables in this machine is unnecessary, since the removal of the records can be effected by merely raising the flanged support until it is free of the rotating turntable. Recorder No. 2 is moved over to the right by the attendant to its starting position where it remains until just a few seconds before recorder No. 1 has completed its record. At this point it is automatically lowered, and after the short period of overlap has elapsed, recorder No. 1 is automatically raised, thus completing the cycle.

The simple and novel means used to perform the automatic operations just described will now be made clear.

In Fig. 1 recorder No. 2 is engaged with its lead screw 10, and, by means of push rod 11, is turning cam 12 counterclockwise about its bearing 13. Engaging cam 12 is a follower 14 rigidly attached to lever 15 which pivots about bearing 16. The upper surface of the lever is made smooth so that extension 17 of the recorder carriage 18 supported by the lever (shown more clearly in Fig. 3) can be moved along it. The cam surface 12 is divided into three sections; two short end portions 19 and 20, which are simply inclined planes, and a relatively long, circular central portion. The inclined portion 19 is used to raise the recorder, the circular portion 12 to maintain it in the raised position, and the third portion 20 to lower it onto the record blank. The inclination of the plane is determined by the speed with which it is desired to raise or lower the recorder, i. e., the greater the speed the steeper the angle. The length of the circular portion is made sufficient to maintain the recorder in its

raised position while the other is operating, with the exception of the short period of overlap. These features are shown in Fig. 4.

As push rod 11 continues to rotate cam 12, roller 14 engages with the inclined portion 20, lowering lever 15 and carriage 18 with it until the half-nut 21 of the carriage engages with the lead screw 22, at which point recorder No. 1 will begin its operation. The carriage, through pull rod 23, rotates cam 12' about its bearing 13', thus causing the inclined portion 19' to engage with the roller 14' which raises lever 15' together with recorder No. 2. The attendant then slides the recorder to the right along its supporting rod 24' until it reaches stop 25' which is set to stop the recorder when it is over its starting position. On sliding the recorder over, cam 12 is also pulled to the right by rod 11. The cam surface passes over the follower until the inclined portion 19, which is made longer than the lowering portion 20, strikes the follower (Fig. 4). The elongated portion is hinged at 32 to permit the cams to pass over the follower in one direction, and is snapped back by means of a spring to cause the follower to ride on the cam in the other direction. After passing over the follower, the cam is ready to again raise its recorder at the proper instant.

To change records the attendant pulls lever 26 toward him (against the rotation of the record) which rotates the three armed spider 27 and raises it by means of the cam 28. The spider lifts the flanged disc 29, carrying with it the completed record 30 until the latter is free of locating pin 31. It is then removed and replaced by a blank, after which the spider is lowered and the flanged disc again rotated by the turntable (Fig. 2). Recorder No. 2 remains in its raised position until its supporting cam has been turned sufficiently by recorder No. 1 to bring the lowering portion in contact with the follower. After it has been lowered the cycle is repeated as long as is necessary.

The driving means for the machine consists of a motor 33 supported by a spring mounting 34 which is used to absorb some of its vibration. A reduction gear 35 transfers the energy to the mechanical torsional vibration filter 36 from which it is sent to the rope drive 37 and the helical gear lead screw drive 38. Individual flywheels 39, 39' are provided for the turntables to further reduce undesirable fluctuations. The rotation is finally carried up to the turntables through shafts 40 and 40'.

To prevent the entire unbalanced weight of the carriage from bearing upon the stylus, an extra joint is provided for the recorder arm (Fig. 3). Two stops, 41 and 42, allow the carriage to be

rotated about its supporting rod 24 by either the lever 15 or the handle 43 without the necessity of a rigid connection.

What is claimed is:

1. In a continuous recording machine, a plurality of recording units each comprising a record blank, a record blank support, a recorder, a lead screw, driving means for the record blank support and lead screw, means for engaging the recorder with the lead screw and a cam surface for raising and lowering said recorder at predetermined stages of the recording, said cam surface at such stages being linked to and driven by the lead screw of the adjacent unit.

2. In a continuous recording device, a plurality of record blanks, individual record blank supports and recorders therefor, individual lead screws for the recorders, driving means for the lead screws and record blank supports, means operated by a lead screw for maintaining the recorder of the adjacent record blank in inoperative position for a predetermined length of time.

3. In a continuous recording machine, a plurality of recording units comprising a recorder, a record blank, driving means therefor, a reciprocating cam, a support for the recorder comprising a lever having thereon a roller follower to engage with the cam, and means on the cam for permitting said follower to engage with the cam when the latter is moving in one direction and to disengage the cam when it is moving in the opposite direction.

4. In a continuous recording machine, a plurality of recording units each comprising a record blank, a support therefor, a carriage and a recorder mounted thereon, a lead screw, means for operatively connecting said carriage with the lead screw comprising a threaded portion integral with said carriage, a cam surface for effecting the connection between the threaded portion and lead screw comprising a circular segment between two oppositely inclined surfaces, the motion of the cam being controlled by the adjacent recording carriage through an intermediate member between the cam and carriage of each unit, and driving means for the record blank support and lead screw of said unit.

5. In a continuous recording device, a pair of recording units, means in each unit for maintaining its cooperating recorder in readiness for operation and a rigid link connecting the means of one unit to an element in the adjacent unit which element is operated by the said adjacent unit, the means being immediately operable upon the initiation of a recording on the adjacent unit.

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