

Sept. 8, 1942.

F. R. FARROW, JR
PHONOGRAPH TRIP MECHANISM

2,295,460

Filed Sept. 29, 1941

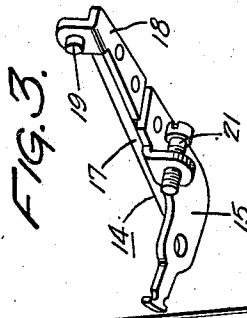
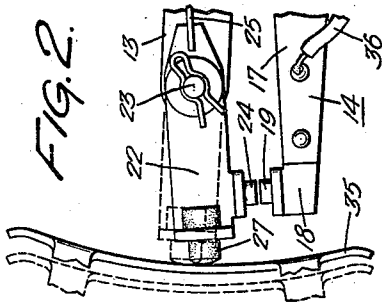
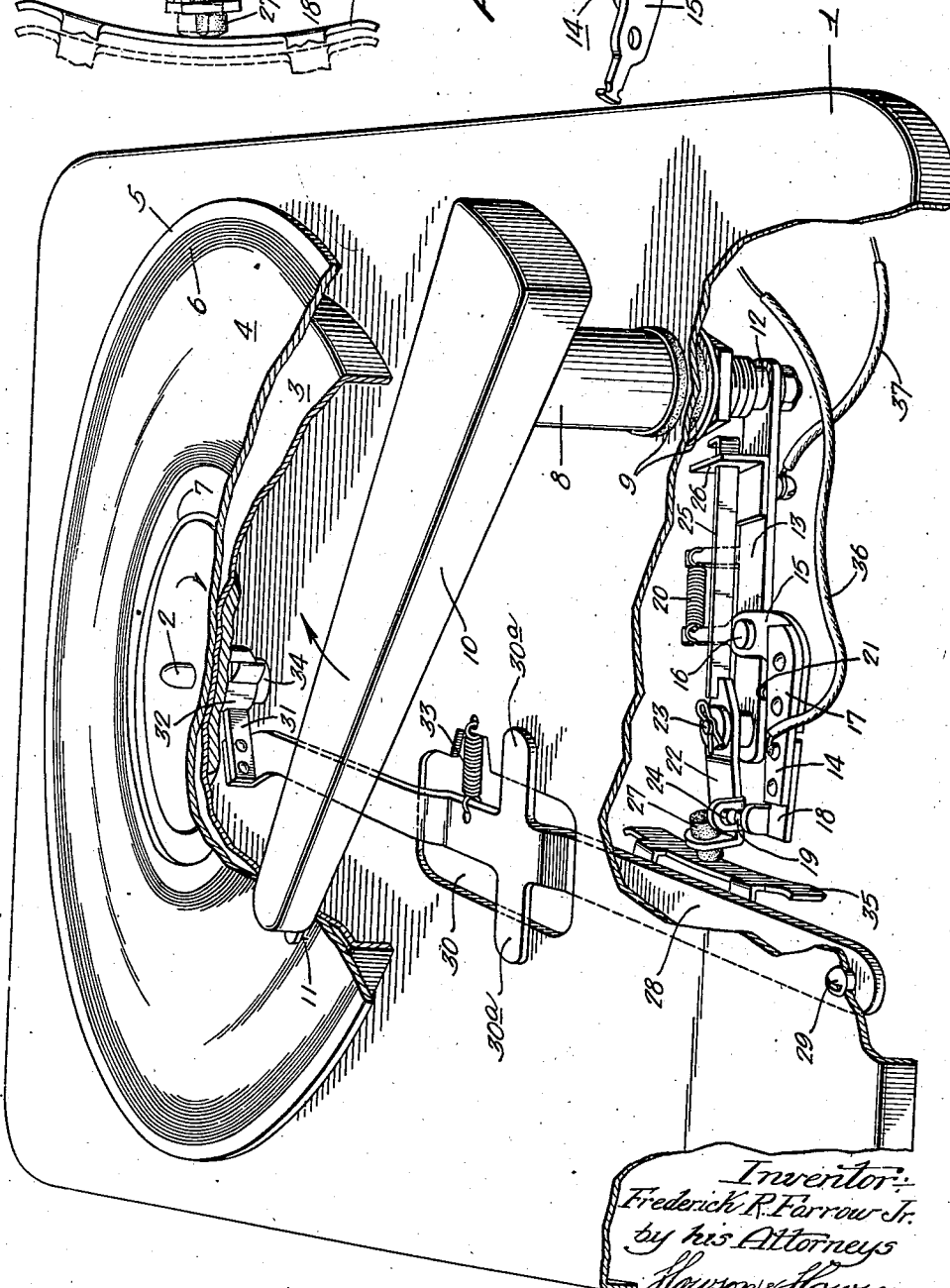


FIG. 1.



Inventor:
Frederick R. Farrow Jr.
by his Attorneys
Hawson & Hawson

UNITED STATES PATENT OFFICE

2,295,460

PHONOGRAPH TRIP MECHANISM

Frederick R. Farrow, Jr., Audubon, N. J., assignor to Philco Radio and Television Corporation, Philadelphia, Pa., a corporation of Delaware

Application September 29, 1941, Serial No. 412,855

5 Claims. (Cl. 274—1)

This invention relates to automatic phonographs of the type wherein the record-changing cycle is initiated by a trip mechanism responsive to the rate of movement of the tone arm pickup over the record being reproduced.

More particularly, the invention relates to that type of trip which is adapted to function at the end of a recording, as the pickup stylus moves out of the reproducing grooves into a spiral of greater pitch, or an eccentric groove; or in the event that the tone-arm moves too rapidly at any time during the playing of a recording. By way of example, the trip itself may be of the type which is triggered by the more rapid than normal movement of the pickup and which, in turn, serves to trigger a suitable mechanism adapted to lift the pickup and swing it off the record, in order that a succeeding recording may be placed upon the turntable.

Many of the trip mechanisms of this general character, which have been employed heretofore, have been of a more or less complicated nature, embodying a large number of moving parts. The use of many parts not only raises the manufacturing cost of the trip mechanism, but has an additional disadvantage in that the trip mechanism, normally in operation, requires considerable energy for its actuation. This energy must come from the movement of the tone-arm, which movement is, in turn, brought about by the cooperation between the stylus and the record groove. Thus, it can be seen, especially with the very light stylus pressures now in use, that there may be a tendency toward bad tracking, that is, the needle point will often ride up one side of the groove and thereby distort the recorded signal.

The principal object of the present invention is to overcome the aforesaid difficulties by the provision of a trip mechanism which is simple to manufacture, embodies relatively few moving parts, and which requires very little energy to operate its trip restraining means.

A further object of the invention is to provide a novel trip mechanism of the type wherein electrical contacts are closed to energize a solenoid or the like which initiates actuation of suitable tone arm moving means.

A further object of the invention resides in the provision of a member moving in a predetermined relation to the movement of the tone-arm; which member carries with it a novel switch, the contacts of which remain open during normal movement of the pickup and close

when the pickup moves more rapidly across the record.

The invention also has for an object the provision of a velocity responsive trip mechanism embodying a switch, wherein the closing of the switch contacts completes an electrical circuit to an electrically-operated device, which is adapted to initiate operation of the tone-arm lifting mechanism.

The invention may be fully understood by reference to the following description taken together with the accompanying drawing.

In the drawing,

Fig. 1 is a perspective view of a phonograph device embodying one form of the present invention with certain parts broken away to better illustrate the construction;

Fig. 2 is a fragmentary view illustrating the operation of the device; and

Fig. 3 is a perspective view of a part of the apparatus.

The phonograph is assembled upon a base plate 1 which has a suitable bearing (not shown) for supporting a spindle 2 which carries a turntable 3. A recording 4 is shown on the turntable, the recording having a clear marginal edge 5, a low pitch spiral sound groove 6, and a high pitch terminating groove 7. Any suitable drive (not shown) may be used to rotate the turntable 3 as will be understood.

Adjacent the edge of the turntable a vertical post 8 may be mounted on the base plate 1, there being resilient washers 9 on each side of plate 1. At its upper end the post 8 pivotally supports a conventional tone arm 10. A reproducer of any suitable type (not shown) may be positioned in the free end of the tone arm, there being a stylus 11 adapted to ride in the groove of the recording. Thus tone arm 10 will move over a recording in the direction indicated until stylus 11 reaches the terminating groove 7.

A vertical rod 12 shown extending below the base of post 8 extends upwardly through the same into engagement with tone arm 10 so that the rod 12 rotates with the tone arm. At its lower end rod 12 carries a horizontal arm 13 adapted to rotate about the pivot formed by rod 12 in a horizontal plane beneath the base plate 1. The arm 13 carries the switch mechanism which consists of two pivoted fingers. Finger 14 consists of an "L" member 15 pivoted at 16 on arm 13, an insulating extension 17 carried by member 15, and a contact carrying extension 18 carried by extension 17, there being a contact button 19 at the outer end of the arm. A

spring 20 tends to rotate arm 14 clockwise to normally maintain the adjustable set screw 21 in contact with the side of arm 13. (See Fig. 3.) Finger 22 is pivotally supported on arm 13 at 23, and carries near its free end a contact button 24 adjacent the button 19 on finger 14. To maintain finger 22 in its normal position, one end of a flat leaf spring 25 is secured to the inner end of finger 22, the other end of spring 25 being secured by a bracket 26 on arm 13. At its outer extremity, finger 22 carries a semi-resilient cushion member 27.

To control the operation of the above described parts, there is provided an arm 28 pivotally mounted beneath the base plate 1 at 29. Arm 28 extends through an opening 30 in the base plate and terminates adjacent the spindle 2 beneath the turntable. Fingers 30a on arm 28 slidably engage the upper surface of base plate 1 and serve to support arm 28 while permitting pivotal movement thereof. A self-lubricating fiber block 31 may be secured to the inner end of arm 28 as shown. The turntable 3 has a hub 32 against which the block 31 is pressed by a spring 33 secured between arm 28 and base plate 1. Hub 32 is formed with a cam like projection 34 on its periphery so that as the turntable rotates, the arm 28 will be periodically pushed out of its normal position for a brief interval. Arm 28 carries an arcuate plate 35 positioned so that when arm 28 is in its normal position, plate 35 will lightly engage cushion member 27 as shown.

The two contact buttons 19 and 24 are connected, by means of wires 36 and 37, in circuit with a suitable relay or mechanism adapted to control the movement of the tone arm. While such mechanism may take any form, a suitable device is shown in the copending application of R. S. Cranmer, Serial No. 393,636, filed May 15, 1941, to which the present application is related.

Having thus described the construction and relation of the parts of the device, the operation thereof may be considered. As the tone arm 10 moves over a recording during the playing thereof, the arm 13 moves correspondingly. During the intervals between successive actuations of arm 28 by cam 34, the contact 24 on finger 22 will remain relatively stationary because of the engagement of member 27 and plate 35, while the continuous movement of arm 13 by the tone arm 10 will cause finger 22 to rotate slightly about its pivot 23 so as to slightly flex spring 25. Contact 19 will move toward contact 24 as the contact 19 is carried by and moves with arm 13. Periodic movement of arm 28 and plate 35 by cam 34 releases member 27 to allow the spring 25 to return finger 22 to its normal position relative to contact 19. The above described parts are so constructed and adjusted that contacts 19 and 24 do not become engaged as the tone arm moves over the record at its normal rate of speed, and each time the finger 22 is released it will be advanced relative to plate 35. The solid line illustration in Fig. 2 shows the position of the contacts just before member 27 is released, while the dotted line illustration shows the relative position of the parts when member 27 is released from plate 35. However, when the tone arm 10 and arm 13 are moving rapidly, as when stylus 11 enters groove 7, the finger 22 will be rotated sufficiently during the interval between successive movements of arm 28 to cause the contacts 19 and 24 to engage and complete an electrical circuit through any desired apparatus.

When contacts 19 and 24 engage during clockwise movement of the tone arm, the finger 14 may rotate slightly about its pivot 16 by extending spring 20 thus preventing too great a side thrust on the stylus 11. During counterclockwise movement of tone arm 10, the member 27 may slide across the face of plate 35 by causing a slight clockwise rotation of finger 22, or a suitable one-way latch may be provided.

It will be seen that the invention provides a trip mechanism for automatic phonographs, responsive to the rate of movement of the pickup, of such nature as to be smooth and positive in its action and which requires very little energy from the tone arm for its operation.

It will be understood that the invention is not limited to the specific construction shown but is capable of modification within the scope of the appended claims.

I claim:

1. In an automatic phonograph having a tone arm, a trip mechanism comprising a first means supported for movement in accordance with the movement of the tone arm over a recording, a member pivotally carried by said first means, oppositely facing contacts on said first means and said member, means tending to maintain said member in a normal position relative to said first means, and means periodically restraining said member so as to cause rotation thereof relative to said first means as the latter moves in accordance with movement of said tone arm, the normal relative positions of the contacts on said first means and said member being such that said contacts become closed only upon movement of said tone arm at a greater than normal rate.

2. In an automatic phonograph having a tone arm, a trip mechanism comprising an arm pivotally supported for rotation in accordance with the movement of the tone arm over a recording, a member pivotally carried by said arm, oppositely facing contacts on said arm and said member, means tending to maintain said member in a normal position relative to said arm, and means periodically restraining said member so as to cause rotation thereof relative to said arm as said arm rotates in accordance with the movement of said tone arm, the normal relative positions of said contacts on said arm and said member being such that the contacts become closed only upon movement of said tone arm at a greater than normal rate.

3. In an automatic phonograph having a tone arm, a trip mechanism comprising a first means supported for movement in accordance with the movement of the tone arm over a recording, a first contact-carrying member carried by said first means and movable therewith, a second contact-carrying member pivotally carried by said first means, oppositely facing contacts on said members, means tending to maintain said second member in a normal position relative to said first member, and means periodically restraining said second member so as to cause rotation thereof relative to first member as said first means moves in accordance with movement of said tone arm, the normal relative positions of said contacts being such that said contacts become closed only upon movement of said tone arm at a greater than normal rate.

4. In an automatic phonograph having a tone arm, a trip mechanism comprising a first means supported for movement in accordance with the movement of said tone arm over a recording, a member pivotally carried by said first means, op-

positely facing contacts on said first means and said member, means tending to maintain said member in a normal position relative to said first means, and means for periodically imposing a frictional drag on said member, thereby to restrain said member and cause rotation thereof relative to said first means as said first means moves in accordance with movement of said tone arm, the normal relative positions of the contacts on said first means and said member being such that said contacts become closed only upon movement of said tone arm at a greater than normal rate.

5. In an automatic phonograph having a tone arm, a trip mechanism comprising an arm pivotally supported for movement in accordance with the movement of the tone arm over a recording, a first contact-carrying member carried by said

arm and normally movable therewith, a second contact-carrying member pivotally carried by said arm and forming a longitudinal extension thereof, oppositely facing contacts on said members, spring means tending to maintain said second member in a normal position relative to said first member, and friction means periodically restraining said second member comprising an arcuate plate member adapted to periodically engage the end face of said second member to cause rotation thereof relative to said first member as said arm moves in accordance with the movement of said tone arm, the normal relative positions of said contacts being such that the contacts become closed only upon movement of said second member resulting from movement of said tone arm at a greater than normal rate.

FREDERICK R. FARROW, JR.