Aug. 9, 1955 E. BACHER 2,715,027

TALKING MACHINES

Filed July 16, 1952 3 Sheets-Sheet 1

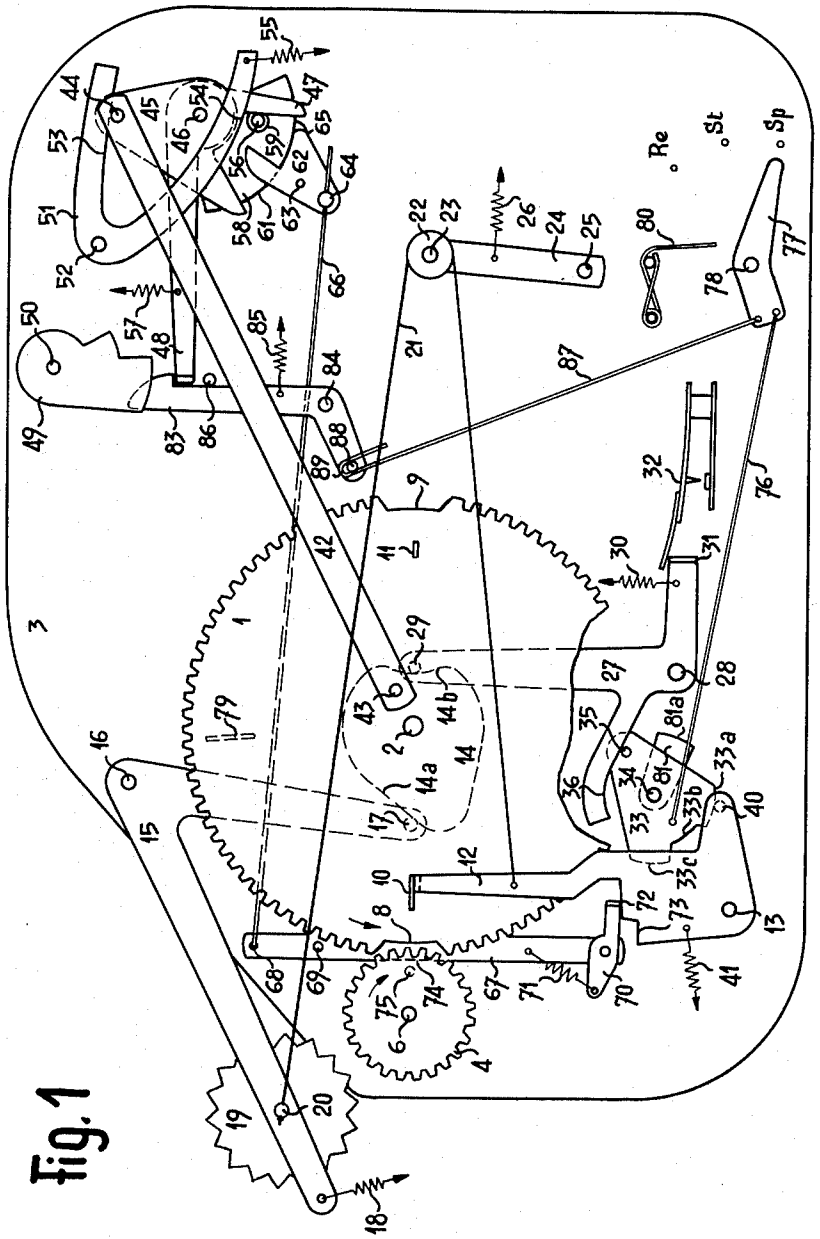


Fig. 1

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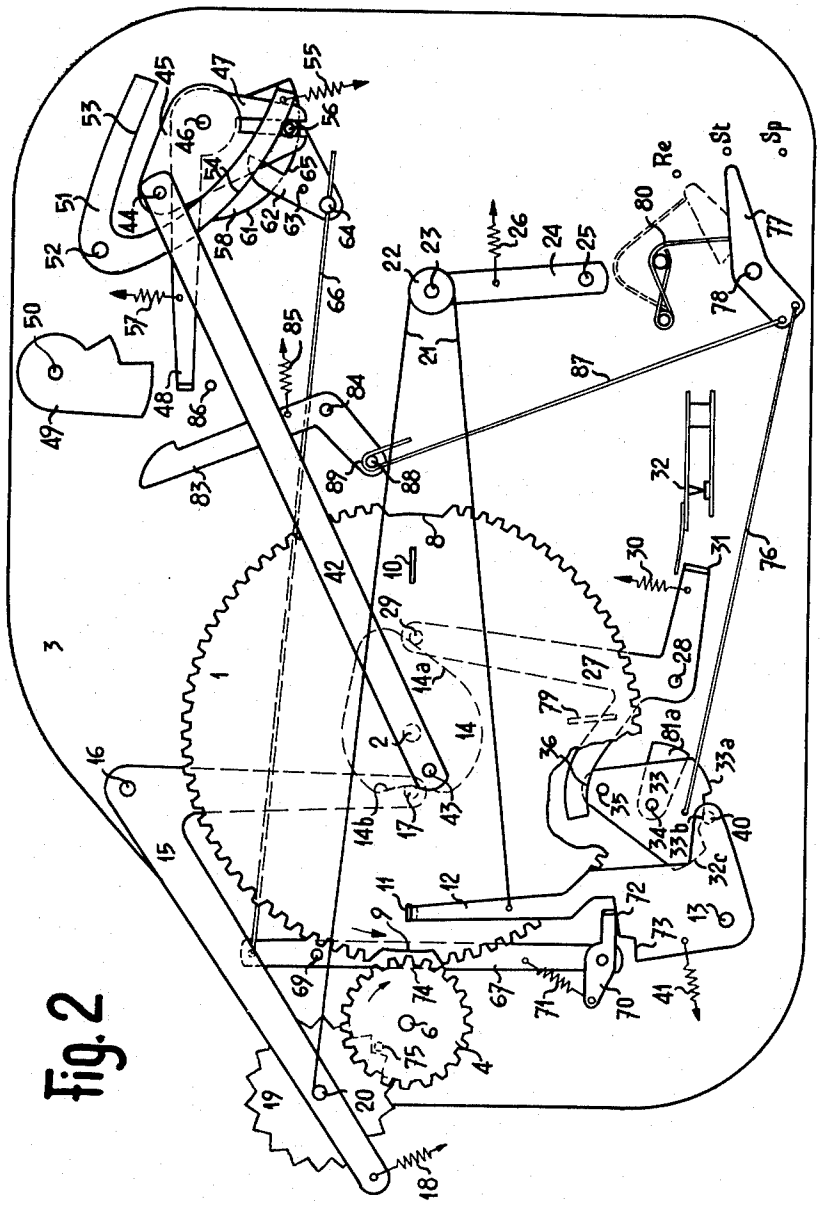


Fig. 2

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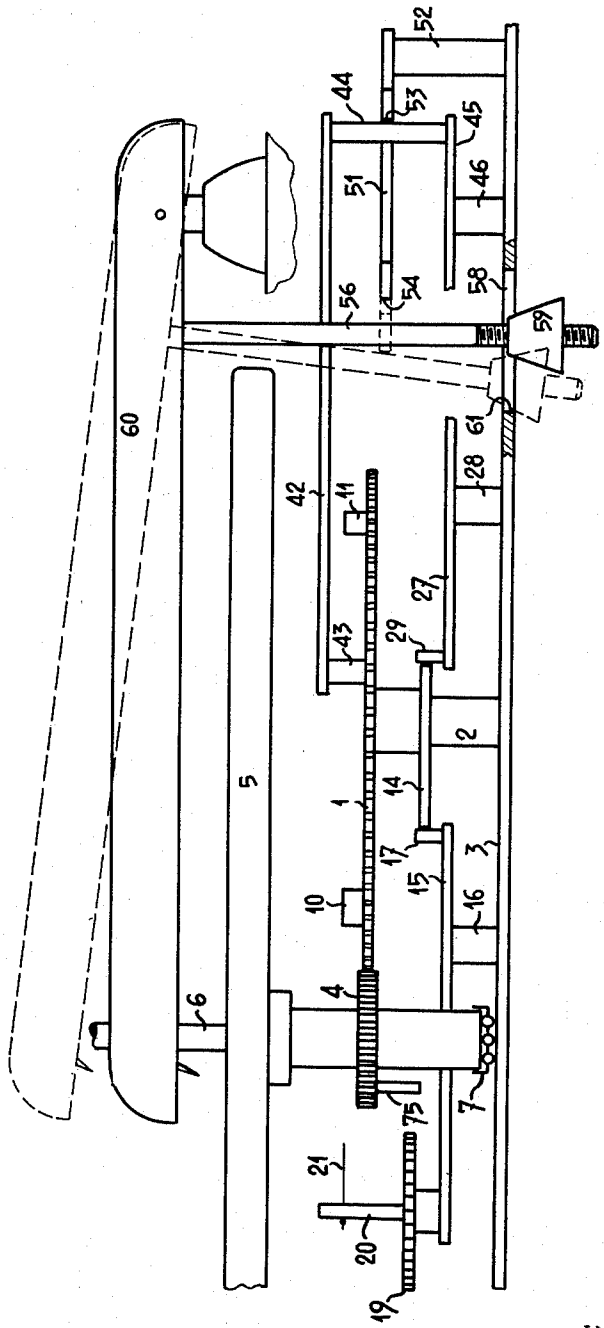
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Fig. 3



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TALKING MACHINES

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8 Claims. (Cl. 274—10)

The invention has for its subject a talking machine of the type with automatic changing of discs, comprising a selecting spindle, a cyclic device comprising a wheel making a complete revolution at each changing of a disc and principally controlling:

a. the movements of the pick-up arm towards and away from the disc turntable,

b. the placing into the active position of a device for feeling the diameter of the discs to be played,

c. a timing device ensuring a period of pause between the playing of two successive discs,

d. the selecting spindle producing the feed of a disc on to the disc turntable.

In talking machines of known construction the manual control members should generally be locked during the disc changing cycle so as to avoid locking or a disarrangement of the machine. Further, in talking machines provided with a timing device, the other control members are locked during the pause, so that it is first necessary to annul this, before being able to effect the other operations (stop, rejection and so forth).

The talking machine hereinafter described is provided with a control mechanism allowing of great simplicity in construction, whilst avoiding the use of locking elements thus eliminating risks of locking, or incorrect operations.

This talking machine is distinguished from talking machines of known construction by the fact that it is provided with a control device comprising a lever of which one end is adapted to co-operate successively during the course of rotation of the wheel of the cycles with two stops secured to this and located at a different distance from the centre of the said wheel, the first of the said stops being adapted to lock the wheel of cycles during the playing of a disc and the second ensuring the locking of the said wheel during the pause, the different positions which the said lever is capable of occupying being determined by a control member co-operating therewith and capable of occupying three positions, one being the stop position, the second the starting position and the third the rejecting position in which the disc changing mechanism produces, in particular, the changing of the disc whilst one of the discs is in the course of being played.

One form of construction of the machine according to the invention is shown diagrammatically and by way of example in the accompanying drawings, wherein:

Fig. 1 is a plan view of its mechanism for controlling the stopping position.

Fig. 2 is a plan view of the said mechanism in the pause position.

Fig. 3 is a view in elevation of a part of the mechanism.

The control mechanism of this talking machine comprises a toothed wheel **1**, pivoted at **2** on a plate **3**, and which gears with a pinion **4** secured to the disc turntable **5** pivoted at **6** and bearing against a ball bearing **7**. At the periphery of the wheel **1** are provided two notches **8** and **9** enabling the wheel **1** to be disengaged from the pinion **4**. The wheel **1**, called the wheel of cycles, controls the operations of changing a disc during its rotation through a revolution about its axis. It is provided with two stops **10** and **11**, co-operating with a lever **12** pivoted at **13** for stopping the rotation of the wheel **1** when the notches **8** and **9** are opposite the pinion **4**.

A cam **14** is mounted fixedly on the wheel **1**.

A lever **15**, pivoted at **16**, bears under the action of a spring **18** against the cam **14** through the medium of a finger **17**. On the lever **15** is pivoted a pivot **20** carrying a wheel **19** forming part of a timing device described in greater detail in patent application No. 266,687. A wire **21**, wound on the pivot **20**, passes around a pulley **22** and is then hooked to the lever **12**. The pulley **22** turns at **23** on a tensioning device **24** pivoted at **25** and pulled by a spring **26**.

A lever **27**, pivoted at **28**, bears, under the action of a spring **30**, against the cam **14** through the medium of a finger **29**. The lever **27**, by its arm **31**, opens a switch **32**. A control member, formed by a lever **33**, pivoted at **34**, carries a finger **35** which comes into contact with a part in the form of a cam **36** of the lever **27**. The lever **33** has three arcs of a circle **33***a*, **33***b*, **33***c*, against which bears a finger **40** carried by the lever **12**, pulled by a spring **41**.

The stop **10** of the wheel **1** of cycles is so conceived that it comes into contact with the bent end of the lever **12**, when the finger **40** of the latter bears against one of the arcs of a circle **33***a* or **33***b*. The stop **11** itself does not abut against the lever **12**, except when the finger **40** is in contact with the edge **33***b*. When the edge **33***c* corresponds with the finger **40**, the lever **12** does not stop any of the stops **10** and **11**.

A link **42** has one end pivoted at **43** on the wheel **1**, and the other end at **44** to a lever **45**, pivoted at **46**, provided for controlling the outward movements of the pick-up arm through the medium of a finger **56**. A lever **47**, also pivoted at **46**, controls the inward movements of the pick-up arm through the medium of the finger **56**. Its other end **48**, pulled by a spring **57**, comes into contact with a cam **49** pivoted at **50**. The cam **49** forms part of a feeler device of the diameter of the discs to be played, described in detail in application No. 266,688. The position of the cam **49** determines the diameter at which the pick-up arm is positioned on the edge of the disc to be played.

A lever **51**, pivoted at **52**, comes to bear by its edge **53** against the pivotal axis **44** of the link **42**, this under the action of a spring **55**.

One edge **54** of the lever **51** is adapted to act on the finger **56** which is secured to the pick-up arm **60** for lifting this above the pile of discs located above the disc turntable **5** (Fig. 3). The finger **56** passes through an opening **58** provided in the plate **3**; this opening **58** in the form of a segment of a circle concentric with the axis of rotation of the pick-up arm, limits the movements of the finger **56** and determines the raised position of the pick-up arm. This position is determined when an element **59** mounted on the finger **56** abuts against the edge **61** of the opening **58** under the action of the edge **54** of the lever **51**. The element **59** is of conical shape, and movable along the rod **56** in such a manner as to render possible the adjustment of the elevation of the pick-up arm.

A lever **62** pivoted at **63** is located in the path of the finger **56** of the pick-up arm which causes it to pivot in a counter-clockwise direction when it moves towards the centre of the disc turntable. The edge **65** of the lever **62** enables the latter to be returned to its starting position, when the pick-up arm moves towards the outside of the disc turntable. A rod **66** is connected to the lever **62** by means of a friction device **64**; the other end of the rod is hooked at **68** to a lever **67** pivoted at **69**. The other end of the lever **67** carries a pawl **70** pivoting and bear-

ing under the action of a spring **71** against the edge **72** of the lever **12**. The lever **67** also comes into contact by its edge **74** with a pin **75** mounted on the driving pinion **4**, the said pin also serving to drive the wheel **19** of the timing device when this comes into engagement therewith.

The lever **33** is connected by a rod **76** to an actuating knob or lever **77** pivoted at **78**, and which can assume the three positions of stopping *Sp*, starting *St*, rejecting *Re*, corresponding with the coming into contact of the finger **40** with the edge **33***a*, **33***b*, **33***c* respectively of the lever **33**. A spring **80** always moves the control lever **77** from reject to start.

The lever **33** can move axially upwards when there are no longer any discs to be played; in this position the finger **35** is hooked by a pin **79**, secured underneath the wheel **1**, which pushes it in such a manner as to place the lever in the position in which its edge **33***a* is opposite the finger **40**, that is to say the control knob **77** at stop.

The wheel **1** also carries the control members of a selecting spindle described in detail in patent application No. 255,166.

A lever **81**, pivoted at **34** co-axially with the lever **33** has an edge **81***a* in the form of an arc of a circle of the same radius as the edge **33***a*, and which may be placed in correspondence with the finger **40**. In this position it prevents the lever **12** from stopping the stop **11**, during the changing of a disc, in other words, the pause between the playing of two discs is eliminated.

A pawl **83**, pivoted at **84** is pulled by a spring **85** against a stop **86**. The shape of this pawl is such that, when its bears against its stop **86**, it allows the lever **47** (**48**) to pass in one direction, but retains it when said lever **47** (**48**) tends to control the return of the pick-up arm in the direction of the turntable **5**.

A rod **87** is hooked at one end to the manual control lever **77** and on the other hand by its other end in the form of a hook **89**, to a pin **88** of the pawl **83**. When the manual control lever is at stop, the pawl **83** is in a position for hooking the lever **47** by its bent end **48**. In the other positions of the control lever **77** (start, rejecting) the pawl **83** is withdrawn rearwardly in such a manner as not to be capable of coming into contact with the lever **47**.

The operation of this mechanism is as follows:

The apparatus being stopped the mechanism is in the position shown in Fig. 1. When the control lever **77** is moved to start, the lever **33** pivots and its edge **33***b* comes opposite the finger **40**. The finger **35** repels the lever **27** against the action of its spring **30** and the switch **32** is closed. The motor, not shown in the drawing, thus drives the disc turntable **5**. This driving of the turntable **5** may take place either through its spindle **6**, or through a friction wheel driven by the motor and acting on the periphery of the turntable **5**.

When the control lever is brought to "reject" the lever **33** pivots and the edge **33***c* repels the lever **12** through the medium of finger **40**, in such a manner that the end of this lever **12** releases the stop **10**. The wheel **1** is thus driven in rotation under the action of the spring **18** acting through the medium of the lever **15** or pressing the finger **17** against the inclined part **14***a* of the cam **14**. After a small angle of rotation, the wheel **1** is engaged with the pinion **4** which drives it until the recess **9** is opposite the pinion **4**, and the stop **11** comes into contact with the lever **12** (see Fig. 2). In fact, during this first portion of the cycle, the knob **77** is allowed to return to start under the action of the spring **80**, that is to say that the edge **33***b* of the lever **33** is opposite the finger **40**. The lever **12** is then definitely in position for stopping the stop **11**. In this position the recess **14***b* of the cam **14** allows the lever **15** to pivot and allows the wheel **19** of the timing device to come into engagement with the pin **75** (see patent application No. 226,687). The link **42** has caused the lever **45** to pivot so as to place the pick-up arm in the outer position, and the pivot **44** has allowed the lever **51** to push, by its edge **54**, the finger **56** of the pick-up, in order to raise the arm thereof.

When the pause has come to an end, the wire **21**, by winding on the spindle **20**, pulls the lever **12** for releasing the stop **11** and the wheel **1** gears with the pinion **4**, this time under the action of the spring **30** acting through the finger **29** of the lever **27** on the part **14***a* of the cam **14**. The wheel **1** terminates its cycle and during this operation it returns the timing device to its inoperative position. Further, it controls the movement of return of the pick-up arm by the lever **47**, pulled by the spring **57** until the end **48** abuts against the cam **49** of the device for feeling the diameter of the discs to be played. This latter is placed in position when the disc to be played drops during the first portion of the cycle. The pivotal axis **44** has repelled the lever **51** rearwardly, this having enabled the pick-up arm to be placed on the disc to be played.

When the pick-up arm approaches the centre of the disc, the finger **56** pushes against the lever **62** which, as it pivots, pulls the rod **66** through the medium of the friction device **64**. The lever **67** comes into contact, by its edge **74**, with the pin **75** which repels it at each revolution, the friction device **64** absorbing the difference in the stroke.

When the pick-up arm is in the recorded portion of the disc, the feed per revolution is insufficient to cause the pawl **70** to leave the edge **72** and drop into the notch **73** of the lever **12**. When, however, the needle of the pick-up is in the last groove of the disc, the feed is more rapid and the pawl **70** has a sufficient stroke to fall into the notch **73** before being repelled rearwardly by the pin **75**. On the next passage of this, the lever **67** is repelled rearwardly and the pawl **70**, engaging with the notch **73**, causes the lever **12** to pivot in such a manner as to cause it to release the stop **10**; thus the disc changing cycle recommences.

When all the discs have been played, a detecting device for the end of the series, described in patent application No. 255,165, now abandoned, lifts the lever **33**. At this moment, the pin **79** fixed under the wheel of cycles engages the finger **35** and pushes it in such a manner as to move the lever **33** into the position shown in Fig. 1, in other words into the position in which the manual control lever **77** is at stop. In this position, no pause occurs, and the wheel **1** carries out a complete rotation without stopping at the notch **9**. The switch **32** remains closed during the cycle and it is only at the last moment that the current is switched off, when the finger **29** of the lever **27** falls into the notch **14***b* of the cam **14**. When coming into the stop position, the manual control lever has released the pawl **83**, which has hooked on to the beak **48** of the lever **47** so as to prevent it from controlling the return of the pick-up arm. Thereupon the lever **51** has allowed the pick-up arm **60** to descend on to its support, at the outside of the disc turntable.

When the talking machine is provided with a mechanism for driving the turntable **5** by means of a friction roller (see patent application No. 289,373), the lever **27** may, besides controlling the switch **32**, control the withdrawal of the roller, so that it does not produce a flat or other permanent deformation at the points of contact between the roller and the turntable or the roller and the driving shaft of the motor; such a deformation being liable to occur when the apparatus is allowed to remain inoperative for a long period of time.

I claim:

1. In a talking machine with automatic changing of discs, the combination, comprising, frame means, a cyclic device rotatably mounted on the frame means and comprising a toothed wheel rotating a full turn at each change of a disc and having two opposite tooth-bare

notches in its periphery for intermittent drive of the wheel, a pinion meshing with the wheel for driving same, a pair of stops fixed to the wheel at different distances from the axis thereof and aligned with the notches, a lever fulcrumed on the frame means for locking the wheel by engaging one of the stops, cam means movably mounted on the frame means for controlling the angular position of the locking lever and movable to one of three different positions, a manually operable member mounted on the frame means and movable to stop, starting and rejecting positions and connected to the cam means for movement thereof, a motor having a notch urged to closed position and driving the pinion, a control device on the frame means and controlling the cyclic device and controlled by the cam means and in the stop position of the manually operable member opening the motor switch, a pick-up arm pivoted to the frame means for vertical and horizontal motion, means actuated by the wheel and swinging the pick-up arm vertically up and then horizontally and vertically down to a position above the disc for playing same and after playing the disc swinging the pick-up arm vertically up and horizontally outwardly of the disc and vertically down, feeler means movably mounted on the frame means and controlling the horizontal swing of the pick-up arm, and a timing device controlled by the cyclic device and controlling the position of the locking lever in the path of the second stop for assuring a pause between the play of two discs.

2. The combination according to claim 1, and wherein the cyclic device also includes a cam rotating with the wheel and the timing device includes a lever fulcrumed on the frame means and urged to engage the wheel cam and thereby rotating the wheel for meshing with the pinion at the commencement of the cycle for changing disc and releasing the locking lever from the first stop by the movement of the manually operable member from stop to starting position, the control device controlling the motor switch is a lever fulcrumed on the frame means and engaging the cam and thereby rotating the wheel for meshing same with the pinion after the locking lever releases the second wheel stop.

3. The combination according to claim 1, and wherein the cyclic device also includes a cam rotating with the wheel and the timing device includes a lever fulcrumed on the frame means and urged to engage the wheel cam and thereby rotating the wheel for meshing with the pinion at the commencement of the cycle for changing disc and releasing the locking lever from the first stop by the movement of the manually operable member from stop to starting position, the control device controlling the motor switch is a lever fulcrumed on the frame means and engaging the cam and thereby rotating the wheel for meshing same with the pinion after the locking lever releases the second wheel stop, and also comprising a manually operable lever fulcrumed on the frame means and preventing the locking lever from obstructing the path of the second stop and thereby eliminating the pause.

4. The combination according to claim 1, and wherein

the pick-up arm carries a finger and the means swinging the pick-up arm inwardly over the disc includes a lever fulcrumed on the frame and engaging the pick-up arm finger for movement thereof and also comprising pawl means movably mounted on the frame and controlled by the manually operable means and in the stop position of same preventing the finger engaging lever from moving the pick-up arm, and a support supporting the pick-up arm in a position outwardly of the disc.

5. The combination according to claim 1, and wherein the pick-up arm carries a finger and the means swinging the pick-up arm inwardly over the disc includes a lever fulcrumed on the frame and engaging the pick-up arm finger for movement thereof and also comprising pawl means movably mounted on the frame and controlled by the manually operable means and in the stop position of same preventing the finger engaging lever from moving the pick-up arm, and a support supporting the pick-up arm in a position outwardly of the disc, the finger carrying a stop adjustable thereon and engageable with the frame means for limiting the upward swing of the pick-up arm.

6. The combination according to claim 1, and wherein the cam means is a lever fulcrumed on the frame means and comprising three cams concentric with the fulcrum axis and of different radii, one of the cams engaging the locking lever in the stop position, the second one in the starting position and the third in the reject position of the manually operable control member.

7. The combination according to claim 1, and wherein the cyclic device comprises a cam rotating with the wheel and the timing device includes a lever fulcrumed on the frame means and urged to engage the wheel cam and thereby rotating the wheel for meshing same with the driving pinion after releasing the locking lever from the first wheel stop, and the control device comprises a second lever fulcrumed on the frame and urged to engage the wheel cam and thereby rotating the wheel for meshing same with the pinion after releasing the locking lever from the second stop, the lever comprised by the control device being also urged to a position opening the motor switch, the cam means including a part engaging the switch controlling lever.

8. The combination according to claim 1, and wherein the locking lever has a notch, and also comprising a pawl movably mounted on the frame means and controlled by the pick-up arm moving rapidly toward the center of the disc and moving the locking lever to a position releasing the first wheel stop.

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