

April 8, 1941.

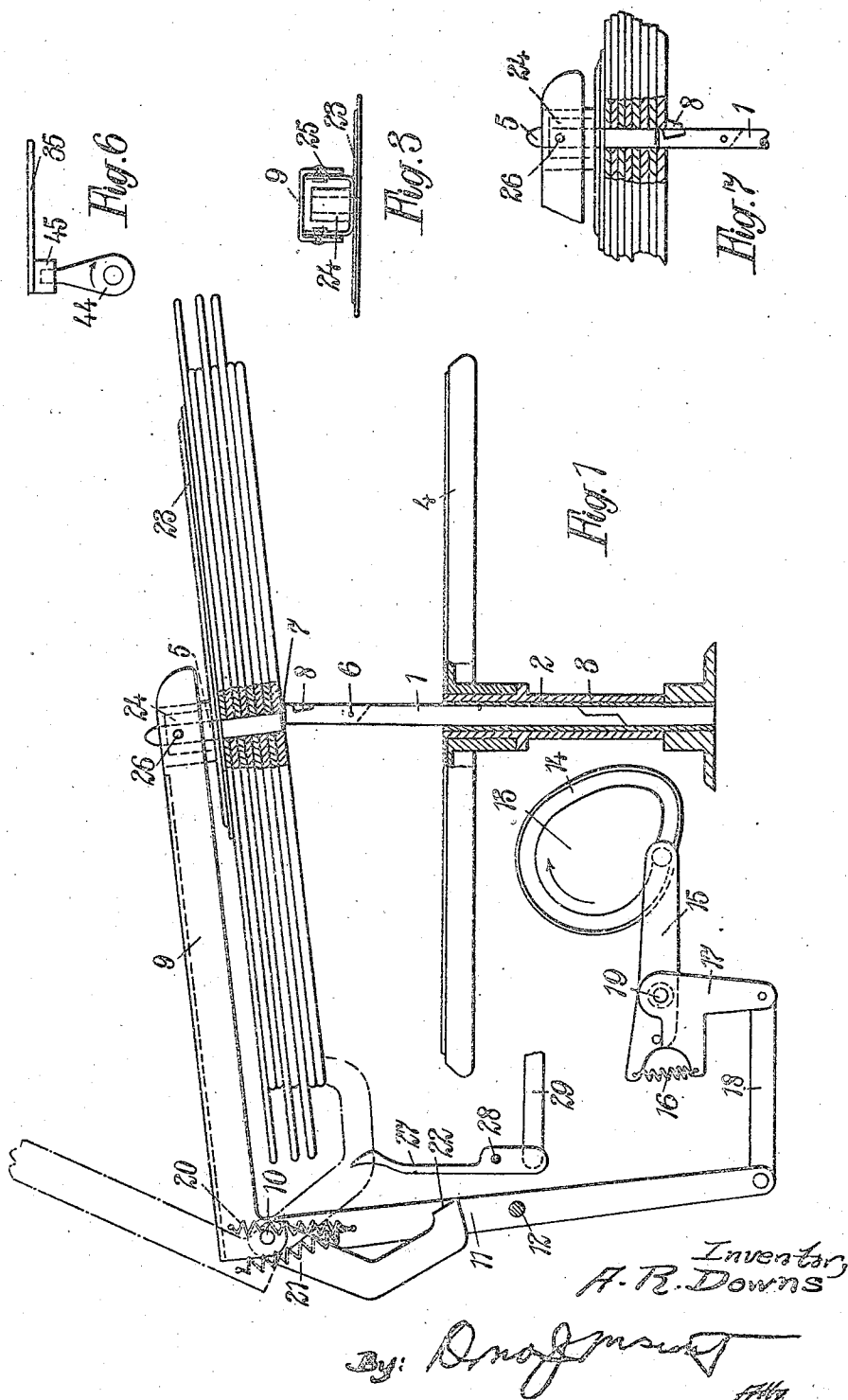
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Filed March 8, 1940

2 Sheets-Sheet 1



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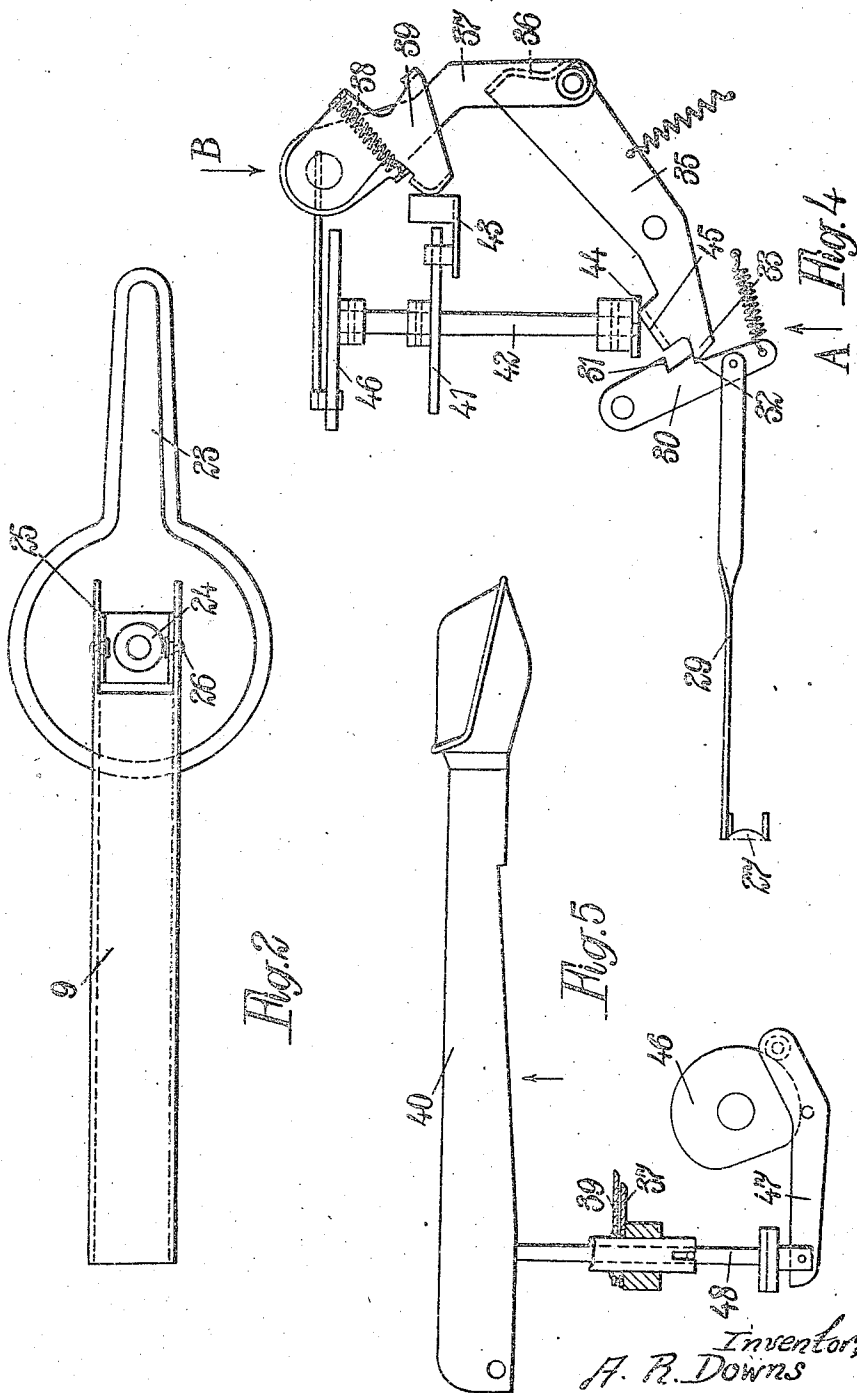
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Inventor,
A. R. Downs

By *Wm. J. Guss*
Attorney

UNITED STATES PATENT OFFICE

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AUTOMATIC RECORD CHANGING MECHANISM FOR PHONOGRAPHS AND THE LIKE

Arthur Robert Downs, Brighton, England, assignor to The Garrard Engineering and Manufacturing Company Limited, Swindon, Wiltshire, England

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5 Claims. (Cl. 274-10)

This invention relates to automatic record changing mechanism of the kind in which records are supported in stack formation above the turntable of the phonograph or the like upon an offset or shouldered spindle from which the records are released one by one and transferred to the turntable under their own weight.

The main object of the invention is to simplify the mechanism required for effecting the automatic changing of the records and to enable records of different sizes indiscriminately arranged to be released in succession for playing.

In the accompanying drawings:

Figure 1 is an elevation, partly in section, of a record changing mechanism constructed in accordance with the invention;

Figure 2 is a plan view of the release actuating arm;

Figure 3 is an end view of the release actuating arm;

Figure 4 is a plan view of a part of the mechanism for actuating the pick-up arm;

Figure 5 is an elevation, partly in section, of the pick-up arm and actuating mechanism, taken in the direction of the arrow B of Figure 4;

Figure 6 is an elevation of the resetting lever for the selecting mechanism, taken in the direction of the arrow A in Figure 4;

Figure 7 is a fragmentary elevation, partly in section, illustrating one of the stages in the record changing operation.

In carrying the invention into effect according to one convenient mode, as applied by way of example to a record changing mechanism for ten inch and twelve inch records, there is provided a central supporting spindle 1 received within a socket formed by a fixed sleeve 2 which also constitutes a bearing for a rotatable sleeve 3 carrying the turntable 4. The spindle 1 is removable and prevented from rotating in the manner described in Patent No. 2,063,199.

The spindle 1 is jointed towards its upper end and the upper or extension portion 5 has a downward portion of flat cross-section which is hinged to the spindle 1 at 6. This hinged joint permits the extension portion 5 to move from the offset position in which it is shown in Figure 1 to the position in which it is shown in Figure 7 where the extension is aligned with the main portion of the spindle 1. With the hinged portion in offset position the upper end of spindle 1 affords a supporting shoulder 7. The hinged extension portion 5 is formed with a projecting shoulder 8. When in the offset position shown in Figure 1 this shoulder or projection is re-

ceived within a corresponding recess in the spindle 1, but when the hinged extension portion 5 is moved into alignment with spindle 1 the shoulder projects laterally as shown in Figure 7. The vertical distance between the upper surface of spindle 1 and that of the shoulder 8 is slightly less than the thickness of a record, for a reason which will hereinafter appear.

Movements are imparted to the hinged spindle portion 5 by means of an arm 9 which is pivoted at 10 to a lever 11 capable of being rocked about a horizontal pivot 12 by means of a rotatable cam 13. A cam groove 14 engages a pin on a lever 15 which actuates, through a spring 16, a lever 17 connected to lever 11 by a link 18. The levers 15 and 17 have a common pivot 19 and the arrangement constitutes a resilient drive between the cam 13 and the lever 11.

The arm 9 is, as previously stated, pivoted up on the lever 11. A spring 20 secured to the arm maintains the latter in the position shown in the drawings in full lines. When the arm is raised for loading purposes the line of action of the spring passes to the opposite side of the pivot 10 and thus holds the arm in the raised position.

An auxiliary arm 21 is secured to the arm 9 and is provided with a supporting surface 22. When the arm 9 is in the raised position this auxiliary arm is located, as shown in broken lines in Figure 1, to afford convenient lateral support for the records during loading.

Provision is also made to prevent tilting of the records during the operations of record changing. The means provided for this purpose comprise a plate 23 attached to a bush 24 which is freely slidable upon the spindle extension portion 5. A U-shaped member 25 also attached to the plate is pivoted at 26 to the arm 9 which, as will be seen from Figure 3, is of channel section.

In order to enable indiscriminately mixed records of different sizes to be dealt with by the mechanism it is necessary to provide some means for automatically setting the pick-up arm of the gramophone to play the different records. For this purpose there is provided a lever 27 located below the stack of records and to one side thereof in such a position that it will be engaged by a twelve inch record when released but will not be engaged by a ten inch record. The lever 27 is pivoted at 28 and is connected by a link 29 to a lever 30 (see Figure 4) having a pair of ratchet teeth 31 and 32. These ratchet teeth are adapted to engage a pawl tooth 33 formed on a selecting lever 35 which is provided with a

raised cam surface 36 adapted to determine the position of an arm 37 which, through the spring 38 and an auxiliary arm 39, determines the lateral position of the pick-up arm 40 when the latter is moved inwardly to playing position. This arm is moved outwardly, during the record changing operation, by a plate cam 41 mounted on a shaft 42. The cam 41 actuates a pivoted lever 43 which in turn engages the lever 37 and thereby imparts the desired outward swinging motion to the pick-up arm. The return movement of the pick-up prior to the playing of the record is determined by the arm 37 in engagement with the cam surface 36. In the position shown, the lever 35 and cam 36 will set the pick-up arm for playing a ten inch record. Actuation of the lever 27 by the dropping of a twelve inch record will displace the arm 30 and the pawl element 33 will move into engagement with the ratchet tooth 31. This displacement of the lever 35 will bring another portion of the cam surface 36 into operative position and this will set the pick-up arm for playing a twelve inch record.

The mechanism is reset by an arm 44 mounted on an extension of the shaft 42. This arm engages a turned down portion 45 on the lever 35 and returns the same to a position in which it is engaged by the first tooth 32 on the arm 30.

The raising and lowering of the pick-up arm is effected by a plate cam 46 also mounted on the shaft 42 which engages a lever 47 arranged to impart vertical movements to a lifting rod 48. This part of the mechanism forms no part of the present invention and its operation is described in the specification of patent application No. 309,879 to which reference may be made.

The operations incidental to record changing will now be described.

To load the mechanism the arm 9 is raised to the position indicated by broken lines in Figure 1. This movement brings the supporting surface 22 into position near the edge of the record stack, and the records are threaded upon the spindle extension 5 which is in the offset position so that the edge of the central hole of the lowermost record rests upon the flat surface or shoulder 7 of the spindle 1. The arm 9 is then brought down over the pile of records and the bushing 24 is threaded over the spindle extension to bring the steadying plate 23 to rest upon the upper surface of the topmost record. It will be seen that in this position the spring 20 will exert a slight downward pressure upon the records and the plate 23 will prevent the pile from tilting or wobbling, it being appreciated that the lateral supporting surface 22 has by now been withdrawn.

The initiation of the record changing operation is effected by rotating the cam 13 which may be driven by any convenient means. Rotation of the cam rocks the lever 11 and through the arm 9 the extension 5 is moved about its pivot into the position in which it is shown in Figure 7. This movement effects a displacement of all the records in the stack and the lowermost record will descend to the shoulder of the projection 8. Continued rotation of the cam 13 will return the spindle extension 5 to its initial position and this movement will withdraw the shoulder 8 from beneath the lowermost record of the stack while at the same time the remaining records will be returned, by the displacement of the extension 5, to the upper surface 7 of the spindle 1. As the shoulder 8 is withdrawn into its recess in the

spindle 1 the lowermost record is released and slides down the spindle to the turntable 4. At this time the remaining records are supported upon the surface 7 as explained above, and the parts are ready for a further record changing operation. It will be seen that the spindle construction described provides in effect a stepped shoulder and the records are supported alternately upon one or other of the steps. It is also necessary, in order to ensure a smooth return of the records to the upper step surface, that the vertical spacing of the steps should be less than the thickness of the thinnest record likely to be used.

As the records are released in succession the arm 9 will descend under the influence of its weight and the action of the spring 20, and the plate 23 will prevent tilting or wobbling of the records as the stack is displaced back and forth. It will also be noted that with the descent of the arm 9 a smaller lateral displacement of the said arm will be necessary to bring the spindle extension 5 into alignment with spindle 1. To allow for this difference in displacement the two levers 15 and 17 connected by the spring 16 provide a resilient drive between the cam 13 and the lever 11.

The operation of the selecting mechanism, which determines the setting of the pick-up arm in accordance with the size of the record released, has already been explained.

After all the records have been played, the arm 9 is swung back into loading position and the spindle 1 is withdrawn from its socket to facilitate the removal of the records.

While the example described above is applied to the changing of ten inch and twelve inch records it will be understood that the mechanism may be adapted by suitable modification to deal with other sizes of records.

I claim:

1. In a phonograph adapted to play a number of records in succession, a turntable, record releasing mechanism including a spindle extending upwardly from said turntable, a member extending upwardly from said spindle and mounted thereon for movement into and out of alignment therewith and extending through a stack of records at their centers, a shoulder on said spindle for supporting the stack of records, a lateral projection coupled to said member and movable into offset relation with respect to the spindle when the member and spindle are in alignment, and movable into flush relation with said spindle when said member is out of alignment therewith, said projection being vertically spaced from said shoulder by a distance the order of the thickness of a record to engage the lowermost record of the stack adjacent its center when the projection is offset as the member and spindle are aligned, whereby the lowermost record is released for movement over said spindle to said turntable by tilting of said member and means operatively connected with said extension member for tilting the same.

2. In a phonograph adapted to play a number of records in succession, a turntable, record releasing mechanism including a spindle extending upwardly from said turntable, a rod extending upwardly from said spindle and pivoted thereto for movement into and out of alignment therewith and extending through a stack of records at their centers, a shoulder on said spindle for supporting the stack of records, a lateral projection coupled to said rod and movable into offset rela-

tion with respect to the spindle when the rod and spindle are in alignment, and movable into flush relation with said spindle when said rod is out of alignment therewith, the top portion of said projection being spaced below said shoulder by a distance the order of the thickness of a record to engage the lowermost record of the stack adjacent its center when the projection is offset as the rod and spindle are aligned, whereby the lowermost record is released for movement over said spindle to said turntable by tilting of said rod and means operatively connected with said rod for tilting the same.

3. In a phonograph adapted to play a number of records in succession, a turntable, record releasing mechanism including a spindle extending upwardly from said turntable, a rod extending upwardly from said spindle and pivoted thereto for movement into and out of alignment therewith and extending through a stack of records at their centers, a shoulder on said spindle for supporting the stack of records, a lateral projection coupled to said rod and movable into offset relation with respect to the spindle when the rod and spindle are in alignment, and movable into flush relation with said spindle when said rod is out of alignment therewith, the top portion of said projection being spaced from said shoulder by a distance the order of the thickness of a record of the stack adjacent its center to engage the lowermost record when the projection is offset as the rod and spindle are aligned, and mechanism detachably coupled to said rod for moving it on its pivot into alignment with said spindle to drop the lowermost record on said projection and for tilting the rod out of the alignment, whereby the records of the stack are released successively for movement over said spindle to said turntable by the tilting of said rod.

4. In a phonograph adapted to play a number of stacked records in succession, a turntable, record releasing mechanism including a spindle extending above the turntable, a shoulder on said spindle for supporting a stack of records adjacent their centers, a member extending upwardly from the spindle, through the stacked records at their centers, and mounted on said spindle for movement from a position in alignment therewith to a position offset therefrom, a support element coupled to said extension member, offset laterally with respect thereto, spaced below the shoulder of said spindle a distance in the order

of the thickness of a record and movable with the extension member out of and into alignment with the spindle as the extension member is moved into and out of alignment with said spindle, and means operatively connected with said extension member for moving said extension member into and out of alignment with the spindle, whereby all the stacked records will be displaced from the shoulder of the spindle to rest on said support element when the extension member is moved in alignment with the spindle, and the lowermost of the stacked records will be released for dropping along the spindle onto the turntable, while the remaining records of the stack will be returned onto the spindle shoulder when the extension member is moved out of alignment with the spindle.

5. In a phonograph adapted to play a number of stacked records in succession, a turntable, record releasing mechanism including a spindle extending above the turntable, a shoulder on said spindle for supporting a stack of records adjacent their centers, a member extending upwardly from the spindle, through the stacked records at their centers, and mounted on said spindle for movement from a position in alignment therewith to a position offset therefrom, a support element coupled to said extension member, offset laterally with respect thereto, spaced below the shoulder of said spindle a distance in the order of the thickness of a record and movable with the extension member out of and into alignment with the spindle as the extension member is moved into and out of alignment with said spindle, and a recess in said spindle into which said support element fits when said extension member is out of alignment with said spindle, and means operatively connected with said extension member for moving said extension member into and out of alignment with the spindle, whereby all the stacked records will be displaced from the shoulder of the spindle to rest on said support element when the extension member is moved in alignment with the spindle, and the lowermost of the stacked records will be released for dropping along the spindle onto the turntable, while the remaining records of the stack will be returned onto the spindle shoulder when the extension member is moved out of alignment with the spindle.

ARTHUR ROBERT DOWNS.