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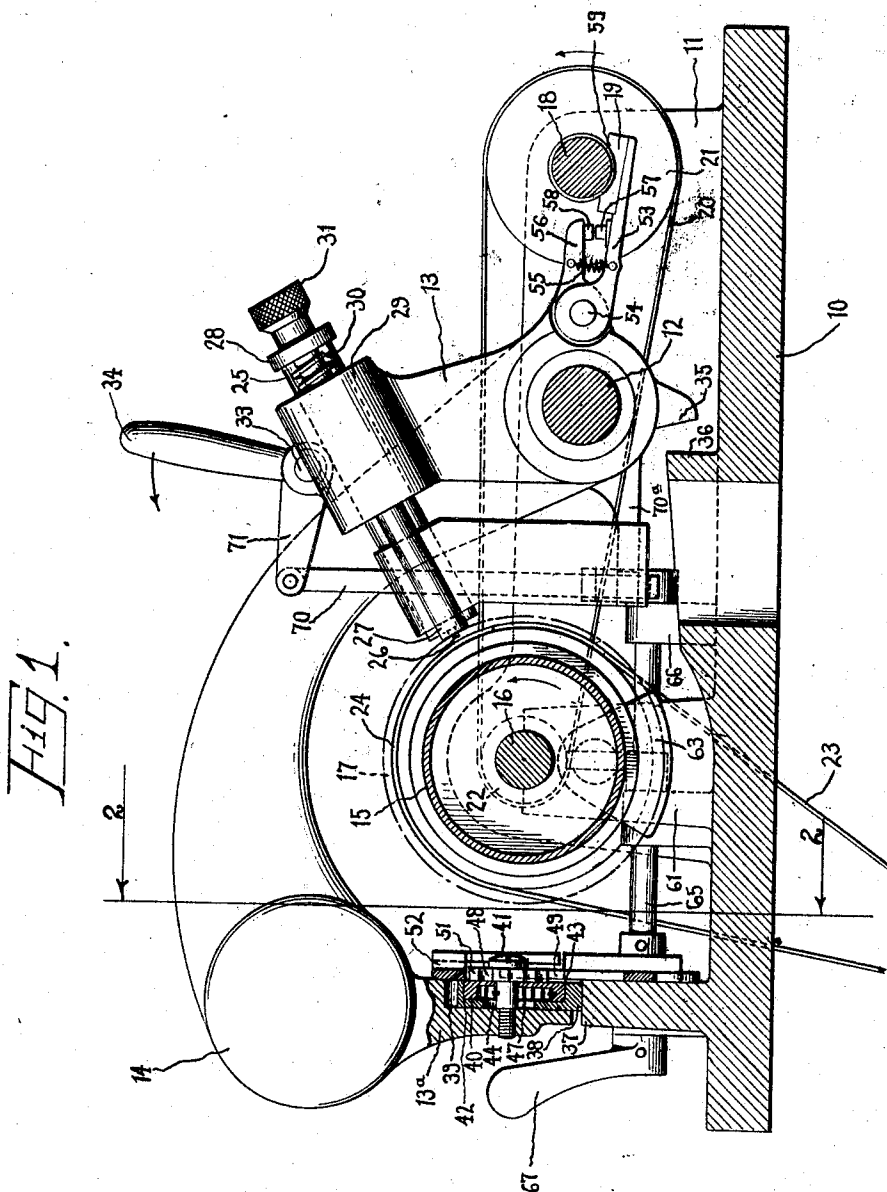
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RECORD RESURFACING MACHINE

Filed July 23, 1927

2 Sheets-Sheet 1



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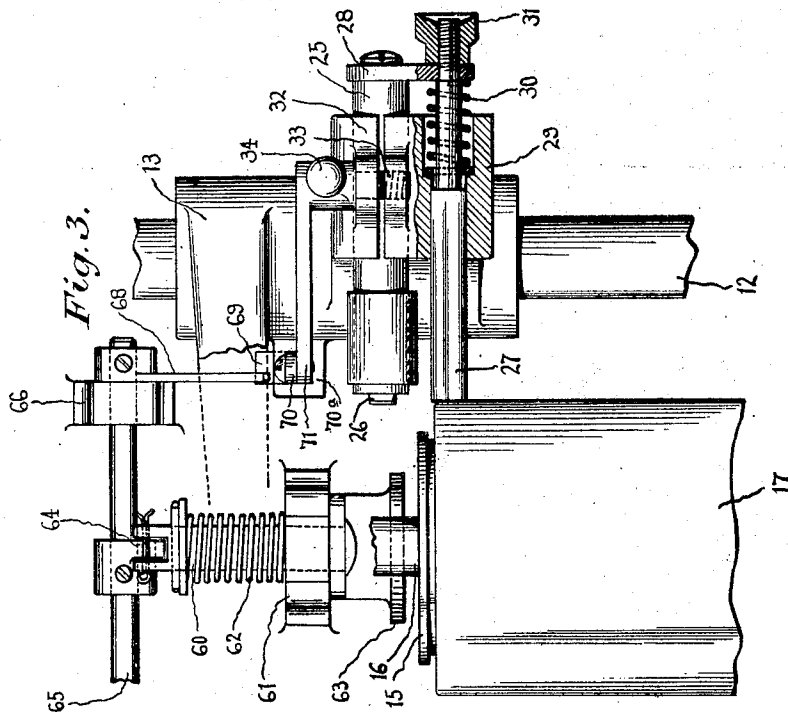
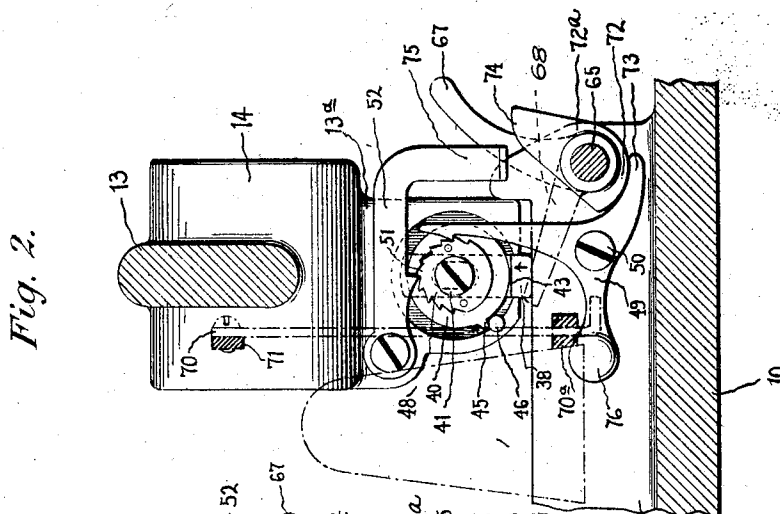
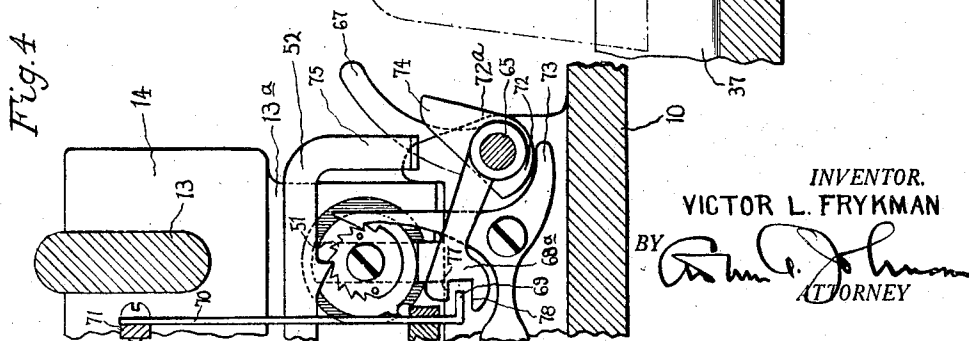
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RECORD RESURFACING MACHINE

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2 Sheets-Sheet 2



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RECORD-RESURFACING MACHINE

Application filed July 23, 1927. Serial No. 207,848.

This invention relates to record-resurfacing machines, and more particularly to an improved machine for shaving record blanks, particularly those intended for use with dictation machines.

An object of the present invention is to provide improved means to facilitate the setting of a record-engaging tool in proper operating position for resurfacing a record.

Another object of the present invention is to provide means to automatically advance the knife-bar carriage successive steps of predetermined extent toward the record for successive finishing cuts.

An important feature of the present invention is the provision of interconnected means for restoring the automatic knife-advancing means, releasing the knife from set position, and ejecting a record from a record-supporting mandrel, so that by a single operation the machine is made ready to receive another record to be shaved.

In the accompanying drawings which illustrate one form of the invention, that at present preferred—

Figure 1 is a right hand end elevation, partly in section, of a record-resurfacing machine with the parts shown in the operating positions.

Fig. 2 is a sectional view taken through the line 2—2 of Fig. 1, showing in detail the automatic step-by-step operating knife-advancing means of the present invention.

Fig. 3 is a fragmentary top plan view of parts of a record-resurfacing machine, and shows the relation of the record-ejector to the knife-bar releasing means.

Fig. 4 is a view similar to Fig. 2, showing a modified form of the invention.

The record-resurfacing machine shown herein is particularly adapted for shaving or otherwise resurfacing phonograph record blanks, particularly those adapted to be used with dictation machines and the like. It comprises a base 10 provided with a left-hand standard 11 and a right-hand standard (not shown), between which is supported a carriage rod 12 on which a carriage 13 is guided for movement longitudinally of the machine. The carriage 13 extends forwardly and up-

wardly from the carriage rod 12 to a point where it is provided with a weight and hand-piece 14 which is adapted to be grasped by the operator when manually moving the carriage.

Located in front of the carriage-rod 12 and supported in the usual manner, is a mandrel 15 having a mandrel shaft 16 adapted to support a record 17. Movement of the knife-bar carriage 13 longitudinally of the record 17 for resurfacing the latter is effected by means of a feed-screw 18 engaged by a feed-nut 19 mounted on the carriage 13. The feed-screw is mounted between the left-hand standard 11 and the right-hand standard (not shown) and is caused to rotate coordinately with the mandrel shaft 16 by means of a connecting belt 20 engaging a pulley 21 on the feed-screw shaft 18 and a pulley 22 carried by the mandrel shaft 16. The mandrel shaft 16 is driven by a suitable motor (not shown) driving a belt 23 which engages a mandrel shaft pulley 24 to drive the mandrel.

The above described structure and mechanism is common to record-resurfacing machines heretofore manufactured and used.

Phonograph record-blanks are customarily shaved when it is desired to obliterate a record preparatory to producing a new record on the surface of the blank. But, this operation may be accomplished by means of burnishing, melting and other arrangements, and in so far as some of the salient features of the present invention are concerned, it is immaterial whether the record-engaging tool is a knife, burnisher, or other device. However, since the method of cutting is the one most frequently used and the most preferable at present, it is illustrated herein.

The device as illustrated herein has a knife-bar 25 adapted to carry at its end a knife 26 usually made of sapphire or other hard stone. A gage-bar 27 is interconnected with the knife-bar 25 by a tie-bar 28 so that the knife-bar will project forwardly beyond the gage-bar an extent depending upon the depth of a predetermined first or preparatory cut which it is desired to take. These parts, to wit—the knife-bar 25 and gage-bar 27—are slidable in the housing 29 forming part

of the carriage 13 for movement en bloc toward or from the side of the record 17 and are normally urged toward inoperative position away from the record 17 by a spring 30.

When a record 17 is placed on the mandrel 15 and it is desired to take a first or preparatory cut, the knife 26 may be quickly set for this cut by the operator pressing on a finger-piece 31 on the end of the gage-bar and moving the knife-bar ensemble forwardly against the pressure of the spring 30 until the gage-bar 27 contacts with the surface of the record 17. Then the knife-bar is locked in the position so determined by drawing a yielding split section 32 of the housing 29 together by a screw 33 having secured to it a lever 34. The threads of the screw 33 are such that when the lever 34 is moved in the direction of the arrow shown in Fig. 1, the knife-bar is locked against movement. The setting of the knife-bar is preferably effected while the carriage is at the position where it finished shaving the previous record, in which position the knife 26 is out of range or beyond the record-surface and the gage is located above the record as shown in Fig. 3 to engage the same.

When the knife-bar 27 is so set in predetermined position with relation to the record 17, the operator grasps the hand-piece 14 and swings the carriage 13 upwardly until a lug 35 on the carriage engages an abutment 36 forming part of the base 10. This movement of the carriage upwardly moves the interconnected knife-bar 25 and gage-bar 27 rearwardly away from the record 17 and also moves the feed-nut 19 out of engagement with the feed-screw 18, as hereinafter described. While so raised, the carriage is slid longitudinally of the record 17 along the carriage rod 12 to the opposite end of the record 17 where the carriage 13 is allowed to swing downwardly to normal position. In this position, the feed-nut 19 again engages with the feed-screw 18.

Then the motor or other driver is started, the record is rotated by the mandrel and the carriage 13 is moved longitudinally over the record 17 on the carriage rod 12 by rotation of the feed-screw 18, thus causing the knife 26 to engage the record 17 and remove a predetermined amount of material, including all or part of the recording thereon. In this travel, the gage-bar 27 follows the knife 26 across the record and hence, being always above a portion of the record just shaved, never contacts with the shaved surface of the record.

The carriage 13 continues to be fed longitudinally until the knife-bar is passed beyond the end of the record, i. e., to the position shown in Fig. 3, where as usual it stops because the feed-nut 19 runs off the threaded

portion of the feed-screw 18 onto an unthreaded portion thereof.

In practice, this first cut is seldom sufficient to remove all trace of the previous recording, and hence does not properly prepare or finish the record-surface for new recording. In order to take, in addition to the first or preparatory cut, other light or finishing cuts of predetermined depth without necessitating the resetting of the knife-bar 25, the present invention provides means for automatically adjusting the carriage 13 to advance the knife-bar mounted therein toward the record 17 a predetermined extent incidental to each operation of moving the carriage 13 to position to start shaving a record.

For this purpose, the present invention takes advantage of the fact that the carriage itself has pivotal movement as well as a sliding movement on the guide rod 12. Hence, to enable advancement of the knife step-by-step by pivotal movement of the carriage, the usual shoe part of the carriage which rides on the front rail is dispensed with and instead the present invention provides mechanism for lowering the carriage and consequently effecting forward movement of the knife-bar toward the record when it is desired to advance the knife for successive finishing cuts.

The mechanism for accomplishing this, according to the present invention, in the form shown in the accompanying drawings, comprises a shoe 38 which is vertically movable in a guide slot 39 on the forward part 13a of the carriage 13. The position of the shoe 38 on the carriage is controlled by rotating movement of an off-set circular disc or cam 40 mounted on a stud 41 and embraced at diametrically opposite sides by flanges 42 and 43 on the shoe 38. The disc 40 is mounted to rotate on the stud 41 which passes through an elongated slot 44 in the shoe 38 permitting vertical movement of the shoe.

The off-set disc or cam 40 which controls the shoe 38 is held in initial or starting position with the stop ear 45 engaging a stop pin 46 on the part 13a by a spring 47 coiled within a recess in the off-set disc 40 and anchored on the stud 41. It is moved from this initial or starting position step-by-step preferably by a pawl and ratchet mechanism such as a ratchet disc 48 secured to the off-set or cam disc 40.

The pawl 49 of this pawl and ratchet mechanism may be conveniently mounted on the carriage for movement relative to the ratchet 48 in any desired manner. However, since the pawl and ratchet mechanism, as above stated, is operated as an incident to the movement of the carriage 13 to position to start shaving a record, which movement includes a preparatory vertical movement of the carriage to release the feed-nut from the feed-screw as above explained, and since the pawl

and ratchet mechanism are intended to co-operate only when the carriage 13 is in a predetermined position longitudinally of the base 10, it is extremely advantageous that the pawl 49 be mounted on the frame and held in such position as to engage the ratchet 48 when the carriage is raised while in the said predetermined position. Accordingly, the pawl 49 is pivotally mounted on a stud 50 carried by the rail 37 and extends upwardly to a place where it is adapted to engage with the ratchet 48 when the carriage has completed its movement in shaving a record. The pawl 49 is normally urged to a position where it will engage the teeth of the ratchet 48 by means of the weights 76 or other actuating device mounted on an arm extending outwardly from the pawl.

Thus, when the carriage 13 is in the finishing position of travel indicated in Fig. 3, the operator grasps the hand-piece 14 and lifts the same, and by so doing the ratchet 48 is bodily moved upwardly away from the relatively stationary pawl 49 causing the latter which is in engagement with a tooth 51 on the ratchet to rotate the ratchet 48 one step or, in other words, an extent equivalent to the space between two teeth 51. At the same time, the back-check or stop pawl 52 rides over and engages a new tooth 51 and holds the ratchet against the returning tendency of the spring 47.

This advance of the ratchet 48 and connected off-set disc 40 moves the shoe 38 in its guide-slot 39 a predetermined distance (see the arrow in Fig. 2) so that, when the carriage is moved to the starting position to travel and is lowered, the shoe 38 again engages the slide rail 37, but this time the shoe having retracted, the forward end of the carriage 13 will be closer to the rail 37, and the previously set knife 26 will be proportionately closer to the record 17. Hence, a new layer of record material will be removed from the record-blank in the subsequent travel of the carriage 13 thereover.

By locating this feeding mechanism near the front of the machine, at a considerable distance from the knife and from the carriage pivot point, several advantages are obtained. For instance, less accuracy in making the parts is required; less variance in the depth of cut with result; and a greater amount of wear is permitted without appreciably effecting the knife-bar relation to the record.

Successive finishing cuts, if found to be necessary, are obtained with equal facility by repeating the above described operation of merely returning the carriage to starting position and shaving.

While in most cases one or two finishing cuts are sufficient to properly produce a high glossy finish on the record surface, it is sometimes necessary to take more than one or two

finishing cuts, and accordingly the present invention has provided for a maximum of four finishing cuts without necessitating the manual resetting of the knife by release of the lever 34 and operation of the finger-piece 31. Clearly, the structure disclosed herein may be modified to decrease or increase the number of finishing cuts to meet special conditions.

The provision of the slide 38 is also advantageous, for, by acting as a wear shoe, it can be made of a material different than the carriage 13, thereby permitting heat treatment to make it wear-resisting. Moreover, by having the shoe 38 interposed between the disc 40 and the rail 37, any wear which occurs is between the working surface of the shoe and the rail, and not on the cam. Since the position of the knife is initially determined by the gage 26 while the disc 40 is in its initial or starting position, the knife 26 will be set properly even if the shoe has become worn to a considerable extent, and the step-by-step knife advancement controlled by the disc 40 will still be predetermined and as uniform under those conditions as they were when the shoe was new.

To hold the feed-nut 19 in engagement with the feed-screw 18 with substantially uniform pressure and yet allow the position of the carriage 13 relative to the feed-screw 18 to change by swinging of the carriage 13 toward the record 17 for successive finishing cuts, the present invention provides a flexible mounting for the feed-nut 19. As seen in Fig. 1, this flexible mounting is obtained by mounting the feed-nut 19 on a pair of arms 53 which are hinged on the carriage 13 by a rod 54. These arms 53 are normally urged upwardly by a spring 55 interposed between an extension 56 on the carriage and one of the arms 53, and yieldingly and uniformly hold the feed-nut mounted on the arms 53 in engagement with the feed-screw while the carriage 13 is in operating position. When the carriage 13 is raised to move it to starting position, a stop 57 on the arm 53 is engaged by a stop 58 on the extension 56, and this causes the feed-nut 19 to be positively moved out of engagement with the feed-screw. These cooperating stops 57 and 58, in addition, serve to limit movement of the feed-nut 19 so that the radius of the feed-nut thread and feed-screw thread are sufficiently close at all times to eliminate wear and tear which would occur ordinarily if the corners 59 of the feed-nut 19 were to engage with the feed-screw thread.

Another particularly important feature of the present invention is the provision of means for coordinately releasing the knife-bar locking means and the carriage knife advancing means, and also ejecting the record, all preferably by movement of a single means

adapted to be manually operated after a record has been resurfaced.

Before continuing the description of the above, attention is called to the fact that the record-resurfacing machine shown in the accompanying drawings is provided, as is usual in such machines, with means for facilitating the removal of the record from the mandrel. This means, as shown in the accompanying drawings, is in the form of a record-ejector having a record-ejector plunger 60 slidable longitudinally of the machine in the standard 61 and normally held in inoperative position by a spring 62. The plunger is moved forwardly until a head portion 63 engages the record to loosen it from the mandrel by a lever 64 mounted on a rocker shaft 65 journaled in the front rail 37 and a standard 66. At its front end, the rock shaft 65 has a manually operable lever 67 which serves to rotate the rock shaft 65 and thereby move the lever 64 and related plunger 60 toward the record.

In order to carry out multiple functions of the present invention above referred to, the rock-shaft is extended rearwardly beyond the standard 66 where it is provided with a lever 68 adapted to overlie an arm 69 of a pendant link 70 which is pivotally connected to an arm 71 on the knife-bar locking screw 33, and which is supported at its lower end by an extension 70a of the carriage 13. Hence, when the operator ejects the record by rocking the shaft 65, the lever 68 moves with the rock-shaft until it contacts with the arm 69 on the link 70 and moves the latter downwardly, rotating the locking screw 33 to release the knife-bar ensemble so that the latter may be returned to inoperative position by the spring 30. It will thus be seen that the operator, without any mental effort, releases the knife-bar lock each time that the record-ejector is operated to remove a record from the mandrel.

To restore the automatic knife-advancing means, the front end of the rock shaft 65 near the slide rail 37 is provided with an arm 71 having a cam 72 which contacts with the extension 73 of the feed-pawl 49 and moves the latter out of engagement with the ratchet 48 when the rock-shaft 65 is rotated. Opposite the cam 72 on the arm 71 is another cam 74 which engages the extension 75 of the back-check or stop pawl 52 and moves the latter out of engagement with the ratchet 48 when the rock-shaft 65 is rotated.

Therefore, the operation of ejecting the record also causes the cam arm 72a to be rocked, thereby moving both the stop pawl 52 and feed pawl 49 out of engagement with the ratchet 48, so that the spring 47 may restore the off-set disc or cam 40 and its related shoe 38 to initial or starting position.

The cam arm 72a, which causes the automatic advancing means to be restored, and

the arm 68 which engages with the pendant link 70 for releasing the knife-bar ensemble, are returned to normal positions by means of the spring 62 mounted on the ejector plunger 60 and are held in this normal position by the plunger head 63 contacting with the standard 61, the rock-shaft 65 being connected to the plunger so as to move therewith in both directions.

The cam 72 on the arm 72a which engages the extension 73 on the feed-pawl 49 is arranged to be normally engaged by the extension and thus limit the counter clockwise movement of the pawl as seen in Fig. 2, under the influence of the weight 76. This provision is made so that when the carriage is raised to move it to starting position for shaving, the feed-pawl 49 will not move so far to the left as seen in Fig. 2 that it cannot re-engage the ratchet 48 when the carriage again reaches the end of its shaving movement when it is desired to advance the carriage and hence the knife for taking a finishing cut.

It will be noted from the above, that the interconnection between the knife-bar releasing means and the knife-advancing means with the record ejector is only effected at the time that the carriage is at the extreme end of its shaving movement, in which position it is allowed to remain until the record has been removed and a new record substituted therefor. Hence, inadvertent or accidental operation of the record ejector while the carriage is in any position other than the position in which it is to be set does not release the knife-bar lock and restore the knife-bar advancing means, and hence such accidental movement does not make it necessary for the operator to re-set the machine again to properly shave the record.

The same result is accomplished in a different manner in the embodiment of this invention shown in Fig. 4. In this modification, the parts with the exception of the lever 68 are the same as those shown in Figs. 1, 2 and 3. The lever 68, however, is omitted and a modified lever 68a is used. This modified lever 68a has two projections 77 and 78 adapted respectively to overlie and underlie the arm 69 on the link 70. Hence, either the projection 77 may engage the arm 69 to operate the pendant link 70 in case the record-ejector lever 67 is actuated, or the arm 69 of the pendant link 70 may engage the projection 78 to operate the lever 68a in case the release lever 34 is actuated. Thus, the record-ejector may be operated and the knife-advancing means restored by manual operation of the lever 34 which releases the knife-bar lock; or the knife-advancing means may be restored and the knife-bar locking means released by manual operation of the record-ejector. Hence, the

operator may perform the same multi-functions by either operating the record-ejector lever 67 or the knife-releasing lever 34, according to which lever is most convenient to the operator's hand at the particular instant that the operations are to be performed.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

Having thus described the invention, what is claimed as new and for which it is desired to obtain Letters-Patent, is:—

1. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced, a carriage, means determining the position of said carriage relative to said record, and means automatically operated as an incident to each successive movement of the carriage to initial resurfacing position for changing step by step the position of said determining means to bring said carriage into closer relation to said record.

2. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced, a frame, a front rail forming part of the frame, a carriage, means engaging said front rail for determining the position of said carriage relative to said record, said means being automatically operated as an incident to the movement of the carriage to initial resurfacing position for bringing said carriage into closer relation to said record.

3. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced, a frame, a carriage pivotally mounted on the frame for arcuate movement toward or from the record, means for determining the operating position of said carriage relative to said record, said means being automatically operated to bring said carriage into closer relation to said record whenever said carriage is moved from its final resurfacing position back to its initial resurfacing position.

4. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced, a carriage, a knife on said carriage, means for setting and locking the knife on the carriage relative to the record to be resurfaced, and automatic means for changing the operative position of the carriage relative to the record at each successive resurfacing cut in order to set said knife for each said successive cut.

5. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced; a frame; a carriage pivotally mounted on said frame; a knife mounted on the carriage; means for setting and locking the knife on the carriage relative to the record to be resurfaced; and mechanism

for advancing the carriage and locked knife toward the record comprising a slide movable in the carriage, an off-set disc, a ratchet wheel segment interconnected with the off-set disc, a stop pawl and a feed pawl automatically operating said off-set disc and ratchet wheel segment when the carriage is moved to position to start a cut.

6. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced; a carriage mounted on said frame; a knife mounted on said carriage; manually operated means for ejecting the record from the mandrel; means for automatically advancing the knife toward the record for finishing cuts; and means operated coordinately with the operation of the record-ejector for restoring said automatic knife-advancing means.

7. In a record-resurfacing machine, the combination of a frame; a mandrel for supporting a record to be resurfaced; a carriage mounted on said frame; a settable knife mounted on said carriage; means for locking said knife in set position; manually operable means for ejecting a record from the mandrel; and means operated coordinately with the operation of the record-ejector for releasing said knife-locking means.

8. In a record-resurfacing machine, the combination of a frame; a mandrel for supporting a record to be resurfaced; a carriage mounted on said frame; a settable knife mounted on said carriage; means for locking said knife in set position; means for automatically advancing the knife toward the record; manually operable means for ejecting the record from said mandrel; and means operated coordinately with the operation of the record-ejector for restoring the knife-advancing means and releasing the knife-locking means.

9. In a record-resurfacing machine, the combination of a frame; a mandrel for supporting a record to be resurfaced; a carriage pivotally mounted on said frame; a knife mounted on said carriage; manually operable means for locking said knife on the carriage; means to pivotally move the carriage to automatically advance the knife supported thereon toward the record; and means operated as an incident to manually releasing the knife-locking means for restoring the carriage moving means.

10. In a record-resurfacing machine, the combination of a frame; a mandrel for supporting a record to be resurfaced; a carriage mounted on said frame; a knife mounted on said carriage; means for locking said knife on the carriage; means for ejecting a record supported on said mandrel; and means operated coordinately with the releasing of the knife-locking means for operating the record-ejecting means.

11. In a record-resurfacing machine, the

combination of a frame; a mandrel for supporting a record to be resurfaced; a carriage mounted on said frame; a knife mounted on said carriage; manually operable means for locking said knife on the carriage; means for advancing the knife toward a record; means for ejecting a record from said mandrel; and means for simultaneously restoring the carriage advancing means, ejecting the record, and releasing the knife-locking means.

12. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced; a frame; a carriage mounted on said frame; a front rail on the frame for supporting the carriage; and carriage advancing means comprising a cam and a wear shoe controlled by the cam and adapted to engage the front rail for the carriage.

13. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced; a frame; a carriage mounted on said frame; a front rail for supporting the carriage; a carriage positioning determining cam; and a vertically adjustable wear shoe mounted on the carriage to serve as an interponent between the cam and front rail.

14. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced; a carriage; a knife setttable in said carriage; and automatic means comprising a pawl on the frame and a cooperating ratchet on the carriage for advancing the set knife toward the record for successive finishing cuts, said pawl and ratchet being operable only when the carriage is in predetermined position.

15. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced; a frame; a carriage movable longitudinally of said frame; a setttable knife mounted on said carriage; means for locking said knife in set position; means for advancing the knife toward the record for successive finishing cuts; manually operable means for ejecting the record from the mandrel; and means operated as an incident to ejecting the record for coordinately restoring the knife-advancing means and releasing the knife-locking means, said means being operable only when the carriage is in predetermined position longitudinally of said frame.

16. In a record-resurfacing machine, the combination of a frame; a mandrel for supporting a record to be resurfaced; a carriage mounted on said frame and movable longitudinally thereof; a setttable knife mounted on said carriage; and means automatically advancing the carriage and knife toward a record for successive finishing cuts incidental to movement of the carriage to position for resurfacing the record, said means being op-

erable only when the carriage is in predetermined position.

17. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced; a frame; a carriage mounted on said frame and movable longitudinally thereof; a knife setttable in said carriage; and means for advancing the carriage and the knife set therein step-by-step a predetermined extent toward the record incidental to the movement of the carriage to starting position.

18. In a record-resurfacing machine, the combination of a mandrel for supporting a record to be resurfaced; a frame; a carriage mounted on said frame and movable longitudinally thereof; a knife setttable in said carriage; and means comprising a cam, and a pawl and ratchet mechanism for automatically moving the cam incidental to movement of the carriage to position for resurfacing the record to advance the carriage and set knife toward the record for successive finishing cuts.

19. In combination, a frame; a record-supporting mandrel; a carriage movable longitudinally of the mandrel; an ejector for releasing a record from the mandrel; and means mounted on the carriage adapted to operate said record-ejector.

20. In combination, a frame; a record-supporting mandrel; a carriage movable longitudinally of the mandrel; an ejector for releasing a record from the mandrel; and means on the carriage adapted to operate said record-ejector when the carriage is in a predetermined longitudinal position.

21. In combination, a frame; a record-supporting mandrel; a carriage movable longitudinally of the mandrel; an ejector for releasing a record from the mandrel; means mounted on the carriage adapted to operate said record-ejector; and means on the frame also adapted to operate the record-ejector.

22. In a record-resurfacing machine, the combination of a record-supporting mandrel; a tool carriage movable with relation to the mandrel; means on the tool carriage for locking the tool in set position; a record-ejector; and means on the carriage for releasing the tool lock and coordinately operating the record-ejector.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 21st day of July, 1927.

VICTOR L. FRYKMAN.