

Nov. 22, 1938.

T. C. BROWN

2,137,383

## RECORD SHAVING MACHINE

Filed Sept. 17, 1937

2 Sheets-Sheet 1

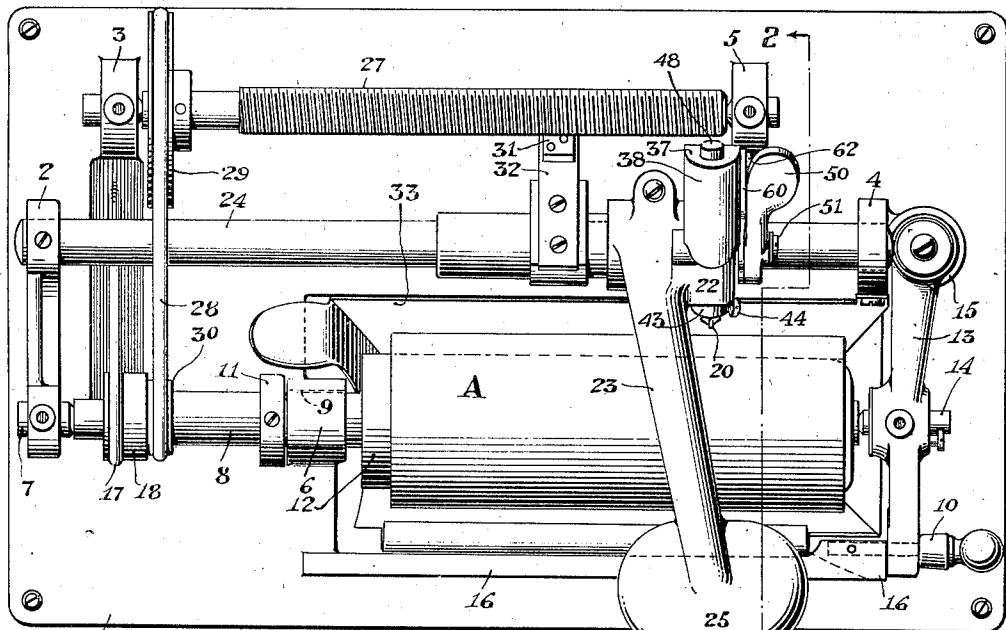


Fig. 1

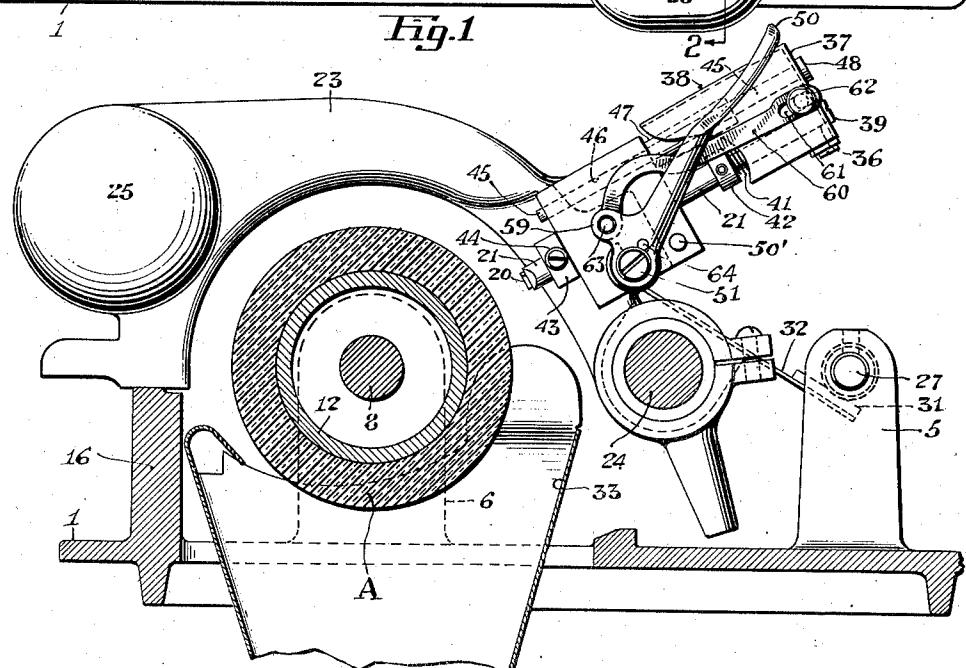


Fig.2

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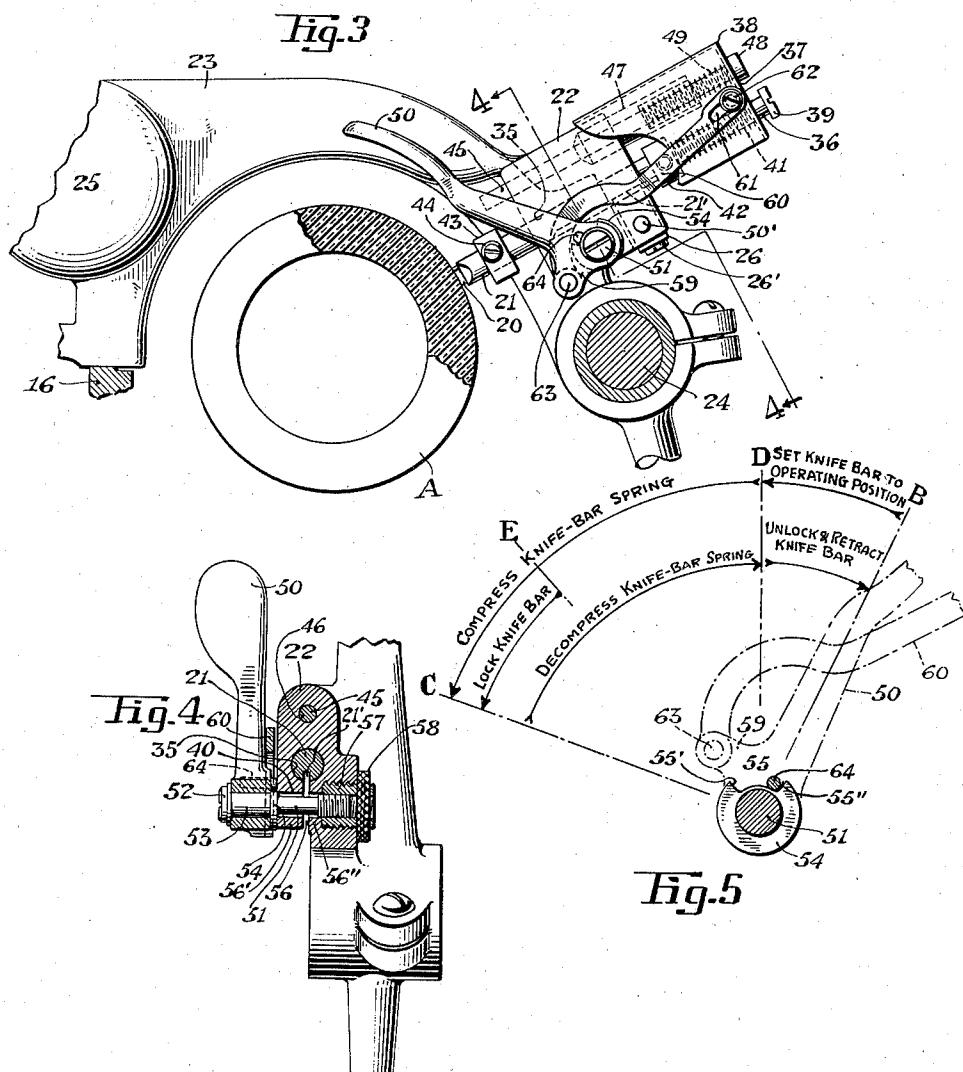
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## RECORD SHAVING MACHINE

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,137,383

## RECORD SHAVING MACHINE

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Application September 17, 1937, Serial No. 164,280

## 20 Claims.

## (Cl. 82—1.1)

My invention relates to machines for shaving or resurfacing sound records, and more particularly to an improved construction for adjusting and controlling the record cutting or shaving tool of such a machine.

Sound record cylinders are usually made of wax-like material, and in the use of these cylinders in connection with business phonographs, it is customary, after dictated matter has been recorded on the cylinders and transcribed therefrom, to resurface the cylinders by shaving off the outer surface portions thereof so as to prepare them for the recording of additional matter. Such a cylinder is commonly referred to as a "used" record; but it is also the practice to shave off the surface portion of a new cylinder to provide the same with a smooth surface suitable to be recorded upon. Therefore, the term "record" as used herein contemplates a wax or other tablet having a surface either adapted to receive and bear or already bearing a sound track or recording.

The record resurfacing operation, as ordinarily performed, involves the use of a machine having a suitably mounted shaving knife which is adapted to traverse a rotatably mounted record cylinder while held in operative relation with respect thereto. Means are provided for moving the knife to and locking it in an operative or set position within fixed limits so that it will take a cut of desired depth as the cylinder is rotated, and also for retracting the knife from operative position upon the unlocking thereof. In some of the shaving machines which have heretofore been disclosed, the adjusting of the knife to operative position and the locking thereof in such position are effected by a single actuation of an operating lever or member, while another single actuation of such lever or member effects the release of the knife and the retraction thereof to inoperative position. For example, such machines are disclosed in Edison Patent No. 465,972, dated December 29, 1891, and Schiff Patent No. 1,174,292, dated March 7, 1916. However, in such prior art machines there are certain disadvantages inherent in the constructions employed for moving the shaving knife to and locking the same in operative position and for subsequently unlocking the knife and effecting the retraction thereof to inoperative position. One such disadvantage is that the knife, when secured in operative position, is urged or biased towards the record cylinder by a spring comprising part of the knife adjusting and controlling means and immediately upon being released or

unlocked, moves or surges forward against the cylinder under the action of such spring. This forward movement of the knife before its retraction from set or operative position is objectionable in that it is likely to result in gouging or mutilating the record cylinder and also in damaging the knife itself.

It is an object of the present invention to provide in a record shaving machine simple and improved knife adjusting and controlling means which preferably are effective to prevent any forward movement of the knife from operative position upon the release thereof when in such position.

Another object of the invention is to provide in such a machine an improved construction for adjusting and controlling the shaving knife whereby the knife will be retained in operative position until there is no effective forward bias thereon and means for retracting the knife becomes effective.

Another object of the invention is to provide a shaving machine construction wherein the shaving knife is normally biased to inoperative position and which includes means for preventing forward movement of the knife upon the release thereof when in operative position.

A further object of the invention is to provide an improved shaving machine construction whereby one or more of the above described results may be obtained and wherein a single manipulation will effect the adjustment of the shaving knife to and the locking thereof in operative position and preferably also wherein another single manipulation will effect the release of the knife and the retraction thereof to inoperative position.

Other objects and features of the invention will hereinafter be more fully disclosed and claimed.

In order that the invention may be more clearly understood, attention is directed to the accompanying drawings forming part of this specification and in which:

Figure 1 is a plan view of a record resurfacing machine embodying an illustrative and preferred form of my invention;

Figure 2 is a cross sectional view taken on line 2—2 of Figure 1;

Figure 3 is a fragmentary and elevational view, partly in section, of the machine shown in Figure 1, with the knife bar adjusted to and locked in operative position;

Figure 4 is a fragmentary cross sectional view taken on line 4—4 of Figure 3; and

Figure 5 is a view illustrating diagrammatically the sequence and relationship of certain actions which take place upon movements of the actuating lever to effect the adjustment of the knife to operative position and the return thereof to inoperative position.

Referring to Figure 1 of the drawings, the form of shaving machine illustrated comprises a base plate 1 having left-hand standards 2 and 3, right-hand standards 4 and 5 and an intermediate standard 6. A conically pointed stud 7 secured in the standard 2 engages a recess in the left end of a shaft 8, thus providing a thrust bearing for said shaft. The shaft 8 passes through an oversized hole 9 in the standard 6 and a collar 11 secured thereon prevents complete disengagement of the shaft from the stud 7. Secured to the shaft 8 is a mandrel 12 onto which may be slid a sound record A into frictional engagement therewith, by virtue of the mandrel and the bore of the record being complementarily tapered. The construction described retains the mandrel 12 in an approximate position only; to maintain the same in proper position during rotation thereof, a supporting means is provided which is removably associated with and adapted to engage the free end of the mandrel. This supporting means includes a swinging end-gate 13 carrying an adjustable conical stud 14 adapted to engage a recess in the adjacent end of the mandrel. The gate 13 is pivoted to a boss 15 on the base plate 1 and is closed, as illustrated in Figure 1, by clockwise movement about its pivot until its forward extremity strikes against the right-hand extremity of a guide-rail 16, in which position it may be releasably held by a suitable latch 10. As this construction is well known in the art, being disclosed, for example, in the above mentioned Edison Patent No. 465,972, it is only conventionally illustrated herein. Suffice it to say that when the gate 13 is moved to closed position, the mandrel 12 is wholly supported by the studs 7 and 14 for rotation about a fixed axis and without appreciable end play. When thus supported the mandrel 12 is in true parallel relation with the guide rail 16 and a record thereon may then be rotated for resurfacing. The driving means for rotating the mandrel 12 usually includes a motor (not shown) located within a cabinet for the base plate 1 and adapted to drive, by means of a belt 17, a pulley 18 secured to the shaft 8. To accommodate the belt 17 a suitable slot is provided in the base plate.

In resurfacing a record cylinder by a machine of the character illustrated, a thin outer surface layer is removed from the cylinder by means of a record-engaging tool illustrated herein as a knife 20. The knife 20 is secured to the end of a bar 21 which is adjustably mounted in a suitable boss 22 provided on a movable arm or carriage 23. The carriage 23 is slidably and tiltably mounted on a rod 24, the latter being disposed behind and parallel to the mandrel shaft 8 and suitably secured to the standards 2 and 4. The arm 23 is approximately semi-circular in side elevation and is provided with a smooth flat bottom surface (see Figure 2) at its forward extremity. A weight 25, preferably formed integrally with the arm 23, provides a convenient handpiece normally maintaining the said bottom surface in contact with the top surface of the guide rail 16. It will be seen that by this arrangement the arm 23 may be tilted so as to bring the knife 20 to engaging or disengaging

position with respect to the surface of the record cylinder A.

The carriage or arm 23, including its associated parts, is designed to traverse the record surface during rotation thereof. This is accomplished by providing a feed screw 27 parallel to the carriage rod 24 and journaled on standards 3 and 5. The feed screw 27 is rotated during rotation of the mandrel 12 by a belt 28 engaging a pulley 29 secured to said screw and a driving pulley 30 secured to the mandrel shaft 8. A feed nut 31 is arranged to engage the feed screw 27 when the arm 23 rests on the guide rail 16 and to disengage said feed screw when the arm is raised. The feed nut 31 is secured to the carriage 23 by a resilient extension 32 carried by a sleeve portion provided on the carriage. It will, therefore, be understood that when the knife 20 is in operative position and the mandrel 12 is rotated, the carriage 23 and hence the knife 20 will move steadily longitudinally of the cylinder from right to left, thus taking a uniform cut from the outer portion of the cylinder. For disposing of the shavings cut from the record cylinder there is provided a chip chute 33 leading to a suitable receptacle (not shown) within the cabinet.

The construction described above is old in the art, the present invention, as hereinbefore indicated, being directed to improvements in the knife adjusting and controlling means. These improvements will now be described, reference being made to such prior art constructions as may be helpful to a clear understanding of the invention.

A problem to workers in this art has been so to adjust the record engaging tool or shaving knife as to obtain a proper depth of cut, i. e., a cut that is neither too deep nor too shallow. This requires that the knife be adjusted to proper position and locked in that position. As hereinbefore indicated, constructions have been proposed for effecting the knife adjusting and locking operations by a single manipulation or actuation of a lever or other member, such, for example, as the constructions disclosed in the above mentioned Edison and Schiffi Patents Nos. 465,972 and 1,174,292. Also a single manipulation of such lever or member in a reverse direction first effected the release of the knife and thereafter its retraction to inoperative position.

In such shaving machine constructions, however, the knife has been adjusted or moved to operative position by or through a setting spring and when locked in operative position was biased by such spring in a direction towards the record cylinder. Consequently, when the knife was unlocked, it took an undesirable forward movement or surge under the action of said setting spring prior to its retraction to inoperative position. To avoid this difficulty means should be provided to restrain the knife against the forward urge or bias of its setting spring until in the operations of unlocking the knife and returning it to inoperative position, the knife retracting means becomes effective to retract the knife. My invention provides an improved construction embodying such restraining means.

Referring to the drawings, the knife bar 21 is slidably mounted in an opening 35 which extends through the boss 22. The outer or upper end portion 36 of the knife bar is reduced in diameter and extends loosely through the top 37 of a hollow cap 38, upward or rearward movement of said cap with respect to the knife bar 21 being

limited by a head 39 provided on the extremity of the knife bar. A coil spring 41 is disposed about the knife bar 21 between a collar 42 pinned to said bar and the top wall 37 of cap 38. Rearward movement of the knife bar 21 is limited by the engagement of a collar 43, secured to the forward end portion of the knife bar by a set screw 44, with the lower or forward end of the boss 22.

10 A guide rod 45 is slidably mounted in an opening 46 which extends through the boss 22, said opening being parallel to the opening 35 in which the knife bar is disposed. At its upper or rear portion the rod 45 also extends loosely through a sleeve 47 which is secured at one end within an enlargement of the opening 46 in boss 22. The rod 45 is secured at its upper or rear end to the top 37 of cap 38 by a headed screw 48 and therefore will partake of all movements of said cap towards and away from the record support or mandrel 12. A coil spring 49 is disposed about the guide rod 45 between the top wall 37 of cap 38 and a shoulder formed on the inside of sleeve 47.

25 The function of spring 41 is to provide a resilient connection between the knife bar 21 and the cap 38 so that in bringing the knife bar to operative position (shown in Figure 3) by moving cap 38 forwardly, as hereinafter described, the knife 20 will not engage the record A with a hammer blow and make a deep gouge therein, but will be gradually and yieldingly pressed a short distance into the material of the record. The adjustment of the knife bar in this manner automatically regulates the depth of the cut the shaving knife will take during the shaving operation. The principal function of spring 49 is to return the cap 38 and knife bar 21 to inoperative position (shown in Figure 2) when the knife bar locking means is released. To prevent the knife bar 21 from turning about its axis, an angular guide piece 26 is secured by a screw 26' to the rear portion of boss 22 and extends through a slot 56 in the boss into engagement with a longitudinal groove 21' provided in the knife bar. To impart a neat appearance to the device, the skirt of cap 38 is preferably of such length as to cover or substantially cover springs 41 and 49 in all positions of the knife bar 21 and guide rod 45.

50 A suitable construction is provided for locking the knife bar 21 in an operative position, which construction will now be described. The above-mentioned slot 56 in boss 22 extends throughout the length of the boss and inwardly from the rear face of the latter to the knife bar opening 35, thus dividing the rear portion of the boss into bifurcated sections 56' and 56'' (see Figure 4). These bifurcated sections are slightly resilient and are adapted when forced towards each other to clamp the knife bar 21 firmly in fixed position with respect to the boss. A cylindrical opening 40 extends transversely of boss 22 through the bifurcated sections 56' and 56'', and in this opening is disposed the reduced portion or shank of a clamping stud or member 51. This clamping stud also comprises an enlarged outer hub portion 53, terminating in a slotted head 52, and a preferably integrally formed flange or collar 54 intermediate the said shank and hub portion. The flange 54 has a peripheral dwell or cutout 55 terminating in shoulders 55' and 55'', and when the clamping stud and associated parts are properly assembled, the said flange is located closely adjacent one side of the boss 22, as shown in Figure 4. The right-hand end portion of opening 40 is enlarged and

the cylindrical wall thereof is threaded; and screwed into said enlarged portion is a short sleeve or thimble 57 which is threaded both externally and internally. The right-hand end portion of stud 51 is threaded and in engagement with the internal threads of sleeve 57. Transverse movement of clamping stud 51 with respect to boss 22 is limited in one direction by engagement of the flange 54 with the adjacent side of said boss, and the limit of such movement may be regulated by adjustment of sleeve 57. The sleeve 57 is adapted to be secured in any position of adjustment by a knurled locking nut 58 which is threaded onto the outwardly projecting end portion thereof. An actuating lever 50 is loosely mounted for pivotal movement on the hub 53 of the clamping stud, and a pin 64 is fixed to this lever and projects therefrom into the dwell or cutout 55 of flange 54 so as to ride freely between the shoulders 55' and 55''. The construction just described provides a lost motion connection between the lever 50 and the clamping stud of the knife bar locking means, the purpose of which will presently be described.

25 The actuating lever 50 comprises a long arm 59 and a short arm 60 extending substantially at right angles to the long arm, the said lever thus being in the form of a bell-crank lever. The lever 50 and cap 38 are connected by suitable means with provision made for a certain amount of lost motion. This means preferably comprises a link 60 having an arcuate or gooseneck formation at one end portion and a longitudinally extending slot 61 in the other end portion. The link 60 has a pin and slot connection with cap 38 by virtue 35 of its slot 61 and a shoulder screw 62 which extends through said slot and is threaded into the cap, and at the end thereof remote from the slot 61 is pivotally connected to the arm 59 of lever 50 by a shoulder screw 63.

40 The gooseneck at the forward end portion of link 60, enables the latter to remain clear of the hub of lever 50 in the swinging movements imparted to the link by the manipulations of lever 50 which effect the setting and locking of the 45 knife bar in operative position and the unlocking of said bar and the retraction thereof to inoperative position, as hereinafter described. However, the said gooseneck is adapted to engage the hub of lever 50 to limit the forward movement of said 50 lever to a position in which the axis of its pivotal connection to link 60 is only slightly past dead center with respect to the axes of the stud 51 and of the shoulder screw 62. Therefore it will be apparent that when lever 50 is at the limit of its 55 forward movement, with a record A on mandrel 12, such lever and also the link 60, cap 38 and guide rod 45 will be releasably locked in the positions shown in Fig. 3 against the bias of spring 49, which is then under considerable compression. 60

When the machine is not operating the knife bar 21 and the movable parts associated therewith, comprising cap 38, rod 45, link 60, lever 50 and clamping stud 51, are normally in the respective positions shown in Fig. 2, to which they are 65 biased by the compression spring 49. The knife bar 21 is then in its most rearward or retracted position with the collar 43 engaging boss 22 and with the knife 20 in spaced inoperative relation to the record cylinder A; the clamping stud 51 is in such angular position that the bifurcated resilient portions 56' and 56'' of boss 22 are spaced so as to exert no clamping effect on bar 21; the pin 64 carried by lever 50, engages or is adjacent the shoulder 55'' at one end of the dwell 55 in flange 75

54; the end wall 37 of cap 38 engages the head 39 of bar 21; and the shoulder screw 62 engages or is adjacent the outer or rear end wall of the slot 61 in link 60. Also lever 50 is then almost but not quite in engagement with a stop pin 50' carried by boss 22, which pin is provided for the purpose of limiting the movement of said lever in a clockwise direction under the action of spring 49.

When a record cylinder A is properly mounted 10 on the mandrel 12 and the knife bar and parts associated therewith are in their normal inoperative positions, as shown in Fig. 2, all that is required in order to adjust the knife bar 21 to and lock it in operative position with respect to the 15 record cylinder, is to swing or turn the lever 50 in an anti-clockwise direction from the position shown in Fig. 2 to the position shown in Fig. 3; and when the knife bar is locked in operative position with respect to the record cylinder A, as shown in Fig. 3, and it is desired to release or unlock the knife bar and effect the return or retraction thereof to its inoperative position, it is merely necessary to swing lever 50 in a clockwise direction from the position shown in Fig. 3.

25 In turning lever 50 from the position shown in Fig. 2 to the position shown in Fig. 3, the cap 38 and knife bar 21 are moved forwardly without any change in their relative positions, by means of link 60, until the knife 20 engages the surface 30 of cylinder A. Thereafter such turning movement of lever 50 causes forward movement of cap 38 with respect to the knife bar with resultant compression of the knife bar spring 41 and further compression of the already compressed spring 49, and consequently the knife 20 is forced under the yielding pressure exerted by said spring 41 into the material of cylinder A. During most of the last part of such turning movement of lever 50, after the pin 64 has been brought into 40 engagement with the end or shoulder 55' of the dwell 55 in collar 54, the cap 38 continues to be moved forwardly, the springs 41 and 49 are further compressed, and the clamping stud 51 is turned so as finally to effect the locking of knife 45 bar 21 in operative position. In the very last part of such anti-clockwise movement of lever 50, probably not amounting to more than 1 or 2 degrees, the axis of the pivotal connection between lever 50 and link 60 is moved slightly beyond a 50 dead center position with respect to the axes of lever 50 and shoulder screw 62 and the goose-neck portion of the link is brought into engagement with the hub of lever 50 to thereby releasably lock said lever and associated parts in the 55 positions shown in Fig. 3; but no further forward movement of cap 38 and no further compression of springs 41 and 49 are then effected.

Upon moving lever 50 in a clockwise direction from the position shown in Fig. 3, the only result 60 effected during the first one or two degrees of such movement is a slight movement of link 60 in a clockwise direction about the shoulder screw 62 sufficient to carry the axis of pivot screw 63 past the dead center position referred to above and 65 thereby release said lever, link and cap from the yieldingly locked positions in which they are shown in said Fig. 3. In the continued clockwise movement of lever 50, however, the cap 38 first moves upwardly under the action of spring 49 until the end wall 37 thereof engages the head 39 of the knife bar, during which time the stud 51 70 remains in clamping position as the pin 64 of lever 50 then rides freely in the dwell 55 of clamping stud collar 54. The cap 38 and the knife bar 21 75 then remain stationary in the relative positions

just described, while the link 60 is moved by lever 50 rearwardly with respect to cap 38, as is permitted by the slot 61, until pin 64 is brought into engagement with the end wall or shoulder 55' of the dwell 55 in the clamping stud collar 54. 5 Thereupon the clamping stud is turned by lever 50 in a direction to effect the release or unlocking of the knife bar. As soon as the knife bar is thus unlocked the strong compression spring 49, if the lever 50 be released, acts to move cap 38, knife 10 bar 21, link 60 and lever 50 quickly to the positions shown in Fig. 2. The action of spring 49 is so sudden and pronounced however, that the link 60 and lever 50 are likely to be moved beyond their normal inoperative positions so as to bring 15 the lever 50 against the limit pin 50'; such movement of the parts 50 and 60, which is advantageous because of the shock and strains to which these parts might otherwise be subjected to, being permitted by reason of the provision of slot 61 in 20 the link.

For a still clearer understanding of the operation of the above described knife bar adjusting and controlling mechanism, certain actions which take place in moving the actuating lever 50 from 25 the position shown in Fig. 2 to that shown in Fig. 3 and in returning said lever from the latter position to the former, and the sequence in which such actions occur have been shown diagrammatically in Fig. 5, it being assumed that the 30 record cylinder on the mandrel 12 is of maximum or nearly maximum thickness, that is, one from which none or but little of the material has been previously shaven. In this figure the actuating lever 50 and its pin 64, the link 60 and the collar 35 54 of clamping stud 51 are shown in the positions they normally occupy when the knife bar is in inoperative position, namely, the positions thereof shown in Fig. 2. In the movement of lever 50 in a counterclockwise direction from the position 40 thereof shown in Fig. 5, indicated by the dot-dash line B, to the position indicated by the dot-dash line C, which is required to adjust the knife bar to and lock it in operative position, the following actions take place in the order or sequence indicated: as the said lever moves from the position B to the position indicated by the dot-dash line D, the knife bar is adjusted to record-engaging position without any compression of the knife bar spring 41 or any angular movement of the clamping stud 51 being effected; as the lever continues its movement from the position D to the position indicated by the dot-dash line E, the knife bar spring 41 is compressed to thereby force the knife 45 50 into the material of the record cylinder and the pin 64 of said lever is brought into engagement with the end or shoulder 55' of the dwell 55 in clamping stud collar 54; and in the final portion of such movement of the lever, that is, from the position E to the position C, the knife bar 55 spring 41 is further compressed and the clamping stud 51 is turned by reason of the engagement of pin 64 with the shoulder 55' so as to effect the locking of the knife bar in operative position. In the reverse or clockwise movement of lever 50 60 from the position C to the position B required to effect the unlocking of the knife bar and the return thereof to inoperative position, the following actions take place in the order described: as the lever moves from the position C to the position D 65 the knife bar spring 41 is fully decompressed and the pin 64 of the lever is brought into engagement with the end or shoulder 55' of the dwell 55 in the clamping stud collar 54, the knife bar in the meantime remaining locked in operative position 70 75

as the pin 64 then travel freely in said dwell 55 and therefore imparts no angular movement to the clamping stud 51; and in the final portion of such movement of lever 50, that is, from position 5 D to position B, the clamping stud 51 by reason of the engagement of pin 64 with the shoulder 55" is turned in a clockwise direction to effect the unlocking of the knife bar. When the knife bar is thus unlocked it is immediately retracted to the 10 inoperative position thereof shown in Fig. 2 under the action of compression spring 49.

It is to be understood that the construction shown and specifically described herein is merely 15 illustrative and that such construction is subject to many changes and modifications without departure from the spirit of the invention or the scope of the appended claims.

I claim:

1. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for adjusting said knife bar to and locking it in operative position with respect to a record on said support, said mechanism comprising a 20 knife bar actuating spring which is compressed in the operation of adjusting the knife bar to operative position and means which with the knife bar locked in operative position is operable to effect first the decompression of said spring and thereafter the release of the knife bar.

2. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for adjusting said knife bar to and locking it in operative position with respect to a record on said support, said mechanism comprising a 30 knife bar actuating spring which is compressed in the operation of adjusting the knife bar to operative position and means which with the knife bar locked in operative position is operable to effect sequentially the decompression of said spring, the 35 unlocking of the knife bar and the retraction of the knife bar to inoperative position.

3. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for adjusting said knife bar to and locking it in operative position with respect to a record on said support, said mechanism comprising a 45 spring through which there is imparted to the knife bar the movement required to adjust it to operative position and which is thereby compressed, and means which with the knife bar locked in operative position is operable to effect the decompression of said spring and thereafter the unlocking of the knife bar.

4. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for adjusting said knife bar to and locking it in operative position with respect to a record on said support and for unlocking the knife bar and retracting it to inoperative position, said mechanism comprising a spring, an actuating member and means which upon one actuation of the actuating member, effects movement of the knife bar to operative position through said spring, the compression of said spring and the locking of the 50 knife bar in operative position and which upon another actuation of the actuating member, effects the decompression of said spring and thereafter the unlocking of the knife bar and the retraction thereof to inoperative position.

5. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for adjusting said knife bar to and locking it in operative position with respect to a record on said support, said mechanism comprising an 55 actuating member movable in opposite directions,

a spring and means which upon movement of the actuating member in one direction effects movement of the knife bar to operative position through said spring, the compression of said spring and the locking of the knife bar in operative position and which upon movement of the actuating member in the opposite direction effects the decompression of said spring and thereafter the unlocking of the knife bar.

6. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for adjusting said knife bar to and locking it in operative position with respect to a record on said support and for unlocking the knife bar and retracting it to inoperative position, said 15 mechanism comprising an actuating lever, a spring and means whereby pivotal movement of said lever in one direction effects movement of the knife bar to operative position through said spring, the compression of said spring and the locking of the knife bar in operative position and whereby pivotal movement of said lever in the opposite direction effects the decompression of said spring and thereafter the unlocking of the knife bar.

7. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for adjusting said knife bar to and locking it in operative position with respect to a record on said support and for unlocking the knife bar and effecting the return thereof to inoperative position, said mechanism comprising a spring which is compressed in the operation of adjusting the knife bar to operative position and in consequence exerts a forward bias on the knife bar 30 when the latter is in such position, means for retracting the knife bar to inoperative position and means whereby forward movement of the knife bar from said operative position under the bias of said spring is prevented when said retracting means is ineffective.

8. In a record shaving machine, a record support, a movably mounted knife bar normally biased to inoperative position with respect to a record on said support, and mechanism for adjusting said knife bar to and locking it in operative position with respect to such record and for unlocking the knife and effecting the return thereof to inoperative position, said mechanism comprising means which when the knife bar is 45 locked in operative position exerts a forward bias on the knife bar and means for relieving the knife bar from forward bias before said bar is released in the operation required to unlock the same.

9. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for adjusting said knife bar to and locking it in operative position with respect to a record on said support and for unlocking the knife bar 60 and effecting the return thereof to inoperative position, said mechanism comprising an actuating member movable in opposite directions, locking means for the knife bar operable by said actuating member and having a lost motion connection therewith, and means including a spring operable by said actuating member when the latter is moved in one direction to effect movement of said bar to operative position, said spring being compressed in the operation of moving the 65 knife bar to operative position, said last named means being effective in the movement of said actuating member in the opposite direction to decompress said spring prior to the releasing of the knife bar by said locking means.

10. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for adjusting said knife bar to and locking it in operative position with respect to a record on said support and for unlocking the knife bar and effecting the return thereof to inoperative position, said mechanism comprising an actuating member movable in opposite directions, means disposed between said actuating member and the knife bar including an element having a lost motion connection with the actuating member and a spring providing a resilient connection between said element and the knife bar, and clamping means for the knife bar having a lost motion connection with said actuating member.

11. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for moving said knife bar to and locking it in operative position with respect to a record on said support, said mechanism comprising an actuating member movable in opposite directions, a spring, and means including said spring interposed between said actuating member and knife bar and adapted upon movement of said member in one direction first to move said knife bar to record-engaging position through said spring and to then compress said spring and lock the knife bar in operative position, and upon movement of said member in the opposite direction to effect first the decompression of said spring and thereafter the unlocking of the knife bar and the return thereof to inoperative position.

12. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for moving said knife bar to and for locking it in operative position with respect to a record on said support and for unlocking the knife bar and effecting the return thereof to inoperative position, said mechanism comprising an actuating lever, a reciprocal element, a link pivotally connected at its ends to said lever and reciprocal element respectively, the pivotal connection at one end of said link being also a lost motion connection, a spring providing a yielding connection between said reciprocal element and the knife bar, and clamping means for the knife bar having a lost motion connection with said lever.

13. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for moving said knife bar to and locking it in operative position with respect to a record on said support and for unlocking the knife bar and effecting the return thereof to inoperative position, said mechanism comprising an actuating lever, a reciprocal element, a link pivotally connected at its ends to said lever and reciprocal element respectively, the pivotal connection at one end of said link being also a lost motion connection, a spring providing a yielding connection between said reciprocal element and the knife bar, and clamping means for the knife bar having a lost motion connection with said lever, the arrangement being such that upon movement of said lever to an extreme position in one direction the axis of the pivotal connection between the lever and said link will occupy a position which is past dead center with respect to the axes of the lever and of the pivotal connection between the link and said reciprocal member.

14. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for moving said knife bar to and locking it in operative position with respect to a record

on said support, said mechanism comprising an actuating member, a knife bar actuating spring which is compressed upon movement of said actuating member to move the knife bar to operative position, locking means for the knife bar operable by said actuating member, and a lost motion connection between said locking means and said actuating member.

15. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for moving said knife bar to and locking it in operative position with respect to a record on said support, said mechanism comprising an actuating lever and means operatively connecting said lever and knife bar, said means including a link which is pivotally connected at one end to said lever and is also pivoted at its other end, the relative arrangement of said lever and connecting means being such that upon movement of the lever to a given position in one direction the axis of the pivotal connection between the lever and said link will be moved past dead center position with respect to the axis of the lever and the pivotal point of that end of the link which is remote from the end thereof connected to the lever.

16. In a record shaving machine, a record support, a movably mounted knife bar, means biased to a position in which it is adapted to maintain said knife bar in inoperative position with respect to a record on said support, and mechanism for moving said knife bar to and locking it in operative position with respect to such record, said mechanism comprising an actuating lever and means operatively connecting said lever and knife bar, said connecting means including a link which is pivotally connected at one end with the lever and which is also pivoted at its other end, the relative arrangement of said lever and connecting means being such that upon movement of the lever to a given position in one direction the axis of the pivotal connection between the lever and said link will be moved past dead center position with respect to the axis of the lever and the pivotal point of that end of the link which is remote from the end thereof connected to the lever.

17. In a record shaving machine, a record support, a movably mounted knife bar, and mechanism for moving said knife bar to and locking it in operative position with respect to a record on said support, said mechanism comprising an actuating lever, a reciprocal element operatively associated with said knife bar to effect movement thereof, and a link pivotally connected at its ends to said lever and reciprocal element respectively, the relative arrangement of said lever, element and link being such that upon movement of the lever to a given position in one direction the axis of the pivotal connection between the lever and the link will be moved past dead center position with respect to the axis of the lever and the point of pivotal connection between the link and reciprocal element.

18. In a record shaving machine, a record support, a movably mounted knife bar, means biased to a condition for maintaining said knife bar in inoperative position with respect to a record on said support, and mechanism for adjusting said knife bar to and locking it in operative position with respect to such record, said mechanism comprising a spring through which there is imparted to the knife bar the movement required to adjust it to operative position and which is thereby compressed, and means which with the

knife bar locked in operative position is operable to effect the decompression of said spring and thereafter the unlocking of the knife bar.

19. In a record shaving machine, a record support, a movably mounted knife bar, a movable member biased to a position in which it is adapted to maintain said knife bar in inoperative position with respect to a record on said support, and mechanism for adjusting said knife bar to and locking it in operative position with respect to such record, said mechanism comprising a knife bar actuating spring which is compressed in the operation of adjusting the knife bar to operative position and means which with the knife bar locked in operative position is operable to effect first the decompression of said spring and thereafter the release of the knife bar.

20. In a record shaving machine, a record support, a movably mounted knife bar, a reciprocal member cooperably associated with said knife bar, a compression spring biasing said reciprocal member to a position in which it is adapted to maintain said knife bar in inoperative position with respect to a record on said support, and mechanism for adjusting said knife bar to and locking it in operative position with respect to such record, said mechanism comprising a knife bar actuating spring which is compressed in the operation of adjusting the knife bar to operative position and means which with the knife bar locked in operative position is operable to effect first the decompression of said spring and thereafter the release of the knife bar.

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