Oct. 30, 1945. L. E. DETTLE 2,388,126

APPARATUS FOR COATING RECORD BLANKS

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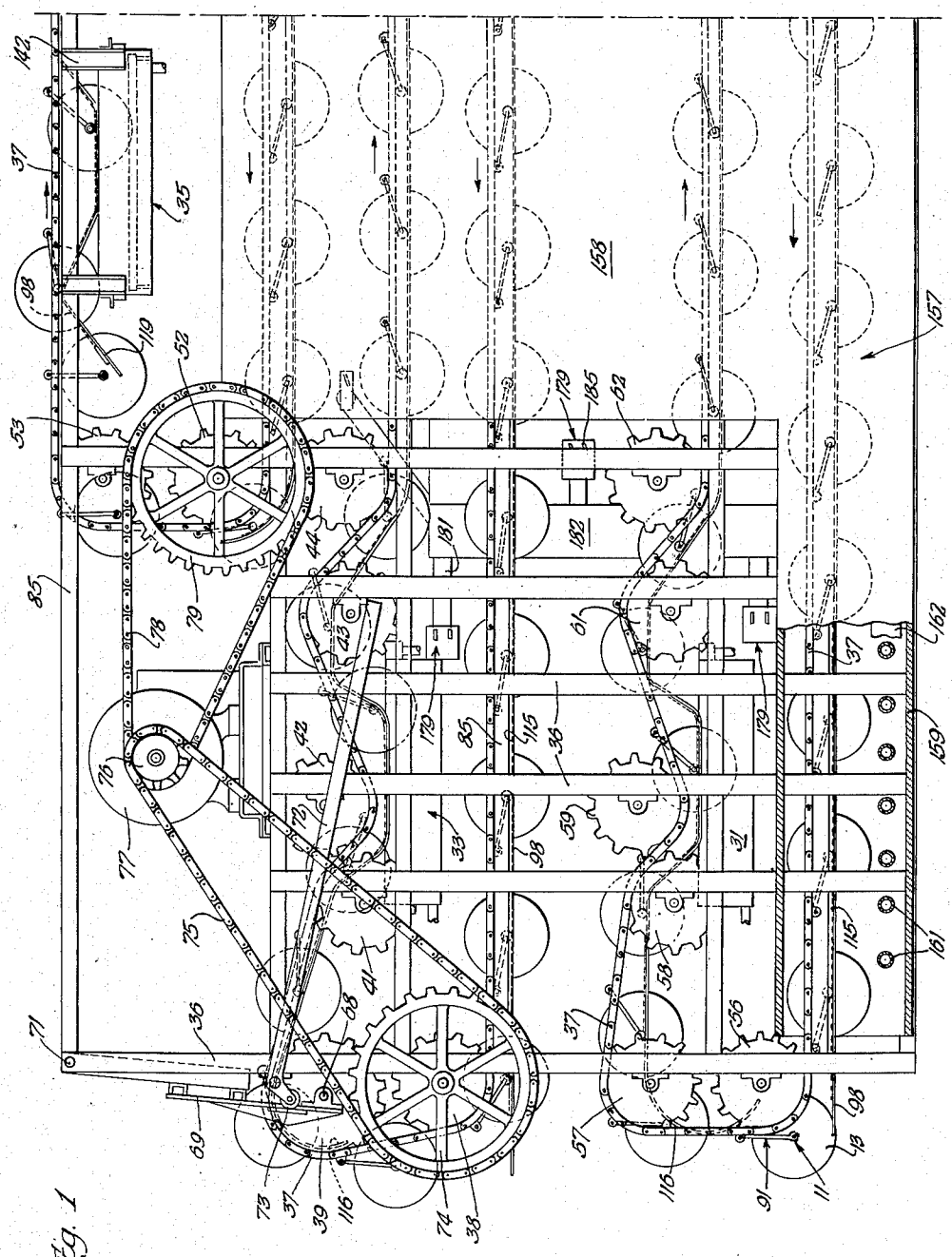


Fig. 1

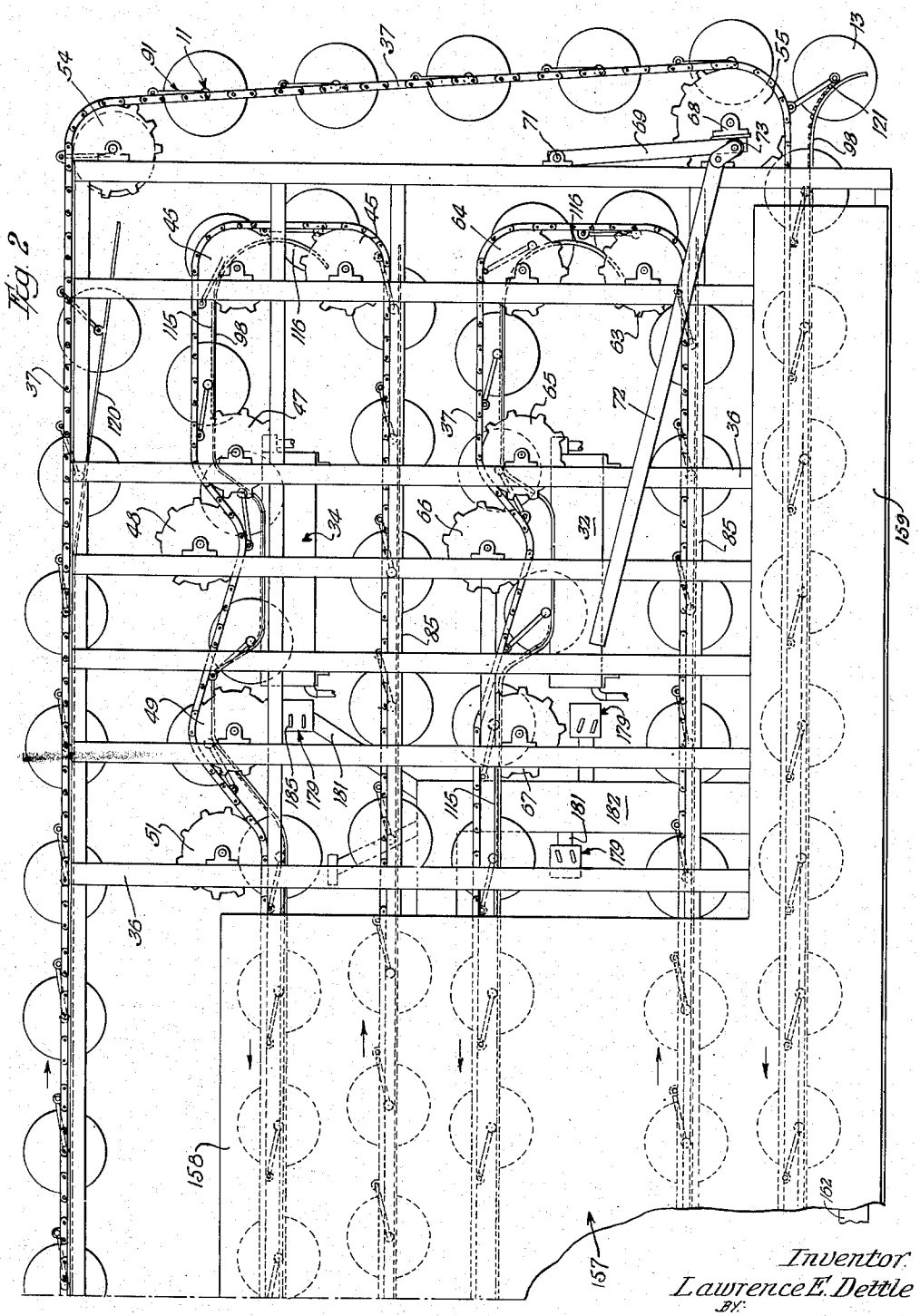
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Fig. 2



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Fig. 3

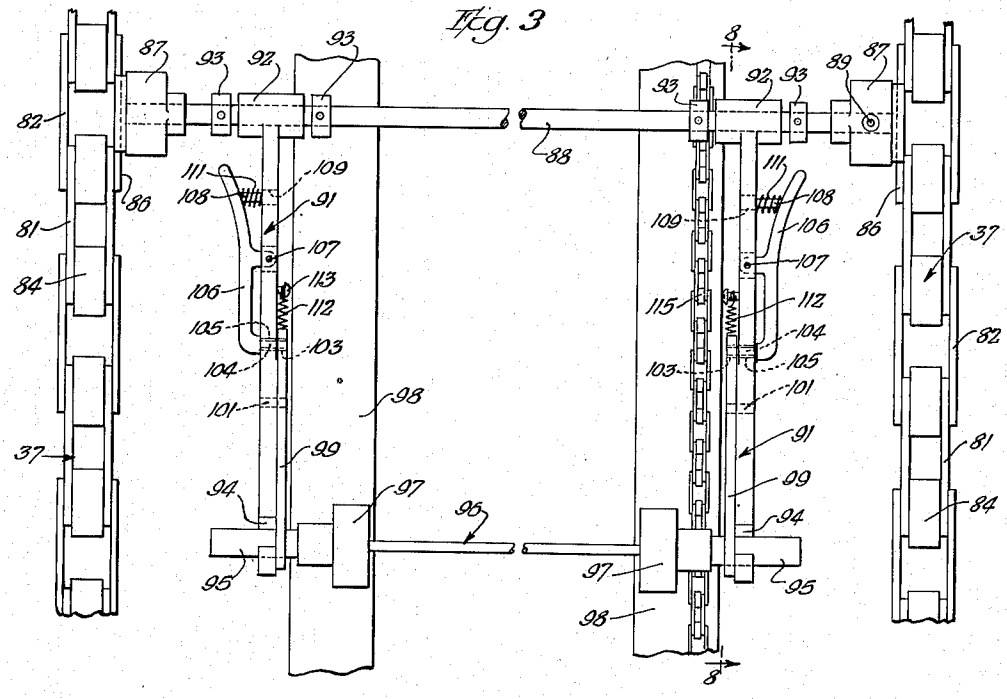
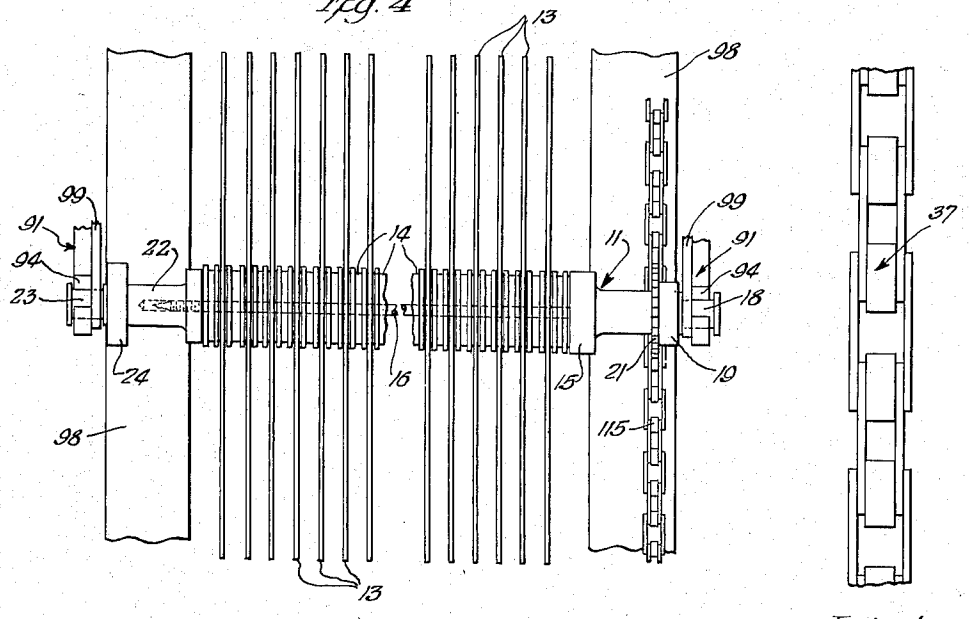


Fig. 4



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Fig. 5

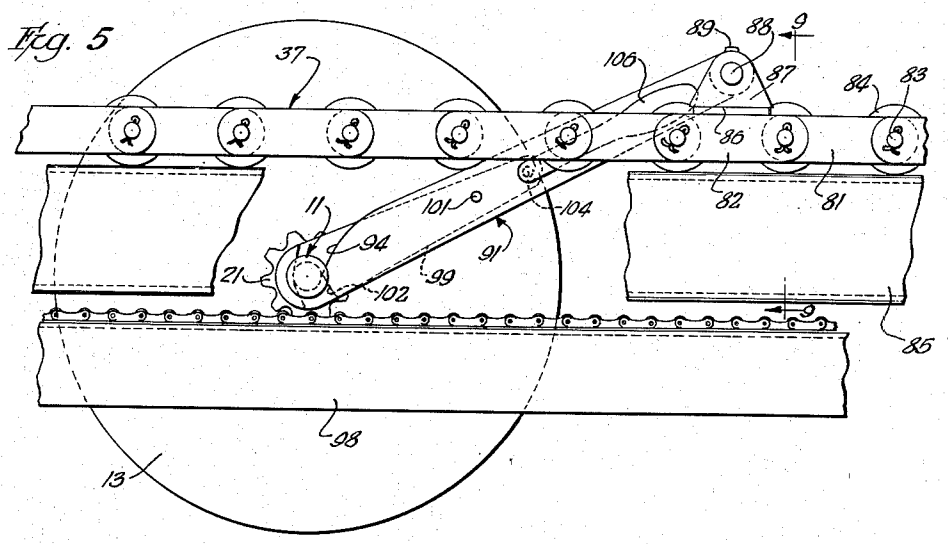


Fig. 6

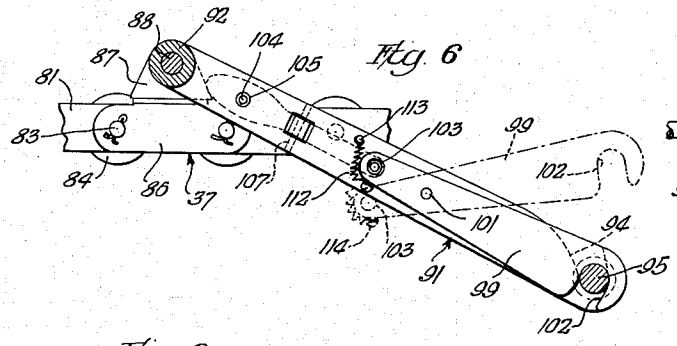


Fig. 7

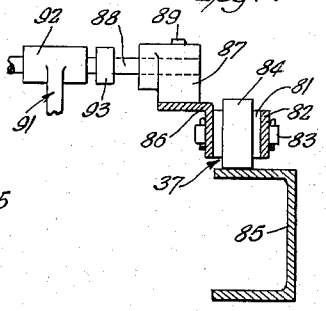


Fig. 8

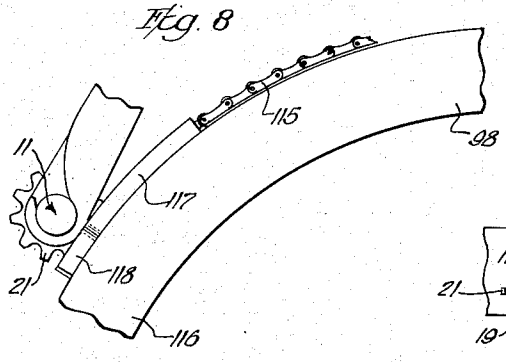
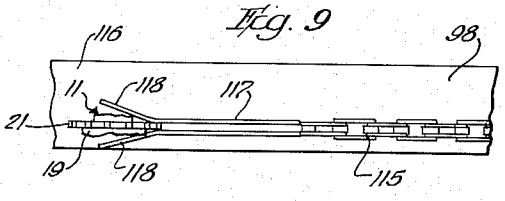


Fig. 9



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Fig. 10

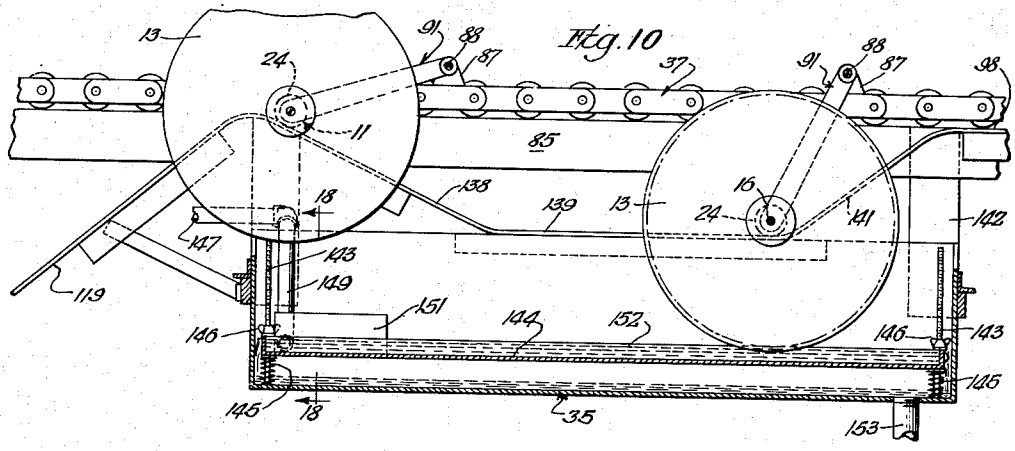


Fig. 11

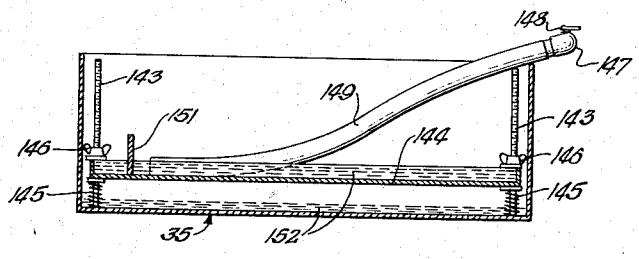


Fig. 12

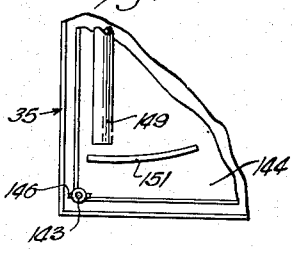
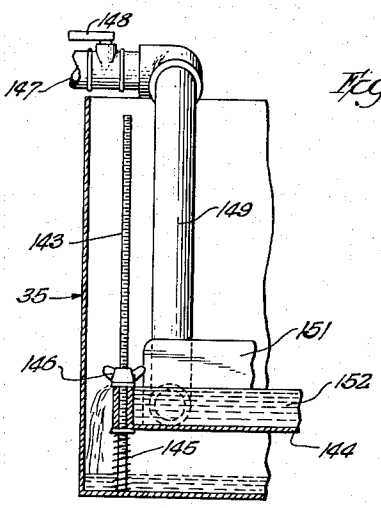


Fig. 13



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Patented Oct. 30, 1945 2,388,126

UNITED STATES PATENT OFFICE

2,388,126

APPARATUS FOR COATING RECORD BLANKS

Lawrence E. Detlie, Chicago, Ill., assignor to Rock-Ola Manufacturing Corporation, Chicago, Ill., a corporation of Delaware

Application December 20, 1941, Serial No. 423,732

4 Claims. (Cl. 91—46)

This invention relates in general to the manufacture of record blanks adapted to receive sound recording tracks, and more particularly to an improved and novel apparatus for applying the desired sound track receiving coating of lacquer or other suitable compound to the usual disc-like record blanks or matrices.

In the manufacture of a record blank, a base portion in the form of a disc-like member of cardboard, fiber, sheet metal, or any other desired material, is coated with a well-known lacquer or other suitable compound adapted to subsequently receive sound recording impressions. One method of accomplishing this result is to mount a plurality of record blanks or matrices concentrically and in spaced relationship on a shaft or arbor, dip the blanks edgewise to a predetermined depth into a tank containing the coating compound, rotate the blanks to cover all but their undipped central portions with the compound, and then remove the same from the tank and place them in an oven to dry or bake the coating compound thereon. Such a method and apparatus for performing the same is disclosed in the copending application for United States Letters Patent of David C. Rockola, Serial No. 382,951, filed March 12, 1941.

A principal object of the instant invention is to materially increase the production of such record blanks and reduce the time required therefor by simplifying the operations involved, performing the same automatically and eliminating all handling of the blanks during such operations, while at the same time producing a better and completely uniform product.

Another object of the invention is the provision of an apparatus for alternately coating and drying or baking such disc-like members to apply a desired number of superposed coatings thereto in a continuous and uninterrupted process or cycle of operations.

A further object of the invention is to provide means for applying the desired superposed coatings to the disc-like members or matrices which, without requiring any changes or adjustments, will uniformly apply the coatings to matrices of different diameters.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, when taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

In the drawings:

Figs. 1 and 2 together comprise an elevation of the right side of a machine embodying the features of the invention;

Fig. 3 is a detail plan view of a portion of the record blank conveyor mechanism;

Fig. 4 is a view similar to Fig. 3 predominantly illustrating a record blank supporting arbor;

Fig. 5 is a detail elevation of the mechanism of Fig. 3 as seen from the right hand side thereof;

Fig. 6 is a detail vertical section taken substantially on the line 6—6 of Fig. 3;

Fig. 7 is a detail transverse section taken substantially on the line 7—7 of Fig. 5;

Fig. 8 is a detail elevational view of one of the means for guiding an arbor sprocket into engagement with its actuating chain;

Fig. 9 is a plan view of the mechanism of Fig. 8;

Fig. 10 is a detail longitudinal section through the rim dipping vat;

Fig. 11 is a vertical section taken substantially on the line 11—11 of Fig. 10;

Fig. 12 is a detail plan view of the forward left-hand corner of the vat of Figs. 10 and 11; and

Fig. 13 is an enlarged detail sectional view of a portion of the vat of Fig. 10.

The preferred embodiment of the apparatus of the invention illustrated in the instant drawings comprises a plurality of coating-material containing dipping vats or tanks, an oven or drying means, and an endless conveyor for moving the matrices or record blanks successively through the vats to apply coatings thereto, and through the oven or drying means, after each coating has been applied, to bake the same thereon.

My copending application for United States Letters Patent Serial No. 400,137, filed June 27, 1941, discloses means for expediting the assembly of a plurality of the disc-like blanks or matrices to be coated in spaced relationship relative to each other on an arbor, and the conveyor of the instant apparatus is designed to accommodate a plurality of such arbors and the matrices or record blanks mounted upon and supported thereby. Referring particularly to Fig. 4 of the present drawings, reference number 11 indicates in general such an arbor, which is designed to support and facilitate the handling of a plurality of disc-like record blanks or matrices 13 of cardboard, fiber, sheet metal, or any other desired material, and members 14 for properly spacing the same from each other on the arbor. The arbor 11 comprises a main portion having a shoulder 15 formed intermediate its ends, and a reduced portion 16 terminating in a pointed end and threaded on its outer surface adjacent thereto. The end of the

arbor 11 opposite the pointed end of the reduced portion 16 is provided with a reduced hub 18, and a hub portion 19 of a sprocket wheel 21 is rigidly secured to the arbor 11 adjacent the hub 18. The disc-like members or matrices 13 and spacers 14 are mounted upon the reduced portion 16 of the arbor and are held rigidly against the shoulder 15 by means of a retainer member 22 which is provided with a tapped bore adapted to engage the threaded end portion of the reduced part 16 and forming a part of the arbor. The retainer member 22 terminates at its outer end in a reduced hub 23 similar to the hub portion 18 at the other end of the arbor. The retainer member 22 is also provided with a roller 24 which is adapted to support the retainer end of the arbor in a manner to be later described.

The record blank or matrix supporting arbor 11 is similar to that disclosed in my above identified prior application, and the reference numerals hereinbefore employed are the same as those used to designate the same parts in said application. This prior application also discloses an assembly device for expediting the mounting upon and removal from the arbor 11 of the disc-like members or record blanks 13 and spacer members 14, but since such assembly device does not form an integral part of the present invention, it will not be described herein.

Referring now to Figs. 1 and 2, the coating material containing dipping vats of the instant invention, which will be described in detail hereinafter, are generally designated by reference numerals 31, 32, 33, 34 and 35, respectively, and are horizontally disposed and secured in spaced relationship to and supported by suitable skeleton frame members 36. The members 36 may be mounted and secured together in any desired manner to provide a suitable supporting frame for the machine. The means for moving the arbors 11 and the assembly of record blanks or matrices 13 carried thereby, successively to the several vats 31 to 35 comprises a pair of endless chain conveyors 37 (Figs. 1, 2, and 3) disposed one at each side of the machine. Each chain 37, starting at the upper front portion of the machine (the upper left-hand end of Fig. 1) engages successively and meshes with a drive sprocket 38, an adjustable tensioning sprocket 39, stationary idling guide sprockets 41 to 44 (Fig. 1), 45 to 51 (Fig. 2), a second driving sprocket 52 and an idling sprocket 53 (Fig. 1), another idling guide sprocket 54 and a second adjustable tensioning sprocket 55 (Fig. 2), and idling sprockets 56 to 62 (Fig. 1) and 63 to 67 (Fig. 2) to guide the chain forwardly, rearwardly and back up to the first driving sprocket 38.

Each of the adjustable tensioning sprockets 39 (Fig. 1) and 55 (Fig. 2) is rotatably supported by a bearing bracket 68 mounted on the lower end of a lever 69 which is pivotally supported at 71 on one of the skeleton frame members 36. A tensioning lever 72 is pivotally supported intermediate its ends by the associated frame member 36, and at its outer end is provided with a roller 73 engaging the associated bracket carrying lever 69. The remaining sprockets are rotatably supported by suitable bearing brackets mounted on the adjacent skeleton frame members 36. Referring particularly to Fig. 1, it will be seen that the first drive sprocket 38 is rotatable by a sprocket wheel 74 secured to the shaft thereof and driven by a chain 75 from a double sprocket wheel 76. The wheel 76 is secured to the shaft of a suitable electric motor 77 of any desired construction mounted on the skeleton frame of the machine, and a second chain 78 meshing with the sprocket wheel 76 drives a sprocket wheel 79 secured to the shaft of the second drive sprocket 52. The shafts of the sprocket wheels 38, 74 and 52, 79 at the right side of the machine (which is the side shown in elevation in Figs. 1 and 2) traverse the frame of the machine and also have the sprocket wheels 38 and 52, respectively, of the other or left-hand conveyor chain 37 secured thereto.

From Figs. 1 and 2, it will be seen that each of the two conveyor chains 37 extends from front to rear of the machine at six different levels and moves in the direction of the arrows in the latter views. The linear speed of travel of the chains 37 is sufficiently slow that an arbor 11 supporting a plurality of finished record blanks may be removed therefrom and another arbor 11 supporting a different group of uncoated disc-like members or matrices 13 may be substituted therefor and attached to the conveyor chains, in a manner to be described hereinafter, during the time any given portion of the chains is moving from the sprocket wheels 56 to the sprocket wheels 57. It is at this point that the cycle of operations to be performed on the matrices 13 begins. After the arbors 11 are attached to the conveyor chains 37, the matrices 13 supported by each of them pass rearwardly through the first dipping vat 31 and are dried, on the second level from the bottom of the chains; are carried forwardly to the third level, passed forwardly through the second dipping vat 32 and are again dried; are carried upwardly to the fourth level by the drive sprockets 38, passed rearwardly through the third dipping vat 33 and are dried; are carried up to the fifth level to be moved forwardly through the fourth dipping vat 34 and are again heat dried; are raised to the sixth or top level by the drive sprockets 52, in which level they may be passed rearwardly through the rim dipping vat 35 and air-dried, if desired; and then they are lowered at the rear of the machine to the first level, on which they pass forwardly through the elongated main portion of the oven for a relatively slow baking, and over the sprocket wheels 56 to complete the cycle.

As shown particularly in Figs. 3 and 5, each of the endless conveyor chains 37 comprises alternate inner and outer pairs of links 81 and 82, respectively, pivotally connected by transverse pins 83 (Figs. 5 and 7) upon each of which is journaled a roller 84. The rollers 84 engage the upper surfaces of portions of the horizontal skeleton frame members which function as track-ways 85 to support the chains 37 during their horizontal movements. Special links 86 (Figs. 3, 5, and 7) are substituted for certain of the outer links 82 at the inner side of each of the conveyor chains 37 in spaced relationship along the latter, which are formed with inwardly extending flanges upon each of which is mounted a suitable bearing bracket 87. The outer ends of rods 88 are supported by each pair of brackets 87, with one end of each rod being secured to its associated bracket at the right-hand side of the machine by a set-screw or the like 89. The rods 88 thus extend transversely across the machine between the conveyor chains 37 at spaced intervals along the latter.

Rotatably mounted upon each of the rods 88 are a pair of arbor engaging and retaining members indicated generally by reference numeral 91. Each of the members 91 comprises a main link having a bearing portion 92 formed at one end

thereof and journaled upon the associated rod 88 between a pair of collars 93 secured to the latter to limit lateral movement of the member 91 on the rod 88. The other or free end of each of these links is provided with a shaft receiving, hook-shaped recess 94. The recess 94 of each pair of associated members 91 is adapted to receive and engage either the hub portions 18 and 23 of one of the arbors 11, or the hub portions 95 (Figs. 3 and 6) provided at the outer ends of idling follower members 96. Each of the latter members 96 is also provided adjacent the inner ends of its hub portions 95 with rollers 97 suitably journaled thereon for engagement with the upper surfaces of parallel track members 98. The members 91 are provided for the purpose of properly retaining the arbors 11 and their supported matrices 13 in operative relationship with the conveyor chains 37. If no arbor 11 is engaged by any given pair of these members 91, however, it is necessary to prevent entanglement of the latter with other parts of the machine and also to insure presenting of the members 91 in proper position at the front of the machine to initially receive an arbor 11. These functions are performed by the idling follower members 96. Since the arbors 11 or members 96 in their movements through the machine by the conveyor chains 37 change direction and are both raised and lowered relative to the chains and by the latter, it is necessary that they be properly retained in the associated slots 94. The means for performing this function comprises a latch lever 99 forming a part of each of the members 91 which is pivotally mounted thereon intermediate its ends by a suitable pin 101. The lower end of each of the latch levers 99 is provided with a curved recess or slot 102 (Fig. 6) for engagement with the hub portions 18, 23 or 95 in cooperation with and in the opposite direction to the slots 94. At its opposite or upper end, each of the latch levers 99 is provided with an aperture 103 engageable by the inner end of a pin 104 extending inwardly through a suitable aperture 105 (Fig. 3) in the main link of the member 91. Each pin 104 is mounted upon the lower end of a manually operable latch handle 106 which is pivotally mounted intermediate its ends on pin 107 extending vertically through the main lever of the member 91. At its upper end, each of the latch handles 106 is also provided with a pin 108 (Fig. 3) adapted to extend through a suitable aperture 109 in the member 91 and surrounded by a coil spring 111. A spring 112 is connected at one end by a screw 113 (Figs. 3 and 6) to the member 91 and at its other end by a screw 114 (Fig. 6) to the under surface of the latch lever 99.

With this arrangement, inward pressure upon the upper end of any one of the latch handles 106 against the action of its spring 111 will remove the pin 104 attached to the lower end thereof from the recess 103 in the associated latch lever 99. The latter may then be raised from its normal or operative position to its release or inoperative position, as shown in broken lines in Fig. 6, whereupon the hub portion 18 or 23 of an arbor 11 or the hub portion 95 of an idling follower 96 may be removed from or disposed in the slot 94 of the associated member 91. After any one of the latch levers 99 has been so released, it will be prevented from returning under the action of its spring 112 to active position by engagement of the upper surface thereof with the pin 104 of the latch handle 106. Consequently, in order to replace any one of the idling follower members 96 with an arbor 11 together with its supported matrices 13, which will be done as the portions of the chains 37 carrying the associated shaft 88 are moved between the sprockets 56 and 57, it is only necessary to release the latch levers 99 from their latch handles 106 and raise the lower ends thereof in the manner just described. The idling follower member 96 may then be lifted from the slots 94 of members 91, the latch levers 99 being retained sufficiently in inoperative position to permit a clearance for the hub portions 95 between the lower ends of the members 91 and the latch levers 99. An arbor 11 may then be placed in the slots 94, and inward movement of the upper ends of the latch handles 106 will then enable return of the latch levers 99 to their active positions by the springs 112. The arbor 11 engaged by the members 91 is thus arranged for movement through the machine by the conveyor chains 37, and all operations which it is desired to perform upon the matrices 13 supported thereby will be accomplished automatically in continuous sequence without necessitating any handling thereof until the arbor again reaches the initial position wherein the rod 88 supporting the members 91 engaging the same is disposed between the sprockets 56 and 57.

Separate pairs of parallel track-ways 98 are provided in each of the six levels traversed by the endless conveyor chains 37 as will be best seen from Figs. 1 and 2. Since it is desired that the matrices 13 supported by the several arbors 11 be rotated continuously during the travel along these several levels of track-ways 98, for a purpose to be later more fully described, rack means in the form of roller chains 115 for engagement by the sprockets 21 of the arbors 11 are mounted upon the upper surface of each of the right-hand track-ways 98 and rigidly secured thereto in any suitable manner (Figs. 3 and 4). As each arbor 11 is transferred by the conveyor chains 37 and members 91 from the track-ways 98 of one level to those of a different level, means must be provided for causing proper meshing engagement of the sprocket 21 thereof with the associated roller chain 115. As illustrated in Figs. 1 and 2, the forward or left ends of the track-ways 98 of the second and fourth level from the bottom and the rear or right ends (viewing Fig. 2) of the third and fifth levels of track-ways 98 are provided with downwardly curved portions 116. Adjacent the joinder of these curved portions 116 with the main part of each of the right-hand track-ways 98 (Figs. 8 and 9) are provided a pair of rails 117 which are secured to the upper surface of the track-ways as downward continuations of the associated roller chains 115. Each pair of rails 117 comprises parallel main portions terminating at their lower ends in laterally flared end portions 118. As any one of the arbors 11 is carried upwardly between the first and fifth levels of track-ways 98, it will be freely suspended from the conveyor chains 37 by the members 91, as illustrated in the lower left-hand corner of Fig. 1. Using this portion of the machine as illustrative, it will be seen that as the links of the chains 37 carrying the brackets 87, associated rod 88 and members 91 are passing over the sprocket wheel 57, the arbor 11 will be engaged by the curved portions 116 of the forward end of the track-ways 98 in the second level. The curved portions 116 of the left track-way 98 will be engaged by the roller 24 of the arbor 11 in the manner illustrated in Fig. 4. At the same time, the sprocket 21 of the arbor will be carried upwardly between the outwardly flared portions 118 of the asso-

ciated guide rails 117. If for any reason, as due to mounting of the arbor on the members 91, the latter and the arbor 11 are out of proper lateral position, these flared portions 118 will insure correct realignment of the arbor by moving the same to bring the sprocket 21 thereof into the main parallel portions of the guide rails 117. Continued upward movement of the arbor 11 by the conveyor chains 37 will then slide the sprocket 21 between the guide rails 117 into proper meshing engagement with the end portion of the associated roller chain 115. Consequently, as the arbor 11 is moved along the track-ways 98 by the conveyor chains 37, the left end thereof will be supported on the left-hand track-way 98 by the roller 24, and the right-hand end of the arbor will be supported on the right-hand track-way 98 by engagement of the sprocket 21 with the roller chain 115. At the same time, movement of the arbor 11 along the track-ways by the conveyor chains 37 will be accompanied by rotation of the arbor through the agency of the roller chain 115 and the sprocket 21 meshing therewith.

As each of the arbors 11 is carried upwardly by the conveyor chains 37 to the uppermost track-way 98, the members 91 supporting the same will be depending vertically from the chains, as illustrated in Fig. 1. The forward ends of this uppermost track-way 98 are provided with straight portions 119 extending downwardly and forwardly therefrom. The right-hand one of these angularly disposed portions 119 is provided with similar guide rails 117, 118 to insure proper engagement of the sprockets 21 with the forward end of the roller chain 115 thereon. As the arbors 11 leave the uppermost track-way 98, they will again be suspended freely from the conveyor chains 37 by the associated members 91. In order to prevent unnecessary swinging of the arbors 11 at this point, the rear ends of the uppermost track-ways 98 are provided with downwardly sloping portions 120 (Fig. 2). These portions 120 of the track-ways 98 in the uppermost level result in a gradual lowering of the arbors 11 to prevent a sudden dropping thereof off of the uppermost track-ways 98. The rear ends of the lowermost track-ways 98 are provided with downwardly curved portions 121, as shown in Fig. 2, which engage the arbors 11 as they are lowered by the conveyor chains 37 past the sprocket wheels 55 to first move the same rearwardly and then raise them into proper engagement with the main portions of the lowermost track-ways 98. The right-hand one of these curved portions 121 is also provided with the guide rails 117, 118 to insure proper meshing engagement of the sprockets 21 of the arbors 11 with the roller chain 115.

As will be seen from Figs. 1 and 2, the several levels of track-ways 98 are so arranged that as each arbor 11 and group of matrices 13 supported thereby is moved along the same, it is successively carried past the several dipping vats 31 to 35. In each instance, the relative arrangement between the respective vats and the track-ways 98 is such that matrices 13 of the maximum diameter to be coated will clear the upper edges of the vats at the front and rear ends thereof. Referring particularly to Fig. 2 as illustrative of the relative track-way and vat arrangement, it will be seen that the track-ways 98 at the right side of the vat 32 extends above and inwardly from the right end wall of the vat a sufficient distance to enable the matrices carried by the arbors 11 to clear the latter. The track-ways then slope downwardly to lower horizontal portions which extend parallel to the upper edge of the side walls of the vat and are joined at their other end with sloping portions, which join the main portions of the track-ways 98 at the other side of the vat. With this arrangement, the full surface of all of the record blanks or matrices 13 will be contacted and coated by the lacquer or other suitable coating material 125 in the vat except for a central portion of predetermined diameter, since the matrices are rotated by the engagement of the arbor sprocket 21 with the roller chain 115 as the same are moved along the track-ways by the conveyor chains 37. The diameter of this central uncoated portion of the matrices 13 is determined by the distance between the lowermost horizontal portion of the track-ways 123 and the liquid level of the coating material 125 in the dipping vat. Since means are provided for maintaining the liquid level of the coating material 125 constant, and since the position of the horizontal portions of the track-way remains unchanged, this uncoated central portion of the matrices 13 will have the same diameter regardless of the diameter of the particular matrices. By virtue of the arbor rotating roller chains 115 on the track-ways 98 and their shape, as described above, and the meshing engagement therewith of the arbor sprockets 21, each and every one of the matrices 13, regardless of the diameter thereof, will have its surfaces uniformly coated with the material 125 in the respective dipping vats.

As is illustrated diagrammatically in Fig. 1, the arrangement for presenting the matrices to the rim dipping vat 35 is similar to that hereinbefore described relative to the vats 31 to 34, and is best illustrated in Figs. 1 and 10. The sloping portions 119 of the uppermost track-ways 98 comprise guiding approaches to downwardly sloping portions 138 of the track-ways which lead into the rim dipping vat 35. At their lower ends, these portions 138 of the track-ways converge with horizontally disposed portions 139 extending parallel with the upper edges of the vat 35, which in turn join upwardly sloping portions 141 functioning to carry the arbors 11 back up to the main part of the track-ways 98. These portions 138, 139 and 141 of the uppermost level of track-ways present successive groups of matrices 13 to the rim dipping vat 35 and cause proper removal thereof from the vat, and are so disposed relative to the latter as to insure clearance between the end walls thereof and the marginal edges of matrices of maximum diameter. The vat 35 is suspended from the uppermost horizontal frame member 85 by suitable brackets 142. Four threaded posts 143 (Figs. 10 to 13) are mounted respectively in the interior of the vat 35 adjacent the corners thereof and are secured in any suitable manner at their lower ends to the bottom of the vat. A shallow pan 144 is slidably mounted adjacent its corners on the several posts 143, and is spaced at its periphery from the inner surfaces of the vertical walls of the vat. The pan 144 is adjustably supported in spaced relationship to the bottom wall of the vat by coil springs 145 mounted upon the posts 143, and is adapted to be held in adjusted position by wing nuts 146 threaded on the posts and engaging the respective corner portions of the pan. A supply conduit 147, which may be interconnected with the previously described supply conduits 129, extends over the upper edge of the rim dipping vat 35 and is provided with a suitable control valve 148 (Fig. 13). The conduit 147 is connected with a

flexible hose 149 extending downwardly into the vat 35 and resting at its lower end on the pan 144. A vertical baffle wall 151 is mounted upon the bottom of the pan 144 adjacent the end of the hose 149 to cause even distribution of the rim coating compound 152 delivered to the vat 35 by the supply conduit 147 and hose 149 over the entire area of the pan 144. With this arrangement, the pan 144 will be maintained full of the rim coating compound 152, which may be the same or different from the main coating compound 125, by virtue of a continuous supply thereof in a manner to be later more fully described. The excess, or that portion of the compound not employed in coating the rims of the matrices 13, will flow over the upper edges of the pan 144 into the bottom of the vat 35, as shown in Figs. 10, 11 and 13, and a conduit 153 (Fig. 10) is connected with the vat 35 to drain this excess coating compound therefrom.

The above described adjustable mounting of the pan 144 in the rim dipping vat 35 enables selective vertical positioning thereof relative to the lower horizontal portions 139 of the track-ways 98 to permit variation of the extent of the portions of the matrices 13 to be coated by the compound 152. In this manner any desired marginal portion of matrices of the same or different diameters may be coated with the compound 152, and after initial setting of the position of the pan 144 in the vat, the extent of such rim coating will remain constant due to the maintaining of the liquid level at such predetermined point. If it is desired that the same compound be used for coating the rims of the matrices as is employed in the main dipping vats 31 to 34, the supply conduit 147 and the drain conduit 153 may be interconnected, respectively, with the supply conduits 129 and return conduits 136. However, if it is desired to use a coating compound having different characteristics, such as a different color, for the rim portions of the matrices, different means separate from those hereafter described may be employed for providing a continuous supply to the pan 144 in the rim dipping vat 35.

As has been previously described in general, the matrices 13 are alternately passed through a suitable oven 157 for drying or baking after each successive coating has been applied thereto. Referring to Figs. 1 and 2, this oven 157 briefly described is open at the front and rear of the machine and comprises a vertically disposed portion 158 located centrally of the machine and a horizontally disposed portion 159 extending for substantially the full length thereof. The oven is adapted to be heated to and maintained at a suitable temperature for drying or baking the matrices 13 by means including, for example, transversely extending heating pipes or tubes 161 and a longitudinally extending tube header duct 162 with which the tubes 161 communicate.

As each group of record blanks or matrices 13 progresses through the machine, it passes from the first dipping vat 31 through the central portion 158 of the oven 157 before being presented to the second dipping vat 32. It again travels through this central portion of the oven after receiving additional coatings in each of the dipping vats 32, 33 and 34. If the rim dipping vat 35 is to be employed, which may be considered as optional, each group of record blanks or matrices is carried therefrom (Fig. 2) to the rear end of the lower portion 159 of the oven, through which it slowly progresses for a final baking operation before being removed from its associated members 91 and the conveyor chains 37 at the front of the machine. In actual practice, it takes approximately 40 minutes for any given group of coated matrices to pass through this elongated portion 159 of the oven, this being cited merely as an illustration of the approximate speed of travel of the conveyor chains 37. When each group of coated matrices 37 completes its travel through the lower portion 159 of the oven 157, it is removed from the supporting members 91 and replaced by another group of uncoated matrices in the manner previously described, this attachment and removal of the matrix supporting arbor 11 being the only manual handling required throughout the entire process of coating the matrices.

It is thought that the invention and any of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the apparatus and in the steps of the process without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the method and apparatus hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a machine of the class described, a plurality of coating material containing means arranged at different levels in said machine, endless conveyor chains for receiving rotatable blank retaining means, means for guiding said conveyor chains for movement past all of said coating material containing means at the different levels thereof in said machine, a plurality of track-ways for guiding movement of said blank retaining means by said conveyor chains into and out of each said coating material containing means, stationary means mounted upon said track-ways and cooperating with said blank retaining means to cause the same to be rotated as a result of movement imparted thereto by said conveyor chains, and means associated with the leading ends of said track-ways for guiding said blank retaining means into cooperative relationship with said stationary means as the former is moved from one level to another.

2. In a machine of the class described, a plurality of coating material containing means arranged at different levels in said machine, a pair of endless conveyor chains mounted in transversely spaced parallel relationship, a plurality of transverse shafts secured to and carried in spaced relationship to each other by said conveyor chains, connecting means pivotally mounted upon each of said shafts and depending therefrom for removably carrying a blank supporting arbor, means for guiding said arbors into and out of each said coating material containing means as the said arbors are moved through the machine by said conveyor chains, and idling follower members engageable by each of said connecting means and adapted to be guided by said last means for insuring proper movement of said connecting means through the machine whenever an arbor is not carried thereby.

3. In a machine for applying coatings of liquid material to disc-like matrices concentrically mounted in spaced relationship on an arbor, an open top rim dipping vat, means for engaging said arbor and conveying the same past said vat, track-ways engageable by said arbor for maintaining the same horizontal and guiding the movement thereof by said conveying means down

into said vat, along central portions of the track-ways, and up out of the vat, a pan disposed interiorly of said vat, means adjustably supporting said pan at a variable and predetermined distance from and in parallel relationship to said central portions of said track-ways, and means for maintaining said pan full of the liquid coating material, whereby the marginal portions of the matrices mounted on said arbor will be coated with said material for a predetermined and variably adjustable radial distance.

4. In a machine for applying coatings of liquid material to disc-like matrices co-axially mounted in spaced relationship on an arbor, the combination with matrix coating means, drying means and an endless conveyor, of means for removably securing a blank supporting arbor to said endless conveyor for movement successively into co-operative relationship with said material coating means and said drying means, comprising a link pivotally connected at one end to said conveyor and having a slot adjacent the other end for rotatably engaging said arbor, a latch lever pivotally mounted intermediate its ends on said link and having a slot adjacent one end in inverted relationship to the slot in said link, and means removably securing the other end of said latch lever to said link to prevent inadvertent removal of said arbor from the slot therein.

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