

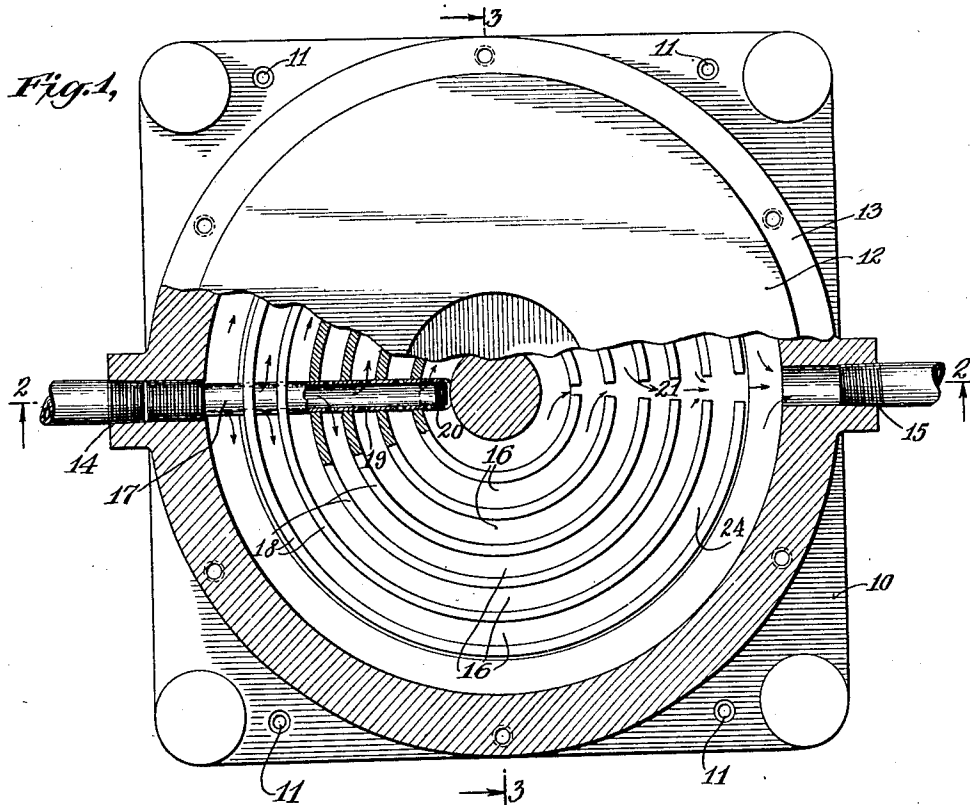
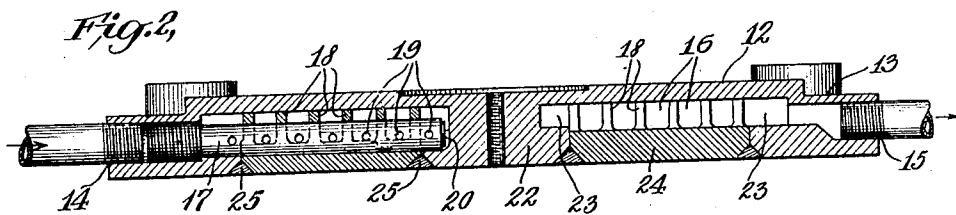
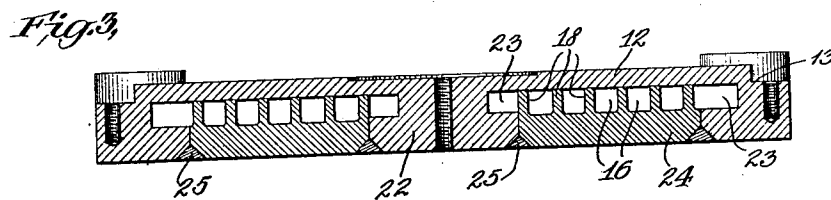
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WATER COOLED DIE.

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1,407,130.

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WATER-COOLED DIE.

1,407,130.

Specification of Letters Patent. Patented Feb. 21, 1922.

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To all whom it may concern:

Be it known that we, GEORGE HOWLETT DAVIS and CHARLES T. BOWMAN, citizens of the United States, and residents of Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Water-Cooled Dies, of which the following is a specification.

Our invention relates to presses, and is particularly directed to improvements in water-cooled press bed plates of the type generally employed in molding talking machine records.

In order to cut down the time required to cool the hot record stock, after it has been molded in the press, to a point where it is sufficiently rigid for removal without distortion, the bed plates of the press used for molding records are often provided with cooling means for chilling the matrices after a record has been molded. It is important that this cooling process be carried on as evenly as possible; for if one part of the record is cooled more slowly than the remainder, the process is either delayed until the tardy portion is adequately cooled, or else the record is subject to distortion while being removed from the press.

It is common practice to employ water jackets for chilling the bed plates; but those heretofore used have failed to chill the records as evenly as is desirable. This is due to the difficulty in regulating the flow of water through the jacket. If the jacket passages are too large, the water will short-circuit, flowing directly from inlet to outlet and leaving relatively stagnant eddies which rapidly heat up and lose their cooling properties. If the water is conducted through a single confined channel extending throughout the plate surface, it will become so hot before leaving the jacket that the portion of the matrix above the end of the channel will be cooled much more slowly than the remainder. On the other hand, jackets in which water passes through a plurality of passages connected to a common supply and discharge have not heretofore functioned properly, since the structures employed have not been capable of equalizing the pressure in all the passages, either at their entrances or at their exits. The result has been that the rate of flow in the various passages varied materially, resulting in uneven cooling of the record. In some cases, there may even be a return flow in

some passages, owing to a siphon action by the water flowing along other passages where the resistance is less or the initial pressure greater. The inevitable result of unequal flow in the various passages is obviously uneven cooling of the record.

A primary object of our invention is to produce a water jacket for the purpose indicated with a plurality of water passages connected to a common source, so arranged that a relatively even flow in all of the passages may be obtained.

A further object is to provide a construction in which the flow in each passage may be accurately predetermined, so as to be commensurate to the length and area of the passage, producing equal cooling effect in all the passages.

Another object is to shorten the time necessary for cooling records, by increasing the amount of water passing through the entire jacket in a given time without sacrificing evenness of distribution.

Other objects and advantages will be apparent from the following description, taken in connection with the accompanying drawings, in which:

Figure 1 is a plan view of a bed plate, parts being broken away,

Figure 2 is a section on line 2—2 of Figure 1, and

Figure 3 is a section on line 3—3 of Figure 1.

The bed plate 10 is of a common type, being a substantially integral structure adapted to be mounted on the press head, as by screws passing through the holes 11. The central portion of the face or upper side of the bed plate is formed with the usual table 12 upon which the matrix is mounted, and may have the usual annular seat 13 for the matrix clamping ring. However, any type of bed plate face may be employed without substantially affecting our invention. Beneath the table 12 we form a number of channels in the bed plate running generally from the inlet 14 to the outlet 15. In order to obtain a maximum flow of water beneath table 12, we provide channels which branch laterally from the inlet 14, the branches traveling preferably in an approximately semi-circular path at opposite sides of the center of the table, and meeting again adjacent outlet 15. Evidently the exact contour of these paths may be

varied substantially; but we have found it both convenient for construction purposes and efficient in operation to employ complementary semi-circular passages 16 having opposed inlets and outlets.

In this construction, however, difficulty has been experienced in obtaining an even flow of water in all of the paths. In particular, the water has a very strong tendency to short-circuit through the shorter paths near the center of the jacket, a tendency which may either reduce the flow in the outer passages, or in extreme cases actually produce a return flow in those passages through the siphon action heretofore alluded to. This is the case where all of the passages are connected more or less directly to the inlet 14.

We have found that this defect is eliminated, and an accurately regulated flow of water may be obtained, by employing what may be termed a distributor, here shown in the form of a pipe 17 connected to inlet 14 and having in turn separate discharge connections with the entrance ends of each of the passages 16. In this way the water is positively introduced to each of the passages at a pressure which can be regulated by varying the size of the discharge apertures in pipe 17, and any opportunity for back flow or variation in rate of flow has been found in practice to be substantially eliminated. Obviously the construction of pipe 17, its arrangement and the method of connection to inlet ends of the passages may be varied quite materially.

A very simple and efficient construction of this type is disclosed in the drawings, including the pipe 17 tapped at one end into the inlet 14 and extending through the partitions 18 between passages 16, and fitting snugly into the partitions to prevent material flow between the passage entrances along pipe 17. The discharge holes 19 are tapped at opposite sides of pipe 17 at the entrance ends of all the passages, so that the water is discharged into each passage from pipe 17 through at least one hole. The inner end of pipe 17 may be closed as by plug 20, with discharge holes for the inner passage located adjacent the plug.

It will be apparent that the exact form of pipe 17 and its method of connection to the passages, particularly its arrangement relative to partitions 18, may be varied considerably, the important feature being the provision of a separate distribution aperture for each passage. Furthermore, while the passage entrance ends are shown as directly juxtaposed, our invention is not limited to this specific construction, which might be considered as necessarily requiring a pierced pipe to feed the passages.

A simple form of common outlet for the passages 16 is disclosed, consisting of a radial

passage 21 through partitions 18, which may be formed by kerfing or boring the walls, preferably in line with outlet 15. In the form shown the outlet passage tapers inwardly, so that the resistance to the exit of the water from the various passages decreases as the passages grow longer, thereby tending to force more water through the outer long passages than will flow through the short inner passages. This arrangement may be employed independently of the size of the discharge holes 19 in pipe 17, and has been found in actual use to be highly efficient in regulating the rate of flow in the various passages proportionately to their length.

While the construction above described may be embodied in a bed plate in various ways, we have disclosed one type of construction which may be readily manufactured and assembled. With the arrangement shown the under side of the bed plate 10 is cut away to form a single deep annular recess with a central boss 22, the outer and inner walls of the recess being undercut at 23 to assist in forming the outer and inner channels 16 respectively. To form the remaining channels, we employ an annular channel plate 24 upon the inner face of which are formed the partitions 18, plate 24 being adapted to fit snugly against the walls of the annular recess in the bed plate 10, with the upper faces of the partitions 18 resting against the bottom of the recess. Plate 24 may conveniently be held in place by welding, as indicated at 25, the adjacent walls of the partition plate and bed plate being beveled in the usual way for welding. It will, however, be apparent that variations in the form of plate 24 and in the manner of mounting it in place are well within the skill of the ordinary mechanic.

We claim:

1. In a fluid-cooled press table having a plurality of separate fluid passages symmetrically arranged at opposite sides of the table center, said passages having radially aligned opposed entrances adjacent a fluid inlet, a distributing tube extending radially across said entrances and having a separate port for discharging fluid from the conduit into each passage.

2. A fluid-cooled press table having a fluid chamber, a plurality of annular partitions dividing said chamber into arcuate passages each connected at one side of the chamber to a discharge opening, and a fluid distributing tube extending across said partitions and provided with a central chamber having a separate discharge port communicating with each passage.

3. A press table of the class described, comprising a hollow body having fluid inlet and outlet openings, the hollow interior being provided with substantially annular partitions defining a plurality of fluid channels,

the partitions being apertured in line with said inlet opening, a distributing tube connected with said inlet opening and fitting closely in said partition apertures and provided with discharge perforations in line with the channels intersected by said tube, said partitions also being provided with apertures defining a fluid discharge passage in line with said discharge opening.

- 10 4. A press table of the class described, comprising a hollow body having fluid inlet and outlet openings, the hollow interior being provided with substantially annular partitions defining a plurality of fluid channels, 15 the partitions being apertured in line with said inlet opening, a distributing tube connected with said inlet opening and fitting closely in said partition apertures and provided with discharge perforations in line 20 with the channels intersected by said tube, said partitions also being provided with apertures defining an outwardly expanding

fluid discharge passage leading to said discharge opening.

5. A fluid-cooled press table comprising a 25 body portion having a recess in one side communicating with an inlet and an outlet aperture therein, an inset section adapted to be mounted tightly in said recess and provided with a plurality of flanges fitting 30 snugly against the walls of the recess to divide it into a plurality of separate passages extending from the inlet to the outlet, and a fluid distributing element extending across said flanges, said element having a central 35 chamber connected to the inlet and communicating with each passage through a separate discharge port.

Signed at Orange, in the county of Essex and State of New Jersey, this 31st day of 40 March, A. D. 1921.

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