June 17, 1930. G. M. EVANS 1,764,943

DISK ROLLING PROCESS

Filed Jan. 22, 1927

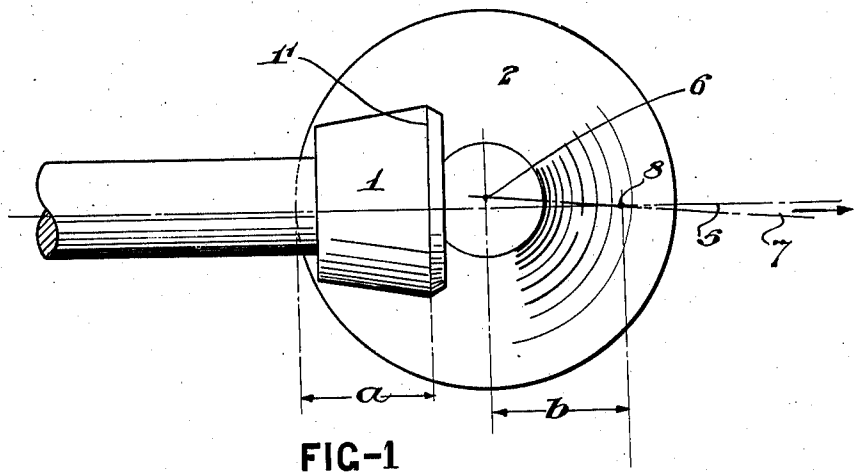


FIG-1

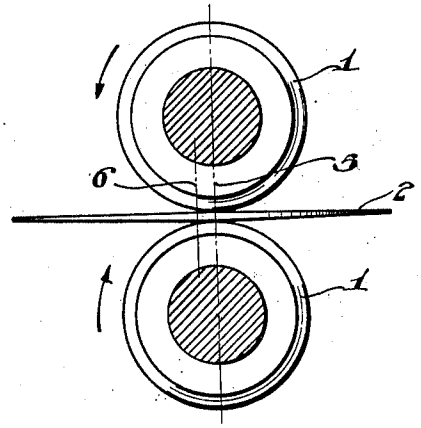


FIG-2

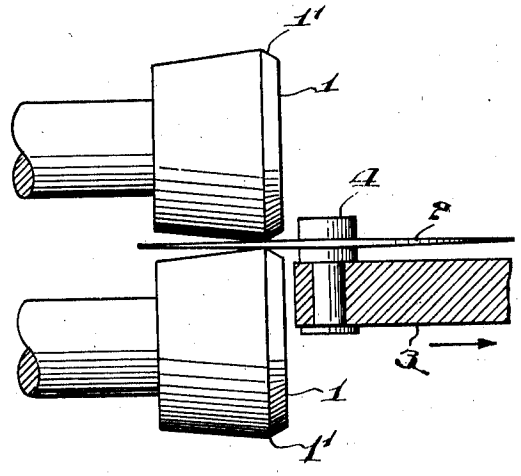


FIG-3

INVENTOR:
Gordon M. Evans
BY
John P. Barker
ATTORNEY.

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UNITED STATES PATENT OFFICE

GORDON M. EVANS, OF DETROIT, MICHIGAN, ASSIGNOR TO BUDD WHEEL COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

DISK-ROLLING PROCESS

Application filed January 22, 1927. Serial No. 162,700.

This invention relates to a disk rolling process and more particularly to a process by which disks tapered from substantially their centers to their peripheries are formed.

An object of this invention is a method whereby such tapered disks are made.

Another object is the provision of a simpler method of making such disks than has heretofore been used.

A third object is the provision of a method whereby both sides of the product are given a superior finish, well adapted to receive paint or enamel and give a good appearance.

The method of the invention is capable of use in less complex machines and with the exercise of less power than heretofore needed.

The annexed specification, with the appended drawings will explain the invention and make other objects and advantages thereof apparent.

The drawings comprise three Figures 1, 2 and 3 which are respectively, diagrammatic plan, end and elevational views of the essential elements of the invention.

In the drawings rolls 1 are illustrated which comprise narrow cylindrical tread portions, or working faces 1′, flanked by adjacent conical portions adapted to support the working faces of the rolls. It is, of course, understood that these rolls are supported on suitable shafts which are so journaled as to permit the mutual approach and separation of the rolls by appropriate pressure mechanism not shown. The numeral 5 designates the plane of the roll axes in the several figures of the drawings, while the numerals 6, 7 denote respectively the axis of the disk 2 and its path of movement under the present invention. As shown in Figure 3, this path of movement may be supplied by the movement, properly guided, of a work-holding device 3, 4.

It will be noted that the plane of the roll axes 5 and the path of movement of the disk center 6, 7 coincide only at one point 8, and not throughout the length of said path. This feature is characteristic of the present method and is productive of several advantages thereof. Due to the initial non-coincidence of the plane of the roll axes and the disk center, the contact of the rolls with the disk, although of small area, is not tangential to the circle drawn from the center of the disk through said point, but on the other hand it intersects such a circle. As a result of this condition, and the rotation of the rolls in the direction of the arrows, Fig. 2, a thrust is produced in the direction of the arrow at the right end of the path 7 in Fig. 1. The work holder 3 which supports the disk rotatably, by means of a holding device indicated diagrammatically at 4, is free to move in this direction under said thrust and hence, the disk is automatically and gradually passed to the right as in Fig. 1. This feed is obtained without any mechanism other than that shown, in contrast to the structures heretofore deemed necessary.

It will be noted that Figure 1 shows the path of movement 7 of the disk center 6, as disposed at an angle to the plane 5 of the roll axes, intersecting said plane in a point 8 at a distance "b" from the disk center 6, measured in said plane 5. In this particular instance the distance "b" is made equal to "a" the radial width of the portion of the disk which is rolled. As a result of this arrangement the rolls act tangentially at the outer periphery of the disk and there is no thrust produced. The feed of the disk between the rolls therefore, is at a gradually and uniformly decreasing rate which becomes zero at the circumference of the disk. Obviously, it is within the province of the invention to adjust the angular relation of the path 7 and the initial distance of the disk center 6 from the plane 5, so as to vary the feed in any desired manner.

The method is carried out by inserting a disk blank between the rolls, while the latter are held separated by their controlling mechanism (not shown). The disk is rotatably secured to the work holder 3 by device 4 and the rotating rolls are brought against the disk with the force necessary to produce the desired effect. Thereupon rolling, and the automatic feeding of the disk begin. To effect the desired degree of taper, the rolls are caused to approach each other gradually as the rolling and feeding progresses. If an

untapered product is desired, this latter step is omitted.

A feature of this rolling method heretofore undescribed, but now made apparent, is its fitness for hot rolling of disks. Since the area of roll contact is small, the rate of heat conduction by contact is low, and hence it is particularly adapted to such use.

What I claim is:

1. The method of rolling tapered disks comprising the insertion of a blank between narrow-treaded rolls and contacting the said rolls with said blank, under suitable pressure, at a point adjacent the center of said blank and providing for a non-radial movement of said rolls relative to said disk and for simultaneous mutual approach of said rolls.

2. The method of rolling tapered disks comprising forcible presentation of narrow-treaded rolls to opposed faces of the disk blank, positioning said blank initially with its center outside the plane common to the axes of said rolls, actuating said rolls under varying pressure and guiding said blank center in a path which finally coincides with the aforesaid plane.

3. The method of rolling tapered disks comprising the forcible application of rotating narrow-treaded rolls to opposite sides of the blank disk and thereby causing a relative rectilinear separational movement of the blank and rolls, said movements beginning outside of the plane of the roll axes, and ending therein.

4. A method of making tapered disks comprising rolling a blank disk between opposed narrow-treaded rolls, initiating said rolling near the blank center with the roll axes outside of a vertical diametral plane of the disk and finishing said rolling with the axes in such a diametral plane.

5. A method of making tapered disks comprising the rolling of a disk blank between narrow-faced opposed rolls which contact with said blank at successive points of the blank, the said rolling being initiated near the center of the blank with the plane of contact of the rolls perpendicular to the roll axes intersecting a circle concentric with the blank and progressing the rolling toward the periphery with the plane of contact of the rolls approaching tangency with a circle concentric with the blank.

In testimony whereof he hereunto affixes his signature.

GORDON M. EVANS.