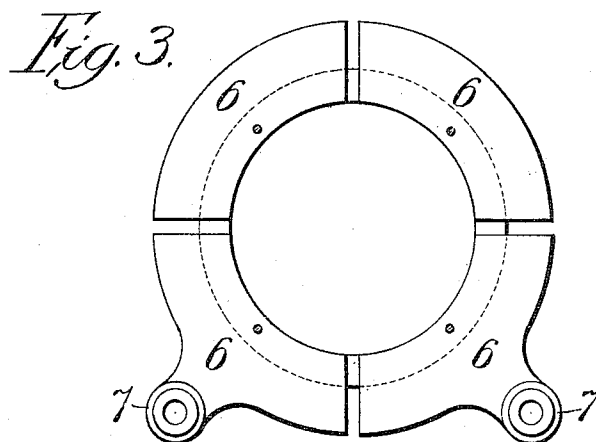
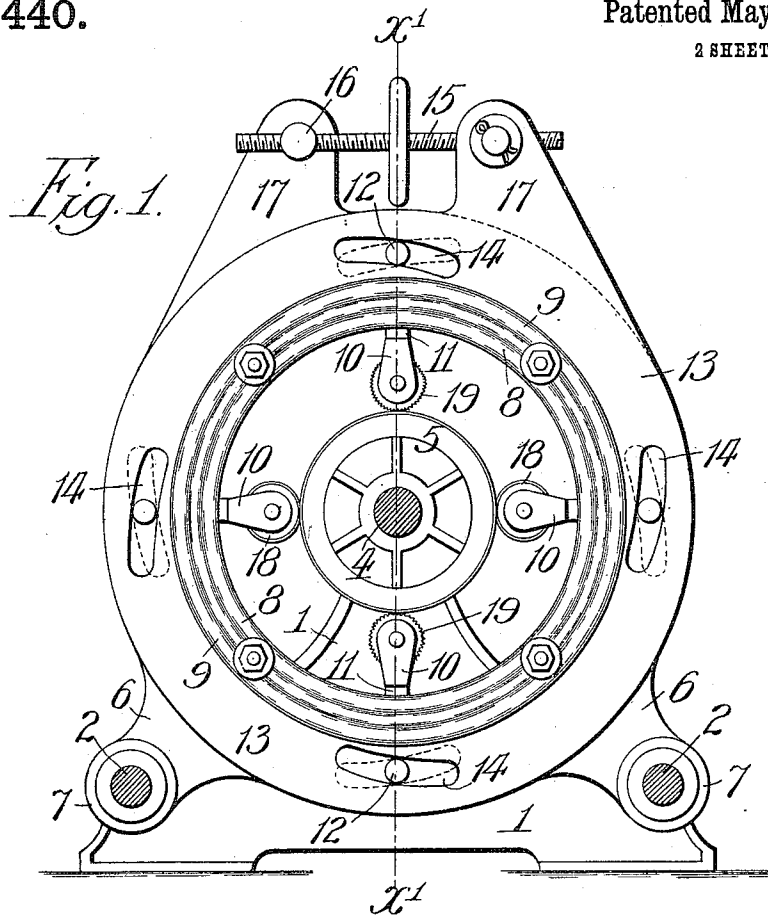


E. J. O'BRIEN.
 PROCESS OF MAKING TOOTHED CYLINDERS.
 APPLICATION FILED MAY 10, 1907.

957,440.

Patented May 10, 1910.

2 SHEETS—SHEET 1.



Attest:

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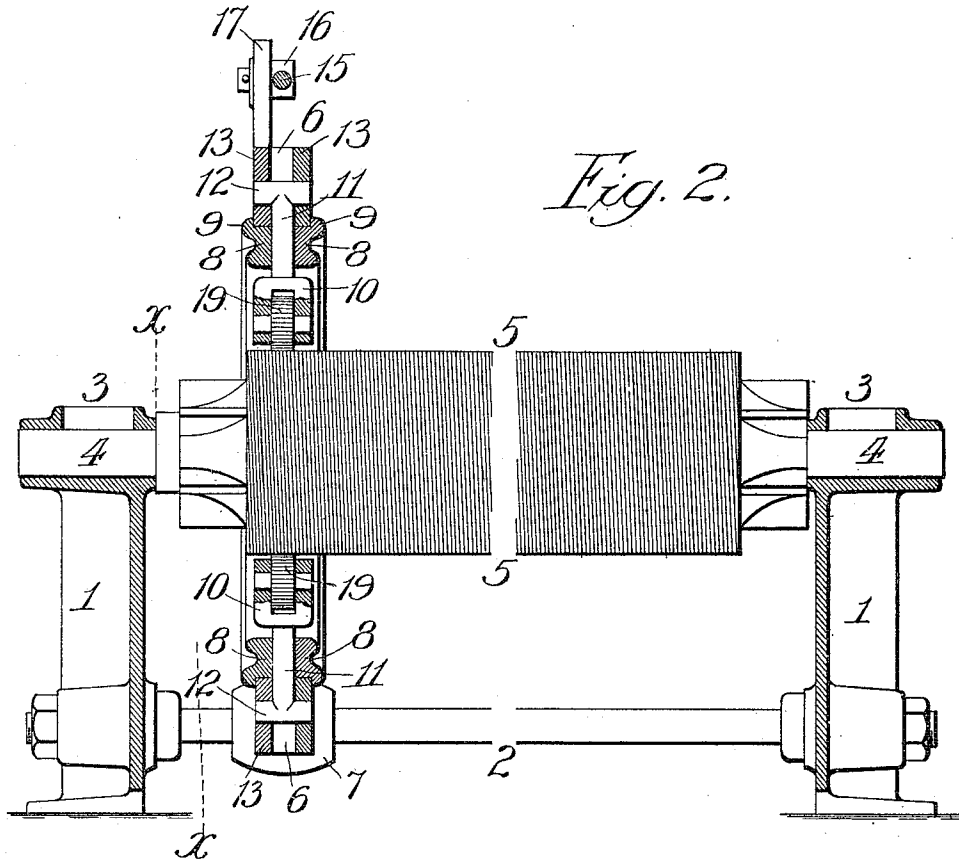


Fig. 2.

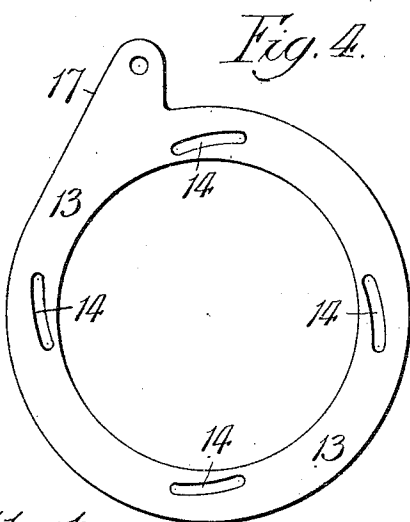


Fig. 4.

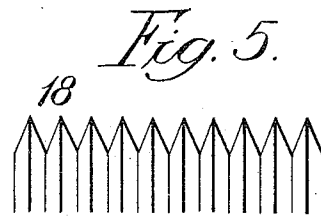


Fig. 5.

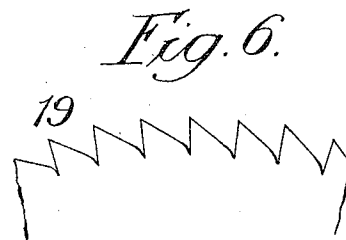


Fig. 6.

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UNITED STATES PATENT OFFICE.

EDWARD J. O'BRIEN, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE PROCTOR AND GAMBLE COMPANY, A CORPORATION OF OHIO.

PROCESS OF MAKING TOOTHED CYLINDERS.

957,440.

Specification of Letters Patent.

Patented May 10, 1910.

Original application filed November 18, 1905, Serial No. 287,950. Divided and this application filed May 10, 1907. Serial No. 372,874.

To all whom it may concern:

Be it known that I, EDWARD J. O'BRIEN, a citizen of the United States of America, and a resident of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Processes of Making Toothed Cylinders, of which the following is a specification.

This invention relates to a process of producing and reproducing teeth upon metal cylinders used in cotton seed delinting machines and the like, and has for its object to provide a simple and efficient process whereby a multiplicity of fine teeth in close relation are formed in a ready and efficient manner in the periphery of a metal cylinder or roll in which a series of circularly or spirally arranged ridges of a substantially triangular form had been initially formed, and by means of which a dense and enduring nature is imparted to the points of the teeth. And with which the original form of the teeth, when worn by continued use, can be readily and efficiently restored without the removal of any of the metal of said teeth or cylinder, all as will hereinafter more fully appear.

The accompanying drawings illustrate an apparatus for effecting the present improved process. Such apparatus forms the subject matter of my prior Letters Patent No. 855,658, dated June 4, 1907, and of which the present application is a division. In such drawings:—Figure 1, is a transverse sectional elevation on line $x-x$, Fig. 2. Fig. 2, is a longitudinal sectional elevation on line $x'-x'$ Fig. 1. Fig. 3, is a detail elevation of the central member of the carriage which carries the nurling rolls. Fig. 4 is a detail elevation of one of the cam rings of said carriage. Fig. 5 is an enlarged detail side elevation of one of the milling or nurling rolls of said carriage. Fig. 6, is a similar view of the other or companion milling or nurling roll.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 represents the stationary supporting frame preferably consisting of a pair of end standards connected together by longitudinal bars or rods 2, which constitutes the slideway for the carriage of the milling or nurling rolls hereinafter described.

3 are alined journal boxes carried by said standards, to afford bearings for either the usual carrying shaft 4, of the metal cylinder to be milled or knurled; or for the end arbors of an ordinary holding mandrel when the metal cylinder is in the form of a cylindrical shell and carried during the process on such holding mandrel. And in either case the shaft or mandrel will receive positive rotation from a suitable power source in any usual manner.

5 is the metal cylinder or shell, which prior to its treatment by the present process, has its periphery formed with a series of circumferential teeth of a slightly less depth than the intended depth of the teeth when finished. And it is preferable that said initial circumferential threads have a spiral arrangement, in that the same affords means for automatically imparting longitudinal movement to the hereinafter described series of milling or nurling rolls in the progress of the present process.

6 is the central carrying member of the carriage heretofore referred to. Such member consists of a series of segmental plates connected together as hereinafter described, and has sliding engagement with the guide rods or bars 2 of the stationary supporting frame by guide sleeves 7 on the lowermost segments of said central member.

8 are a pair of clamping rings arranged at opposite sides of and bolted to the segments aforesaid to maintain the same in separated relation as shown in Fig. 3 and provide radial ways for the guide shanks of the hereinafter described carrying yokes of the milling or nurling rolls.

9 are peripheral flanges on the rings 8 to form similar bearing recesses at the periphery of said rings and at opposite sides of the central member 6, as shown in Fig. 2, for the reception of the hereinafter described cam rings by which simultaneous radial adjustment is imparted to the milling or nurling rolls and their carrying yokes.

10 are the carrying yokes above referred to, and which are provided with guide shanks 11 having sliding movement in the before described radial ways located between the segmental plates of the member 6 and the rings 8. Such shanks are provided with lateral studs or pins 12 at or near their

outer ends for engagement in the eccentric or cam slots of the operating cam rings hereinafter described.

13 are the cam rings, of a plate form and arranged in the respective peripheral recesses of the rings 8 and having a turning adjustment thereon.

14 are a plurality of eccentric slots formed in the cam rings and so arranged that the slots in one ring will be in crossed or reversed relation to the slots in the other ring as shown in Fig. 1; such slots 14 receive the lateral pins 12 of the carrying yokes 10 aforesaid, to constitute operative connections between the cam rings and the series of carrying yokes, and so that simultaneous radial adjustment will be imparted to the carrying yokes with a circular adjustment of the cam rings.

15 is a shaft having right and left-hand screw threads on its respective ends adapted for operative engagement with screw-threaded hubs mounted upon the arms 17 of the respective cam rings 13.

18 and 19 are the milling or nurling rolls, usually four in number. One set or pair 18 of said rolls are grooved circumferentially to form a series of V-shaped circular ridges as shown in Fig. 5; while the other set or pair of said rolls are grooved longitudinally to form a series of longitudinal ridges of a substantially triangular form as shown in Fig. 6.

The mode of operation of the present process is as follows:—The carriage carrying the series of milling or nurling rolls is moved to one end of the apparatus and said rolls moved radially outward. The metal cylinder after having been first operated upon in a turning lathe or the like, to produce in its periphery a spiral thread of a slightly less depth than the intended depth of the finished teeth, is journaled in the supporting frame and receives a positive rotation from a suitable power source. The milling or nurling rolls are then forced inwardly into engagement with the threaded periphery of the metal cylinder by the manual means heretofore described. As the metal cylinder revolves the circularly ridged periphery of the rolls 18 will follow the thread initially chased in the periphery of

said metal cylinder; while the longitudinally ridged periphery of the rolls 19 will force the metal under the edges of their ridges toward the center of the cylinder 5, thereby bringing out pyramidal points of uniform length and with equal pitch on each side and at an angle of ninety degrees and forty-five degrees approximately front and back.

By the above described process of producing and reproducing a series of teeth in the periphery of a metal cylinder or roll, a very dense, strong, tough and efficient abrasive surface is produced, with the added advantage, that when after continued use the teeth become worn and dulled on the points, the present process can be repeated to bring up the teeth again without removing any of the metal of the cylinder, and accordingly the present process affords a very superior, accurate and expeditious manner of renewing the abrasive surfaces of a toothed cylinder when dulled and worn, and at the same time imparting density and durability to the points of the teeth.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. The herein described process of forming toothed cylinders, the same consisting in initially forming a series of circular threads upon the periphery of a metal cylinder, and subsequently forming a series of longitudinal grooves in said threads and simultaneously imparting added density to the teeth thus formed by a lateral displacement of the metal thereof.

2. The herein described process of forming toothed cylinders, the same consisting in initially forming a series of spiral threads upon the periphery of a metal cylinder, and subsequently forming a series of longitudinal grooves in said threads and simultaneously imparting added density to the teeth thus formed by a lateral displacement of the metal thereof.

Signed at St. Louis Missouri, this 7th day of May 1907.

EDWARD J. O'BRIEN.

Witnesses:

ROBERT BURNS,
JAS. E. GREEN.