No. 855,658. PATENTED JUNE 4, 1907.

E. J. O'BRIEN.

APPARATUS FOR NURLING CYLINDERS.

APPLICATION FILED NOV. 18, 1905.

2 SHEETS—SHEET 1.

Fig. 2.

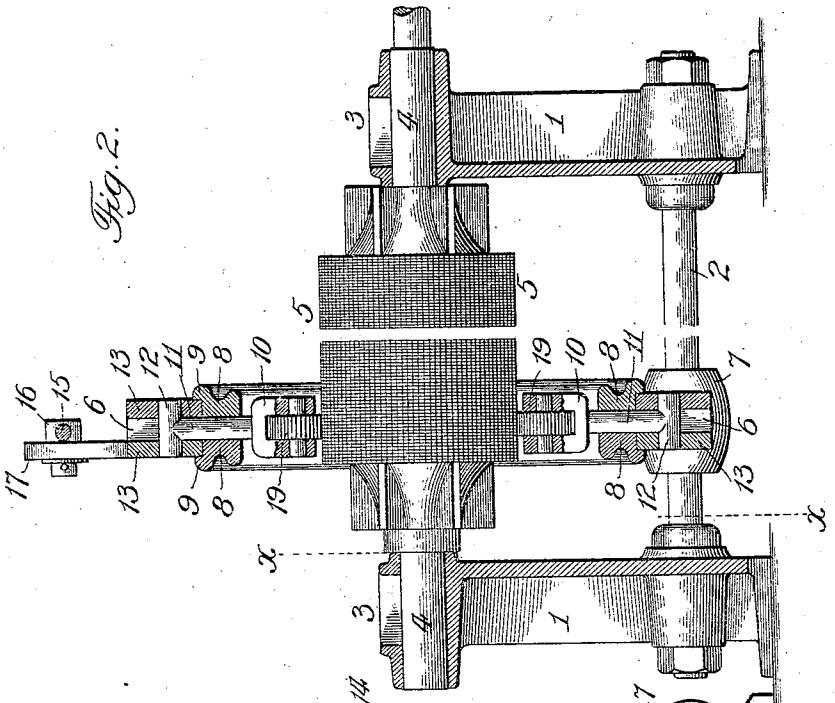
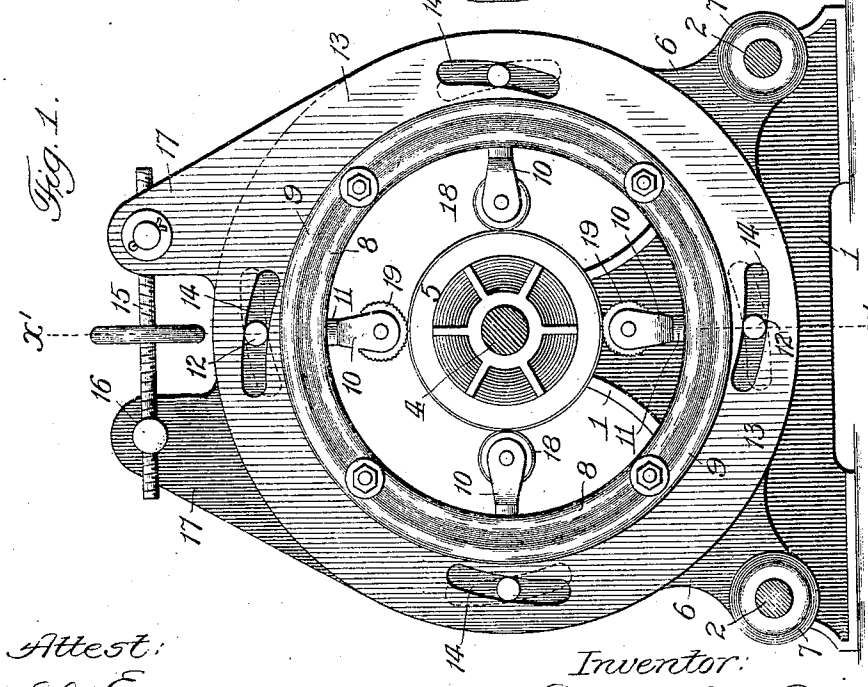


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 4.

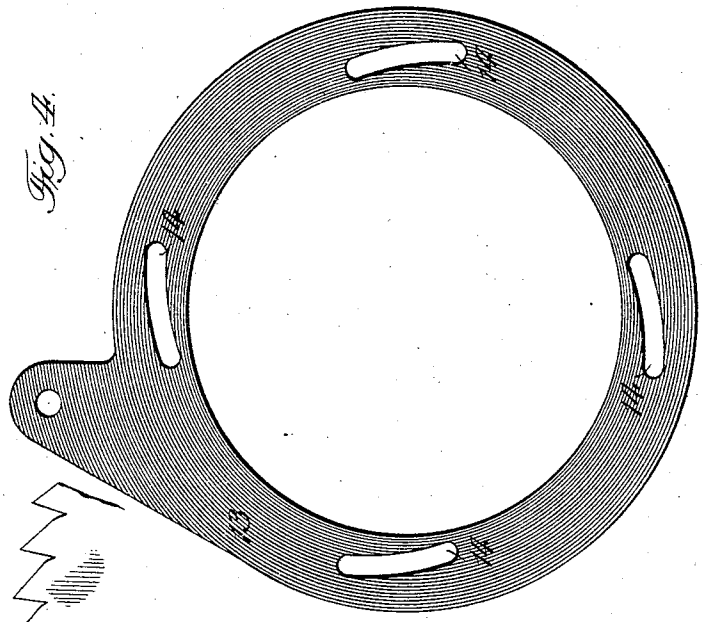


Fig. 5.

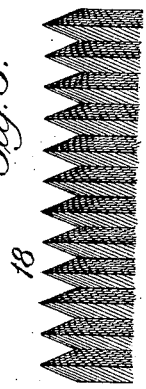
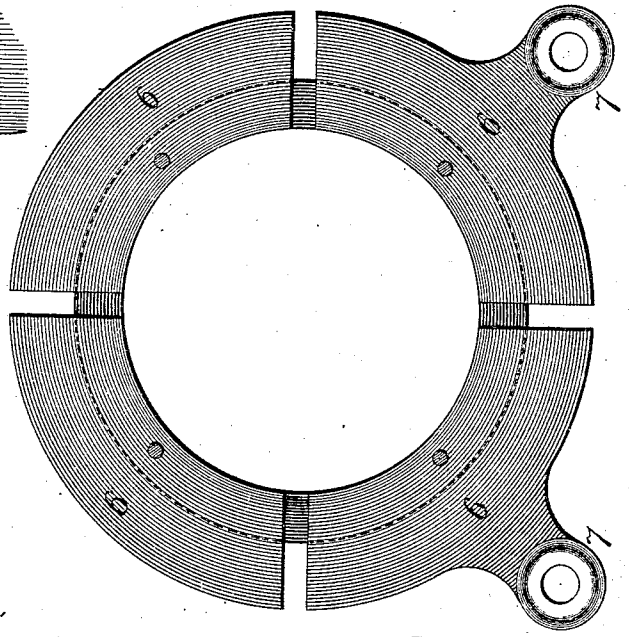


Fig. 6.



Fig. 3.



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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.

APPARATUS FOR NURLING CYLINDERS.

No. 855,658. Specification of Letters Patent. Patented June 4, 1907.

Application filed November 18, 1905. Serial No. 287,950.

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 Apparatus for Nurling Cylinders, of which the following is a specification.

The present invention relates to an apparatus for production and reproduction of abrading or delinting teeth upon the abrading cylinders or rolls of cotton seed delinting machines, and more especially the type of such delinting machines which forms the subject matter of Letters Patent No. 801,809, dated October 10, 1905. And the present improvement has for its object to provide a simple and efficient apparatus, whereby a multiplicity of fine teeth in close approximation are formed in a rapid and efficient manner in the periphery of a metallic cylinder or roll in which a series of spirally or circularly arranged ridges of a substantially triangular form had been initially formed; 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.

In the accompanying drawings illustrative of the present invention: 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 an elevation of the central member, detached, of the carriage which carries the nurling rolls. Fig. 4 is an elevation of the cam ring, detached, of said carriage. Fig. 5 is an enlarged detail side elevation of one of the milling or nurling rolls of the present invention. Fig. 6 is an enlarged detail end elevation of the other or companion milling or nurling roll of the present invention.

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

Referring to the drawings:—1 represents the stationary supporting frame of any usual and suitable form, and which in the construction shown in the drawings comprises a pair of end standards connected together by parallel rods or bars 2, which constitute a slideway for the carriage of the milling or nurling rolls of the present invention.

3 are alined journal boxes carried by the aforesaid end standards of the supporting frame 1, and adapted to afford bearings for either the usual carrying shaft 4 of a delinter cylinder to be milled or nurled; or for the end arbors of an ordinary holding mandrel when the delinter cylinder is in the form of a detachable outer shell and carried during the operation on such holding mandrel. And in either case said shaft or said mandrel will receive positive rotation from a suitable power source in any usual manner.

5 is the delinter cylinder or shell, which prior to its treatment in the present machine, has its periphery formed with a series of circumferential teeth of a slightly less depth than the intended depth of the finished teeth when completed. 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 series of nurling or milling rolls, hereinafter described, in the operation of the machine.

The carriage in which the milling or nurling rolls of the present invention are mounted, has movement in a longitudinal direction upon the slideways 2 of the stationary supporting frame 1, and in parallel relation to the periphery of the delinter cylinder when the same is in position in the supporting frame 1; such carriage is preferably of an annular form adapted to encircle the delinter cylinder, and in detail will preferably comprise a structural formation and arrangement of parts as follows:—

6 is the central carrying member of the carriage, consisting of a series of segmental plates, connected together as hereinafter described, and having sliding engagement with the guide rods or bars 2 of the supporting frame 1, by guide sleeves 7 on the lowermost segments of said central member.

8 are a pair of clamping rings arranged at opposite sides of the segments comprising the central carrying member 6, and bolted or otherwise fixedly secured thereto, so as to maintain said segments in separated relation as shown in Fig. 3, and provide radial ways for the reception of the guide shanks of the carrying yokes of the milling or nurling cutters hereinafter more fully described.

9 are peripheral flanges on the clamping rings 8 to form circular bearing recesses at the periphery of said rings and at opposite sides of the central carrying 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 of the milling or nurling rolls, and are provided with guide shanks 11, having sliding movement in the before described radial ways located between the segmental plates of the central member 6, and the clamping rings 8. Such shanks are provided with lateral studs or pins 12, at or near their outer ends for engagement in the cam or eccentric slots of the operating cam rings hereinafter described.

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

14 are a plurality of eccentric slots formed in the cam rings 13 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 before described, 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 as hereinafter set forth.

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

With the above described arrangement of parts, a rotation of the shaft 15 in one direction will positively draw the arms 17 together to impart circular adjustment in opposite directions to the pair of cam rings carrying said arms, and through the instrumentality of the eccentric slots 13 impart simultaneous inward radial adjustment to the series of yokes 10 which carry the milling and nurling rolls of the present invention; while a rotation of said shaft 15 in the other direction will positively force the arms 17 apart, to impart circular adjustment to the cam rings in directions the reverse to the directions above described, and through the instrumentality of the eccentric slots 13, impart simultaneous outward radial adjustment to the yokes 10 carrying the aforesaid milling and nurling rolls.

18 and 19 are the milling or nurling rolls of the present invention, usually four in number, but which number may be increased or diminished as the judgment of the constructor or circumstances may direct. One set or pair 18 of said rolls are grooved circumferentially to form a series of circular ridges of a V shape as illustrated in Fig. 5; while the other set or pair 19 of said rolls are grooved longitudinally to form a series of longitudinal ridges of a substantial triangular form as illustrated in Fig. 6.

The operation of the machine is as follows: The carriage carrying the series of milling or nurling rolls 18 and 19, is moved to one end of the apparatus, and the said rolls 18 and 19 are moved radially outward, preferably to their limit. The delinter cylinder 5, after having been first operated upon in a lathe or like machine to produce in its periphery a spiral thread of a slightly less depth than the intended depth of the finished abrading teeth, is placed in the supporting frame 1, and supported in the journal boxes 3 thereof by its carrying shaft 4, which is adapted to receive positive rotation from any suitable power source. The carriage aforesaid, is now moved to a position adjacent to one end of the delinter cylinder 5, and the milling or nurling rolls 18 and 19 are forced inwardly into engagement with the threaded periphery of the delinter cylinder 5, by the manual means heretofore described. The said rolls 18 and 19 receive motion through peripheral contact with the threaded surface of the delinter cylinder 5, which is the prime mover in the present process. As the delinter cylinder 5 revolves, the circularly ridged periphery of the rolls 18 will follow the thread initially or previously chased in the periphery of said delinter 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 mode of producing and reproducing a series of teeth in the periphery of a metal cylinder or roll, a very strong, tough and efficient abrasive surface is produced, with the added advantage that when after continued use for a greater or less period the teeth become dulled on the points it is only necessary to replace the delinter cylinder in the present apparatus and repeat the process above described, thereby bringing the teeth up again, without removing any of the metal of the cylinder, as would be the case ordinarily where the teeth on the surface of a cylinder are formed by circular and longitudinal cuts, and accordingly the present process affords a very superior, accurate and expeditious means for renewing the abrasive surface of the cylinder when dulled and worn by continued use.

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

1. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate, an annular carriage sliding on said

frame and encircling the cylinder, a series of nurling rolls mounted on said carriage and adapted to have engagement with the periphery of the cylinder, and means for imparting radial adjustment to said nurling rolls.

2. In an apparatus for nurling abrading teeth upon the initally threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate, an annular carriage sliding on said frame and formed with a series of radial guideways, a series of yokes having guide stems moving in said guideways, a series of nurling rolls journaled in said yokes, and means for imparting radial adjustment to said yokes.

3. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinder, the combination of a frame in which the cylinder is arranged to rotate, a carriage consisting of a central member having sliding engagement with said frame and formed by a series of separated segments, clamping rings secured at opposite sides of said segments and provided with peripheral flanges, a series of yokes having guide stems sliding between the segments aforesaid, a pair of cam rings turning on the periphery of the aforesaid clamping rings and provided with eccentric slots for operative engagement with the shanks of the yokes, an operating right and left hand screw engaging the cam rings, and a series of nurling rollers journaled in said yokes.

4. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate, an annular carriage sliding on said frame and encircling the cylinder, a series of nurling rolls mounted on said carriage and adapted to have engagement with the periphery of the cylinder, means for imparting radial adjustment to said nurling rolls, the same comprising a cam ring turning on said carriage and operatively connected with the nurling rolls and means for imparting circular adjustment to the cam ring.

5. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate, an annular carriage sliding on said frame and formed with a series of radial guideways, a series of yokes having guide stems moving in said guideways, a series of nurling rolls journaled in said yokes, and means for imparting radial adjustment to said yokes, the same comprising a cam ring turning on said carriage and operatively connected with the carrying yokes of the nurling rolls.

6. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate, a carriage sliding on said frame, a series of nurling rolls mounted on said carriage and adapted to have engagement with the periphery of the cylinder, and means for imparting radial adjustment to said nurling rolls, a part of the series of nurling rolls having circularly ridged peripheries and a part having longitudinally ridged peripheries, the circularly ridged rolls being adapted to hold the parts in alinement while the longitudinally ridged rolls are forming the serrations on the metal cylinder.

7. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate, an annular carriage sliding on said frame and encircling the cylinder, a series of nurling rolls mounted on said carriage and adapted to have engagement with the periphery of the cylinder, and means for imparting radial adjustment to said nurling rolls a part of the series of nurling rolls having circularly ridged peripheries and a part having longitudinally ridged peripheries.

8. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate, an annular carriage sliding on said frame and formed with a series of radial guideways, a series of yokes having guide stems moving in said guideways, a series of nurling rolls journaled in said yokes, and means for imparting radial adjustment to said yokes, a part of the series of nurling rolls having circularly ridged peripheries and a part having longitudinally ridged peripheries.

9. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate, a carriage consisting of a central member having sliding engagement with said frame and formed by a series of separated segments, clamping rings secured at opposite sides of said segments and provided with peripheral flanges, a series of yokes having guide stems sliding between the segments aforesaid, a pair of cam rings turning on the periphery of the aforesaid clamping rings provided with eccentric slots for operative engagement with the shanks of the yokes, an operating right and left hand screw engaging the cam rings, and a series of nurling rollers journaled in said yokes, a part of the series of nurling rolls having circularly ridged peripheries and a part having longitudinally ridged peripheries.

10. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate,

an annular carriage sliding on said frame and encircling the cylinder, a series of nurling rolls mounted on said carriage and adapted to have engagement with the periphery of the cylinder, means for imparting radial adjustment to said nurling rolls, the same comprising a cam ring turning on said carriage and operatively connected with the nurling rolls, and means for imparting circular adjustment to the cam ring a part of the series of nurling rolls having circularly ridged peripheries and a part having longitudinally ridged peripheries.

11. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame in which the cylinder is arranged to rotate, an annular carriage sliding on said frame and formed with a series of radial guideways, a series of yokes having guide stems moving in said guideways, a series of nurling rolls journaled in said yokes, means for imparting radial adjustment to said yokes, the same comprising a cam ring turning on said carriage and operatively connected with the carrying yokes of the nurling rolls and means for imparting circular adjustment to the cam ring, a part of the series of nurling rolls having circularly ridged peripheries and a part having longitudinally ridged peripheries.

12. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame having means for supporting the cylinder, a carriage supported on said frame, in a manner to permit of independent longitudinal adjustment and circular rotation between the carriage and the cylinder, a series of nurling rolls mounted on said carriage and adapted to have engagement with the periphery of the cylinder, and means for imparting radial adjustment to said nurling rolls, a part of the series of nurling rolls having circularly ridged peripheries and a part having longitudinally ridged peripheries the circularly ridged rolls being adapted to hold the parts in alinement while the longitudinally ridged rolls are forming the serrations on the metal cylinder.

13. In an apparatus for nurling abrading teeth upon the initially threaded periphery of metal cylinders, the combination of a frame having means for supporting the cylinder, an annular carriage supported on said frame in a manner to permit of independent longitudinal adjustment and circular rotation between the carriage and the cylinder, a series of nurling rolls mounted on said carriage and adapted to have engagement with the periphery of the cylinder, and means for imparting radial adjustment to said nurling rolls, a part of the series of nurling rolls having circularly ridged peripheries and a part having longitudinally ridged peripheries.

Signed at St. Louis Missouri this 13th day of November 1905.

EDWARD J. O'BRIEN.

Witnesses:

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C. PORTER JOHNSON.