Jan. 26, 1943. H. C. HARRINGTON 2,309,344

DRUM CONDITIONING APPARATUS

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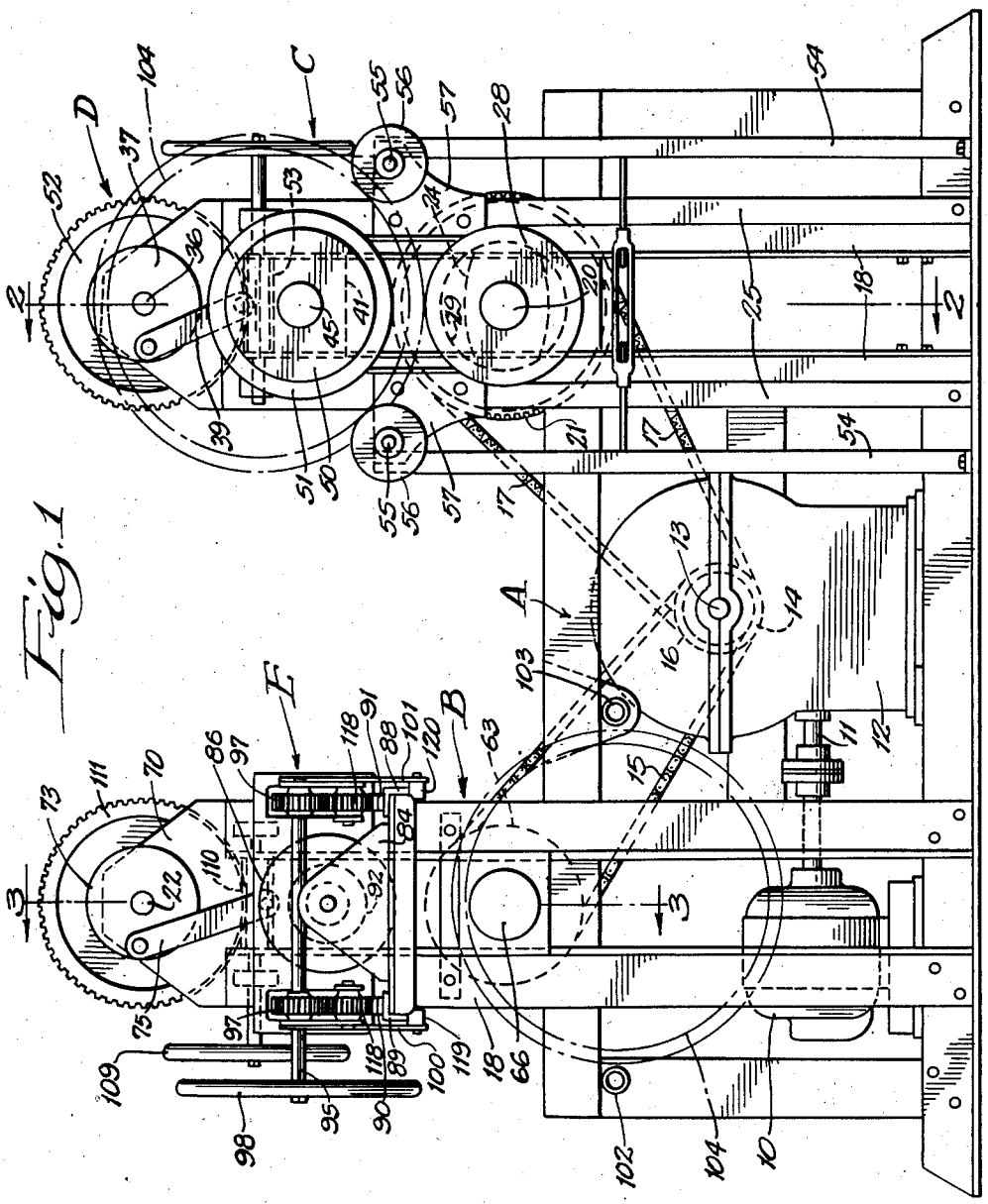

Fig. 1

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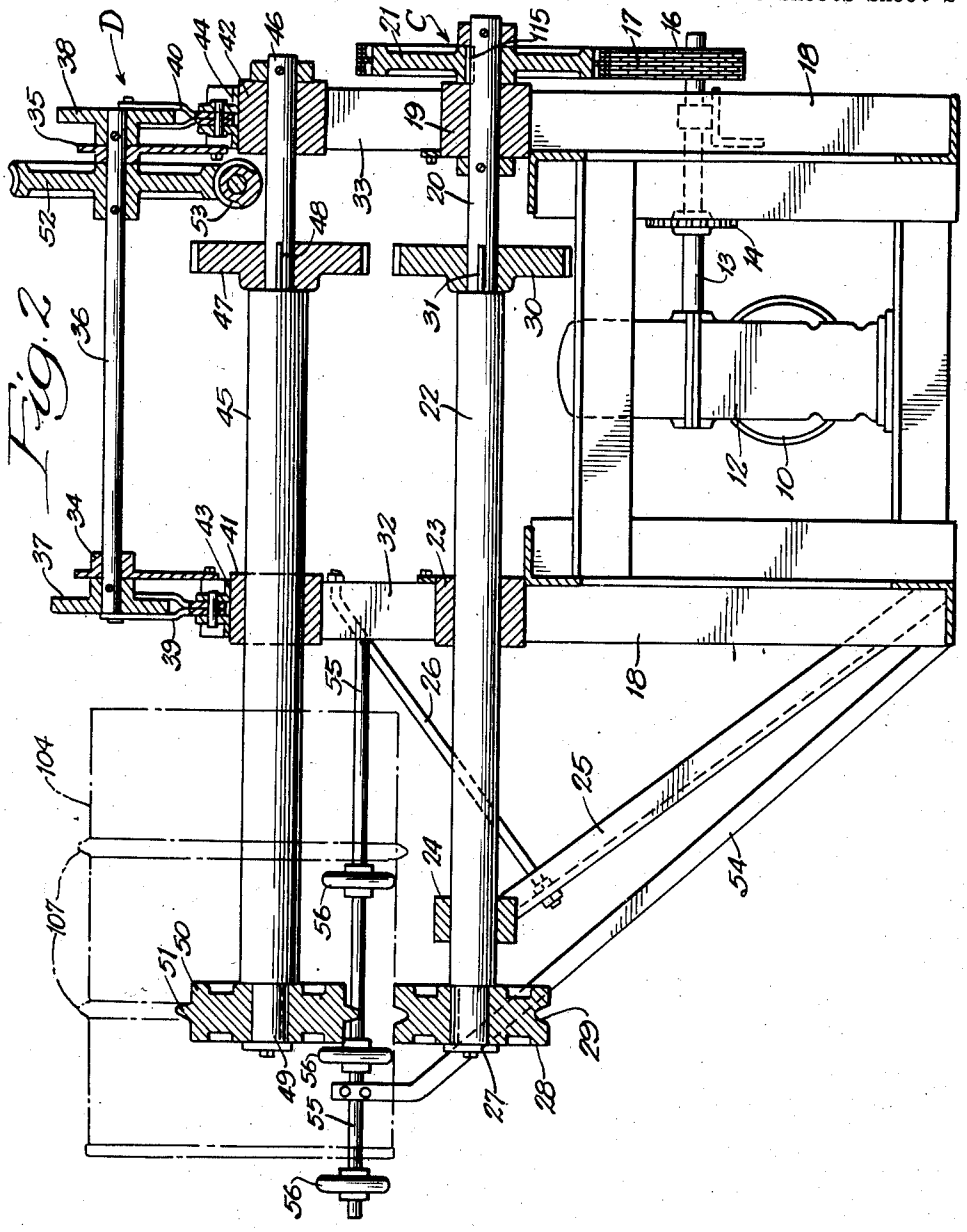
Fig. 2



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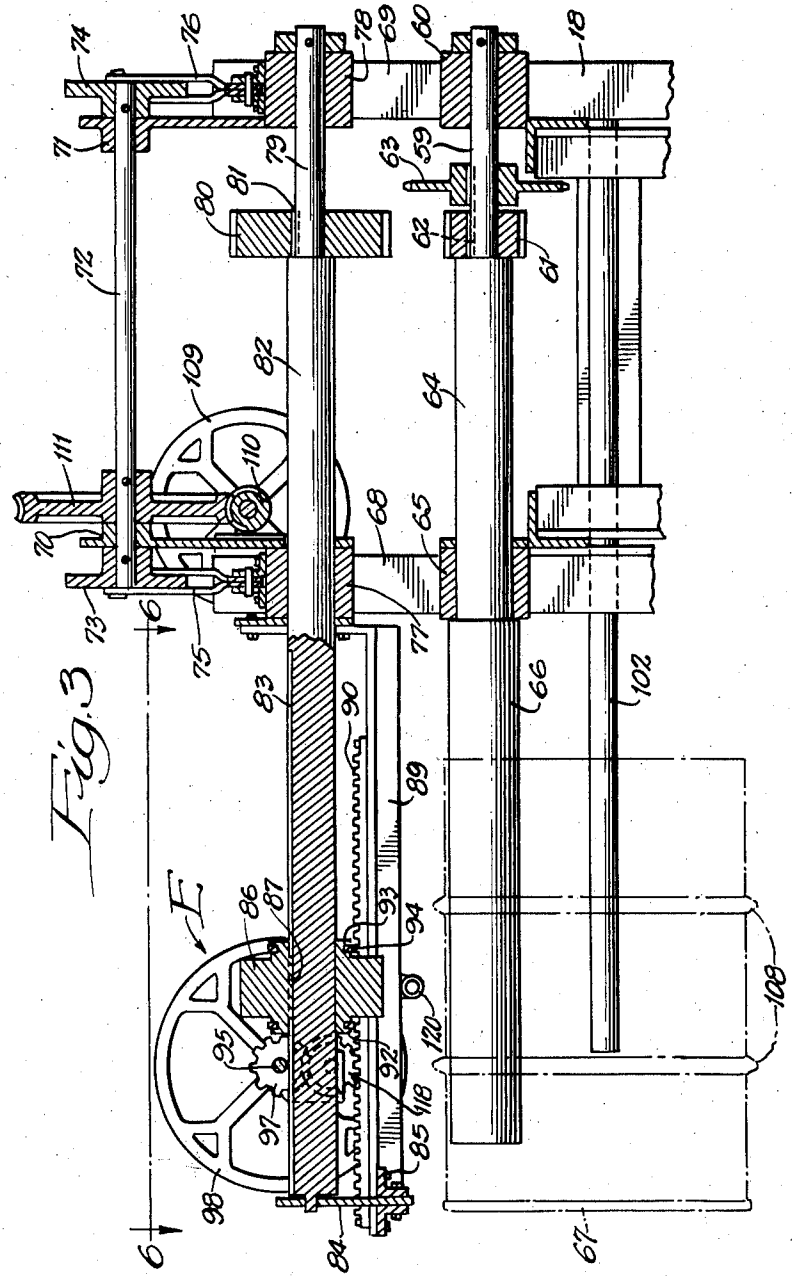

Fig. 3

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Fig. 4

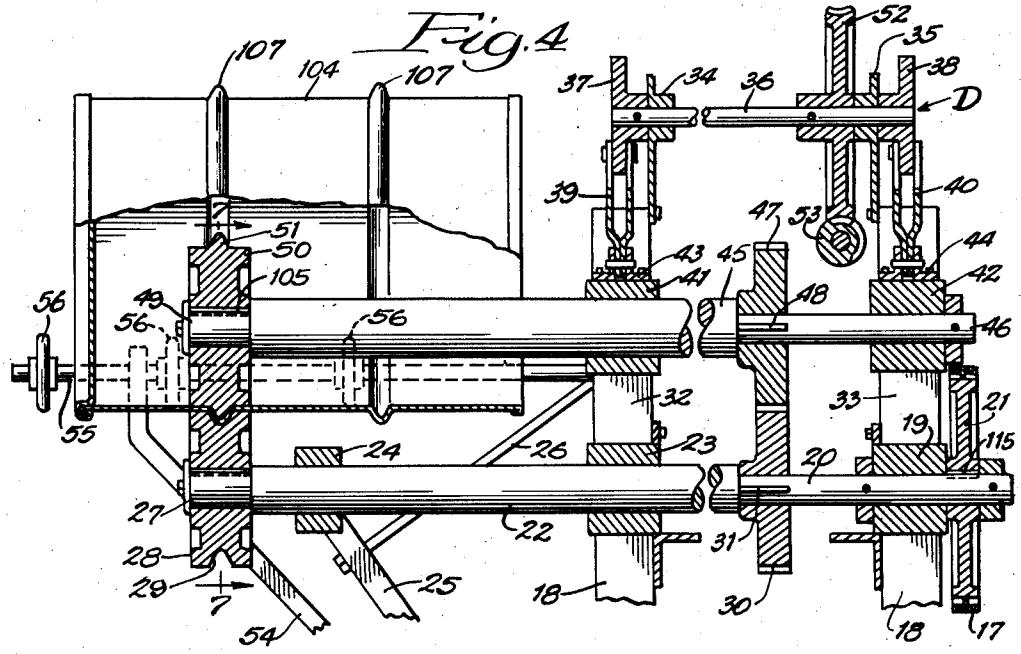

Fig. 5

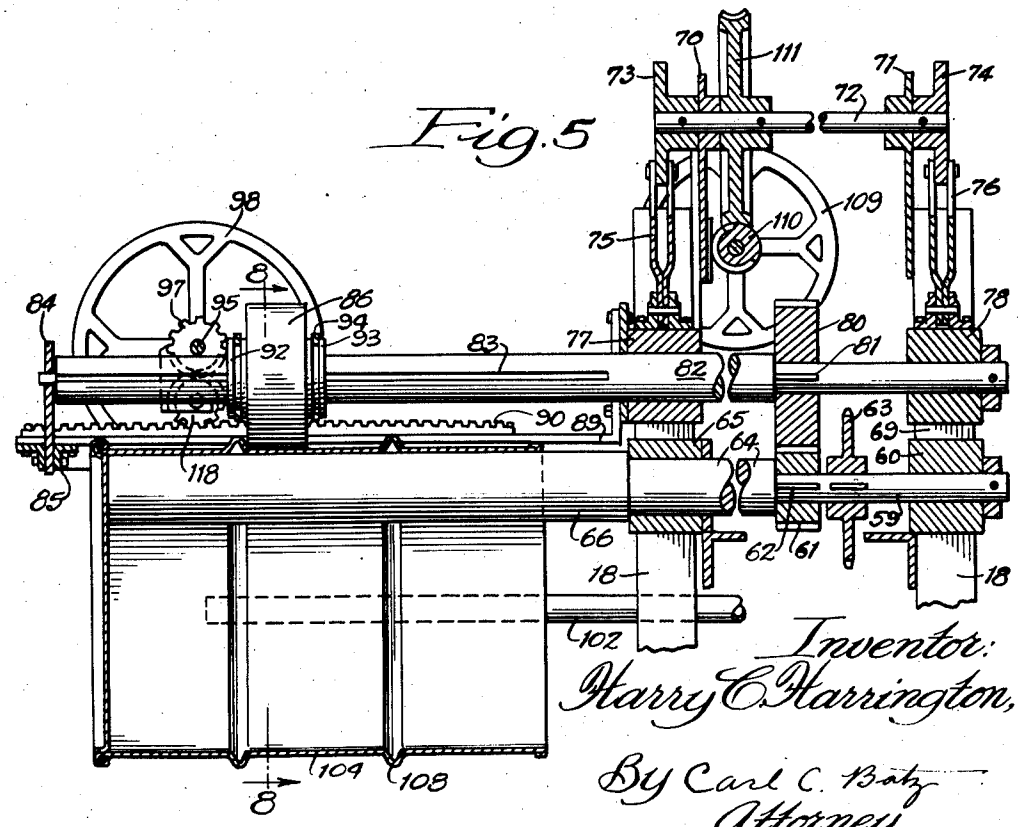

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Fig. 6

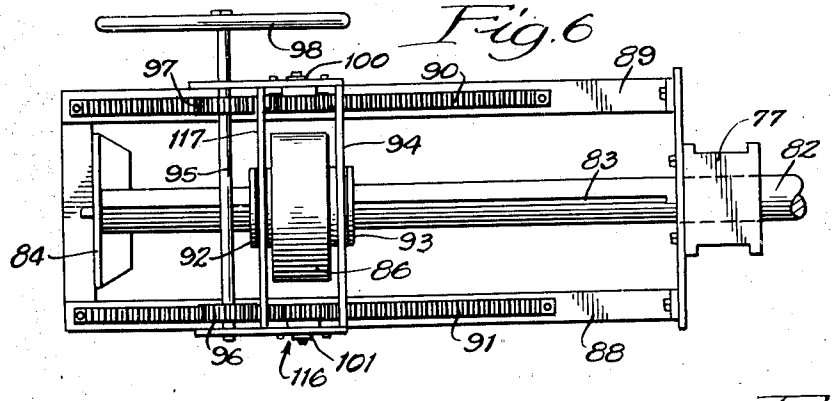


Fig. 7

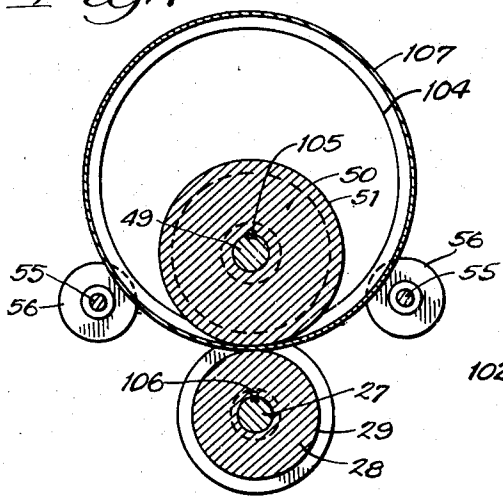
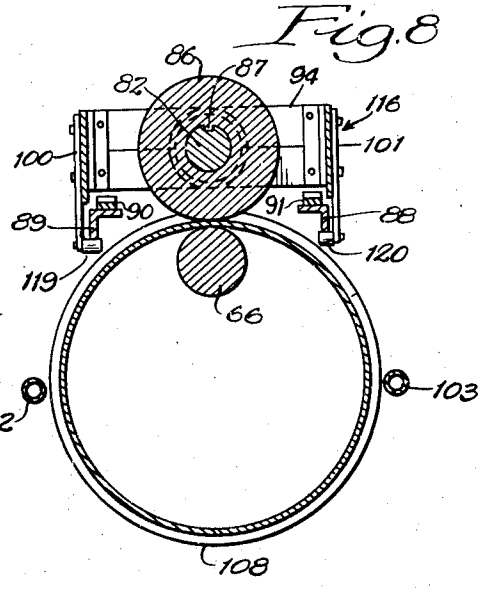


Fig. 8



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Patented Jan. 26, 1943

2,309,344

UNITED STATES PATENT OFFICE

2,309,344

DRUM CONDITIONING APPARATUS

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Application December 5, 1940, Serial No. 368,573

11 Claims. (Cl. 153—9)

This invention relates to a drum conditioning apparatus and more particularly to an apparatus for removing dents, kinks, etc. from drums, especially from drums which are equipped with chimes or ribs.

One feature of the invention is to provide means for subjecting the sides of a drum to the action of a pair of rollers, one inside and one outside the drum whereby the drum is pressed tightly between the two rollers and the dents removed therefrom.

Another feature is to straighten and recondition the chimes in drums. Still another feature is to provide in the apparatus a shaft having a free unsupported end adapted to be received within the drum, the end of the shaft being equipped with a roller for engaging the inside surface of the drum. Yet another feature is to provide a pair of rollers arranged to engage the inside and outside surfaces respectively of the chimes in a drum and to provide one of the rollers with an annular projection and the other with an annular groove whereby when the drum is placed between the rollers the chime is received within the groove in the outside roller and in turn receives the annular projection of the inside roller. A further feature is the construction of means for shifting the position of at least one of the rollers so that this roller may be brought to and from a position of tight engagement with the drum. Another feature is to provide rollers for engaging inner and outer surfaces of the side of a drum, the roller engaging the outer surface being slidably mounted on a shaft and shiftable to and from engaging position with respect to the drum whereby the flat surface of the drum between the chimes therein may be pressed tightly between the two rollers and straightened, and thereafter the outer roller may be moved away from the drum, shifted longitudinally with respect thereto and brought again into engagement with the drum on the opposite side of the adjacent chime.

Still another feature is to provide a wide roller on the free end of a shaft extending into a drum and a second roller adapted to engage the outer surface of a drum and movable to and from engaging position. Other features and advantages will appear from the following specification and drawings, in which:

Figure 1 is a front elevational view of the apparatus; Fig. 2 is a vertical sectional view taken along the line 2—2 of Fig. 1; Fig. 3 is a vertical sectional view taken along the line 3—3 of Fig. 1; Fig. 4 is a vertical sectional view similar to that of Fig. 2 except that the rollers are shown in engagement with the drum and the mechanism is in operative position; Fig. 5 is a vertical sectional view similar to the view shown in Fig. 3 but showing the rollers in engagement with the drum and the mechanism in operative position; Fig. 6 is a plan view of a portion of the apparatus, the view being taken along the line 6—6 of Fig. 3; Fig. 7 is a transverse sectional view taken along the line 7—7 of Fig. 4; Fig. 8 is a transverse sectional view taken along the line 8—8 of Fig. 5.

Drums are usually provided with a plurality of chimes or ribs extending around the sides thereof in order to strengthen the drums and to protect them against injury in handling. The chimes may vary in number and in spacing from each other. Usually a drum is equipped with two or three chimes. After a substantial period of use, the drums and particularly the chimes thereon become dented and bent and eventually must be discarded from use. This effect is particularly noticeable on the chimes which are in exposed position at all times.

The present invention provides a means for reconditioning the drums by which the drums may be straightened and the dents and kinks removed from the body of the drum and from the chimes.

In the specific embodiment of the invention described herein, a drive means A serves to operate a mechanism B for straightening the sides of the drum and a chime-straightening mechanism C. The mechanisms B and C are each provided with equipment D for shifting the position of the shafts carrying the rollers while the mechanism B is additionally equipped with apparatus E for sliding one of the rollers longitudinally with respect to the shaft on which it is mounted.

The drive means A includes a suitable electric motor 10 which rotates a shaft 11 operating the transmission 12 by means of which the power is communicated to a main power shaft 13. The gear 14 and the drive shaft 13 engage a chain 15 which at its other end meshes with a gear 21 to drive the mechanism B. Another gear 16 on the same shaft 13 engages the chain 17 and drives the gear 63 to operate the chime-straightening mechanism C.

A heavy metal frame 18 of suitable construction is provided for supporting the various mechanisms. Referring particularly to Fig. 2, the frame 18 supports a bearing 19 in which is journaled a small shaft 20. The gear 21 is fixedly mounted in one end of the shaft 20 by means of a key 115. On the other end of the shaft 20 is mounted a gear 30 attached to the shaft by a key 31. A gear 30 is secured to the end of a shaft 22 which is also journaled in the bearing 23 in the frame 18. Another bearing 24 mounted on the standard 25 also supports the shaft 22. The standard 25 is attached to the frame 18 at its base and also by the rod 26. The reduced end 27 of the shaft 22 carries a roller 28 fixedly mounted thereon, the roller 28 being equipped with a V-shaped annular groove 29 extending around the surface thereof.

The uprights 32 and 33 of the frame 18 support

bearings 34 and 35 in which is journaled a shaft 36. The shaft 36 in turn supports a pair of plate members 37 and 38 to which are eccentrically secured the depending brackets 39 and 40 respectively. Bearings 41 and 42 are secured to the depending brackets 39 and 40 respectively by the lugs 43 and 44 or any other suitable means. A shaft 45 is attached at one end to the gear 47, which gear in turn is secured to the stub shaft 46 by the key 48. The other end of the shaft 45 is reduced at 49 and supports thereon a roller 50 provided with an annular projection 51 substantially in the shape of an inverted V. Because of the rigid connection of the shaft 45 to the stub shaft 46 through the gear 47, the bearing 42 as well as the bearing 41 in effect serves to support the shaft 45.

The shaft 36 carries a large gear 52 rigidly secured thereto. The gear 52 is arranged to mesh with the worm 53 which is secured to a hand wheel (not shown), in the manner shown in Fig. 3 with respect to the mechanism B.

A pair of standards 54 carry shafts 55 to which are attached rollers 56 of rubber or other suitable material. As seen also in Fig. 1, these shafts are attached at their other ends to the bracket 57. The rollers 56 on the shafts 55 support the drum 104 between them. By turning the worm 53 the plate members 37 and 38 operate in conjunction with the depending brackets 39 and 40 to produce a cam effect on the bearings 41 and 42, raising and lowering the bearings when worm 53 is turned.

In Fig. 4 the mechanism is shown with the bearings 41 and 42 in lowered position. In this position, the gears 30 and 47 mesh and the rollers 28 and 50 are tightly pressed against opposite surfaces of the chime 107 in the drum. The rollers 28 and 50 should be arranged on the shafts 22 and 45 so that the groove 29 is in alignment with the projection 51. The groove 29 thus receives the chime 107 which in turn receives the projection 51.

Although the drum 104 is supported by the rollers 56 on the shafts 55, the supports are so arranged as to permit the drum to rest in the groove 29 in the roller 28.

Referring now to Fig. 3, the frame 18 supports a stub shaft 59 in the bearing 60. A gear 61 is secured to the shaft 59 by a key 62. A driving gear 63 fixedly mounted on the shaft 59 engages the chain 15 (Fig. 1). To the gear 61 is attached the shaft 64 which is supported in the bearing 65. The bearing 60 also serves as a support for the shaft 64 through the rigid connection thereof with the shaft 59. The bearing 65 is disposed intermediate the ends of the shaft 64 which is provided with a free unsupported end extending from the bearing 65. On this end of the shaft 64 is mounted a roller 66 which is preferably of a width as great as the length of the side of the drum to be conditioned. The drum 67 is received on the roller 66 and supported thereby. Auxiliary supports 102 and 103 engage the outside surfaces of the drum on opposite sides thereof and thus aid in retaining the same in proper position.

The uprights 68 and 69 of the frame 17 support bearings 70 and 71 in which is journaled the shaft 72. The shaft 72 is equipped with a pair of members 73 and 74 rigidly mounted thereon. A pair of depending brackets 75 and 76 are eccentrically attached to the members 73 and 74 and extend downwardly therefrom to the bearings 77 and 78 which are respectively carried by the brackets 75 and 76. A stub shaft 79 journaled in the bearing 78 supports a gear 80, the gear being secured to the shaft by the key 81. The gear 80 is also attached to the shaft 82 which is journaled in the bearing 77.

A gear 111 fixedly mounted on the shaft 72 meshes with a worm 110 which is turned by the operation of the hand wheel 109. The construction for moving the bearings 77 and 78 is thus exactly the same as that shown for moving the bearings 41 and 42 and need not be further described herein.

The shaft 82 extends through the bearing 77 to the bearing 84 which supports the end of the shaft. The portion of the shaft between the two bearings is provided with a groove 83 along the longitudinal surface thereof. A lateral extension 85 of the frame 18 carries the bearing support 84 and also provides a support for the carriage 116.

Referring now to Figs. 6 and 8, a roller 86 is supported on the shaft 82, the groove 83 receiving a projection 87 on the inner surface thereof.

The extension 85 of the frame 18 includes a pair of bars 88 and 89 equipped with racks 91 and 90 respectively. Lugs 92 and 93 receive cross members 94 and 117 of the carriage 116. A shaft 95 extends across the carriage 116 and is equipped with a pair of gears 96 and 97 and a hand wheel 98.

Referring now to Fig. 5, the gear 96 meshes with a gear 118 which in turn engages the rack 91. Depending arms 100 and 101 (Fig. 8) on the carriage 116 are equipped at their lower ends with rollers 119 and 120 which engage the bars 88 and 89 to retain the carriage 116 in proper position.

Referring now to Fig. 7, the drum 104 is received about the roller 50 which is fixedly mounted on the shaft 45 by means of the key 105. A similar key 106 secures the roller 28 to the shaft 22. When the roller 50 is lowered by means of the rotation of the worm 53 and the mechanism D actuated thereby, the chime of the drum is tightly pressed between the two rollers.

The rollers 28, 50, 66 and 86 may be made of hardened steel or other material suitable for removing the dents from the steel drums.

Operation

When the dents, kinks, etc. are to be removed from a drum, the drum 67 is placed on the roller 66 as shown in Fig. 3 and moved inwardly on the roller to the position shown in Fig. 5. The supports 102 and 103 engage the sides of the drum and retain it in proper position on the roller 66.

The motor 10 may then be set in operation, or if desired, the motor may be operated continuously when the apparatus is in use. The operation of the motor 10 through the transmission 12 causes rotation of the main drive shaft 13 and drives the chain 14. The chain 14 meshes with the gear 63 (Fig. 3) and drives the gear 61.

The hand wheel 109 is then turned to cause rotation of the worm 110, the gear 111 and shaft 72. This produces a cam action on the members 73 and 74 and brackets 75 and 76, causing the bearings 77 and 78 to be lowered toward the position shown in Fig. 5.

The gear 80 engages the gear 61 as the bearings are lowered, thus driving the shaft 82 and the roller 86 thereon. As the rotation of the wheel 109 is continued, the roller 86 is brought into tight engagement with the side of the drum 67 between the chimes 108, the pressure exerted

on the drum being dependent upon the extent of the rotation of the wheel 109. The rotation of the rollers 66 and 86 causes the drum 67 to rotate between them whereby the dents and kinks may be removed therefrom.

When the portion of the side of the drum 67 between the chimes 108 has been straightened, the wheel 109 is rotated in the opposite direction to operate the mechanism D and lift the roller 86 from engagement with the drum. When the roller 86 has been raised high enough to clear the chimes 108, the mechanism E is operated to shift the longitudinal position of the roller 86 with respect to the shaft 82, thus placing the roller in position to engage a different portion of the side of the drum 67.

The mechanism E is operated by turning the hand wheel 98 which causes rotation of the gears 96, 97 and 118 and movement of the carriage 116 along the racks 99 and 91. When the roller 86 is in proper longitudinal position, the hand wheel 109 is again turned to bring the roller into tight engagement with the side of the drum 67.

At the same time, the mechanism C may be operated to straighten the chimes in another drum 104. As seen particularly in Fig. 2, this drum 104 may be placed around the shaft 45 and the roller 50. The drum is placed in such position that the annular projection 51 of the roller 50 is aligned with the groove of the chime 107, the chime 107 in turn engaging the groove 29 in the roller 28.

The mechanism may be changed from the position shown in Fig. 2 to the closed or engaging position shown in Fig. 4 by the operation of the hand wheel (not shown) to turn the worm 53, the gear 52, the shaft 36 and the members 37 and 38. The cam action of the depending brackets 39 and 40 lowers the bearings 41 and 42 until the gear 47 engages the gear 30 and thereafter the projection 51 of the roller 50 engages the chime groove of the chime 107.

As in the case of the mechanism shown in Figs. 3 and 5 for straightening the side portions of the drum, the pressure exerted upon the drum by the rollers 28 and 50 depends upon the extent to which the worm 53 is turned.

When the chime 107 has been straightened, the worm 53 is turned in the opposite direction to lift the roller 50 from engagement with the chime and the drum is moved longitudinally to a position where the next adjacent chime is received within the groove 29 of the roller 28. The operation is then repeated to straighten this chime.

While in the foregoing description, I have set forth certain details and certain modifications as illustrative of the invention, it will be understood that such details and modifications may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. Drum conditioning apparatus of the character described comprising a frame, a shaft rotatably supported by said frame, a pair of members fixedly mounted on said shaft, supporting brackets eccentrically attached to said members, a pair of bearings carried by said supporting brackets, a shaft journaled in said bearings with a free unsupported end of the shaft extending from one of the bearings, said shaft being equipped with means for engaging a drum, means for supporting a drum adjacent said engaging means, and means for rotating said first-mentioned shaft whereby said bearings are moved and the position of said engaging means with respect to said drum is changed.

2. Drum conditioning apparatus of the character described comprising a frame, a pair of bearings movably mounted in said frame, a shaft journaled in said bearings, one of said bearings being positioned intermediate the ends of said shaft whereby a free unsupported end of the shaft extends therefrom, a roller on said free end of the shaft, said roller being equipped with an annular projection in the shape of an inverted V extending around the same, means for supporting a drum around said shaft with the projection of said roller engaging the V-shaped groove in the inner wall of said drum, a roller equipped with an annular V-shaped groove therein, said last-mentioned roller being rotatably mounted in engagement with the opposite surface of the side of said drum in alignment with said first-mentioned roller with the V-shaped surface of the groove in the roller engaging the surface of the V-shaped projection on the drum, means for moving said bearings to move said first-mentioned roller to and from a position of engagement with said drum, and means for rotating said rollers.

3. Drum conditioning apparatus of the character described comprising a frame, a pair of bearings movably supported by said frame, a shaft journaled in said bearings and equipped with a gear secured thereto, a roller fixedly mounted on said shaft, a second pair of bearings carried by said frame, a shaft journaled in said second pair of bearings, one of said bearings being positioned intermediate the ends of said shaft whereby a free unsupported end of the shaft extends therefrom, a roller fixedly mounted on said free end of the shaft, said roller being disposed opposite said first mentioned roller in parallel relation thereto and being adapted to receive a drum thereon and to support said drum with the opposite surface thereof in engagement with said first-mentioned roller, a drive gear secured to said second shaft in alignment with said first-mentioned gear, means for moving said first-mentioned pair of bearings with respect to said frame to move said first-mentioned roller to and from a position of engagement with said drum while maintaining the rollers in parallel relation and to simultaneously bring said gears into meshing relation, and means for rotating said second shaft.

4. Drum conditioning apparatus of the character described comprising a frame, a pair of bearings movably mounted in said frame, a shaft journaled in said bearings with one end thereof extending unsupported from the bearing adjacent thereto, a roller slidably mounted on the unsupported end of said shaft for longitudinal movement only thereon, means for supporting a drum in engagement with said roller, means for moving said bearings to bring said roller to and from engaging position, means for moving said roller longitudinally with respect to said shaft when said roller is withdrawn from drum-engaging position, and means for rotating said shaft.

5. Drum conditioning apparatus of the character described comprising a frame, a pair of bearings movably mounted in said frame, a shaft journaled in said bearings, a roller slidably splined to said shaft, a second pair of bearings carried by said frame, a shaft journaled in said second pair of bearings, one of said bearings being positioned intermediate the ends of said shaft whereby a free unsupported end of the shaft ex-

tends therefrom, a roller fixedly mounted on the free end of the shaft, said roller being of a width as great as the length of the sides of the drum to be conditioned and being adapted to receive a drum thereon and to support said drum with the opposite surface thereof in engagement with said first-mentioned roller, means for moving said first-mentioned pair of bearings with respect to said frame to bring said first-mentioned roller to and from a position of engagement with said drum, gear and rack means for moving said first-mentioned roller longitudinally with respect to said first-mentioned shaft, and means for rotating said shafts.

6. Drum conditioning apparatus of the character described comprising a frame, a pair of shafts rotatably supported in adjacent relation by said frame, each of said shafts being provided with a roller mounted thereon, said rollers being provided with flat outer surfaces in parallel relation to each other, one of said rollers being of substantially greater width than the other, said rollers being arranged in opposed relation and being adapted to receive the wall of a drum between them, means for bringing said rollers into engagement with the opposite surfaces of the wall of the drum and for separating the rollers to release the drum, a carriage secured to the narrower roller, and means for longitudinally shifting the carriage and the narrower roller secured thereto, whereby the roller may be brought into opposed relation with different portions of the wider roller.

7. Apparatus for conditioning drums equipped with a plurality of chimes extending peripherally about the walls thereof comprising a frame, a pair of shafts rotatably supported by said frame, a pair of rollers mounted respectively on said pair of shafts, said rollers being provided with flat outer surfaces disposed adjacent each other in opposed parallel relation and being adapted to receive the wall of a drum between them, one of said rollers being of a width substantially equal to the length of the wall of the drum and the other roller being of a width slightly less than the distance between the chimes in the wall of said drum, means for bringing said rollers into engagement with the opposite surfaces of the wall of the drum and for separating the rollers to release the drum, a carriage secured to the narrower roller, and rack and gear means for longitudinally shifting the carriage and the narrower roller secured thereto to bring the narrower roller into opposed relation with different portions of the wider roller whereby it may engage the surface of the drum adjacent different chimes.

8. Drum conditioning apparatus of the character described comprising a frame, a pair of bearings mounted in said frame, a shaft journaled in said bearings, a roller carried by said shaft, a second pair of bearings carried by said frame, at least one of said pairs of bearings being movably mounted in said frame, a shaft journaled in said second pair of bearings with one of the bearings being positioned intermediate the ends of the shaft whereby a free unsupported end of the shaft extends therefrom, a roller mounted on the free end of the shaft, said shafts being arranged in spaced parallel relation with the longitudinal flat surfaces of the rollers being disposed in opposed spaced parallel relation and being adapted to receive the wall of a drum therebetween, and single means for moving the movable pair of bearings with respect to the frame to bring the roller on the shaft carried by said bearings to and from a position of engagement with said drum, said means being adapted to maintain the shafts and rollers carried thereby in parallel relation during such movement, and means for rotating the rollers.

9. Drum conditioning apparatus of the character described comprising a frame, a shaft rotatably supported by said frame, a pair of members fixedly mounted on said shaft, supporting brackets eccentrically attached to said members, a pair of bearings carried by said supporting brackets, a shaft journaled in said bearings with a free unsupported end of the shaft extending from one of the bearings, said shaft being equipped on the free end thereof with a roller for engaging the wall of a drum, a shaft rotatably supported by said frame in spaced parallel relation with respect to the shaft journaled in said bearings, said last mentioned shaft being provided with a roller disposed opposite said first mentioned roller and arranged in spaced parallel relation with respect thereto, said rollers being adapted to receive between them the wall of a drum, means for rotating said first mentioned shaft whereby said bearings are moved and said first mentioned roller is brought into engagement with the wall of the drum while maintaining said rollers in parallel relation, and means for rotating said rollers.

10. Drum conditioning apparatus of the character described, comprising a frame, a shaft rotatably supported by said frame, a pair of members fixedly mounted on said shaft, supporting brackets eccentrically attached to said members, a pair of bearings carried by said supporting brackets, a shaft journaled in said bearings, said shaft being equipped with a roller for engaging the wall of a drum, means for supporting a drum in engagement with said roller, a second roller rotatably supported in engagement with the opposite surface of said drum in alignment with said first-mentioned roller and in parallel relation thereto, means for rotating said first-mentioned shaft whereby said bearings are moved and said first-mentioned roller is brought into engagement with the wall of the drum while maintaining the rollers in parallel relation, and means for rotating the rollers.

11. Drum conditioning apparatus of the character described, comprising a frame, a roller rotatably supported by said frome, said roller being equipped with an annular projection in the shape of an inverted V extending around the same, means for supporting a drum about the roller with the projection of said roller engaging the V-shaped groove in the inner wall of said drum, a roller equipped with an annular V-shaped groove therein, said last-mentioned roller being rotatably mounted in engagement with the opposite surface of the side of said drum in alignment with said first-mentioned roller with the V-shaped surface of the groove in the roller engaging the surface of the V-shaped projection on the drum, means for moving at least one of said rollers to bring the rollers to and from a position of engagement with the drum, and means for rotating said rollers.

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