

Dec. 29, 1931.

R. H. CRAMER

1,839,172

CLEANING APPARATUS

Filed June 6, 1928

3 Sheets-Sheet 1

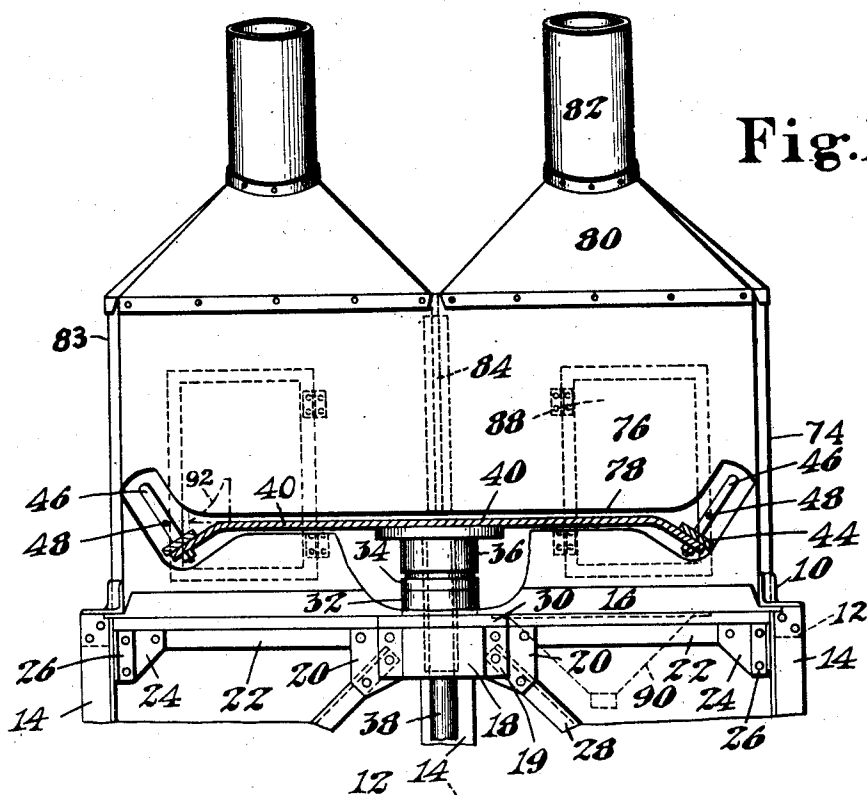


Fig. 1.

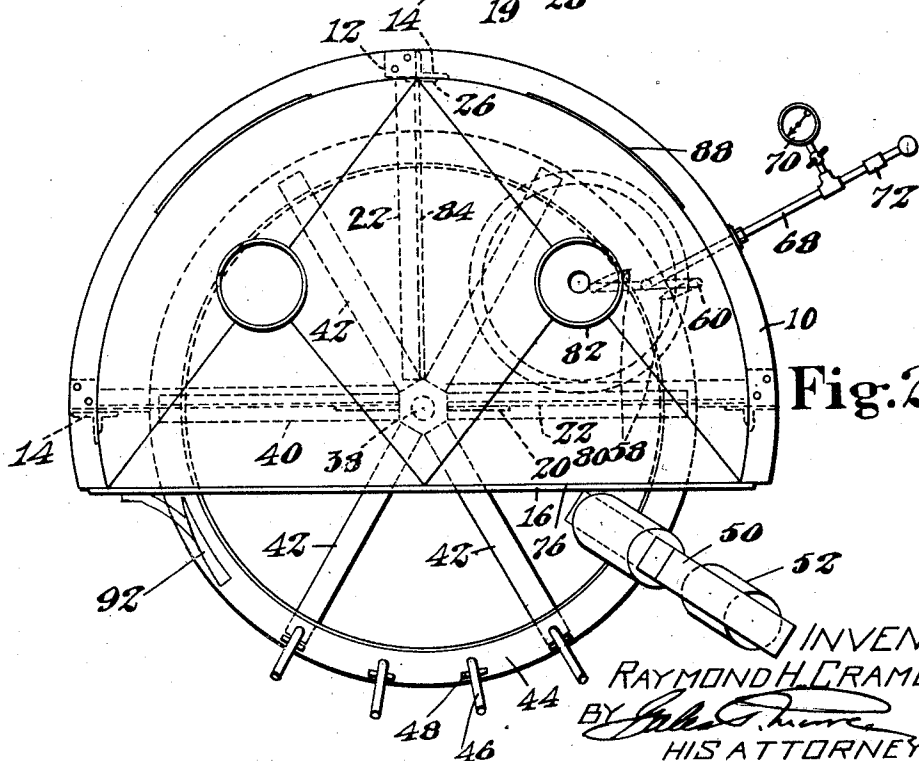


Fig. 2.

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Fig.3.

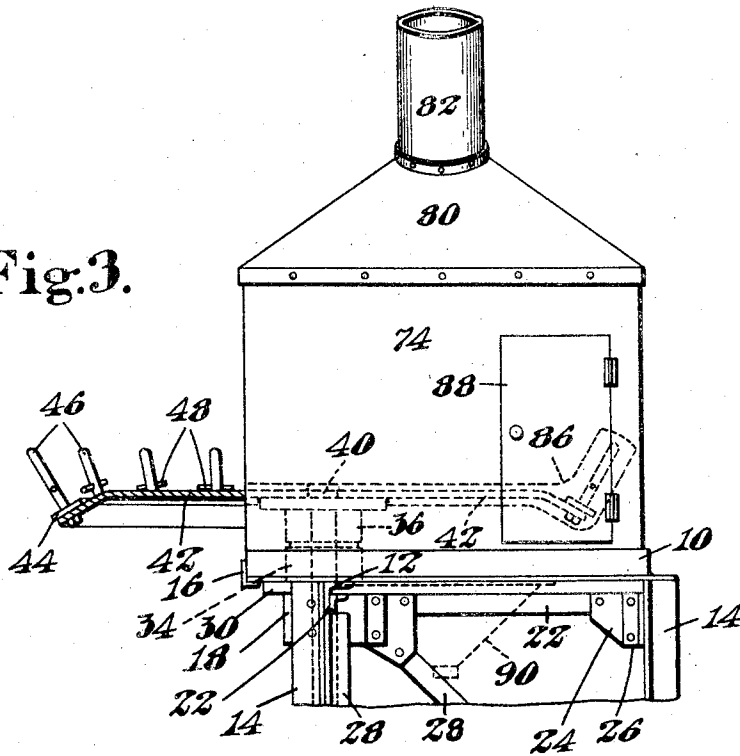
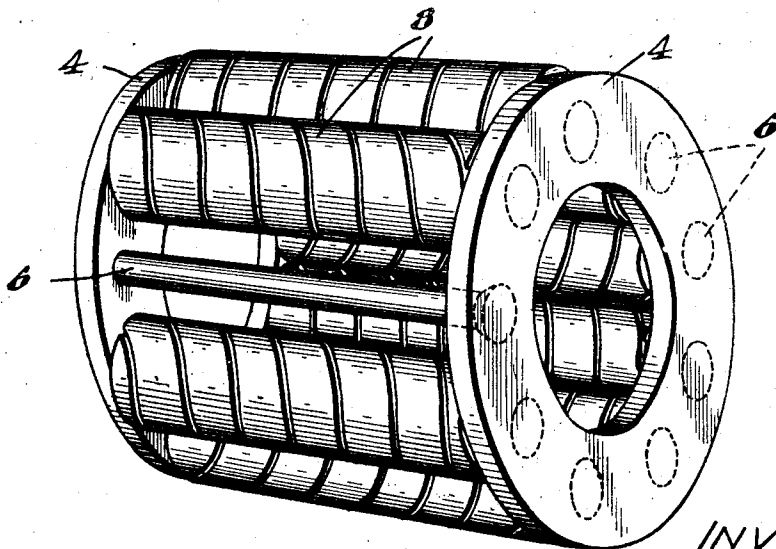


Fig.4.

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3 Sheets-Sheet 3

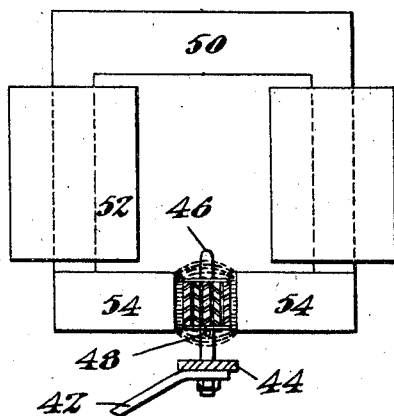


Fig. 5.

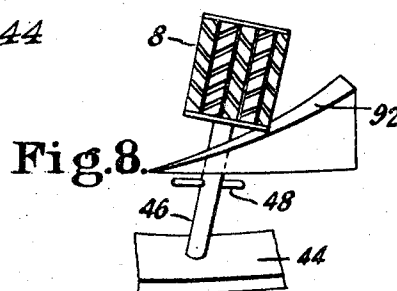


Fig. 8.

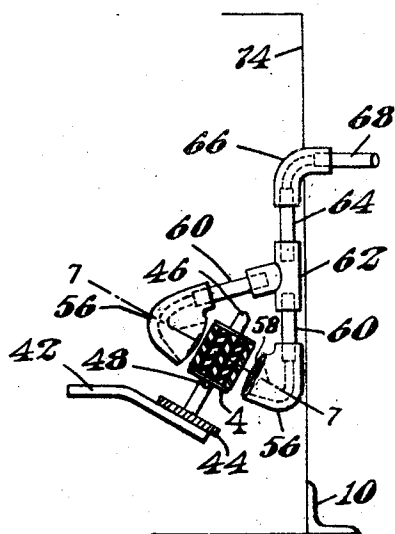


Fig. 6.

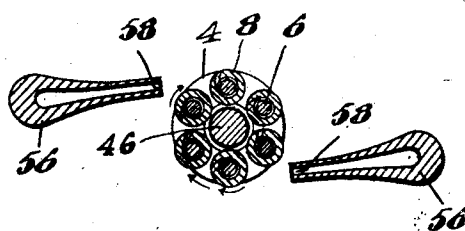


Fig. 7.

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UNITED STATES PATENT OFFICE

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CLEANING APPARATUS

Application filed June 6, 1928. Serial No. 283,175.

This invention relates to cleaning apparatus and comprises all the features of novelty herein disclosed. In the manufacture of anti-friction bearings, metal particles and other foreign matter adhere to the parts and must be removed before shipping the bearings. Magnetization, and the grease and oil with which the parts come in contact increase their liability to accumulate extraneous matter and, when the bearings are roller bearings having helically wound hollow rollers, the interstices of the rollers also provide lodgement for such foreign matter. An object of the invention is to provide improved cleaning apparatus for revoluble articles such as anti-friction bearings. Another object is to provide improved supporting and feeding devices for articles such as roller bearings to facilitate the cleaning action of a jet of cleaning fluid.

To these ends and to improve generally and in detail upon devices of this character, the invention also consists in the various matters hereinafter described and claimed.

In its broader aspects, the invention is not necessarily limited to the specific embodiment selected for illustration in the accompanying drawings in which

Fig. 1 is a front view of the apparatus with the carrier in section and with part of the front wall broken away.

Fig. 2 is a plan view.

Fig. 3 is a side view with the carrier in another position and partly in section.

Fig. 4 is a magnified perspective view of an article to be cleaned, one of the rollers being omitted.

Fig. 5 is a front view of the demagnetizer.

Fig. 6 is a detail view of the cleaning nozzles and associated parts.

Fig. 7 is a section on line 7—7 of Fig. 6, enlarged.

Fig. 8 is a perspective view of details at the unloading station.

As a typical example of the article to be cleaned, there is shown to a large scale in Fig. 4 a roller assembly comprising end rings 4 rigidly connected by tie bars 6 with helically wound hollow rollers 8 sleeved on the

tie bars. The articles are loaded one-by-one on inclined trunnions or posts of a rotary carrier which carries them first through a demagnetizing field and then into a steam chamber. Each article travels to a cleaning station between a pair of nozzles so arranged as to cause jets of steam to strike the roller assembly at an angle thereby causing the roller assembly to rotate on the post and also causing the individual rollers themselves to rotate on their axes. The steam jets cut or burn off the grease and blow off the particles of foreign matter, rotation of the article and its individual rollers aiding in throwing the particles away from the bearing. Each article is then carried into a drying chamber and then out to an unloading station where a cam causes the roller assemblies to be lifted from the posts.

The supporting stand comprises an angle iron 10 of substantially semicircular form connected by angle plates 12 to vertical legs 14, the ends of the angle iron 10 being connected at the front by a straight angle iron 16. A bearing block 18 having vertical webs 19 is bolted to gusset plates 20 which are connected by horizontal radial arms 22 to the legs 14 through the agency of gusset plates 24 and angle plates 26. Inclined radial bracing arms 28 also extend from the gusset plates 20 to the legs 14. The bearing block 18 has an annular flange 30 and a portion 32 supporting a thrust bearing 34 which in turn supports a hub 36 bolted to a rotary carrier. The hub is pinned to a vertical shaft 38 journaled on a bushing in the bearing block 18. The shaft is rotated by any suitable mechanism, preferably in an intermittent manner.

The carrier comprises a diametrical arm 40 and a plurality of radial arms 42 all bolted to a flange of the hub 36 and having their outer ends bent downwardly and secured to a continuous ring 44. The ring is dished and is preferably made of brass or some non-magnetic material and supports a series of upwardly and outwardly inclined trunnions or posts 46, preferably of brass. Each post carries a pair of opposite anti-friction rolls 48 to support the article for rotation by en-

gagement with one of the end rings 4 as indicated in Fig. 6. Each post is of such diameter as to freely enter the opening between the circular series of individual bearing rollers 6 and is a smooth cylinder, thereby forming a trunnion on which the bearing assembly can rotate when subjected to the action of steam jets, the trunnion serving as a raceway for the bearing rollers to roll upon.

When a roller assembly has been thus sleeved over one of the posts at the front of the machine, it is carried first to a demagnetizer comprising a yoke 50 having coils 52 and a pair of pole pieces 54 spaced apart to provide a field through which the article passes, as indicated in Fig. 5. The details of the demagnetizer may be varied and it is supported in any suitable way, its function being to demagnetize the roller assembly and the metallic particles sticking to it and so facilitate the release of said particles.

Each article is next carried to a cleaning station where it is received between a pair of nozzle casings 56 having orifices 58 in the form of elongated slits extending lengthwise of the bearing assembly and directed substantially towards the periphery on opposite sides of the axis of rotation. Each nozzle casing is flattened at the sides but increases in width outwardly so that the narrow steam passage therein gradually becomes tubular for threaded attachment to a swivel pipe 60. The pipes 60 are attached to a branch coupling 62 carried by a pipe 64 which is attached to an elbow 66 extending through a steam chamber wall to a steam supply pipe 68 having a pressure gauge 70 and a throttle valve 72. The two swivel pipes 60 extend towards diametrically opposite sides of the bearing assembly and the nozzles can swivel thereon to adjust the direction of the jets of steam at the most efficient angle for rotating both the bearing assembly and the individual rollers thereon and blowing out the particles of foreign matter.

The nozzles are enclosed by galvanized sheet iron in a steam chamber having an arcuate side and rear wall 74 and a straight front wall 76 which is provided with a slot 78 to allow the carrier to rotate and to project out to the front for loading. The steam chamber also has a hood 80 and a pipe 82 to exhaust the steam and is separated from a drying chamber 83 by a partition 84 having a slot 86 for the carrier. The steam chamber wall 74 has a hinged door 88 at the rear and a conical drain 90 in the bottom. The drying chamber 83 is supplied with dry air and also has a hood and a door. As the articles are carried out of the drying chamber they run against a fixed wedge or cam 92 which causes them to rise from the inclined posts and drop into a receptacle. As shown in Figs. 1 and 2, the cam is arranged just outside the circular series of posts or trunnions and its

upper face inclines from about the level of the rolls 48 to the level of the ends of the trunnions thereby to engage and lift outgoing articles from the posts.

I claim:

1. In apparatus for cleaning rotatable articles, a movable carrier having a series of trunnions to act as the axes of rotation for the articles, rolls projecting from the trunnions to support the articles for rotation, and a nozzle arranged at one side of the path of the articles for directing a jet of fluid against the articles to rotate and clean them.

2. In apparatus for cleaning rotatable articles, a movable carrier having a series of inclined trunnions to receive the articles one-by-one to hold them for rotation, a nozzle arranged at the side of the path of the articles for directing a jet of cleaning fluid against the articles successively, and a cam arranged in the path of the articles to lift them successively from the trunnions.

3. In apparatus for cleaning a rotary article which has a circular series of round members individually rotatable thereon, a trunnion for entering the opening at the center of the circular series of members and having a smooth cylindrical surface acting as a raceway for the members and as a centering means for the article, article supporting means projecting radially from the trunnion to engage one end of the article, and a nozzle for directing a jet of cleaning fluid against the members at the side of their axes of rotation to successively rotate the members around their axes while the article carrying the individual members is rotated as a whole by the jet around the raceway provided by the trunnion.

4. In apparatus for cleaning an article, a movable carrier having means for supporting the article, means for demagnetizing the article and its adhering material at one station, and a nozzle for directing a jet of cleaning fluid against the article at another station for removing the adhering material.

5. In apparatus for cleaning rotary articles, a chamber having a front wall provided with a carrier opening, a rotary carrier traversing the chamber and having a segmental portion projecting through the opening, the carrier having a series of inclined article holders to receive and guide the articles for rotation, and a nozzle arranged at the side of the path of the articles for directing a jet of cleaning fluid towards the periphery of each article in its traverse through the chamber to thereby rotate the article and remove foreign matter therefrom.

6. In apparatus for cleaning rotary articles, a movable carrier having a series of article holders to guide the articles for rotation around their axes, article supporting means projecting radially from each holder, and a pair of nozzles straddling the path of

the articles, the nozzles being arranged with their spray openings directed out of line with one another to direct jets of cleaning fluid substantially tangentially against opposite sides of each article to rotate it on the holder in its traverse between the nozzles.

7. In apparatus for cleaning rotary articles, a movable carrier having a series of inclined trunnions thereon to guide the articles for rotation, the trunnions having a plurality of radially projecting supporting rollers to engage the ends of the articles, and a nozzle arranged adjacent to the path of the articles, the nozzle comprising a flattened casing having an elongated spray opening extending lengthwise of the adjacent articles for directing a jet of cleaning fluid against the articles in their traverse with the carrier, the jet of fluid being directed against all points of the articles in their traverse and thereby rotating the articles and removing foreign matter.

8. In apparatus for cleaning rotary articles, a rotary carrier having a series of trunnions slanting outwardly and upwardly to enter axial openings in the articles and guide them for rotation, the trunnions having radially projecting supporting rollers engaging the ends of the articles, and a nozzle arranged adjacent to the path of the articles for directing cleaning fluid against the articles in their traverse with the carrier.

In testimony whereof I hereunto affix my signature.

RAYMOND H. CRAMER.