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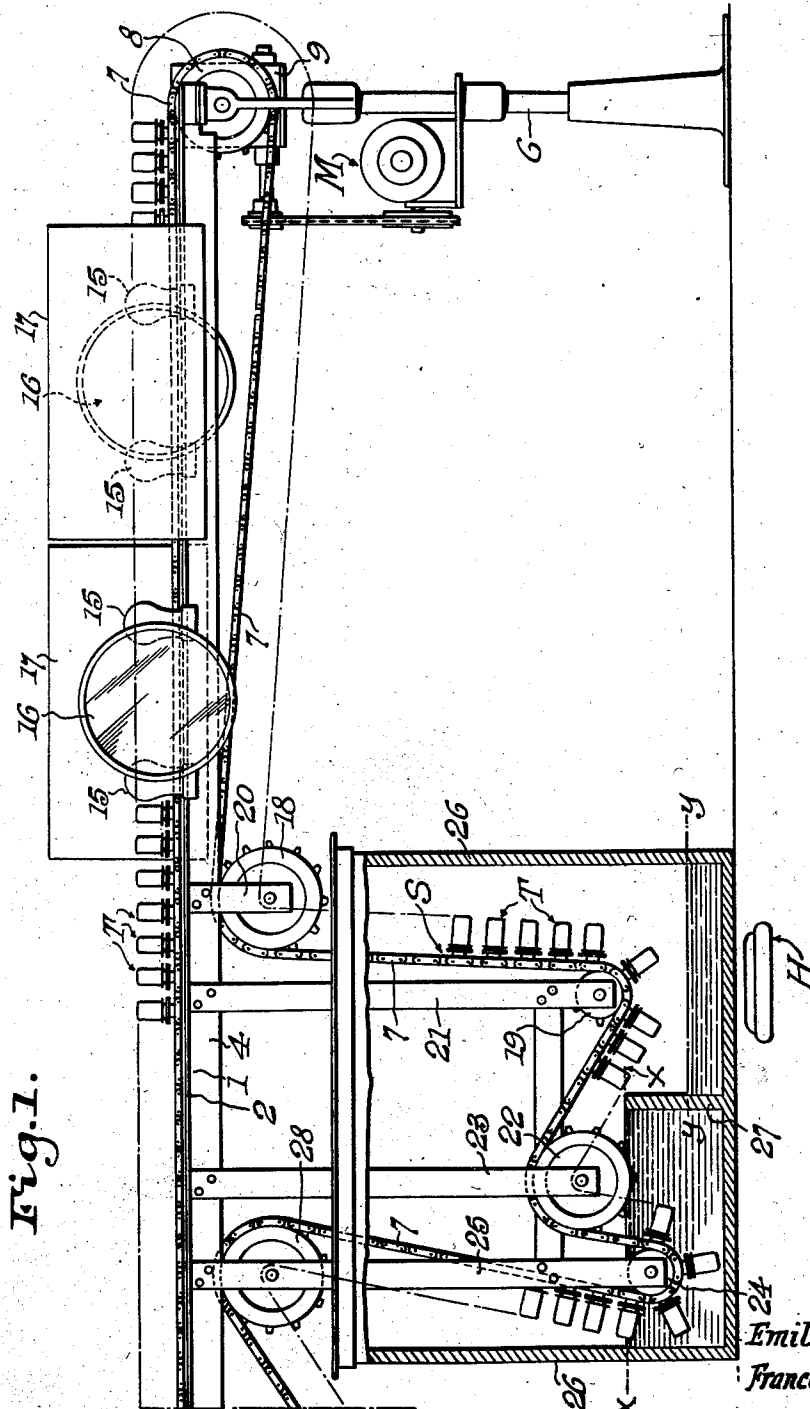
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APPARATUS FOR DEGREASING CONTAINERS

Filed March 28, 1944

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

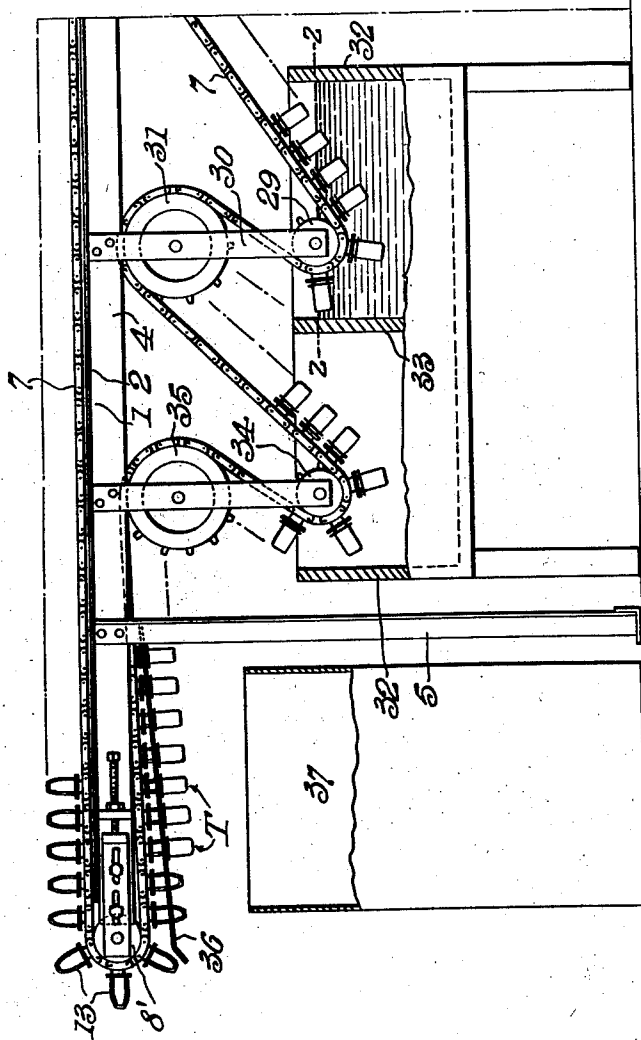


Fig. 1a.

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Fig. 2.

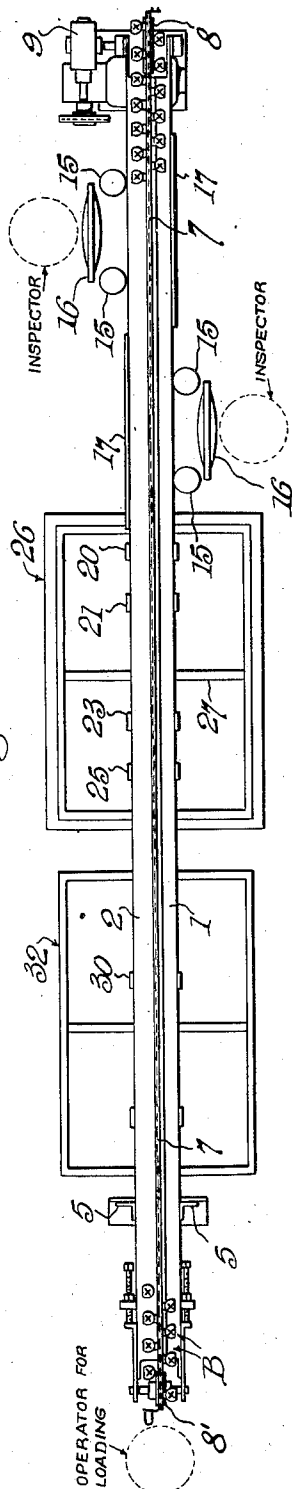


Fig. 4.

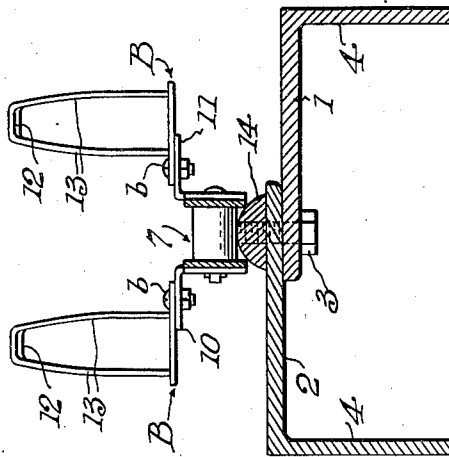


Fig. 3.

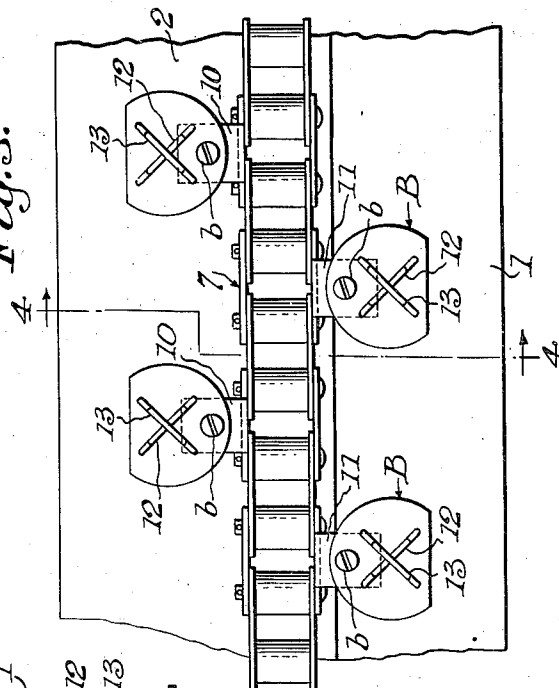
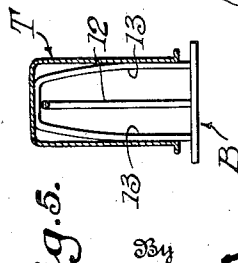


Fig. 5.



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APPARATUS FOR DEGREASING
CONTAINERS

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Application March 28, 1944, Serial No. 528,488

7 Claims. (Cl. 91—13)

The invention relates to new and useful improvements in an apparatus for degreasing containers and is particularly adapted for degreasing a radio tube shell which is made of a single piece of drawn metal having one end closed and the other end provided with a laterally, outwardly projecting flange.

An object of the invention is to provide an apparatus, wherein the articles to be degreased are passed by a conveyor in succession through a chamber in which is maintained a degreasing fluid in vapor form, and then through a chamber containing a degreasing fluid in a liquid form, in which the articles are completely immersed.

A further object of the invention is to provide an apparatus of the above type wherein the articles after being immersed in the degreasing fluid are positioned so as to completely drain the degreasing fluid from the article, after which they are passed in succession through a bath of rustproofing liquid.

A still further object of the invention is to provide an apparatus of the above type, wherein the articles before passing into the presence of the degreasing vapor are passed through an inspection station where the articles may be fully inspected.

A still further object of the invention is to provide an apparatus of the above type wherein a continuous traveling conveyor is provided with means for supporting the articles to be cleaned, which conveyor carries the articles through the inspection station, thence through the cleaning treatment, and thence through the rustproofing treatment, and wherein automatic means is provided for stripping the articles from the conveyor after the final treatment.

These and other objects will in part be obvious and will in part be hereinafter more fully described.

In the drawings, which show by way of illustration one embodiment of the invention,

Figure 1 is a side view showing more or less diagrammatically and partly in section, a portion of an apparatus embodying the improvements.

Figure 1a is a side view showing the remainder of the apparatus.

Figure 2 is a plan view of the same.

Figure 3 is a plan view on an enlarged scale of a portion of the conveyor.

Figure 4 is a sectional view through a portion of the frame and through the conveyor on a line 4—4 of Fig. 3.

Figure 5 is a view showing on an enlarged scale one of the carriers with a radio tube shell mounted thereon.

While the apparatus embodying the invention may be used for degreasing articles of various types, it is especially adapted for degreasing a

container used in connection with radio tubes and commonly referred to as a radio tube shell.

In Figure 5 of the drawings, there is shown a radio tube shell T which includes a cylindrical body portion having a closed end portion at one end and a laterally projecting flange at the other end. This shell is made from a single piece of metal by a drawing operation. The purpose of the present apparatus is to remove all particles of grease from both the interior or exterior of the finished shell.

The apparatus comprises a suitable supporting frame including a table formed of two sections of angle iron 1 and 2, secured together by bolts 3. Each section has a depending skirt 4, 4. At the left-hand end, as viewed in Figure 1, there are supporting legs 5 which are bolted to the depending skirts of the angle members forming the table. At the right-hand end the table is supported by a standard 6.

Mounted for travel lengthwise of the table is a conveyor 7. This conveyor consists of a series of links arranged in pairs and provided with spacer collars and pivot bolts forming a usual type of conveyor chain adapted to travel over sprockets. The conveyor chain meshes with a driving sprocket 8, which is connected through a suitable train of gearing, indicated at 9, with a motor M. The motor is mounted on a bracket carried by the standard 6.

At the other end of the table is a sprocket wheel 8' over which the conveyor travels, and this sprocket wheel is mounted in bearings carried by members which can be shifted longitudinally of the table for taking up the slack in the conveyor.

Attached to alternate links on one side of the conveyor are brackets 10 and attached to alternate links on the other side of the conveyor are brackets 11. These brackets are preferably arranged so that they are staggered relative to each other when viewed from above. Each bracket is provided with a holder consisting of a base plate B carrying two rods bent into U-shape. These base plates are secured to the respective supporting brackets by bolts b. These rods are indicated more in detail in Figure 5. The rod 12 lies in a plane at right angles to the rod 13. These rods extend through openings in the supporting base plate B and are welded or otherwise secured thereto. The rods are so shaped and dimensioned that a radio tube shell can be quickly slipped down over the rods when in vertical position and contact between the inner surface of the shell and the rods will be of a minimum character. The rods are round, and therefore the rod 13 will make a very short line contact with the closed end 2 of the shell. Each of the rods will also make line contact with a portion of the shell adjacent the outer end thereof.

This contact between the rods and the side wall of the shell is sufficient to retain the shell on the rods, even when said rods are inverted so that they depend from the conveyor supporting the same.

The left hand end of the apparatus as shown in Figure 1a may be referred to not only as a loading station, but also as a discharge station. As the holders pass in a clockwise direction around the sprocket wheel 8' they will be brought onto the upper face of the table and as they move along, an operator can readily slip a shell down over the holders carried by the carrier. Two operators are preferably provided, one at each side for loading the shells onto these holders. The bolts 3 for securing the sections of the table together, also secure a half round strip 14 to the upper face of the table and the conveyor rides along on the half round strip.

The conveyor first presents these shells to an inspecting station. There are two inspecting stations and each includes lamps 15, 15, and a magnifying glass 16. A suitable metal baffle 17 is provided at each inspecting station to facilitate the inspection of the tubes. After passing the inspecting stations, the tubes pass around the sprocket 8 and thence along underneath the table. The conveyor runs around a sprocket 18 and thence downward and around a sprocket 19. The sprocket 18 is mounted in depending brackets 20 carried by the angle bars forming the table. The sprocket 19 is carried by depending brackets 21, also mounted on the angle bars. The conveyor after passing around the sprocket 19, passes around a sprocket 22 carried by depending bracket arms 23, thence around a sprocket 24, carried by depending bracket arms 25. The sprockets 19, 22 and 24 are located in a treating tank 26 provided with a suitable cover having openings to permit the conveyor to pass into and out of the tank.

The tank is provided with a cross partition 27 which terminates at a line $x-x$. The partition 27 in a measure divides the tank into two sections, one is a vapor degreasing section and the other is a rinsing section where the articles are submerged in the degreasing fluid. In the section at the right of the partition 27, the level of the degreasing fluid is substantially at a line $y-y$.

A heating means is provided in this section of the tank which raises the temperature of the degreasing fluid above boiling point and creates a degreasing vapor that fills the tank above the liquid level therein. This heating means may be an electric heater disposed below the bottom of the tank, as indicated at H, or any other suitable heating means may be employed.

The sprockets 18 and 19 are so positioned relative to each other that the section indicated at S lies in a line which is at an acute angle to the vertical. Preferably the angle is about five degrees. This will cause a center line through each holder to incline downwardly slightly. While the shells are passing along this section of the conveyor travel, the vapors of the degreasing fluid contacting with the inner and outer faces of the shell will condense and flow down into the shell so that the closed end of the shell is subjected to this degreasing fluid.

While the shells are traveling through this vapor degreasing section of the tank, they will be thoroughly subjected to the degreasing vapor and every particle of grease loosened for removal from the surface of the shell. The sprocket wheels 22 and 24 are so positioned that the holders carrying the shells pass over the partition 27

and thence downward beneath the surface of the degreasing fluid in the left-hand section of the tank. This section of the tank is kept filled with the degreasing fluid and as the condensed fluid is left in this section of the tank, it will flow back over the partition. The temperature of the fluid in the left-hand section is maintained substantially at 200° F. As these shells enter the degreasing fluid in the left-hand section of the tank, they will be filled with a degreasing fluid. The shells pass into the fluid in an inclined position which permits all air and gases in the shells to be forced out of the same as the degreasing fluid enters. The same is true of the shells as they pass into the vapor degreasing section of the tank. After leaving the sprocket wheel 24, the conveyor passes over a sprocket wheel 28. This sprocket wheel is carried by the bracket arms 25, but inasmuch as the conveyor leaves the left-hand side of the sprocket wheel 24 and passes on to the right-hand side of the sprocket wheel 28 the conveyor will travel in a line which is inclined to the vertical and the shells will be so positioned during this section of the path of travel of the conveyor that all degreasing fluid therein will be drained therefrom. This degreasing fluid is very volatile, and as soon as it is emptied from the shell, both the interior and the exterior of the shell will instantly dry.

After leaving the sprocket wheel 28, the conveyor passes over a sprocket wheel 29 carried by depending bracket arms 30 secured to the skirt of the table, and thence over a sprocket wheel 31. Directly beneath the sprocket wheel 31 is a tank 32 formed by a partition 33 into two sections. The section at the right of the partition 33 contains a rustproofing material which may be in the form of any suitable drying oil.

The level of the treating fluid is substantially on the line $z-z$ of Fig. 1a. The conveyor will completely immerse the shells in the rustproofing liquid, and as the conveyor travels over the sprocket 31, these shells will be so positioned that the liquid contained therein will be drained from the shells. The shells pass into the liquid in an inclined position which permits all air and gases in the shells to be forced out of the same as the rustproofing liquid enters. In order to give more time for the complete draining of the rustproofing liquid from the shells, the conveyor passes over a sprocket 34 and thence over a sprocket 35 arranged directly above the section at the left of the partition 33. This section is substantially empty and serves as a collecting tank for any further rustproofing liquid which drains from the shells.

The conveyor after leaving the sprocket 35 passes over the sprocket 8' and back to the loading station.

Mounted on the supporting legs 5, 5 are stripping plates 36, 36, one at each side of the conveyor. These stripping plates are so disposed that the flange of the shell will contact therewith while the base plate supporting the holder for the shell passes above the stripping plates. These plates 36 are also inclined downward and therefore the plates will force the shells off from the holders and they will drop into a suitable fiber drum indicated at 37 in the drawings.

It is thought that the operation of the apparatus will be clearly understood from the detailed description which has been given above. It may be stated, however, that the articles to be degreased are placed by the operators on the holders while they are moving, and these holders con-

vey the articles past the inspecting station where if they are found defective as to physical structure, they can be readily removed from the conveyor. The articles after passing through the inspecting stations are conveyed automatically into the presence of the degreasing vapor where all particles of grease clinging to the inner and outer surfaces of the shells are attacked and removed. The shells are then passed through a bath of the degreasing fluid for rinsing the same, after which they are positioned so that all degreasing fluid collecting in the shells is drained therefrom. The shells are then passed into a rustproofing liquid where they are completely immersed and positioned as they leave the bath so that the rustproofing liquid collecting therein is completely drained from the shells. After the draining of this rustproofing liquid from the shells they are automatically stripped from the conveyor into a container and the operator does not handle the shells after they have been degreased and the rustproofing material applied thereto. The shells may be shipped in these containers to the place of use.

While the invention has been described in detail as applied to the degreasing of a cup-shaped radio tube shell, it will be understood that it may be equally applied to the degreasing of any article. The only changes necessary would be in a supporting means for holding the article on the conveyor so as to insure the article being completely subjected to the degreasing vapors, also to the rinsing action by the degreasing liquid, and also to the rust-proofing liquid following the degreasing treatment.

We claim:

1. A degreasing apparatus comprising a tank, means for maintaining in one section of the tank a hot vaporized grease-removing fluid and in another section of said tank a liquid bath of said grease-removing fluid, and a conveying means for passing the articles to be degreased continuously and in succession through the grease-removing vapors and then into and out of the grease-removing liquid.

2. A degreasing apparatus comprising a tank, means for maintaining in one section of the tank a hot vaporized grease-removing fluid and in another section of said tank a liquid bath of said grease-removing fluid, a second tank having a bath of a rustproofing liquid and a conveying means for passing the articles to be degreased continuously and in succession through the grease-removing vapor, then into and out of the liquid bath and thence into the second tank and into and out of the rustproofing liquid.

3. A degreasing apparatus comprising a tank, means for maintaining in one section of the tank a hot vaporized grease-removing fluid and in another section of said tank a liquid bath of said grease-removing fluid, and a conveying means for passing the articles to be degreased continuously and in succession through the grease-removing vapors and then into and out of the grease-removing liquid, said conveying means including an endless chain, sprockets over which said endless chain passes, said endless chain having supporting brackets at spaced intervals and a holder carried by each bracket for supporting the article to be degreased.

4. A degreasing apparatus comprising a tank, means for maintaining in one section of the tank a hot vaporized grease-removing fluid and in another section of said tank a liquid bath of said

grease-removing fluid, and a conveying means for passing the articles to be degreased continuously and in succession through the grease-removing vapors and then into and out of the grease-removing liquid, said conveying means including an endless chain, sprockets over which said endless chain passes, said endless chain having a supporting brackets at spaced intervals and a holder carried by each bracket for supporting the article to be degreased, said sprockets being arranged so that the articles after leaving the grease-removing liquid are positioned so that all liquid retained by the articles is drained therefrom before passing the articles through the rustproofing liquid.

5. A degreasing apparatus comprising a supporting table, a tank disposed beneath the table, means for maintaining a hot vaporized grease-removing fluid in one section of said tank and a liquid bath in another section thereof, a second tank, means for maintaining a rustproofing liquid bath therein, sprocket wheels at each end of the table and in said tanks, an endless conveyor passing over said table around said sprockets and into and out of said tanks, spaced holders for the articles to be degreased carried by said conveyor, and means for driving said conveyor continuously, said sprockets being disposed so as to cause the articles to pass in succession through the grease-removing vapor, then into and out of the grease-removing liquid and then into the second tank and into and out of the rustproofing liquid.

6. A degreasing apparatus comprising a supporting table, a tank disposed beneath the table, means for maintaining a hot vaporized grease-removing fluid in one section of said tank and a liquid bath in another section thereof, a second tank, means for maintaining a rustproofing liquid bath therein, sprocket wheels at each end of the table and in said tanks, an endless conveyor passing over said table around said sprockets and into and out of said tanks, spaced holders for the articles to be degreased carried by said conveyor, means for driving said conveyor continuously, said sprockets being disposed so as to cause the articles to pass in succession through the grease-removing vapor, then into and out of the grease-removing liquid and then into the second tank and into and out of the rustproofing liquid, and means for automatically stripping the articles from the holders on the conveyor after the rustproofing treatment.

7. A degreasing apparatus comprising a supporting table, a tank disposed beneath the table, means for maintaining a hot vaporized grease-removing fluid in one section of said tank and a liquid bath in another section thereof, a second tank, means for maintaining a rustproofing liquid bath therein, sprocket wheels at each end of the table and in said tanks, an endless conveyor passing over said table around said sprockets and into and out of said tanks, spaced holders for the articles to be degreased carried by said conveyor, means for driving said conveyor continuously, said sprockets being disposed so as to cause the articles to pass in succession through the grease-removing vapor, then into and out of the grease-removing liquid and then into the second tank and into and out of the rustproofing liquid, and inspecting stations arranged along said table including lamps and a magnifying glass.

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