April 8, 1947. W. HASENDAHL 2,418,552

SCOURING CHAIN

Filed Nov. 5, 1940

Fig. 1.

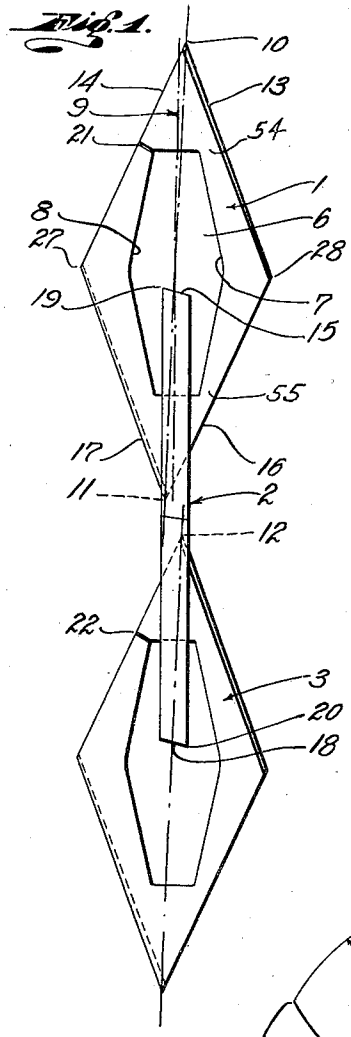


Fig. 2.

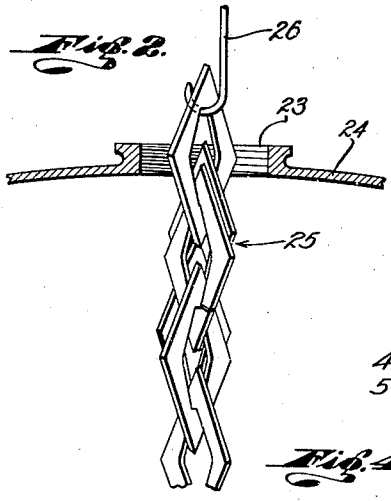


Fig. 4.

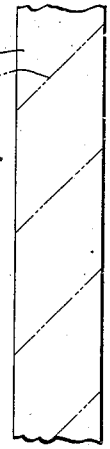
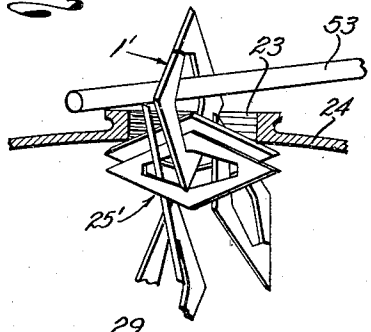


Fig. 3.



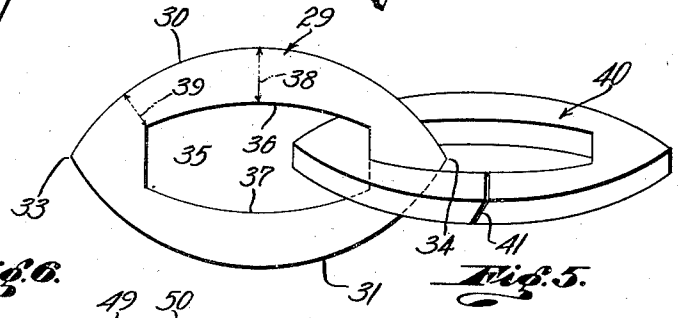
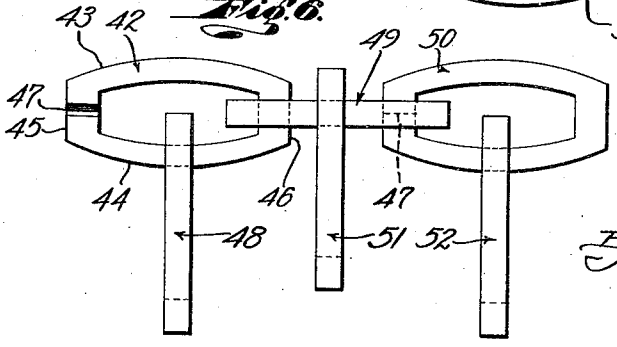


Fig. 5.

Fig. 6.



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SCOURING CHAIN

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13 Claims. (Cl. 15—104)

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The invention relates to a chain for cleaning and scouring the entire inside surface and chimes of a drum. By the use of known machines, the drum is rotated on its own axis and on another axis to tumble it. It is thus tumbled with the chain of this invention inside of it and with or without the use of cleaning fluids. The links of the chain thus make scouring and cleaning contact with the inside of the drum as it is tumbled.

The objects of the invention are to provide a chain having long wear, to provide chain links having extensive and effective cleaning surfaces, to provide links having cutting points and chisel like cutting ends, to reduce the likelihood of the chain balling up when it is being used in the drum so that it can be easily removed through the bunghole of the drum, and to provide links which may be economically manufactured.

It will more particularly appear how the above and other objects of the invention are accomplished, from the following specification when taken in connection with the accompanying drawings wherein Fig. 1 is a front elevational view of a portion of a drum cleaning chain according to this invention, and showing the preferred form of link. Fig. 2 is a front elevational view, with a portion of a drum in section, illustrating the removal and insertion of the chain of Fig. 1 with respect to the drum. Fig. 3 is a view partly in section showing how one of the links may be broken in case the chain is balled up or knotted on its removal from the drum.

Fig. 4 is a plan view of a strip of sheet metal showing how the links of Figs. 1–3 may be stamped without wasting stock.

Fig. 5 is a plan view of a modified form of cleaning chain.

Fig. 6 is a plan view of another modification of the chain of Fig. 1, illustrating the use of cross links.

Referring in detail to the drawings, the drum cleaning chain of Fig. 1, which is the preferred form, comprises a chain made up of a large number of running links, only three of which are illustrated. As all such links are substantially the same, the description of one of them will apply to all of them. The link 1 is in the shape of a diamond, and the diamond link is preferably cut from a strip of sheet metal 4 as shown in Fig. 4, each cut 5 forming sides of two links. The link 1 has a central aperture 6 having sloping sides 7 and 8 to permit the adjacent links to slide around as the chain is

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tumbled inside of the drum. The axis of the central aperture 6 which is illustrated by the line 9, is misaligned with reference to the longitudinal axis 10 of the diamond link 1, so that when the chain is suspended, the lower point 11 of link 1 is out of alignment with the upper point 12 of the link 3. This reduces a likelihood of the adjacent points such as 11 and 12 striking each other and balling up the chain when it is dropped in a pile. However, if desired, the axis of the aperture 6 may be aligned with the longitudinal axis of the link 1.

The sides 13 and 14 of link 1 meet in an acute angle, thereby providing a chisel-like cutting edge as shown at 15 for link 2. Similarly the sides 16 and 17 of link 1 form a chisel like cutting edge as shown at 18 for link 2. Also the chisel like edges 15 and 18 are preferably bevelled, thereby providing a pick-like cutting point 19 on the left side of link 2 and a similar cutting point 20 on the right side of link 2, as shown in Fig. 1, whereby a pick-like cutting point contacts the inside surface of the drum, regardless of whether one side or the other of link 2 contacts the inside surface of the drum.

Alternate links 1 and 3 are provided with slots or cuts through their sides as shown at 21 and 22, to facilitate assembling the links to form a chain, and to facilitate breaking a particular link 1', with a bar 53, as shown in Fig. 3, in case the chain should have become balled up as shown at 25 before removing it from the bunghole 23 of the drum 24.

As shown in Fig. 2, after the drum has been scoured and cleaned with the chain, the chain 25 may be removed from the inside of the drum by means of a hook 26. As the links of the chain in Figs. 1 and 2 are substantially flat, a double chain may be removed through a bunghole 23 having a diameter only slightly larger than the width of a single link.

It will also be apparent that the sides 14 and 17 of link 1 meet to form a cutting point and corner 27, and the sides 13 and 16 meet to form a cutting point and corner 28.

In the modification shown in Fig. 5, the contour of link 29 is formed by two convex curves 30 and 31 which meet to form cutting edges 33 and 34 which are adapted to enter the chime of the drum as it is tumbled, while the adjacent portions of the curves 30 and 31 scrape the inside surface of the drum. Link 29 is provided with a central aperture 35 having sloping sides 36 and 37 which facilitate the adjoining links to slide with respect to link 29 as the chain is

tumbled. The mid portion of link 29 receives much greater wear than the side of link 29, and therefore the dimension 38 in the center of the link is made greater than the dimension 39 near the end of the link. Also ample material is provided behind point 33 to allow for wear here. Similarly, in Fig. 1, the material behind points 11, 12, 27 and 28 is thicker than the material at the places 54 and 55, to take care of the difference in wear and tear.

Alternate links 40 are provided with a cut 41 like cut 21 in Fig. 1, and for the same purpose.

In Fig. 6 a modified form of link, 42, is shown, wherein the sides 43 and 44 are convex curves intersecting with straight parallel ends 45 and 46, thereby providing four cutting edges at the intersections of these sides and ends. Link 42 has a cut 47 for the purpose described in connection with cuts 21 and 41. The chain in Fig. 6 may be used for small bungholes and the links 42 thereof may be stamped from the blanks cut out by forming the central aperture 35 of the link 29 in Fig. 5. If desired, the link 42 may be provided with a cross link 48 which is the same as link 42, except it need not have the cut 47. One or more of the other running links 49 and 50 of the chain in Fig. 6 may similarly be provided with cross links 51 and 52 to increase the weight of the chain and to add scouring surfaces and cutting edges and points.

With regard to all of the chains above described, it will be apparent that the alternate links have cuts such as 21, and the remaining alternate links such as 2 have no such cuts as they are not needed. Also all of the links above described may be made of a known alloy or steel, suitably heat treated to make it of suitable hardness such as the hardness of a file, and the chain will be hard and tough so that it will wear a long time. By way of example, Figs. 1, 5 and 6 illustrate full scale the size of links which may be used. If such links are employed in connection with a bunghole having a diameter which is only slightly greater than the width of each of such links, nevertheless a double length of such chain as illustrated in Fig. 2 will pass through the bunghole by reason of the use of a substantial planary form of link as shown and described in connection with all of the forms of the invention, wherein the opposite faces of the link are substantially congruent and parallel, and the cutting points and cutting edges lie within the space defined by those faces.

By way of example, in cleaning a typical 55 gallon drum, use may be made of three lengths of chain each ten feet in length and the total weighing about twenty-five to thirty pounds.

In the course of the above mentioned heat treatment, the links may become warped.

Various modifications may be made in the invention without departing from its spirit. For example, any type of link may be used as a cross link for the running links. Also two or more cross links or none may be used for some or all of the running links. Also the invention is not limited to any particular manner of moving the drum, and in fact may be used wherever desired for cleaning articles other than drums.

I claim:

1. A scouring and cleaning device comprising a plurality of similar drum scouring elements linked together in seriatim and forming a chain, each of said elements comprising a flat strip of sheet metal punching of uniform thickness having substantially congruent, parallel flat top and bottom faces separated by the sheet metal thickness and having contours providing a plurality of scraping edges and a plurality of cutting points within the area defined by the top and bottom faces of said strip, each of said elements having an aperture in which the preceding and following ones of said elements are linked and may be moved into juxtaposition, whereby a double length of said chain may be formed by suspending an intermediate one of said elements, said double length of said chain having as its width, a dimension substantially the same as the width of a single chain, to facilitate insertion and removal of a double length chain through a bung hole only slightly larger in size than the width of a single length of said chain.

2. A scouring and cleaning device according to claim 1 comprising a single cross link of said elements for each of a plurality of the running links of said chain.

3. A scouring and cleaning chain comprising a plurality of similar flat diamond shaped elements of flat strip metal linked with each other, the edges of said flat strip comprising within its contour scraping or scouring edges, and the ends of said flat strip having points within its contour comprising scouring or scraping chisel-like cutting ends, each of said elements having an aperture in which the preceding and following ones of said elements are linked and may be moved into juxtaposition, whereby a double length of said chain may be formed by suspending an intermediate one of said elements, said double length of said chain having as its width, a dimension substantially the same as the width of a single chain, to facilitate insertion and removal of a double length chain through a bung hole only slightly larger in size than the width of a single length of said chain.

4. A scouring device according to claim 3, wherein certain of the chisel-like cutting ends of said diamond are bevelled at an acute angle, thereby providing sharp pick-like cutting points on opposite sides of each diamond element at opposite ends thereof.

5. A scouring and cleaning chain comprising a plurality of similar diamond shaped elements linked together, the edges of said diamond comprising scraping or scouring edges, and the points of said diamond comprising scouring or scraping chisel-like cutting ends, each of said elements having a central aperture having ends so related to their respective cutting points, that the cutting points on adjacent links of said chain are misaligned with each other when said chain is suspended.

6. A scouring and cleaning chain comprising a plurality of similar shaped elements of strip metal linked together, the edges of said elements comprising scraping or scouring edges, and said elements having points comprising scouring or scraping cutting ends, each of said elements having a central aperture having ends so related to their respective cutting points, that the cutting points on adjacent links of said chain are misaligned with each other when said chain is suspended.

7. A scouring and cleaning chain according to claim 5, wherein the central aperture in the link elements of said chain is so positioned, that the width of the material around said aperture is greatest where the wear is greatest, to wit: at the middle of the sides and at the ends of said link elements.

8. A scouring and cleaning chain according to

claim 6, wherein the central aperture in the link elements of said chain is so positioned, that the width of the material around said aperture is greatest where the wear is greatest, to wit: at the middle of the sides and at the ends of said link elements.

9. A scouring and cleaning device according to claim 1 comprising cross link means for each of a plurality of the running links of said chain, said cross link means having cutting points and scraping edges.

10. A scouring and cleaning chain comprising a plurality of similar flat link elements of flat strip metal linked with each other, the edges of said flat strip comprising within its contour scraping or scouring edges, and the ends of said flat strip having points within its contour comprising scouring or scraping chisel-like cutting ends, each of said elements having an aperture in which the preceding and following ones of said elements are linked and may be moved into juxtaposition, whereby a double length of said chain may be formed by suspending an intermediate one of said elements, said double length of said chain having as its width, a dimension substantially the same as the width of a single chain, to facilitate insertion and removal of a double length chain through a bung hole only slightly larger in size than the width of a single length of said chain.

11. A scouring and cleaning chain comprising a plurality of similar running link elements linked directly together, the edges of each of said elements comprising scraping or scouring edges, and said elements having points comprising scouring or scraping chisel-like cutting ends, each of said elements having a central aperture having ends so related to their respective cutting points, that the cutting points on adjacent link elements of said chain are misaligned with each other when said chain is suspended.

12. A cleaning chain comprising a plurality of running links directly linked together in seriatim, each of said running links comprising a flat link of heat-treated wear resisting sheet metal of uniform thickness, each of said links being of substantial thickness and having on opposite sides thereof a plurality of extended scraping edges and cutting points within two parallel surface planes defining the thickness of said links, said

chain having sufficient weight, to effectively clean by its own weight the inside of a container when moved therein, each of said links having a central aperture so positioned that the width of the material around said aperture is greatest where the wear is greatest, to wit: at the middle of the sides and at the ends of said links.

13. A scouring chain link of sheet metal in the shape of a diamond having a central aperture large enough to receive a similar link, each of the four edges on opposite sides of said diamond comprising scouring or scraping edges, with adjacent ones of said edges merging into four cutting points, and the thickness of said diamond throughout being substantially uniform and the thickness of said sheet, said diamond having substantially congruent flat opposite faces, said link having a central aperture so positioned that the width of the material around said aperture is greatest where the wear is greatest, to wit: at the middle of the sides and at the ends of said link.

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