Dec. 10, 1963

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3,113,337

BRUSH ASSEMBLY

Filed Jan. 8, 1962

FIG. 2

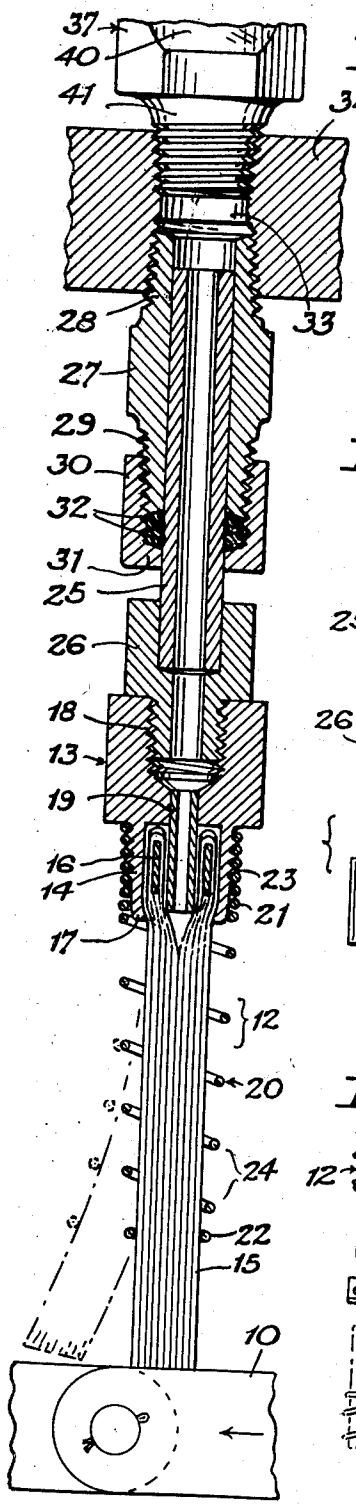


FIG. 3

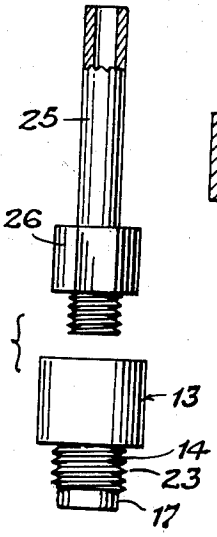


FIG. 4

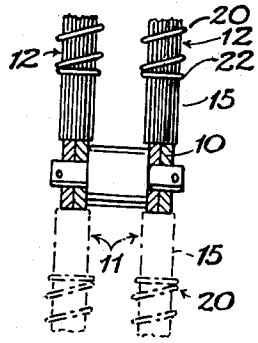
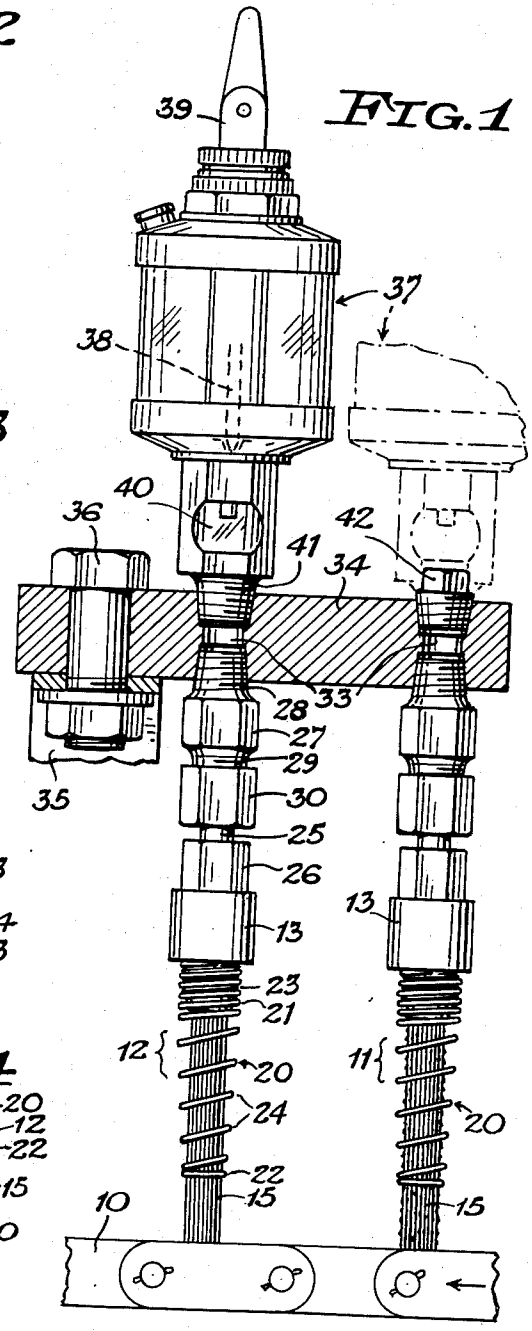


FIG. 1



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BRUSH ASSEMBLY

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This invention relates to brushes adapted for oiling and cleaning conveyor chains and the like.

An object of the invention is to provide an improved brush assembly including a flexible brush element of relatively small diameter and with relatively long bristles in order to reach into narrow spaces and to permit feeding of minute quantities of oil onto a moving chain in contact with the brush element.

Another object is to provide a brush assembly in which the chain-contacting brush element is yeldably confined or restrained against lateral displacement, so that the flexible brush bristles will not take a permanent set and will be restored to normal position without damage after being accidentally deflected by an article on the moving chain.

Still another object is to provide a brush assembly which will facilitate mounting of the brush element in proper relation to the chain and permit ready adjustment of the brush element to compensate for brush wear.

A further object is to provide an improved adjustable brush assembly which also serves to conduct oil or other fluid to the brush element.

The invention further consists in the several features hereinafter described and claimed.

In the accompanying drawing,

FIG. 1 is a side elevational view of a two-unit brush assembly of the invention associated with a conveyor chain, parts being broken away and parts being shown in section;

FIG. 2 is a longitudinal sectional elevational view of one of the brush units on an enlarged scale;

FIG. 3 is a detail view, partly in section, of a brush holder and associated shank, and

FIG. 4 is a fragmentary elevational view of a modified form of brush assembly, the chain being shown in transverse section.

In the drawing, 10 designates an endless conveyor chain of conventional type which is suitably supported in any usual manner, a portion of an upper horizontal run of the chain being shown. The chain is cleaned and lubricated by a brush assembly here shown to comprise a pair of end brush units 11 and 12 which extend vertically above the chain and are spaced in a direction along the chain run. These brush units, which are supported as hereinafter described, are of identical construction except that in some cases the bristle material of the brush units may be of different types. In the arrangement shown in FIG. 1, the brush unit 11 is a cleaning unit and precedes the brush unit 12 which is an oiling unit. Each brush unit comprises a generally cylindrical holder or brush body 13 formed of a suitable metal, such as an aluminum alloy, and having a cupped lower end portion 14 of reduced diameter in which the upper end portion of a brush bundle 15 of narrow, elongated, generally cylindrical shape is fixedly secured, as hereinafter described, the free lower ends of the resilient brush bristles being adapted for slidable contact with the chain. The bristle or filler material may be of various types, such as

horsehair, mixed horsehair and nylon (for example 70% horsehair and 30% nylon), black crimped nylon, and plain or crimped stainless steel wire. Horsehair and nylon, and mixtures thereof, are found desirable for general lubricating purposes, while stainless steel wire is suitable for lubrication of hot chains and for chain cleaning. Nylon bristle material, by reason of its good wearing qualities, is desirable for lubrication of high-speed chains. Crimping of nylon and stainless steel bristles serves to improve oil retention.

In a preferred method of assembling the brush, a metal mounting or retaining ring 16 of tubular shape is first placed around a straight bundle of brush bristles near the midportion thereof, and the bundle is then folded or doubled about the ring to bring the opposite bristle ends into the same transverse plane, whereupon the ring-mounted end of the folded bundle is pushed into and frictionally retained in the cupped lower end portion 14 of the holder body. If necessary, the bristle ends may be trimmed to the same length after mounting of the brush bundle. The cupped portion 14 of the holder has a rim 17 of reduced thickness which may be pressed or rolled inwardly a slight distance to improve the grip on the bristle bundle, as shown in FIG. 2.

The holder 13 has a screw-threaded coaxial bore 18 in its upper portion, and a tubular oil-conducting drip nozzle 19, FIG. 2, is axially pressed into the holder, the upper end of the nozzle being in communication with the screw-threaded bore 18, and the lower end of the drip nozzle extending downwardly into the central upper end portion of the subsequently applied cylindrical brush bundle so as to insure free flow of oil into the brush bundle. By way of example, in a typical brush, the diameter of the brush bundle may be about ¼ inch, and the length of the brush bundle projecting from the holder may be about 1¾ inches.

In order to maintain the elongated, small-diameter, resilient brush bundle 15 in its normal axial position with respect to the holder and to restore the brush bundle to normal position if it is accidentally deflected, as by an article carried by the moving chain conveyor, there is provided a protective resilient guide member or supporting member 20 which is desirably in the form of a coil spring surrounding the brush bundle and having a helical upper end portion 21 anchored on the holder body and its ring-like lower end 22 loosely surrounding the brush bundle adjacent to the free lower end of the brush bundle. The cupped lower end portion 14 of the holder is provided with an external screw thread 23 above the rim 17, and the upper portion 21 of the coil spring has its convolutions matching the screw thread and snugly screwed thereon, thus firmly anchoring the spring. The screwed-on portion of the spring exerts a clutching or wrapping action on the holder which strongly resists unscrewing of the spring. The remaining convolutions 24 of the spring are widely spaced and are progressively smaller in diameter toward the lower end of the spring. The coil spring surrounds the greater part of the projecting length of the brush bundle, and the ring-like lower end of the spring minimizes spreading of the chain-contacting portion of the brush bundle. The conically shaped or tapered coil spring is spaced from the bristle bundle except at its ring-like lower end portion, thus avoiding undue restriction of the downward passage of oil in the bristle bundle, the

latter being free to expand. In a typical brush bundle of about ¼ inch in diameter the lowermost convolution **22** of the spring is spaced upwardly from the lower end of the brush bundle about ½ inch to allow for brush wear.

A tubular rod **25**, such as a length of copper or brass tubing, has its lower end brazed or otherwise fixed in a hexagonally headed adapter bushing **26** which is screwed into the upper end of the bore **18** of the brush holder, the rod forming a hollow axial shank or stem for the brush. The upper portion of the rod **25** slidably fits in a tubular coupling fitting **27**, such as a compression fitting, which has threaded upper and lower ends **28** and **29**. A packing nut **30** with an inturned end flange **31** is screwed onto the lower end of the fitting **26** and houses therein a pair of O-rings **32** of synthetic rubber-like material which are axially compressed between the lower end of the fitting **27** and the nut end flange, thus fritcionally clamping the tubular rod **25** in vertically adjusted position and also forming a seal. In some instances, the lower end of the tubular shank-forming rod **25** may be secured directly in the holder **13**, the adapter bushing **26** being omitted. Also, with no change in the brush diameter the holder **13** can be considerably reduced in diameter if required by space limitations.

The upper ends of the coupling fittings **27** for the two brush units are screwed into the lower ends of respective laterally spaced vertical bores **33** formed through a supporting member **34**, such as a horizontal cross bar, the cross bar being adjustably secured to a mounting bracket **35**, as by a vertical bolt **36** passing through the bar.

A valved oil-feeding device **37** of any conventional type, such as a drop-feed oil cup with the usual adjustable needle valve **38**, shut-off device **39** and sight glass **40**, has a bottom discharge nipple **41** which is screwed into the upper end of the cross bar bore **33** communicating with the chain-oiling brush unit **12**. The upper end of the other cross bar bore **33**, aligned with the chain-cleaning brush unit **11**, is closed by a screw plug **42**. In cases where the brush unit **11** is to be used as a fluid-applying or lubricating unit, the screw plug **42** is removed and replaced by a valved fluid-feeding device, such as another oil cup **37**. In some types of machines, the cleaner brush unit may be supplied with a suitable cleaning fluid. In chain installations requiring several brush units, and particularly in installations in which the conveyor chains are disposed in housings or ovens, these units may be served by an oil supply system comprising individual sight-feed valves and a common oil reservoir with a solenoid shut-off valve, such as the system described in my United States Patent No. 2,646,856, for Multiple Oiler, issued July 28, 1953. An oil supply system of this type may also be used to serve a single brush unit.

When the brush assembly is installed, the brush units are vertically adjusted by their supporting shanks or rods **25** and packing nuts **30** to bring the lower ends of the small-diameter end brushes into light contact with the upper side of the conveyor chain. During the travel of the chain the cleaner brush **11** removes surface dirt deposits from the upper side of the chain, and the oiler brush **12** deposits a small regulated amount of oil onto the cleaned chain, this oil finding its way between the chain links and onto the pin bearings. The free ends of the flexible end brushes will adjust themselves to the contour of the moving chain.

The relatively long, small-diameter flexible brushes can be mounted in close quarters, and the bristles will not take a permanent set. The small diameter of the oiler brush facilitates accurate feeding of extremely small quantities of oil to the chain, and also avoids danger of overoiling or dripping in cases where an increased rate of oil feed is desired. The brush bristles will be laterally deflected, as indicated by broken lines in FIG. 2, if accidentally struck by an object on the moving chain conveyor, but the bristles will not be broken or permanently set, and will be restored to normal position by the guiding or supporting spring **20**.

After each brush wears, it can be readily and quickly adjusted by loosening the packing nut **30**, then longitudinally shifting the slidable holder shank **25** downwardly in the fitting **27** to bring the brush to the desired position, and finally retightening the nut. The brush may also be rotated occasionally to prevent uneven wear.

While the brush units are shown to be mounted in vertical position, they may be mounted in various angular positions to suit the conveyor chain installation. Also, the brush units may be mounted to engage the other edges of the chain links on a return run of the chain.

In the modified construction shown in FIG. 4, the two brush units are both used as oiler brushes **12** and are disposed in laterally offset relation to deposit a minute amount of oil at opposite side links of the conveyor chain **10**. This view also shows cleaner brushes **11**, indicated in broken lines, engaging the underside of the chain.

The protective guiding or supporting spring **20** may also be used on an end brush of larger diameter, permitting the bristles to be made longer than has heretofore been possible, so as to increase the flexibility and life of brush, and to limit or minimize spreading of the free end portion of the brush.

I claim:

1. In a brush, a brush holder, a brush bristle bundle secured to said holder and having a portion projecting from said holder, and a resilient brush guide secured to said holder and having a free end portion surrounding the free end portion of said bristle bundle in close proximity to said bundle, the remaining portion of said brush guide being spaced outwardly from said bristle bundle.

2. In a brush, a brush holder, a brush bristle bundle secured to said holder and having an elongated portion of generally cylindrical cross-section and relatively small diameter projecting from said holder, and a brush-guiding coil spring surrounding said bristle bundle and having an end portion fixed on said holder in outwardly spaced relation to said brush bundle and an opposite free end portion of smaller diameter surrounding the free end portion of said bristle bundle in close proximity to said bristle bundle.

3. In a brush, a brush holder, a brush bristle bundle secured to said holder and having an elongated portion of generally cylindrical cross-section projecting from said holder, and a brush-guiding coil spring surrounding said bristle bundle and having an end portion screwed onto said holder in outwardly spaced relation to said bristle bundle and an opposite free end portion of smaller diameter surrounding the free end portion of said bristle bundle in close proximity to said bristle bundle.

4. In a brush, a brush holder having a hollow end portion and an exterior screw thread, a brush bristle bundle secured in said holder end portion and having an elongated portion of generally cylindrical cross-section projecting from said holder, and a brush-guiding coil spring surrounding said bristle bundle and having a helically coiled end portion screwed onto said screw thread and confined thereon by the clutching action of said screwed end portion, and said spring further having a free end portion of smaller diameter surrounding the free end portion of said bristle bundle in close proximity to said bundle for yieldably resisting lateral deflection of said bristle bundle from its normal position.

5. In a brush, a brush holder, a brush bristle bundle secured to said holder and having an elongated portion of generally cylindrical cross-section projecting from said holder, a coil spring surrounding said bristle bundle and having an end portion anchored on said holder and an opposite free end portion surrounding the free end portion in close proximity to said bristle bundle of said bristle bundle, the anchored end portion of said coil spring being

of larger diameter than its free end portion, and said coil spring being of generally conical shape.

6. In a brush for applying fluid to a chain or the like, a brush holder having a cup-like hollow portion and a fluid-feeding duct communicating therewith and including a tubular drip nozzle, a brush bristle bundle having an end portion tightly secured in said hollow holder portion and further having an elongated portion of generally cylindrical shape projecting from said holder and adapted to contact a moving chain, said nozzle extending axially into the secured end of said bristle bundle to a point adjacent to the outer end of said hollow holder portion for feeding fluid into said bristle bundle, and a resilient

brush guide extending longitudinally of said bristle bundle and having an end portion secured to said holder, said guide having an opposite end portion surrounding the free end portion of said bristle bundle in close proximity to said bundle.

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