ABSTRACT: A block for holding an ultrasonic transducer (piezoelectric crystal), adapted to be mounted interiorly of a hollow liquid-filled work-engaging roller, is carried on the roller shaft and has a cap removably secured thereto. The cap has a recess in its block-engaging face, dimensioned to accommodate the transducer. A seal between the engaging faces of the block and cap prevents the liquid with which the roller is filled from coming into contact with the transducer.
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TRANSDUCER-HOLDING BLOCK ADAPTED TO BE MOUNTED WITHIN A LIQUID-FILLED WORK-ENGAGING ROLLER

This invention relates to the mounting of transducers used for ultrasonic testing and, in particular, to a mounting adapted to be placed inside a hollow liquid-filled work-engaging roller.

BACKGROUND OF THE INVENTION

Transducer mountings of the general type indicated above are known. One example is that made by Sperry Products Division, Automation Industries, Inc. Difficulty has been experienced using these devices because of the tendency of the liquid (ethylene glycol) to dissolve the cement bonding the transducer to a block carried on the roller shaft. I have invented an improved transducer-mounting block which overcomes the aforementioned difficulty. My mounting block fully encloses the transducer and prevents contact therewith by the liquid filling the hollow roller.

BRIEF SUMMARY OF THE INVENTION

In a preferred embodiment, I provide a block of light material, e.g., Lucite synthetic plastic for mounting on the shaft of a hollow roller which is adapted to be filled with liquid and to engage the product to be tested. I also provide a removable cap to be secured to the block and form a recess or pocket in the under side of the cap adapted to accommodate the transducer. Cooperative sealing means closes the joint between cap and block entirely around the pocket. When the cap is secured on the block, the transducer is fully protected from contact by the liquid.

BRIEF DESCRIPTION OF THE DRAWINGS

A complete understanding of the invention may be obtained from the following detailed description and explanation which refer to the accompanying drawings illustrating the present preferred embodiment. In the drawings:

FIG. 1 is a side elevation of a conventional ultrasonic testing roller having my improved transducer-mounting block installed therein;

FIG. 2 is an end elevation thereof;

FIG. 3 and 4 are sectional views taken along the planes of lines III–III of FIG. 2 and IV–IV of FIG. 1, respectively; and

FIG. 5 is an enlargement of a portion of FIG. 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawings and, for the present, to FIGS. 1 and 2 particularly, a hollow liquid-filled roller 10 is journaled on a fixed shaft 11 spanning standards 12, by bearings 13. Roller 10 is mounted so as to make rolling contact with a workpiece 14 (a length of pipe in the drawing) as it travels lengthwise along a predetermined path such as a roller conveyor. Except for my invention, devices such as roller 10 are known (as wheel search units) and are commercially available, being manufactured by Sperry Products Division of Automation Industries, Inc. one of which, suitable for my invention, is designated Sperry Style No. 50D263 Wheel Unit.

My invention is the transducer unit 15, mounted on shaft 11 within the roller 10, which is shown in greater detail in FIGS. 3–5. This unit comprises a block 16 having its sides recessed as at 17 to accommodate spaced wing plates 18 welded onto shaft 11, whereby the block may be secured to the shaft by through bolts 19. The top face 20 of block 16 is at an oblique angle to the bottom and has fitted thereon a cap or cover 21 secured by screws 22. The block 16 and cap 21 are conveniently formed from an acrylic resin such as Lucite plastic.

The undersurface of cap 21 which makes face to face contact with the top 20 of block 16 has a recess 23 formed therein of size and shape adapted to accommodate a transducer assembly 24 secured therein by screws 25 with a layer of sealant such as silicone grease G between the assembly and the bottom of the recess to prevent the entrapment of air. Sealing grooves 26 in the contacting faces of the block and cover extend around the recess 23 and an O-ring 27 seated therein prevents the access of the liquid-filling roller 10 to assembly 24.

A passage 28 drilled into block 16 from one side thereof intersects top 20 within the area of recess 23 and permits leads from the assembly 24 to be taken out to the exterior of roller 10 through a suitable passage (not shown) in shaft 11.

After the leads have been inserted through passage 28, the outer end thereof is plugged with silicone rubber to exclude liquid.

It will be understood that my invention provides a transducer mounting for wheel search units having important advantages. In the first place, it is simple and inexpensive and may be manufactured by conventional machine practice. The principal advantage, however, is that my mounting wholly excludes the liquid filling the wheel or roller from damaging access to the transducer assembly.

I claim:

1. Ultrasonic testing apparatus comprising a fixed supporting shaft, a hollow ethylene-glycol filled work-engaging roller mounted on said shaft, radial wing plates secured to said shaft in spaced-apart relationship, a block between said wing plates extending radially from said shaft, means fastening said block to said wing plates, a cap removabley secured on said block and adjacent the periphery of said roller, a recess in the underside of said cap, means sealing the joint between the cap and the block extending entirely around the area of the recess, a transducer, means for removable securing said transducer in said recess, and a lead-wire passage extending from the exterior of said block to a point within said area.

2. Apparatus according to claim 1 in which said sealing means includes a circular groove surrounding the recess on the mating face of said cap, a matching groove on the mating face of said block, and a sealing ring seated in said grooves which seals said recess when said cap is secured to said block; an acoustical coupling of silicone-glyce between said cap and said transducer; a silicone rubber plug sealing said lead-wire passage from said liquid, and said cap and said block are both composed of an acrylic resin.