Nov. 19, 1940. J. E. KROBUSEK 2,221,803

RADIATOR CLEANING DEVICE

Filed Aug. 21, 1939

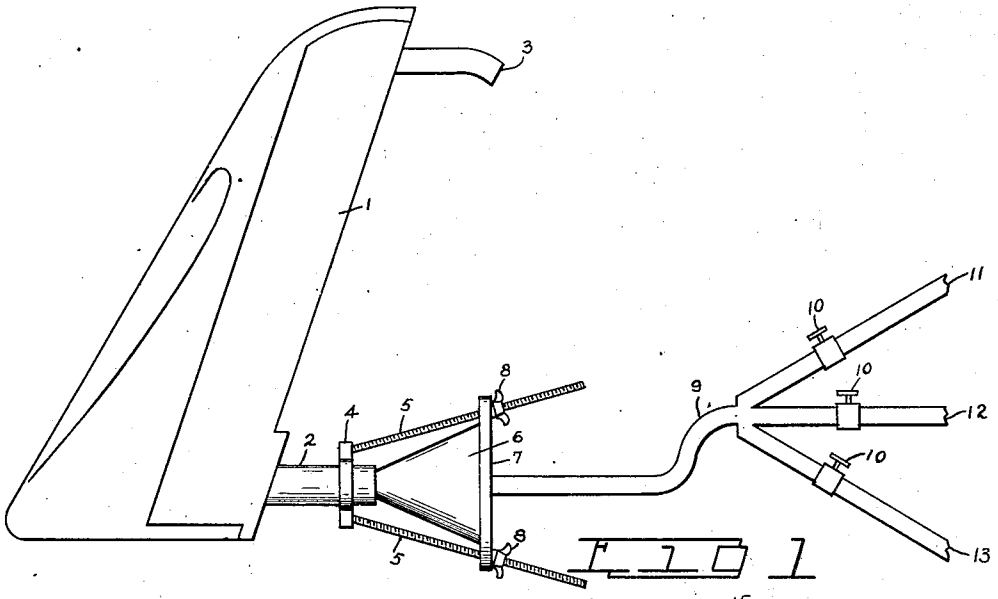


FIG. 1

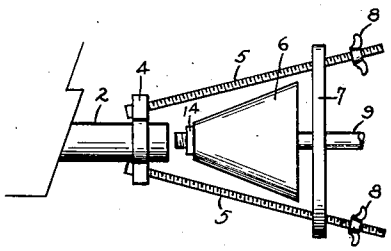


FIG. 2

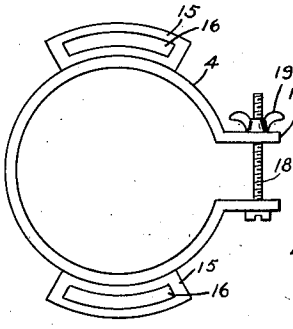


FIG. 3

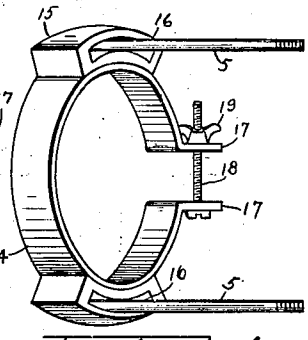


FIG. 4

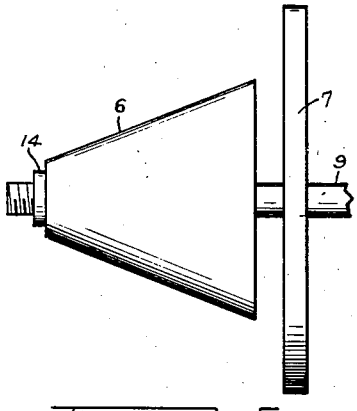


FIG. 5

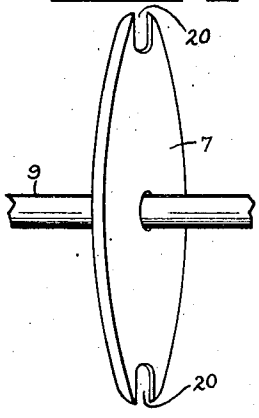


FIG. 6

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RADIATOR CLEANING DEVICE

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2 Claims. (Cl. 285—130)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention relates to improvements in radiator cleaning machines in which a means is provided for quick and secure application of the machine to radiators with variable sized orifices, without mechanical change, with means to inject live steam under pressure, water under pressure, and air under pressure separately or together, and with manually operated valves to control the flow and pressure of each at the will of the operator; and the objects of the improvement are, first, to provide a simple machine readily attachable to radiators with variable sized orifices with an adjustable union, without the removal of the radiator, with controllable means to permit the injection of live steam into the radiator to heat liquid chemical dissolvents placed in the radiator, thereby to more efficiently dissolve accumulated foreign substances whether in solidified or free state, with controllable means to permit the injection into the radiator of air under pressure to dislodge and force out accumulated foreign substances, and with controllable means to permit the injection into the radiator of water to wash and flush out dislodged and loosened foreign substances from the radiator; second, to provide an adjustable union to connect the injection pipe of a radiator cleaning machine to variable sized radiator orifices, without mechanical changes and without the removal of the radiator, with adjustable means to connect the same securely against the pressure of steam, air and water; and third, to provide a simple, compact radiator cleaning machine, with a minimum of destructible parts, each cheaply and readily replaceable, with an adjustable union for connecting with radiators having variable sized orifices, permitting the cooking of chemical dissolvents within the radiator without the removal of the radiator, and the whole possessing simplicity and novelty of design.

One form of the invention is illustrated in the accompanying drawing, in which Figure 1 is a side view of the entire machine in place and attached to an automobile radiator; Figure 2 is a view of a part of the machine showing the adjustable union in detail with the parts thereof sufficiently separated to illustrate their use; Figure 3 is a view of the clamp illustrating its adjustability, and which is provided with slot-ways to permit centering of the tension bolts irrespective of the diameter of the pipe around which it is clamped to produce equal pressure at all points between the cone-shaped union and pipe attached to radiator; Figure 4 is a detailed view in perspective of the adjustable clamp showing the tension bolts adjusted to center in the slot-ways; Figure 5 is an enlarged view of the cone-shaped union mounted on the injection-pipe of the radiator cleaning machine, with a pressure nut at the small end of the cone-shaped union designed to prevent the injection pipe from being forced out of the cone-shaped union by pressure of air, steam or water, and showing the compression-collar mounted on the injection pipe; and Figure 6 is a detailed view in perspective of the compression-collar mounted on the injection-pipe of the radiator cleaning machine showing notches in the compression-collar suitably spaced to produce in combination center adjustment of tension bolts in the clamp slot-ways an equal pressure at all points on the cone-shaped union by means of thumb-nuts threaded upon the tension bolts.

The radiator 1 may be an automobile radiator or any cellular, tubular or honeycomb structure, or any closely confined structure including the water cooling area of a water cooled motor, in which foreign substance may accumulate and need dissolving and removal, and forms no part of the invention but illustrates only one of its many uses.

The pipe 2 and pipe 3 is no part of the invention but serves to illustrate the conventional inlet and outlet of typical automobile radiators and either of which provides a suitable means of coupling the radiator cleaning machine to an automobile radiator; although not illustrated similar, or substantially the same, inlets and outlets are a part of all structures to which the radiator cleaning machine is applicable.

The clamp 4 is adjustable to fit variable sized pipes 2 and 3 and may be provided with a thumb or wing nut for ease of clamping securely without the use of tools.

Tension bolts 5 extend from the clamp 4 to compression-collar 7 and may be provided with thumb or wing nuts 8 for ease of applying compression force to compression-collar 7 without the use of tools.

The cone 6 mounted around injection-pipe 9 in combination with the adjustable clamp 4, tension bolts 5, nuts 8 and compression-collar 7, when applied to pipes 2 and/or 3 form an adjustable union to couple the radiator cleaning machine to a radiator or other structure to be cleaned.

Injection-pipe 9 may be curved (see Fig. 1) to produce a convenient position of manually operated valves 10 for ease of operation.

Pipes 11, 12 and 13 are designed to carry, each respectively, air, steam and water, and valves 10 interposed therein provide the means of manu-

ally controlling both flow and pressure as against the back pressure of the radiator or other structure to be cleaned. Air, steam and water are to be carried to pipes 11, 12 and 13 by means of hose extensions or metal pipe extensions with flexible couplings. Pipes 11, 12 and 13 are connected to pipe 9, and they may be joined by suitable pipe fittings or may be cast in one piece.

Clamp 4 except where slot-carriers 15 are mounted is constructed of metal sufficiently pliable to permit expansion for applying to pipes 2 or 3 and contraction upon pipes 2 or 3 by means of tension bolt 18 passing through the lips 17, with a thumb or wing nut 19 to permit of adequate pressure without the use of tools, or in lieu of nut 19 an ordinary nut may be used to be turned against pressure with pliers or wrench (see Fig. 3). Slot-carriers 15 may be an integral part of clamp 4 or may be made separate and attached to clamp 4 by riveting, welding or other means. Slot-ways 16 provide slots through which tension bolts 5 pass and permit adjustment of tension-bolts 5 to center irrespective of the circumference of clamp 4 when contracted around pipes 2 or 3 (see Fig. 4).

Cone 6 may be constructed of rubber, cork or any material providing both strength and sufficient plastic quality to readily form a seat under mild pressure against pipes 2 or 3. Cone 6 is mounted around injection pipe 9 with a part of injection pipe 9 extending beyond the small end of the cone to permit pressure-nut 14 to be threaded upon injection-pipe 9. Pressure-nut 14 is designed to prevent injection-pipe 9 being forced out of cone 6 by pressure created by steam, water or air accumulating in the radiator or other structure being cleaned.

Compression-collar 7 is loosely mounted on injection pipe 9, and is provided with notches 20 (see Fig. 6) in which tension bolts 5 are readily placed without removing nuts 8; threading nuts 8 on tension bolts 5, when placed in the notches 20, produces a pressure on compression-collar 7, and compression-collar 7, in turn, compresses cone 6 into pipes 2 or 3 to form a seat to prevent escapement of air, steam or water injected under pressure through injection pipe 9 into radiator 1 or other structure to be cleaned.

The invention described herein may be manufactured and/or used by or for the Government of the United States for governmental purposes without the payment of any royalty thereon.

I claim:

1. A means for attaching a cleaning apparatus to an object to be cleaned including in combination an injector nozzle for conducting a cleaning fluid under pressure into the object to be cleaned, a conical sealing member surrounding the nozzle and adapted to be seated in an outlet of the object being cleaned, an adjustable clamp to engage the said outlet, segmental ears mounted on the clamp, said ears being provided with longitudinally extending arcuate slots, a notched compressor plate slidable along the nozzle, rods freely movable in the slots and engaging in the notches of said plate, means for shortening the rods whereby the plate is caused to engage the sealing means to seat said means in the outlet, and means for regulating the flow of the cleansing fluid through the nozzle.

2. A means for attaching a cleaning apparatus to an object to be cleaned including in combination an injector nozzle having a threaded terminal, a sealing means carried by the nozzle, a clamp adjustable to varying sizes of outlets, slotted ears mounted on the clamp, a compressor plate slidable on the nozzle and engageable with the sealing means, rods freely movable in the slots and engaging the compressor plate, means on the rods for varying the effective length thereof, means mounted on the threaded terminal and engaging the sealing means to prevent premature expulsion of the nozzle from the sealing means, and means for regulating the flow of a cleansing medium through the nozzle.

JOSEPH EDWARD KROBUSEK.