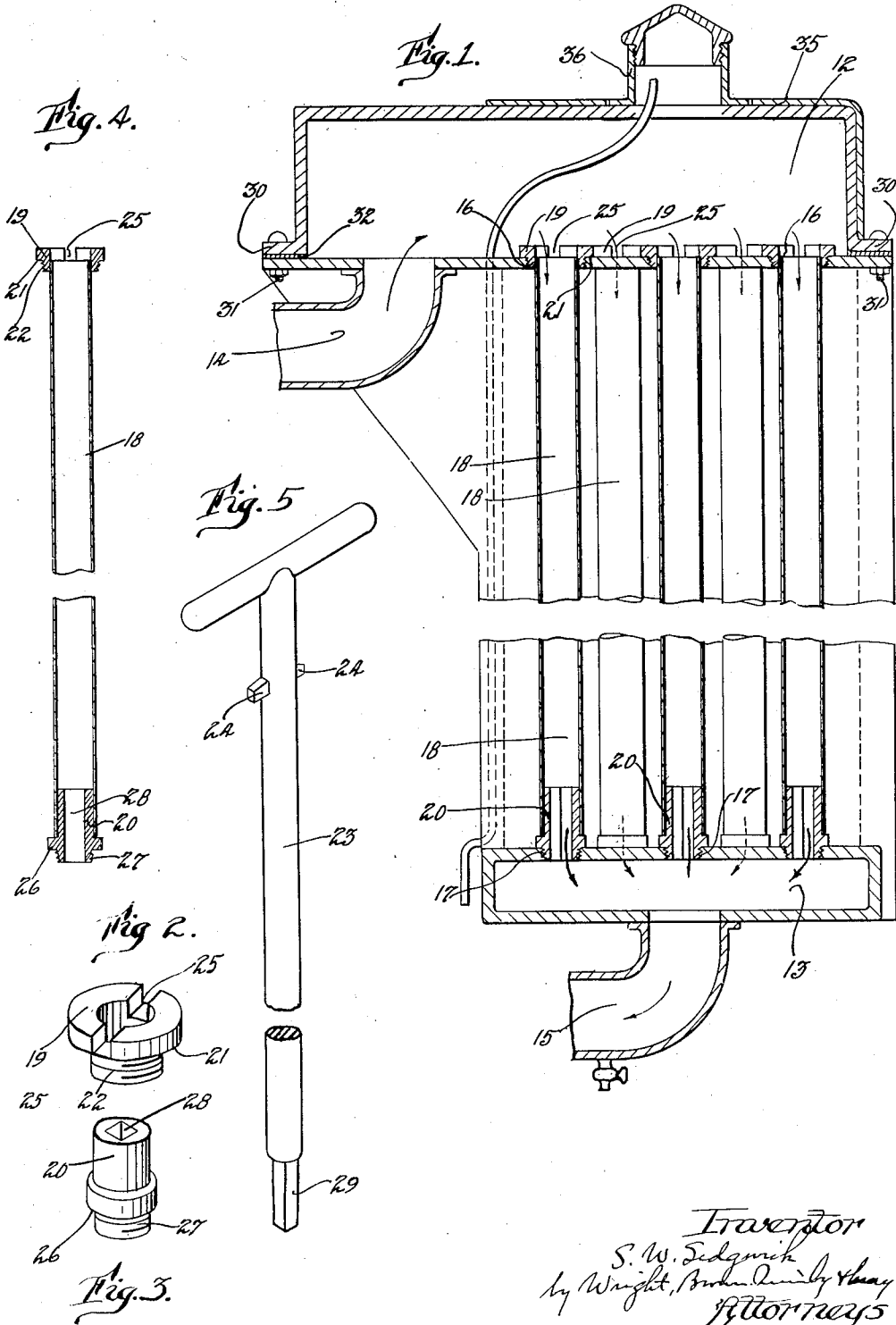


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 FLUID CONDUCTING STRUCTURE.
 APPLICATION FILED MAR. 3, 1920.

1,389,997.

Patented Sept. 6, 1921.



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FLUID-CONDUCTING STRUCTURE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, STANLEY W. SEDGWICK, a citizen of the Dominion of Canada, residing at Edmonton, in the Province of Alberta, Dominion of Canada, have invented new and useful Improvements in Fluid-Conducting Structures, of which the following is a specification.

This invention relates to a fluid-conducting structure such as a radiator coöperating with the cooling system of an internal combustion engine and used on a motor vehicle, the radiator including upper and lower tanks, spaced apart to permit the passage of air between the tanks, and upright conduits adapted to conduct water from the upper to the lower tank and through the space between the tanks. Said conduits are usually seamless drawn tubes of thin metal, and in most cases are inseparably attached at their upper and lower ends to plates or tube sheets forming parts of the tank walls.

The chief object of the invention is to provide an improved construction whereby the said tubes may be detachably secured to the said tube sheets and quickly and conveniently applied and removed, so that a tube which has been ruptured, for example, by the freezing of water therein, may be readily removed, and either repaired and returned to place, or replaced by a new tube, the operation of securing a tube to the tube sheets being performed without exerting injurious twisting strain on the thin metal of the tube.

To these and other related ends the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings forming a part of this specification,—

Figure 1 represents a vertical central section of a radiator embodying the invention.

Fig. 2 is a perspective view of one of the collars hereinafter described, applied to the upper ends of the upright tubes.

Fig. 3 is a perspective view of one of the collars hereinafter described, applied to the lower ends of the tubes.

Fig. 4 is a sectional view of a conduit composed of a tube and the said collars.

Fig. 5 is a perspective view of the wrench rod hereinafter described.

Figs. 1, 4 and 5 are broken away between their end portions.

The same reference characters indicate the same parts in all of the figures.

In the drawings, 12 and 13 represent the spaced apart upper and lower tanks of a radiator, which as here shown, is of the general form of the Ford radiator, although it is to be understood that my invention is not limited to radiators and to fluid-conducting structures of this type. Into the upper tank water passes from the cooling system of the engine through an inlet 14, and water is returned from the lower tank to said system through an outlet 15.

In carrying out my invention, I form in the bottom plate or tube sheet of the upper tank a plurality of tapped orifices 16, and in the top plate or tube sheet of the lower tank a plurality of tapped orifices 17, the orifices being arranged in vertical alinement with each other, and their threads having the same direction and pitch. To conduct water from the upper to the lower tank, I provide a plurality of upright conduits, each of which is composed of a tube 18, which is preferably a seamless drawn tube of thin metal, a collar 19 fixed to one end of the tube, and a collar 20 fixed to the opposite end of the tube. The end portions of the tube may be rigidly secured to said collars in any suitable manner, as by soldering, brazing, or pressing.

The collar 19 is external to the tube, the latter being fixed to the inner periphery or bore of the collar. Said collar is provided with a downwardly facing shoulder 21, adapted to be seated on the bottom plate or tube sheet of the upper tank 12, and with an external screw thread 22, adapted to engage the thread of an orifice 16, the threads of the collar and orifice being preferably tapered. The collar 19 is formed to engage turning members on an elongated wrench rod 23,

inserted in the conduit. As here shown, the rod 23 is provided with oppositely projecting ears 24, and the collar 19 is provided with radial slots 25, adapted to engage the ears 24.

The collar 20 is inserted as a bushing within the lower end portion of the tube 18, and is provided with a downwardly facing shoulder 26, adapted to be seated on the top plate or tube sheet of the lower tank 13, and with an external screw thread 27, adapted to engage the thread of the orifice 17, and with a bore 28 which is polygonal in cross section, and adapted to receive a corresponding end portion 29 of the wrench rod. The screw threads of the orifice 17 and collar 20 are also preferably tapered.

The tapped orifices 16 in the upper tube sheet are of greater diameter than the orifices 17 in the lower tube sheet, and are formed to permit the collars 20 to pass freely through the tube sheet of the upper tank, when the above described conduits are being inserted and removed.

The upper tank is composed of a fixed section, which includes the bottom plate thereof, and a removable section, which may be provided with flanges 30, detachably secured to the marginal portion of the fixed section, as by bolts 31, suitable packing material being interposed between the two sections to form a water-tight joint. When the bolts 31 are removed, the top portion of the upper tank may be removed to expose the bottom plate or tube sheet thereof, and permit the insertion and removal of the described conduits without opening the lower tank to expose its tube sheet.

It will now be seen that each of the described conduits may be applied and removed by engaging the ears 24 of the wrench rod with the slots 25 of the collar 19, and the end portion 29 of the wrench rod with the bore 28 of the collar 20, and then rotating the wrench rod to engage the collars 19 with the tapped orifices 16, and the collars 20 with the tapped orifices 17, this operation being performed without exerting any injurious twisting strain on the relatively thin metal of the tube 18.

The slots 25 in the collars 19 are preferably flush with the upper surface of the tube sheet of the tank 12, so that said slots constitute drainage outlets through which water may escape from the bottom portion of the upper tank.

The tanks 12 and 13 are rigidly connected and held spaced apart by suitable upright supports or frame members 34, between which air is adapted to pass from front to rear of the radiator.

The tubes 18 are preferably arranged in staggered relation, and may be provided

with the usual heat-radiating fins or leaves, although for the sake of clearness and simplicity, I have not shown these in the drawings.

The exposed forward portion of the upper tank 12 may be provided with an ornamental top casing 35, through which the usual filling neck 36 may be projected.

I claim;

1. A fluid-conducting structure including two spaced apart tube sheets each provided with tapped orifices, the screw-threads of which have the same direction and pitch, and a plurality of sheet-connecting tubes, each having fixed collars at its opposite ends externally threaded and adapted to simultaneously engage the threads of two aligned tube sheet orifices, said collars being formed to be simultaneously engaged by turning members on an elongated wrench rod, whereby the collars and tube may be simultaneously rotated without strain on the tube.

2. A fluid-conducting structure substantially as specified by claim 1, the tapped orifices in one of said sheets being larger than those in the other sheet, and the collar at one end of each tube being larger than that at the opposite end, so that one collar may be passed loosely through one of the tube sheets to permit the simultaneous engagement of both collars with the threads of two aligned orifices.

3. A fluid-conducting structure substantially as specified by claim 1, the tapped orifices in one of said sheets being larger than those in the other sheet, and the collar at one end of each tube being larger than that at the opposite end, so that one collar may be passed loosely through one of the tube sheets to permit the simultaneous engagement of both collars with the threads of two aligned orifices, the larger collars being applied to the external surfaces of the tubes and provided with downwardly facing shoulders seated on one of the tube sheets, and with radial slots formed to engage ears on said wrench rod.

4. A fluid-conducting structure substantially as specified by claim 1, the tapped orifices in one of said sheets being larger than those in the other sheet, and the collar at one end of each tube being larger than that at the opposite end, so that one collar may be passed loosely through one of the tube sheets to permit the simultaneous engagement of both collars with the threads of two aligned orifices, the smaller collars being bushings applied to the internal surfaces of the tubes, and provided with downwardly facing shoulders seated on one of the tube sheets, and with bores formed to engage a portion of said wrench rod.

5. As an article of manufacture, a tube

sheet-connecting conduit composed of an elongated tube, and collars attached at opposite ends thereof, said collars being externally threaded to engage tapped orifices in
5 two spaced apart tube sheets, and formed to engage turning members on an elongated wrench rod inserted in said conduit.

6. A tube sheet-connecting conduit substantially as specified by claim 5, the threaded
10 portion of the collar at one end of the tube being of greater diameter than the threaded portion of the collar at the opposite end.

7. A tube sheet-connecting conduit substantially as specified by claim 5, the collar
15 at one end of said tube being applied to the external surface of the tube, and provided with a downwardly facing shoulder and with radial slots, while the collar at the opposite end of the tube is a bushing applied
20 to the internal surface of the tube, and provided with a downwardly facing shoulder, and with a wrench rod-engaging bore.

In testimony whereof I have affixed my signature.

STANLEY W. SEDGWICK.