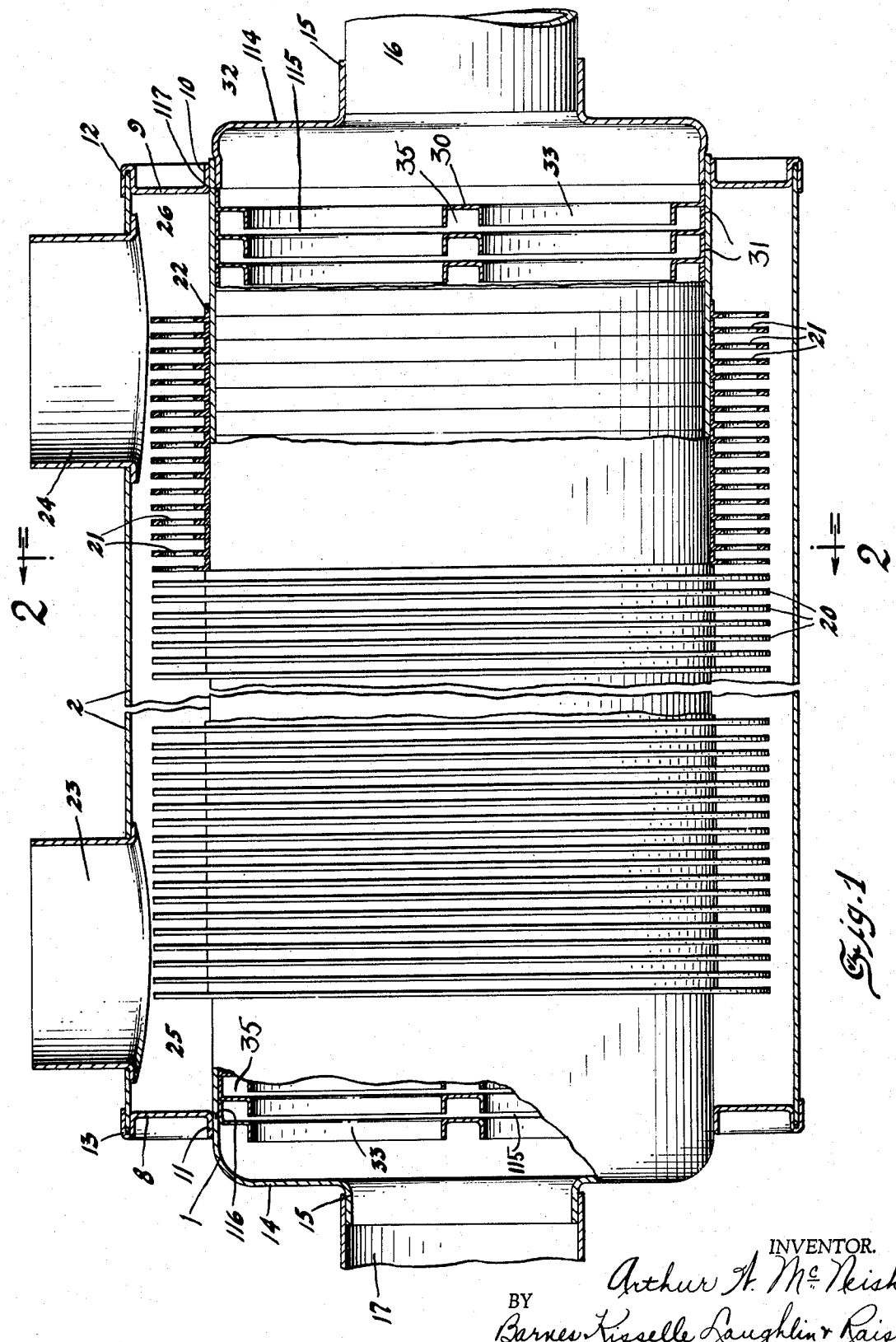
Dec. 14, 1937. A. W. McNEISH 2,102,581

AUTOMOBILE HEATER

Filed Aug. 19, 1936 2 Sheets-Sheet 1



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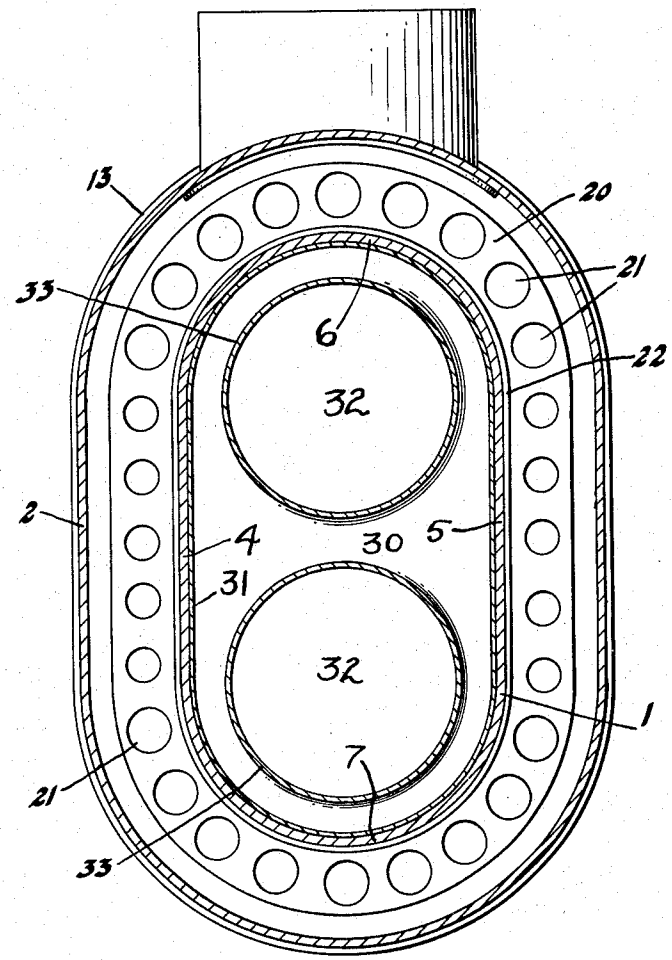


Fig. 2

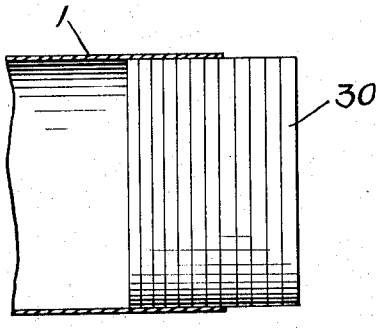


Fig. 3

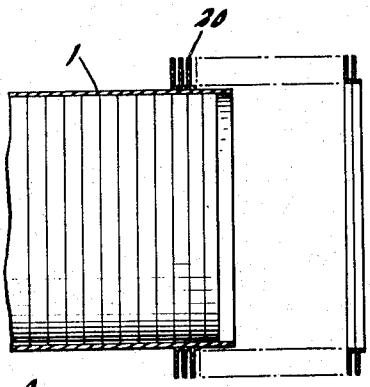


Fig. 4

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AUTOMOBILE HEATER

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Application August 19, 1936, Serial No. 96,726

1 Claim. (Cl. 257—241)

This invention relates to an automotive vehicle heater of the exhaust type.

This invention relates more particularly to an automotive vehicle heater through which the exhaust gases from the internal combustion engine are passed and through which a stream of air is passed in heat exchange relation with the exhaust gases prior to being conducted into the vehicle body.

It is an object of this invention to produce an exhaust type of heater which is compact, cheap to manufacture, efficient and quiet in operation, and which is relatively light in weight for its heating capacity compared with the heaters now on the market.

In the drawings:

Fig. 1 is a vertical longitudinal section through the heater.

Fig. 2 is a section along the line 2—2 of Fig. 1.

Figs. 3 and 4 show the method of assembling the heat exchange fins to the inner shell of the heater.

Referring more particularly to the drawings the heater comprises an inner casing 1 through which the hot exhaust gases are passed and an outer casing 2 through which the air to be heated is passed.

The inner casing 1 comprises a single sheet of steel, such as sixteen gauge stock, which initially comes in the form of a flat disc of sheet steel and by a series of drawing operations in a suitable press is drawn into the final form of a tube as shown. By drawing the inner casing 1 from an initially flat disc of sheet steel into its final form there is obtained an inner casing 1 which in reality is a seamless and jointless, homogeneous throughout, steel tube. The absence of joints and seams in the tubular casing 1 is advantageous in that it removes the possibility of the exhaust gases, which pass through this casing, leaking into the air chamber formed between the outside of the inner casing and the inside of the outer casing.

The one end 14 of the tubular casing 1 is pierced and the opening flanged to form a tubular mouth portion 15 for the exhaust pipe 17. The other end of the tubular casing, which is closed by the closure plate 114, has a press fit with the casing 1 and the joint of which is copper welded.

In Figs. 1 and 2 of the drawings the heater is shown full size. The inner casing 1 has the straight side wall portions 4 and 5 which are about two inches high, and the rounded end portions 6 and 7 which have a radius of about one and one-eighth inches.

The inner casing 1 is supported within the outer casing 2 in spaced relation therewith by means of the end plates 8 and 9 which are pressed over the inner casing 1 as at 10 and 11 and which are clamped over the ends of the outer casing as at 12 and 13. The joints between the plates 8 and 9 and the inner and outer casing, as well as all the other joints in the entire heater, are all copper welded. The plate 114 is provided with the tubular mouth portions 15 which receives the end of the exhaust pipe 16. The exhaust gases are conducted through the pipe 16 into the casing 1 and out of the casing 1 through the pipe 17.

Before the casing 1 is mounted within the casing 2 and before the end plate 114 is pressed in place, the casing 1 is provided with external and internal heat conducting fins.

The external fins 20 are positioned circumferentially about the casing 1 and perpendicular to the longitudinal axis of the casing. Each fin 20 is provided with a plurality of openings 21 and with a flange 22. Each flange 22 extends completely around the casing 1 and has a pressed fit therewith to obtain a good heat conducting contact. The flanges 22 also act as spacers which determine the distance between the adjacent fins 20. It will be noted that the fins 20 are positioned contiguously about the casing 1 between the air inlet opening 23 and the air outlet 24. The fins 20 stop short of the ends of the casing 1, that is, the casing 1 has no external fins 20 for a distance of about one inch from the end plates 8 and 9, to provide spaces 25 and 26 extending around the inner casing 1 between the extreme outer fins 20 and the end plates 8 and 9 respectively which provide air distributing chambers. Thus, the air coming in the inlet 23 is distributed in the space 25 completely about the inner casing 1 before it passes lengthwise along the air space extending between the inner casing 1 and the outer casing 2 where it is heated before passing through the outlet 24.

The method for assembling the fins 20 onto the casing 1 is shown in Fig. 4. The fins 20 can be threaded one on top of the other over a suitable plunger (not shown) and the end of the plunger then inserted in the end of the casing 1. At this time the entire stack of rings can then be forced in a single operation off the spindle and onto the casing 1 to obtain a pressed fit of the fins on the casing.

The casing 1 is provided on the inside throughout the entire distance between the ends 14 and 114 with heat distributing fins 30. Each of these

fins comprises a flat plate, the circumference of which corresponds to the cross section of the casing 1, and each plate is provided with a spacer flange 31. The flanges 31 preferably should not be more than one inch long. Each of the plates 30 is provided preferably with two large openings 32. Each of the openings 32 is provided with a circumferential flange 33 which extends preferably approximately normal to the plate 30 and each flange 33 has a clearance 115 of about one-sixteenth of an inch with the next or adjacent plate 30 thereto. Although several openings are shown through each plate 30, the important thing is an opening should be provided through each plate 30 having an area approximately equal to, or slightly larger than, the cross sectional area of the exhaust pipe 16 so that no exhaust gas back pressure is formed in the heater. The total area of the opening 32 equals, or is slightly larger than, the cross sectional area of the exhaust pipe 16. The flanges 31 properly space the heat conducting plates or fins 30 and thus in conjunction with flanges 33 provide therebetween a multiplicity of air spaces or pockets 35 into which the exhaust gases expand and which serve to tear up the exhaust gas pulsations and in a large measure silence the exhaust gases as they pass through the heater.

It will be noted that the internal fin plates 30 extend from one end of the casing 1 to the other and that the spacer flanges 31 are contiguous. The spacer flanges it will be noted extend the entire distance between plates 8 and 9, that is, from points 116 to points 117 thus forming an additional wall within casing 1. Hence, as above specified, all of these joints are copper brazed. Therefore, these flanges 31, in conjunction with the copper brazed joints, form an imperforate gas-tight reinforcing wall within the casing 1 and thus give additional security against exhaust gases leaking from within the casing 1 into the air space between the casing 2 and the outside of the casing 1. It will be noted that points 116 and 117, at which the flanges 31 terminate, are outside of the plates 8 and 9 and thus any leakage that would occur at points 116 and 117 would leak to atmosphere and not into the air chamber between casings 1 and 2. The flanges 22, insofar as they extend along the outside of the casing 1, also when copper brazed form an additional reinforcing wall on the outside of the casing 1 in the same fashion as the flanges 31.

In operation the exhaust gases enter the casing 1 through the exhaust pipe 16. After entering the casing 1 through the pipe 16 they pass through the opening 32 into the first chamber 35 between the first two plates 30 whereupon the exhaust gases expand somewhat. Of course, a portion at the same time passes through the opening 32 in the second plate and thence into the second chamber 35 between the second and third plates 30. This process continues throughout the length of the heater. The plates 30 and intervening spaces 35 serve to expand and muffle the exhaust gases so that practically no noise from the pulsating exhaust gases, as they enter the heater through the pipe 16, is conducted to the air passing through the heater.

The heat conducting plates 32 and flanges 33 contact with the hot exhaust gases and efficiently remove the heat from the exhaust gases and then conduct this heat through flanges 31 to the casing 1 which in turn conducts the heat directly to the air which is to be heated and also through flanges 22 to the heating fins 20 which in turn give off the heat to the air passing through the heater and through holes 21. Each of the fins 20 serve not only as a heat conducting fin for transferring the heat of the exhaust gases to the air but also serve in a measure as a baffle requiring the air to traverse a tortuous passageway as it passes into the heater through inlet 23 and then through the heater in the space between the inner casing 1 and the outer casing 2 and then outwardly through outlet 24 and into the automobile body.

I claim:

An automobile heater of the exhaust type comprising an inner sheet metal casing adapted for passage of exhaust gases therethrough and an outer sheet metal casing surrounding the inner casing in spaced relation therewith for passage of the air to be heated, spaced inlet and outlet openings in each of the said casings, a plurality of heat radiating sheet metal fin members each consisting of a closed ring of approximately L cross section, one leg of the L section of each fin member forming a continuous heat radiating fin lying in a plane approximately normal to the longitudinal axis of the casing and extending about the entire outer circumference of the inner casing and spaced from the inside wall of the outer casing, the second leg of the L section of each fin member forming an integral flange in the form of a continuous ring in continuous contact with the outside circumference of the inner casing and abutting the adjacent fin member to space each fin from the next adjacent fin whereby the flange of each fin is adapted for joining to said casing by copper brazing, the said legs of each fin in section forming an approximately right angled external corner extending completely around said ring, the second leg of each fin along its free edge contacting the adjacent fin along said external corner with a surface contact whereby under the condition of relatively rapid heating at brazing temperature, and with the inner casing at a lower temperature than the fin members, such surface contact serves to retain melted copper in place in the joint until the inner casing is heated to the approximate temperature of the fin members.

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