S. MATTHEWS.

AUTOMOBILE HEATER.

APPLICATION FILED JUNE 13, 1912.

1,068,516.

Patented July 29, 1913

2 SHEETS—SHEET 1.

Fig. 1.

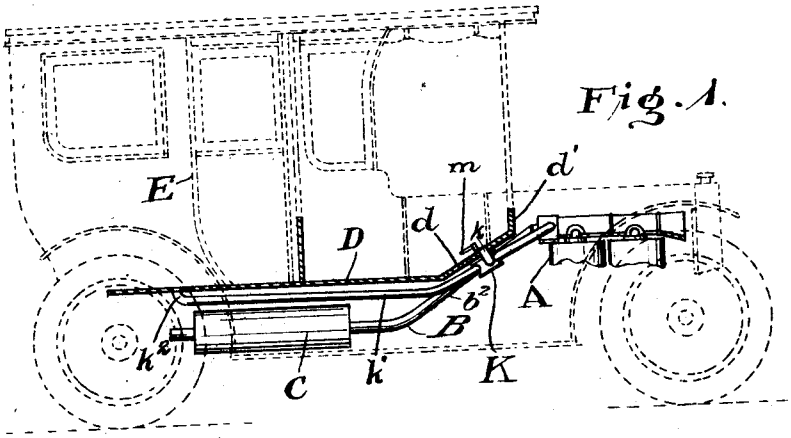


Fig. 2.

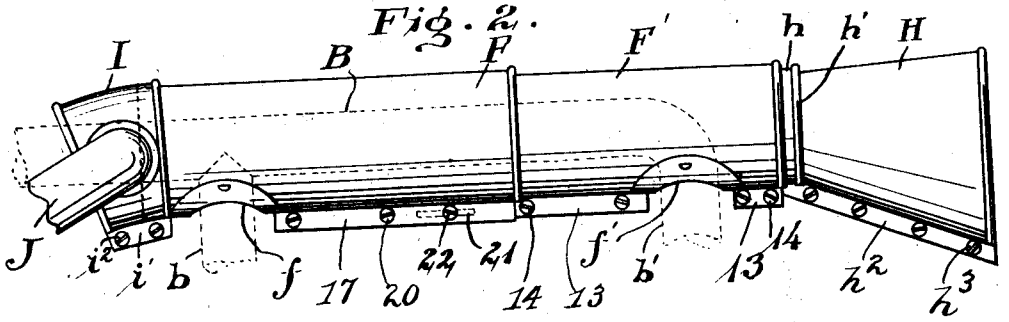


Fig. 3.

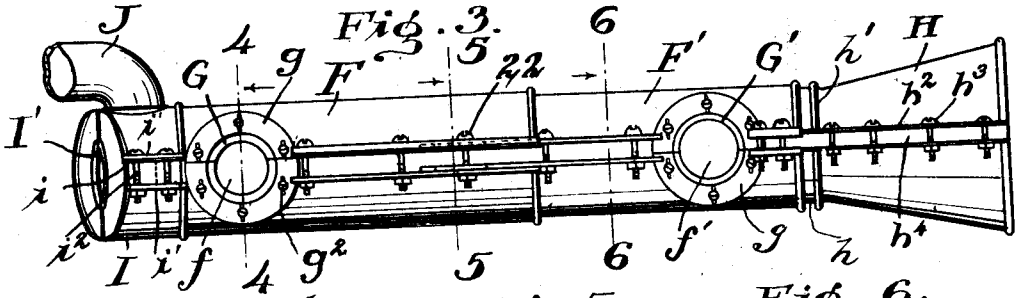


Fig. 4.



Fig. 5.

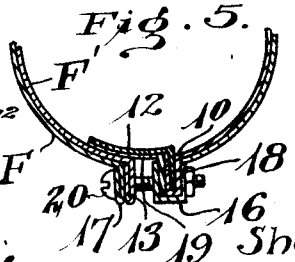
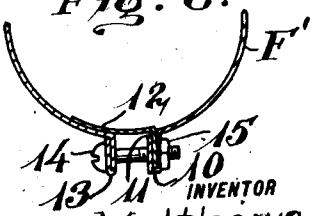


Fig. 6.



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2 SHEETS—SHEET 2.

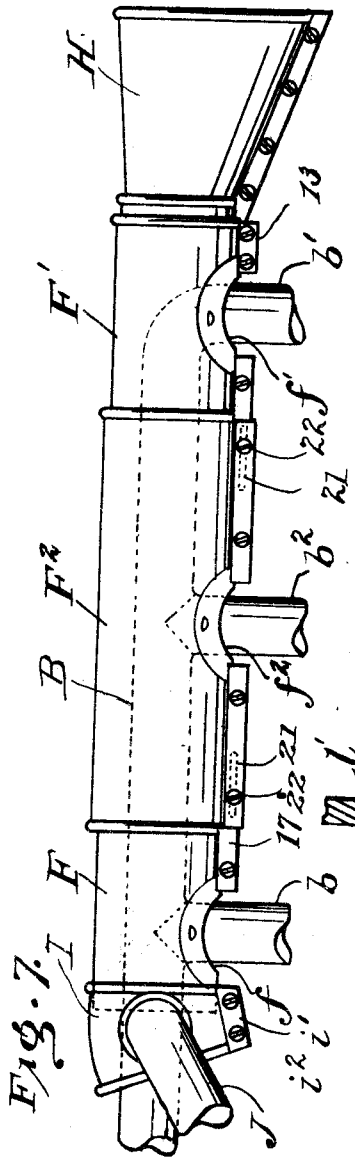


Fig. 7.

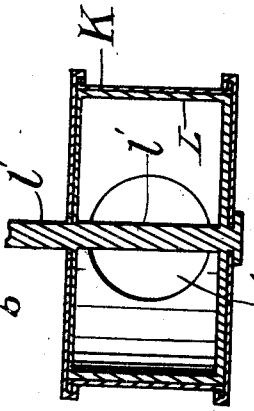


Fig. 10.

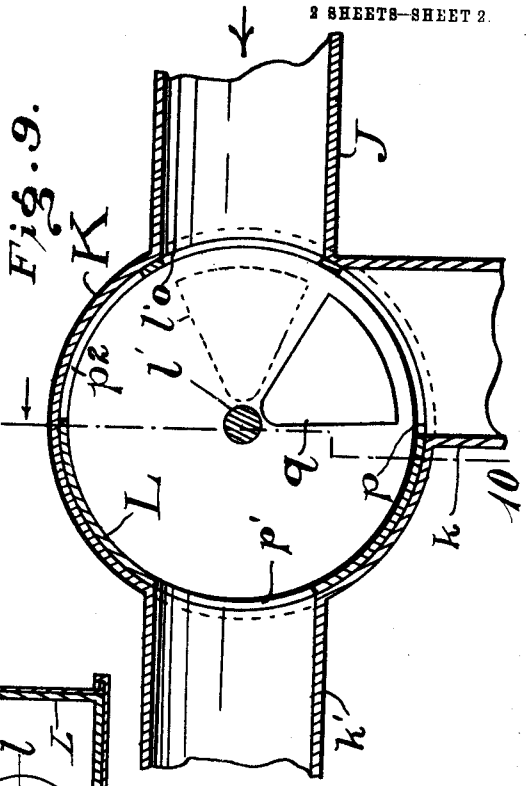


Fig. 9.

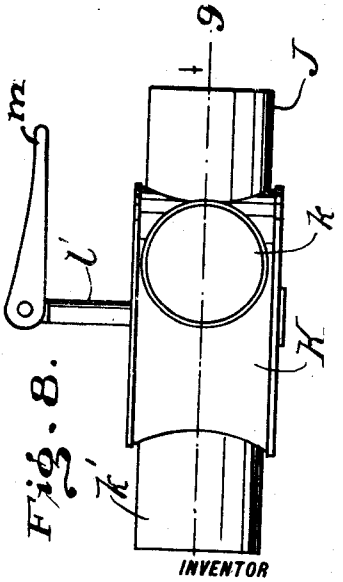


Fig. 8.

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UNITED STATES PATENT OFFICE.

SHERMAN MATTHEWS, OF NEW YORK, N. Y.

AUTOMOBILE-HEATER.

1,068,516. Specification of Letters Patent. Patented July 29, 1913.

Application filed June 13, 1912. Serial No. 703,400.

To all whom it may concern:

Be it known that I, SHERMAN MATTHEWS, a citizen of the United States, residing in the city of New York, borough of Manhattan, county and State of New York, have invented a certain new and useful Automobile-Heater, of which the following is a specification.

This invention is an automobile heater, and the main object in view is a structure capable of being adapted for use in connection with internal combustion engines of different types so far as concerns the number of exhaust ports of such engines.

The object specified is accomplished by so constructing the heater that it will receive engine exhaust pipes from ports of variable distances apart, or varying in number, and, further, so that it will receive main exhaust pipes of varying diameters.

In the practical embodiment of the invention herein illustrated and described, the heater is made extensible longitudinally and expansible diametrically, preferably by overlapping the members entering into the structure of the heater.

Furthermore, the invention embodies an elbow fitted to an end portion of the tubular heater in such manner that the position of said elbow relative to the heater may be changed according to the angle occupied by that part of the exhaust pipe which extends outside of the heater, said external part of the exhaust pipe running from the heater to the muffler. This movable elbow supports or carries a part of a warm air pipe by which the air from the heater is discharged into the car or body of the automobile. The elbow construction is useful in that it provides for the attachment of the heater to different kinds of engines, the exhaust pipes of which are frequently at different angles rearwardly of the engine.

The invention embodies, also, a distributing pipe with one or more branches, whereby warm air may be supplied to the interior of a car, together with valve mechanism so arranged with respect to said pipe that the flow of air may be shut off and regulated or the warm air may be discharged exteriorly of the car and without entering said car, said valve mechanism being provided with a separate port which, preferably, opens downwardly for the outlet of warm air at a point rearwardly of the engine and away from the car body.

The heater of this invention has an air intake positioned substantially at the front of the car so that fresh air, free from road dust, will be admitted to, and heated within, said heater, whereby fresh warm air is supplied to the car. The heater provides means for economically warming air and supplying the same to the car during cold weather, but in the summer season of the year the air circulates rapidly through the heater and into intimate contact with the hot exhaust pipe, so as to result in a cooling of the pipe, the warm air being discharged by the valve below and exteriorly of the car, at the rear of the engine.

Other detail features of the invention will be apparent from the accompanying description, drawings and appended claims.

Figure 1 is a side elevation of a portion of an automobile engine, the muffler and the exhaust pipe with the heater of this invention applied thereto in operative relation to the car, a part of which is indicated in vertical section and other parts in dotted lines. Fig. 2 is a side elevation of the heater with the exhaust pipe or manifold and the branches thereof indicated in dotted lines. Fig. 3 is a bottom plan view of the heater shown in Fig. 2. Figs. 4, 5 and 6 are vertical cross sections on the lines 4—4, 5—5 and 6—6, respectively, of Fig. 3. Fig. 7 is a plan view illustrating another embodiment of the heater, wherein three telescopic sections are employed in order that the heater may be used in connection with an exhaust manifold for a six cylinder engine. Fig. 8 is a side elevation of a three-way valve by which the flow of air through the distributing pipe or through the separate outlet may be controlled. Fig. 9 is a horizontal section on the line 9—9 of Fig. 8. Fig. 10 is a vertical section on the line 10—10 of Fig. 9.

In Figs. 1 and 2 of the drawings, A designates the cylinders of an automobile engine, and B the exhaust pipe or manifold, the latter having two branches *b b'* which communicate with the exhaust ports of engine A. The exhaust pipe B inclines for a part of its length downwardly and rearwardly from engine A, said pipe B entering a muffler C of any usual form. The muffler, together with the inclined and rear parts of the exhaust pipe, extend below the floor D of an automobile car or body E, the latter being indicated in dotted lines in Fig. 1, said

floor D having an inclined section *d* and a dash *d'*. All the parts referred to may be of the usual or any preferred construction, and they are described for the purpose, mainly, of illustrating an ordinary car to which the heater of the present invention is adapted to be applied. In the example shown, engine A is of the four cylinder type having two exhaust ports which communicate with the branches *b b'* of the exhaust pipe or manifold B, but as will be seen by reference to Fig. 7, the heater of this invention is adapted to be used in connection with a six cylinder engine having three exhaust ports, as will hereinafter appear.

The heater, proper, for a four cylinder engine consists of sections F F' and a hood H, although the number of sections may be increased when the heater is used in connection with a six cylinder engine. The sections F F' are positioned in lapping engagement so that one section may telescope into the other, whereby the heater is made extensible for the purpose of adapting it to the exhaust manifolds of different engines, the distance between the branch exhaust pipes of which may, and commonly do, vary with relation to each other. The sections F, F' of the heater are provided with apertures *f*, *f'* to receive the branches *b b'* of the exhaust manifold.

As hereinbefore indicated, the heater is extensible in the direction of its length, and is expansible circumferentially, whereby said heater is applicable to exhaust manifolds of different types of engines, which manifolds have their exhaust port connections spaced at different distances apart, said manifolds being of different diameters. The extension of the heater is secured by employing two or more sections assembled in overlapping relation, each section being provided with an aperture, such as *f* or *f'*, whereby the sections may be drawn out or extended while retaining them in lapping relation so that the distance between the apertures *f*, *f'* in the respective sections will correspond to the distance between the exhaust ports of a particular engine. The expansion or contraction circumferentially of the heater is obtained by the construction illustrated more particularly in Figs. 5 and 6. As shown in Fig. 6, section F' of the heater is divided or split lengthwise, said section being provided at one edge with a flange 10, the latter being doubled upon itself so as to form a groove into which extends a flange 11 of a wing plate 12, see Fig. 6. The section F' is provided at its other edge with a flange 13, the latter being doubled upon itself in order to stiffen it, said flanges 10, 13 at the respective edges of the divided section F' being parallel to each other and extending lengthwise of the section. The wing plate 12 is thus attached to the flange 10 at one edge of the section, and this wing plate is positioned to have overlapping engagement with the other edge of said section, which edge is provided with the flange 13, whereby the wing plate is attached to flange 10 and is adapted to close the space in the section between the flanges 10, 13, when the section is expanded or contracted within a certain limit. Parallel flanges 10, 13 of section F' are provided with apertures through which pass the bolts 14 having nuts 15, the bolts operating to retain the flanges 10, 13 and the wing plate 12 in the positions to which they are adjusted when the section is enlarged or diminished in diameter. The other section F of the tubular heater is similar in construction to the section F', that is to say, the section F is divided or split lengthwise. One edge of the section F is provided with a channeled flange 16, and the other edge is provided with a doubled flange 17. In the channeled flange 16 of section F fits a depending flange 18 of a wing plate 19, the latter extending across the space between the parallel flanges 16, 17 at the respective edges of section F so as to close the opening or space between the two flanges. At the meeting or lapping parts of sections F, F', section F' extends or fits into section F. Accordingly, the flanges 10, 13 of section F' overlap the flanges 16, 17 of section F, and the wing plate 19 of section F overlaps the corresponding wing plate 12 of section F', whereby the flanges and the wing plates of the sections are compactly disposed with respect to each other at the overlapping portions of said section. It should be noted that the flanges 16, 17 of section F are connected by bolts 20 which pass through suitable openings in the flanges in a similar manner to the bolts 14, but at the meeting or overlapping portions of the sections and their flanges, a slot or slots 21 are provided in one or more flanges so as to receive bolt or bolts 22, said slot and bolt, as shown in dotted lines in Figs. 2 and 3, providing for the required longitudinal adjustment of sections F, F' in order to extend or decrease the length of the tubular heater, whereby the openings *f*, *f'* are made to approach toward or recede from each other, for the purpose of adapting the tubular heater to receive branches *b*, *b'* of the exhaust manifold, which branches may be located different distances apart in the different styles or makes of the internal combustion engines.

It is to be observed that the overlap between the flanges 10, 13 on section F', and 16, 17 on section F retains the two sections F, F' in alined relation longitudinally of the heater tube, said flanges thus serving the purpose of means to preclude rotative movement of one section with respect to the other

section. The screws and flanges provide means whereby the sections may be increased or decreased in diameter for the reason that the bolts or the screws can be turned in one direction so as to expand the sections and, contrariwise, the nuts can be tightened on the screws so as to decrease the diameter of the sections, whereby said sections are adapted for use in conjunction with exhaust manifolds, the diameters of which vary in the different makes of engines. Furthermore, the sections F, F′ are divided lengthwise, but the spaces or longitudinal openings in the sections are closed by the employment of the wing plates, as a result of which the sections may be increased or decreased in diameter as desired and there will be no free spaces or openings through which air can flow, whereby the sections are extensible longitudinally, expansible circumferentially, and present continuous surfaces against the inflow of air except as the air flows lengthwise through the heater tube.

By reference to Fig. 3 it will be noted that the longitudinal division in sections F, F′ extends through openings *f*, *f*′ in the heater tube. Accordingly, the expansion or contraction of the heater tube enlarges or diminishes the diameter of said openings, but it is important that the flow of air through openings *f*, *f*′ be precluded around the branches of the exhaust manifold. To accomplish this end I employ packings G, G′ positioned partly within the openings and retained in fixed positions by fastening them to sections F, F′, said packings being composed of asbestos, or a compound of asbestos, or of any other appropriate material which is noncombustible. As shown, each packing consists of four semi-circular pieces of material, two of said pieces being assembled so as to form a complete ring, and one ring being positioned on the inside of the heater tube, whereas the other ring is positioned exteriorly to the heater tube. The sections composing the two packing rings in each opening are retained in position by semi-circular clamping plates *g*, *g*′ positioned exteriorly and interiorly of the heater tube, and these plates are fastened securely in position by screws, bolts or rivets *g*², which are shown in Fig. 4 as passing through the two packing rings and the series of clamping plates. The heater tube is slotted, or the plates may be slotted as shown in Fig. 3, in order that the packing rings and their clamping plates may be adjusted to bring the packing rings into close contact with branches *b*, *b*′ of the exhaust manifold. The described construction enables the heater tube to be fitted to the said branches of the exhaust manifold in order to prevent the flow of air around said branches and into the heater tube, but as the packings are composed of fire resisting material, it is evident that the parts of the tubular heater in contact with the highly heated branches of the exhaust manifold will not be affected by, or deteriorated under the influence of, the exhaust gases from the engine. Furthermore, the expansion or contraction of the sections F, F′ composing the tubular heater to adapt them for different sizes of exhaust manifolds will bring about a corresponding adjustment in the sections of the packings and their clamping plates, and thus the tubular heater is constructed for use in connection with the exhaust manifolds and the branches thereof in the different makes of engines.

The tubular heater is positioned in close relation to engine A, and upon that side thereof having the exhaust manifold, said tubular heater extending lengthwise of said manifold at that part of the latter into which the exhaust is discharged directly from the engine. The hood or funnel H is provided at the intake end of the tubular heater so that the funnel will extend well forward of the engine cylinders and be elevated substantially above said cylinders, thus locating the funnel directly at the rear of the radiator, whereby fresh air substantially free from road dust will be supplied to the tubular heater. The funnel has its open end close to a fan positioned at the rear of the radiator shown in Fig. 1 in that style of engine which is cooled by the operation of a rotary fan, and, accordingly, when such a fan is used, a certain amount of air will be blown through the funnel and the tubular heater, as a result of which a forced circulation of air takes place in contact with the highly heated exhaust manifold so as to reduce the temperature of said exhaust manifold during the summer season of the year. The funnel is tapering, but the angle of the taper on one side is greater than on the other, as shown in Fig. 2, as a result of which the funnel is provided with an intake of large diameter and is positioned in such relation to the engine that a certain amount of air will be blown into the engine by the operation of the fan. The funnel is provided with a cylindrical section *h* and with a bead *h*′, the latter acting to limit the inward movement of said funnel with respect to section F′. Furthermore, the funnel and its tubular section *h* are divided longitudinally and provided with side flanges *h*² to receive the bolts *h*², whereby the funnel is rendered expansible and contractible in order to make it conform to the expansion or contraction of the heater tube. The space between the flanges and the divided funnel is closed by a wing plate *h*⁴ indicated in Fig. 3, said wing plate being similar to the wing plates 12, 19 of sections F′, F, respectively. The tubular inner end *h* of the funnel is received within the forward end portion of section F′ so as to have overlapping relation thereto, and the

funnel is clamped within said section F' by tightening up the screws or bolts 14.

It is well known that rearwardly of the engine the length b^2 of the exhaust manifold extends at different angles in different makes of engines, and to adapt the tubular heater for use on such different inclinations in the lengths b^2 of the exhaust manifold I have provided a movable elbow I, the latter being expansible to conform to the increase or decrease in the diameter of the tubular heater. Elbow I is curved, as shown more clearly in Fig. 2, and divided lengthwise as at i, the edges of the elbow at the divided part thereof having flanges i' to receive the bolts or screws i^2, the space between the flanges being closed by a wing plate, similar to the wing plates therefore described. The divided elbow is slipped over the rear end portion of section F composing one member of the heater and this elbow is moved or shifted to conform to the inclination of the length b^2 of the exhaust manifold, after which the screws or bolts i^2 are tightened for the purpose of clamping the elbow firmly in position upon the tubular heater. The space between the open rear end of elbow I and the external surface of inclined length b^2 of the manifold is adapted to be closed in any suitable way, such as by packings I', similar to the packings G, G' between branches b, b' of the exhaust manifold and the edges of the openings f, f' in sections F, F' of the tubular heater. Attached to the shiftable elbow is a length J of a distributing pipe which extends downwardly and rearwardly from the tubular heater. The length J of said distributing pipe is attached to the elbow, although it may be shifted relative thereto by fitting said length over a nipple or flange (not shown) and thus the pipe J may be brought into proper relation to the inclined part d of the car floor, notwithstanding the position of elbow I relative to the heater may be changed in order to conform to the inclination of the manifold length b^2. The distributing pipe J is attached to a valve shell or casing K, the latter being positioned quite close to and directly beneath the inclined part d of the car floor, see Fig. 1. To this valve casing are attached distributing pipes k, k', the pipe k' extending beneath the car floor and bent upwardly at its rear, at k^2, so as to discharge warm air into that compartment of the car which is to be occupied by the passengers, whereas the pipe k is provided with an upturned portion which extends through the inclined part d of the car floor for the purpose of discharging warm air into that compartment of the car which is to be occupied by the chauffeur, whereby two distributing branches extend from valve casing K into the respective compartments of the car. In addition to the inlet which communicates with pipe J, and the two outlets which communicate with pipes k, k', the valve casing K is provided with a separate outlet port l, the latter being provided preferably, in the bottom of said valve casing so as to discharge warm air below the car and rearwardly of the engine, said outlet l providing for the free flow of warm air from the heater to a point rearwardly of the engine, and without permitting said warm air to enter the car.

Operating within the valve casing K is a rotary valve L, the latter being in the form of a cylinder and carried by a rotary shaft l', said shaft being journaled in appropriate bearings provided in the top and bottom of valve shell K. The upper part of the valve stem is intended to pass through the inclined section d of the car floor, and on the upper end of this valve stem is provided an operating piece m, the latter being within convenient reach of the chauffeur, whereby the valve may be operated without requiring the chauffeur to leave the seat in the car. Valve L is hollow, and it is provided with four ports o, p, p', and p^2, and an exhaust port q. The said valve is adapted to be rotated within the shell K, by means of member m, so that any one, two or three of these ports may be brought into register with pipes J, k, or k', whereas the port q is adapted to register with an aperture l in the valve shell. It will thus be obvious that the heated air, entering the valve by way of the pipe J, may be directed through either of the pipes k or k', or both, or through the port q and aperture l to the outer atmosphere. With the valve L adjusted as shown in Fig. 9, the aperture l is closed and the heated air is allowed to blow into both fore and rear compartments of the car. If the valve L is partly rotated so as to bring the ports p^2 and o into register with the pipes J and k, respectively, the port p' will be closed and the air will flow into the chauffeur's compartment of the car only. Again, the valve may be rotated to bring the port p into register with pipe J and the port q into register with the port l, thus closing both distributing pipes k, k', and opening the separate outlet through the bottom of the valve, for the purpose of discharging the warm air through the valve and outside of the car without permitting said warm air to enter the car.

It is evident that the valve is capable of several movements in order to provide for the discharge of warm air without entering the car, as during the prevalence of hot weather, and for admitting the warm air into one or both compartments of the car during the cold weather. The flow of air through the tubular heater and through the port l of the valve operates to measurably cool off the heated exhaust manifold so as to preclude excessive heating of the engine, but

when cold weather prevails, the air is warmed without expense by circulating in contact with the exhaust manifold, and this warm air, in a fresh condition and free from dust, is adapted to be supplied into one or both compartments of the car.

I have heretofore described the invention in connection with a four cylinder engine having two branches b, b' leading to the exhaust manifold, but in Fig. 7 of the drawings I have shown a construction of the tubular heater which is adapted for use in connection with a six cylinder engine having three branches to the exhaust manifold. As disclosed in said figure, the tubular heater consists of the sections F, F′ having openings f, f', respectively, and an additional section F^2 positioned between the sections F, F′, said intermediate section F^2 being provided with an opening f^2, for the purpose of receiving the branch b^2 of the exhaust manifold. The section F^2 is constructed similarly to the sections F, F′, that is by providing it with flanges and a wing plate, so as to permit expansion and contraction of said section F^2; furthermore, section F^2 is provided with packings similar to the packings G, G′, and the end portions of section F^2 are in lapping engagement with the sections F, F′, respectively, so as to provide for the increase or decrease in the total length of the tubular heater.

Having thus fully described the invention, what I claim as new, and desire to secure by Letters Patent is:

1. An automobile heater embodying a heating-tube positioned to substantially incase the exhaust manifold of a vehicle engine, said heating-tube consisting of relatively adjustable sections provided respectively with transverse openings which are adapted to receive the branches of said exhaust manifold.

2. An automobile heater embodying a heating tube positioned to incase the exhaust manifold of a vehicle engine and composed of sections provided respectively with transverse openings for the introduction of branch exhaust pipes forming parts of said exhaust manifold, said sections being positioned in overlapping relation lengthwise of the tube, whereby the length of the tube may be extended or diminished for the purpose of varying the relative distance between said openings.

3. An automobile heater embodying a heating tube composed of telescopic sections positioned to incase the exhaust manifold of a vehicle engine, said telescopic sections being provided respectively with transverse openings for the introduction of branch exhaust pipes forming parts of said exhaust manifold, each of said sections having a circumferentially lapped joint whereby the diameter of the tube may be varied for the purpose of receiving exhaust manifolds of varying diameters.

4. An automobile heater embodying a longitudinally divided tube provided with a plurality of transverse openings, the line of division in said tube intersecting with said openings, and expansible collars in coöperative relation to said transverse openings of the tube, whereby the heater tube and the collars may be expanded in operative relation to an exhaust manifold and its branches.

5. An automobile heater embodying a heating-tube positioned to substantially incase the exhaust manifold of a vehicle engine, and an elbow embracing the delivery end portion of said heating tube, said elbow being closed at one end and provided in said closed end with an opening through which is adapted to pass an exhaust pipe leading from the exhaust manifold, said elbow being shiftable to different angular positions relative to the longitudinal axis of said heating tube for accommodating the elbow to the angle of inclination occupied by different exhaust pipes to their respective exhaust manifolds.

6. An automobile heater embodying a heating-tube positioned to substantially incase the exhaust manifold of a vehicle engine, said heating-tube being divided lengthwise and provided with means for expanding or contracting the diameter thereof, and a divided elbow provided with means for expanding or contracting the diameter thereof, whereby the heating-tube and the elbow may be positioned to incase exhaust manifolds and exhaust pipes of varying diameters, said elbow being clamped upon the heating-tube and adapted to be shifted to different angular positions with respect to the longitudinal axis of said tube.

7. An automobile heater embodying a heating-tube positioned to substantially incase the exhaust manifold of a vehicle engine, said heating-tube being provided with a fresh air intake at one end and with transverse openings to receive the branches of said exhaust manifold, an elbow clamped to the delivery end of said heating-tube and shiftable thereon to different angular positions with respect to the longitudinal axis of said tube, means for partially closing the free end of the elbow, and an air delivery pipe connected to said elbow independently of the heating tube.

8. An automobile heater embodying a heater tube adapted to incase the exhaust manifold of a vehicle engine, and composed of sections each provided with a transverse opening for receiving a branch of the exhaust manifold, said sections overlapping each other and permitting the heater to be extended or decreased in length for varying

the position of the transverse openings therein, and means for precluding rotative movement of said sections relative to each other.

9. An automobile heater embodying a heater tube positioned to incase the exhaust manifold of a vehicle engine and composed of a plurality of not less than three sections positioned in lapping engagement with each other lengthwise of said tube, each section being provided with a transverse opening for receiving a branch of an exhaust manifold, one of said sections being positioned between two other sections.

10. A heater for use upon the exhaust manifold of an automobile engine embodying an expansible tubular member provided with a plurality of transverse openings, said tubular member being divided lengthwise and the line of such division intersecting with said transverse openings, an expansible collar in cooperative relation to each transverse opening, and a packing composed of non-combustible material within each expansible collar, said packing being positioned for contact with a branch of the exhaust manifold.

11. An automobile heater embodying a heater tube consisting of relatively adjustable sections each provided with a transverse opening for receiving the branch of an exhaust manifold, each section being divided lengthwise, whereby the section may be expanded or contracted, and an expansible collar positioned on each section in operative relation to the transverse opening therein, for closing the space between the edges of said transverse opening and the branch of an exhaust manifold.

12. An automobile heater embodying a heater tube consisting of relatively adjustable sections each provided with a transverse opening for receiving the branch of an exhaust manifold, each section being divided lengthwise and provided with radial flanges at the edges of the divided part thereof, said radial flanges of one section lapping the corresponding flanges of the other section for directing the sliding movement of one section relative to the other section and means connecting said flanges whereby the section is adapted to be expanded or contracted diametrically.

13. An automobile heater embodying a heater tube consisting of relatively adjustable sections each provided with a transverse opening for receiving the branch of an exhaust manifold, each section being divided lengthwise and provided with radial flanges at the edges of the divided part thereof, the flanges of one section lapping the flanges of the other section, means connecting said flanges whereby the section is adapted to be expanded or contracted diametrically, and means on each section for closing the space or opening between said flanges.

14. An automobile heater embodying a heater tube consisting of relatively adjustable sections each provided with a transverse opening for receiving the branch of an exhaust manifold, each section being divided lengthwise and provided with radial flanges at the edges of the divided part thereof, the said flanges of the respective sections being in engagement to preclude rotative movement of said sections, means connecting said flanges whereby the section is adapted to be expanded or contracted diametrically, and wing plates each attached to one section and overlapping the edges thereof in position to close the space between the flanges.

15. An automobile heater embodying a heater tube consisting of telescopic and expansible sections each provided with a transverse opening for receiving the branch of an exhaust manifold, each section being divided lengthwise thereof, and wing plates each spanning the space between the edges of one section at the divided part thereof.

16. An automobile heater embodying a heater tube consisting of telescopic and expansible sections each provided with a transverse opening for receiving the branch of an exhaust manifold, each section being divided lengthwise thereof, and wing plates each spanning the space between the edges of one section at the divided part thereof, said wing plates being attached to one edge of the section and overlapping the other edge thereof.

17. An automobile heater embodying a heater tube divided longthwise and provided with transverse openings to receive the branches of an exhaust manifold, the line of said longitudinal division intersecting said transverse openings, means whereby said heater tube may be expanded or contracted diametrically, packing members positioned to extend into said transverse openings of the heater tube, and means for clamping the packing members fixedly to the heater tube.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SHERMAN MATTHEWS.

Witnesses:
JACOB SKIDMORE,
ETHEL MCCLURE