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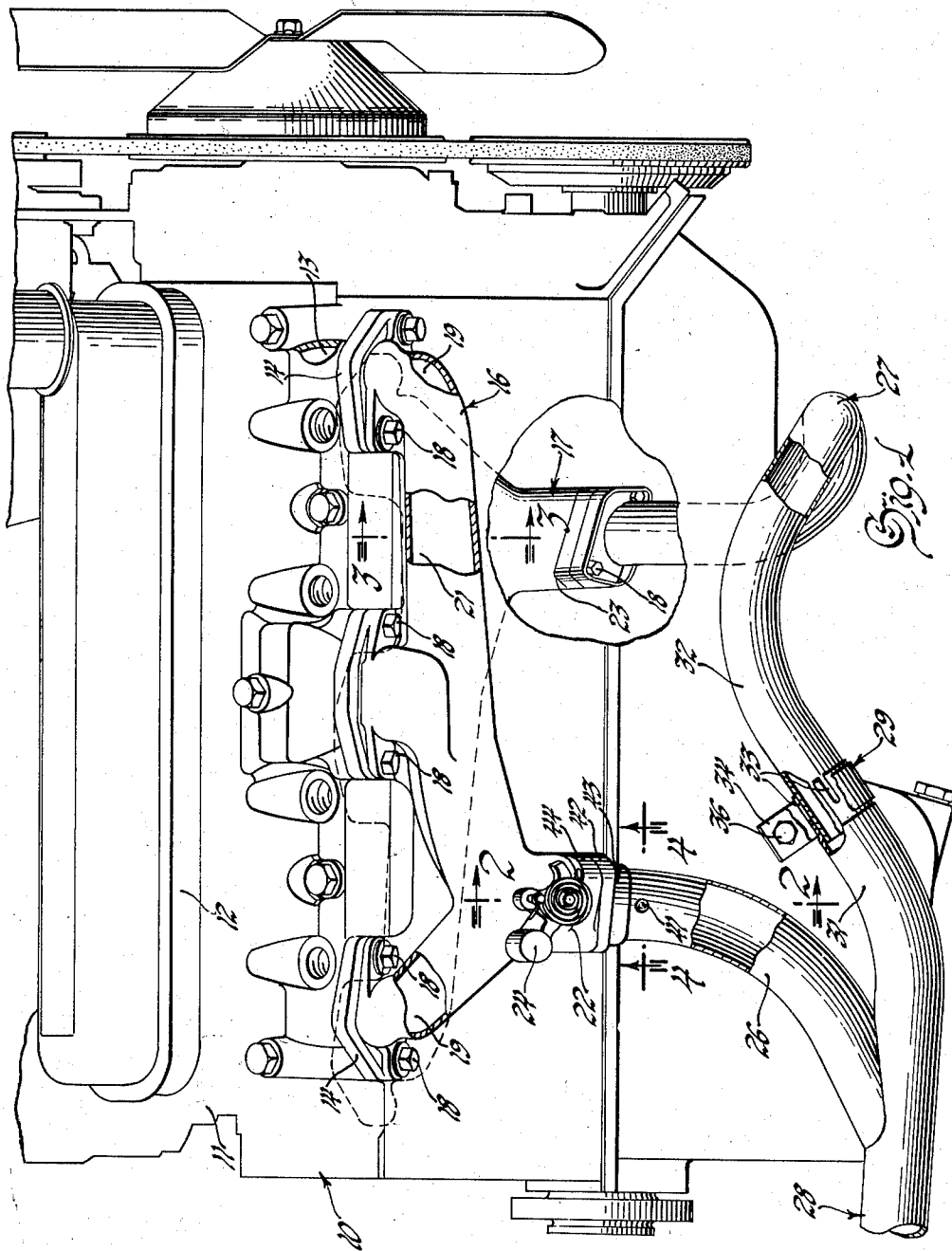
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2,847,820

CROSSOVER EXHAUST SYSTEM FOR V-8 ENGINES

Filed June 30, 1954.

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

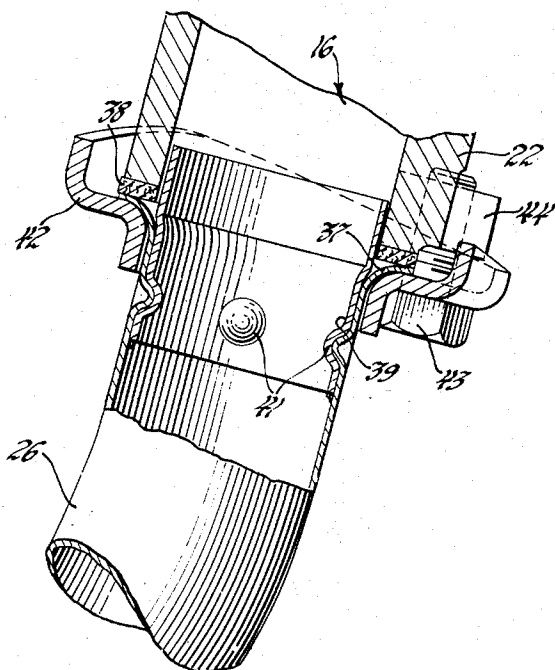


Fig. 2

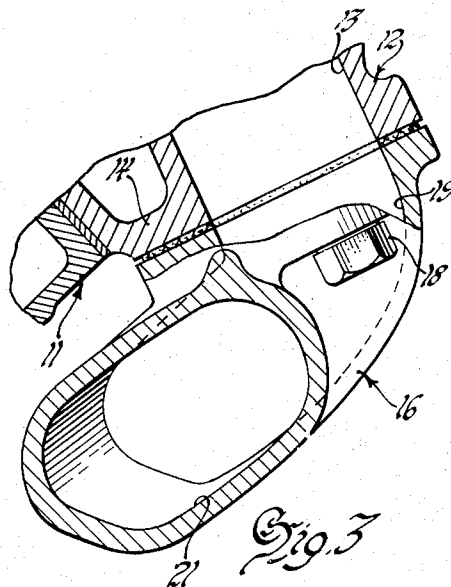


Fig. 3

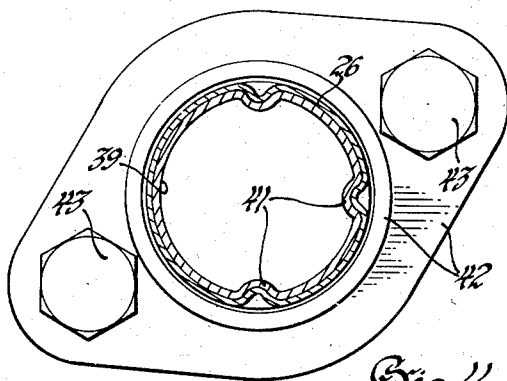


Fig. 4

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CROSSOVER EXHAUST SYSTEM FOR V-8 ENGINES

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2 Claims. (Cl. 60—29)

This invention relates to exhaust systems for engines and for other purposes and has particular relation to exhaust systems especially applicable for use with light weight, high speed, internal combustion engines for automotive and other uses.

It has heretofore been considered desirable to employ as many as possible of identical parts in manufacturing engines for automotive and other uses. However, in the manufacture of exhaust systems particularly for V type engines where exhaust manifolds are employed on opposite sides of an engine it has been found difficult to use the same manifold in both positions. Steering mechanisms, starters, generators and other engine accessories and vehicle components have made it necessary to employ specially designed manifolds on each side of the engine, to employ separate exhaust conduits for each side of the engine or to employ conduit systems with many sections and with complicated bends and other objectionable features that increase the back pressure in the exhaust system and that render the exhaust system expensive and difficult to handle and to install and remove.

It is now proposed to provide a simplified exhaust system in which identical exhaust manifolds can be employed on opposite sides of the engine. These exhaust manifolds are constructed to lie as close as possible to the sides of the engine and to provide manifold outlets at the rear of the engine on one side of the engine and at the front of the engine on the opposite side of the engine. It is further proposed to provide a bifurcated exhaust conduit which may be disposed principally on one side of the engine, with branches communicating with each of the manifold outlets and with coupling means capable of allowing the conduit means to be easily installed and disassembled.

In the drawing:

Figure 1 is a fragmentary side elevational view of an engine having an exhaust system embracing the principles of the invention.

Figure 2 is a fragmentary cross sectional view of the connection between one of the manifold outlets and one of the exhaust conduit branches as the structure may appear substantially in the plane of line 2—2 on Figure 1.

Figure 3 is a fragmentary cross sectional view of the engine and showing the main manifold passage of one of the exhaust manifolds employed in the engine. Figure 3 is taken substantially in the plane of line 3—3 on Figure 1, looking in the direction of the arrows thereon.

Figure 4 is a cross sectional view of the coupling shown by Figures 1 and 2 as the coupling will appear substantially in the plane of line 4—4 on Figure 1.

The engine 10 employed in illustrating the invention may be a V type engine having obliquely disposed cylinder banks 11 to which engine heads 12 are bolted or otherwise secured. The heads 12 have exhaust manifold passages 13 opening outwardly therefrom through outer side walls 14 of each head. Exhaust manifolds 16

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and 17 are adapted to be secured by bolts 18 to the side walls 14 in such manner that the manifold branches or inlet passages 19 will communicate with the exhaust passages 13 in the heads 12. In the present instance each of the manifolds 16 and 17 has branch passages 19 at the opposite ends thereof for one cylinder of each bank of cylinders of the engine and branch passages 19 intermediate the ends thereof for two cylinders of each bank of cylinders of the engine. The branch passages 19 extend outwardly and downwardly from the exhaust passages 13 substantially in parallel relation to the outer side walls of the banks of cylinders 11. The lower ends of the branch passages 19 communicate with main passages 21 that extend throughout the length of the manifolds 16 and 17 and in such manner as to connect all of the branch passages 19. The main passages 21 are oval in cross section and lie as closely as possible to the sides of cylinder banks 11 with the major axes of the oval formation thereof extending downwardly and inwardly along the sides of the cylinder banks 11 and substantially in parallel relation to the outer side walls thereof.

The manifolds 16 and 17 have manifold outlets 22 and 23 extending downwardly and inwardly therefrom and at substantially the same angles with respect thereto and between manifold branches at the opposite ends thereof.

With respect to all of the structure previously described the manifolds 16 and 17 are identical so that a single design of manifold may be employed in constructing the engine, two of the manifolds being employed in reverse relation on opposite sides of the engine.

If it is desired to employ exhaust heating for the induction system of the engine one of the manifolds may be modified in such manner as to permit the installation of a heater control valve such as that indicated at 24.

The manifold outlets 22 and 23 are adapted to communicate with branches 26 and 27 of a bifurcated exhaust conduit 28. In order to expedite the construction and installation of the bifurcated exhaust conduit 28 it is proposed to employ an axially rotatable coupling 29 in the branch conduit 27. The coupling 29 is formed by conduit sections 31 and 32 with the outer section 31 being larger than the inner section 32 and the end of the section 32 telescoping within the end of the section 31. The end of the section 31 is slotted at 33 to permit the end of the section 31 to be contracted upon the end of the section 32. A contractable coupling member 34 is adapted to have the ends thereof secured together by a bolt 36 for the purpose of contracting the end of the section 31 upon the end of section 32.

It will be apparent that when the bolt 36 in the coupling member 34 is loosened that the conduit section 32 may be rotated with respect to the conduit section 31 and with respect to the branch conduit 26 of the bifurcated conduit 28.

The ends of the branch conduits 26 and 27 which are adapted to be connected to the manifold outlets 22 and 23 each are constructed to provide an outwardly projecting flange 37 adapted to engage a gasket 38 at the ends of the outlets 22 and 23. Secured within the flanged ends of each of the branch conduits 26 and 27 is a coupling member 39 adapted to telescope within the end of one of the manifold outlets 22 or 23. The coupling members 39 may be secured within the ends of the conduits 26 and 27 in any suitable manner as by employing the dimple construction indicated at 41. Flange collars 42 are adapted to engage the outer surfaces of the flanges 37 for the purpose of securing the flanges against the ends of the outlets 22 and 23. Bolts 43 may be made to engage threaded openings in the

flanged lower ends 44 of the outlets 22 and 23 for the purpose of compressing the flanges 37 against the gaskets 38.

It will be apparent that the manifolds 16 and 17 may be reversed upon the opposite sides of the engine 10 and that consequently only one manifold design need be employed.

It will also be apparent that the ends of the branch conduits 26 and 27 may be made to telescope within the ends of the manifold outlets 22 and 23 when the conduits are secured to the manifolds by the bolts 43 and that this installation may easily be made by reason of the axially rotatable coupling 29 which permits the bifurcated conduit 28 to be adjusted to the position of the outlets 22 and 23 from the manifolds 16 and 17.

I claim:

1. An exhaust system for engines having obliquely disposed banks of cylinders with the outer walls thereof sloping inwardly toward the crankcase of the engine and comprising, similar exhaust manifolds having manifold outlets projecting downwardly from the main manifold passages therein, said manifold passages being formed in said manifolds to extend along said side walls of said banks of cylinders and being oval in formation with the major axes of said oval formations extending inwardly substantially in parallel relation to said side walls, said manifolds being formed to provide upwardly and inwardly disposed branch passages extending from said main manifold passages to provide communications between the exhaust passages in said engine and said main manifold passages, said manifold outlets also being formed to slope downwardly and inwardly along said side walls of said engine from said main manifold passages and from between two of said branch passages at different ends of said manifolds when said manifolds are disposed on opposite sides of said engine, and bifurcated exhaust conduit means having inlets connected to said manifold outlets, said bifurcated exhaust conduit means

being disposed principally on one side of said engine with a branch conduit communicating with the manifold outlet adjacent the rear end of one of said manifolds and with another branch conduit extending forwardly and beneath said engine and communicating with the manifold outlet adjacent the front end of the other of said exhaust manifolds, said branch conduits being provided with means telescoping within the ends of said manifold outlets and with flange means engaging the ends of said manifold outlets and with collar means engaging said flange means to compress said flange means against the ends of said manifold outlets.

2. An exhaust system for engines as defined by claim 1 and in which said branch conduit extending forwardly and beneath said engine is provided with rotatable coupling means permitting sections of said branch conduit to be axially rotated so that said means telescoping within the ends of said manifold outlets and said flanges may be adjusted to fit the ends of said manifold outlets.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,847,820

August 19, 1958

Clayton B. Leach

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 28, list of references cited, under "UNITED STATES PATENTS" for the patent number "2,346,782" read -- 2,356,782 --.

Signed and sealed this 30th day of December 1958.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents