Sept. 27, 1966 P. V. GREGG 3,275,346

FLANGE

Filed June 8, 1964

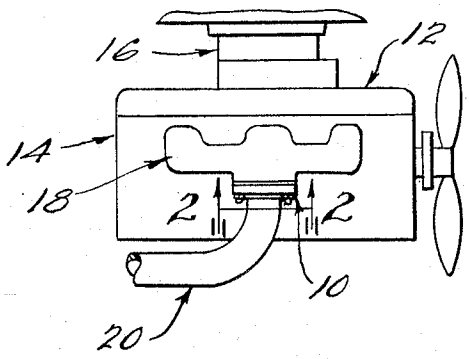


Fig. 1.

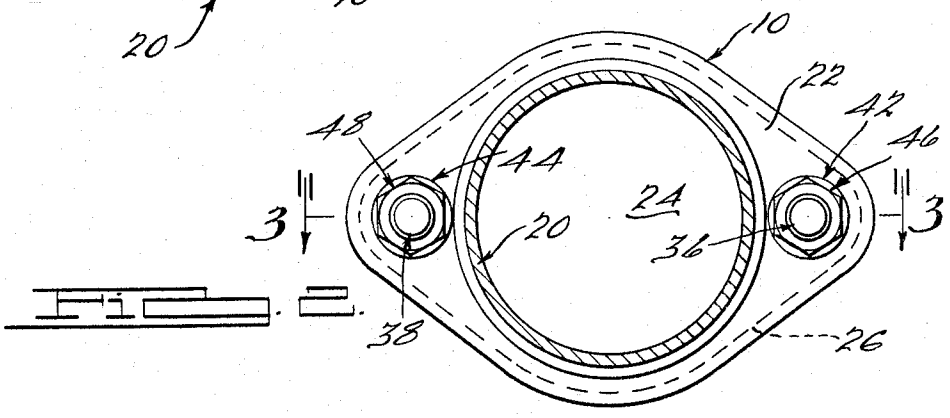


Fig. 2.

Fig. 3.

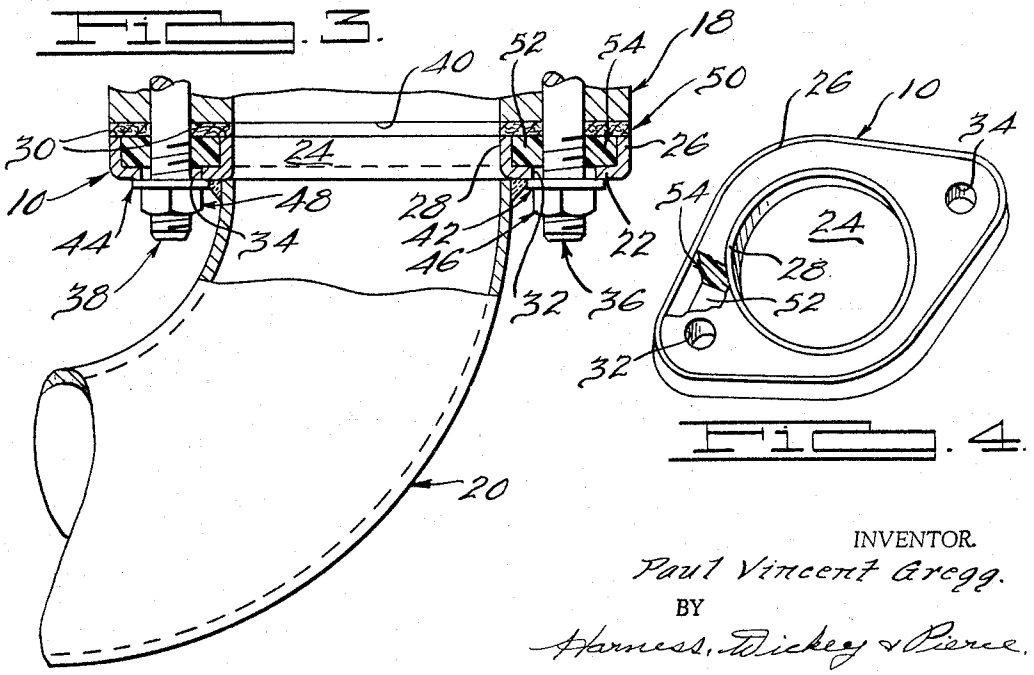


Fig. 4.

INVENTOR.
Paul Vincent Gregg.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

United States Patent Office

3,275,346

Patented Sept. 27, 1966

3,275,346

FLANGE

Paul V. Gregg, Racine, Wis., assignor to Walker Manufacturing Company, Racine, Wis., a corporation of Delaware

Filed June 8, 1964, Ser. No. 373,448
1 Claim. (Cl. 285—49)

This invention relates generally to internal combustion engines, and more particularly, to an improved pipe flange for connecting the exhaust pipe to the exhaust manifold of an automotive engine.

It is a primary object of the present invention to provide a flange for interconnecting the exhaust pipe and exhaust manifold of an automotive engine, which flange is characterized by the same structural rigidity as heretofore known and used flange devices, but wherein considerably less material is used than in such known and used flanges.

It is another object of the present invention to provide a flange of the above character which, by virtue of the fact that it consists of less material than heretofore known flange devices, may be manufactured or produced at a considerably faster rate than such known flange devices and is therefore considerably less expensive to commercially produce.

Other objects and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawing, wherein:

FIGURE 1 is a side elevational view of the flange of the present invention, as seen in operative association with a conventional automotive exhaust pipe and exhaust manifold;

FIGURE 2 is an enlarged cross-sectional view taken along the line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged transverse cross-sectional view taken along the line 3—3 of FIGURE 2; and

FIGURE 4 is an elevated perspective view, partially broken away, of the flange of the present invention.

Referring now to FIGURE 1 of the drawing, a pipe flange **10**, in accordance with a preferred embodiment of the present invention, is shown in operative association with a conventional automotive engine **12** comprising an engine block **14**, an air-fuel intake system **16**, and an exhaust system consisting of an exhaust manifold **18** and an exhaust pipe or conduit **20**. The flange **10** is adapted to rigidly connect the manifold **18** with the conduit **20**, in a manner hereinafter to be described.

As seen in FIGURES 2 and 3, the flange **10** is generally oval in shape and comprises a flat or planar base section **22** which defines a central annular opening **24**. An outer peripheral section or skirt **26** projects perpendicularly upward from and extends around the outer periphery of the flange's base section **22**. In a similar manner, an annular shoulder or extrusion **28** projects perpendicularly upward from the flange's base section **22** around the periphery of the opening **24**. As seen in FIGURE 3, the upper edges of the skirt **26** and extrusion **28** are coplanar and define a gasket seating surface **30**.

The size of the opening **24** is preferably equal to the inside diameter of the exhaust pipe **20**, and the side of the flange's base section **22** opposite the skirt **26** and extrusion **28** is adapted to be secured as by welding to the upper end of the pipe **20** in a manner such that the opening **24** is coaxially aligned with the inside diameter of the pipe **20**, as seen in FIGURE 3. A pair of manifold stud receiving apertures **32** and **34** are formed in the base section **22** of the flange **10** on the opposite sides of the central opening **24** and interjacent the peripheral skirt **26** and extrusion **28**.

As seen in FIGURES 2 and 3, the flange **10** is secured to the exhaust manifold **18** by a pair of manifold studs **36**

and **38** that are fixedly secured at their upper ends to a flat exhaust pipe mounting surface **40** formed on the lower side of the manifold **18**. The lower ends of the studs **36** and **38** are externally threaded and extend downward from the mounting surface **40** through the apertures **32** and **34** formed in the flange **10**, whereby suitable washers **42**, **44** and nuts **46**, **48**, are used in conjunction with the studs **36** and **38** to rigidly secure the flange **10** to the manifold **18**. A gasket, which is herein designated by the numeral **50** and is formed with suitable openings corresponding to the opening **24** and the apertures **32** and **34** of the flange **10**, is compressed between the mounting surface **40** of the manifold **18** and the gasket seating surface **30** formed by the upper edges of the flange's skirt **26** and extrusion **28**, thereby providing a gas-tight seal between the manifold **18** and the flange **10** upon assembly thereof.

In a preferred construction of the present invention, the flange **10** is fabricated of .090 inch to .125 inch coil stock and is formed into the above described configuration by means of conventional stamping techniques. Preferably, the thickness or height of the flange **10** in the axial direction is about $\frac{5}{16}$ of an inch, and the upper edges of the skirt **26** and extrusion **28** are machined on a conventional belt grinder or the like so as to be coplanar and thereby define the flat gasket seating surface **30**. With the above construction, it has been found that normal tightening of the nuts **46** and **48** on the manifold studs **36** and **38** to secure the flange **10** to the manifold **18**, does not cause the upper edges of the skirt **26** or extrusion **28** to cut or similarly damage the gasket **50**. Furthermore, it has been found that the base section **22** of the flange **10** does not tend to diaphragm or deform upon normal tightening of the nuts **46** and **48** on the studs **36** and **38**.

As seen in FIGURES 3 and 4, the flange's base section **22**, skirt **26** and extrusion **28** form an annular channel, herein designated **52**, that extends between the inner periphery of the skirt **26** and the outer periphery of the extrusion **28**. The channel **52** may be filled with a suitable heat-resistant, sound-deadening material **54** to reduce the high frequency pipe ring produced as exhaust gases are transmitted through the exhaust pipe **20**. One suitable sound-deadening material consists of a plastic resin such as polybutene, poly-isobutene or butyl rubber. This material may be molded directly with the channel **52** or alternatively, may be molded and cut to the size of the channel **52** and be inserted therewithin upon assembly of the flange **10**.

It will be apparent from the aforegoing description of the present invention that a particular feature of the flange **10** resides in the fact that a strong durable construction is provided that requires a minimum amount of material and a minimum number of manufacturing operations for the fabrication thereof. Accordingly, it will be evident that the flange **10** is considerably more economical to commercially produce than similar type flange structures heretofore known and used; i.e., flanges that are constructed of relatively heavy gauge strip stock material.

While it will be apparent that the preferred embodiment herein illustrated is well calculated to fulfill the objects above stated, it will be appreciated that the flange **10** of the present invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claim.

What is claimed is:

A pipe flange for connecting the exhaust pipe to the exhaust manifold of an automotive engine,

said flange comprising a flat oval-shaped base section which defines a central exhaust gas opening and a pair of manifold stud-receiving apertures on the opposite sides of said opening,

said flange being formed with skirt section projecting perpendicularly away from said base section and ex-

tending around the outer periphery of said base section,

said flange being further formed with an extrusion section projecting perpendicularly away from said base section in the same direction as said skirt section and disposed around the periphery of the said central opening,

the outer ends of said skirt section and said extrusion section defining a gasket seating surface,

the cavity defined by said base section, extrusion section and said skirt section being at least partially filled with the plastic resin sound-deadening material,

said flange being welded to the exhaust pipe around the periphery of said central opening and on the opposite side of said base section from said skirt section and said extrusion section,

means including bolt means extending through said apertures for connecting said flange to said manifold, and

gasket means interposed between said seating surface and said manifold.

References Cited by the Examiner

UNITED STATES PATENTS

1,620,924	3/1927	Snell	285—368 X
2,700,343	1/1955	Pezzillo	285—48
2,752,579	6/1956	Caldwell et al.	285—48 X
2,847,820	8/1958	Leach	285—368 X

CARL W. TOMLIN, *Primary Examiner.*

T. A. LISLE, *Assistant Examiner.*