Feb. 21, 1928. 1,659,676

J. G. VINCENT

MOTOR CYLINDER

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Fig. 2.

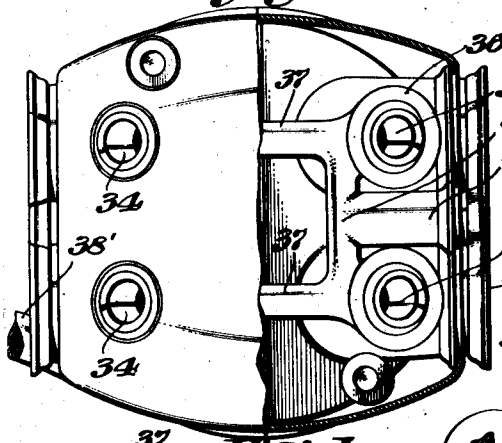


Fig. 5.

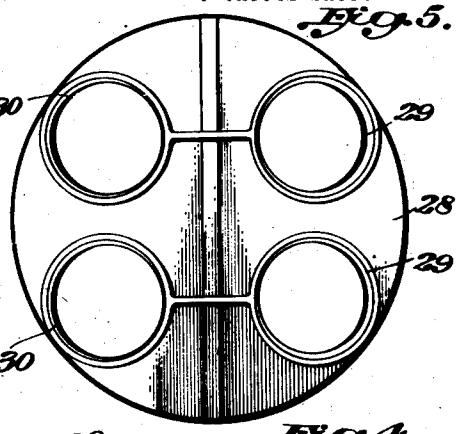


Fig. 1.

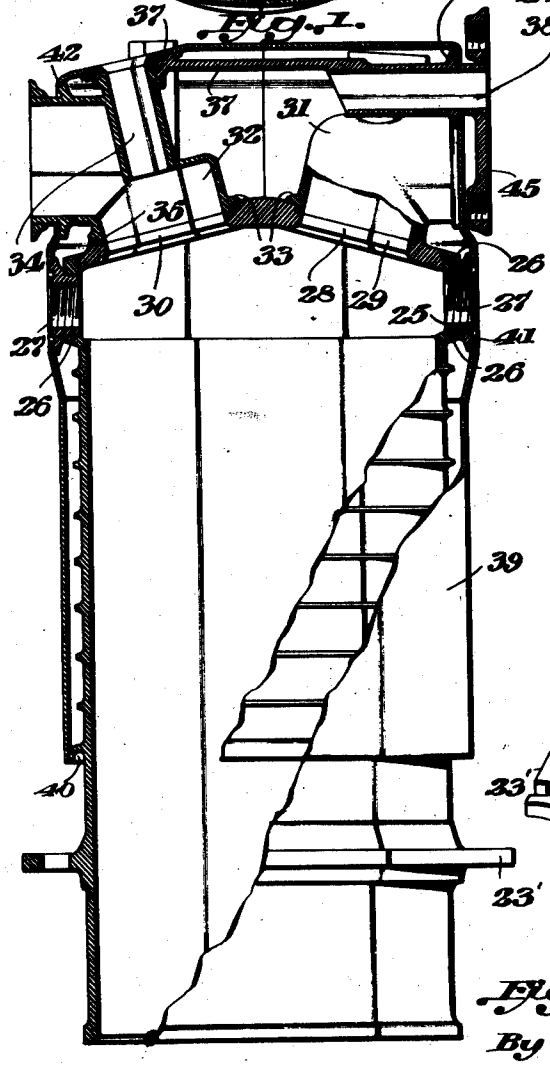
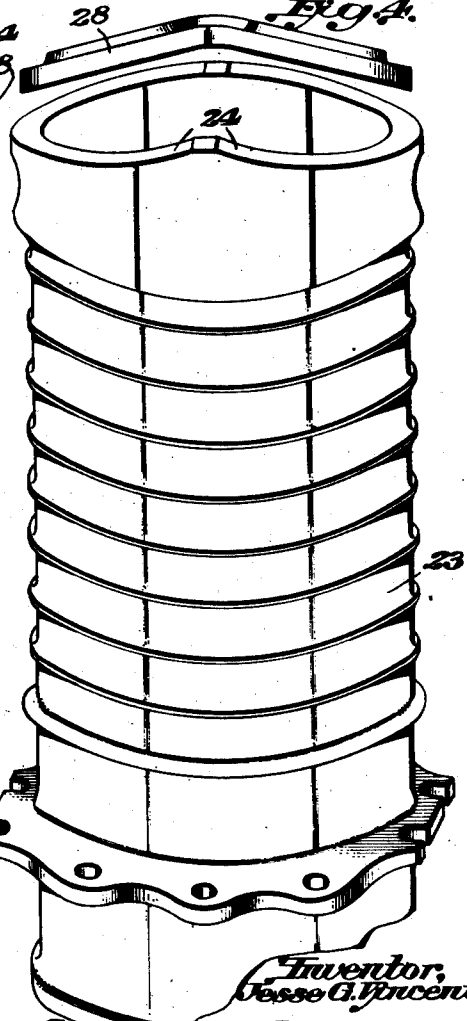


Fig. 4.



Inventor,
Jesse G. Vincent,

Fig. 3.

By Millon T. Betts Atty.

Feb. 21, 1928. 1,659,676

J. G. VINCENT

MOTOR CYLINDER

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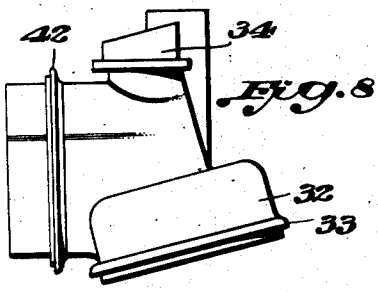


Fig. 8.

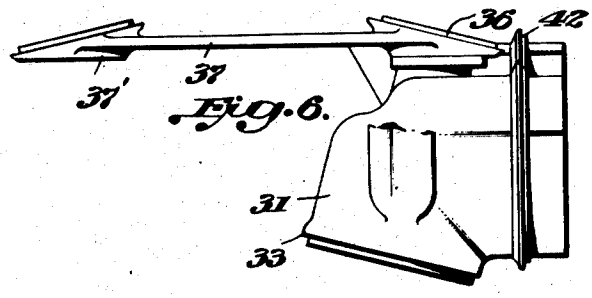


Fig. 6.

Fig. 9.

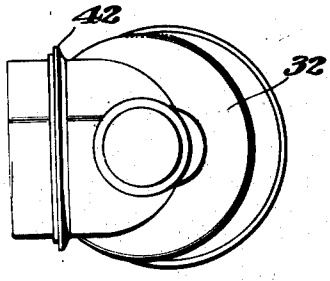


Fig. 7

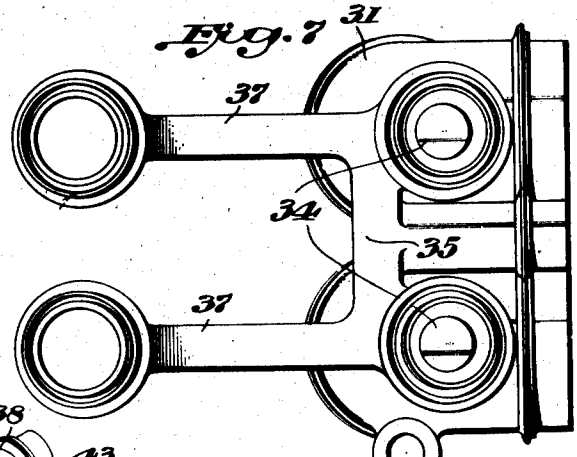


Fig. 12.

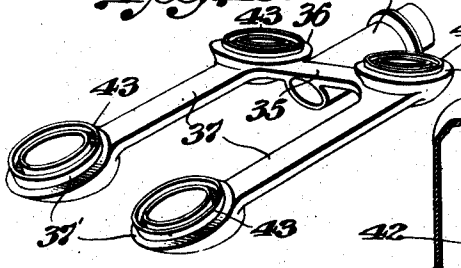


Fig. 11.

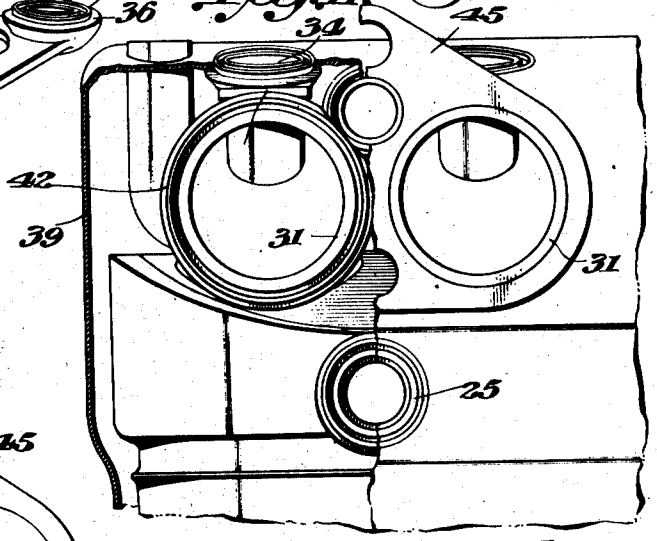
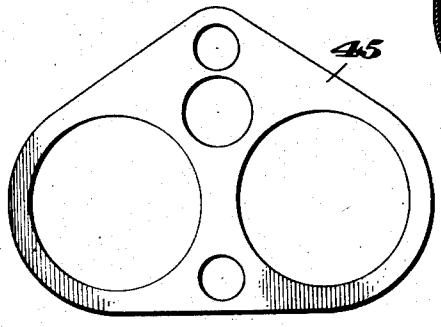


Fig. 10.



Inventor;
Jesse G. Vincent,
By Milton Tibbetts Atty.

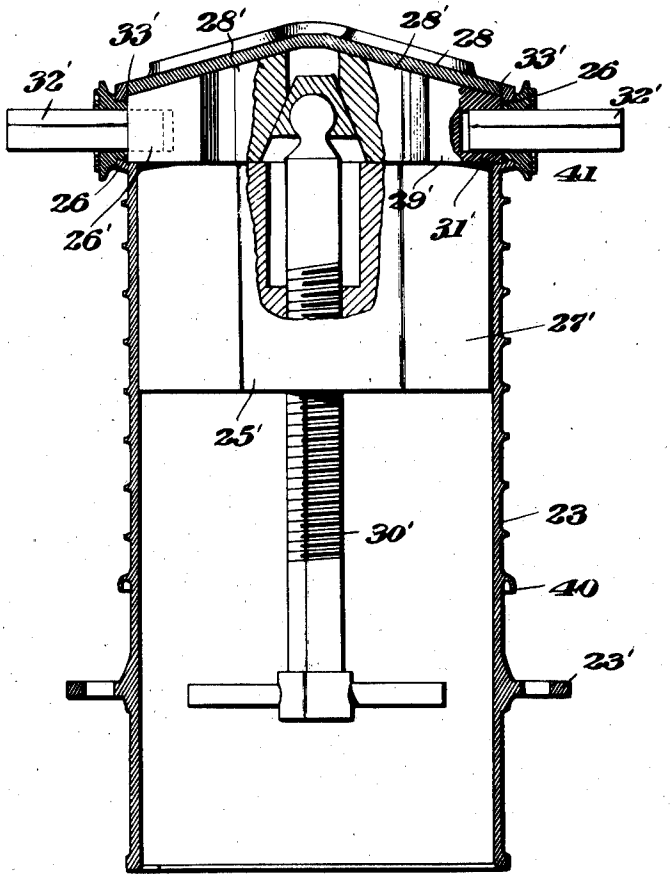
Feb. 21, 1928. 1,659,676

J. G. VINCENT

MOTOR CYLINDER

Filed Feb. 7, 1920 3 Sheets-Sheet 3

Fig. 13.



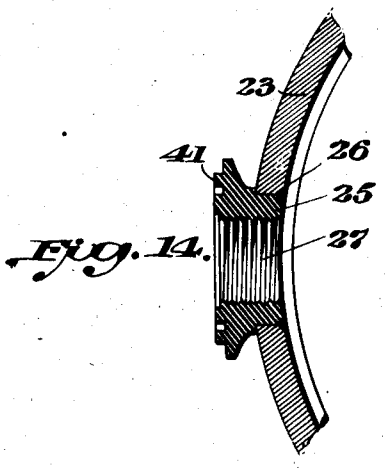


Fig. 14.

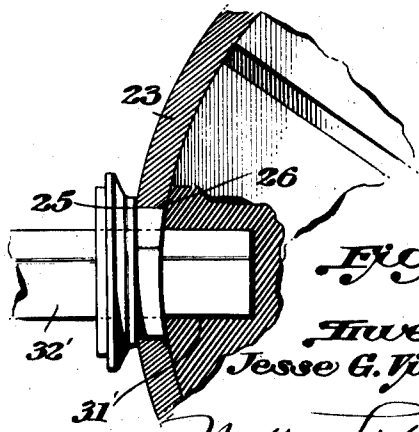


Fig. 15.

Inventor,
Jesse G. Vincent,
By Mellen-Tibbetts
Atty.

Patented Feb. 21, 1928. 1,659,676

UNITED STATES PATENT OFFICE.

JESSE G. VINCENT, OF DETROIT, MICHIGAN, ASSIGNOR TO PACKARD MOTOR CAR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

MOTOR CYLINDER.

Application filed February 7, 1920. Serial No. 357,022.

This invention relates to motor cylinders and to the head construction thereof.

In certain types of hydrocarbon motors, as is well known, the inlet and exhaust valves are mounted in the cylinder head. In so mounting the valves, difficulty has been experienced where more than two valves are to be mounted in a head. This difficulty arises from the fact that if the valves are tilted sufficiently to be disposed normal to the spherical surface of the cylinder head then the pairs of valves—assuming that two or more pairs are used—will not be in parallel alinement for convenient operation by the cam shaft. Moreover, unless the valve stems are arranged substantially normal to the spherical surface of the cylinder head it will be necessary to form pockets in the head and these pockets would necessitate variations in the thickness of the head, making it difficult to cool the head uniformly.

With the above difficulties in mind, the present invention has for its object to provide a light construction of motor cylinder, while at the same time providing a strong and rigid construction that will withstand the intense heat encountered by such cylinders.

Another object is to provide a cylinder that may be easily and accurately manufactured.

Another object is to provide an improved method of manufacturing cylinders by means of which the cylinders may be easily machined and finished.

Further objects will appear as the description proceeds.

With these objects in view, the invention consists preferably of forming the body or barrel and the cylinder head separately, the latter being secured to the former in some suitable manner as by welding.

In order that the valve stems may be properly positioned, in the embodiment of the invention illustrated, the upper end of the barrel of the cylinder is peaked or beveled and the head is made angular to fit the beveled upper end of the barrel of the cylinder.

The intake and exhaust conduits or elbows are preferably welded to the head and are so connected together as to insure a strong and rigid construction.

One embodiment of the invention has been illustrated in the accompanying drawings and in these drawings:

Figure 1 is a vertical, longitudinal section, partly broken away, illustrating my improved cylinder construction;

Figure 2 is a top plan view, partly broken away, showing the construction illustrated in Figure 1;

Figure 3 is a perspective view of the cylinder barrel after it has been machined;

Figure 4 is a side elevation of the cylinder head;

Figure 5 is a top plan view of the construction shown in Figure 4;

Figure 6 is a side elevation of the intake elbows and bracing arms connected thereto;

Figure 7 is a top plan view of the construction shown in Figure 6;

Figure 8 is a side elevation showing one of the exhaust elbow forgings;

Figure 9 is a plan view of the construction shown in Figure 8;

Figure 10 is an end elevation of the plate through which extend the intake elbows and water outlet conduit;

Figure 11 is a detail elevational view, partly in section and partly broken away, showing the cylinder head construction;

Figure 12 is a perspective view of the forging forming the bracing arms for the intake elbows;

Figure 13 is a vertical sectional view illustrating the method of making the cylinder and particularly the method of supporting the cylinder head plate in position for welding;

Figure 14 is a sectional view on an enlarged scale showing the spark plug bosses welded to the cylinder barrel, and

Figure 15 is a sectional view similar to Figure 14 but showing a portion of the cylinder head plate positioning member.

The barrel 23 of the cylinder utilized in my improved construction is preferably formed from a steel drop forging. After the barrel has been upset to roughly form the holding flange 23′ it is machined inside and outside and the upper or head end of the barrel is beveled from the center outwardly as shown at 24.

Suitable bosses 25 for the reception of the spark plugs are secured to the diametrically opposite sides of the barrel, preferably

by welding, as shown at 26 in Figure 1. The welding of the bosses may be a rough job since the interior of the head end of the cylinder and the inner ends of the bosses are machined after the bosses have been welded. The bosses are then drilled but preferably not tapped for reasons hereinafter stated.

The upper or head end of the cylinder is closed by an angular plate 28 which conforms to the beveled upper end of the cylinder and is machined cylindrically so that it will fit within the extreme upper end of the cylinder barrel and close the combustion space thereof. This plate or cylinder head has valve seats or ports 29 and 30 formed in its inclined faces, the two ports 29 accommodating the intake valves and the two ports 30 the exhaust valves.

For positioning the cylinder head plate for welding, a tool 25′ is inserted from the opposite end of the barrel. One form of this tool is shown in detail in Figure 13 and it comprises a head 26′ and a guiding block 27′ substantially the size of the inside of the cylinder barrel. The tool head 26′ is adapted to support the angular head plate 28 in position for welding and to support this particular form of head plate the head has beveled portions 28′ corresponding in shape to the beveled portions of the head plate. The head 26′ is preferably made up of a plurality of sections 29′ which are adapted to be expanded by a screw 30′.

In order to accurately position the tool head 26′ vertically and angularly in the head end of the cylinder barrel, the former is provided with a pair of diametrically opposed radial openings 31′ which are adapted to receive guiding or positioning pins 32′, the pins extending through the drilled bosses 25. The reason for not tapping the bosses will now be evident as the insertion of the pins 32′ might injure the threads.

After the tool has been inserted in the cylinder barrel, the pins 32′ are inserted in the openings 30′ of the tool head and the head is then expanded into engagement with the walls of the cylinder combustion space. The cylinder head plate 28 is then placed in position on the upper surface of the tool head and is welded in place as shown at 33′.

The bosses 25 may then be tapped to form the screw threads 27 which receive the spark plugs.

Intake elbows 31 and exhaust elbows 32 are secured respectively to the head plate at ports 29 and 30, preferably by welding, each of these elbows having a flange 33 at its lower end to properly position the elbow on the head plate.

Each of the elbows 31, 32 has formed integral therewith a valve stem guiding member 34, the guiding members for the intake valve stems being disposed at an angle to the guiding members of the exhaust elbows.

In order to securely position the elbows and valve stem guiding members with respect to each other, a bracing member is provided, this member comprising a single forging and having a general U shape, the cross member 35 of the bracing member having apertured bosses 36 at its ends to receive the valve stem guiding members for the intake elbows, the guiding members being welded to the bosses 36. A pair of arms 37 project outwardly from the ends of the cross member 35 and from the bosses 36, these arms having formed thereon bosses 37′ to which are welded the valve stem guiding members for the exhaust elbows. The bracing member has also formed integral therewith a conduit 38 which forms the water outlet for the water jacket hereinafter described, the water entering the jacket through a conduit 38′.

A water jacket 39 surrounds the cylinder and head, the jacket being secured, preferably by welding to a down-turned flange 40 formed on the cylinder barrel and to flanges 41 formed on bosses 25, flanges 42 formed on the intake and exhaust elbows, flanges 43 formed on the bosses 36 and 37 carried by the bracing member and a flange 44 formed on the water conduit 38.

A plate 45 is welded to the outer ends of the intake elbows 31 and to the outer end of conduit 38.

It will thus be seen that a simple, practical and efficient method has been provided for manufacturing a light, strong and rigid hydrocarbon motor cylinder.

While one specific embodiment of the invention has been illustrated in the accompanying drawings, it should be understood that the invention is capable of modification and that modifications and changes in the construction and in the arrangement of the cooperating parts and in the method of forming the improved cylinder may be made without departing from the spirit or scope of the invention as expressed in the following claims.

What I claim and desire to secure by Letters Patent is:

1. A cylinder for hydrocarbon motors comprising a barrel having a beveled upper end, and a separately formed angular head rigidly secured to said barrel within the beveled upper end of said barrel.

2. A cylinder for hydrocarbon motors comprising a barrel having an upper end beveled from the center outwardly, and a separately formed angular head rigidly secured to said barrel within the beveled upper end thereof.

3. A cylinder for hydrocarbon motors comprising a barrel having a beveled upper end, and a separately formed angular head welded to said barrel flush with the beveled

upper end thereof and having a plurality of valve seats arranged on the opposite angular side portions of said head.

4. In a cylinder for hydrocarbon motors, a combustion space having a cylindrical wall portion and an upper wall peaked in form.

5. In a cylinder for hydrocarbon motors, a combustion space having a cylindrical wall portion and an upper wall beveled from the center to the outer edge.

6. A cylinder for hydrocarbon motors comprising a barrel having a beveled upper end, a head welded to the barrel and having diametrically opposite side portions disposed at an angle with respect to each other, a pair of valve seats formed in each of said opposite portions, intake elbows secured to said head and registering with the valve seats on one portion of said head, and exhaust elbows secured to said head and registering with the valve seats on the opposite portion.

7. A cylinder for hydrocarbon motors comprising, in combination, a barrel, a separately formed cylinder head welded thereto, intake and exhaust elbows welded to said head on opposite side portions thereof and bracing means for rigidly connecting said intake and exhaust elbows.

8. In a cylinder head, a head plate having diametrically opposite side portions disposed at an angle with respect to each other, each side portion having a pair of valve seats therein.

9. In a cylinder head, a head plate having diametrically opposite side portions disposed at an angle with respect to each other, each side portion having a pair of valve seats therein, the valve seats on each side portion of the plate being disposed in a single plane and the planes of the two sets of valves being arranged at an angle with respect to each other.

10. A cylinder head comprising, in combination, an angular head plate, a pair of intake elbows welded to one side portion of said head plate and a pair of exhaust elbows welded to the diametrically opposite side portion of said head plate.

11. A cylinder head comprising, in combination, a head plate having a central ridge and angularly disposed portions on opposite sides of said ridge, a pair of elbows welded to each of the portions of said head plate on the opposite sides of said ridge and a bracing member connected to each of said elbows.

12. A cylinder head comprising, in combination, a head plate, a pair of intake elbows, a pair of exhaust elbows, and rigid bracing means connecting said intake elbows with said exhaust elbows.

13. A cylinder head comprising, in combination, a head plate having intake and exhaust elbows secured thereto, and having valve stem guides, and means for bracing said elbows including a member adapted to receive and be secured to said guides.

14. A cylinder head comprising, in combination, a head plate having intake and exhaust elbows secured thereto, and having valve stem guides, and means for bracing said elbows including a member having portions receiving said guides and welded thereto.

15. A cylinder head comprising, in combination, a head plate having intake and exhaust elbows secured thereto, and having valve stem guides, and means for bracing said elbows including an integrally formed member having means receiving said guides carried by the intake and exhaust elbows and welded thereto.

16. A cylinder head comprising, in combination, a head plate having intake and exhaust elbows secured thereto, and having valve stem guides, and means for bracing said elbows including a member welded to said guides and having a water conduit formed integral therewith.

17. In a cylinder head for hydrocarbon motors, a conduit integral therewith, a valve stem guiding member forged integrally with said conduit and bracing means for said valve stem guiding member.

18. In a cylinder head, intake and exhaust elbows integral with said head, valve stem guiding members forged integral with said elbows and means for bracing said members and supporting a water jacket for said head.

19. In an engine cylinder head construction, a head member joined with the cylinder, valve seats and ports provided therein, separate valve guides joined with said head at said ports, and means connecting said guides serving to reinforce said head.

In testimony whereof I affix my signature.

JESSE G. VINCENT.