Jan. 22, 1929. 1,699,658

J. T. FAGAN

COMBINATION OIL RESERVOIR, ROCKER ARM, AND MAIN SUPPORT OVERHEAD STAMPED BEARING SHAFT

Filed Nov. 15, 1926 2 Sheets-Sheet 1

Fig. 2.

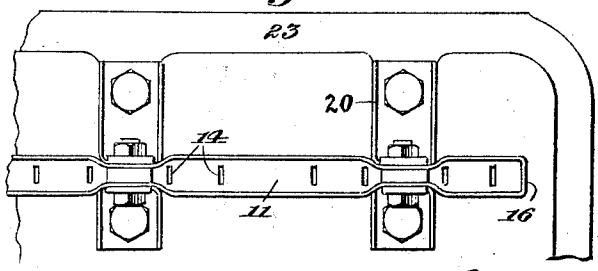


Fig. 5.

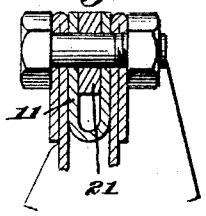


Fig. 6.

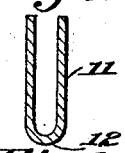


Fig. 4.

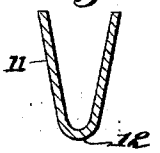


Fig. 1.

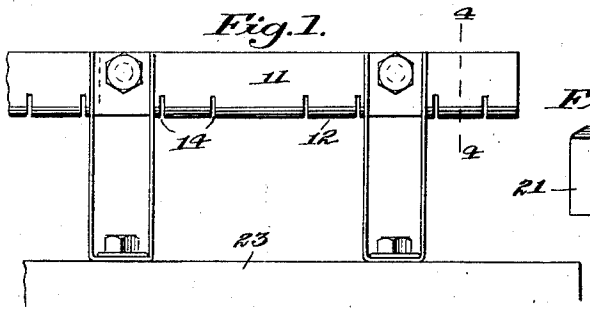


Fig. 7.

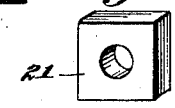


Fig. 3.

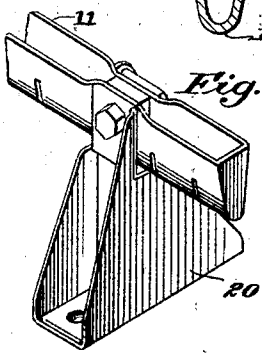


Fig. 8.

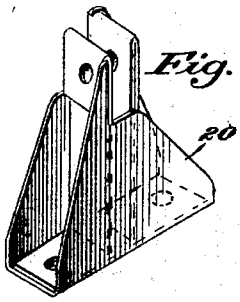


Fig. 10.



Fig. 12.

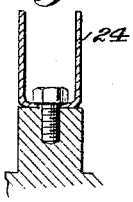


Fig. 9.

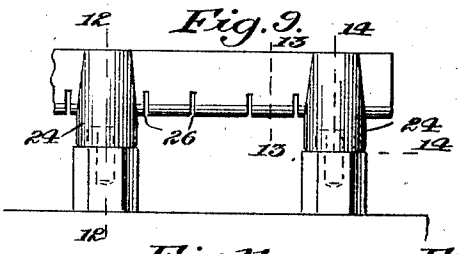


Fig. 11

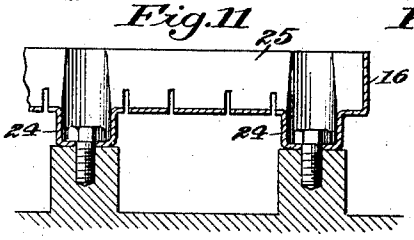


Fig. 13.

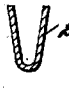


Fig. 14.



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Fig. 16.

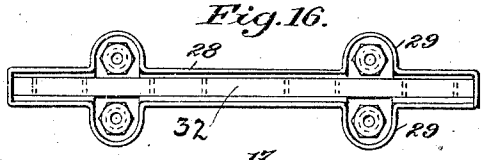


Fig. 18.

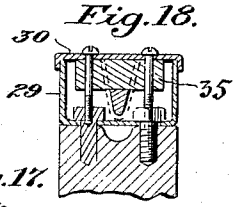


Fig. 15.

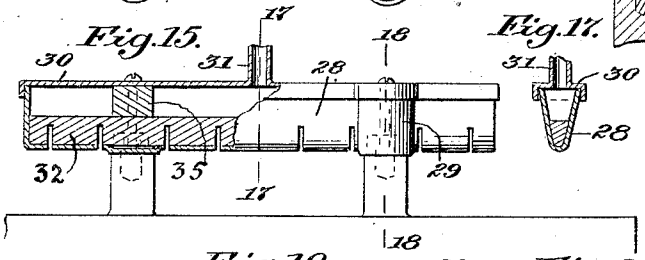


Fig. 17.

Fig. 19.

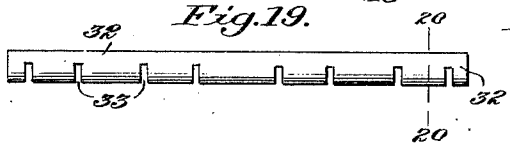


Fig. 20.

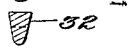


Fig. 22.

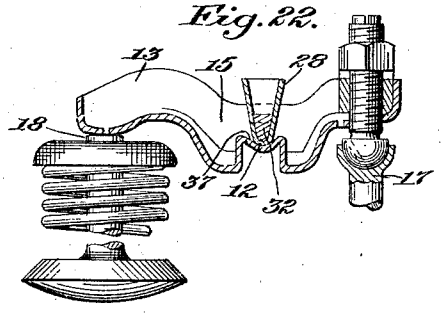


Fig. 21.

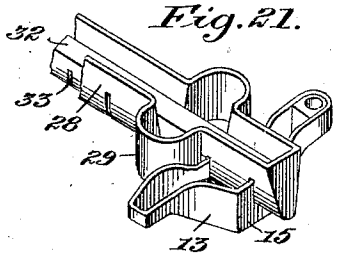
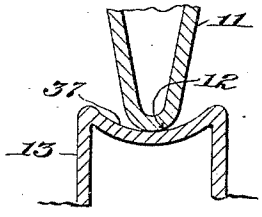


Fig. 23.



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Patented Jan. 22, 1929. 1,699,658

UNITED STATES PATENT OFFICE.

JOHN T. FAGAN, OF CLEVELAND HEIGHTS, OHIO.

COMBINATION OIL RESERVOIR, ROCKER ARM, AND MAIN-SUPPORT OVERHEAD-STAMPED BEARING SHAFT.

Application filed November 15, 1926. Serial No. 148,558.

This invention relates to a combination oil reservoir, rocker arm, and main support overhead stamped bearing shaft, such as are used in connection with internal combustion engines on automobiles.

An object of the invention is to provide a shaft having all of the desirable properties of rigidity, durability, strength, and lightness, combined with economy in cost and ease of assembly;

A further object is to provide a shaft which serves as an oil reservoir, to lubricate the rocker arms and other parts cooperating therewith;

A further object is to provide a shaft containing means that will slowly but continuously supply and distribute oil in a film to the surfaces to be lubricated, thereby economizing in oil;

A further object is to provide a shaft which functions as a fulcrum for the rocker arms and provides a practically frictionless and noiseless bearing;

A further object is to provide a self-lubricating shaft and rocker arm that may be bolted direct on to the engine;

A further object is to provide a light, trough-like rocker arm in which the bearing surface is an arc of a circle of longer radius than the cooperating surface on the shaft;

Other objects will appear upon reading the specification.

In the accompanying drawings:—

Figure 1 is a side elevation of the shaft mounted upon supports above the engine top, for use in a Buick Master Six automobile;

Figure 2 is a top plan view of the mounted shaft, showing a part of the engine frame;

Figure 3 is a view in perspective of an end of the shaft, with a support;

Figure 4 is an enlarged cross section of the V-shaped shaft on the line 4—4 of Figure 1;

Figure 5 is an enlarged cross section of the shaft bolted to a support, and showing the pressed-in portion of the shaft at the point of support;

Figure 6 is an enlarged view, in section of a modified form of shaft having parallel sides;

Figure 7 is an enlarged view of a spacer to be placed within the walls of the shaft at the place of support;

Figure 8 is a view of one type of support which may be bolted or welded to the shaft;

Figure 9 is a side elevation of a modified type of shaft which is bolted direct upon the top of the engine;

Figure 10 is a top plan view of a detached shaft;

Figure 11 is a longitudinal sectional view of Figure 9, showing the bolts;

Figure 12 is a transverse sectional view of an enlarged supporting lobe, on the line 12—12 of Figure 9;

Figure 13 is a view in section of the shaft, on the line 13—13 of Figure 9;

Figure 14 is a transverse section of one of the supporting lobes on the line 14—14 of Figure 9;

Figure 15 is a view partly in elevation, and partly in section, of a further modification, to be used on automobiles that do not have a forced oil feeding system;

Figure 16 is a top plan view of Figure 15, with the cover removed;

Figure 17 is a transverse section on the line 17—17 of Figure 15;

Figure 18 is a transverse section on the line 18—18 of Figure 15;

Figure 19 is a side elevation of a fibrous septum, showing the cross-slots which register with the slots in the shaft;

Figure 20 is a transverse section on the line 20—20 of Figure 19;

Figure 21 is a view in perspective of the type of shaft shown in Figure 19 with the cover removed and showing an underslung rocker arm in place;

Figure 22 is a longitudinal section of a rocker arm in place on the shaft, and showing parts of the valve stem and push rod; and

Figure 23 is an enlarged view illustrating the rocker arm bearing surface constituting an arc of a circle having a longer radius than that of the cooperating bearing edge of the shaft.

Special shapes are given to the shaft to accommodate the different types of engines now in general use.

In Figure 1, the shaft 11 is for a Buick Master Six automobile, and consists of a channel or trench shaped bar, preferably stamped from sheet metal, or it may be forged or die cast, and provided with a curved lower, specially hardened edge 12, which serves as a fulcrum for the bearings of the rocker arms 13. The shaft 11 is provided with slots 14, which receive the

side walls 15, which are smooth and in parallel planes, of the underslung rocker arms 13, and aid in maintaining the same in alinement. The shaft is closed at its ends, as at 16, thereby constituting an oil well or reservoir, for oil, to feed through the slots 14, and supply the rocker arm bearing, and also lubricate the surfaces of the push rod 17 and valve stem 18, at the ends which contact with the working surfaces of the rocker arm, and also their journals. The bearing surface on the rocker arm which cooperates with the curved edge of the shaft is specially hardened to eliminate wear.

The shaft 11 may have a V-shape cross section as shown enlarged in Figure 4, or it may have parallel sides as shown in Figure 6. When constructed as shown in Figure 4, the V-sides are preferably pressed into parallel relation at definite intervals as shown in Figures 2 and 5, and perforated with bolt holes to secure the supports 20 shown in Figures 3 and 8, which supoprt the shaft above the engine 23, or the supports may be electrically welded to the shaft. In order to prevent the sides of the shaft 11 from collapsing when bolted, spacers 21, Figures 5 and 7 the thickness of which will vary with the construction of the shaft, are inserted as shown in Figures 2 and 5. In the types of automobiles which use forced oil feeding, oil is supplied from a feed pipe, not shown, to the shaft trench, and from there it flows through the slots 14 into the rocker arms 13 and upon the valve stems 18 and push rods 17, and then over the engine into the oil sump, from which it is pumped into the forced oil feeding system.

In Figures 9 to 14, a type of shaft is especially designed for such construction as is used in the Nash type of automobile, which latter has but one line of bolt holes to secure the shaft. As in the first type, the shaft consists of a stamped metal channel, or trench, as shown in Figures 9 to 14, and is provided with enlarged depressions 24, at intervals, perforated, the depressions serving as lugs or bases, or supports, to receive bolts, and by which the shaft is secured to the engine as illustrated in Figures 9, 11 and 12. The shaft 25 is provided with slots 26 to receive underslung rocker arms, as in Figures 9, 11, 21, 22 and is supplied with oil from the forced oil feed system, as described above. The oil lubricates the rocker arms, valve stems, and push rods, as above described, and then flows over the engine, to the oil sump, from which it is pumped into the forced oil feeding system.

In Figures 16 to 21, a type of shaft especially designed for such constructions as do not use forced oil feeding, for example the Chevrolet automobile, is shown.

The channel shaft 28 is provided with pressed out lobes, or enlargements 29, on each side at intervals, perforated to receive bolts, and by which it is secured to the engine. A detachable cover 30, preferably secured by screws passing through spacers 35 as shown, and provided with an oil inlet 31, is also provided. Within the shaft is a septum, a piece of fibrous material 32, Figures 19 and 20, for example, wood, preferably wood freed from resinous gums, etc., although other fibrous materials such as prepared cellulose, fibrous metal wicks, strips of leather, etc., may also be used. Among suitable woods are, poplar, spruce, yucca, etc. The fibrous block is first cut with properly spaced slots 33, preferably enlarged, to provide for swelling, and then pressed into the slotted shaft 28, where it serves to slowly but continuously filter, distribute, and supply oil to the rocker arms and other parts as above noted. In use, oil is periodically supplied to the shaft through the oil inlet, the waste flowing into the oil sump.

In each of the above types of shaft, the rounded lower edge 12, Figures 4 and 22, serves as the fulcrum for the rocker arm 13, Figure 22, which latter is mounted in the slots in underslung relation, as shown in perspective in Figure 21, and contacts with a rounded edge 12, as shown in Figure 22. As shown in Figure 23, the rounded edge 12 of the shaft 11 is preferably the arc of a circle, it is correctly shaped, hardened and polished, and provides a practically frictionless, noiseless, and durable bearing, and in practice has not exhibited any signs of wear after a prolonged severe test. The oil-feeding shaft reservoir maintains a continuous supply of oil, distributed where needed, and when the fibrous distributor is used, the oil is also filtered. The slots 14 function as bearings for the sides 15 of the rocker arms, and keep the latter in alinement. The curved bearing surface 37 of the rocker arm 13, is also preferably that of an arc of a circle, see Figure 23, but having a longer radius than that of the shaft 11, as shown. In actual use the movement of the rocker arm 13 is through a very small angle, and is a rolling movement upon the rounded bearing edge 12 of the shaft.

I claim:

1. A shaft for rocker arms, said shaft comprising an open channeled member, and constituting an oil reservoir, and outlets for said oil.

2. A shaft for rocker arms comprising an open channeled member, said member provided with a lower bearing edge, said channel serving as an oil reservoir, and transverse slots in the lower edge of said shaft.

3. A shaft for rocker arms comprising an open channeled member, said member provided with a lower bearing edge, said channel serving as an oil reservoir, means to se-

cure said shaft to an engine, transverse slots in the lower edge of said shaft, and said slots communicating with said channel.

4. A shaft for rocker arms comprising an open channeled member, said member provided with a lower bearing edge, said channel serving as an oil reservoir, oil outlets from said channel, and a fibrous septum in said channel.

5. A shaft for rocker arms comprising a channeled member, said member provided with a lower bearing edge, said channel serving as an oil reservoir, means to secure said shaft to an engine, transverse slots in the lower edge of said shaft, a fibrous septum in said channel, and slots in said septum registering with the slots in the shaft.

6. A shaft for rocker arms comprising a channeled member, said member provided with a lower bearing edge, said channel serving as an oil reservoir, means to secure said shaft to an engine, transverse slots in the lower edge of said shaft, a fibrous septum in said channel, slots in said septum registering with the slots in the shaft, and a detachably secured cover for said channel.

7. A shaft for rocker arms comprising a channeled member, said member provided with a lower bearing edge, said channel serving as an oil reservoir, means to secure said shaft to an engine transverse slots in the lower edge of said shaft, a fibrous septum in said channel, slots in said septum, registering with the slots in the shaft, a detachably secured cover for said channel, and means to supply oil to the channel.

8. In a slotted shaft for rocker arms, a fibrous septum therein, and slots in one side of said septum registering with the slots in the shaft.

9. In a slotted shaft for rocker arms, a wood septum therein, and slots in one side of said septum registering with the slots in the shaft.

10. The combination comprising an open channeled shaft for rocker arms, said shaft comprising an oil reservoir, outlets for said oil, and a rocker arm in operative relation to said shaft.

11. The combination comprising an open channeled shaft for rocker arms, said shaft comprising an oil reservoir, a lower bearing edge on said shaft, outlets for said oil, and a rocker arm in operative relation to said shaft and engaging said bearing.

12. A rocker arm comprising a trough-like body, smooth sides in parallel planes thereon and constituting shaft alinement bearings, and an integral bearing surface within said body, said bearing surface located below the top of said trough.

13. A rocker arm comprising a trough-like body having parallel sides, said sides constituting alinement bearings a bearing surface within said body and located below the top of said sides.

14. A rocker arm comprising a trough-like body having parallel sides, said sides constituting alinement bearings an integral bearing surface within said body and located below the top of said sides.

15. A rocker arm comprising a trough-like body having parallel sides, said sides constituting alinement bearings, an integral curved bearing surface within said body and located below the top of said sides.

16. The combination of a rocker arm comprising a trough-like body, said body having parallel sides, a curved bearing surface within said body and located below the top of the sides, a shaft, said shaft having a lower rounded bearing edge, said shaft having transverse slots across its bearing edge, the sides of said rocker arm constructed to fit in said slots, said curved bearing surface constructed to cooperate with said bearing edge, said curved bearing surface constituting an arc of a circle with a longer radius than that of the cooperating bearing edge.

17. The combination of a rocker arm comprising a trough-like body, said body having parallel sides, a curved bearing surface within said body and located below the surface, a shaft, said shaft having a lower rounded bearing edge, said shaft having transverse slots across its bearing edge, the sides of said rocker arm constructed to fit in said slots, said slots constituting bearings for said sides whereby said sides are maintained in alinement, said curved bearing surface constructed to cooperate with said bearing edge, said curved bearing surface constituting an arc of a circle with a longer radius than that of the cooperating bearing edge.

18. The combination of a rocker arm comprising a trough-like body, said body having parallel plane sides, a curved bearing surface within said body and located below the top of said sides, a trough-like shaft, said shaft having a lower rounded bearing edge, said shaft having transverse slots across its bearing edge, the sides of said rocker arm constructed to fit in said slots, said slots constituting bearings for said sides whereby said sides are maintained in alinement, said curved bearing surface constructed to co-operate with said bearing edge.

In testimony whereof I hereby affix my signature.

JOHN T. FAGAN.