Dec. 23, 1958 A. C. SAMPIETRO 2,865,353

VALVE LASH ADJUSTER

Filed Jan. 31, 1956 2 Sheets-Sheet 1

Fig. 1

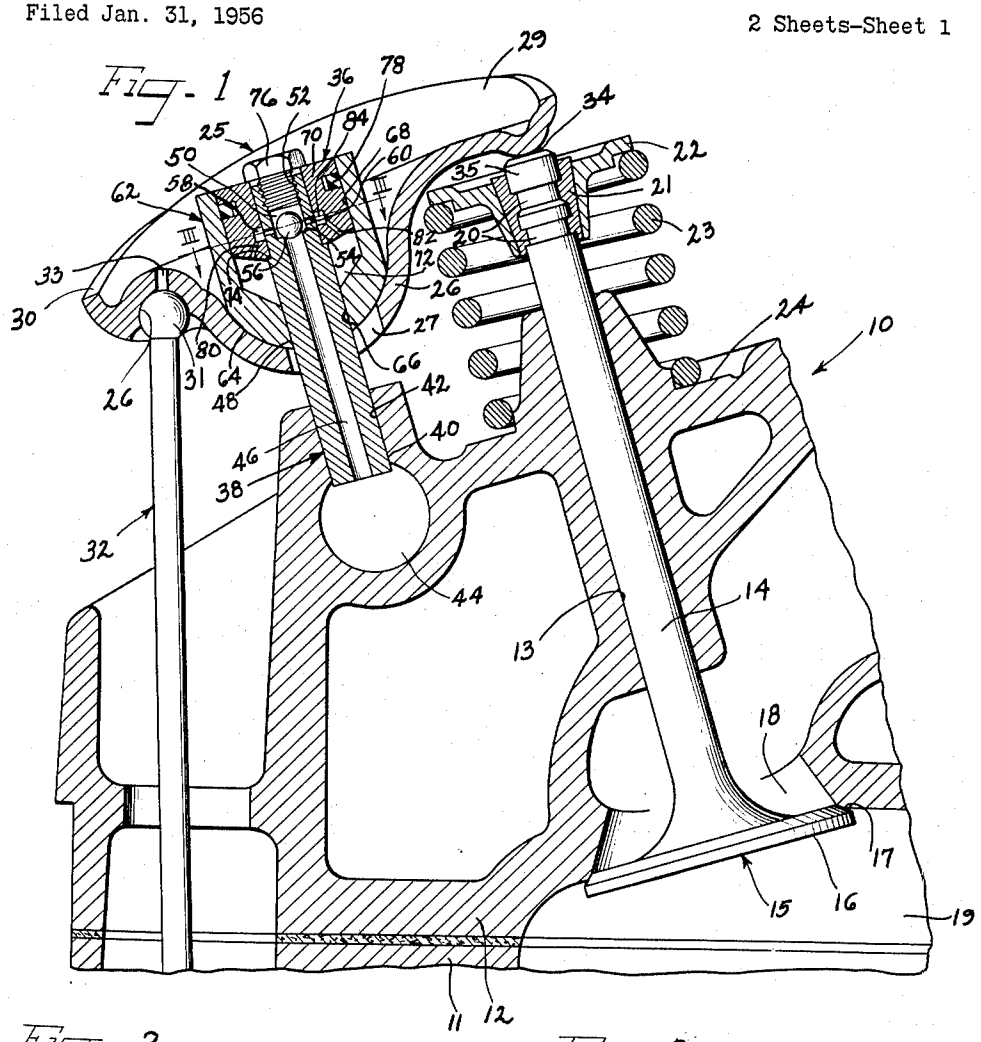


Fig. 2

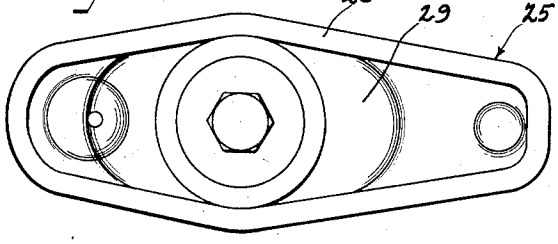
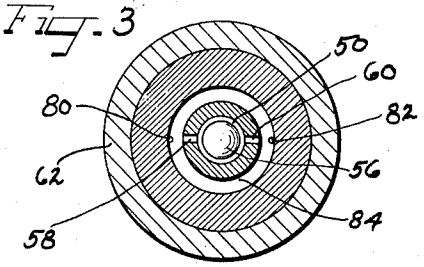


Fig. 3



Inventor

ACHILLES CHARLES SAMPIETRO

by Hill, Sherman, Meroni, Gross & Simpson Attys.

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VALVE LASH ADJUSTER

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Fig. 4

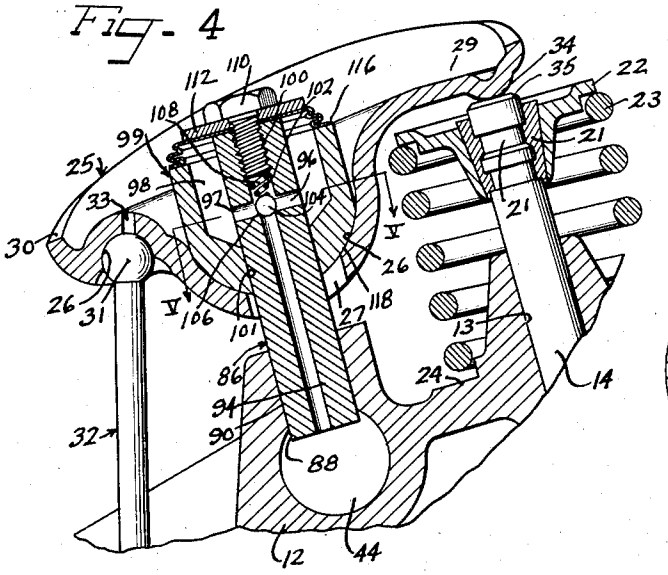


Fig. 5

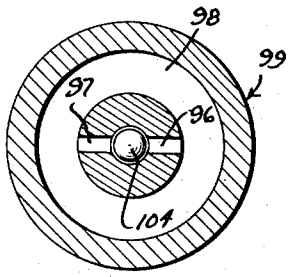


Fig. 6

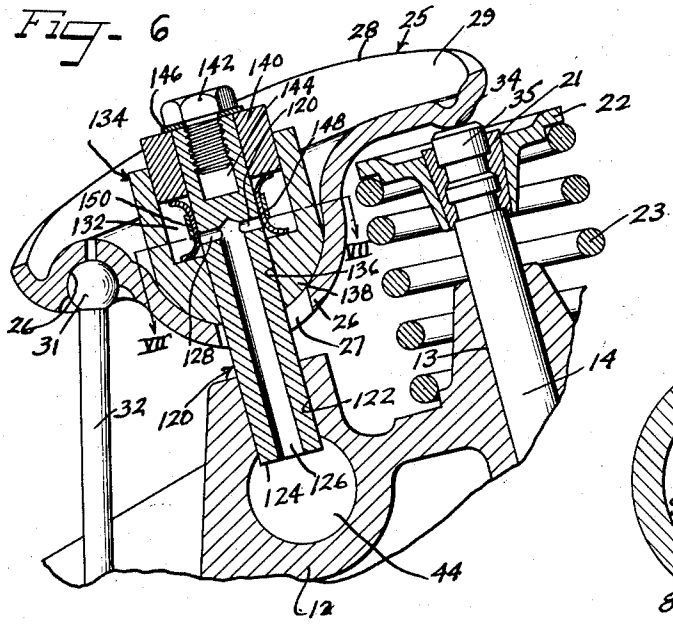
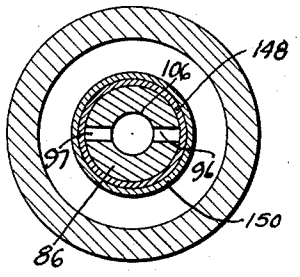


Fig. 7



Inventor

ACHILLES CHARLES SAMPIETRO

by Nies, Sherman, Merriam, Cross & Kingsland Attys.

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VALVE LASH ADJUSTER

Achilles C. Sampietro, Detroit, Mich., assignor to Thompson Products, Inc., Cleveland, Ohio, a corporation of Ohio

Application January 31, 1956, Serial No. 562,422

16 Claims. (Cl. 123—90)

This invention relates to improvements in lash adjusters for engine valve linkage, and more specifically relates to an oil operated valve lash adjuster which is mounted on the pivot post of the rocker arm of a valve head engine valve linkage and operates under the pressure of the oil of the engine to hold the rocker arm against the valve stem and push rod and take up the play which occurs in the linkage.

The present invention contemplates a light weight stamped, pressed, brazed, or otherwise fabricated metal rocker arm having a fragmental spherical depressed portion and receiving a mounting stud or post anchored in the engine head in communication with the oil gallery. A bearing member with a hemispherical end is slidable on the post or stud to seat the depressed portion of the rocker arm. The stud or post has an oil passage therethrough communicating with the hollow interior of the bearing member. A check valve accommodates the flow of oil from the gallery to the bearing member but prevents reverse flow of oil. The bearing is thus held by oil pressure in bearing contact with the depressed portion of the rocker and the rocker in turn is urged into good bearing contact with the conventional push rod and spring loaded engine valves. Improved means are provided for enhancing the action of the bearing member and for sealing the interior of the bearing member to retain the oil therein.

A general feature of this invention is to provide an automatic valve lash adjuster which has improved action and which is able to take advantage of the full effect of the pressure of the oil to perform its valve lash preventing operation.

Another object of the invention is to provide an improved valve lash adjuster in which the parts are more readily assembled and which are more simple and easy to manufacture.

Another object of the invention is to provide an improved valve lash adjuster in which the wearing life of the machine is considerably improved.

Another object of the invention is to provide an improved valve lash adjuster with an improved check valve design which will prevent the oil from flowing back into the engine head gallery.

Another object of the invention is to provide an improved valve lash adjuster which is operated by pressurized oil fed through the engine gallery wherein the resistance to the lash adjusting action of the bearing member is maintained at a minimum and the oil leakage is kept at a controlled rate.

Further objects and advantages of the present invention will become more apparent in connection with the following specification taken in combination with the appended drawings in which:

Figure 1 is a vertical elevational view taken in section through the head of the internal combustion engine;

Figure 2 is a plan view of the valve latch adjuster taken from the top of Figure 1 with portions removed for clarity;

Figure 3 is a horizontal cross-sectional view taken along line III—III of Figure 1;

Figure 4 is also a horizontal cross-sectional view inside elevation of a valve in head internal combustion engine equipped with an alternative embodiment of an automatic valve lash adjuster according to the present invention;

Figure 5 is a sectional view taken along lines V—V of Figure 4;

Figure 6 is a transverse cross-sectional view in side elevation with the engine equipped with still another embodiment of an automatic valve lash adjuster according to the present invention; and,

Figure 7 is a sectional view taken along lines VII—VII of Figure 6.

In the embodiment illustrated in Figure 1, the internal combustion engine is shown generally at **10** and includes a cylinder block **11** and a cylinder head **12**. The head **12** has a guide **13** receiving in slidable relation therein the stem **14** of the poppet valve **15**. The head **16** of the valve **15** cooperates with the seat **17** in the engine head **12** to control the flow between the valve port **18** and the head **12** in the combustion chamber **19**.

The upper end of the valve stem has grooves **20** thereon and the conventional split valve locks **21** have beads seated in these grooves. A valve spring retainer **22** is fixedly held on the upper end of the valve stem by locks **21** and a valve spring **23** surrounds the valve stem and has one end bottomed on a retainer **22** and the other end bottomed on a shouldered **24** of the engine head **12** surrounding the guide **13**. The valve stem **23** is biased to hold the valve head **16** against seat **17**.

A stamped sheet-metal rocker arm **25** has a depressed fragmental spherical socket portion **26** in the bottom thereof with an aperture **27** through the bottom of the socket. The rocker arm **25** is indicated in both Figures 1 and 2 and is surrounded by an upturned peripheral flange **28** to have a generally bowl-shaped interior **29**. At one end of the rocker arm and on one side of the socket **26** the bottom of the bowl **29** is raised to provide an inverted socket **30** for the rounded end **31** of a push rod **32**. The push rod end **31** can rock in the socket **30** and an oil aperture **33** is provided through the socket to lubricate the end **31** of the push rod. On the opposite side of the socket **26** and on the opposite end of the rocker arm, the bowl-shaped bottom portion **29** of the rocker arm is depressed at **34** to provide a round exterior for engaging and rocking on the end **35** of the valve stem **14**.

In accordance with this invention the rocker arm is mounted on the engine valve head **12** by means of an automatic lash adjuster shown generally at **36**.

The lash adjuster includes a vertical upstanding post **38** which is press fit into a hole **42** in the engine head. This hole has a smooth cylindrical interior to accommodate the smooth cylindrical end of the post to achieve a press fit. The post extends downwardly through the hole **42** to project into the pressurized oil gallery **44** of the engine head with the lower end **40** of the post extending beyond the lower limits of the hole **42**. The post **40** will be securely mounted into the hole and the metal of the post will expand beneath the hole **42** as well as above the hole to provide a very secure mounting for the post.

The post **38** is provided with an axially extending interior bore **46** which in the embodiment of Figure 1 extends through the entire length of the post. The bore **46** however is enlarged at the upper end of the post to form a cage **50** for the check valve shown in the form of spherical ball **56**. The enlargement of the axial hole **46** into the cage **50** forms an annular shaped shoulder **54** against which the spherical ball **56** can seat to prevent the back flow of oil down through the axial bore **46**.

The upper end of the enlarged portion **50** of the bore

hole has female threads **52** to receive a bolt **76** and the function of this bolt will be explained later although the bolt does form a secondary function in that its lower end completes the cage for the check valve. For this reason the length of the bolt is relatively critical to permit free movement of the check valve when it leaves its seat.

Slidably fitted to the post **38** is a bearing member shown generally at **62**. This bearing member has at its lower end a cylindrical bore so that it may be slidably positioned on the cylindrical post. The post has a smooth cylindrical shank **48** to accommodate the vertical sliding movement of the bearing member. The tolerance between the post **38** and the cylindrical hole **66** in the bearing member may be in some instances if desired not so close so as to permit a leakage of oil between the post and the bearing member to lubricate the joint between the bearing member and the post. This will especially lubricate the outer spherical face **62** of the bearing member which bears against the inner spherical face of the socket **26** of the rocker arm.

The lower bearing surface **64** of bearing member therefore bears downwardly against the inner mating bearing surface of the rocker arm, and the bearing member is continually urged downwardly by the pressure of the oil in the manner which will be later described in detail. This will hold the rocker arm against the upper end of the push rod and against the valve stem to maintain good contact therebetween and remove all lash during operation of the rocker arm. The rocker arm has the enlarged hole **27** formed in the lower spherical face to accommodate the post **38** and so that it will not strike the post during its pivotal rocking operation.

The bearing member has a hollow interior which is formed by a cylindrical bore **68** therein to form a cylinder. The cylinder is open at the top and receives a piston **70** which is slidably fitted into the cylinder. The piston is formed with an annular groove to receive a piston ring **78** and which seals the piston wall against the interior cylinder wall **68** of the bearing member. With the use of a piston ring **78** close tolerances between the wall of the piston and the wall of the cylinder are not necessary to prevent oil leakage and with a loose fit the frictional losses between the piston wall and cylinder wall can be reduced with the leakage losses being taken care of by the piston ring **78**. The piston ring may be of brass or some soft material but preferably of nylon or a similar long wearing material which is easily handled and forms an excellent oil seal.

The piston thus slidably mounted within the cylindrical opening **68** of bearing member, forms a pressure chamber **72** within the bearing member below the piston. This pressure chamber is filled with oil which reacts downwardly against the bearing member to urge it into constant pressure engagement with the rocker arm.

The piston is secured to the upper end of the post **38** and for this purpose the post has a reduced upper end which forms an annular shoulder **74** against which the piston **70** rests when it is in place secured to the upper end of the post **38**. To hold the piston in secure engagement with the shoulder **74** on top of the post, the bolt **76** is threaded down into its threaded opening **52** and the bolt head engages the upper surface of the piston holding it tightly against the post. Thus the bolt **76**, as was previously mentioned, secures the piston to the upper end of the post and the lower end of the bolt **76** completes the upper opening of the cage **50** for the check valve **56**.

To provide a passageway from the cage **50** for the pressurized oil which passes upwardly through the axial conduit **46** and which must pass out to the pressure chamber **72**, a pair of lateral or radial openings **58** and **60** are provided. These lateral openings may be merely holes drilled radially from the outer reduced portion of the post and communicating to the cage **50**. These lateral holes **58** and **60** are best seen in the sectional view of Figure 3. To communicate to the pressure

chamber **72** from the lateral openings, an annular groove **84** is cut in the inner surface of the piston **70**. This annular groove insures that the communication will be had with the lateral openings without having to orient the piston **70** with respect to the post. The lateral groove **84** leads to the diagonal holes **80** and **82** which open to the lower face of the piston and to the pressure chamber **72**.

Thus the pressure chamber **72** communicates with the pressurized oil gallery **44** of the engine head **12** through the axial passageway **46**, through the check valve cage **50**, through the lateral passageways **58** and **60**, through the annular groove **84**, and finally through the diagonal passageways **80** and **82**. Upon starting the engine pressurized oil flows upwardly through the path just described and lifts the ball valve **56** from its seat to permit oil to flow into the pressure chamber **72**. To prevent the oil from backing up through this passageway the ball valve will seat upon its shoulder **54** at any time when the pressure within the pressure chamber **72** becomes greater than the pressure within the oil gallery. Generally a small leakage path is provided either between the cylindrical bore **66** in the lower face of the bearing member and the post or between the walls of the piston and the cylindrical inner wall **68** of the bearing member to prevent excessive pressures from developing in the pressure chamber **72**.

Thus it will be seen that we have provided an exceedingly simple arrangement for removing the lash from the operating mechanism of an overhead valve arrangement, the mechanism being simple to assemble and construct. The tolerances of the manufacture will not be critical and in assembly the pieces are easily placed in their relative orientation and no specific orientation or gauging is necessary during the assembly operation.

The nylon piston ring is long wearing and performs an effective seal and is also very easily assembled. With the use of this arrangement the manufacturing tolerances between the piston and the cylinder wall need not be critical and the frictional losses between the piston wall and cylinder wall can be reduced with increased clearance therebetween.

Further, the use of a press fit between the supporting post and the cylinder head reduces the assembling time and the necessary assembling operations and prevents the opportunity of the parts accidentally separating from vibration as can happen with a threaded fit. Further increased rapidity of assembly can be obtained since no threading operation is required. Since there is no critical space relationship between the position of the piston **70** and of the bearing member **62** a press fit for the bearing post can readily be used and no adjustment such as is available with a threaded fit is necessary.

In the embodiment of Figure 4 parts similar to the other figures are identified with similar numerals. The arrangement is used with the head **12** of an internal combustion engine, the head being provided with a valve as indicated by the valve stem **14** slidably mounted within the valve guide hole **13**. The valve spring retainer **22** is secured to the valve by the split valve locks **21** and the valve spring **23** is compressed between the valve spring retainer **22** and the shoulder **24** on the engine head.

The push rod **32** extends upwardly through the engine head and has a cylindrical upper end **31** which engages the socket **26** of the rocker arm **25**.

The rocker arm **25** is of the type shown in Figure 1 and as shown in Figure 4 has an upturned flange **28** to give it a generally bowl shaped interior **29**. The bowl-shaped end is depressed at **34** to provide a rounded exterior for rocking at the end **35** of the valve stem. The bowl-shaped portion **29** is also depressed at the other end at **26** to form the socket for the spherical upper end of the push rod **32**.

An aperture **27** is provided in the bottom of the rocker

arm and this aperture is located in the fragmental spherical socket portion **26** which provides the contact surface for the bearing member **99** which will be described later in greater detail.

A supporting post **86** is press fit into the hole **90** in the engine head with the smooth spherical hole **90** leading to the pressured oil gallery **44**. The smooth spherical lower end of the post is press fit into the hole **90** with the lower end of the post **88** projecting beyond the hole into the gallery **44** to better lock the post in position.

Slidably fitted to the posts is the bearing member **99**. The post of course is cylindrically shaped throughout its length and is received by the cylindrical bore **101** in the lower spherical face **118** of the bearing member. The bearing member has a hollow interior which between the inner wall of the bearing member and the upper end of the post **86** forms an oil pressure chamber **98**. The pressure chamber receives pressurized oil which urges the bearing member downwardly relative to the post and holds the rocker arm member against the upper end of the push rod **32** and against the upper end **35** of the valve stem to create a condition of zero lash.

The post **86** is provided with an axially bored hole **94** which communicates with the pressurized oil gallery **44** and leads upwardly to conduct oil to the pressure chamber **98** within the bearing member. For this purpose lateral openings are provided at **96** and **97** which extend radially through the post to conduct oil from the bore **94** to the pressure chamber **98** of the bearing member. The lateral holes **96** and **98** are opposite each other and may be formed in the post by a single drilling operation which extends completely through the post.

The axial bore **94** through the post is enlarged at its upper end to form a cage **102** for the ball check valve **104**. This enlarged opening forms a shoulder **106** at the upper end of the smaller portion **94** of the axial opening and this shoulder forms a seat for the check valve **104**. A spring **108** may be provided to hold the ball check valve down upon its seat to prevent the back flow of oil during operation of the lash adjusting member when the pressure within the chamber **98** becomes larger than the pressure within the oil gallery **44**.

To close the upper end of the cage **108** a bolt **110** extends downwardly through the upper threaded portion of the enlarged section **102** of the axial bore. The lower end of the bolt **110** holds the spring **108** in place and closes the cage **102** for the spherical ball valve.

To seal the upper ends of the oil pressure chamber **98** and yet to provide for relative movement between the bearing member **99** and the post **86** a flexible seal is provided between the bearing member and the post. This flexible seal is preferably in the form of a flexible metal bellows, and the lower edge of the bellows is secured to the upper annular edge **116** of the bearing member such as by welding or the like. The upper edge of the bellows is secured to the post **86** and for this purpose the bolt **110** is threaded into the upper end of the post **86**. The bolt head secures the upper end of the bellows to the post and to provide a backing member for withstanding the oil pressure reactance in the upward direction, a washer **112** is positioned at the upper end of the post beneath the head of the bolt **110**.

Thus it will be seen that I have provided a flexible seal between the bearing member **99** and the post **86** which permits the bearing member **99** to freely move relative to the post **86** to thus hold rocker arm firmly against the push rod and the valve stem. The mechanism is easily assembled and in manufacture the bellows can be secured to the bearing member before assembly and the unit is assembled by merely sliding the bearing member over the top of the post and then reading the bolt **110** into place.

The bellows forms a complete tight seal which absolutely prevents leakage of oil from the pressure chamber **98**. If desired the leakage oil may be provided by calculated loose fit between the shank of the post **86** and the cylindrical opening **101** in the bearing member in order that oil will leak from the pressure chamber and lubricate the upper portions of the rocker arm and engine. Also if desired a calculated small leakage path way be provided beneath the bolt head which secures the bellows to the post.

A further embodiment of the invention is shown in Figure 6. Like portions of the engine in that figure are given numbers the same as in Figures 1 through 5. The engine is again provided with a head **12** having the valve stem **14** slidable in the guide **13** and the valve is urged to closing position by the spring **23** which is secured to the valve by the retainer ring **22** which is connected to the valve by means of the locks **21**. The upper end **35** of the valve and the upper end **31** of the push rod **32** are engaged by the opposite ends of the rocker arm **25**.

The pressed steel rocker arm is the same that is used in the embodiments of Figures 1 and 4 having an outer flange **28** to provide a bowl-shaped interior **29**. The bowl-shaped interior is provided with a socket **26** at one end for receiving the spherical upper end of the push rod and is provided with a depression **34** at the other end for engaging the upper end of the valve stem. The socket has a spherical bearing portion **26** which has an opening **27** at its center to admit the post **120**. The post is again spherical and smooth in shape and appearance and is press fit into the smooth cylindrical hole **122** in the head, so as to communicate with the oil gallery **44**. The lower end **124** projects into the oil gallery to provide a firm engagement between the post **122** and the engine head.

An axial bore **126** leads upwardly through the post and communicates with the pressurized oil gallery to conduct oil upwardly. The axial bore terminates at its upper end before it reaches the upper end of the post and connects to a pair of radial openings **128** and **130** which lead outwardly to the pressure chamber **132** in the bearing member **134**. The bearing member is slidably fitted to the post and for this purpose has a cylindrical opening **136** in its lower end which permits sliding movement of the bearing member up and down relative to the post. The bearing member has a lower spherical bearing surface **138** which is held in engagement with the socket portion **26** of the rocker arm.

To close the oil pressure chamber **132** the post carries a piston **140** at its upper end. This piston is slidably fitted into the cylindrical interior of the bearing member **134**. To secure the piston to the upper end of the post it is slid down over the post and a bolt **142** is threaded into the upper threaded end **144** of the post. The bolt may carry a washer **146** to hold the piston down over the post.

A valve member is shown generally at **148** located in the pressure chamber **132** to act as a valve and to form a spring for urging the piston upwardly and to tend to urge the bearing member **134** and piston **140** to their separated positions. The valve member is comprised of an annular flexible ring **148** which extends from the lower end of the pressure chamber **132** to bear against the under surface of the piston **140**. This flexible annular valve member provides a sealing valve for the ports **128** and **130** to prevent back flow of oil from the chamber **132** to the ports. Thus when the oil flows upwardly through the axial conduit **126** and outwardly through the lateral ports **128** and **130**, the lower end of the flexible valve **148** will lift up to permit the oil to pass outwardly to the pressure chamber. However the ends of the valve will seat against the lower surface of the piston and against the lower surface of the interior of the bearing member to prevent the back flow of oil. To hold the flexible valve member in place an annular metal ring **150** extends around the mid point of the flexible valve member holding it tightly against the side

walls of the post. The metal ring or band firmly keeps the valve member 148 in place but does not bind it over the holes 128 and 130.

Thus it will be seen that I have provided a very simple and very easily manufactured and assembled valve lash adjuster assembly which meets the objects and the advantages hereinbefore set forth. The mechanism is light in weight and does not add to the reciprocating weight of the valve gear. The adjuster therefore is not subject to the accelerations and wear encountered by a heavier more bulky conventional type adjusters.

I have, in the drawings and specification, presented a detailed disclosure of the preferred embodiment of my invention, but it is to be understood that I do not intend to limit the invention to the specific form disclosed but intend to cover all modifications, changes and alternative constructions and methods falling within the scope of the principles taught by my invention.

I claim as my invention:

1. A valve arrangement for an engine provided with a valve push rod, a spring loaded poppet valve, and a rocker arm therebetween, the combination comprising an engine head having a pressurized oil gallery and a smooth cylindrical hole leading to the gallery, a rocker arm supporting post having a straight cylindrical end press fit into said cylindrical gallery, a bearing member slidably carried on the post and being in engagement within the rocker arm to urge it against the push rod and valve, said bearing member being hollow to define a pressure oil chamber between it and the post, means connected to the post for sealing said oil chamber, means providing a small leakage path from the chamber to prevent pressure from building up within said chamber, and a passageway extending through the post and in communication with said oil chamber and the gallery to pressurize the chamber.

2. A valve lash adjuster for supporting a pivotal rocker arm on an engine head comprising an engine head having a pressurized oil gallery and a smooth cylindrical hole communicating with the gallery, a rocker arm supporting post having an end press fit into the cylindrical hole of the gallery with the end of the post extending into the gallery past the end of said gallery hole whereby the end will lock by expanding past the hole, a hollow bearing member slidably mounted on the post and engaging the rocker arm to hold it against the push rod and valve of the engine, a hollow oil pressure chamber within the bearing member adapted to contain pressurized oil to urge the bearing member against the rocker arm, means for sealing the chamber of the bearing member, a small leakage path from the chamber to prevent excessive pressure from building up within the chamber, and a passageway extending through the post and communicating with the oil gallery and with the pressure chamber of the bearing member to cause the oil pressure to force the bearing member against the rocker arm.

3. A valve lash adjuster for supporting a pivotal rocker arm on an engine head comprising an engine head having a pressurized oil gallery, a rocker arm supporting post mounted on the engine head with a bore connecting to said pressurized oil gallery for conducting oil to the rocker arm, a piston connected to the upper end of said supporting post and adapted for sliding movement in a hollow bearing member, a hollow bearing member slidably mounted on the post and having a cylindrical bore in which the said piston is slidably located, passageways leading from the oil bore hole through said supporting post to the cylindrical hollow bore of the bearing member to conduct oil into the space beneath the piston and force the cylinder slidably downwardly away from the piston on the post, and a piston ring located in a groove in said piston located between the inner cylindrical wall of the hollow bearing member and the piston to prevent oil leakage past the piston and to permit greater tolerances between the size of the piston and the cylindrical bore in the bearing member.

4. A improved valve lash adjuster for supporting a pivotal rocker arm on an engine head comprising a rocker arm supporting post attached to the engine head, an axial bore leading through said supporting post and connected to the oil gallery of the engine head to conduct pressurized oil through said post, a hollow bearing member slidably mounted on the post and having a lower bearing surface to engage the rocker arm to hold against th push rod and valve of the engine, a cylindrical bore within the slidably mounted hollow bearing member adapted to receive a piston, a piston secured to the upper end of said post and slidably mounted in said cylindrical opening in the hollow bearing member to retain oil in the space beneath the piston, an opening in the post connecting the space beneath the piston within the bearing member to the axial bore through the post to conduct oil to said space, said oil forcing the hollow bearing member downwardly to urge the rocker arm downwardly against the valve stem and pusher arm, and a bolt threaded into the upper end of the post to block the oil passageway through the bolt and having a head which overhangs the piston to secure the piston to the post.

5. A valve lash adjuster for supporting a pivotal rocker arm on an engine head comprising an upstanding post secured to the engine head, an axial bore through said post forming a passageway for communicating with the oil gallery of the engine head for conducting oil upwardly through the post, a hollow bearing member slidably mounted on the post and having a bearing surface engaging the engine rocker arm to hold the rocker arm against the valve stem and the push rod, a reduced portion at the top end of the post, a cylinder positioned over said reduced portion, a cylindrical bore formed within said bearing member and adapted to receive the cylinder member in sliding engagement, a bolt threaded into the upper end of the post and having a head extending over the piston to hold it on said reduced portion for sliding movement within the bearing members, and a communicating passageway leading through the post to conduct oil to the space below the piston within the bearing member to urge the bearing member downwardly holding the rocker arm against the valve stem and push rod.

6. A valve lash adjuster including a pivotal rocker arm for transmitting linear motion from a push rod to a valve stem comprising an upstanding post secured to the engine head and provided with an axial bore connecting to the pressurized oil gallery of the engine head, a rocker arm bearing member slidably mounted on the post having a lower bearing surface engaging the rocker arm for urging the rocker arm downwardly against the piston rod and pusher member as the rocker arm is moved pivotally, a cylindrical bore open at the upper end within the sliding bearing member and adapted to receive a piston, a piston positioned over the upper end of the post and fitted within the cylindrical bore of the sliding bearing member, radially extending openings leading through the post member from the axial bore, and communicating openings in the piston registering with the radial openings in the post to conduct oil from the axial bore through the radial bore of the post and through the piston to the hollow pressure space beneath the piston within the sliding bearing member, the pressurized oil urging the piston to resiliently hold the rocker arm against the push rod and valve stem.

7. A valve lash adjustment for supporting the pivotal rocker arm on an engine head having a pressurized oil gallery, the lash adjuster assembly comprising an upstanding post mounted on the engine head, an axial bore extending through said post and communicating with the pressurized oil gallery to conduct pressurized oil upwardly through the post, an enlargement of the axial bore at the upper end of the post to provide a cage for a check

valve, a spherical ball positioned in said cage to provide a check valve for preventing the back flow of oil, a bearing member slidably mounted upon the post and having a lower bearing surface engaging the rocker arm, said bearing member having a cylindrical bore extending from the upper end for receiving a piston, a piston secured to the upper end of the post and slidably fitted into the cylindrical bore on the sliding bearing member, a bolt fitted into the top end of the post with the lower end of the bolt closing the cage which houses the ball valve, the head of said bolt extending outwardly over said piston to secure it to the upper end of said post, an opening extending laterally from said cage to the hollow space within the sliding bearing member in the piston to direct pressurized oil in said space and urge the sliding bearing member downward against the rocker to hold it firmly against the push rod and valve stem.

8. A valve lash adjuster for supporting a pivotal rocker arm on an engine head comprising an engine head, a pressurized hollow oil gallery, a post connected to said engine head and extending into said gallery, an axial bore extending upwardly through the post for conducting pressurized oil upwardly through the post, a hollow bearing member slidably positioned on the post and having a lower bearing surface for engaging the engine rod arm to hold it downwardly against the valve stem and the push rod, and a flexible sealing member extending between the upper end of the post and the bearing member to seal the hollow opening within the bearing member and maintain the pressurized oil to permit the oil to urge the bearing member downwardly against the rocker arm holding it against the push rod and valve stem, said axial bore through the post communicating to the hollow interior of the slidable bearing member to direct the pressurized oil thereto.

9. A valve lash adjuster for supporting a pivotal rocker arm on an engine head having a pressurized oil gallery, the adjuster comprising an upstanding post secured to the engine head and extending downwardly into the oil gallery, an oil passageway extending upwardly through the post to conduct oil from the gallery, a rocker arm bearing member movably fitted on the post for movement relative to the post to hold the rocker arm against the valve stem and push rod, the bearing member having a finished under surface for engaging the rocker arm in bearing contact, a flexible metal bellows having one edge secured to the post and the other free edge secured to the slidable bearing member to form a hollow oil chamber between the post and bearing member, and an opening communicating between the hollow within the bearing member and said oil passageway in the post to direct pressurized oil into said hollow space within the bearing member and permit the oil pressure to urge the bearing member downwardly against the rocker arm.

10. A valve lash adjuster assembly for supporting a pivotal rocker arm on an engine head and utilizing the oil pressure of the engine head to hold the rocker arm in firm engagement with the valve stem and push rod, the combination comprising a supporting post mounted on the engine head, an axial passageway extending through the supporting post and communicating with the pressurized oil gallery of the engine head, a rocker arm bearing member slidably fitted to the post and having a lower bearing surface for engaging the rocker arm, the sliding bearing member being hollow so as to form a pressurized oil chamber between the hollow walls of the bearing member and the post, an enlargement of the upper end of the axial passageway through the post forming a bearing cage, a spherical check valve inserted in the bearing cage preventing the oil from flowing backwardly through the axial opening in the post, a bolt threaded into the upper end of the post with the lower end of the bolt forming a closing for the valve cage, a lateral passageway extending from the valve cage to the hollow interior of the slidable bearing member, and a flexible metal bellows having its lower edge secured to the upper walls of the hollow bearing member and having its upper edge seated on top of the post with the head of the bolt securing the edge of the bellows to the post to thereby seal the interior of the bearing member with the bellows flexing as the bearing member moves downwardly with oil pressure to urge the rocker arm against the valve stem and push rod.

11. A valve lash adjuster for supporting a pivotal rocker arm on an engine head having a pressurized oil gallery, comprising a supporting post secured to the head, an axial bore extending through the post and communicating with the oil gallery, a hollow bearing member slidably fitted to the post having a lower bearing surface engaging the rocker arm, a piston secured to the upper end of the post, said bearing member fitted with a cylindrical bore opening at the top and receiving said piston to form a closed chamber within the hollow bearing member located within the walls of the bearing member and beneath the piston, radial openings extending laterally through the post and communicating between the pressure chamber within the walls of the bearing member and the bore within the post to permit pressurized oil to flow out into the chamber and force the bearing member against the rocker arm, said post having a smooth cylindrical outer surface in the area of said radial openings and a flat annular band encircling the post and positioned over the outer end of said radial holes preventing the back flow of oil from the pressure chamber and permitting the valve to be forced outwardly by the pressure oil to fill the chamber.

12. An automatic valve lash adjuster for engine comprising a post for supporting a rocker arm in operating position to engage a valve and push rod, a bearing member slidably supported on the post and having a smooth bearing surface for engaging the rocker arm and having a hollow interior to form a pressure oil chamber between the post and the wall of the bearing member, a passageway through the post leading from the oil gallery of the engine to said pressure oil chamber within the bearing member, a very small passageway leading from the chamber to prevent excess pressure from building up, a closure member for said oil chamber within the bearing member to pervent oil from escaping, and means for securing the closure member to the post to permit the oil pressure to form within the bearing member to force it slidably down on the post against the rocker arm.

13. A valve lash adjuster for supporting a pivotal locker arm on an engine head comprising a supporting post carrying the lash adjusting assembly, the post being secured to the engine head and have internal axial passageway communicating with the pressurized oil gallery of the head, a bearing member slidably fitted to the post and having a lower bearing surface engaging the rocker arm, the bearing member having a hollow interior forming an oil pressure chamber for the receipt of pressurized oil to force the bearing member downwardly against the rocker arm urging the rocker arm against the valve stem and push rod, a piston secured to the upper end of said post and slidably fitted into the hollow interior of the bearing member to close the pressurized oil chamber beneath the piston, radially extending oil passageways leading to the oil chamber from the axial passage through the post, an annular flexible valve member encircling the post at the location of the radially extending oil passageways to form a flap over the passageways to prevent the back flow of oil and being forced away from the post with the pressurized oil flowing into the chamber, and an annular reinforcing band extending around the post and mounted exterior of the flexible band and being narrower than said flexible band to hold the band to the post but not block said radial oil passageways.

14. A valve lash adjuster for supporting a pivotal rocker arm on an engine head comprising an engine head having a pressurized oil gallery and a smooth cylin-

drical hole communicating with the gallery, a rocker arm supporting post having an end press fit into the cylindrical hole of the gallery with the end of the post extending into the gallery past the end of said gallery hole, whereby the end will lock by expanding past the hole, a hollow bearing member slidably mounted on the post and engaging the rocker arm to hold it against the push rod and valve of the engine, a hollow oil pressure chamber within the bearing member adapted to contain pressurized oil to urge the bearing member against the rocker arm, means for sealing the chamber of the bearing member, and a passageway extending through the post and communicating with the oil gallery and with the pressure chamber of the bearing member to cause the oil pressure to force the bearing member against the rocker arm.

15. An improved valve lash adjuster for supporting a pivotal rocker arm on an engine head comprising a rocker arm supporting post attached to the engine head, an axial bore leading through said supporting post and connected to the oil gallery of the engine head to conduct pressurized oil through said post, a hollow bearing member slidably mounted on the post and having a lower bearing surface to engage the rocker arm to hold against the push rod and valve of the engine, a hollow oil pressure chamber formed within the bearing member for receiving pressurized oil to urge the bearing member against the rocker arm, closure means connected to said post and operative to seal said pressure chamber, an oil passageway communicating with said pressure chamber for delivering oil thereto, a threaded opening

in the top of said post, and a headed bolt threaded into said opening in the post and retainingly engaging said closure means holding it in operative position with respect to the post and the bearing member.

16. An improved valve lash adjuster for supporting a pivotal rocker arm on an engine head comprising a rocker arm supporting post attached to the engine head, an axial bore leading through said supporting post and connected to the oil gallery of the engine head to conduct pressurized oil through said post, a hollow bearing member slidably mounted on the post and having a lower bearing surface to engage the rocker arm to hold against the push rod and valve of the engine, a hollow oil pressure chamber formed within the bearing member for receiving pressurized oil to urge the bearing member against the rocker arm, closure means connected to said post and operative to seal said pressure chamber, a lateral passageway extending from said axial bore and communicating with said oil pressure chamber to deliver oil thereto from said oil gallery, and check valve means located between said axial bore and said pressure chamber preventing the return of oil to said oil gallery.

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