No. 623,974. Patented May 2, 1899.

C. W. BECK.

LAMP FOR GENERATING ACETYLENE GAS.

(Application filed Aug. 29, 1896.)

(No Model.)

Fig. 1.

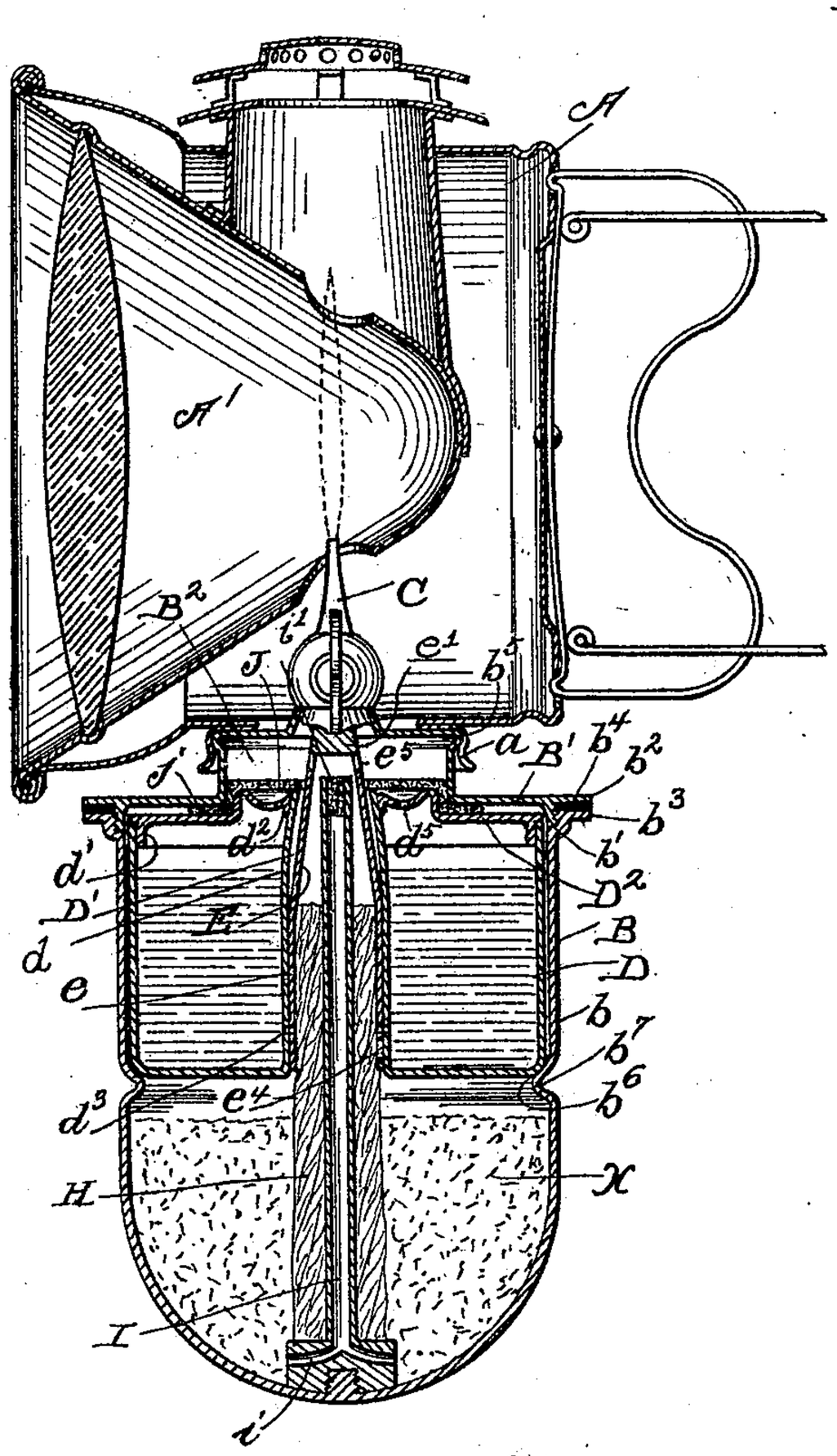


Fig. 2.

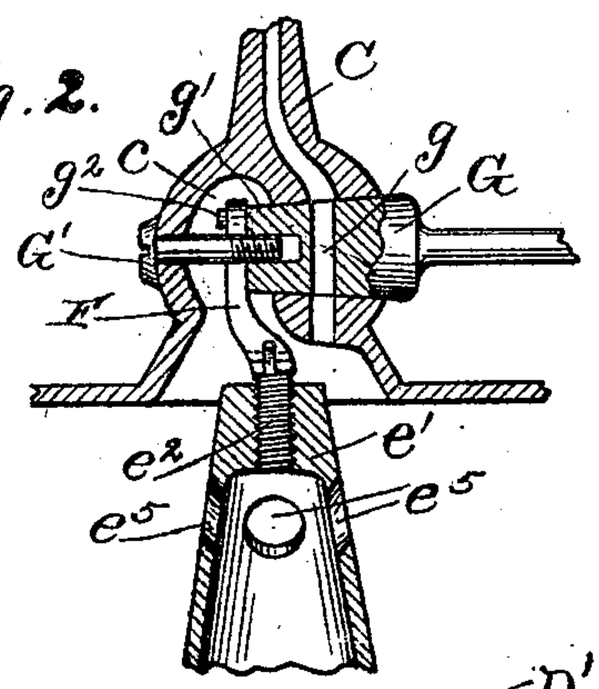


Fig. 5

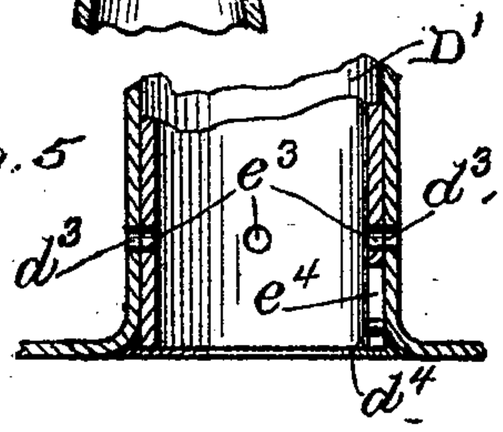
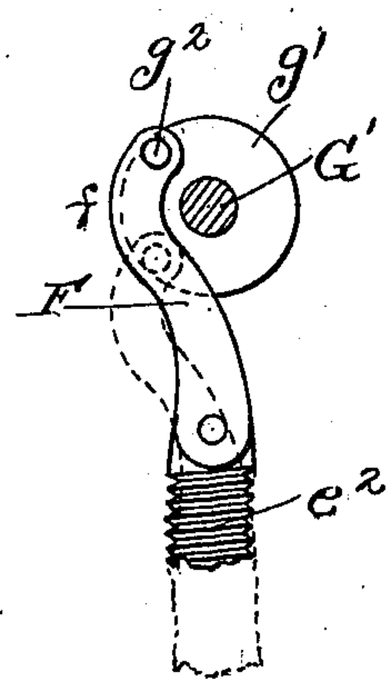


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES W. BECK, OF CHICAGO, ILLINOIS.

LAMP FOR GENERATING ACETYLENE GAS.

SPECIFICATION forming part of Letters Patent No. 623,974, dated May 2, 1899.

Application filed August 29, 1896. Serial No. 604,255. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. BECK, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lamps for Generating and Burning Acetylene Gas, of which the following is a specification.

This invention relates to improvements in lamps for generating and burning acetylene gas made from calcic carbid or analogous material, and has reference more particularly to a portable lamp of the character described which is particularly designed for use as a bicycle-lamp, the invention being, however, susceptible of embodiment in other forms.

Among the objects of the invention is to provide an improved construction wherein the transfer of the liquid slaking agent to the compound is regulable at will and in which the flow of liquid is not substantially affected by jarring or jolting of the lamp.

A further object is to provide a construction whereby the supply of liquid is shut off at the same time that the burner is closed, thereby interrupting the generation of gas and preventing the waste of material.

Still another object is to produce a lamp the body or generating-chamber of which consists of a single integral outer shell having but one opening, closed by a hermetically-tight joint, thereby reducing liability of gas-leakage by reason of defective joints.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims, and may be readily understood by reference to the accompanying drawings, in which—

Figure 1 is an axial sectional view of a bicycle-lamp embodying one form of my invention, the headlight of the lamp being of conventional form. Fig. 2 is an enlarged detail axial sectional view of the burner or jet-nozzle and connected parts shown in Fig. 1. Fig. 3 is an enlarged fragmentary detail showing the inner end of the valve-plug and the valve-actuating rod connected therewith. Fig. 4 is an enlarged detail fragmentary view of the lower part of the liquid-receptacle and the centrally-arranged valve-sleeve, showing particularly the means for holding the valve-sleeve in alinement with the valve-openings.

Referring to the drawings, A designates as a whole a headlight, which may be of any desired and suitable form, and B the fount or gas-generating device, suitably connected with the lower part of the headlight and provided at its top with a jet-nozzle C, arranged to project upwardly within the reflector A′ of the headlight. The fount B consists generally of the bowl-shaped outer shell *b*, the upper portion of which is cylindric and closed at its upper end by means of a screw-cap B′, arranged to close the said shell *b* hermetically, except for the jet-nozzle or burner C, hereinbefore referred to. As a convenient construction for securing a gas-tight fit at the junction of the screw-cap with the shell the former is shown as provided with a cylindric depending flange b', exteriorly screw-threaded to fit within the upper end of the shell *b*, and with a radially-outturned marginal flange b^2, which overlies a similar outturned flange b^3, formed at the upper margin of the shell *b*. Between said flanges b^2 b^3 is arranged a packing-ring or washer b^4. The cap B′ is provided centrally with an upwardly-projecting extension B^2 of reduced diameter and of general cylindric form, adapted to fit within the depending spring petticoat-flange *a* of the headlight and provided at its upper end with a circumferential bead b^5, over which the said spring-flange clasps.

D designates a liquid-receptacle suitably conformed to fit snugly, but easily, within the upper cylindric part of the shell *b* and of such depth as to extend downwardly within said shell approximately one-half the depth of the latter. In order to support said liquid-receptacle in this position within the upper part of the shell, the latter is conveniently provided with an internal ledge or bead b^6, herein shown as made by forming an external circumferential crease b^7 in the body of the shell, upon which ledge the lower end of the liquid-receptacle rests. The liquid-receptacle D is of annular form or is provided with a relatively large open-ended tubular passage D′, extending entirely through the said receptacle from top to bottom thereof. The upper portion of the tubular wall forming the passage D′ is contracted or made slightly tapering upwardly, as shown clearly in the drawings. The top of the liquid-receptacle is closed by means of a cap or cover D^2, suitably apertured at its cen-

ter to fit exteriorly upon the upper end of the tubular partition-wall d and provided with depending flanges d' d^2, which serve to retain the cover in position and insure close joints at the outer and inner margins, respectively, of said cover.

In use the calcium carbid X will be placed within the lower part of the shell b, and it will be obvious that in such a construction, wherein the carbid occupies the lower part of the fount and the liquid the upper part thereof, the automatic flow of liquid from the receptacle to the carbid may be effected, and in order that the flow may be more regular and maintained under better control the escaping liquid is caused to pass through controlled outlets and thence through a wick before reaching the carbid.

The construction and arrangements of parts are as follows:

E designates a sleeve, for convenience hereinafter designated a "valve-sleeve," arranged to fit closely at its lower end portion e within the lower part of the tubular passage D' and made tapering and extended upwardly, so as to terminate at its upper end e' adjacent to or within the base of the jet-nozzle C. The said upper end of the valve-sleeve is interiorly screw-threaded, (see detail Fig. 3,) as at e^2, to receive the lower end of the jointed pitman or actuating-rod F, which extends upwardly within the jet-nozzle to and is connected with the valve-plug G, which controls the gas-passage through said nozzle. The lower part of the sleeve E is provided with valve-apertures e^3, which are adapted to be brought into and out of register with corresponding outlet-apertures d^3 to form passages through the inner cylindric wall of the liquid-receptacle, near the bottom thereof. Obviously with this construction the flow of liquid through the outlet-passages may be controlled by simply shifting the sleeve E endwise within the tubular passage D', and in order that said sleeve may be thus shifted simultaneously with the shutting off or turning on of the flow of gas through the jet-nozzle connections are provided as follows: At that part of said nozzle through which the valve-plug is inserted the body thereof is enlarged spherically, as indicated most clearly in Fig. 3, and the gas-passage therein is deflected from an axial line toward the base or larger end of the valve-plug, the gas-passage g through the latter being correspondingly located to register therewith. The smaller truncated end g' of the valve-plug terminates at a point within the body of the spherical enlargement, the latter being chambered or provided with a recess c, within which the said end of the valve-plug projects freely. A stud or wrist-pin g^2 is provided upon the face end of the valve-plug, located eccentrically to the axis of the latter, with which recess the upper end of the pitman or actuating-rod F is pivotally connected. The wrist-pin g^2 is located in such angular relation to the gas-passage g through the valve-plug that when the latter is oscillated to open and close the jet-nozzle the sleeve E will be correspondingly elevated or depressed to open or close the valve-apertures in the liquid-chamber D. In order that the valve-plug G may be held within its seat, a screw G' is arranged to extend through the side wall of the jet-nozzle in axial alinement with the valve-plug and is engaged at its inner end with the end of the latter. In order to avoid interference with this retaining-screw, the actuating-rod F is curved, as indicated at f.

Inasmuch as the screw-cap B' of the fount must be removed each time the lamp needs to be replenished, it is necessary that the actuating-rod be also disconnected when the cap is removed and reconnected when the cap is returned to place, and this is conveniently accomplished by making the pitch of the screw-threaded coupling between the end of the actuating-rod and the upper end of the sleeve E and the pitch of the screw-threads upon the margins of the screw-cap equal, so that in turning the screw-cap said parts will be simultaneously connected or disconnected, as the case may be. In order to hold the sleeve E from rotation when the screw-cap is being turned, I provide a guide-stud d^4 upon the inner tubular wall of the liquid-chamber, which stud is arranged to extend within a vertical slot e^4, formed in the sleeve E.

In order that the flow of liquid from the liquid-chamber may be retarded and made more regular and the liquid conveyed below the top level or within the body of carbid occupying the lower part of the fount, I provide a wick or packing H, of suitable porous or absorbent material—such, for instance, as felt or the like—which is fitted or compressed within the lower part of the sleeve E and extends thence down within or through the body of the carbid.

I have ascertained by experiments that the gas becomes supercharged with aqueous vapor in the course of its generation in a lamp of the character described, so that water in the form of minute drops will be carried up and form in the jet-nozzle and be forced therefrom, so as to interfere more or less with the proper burning of the gas, unless some means be provided for precipitating and collecting the superfluous moisture before the gas issues from the nozzle. I have therefore in the present instance provided a stand-pipe I, secured to the interior of the bottom of the bowl b and arranged to extend upward axially within the sleeve E to a point near the upper end of the latter. This stand-pipe is provided with a plurality of gas-inlet passages i, located at or near its lower end, so that the gas generated in the body of the carbid is in passing to the burner compelled to rise through the entire length of the stand-pipe, thus affording opportunity for the supercharged vapor to precipitate some of its moisture. As a still further precaution I provide a filter of porous

material i', such as felt or the like, in the upper end of the stand-pipe, through which the gas must pass. Exit-passages e^5 e^5 are provided in the upper part of the sleeve E for the passage of the gas outwardly into the upper interior of the cap B′ and thence to the nozzle. In order to admit gas into the upper part of the liquid-receptacle to prevent the formation of a vacuum therein as the liquid escapes, inlet-apertures d^5 are formed in the cover, preferably and as shown in the present instance in the lowermost part of an annular depression, which serves to direct any liquid which may be splashed upwardly through said apertures back into the receptacle.

In order to hold the liquid-receptacle in firm bearing upon the ledge b^6 and at the same time to insure that any gas which may pass upwardly between the outer walls of the liquid-receptacle and the shell b shall be filtered, I provide a felt or analogous washer or packing J, which overlies the cover of the liquid-receptacle and is clamped at its margins, as at j, between said cover and the screw-cap of the fount.

The operation of the lamp thus described is as follows: The screw-cap having been removed and the liquid-receptacle lifted out, the stand-pipe, with its surrounding wick, is left exposed and the lower part of the fount accessible. The carbid is now poured in, the liquid-receptacle filled and replaced in position, care being taken to telescope the lower part of the valve-sleeve over the upper part of the wick, and the screw-cap turned down to position. Upon turning the cock so as to open the nozzle C the valve-apertures will be opened and the liquid passing downward through the wick will be brought into contact with the carbid and rapidly generate gas. The gas generated in the body of the carbid having no other means of ready escape is forced into the stand-pipe and thence up to the jet-nozzle, issuing from the latter with considerable force and burning, when ignited, in a bright strong jet.

Among the advantages of the construction hereinbefore described may be mentioned that it provides a fount which is hermetically closed, except for the burner-outlet, and has but a single joint where the screw-cap fits upon the body of the fount. A further advantage is that practically the entire internal mechanism of the lamp may be lifted out by simply removing the screw-cap, thereby affording the most perfect access to all parts of the lamp for replenishing the gas ingredients or removing the exhausted compound, for adjusting the regulating devices, or for other purposes. In this lamp also the shutting off of the gas-supply to the burner operates to automatically shut off the supply of liquid to the carbid, thus arresting the generation of gas and rendering the waste of carbid impossible.

While I have herein shown what I deem a preferred embodiment of my invention, yet it will be obvious that the details thereof may be modified to some extent without departure from the invention, and I do not therefore wish to be limited to the precise details shown, except as made the subject of specific claims.

I claim—

1. In a lamp for burning acetylene gas generated from calcic carbid and similar compounds, the combination of a chamber for the compounds, a chamber for the slaking fluid, means for conducting the fluid to the compounds, and means operated by connection with the stop-cock of the gas-duct whereby the turning of the cock to cut off or turn on gas cuts off or turns on the feed of fluid to the chamber for the compounds.

2. In a lamp for burning acetylene gas generated from calcic carbid and similar compounds, the combination of a chamber for the compounds, a chamber for the slaking fluid, means for conducting the fluid to the compounds, a valve controlling the flow of the fluid, a gas-duct leading to the burner, a stop-cock in said duct, and a connection between said stop-cock and the valve, whereby the turning of the cock operates said valve to cut off or turn on the feed of fluid to the chamber for the compounds.

3. In a lamp for burning acetylene gas generated from calcic carbid and similar compounds, the combination of a chamber for the compounds, a superposed chamber for the slaking fluid, a perforated tube extending through said latter chamber and communicating with the compound-chamber, a sleeve sliding within said tube to cut off or turn on the flow of fluid through its perforations, a gas-duct with which said sleeve communicates, a stop-cock in said duct, and a link eccentrically pivoted to the stop-cock and connecting it with the sleeve, whereby the turning of the cock operates the sleeve.

4. In a lamp for burning acetylene gas generated from calcic carbid and similar compounds, the combination of a chamber for the compounds, a superposed chamber for the slaking fluid, a perforated tube extending through said latter chamber, and a wick of porous material extending from the chamber for the compounds up between the walls of the perforated tube to receive from the fluid-chamber.

5. In a lamp for burning acetylene gas generated from calcic carbid and similar compounds, the combination of a chamber for the compounds, a superposed chamber for the slaking fluid, a perforated tube extending upward through said chamber from the chamber for the charge of compounds, a gas-jet above said tube and a wick or packing of porous material extending up between the walls of said tube.

6. In a lamp for burning acetylene gas generated from calcic carbid and analogous com-

pounds, the combination of a chamber for the compound, a superposed chamber for the fluids, a perforated tube extending upwardly from the bottom of said latter chamber, a sleeve inclosed within said tube and opening above to the gas-duct, and a connection between said sleeve and the stop-cock, whereby it is reciprocated by the turning of the latter, to cut off or admit the flow of fluid.

7. In a lamp for burning acetylene gas generated from calcic carbid and analogous compounds, the combination of a chamber for the compound, a superposed chamber for the fluids, a perforated tube extending upwardly from the bottom of said latter chamber, a wick inclosed within said tube and extending down into the compound-chamber to convey fluid thereto, a sleeve sliding within said tube and opening above to a gas-duct, a stop-cock in said duct, and a connection between said sleeve and the cock, whereby it is reciprocated by the turning of the latter, to cut off or admit the flow of fluid.

8. In a lamp for burning acetylene gas generated from calcic carbid and analogous compounds, the combination with a compartment for the reception of carbid, and generation of gas and a communicating compartment for a charge of slaking fluid, of a burner at the top of the lamp and a stand-pipe rising through the carbid and leading from the generating-compartment to a point adjacent to the base of the burner, said pipe being provided with an inlet passage or passages located within the body of carbid.

9. In a lamp for burning acetylene gas generated from calcic carbid and analogous compounds, the combination with a compartment for the reception of carbid, and generation of gas, and a compartment for a charge of slaking fluid communicating with the upper part of the generating-compartment, of a burner at the top of the lamp, a stand-pipe leading from the generating-compartment to a point adjacent to the base of the burner, and provided with an inlet passage or passages located below the normal surface of the body of carbid, and a filter closing the top of the stand-pipe.

10. In a lamp for burning acetylene gas generated from calcic carbid and analogous compounds, the combination with a compartment for the reception of carbid and generation of gas, and a superposed compartment for a charge of slaking fluid, of a perforated tube rising through the fluid-compartment, a wick of porous material inclosed within said tube and extending into the carbid-compartment, and a stand-pipe leading from the generating-compartment up through said perforated tube and having an inlet passage or passages at its lower end.

11. The combination of the fount having the internal ledge or bead, the fluid-receptacle resting upon said ledge, the removable cap to the fount, and the porous packing interposed between said cap and the top of the fluid-receptacle, to hold the latter in place and serve as a gas-filter.

12. The combination of the generating-compartment, the fluid-chamber, the superposed burner, and the annular depression in the cap of the fluid-chamber, perforated to conduct the drip back to said chamber.

13. The combination of the fount, the fluid-chamber, the cut-off sleeve, the stop-cock, the pitman, and the adjustable coupling connecting the pitman to the cut-off sleeve.

14. The combination of the fount and its screw-threaded cap, the fluid-chamber, the cut-off sleeve, the stop-cock, the pitman, and the coupling connecting the pitman to the cut-off sleeve, screw-threaded into the top of the sleeve to the same pitch and in the same direction as the screw-threaded cap.

15. The combination of the chambered nozzle, the truncated valve-plug having a wrist-pin upon its truncated end, the screw holding the plug in place, the curved pitman, and the cut-off valve.

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