

## The Automobile Simplified

By FREDERICK C. GUERRICH, M. E.  
Make This Your Automobile Correspondence School

**A**N intimate talk on the working units of the automobile discussed in such a way that the layman can easily understand them. If in reading these articles, as they appear in the Palladium each Saturday, there is anything not clear to you, ask Mr. Guerrich about it. An answer will be published on the completion of the articles on the section of the automobile under discussion.  
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Before taking up the magneto and starting and lighting system, there are a few questions which I wish to answer, as they are interesting.

Question from A. J. B.: The motor in my Buick car does not have the valves placed as those shown in the engine in your first lesson. They call my engine a valve in head engine. Could you explain its action to me?

Question from F. B. P.: My engine has not got valves on both sides, they are all on one side. Is the action the same as the engine you showed?

Answer: For convenience, when I explained the cycle and valve action of the engine, I used what is known as a T Head motor; that is, one in which the valves are placed on opposite

sides of the cylinder. Figure 1 in the drawing shows this motor, and you will notice that it really forms the letter T from which it gets its name.

In addition to the T-head motor, engines are also built in the form of the L-head and also of the Valve-in-the-head, or as it is often called, overhead-valve motor. Then there are special types, such as the Knight sleeve valve and the Rotary valve motor.

The L-head motor, shown in Figure 2, differs from the T-head motor only in the arrangement of the valves. In this motor, the valves are all placed on the one side, the action otherwise being exactly the same as that of the T-head motor.

Of course, in the T-head motor, the fresh gases enter on one side and the exhaust gases go out on the other side, while in the L-head, the gases enter on the front or rear portion and exhaust on the rear or front portion of the cylinder, respectively, but on the same side.

Valve Arrangement  
In most L-type engines, the valves are arranged thus: No. 1 will have the exhaust in forward position, and inlet rear; No. 2, the inlet forward and exhaust rear; No. 3, exhaust forward, inlet rear; No. 4, inlet front, exhaust rear. The reason for this is that it will permit the inlet manifold to be built with only two branches for the four-cylinder engine, and three branches for the six-cylinder engine.

Both the T and L-head motors have their advantages and disadvantages. The T-head motor can have larger valves, and these valves will usually be more accessible. It is, however, more expensive to build and has more parts, as it will have to have two cam shafts and two half-time gears. It is, naturally, a heavy motor.

The L-head motor will require only one cam shaft and gear, and has the added advantage of having the exhaust manifold near the inlet manifold, so that the heat of the exhaust will tend to heat the inlet manifold, and so help prevent the condensation of the gas in the mixture. The size of the valves, however, is limited, and are liable to be less accessible.

Valves on Top  
The overhead-valve engine, has the valves placed on top, or in the head of the cylinders. In both the T and L-head motors the valves are opened by being pushed up against the spring, but in the overhead engine, they are opened by being pushed down. The cam shaft is the same, but between the valve lifter and the valve a Push Rod and Rocker Arm are placed.

Figure 3 shows the overhead, or Valve-in-the-head motor. D is the valve-lifter guide. A the valve lifter (these parts you will notice are the same in the T and L-head motors), and B is the push rod, which rests in a hollow on the valve lifter, while C is the rocker arm, and E the valve stem.

You will note that as A is raised, B also is raised, and that, because of the rock-arm action, the valve stem and, therefore, valve is pushed down, and so the valve is opened.

In most overhead-valve engines the valve is contained in a Valve

arm, the valve will open the hole S, and the mixture will come in through the inlet manifold, passage L, hole O in the side of the cage, and then down into the cylinder through S. On the compression and power stroke the valves will be closed, but on the exhaust stroke the exhaust valve will be pushed down, thus opening R, and the burned gases will come up and out of the cylinder through R, then through the hole P, passage M and so out through the exhaust manifold.

When the valves are to be ground, the entire cage, valve and valve spring are removed assembled. This is done by removing the rocker arm, and the large nut which holds the cage in place, and then inserting the end of a screwdriver or tire tool under the spring and prying the cage out of its hole. A block of wood may have to be used as a fulcrum.

Valve Grinding.  
Question by S. R. F.: You have

mentioned the great importance of having the valves ground. Can this be done by the ordinary owner, and, if so, how is it done?

Answer: Valve-grinding is not a difficult job, and I think it would be good for every owner to know how to do it. Many will find it a recreation. I give the way to do this in a series of steps.

First—Get a new set of gaskets to put under the valve caps, also some grinding compound, such as for example, Clover Leaf or Old Dutch, and a valve-spring lifter.

Second—Remove spark plugs, compression cocks and valve caps.

Third—Scratch the carbon off one of the valves and note if it is numbered. If not, number the valves by making center-punch marks on them.

Fourth—Remove the valves as follows: With the valve-spring lifter press up the spring. As you do this the valve will probably also raise, if not, raise it with a screwdriver. Insert a fine wire under the valve head.

Force down the valve and remove the key. Let down the spring and remove the valve-spring tool. With the wire pull out the valve. Remove the spring. If you do the above, as given, you will find it comparatively easy, otherwise you may find getting the valve out a tedious task.

Clean All Carbon.  
Fifth—Clean the carbon off all of the valves, but do not touch the valve seats. (The valve seat is the portion against which the valve rests in the cylinder.)

Sixth—Put a very thin coat of the compound on the valve, replace it, and with a screwdriver remove the valve back and forth, raising it and giving it a half turn about every tenth oscillation. Periodically remove the valve and see if the little holes (pits) have disappeared. When they have disappeared, or a fine bright ring appears, the valve is properly ground.

Seventh—Re-assemble the parts.  
Hints: Always, when assembling, put a little graphite on threaded parts subject to heat, so as to keep the threads from fusing together.

A mixture of graphite and brown shellac placed on the threads of the valve caps will help to make them tight, but this must not be put on the spark plug threads.

After grinding the valves will usually require to be readjusted. When grinding or adjusting be sure that the valve lifter is fully down and not resting on any portion of the set of the cam. If so, revolve the shaft by cranking a half-turn.

The valve adjusting should be checked up when the engine is hot, as the expansion may result in the valve not seating properly.

Camden, O.

Thomas Mason of Purdue University gave a lecture on the work of the Y. M. C. A. overseas at Fairhaven, Wednesday evening. Mr. and Mrs. Marlon Lybrook attended the fair Thursday and Friday. Roy Benham is

visiting relatives in northern Michigan. Howard Pattison and family moved to their home recently purchased on North Lafayette street. Ray Simpson and family came to the house vacated by Mr. Pattison. Claude Neff and wife are moving into Eva Wall's property on Second street.

Mr. and Mrs. Wm. Fisher were Richmond shoppers Wednesday. Mr. and Mrs. Bailey, Elma Stewart, Margaret Williams, Mary Simpson, of Fairhaven attended the Y. P. C. U. convention at Sycamore this week. Lawrence Whitesell went to Chicago Wednesday. Roy Whitesell and wife and Mr. and Mrs. Clarence Whitesell attended the Richmond chautauque, Wednesday. Mr. and Mrs. Dan Payne were at the State Fair at Columbus, Tuesday. Mrs. Charles Anderson, who has been visiting friends here the past week, has returned to her home in Columbus. Mr. and Mrs. Philip Snyder of Middletown, O., and Mrs. Hannah Pierson, of Indianapolis, were Sunday guests of Mrs. Kennedy. Mrs. Pierson remained for several days. Charles Williams and family, Mr. and Mrs. R. B. Evans, Charles Bishop and daughter Thelma, attended the Tony reunion at Glen Miller Park, Wednesday.

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**HOUSE PASSES ARMY BILL.**  
WASHINGTON, Aug. 30.—The administration bill authorizing the War Department to retain 18,000 officers in the army until next July was passed today by the House. It now goes to conference.

**OLD SORES, PILES, BURNS AND SCALDS HEAL VERY QUICKLY**  
Thistlethwaite's 6 Drug Stores sell an ointment called San Cura that surely does do anything it is advertised to do or money back.

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Everybody should use San Cura Soap, it's antiseptic, prevents germ life, keeps the skin clear, soft and velvety, 25 cents. Thompson Medical Co., Titusville, Pa.—Adv.

**Aviator is Fined for Disturbing the Peace**  
KANSAS CITY, Mo., Aug. 30.—On a charge of flying his airplane within ten feet of the roof of a farmer's house Charles H. Levy was fined \$25 and costs for disturbing the peace, in a justice court at Dodson, Mo., today.

The complainant, Fred Hoeman, a farmer living near a local aviation field, asserted that the aviator had scared his family and frightened his stock. While it was admitted that no law on the statutes covered the case, Justice S. I. Farmer declared that it was his opinion the aviator had disturbed the peace of the farmer and his family. Levy stated he would appeal the case.

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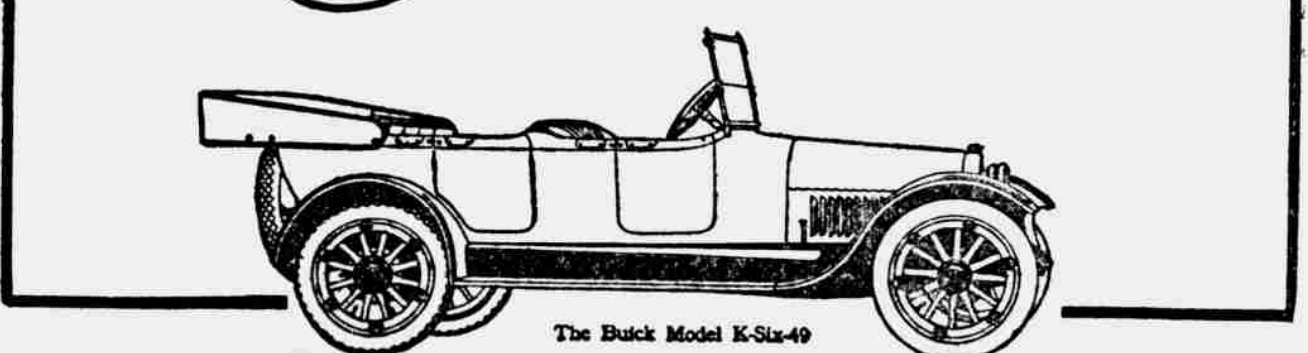
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