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ENGINES ARE CLASSIFIED

Thickness of Lubricant to Be Used Is Determined by Cooling and Distribution System, as Temperature Is Important.

A scientific analysis of the lubricating systems of all standard makes of motor vehicles, in connection with exhaustive tests with different oils in each, demonstrated that practically every lubricating system in use today could be included in the following 10 distinct types:

- 1. Full splash.
2. Splash, with circulating pump.
3. Pump over and splash.
4. Force feed and splash.
5. Pump over.
6. Separate force feed.
7. Force feed.
8. Full-force feed.
9. Knight slide valve motor.
10. Oil fed with fuel.

Tests have shown conclusively that no one grade of oil, however high its quality, can be suitable for all types of motors and lubricating systems.

The reason for having chosen a fixed number of lubricating systems for internal combustion motors is because the details of these lubricating systems exert a material effect upon the flow of oil to the moving parts.

For the proper and efficient lubrication of internal combustion engines in general there are two chief factors which determine the character of the lubricating oil necessary for use.

(a) Type of cooling system—water or air. This largely determines the operating temperature of the oil passing through the bearings.

(b) Type of lubricating system—method of applying oil to the moving parts.

The above lubricating systems may be divided into two general groups—"circulating" systems and "all-loss" systems.

In "circulating" systems the original oil filled into the crank case or sump of the motor is used over and over again, being circulated by splash or by pump to the surfaces in contact with the moving parts themselves or by a circulating pump.

When the oil has been in use in a motor employing these systems, during several hundred miles running, it is necessary to drain the crank case and thoroughly rinse out the oil.

In the "all-loss" systems oil is filled up to a fixed level in the crank case of the motor, and the oil is lost as it is used.

The "all-loss" systems are much less foolproof than are the "circulating" systems. They require a constant supply of oil into the crank case, causing a rapid change in the oil.

Oil fed with fuel consists of mixing approximately equal parts of oil with each five gallons of fuel.

Light-Dimmer Works Well Series-Parallel Wiring Permits Saving of Current.

The ordinance which many cities are now enforcing in regard to automobile head lights make dimmers necessary on all cars.

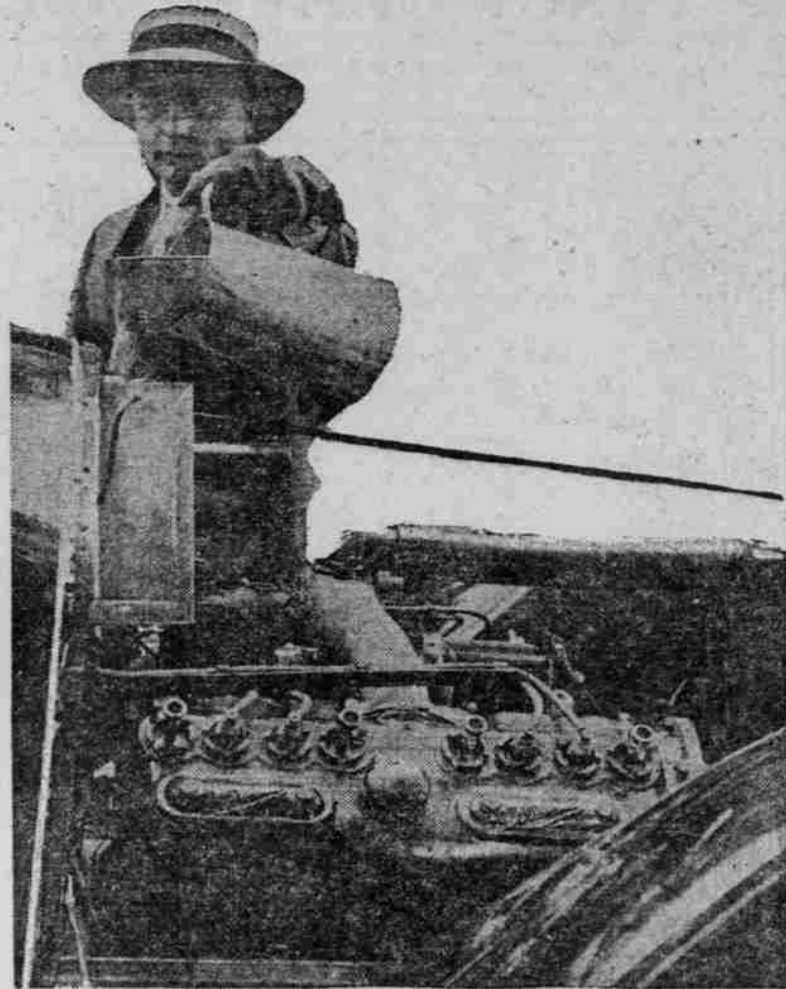
There are several ways of dimming the bright head lights to comply with these ordinances. The better method and the one in use on all of the better cars, is what is called the series-parallel system.

When the farmer buys a motor car he has to be sure he gets a car that will "take him there and back."

Countrymen Demand Reliability Instead of Appearance in Cars.

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MITCHELL EIGHT RUNS 17.7 MILES ON GALLON OF GASOLINE UNDER ORDINARY CONDITIONS.



H. S. RODEBAUGH, SALES MANAGER OF MITCHELL COMPANY, POURING IN FUEL SUPPLY.

Just to prove that it doesn't require a mint of money to run an eight-cylinder car, the officials of the Mitchell, Lewis & Starvo Company recently staged a gasoline economy test in Portland that was remarkable in more ways than one.

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GREAT OREGON HIGHWAY DESCRIBED IN BOOKLET

Portland Automobile Club Publishes Story of Wonders of Columbia River Gorge, Made Accessible to Tourists by America's Greatest Scenic Road.

Very excellent condition, but it is not advised that the remainder of the run to Astoria be attempted this year.

Country is Inland Sea Bed. Explanation is due the Columbia River, ranking second in size in the United States and draining an area of more than a quarter million square miles in Canada, Montana, Wyoming, Idaho, Washington and Oregon.

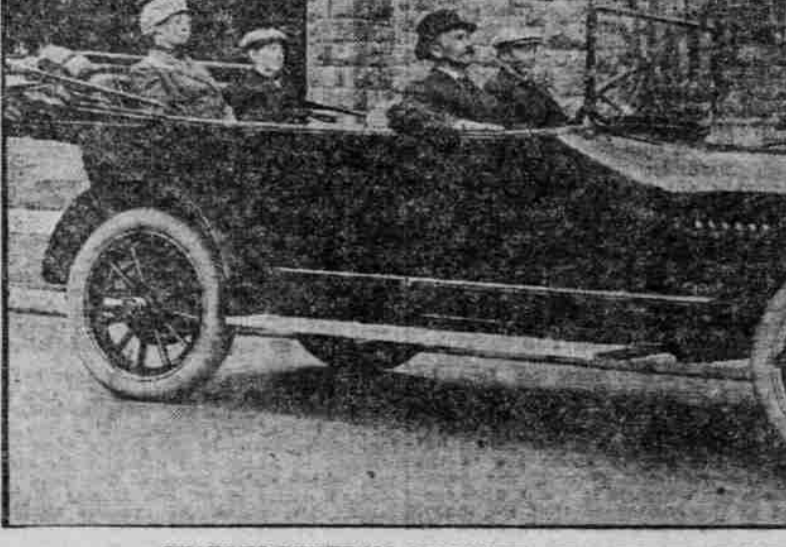
There are places where the deposits of centuries had drifted, covering monitory logs and petrifying them into stone, only to be revealed by the building of the road.

But see the Columbia scenic highway acts all that is wonderful in it. A guide that will tell you how is more useful than any description from what-soever source.

The Columbia River Highway is planned to lead from the Pacific Ocean eastward some 320 miles inland to Penland, linking the north and south trunk highways, and connecting with the old historic Oregon trail across the state, which was once traveled by the weary ox teams of pioneers who sought a new Western empire some three-quarters of a century ago.

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TRIP TO CALIFORNIA IS MADE WITHOUT PUNCTURE OR MECHANICAL EXPENSE.



CHARLES BERTRAM, OF BAKER, OR., AND HIS FAMILY, IN LIGHT HUDSON SIX.

Charles Bertram, of Baker, Or., visited C. L. Bosa & Co. last week on his return trip from Southern California. On August 10 he left Baker for a vacation on a tour through California in the light six Hudson.

Ition and Table mountains and other points done by the Great Artist in his favorite tinting of buffs and browns and purples.

Hatcheries Are World's Largest. Table Mountain is said to have been the northern limit of the Bridge of the Gods.

Flowers of Spring, of Summer or Autumn are always blooming and with the tender tints of evergreens soften rugged outlines.

At Bonneville there must be a stop to see the fish hatcheries, the largest in the world, where every year millions of tiny salmon, water trout, are propagated to repopulate much-fished waters, which supply an annual output of about 100,000,000.

It is on the grade just west of Tanner Creek that the petrified logs are found. Some were oak and some were fir, and each kind may be told by its coloring and grain.

Near this point is discernible the old Government trail made 50 years ago, which winds steeply along the mountain slopes.

Moffatt Creek bridge, named for one of the early settlers on the Upper Columbia, is a fine example of modern bridge construction. One of its spans stretches across 170 feet with a 17-foot rise and it is 75 feet above the dashing stream.

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No "Skimping" Anywhere in the Chandler Light Six, \$1295

CHANDLER reputation doesn't rest on the fact that this was the first light-weight six selling for less than \$2000. It doesn't rest on the fact that the Chandler pioneered the light-six field when all the rest of the industry was insisting that sixes had to be high-priced and heavy.

- Bosch Magneto, admittedly the best ignition.
Gray & Davis Electric Starting Motor.
Rayfield Double-Jet Carburetor.
Three silent chains, enclosed and running in bath of oil, for driving motor shafts.
Cast aluminum motor base extending from frame to frame, giving rigidity to engine mounting; providing pedestals for magneto, generator and pumps; and doing away with necessity for a dirty, rattly sheet-metal drip pan.
Imported Annual Ball Bearings.
Silent Worm-bevel Rear Axle.
Genuine Mayo Mercedes Type Radiator.
Stewart Vacuum Gasoline Feed.
Firestone Demountable Rims.

All of them are on the Chandler: powerful, quiet, economical and beautifully finished—a motor to be proud of.

Then Think of the Price, \$1295 Seven-Passenger Touring Car and Roadster



Come Now for Your Demonstration Dulmage, Manley Auto Co. 46 North Twentieth. Phones, Marshall 1699, A 1299

CHANDLER MOTOR CAR COMPANY, Manufacturers, CLEVELAND, OHIO

Highway—here surely you will come under its magic spell.

Crown Point is also the property of Portland. A wall has been made of concrete which gleams white when seen from lower levels, and it curves on a radius that makes of it a magnificent observatory.

Now the road descends and brings you to Sandy River, whose source is a glacier of Mount Hood.

The Gorge of the Columbia is yours, and you will carry it away with you, a treasure in the storehouse of memory.

WASHINGTON HIGHWAY COMMISSION AILLOTS \$24,542.

MONTESANO, Wash., Oct. 1.—(Special.)—The state Highway Commissioners have written Engineer George D. Robertson that a decision has been reached, and the \$24,542 appropriated for the Olympic Highway extension from Quinalt to Lake will be used to clear and grub the 25-mile stretch to the Quets River at the junction with the Clearwater.

NEW WASHINGTON MOTOR CODE RETURNS BIG REVENUE.

Automobiles Not Reported to Tax Assessors Are Found When License Is Taken Out for Them.

OLYMPIA, Wash., Oct. 3.—(Special.)—During less than three months under the new Washington motor code 40,922 licenses have been issued, 4601 to motorcycles and 35,491 to automobiles of various classes, for which \$196,885.50 has been turned into the state treasury.

That the new law is having the effect of forcing all vehicles to take out licenses is indicated by the fact that while 35,419 automobile licenses already have been issued, County Assessors this year returned only 27,713 automobiles.

The first \$70,000 collected has been placed into the general fund to meet all expenses of the administration of the act for the biennium. The remaining \$125,785.50 has been placed in the permanent highway fund to be used by the counties on maintenance work.

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In the fiscal year ending May 31, under the old law, 22,224 licenses were issued at the flat rate of \$2 each, giving the state only \$44,448. All of which went into the general fund.

'DRAG ROAD' ADVICE

Washington Highway Engineer Points Out Methods.

PROPER SHAPING VITAL

State Bulletin Illustrates Simple Way to Keep Surface Smooth in Spite of Rains and Tells of General Road Problems.

With the Fall rains comes the time when the need for maintenance on earth roads becomes very apparent.

"Drag the road when the soil is moist and mellow, but not when it is dry and sticky. The earth should move freely along the sides of the slab. If the roadway is extremely full of ruts and holes, it is best to drag once when the surface is slushy. Clay and water, when puddled in an intimate mixture, becomes tough and impervious to water, and will gradually get hard if compact in this condition.

Pavement Made of Earth. It has been shown that this puddled earth, when compressed and dried, becomes extremely hard. On these facts rest the value of dragging the road. When road dragging is properly done, it produces a smooth surface, filling up the ruts, holes and hollow places. As a small amount of material is always pushed to the center of the road, the surface will present an even, round appearance, over which the water will readily drain, and subsequent drying will be more effective, and will result in a better maintained surface.

"As water is the natural enemy of a road, its draining should be in no way the shaping of the road so that it will shed water, and the water-proofing qualities of the material in the road to moisture will soak into the roadbed.

"Because of the loose character of the material of which earth roads are composed, running water will soon wash away the dirt and form gullies. On the other hand, standing water saturates the surface, and when it dries, experience has proved that dragging the road is one of the best means that can be used in the improvement of these conditions.

State Furnishes Bulletin. A bulletin entitled The Improvement of Earth Roads, has been prepared by the State Highway Department and will be mailed free of charge on request to the address in the accompanying publication is a simple treatise of the problems of road maintenance, drainage, culverts, and contains suggestions for road dragging, together with complete instruction and specifications for the construction of the King split log drag.

also contains illustrations of roads before and after dragging and a full-page photograph of the ideal split-log drag.

PACIFIC HIGHWAY OLD ROUTE Trail in Early Days Connected Various County Seats.

"Since the early days of military occupancy there has always been a wagon road—or perhaps trail—would be a better designation—along the general route of the Pacific Highway, and with the settlement of the country,

various links of the present route were constructed by the counties, and in some cases extended between county seats as the population increased," says W. H. Roy, State Highway Commissioner of Washington.

The most important section to the earlier settlers, from the standpoint of through travel from Puget Sound to Portland, was the road from Olympia to Cowlitz River Landing, in Lewis County. From the latter point passengers traveled down the Cowlitz in canoes to the Columbia, thence by steamer to Portland. There was a trail constructed by the army from Olympia to Steilacoom and thence to Fort Bellevue, near the present city of Bellingham.

BOSCH FIRM AWARDS PRIZES

First Three Drivers in Astor Cup Race Get Cash Honors.

In keeping with its usual practice, the Bosch Magneto Company offered a number of Bosch prizes for distribution in connection with the 350-mile Astor cup races held at New York yesterday.

The winning driver received a Bosch prize of \$500 in gold, the driver of the second car a Bosch prize of \$500 in gold and the driver of the third car a Bosch prize of \$200 in gold.

In addition to the above prizes, there will be an additional bonus of \$100 for each place, providing the winner made a better average than the best time made in an American long distance contest, i. e., an average of 101.86 miles an hour; provided the second driver made a better average than the best time made by a second place car in an American long distance contest, an average of 100.58 miles an hour, and provided the third driver made a better average than the best time made by the third place car in an American long distance contest, an average of 97.78 miles an hour.

Stretchless Inside Tires

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One, on an average, will reinforce three old tires and if they do not do what we claim, you can have your money back at any time for the asking.

MOTOR VIGOR

Removes Carbon, Intensifies Fuel, Promotes Perfect Combustion

MOTOR VIGOR SAVES GASOLINE, OIL, REPAIRS AND ROAD TROUBLE, INCREASES MILEAGE, DECREASES EXPENSE.

MOTOR VIGOR CO. 14 North Broadway, Near Burnside, PORTLAND, OREGON.