AIRPLANE BATTERY PROBLEM TOUGH ONE

Willard Company Solved It by New Design.

EFFICIENCY RECORD MADE

Remarkable Battery, Developed to Meet Urgent Needs of War, Operates Upside Down.

When a Liberty motor is giving its utmost to push forward a Liberty plane, the result, to the ear at least, is a noise which would hardly be welcome in the reading room of a public library, or under your window when you want to sleep.

Such is the voice of gasoline raised in protest against being introduced to the little spark of electricity which jumps across the spark plugs 165 times every second; but the protest is in vain, for the "juice" keeps coming—165 times each second, 9900 sparks per minute, 594,000 times in an hour—coming from a little innocent-looking box full of lead and acid and water and rubber, stowed away in the fuselage, out of sight, but never out of the mind of the man whose life depends upon it.

The storage battery is the soul of the Liberty motor. As gasoline is its food, steel and aluminum its clothing, so is electricity its spark of life. Without that spark it is an inert mass; with it the Liberty motor is a source of magnificent power.

Great Difficulties Overcome.

The Willard Storage Batter company in Cleveland had for years been making storage batteries for starting, lighting and ignition on automobiles. When Uncle Sam decided he would take no more "nonsense" from the kaiser, the Willard organization was asked to design a storage battery for ignition in an aircraft motor.

The first difficulties faced were the necessary limitations on size and weight, as Uncle Sam's specifications called for a battery of a certain capacity weighing not more than ten pounds. Any motorist who has tried to lift his storage battery knows what it weighs. Lead—the very name sounds heavy—makes up most of the storage battery, and ten pounds of lead is not very much. The Willard engineers set to work and designed a battery of the proper capacity, weighing ten pounds and two ounces which was satisfactory to the government designers.

But size and weight were not the only obstacles. An automobile properly driven stays on its wheels and there is no danger of the acid contents of the battery spilling out. But a Liberty plane must operate just as well "head over heels" as any other way, and the Willard engineers found that they must design a battery which, while open at the top, did not spill its contents when inverted. This sounds rather difficult—and it was—but it was done, just the same.

Special Battery Designed.

Within ten days from the receipt of the government specifications, the Willard engineers had designed and perfected a battery which had met the government's needs as to capacity, size, weight—and this battery operated upside down. This battery was adopted and never since has it been changed in any detail.

Such is the inside story of the ignition of the Liberty aircraft motor. Storage batteries have for years been recognized as the most efficient and most reliable means of providing ignition for gasoline motors, but other and less advantageous forms of ignition had to be used until American inventive genius was brought to bear on modern war problems.

The inventions of war are being rapidly turned to peace use. We are breaking our swords into plow shares, and the same little Willard battery which gave life to the Liberty aircraft motor over the Argonne is now furnishing the 9900 sparks per minute which help to carry Uncle Sam's mail along the air lanes.

CARBON BAD FOR MOTOR

HARRY LYON TELLS MEANS OF GETTING RID OF IT.

To Have Carbon Burned or Scraped Out of Cylinders Will Benefit Any Automobile.

Carbon deposit in the motor is about the only annoyance car owners have to contend with in these days of mechanical efficiency. For that reason the automobile should be treated much like a household furnace and occasionally given a thorough cleaning.

"The present day automobile," says Harry Lyon of Cook & Gill, Paige distributors, and service, "is thoroughly efficient—a highly developed piece of machinery. But low grade fuels are forced upon it; and, while many cars collect less carbon than others, nevertheless in time all automobile cylinders will become carbonized.

"When this happens efficiency in operation is naturally somewhat lowered. The full power of the machine is not given because the carbon in the cylinders pre-fires the gasoline charge with the result the motor is working against itself.

"To make my point clear—the automobile engine is somewhat like the furnace. If you feed it high-grade coal it will keep your heating going at an even efficiency for many months, perhaps a whole year. On the other hand, if you use the cheaper grades of coal or slack, the flues and other parts of the heating plant clog up and if you do not clean it out your heating efficiency is lowered.

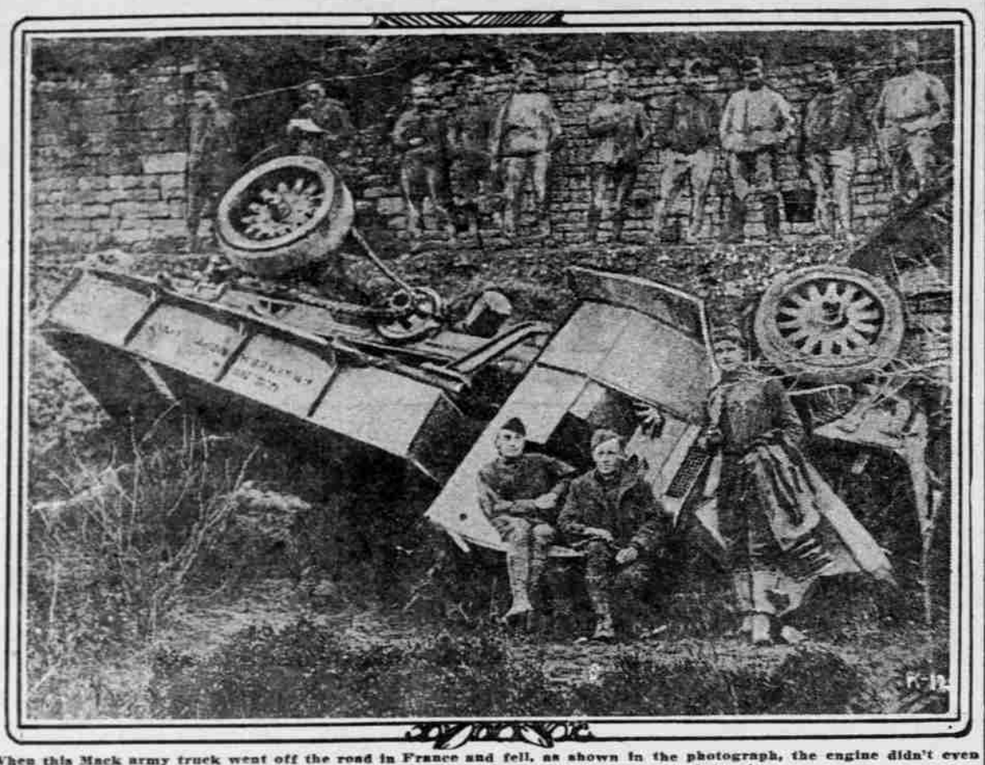
"The same is true of the automobile. To have the carbon burned or scraped out will be of great benefit to any car, no matter what the price of the car may have been. A little kerosene put in the cylinders through the pet-cocks now and then and allowed to stand over night will be of great benefit in cutting the carbon.

"Others have found that the steam from water taken through the air-intake on the carburetor will loosen up the carbon. This should be done when the motor is warm. A small pet-cock attached to the manifold to which is attached a small rubber hose connected with a covered bucket of steaming water will be found a most convenient way to apply the steam cleaning process. The motor is run at high speed and by opening and closing the pet-cock the suction of the water can easily be regulated. The carbon and refuse that will be kicked out of the exhaust will surprise you."

Oil for Bearings.

In ball bearings that move with great rapidity ordinary lubricating oil is best to use. On the other hand for slow moving bearings semi-hard graphite grease is most satisfactory.

IF HUMPTY DUMPTY HAD FALLEN IN A MACK TRUCK THERE'D HAVE BEEN NO CALL FOR ALL THE KING'S HORSES AND ALL THE KING'S MEN.



When this Mack army truck went off the road in France and fell, as shown in the photograph, the engine didn't even stop running. And the men in the stoutly-built cab were uninjured.

The truck, a Mack 5½ dump vehicle, loaded to capacity with rock for road repairs, went off the road when the 12-foot retaining wall shown in the background gave way. The truck fell in the position shown, but, due to the strength of the Mack cab, the occupants were not hurt, and the engine was still running after the fall. Next day another Mack truck was used to set it upright, and it ran to camp under its own power. The truck is operating in army service today in France as well as before the accident.

HEAVIER ROADS NEEDED

MACK TRUCK DISTRIBUTOR EMPHASIZES REQUIREMENT.

Double Highway Capacity Imperative to Keep Up With Increase in Traffic by Trucks.

It is computed that the number of motor trucks in use ten years ago was about 4000. Today there are between 400,000 and 500,000, according to James P. Nash, engineer for the state highway department of Texas, who says there is no reason why the number of motor trucks should not increase this year in the same ratio as in the past.

If the number of motor trucks increases in the next ten years in the same ratio as it did in the past ten years there will be more than 22,000,000 trucks in the United States by 1929. The figures cited by Mr. Nash are the most optimistic on record but not beyond the possibilities, in the opinion of F. C. Atwell of the International Mack corporation, distributors for Mack motor trucks. In many parts of the country the highways are inadequate for present needs. Mr. Nash has said that their capacity must be doubled to meet the requirements of the next two years.

How shall this highway capacity be increased?" asks Mr. Atwell. "Shall the width of the roads be doubled and the first cost and maintenance increased 100 per cent or shall the roads be built in the first place of sufficient strength to support vehicles of 100 per cent greater carrying capacity for a given width of road, the first cost of which would be only 10 or 20 per cent more per mile than present roads cost?

"In view of the fact that 50 per cent increase in hauling capacity gives a reduction of 15 per cent in transportation costs, it would seem that the latter would be the better method. Much of the money spent on road construction, according to present standards, in a few years becomes money thrown away. That is because the roads are not built so much for the sake of permanency as they are to meet an immediate need. Better roads and less mileage would seem to be the ultimate solution."

DON'T LET 'EM DRAG.

Dragging brakes cause American motorists to suffer large pecuniary losses each year. When either emergency or service set has continual contact between lining and drum, it means not only needless consumption of power and fuel, but also excessive wear on the entire driving mechanism of the car, to say nothing of the damage done to the brakes and their linings.

You can easily learn if your brakes are dragging by the following simple process: After placing the gears in neutral, jack up the rear wheels, one at a time, and turn them over by hand. If they give forth a rubbing or scraping sound, or if they turn with unusual difficulty, they are dragging. The remedy lies in adjusting the brake affected so that the wheel turns easily and without friction between band and drum. At the same time see that the brakes take hold firmly when in operation.

AUTO LOCK ON DIFFERENTIAL

Anti-Thief Device Works on New Principle.

George Bigelow, who lives in the Imperial Arms apartments, Portland, has obtained a patent on an automobile locking device that he believes is absolutely thief proof, unless a thief is so determined to get a car that he will bring a five-ton truck along to tow it off with one rear wheel dragging.

The new lock is different from anything heretofore offered the motoring public. It operates not on the clutch, nor on the wheels, but on the differential.

The locking device is built into the car on the seat beside the gear shift. From that point a steel wire extends in a case-hardened tube to the differential case. There a pawl is welded into the differential case, so that when the lock is dropped in by the driver on leaving the car, the pawl is released and drops in mesh into the driving pinion of the differential.

He has perfected the device to such an extent that if a thief tried to beat it by oxy-acetylene torching the case and cable in two, a spring would be released and the cable would wrap around the differential and gum things up for the thief. The more he would monkey with it, the worse locked the car would be.

As all motorists know, with the differential set one rear wheel is free to turn, but the other is locked. Thus to drag away the car locked with this device, one wheel would be dragging. At the same time, in case of fire the car could be moved a short distance without a great deal of trouble.

REST STATION IS NEARLY DONE

Grays Harbor County Prompt to Aid Travelers.

ABERDEEN, Wash., June 21.—(Special.)—A new rest and comfort station is nearing completion on the Olympic highway near Montesano—just south of the Wynooche bridge. This is the first of three or more that will be built in this county.

The state provides for such stations for the accommodation of autoists, and Grays Harbor county is among the first to build them. They will have two or three small buildings in which will be concrete stoves for cooking. One will be built near Elma and another at Quinault lake.

One Maxwell Per Minute to Bonneville.

C. F. Kendrigan Keeps Track of Cars Met on Sunday Drive.

COUNTING the number of cars of the same make as the one he was driving over the Columbia River highway one Sunday recently proved diverting and instructive to C. F. Kendrigan of 42 Ella street, who owns a Maxwell.

Folks are interested mostly in the make of car they drive. Soon after Mr. Kendrigan had bought his Maxwell of the C. L. Boss Auto company he started to Bonneville one Sunday afternoon and noticed several Maxwells returning. He counted those he passed and started to keep accurate tab on those he met. Before he reached Bonneville he counted 112.

Figuring Bonneville as 42 miles from Portland means approximately three Maxwells to every mile. Estimating his rate of travel at 20 miles per hour, he met Maxwells at a rate of one per minute.

Watch the Battery.

Storage batteries should be examined every 15 days and distilled water added. This applies also to cars laid up for the winter and the battery should be charged at least once a month, otherwise the plates will buckle and an overhauling be made necessary.

Pneumatic Cord Tires.

Pneumatic cord tires increase the carrying capacity, prolong the life of the truck and allow of greater speed, declares George D. Wilcox, director of sales and advertising for the Commerce truck.

FUTURE SOURCE OF OIL

VAST DEPOSITS OF SHALE ROCK MAY RENEW SUPPLY.

Present Oil Resources Likely to Be Exhausted in 20 Years, and Then Shale Must Serve.

Much attention is now being paid to the oil shale deposits in the United States, and the possibility of exploiting them to take the place of the liquid oil supply in due course, as it is estimated that the latter source of supply will be exhausted in about 20 years. Oil shale deposits are found in several parts of the United States, but those in Colorado and Utah are the most extensive and have so far received the greatest attention. The following facts regarding the nature of oil shale are taken from an article in the Engineering and Mining Journal:

Oil shale has no oily appearance indicating that it contains free oil, but upon being subjected to heat its organic materials are broken up, and among other things, oil and gas are yielded. The yield varies from six to 90 gallons of crude oil per ton of shale. The crude oil distilled may give 7 per cent to 12 per cent gasoline, 23 per cent to 49 per cent kerosene and 39 per cent to 62 per cent residuum. Shale analysis indicates ½ per cent to 52 per cent volatile matter and 45 per cent to 80 per cent ash. The asphalt varies from ½ to 4 per cent and paraffin from 2 per cent to 9 per cent.

The by-products of oil shale are extremely valuable and include gasoline, kerosene, lubricants, enamels, varnishes, paints, rubber substitutes, manufacturing products for glass, pottery and ornamental tiles, dyestuffs, ammonium sulphate, flotation oils and producer gas. The Colorado shale area covers more than 2500 square miles and the Utah area over 3000 square miles. The strata vary from a few inches to 80 feet thick. The yield is from 31½ to 81½ gallons per ton.

In Scotland over 3,000,000 tons of shale are profitably treated annually, but it is only the ammonium sulphate produced as a by-product which makes the business pay. On the other hand, the prospects of the American oil shale industry should be good, as in Colorado and Utah the shale beds are relatively thick, suitably located high up for gravity transportation and give a yield of 40 to 50 gallons per ton.

Don't adjust non-skid chains so loose that they fall off, nor so tight that they won't take hold.

HIGH TAX ON YANKEE CARS

BRITISHERS SLAM DOWN BARS AGAINST US HARD.

Autos Produced in British Colonies Get Two-Thirds Reduction on High Tariff.

LONDON, July 5.—The automotive activities throughout the United Kingdom are showing considerable increase. The budget introduced April 30, makes no changes that concern American motor cars, but shows a decided preference for cars manufactured in British colonies. An American car for instance would pay 33 1-3 per cent import duty while a British colony car would pay 2-3 less.

The Ford company has resumed building operations at its new factory at Brook Green, Hammersmith, London, and is now adding a third floor. The plan is eventually to make the building five stories. This building so far has been used more as a repair shop than as an assembly plant, but eventually will be a factory. The Ford interests have announced that the first castings have been produced at the Fordson factory in Cork. There was a celebration of this event at the factory.

The pneumatic tire committee of the Society of Motor Manufacturers and Traders has taken up the work of the international standardization of all solid tires. The work undertaken by this committees follows that of committees representing the British Rubber Tire Manufacturers' association and the British engineering standards committee. The object of this work is to eliminate a great number of types and sizes now on the market and to make tires interchangeable throughout the world. T. H. Woollen is chairman of this committee.

Dim your light when approaching another auto on the road.