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MODERN MECHANIX AND INVENTIONS

Thrills of Balloon Racing – Houses that Hang From a Pole
Picking Army Flyers – Steam Cars – Ideas for Inventors

The STEAM CAR is

The steam-powered automobile, put out of the running by its gasoline rival years ago, is all set to stage a comeback in popularity. Well-financed companies are planning the production of steam cars and buses whose economy of operation, simplicity of control and other known advantages over the gasoline cars are expected to re-establish them in general favor.

One of the oldest autos in America—built in 1891 by M. Phelein, this novel steam car can still do about eight m.p.h. with a two-man crew.

AFTER twenty years during which it has been regarded as a back-number in a class with the one-hoss shay, the steam-driven automobile is at last staging a comeback which threatens the long-established popularity of the gasoline car.

Several companies are actively at work in the production of steam cars, which will first be in the form of buses and trucks, later branching out into the pleasure car field. Steam has always been recognized by engineers as having numerous advantages over the internal combustion type of engine used in present-day cars.

Perhaps you remember fantastic tales of steam cars and their accomplishments. There was, for instance, the manufacturer who offered a free car to anyone who could hold the throttle open for fifty miles. There is no record of any daring soul ever accepting the challenge.

Builders of the Stanley steamer posted $5000 at the Indianapolis speedway that their specially constructed steam racer would beat any internal combustion car in a distance race. They found no takers. Unconquered engineering problems did their bit to shove the steam car into temporary oblivion, but these difficulties have now been overcome.

What are the advantages of steam? It gives, smooth, rapid acceleration to a degree not obtainable in gasoline engines. There is no clutch or transmission. The double-acting steam cylinder gives two smooth power strokes to each revolution, while the four-cycle gasoline motor has one power stroke to each two revolutions.

The engine makes but 750 revolutions at 50 miles an hour, compared to 3000 for the usual internal combustion motor. Expanding steam in a cylinder gives a complete power push to the piston head for the full stroke. The gasoline engine gets a power impulse on its piston only at the instant of explosion in the cylinder.

Will Your Car Do This?

- Operate without a clutch or transmission?
- Climb the steepest grade without shifting gears?
- Operate without engine noise at all speeds?
- Start without cranking or using a starter?
- Get constant power application without a flywheel?
- Accelerate from a stop to 50 m.p.h. in 100 yards?
- Run a mile for .017 fuel cost?

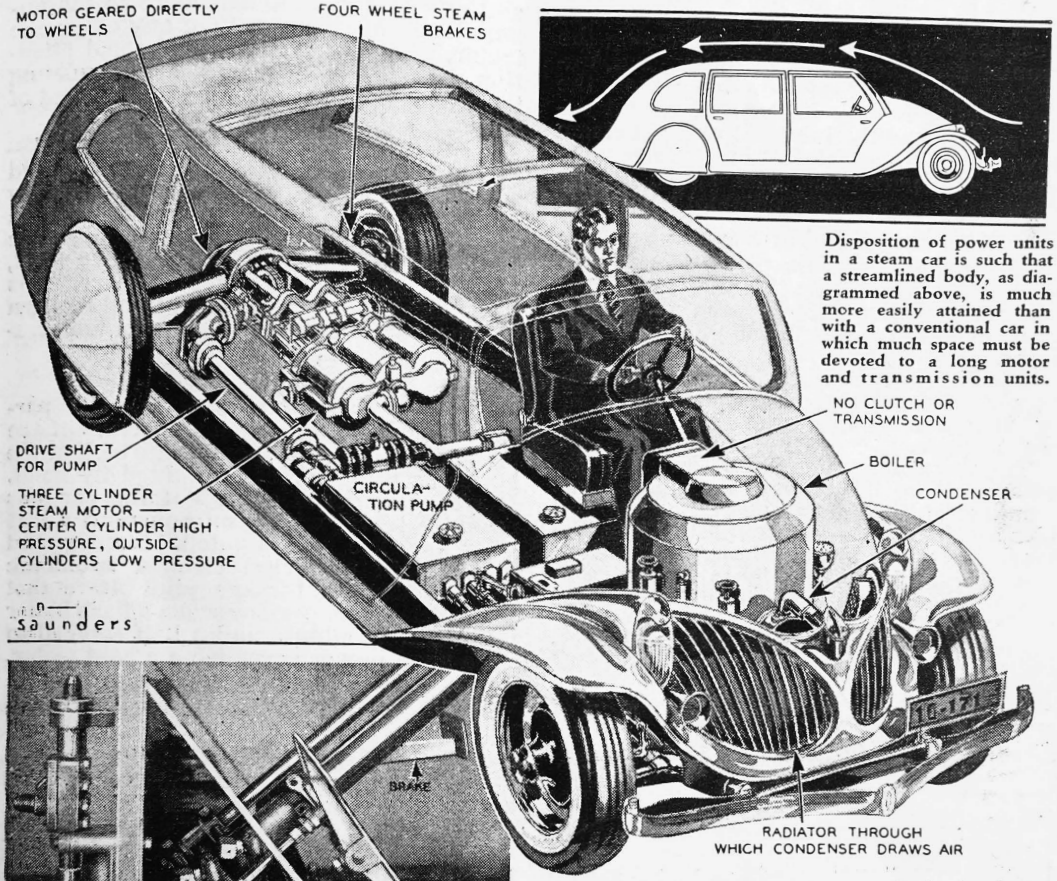
A STEAM CAR WILL!

These are some of the factors which have kept the steam car idea alive in the minds of engineers since Cugnot made the first self-propelling vehicle in 1770. His three-wheeler, boiler and seat "road locomotive" was a far cry from the luxurious steam car slated for production this year, but it worked, developing 2¼ miles an hour.

In 1839 steam cars were established with fair success in England, a man named Hancock

Coming Back!

by RALPH DAIGH



Disposition of power units in a steam car is such that a streamlined body, as diagrammed above, is much more easily attained than with a conventional car in which much space must be devoted to a long motor and transmission units.

Steam car chassis construction is extremely simple. Steam is generated in boiler, carried back to three-cylinder engine geared directly to wheels, pumped back to condenser where it is returned to water ready for another power cycle.

Only two controls are needed by the steam-car driver—brake and throttle. The accelerator, operated with left foot, occupies the position of the clutch pedal in a gasoline car.

developing a 3½-ton omnibus for London operation that developed 20 miles an hour under ideal conditions. Excessive road tolls and legislation demanding that a crier run before the car and wave a red flag, so the citizens might flee to safety, soon forced the bus to be discontinued.

Not until 1889 was the steam car revived again. Serpollet of France developed a flash type of boiler heated by vaporized fuel. The idea was eagerly received in this country and Stanley, of Stanley Steamer fame, went to work in earnest. In 1900 Stanley was able to get 14 miles from a gallon of kerosene. Proof that the steamers satisfied engineering requirements of the day is found in the fact that the first automobile bought by the United States government was a Mobile steam car.

Boiler Supplied Hot Coffee!

The new car electrified army officials and tacticians. Extravagant speeches were made and it was prophesied that the whole course of warfare would be changed now that "troops could be moved one hundred miles over broken prairie country in a day and arrive for combat as fresh in body and spirit as when they started." Neither was the comfort of the soldier riders neglected. A faucet was attached to the boiler that hot water might be drawn off for coffee en route. In this ultimate of comfortable transportation, however, the driver steered with a tiller and the designer neglected to include serviceable springs.

From 1900 to 1915, steam cars of Doble, White and Stanley were recognized com-

petitors of the gasoline driven automobiles. It is estimated that five hundred of these cars are still running.

Strangely enough, the problems confronted in developing the steam car were not as great as those conquered in perfecting the popular gasoline engine of today. But, until now, the gasoline cars have won the race, and it is only because of recent developments and the inherent value of steam power, that financial and business powers have been persuaded that steam is the answer to economical automotive power.

Problem of Sufficient Steam Solved

The biggest problem met and not conquered by the White, Stanley and other steamer people was in keeping a sufficient head of steam under hard pulling conditions.

The flash boiler, while having the advantage of quick starting, added to this difficulty. It had many fire tubes but not enough water space.

The uniform application of driving force as applied by the powerful steam pistons would send the old steamers up a steep hill like a scared cat—unless the hill was too long. Then the steam pressure would be dissipated. It was sometimes necessary to stop on the hill while additional steam was generated.

This difficulty has been overcome by giving a hotter fire to a greater quantity of water.

Another problem was the elimination of side drafts on the boiler. This—and unsatisfactory insulation for the boiler—tended to cool the steam with a resultant loss of power. A complete and insulated enclosure for the boiler has remedied this.

Another big drawback in the older cars, and one that contributed more to the unpopularity of steamers than any other one factor, was the amount of personal attention needed in tending the fire, regulating the water level and keeping a safe head of steam.

A recently discovered thermostat metal—developed by General Electric—has proved positive under all conditions. This new metal (it is really two metals fused at a high temperature) permits the automatic and fool-proof adjustment of water level, steam pressure and fire temperature. This thermostat metal is standard in all modern thermostatic appliances for room temperature control, etc.

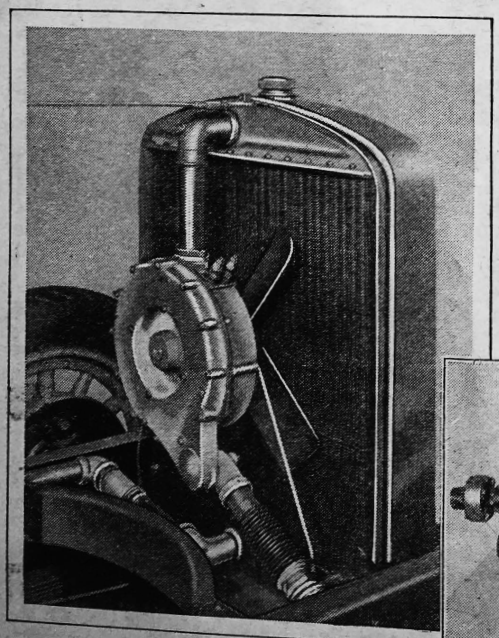
Starts in 30 Seconds

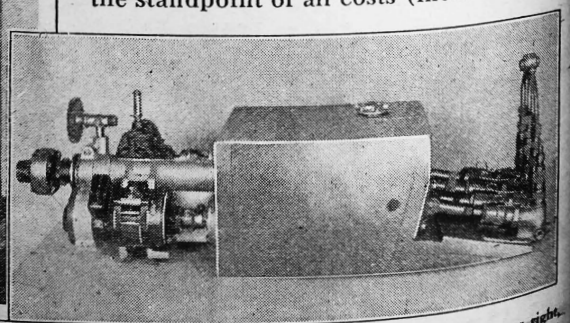
Another detriment involving the personal element was the slow starting of the early cars. Some of them required that the boiler or pilot flames be lighted by hand. It was considered enough if the car was ready to travel within an hour and a half after the fire was lighted. Stanley and White both perfected electric automatic lighting devices for the pilot flame that made delay unnecessary when a flash boiler was used. A minute and a half sufficed to get a good power surge from a cold motor. Thirty seconds was enough to generate a working head of steam if the boiler was warm.

Fuel Costs but $.017 a Mile

Fuels being used by steam cars in this country are chiefly three: kerosene, fuel oil and a mixture of gasoline and kerosene. In England and France trucks are running on these fuels as well as on coke, coal and even wood. The last three have not proved satisfactory. The Steam Motors vehicle is giving satisfactory results on fuel oil.

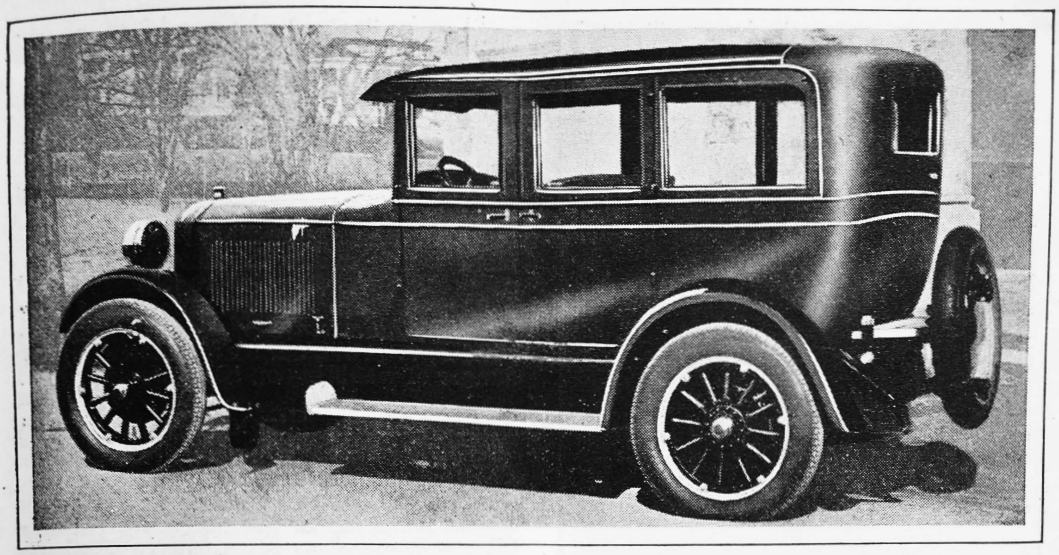
The economy of any of the three main fuels as compared with gasoline is apparent. Figures released by the Steam Motors Company show a fuel cost of $.017 per mile. The trucks are conservatively estimated to be fifteen per cent more economical from the standpoint of all costs (including origi-





At left, steam turbine and condenser on car now running. Steam enters through tube running diagonally at lower right, turns fan, exits through tube at top, passes through radiator, condenses to water, and is returned to boiler through pipe with two right-angle bends. At right is shown a photo of the pump unit and generator for starting equipment.

No Noise, Ease and Economy of Operation, Factors Favoring Steam Car



This photo shows the last Stanley steamer, built in 1916, which compares favorably with present-day car body design.

nal cost, upkeep and operating expense) than gasoline driven vehicles of comparative size.

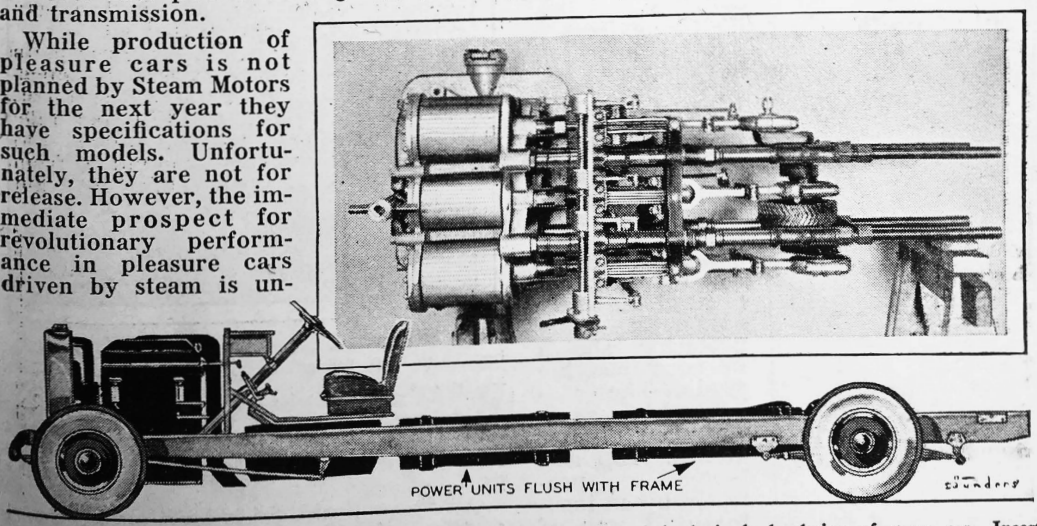
At the present time Steam Motors is concentrating on truck and bus jobs. The one hundred twenty cars they manufacture in the next year will be of those two classes. Not wishing to advance too fast with a product that could not be properly serviced by today's garages and mechanics they will concentrate on supplying maintained and supervised fleets where economy is of prime importance.

The engine of the Steam Motors truck weighs 700 pounds. The boiler and burner bring this up to 1600 pounds for the heavy truck. A comparative gasoline driven truck has over 2200 pounds in engine, flywheel and transmission.

While production of pleasure cars is not planned by Steam Motors for the next year they have specifications for such models. Unfortunately, they are not for release. However, the immediate prospect for revolutionary performance in pleasure cars driven by steam is unlimited, according to Mr. L. E. Rightmyer, Steam Power Corporation of America, and formerly with the Stanley people.

Bodies Can Be Easily Streamlined

"Modern development of the steam car idea has so condensed the machinery required that a diligent engineer can fit all the power plant and drive mechanism between the longitudinal members of the chassis. This means that body designers will strike new notes in body designing. There is no necessity for a cumbersome hood. The forepart of the car can also be designed according to the best streamline principles with no consideration for the engine, which is directly connected with the rear axle and under the body of the car."



Side view shows how power units fit flush with frame, permitting wide latitude in body design of steam car. Insert photo shows three-cylinder steam engine, in which center cylinder is high pressure, the outside cylinders low pressure.