COMPARES STEAM AND GAS ENGINES

Charles W. Snyder Gives Treatise on Relative Values of Power

EQUALIZES BOILER PRESSURE

Middleby Car Expert Says Full Stroke Comes from Throttle Controlled Cylinder

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An ordinary gas engine cannot be started under a load. In a steam engine the pressure in the cylinder is controlled by the throttle and may be made to equal the boiler pressure for practically the full length of the stroke, and if there are two or more cylinders there is the maximum pressure continuously applied.

The power in a gas engine is entirely different. Each power impulse might almost be considered as a blow. Take any single cylinder, for instance, as the piston begins its power stroke there is a sudden development of pressure to, say, 200 pounds per square inch or more, and as the piston passes downward there is at first a marked fall in this pressure, followed by a gradual decrease, so that at one-fourth the stroke the pressure is not over 150 pounds, at half the stroke about 75 pounds, and at about 30 degrees before lower center the exhaust valve opens and the pressure ceases.

This gives a very uneven torque, there being one-tenth of the stroke developing no power and about two-thirds of the stroke where the pressure is low. In a four-cycle four-cylinder motor there is this 30 degrees where no power is produced between each cylinder; in the six-cylinder there is always some pressure turning the engine, but quite a portion of the time this pressure is very low. In a four-cylinder two-cycle the torque is more continuous, and so far as the turning moment is concerned the six-cylinder two-cycle is almost ideal. This is due to the fact that in a two-cycle motor there is an explosion above each piston on every revolution.

This irregularity of pressure is taken care of in a gas engine by the inertia of the flywheel and other moving parts, and for this reason the single cylinder motor requires the heaviest flywheel, and the weight may be decreased as the cylinders increase in number.

This inability to start under load necessitates the use of some mechanism for connecting the engine with the car, after the engine is in operation, and the clutch is the appliance designed for this purpose.

CLUTCHES FRICTION TYPE

The clutches used in automobiles are of the friction type, that is, they depend on the friction developed between two plane surfaces for the connection between the engine and the road wheels. Their action in reality is exactly like the brakes on your car. You apply the brakes and the car keps on going, but finally the pressure has caused these breaks to "set down" and fit tightly enough to develop sufficient friction to stop the car. When you let in your clutch the same thing occurs; as the clutch goes in the friction increases until your engine is locked and moves as one unit with your transmission shaft.

If you want to demonstrate the similarity between brakes and clutch, lock your wheels so the car can't start, let in your clutch and see how soon your clutch will act as a brake on the engine and stop it.

Friction clutches may be divided into four types: Constricting, like the brake on the outside of a hub; expanding, acting in the same manner as the brake inside the hub, the cone and the disk.

The contracting clutch is the simplest and is a band of iron, lined with leather, fibre or some other suitable material, and arranged so that it can be drawn tightly around a drum. Its use is limited to planetary gears.

The expanding clutch is in little use. It is arranged inside a drum, with suitable mechanism for causing it to expand against the drum.

The most common type of friction clutches are the cone and multiple disk.

The amount of friction developed between two equal surfaces depends on the pressure between these surfaces, and in the use of a friction clutch the design must be such as to enable the operator to increase this pressure gradually. The grip must not be made suddenly, because the momentum of the flywheel will make it act just like a hammer, and this blow transmitted to the gear teeth tends to break them in the same manner as though these teeth themselves were struck by a hammer. Again, the sudden "jerk" of the car makes the passengers most uncomfortable. A clutch of the correct design and which has had the proper care will pick up its load without any perceptible shock, carry it without slipping, and release without trouble.

The clutch most widely used is the cone, and it has many advantages over any other type. It is the most reliable. Unless actually broken it is practically impossible to get it in such a condition that it cannot readily be made to "bring you home." It wears well and even when worn the leather face is easily and cheaply replaced. Its defects are a tendency to be "fierce" and take up its load too suddenly, to some times "stick" or "slip," but if the clutch is properly designed these defects are easily remedied.

The cone clutch acts like a wedge, the further it is forced in, the greater the pressure developed on its face and the greater the friction. The most satisfactory angle is 14½ degrees, the diameter and length of face depending on the load it is required to carry. A pitch of about this angle is necessary to secure good frictional effect, and at the same time it prevents "sticking." Cone clutches are always faced with leather and this leather should be kept soft because it then makes a much better "fit" as it is forced into the flywheel, giving more surface for holding.

The better types of cone clutches are provided with what are termed "slip springs." These are usually four light springs arranged around the circumference of the cone under the leather. Their function is simply to cause a portion of the leather facing to take hold and just start the car in motion before the full surface comes in contact, preventing any tendency toward sudden "gripping."

The care of a cone clutch is very simple. Keep the leather soft by frequently applying neat's foot oil or castor oil. Never allow lubricating oil to get in a cone clutch. Wash the leather occasionally with gasoline to remove dirt and grease before oiling. See that the "slip springs" are loose and in operation.

If this clutch becomes fierce it is because the leather is dry and grips too suddenly. If it slips the spring may be too weak, the leather may have too much oil on the surface, or it may be worn so that it cannot enter a sufficient distance.

If you should be away from home and your clutch becomes "fierce," use it more carefully. If it slips, look to the spring; if this is weak or broken you can put your heel over the clutch lever, pull it back and force the clutch in. If the leather is covered with oil pour gasoline over it, or even in extreme cases "dust it" with a little sand, seeing that the sand doesn't get anywhere but on the leather. If the leather should get burned by slipping you can run many miles by pushing the clutch out and slipping a few pieces of shoe leather between the faces and wiring them to the cone. If you have to use this clutch very much these pieces of leather may bother some, but they will "bring you home."

MULTIPLE DISK POPULAR

Next to the cone, the multiple disk is most popular, and gives excellent results. It doesn't get "fierce," but is more expensive, and if it does "go to the bad" is most centain to leave you "stranded" somewhere along the road until you can get new parts. Its operation depends upon the friction developed between the faces of a number of plates, usually made of two different metals, perhaps steel and brass, all of one kind being keyed on the engine shaft, while the other kind are attached to a drum on the transmission shaft.

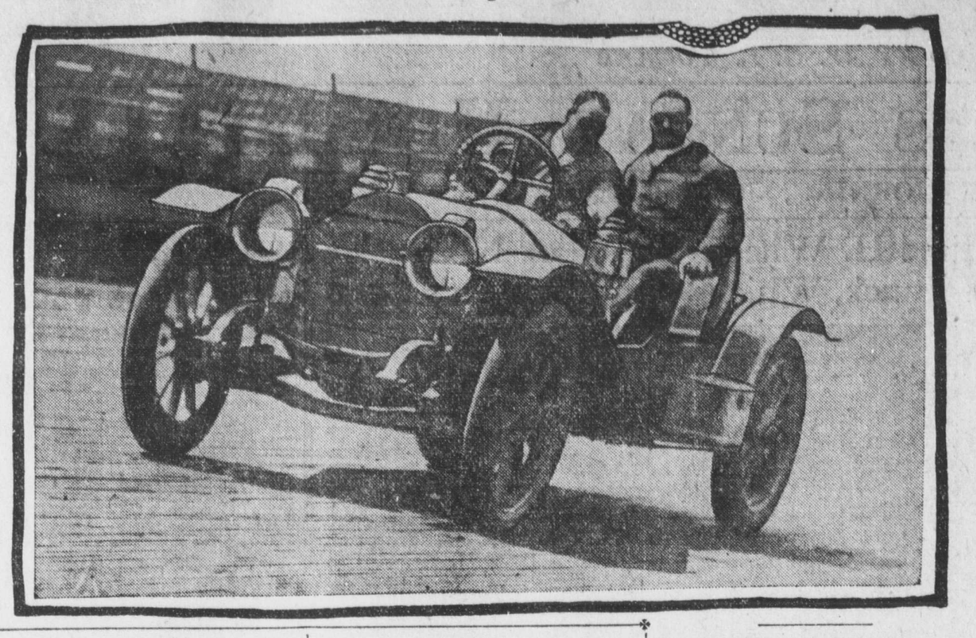
Those disks keyed, or otherwise attached to the engine shaft, of course turn with this shaft and are so arranged that they slide along it. Those contained in the drum on the transmission act in a like manner. These plates are arranged so as to alternate, first one that is fast to the crank shaft, and then one that is attached to the transmission. And the friction which is very gradually developed between the surfaces causes them to pick up the load very gently.

To further increase their smooth action some are run in oil, usually a mixture of cylinder oil and kerosene, and this must be squeezed out from between the face of the disks before they actually "set." Others are run dry, and have pieces of cork inserted through holes in every other disk, so that the cork furnishes a small friction, which is increased as the cork is pressed together and the disks come in contact.

The multiple disk clutch, run in oil is the most reliable, and wears well, and it can readily be slipped without injury. The cork inserts give a splendid cork action, but the clutch must not be slipped to any extent, and the cork often needs renewing.

The contracting, or expanding clutch is placed in operation by a lever, and held in position by some method of locking this lever. The cone and multiple disks are always engaged and held in position by the action of a powerful spring being released when desired by compressing the spring, this action being accomplished by either foot or hand levers.

Manager W. O. Williams and J. E. Bell Speeding at 77 Miles an Hour in New Amplex Roadster at Motordrome



AMPLEX ROADSTER SECURES HONORS

Car Driven by W. O. Williams Easily Reaches 77 Miles an Hour

IS BUILT LIKE A GREYHOUND

Will Contend for First Place in the Big Local Race This Year

The newest claimant for racing honors, and yet every inch a car, is the sixty-horsepower Amplex roadster received the past week by the Bekins Motor Car company.

Its first tryout was Friday at the Motordrome, when as the guest car, for Fred H. Wheeler of the Wheeler-Schebler Carburetor company, it whirled the gentleman down to the track at an average speed of fifty miles an hour on country roads, and driven by Manager W. O. Williams it set the high mark of seventy-seven miles an hour while speeding over the great board track.

This car was specially ordered for participation in the Los Angeles-Phoenix rac in November, and is so built that it will easily trim any similar car in the city priced upward of $4000. It has a guaranteed speed of seventy-five miles, but under pressure can do ninety miles an hour. And right here, it must be seriously reckoned with as a contender for first honors in the big race that will be pulled off locally this fall. It is finished in the new gray, is built like a greyhound, and the hum of its motors will cause any motorist to prick up his ears. The Amplex is out to win public favor, and the indications are that it will.

PROPER SIZE FOR TIRES DISCUSSED BY EXPERT

Experiments Show Results of Various Substitutions That Are Made

In order to determine whether larger tires substituted for the usual sizes do not increase skidding, waste power, especially on hills, and cause difficulty in handling the steering gear, Theodore Weigle of the Diamond Rubber company has made many experiments with all sizes of Diamond tires. These questions have been especially puzzling to automobile owners.

"Experiments fail to show that the substitution of larger tires, as for example 5-inch for 4½-inch tires, increases the tendency to skid, provided the car is properly loaded," says Mr. Weigle. "The substitution of larger sizes are of advantage only on cars where the tires are overloaded. Skidding, it has been shown, is influenced very much more by the relation of the power transmitted by the rear wheels to the weight which these wheels are carrying than by the size of the tires.

"It is undoubtedly true, on the other hand, that a large tire will cause a loss of more power than a small one. This is especially noticeable in hill-climbing. This waste of power is not at all in direct ratio to the size of the tire, and can scarcely be noticed in a comparison of 4½-inch tires and 5-inch tires.

"The use of tires of larger diameter produces a very appreciable effect on the hill-climbing ability of the car on high gear. For instance, a car which on high gear negotiates a given hill with difficulty at 20 miles per hour on 34x4½-inch tires would probably not be able to go at all if equipped with 35x4½-inch tires.

"As far as ordinary work is concerned large tires on the front wheels present no greater difficulties in steering, but in the case of racing cars running at extreme speeds a small tire handles better than a large one.

"Considering the tire question from the point of economy tires of a larger diameter will develop more mileage at given cost. Increases in the cross section will unquestionably be very profitable, therefore, in cases where an overloaded tire is replaced by one of adequate size. In such cases the average mileage secured repays the difference in cost several times over."

PROMOTER RETIRES

W. J. Morgan, president of the Motor Contest association, announces his retirement from active promotion of automobile contests, with which he has been prominently identified for several years. He discovered the Ormond Beach and ran a majority of the races on that famous course. He was also responsible for the "Climb to the Clouds" on Mount Washington, the Cuban road race and numberless other events. He also originated the Orphans' day outing, which has spread all over the country. Mr. Morgan's activities will be assumed by E. L. Ferguson.

COMPULSORY EXAMINATION OF AUTOISTS' EYES URGED

Delaware Oculists Consider Asking Legislature to Act

The Delaware Optical society has taken up the matter of vision of automobile drivers, and at the semi-annual meeting, which was held at Dover, the members discussed the advisability of asking the legislature to pass an act requiring automobile drivers to have their eyes tested, and to show a certain standard of efficiency before being granted a license to operate a machine. No action was taken, the matter going over until the next meeting.

The discussion was probably suggested by a development in a suit at Wilmington, Del., that of Mary E. Campbell vs. Alfred W. Walker, for $5000, the result of an automobile striking a wagon. Counsel for the plaintiff alleged that because the defendant had lost sight of one eye he was incompetent to operate an automobile, and that this was partly the cause of the accident.

Counsel for the defense demurred to the court in the nar relating to the sight of his client, but the court did not sustain the demurrer, holding that the plaintiff had a right to submit proof on this point.

MILE OF BUICK CARS SOLD IN LOS ANGELES

Money Tied Up in These Cars Totals More Than $1,500,000

On the first day of July Frank Howard, manager of the Howard Automobile company, was "doing things with a pen," as Kipling would express it. He says:

"Since September 1, or, to be exact, since September 5, when our first consignment arrived, the Howard Automobile company has sold over 500 Buick automobiles. This is at the rate of about two for every working day of the ten months that have elapsed. Going some, eh?

"The average price of these 500 cars was about $1500. This makes the total sales of the Buick for the ten months from this agency alone total more than $750,000.

"And while we are quoting figures, I might add that there are over 1000 Bucks in use in Southern California, making an investment of more than $1,500,000 in Buicks alone. Add the numerous other makes, and you get some idea of the enormous total values invested in automobiles in this neck of the woods.

"The average Buick car is about twelve feet in length. This means that we have sold more than a mile of Buick cars during the last ten months."

Charles Fuller Gates, Philip Crippen and Conrad Scherer made a trip last week in Mr. Gates' Duro car to Jawbone canyon in the Mojave desert and report a pleasant trip for this season of the year, as the famous Mojave winds were blowing and there was an absence of dust and heat both day and night.