

Clever Job Done By Hard-Worked Differential

This Part of the Car Sees To It That Both Rear Wheels Deliver Full Service in Driving Car Correctly

What do you know about the whiffletree on your car? Ever hear of such a part? Be sure that there is one, just as surely as on any two-horse vehicle you ever saw.

Remember that the whiffletree was on the rear end of the wagon pole and one horse was attached to each end of the whiffletree. This was to make sure that neither of them could loaf on the job, and that is exactly what the whiffletree is for on your car—to make sure that neither of the rear wheels takes undue advantage of the other.

The other name for the whiffletree is the differential, and it is located in a housing in the center of the rear axle. It is one of the most ingenious devices on the car and somebody expended a tremendous amount of gray matter in thinking it out. If you have never seen one it is worth all the trouble and mess involved in taking the cover off the housing, cleaning it out and re-lubricating with fresh lubricant.

You will find a combination of six or seven gear wheels, one of which is attached to the drive shaft, imparting motion to all the others and driving

When You Turn Curve What Happens With Wheels?

What he regards as the "whiffletree" of the automobile is described by H. C. Brokaw, director of the West Side Y. M. C. A. automobile schools, in his article herewith on the differential. It is a part of the machine that craves lubricant and will do well only when thoroughly greased.

the car. It engages a large ring gear attached to a housing or cage which contains the differential gears proper. There is a smaller beveled gear on the end of each axle shaft, the rear axle being divided at this point. Between these gears are set four pinion gears, which revolve when the two halves of the axle go in different directions, or at varying speeds.

At Different Speeds
The wheels do have to go at different speeds in running. Most drivers understand that in turning a corner the outer wheel travels a considerable distance further than the inside wheel, because it must traverse a much larger arc of a circle. The same effect is likewise true when one wheel goes over a bump in the road. To get the wheels to travel at the same speed on a straightaway and yet go at different speeds on a curve was a real problem, and if you will inspect the differential you will take off your hat to the man who solved it.

While you are at the inspection jack up both rear wheels, set the gear in first speed and then turn one of the wheels by hand. You will observe that the other wheel will go in the opposite direction, because the pinion gears give it a reverse motion.

With gear shift in neutral and clutch released either of the wheels may be moved while the other is held still, but with gears and clutch engaged, and occasional adjustment in gear, it will be observed that both wheels cannot be held at the same time and that when sliding one the other goes ahead twice as fast.

In some differentials there are three pinions, instead of four, which is the usual number. One would give the same action; the others are for added strength. These pinions are mounted upon what is called a spider; to keep them in position and work simultaneously the spider is fastened in and must revolve with the housing. The large ring gear on the housing and the smaller gear on the end of the driving shaft which meshes with it are not generally considered as part of the differential itself, but are known rather as the "final drive."

Reduction in Speed
It would be impossible to drive the rear wheels at the engine speed, or even at the reduction made by the transmission gear, on anything but a perfectly level road. With a heavy load, or in climbing a hill, the engine would stall quickly, but by reducing the speed of the axles a leverage is obtained which will move the heavy load or enable the car to climb a hill easily.

Therefore, if there are ten teeth on the gear attached to the driving shaft there may be fifty teeth on the ring gear with which it meshes, so that there would be a speed reduction of five to one and a corresponding increase in leverage.

Increased power for moving heavy loads or for hill climbing is obtained by increasing the ratio between these gears. Racing cars, traveling only on the level, may have a ratio as low as two to one or three to one, because there is little load carrying capacity needed, and this may be sacrificed to speed. This, with some other differ-

ences, explains why a racing car is good for racing only.

The differential is practically a fool-proof device. It works automatically, but it does require regular lubrication and occasional adjustment in gear. Perfect action all the gears should mesh properly. If the driving gear teeth do not mesh at the right angle or deep enough with the teeth of the ring gear, there will be play and a consequent wear and possibly a hum—whichever sometimes is a nice little song—and in some the necessity for new gears. If the teeth mesh too tightly there is wear of another sort, but equally destructive, and the teeth may be chipped off or other damage result.

An adjustment is usually provided at the rear end of the drive shaft for correcting every evil; but it is usually best to have the adjusting done at a repair shop. There should be practically no wear on the pinion gears, since they are not revolving except when turning a curve. Going straight away the whole differential assembly revolves as one piece, actuated by the gear of the drive shaft.

Keep It Well Lubricated
The principal care that the differential needs is lubrication of the proper quality and character. The car instruction book gives the manufacturer's advice as to the best lubricant and presumably he knows what he is talking about. The instruction in most cases is to keep the housing a little less than half full of very heavy oil; in a few cases grease is recommended, but it must be a light grease to have any value as a lubricant.

Many differential housings are provided with a drain plug placed so that the proper amount of lubricant may be determined and any excess will drain off when the plug is removed. If the case is too full the oil may run through the axle housing, get on the brakes and cause them to slip. The differential should be inspected every 500 miles and lubricant added, if needed. Every 5,000 miles the case should be drained, thoroughly cleaned out with kerosene and have entirely new lubricant.

It should be kept perfectly tight, otherwise the lubricant will leak out and besides wasting will drip on the pavement to get on other folks' tires, clothing, etc. And, of course, the oil in the pavement won't lubricate your gears.

Rules for Truck Users To Lengthen Tire Life

Things to Do and Not to Do to Make Conditions Better in Truck Operation

Here is a set of rules for truck drivers on the care of solid and pneumatic truck tires, formulated by the technical department of a leading tire company for the benefit of truck owners:

1. All truck tires have a load limit. Constant slight or occasional heavy overloads shorten tire life.
2. Distribute the load in the truck body so each tire will bear its proportionate share of the weight carried.
3. Overspeeding a tire has the same harmful effect as overloading. Keep truck speed within prescribed limits.
4. Know—don't guess—your inflation pressure. Proper inflation pressure is as important as proper loads and speeds.
5. Tires are limited in shock absorbing power. Careful, slow driving on rough or rutty roads will reduce tire costs.
6. Check your wheel alignment. Tires cannot give full service if subjected to the diagonal grind resulting from improper mounting or from misaligned wheels.
7. Use chains only as long as the traction wheels are likely to slip and apply them loosely.
8. Tires, especially pneumatics, are cut or scraped occasionally by bent fenders or loaded truck built bodies when the loaded truck travels over rough places. Carefully watch the clearance of your tires.
9. Neglected cuts lower tire mileage. Trim off loose slivers from the solid tires. Mend the small and repair the large cuts in pneumatics without delay.
10. Turn corners slowly to prevent tire strains. Apply power and brakes gradually to avoid useless spinning or locking of the wheels. Equalize the brake adjustment. These are common and avoidable tire abuses.
11. Bumping in car trucks causes tires to break down early. Avoid car tracks.
12. Learn the correct method of applying and dismounting pneumatic truck tires. Plan and take should it properly in casing and casing it properly on a dented, rusty or dirty rim.
13. To avoid unnecessary strain on pneumatics or flat spots on solids, lift the truck weight from the tires when the truck is to be idle any considerable length of time.

Moral Hazard Counts Much in Auto Insurance

For This Reason Taxicab Business Isn't Covered by the Regular Companies

The selection of risks by the insurance companies to-day is an important part of the business. The ratio of losses is very sensitive to the quality of business obtained, and, of course, it is natural for the majority of the insurance concerns to consider quality of risks rather than quantity. That is one very good reason for the frequent refusal by insurance companies of applications covering taxicabs.

It has cost many an insurance broker much time and labor in his fruitless attempt to obtain such protection, although there are some who may be fortunate enough to receive such an accommodation, only to a limited amount of policies and coverage. The objection to such taxicab protection is the moral hazard, inasmuch as the period of exposure, which is an insurance term plainly signifying the many hours of usage that a taxicab is put to, creates in itself a greater hazard than that of a car owned by a private individual and used for other purposes than hacking.

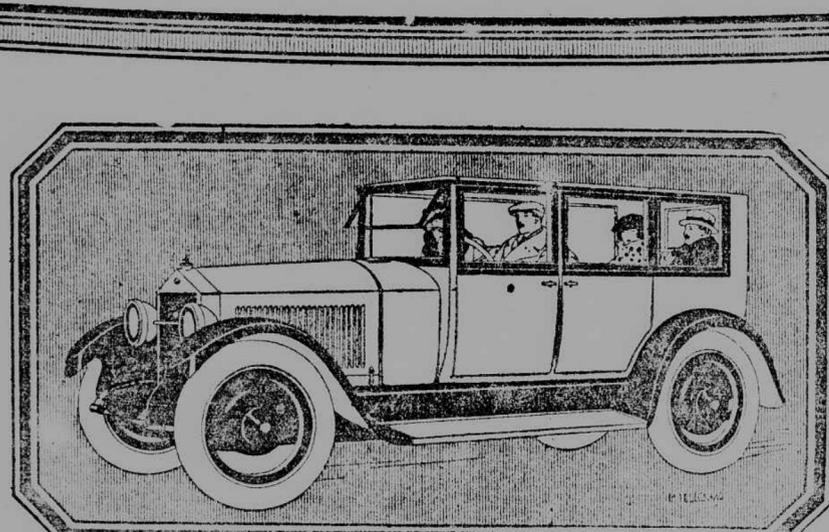
Then again it is almost every one's opinion that many taxicab drivers disregard traffic rules and at times are very careless. The taxi is always in a rush, and therefore in itself creates greater risk, and the taxi driver very frequently takes more chances to get in and out of the paths of other cars, in order to reach a certain destination quickly, and at the same time disregards the selection of the better streets or highways.

Windshield Pastors Don't Really Identify

The windshield pasters which the police issue after having "examined" automobiles in the present campaign have no serial number, and could, if occasion required, be duplicated very easily. Furthermore, they are not marked in any way so as to show for what car they are issued, or by whom.

In other words, it is a very slipshod plan, and one that really serves no particular purpose. There is nothing to prevent a man who has a car which he knows to be stolen from getting a paster for some car which was not stolen, and then removing it and applying it to a stolen car and getting that out of the jurisdiction.

There is the germ of an excellent idea in this inspection plan, but its operation is such as to make it of little or no value.



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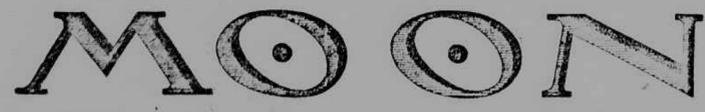
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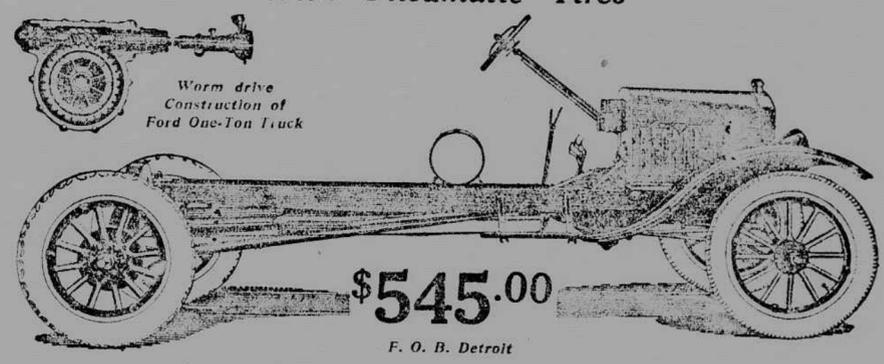
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