

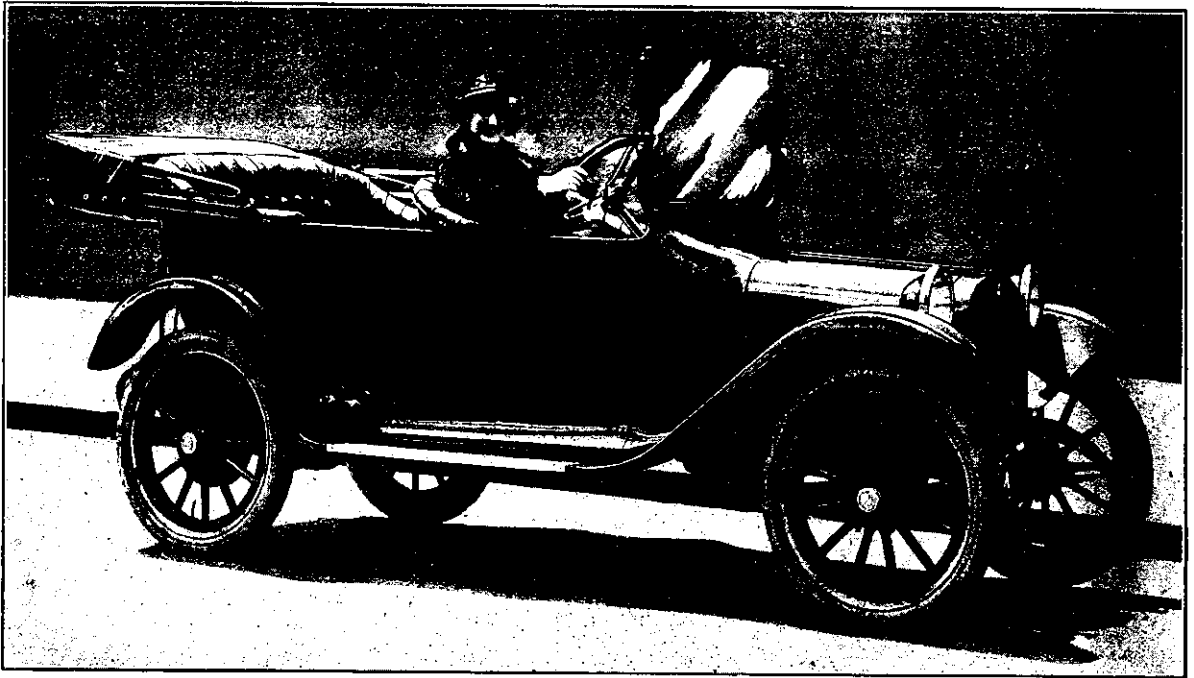
The Differential Gear.

Will it be Retained?

The suggestion that a modern car can be put on the road without a differential gear comes almost as a shock. We have become so used to the passive acceptance of the gear as a necessary piece of car equipment that the idea of its abandonment is almost as startling as would be the suggestion that the car should be run without tires. It is a safe statement that not one driver in twenty knows just how a differential acts, and it is an extremely doubtful point as to whether one motor mechanic in five could draw the gear on paper and explain its action to the

radius of say 40-ft. which is quite normal. The inner wheel will travel a circle some four feet inside this, but the total difference in the distance travelled by the two wheels is only as about 40 is to 37. That means that while the outer wheel covers 40-ft. of ground the inner only covers 37 and the odd three feet is taken up by the differential. If the two wheels were fixtures on the same axle it follows that in order to round the curve, skidding to cover the 3-ft. of distance travel must take place, and at first glance this seems repulsive to any driver who cares for his tires. A little thought, however, shows that the proportion of curve driving to straight ahead work is infinitesimal in an ordinary day's run.

Again it is questionable whether the differential does not take more out of the rear tires on a straight away run than it saves in rounding curves. On an



A Dodge Car and a Fair Driver!

uninitiated. However, expert and amateur alike all know and have accepted the fact that the prime duty of the differential is to equalize the drive on the rear wheels when taking curves, the outer wheel of the radius of the curve having to travel the maximum distance while the inner one more or less "marks time" while the movement is completed.

The effect of the differential gear is of course to allow the difference of speed of rotation of the two wheels, for were they both fixtures on the same axle the inner or outer wheel would have to skid over the ground in order to equalize.

To demonstrate how absurdly the duty of the differential has been exaggerated in our minds, merely from having accepted it blindly as a necessary fitment on a car, take a motor swinging round an ordinary street corner. We will suppose the outer wheel to be moving round an imaginary point at a

ordinary paved or country road, every time either back wheel leaves the road surface (and we know how often that happens) due to inequalities in the road, the differential comes into play, speeding up the wheel that has momentarily lost contact with the surface, and letting it descend on the road again revolving at too fast a pace, which is to all intents and purposes a miniature skid with a wearing effect on the cover. This may happen many hundreds of times during a long day's run and the total tire wear may be considerable, depending largely on the class of road surface. This perpetual skidding would be entirely cut out with a solid drive. Again on heavy roads, in starting, how often does one see one wheel of a car stuck fast while the other tears round endeavouring to start the load? This is a disastrous thing for a tire and could not possibly happen but for the differential.