

SIMPLIFIED LESSONS IN CARE OF AUTOMOBILE

Part Describes Rear-Axle Assembly and Method of Their Coupling.

NOTS WELL WORTH KNOWING

How to Tow Car Should Gear of Differential or Transmission Break Questions and Answers on Interesting Machine Problems.

FREDERICK C. GUERRICH, M. E. Auto Lesson No. 102.

The rear axle assembly is made up of the following parts or units: the differential, the driving shafts, the housing, the bearings, and we might say the brakes.

There are a number of different ways in which the above members are joined together, and these differences result in the units performing different services or accomplishing different results.

Thus we have what is termed the full floating axle, the semifloating axle and the live axle.

By studying figure 1 you will see that the squared end of the driving shaft or axle is simply inserted into a square hole in the differential and at the other end is formed into a splined shaft, the splines fitting into the splines in the hub of the wheel. It is not positively connected at either end.

On the other hand, the axle of a semifloating axle is positively fastened at both ends, while that of a live axle is fastened to the wheel. The former, or that shown in figure 1, is the full floating; that shown in figure 2, the semifloating; and that shown in figure 3, the live axle.

The live axle differs much from the semifloating axle in that it carries the weight of the car and the thrust of the wheels directly fastened to the ends of the shafts. To remove the shafts, the wheels must be dismantled, the axle assembly must be taken out of the housing, then pulled apart and, finally, the differential must also be taken apart.

As some of the highest-priced cars use the live axle, it is a matter of engineering opinion as to which type is the best. The cost of repairs of the live axle is very much less than for the live axle, because it is so easy to get at.

Figure 1 shows a full-floating axle, the driving shaft partly removed. You will observe that the axle is entirely carried on the axle housing, and how by having two bearings, one at each end of the hub, the thrust of the wheel is taken care of.

You will also notice that the driving shaft is not positively connected at either the differential or to the wheel. The differential end of the axle is square and is simply slipped into a square hole in its gear, while the wheel end has forged on to it what is known as a "dog." This you will note, has a number of offsets, which fit into corresponding spaces in the wheel hub.

Thus the driving axle shaft, simply by the wheels and might be said to "float" in its housing. It is kept in place by the wheel hub.

HOW TO TOW CAR WHEN GEAR OF DIFFERENTIAL BREAKS

Here is something worth knowing: could a gear of the differential or transmission break so that a movement of these parts would result in the ruin of other parts, the car equipped with a full-floating axle can be towed to a garage by simply pulling the driving axles. This would, in reality, convert the automobile into a carriage.

It cannot be done where the car has a live axle, it being necessary, in this case, to put a truck under the wheels.

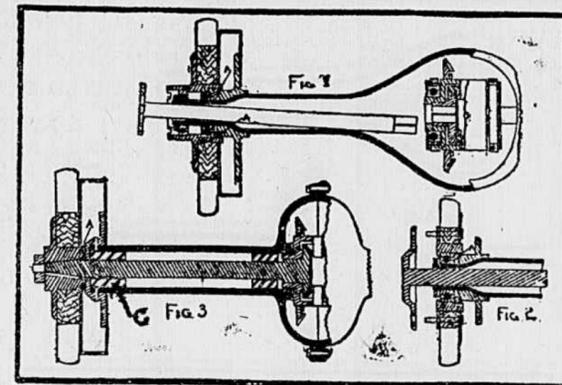
Figure 2 gives that portion of the semifloating axle which differs from a full floating. You will observe that the shaft is fastened to the housing of the side thrust of the wheel is not taken care of by the differential end of the driving shaft, but the wheel end has forged to a heavy flange, which flange is bolted to the wheel. Thus the shaft will support any of the weight of the car.

The shafts can be removed without dismantling the wheels and without disturbing the differential exactly as shown in figure 3.

Figure 3 shows the live axle. In this wheel is fastened directly to the driving shaft in such a way that the shaft not only carries the weight of the car, but also takes care of the side thrust. The shaft is also positively fastened to the differential. You will observe that in order to remove a shaft, or to do work on the differential, that it will be necessary to dismount the wheels, but the entire assembly will have to be moved from the car.

It is important that the oil or grease in the differential be kept at just the right level. If too much is put in it

Rear Axle Assembly



will run along the shaft and so get into the brakes. Most cars have a plug screwed into the housing, about three or four inches from the lowest part, and grease or a heavy oil should be maintained at such a level that it will just flow out of this plug hole.

If oil or grease gets on to the brakes, even though the level is right, then the felt washers, lettered A, will probably be found to be badly worn and will need replacing.

Because the driving shaft, when bent, naturally takes the position shown in figure 1, it is necessary to press down on the wheel end of the shaft when putting the shaft in. By remembering this, what to many is a difficult and tedious task will prove easy.

When the grease used in a live axle works on to the brakes, no matter how good the felts are, the trouble can often be overcome by taking out bearing C, figure 3, and then packing cotton waste around the axle shaft, after which the bearing is replaced.

QUESTIONS AND ANSWERS

(Copyright, 1918, by Fred. C. Guerrich.)

Q. Have gained many useful hints from your column, but now am in trouble and like to be helped out. I have a 1915 Buick with a 1914 motor. When heated it binds. Lately I put in new piston rings and replaced one new piston. In place of the one that was cracked, also took up my crank shaft bearings. I cannot seem to realize where it binds as I find a little fluid with oil and let it wear in. I think it will be the bearings. If it binds a little, does a crank shaft expand when heated? How is the 1914 motor tested?

A. First, be sure that the loss of power is due to a binding, as it may be that the valve stems were not set up properly, so that, by expanding they do not close. You can test the binding by trying to crank when the engine is warm. The bind may be due to the piston fitting too close. I doubt that it will be the bearings. If it binds a little, flood with oil and let it wear in. If the binding is much you will have to refer to the expert. The lights should be of the type of how the magneto is working.

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RUBBER REVOLUTIONIZES METHODS OF WARFARE

Transportation of Supplies No Longer Requires Kicking Mule and Swearing Driver.

How the automobile has revolutionized methods of warfare was recently pointed out by Samuel P. Colt, of a well-known manufacturing company.

"In the days of the War Between the States," said Colonel Colt, "transportation was slow and tedious, being mostly in the hands of the obstinate mule and the profane skinner. Operations and maneuvers which are carried on daily in this war would have been impossible then, because of the tardy distribution of supplies and armament."

"To-day army transportation is a marvel of speed and dependability, and rubber has been largely responsible for the change. The fast motor truck of to-day could not have been developed on steel tires, or on tires of any known material other than rubber. Motor trucks carry supplies for soldiers, ammunition for their guns, and even the soldiers themselves, making the army of to-day more than ever dependent upon mechanical transportation for its effectiveness. The entire armies at the present time use in the neighborhood of 50,000 to 100,000 motor trucks."

"The passenger automobiles with rubber tires make it possible for the commanders to oversee operations on twenty, thirty, fifty and even 100-mile fronts. They make it possible for wounded men to be quickly and carefully carried from the battle field to the modern hospitals. Thousands of lives are weekly saved in this way. The motorcycle takes the place of the mounted dispatch bearer of other days. The total number of motor cars in use by the entire allies, exclusive of trucks, is approximately 100,000."

"The largest truck train movement yet undertaken by Uncle Sam recently reached a successful ending at Camp Jesup, Ga., when ninety three-ton trucks completed a 981-mile cross-country journey from Detroit."

Not only was the trip remarkable on account of the distance and the length of the train—but much of the country traversed was unsuited to such heavy traffic, and the soldier-drivers had to strengthen and rebuild dozens of bridges along the route.

At Guntersville, Ala., where the swollen Tennessee River had to be crossed, only a one-man ferry, capable of carrying a single truck was available. This diminutive transport required two hours for each round trip, and would have necessitated a week's night-and-day effort to put the train on the far bank. So moving several miles down the river, a railroad ferry accommodating eighteen trucks was commandeered, and after a suitable approach was built, the long caravan put the stream behind it in little more than a day's time.

Despite many such difficulties, the trucks rolled into Camp Jesup seventeen days after leaving the factory, every truck in fighting trim.

The train was in charge of Captain G. P. Hippee, Lieutenant L. A. Couch and Lieutenant C. O. Middlebrook. Captain R. F. Andrews also accompanied the train as a special convoy officer. The trucks were manned by 200 picked soldier-mechanics from mechanical unit No. 305. Camp was made each night at a suitable place along the line.

CHARLOTTE, N. C., August 24.—Up in Haywood County, high up in the mountain ranges of this State, a railway is being built by the members of Company A, 16th United States Engineers. The road, which is to be known as the "Spruce Railway," is being built from Sunburn, a village in Haywood, three miles into the finest spruce forest to be found in the United States. The road, which was commenced in April, is about finished and is really in operation and the mill, which saws up the timber, has been put to work.

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CHARLOTTE, N. C., August 24.—Up in Haywood County, high up in the mountain ranges of this State, a railway is being built by the members of Company A, 16th United States Engineers. The road, which is to be known as the "Spruce Railway," is being built from Sunburn, a village in Haywood, three miles into the finest spruce forest to be found in the United States. The road, which was commenced in April, is about finished and is really in operation and the mill, which saws up the timber, has been put to work.

WILSON, N. C., August 24.—The Wilson Compress and Storage Company has completed a 981-mile cross-country journey from Detroit to Camp Jesup.

The largest truck train movement yet undertaken by Uncle Sam recently reached a successful ending at Camp Jesup, Ga., when ninety three-ton trucks completed a 981-mile cross-country journey from Detroit.

Not only was the trip remarkable on account of the distance and the length of the train—but much of the country traversed was unsuited to such heavy traffic, and the soldier-drivers had to strengthen and rebuild dozens of bridges along the route.

At Guntersville, Ala., where the swollen Tennessee River had to be crossed, only a one-man ferry, capable of carrying a single truck was available. This diminutive transport required two hours for each round trip, and would have necessitated a week's night-and-day effort to put the train on the far bank. So moving several miles down the river, a railroad ferry accommodating eighteen trucks was commandeered, and after a suitable approach was built, the long caravan put the stream behind it in little more than a day's time.

Despite many such difficulties, the trucks rolled into Camp Jesup seventeen days after