

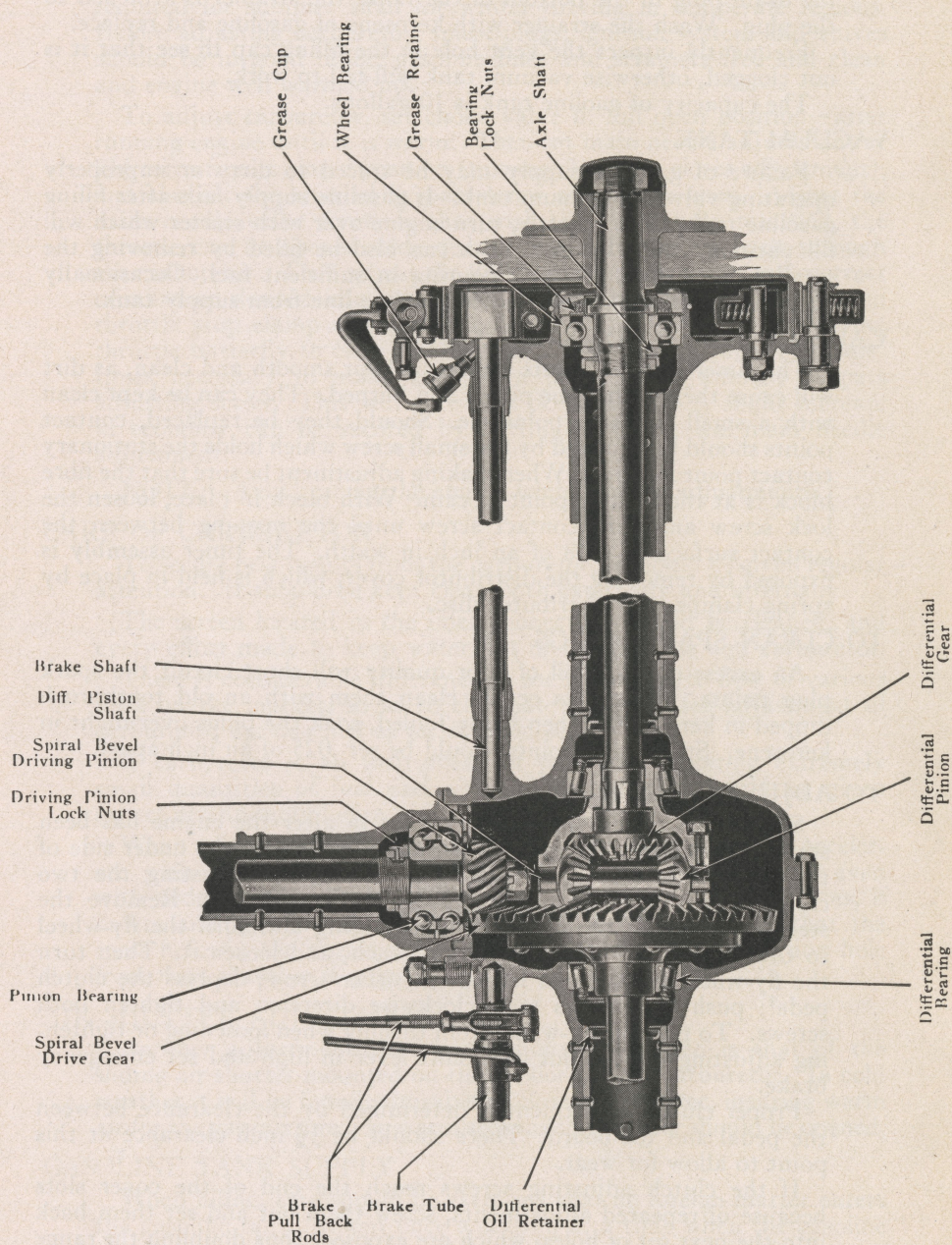


FIG. 5—REAR AXLE

BRAKES

There is no part of the car that should receive more careful attention than the brakes, as their failure to operate properly at critical moments may result in serious accidents.

The foot brake should be used for all normal braking purposes. the hand brake should be used only in cases of extreme need to assist the foot brake, or to hold the car when it is left standing.

TO ADJUST FOOT BRAKES

The foot or service brakes are of the external band type, and the method of adjusting them is similar to all brakes of this type. The procedure would be as follows:

With the pull rod leading from the brake pedal to the amidships rocker shaft disconnected, adjust brakes so that the center of clevis pin in upper end of the bent operating lever on the brake band is approximately $\frac{1}{4}$ " ahead of the center line of the brake adjuster rod. Then connect pull rod, adjusting same to length, with brake pedal in the fully off position.

Next—manipulate the hexagon washer at the rear anchor bracket, placing same so that there is approximately $\frac{1}{32}$ " clearance between the drum and lining at the rear of the band. By manipulation of the special hexagon nut at the top of the adjuster rod and the two nuts underneath the spring on the adjuster rod, adjust the upper and lower halves of the bands respectively to get approximately $\frac{1}{32}$ " clearance all the way around.

The brakes should now be tried to determine whether or not they are equalized. If not, equalize them by adjustment of the nuts at the upper and lower end of the adjuster rod at the front side of the brake and possibly with the hexagon washer at the rear anchor bracket, as the brakes wear and the clearances becomes greater, the brakes should be adjusted by manipulation of the adjustments at these three points. When once properly set up, it should not be necessary to adjust any pull rod lengths.

TO ADJUST HAND BRAKES

The hand brake is so designed that pulling it back four notches on the lever's sector should press the bands on inside of the drums equally against the drums' inner surfaces. Should you find that the hand brakes are not taking hold in the course of the lever's travel along its sector, take up on the front pull rod with adjustable yoke end at the bottom end of hand brake lever. Operate hand lever and try both wheels to make sure that brakes are adjusted equally; if not, equalize them by adjusting the rear pull rod leading from amidships rocker shaft to rear axle.

KEEP GREASE AND OIL OFF BRAKES

The brake bands must be kept free from oil and grease. Should these substances accumulate they will glaze the surface of the brake lining, causing the brakes to slip whenever braking effort is applied.

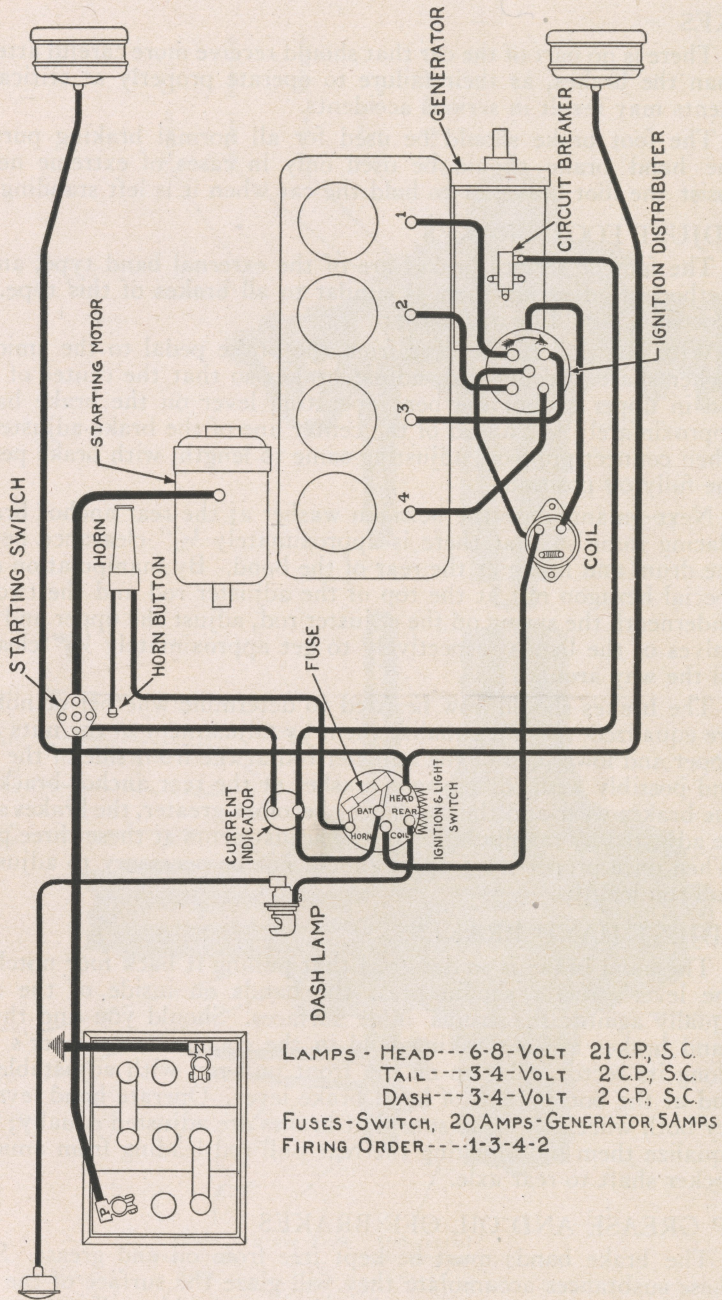


FIG. 6—WIRING DIAGRAM

When this prevails wash lining with kerosene to restore it to its normal condition.

WHEEL BEARING ADJUSTMENT

The use of Timken adjustable roller bearings in the front wheels, calls for a careful adjustment at least twice a season. Remove the hub cap, remove cotter pin from the adjusting nut. Jack wheel up from floor. Spin wheel, and while it is spinning, tighten adjusting nut slowly until a braking effect on the spinning wheel is noticed. Then back off the adjusting nut three quarters of a turn and lock in position.

CARE OF STORAGE BATTERY

Neglect or abuse will shorten the normal life of a battery.

Care of the battery in service can be summed up best in the following rules:

1—Keep plates in each cell covered by adding pure distilled water when necessary.

2—Take frequent hydrometer readings in order to determine that the specific gravity of the electrolyte in each cell is correct.

3—Should the hydrometer show that the gravity has fallen in the cells, then operate the car, using the lights and electric starter sparingly, until the battery becomes recharged. If this is not convenient, have the battery recharged at the nearest USL battery service station.

4—Keep filling plugs tight and the top of the battery clean.

5—Keep all battery connections tight and the top of battery clean.

6—Keep battery connections coated with vaseline to prevent corrosion.

TO ADD WATER

If the plates are exposed for any length of time they can be seriously damaged, therefore it is advisable to add water enough to keep the plates covered. In this respect the battery will require more attention in summer than in winter. In freezing weather, when it becomes necessary to add water, always do it just before running the car. Water being lighter than the electrolyte, will remain on the surface and will freeze if the temperature is low enough. If the engine is run immediately after, however, the effect of the charging current will be to mix thoroughly the water and the electrolyte. The electrolyte in a fully charged battery, with a specific gravity of 1.285 will freeze only at 85 degrees Fahrenheit below zero.

To add water remove filling plugs, and if level of electrolyte is found to be less than $\frac{5}{8}$ of an inch above the plates, add only pure, distilled water or clear rain water that has not come into contact with metal or cement containers, until the proper level is reached. Be sure to screw cap securely on vent holes.

Nothing but water should be used in the cells. If acid of any kind, alcohol, or, in fact, anything but pure water is added to the cells, it may result in very serious injury to the plates.

HYDROMETER READINGS

The hydrometer is an instrument used for quickly detecting the specific gravity of the contents of the cells. A reading of 1.285 to 1.300 indicates that the battery is fully charged. A reading of 1.225 indicates that the battery is about one-half charged. The gravity below 1.200 indicates that the cells are near exhaustion. It is advisable to take hydrometer readings after the car has been run for some little time and before water is added to the battery. Should the gravity register below 1.225 it will be necessary to use lights and starter very sparingly until the battery has had an opportunity to build itself up again.

It is well to make it a practice to have your nearest USL Battery Service Station frequently inspect the battery. You will find them willing to cooperate with you towards seeing that your battery is at all times maintained in perfect condition, thus keeping down your cost of battery upkeep.

IF GENERATOR DOES NOT GENERATE

Make sure that all connections in the charging lines are clean and tight, that the commutator is clean, that the brushes make perfect contact and do not spark, and that the fuse in the field circuit is not burned out. The fuse can be easily examined or replaced by removing the generator band and the slotted head screw which forms a part of the fuse contact. Repeated burning out of the fuses indicates a probable open circuit or a poor connection.

If the generator fails to generate and the fuse has not burned out, it is an indication that the trouble is internal or due to an excessive output, and the nearest Willys-Overland dealer should be consulted.

SHORT-CIRCUIT GENERATOR WITH BATTERY REMOVED

If the battery has been removed from the car do not run the engine unless the generator has been short-circuited. This can best be done by connecting the terminal on the generator to any part of the engine with a piece of bare copper wire. Be sure that the wire is removed when the storage battery is put back on the car. If you wish to run the car with battery removed, short-circuit the generator, then connect three dry cells in the battery circuit. This will give you current for ignition, but care must be taken not to use starter or lights.

INSPECTION OF WIRING. FIG. 6.

All electrical wiring should be carefully inspected every few thousand miles to make sure that all terminal connections are tight and that the insulation has not been chafed or rubbed off to cause a short circuit. Terminals are likely to work loose and should be tightened occasionally.

TO REDUCE TIRE EXPENSE

The satisfaction that you get from your tires is directly dependent upon the attention you give them. To get the most service at least expense, inspect the tires frequently; seal or repair all small holes

and cuts with tire putty, preventing water and dirt from working between the fabric and rubber tread.

Never run on a tire that is partly deflated as this causes rim cutting. The chances of a puncture are greatly reduced in a fully inflated tire, as a hard tire exposes much less surface to the road than a soft tire and also deflects sharp objects that would otherwise penetrate a partly inflated tire. Do not turn corners at high speed as the wear caused by skids shortens the life of the tires. Avoid locking of wheels with brakes as the sliding of the rear tires is most injurious to the casings.

Do not turn in street-car tracks and ruts, nor bump the side of the tires into curbs. If oil or grease collects on tires remove as soon as possible. Test tire pressure once a week, and when touring, every morning. Keeping tires at proper pressure will result in easier riding and greater mileage.

ALIGNMENT OF FRONT WHEELS

The greatest cause of wear on front tires is improper alignment of the front wheels. This should be periodically inspected as very often the wheels are thrown out of line by striking curbs or obstructions.

With a long stick measure the distance at the front of the wheels from the inside of one felloe band to the outside of the felloe band on the opposite wheel. Then measure at the rear of the wheel in the same way. The distance between the two should be $\frac{3}{16}$ to $\frac{5}{16}$ of an inch greater in the rear than in the front for high pressure tires and $\frac{1}{8}$ to $\frac{1}{4}$ for Balloon tires. If the wheels do not toe in this much, correct the alignment by turning the steering knuckle tie-rod adjusting yoke.

NON-FREEZING SOLUTIONS

The following table shows the proper proportions of alcohol, based on the capacity of the Models 91 and 92 cooling system, to prevent freezing at the temperatures given:

Temperature Fahrenheit	Quantity Denatured	Quantity Wood
	Alcohol	Alcohol
30 above	1 qt.	1 pt.
20 above	$2\frac{1}{4}$ qts.	$1\frac{1}{4}$ qts.
10 above	$3\frac{1}{4}$ qts.	2 qts.
Zero	$4\frac{1}{4}$ qts.	3 qts.
10 below	5 qts.	$3\frac{3}{4}$ qts.
20 below	$5\frac{3}{4}$ qts.	$4\frac{1}{2}$ qts.
30 below	$6\frac{1}{2}$ qts.	$5\frac{1}{2}$ qts.
40 below	$7\frac{1}{2}$ qts.	$6\frac{1}{4}$ qts.

As alcohol evaporates much more rapidly than water, in replenishing, an equal amount of alcohol and water should be used.

CAUTION:—Care should be exercised in handling of alcohol in connection with anti-freezing solution to not spill it on any portion of the hood or body. Mixtures compounded in accordance with the above proportions down to 20 degrees above zero Fahrenheit, will cause no harm, but mixtures for temperatures below that are apt to damage the finish.