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Holiday Hints to Owners

Almost without exception every Ford Car Owner is looking forward eagerly to the coming vacation. The vacation is a short release from the office, the sweat of the shop and daily grind and routine. The Ford Car forms an ideal means of transporting him and his family to a place where care and worry can be forgotten. In order to make the most of this opportunity he will in most cases, consider the amount of money spent, a secondary matter and in any case the car will form the cheapest means of making a real vacation possible.

The full benefit of this vacation cannot be realized however, unless the car is running properly and right here is an opportunity for each Dealer to cash in by a timely reminder to your car owners. Ask them to let you carefully and systematically inspect their cars and make the necessary adjustment. In this way you will be performing a real and profitable service.

List of Motor Numbers Continued From Service Bulletin No. 8, Page 62, Date, January, 1924

454500.....Dec. 13–23	463500.....Jan. 29–24	472500.....Feb. 29–24
455000.....Dec. 21–23	464000.....Jan. 24–24	473000.....Mar 7–24
455500.....Dec. 18–23	464500.....Jan. 29–24	473500.....Mar. 7–24
456000.....Jan. 3–24	465000.....Feb. 12–24	474000.....Mar. 27–24
456500.....Dec. 27–23	465500.....Feb. 19–24	474500.....Mar. 7–24
457000.....Dec. 19–23	466000.....Feb. 13–24	475000.....Mar. 11–24
457500.....Dec. 26–23	466500.....Feb. 4–24	475500.....Mar. 19–24
458000.....Dec. 28–23	467000.....Feb. 12–24	476000.....Mar. 14–24
458500.....Dec. 28–23	467500.....Feb. 18–24	476500.....Mar. 12–24
459000.....Jan. 8–24	468000.....Feb. 23–24	477000.....Mar. 19–24
459500.....Jan. 8–24	468500.....Feb. 19–24	477500.....Mar. 19–24
460000.....Jan. 10–24	469000.....Feb. 20–24	478000.....Apr. 1–24
460500.....Jan. 15–24	469500.....Feb. 22–24	478500.....Mar. 26–24
461000.....Jan. 14–24	470000.....Feb. 23–24	479000.....Mar. 21–24
461500.....Jan. 17–24	470500.....Feb. 26–24	479500.....Mar. 28–24
462000.....Jan. 29–24	471000.....Feb. 25–24	480000.....Mar. 25–24
462500.....Jan. 19–24	471500.....Feb. 27–24	480500.....Mar. 29–24
463000.....Jan. 17–24	472000.....Mar. 4–24	

Repairing Bendix Drives

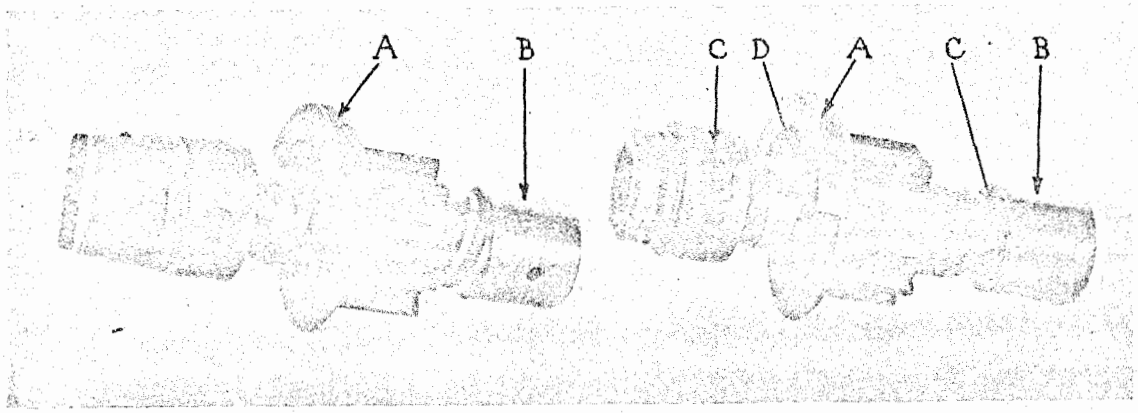

Fig. 1

We do not recommend that our Dealers repair the Bendix assembly except to replace the Bendix drive sleeve 5021½ as illustrated and explained on page 53—December 1923, Service Bulletin.

We have had several instances brought to our attention where repair men have endeavored to replace the collar A on the gear. It is almost impossible to replace this collar unless special machinery is used similar to that used by the manufacturers. The reason for this being that in order to remove the gear for repairing, it is first necessary to remove the nut (B). As these nuts are very hard and swedged in place it is almost impossible to remove them without damaging the threads on the inside or damage other parts of the assembly as was the case at C-C on the bendix illustrated. Also when swedging on the new spurious collar some means must be employed to hold it and the assembly true or there is a danger that one or more of the four lugs will be swedged past the inside of the gear and rub against the threads on the shaft causing the gears to bend on the shaft slightly as was the case with this particular bendix illustrated. It is also a difficult matter to drill the hole for the brake pin through the collar in the correct position so that it will ride squarely in the centre of threads unless special machinery such as is used by the manufacturers. You will notice that the pin D in this repaired bendix is fairly riding on the edge of the thread.

Now we will say that you have replaced the counterweight to your satisfaction you still have the problem of replacing the nut. When you replace this part you will in most cases find that when it is tightened down it does not tighten to the same position it held formerly. This will throw the whole nut out of true as these nuts are all ground in special machines after they are assembled by the manufacturers.

Lincoln Rear Axle Ratios

The gear ratio of the standard rear axle of all Lincoln Cars, with the exception of the 2-Passenger Roadster, is 12-55. The gear ratio of the axle on the 2-Passenger Roadster is 13-55. We can also supply Lincoln Cars with 11-54 ratio axle where unusually severe driving conditions, such as hilly country, exceedingly rough roads, etc., make a lower axle ratio more desirable.

If cars having lower ratios are desired, orders placed with the Sales Department should specify 11-54 axles instead of 12-55.

Fordson Drawbar Cap Extension

In order that tractor implements may be used to better advantage with fender equipped tractors, we are now prepared to furnish a drawbar cap extension, F-1537.

The use of this extension places the hitch far enough back so that in turning, the implements do not strike the fenders.

Dealers may obtain these drawbar cap extensions together with necessary parts for attaching, viz:

2 F 1337 Drawbar cap extension bolt
2 T 124 Drawbar cap extension nut
2 F 1834 Drawbar cap extension cotter

from our Branches. These parts are now included in all shipments of fender equipped tractors and will be supplied without charge to take care of fender equipped tractors which were shipped less these parts.

Flat Rate Labor Charges Are

Ford Mechanics' Section

(*Continued from Page 88, April, 1924, Service Bulletin*)

Lubrication

The sole purpose of lubrication is to prevent moving surfaces from making contact with one another or making an actual metal to metal contact. In other words when we place a lubricant in a bearing or piston, we do it to maintain a film of oil between the surfaces and the moving parts actually float in this film of oil although it may be only a few thousandths of an inch in thickness. For instance, a perfect fitting bearing is a bearing so fitted that it will have a one hundred per cent oil clearance.

The metal surfaces, regardless of how smooth they may appear, or feel, to the touch, are very rough under a strong microscope and whenever these surfaces are allowed to touch or rub against each other friction is caused which will result in a tearing of the metal which will gradually pile up until we have a seized bearing or a damaged surface which can be plainly seen with the naked eye.

From the above it will be seen that each moving part must receive lubricating oil at its bearing and in sufficient quantity. The problem of applying this oil to the bearing and the problem of the correct grade of oil has been an engineering problem of some magnitude.

For instance, some bearings work under great pressure—these bearings must have oil of sufficient body so that it will not be squeezed from the bearing under the load, other bearings operate under a heavy load with excessive heat conditions as well. Oil for this type of bearing must be such that it will maintain its body under both load and heat; other bearings such as the piston and cylinder walls must have a lubricant which will stand up under a fire test as the oil must do in cylinder walls.

In the automobile engine a lubricating oil must be of such a nature that it will stand up under both pressure and heat and, as many of the parts move at a considerable speed, they must have a liberal supply of oil at all times.

At the present time there are almost as many different lubricating systems in use as there are makes of motors. The trend however, in the last few years, has been towards simplifying these systems, making them as fool-proof as possible, at the same time having their action positive.

We will not attempt to explain the various systems, but will confine our discussion to the particular system used in the Ford car and tractor which have met the requirements effectively covering a period of years.

Constant Level Splash System

The constant level splash system which is used in the Ford car and tractor is the simplest of all satisfactory systems in use today.

In the Model T motor we pour about one gallon of lubricating oil in the breather hole at the front of the motor on the right hand side. This oil flows down through the crankcase filling the splash cups under the connecting rods and into the lowest part of the crankcase under the fly wheel. As soon as the motor is started the fly wheel and magnets carry the oil to the top of the transmission cover from whence it drips or flows into the funnel shaped upper end of the oil pipe.

Then the oil flows by gravity down through the oil pipe to the timing gears at the front of the motor, back to the crankcase and the oil which is not required to keep the splash cups under the connecting rods filled, flows back into the lower part of the crankcase and is again circulated by the action of the fly wheel.

Meanwhile the connecting rods are dipping into the small cups under them, splashing the oil to all parts of the motor and up through the small holes in the valve spring chamber. The excess oil which flows up around the valves, drains back again into the crankcase.

The oil pipe mentioned is the only one used.

The transmission is also kept in a bath of oil by the fly wheel and magnets.

From this you will see that the system, operates automatically.

The only attention it requires, other than to replensih the oil from time to time, is to occasionally wash out the complete system. This should be performed at regular intervals of from eight hundred to one thousand miles of actual use.

When draining and cleaning out the crankcase, first remove the drain plug under the lowest part of the crankcase which will allow the old oil to be removed. When the oil has been removed, replace this plug and pour into the motor at the filler plug, about a quart of kerosene. You may now run the motor at normal speed for about half a minute after which the kerosene is drained off before replacing the drain plug, pour about a pint of lubricaring oil into the motor, or enough to

drive the remaining kerosene out of the splash cups. As soon as the good oil starts to flow from the drain plug, you may replace it and fill the motor with fresh oil.

It is very important that the kerosene be all drained out, using this method, as kerosene will seriously damage the lubricating qualities of the oil if left in the motor.

The oil level is determined by the two pet cocks on the right hand side of the crankcase just back of the widest part of the crankcase. These two pet cocks are a high and low level and the oil should not be allowed to get above the highest pet cock or below the lowest, as damage is likely to occur in the motor either one way or the other.

If at any time the oil tube becomes blocked up due to dirt or foreign substance collecting in it, it can be usually cleaned out without completely disassembling the motor.

To clean the oil tube first remove radiator, fan, cylinder front cover, remove large time gear which when removed, will expose the front end of the oil tube. Unless very badly plugged a high pressure air will usually clean it out.

A flexible piece of wire can be inserted through the tube to dislodge or loosen up the dirt. If this will not clean the tube you can get at the rear end of the tube by removing the transmission cover. If you are still unable to dislodge it it will be necessary to disassemble the motor and remove the tube completely.

As Applied to Fordson Tractor

Where the temperature of the circulating water is seldom allowed to exceed 165 degrees F. as in an automobile motor running under but a fraction of its maximum load, the vaporizing point of the lubricating oil is seldom reached. But in a tractor engine running for hours at close to its full load the circulating water seldom reaches much below the boiling point at sea level, 212 degrees F. and the conditions of operation are such that every part of the engine is very much hotter than this. Under the heavy load the pressure between the piston and the cylinder wall is much greater, and the oil tends to squeeze out much more rapidly, so that it must be renewed with far greater frequency than is necessary in an automobile engine.

Where the lubricating system is concerned, as well as regards other essentials, the novice in tractor operation will do well not to rely on his automobile experience to carry him through without a slip that will result in serious damage. There can be no comparison whatever between the 20 H. P. automobile motor that runs for ten hours a day and is seldom called upon to deliver 50 per cent of its rated power and the tractor engine of the same rating that is delivering 80 to 85 per cent of its rated output all day long.

Fordson Tractor System

The oiling system employed on the Fordson Tractor is known as the "constant level circulating splash system." The oil is poured into the filler pipe at the left side of the front of the motor, from which it flows over the connecting rod troughs of the crankcase lower cover (leaving them full), and into the lowest part of the crankcase under the fly wheel. When the motor is running the oil in the bottom of the crankcase is carried by the fly wheel and magnets near the top of fly wheel case. Here a portion of it drips into the funnel-shaped upper end of the oil pipe where it flows by gravity down to the timing gears, returning once more to its original position under the fly wheel. The oil pipe mentioned is the only one used. No pump is required in the Fordson system. All moving parts of the motor are kept well oiled by this system. The only opening into the crankcase is the breather pipe. Any oil which may be "pumped" to the top of the push rods is automatically drained back into the crankcase by a small hole in the front end of the case. The Fordson oiling system is highly efficient, has proved satisfactory over a long period of years, and is more fool-proof than any other in use today. The only attention required, other than replenishing the oil supply from time to time is to wash out the crankcase at least once a month and drain the oil and dirt from oil sump once a week. The oil level should be kept between the two pet-cocks at the rear of the crankcase.

In the above explanation we have referred entirely to the lubrication of the motor, however, there are other parts about a car which require lubricating and it is as important that these parts be thoroughly lubricated and receive the same attention as the motor.

For instance the rear axle in the Model T we have a heavy thrust and gear action, this necessitates the use of a heavy fluid oil which will follow the teeth, reducing excessive wear and noise. As this part is not subject to heat, the grade of oil will necessarily be different from that used in the motor. The rear axle is lubricated by splash and the crown gear carries the oil up over the differential and to the two inside roller bearings next to the differential. The correct height of the oil in the rear axle should be just to the level with the filler plug in the right hand housing.

In the truck, and Fordson tractor as well,

we have still another condition of the worm gear and the oil must be of sufficient body to stand the tremendous pressure between the teeth of the worms.

The truck axle is also lubricated by the worm carrying the oil up from which it flows to the different internal portions of the axle, worm gear and worm bearings.

In the Fordson tractor transmission we also have a very heavy gear action however, the same oil which is used to lubricate these gears is suitable for the worm in the rear axle so that the whole system of transmission and axle are lubricated from the one system.

Laboratory Tests of Oils

Gravity Test

The Baume Hydrometer is in general use throughout the United States. This instrument, carrying an arbitrary scale, when allowed to float freely in an oil or other liquid, sinks to a depth corresponding to the density of the liquid (this is the instrument commonly used in testing the electrolyte in a storage battery). The Baume "Gravity" value is then at the point where the surface of the liquid interests the scale. The liquid is maintained at a constant temperature of 60 degrees F.

Specific Gravity is the ratio of the weight of a solid or liquid substance to that of an equal volume of water.

Gravity is of secondary importance in judging the qualities of lubricating oils.

Flash Test

The flash point of an oil is the lowest temperature at which the vapor arising therefrom ignites, without getting fire to the oil itself, when a small test flame is quickly approached near its surface in a test cup and quickly removed. When an oil is used for the lubrication of internal combustion engines and thus exposed to severe heat, it becames imperative not to allow the flash point to drop much below 400 degrees F. This is a guarantee of efficiency and durability. Flash is indicative of an oil's suitability of such use.

Inasmuch as the temperature of explosion exceeds by several times that of the highest obtainable flash, it is clearly apparent that even 100 degrees difference in the flash of two oils can be of no avail in resisting destruction within the explosion chamber. Below the pistons, however, the operating temperature of piston heads and other parts require the use of high flash oils for reasons of economy and durability. Motor oils having a flash point below 400 degrees F. show a very appreciable vaporization loss by way of the breather orifices. This loss increases rapidly with a further drop in flash and increase in crankcase temperature.

Fire Test

The fire point of an oil is the lowest temperature at which the oil ignites from its vapors when a small test flame is quickly approached near its surface and quickly removed. Since the fire is always above the flash, the fire value becomes of minor importance when judging fresh oils for use in explosion engines.

After an oil has been used in the crankcase of an engine, coming into contact there with highly heated parts and gases (fresh and spent) escaping from the cylinder, past pistons, it usually becomes contaminated with condensed gasoline and water. It is very probable too that unstable oils "crack" to some extent into light and heavy products.

Carbon Residue Test

Carbon Residue determination consists of distilling a definite quantity of oil in a standard flask, to the end, when a carbon deposit, or residue is left upon the walls of the flask. This is weighed, and the percentage of Carbon Residue obtained. The percentage of Carbon Residue relatively high or low, which an oil contains, does not necessarily indicate the amount of carbon deposit which will occur in the combustion chambers of an engine. Carbonization is also materially influenced by the quality of the oil, by its viscosity, and flash, and by the mechanical defects of the engine.

Color Test

Color values of oils are determined by comparing their colors, by transmitted light, with the colors of standard chromate solutions, or with the colors of glass slides corresponding to these solutions. Color in no way indicates the quality or the durability of an oil, neither does it show its suitability for a certain use.

Cold Test

The Chill or Cold Test of an oil is the lowest temperature at which the oil will pour. This characteristic need only be taken into consideration of its effect upon the free circulation of oil through exterior feed pipes, etc. where pressure is not applied. The Cold Test is in no way indicative of the lubricating or heat-resisting qualities of an oil. If the car or tractor must be exposed to extremely low temperature in an unheated barn or shed or out-of-doors, only oils having a cold test corresponding to the exposure temperature should be used.

Viscosity Test

Many instruments are at present in use in different countries for measuring the relative viscosity or body of lubricating oils. In the United States, the Saybolt and Tagliabue instruments are used almost exclusively by oil refiners and by oil users. The object sought by all instruments, however, is identical in every case. The result of the measurement called "Viscosity" is, with few exceptions, expressed as a number of seconds required for a definite volume of oil under an arbitrary head to flow through a standardized aperture at constant temperatures. In other words, viscosity is an empirical expression of the molecular cohesion (internal friction) of fluids. Readings are commonly taken at 100 degrees and 212 degrees F. In referring to the viscosity of an oil it is essential to state the kind of instrument used. The viscosities referred to in this paper are Saybolt.

Evaporation Test

The rate of evaporation and the characteristics of different oils have a very important bearing on the losses of oil through the breather orifices in the crankcase of the engine. In a practical way this means a decrease or increase in gallon of oil used. The evaporation test is run in many ways in different laboratories, but the results obtained on different oils by any good method are capable of comparison. It may be determined as follows:

Place a weighed amount of the oil to be tested in a breaker and heat on an electric plate up to 300 degrees F. maintaining this temperature for a period of from six to ten hours. The oil remaining is then weighed and the percentage of loss by evaporation is calculated from the difference in weight, before and after heating.

Chemical Requisites of Motor Oils

To obtain maximum lubricating efficiency and durability, it is imperative that engine oils contain the smallest possible quantity of unstable hydro-carbons and no "sulpho" compounds or other impurities which cause rapid decomposition of the oil. The proper methods of making emulsion tests to determine the presence of "sulpho" compounds are as follows:

Fill a bottle one-third full with the oil to be tested. Pour in an equal amount of water, leaving a space of one-third free above the oil and water. Cork and shake the bottle vigorously 30 minutes in a shaking machine (or by hand) then set it aside for 24 hours. Good oil shows a fine white line of demarcation between the oil and clear water below, indicating the absence of acid compounds. Impure oil mixes permanently with the water, appearing as a curdless mass, floating upon milky water below. The curdled portion is a sort of suplhuric acid soap, and the amount of the curd shows the quantity of "sulpho" compounds present.

In all types of automobile engines a certain amount of burned gas escapes past the pistons into the crankcase, where water vapor in these products of combustion condenses and settles to the bottom of the oil in the sump. This unfailing source furnishes sufficient water to cause the complete emulsification of that part of the used oil that will emulsify. The tendency to emulsify is naturally much greater during cool weather than during hot weather, for the reason that in the summer the heat of the oil in the crankcase is sufficient to prevent condensation of the water vapors and to assure their expulsion from the crankcase through the breather pipes.

Thorough draining and cleansing of the crankcase as described above is to be strongly recommended, particularly during the winter. Very frequently the level of the oil in the crankcase remains the same or rises instead of decreases during the operation of the car over several hundred miles. Some operators conclude, therefore, that their motors are extraordinary in that they actually generate oil rather than consume it. In the end, however, this belief inevitably results in the disaster of an injured motor or burned out bearings and scored cylinders.

Another way to test for acids is to add copper oxide to copper ash to a sample of the oil contained in a glass vessel; acid-free oil retains its original color, while if the oil contains acid, it becomes greenish or bluish. This test, however, is not an accurate one, and should not be taken as conclusive evidence as to the acidity of the oil.

Test for Solid Matter

The presence of solid impurities in an oil may be detected by adding kerosene to a small quantity of the oil, making the mixture quite thin, it is then poured through filter paper which will strain out any solid matter that may be present. The paper is then washed with gasoline, leaving it clean unless solid impurities are contained in the oil.

(To be Continued)

Special Carburetors for Ford Cars

The fact that certain carburetor manufacturers are making extravagant claims as to mileage to be obtained by the use of their product on Ford cars, is, no doubt, responsible for the frequent inquiries which the dealers receive regarding the authenticity of these reports. Advertisements have appeared in which the user of such carburetors is pictured as obtaining anywhere from thirty to fifty miles to a gallon of gasoline. Every Ford dealer understands that the result of a special gasoline test does not represent the efficiency of that particular carburetor under actual every day working conditions.

There is no question that the experienced driver can secure one hundred per cent greater gasoline mileage in running a test mile with his hand on the needle valve than can be secured by the average driver operating his car under every day conditions. On the one hand, you have the ideal condition of the engine, road, temperature, wind, and in fact everything that makes for increased mileage, while with a car used in practical service the carburetor must be so adjusted as to give ample power for starting as well as pulling a load under slow speeds.

Considering the conditions under which Ford cars are operated the fuel consumption is as low as can be expected with present day gasoline. It must be remembered that the wide point of variance between the mileage record of one driver and another depends mainly upon the driver's willingness to adjust the flow of gasoline through the carburetor by turning down the needle after his engine has become thoroughly warmed up. No carburetor will give maximum results when the adjustment remains unchanged between a cold and heated engine.

Improved Tractor Brake

The Tractor Brake has been improved, giving increased braking surface and greater braking power.

In the original design two brake plates were used, whereas three stationary plates, two rotating plates and a brake hub are used in the present design. Three of these brake plates (one rotating plate between two stationary plates) are installed in front of the idler gear, and two plates and the brake hub (a rotating plate between a stationary plate and the hub) are installed back of the idler gear, the stationary plate being placed next to the gear.

New Design Transmission Cover Gasket

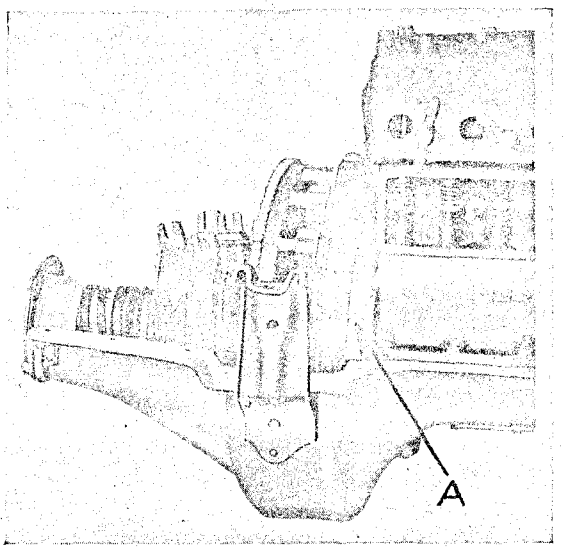

Fig. 2

T-3363-872-B transmission cover gasket has been redesigned and instead of using one T-3363-872-B gasket and one T-3363-B-4358 gasket, as formerly, we now use one T-3363-872-B gasket of the new design "A," (Fig. 2).

The new design single piece gasket is both heavier and wider than the old style gasket, and this, together with its improved quality, prevents any possibility of oil leakage between the transmission cover and cylinder assembly. Change in the width of the new gasket eliminates the trouble that was sometimes experienced by repairmen, when it was necessary to install this part, owing to the tendency of the old gasket to slip off of the cylinder block.

The improvement that has been made in this part also insures correct alignment of the universal ball cap with the transmission cover and crankcase, thereby preventing any possibility of distortion, with consequent strain upon the crankshaft and bearings.

It is of course understood that only one of these gaskets should be used between the transmission cover and cylinder assembly. Under no circumstances should dash to body gaskets be used between the transmission cover and cylinder, which we understand has been the practice of some dealers in the past.