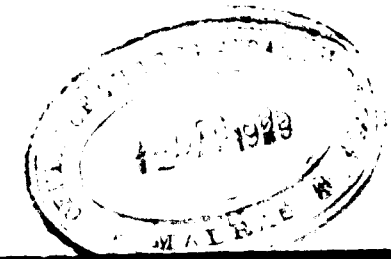
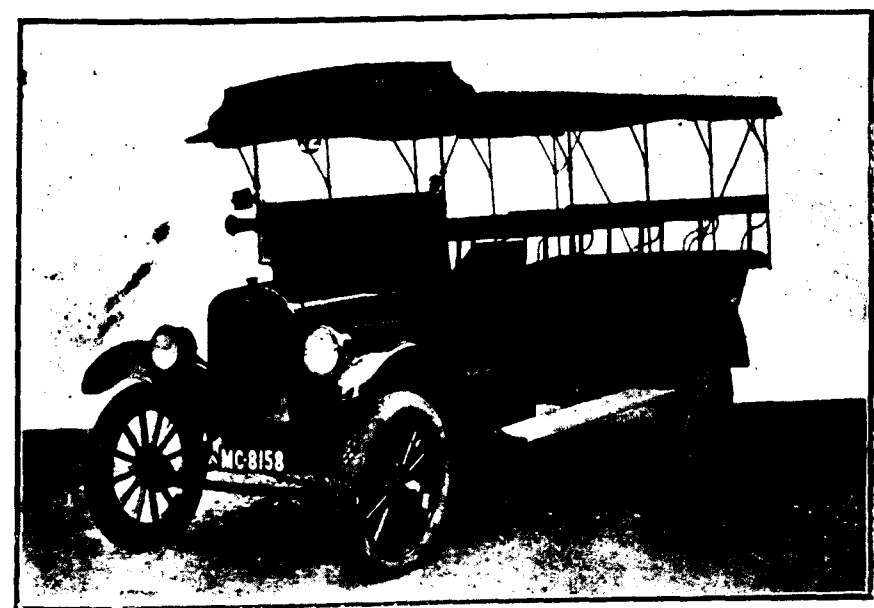


Indian Motorist.



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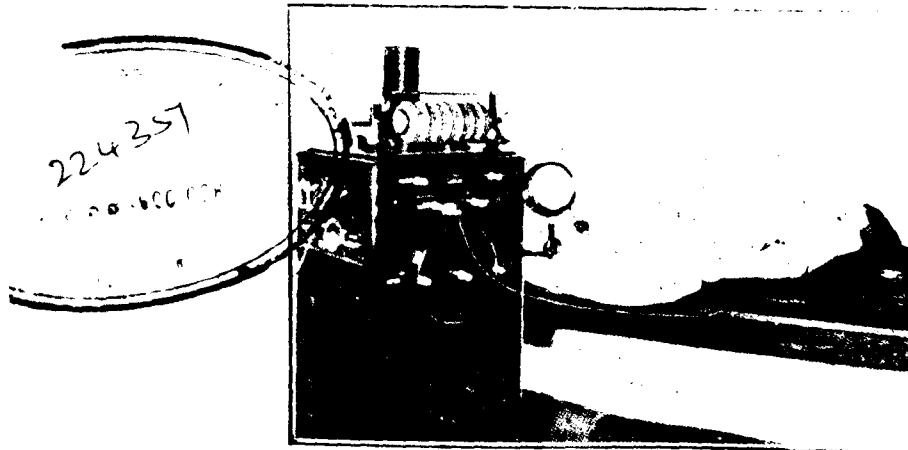
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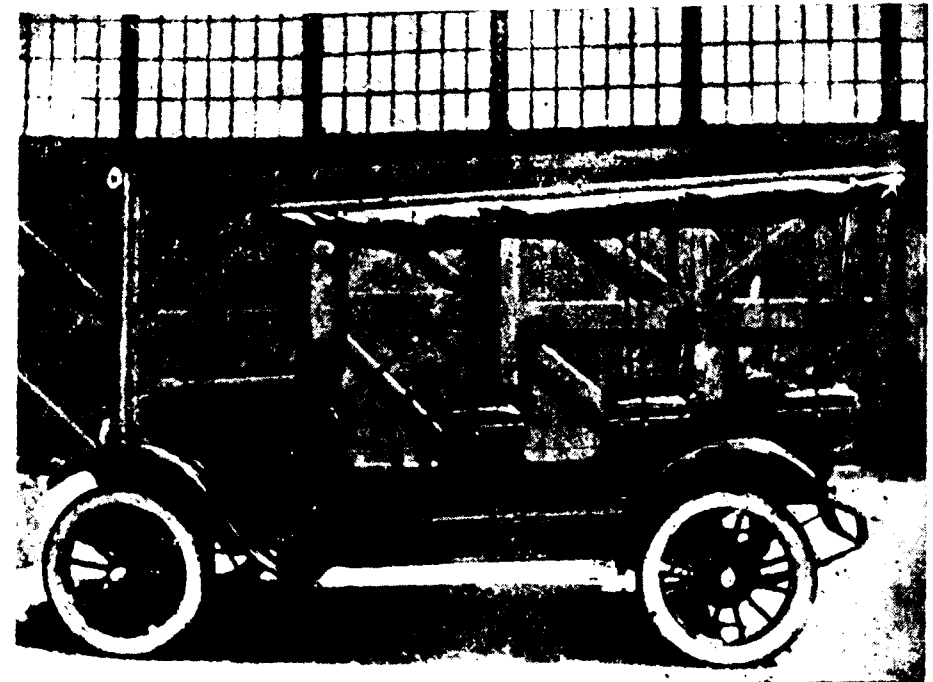
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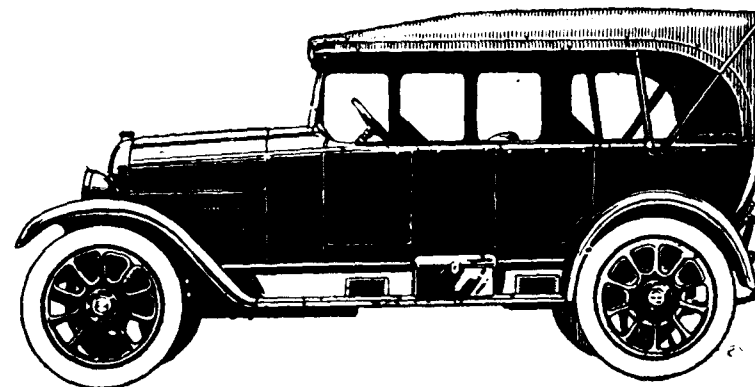
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Indian Motorist.

A Monthly Magazine of Motor Matters.

VOL. I

AUGUST 1925

NO. 4

How to Drive a Motor Car.

STARTING AND STOPPING—SHIFTING GEARS—PARKING—
SKIDDING, AND HOW TO PREVENT IT—ASCENDING AND
DESCENDING HILLS.

There are various conditions under which a motor car must be driven, some of these depending upon the car itself, while others are set up by road conditions. Driving on a level open road is quite simple, driving in traffic adds some complications; however, preventing the car from skidding on wet road surfaces, parking and driving on the hills as well as shifting gears requires skill and a thorough knowledge of the car's ability.

To obtain maximum pleasure, comfort and economy from the car, finesse in driving is essential. And, the motorist who understands the operation of his car seldom has serious trouble with it, for his knowledge prevents "accidents" which are so puzzling and difficult to overcome when one does not understand the control of the car under all conditions. Skill in driving can easily be acquired by any one. It is only a question of little experience and an understanding of what happens when the various pedals and levers are operated.

Starting and Stopping:

Owing to the inability of the motor car engine to start, it is necessary to

accomplish this with an external source of power. This power is supplied by the electric starting motor and operated by a hand or foot switch. Operating of the switch completes the circuit between the starting motor

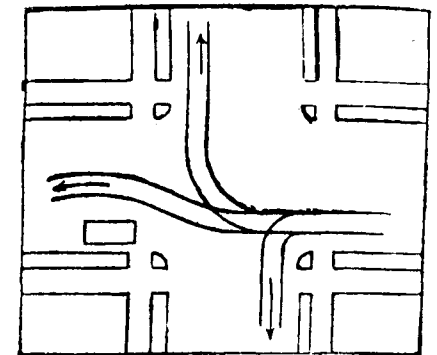


Diagram indicating the rules of the road.

and the battery, permitting the motor to crank the engine through suitable gearing. This naturally places a heavy drain on the storage battery momentarily; it can be decreased, however, by disengaging the clutch so that the starter does not have to turn the gears in the transmission and churn the heavy oil that may have congealed. There is no need of continuing the use of the starter if

the engine does not start promptly. It is generally conceded that most engines fail to start quickly because of a flooded or overloaded presence of raw gasoline in the cylinders rather than because of an insufficient quantity of fuel. Allowing the starter to remain idle for a few minutes usually remedies this condition.

One can readily understand that proper starting and stopping are essential, if serious damage to the car is to be avoided. In general, it may be said that a good driver never causes the mechanism to jump or jerk; all the starting and stopping should be gradual. In order that one may have the proper conception of starting and stopping a vehicle, this may be outlined as follows:

If the gears do not mesh properly when shifting the change gear from neutral, do not force them. Allow the clutch to engage for a few seconds which will revolve the gears for a few revolutions and then with the clutch disengaged try again. Clashing of the gears is very harmful to the gear teeth and the bearings of the transmission and in time will ruin the entire unit. Never start the car with the front wheels cramped over hard. Start with them straight ahead and swing quickly into the desired direction after the car is in motion.

When the car has gathered headway, again disengage the clutch and shift into the next desired speed; either second or high, allowing the clutch not quickly but gradually re-engage before the car loses headway.

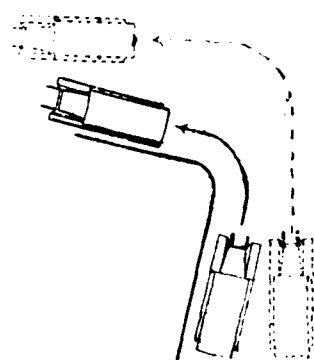
There is some difference of opinion as to the proper method of stopping the car and the method cannot be clearly defined for the reason that the type of clutch has some influence. The general recommendation is that the clutch be left engaged when using the brakes for momentarily slowing down and by throttling the engine. The claim made for this suggestion is that it saves the clutch frictional surfaces, as they are not subject to slippage when again accelerating. For a complete stop, the clutch should

of course, be disengaged, at the same time throttling the engine, thus allowing the car to coast. The final operation is to apply the brakes gradually until the car comes to rest at the desired point. To jam on the brakes suddenly when the car is under speed is bad practice; it causes the wheels to slide and injures the tread of the tires in time, while there is also danger of skidding, especially if the road surface is wet.

Car tracks, chuck holes and road obstacles should be avoided as much as possible and if it is necessary to drive over a rough road the speed of the car should be reduced to a point that will enable it to travel over the road smoothly.

On the Road.

Ordinary driving is done at high speed, but when rough stretches are encountered, the speed should be proportionately reduced. This requires good judgment and when the jolting or vibration becomes severe, much better time can be made by slowing down to a speed that can be taken with safety. Driving on congested traffic is even more severe than road work.



The Left Turn.

Solid lines represent the correct method and dotted lines the incorrect method.

The engine should never be permitted to labor, for there is nothing more injurious than trying to pull a

load in high gear at a low speed. Therefore, when slowed down for traffic, use the low or intermediate speed until the car speed can be increased sufficiently to warrant the use of high gear. Laboring may readily be distinguished by the sound of the exhaust and the jerky motion of the car. More mileage can be made with less strain on the mechanism, by using the intermediate gear whenever necessary, as the car speed will be greater under this condition than when the engine is laboring in high speed.

Engine speed is dependent upon the throttle opening which is controlled by hand or foot or both. In the latter case, the hand control should be set in a position that will not permit the engine to race when the foot control is released. The latter is extremely useful in traffic as both hands are free for the remaining controls. The throttle, whether hand or foot operated, should never be opened suddenly as this puts a tremendous strain on every part of the driving mechanism. Racing of the engine when idling is also harmful.

The proper handling of the car is also an important factor in obtaining tire mileage. Many have the habit of driving in the car tracks; occasionally when the road is very rough, it is advisable to drive in the tracks, but if done continuously the tires will suffer, as under this condition approximately one-half of the tire width is called on to support the load. Another habit that is considered bad practice is to follow a track around a curve, as frogs and switches have sharp edges which cut into and damage the tires. When crossing a track, disengage the clutch and slow down making the approach at a slight angle in preference to crossing at right angles. Under inflation, sudden brake or power application, wheel alignment, skidding and anti-skid devices are also destructive to tires. Driving around a sharp curve at high speed will do more harm than many

miles of straight road work, as the side thrust acting on the walls of the tire will have a tendency to weaken it.

Skidding and How to Check It:

Skidding is the term applied to the side motion of the car, particularly the rear end, but in its true sense, it also applies to a sliding of the front wheels from any cause. Skidding may be caused in several ways; for instance, a car travelling at a high speed on a crowded road will skid sideways if the surface is wet or slippery and the brakes are suddenly applied. The cause of this is not attributed to the action of the differential gears as generally supposed, but to the slippery road surface, the locked wheels and the momentum of the car. Thus to cause this skid, the rear wheels must be locked, so that the tires are free to slide in any direction. To check a skid caused by locking the rear wheels, release the brakes and turn the front wheels in the direction in which the rear wheels are skidding. This is an effective remedy for most skids of the rear end of the car.

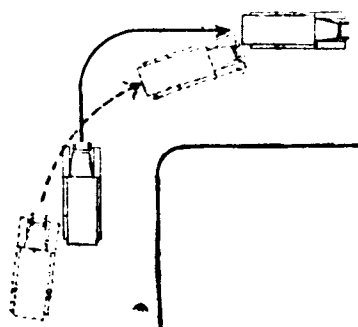
Skidding, however, is not confined to locked wheels, but may also occur when the slippage of one rear wheel is greater than the other, due to the action of the differential and the fact that there is less traction on one wheel than the other. When skidding is due to a lack of traction it may be corrected by turning the front wheels in the direction of the skid and momentarily reducing or shutting off the power. In order to be effective, however, this action on the part of the driver must be also simultaneous with the skid. Skidding in a straight path may also occur and if the road is clear no damage can be done, except to grind the tread of the tires.

In turning corners on slippery road or pavements, it frequently happens that the front wheels skid, which requires immediate action if trouble is

to be avoided. Suddenly applying the brakes for a moment so as to lock the rear wheels will skid the car in the direction in which it is to be turned. Releasing the brakes and slightly increasing the power will bring the car round the corner without any overtravel of the front end.

Parking in A Small Place :

Few of us know how to work a car into a small space and to get near a wall or a curb when it is necessary to wedge in between 2 cars not more than 16 to 20 feet apart. As a general rule one will attempt to get into such



The Right Turn

Solid lines represent the correct method and dotted lines the incorrect method.

a space head first, whereas it will be practically impossible to work into a place by this method, particularly if the space is limited. No amount of working and cramping the wheels avail unless there is ample room, and then it will take a good deal of maneuvering.

The proper method of parking in such a space is to swing to the right and alongside of the forward car. This will set the car in position heading slightly out, making it possible to begin backing into the space between the two cars. Existing conditions will govern to some extent the exact movement and the amount of turning the hand of wheel, but it can be seen by this idea that the car can be brought close to a

curb at the rear wheel, when it becomes easy to cramp the front wheels towards the curb. This turning of the wheels, however, should be performed while the car is still under way, or else destruction of the tires may result.

The final step is to straighten the car in its position, as close to the curb as possible, yet allowing room for swinging out. The wheels should stand not nearer than six inches from the curb, or will be difficult to extract the car from a close space. The getting out process is exactly the opposite.

Over the Hills :

A great hill may be taken on high speed, but as soon as the car slows down or the engine begins to labor, reduce the speed by shifting gears. When shifting from one speed to another, it is important to have the speed of the engine as nearly balanced as possible with the speed of the car in the particular reduction to which the shift is made. Gears should never be shifted with the engine racing; the engine should be throttled down, and, immediately after the change has been made the throttle should be opened gradually. Gear shifting under such conditions is somewhat of an art and can only be accomplished through experience. It requires the complete disengagement of the clutch and sufficient time to allow the gears in the transmission to slow down, but not until they come to rest. If the gears are shifted with the clutch engaged or partly engaged, stripping of the gear teeth is likely to occur.

In travelling down the hill the speed is likely to become excessive and thus injure the car before the driver realizes it. And, it is more difficult to slow down for road irregularities. Economy can be promoted by coasting down hill and throttling the engine and in addition this has a tendency to cool the engine, if it is inclined to heat. In approach-

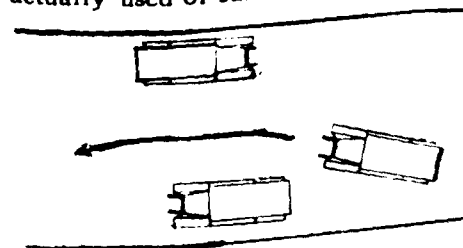
ing the bottom of the hill care must be taken not to engage the clutch suddenly otherwise the entire mechanism of the car will receive a severe shock.

In descending grades, the car can be much more easily controlled and considerable wear on the brake lining saved if advantage is taken of the retarding effect created when the car is compelled to drive the engine. Thus on slight grades, simply closing the throttle and leaving the clutch engaged will offer considerable resistance to the acceleration of the car.

Rules of the Road :

Driving is not considered a difficult task, but each community has a number of laws which must be obeyed. Yet, it is surprising how few motorists know or heed these laws, or to be more specific these rules of the road. Many of these are very simple and more or less defined by custom. They may be outlined as follows :

In passing a vehicle headed in the opposite direction turn to the left of the center of the existing beaten track or most travelled part of the road, allowing room for the other vehicle to pass. This means that in case of a road under repairs the driver should turn to the left of the track that is broken through and being used, regardless of the position of this track relative to the original road. The same applies in the country to the part of the width of the road that is actually used or suitable for driving.



The arrow indicates the path of a vehicle in overtaking another vehicle

When overtaking a vehicle always pass to its right except in unusual situations as given below. As a rule

it is best not to pass to the right when overtaking a vehicle, unless absolutely forced to do so. It is better to slow down until the road is sufficiently cleared to pass.

When passing a vehicle at a fork in the road, if the vehicle ahead shows that it is going to take the right fork, it is allowable to pass to the left, if one desires to take the left fork. One should not cut the corner when making a turn to the right into a cross road, but should continue on the left side sweeping in a large arc to the left hand side of the cross road. In turning to the left it is best to keep close to the left hand side and slow down, making the turn as close to the curb as possible, to avoid head-on collisions with vehicles that may be met after making the turn. Avoid a wide sweep, but allow ample room to miss the curb with the rear wheels.

Stationary objects or other vehicles standing in the road occasionally make it necessary to pass to the right, but this should never be done when approaching a cross road or a road leading to the right, as the vehicle ahead may turn in that direction, thus pocketing the vehicle attempting to pass between it and the curb.

Moving out from the curb should be done in a gradual diagonal line, and when swinging into the curb it should be done slowly and gradually. The driver following is also entitled to the courtesy of knowing the intentions of the vehicle ahead, therefore hand signals should be used under all conditions.

Whenever there is doubt as to the intentions of the vehicle ahead, approaching from the opposite direction, or the road is obstructed in any way, the best plan is to drive slowly and not follow the vehicle ahead too closely.

In Conclusion :

One of the first essentials to successful operation of a motor car, is its careful inspection before leaving

the garage. One should inspect the radiator, fuel tank and engine oil gauge to ascertain whether he has an ample supply of oil, fuel and water. He should also check up on any irregularities noted on the previous drive and make any adjustments that may be necessary, instead of waiting until absolutely forced to do so on the road side.

We are all interested in obtaining many years of satisfactory service from a motor car. Manufacturers are doing their part to this end in building the vehicle, which is demon-

strated by the vast number in service. Only by proper handling on the road or in any service and giving the minor troubles which originate prompt attention, can the motorist contribute his necessary share toward obtaining this performance. Proper handling and knowledge of the car is the key to success, as luck is only a small factor in the operation or driving of a motor car.

Another article reading "That new car of yours," will appear in the next issue.



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General Instructions of Battery Care.

Inspect the battery once a week while the car is in use, and once a month when the car is laid up.

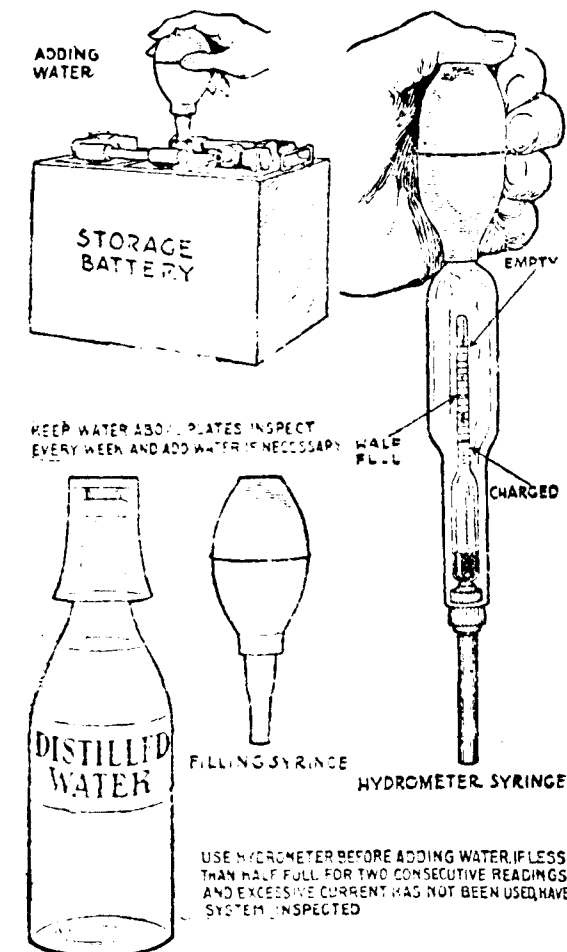
Be sure that the battery plates are always covered with the electrolyte.

Do not add acid to the electrolyte.

Do not take an open flame near the battery.

Use nothing but pure distilled battery water and keep it in a non-metallic vessel.

As the starter has harder work to do during cold weather, because of the thickened oil which makes the engine harder to turn over and the fact that the gasoline does not fire so readily, particular attention should be paid to the battery during the winter months. When the engine is very cold, crank it by hand several times before turning on the starting switch.



If the temperature of the battery shows indications of rising above 119 degrees Fahrenheit, discontinue the charging or reduce the charging rate.

WEEKLY INSPECTION:- Take the specific gravity reading of the electrolyte, add water if necessary and wipe the battery clean and dry.

Make sure that terminals are covered with film of vaseline to prevent corrosion.

MONTHLY INSPECTION :— If car is laid up, the battery should be removed and left in the care of a battery service station. If this is impracticable, the battery can be kept in good condition by running the engine idle once a month at a speed that corresponds with a car speed of from 18 to 20 miles an hour until the specific gravity reading comes up to maximum, showing a completely charged battery. If the temperature of the battery tends to rise above 110 degrees F. during this charge, slow down the motor or discontinue charging until the temperature drops.

ADDING WATER :— Unscrew the filler caps on each separate cell and add the water until the solution covers the battery plates to a depth of $\frac{3}{8}$ inch.

CAUTION :— While the acid solution is not strong enough to burn the hands badly, it will quickly destroy varnish, upholstery or clothing. In case it spills or splatters, you can neutralise the effect with ordinary soda or with ammonia.

ACID :— New acid should never be added to the battery unless the electrolyte has been spilled, and then only by an experienced battery man.

FREEZING :— If the battery is kept fully charged there is absolutely no danger of the solution freezing, as acid solution with specific gravity of 1.300 does not freeze until a temperature of far below zero F. has been reached. On the other hand, a battery in the uncharged state is apt to freeze, for the specific gravity of 1.100 freezes at 19 degrees above zero.

If a battery stands in a discharged state for any length of time the plates become sulphated. This sulphate generally takes the form of a

thin white coating which insulates the active material of the plates from the liquid. The only way to reduce sulphation is by long charging at a low rate, a laborious and expensive operation. Make sure, therefore, that the battery is always kept fully charged.

When a battery is in a chronic state of weakness and will not hold its charge, the trouble may be due to a weak or "dead" cell. In such case, take a voltage reading of each individual cell in addition to making the usual specific gravity readings. For this test use a low reading volt-meter graduated at least to one-tenth of a volt.

Since the voltage of an idle storage battery, regardless of its condition, is practically constant, the reading will have to be taken while the battery is working. Therefore, remove the spark plugs to relieve the compression, depress the starter button and take a voltage reading of each individual cell while the battery is turning over the motor. If the voltage of any one cell is the defective one, and a competent battery man should be consulted at once.

When a battery is discharged at a rate of $7\frac{1}{2}$ amperes and a cell voltage drops to 1.8 volts, that cell has reached the limit of its normal discharge.

If the battery is fully charged and in good condition, it will stand a discharge of $7\frac{1}{2}$ amperes for 8 hours without causing the voltage of any cell to drop below 1.8.

IF A BATTERY DOES NOT HOLD ITS CHARGE :— It takes a whole lot of current to actuate the starting motor—much more than the generator is capable of delivering to the storage battery in the same length of time. Consequently, if the car is started and stopped frequently, and scarcely ever given a long run so that the generator will have time to generate sufficient current to make good the current used, it is evident that the battery will become discharged. Especially is this true in cold weather, when an extraordinary amount of current is required for starting.

It is also characteristic of storage battery to show a drop in voltage during cold weather, regardless of the demands on the battery.

Consequently, the battery will lose its charge gradually until a point is reached when it will no longer start the engine. If the car is run under these conditions, the battery should be charged from an outside source at least once a month, or the engine should be run idle for an hour or more at a time at a speed corresponding to 18 miles an hour to charge the battery.

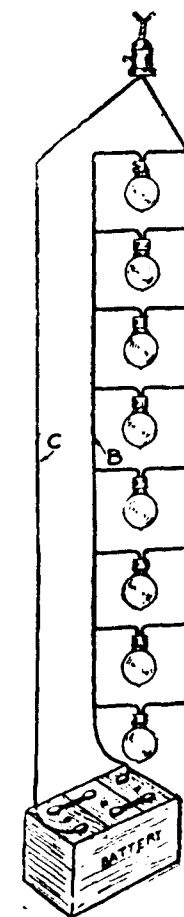
Sometimes a battery will lose its charge for no apparent reason. If the battery on a test discharge shows normal capacity, and the car is operated properly, the trouble may be due to a "ground" in the system.

CHARGING BATTERY FROM OUTSIDE SOURCES :— The battery can be recharged from a direct or alternate current source, but first determine whether current is "alternating" or "direct." Also the voltage or pressure. This information may be obtained from the electric power or light company.

DIRECT CURRENT 220-VOLT CHARGING PROCESS :— If "direct" current is available, a certain amount of resistance is required in series with the battery, to adjust the charging current. A number of lamps, such as are used for house lighting, may be used as resistance. (Battery cannot be charged by alternating current in this manner. Use rectifier.)

Figure shows how lamps are connected in direct current circuit for battery charging.

Connect a wire "A" from one side of lighting source to one side of these lamps, and to the other side connect another wire "B". Then connect wire "C" to the other side of lighting source. When the other end of this third wire "C" is connected to the end of wire "B" the lamps should light. Now determine which is positive (plus) and which is negative (minus)



wire. Disconnect these two wires "C" and "B" which caused lamps to light, and dip the ends in bowl of water-containing a few tablespoonfuls of salt or one tablespoonful of battery solution. Hold the immersed ends about one-quarter inch apart. The wire from which the small bubbles rises is the negative (minus) wire. This wire should be connected to the negative battery post marked "Neg." The other wire, which is positive (plus) should be connected to the positive battery post marked "Pos.", but not until proper amount of resistance has been determined.

If the direct current is 220 volts any of the following lamps can be used as a resistance to permit a current of 4 amperes to flow into the battery to charge it:

Illustrating method of charging three-cell (6 volts storage battery from 220 volts direct current circuit).

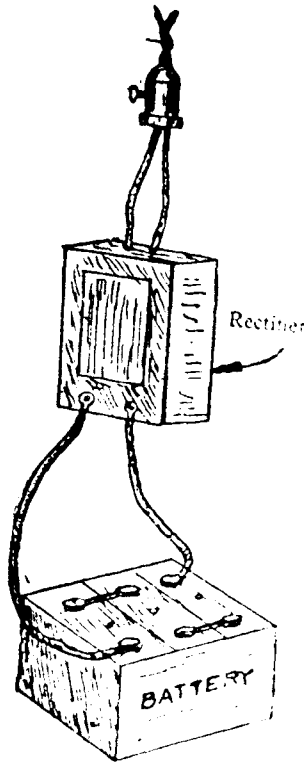
- 4—220—Volt—16 C.P. (50 Watt) carbon bulbs.
- 2—220—Volt—32 C.P. (100 Watt) carbon bulbs.
- 8—220 Volt—25 Watt Mazda Tungs. Lamps
- 4—220 Volt—50 Watt Mazda or Tungs. Lamps.

The charging operation should continue from 24 to 30 hours, or two periods of 15 hours each.

HURRYING CHARGE :— If it is necessary to charge the battery in a

shorter time, follow directions marked on battery name plate (side of battery), or obtain this information from battery manufacturers.

ALTERNATING CURRENT CHARGING PROCESS:—If alternating current is available, the batteries can be charged by a rectifier, Figure, which can be procured through electri-



Shows how storage Battery is charged from 110 volt or 220 volt alternating current main, by use of a rectifier for changing current from alternating to direct.

cal supply houses. In ordering, state the voltage and cycles. This information can be obtained from the Electric Power and Light Company. Also state voltage and capacity of battery to be recharged.

To charge battery through a rectifier, connect rectifier in alternating current line, as per directions accompanying instrument. Recharging should take

place once every month when the car is not in use.

When Dynamo is Disabled Recharge from Outside Source.—If through accident to dynamo it becomes necessary to recharge the battery from outside source, charging should take place whenever battery becomes weak.

SYMPTOMS OF A DISCHARGED OR EXHAUSTED BATTERY.

Symptoms.

1. Car lamps burn dimly or not at all.
2. Starting motor refuses to crank engine.
3. Starting motor turns slowly.
4. Lamps burn brightly when first turned on, but soon become dim.
5. Specific gravity low.
6. Electric horn less powerful than usual.
7. Lamps dim excessively when starting pedal is pressed.

DISCHARGED OR WEAK CONDITION OF THE BATTERY MAY BE ATTRIBUTED TO THE FOLLOWING:

Causes.

1. Dynamo not charging battery.
2. Dynamo belt slipping.
3. Wires in contact with frame.
4. Battery plates not fully covered with electrolyte; defective or leaky cell.
5. Drain on battery due to excessive lamp load.
6. Excessive use of lamps while engine is not running.
7. Engine not running fast enough to charge at sufficient rate.
8. Incessant use of starter.
9. Battery terminals not firmly connected or charging circuit open.

When car is stored and not in active service, one battery wire should be disconnected to minimize the possibility of any drain on battery.

WHEN CAR IS STORED:—The battery should receive a refreshing

charge at least once a month. To accomplish this, run the engine at speed equivalent to 12 or 15 miles per hour for 6 or 8 hours. If this is impracticable, battery should be sent to a reliable garage and recharged once

a month, and stored in a dry place, until battery is again in active service. Battery at each recharging should be inspected to see that electrolyte fully covers the plates.



Why is it that you and I do these Things

Why is that you and I—

Sometimes drive fast and attempt to stop suddenly on a wet pavement? Try to start the engine with the switch turned off?

Forget that using the starter a certain number of times will exhaust the supply of current in the battery, unless the engine is run sufficiently to recharge it?

Fill the lubricator in the engine, and neglect to lubricate other parts of the car?

Advance the spark when starting the engine?

Allow the clutch to engage suddenly?

Apply the brakes suddenly when it isn't at all necessary?

Push in the starting button when the engine is running?

Neglect to inspect the level of the acid in the storage battery, even after two or three weeks have gone by, and overlook a supply of distilled water needed?

Shift from third to second or first gear when the car is running at a high rate of speed?

Forget to keep the radiator filled with water.

Shift reverse gear when the car is moving ahead?

Neglect to investigate any unusual sound which may develop in the car?

Overlook keeping the tires properly inflated?

Release the clutch when the throttle is open very wide?

Benevolently allow every Tom,

Dick and Harry to drive our car without admonition or chiding?

Use the starter to run the car, even while understanding that excessive overload in the battery is very injurious?

Allow our car to stand in puddles of oil or water, while perfectly aware that neither one is good for our tires?

Overlook the fact that pan, engine and other mechanical parts of a car should be kept clean?

Turn corners too fast, liking to be spectacular even at cost of tires?

Open the throttle quickly, without giving the motor a chance to pick up gradually?

Find it too much trouble to keep our brakes adjusted—or at least too much trouble to keep our mind on it?

Fail to release the clutch before shifting gears?

Accelerate too quickly, and so enjoy the car jumping and the motor pounding?

Fail to examine the car occasionally for loose nuts and bolts?

Race our engine under any and all circumstances when we feel like it?

Fail to heed the squeak that calls for oil?

Take our car out without noticing whether it is properly lubricated?

Attempt to start without being sure the brakes are released?

Make adjustment on our cars before knowing whether we're right, just trusting to luck?

Let our engine labor up a steep hill without dropping to low gear?



By Motor to the Palni Hills.

BY A CORRESPONDENT.

DURING the season the number of visitors to the hill station of Kodaikanal, in South India, is very large, and the popularity of the place is steadily increasing. Its bracing climate and wonderful scenery, with the splendid opportunities it provides for boating, golf, tennis etc account for its popularity but it was shunned by many on account of the difficulty of getting there. Until recent years the visitors had to make the ascent up the Palni Hills on which Kodaikanal is situated, by

all is changed, for an excellent motor-ing road has been made from the foot of the ghats, which begin some twenty miles from the railway station, and on this the motorist may make his journey, not only with ease, but with pleasure. The engineer must have had the needs of the motorist in view when he aligned the road, for, though there are many difficult places to be negotiated, he has succeeded in making his road without corners of any special difficulty. It is true there are, especially in the first part, many



At the Fort of the Palni Hills.

methods not altogether pleasant or easy, and many were afraid to face it. After a long journey by road by slow transit carts, the ascent of the hill had to be made, either on small hill ponies or by foot. The difficulty of getting luggage up was also a serious one, and it was not surprising that those seeking a holiday should hesitate before deciding to make such a journey. But to-day

corners to be negotiated, and the driver must exercise care or he may find himself in trouble, but none of these necessitate any reversing. There is evident a desire to lessen the difficulties of the motorist as much as possible, and every one who makes this journey will acknowledge his indebtedness to the engineer responsible for the fine piece of work.

From Kodaikanal Road Station, on the South Indian Railway, the journey is begun. There are motor services available for those who are not fortunate enough to possess their own cars, and it is also possible to get private cars at reasonable rates. Few make the journey by the old route, for the journey by motor bus is so much easier and quicker than the bullock transit. The ride, for the first twenty miles is on a practically level road, there being nothing of special interest to see. Several small villages are passed through, but after about fifteen miles, we begin to feel we are really approaching the mountainous district. On the right one gets several excellent and pic-

limited through the greater part of the year. Gradually we find ourselves amid the mountains, and on the left side there are great precipices. Then, in the distance we see range after range ascending. These hills are mostly bare, and here and there one can see a fall of wall into the valley below. The rocks look very precipitous. The road is constantly winding, scarcely a hundred yards without a turn and the gradient as still as one desires. Our car ran up with perfect ease for we had carefully tuned it up before starting, and it was a real pleasure to see it tackling the stiff work with pleasure and success. But almost any engine would get hot by the time those



The Ghat Road near Kodaikanal

turesque views of the mountains and the photographic enthusiast will doubtless stop his car to get one or two snaps of the distant hills. Very effective are some of the views that include a small tank in the foreground.

After about twenty miles the ascent begins. The first five miles are a real test both of the power of the car and the skill of the driver. The surface is usually in excellent condition, partly because it has been well made in the beginning, and partly because the traffic is somewhat

five miles are accomplished, and every motorist welcomes the sight of the water supply placed at a convenient position on the road. Here we halt for a while when the engine is cooled. And what a glorious view one gets of the country all around. Right across the valley one sees the great heights and the dark valleys. If it happens that it is a thundrous day, the hills have a peculiarly forboding appearance.

After cooling the engine we pass on for the remaining twenty five miles

or so, along a road that is a delight to the motorist. The surface continues good, and one is spared that monotonous run along a level road with unchanging scenery. Here the road is continually bringing us into new country, and every turn opens out a new vista. In a journey of that distance, along a ghat road which must wind round many hill sides, we naturally expect variety of scenery. And one gets enough to satisfy the most greedy in the run to Kodaikanal. The first part is through somewhat wild scenery, the hills being only sparsely covered with trees and bushes, but as we reach the last part

beauties of nature. For several miles we pass along a perfect and level road in the wealth of beauty all around. It is indeed a fine ending to our ride. Before Kodaikanal is reached, we pass a fine waterfall, which, in the monsoon season must be a very beautiful picture. But our journey was done in the season, and then the water was comparatively small in volume. Here the pioniers from Kodaikanal spend many happy hours, for it is easily reached from the station by car, bicycle or even on foot. As we pass along we see a fine imposing building, a Roman Catholic Institution, for the training of young



Motoring up the Ghat.

of the journey we enter quite different country. Here everything is rich in foliage, and in the beds of the small streams that we pass on the way here is a wonderful wealth of flora. We begin to see the large tree ferns or which the Hills are famous. The growth is almost too thick to permit of our seeing into the dells where the streams flow, but now and again, here is an opening, and the most enthusiastic motorist will not begrudge a little pause to look into these

fellows for the priesthood. There is a large staff of priests here in charge of this institution, and a considerable number of students resident there. They come from all over India.

Our run from Kodaikanal Station has taken us a little over three and a half hours, for we have not come very fast, and we have made several halts by the way. We have been too busy taking in the views of the journey to concern ourselves about getting to our

destination. But now that Kodaikanal is reached we find that the place itself does not fall one whit behind that of the journey. We make our way to a fine new hotel which has been built by an enterprising gentleman, on the Lake side. It is delightfully situated, and we know that we shall enjoy our stay in Kodaikanal. We are given to understand that the prospects of motoring in Kodaikanal, or neighbourhood are not very bright, for there has been comparatively little development of the district around. That will come in time, and doubtless Kodaikanal will provide the same delightful

about so much, one gets new views every hundred yards or so. In the early morning, provided the cranking of the engine does not give too much trouble, on account of the cold, a run round here is a great delight; then, too, in the pleasant evenings, one never tires of a ride round this road of about three miles. Then too, there is the run to the Golf Course, one of the most picturesque places in the vicinity of Kodaikanal. Every morning in the season, considerable numbers go out in their cars for a round of golf, and as this is through most picturesque country, the non-golfer will find pleasure



The Hotel Kodaikanal.

runs that the older hill station of Ootacamund does already. However, from our hotel we see that, even though our car be placed in the garage till the day of our return, we shall have many lovely places to see. The Lake itself is an endless source of joy. But we soon find that our car need not remain idle, for the run round the lake is one that affords a pleasure not soon forgotten. It is a level road, it is true, but it winds

in the trip. Kodaikanal may not offer the same attractions as some of the older stations to the motorist, but there are few more enjoyable rides than the one we have described from the Station to Kodaikanal itself, and even though the car may not be used much on arrival, the motorist will feel repaid for the great ride up the ghat road. The Government will doubtless as money is available, give help in

opening up more roads in the neighbourhood so as to provide scope for their own cars, and cannot think with pleasure of a holiday resort that



Kodaikanal Lake View from Bouthouse.

the motorist. In these days good roads leading out into the country are necessary, as so many possess



AT SPENCER'S CHRYSLER BUILDS FOUR CYLINDER CAR.

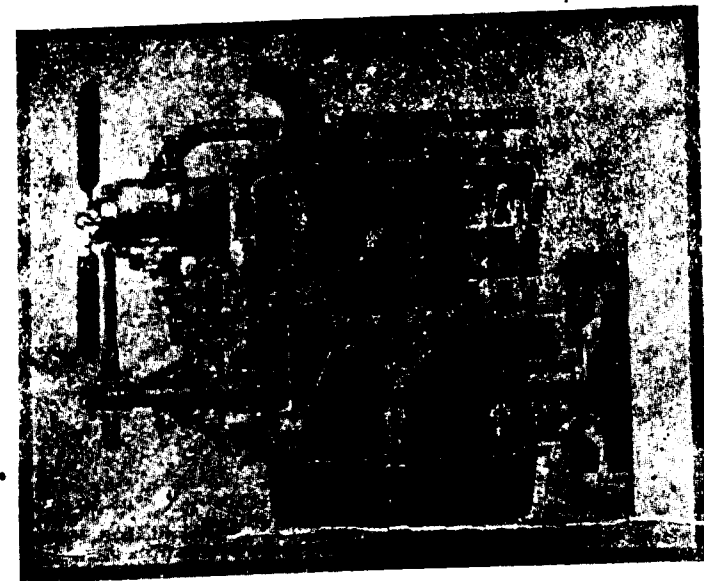
The new four-cylinder line consists of touring, coupe, coach and sedan. All models are finished in two-tone Duco and closed bodies are built by Fisher. Lockheed hydraulic four wheel brakes are offered as optional equipment at additional cost.

The 109-in. (2.72 m.) wheelbase chassis follows conventional practice, employing a four-cylinder 358 x 4 1/2 in (92.1 x 114.3 mm) L-head engine

x 5.25 in, balloon tyres on all model except the sedan which has 30 x 5.77 in. tyres.

Nickel radiator shells are standard on all models and the closed bodies have Fisher V-V windshields, automatic windshield cleaners, sun visors, rapid acting window regulators and and rear view mirrors.

Bodies have a line of beading extending from the radiator and around



Partially sectional View of the Chrysler Four Engine.

developing 33.5 h.p.; single dry plate clutch; three speed transmission; semi-floating rear axle; half-elliptic springs; and artillery wheels with 30.

the bodies, providing a double belt effect which adds greatly to the symmetry of the coach work.

The touring car is upholstered in

hand crushed dual tone Spanish leather which harmonizes with the beige brown exterior finish and the black top. An exceptional amount of space is provided in the two passenger coupe for luggage and parcels, the rear deck opening the full width and a second compartment being located just back of the seat for holding small parcels. This model is upholstered in leather and the exterior finish is Sheraton gray. This color with cream striping is also used on the coach. Interior trim in the sedan is plush with dull silver hardware and the exterior is done in beige brown with blue striping. Storm curtains opening with the doors, are provided on the touring car.

Speedometer, oil gage, ammeter, dash light, carburetor control and rotary one lever type lighting switch are mounted in an oval panel in the center of the metal dash. Natural wood wheels with 13 8 in. spokes are regular equipment on all models.

Unusual smoothness is claimed for the power plant in which vibration has been minimized by placing all rotating parts of the engine and clutch in dynamic and static balance, by matching all piston and rod assemblies to within .01 oz. before assembly and by the use of a heavy crankshaft. In addition, the front engine

The tyres on the Chrysler Four models are 30 x 5.25 in. balloons except on the sedan, which carries 30 x 5.77 in. Rims are of the Hayes attached lug type. The wheelbase is 109 in. (2.72 in.) The engine dimensions are 35 8 x 4 1/2 in. (92.1 x 114.3 mm.); horsepower 38. 5. Four wheel brakes are optional at additional cost.

support is a 14-leaf transverse semi-elliptic spring and at the rear, the power plant is carried by live rubber bushings as shown in one of the accompanying illustrations. This en-

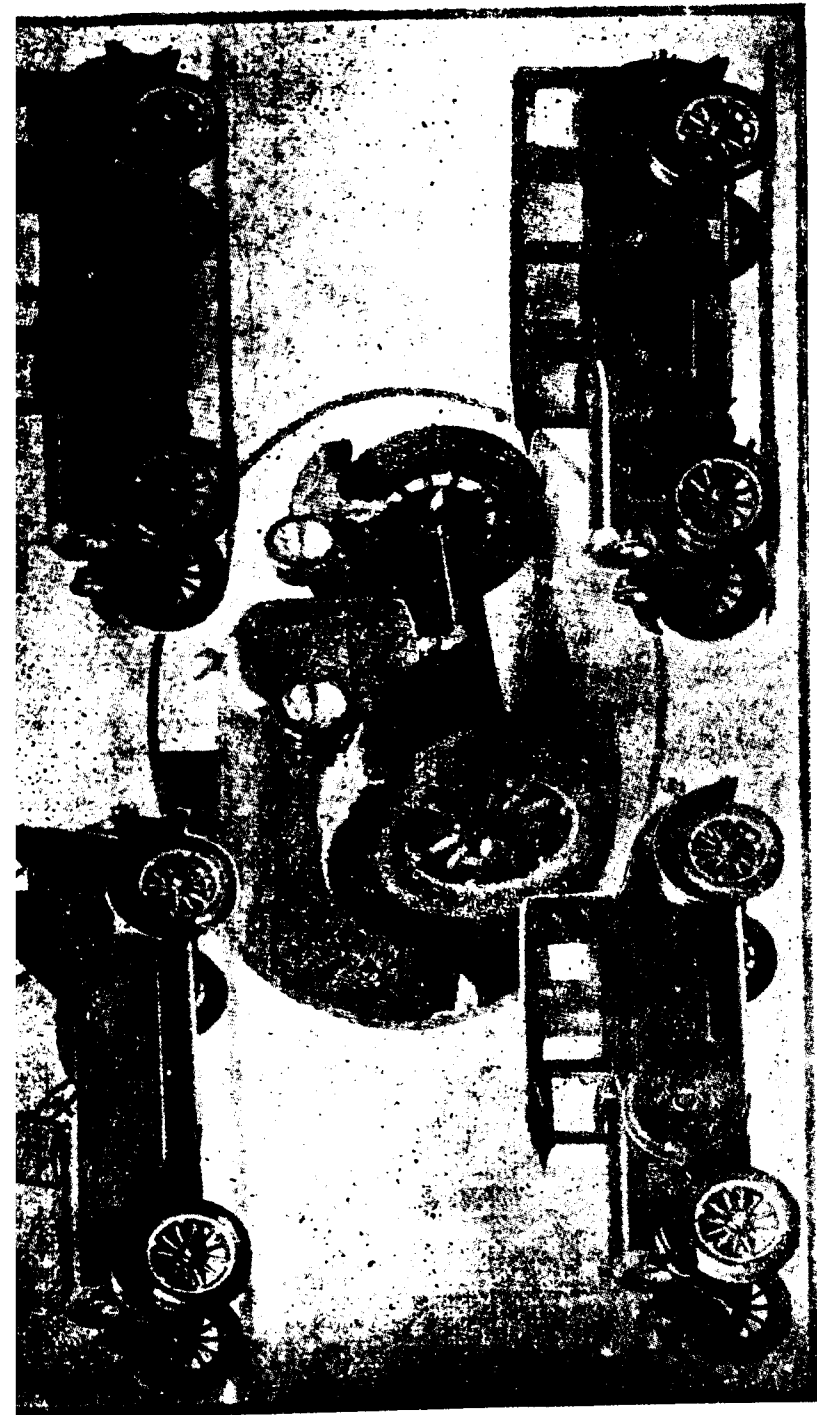
gine mounting insulates the frame from any vibrations developing in the engine.

Cylinder block and crankcase are cast integrally of gray iron and the detachable head is of the same material. The oil pan is pressed steel. The crankshaft is mounted in three main bearings.

All main and connecting rod bearings are lubricated by oil under pressure and a stream of oil from the front main bearing provides for the timing gears. A new feature of this engine is the method of lubricating the cylinder walls and piston pins. A hole drilled through the web of the connecting rod and bearing on the left side when viewed from the front, registers periodically with the oil hole on the crank pin. Registration of these holes is so timed that when they are in line a stream of oil is spurted out by the pressure in the crankshaft, thereby lubricating the pins and cylinder wall. The Oil-Vac fuel feed system is incorporated in the oil pump and mounted on the right side of the crankcase. The oil reservoir holds one gallon and before entering the pump, all oil passes through a strainer.

Cooling water is circulated by thermo-syphon and the system has a capacity of 3 1/2 gal. (23.3 liters.) Air is drawn through the tubular radiator by a 17 in. two-bladed fan which is carried on the forward end of the generator shaft and driven together with the generator at twice engine speed by a V-type molded belt. The generator is mounted on a cradle bolted to the top of the gear case cover and is held in place by a steel trap. The starting motor is mounted on the left side of the engine and is equipped with the Bendix drive. Semi-automatic distributor and coil are mounted at the front of the engine on the gear case cover. The electrical equipment is of Remy manufacture with the exception of the battery which is a six-volt Willard.

Clutch and gear set are assembled with the engine to make up a unit



Center: Radiator and hood lines of the Chrysler Four. Upper left—The touring model. Upper right—The coach. Below—The coupe and sedan.

power plant. The reduction ratio provided by the gear set are low, 3.42 to 1; second, 2.02 to 1; third, direct; reverse, 4.62 to 1. The main shaft is carried on two single row ball bearings while the countershaft is mounted in plain bronze bushing. The emergency brake is of the contracting type and is mounted on the rear end of the transmission. Drive to the rear axle is through a tubular propeller shaft which is fitted with three disk rubber-fabric universal joints at either end.

Rear axle torque and propulsion are taken through springs. Final drive is through spiral bevel gears providing a reduction ratio of 4.64 to 1. The pinion and pinionshaft are integral and the latter is carried on a double roll ball bearing at the forward end and a single roll ball bearing at the rear. Taper roller bearings are used at the differential and annular ball bearings at the other ends of the axles.

On both the two and four wheel

brake models ball thrust bearings are provided at the knuckle heads, bronze bushings at the pivot pins and tapered roll bearings at the wheel. Heavier construction to withstand the torque of front wheel braking and king pins inclined at an angle from the vertical characterize the four wheel brake front axles. The steering gear is a semi-reversible worm and sector type, specially designed for use with low pressure tyres. At the center of the steering wheel the horn button and short lever type spark and throttle controls are located.

Semi elliptic springs are used all around. Exclusive of the front tubular brace and the rear engine support, four heavy gage cross members are employed in the frame.

The Chrysler Corp. has acquired all the business and properties of the Maxwell Motor Corp., and incorporation papers of the Chrysler company have been filed. The present Chrysler is a modification of the Maxwell.

**Are you
driving
your
Car?**

**Half the pleasure of
owning a car consists
in driving it yourself.
LEARN TO DRIVE**

We can teach you to drive your car, to handle it, to understand its mechanism, to manage it. You will then have your car in prime condition always.

Our "C" course does it. Drop a card for particulars.

SRI RAM MOTOR SCHOOL

57-58, Walajah Road, Mount Road P. O. MADRAS.

Recognized by the
Madras Government

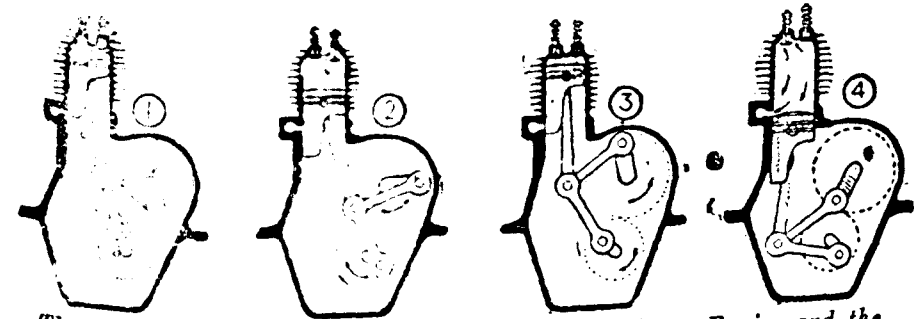
A New Type Four Cycle Engine.

NEW FRENCH POWER PLANT OF NOVEL DESIGN
INCORPORATES A VARIABLE STROKE TO UTILIZE THE FULL
POWER OF THE EXPANDING GASES.

THE power of an internal combustion engine is developed by the force of the expanding gases acting on the head of the piston, and one of the disadvantages in this type of engine is that the length of the piston travel in each stroke is equal to that in very other stroke. The exhaust valve must open when there is still considerable pressure in the cylinder and the part of the energy of combustion is lost while other undesirable effects are also produced such as excessive heating of the walls, valves, etc. and an excessively noisy exhaust. Foreign publications and a recent issue of Mechanical Engineering carry descriptions of an engine which is an example

The operation of the engine will readily be understood from the cycle of operations shown in the accompanying diagrams by following the movement of the three connecting rods, C, D and E through four strokes of the piston, bearing in mind that the Secondary crankshaft Y runs at one-half the speed of the main crankshaft O. The piston is made unusually long to cover an auxiliary exhaust port at the lower end of the power stroke and cut away at one side to provide, presumably, clearance for the main connecting rod.

The main crankshaft O is connected to the piston by means of the conventional type of connecting rod C



These illustrations show the cycle of operations Andreau Engine and the mechanism of which the variable stroke is made possible.

of what designers will do to get the last ounce of power from an engine of given cylinder capacity.

This engine is known as the Andreau and its essential feature is that the conventional method of operation has been substituted by a simple mechanical combination which permits a variable stroke making the power and exhaust stroke longer than the intake and compression stroke. In order to produce this variable stroke, the engine is provided with two crankshafts, twelve connecting rods and a set of gears between the two shafts.

and the secondary connecting rod E. The two crankshafts are connected by means of gear and rotate in opposite directions. The secondary crankshaft Y is connected to the main connecting rod C by means of a secondary connecting rod D.

The first illustration shows the position of the piston at the end of the exhaust stroke. It is on its upper dead center and about to start downward on the suction stroke. As its movement on this stroke starts, the inlet valve begins to open and a fresh charge enters the cylinder. In the

second illustration, the piston is at the bottom of the intake stroke and in its movement upward, which is the compression stroke, it will stop a certain distance from the cylinder head as shown in illustration 3. The uppermost point of the piston travel on this stroke is dependent upon the compression ratio chosen for the engine. On the firing or expansion stroke it will be noted that the piston descends very much lower in the cylinder as shown in the illustration. As the piston reaches the bottom of the cylinder it uncovers an auxiliary exhaust port, while the exhaust valve also opens and on the return stroke of the piston the spent gases are forced out of the cylinder and the piston again travels to the point shown in the first illustration. The firing or expansion stroke is actually two and one-half times the length of the compression stroke. In the conventional engine, the connecting rod has the same obliquity during each stroke and the lateral pressure of the piston against the cylinder wall is at its maximum during the working stroke. In the Andreau engine, the main connecting rod C is practically vertical throughout the power stroke, the movement of its lower end being controlled by the small connecting rods D and E, the crankpins of the two crankshafts being so arranged as to bring about this condition.

The advantages claimed for the design are: Prolonged expansion of the gases, much lower exhaust gas temperature and little friction between the piston and cylinder walls due to the position of the connecting rod on the power stroke. The connecting rod D is in tension during the working stroke and therefore may be made very light. All parts of the engine, as a matter of fact, can be made lighter than those of the ordinary engine, but it seems doubtful whether their number does not nullify this advantage.

Were it not for the fact that this engine is claimed to have developed great efficiency under prolonged and very severe tests at the Laboratory of Arts and Manufacturers in Paris, one would be inclined to regard it as merely a mechanical curiosity. A fifteen-hundred hour test disclosed no appreciable wear particularly in the articulation of the three connecting rods. These tests have also indicated that in an engine of passenger car or truck size a fuel consumption 0.35 pounds per brake horse when running on ordinary gasoline may be confidently expected. This would be essentially the consumption of a semi-Deisel engine enjoying the advantages of running on gasoline. A general consideration of the design would indicate that there are no especially difficult production problems involved in its manufacture.



WHAT IS THE FUTURE COST OF TYRES

The price of crude rubber has reached its highest in 1925 which has not been reached for many years.

Tires prices are of course advancing in sympathy with the higher rubber quotations and what will be the developments of the next few months are impossible to foresee. Various smaller tire companies have been forced to suspend operation and for every territory there is prospect of numerous readjustments in regard to tire prices, tire distribution and tire merchandising, not to mention the changes that will certainly follow in the manufacturing field.

The demand for tires, however, is steadily growing and far more tires are being consumed today than in any other period of the industry. Every automobile in operation today requires at least three, possibly four, replacement tires every year. Four million new automobiles in 1925 necessitate four or five tires as original replacement for each. Service requirements in some territories are such that as many as five or six tires are worn out by an automobile in active operation each year. The world's tire bill is mounting by leaps and bounds.

In effect, there is a shortage in rubber supplies. Production of crude rubber cannot be increased over night, although with the present situation we may expect that everything possible will be done to put crude rubber on the market. While cost varies

through the different producing areas, there can be no doubt that rubber returns the most generous and handsome profits with the 1925 profits.

The reclamation of used rubber, which had practically been given up during the reign of low prices, is being resumed on a large scale. Such rubber can be used in many ways. Furthermore, it can be anticipated that vast new plantations will be opened up which, in a few years, will throw out a new flood of production. The advance hints of these new plantations are already in the air, from Africa, parts of Oceania, Ceylon, and elsewhere in the tropical regions.

Thus an immediate period of shortage, extending perhaps for one, two or three years, seems positive. Then will come an oversupply and the trade cycle of a few years ago will be experienced again.

Such a prediction is becoming widely extant in the rubber and tire industry. Perhaps it may be averted. But, in any event, a curious and decidedly dangerous situation exists to-day, the developments of which will concern every section of the automotive industry.

FORD REFINES CHASSIS.

New type transmission bands simplifying replacements and steering gears of 5 to 1 ratio making for easier steering are now fitted on Ford cars and trucks. All dealers and traders throughout the world are being supplied with the new parts.

It is no longer necessary to remove

the transmission cover to change the new type of bands as a detachable ear on one side allows the bands to be withdrawn and replaced through the transmission cover door.

To remove the ear, it is only necessary to insert a tool which is made by bending over the end of a screwdriver one-quarter of an inch, through the end of the ear into the square hole in the end of the brake band, lifting up on the tool and forcing the band down.

Where a car is equipped with the old type of bands, the transmission cover must be removed. The slow speed shaft must be cut off about 7/8 in. (22.2 mm.) from the shoulder and a new type slowspeed adjusting screw installed.

Steering gears of 5 to 1 ratio, which were originally installed only in cars equipped with balloon tyres, are now being used on all cars regardless of tyre equipment. A new steering wheel, 17 inches (43.1 cm.) in diameter is used with the new steering gears which together with the increased ratio adds materially to the steering control. The gears used in the new 5 to 1 steering gear are not interchangeable with the old 4 to 1 type and it is very important that mechanics be told of the difference of the gears of the two ratios to prevent accidents due to locking.

Using sidebolts and blocks for the crankcase arms on the "TT" trucks have been discontinued. This allows the mounting of the engine to be somewhat more flexible and reduces the possibility of cracking the crankcase arms.

BUICK MAKES WORLD TRIP.

Within six months, a Standard Six Buick touring car has completed a trip

around the world, having been driven in that time a total of 16,499 miles in fourteen different countries and by a hundred or more drivers provided by the distributors holding the sales territory through which the car passed. The trip was undertaken, under the supervision of the General Motors Export Co., as a demonstration of the wide extent of Buick sales and service facilities, and was carried out through the cooperation of Buick distributors and dealers in England, Holland, Belgium, France, Egypt, Palestine, Syria, Mesopotamia, India, Ceylon, Australia, New Zealand, Hawaii and the United States.

A standard model in all respects the car was shipped from New York on Dec 20, 1924, and its long journey overland was begun at London late in January. Under the plan, the car was not accompanied by a factory driver or service mechanic, but was passed along from distributor to distributor, each of whom was responsible for the car and its performance while it was in the local sales territory.

The itinerary thus covered was London, Amsterdam, Antwerp, Paris, Marseilles, Port Said, Beirut, Basrah, Bombay, Calcutta, Colombo, Perth, Adelaide, Melbourne, Sydney, Auckland, Christchurch, Dunedin, Invercargill, Napier, Wellington, Honolulu, San Francisco, Flint and New York. The car reached New York on June 23.

The longest stretches of the journey unbroken by water haul were:

From Port Said, Egypt to Basrah, on the Persian Gulf, 1400 miles.

The Trans-India trip, from Bombay to Calcutta.

From Perth to Sydney, in Australia, 2500 miles.

From San Francisco to New York, 3000 miles.

Fun from Here and There.

"Here, boy," said the wealthy motorist, "I want some petrol, and get a move on! You will never do anything in this world unless you push. Push is essential. When I was young I pushed, and that is what got me where I am."

"Well, Gov'nor," said the boy, "I reckon you'll have to push again, 'cause there's not a drop of petrol in the place."

It is stated that motoring parties supper are becoming increasingly popular. Apparently, students have not the monopoly of burning the midnight oil.

WHEN OPINIONS DIFFER.

The defendants were all certain that they had not been speeding. "We may have been putting on speed when we got to the hill, but we could be down to twenty miles an hour within two car lengths," said the first one. "I'm sure," said the next man, that we weren't doing more than fifteen miles an hour, and at the cross roads we were down to ten."

The third merely put it: "We were practically at a standstill when the policeman came up."

"If I hear any more witnesses I shall have the car backing into some one," said the magistrate "I'd better stop the thing now. Three guineas fine."

Motorist: "How do you know if I am exceeding the speed limit when you haven't a watch or anything."

Country Constable: "Well, Ye see that yellow dog a chasin ye, didn't ye? When that dog can't keep up with a fellows Goin more than thirty miles an hour."

It was the dear old lady's first ride in a taxi, and she watched with growing alarm as the driver continually put his

hand outside the car as a signal to the traffic following.

At last she became exasperated.

"Young man," she said, you look after that car of yours and watch where you're driving. I'll tell you when it starts raining.

NO JOY RIDE.

He and his young wife were taken for a motor trip by some friends.

"Are you quite comfortable?"

"Quite, darling."

"Not being jolted?"

"Oh, no, sweetheart."

"Not in a draught?"

"No, lambkin."

"Then change seats with me."

A COLOUR SCHEME.

Gray: "Having your car repainted to match your wife's gown, eh? Isn't it rather expensive?"

White: "It's cheaper than buying a gown to match the car."

A MOVING STORY.

The elderly passenger was talking to the conductor concerning his work on the bus.

"I shouldn't mind the driving," he said, "but I don't know how I should manage to do all the writing a conductor has to do while the bus is in motion."

"Oh, you get used to that, sir," replied the conductor.

"When I write a letter at home now I have to get my little daughter to shake the table."

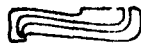
"I wish you would do something for my son, Doctor. He is terrible, reckless, careless, and don't care a hoot about consequences."

"What is he, a motor car-a-banc driver?"

THE car came to a deadstop in the main street of a scattered hamlet on the Scotch hills. The driver was one of those American tourists who are accustomed to having what they want—and quick. He leaned out of the car and beckoned to a native who was festooning the side of the village pub. "Say, you feller," he said, waving a pound note, "I want a can of petrol and I want it slick. Hustle, man, hustle! What you guys want round this part is push. Push d'ye hear,

same as we've got in America." "Aweel," said the unimpressed Scot, without moving. "I'm thinkin' ye'll have to push some more. There's nae petrol in this place."

Struck by a motor-car at dusk a sparrow was given first aid treatment at Hampstead police station. In all fairness to the motorist however, it must be admitted that the bird was not carrying a red tail-light.



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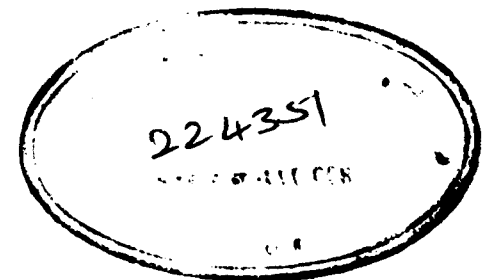
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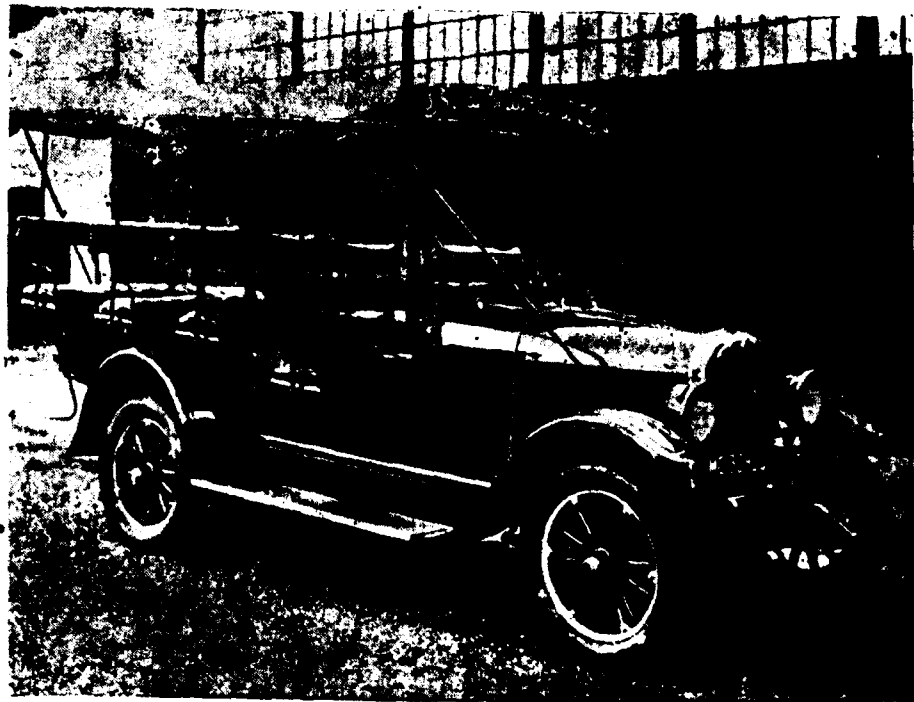
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