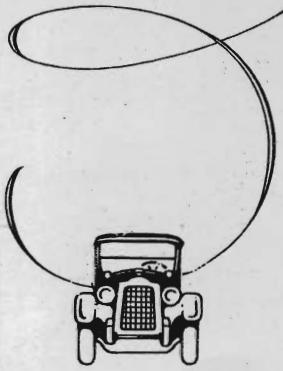
KNOW YOUR CAR

Know Your Car

A Primer of Automobile Lubrication



STANDARD OIL CO. OF NEW YORK
26 BROADWAY


Back of every drop of Socony
stands Standard Oil Company of New York

INTRODUCTION

DURING the past few years we have been asked many questions concerning the care and upkeep of the automobile. To meet this demand for information we have prepared this book of first principles. We have tried to make it a primer which treats the automobile in terms familiar to us all.

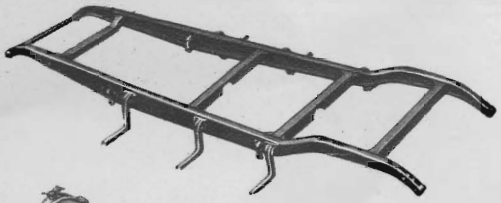
The automobile is one of the finest assemblies of machinery in existence, and yet its mechanisms are not complicated. Master its principles and you will be repaid many times over for the attention and care which you give your motor car.

Oil and grease are consumed on a mileage basis. Replenish them on the mileage basis. Let your speedometer and this book act as your guide. Use them to see that every moving part receives the proper attention where it needs it and when it needs it.

If you will read "*Know Your Car,*" if you will study its interesting and instructive illustrations, if you will follow its simple charts, it is our belief that you will lower your car-operating costs. Your car will serve you better, give you less trouble, and in the end you will benefit by greater trade-in values.

It is our earnest hope that "*Know Your Car*" will leave with you a better understanding of what actually takes place when you "step on the gas" or when you "shift" your gears.

We take pleasure, therefore, in dedicating "*Know Your Car*" to the vast army of men who, through their Socony Lubrication services, have made the automobile a more highly desirable and economical means of transportation.



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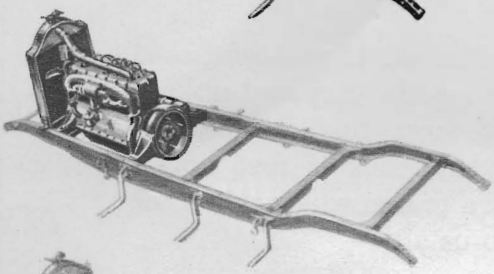

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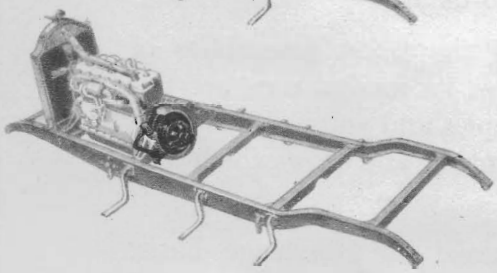

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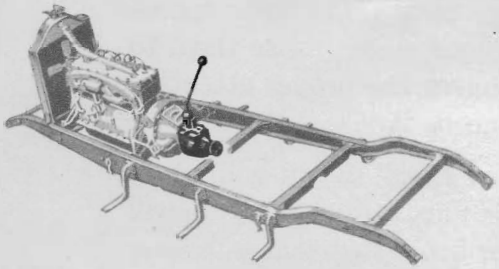

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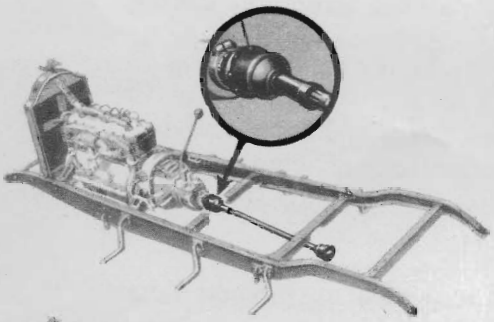

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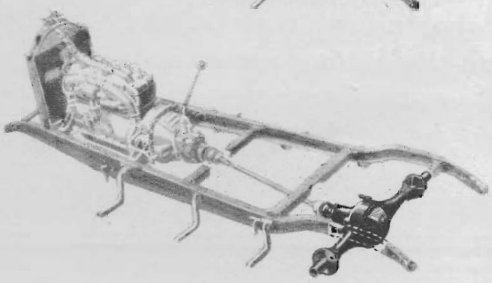

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First We Assemble Our Automobile

1. *The Frame*

WE begin the assembly of our automobile with a rectangular frame consisting of two long steel side members, braced with cross pieces for rigidity and strength.

The frame is the foundation upon which we will build our car. It must be exceedingly strong if it is to resist distorting road strains of every nature.

2. *The Motor*

To give our car a source of power we add a motor. The automobile motor is a marvel of compactness. It supplies the power of many horses to do your bidding—to speed along the highways and climb steep hills.

3. *The Clutch*

That we may control the power developed by our motor, that we may apply or release it at will, we install a clutch.

The metal housing which supports and protects the clutch is usually cast as an integral part of the engine crankcase.

4. *The Transmission*

We must be able to start our car, climb hills, and reverse. So we add a transmission.

The purpose of our transmission is to use more effectually the power of our engine. The transmission does not multiply the power of our motor. It merely changes this power into a more useful form—it gives more pulling power to our engine at a sacrifice of car speed.

5. *The Driveshaft and Universals*

To relay power from our transmission to the rear axle we install a driveshaft and universal joints. Universal joints are flexible couplers, permitting the angle of the driveshaft to change with the unevenness of the road.

6. *The Differential*

We next install a differential. Its main function is to direct the flow of power at right angle to our driveshaft.

Its other function is to allow our inside rear wheel to revolve more slowly than the outside rear wheel when rounding a turn.

7. *The Springs*

To smooth out road shocks and secure maximum riding comfort we support our frame on steel springs.

There are usually four springs in all—two anchored to the front and two anchored to the rear of the frame.

8. *The Axles*

To these springs we bolt our axles by means of steel clamps. The front axle assembly supports the front end of the car, above the front wheels. Our rear axle is next installed. It relays the power through the differential to the rear, or driving wheels.

9. *The Brakes*

For the purpose of stopping our car, two sets of brakes are installed—the foot brake, called the "service brake" and the hand brake, known as the "emergency or parking brake."

The principle of braking is simply the application of the retarding action of band friction to metal drums fastened to the wheels or driveshaft.

10. *The Wheels*

To provide means for our car to move along the highways, we next add four wheels. These wheels are placed on the axles, first inserting bearings which permit them to turn freely. There are three types of wheels: wire, disc, and wood.

11. *The Steering Gear*

We must be able to control the direction of our car. For this purpose we add a steering gear.

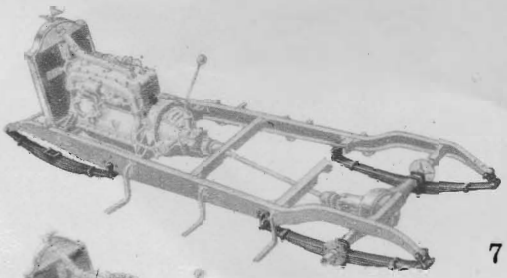
The front section of our axle remains stationary and the two hinged axle tips, to which the wheels are attached, turn in unison as we turn the steering wheel.

12. *The Body*

Finally, we fit the body, running boards and mud guards to our chassis.

Now that we have assembled our car, let us turn our attention to the engine and its component parts.

There is a Socony Product for every moving part in our assembled automobile—the nearest Socony dealer will recommend the proper grade for your car.



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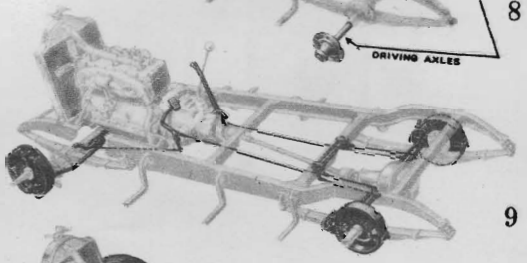

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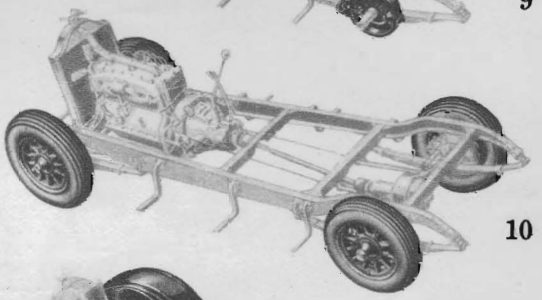

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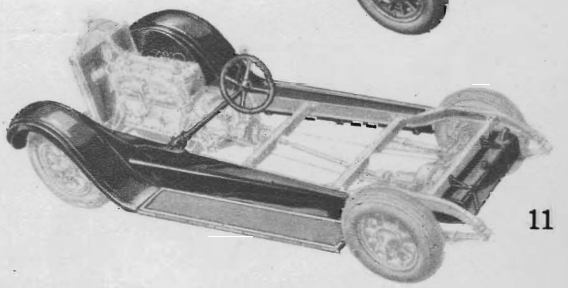

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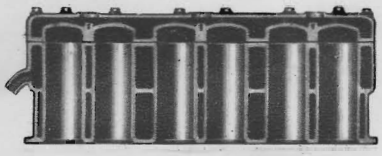

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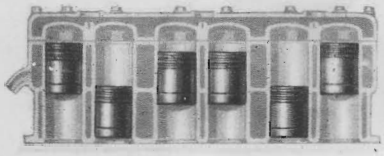

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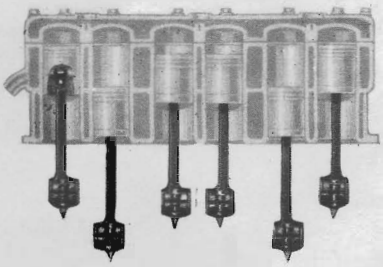

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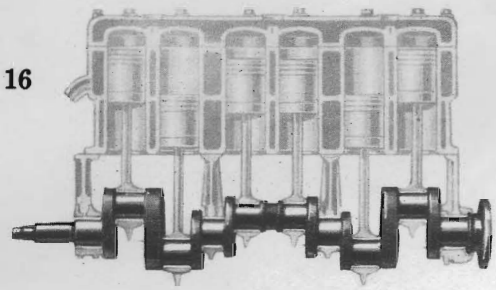

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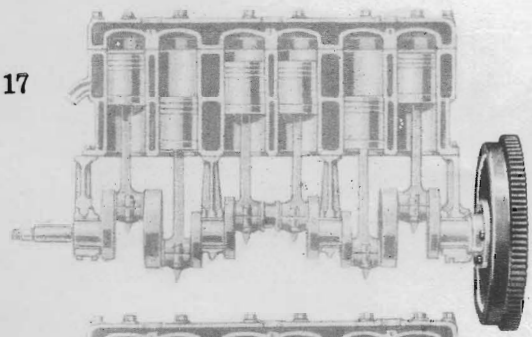

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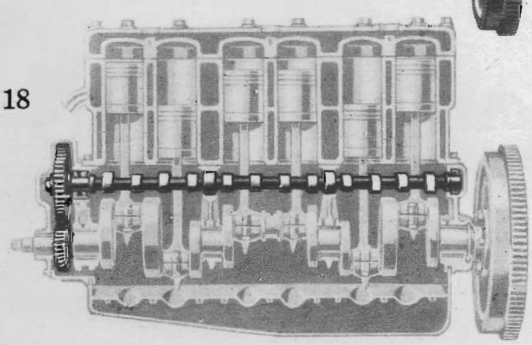


Now Let Us Examine Our Engine

13. *The Cylinders*

Our motor consists of a group of cylinders. A cylinder is a cylindrical hole in a block of cast iron, with water jackets surrounding it for cooling purposes.

14. *The Pistons*

In each cylinder there is a movable part called a "piston" which slides up and down. Pistons are hollow and usually made of cast iron or aluminum alloy. In operation our piston is similar to a plunger in a pump.

15. *The Connecting Rods*

The piston is supported in its cylinder by a connecting rod. The connecting rod is a metal shaft "connecting" the piston with the crankshaft.

At the piston end of the connecting rod there is a movement similar to our wrist-joint. We place a bearing here and call it a "wrist-pin bearing." The lower end of the rod "connects" to the crankshaft. We call it a "connecting-rod bearing."

16. *The Crankshaft*

We install a crankshaft. A crankshaft is a series of crank arms or coffee grinder handles, one per cylinder, forged as one shaft. It is suspended in our motor by a number of "crankshaft bearings."

As our pistons move up and down in their cylinders, the connecting rods follow, hence the crankshaft revolves.

17. *The Flywheel*

We fasten a flywheel to the end of the crankshaft to smooth out the flow of power from our cylinders.

Our flywheel is a balance wheel for our motor. Without a flywheel a motor would tear itself to pieces. Usually the flywheel has gear teeth cut in it for starting.

18. *The Timing Gear*

On the opposite end of the crankshaft from the flywheel, we mount a small gear which drives the camshaft gear. These two gears are known as "timing gears."

The timing gears "time," through the medium of a camshaft, the opening and closing of our valves.

To Open and Close the Valves We Add a Camshaft

19. *Camshaft Drive*

The illustration at the right shows the arrangement of the timing gears when the two gears move in contact with one another.

20. *The Camshaft*

Our camshaft is simply a straight steel shaft provided with a series of "cams" or eccentrics. There are two or more cams per cylinder arranged on the shaft to "time" the opening and closing of our valves.

21. *The Cams*

A cam is a flat section of an egg-shaped piece of steel which rotates with a "wobbly" motion as it revolves. The movement of our cams may be compared with the rotation of a phonograph record through which a hole has been bored off center.

22. *The Cam Followers*

It is impracticable to allow the ends of our valve stems to come in direct contact with their cams, because of wear. Hence we install adjustable cam followers.

Our cam followers are round metal rods with mushroom-like fittings where they rest on the cam surfaces. They are adjustable in length and transmit to the valves the up and down movement of our cams.

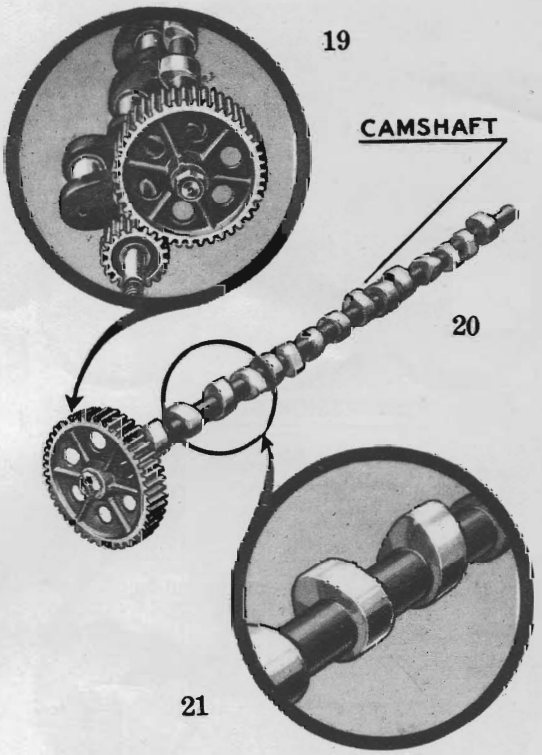
23. *The Valve Mechanism*

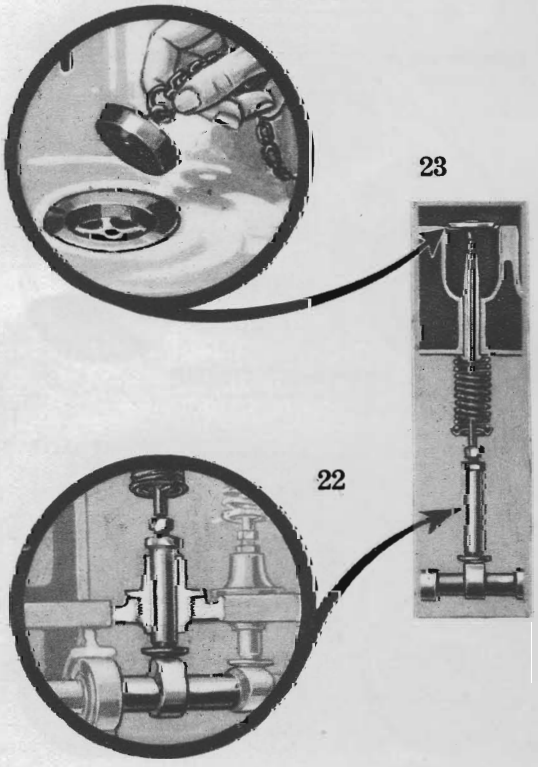
There are two types of valves—the "poppet" and "sleeve."

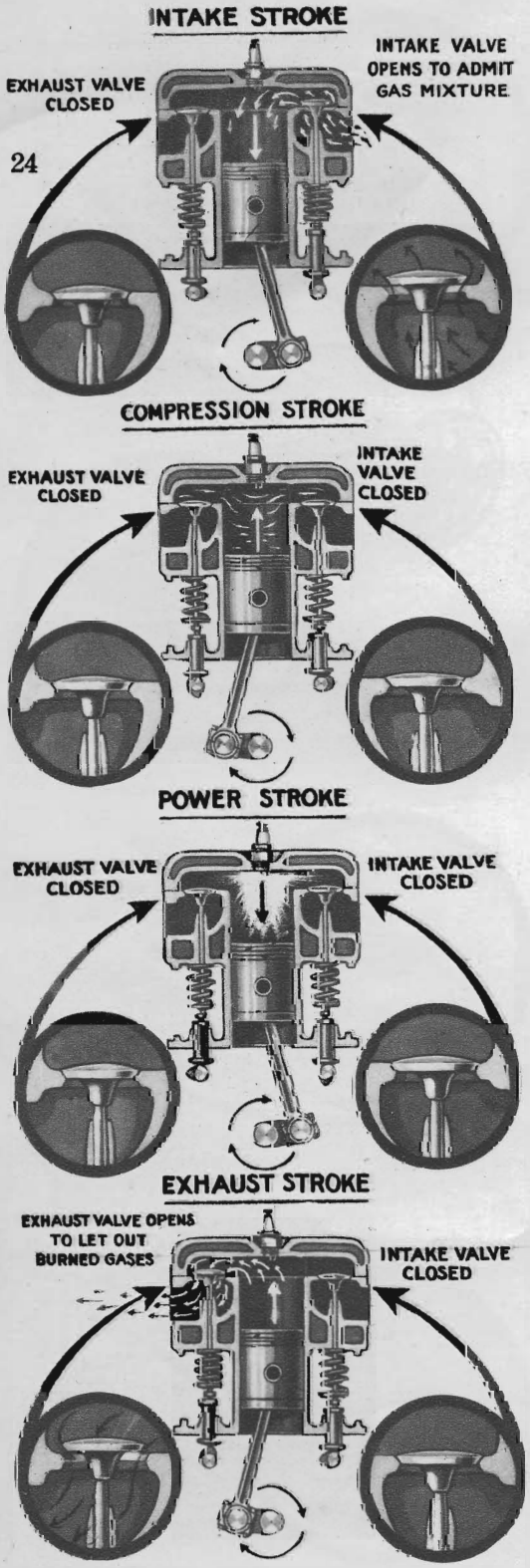
The "poppet" valves, the most commonly used type, act as gas tight "stoppers," alternately sealing and opening the combustion chambers to allow for the admission of fuel or expulsion of burned gases.

The "sleeve" valve, as its name implies, consists of two sleeves surrounding the piston, and moving up and down within the cylinder. As the sleeves move and the ports cut in them come opposite each other, passages are created into the cylinders for the admission of fuel or expulsion of burned gases.

Poppet valves are securely held in their tapered seats by stiff valve springs, Fig. 23. When our motor is started, these valves "intake" and "exhaust" in proper sequence due to the movement of the cams.







Concerning the Principle Under Which Our Engine Operates

24.

Our automobile engine operates under the four-cycle, or four-stroke principle. By "stroke" we refer to an upward or downward movement of a piston in its cylinder. Each upward or downward stroke of a piston is made possible by a half turn of our revolving crankshaft.

Naturally then, there are two strokes to every revolution of our crankshaft. And there are four strokes or two revolutions of our crankshaft per cylinder to each explosion, regardless of the number of cylinders. Each of these four strokes performs a definite function in the operation of our engine.

To operate our motor we first need fuel. Therefore, at the first half turn of our crankshaft, the piston in our cylinder travels downward. The "intake" valve is opened and the exhaust valve is closed. A mixture of gasoline and air is sucked through the open intake valve into the cylinder. This completes the first, or "intake" stroke. Our piston is now at the bottom of its cylinder.

As our crankshaft revolves on its next half turn, our intake valve closes. Both valves are now closed. Our piston travels upward and the mixture of gasoline and air in our cylinder is tightly compressed. This is the second, or "compression" stroke. Our piston has now almost reached the top of its cylinder.

A spark, and our highly compressed gasoline-air mixture is quickly ignited in its cylinder. Power is produced. As a result our piston is forced downward, thereby completing the third half turn of our crankshaft. This is the "power" stroke.

Now we must quickly expel the burned gases from our cylinder to clear the path for the next "intake" stroke. Up comes the piston again. The "exhaust" valve opens; the intake valve remains closed. This is the fourth, or "exhaust" stroke and completes the sequence by forcing the burned gases through the exhaust valve.

Intake, Compression, Power and Exhaust is the basis upon which our four-stroke automobile engine operates.

We Continue with the Assembly of Our Automobile Engine

25. *The Fuel System*

Let us carry on with the assembly of our engine. The next step is to install the units which comprise the fuel system. First let us add the intake manifold.

Our intake manifold may be described as a piping arrangement whose function it is to distribute equal quantities of fuel to each cylinder. This is of utmost importance. Quite often an intake manifold is so designed as to heat the gasoline before it enters our cylinders. Heat is a great aid to efficient combustion of our fuel.

The carburetor is the next addition to our fuel assembly. We bolt our carburetor to the lower end of our intake manifold. The sole purpose of our carburetor is to mix gasoline with air in the proper proportions before it is burned in our cylinders.

Now comes the vacuum tank—an ingenious device which permits gasoline to flow uphill. The function of our vacuum tank is to supply our carburetor with gasoline, drawn from the fuel tank.

And last but not least in our assembly of the fuel system we install the gasoline tank into which we pour the best of fuels when we fill with Socony.

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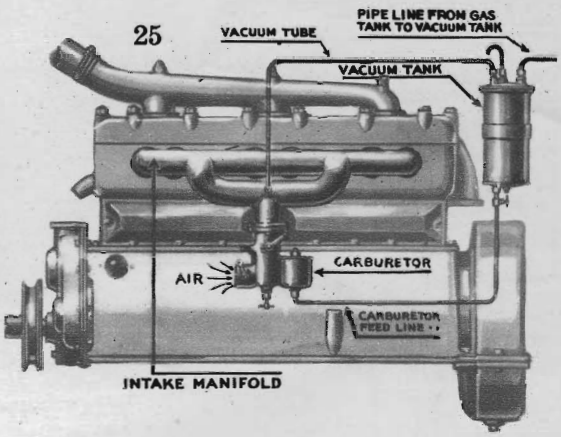

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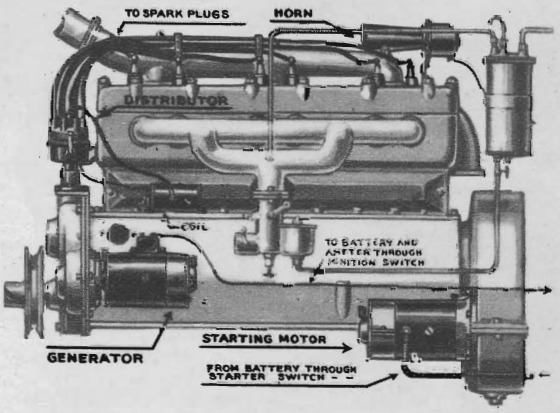


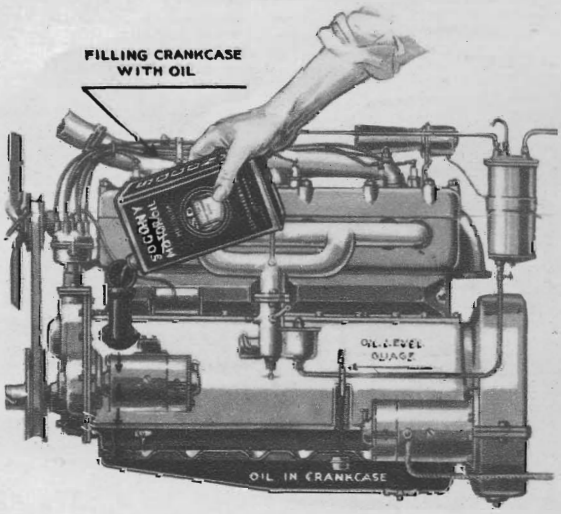
26. *The Electrical System*

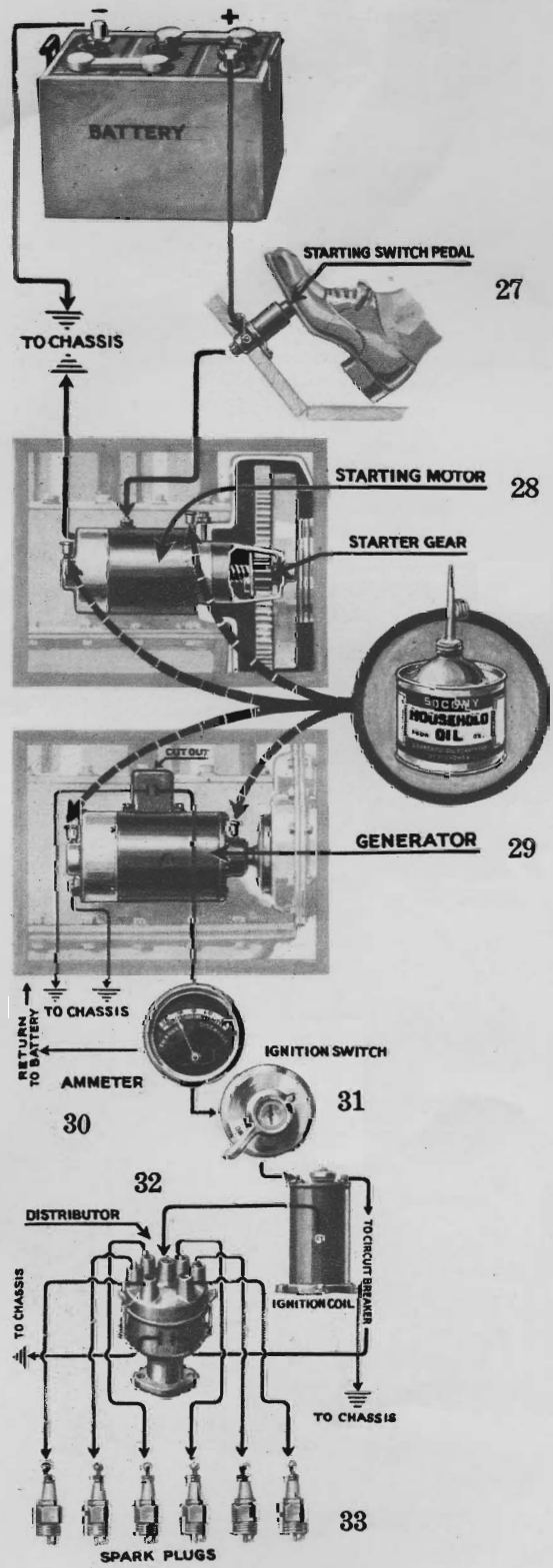
It takes but a short time to install the electrical units which are a part of our motor assembly. First comes the starter which mechanically cranks our engine. We next add the generator which "generates" electricity. Into the cylinder heads we screw the spark plugs which ignite our fuel.

We now add the distributor which "distributes" electricity to our spark plugs. And we complete the electrical unit assembly of our motor with the horn.

In building our automobile let us not forget to install the lower half of our engine crankcase. This is the metal housing which protects the bottom of our motor.

The lowest part of this half of our crankcase includes the "sump"—a reservoir for our Socony Motor Oil which we now pour into our crankcase through the filler pipe.





We Start and Run Our Engine

27. *The Starting Pedal*

When we step on the starting pedal, which is really a switch, we complete an electric circuit by joining two wires. With the completion of this circuit we draw current from our storage battery.

28. *The Starting Motor*

The current from our storage battery flows through wires to our starting motor. When the starter is operating, a small gear spins out on a shaft and meshes with the gear teeth on the flywheel. This gear springs back from the flywheel as soon as the engine starts.

Starting motor bearings demand a light oil. Socony Household Oil is an ideal lubricant.

29. *The Generator*

As our flywheel revolves, the generator "generates" electricity for our lights, supplies ignition and replenishes our storage battery.

Inasmuch as the generator revolves at high speed, it demands Socony Household Oil, the lubricant for generator bearings.

30. *The Ammeter*

The ammeter registers the "charging" rate of the generator, when running at sufficient speed to compensate for the current consumed by ignition and other circuits. While the generator is not running the ammeter registers the battery discharge.

31. *The Ignition Switch*

In starting our car, we close the ignition switch. The electricity from the generator or the battery flows through the switch into the ignition coil. In our automobile, the ignition coil transforms the low voltage current from the generator or battery, into high voltage current required for ignition.

32. *The Distributor*

From the ignition coil, our high voltage current flows to the distributor where it is "distributed" to the spark plugs. The low voltage current passes from the coil to the circuit breaker, in the distributor, where the circuit is "broken" at intervals as the distributor shaft revolves.

33. *The Spark Plugs*

Spark plugs are installed. They ignite the gasoline sucked into the cylinders.

How Our Spark Distributor Works

34.. *The Breaker Cam*

Our distributor is operated by a rotating shaft which is gear-driven from our crankshaft. On the upper end of this shaft is a piece of metal with as many sides as there are cylinders to our engine. This many-sided piece of metal is called the "breaker cam."

35. *The Breaker Arm*

The next item of importance in our distributor is the "breaker arm" which is pinned to our distribution casing at one end, permitting it to swing backward and forward for its entire length. In the center of this distributor arm is a piece of fibre. This fibre is held in contact with our breaker cam by a stiff spring.

If we watch, we can see this breaker arm move in and out as our distributor shaft revolves. The corners on our breaker cam push it away from the distributor shaft and the stiff spring forces it back after the fibre has passed the high points of our cam.

The action of our breaker arm and cam is similar to holding a stick against the spokes of a revolving wheel. Our stick contacts each spoke and breaks away.

On the end of our breaker arm is a piece of metal called a "breaker point." And on the opposite side of our distributor is a fixed arm fitted with a similar "breaker point."

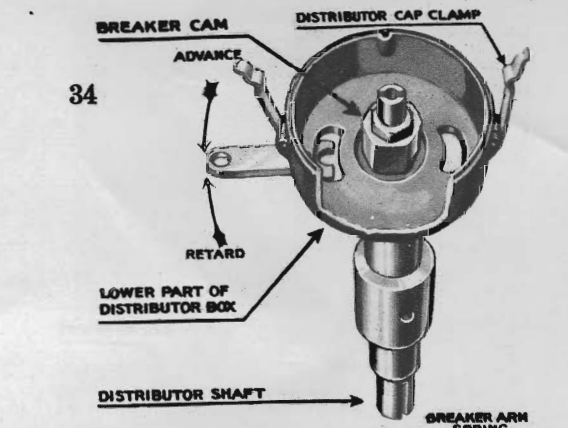
As our distributor shaft revolves, these points come together and "break," hence the name "breaker points." One of these breaker points is adjustable, but it is advisable to let your service station adjust it.

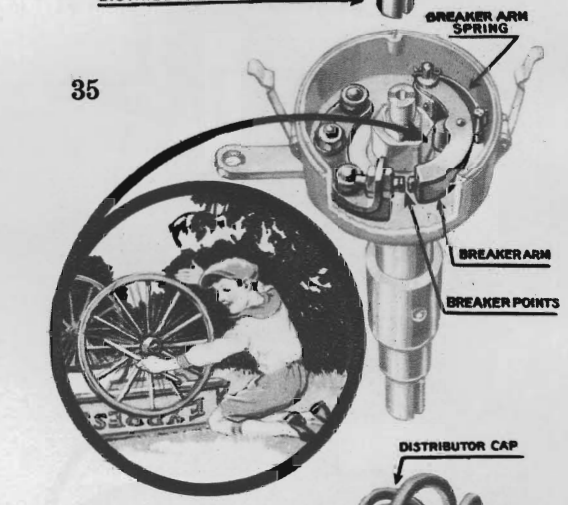
The function of our breaker points is to interrupt the flow of electricity to our spark plugs, for our spark must occur at just the right moment in our cylinders. The opening and closing of the points makes this possible.

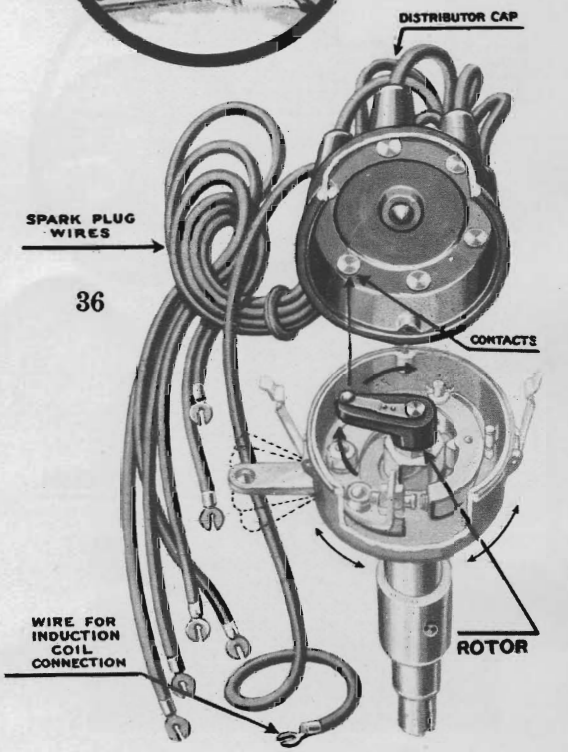
36. *The Rotor*

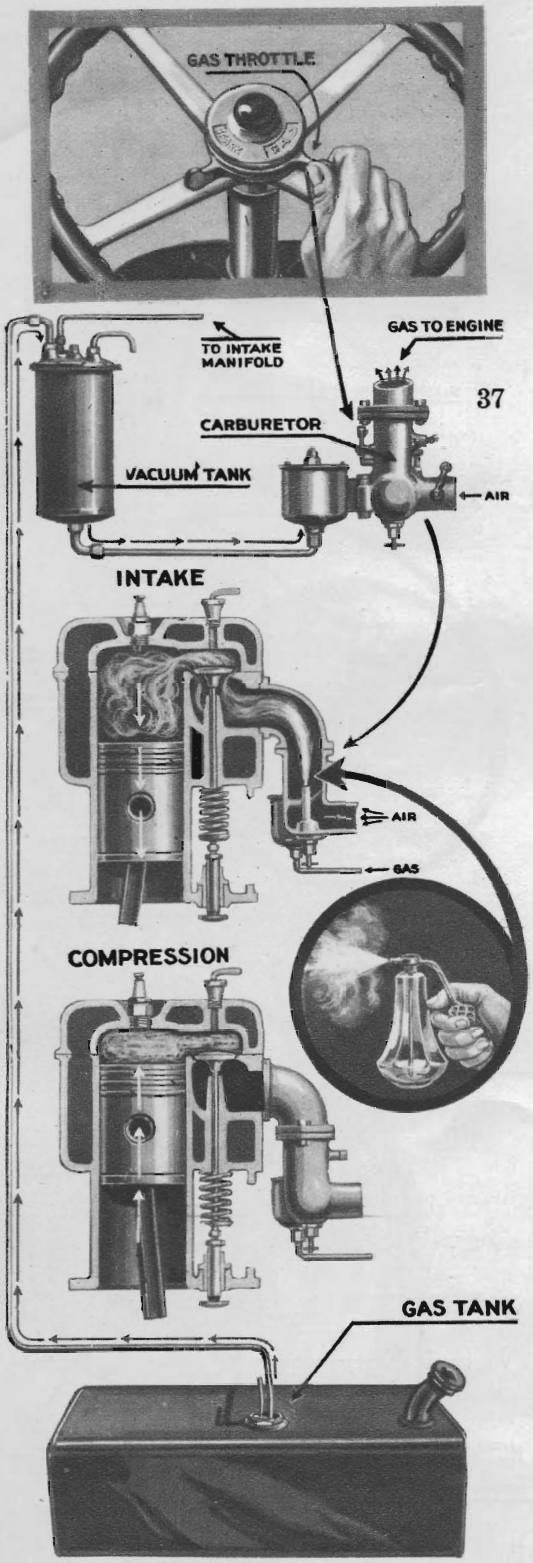
The rotor, which fits in the slot in the top of our distributor shaft and rotates with it, distributes the sparks to the proper spark plugs. It makes electrical contact with the studs embedded in the distributor cup.

When we advance or retard our spark we move the breaker points backward or forward which makes the spark in our cylinders come earlier or later in the stroke.









And This Is What Happens

37.

As the electric starting motor cranks our engine, liquid gasoline is sucked by vacuum from the gasoline tank, into the "vacuum tank" where it is strained and stored for use.

Most often the outlet of the main gasoline tank at the rear of our car is lower than the engine. The purpose of the vacuum tank is to insure a steady flow of gasoline to our engine regardless of the angle or position of our car.

The gasoline then flows from the vacuum tank into the carburetor where it is mixed with air before it is sucked into the cylinders in the form of a fog or vapor.

In some cars the gasoline is stored in a tank at a higher elevation than the carburetor. Thus it flows by gravity directly into the carburetor and not through a vacuum tank. In other cars the gasoline is fed to the carburetor by air pressure produced by a small compressor which forces air under pressure directly into the fuel tank.

Our foot accelerator operates a carburetor valve somewhat similar in principle to a stove-pipe damper. As we step on our accelerator we regulate the quantity of gasoline-air vapor sucked from the carburetor into the cylinders.

As the piston travels down in its cylinder, it creates a partial vacuum or suction and gasoline-air vapor is sucked from the carburetor to fill the space.

Our carburetor is a vaporizer or atomizer. It mixes air with gasoline in the form of an air-gasoline vapor. In principle, the carburetor is quite similar to the perfume atomizer.

The gasoline-air vapor, sucked into our cylinders, is now tightly squeezed or compressed by the upward stroke of the piston. This compressed charge will burn with great rapidity when ignited. The tremendous heat developed expands the gas and produces the power needed to drive the piston to the bottom of the cylinder.

The more gasoline-air vapor admitted into the cylinders, the greater the power and speed. Closing the carburetor valve reduces the speed of our motor.

The Vacuum Tank in Operation

38.

The purpose of our vacuum tank is to insure a steady flow of gasoline to our carburetor regardless of the angle or position of our car. Here is the way it does it.

Our vacuum tank consists of two tanks combined in one. An upper tank and a lower tank. The upper tank is the actual vacuum tank and the lower one a reservoir.

When we discussed the four-cycle principle, we saw that when the piston travels downward on its "intake" stroke it creates a suction or vacuum in a cylinder.

Ingeniously we take advantage of this vacuum and put it to work to suck the air from the upper chamber of our vacuum tank. This we accomplish through a copper tube which connects the upper chamber of the vacuum tank with our intake manifold. The intake manifold, we will recall, is the piping arrangement through which the gasoline vapor is sucked into our cylinders.

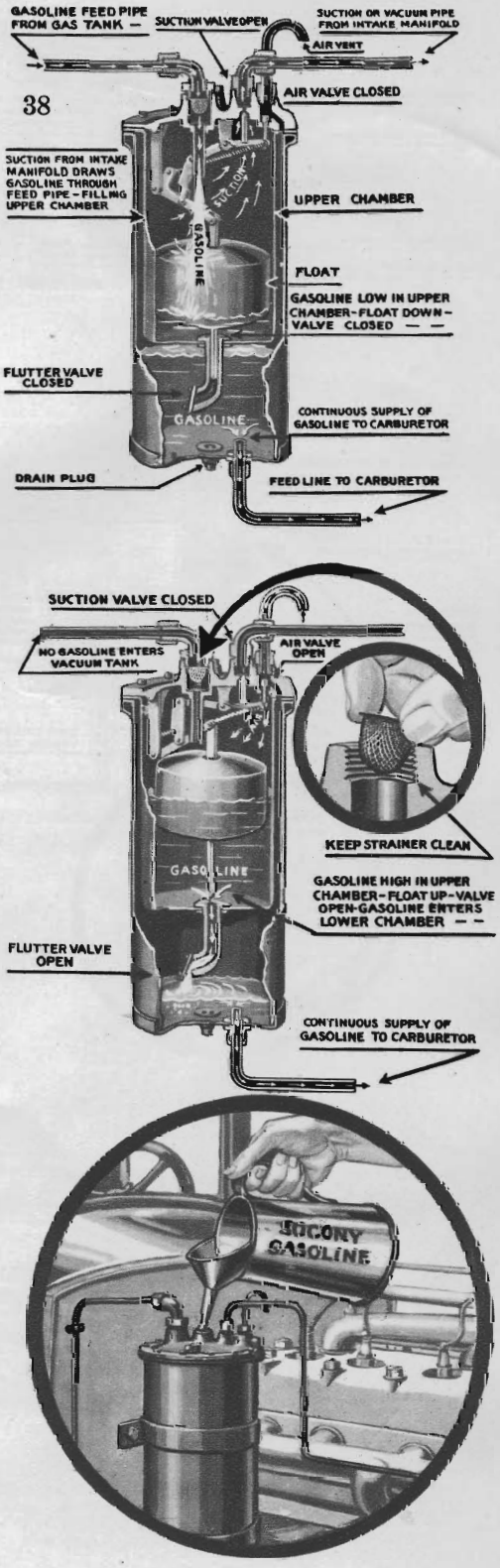
Nature abhors a vacuum. Hence the gasoline in our main gasoline tank rushes in to fill the vacuum. A copper tube connecting the main gasoline tank with the upper chamber of the vacuum tank acts as the vehicle through which our fuel is transported.

This process of sucking gasoline from the main gasoline tank continues until the fuel in the upper chamber reaches a level governed by a valve, which in turn is opened or closed by the rise or fall of a hollow metal can which floats in the gasoline.

When this metal float reaches a certain fixed level the suction or vacuum is automatically cut off, and air is allowed to enter this chamber through an air valve, thereby temporarily breaking the vacuum. The gasoline in this upper chamber now flows by gravity through a valve into the lower chamber or reservoir of our vacuum tank.

When we run out of gasoline it is necessary to prime our vacuum tank. Fuel poured into the upper tank flows through the valve into the lower tank and supplies the carburetor.

As our engine starts, the vacuum again operates and the flow of gasoline from the main tank is resumed.



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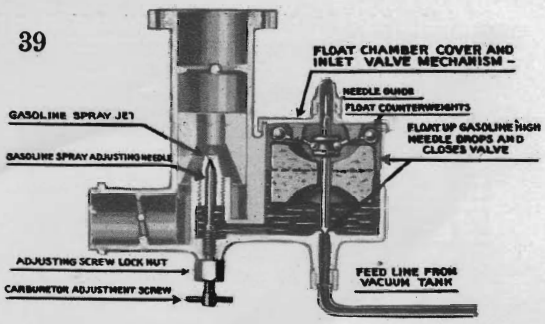
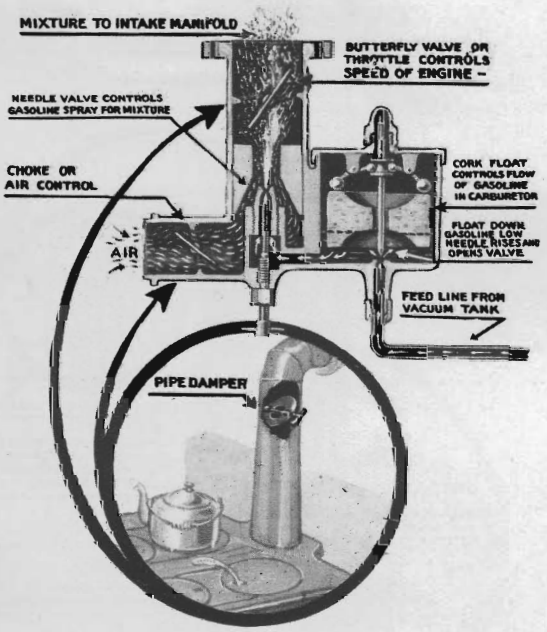
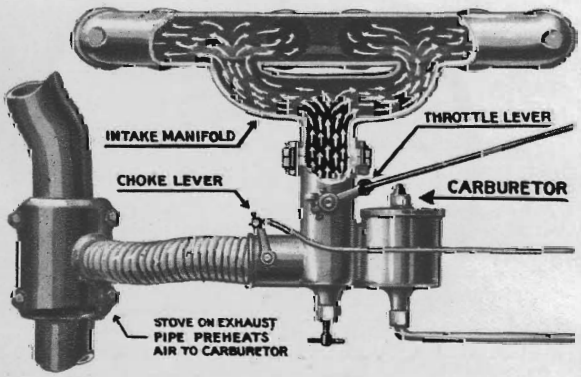






How Our Carburetor Works

39.

The gasoline flowing from our vacuum tank to our carburetor is first stored in a float chamber. As the gasoline rises in this chamber, the float rises. When the gasoline has reached the proper level further flow is stopped by a lever which closes a needle valve at the bottom.

At this point the level of the gasoline in the float chamber is even with the top of the spray jet in the mixing chamber. Now the suction, in our various cylinders, draws air through the air intake pipe and on through the mixing chamber.

As the air rushes past the spray jet it sucks from this jet a small amount of gasoline which is vaporized and mixed with the rapidly moving air in the proportion of approximately 15 parts of air to 1 of gasoline.

The gasoline-air vapor is now drawn through the manifold to our various cylinders as it is needed. The proportion of air and gasoline mixed in our carburetor is controlled by a needle valve which opens or closes the spray jet.

The amount of gasoline-air vapor which is fed to our cylinders is controlled by the movement of a "butterfly" valve which is operated by our foot accelerator or the throttle lever. The butterfly valve closes or opens the passage to the intake manifold just as the damper closes or opens the smoke pipe on a stove.

In starting, it is sometimes necessary to use a very rich mixture. We secure this rich mixture by use of a "choke" which reduces the quantity of air sucked into the mixing chamber. Approximately 8 parts of air to 1 of gasoline is considered a rich mixture.

The "choke" is a valve which opens or closes the opening to the air intake pipe and is similar in operation to our stove damper. Be cautious with the use of the choke as a too-rich mixture will flood our engine and dilute the oil in the crankcase.

Many carburetors are fitted with "hot-stoves," attached to the exhaust pipe, which pre-heat the air before it is drawn into the mixing chamber. This is especially desirable for winter driving as it helps to vaporize the gasoline drawn into the mixing chamber.

And This Is What Happens Next

40.

Now comes the electric spark from the spark plug. The highly inflammable, highly compressed gasoline-air vapor ignites in our cylinder. Great heat is quickly developed. The gas which has been trapped in the combustion chamber of our cylinders expands almost instantly. The pressure thus produced forces the piston downward with the speed of a bullet.

This procedure is similar to that of a big gun. The spark plug is the fuse, the gasoline is the powder, the cylinder is the gun barrel and the piston is the bullet.

The pistons in our engine move with great rapidity. When an engine with a 4½-inch stroke turns over at 1,200 revolutions per minute, a car speed of approximately 25 to 30 miles per hour, the piston speed is 900 feet per minute—a distance 108 feet greater than the height of the Woolworth Tower, in New York, one of America's tallest buildings.

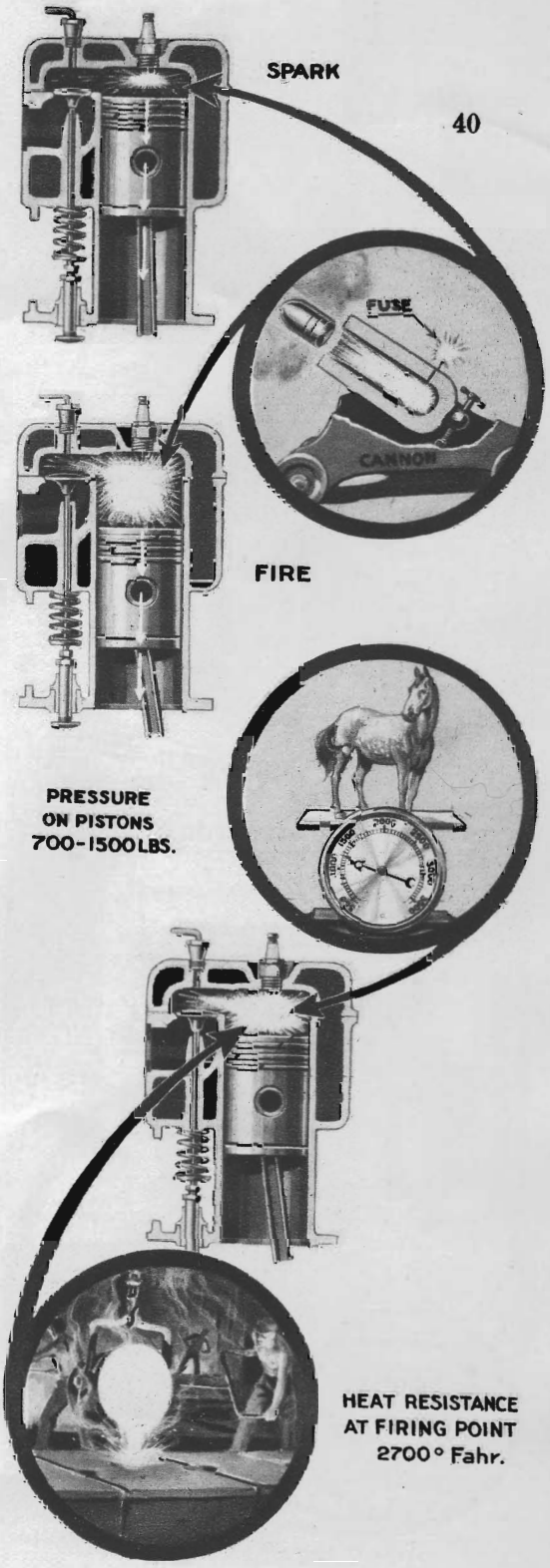
The pressure is transmitted from the piston through the connecting rod to a crankarm. As a result, the crankshaft whirls around and around like the handle on a coffee grinder or an ice-cream freezer, thereby developing the power necessary to drive our car.

The pressure pushing against each of our pistons at the instant of explosion totals many thousands of pounds, depending upon the size of our cylinders.

No wonder our pistons travel downward at such terrific velocity! No wonder the automobile engine can develop amazing horsepower with these pressures!

This great pressure in our cylinders is caused by the expansion of the rapidly burning gasoline-air vapor. The temperature developed in the burning process reaches approximately 2,700 degrees Fahrenheit at the core of the explosion.

This is above the melting point of cast iron or steel and at this temperature our pistons and cylinders would quickly melt like wax if steps were not taken to cool them.



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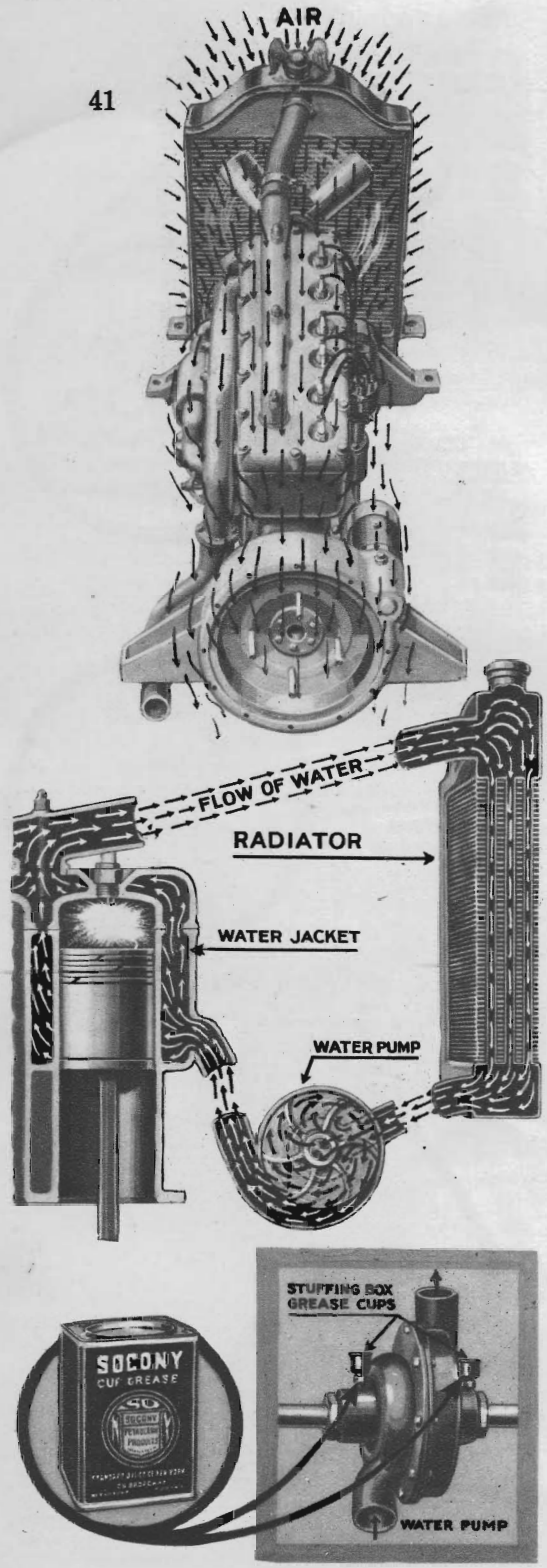


And So We Must Cool Our Motor

41.

We reduce the terrific heat developed in our motor usually by means of water. The most generally used water cooling system consists of a radiator for cooling the water, water jackets which encase the cylinders and other parts to be cooled, and a pump for forcing cool water through the heated areas.

Another water cooling arrangement, known as the thermo-syphon system, depends upon the difference in density of hot and cold water for its circulation.

The water, heated in the jackets surrounding the engine, flows continually upward and into the top of the radiator. The cooler water at the bottom of the radiator flows by gravity to the bottom of the water jackets, to be heated in turn and thus to complete the cycle of circulation.

In yet another system, a large volume of air is drawn through the front of the hood, past flanges attached to the cylinder walls, and, after doing its work of air-cooling the air is sucked out at the back of the engine by means of a suction fan.

The water in the water-cooling system passes through the engine jackets at a rapid speed. In most cases all of the water makes a complete circuit of the cooling system every minute we drive our car twenty-five miles per hour.

Note:—Since the water pump is such an important unit in our cooling system it should be lubricated with the best of grease. Socony Cup Grease will make your pump last longer and leak less.

To maintain the proper temperature in our cooling system we require a flow of air through the radiator at all car speeds. For this purpose we install a fan, driven by the motor, and placed directly behind the radiator.

There is hardly a revolving mechanism in our entire automobile engine which approaches the rotating speed of the fan.

A noisy fan bearing is annoying. Noise and waste of power at this point, caused by a poorly lubricated fan bearing, is reduced by regular use of the correct Socony lubricant.

We Silence Our Engine

42.

We have described the terrific heat and pressure under which our engine operates. If we allow these exhaust gases to blow directly out of our engine, with no attempt to silence them, the noise would be deafening.

The cause of this noise is a peculiar one. As the hot exhaust gas leaves the engine it pushes away the air outside very rapidly —just as the gases from a cannon expand at the cannon mouth. Thus we may say that, for an instant, we have a large bubble of hot exhaust gas outside our exhaust port which is pressing strongly against the air surrounding it.

However, at the next instant, this pressure drops. The volume occupied by the bubble of exhaust gas is greatly decreased. The surrounding air, which a moment ago had been pushed away, rushes back to fill this space. As the opposite layers of air come together a sharp report is heard.

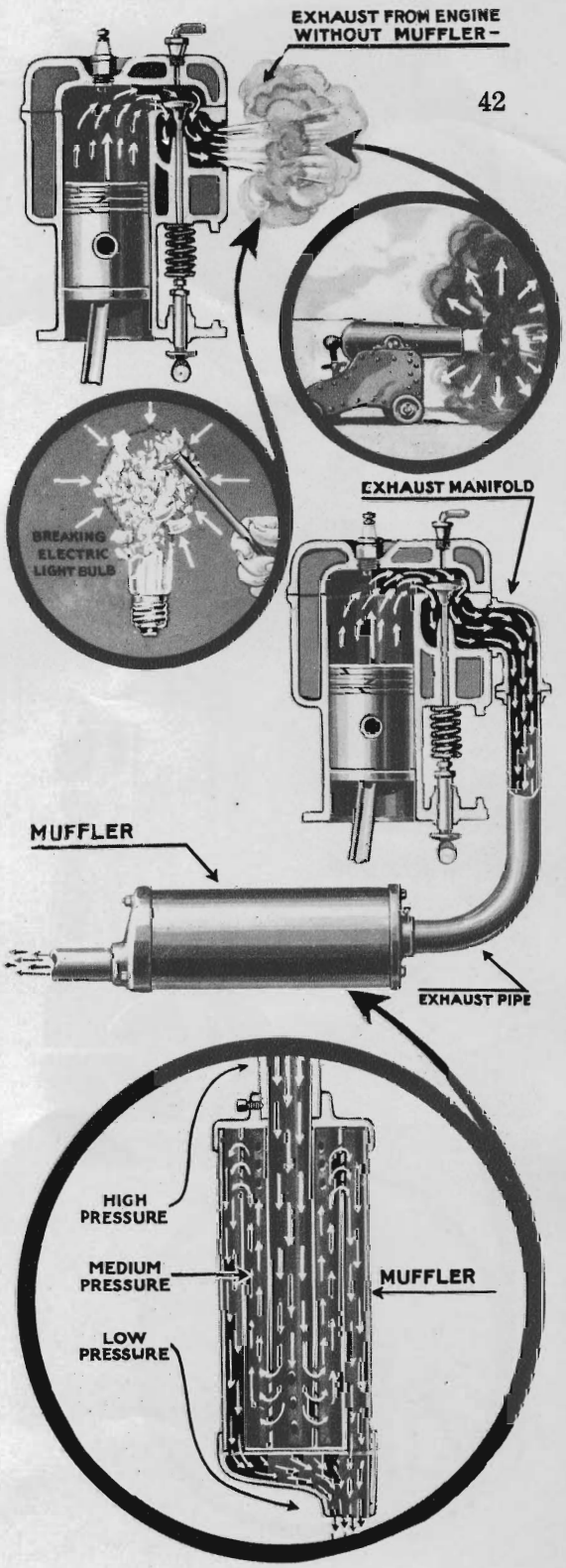
This action may be compared to breaking an electric light bulb. At the moment of breaking, the outside air rushes in to fill the vacuum inside. The opposite layers of air strike each other with a bang, just as in the case of the air surrounding the exhaust gas as it is expelled from the engine.

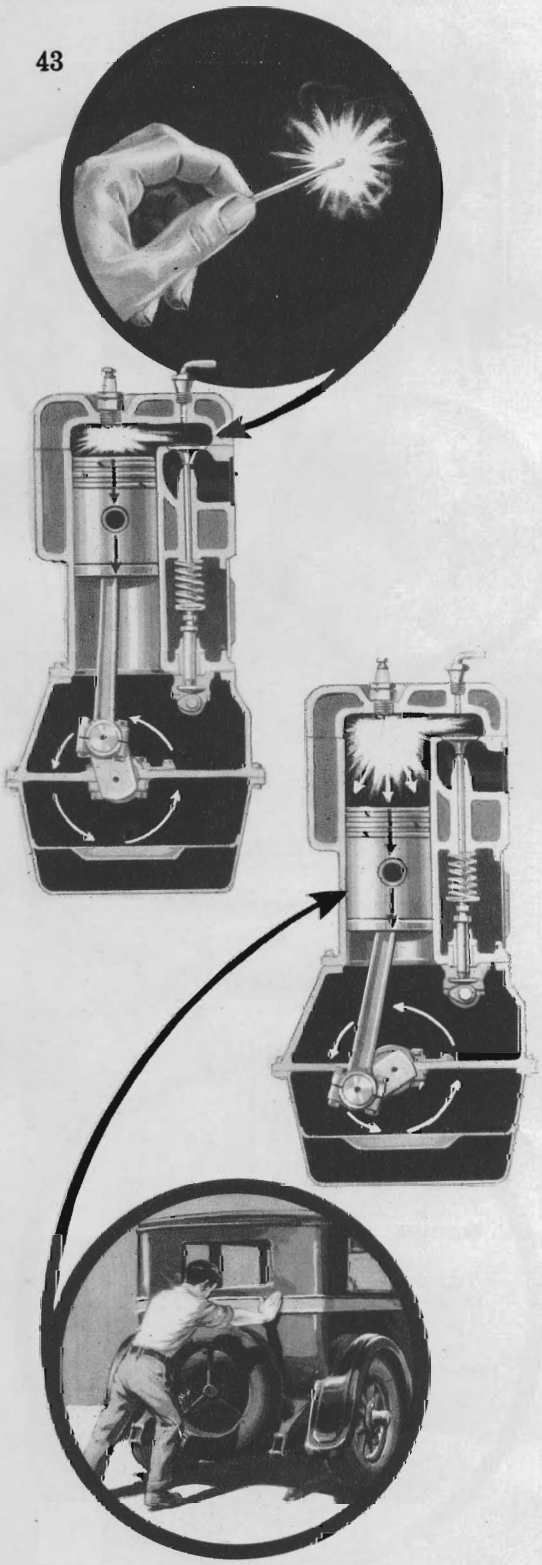
If, instead of allowing our exhaust gas to expand and contract instantly in the surrounding air, we conducted it through a long pipe where it could expand more slowly, we would be able to reduce this noise materially. This is just what our muffler does for us.

Of course, we do not use a long pipe, but we obtain the same result by passing our gases through a series of short pipes, each one larger than the other as pictured.

With our car running at 25 miles per hour, the exhaust gas leaves our cylinders at a pressure of about 25 pounds per square inch. It passes into the exhaust manifold attached to our engine and is conducted through the exhaust pipe into the muffler.

By passing the gas through our muffler, we reduce the pressure from 25 pounds per square inch at our engine to a pressure so low that it is practically noiseless.





43

How Gasoline Supplies the Power to Our Engine

43.

Gasoline does not explode—it *burns* in our cylinders. The difference is that an explosion is instantaneous while the burning of gasoline-air vapor, though swift, is not instantaneous. If we wish to push our car we know it would be useless to run up and hit it, for the instantaneous shock would hardly move the car. We get behind the car and push with all our weight and force—and the car moves.

The burning of gasoline in our cylinders is similar to the burning of a match. Every substance has a different burning point. The highly inflammable match tip has a lower burning point than the wood stick of the match.

We raise the highly inflammable match tip to its burning point by rubbing the tip on a rough surface. When ignited, the match tip flares up and produces the heat necessary to raise the wood stick to its burning point.

Figuratively, gasoline passes through a similar process of combustion in our cylinders. The flame from the spark plug swiftly ignites the inflammable tips or parts of the gasoline, and the heat developed ignites the slower burning, but more powerful remainder of our fuel.

When a compressed mixture of gasoline-air vapor is completely ignited in our cylinders, it burns with great speed and produces intense heat. As a result of the heat, the burning gases quickly expand and develop terrific pressures which exert their force upon the top of our pistons.

Gasoline must be balanced in its make-up. It should contain just enough highly inflammable ends to ignite readily for quick starting. It should contain just enough less inflammable but more powerful ends to produce the necessary heat and pressure to drive the pistons.

Socony Gasoline is properly balanced, and, because it burns cleanly, it leaves little or no carbon. Every gallon of Socony Gasoline is of uniformly fine quality because of the careful attention it receives at every stage of the refining process.

Socony Gasoline—Every Gallon Uniform—Every Drop Full of Power

44.

Our gasoline engine is a "heat and pressure" engine. It depends for its power on the amount of heat and pressure developed by burning gasoline in its cylinders to drive its pistons. The greater the heat the greater the pressure, and the greater the power, up to certain limits, of course.

Some brands of gasoline develop more power than others, but will not start so quickly. Some brands will start quickly, but will not develop the same amount of power. Some gasoline will do neither, and form excess carbon as well.

Some gasolines contain sulphur in their makeup. Sulphur, combining with moisture, forms harmful sulphuric acid, which in time may eat away our floats, strainers and other metallic parts of our fuel system.

The difference in gasolines, as we have observed, is simply a matter of balance.

Socony Gasoline is the properly balanced fuel for our motor. It contains just enough highly inflammable parts to start our engine quickly. It contains the right amount of less inflammable, but more powerful parts to produce the heat and pressure to our cylinders necessary for maximum power.

And due to the fact that every drop of Socony Gasoline is scientifically balanced, it burns completely at each explosion, insuring a minimum of carbon.

It is refined in the most completely equipped plants in the world, by men long skilled in the art of refining the products of petroleum. And its quality is assured whether you purchase it in Portland, Maine, or Mastic, Long Island.

Socony dealers pride themselves in the service they offer. You may be assured that you will receive courteous and prompt attention from them everywhere. Service and the best of products are the methods upon which they hold your trade.

Start this season off right. When your tank is almost empty, fill it up with Socony Gasoline and let it prove its worth in your engine.

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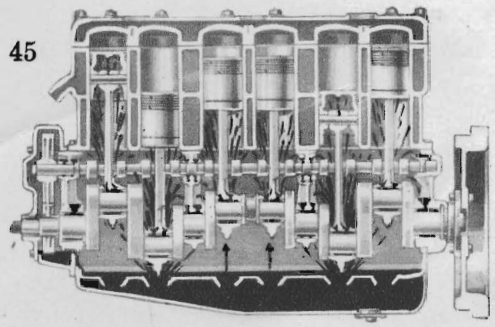

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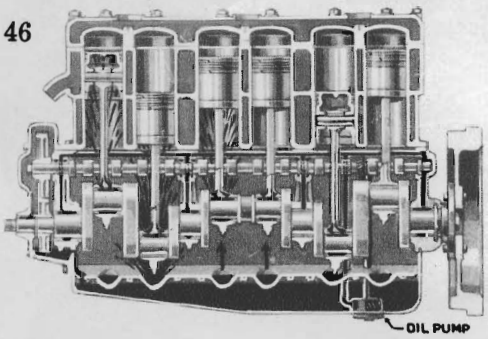

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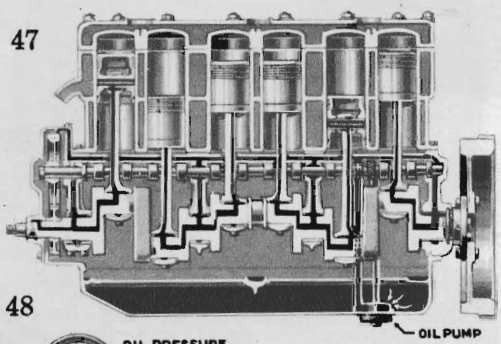

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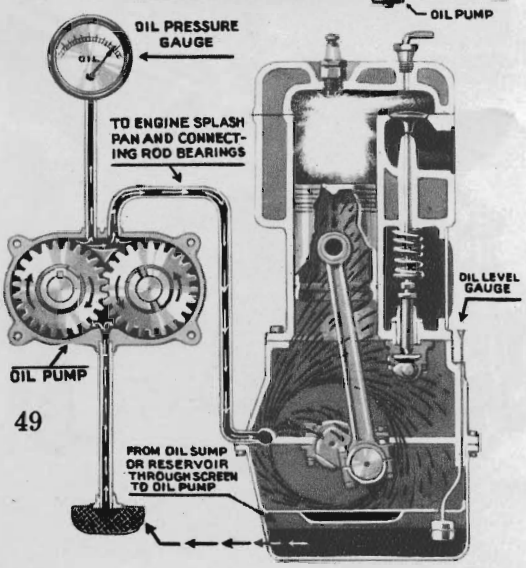


49

Lubricating Our Motor

45. *Splash Circulation*

The Splash System of engine lubrication means exactly what its name implies. The oil is "splashed" from troughs to the various moving parts of the engine by scoops on the ends of the connecting rods.

In the Model T Ford engine, the oil is continuously thrown into small cups whence it flows by gravity to the main or crankshaft bearings. The centrifugal action of the flywheel acts as a pump and makes possible a continuous flow of oil in the crankcase.

46. *Splash and Pressure*

In the Splash and Pressure System the oil in the crankcase is pumped to the main bearings and overflows to the connecting rod troughs where it is splashed to other bearings.

47. *Pressure System*

The Pressure System, the most positive of all lubrication systems, forces the oil, under pressure, by means of a pump, to the principal moving surfaces within the engine, such as crankshaft bearings, connecting-rod bearings, wrist-pin bearings, cylinder walls, timing gears and valve mechanism.

48. *Oil Level Gauge*

There is an oil level measuring rod in the crankcases of all cars by which we may check the quantity of oil in our crankcase. Be sure to maintain the correct level.

It is vitally important that we check our crankcase oil, for if we allow it to run low we are in danger of causing serious and expensive damage to our motor.

49. *Oil Pump*

Our oil pump usually consists of two gears which revolve in opposite directions in a small metal case about the size of a snuff box.

After the oil has been filtered through a screen it enters one side of the pump case and the rotating gears force it out at the other side.

Our oil gauge indicates the pressure exerted in forcing the oil through our engine.

Tasks Our Motor Oil Must Perform

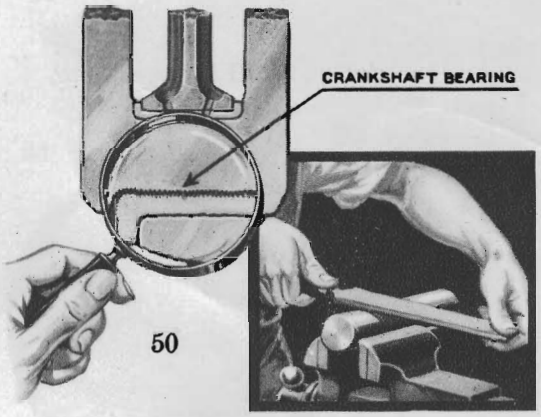
50. *Reduce Friction*

All moving parts of our car are supported by bearing surfaces which, when properly oiled, reduce friction and wear. To the naked eye a bearing surface appears as smooth as glass. But when we examine it under a microscope we find it resembles a file in its roughness.

Should we permit bearing surfaces of this rough nature to come together, the effect would be similar to filing a piece of metal.

The first task for our motor oil is to provide a layer of lubricant between moving surfaces, an oil film which will prevent direct metal-to-metal contact with each other. We need a coating of lubricant which will accomplish the same slippery effect in our bearing as a lather of soap and water gives to our hands when washing.

The efficiency of our car is retarded 10 per cent, or about 2 cents on each gallon of gasoline, through unavoidable friction. To prevent increase it is important that we use Socony Motor Oil in our motor.



51. *Seal in Power*

We use two or more metal rings on our pistons to form air-tight joints between pistons and cylinder walls. These joints must be leak-proof; otherwise the compressed gases in our cylinders will escape into the crankcase, and an excess of oil will form carbon in our cylinders.

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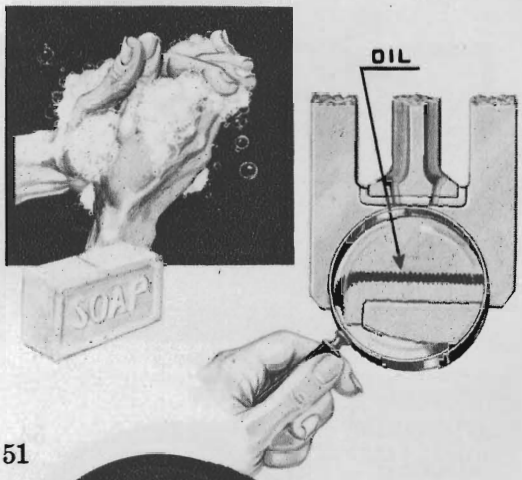

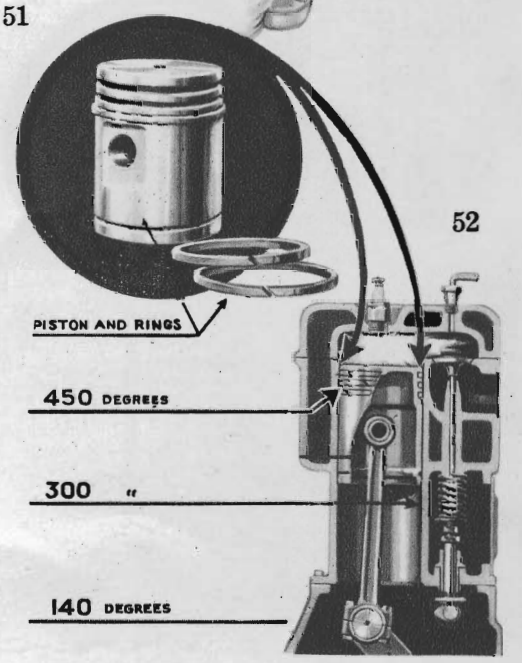

52. *Cool Motor*

In various parts of our engine, the temperature ranges from 140 degrees Fahrenheit to as high as 450 degrees Fahrenheit on some parts of the cylinder walls. Our motor oil, as well as water and air, must do its part to reducing these temperatures.

In choosing Socony Motor Oil to lubricate our motor we are selecting a lubricant which insures the correct operating temperature for our engine. Socony Gasoline and Motor Oil are ideal working companions.

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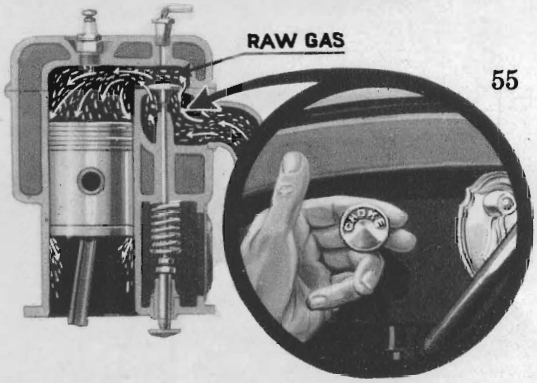

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56

Hazards Which Threaten Our Motor

53. *Heat*

We have described in preceding pages the terrific heat under which our motor operates. Normal running temperatures varying from 160 to 450 degrees.

Not every oil can stand under these temperatures. Socony Motor Oil is the ideal lubricant for our automobile engine because it stands up and does its work efficiently.

54. *Friction*

Friction is a deadly enemy of motion. Permit any two surfaces to come in contact, without some form of lubricant to keep them apart, and the result may be likened to holding a knife against a grindstone.

Friction never can be overcome, but it can be greatly reduced through the use of proper lubricants.

55. *Dilution*

Another function of our lubricating oil is to form leakproof seals around the piston rings in our motor. If our oil fails in this, the compressed gasoline vapors will blow by the piston rings into the crankcase.

The effect of leaky piston seals is similar to that of running our engine with the carburetor choke pulled out. Gasoline washes the oil from the cylinders. Friction is set up, and our oil is diluted.

The oil we select to seal the power in our cylinders shoulders a great responsibility. To insure protection for our motor use Socony Motor Oil of the correct grade.

56. *Dirt*

In an air space, the size of a hen's egg, there are a million dust particles. The greater part of this dust is blown out through the exhaust. But some particles adhere to the combustion chamber surfaces.

This remaining dust mixes with our oil and forms hard "carbon." Some of the dust mixes with the lubricating oil. In time the oil in our crankcase becomes mixed with this dirt and acts as a grinding compound.

In spite of devices for preventing the admission of dust and dirt to our engine, the safest plan to insure perfect lubrication is to change our motor oil at regular intervals.

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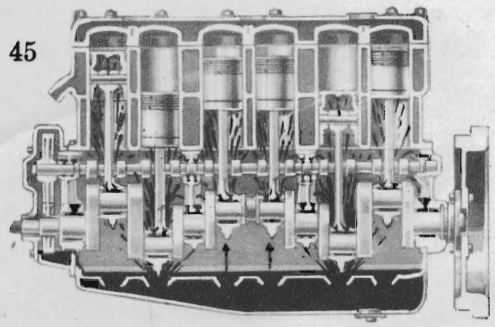

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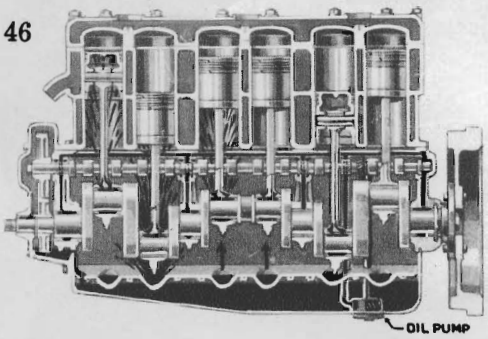

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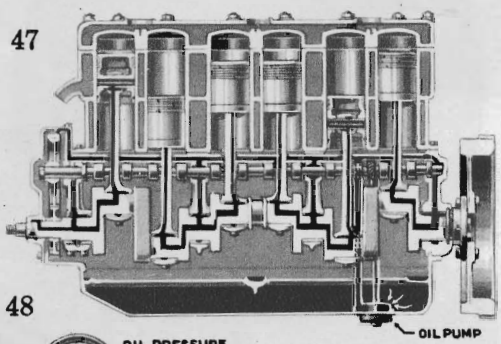

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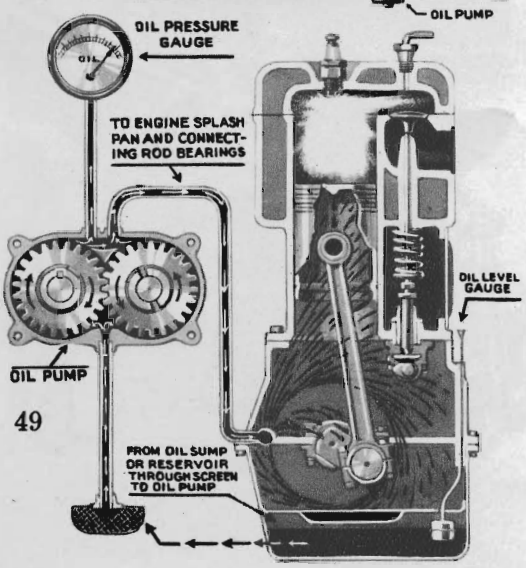

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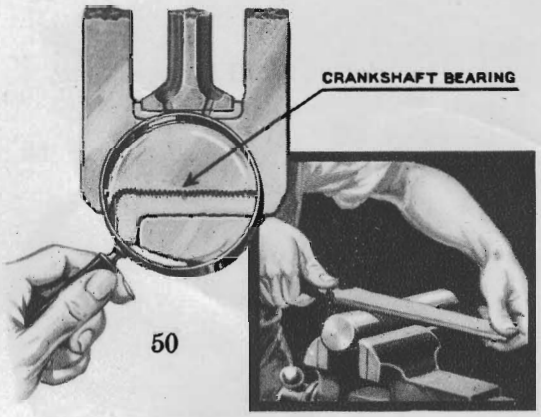

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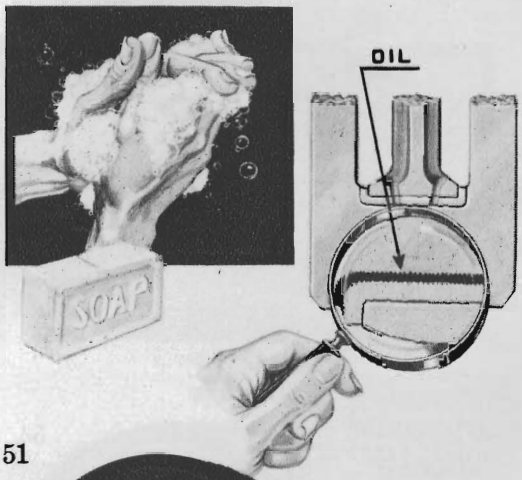

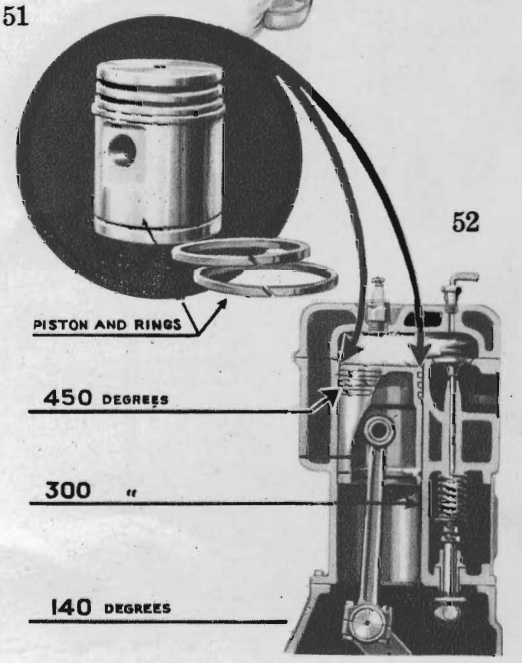

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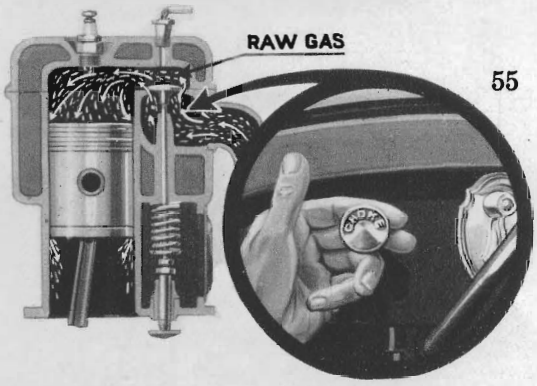

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56

Hazards Which Threaten Our Motor

53. *Heat*

We have described in preceding pages the terrific heat under which our motor operates. Normal running temperatures varying from 160 to 450 degrees.

Not every oil can stand under these temperatures. Socony Motor Oil is the ideal lubricant for our automobile engine because it stands up and does its work efficiently.

54. *Friction*

Friction is a deadly enemy of motion. Permit any two surfaces to come in contact, without some form of lubricant to keep them apart, and the result may be likened to holding a knife against a grindstone.

Friction never can be overcome, but it can be greatly reduced through the use of proper lubricants.

55. *Dilution*

Another function of our lubricating oil is to form leakproof seals around the piston rings in our motor. If our oil fails in this, the compressed gasoline vapors will blow by the piston rings into the crankcase.

The effect of leaky piston seals is similar to that of running our engine with the carburetor choke pulled out. Gasoline washes the oil from the cylinders. Friction is set up, and our oil is diluted.

The oil we select to seal the power in our cylinders shoulders a great responsibility. To insure protection for our motor use Socony Motor Oil of the correct grade.

56. *Dirt*

In an air space, the size of a hen's egg, there are a million dust particles. The greater part of this dust is blown out through the exhaust. But some particles adhere to the combustion chamber surfaces.

This remaining dust mixes with our oil and forms hard "carbon." Some of the dust mixes with the lubricating oil. In time the oil in our crankcase becomes mixed with this dirt and acts as a grinding compound.

In spite of devices for preventing the admission of dust and dirt to our engine, the safest plan to insure perfect lubrication is to change our motor oil at regular intervals.

Why It Is Necesary to Change Our Motor Oil Frequently

57.

For genuine economy in running our automobile we should change our motor oil approximately every 500 miles.

Motor oil is refined from crude oil by heat. In our engine it is again subjected to running temperatures reaching 450 degrees Fahrenheit. Ordinary motor oils, not properly refined, cannot long endure these extreme temperatures.

Oil which has lost its lubricating value cannot effectively reduce friction or form the kind of piston seals necessary to seal the power in our cylinders, let alone stand up under more heat or aid in cooling our motor. For these reasons some motor oils must be changed more frequently than others.

Road dust and sand which work into our engine play havoc with the lubricating value of our oil. Unless our oil is changed frequently and the interior of our crankcase thoroughly washed out with a good cleanser, such as Socony Flushing Oil, sludge will accumulate in the bottom of our engine and endanger our bearing surfaces.

Sludge is a thick gummy mass, somewhat the same consistency as molasses. If sludge is present in our crankcase it may clog the oil leads and hence endanger our bearings.

Kerosene should never be used as a flushing liquid, for it is quite impossible to drain all of it from our crankcase. Some of it is bound to remain and dilute the fresh oil.

As for the practice of periodically adding fresh oil without draining our crankcase, it stands to reason that half a gallon of clean oil added to half a gallon of dirty oil makes a gallon of dirty oil.

Socony dealers pride themselves on the service which they offer. Take advantage of this service and let your Socony dealer drain your crankcase, flush it out with Socony Flushing Oil, and refill it to its proper level with the grade of Socony Motor Oil recommended for your motor.

If you prefer to service your own car, Socony Motor Oil may be purchased from your dealer in containers from one quart to a barrel in size.

58

Socony Motor Oils for Dependability

58.

Prior to 1859, when Colonel Drake of Buffalo pointed the way to the commercial production of mineral oil at Titusville, Pa., animal and vegetable oils were accepted as lubricants for anything and everything.

In 1872, George Selden began serious experiments in "road locomotion." Six years later he practically abandoned his ideas of perfecting his road vehicle because he found the lubricants unsuitable for his engine.

Not long after, Selden heard of a new heavy mineral oil. He secured a few gallons and to his surprise found this oil to perform satisfactorily. This was the turning point in motor development—today mineral oil is the base for all engine oils.

Standard Oil Company of New York was a pioneer in the oil industry. Since 1873 it has produced petroleum products, and its constant aim is to offer the best products within the skill of engineering knowledge.

Socony Motor Oils are as good lubricants for our automobile engine as money can buy. Due to extreme care in refining, Socony Motor Oils do not lose their lubricating qualities under the scorching engine heats. They reduce friction and consistently form piston seals which seal the power in our motor, mile in and mile out.

We must not overlook the fact that the automobile is one of the finest pieces of machinery in the world. We will be repaid for the attention we give it.

Our motor deserves the best. The cost of lubricating it properly with Socony Motor Oil is only about two percent of the yearly upkeep cost of the entire car. At such a low cost for proper lubrication it is a risky matter to experiment with motor oils, especially when the difference between proper and improper lubricants amounts to only $2.00 or $3.00 a year.

For economy's sake, consult the Socony chart at your dealer's station for the correct grade of Socony Motor Oil for your engine. You can secure every grade of Socony Motor Oil anywhere—and it's uniformly good no matter where you purchase it.

To Control the Power from Our Engine We Need a Clutch

59. *How Our Clutch Works*

Now that our motor is running we must apply the power it develops to turning our wheels. The first step is through the clutch. The clutch is a device for engaging and disengaging our motive power from the rest of the driving units, so our car may or may not move while the engine is running.

Nowadays the "disc" clutch is almost universally used. Engaging and disengaging our disc clutch is purely a matter of firmly clamping and unclamping a number of "discs," which are fastened to the ends of the crankshaft and the transmission shaft respectively.

The discs are clamped together and prevented from slipping by a stiff steel spring which holds them securely under a pressure as high as 300 pounds.

Mr. A. L. Dyke illustrates the disc clutch principle by placing a silver dollar between two half dollars and squeezing them together between the thumb and forefinger of the left hand. With the right hand, try to revolve the dollar. It requires but a slight pressure to make it impossible to move the dollar without moving the half dollars.

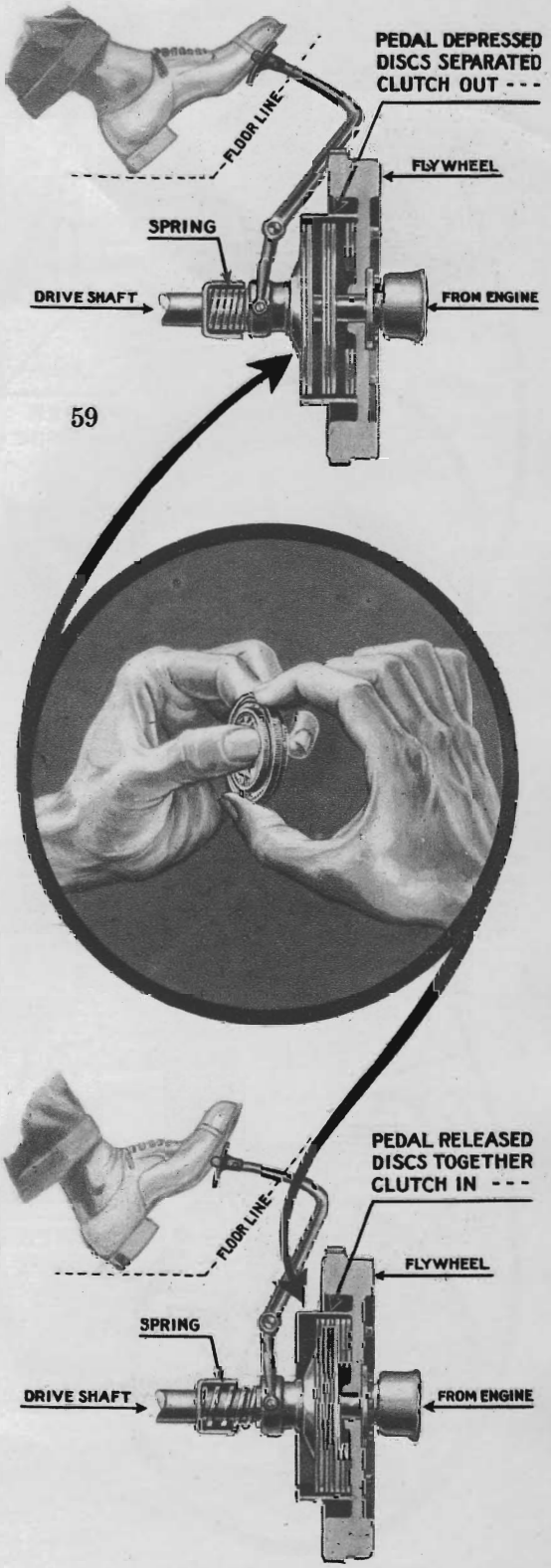
60. *Types of Disc Clutches*

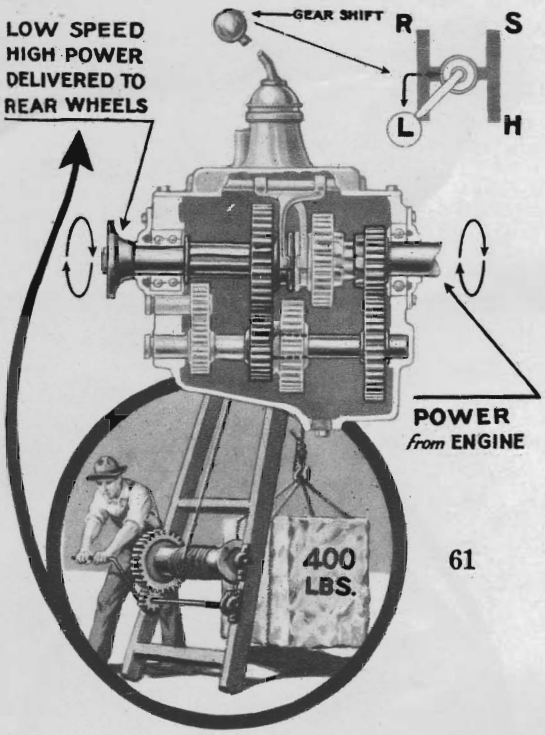
The single plate clutch is a type in which one disc or plate is clamped between two others—illustrated in principle by the silver dollar between two half dollars described above. There are two general classes of single plate clutches—those which operate in oil, called "wet" and those which run "dry."

The multiple disc clutch consists of a number of discs, which are pressed together. When the clutch is "engaged," the friction between them causes one set of discs to drive the other.

When a wet clutch is disengaged, its discs are separated and oil flows between them. When we engage the clutch, this oil is squeezed out.

As the oil is squeezed from between the discs, the clutch slips and it eventually takes hold when the oil is entirely squeezed out. The idea of the slipping clutch allows our car to start smoothly without a sudden jerk.





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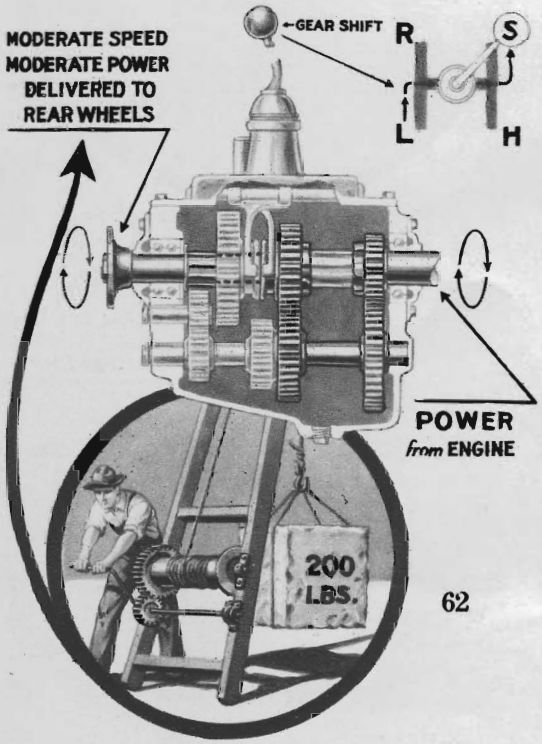


62

For Starting, Climbing Steep Hills and Reversing We Need a Transmission

61. *Low Gear*

Our transmission is called a selective transmission because we may "select" the gears to "transmit" the power to our rear wheels. In almost all American made automobiles, we are usually provided with a selection of three forward gears and one reverse.

When we shift into "low," we engage a set of gears whereby through fast engine speeds we transmit a world of power to our rear wheels, but with a crawling forward car-speed.

Our transmission reminds us of a man operating a derrick. When he lifts a heavy load he turns a little gear against a larger one, but he must turn his little gear many times to lift the weight a distance corresponding to once around the lifting drum.

Low gear usually operates on a 3 to 1 ratio. In other words, our engine crankshaft revolves three turns to one of our driveshaft. Low gear is a powerful but a slow gear. It comes in handy when starting or when climbing steep hills.

62. *Second Gear*

When we shift from low to second gear we mesh other gears in our transmission assembly. Through second gear we increase our car speed, but decrease the power transmitted to our rear wheels.

Second gear again reminds us of a man operating a derrick. By increasing the size of the little gear and maintaining the same size larger gear the man now turns his handle fewer times to lift the weight the same distance as explained above. But with the same effort he cannot lift the same number of pounds that he formerly lifted with the smaller gear.

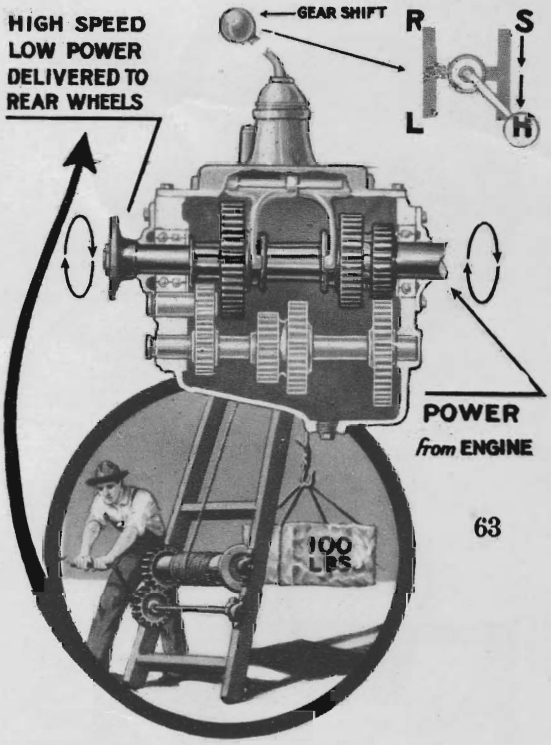
In second gear, power is sacrificed for increased speed. Second gear generally operates on a $1\frac{3}{4}$ to 1 ratio—$1\frac{3}{4}$ turns of our engine make one turn of our rear driving wheels.

63. *High Gear*

When we shift from second into high gear we connect directly the crankshaft with the driveshaft, which once more increases our car speed, but still further decreases the power transmitted to our wheels.

Going back to the derrick, this time our man uses two gears of the same size to lift the weight. This time one turn of the handle lifts the weight a distance equal to once around the lifting drum. But with the same number of pounds as he lifted formerly. Once more power is sacrificed for speed.

High gear operates "direct," 1 to 1 ratio, which is one revolution of the crankshaft to one revolution of the driveshaft. High gear is our fastest, but the least powerful of all the gears in our car. High gear, sometimes called "third gear," comes in handy for speed over level country.



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64. *Reverse Gear*

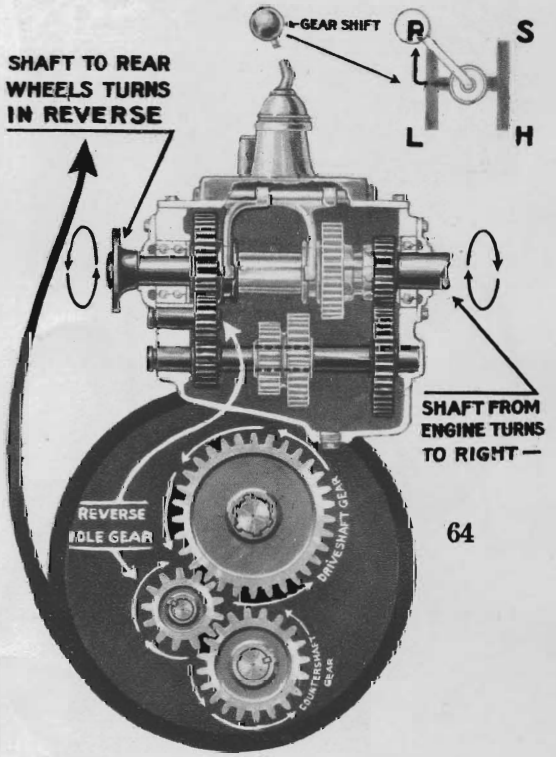
When we shift into reverse gear we engage a fourth set of gears which reverses, through an idler gear, the rotation of our driveshaft.

Reverse gear does not in any way make our engine turn backward. If we look at the illustration at the bottom of the page we will see how the idler gear reverses the direction of our propeller shaft.

Our reverse gear is the slowest, but most powerful of all gears. The reverse gear usually transmits our engine power to our driveshaft on a 3¾ to 1 ratio—3¾ turns of our crankshaft make 1 reverse turn of our driveshaft.

In the Model T Ford car there are but three speeds in all. There are but two forward gears instead of three. And as in other cars there is only one reverse speed. Contrary to the operation of other cars, the gears in the Model T Ford car are shifted with the feet.

It is a good thing to remember that quite frequently the power made possible through our reverse gear will pull us out of a hole when even the power of our low gear fails to do so.



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65

Socony Gear Oil Insures Smooth Shifting

65.

For the four shifts of our car there is a total of eight gears. These gears are composed of a number of "teeth," the same as the gears on a watch. The teeth of each gear mesh with the teeth of another gear.

For efficiency and quietness in operation they must fit snugly in their meshing spaces with just enough room for a layer of lubricant between their teeth.

The driving or power gears in our transmission turn the driven gears with a prying action. The teeth of a driving gear pry the teeth of its engaged driven gears around and around, a tooth at a time.

The prying action of gear teeth against gear teeth is similar to a lumberman rolling a heavy log by prying under it with his logging pole. Under load, the transmission gears pry one another with a pressure as high as 2,900 pounds.

In our transmission we cushion the terrific prying pressure between our small gear teeth by means of oil. Our transmission case holds about two quarts of oil. It is not the type of oil used in our engine but a heavier oil, known as Socony Gear Oil.

The purpose of the transmission lubricant is not only to cushion the shock between our little gear teeth, much the same as a rubber heel relieves the shock of walking, and not only to reduce friction by lubricating the bearings in our transmission, but to make it easy for our gear teeth to mesh and unmesh as they whirl around and around.

Socony Gear Oil is a splendid high-grade lubricant. It is light enough to overcome friction and heavy enough to insure easy shifting, even in winter.

Our transmission case should be flushed out thoroughly with Socony Flushing Oil two or three times a year, or every 3,000 miles. Particles of road dust and sand work into it; steel from our gears and bearings gather and cause undue wear unless the above precaution is taken.

Your nearest Socony dealer will service your transmission for you.

In the Ford the Clutch and Transmission Are Combined

66.

In the Ford Model T car, the engine, the clutch, the transmission and the foot brake are combined into one assembly.

In the Ford Model T automobile, one oil must lubricate and protect the important wearing surfaces of all these important units. In other cars each unit may use a different lubricant.

The Ford engine, Model T, with its planetary transmission, is lubricated by the "splash circulating" system. Connecting-rod, wrist-pin and camshaft bearings and the cylinder walls are lubricated by oil splashed from the crankcase. The main or crankshaft bearings are lubricated by oil thrown into overhead cups and fed by gravity to these surfaces.

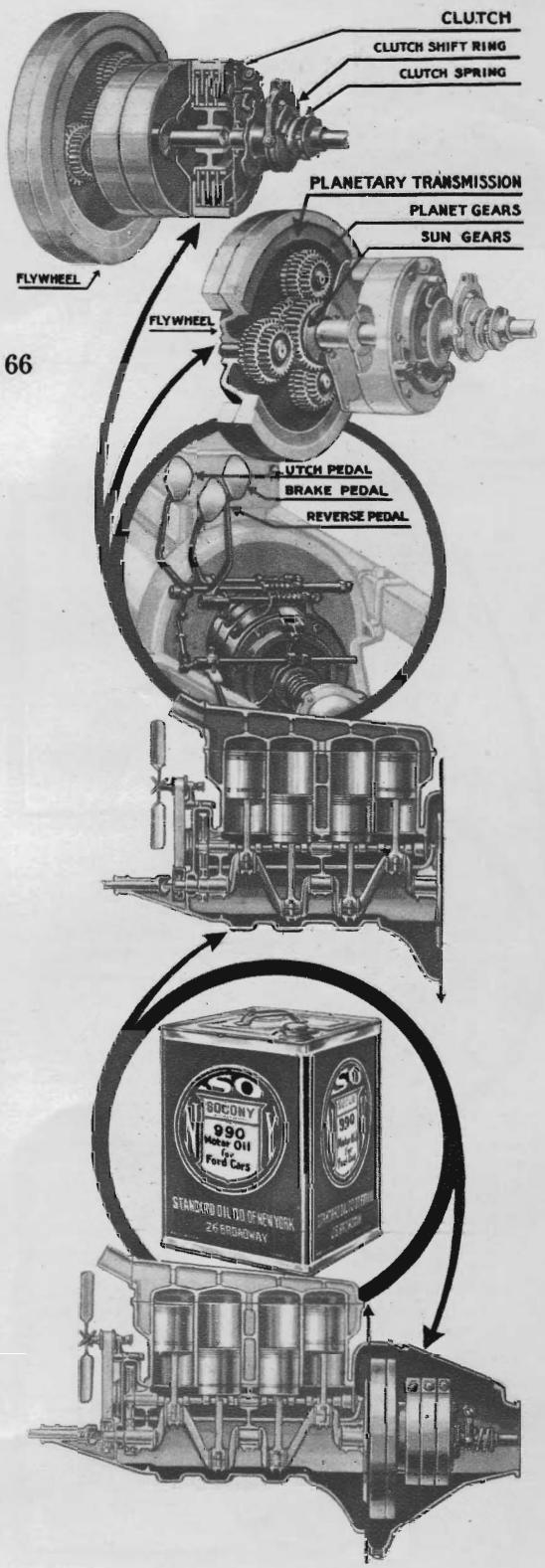
Due to its unique system of water cooling, the Ford engine is a comparatively hot running engine. Its water temperature is about 200 degrees—just a few degrees below boiling. In other cars the water temperature averages 175 degrees—25 degrees cooler than the Ford engine.

It is a two-fisted job for any motor oil to properly lubricate the Model T Ford. Think for a minute—*one oil is called upon to do the work which two different oils do in other makes of cars.*

It is false economy to pour inferior oil into the Ford crankcase. The risk is too great. There is Socony 990 Motor Oil made especially to lubricate the Ford Model T motor and allied units. It has taken years of research and experimenting to perfect this Socony Oil. You will find Socony 990 Motor Oil on the list of lubricants approved by The Ford Motor Company for use in the Model T car.

If you drive a Model T Ford car drain the oil from your crankcase. Flush and refill it to its proper level with Socony 990 Motor Oil refined and sold exclusively for Fords.

You may secure Socony 990 Motor Oil from any Socony dealer. Carry a can of this oil in your car. Socony 990 Motor Oil may be purchased in various sized containers, and in bulk.



Springs and Shackles Support the Weight of Our Car

70.

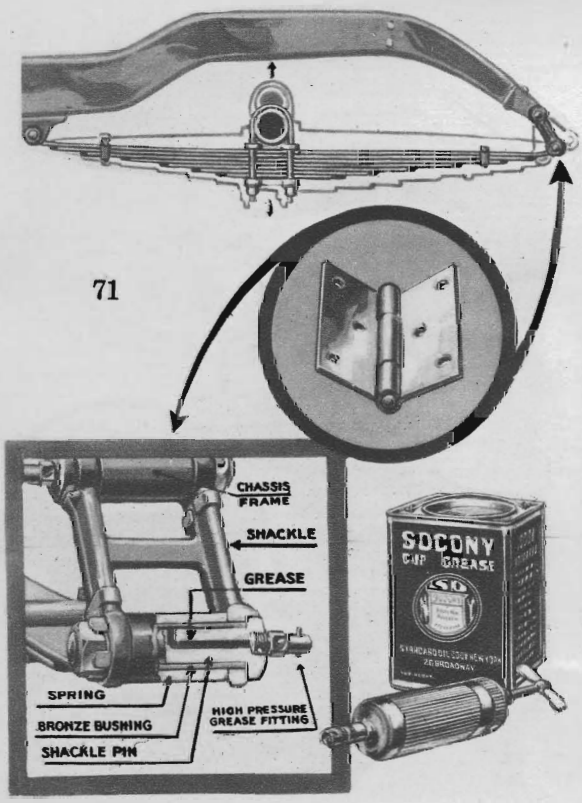
Car springs consist of a number of layers of steel leaves held together with clips. When our wheels hit a bump the springs flex like an archer's bow. The spring leaves absorb the shock by sliding upon each other.

An automobile spring is similar to a shoe sole. A shoe sole consists of a number of leather layers which flex back and forth as we walk. At times these leather layers chafe against each other, and our shoe squeaks.

If we take our squeaking shoe to a shoemaker who knows the tricks of the trade, he will punch a hole half-way through the sole and insert a few drops of oil. From then on the squeak will disappear. Automobile springs squeak for the same reason that shoes squeak—the spring leaves chafe against each other. A few squirts of oil will not only overcome the squeak, but will put our springs in better condition to carry out their function as shock-absorbers.

Socony Spring Oil will stop squeaks and go far toward protecting your springs against breakage.

We have seen that our springs are bow-shaped. When our car hits a bump the springs momentarily straighten out and become longer. Therefore, we attach them to our chassis with spring shackles—which are like door hinges. These shackles permit our springs to extend and contract in length.



71. *Spring Shackles*

Our springs are anchored in their shackles or hinges with shackle bolts or hinge pins. Since our springs lengthen and shorten with the unevenness of the road, our spring hinges and hinge pins must be lubricated to insure freedom of spring motion.

Socony Cup Grease is an excellent lubricant to use for spring shackles because it is non-fluid and remains in the shackles. Socony Cup Grease owes its lubricating qualities and great lasting powers to the fact that it is solidified Socony Motor Oil.

Lubricate spring shackles every 500 miles. Your Socony dealer will do this job. If you prefer to service your own springs you may purchase either of these lubricants in various sized containers.

We Control the Direction of Our Car Through the Steering Gear

72.

In the old days when we made a turn in the horse-drawn carriage, our front axles and wheels were turned by the horse. It was an unsteady turn at best, for the entire front axle assembly, wheels and all, revolved on one central pivot called a "fifth wheel."

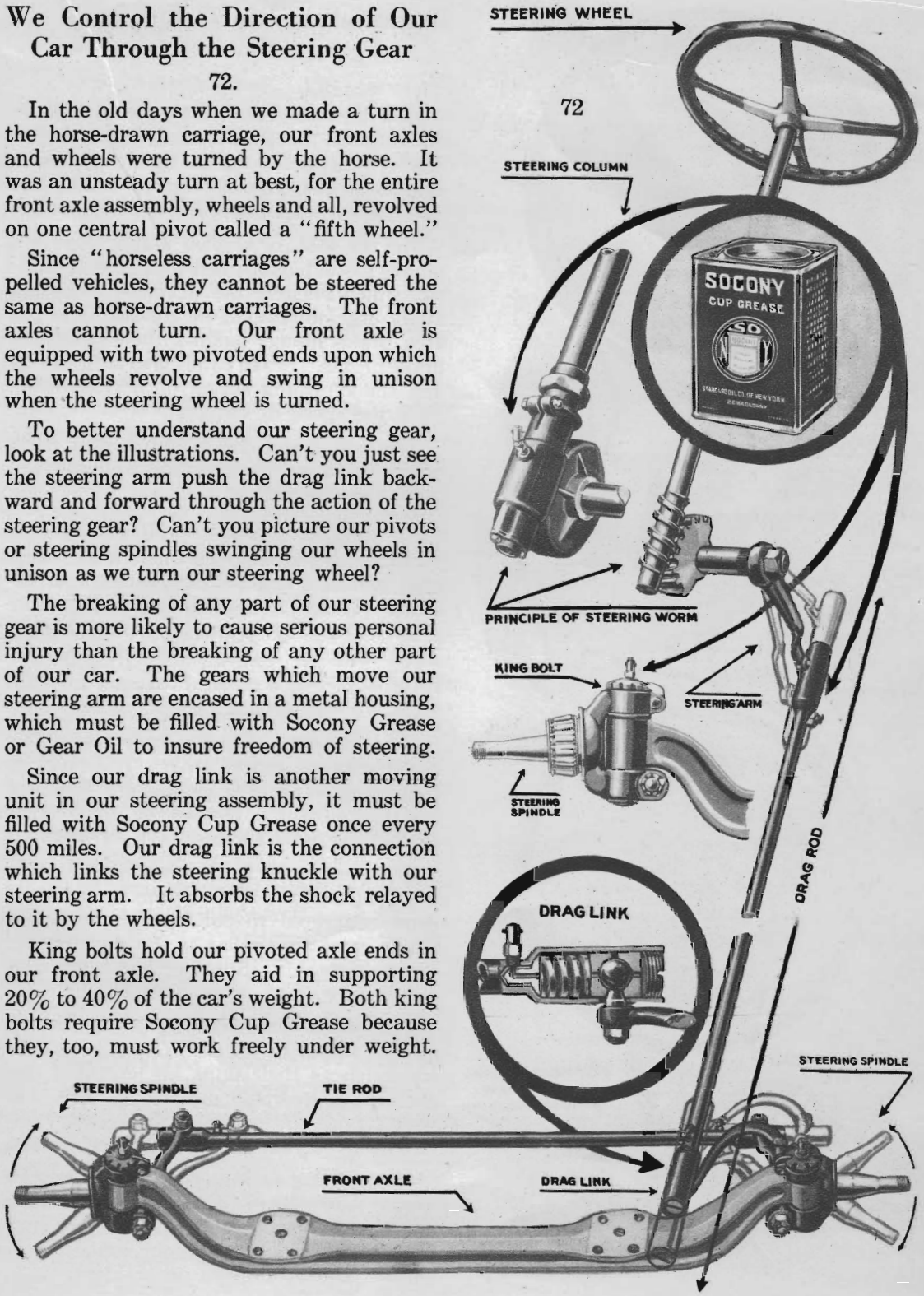
Since "horseless carriages" are self-propelled vehicles, they cannot be steered the same as horse-drawn carriages. The front axles cannot turn. Our front axle is equipped with two pivoted ends upon which the wheels revolve and swing in unison when the steering wheel is turned.

To better understand our steering gear, look at the illustrations. Can't you just see the steering arm push the drag link backward and forward through the action of the steering gear? Can't you picture our pivots or steering spindles swinging our wheels in unison as we turn our steering wheel?

The breaking of any part of our steering gear is more likely to cause serious personal injury than the breaking of any other part of our car. The gears which move our steering arm are encased in a metal housing, which must be filled with Socony Grease or Gear Oil to insure freedom of steering.

Since our drag link is another moving unit in our steering assembly, it must be filled with Socony Cup Grease once every 500 miles. Our drag link is the connection which links the steering knuckle with our steering arm. It absorbs the shock relayed to it by the wheels.

King bolts hold our pivoted axle ends in our front axle. They aid in supporting 20% to 40% of the car's weight. Both king bolts require Socony Cup Grease because they, too, must work freely under weight.



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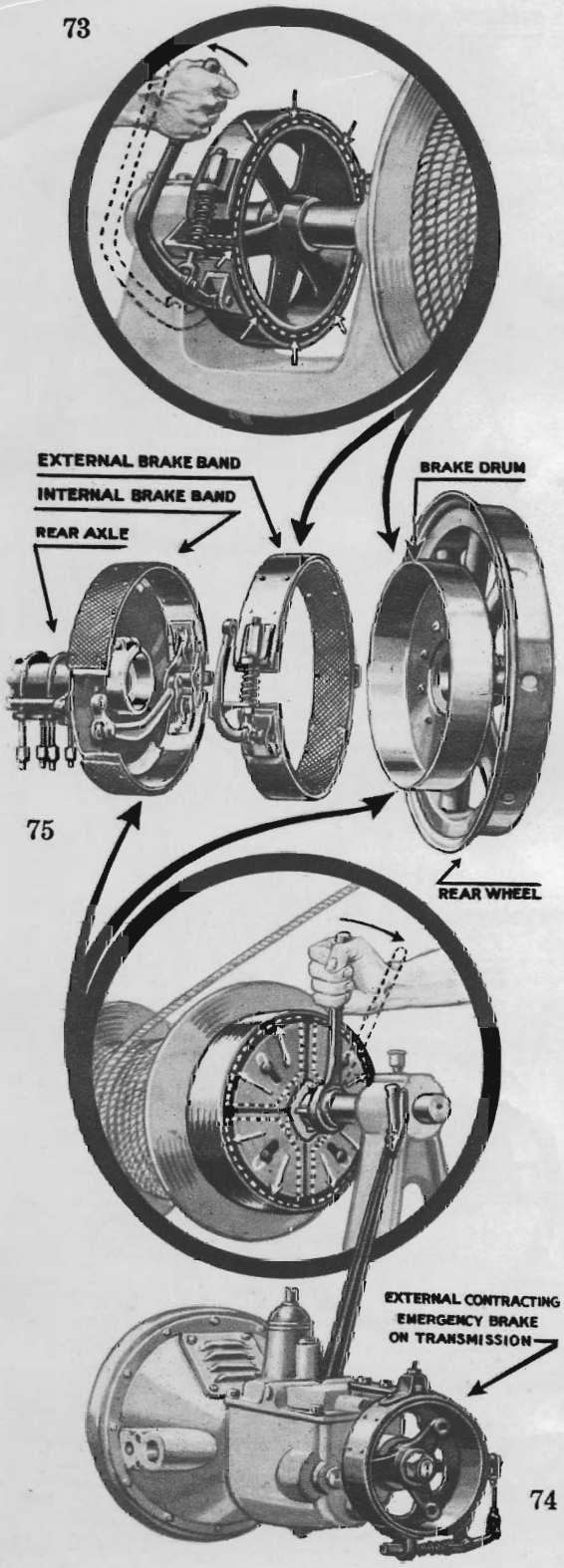

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74

Brakes Are Added for Safety in Driving

73. *Service Brakes*

Now that our car can move we must be able to stop it. Brakes make a car safe to drive. The first step is to mount brake drums on the wheels. Brake drums are steel pans resembling round hat box covers.

For the foot, or service brake, there are pliable metal bands, lined with asbestos fabric, which encircle the drums. When we apply our foot brake, we contract the pliable brake linings against their revolving brake drums. Brake bands grip their drums and the retarding action of friction holds back the speed of our car.

The brakes and clutch are the only parts of our car where friction works to the advantage of the owner.

74. *Transmission Brakes*

Some cars are equipped with a brake operated against a drum attached to the driveshaft. These brakes work upon the same principle as the drums described above. This brake is usually the emergency or parking brake.

75. *Emergency Brakes*

Our emergency brake operates differently from our service brake. It derives its friction by expanding against the inside of our brake drums instead of contracting against the outer surfaces.

The emergency brake expands shoes or bands against the brake drums by means of cams connected to our hand brake lever. Brake cams are similar to the cams on our engine camshaft. Shoes or bands are usually lined with an asbestos material.

Four-wheel brakes are simply brakes on all four wheels of our car. They differ only inasmuch as their units are operated mechanically, hydraulically, or by air. Let your service station make all necessary adjustments on your two or four-wheel brakes.

Many brake fittings periodically require Socony Grease and Oil. Faulty brakes are directly responsible for accidents. Let your Socony dealer lubricate your brake mechanism. It may prevent an accident.

Socony Liquid Gloss for High Polish and Durability

76.

"Save the surface and you save all" applies to the paint on our car even more than it applies to most things. If we protect the paint on our car it will last longer. It won't chip off, and hence your mudguards and the like will not deteriorate through rust.

It isn't as much work as you would think to put a mirror-like finish on a car. It simply requires a little time and effort—very little effort at that—with Socony Liquid Gloss, to polish a car almost like new. You will be surprised to see how long the high luster remains.

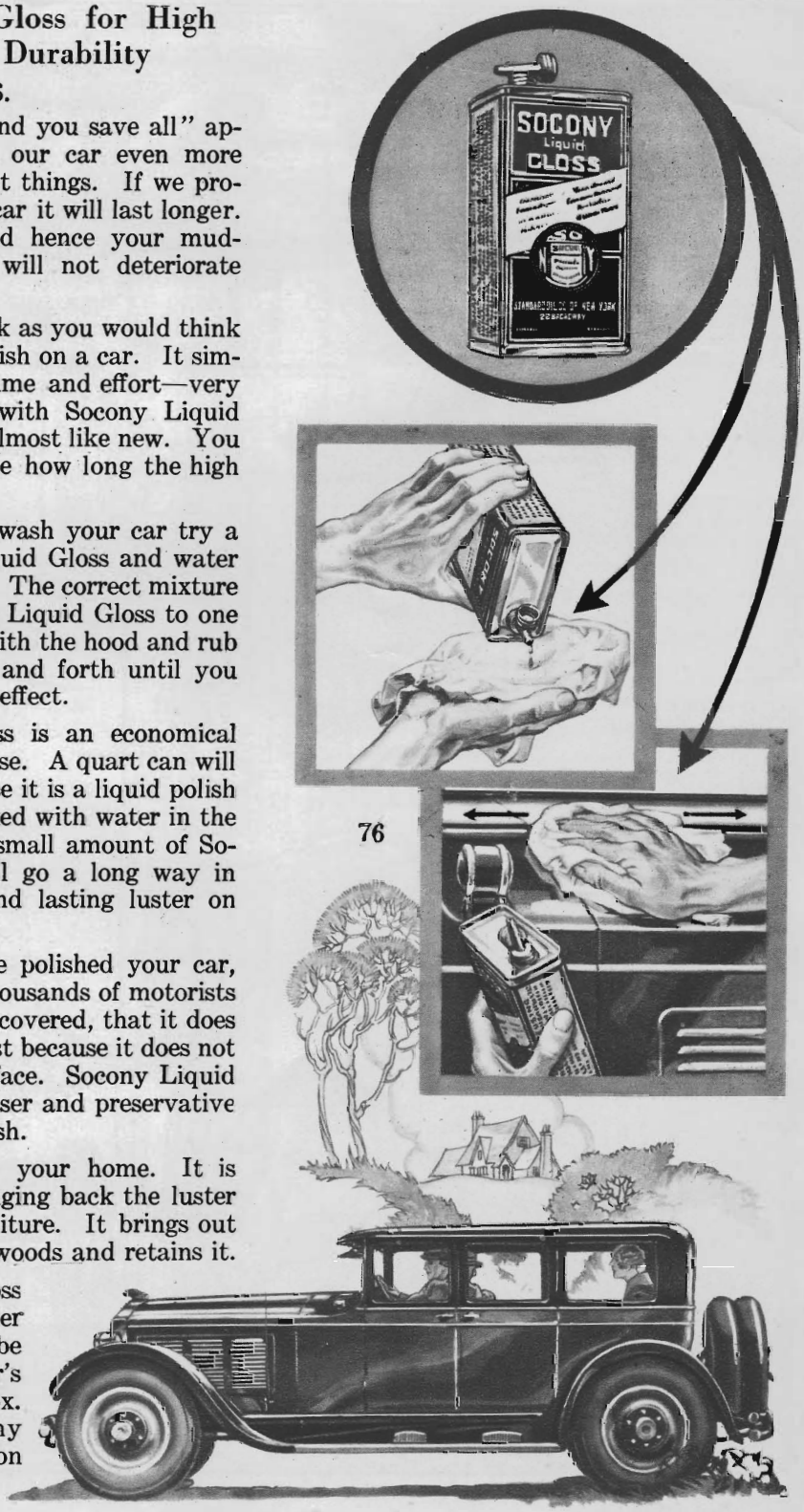
The next time you wash your car try a mixture of Socony Liquid Gloss and water on its painted surface. The correct mixture is two parts of Socony Liquid Gloss to one part of water. Start with the hood and rub in straight lines back and forth until you are satisfied with the effect.

Socony Liquid Gloss is an economical polish for automobile use. A quart can will last for months, because it is a liquid polish and because, when mixed with water in the proper proportions, a small amount of Socony Liquid Gloss will go a long way in maintaining a high and lasting luster on your car.

After you have once polished your car, you will discover, as thousands of motorists in Soconyland have discovered, that it does not quickly pick up dust because it does not leave a "flypaper" surface. Socony Liquid Gloss is the ideal cleanser and preservative for cars with Duco finish.

Purchase a can for your home. It is also unexcelled for bringing back the luster to your piano and furniture. It brings out the natural grain of woods and retains it.

Socony Liquid Gloss comes in quart and smaller cans small enough to be tucked under the driver's seat or in your tool box. Almost every Socony dealer and Service Station carries it in stock.



Let Us Take the Mystery Out of Gasoline and Motor Oil

YOU are a busy man or woman who drives a car. Technical talk tires you. You want to do the best thing for your engine with the least trouble and cost.

These Are Plain Facts

1. The Standard Oil Company of New York has been making lubricating oil for fifty-two years. We know how.

2. We produce our own crude. We refine it in our own refineries.

3. We have a tremendous incentive for making the best oil, for the safety of our investment depends on your good will.

4. We test the oil thirteen times between the time when it emerges from the ground and the time when you put it in your car.

5. It is immensely important for you to standardize on one kind of gasoline and motor oil. Buying here and there and everywhere is like eating here and there and everywhere. You can wear out an engine as easily as you can wear out a stomach.

6. It is easy for you to standardize on Socony because we have 30,000 distribution points. You are rarely out of sight of a Socony station.

7. The service at those stations is courteous, quick and appreciative.

8. We give you our word, backed by our whole experience and investment, that Socony Gasoline and Lubricants are the best that we know how to make. And whenever there is a possibility of improvement we believe that our scientists and engineers are likely to discover it first.

Standardize on Socony Gasoline and Motor Oil

YOU WILL PROFIT BY ADDING TO THE LIFE OF YOUR CAR

Socony Service Stations

THE highways and city streets of New York State and New England are dotted with service stations like the one above.

Supplying you with gasoline and motor oil is their main function—but not their only function.

These stations are designed for your convenience. They are equipped with clean rest rooms. Their attendants are courteous. They have road maps to make your travel easier. They are live, intelligent men who want to do everything possible for your motoring pleasure.

Use these stations regularly. The men in charge of them know that their success depends upon your patronage. They have pledged themselves to earn and keep your confidence.