

**GROUT**





ONE PIECE DROP FORGED YOKE  
AROUND COMPENSATING GEAR.

## Steam vs. The Others

At first thought the observer, by making strict distinctions, divides automobiles into three classes, as regards motive power — electricity, gasoline and steam. Experience and investigation make a different classification, into two sorts, steam and — *the others*.

Since the earliest devices for auto-locomotion, steam has had no successful rival.\* Perhaps at some future time electricity will supplant steam as a motive power in factories and for propelling vehicles, but it has not done so yet except in *restricted* fields. The possible rivalry of steam by electricity can be disposed of almost by a word. There are two ways by which electricity can be made available for vehicle propulsion. One is by the trolley system — a great success for street cars, it is true, but positively out of the question for automobiles. The other is by means of the storage battery, which must be charged every few miles. The result is that by using electricity the auto owner sacrifices independence of movement, and this alone suffices to condemn the electric fluid as a motive power until the time shall come when its shortcomings shall be remedied.

Having narrowed the field to the comparison between steam and gasoline, it is easy to show the vast superiority of the former by taking up the various points in their order.

Now-a-days a boy of six can go into almost any toy shop and buy for a half dollar a miniature steam engine. He fills the small boiler with water, lights the spirit lamp under it and in a few moments he has a head of steam. By means of a throttle-valve he can start and stop the engine and control its speed to a nicety. There is a safety-valve and a water-gauge. By simple belts of string the young engineer can apply the power in various ways to operate small saw-mills and other mechanical toys.

**Simplicity**

The point about the use of steam in the case of the boy is that he *understands* just why it works as it does. It is *simple*. When steam is applied to the automobile the principle is the same — the utmost simplicity coupled with the following advantages in operation :

**Ease** There is *no cranking* connected with the use of steam in an automobile. The simple opening of a valve admits the steam into the cylinders, where it does the work at a degree of speed absolutely within the control of the operator.

The gasolene "chauffeur," in order to start his engine, must exert a certain degree of strength in starting the balance wheel. The engine is not at rest, once this wheel is set revolving, even when the machine stands at the curb or in the garage. The motor vibrates and shakes the whole fabric of the vehicle.

The "chauffeur," in order to start, shifts certain "clutches" in such a way that the motor's force is transmitted to the gears, which propel the vehicle. There are three or four available speeds. The lowest of these is such that when the power is applied the machine starts off with a jolt. There is no gradation between varying degrees of velocity — the car travels at one "speed" or another.

But the steam operator has his pressure at his finger's command. He regulates it to a hair. We have all sat in a steam-railroad car, and, hearing the conductor's starting signal, observed the station platform and walls glide slowly backward, as the train began to move, without the slightest jar. Such is the possibility of steam when applied to the automobile.

**Control** The gasolene engine is propelled by a series of explosions, following each other in rapid succession. That is, it is applied in "chunks." If you stand behind a boy's cart and give it a push, it travels until the impetus is exhausted. Another push with the hand renews the motion. The principle is the same as that of the row-boat, which moves along by an alternation of starts and stops, as it were. The application of steam is uniform. The speed of the motor is even. There is a *constant impetus*, instead of a spasmodic series of pushes.

The advantage of the uniform steam pressure over the gasolene-explosion-series is especially observable in hill climbing. Returning to our little wagon, let us endeavor to force it *up hill* not by a steady push from behind, but by a thrust of a given power once per second. The cart moves briskly for a few feet, gravitation tends to retard it, and at the end of the second its speed is considerably lessened. Its motion is renewed only when the next push is given it. **Hill Climbing**

The point here to be observed is that in the interval between one application of power and another, the only advancing agent for the vehicle is its *momentum*. The momentum acquired from one push is expected to keep it in motion until the arrival of a new impetus.

An impetus applied every second may suffice to keep the wagon moving until the slope is surmounted. If, however, the load or the grade be increased, the momentum may become exhausted, and the vehicle begin to stop and roll backwards down the hill before the interval between the two force-applications can expire. This, then, is the simplified principle of the labors of the gasolene car ascending a grade. The steam car, with its steady, even and *constant* pressure, will pass it and with ease reach the top, even if the gasolene vehicle becomes stalled and helpless to proceed.

The constant impact of a succession of explosions violent enough to propel a heavy car causes a tremendous vibration throughout the fabric of the vehicle. Here, then, is the cause of many a loose nut, started bolt and consequent break-down. The steam carriage moves without quiver or undue strain upon its fixed or "standing" parts, and escapes the likelihood of actually shaking itself to pieces. **Vibration**

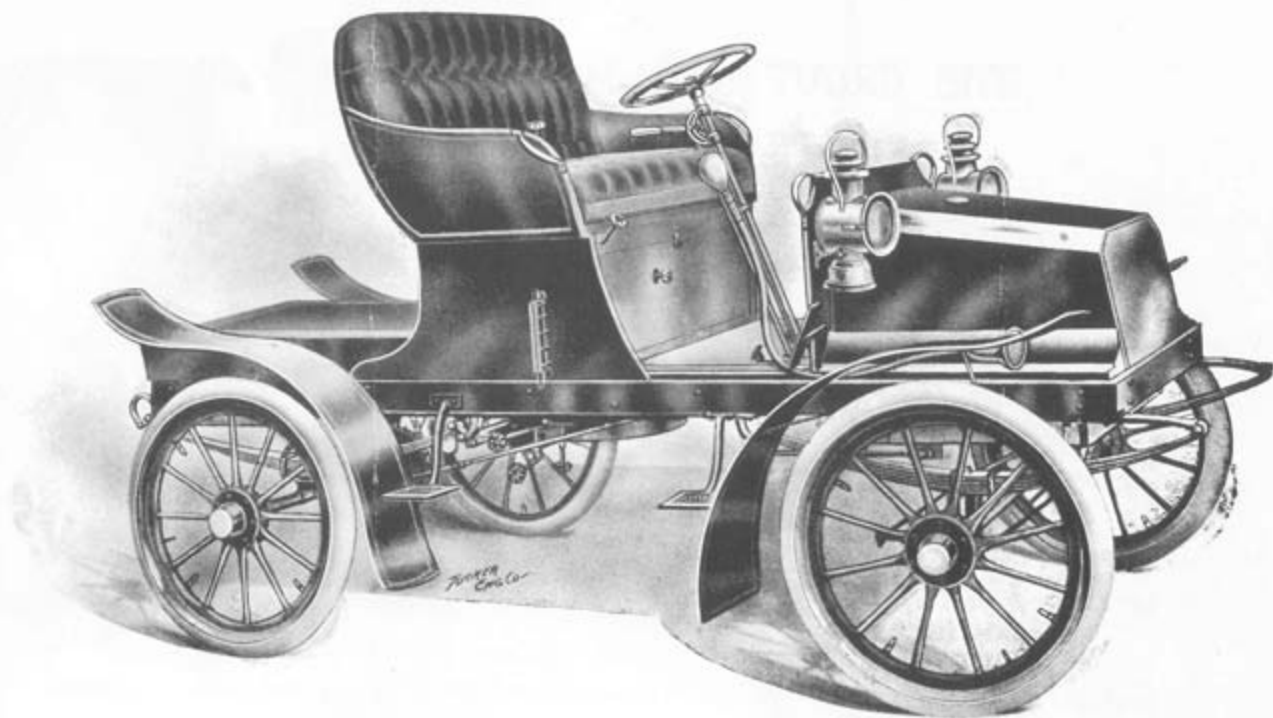
The thump—thump—thump of the exhaust from the petrol explosions in the gasolene motor is a tremendous annoyance to its owner, and has done more than any other feature of the automobile in general to bring it into disfavor with the public and more especially with those who drive horses. No such complaint can be made of the quiet seemly progress of the steam vehicle as it goes swiftly and silently along either crowded city streets or the open roads of the country. **Noise**

## THE GROUT STEAM RUNABOUT, \$800

The Grout \$800 Runabout is the first decisive step in the direction of an answer to the question, "When will good automobiles be cheap enough for people of moderate means?" The Grout Runabout is not a mere road cart or buggy. It is a big, bowerful *car* — capable of making long journeys with ease, comfort and security.

No other machine at anything like this price is so staunch or so able to meet the many vicissitudes of all-around automobile service. There is many a car in use to-day, costing its owner originally from \$500 to \$1000 more than our car to purchase, yet involving a very much greater expenditure for repairs, and furnishing less good, thorough service from the beginning of the season to the end.

No automobile for sale to-day demonstrates so perfect a concentration of great power at small cost as the Grout. Rated at 10 horse power (the highest power of any so-called "Runabout" at this price) the Grout is easily capable of from 12 to 15 horse power. The appearance of the Grout Runabout is impressive. It is built on strong common-sense lines, and gives the impression of a fine piece of automobile construction, which indeed it is, in every possible way.



**THE GROUT \$800 STEAM RUNABOUT**

Guaranteed to Go Where Any Automobile Ever Went

## THE GROUT STEAM RUNABOUT, \$850

### With Surrey Seat for Touring

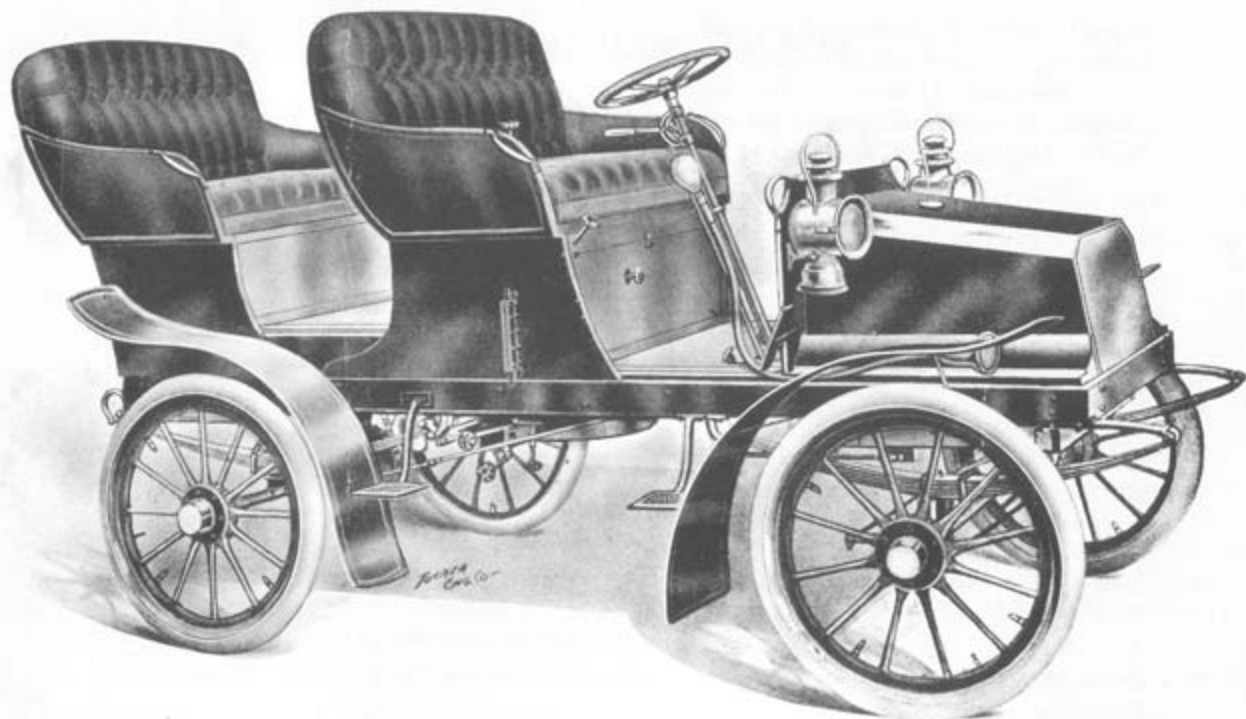
The Grout Runabout, as described, can be made substantially more useful by the addition of the Surrey seat, at a cost of \$50. This extra seat is detachable, and is fastened securely upon the Runabout in 20 minutes. Thus you may have an actual touring car, with ample seating capacity for four people.

Such a car is suitable for quite extended trips. It carries water for 40 to 50 miles and gasoline fuel for 90 to 100 miles. Here come into play its fine hill-climbing powers and splendid reliability of parts. The ease with which the machinery is reached makes inspection and adjustment a very simple matter for the owner. The presence of the Surrey seat does not interfere with the raising of the rear platform (hinged) under which the engine and running parts are located. No one ever has to *crawl under* a Grout to get at the engine.

The rear seat is much preferable to the extra front seat on some makes of cars, the use of the latter involving so much danger that bills for its prohibition have already been presented in the legislature of Massachusetts.

Canopy tops with Glass front, \$100.





**THE GROUT STEAM RUNABOUT WITH SURREY SEAT — \$850**

Guaranteed to Go Where Any Automobile Ever Went

## Specifications : The Grouv \$850 Steam Runabout

*Engine.* 10 H. P., horizontal, encased.

*Generator.* 16 x 16 inches, 1/2-inch tubing — *non-burnable*. All mechanical parts same as described, "Burner," "Generator," "Engine," etc.

*Throttle.* Under wheel grip on wheel post.

*Brake.* Double action Hub Brakes applied by right foot with almost no effort, and is very powerful.

*Reverse.* Left foot lever, Stephenson link.

*Water.* Tank under bonnet over front axle, capacity 43 gallons, enough for 40 to 50 miles.  
Gasolene under platform at rear, capacity 12 gallons, enough for 90 to 100 miles.

*Wheel-Steerer.* Locking type, wheels *cannot turn* unless turned by steerer. This adds to both ease and safety of driving.

*Frame.* Seasoned ash, reinforced with steel plates entire length. *Machinery* set on steel plates.

*Wheels.* 28-inch hickory, Artillery type (interlocking spokes), ball bearings, steel rims.

*Tires.* 3-inch double tube.

*Extreme Length.* 9 feet, 9 inches.

*Extreme Width.* 5 feet, 3 inches.

*Extreme Height.* 5 feet, 5 inches.

*Wheel-base.* 78 inches. *Tread* 56 inches.

*Upholstering.* Real leather and best grade curled hair and springs throughout.

*Seat.* Width, 40 inches; depth, 19 inches; back, 24 inches.

*Rear Platform.* Lifts on hinges to allow instant access to engine and working parts.

*Price.* \$850 with tools, oilers and mud-guards, and detachable surrey seat.

*Surrey Seat.* Detachable.

Automatic Fire Regulator and Water Lift.

## The Grout Fuel System

The Grout Fuel System is the most effective as well as the most economical ever devised for a steam car. A glance at the accompanying diagram will illustrate its working.

In the main supply tank the gasolene is never under pressure. In the pressure fuel tank, however, it is subjected to enough pressure to force it into the burner in the requisite quantity.

Having established 40 pounds air pressure in the pressure tank at valve "A," the gasolene is drawn from the supply tank by the fuel pump and thrown into the pressure tank, from which it is forced (via valve "D") to the burner. Valve "J" will admit the fluid but will not allow it to return. When the gasolene has been forced through this valve until a sufficient pressure is attained, no more will enter, but instead it "by-passes" and stops the pump. As the pressure is relieved by the consumption of the fuel by the burner, the gasolene feeds through valve "J" just enough to supply the consumption and no more. Thus a uniform pressure of fuel is maintained.

Please note in the diagram that the fuel goes two ways after passing valve "D." By the lower branch it passes into the "Pilot light," or torch, and by the upper branch to the main burner. The operation of these two parts is easily understood.

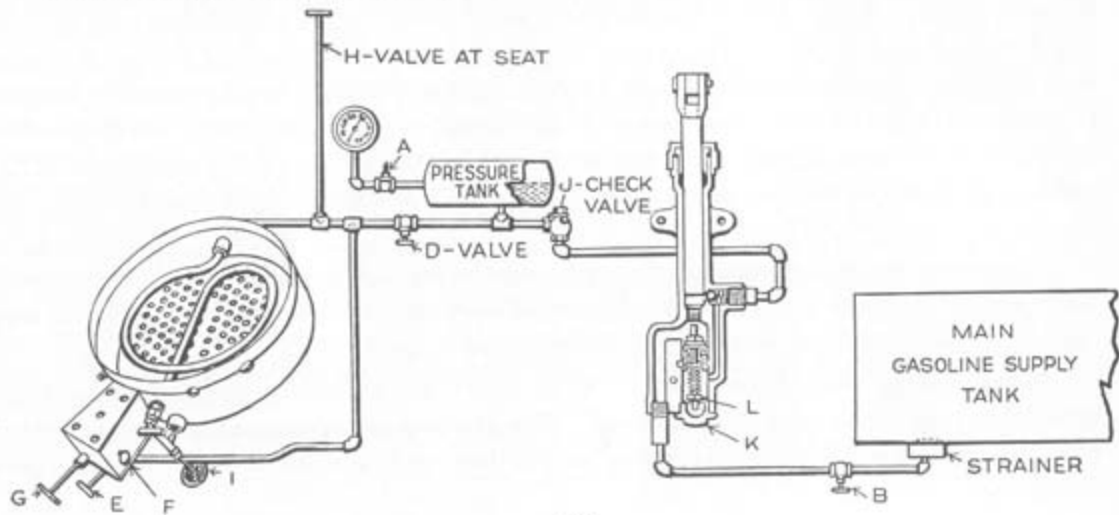
When making ready to start, valve "E" is used to fill a small cup with gasolene—just a spoonful or two. This valve is then closed. The gasolene in the cup is ignited with a match and the flame quickly heats the vaporizing plate of the torch (just above it). Then the gaso-

lene from valve "G" is sprayed against this hot plate and immediately emits a clear blue flame.

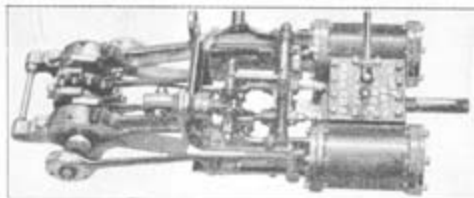
As soon as the torch or pilot is alight, the main supply is admitted via valves "H" and "I," and the flame from the torch quickly ignites the main fire under the generator. This fire is regulated entirely from the seat of the car, by valve "H."

Sufficient steam is made in six minutes from the lighting of the fire to start car. If the car is brought to a stop the main fire is cut off by valve "H," and the flame of the pilot maintains the steam pressure as long as the car is standing, with almost no consumption of fuel. To re-light the main fire when the car is started, all that is necessary is to admit the fuel by operating valve "H" at seat.

Supplied with Automatic Fire Regulator.



# The Grout Engine



Like all other parts of the Grout Steam Motor Car, the engine is of our own devising and manufacture. Every engine is made in our factory under our personal supervision. It is small and compact, yet exceedingly powerful, made in two sizes, 10 and 20 horse power.

The Grout engine is of the two-cylinder type, furnishing four expansions, one at each end of the piston stroke. That is, the impact of the steam thrusts the piston forward to the end of the cylinder, where it is met by a second jet of steam which forces it back. Thus there are four powerful sources of energy in every Grout machine.

**Cylinder**

Right here let us emphasize the difference between the Grout Steam and the gasoline engine. The gasoline explosion occurs at but one end of the cylinder, forces the piston in one direction only, and so the piston must depend upon its own momentum to carry it back. This is especially to be noted in connection with gasoline cars sold at anything like the price of the Grout Runabout, which have only one cylinder, and so provide for only one spasmodic impetus to the vehicle, where the Grout engine furnishes *four*, and those so arranged that two are constantly at work, thus imparting a steady and unvarying force-application.

The Grout cylinders are provided with an automatic oiling system. The oil is applied at one place, whence it is distributed throughout the mechanism. And now note this important fact — that where the gasoline machines (on account of the tremendous dry heat generated by the explosions in the cylinder) require a gallon of cylinder oil (at 90 cents per gallon), the Grout engine demands only *one pint* for an equal distance travelled. So much for the side of Grout economy.

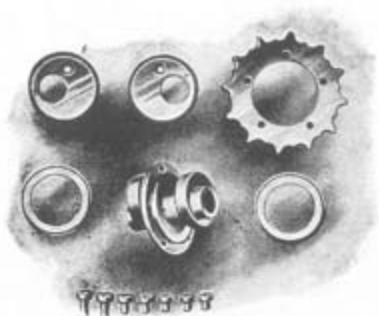
**The Oilers**

**Construction**

The Grout Engine is of the best and most painstaking construction both as to material and workmanship; cylinders are the best gray iron, frame of phosphor bronze (strongest metal for its weight known), and all other parts of best steel drop-forgings. The sprocket and eccentrics (by which the energy of the motor is transmitted to the running gear) are forged in one piece, instead of many (thirteen being the usual number in other machines).

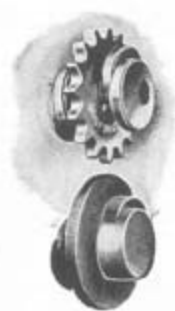
**Control**

The Grout Motor is controlled *from the steerer*, the throttle being attached just under the wheel-grip. The reverse (to change directions of travel) is worked by an improved lever, Stephenson link system of valve-control. *A one-armed man can drive a Grout with safety.* The throttle, which is self-closing, is released by a slight pressure of the right foot upon a conveniently situated trip-lever; and by slight additional pressure on the same lever, the operator can, when so desired, apply the brakes.



13 PARTS

OTHER SPROCKETS



TO 1

THE GROUT

## The Grout Generator

The Grout Generator consists of a vertical tubular boiler with tubes of copper enclosed in a cylindrical jacket of steel, and a powerful burner for the consumption of gasoline (or kerosene if desired). The burner pours a steady stream of blue flame into each tube, and in six minutes from the application of the match, a steam pressure of 300 pounds is generated from the vaporization of the water circulating among the tubes. The boiler is tested at 700 pounds and the safety valve adjusted at 350 pounds.

*This boiler cannot burn out by careless handling.* Our perfected *Fusible Plug* is a feature not found on any other machine. It consists of a plug of soft metal so arranged that no sooner does the water become depleted to a certain pitch than the plug fuses or melts and permits the escape of the steam, warning the occupant of the vehicle that his fire must be shut off. A new plug may be inserted in from five to ten minutes.

The Grout Generator is provided with a Klinger Unbreakable water glass, which shows the pitch of water distinctly, so that at all times the water supply may be regulated perfectly.

*Superheated Steam.* In order that the steam may reach the engine at the utmost efficient temperature, the Grout Generator is provided with a "Superheater," which imparts additional heat to the vapor just before it enters the cylinders. The Grout Generator is lagged (packed) with a coating of asbestos, which serves the double purpose of protecting the surrounding parts of the vehicle from heat and the boiler from outside cold.

The Grout Generator has a reserve pressure of steam and *does not necessitate the use of hand water-pumps in taking hills.* It is an excellent steamer. It has sufficient water capacity to be left standing several hours under steam.

# Grout Bros. Automobile Co.,

ORANGE, MASSACHUSETTS.

BOSTON BRANCH, 151 — 153 COLUMBUS AVENUE.

## AGENCIES.

EASTERN AUTOMOBILE CO.,

308-310 W. 59th St., New York City.

JOHN A. PETRIE,

New Haven, Ct.

C. R. HUSTON,

Morgantown, W. Va.

COLORADO MOTOR CARRIAGE CO.,

Denver, Col.

COOLIDGE CYCLE CO.,

Rutland, Vt.

M. M. WOOD CO.,

Chicago, Ill.

W. A. VANDERVEER,

Port Ewen, N. Y.

A. C. DECKER.

Keokuk, Iowa.

J. F. LANSING & SON,

Lincoln, Neb.