

THE \$1085 COATS STEAMER

No Gears to Shift—Carbon to remove
Valves to grind or Spark
Plugs to trouble

It is powerful, smooth, reliable, and economical. Will perform wonderfully in muddy roads, steep hills and cold weather.

Nothing complicated or new to learn.

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Picture the satisfaction of the Coats engineers when this boiler *stood the severe thousand day test* without showing the slightest deterioration or the necessity of replacements.

The lack of such a boiler in the past has retarded the universal adoption of the Steam Automobile.

The placing of the engine in the center of the car to eliminate road jars, minimize repair costs and to relieve the rear axle of the excessive unsprung weight, allows the selection of standard units in construction, makes for longer life in the automobile and will save the public untold millions of dollars in the future.

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Coats Steam Car Co.

Exclusive Sales Agency

1675 SOUTH HIGH STREET

COLUMBUS, OHIO

Power Plant of Coats Steamer Has Important New Features

How Power Stability is Maintained—The Pure Blue Flame—Auxiliary Engine Insures Immediate Starting and Banishes Freezing Worry

(By C. A. FRENCH, Engineer, Coats Steam Car Company)

The power plant of Model 1923 Coats Steam Car is in most respects entirely unlike any previous steam power plant designed for a passenger car.

Heretofore the great boiler problem has been to keep the right amount of water in the boiler and to force the evaporation to a very high rate without danger of burning the tubes and without violent fluctuation of the steam pressure and temperature.

The burner problem has been to produce a burner that will instantly give a perfectly silent and entirely clean transparent odorless blue flame without the use of vaporizing coils, vapor nozzles, atomizing nozzles, fuel under pressure or any of the other troublesome features.

Approved by Leading Engineers

A large number of competent engineers have examined the design on the power plant of the Coats Steamer in operation and all freely admit that everyone of the old problems has been solved. Of all the engineers that have gone over it, not one could find that any new problems were liable to develop. Among these engineers were some who previously manufactured steam passenger cars.

An automotive steam boiler is up against the same problems as a man doing a large business with an extremely small capital—the small amount of water in the boiler represents the capital on which large drafts are made at irregular intervals. A man doing business under such circumstances must do a lot of mighty close figuring to prevent overdrafts on his account unless he can so plan it that every time he makes a check for, say, \$100 he also makes a deposit of \$99.99 to \$100. With that kind of an arrangement he could do considerable business before he would need to worry about his

bank account and he would have time to fix up the few cents discrepancy that would occur when he deposited a few items of \$99.99.

It is obvious that if practically all of the steam taken from the boiler is condensed to water and the water immediately pumped back into the boiler, the amount of water in the boiler can only change very slowly giving ample time for any water level automatic to take care of it even though it were leaky or, out of adjustment. With such a system, great stability of the boiler is assured. As the preheating, evaporating and superheating zones are of fixed areas, the temperature of the steam can not vary except between narrow limits.

Small Auxiliary Engine

The condenser and burner-fans, condenser and boiler feed pumps are all operated at constant speed by a small, high speed automatic two cylinder auxiliary steam engine which operates continuously by steam from the main boiler.

By this method the maximum condenser capacity is secured at all times, and the pumps will always return the water to the boiler as fast as they receive it.

This gives a degree of capacity and stability that it is impossible to secure when the fans and pumps are operated from the main engine.

When the condenser fan and boiler feed pumps are operated from the main engine in a slow hard pull, neither the condenser fan nor the feed pumps are running fast enough to do much good, and at high car speeds they are running much faster than is necessary.

In large steam power plants, where a large investment is made to secure greatest possible reliability, stability and economy of the boiler plant, all steam is condensed and the water is returned to the boiler, all auxiliaries such as fans, pumps, stokers, etc., are operated independently by steam.

Inasmuch as 60% of a gas automobile's troubles are electrical, there seems to be no good reason for carrying these troubles over to the steam car by trying to operate the auxiliaries electrically, so long as it can more cheaply and reliably be done with a steam engine.

Semi-Flash Counter Flow Boiler

The boiler is of the semi-flash water tube type with the coils surrounding the burner.

A steadying drum is used to prevent fluctuations of pressure and temperature as well as to provide absolutely dry steam to the superheater and to provide means for separating out any scale forming material.

Means are used to force the recirculation of a very large amount of water through the evaporating section of the boiler. This is accomplished without the aid of any extra pumps or other extra mechanism except two check valves. So long as there is any water in the separating drum, much more water is going through the evaporating section than the fire can evaporate into steam. On account of the rapid circulation in all parts of the boiler, it is especially adapted to handle scale forming water.

On the separating drum is a water level regulator that permits water to flow from the supply tank to the feed pump. When the level in the drum falls below a pre-determined point, this restores this level to the proper point. Under ordinary circumstances this automatic admits about one pint of water every three or four hours.

It can be seen that under this system the condenser capacity and consequently the water mileage, are greatly increased. The amount of scale forming material taken in with new water is greatly decreased. The water being returned to the boiler practically as fast as taken out in steam, reduces the frequency and amount of control and increases the stability, safety and efficiency to a degree that can not be approached by any other method of control.

After a careful examination of this system several engineers have remarked that its every tendency is to stay in balance and that, outside of the very slow loss of water from the system, there is no force tending to throw it out of equilibrium.

New Type of Burner

The burner is unlike any in use in that the fuel, (kerosene) is burned in two independent and disconnected stages; the first stage being the burning of a very small quantity of the atomized fuel in insufficient air for the purpose of vaporizing the fuel, after which the flame is extinguished. The hot fuel vapor is then mixed with the full quantity of air and burned

from the cylindrical grating in the center of the boiler.

Both of the flames in this burner are blue, transparent, odorless, noiseless and incapable of making soot. There is no regulating or throttling of this burner. It is on full or entirely off.

The working steam pressure in the boiler is 700 lbs. per square inch.

When the pressure drops to 650, the burner starts and remains on until the pressure reaches 700 lbs. when it is automatically shut off. When the burner is on, enough fuel is burned to give 35 brake horse power.

A small electric motor driven fan furnishes air to operate burner while firing up, which requires about 40 seconds.

When there is steam enough to start the auxiliary engine, the motor is stopped and not again used until the auxiliary engine has been stopped for an hour or more.

Ordinarily the auxiliary engine is allowed to run as long as the car is in use. So long as this engine is running, the power plant is at all times instantly ready to give maximum power—whether the stop is of one minute or twenty-four hours duration.

No Freezing Problem

This also does away for once and all with the old problem of worry about freezing. With the car in ordinary use—even with long standstills—there need be no fear of freezing in any temperature where automobiles are operated.

The Coats Engine

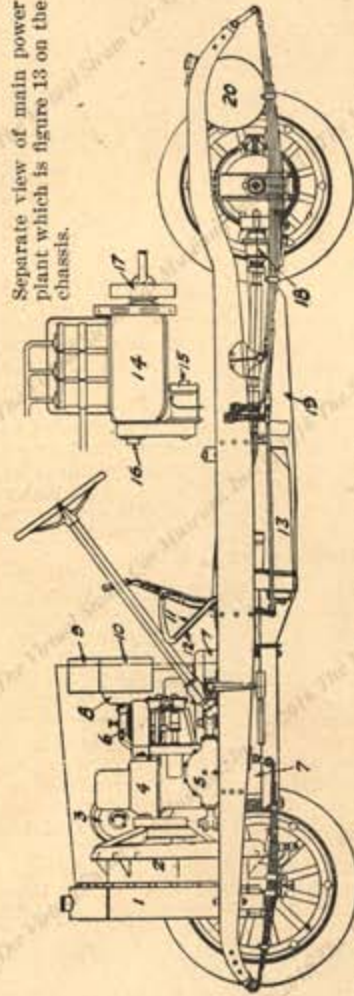
The Coats engine is a horizontal three cylinder, single acting semi-uniflow, poppet valve type, all valves being controlled by one camshaft. This single camshaft handles cut-off, forward and reverse speed; the engine being of the reversible type directly connected with propeller shaft. Forced feed and splash system of lubrication.

The crank shaft is carried on four main bearings. Crank pins are exceptionally large. Connecting rods are fitted with bronze back babbitt bearings.

Gears are employed in driving camshaft and electric generator.

All valves mechanism and moving parts are enclosed in dust proof housing.

Separate view of main power plant which is figure 13 on the chassis.



- 1 Condenser
- 2 Condenser fan and blower
- 3 Electric starting blower
- 4 Auxiliary steam motor
- 5 Water pumps
- 6 Burner
- 7 Boiler

- 8 Separating drum
- 9 Fuel tank (aux.)
- 10 Water tank
- 11 Service brake
- 12 Cam shift pedal
- 13 Main power plant
- 14 Top view main power plant

- 15 Electric generator
- 16 Lubricating gear pump
- 17 Power plant fly wheel and front universal joint.
- 18 Rear universal joint
- 19 Exhaust fuel pipe
- 20 Fuel tank

SPECIFICATIONS

ENGINE—Horizontal, three cylinder, single acting, semi-uniflow, poppet-valve type. Valves controlled by camshaft. Forward, cut-off and reverse actuated from left foot pedal sliding the camshaft. Cylinders cast individual with half of crankcase. Four bearing crankshaft. Splash and gear pump force lubrication. Horse power—15 in steam, 35 brake test. Any garage man can understand this engine. Its position in the car is that of a transmission and is connected directly to the universal joint.

BOILER—Semi-flash, water tube type with coils surrounding burner. Maintains water level by receiving water from the condenser constantly, loss is made up from the spare tank by a positive automatic.

BURNER—Air controlled. Fuel gravity to the well, forced to burner by air and electrically ignited. Maximum steam pressure closes off air entirely. When pressure descends, air is again allowed in and fire comes on full. Auxiliary Engine continues to run when fire is out. In cold weather this engine can be left running or water treated with alcohol without harming system.

BLOWER—Combination condenser-fan and blower furnishes air to the burner and is driven by an auxiliary steam engine. In starting with a cold boiler, a small blower is used and driven by an electric motor from the battery, less than one minute.

CONDENSER—Large enough to condense all the exhaust steam from both steam engines. Water is then pumped back into the boiler by the auxiliary engine. Condenser shell is finished off in nickel silver.

FRAME—Depth, six inches with four heavy cross members.

WHEELBASE—115 inches. **REAR SPRINGS**, 58 inches with 8 leaves.

BRAKE—Service from right foot pedal. Emergency by hand lever.

TIRES—32 x 4 Cumberland Cord. **STEERING WHEEL**, 18 inches.

REAR AXLE—Semi-floating, Spiral Bevel Gear, 2 1/4 to 1 ratio.

TANKS—Seamless, **FUEL**, 18 gallons. About 20 miles are obtained from a gallon of kerosene. **WATER**, 6 gallons. Enough for a weeks Ordinary Running.

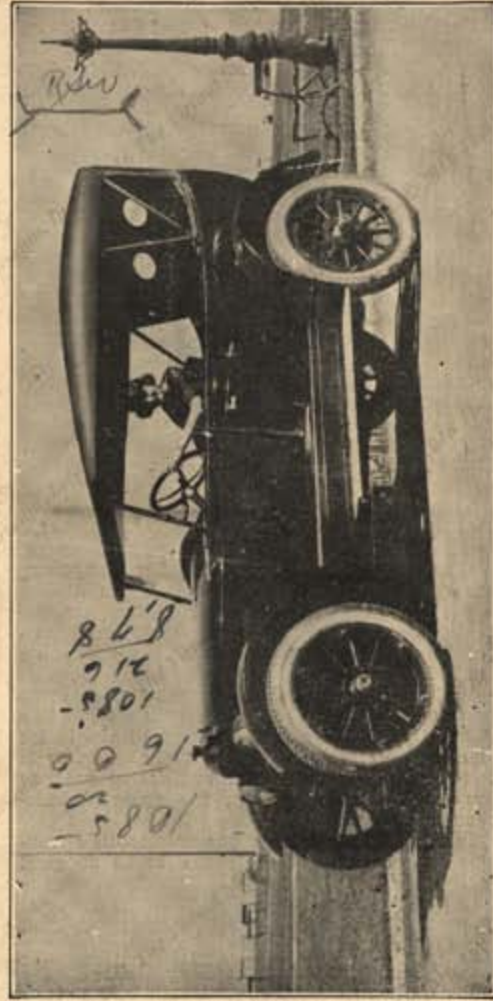
EQUIPMENT—Complete, set of tools, extra rim on tire carrier, 6 volt battery, barrel headlights, etc.

DASH—Speedometer, oil gauge, ammeter, water and steam indicator, lighting and electric motor switch, and auxiliary steam motor throttle. Main engine throttle on steering wheel.

BODIES—Five passenger open. Upholstered in a very good grade of leather. Five passenger four door Sedan. Upholstered in dark blue broadcloth with many attractive refinements. Painted Dark Blue.

PRICES—Open, \$1085.00. Closed, \$1495.00. F. O. B. Columbus, Ohio. Freight and War Tax, Extra.

Latest in Body Designs Now Being Built



Photograph of factory demonstrator while in Milwaukee

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