Century Flash Steam System

For Automobiles, Steam Trucks, Launches, Yachts, Small Stationary & Portable Power Plants, Etc.

Flash Generators, Kerosene Burners, Automatic Fire and Water Regulators, Packingless Throttles, Thermostats, Seamless Steel Fittings and Steam Automobile Specialties.

Manufactured by

Century Auto-Power Company,

East Orange, N. J., U. S. A.

New York Office: 102-104 Fulton Street.

Foreword.

The Steam Automobile of today possesses many advantages over the gasoline-explosive car, which are gradually becoming apparent to thinking automobilists. This is surely evidenced by the recurrent popularity of the steamer, and the remarkable records of competitive tests, in this country and abroad, covering speed, endurance and economy, which have demostrated in a practical way that Steam is still the World's greatest motive power.

The superior flexibility of control; all speeds, forward and reverse, through the handling of a throttle; the uniform reliability; the absence of dependence upon another factor to produce working results, as in the constant employment of electricity for ignition purposes,—(a very variable factor at best); the elimination of complex and costly transmission systems; the absence of vibration and the noiseless running; the great reserve power always ready for emergency loads; the wonderful hill-climbing properties; *all* are contributing to place Steam in the first rank as a motive power for the modern automobile.

The present popularity of the gasoline-explosive car, may, in fact, be chiefly attributed far less to its own inherent advantages, than to the defects of the steam system as first applied to automobiles. This fact will be made clearly evident by distinctly differentiating between the "New Steam" as generated by the Flash System, and the old which was an imperfect adaptation of the Railroad Locomotive to road vehicle use. It was quite natural that the first operative automobile in the world should have been propelled by steam. It is also not to be wondered at, that in the process of adaptation serious defects should have developed, owing to the vast differences, now as then, existing between the Railroad Locomotive and the Automobile. But it is safe to say that these early steamers gave their owners in all parts of the country a satisfaction and pleasure, and a faithful service, although harder worked on the average, unparalleled by many of the best gasoline-explosive cars of today.

Many of these steam cars are still in use, and the attention of their owners, as well as the owners of more recently constructed steam cars, and of all who contemplate building their own cars, is especially called to the superior merits of the

Century System of Flash Steam Generation with Kerosene Fuel,

as applied by us to automobiles of every description, from the lightest runabout to the heaviest steam truck for commercial purposes, as well as to launches, small yachts, and small stationary and portable power plants covering a multitude of uses.

The Old & New—A Comparison.

First

Gasoline used for fuel. Extremely dangerous in all cases where flame is used, as evidenced by numerous street fires in which entire machines have been ruined.

Second

A boiler, which was heavy; required a water level and glass, and fusible plugs, and continual watching on the part of the operator lest it burn out or collapse its myriad tubes through overheating or lack of water, (a costly and common event) crippling the car absolutely. Also subject to the usual scaling and corrosion of steam boilers.

Third

Complex construction of the steam generating outfit, making rapid repairs impossible, and confusing to the ordinary user of the car

Fourth

A ridiculously small steam generating plant for the work required of it. Most of the firetube boilers were worked to their utmost capacity all the time to supply steam, and had, consequently no margin or reserve left.

Fifth

A long time necessarily consumed in raising steam first from cold water; 20 minutes or more.

Sixth

An unnecessary amount of fuel consumed as the result of burning gasoline in a burner as against exploding it in mixture with air within a cylinder, thus giving the gasoline-explosive car the advantage in lower running cost per mile.

First

Common kerosene oil for fuel, costing 40 per cent less than gasoline, giving over 25 per cent more heat, obtainable everywhere at any time, perfectly safe to handle with flame and free from objectionable odor or smoke.

Second

A Steam Generator, made of seamless steel tube, weighing nearly 50 per cent. less than the old boiler, producing steam of higher expansive force with greater safety, (absolutely non-explosive under any pressure), operated without guage cocks or water level, uninjured by accidental overheating or lack of water, and requiring 1 as fuel per pound of water to produce steam.

Third

Marked simplicity of arrangement enabling the merest novice to understand the working of the system on the first explanation, and facilitating repairs.

Fourth

In all cases ample steam producing capacity provided for, with plenty to spare for extra loads without taxing the system unduly. This is possible through the saving in weight and compactness, and means highest economy of fuel and water.

Fifth

Steam made instantly from cold water in some case quicker than the modern gasoline-explosive car can be "cranked" and with much less effort.

Sixth

A remarkable reduction in fuel cost as the result of our combination of a perfect flash boiler and perfect kerosene burner, with reliable and improved automatics, making the steamer as economical in the use of fuel as any, and more so than many gasoline-explosive cars.

Which Will You Have by Preference?

Descriptive

Construction

The **Century Flash Steam Generator** is built of coils or units, superimposed one upon another, and all connected. The single coils are made from seamless, cold drawn steel tube, wound on a special mandrel, and are joined together by right and left couplings of seamless steel having very heavy walls, specially tapped out for this purpose. No cast-iron fittings or lap-weld tubes enter into the construction of the generator at any point, thus ensuring its ability to withstand very high pressures of steam without leaks in the couplings or ruptures in the coils. This seamless steel tube is the strongest and most durable metallic substance of its kind in the world, and the generator is consequently of equal strength and durability. The single coils after being spaced and assembled are locked fast in one solid unit by heavy cast iron spiders at top and bottom, with steel rods running through the assembled coils, and threaded into the spiders, which enable the coils to be drawn tightly and compactly together. Care is also taken in the assembling of the coils to stagger them instead of building them up one above another in too regular formation, as the highest efficiency results from the greatest amount of heating surface presented to the burner. The generator is then cased in a suitable sheet iron casing, with several layers of asbestos laggings to insulate it thoroughly from outside temperatures, and a final casing of very light sheet iron secured by brass straps is laid over the asbestos, giving the generator a very handsome appearance when finished. For automobile uses the generator is provided with lugs or suitable wrought iron hangers for suspension in the car frame, and flue connection on the top. These details however, *are to the sketch of the purchaser only*. For stationary and marine purposes the generator is mounted with the burner underneath on short iron legs, with the automatics, steam guage and fittings, all attached to the outside casing. These last mentioned parts in automobile use are not attached to the generator but are supplied separately, to be placed in the car at the pleasure of the builder.

Operation

In operation, water, with or without preliminary heating, is introduced into the top coil or unit, under pump pressure, after having passed in at the bottom of the generator through a single tube lying directly over the burner fire and passing up through the open space or central core of the assembled coils. It travels down through successive coils until it reaches a point near the center of the generator. Here it is suddenly "jumped" by a downward-leading tube straight to the bottommost coil. By this means there is always present in the coil nearest the fire a saturated vapor, and as a tube can become no hotter than the temperature of the fluid within it, it is evident that in the **Century Generator** the lower coils cannot burn out from over-heating. The vapor now takes on an upward circulatory movement through the coils, the exact reverse of the downward motion first above referred to, until it reaches the coil next under the one from which it was so suddenly diverted. This is at a point generally about midway in the generator, and from here the steam is led off in a loop inside the casings down and under and across the bottom of the generator, through a special steel tube of very heavy wall, without joints or couplings of any nature, in order that it may be subjected to a full degree of superheat, but it will be noted that in this single bottom discharge tube it is impossible for the steam to be overheated as would be the case if it were obliged to traverse a whole helical coil directly over the fire before discharging from the generator. Having reached the point of discharge the steam next passes to a special four-way steel fitting on the outside of the generator. From this four-way lines lead off as follows: [1] to the throttle and engine; [2] to the diaphragm water automatic; [3] to the diaphragm fire automatic; [4] to the steam gauge through the usual trap. No series of water-traps are used on the various coils of the Century, as the generator as a whole constitutes one grand trap, and priming is absolutely impossible. Two of the most important advantages claimed for our construction, which is patented, are, [1] that while ensuring perfectly dry steam at all times from the generator, the steam will never become too highly heated for ordinary engine use, and [2] the lowest coil next to the fire, containing as it does water and saturated vapor instead of highly superheated steam cannot burn out, scale or become overheated, both of which conditions we have found by practice to be altogether too prevalent with those types of Flash Generators in which the circulation is entirely downward, and the steam to the engine is drawn from directly over the fire from the lowest coil.

Referring to the illustrations presented herewith Fig. 1 shows the coils assembled, ready for jacketing. It shows

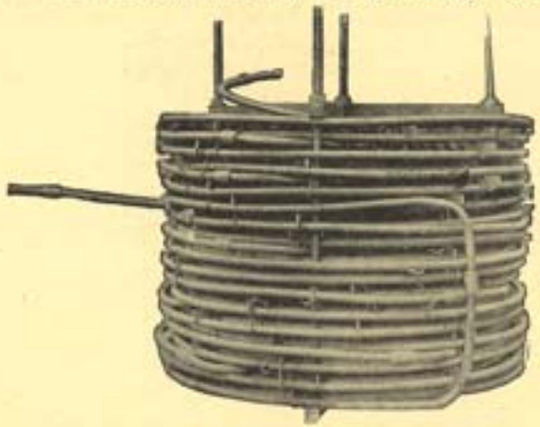

Fig. 1

clearly the special feature of construction as embodied in the two opposed circulatory movements of water and steam, and the downward leading tube along the side. Fig. 2 is a view

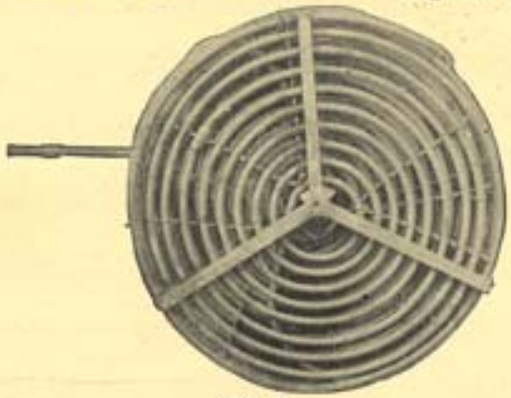

Fig. 2

of the coils looking up through the generator from the bottom and Fig. 3 shows a generator of 20-25 h.p. capacity completely cased for marine or stationary use, with burner underneath, automatics, throttle and steam gauge attached, with short vertical stack. The generator illustrated is 24 inches in diameter, 20 inches high without burner, weighs 225 pounds without extras, and is designed to develop its full horse power on 350 pounds working steam pressure.

Fig. 3

Automatic Control

As important as is the particular construction of the Generator, is the means or system employed to automatically regulate the supply of water and fire in exact proportion to the amount of steam taken from the generator while in operation. We do not use the Thermostatic principle for fuel control (although we manufacture a reliable Thermostat of new and improved design), for the simple reason that we have found by exhaustive experiment and practice that a Thermostat cannot be relied upon uniformly to act both ways (expansively and contractively) with the promptness demanded by perfect automatic fire control. Therefore we have devised a new application of the old familiar diaphragm hydrostatic control, by which we control both the water and the fire by the hydrostatic pressure within the generator. We do not illustrate either of these automatics for the simple reason that they have been in common use in this connection for more than 20 years and are familiar to steam users. Our water automatic is of the universal diaphragm by-pass type, built in a very superior manner, provided with easy adjustment so that it can be set for any predetermined maximum pressure. Our fire automatic is exactly like the water as far as actuation goes, but acts directly on the gas to the main fire of the burner, instead of on the raw oil. In operation the fire automatic is set at a predetermined maximum slightly in excess of that required for the water. If for any reason the pressure should reach a predetermined maximum of say 500 pounds, the fire automatic will promptly extinguish the main fire in the burner and turn on the pilot. In reverse action

it will promptly and gradually turn on the main fire in proportion to the drop in pressure shown on the guage. With the combination of these two perfect working automatics and owing to the fact that in the **Century** generator there is no danger of overheating the bottom coil, a Thermostat, with its attendant weaknesses and defects, is not required.

Thermostat

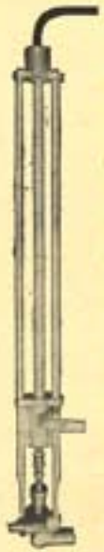

Fig 4

For those however who have flash boilers of other makes, in which a thermostat is required, we manufacture a new and improved Thermostatic Fuel Regulator of our own design. This is illustrated herewith. Being placed on the outside of the generator it can be relied upon to *contract* as promptly as to *expand*, which is not the case where the thermostat is placed within the boiler or over the burner. Another point in favor of this thermostat is that it is easily adjusted owing to its plain get-at-able-ness at all times, and it cannot be burned out. The actuating agent is the temperature of the steam as it emerges from the boiler and passes through the steam tube of the thermostat. Owing to the absolute separation of the thermostatic part from the valve part, this thermostat will work perfectly with keroseue fuel, which would not be possible were the oil to come in contact with the actuating part, owing to carbonization.

Packingless Throttle

No single feature of the **Century System** is of greater importance than the throttle. The use of superheated steam has always caused more or less trouble with packings and with brass fittings. Erosion and corrosion of the delicate

Fig. 5

valve seats and the continual packing of the stem is entirely abolished in the improved throttle valve shown herewith. It is rotary in motion, *has no packing nut and employs no packing*, is built on a new principle whereby *the higher the steam pressure the tighter the valve*, and having no conical seats, *is absolutely proof against lodgment of foreign matter between the seats*. It is built to stand 1000 pounds of steam pressure and is tested by us to that amount. It will be found *the most perfect steam throttle ever devised*, and will prove to be of inestimable value to all users of superheated steam. Our throttle can be placed at the bottom of the steering post where wheel steer is used, or can be linked up with lever control for side steering. Where the throttle is supplied by us for marine or stationary use handle lever is attached.

Special Gauges

The cut presented herewith snows our special 1000 pound Steam gauge and 80 pound Air gauge uniform therewith. These gauges are built for service and will be found absolutely the best on the market. As they are finished in heavy polished brass, with beveled glass faces, they present a very handsome appearance when mounted. Owing to the extremely low air pressure required for the *Century Kerosene Burner* the 80 pound gauge will be found of ample capacity, but we are prepared to furnish gauges to order of any stated pressure limit. The cut also shows our improved pop safety valve, set for 800 pounds, with spring exposed to the air, in order to avoid loss of temper by contact with hot steam.

Fig. 6

Special Fittings

Although not illustrated herewith, we manufacture a complete line of seamless steel fittings for use with superheated steam including,

Right and left couplings; elbow bends; four-ways; tees; nipples; bushings and reducers; steam gauge loops.

These are built from Shelby steel and are made in 5-16 and 1-2 tube size, and 1-8 and 3-8 pipe size with No. 26 threads. They will be found indispensable for all steam lines as the ordinary standard brass fittings *will not withstand superheated steam.* We also furnish fuel lines of "lighter tube," a flexible composition tube of 3-32 inside diameter, german-silver-brazed to standard 1-8 brass unions. This "lighter tube" is the best fuel conductor obtainable, as it can be bent and twisted without joints into every conceivable position, and will withstand high pressures. We also make small universal or toggle-joints for connecting burner valve to front seat of car. Prices of fittings on application.

Safety

There is no method of generating steam other than the Flash System, which is positively and absolutely non-explosive. Every **Century Generator** is tested by us under a steam pressure of 1000 pounds before it leaves the factory, and will withstand the very highest steam or hydrostatic pressures before giving way to overpressure. This "giving way" in a Flash Generator merely consists of a rupture or or split in a coil, or the opening of a seam at a coupling, gradually and harmlessly permitting the steam to escape for a few moments until the coils are entirely empty. As there is no shell, there can be no rending and tearing, and as the amount of steam and water within the coils at any one time is limited there can be no scalding. Furthermore, superheated steam such as comes from a Flash Boiler possesses some very remarkable characteristics, among which is its harmlessness to the human body. Unlike saturated steam it does not burn or scald the skin, and is entirely invisible when first liberated. **The Century Flash Generator** requires no Government inspections, no safety precautions of any kind, and uses no fusible plugs or other troublesome devices. It is the *ideal and only safe boiler for marine use,* or any of the uses to which it is adapted.

Circulation

The velocity of superheated steam through the coils is so extremely rapid that scale, corrosion, or deposits of sediment are unknown. After years of use the inside wall of a flash coil when inspected was found to be shiny bright, showing the absolute freedom from this trouble. This renders the **Century Generator** the ideal boiler for use with a condenser, which necessarily returns some of its water back to the tank in more or less of an oily condition.

Rapidity

In the Flash Generator steam is made instantaneously from cold water. This means not only a great saving of time, but an enormous saving in fuel, and from this advantage comes the economy of the Flash Generator over all other types of steam producers.

Light Weight

A fire tube boiler of ordinary construction, containing 951 copper tubes, having a diameter of 24 inches, and rated at 25 h.p. will weigh approximately 608 pounds. The **Century Generator** of like diameter and rated h.p. weighs less than 250 pounds. This applies to smaller sizes in proportion.

Reserve

Contrary to some mistaken ideas on the subject a Flash Generator contains great reserve power. We have kept steam on the guage of a 24 inch Generator showing 250 to 300 pounds, for a half hour *after the fire had been turned completely out.* Combined with its instantaneous steam-making qualities and its ability to hold steam for a considerable period of time, the Flash Generator can be depended upon to do what the fire or water tube boiler cannot do, i.e., respond instantly to a load or a sudden demand upon it for more steam.

Patents

All of the parts of the **Century Flash System** which represent our own special inventions, including the Generator are protected by Letters Patent either issued or pending, and we will protect our patent rights to the fullest extent against infringements.

Prices

The **Century Flash Generator** will not be sold separate from the Century Kerosene Burner nor without the fire and water automatics and the throttle valve. The burner, however, as well as the automatics, thermostat, throttle and fittings and accessories will be sold separately as per the separate prices quoted below.

18" dia. outfit, complete with generator, cased and insulated with asbestos jacket, kerosene burner, water and fire automatic regulators, packingless throttle, steam and air gauges, and safety valve. 10-12 h. p.	$255.00
20" dia. outfit, same as above. 12-15 h. p.	300.00
24" dia. outfit, same as above. 20-25 h. p.	315.00

Smaller or larger sizes than above made to order. Prices on application.

Automatic Water Regulator	$15.00
Automatic Fire Regulator	15.00
Packingless Throttle	12.00
Thermostat	10.00
1000 lb. Steam Guage, net	5.00
80 lb. Air Guage, net	4.00
800 lb. Safety Valve, net	3.50

Burner prices given in special catalog on Kerosene Burners.

Terms

Invariably cash when goods are shipped. All quotations are f.o.b. Erie Railroad, East Orange, N. J. From parties not rated, or otherwise unknown to us, we require a cash payment of 25 per cent in advance with the Order, balance, sight draft against Bill of Lading or Express Co.'s receipt.

Guarantee

We guarantee that the system will do exactly as we claim if installed and operated according to our directions which will be furnished in detail to all purchasers. All parts and devices listed herein are tested before leaving the factory, and are of the best workmanship and material obtainable. Any part proving defective in this respect within one year from date of purchase will be replaced.

Century Auto-Power Company

MAIN OFFICE AND FACTORY

EAST ORANGE, N. J.

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Flash Generators, Kerosene Burners, Automatic Fire and Water Regulators, Packingless Throttles, Thermostats, Seamless Steel Fittings and Steam Automobile Specialties.

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List of Sundry Parts.

	Price	Postage
Brass Steam Gauge 2 1/2 inch Dial 300 lb	$3.50	$0.24
" " " 2 1/2 " " 500/1000 lbs	6.50	.24
" " " 3 " " 300 lb	3.50	.33
" " " 3 " " 500/1000 "	6.50	.33
If nickel plated case is desired, add 5% to list price		
Brass Pop Safety Valve) Outside Spring Pattern) side opening 1/8 & 1/4"	$3.50	.15
Brass Pop Safety Valve) Outside Spring Pattern) side opening 3/8 & 1/2"	4.00	.20
Brass Pop Safety Valve, Reg. Pattern 1/8 & 1/4"	3.50	.16
Brass Pop Safety Valve, Reg. Pattern 3/8 & 1/2"	4.00	.20
Regular Pattern will have side outlet if preferred.		
Klinger Gauge Glass, 4 inch glass, Auto. size	15.00	
Klinger Glass with washers for above glass	3.00	
Pony Rochester Ratchet Lubricator 1/2 Pint	18.00	
" " " " 1 "	25.00	
Quick Opening Globe Valve for Throttle 3/8 inch	1.60	
" " " " " " 1/2 "	1.75	
" " " " " " 3/4 "	2.50	
State whether angle or straight valve is preferred.		
Small Universal Joints for Seat Control	1.25	.10
Special Boiler Wrench for removing 1/8 nipples	2.00	
" " " " " 1/4 "	3.00	
Price refunded if wrench is returned in good condition, prepaid.		
Extra coils for automobile boilers 1/8 size	1.00	
" " " " " 1/4 "	1.25	
Coils for boilers larger than 24 inch quoted on application.		
Boiler nipples for 1/8 coils	.10	
" " " 1/4 "	.12	
Superheater of Seamless Steel Tube 15 1/2 to 20"	10.00	
" " " " " 20 to 24"	12.00	

When ordering boiler coils, state clearly the size of boiler, row from standpipe the coils belong in, number of turns in each coil and whether they are coils right or left. Better illustrate this latter point.