# Ofeldt's Steam Automobile Specialties

F. W. OFELDT & SONS

NYACK-ON-THE-HUDSON

NEW YORK

# OFELDT'S

BLUE FLAME KEROSENE BURNER
SAFETY WATER TUBE BOILER
AUTOMATIC WATER REGULATOR
AUTOMATIC FUEL REGULATOR
FEED WATER HEATER
COMPOUND STEAM ENGINES

FOR

*STEAM AUTOMOBILES*



PATENTED AND MANUFACTURED

BY

*F. W. OFELDT & SONS*

NYACK-ON-THE-HUDSON, N. Y.

*The Old Firm*

*In A New Location*

# FACTS.

**Forward**

The information contained herein is presented for the consideration of the automobile public, and for the steam automobile owner in particular. Eleven years have elapsed since we built our first steam automobile, hence we claim to be among the pioneers of the automobile industry in America. From the first we pinned our faith to steam as the ideal power for automobiles and we believe, when properly applied, it will become the leading motive power for horseless vehicles. To this end, we have given much time and attention to perfecting the power plant and the one we manufacture is the most practical, economical and the best in every way on the market to-day. The information contained herein is the result of our experience with automobiles equipped with our specialties, and not that of theorists or professionals. We shall be glad to reply to any inquiries pertaining to the steam automobile which our patrons may make.

**Our Motto**

"A Satisfied Patron our Best Advertisement," hence we do not spare time or money to please, as those who have dealt with us in the past can state. If you purchase any of our specialties, remember that we are as much interested in their being satisfactory as you are in having them so. No firm can do business long who does not please its patrons.

**Our Slogan**

"We have solved the problem of using kerosene for fuel in steam automobiles." We use this slogan again for it contains the truth in a nut shell. If you are not already convinced of this fact, read in "A Few Of Our Testimonials" the experience of those who have operated our burners.

**Skepticism**

We realize there is nothing the steam automobile owner is more skeptical about than a kerosene burner, and we do not wonder that such is the case. Owing to the great demand for a good kerosene burner, many unscrupulous persons have deluged the steam automobile public with worthless types. These persons (being anxious to effect sales only) would not answer the communications of their patrons when they could not operate the burners satisfactorily, hence the purchaser could get no redress. Already a number of these concerns have been forced out of business. This abuse of confidence has made the public very doubtful in regard to the claims put forth for kerosene burners, and it questions if a successful burner is made. To any who may feel that way, we wish to say that in purchasing from us you are dealing with an old established firm, which has a reputation at stake, and is in the business to stay.

**We Make Good**

To do business, we do not find it necessary to compare our burner with others, for our burner sells on its merits; nor is it necessary to fill our catalogue with exaggerated statements, or to misrepresent our burner or other specialties in any way. We state facts and give an accurate description of our burner and other specialties, leaving it to you to judge of their quality and practicability. We were positively through experimenting before we put our burner upon the market, hence we do not need to make new pilots for the old burners; nor does the purchaser have to remodel them to make the same satisfactory. But we are making them in the same shape as when we first offered them to the public. We made our burner to sell and the public is taking advantage of the fact that it can secure a reliable kerosene burner. You are not buying an experiment. If you have purchased some other type and it has not proven satisfactory, do not condemn all kerosene burners until you have tried ours. Send us a trial order that we may prove to you that we make good.

**Our First Kerosene Burner**

Sixteen years ago we realized the demand for a kerosene burner. We invented one, wherein we vaporized the kerosene and successfully burned it, but the burner was a very crude and noisy one compared with the noiseless, blue-flame burner which we make to-day. Not being satisfied with our first burner, we still experimented until three years ago, when we overcame the carbonization and condensation, which caused the most trouble, and we put the present very efficient burner upon the market.

**Kerosene as Fuel**

We might write a long article on kerosene as fuel for steam automobiles, but we shall not tire the reader by doing so. We will, however, mention a few of its strong points. Its superiority as fuel wherever liquid fuel can be used is acknowledged by everyone. It has 30% more heat units than gasolene and when properly vaporized gives a much hotter fire, a fact which is greatly in its favor when we consider the necessity of producing as much heat as is possible in the very small fire box of an automobile. Kerosene can be procured anywhere along the route, even from the farmer. It is not

amenable to insurance restrictions. It does not unite with air in atmospheric pressure to form an explosive mixture, hence is perfectly safe to use. On all cars where we have installed our burner in place of another it has always increased the speed of the car 25%. The greatest claim that can be made for it is the very small cost of running a car.

**Naphtha Dangers**

The dangers from burning naphtha are numerous and well known, chief among them being its volatility, for it readily unites with air under atmospheric pressure and forms one of the most powerful explosives known. It rarely can be procured in country sections. It does not give as hot a fire as kerosene. As it is so very expensive, it makes the cost of fuel per mile two cents or more. The fact that it is becoming scarce and more expensive makes it desirable that an efficient substitute be found.

**Experience**

In purchasing our boiler you are not getting the experiment of some unfledged inventor, or a discarded type of some other manufacturer, but a boiler which is the outcome of twenty years experience in successful boiler making. A very high class of engineering is required to make a successful water-tube boiler. This is proven by the great number of failures in attempts to make water-tube boilers. We were the pioneers in adapting this type of boiler to automobiles and our boiler is filling a long felt want in the steam automobile industry. Our boilers are the lightest, strongest and most durable made. Our automobile type is only one of several which we make, for we build as high as 200 H. P. The superiority of the water-tube boiler over the fire-tube type is acknowledged by all, and this is particularly true in regard to water-tube boilers for automobiles.

**Water Level versus Flash**

For the past ten years we have manufactured a flash boiler for use in connection with our vapor motor for launches, which is exceedingly light and has proven very satisfactory, for in the launch a constant resistance is always met with. Upon trying to adapt the flash boiler to automobile purposes we found it was not as satisfactory as the water level boiler, for the resistance was not the same for more than five minutes at a time and it was impossible to keep an even steam pressure or take the hills without hand pumping. A water level boiler with a strong water pump does away with these annoyances, and enables one to take the longest and steepest hills without hand pumping. In our boiler we combine all the strong points of the flash type with those of the water level.

**Only a Side Line**

It may be of interest to the reader to know that our automobile specialties are only a side line with us, for our principal business is yacht and launch building. We also build triple expansion and compound steam engines of from 40 to 200 Horse Power. We have invented three marine vapor motors and the last, the Improved Compound Vapor Motor, is the peer of all. We build this motor in sizes ranging from 10 to 40 Horse Power, for launches and auxiliary purposes. Our automobile engines are the climax of our engine experience. They are built on up-to-date lines and combine all the modern and best principles of steam engines.

**Guarantee**

"We hereby agree to refund the money received from Mr.....for one kerosene burner (or other specialty), if after a fair trial it is not as represented and does not give satisfaction, provided it is returned to us in good condition, with express charges paid." The above is the written guarantee we give our patrons and you will observe that it is not a vague statement. We leave you to be the judge, for we know that if you operate our specialties once you will always want to do so. We want a chance to prove that the claims we make for our specialties are facts, not fiction.

**Terms**

Our terms are cash with order, or goods will be sent C. O. D., if sufficient deposit is forwarded with order to cover express charges both ways. When shipment is made by freight sight draft will be attached to bill of lading. Where patrons wish instructions in operating our specialties, we will send our representative to teach them, charging only for his actual expenses. If, however, the specialties have been wrongly installed or injured in transit we should have to make a charge of fifty cents per hour for a representative in addition to his expenses.

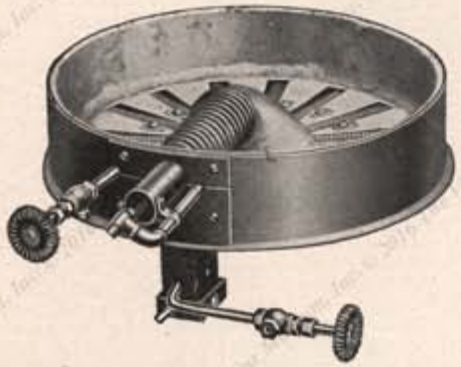
References will gladly be furnished at any time.

Prices listed are f. o. b. Nyack-on-the-Hudson.

**Copyright**

 We have taken the precaution to obtain a copyright, as material in our former catalogue was copied word for word by unscrupulous parties.

# BLUE FLAME KEROSENE BURNER.



**The Pilot** The pilot is of the torch type and is an integral part of the burner placed under the main vaporizer. The pilot box fits into an opening in the burner pan, to which it is securely attached, and extends four inches below. The box is placed 1½ inches under the burner, is open on the top and covered on the bottom with a detachable drip pan, containing a little asbestos, which acts as a wick when lighting the pilot. The pilot box contains the pilot vaporizer and pilot nozzle. The pilot flame in addition to heating the pilot vaporizer, heats the main burner vaporizer, and the mixing tube, thus giving the main burner a supply of heated air. It can be regulated to keep steam up when the car is standing or only to keep the main vaporizer hot. The pilot burns with a strong blue flame, remains lighted when the car is standing and is not affected by the worst wind. The pilot nozzle can be removed in a few seconds without taking the pilot apart.

**To Start Pilot** In starting the pilot a little alcohol is put into the pilot drip pan from an oiler, or a little kerosene from the pilot nozzle, and lighted with a match. In three minutes this will heat the pilot vaporizer, when the pilot valve can be opened and the pilot lights from fire still burning in the drip pan. In three minutes more the pilot flame has so heated the main burner vaporizer that the main burner valve may be opened, and the burner lights from the pilot. In from four to six minutes one hundred pounds of steam will be raised, thus taking but ten or twelve minutes to have steam up ready for starting after lighting a match. In actual operation, after becoming familiar with the process, the time can be shortened to seven or eight minutes. The operation is very simple, cleanly and much quicker than many gasolene burners.

**The Burner** The burner consists of a galvanized iron pan, which prevents rusting and also wears better; lined around the sides with millboard asbestos. The perforations in the bottom of the pan are drilled in a straight line under the burner pieces, and are of one size thus admitting the same amount of air to the burner pieces throughout their length. A hole through the side of the pan covered with a slide gives a chance to see the fire. The burner pieces are made of iron with slots sawed in them—for round holes will not burn kerosene satisfactorily—radiating from a central chamber for distributing the gas, into which they are securely screwed. The central chamber is attached to the pan. The central feed is the only system where the same amount of gas is supplied to each burner piece, thus insuring a perfectly even fire over the whole burner space. The main vaporizer consists of one-eighth iron pipe and surrounds the mixing tube. One end of the main vaporizer projects through the side of the burner and holds the burner nozzle in front of the mixing tube. The mixing tube passes through the side of burner one inch from the top of the pan.

**Fuel System** The fuel upon leaving the tank passes through a gauge strainer of very small mesh, which prevents any dirt from entering the pilot or main burner. A branch from the main line carries the fuel to the pilot, and the fuel in the main line passes through the fuel regulator (which is placed as near the main vaporizer as possible) to the burner vaporizer, where it is thoroughly converted into a gas. This gas then passes through a pin-hole nozzle to the mixing tube, with great force, where it is mixed with heated air, thus preventing condensation. It then passes to the central distributing chamber and radiates evenly to the burner pieces, where it is lighted by the pilot. In addition to the air mixed with the gas in the mixing tube, more is drawn up through the bottom of the burner, thus insuring perfect combustion. When turned low the burner burns with an in-

tense blue flame, and when turned on full a blue flame tipped with orange is produced, which is much hotter than a purely blue flame—a fact that is not generally known.

**Carbonization Overcome** Carbonization has been a great drawback in successfully burning kerosene, and we are glad to say that we have overcome that difficulty without the use of wire rope or other obstacles in the vaporizer; but by keeping the vaporizer at the correct heat to give a perfect gas, and with our fuel system. Some of our burners have been in operation for three seasons, thus proving our claim. Kerosene gas condenses very easily, hence it is important that the gas be mixed with heated air and the fuel line be heated for the gas after it leaves the vaporizer; both of these features are contained in our burner, and a great part of its success depends upon them. Where perfect combustion is secured, the correct amount of oxygen must be supplied and this insures an odorless, smokeless fire. Whistling and all other noises are positively eliminated and a noiseless burner is produced.

**Only 60 Pounds Air Pressure** It seems almost incredible that a successful kerosene burner can be operated with only 60 pounds of air pressure, yet this is a fact concerning ours which should not be overlooked. It is a mistaken idea that kerosene cannot be burned with low air pressure, for some of our patrons do not use over 40 pounds. We state positively that 60 pounds air pressure give the best results with our burner. Because of the low air pressure the pilot is supplied by a branch from the main burner line and air pressure can be easily kept on the fuel. The burner works as well with air pressure on the main fuel tank as with a small pressure tank and fuel pump. It is piped direct to the pressure tank and not through the boiler, this being the only change necessary in the fuel system. The main burner vaporizer can be replaced without taking the burner down.

**Noted for Its Simplicity** Simplicity is one of the strong points of our burner and, in fact, it is becoming noted for this. It has been our aim to do away with all unnecessary parts and complicated fittings, and by accomplishing it we have secured an ease of operation never before seen in a kerosene burner. Our patrons write that they do not have to give it a thought while on the road. No special grade of kerosene is required, but the ordinary commercial article which can be purchased in any grocery store.

**When Installing** Our burner can be installed with either up or down draft, but if down draft is used the vent should be large enough to carry off the fumes without the assistance of the exhaust or a steam jet, and although not necessary a small smoke vent on top will assist in starting the burner more quickly. We strongly advise against a steam jet, for it is a waste of steam and as it often gives too much draft it will interfere with proper combustion in the burner. A good mechanic will install the burner in one day.

**When Ordering** Our burner will go on in place of the gasolene burner with which the steam car is usually equipped. These burners we call the standard sizes and they measure one half inch more in diameter than listed. Thus the 14 inch burner is 14½ inches in diameter. The 14 and 16 inch sizes are 4½ inches high, while the larger sizes are 5 inches high. The pilot being located at one side does not interfere with the chain, hence in speaking of measurements it is not considered. If the boiler requires a special burner pan we will make one without extra charge. Lugs for attaching the burner to the boiler will accompany the burner.

**Special Burners** Smaller or larger sizes than those listed, square or oblong types, will be made to order. We make special burners for portable, stationary, yacht and launch boilers and for general laboratory purposes; in fact our burner can be used wherever a hot, odorless, smokeless fire is required.

## PRICES

| Size | Weight | Each | Size | Weight | Each |
|---|---|---|---|---|---|
| 14 inch | 23 pounds | $25.00 | 20 inch | 33 pounds | $44.00 |
| 16 " | 26 " | 32.00 | 22 " | 40 " | 50.00 |
| 18 " | 30 " | 38.00 | 24 " | 52 " | 57.00 |

## PARTS

| | | | |
|---|---|---|---|
| Main Burner Vaporizer, | 1.00 | Pilot Vaporizer, | .50 |
| Main Burner Nozzle, | .25 | Pilot Nozzle, | .25 |

# SAFETY WATER-TUBE BOILER.

**Generator Heart of Steamer** Without question the generator is the heart of the steam car. If the car has not a boiler large enough to supply the necessary power to propel it at a good speed up all grades and over the poorest roads it has been poorly constructed and a generator of greater horse power should be put in. Upon the generating outfit depends the pleasure of operating a steam automobile.

**Stand Pipe** The boiler consists of a central stand pipe of standard boiler pipe 5 inches or more in diameter with a ½ inch bottom securely welded in. The stand pipe is covered with a steel cap, from which extend three arms to the boiler cover holding the boiler proper in the cover. The cap is threaded and securely fitted to the stand pipe. The work of the stand pipe is to hold a reserve of water in the bottom, distribute water to the coils and hold a reserve of steam at the top, in addition to forming an important part in the construction of the boiler. The reserve water in the stand pipe and coils varies from 3 gallons in the smallest sizes to 8 gallons in the 24 inch boiler. Our boiler has no steam drum, hence all danger of its blowing up is positively overcome, a characteristic of all water-tube boilers.

**The Coils** The coils are made of a special grade of iron pipe, ⅛ being used in the boilers of small size and ⅛ and ¼ combined in the larger sizes. They are coiled at a pitch of 1¼ inches, giving rapid circulation and preventing clogging. The coils are attached to the stand pipe at top and bottom with right and left extension pieces. Although the coils look to be intercoiled, they are not, but simply interlocked, and by removing an extension piece at top and bottom each coil will easily come off.

**The Cover** The cover is made of a heavy grade of galvanized iron (which does not rust), lined with millboard asbestos to prevent radiation. The top of the cover is held in place by a few screws and can be easily removed for inspecting the boiler. No separate hood is required on top of the boiler, for the space between the boiler coils and the top of the cover is sufficiently large to carry off the fumes. The vent for carrying off the fumes is placed near the top at the back of the cover; or we can place it at any desired angle to fit the car. The vent is 12 inches wide by 2½ inches deep. The burner fits on the outside of the cover against a bead, where the burner pan is fastened with screws to the boiler cover. The lugs for holding the boiler in place will be attached to the cover if the exact location for them is mentioned in the order; otherwise they will be forwarded with the boiler for attachment. Our boiler cover has no flanges and when mentioning the diameter we refer to the extreme outside measurement.

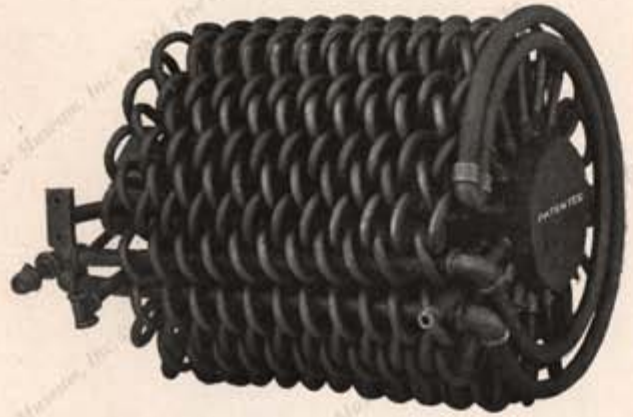
**Water System** The water is fed through a ¼ inch connection into the bottom of the central stand pipe. It is then drawn into the coils by the rapid circulation through them, where it is turned into steam and passes to the top of the stand pipe, taking with it a certain amount of water. As the steam and water pour from the top of the coils into the stand pipe, the steam is completely separated from the water by an ingenious system of baffle plates which prevent the boiler from priming or, as some term it, foaming.

**Steam System** The steam is taken from the center of the top of the boiler and passed down through a pipe inside the cover to a large superheater lying directly in the fire, where it is thoroughly dried, making it as expansive as possible. Upon leaving the superheater, the steam passes inside the cover to the top of the boiler and

through the cover in front where a ½ inch connection is made for the engine. We have learned from experience to equip our boilers with just sufficient superheating pipe to give the best results. It is important that the steam be not heated above the point of dissolution, for it then injures the engine and it is impossible to keep the stuffing boxes tight. This often occurs with flash generators.

**Cannot Burn Out**

The water-tube boiler is superseding the fire-tube boiler in the automobile industry, as it has already done in other fields where the annoyance occasioned by burned out boilers had to be



overcome. In our safety water level boiler a reserve is always on hand when a hill is reached. Should the boiler run dry no injury accrues, for it does not impair iron to heat it; thus the annoyance and inconvenience resulting from the burning out of the tubes in fire-tube boilers are here eliminated. Neither does our boiler require a fuse plug, which often occasions a great deal of trouble. It also saves repair bills which accompany burned boilers and often saves a large amount during the season in this way. Futhermore, it will save the expense of a tow home. Above all, it gives a feeling of **safety**, which adds greatly to the pleasure of automobiling. Our boilers are very durable and will last for many years.

**Very Quick Steamer**

The steaming qualities of a boiler depend upon the amount of effective heating surface it has and not upon the number of square feet only. The heating surface in our boiler is all very effective. The coils are so interlocked that the currents of heat passing eight or more times across and between them are brought intimately into contact with all parts of the heating surface, thus absorbing practically all the heat units in the fire. The rapid circulation prevents the coils from clogging and assists in making the boiler a quick steamer, also making it possible to use the boiler in connection with a condenser. The water being divided into small streams, passes directly through the hottest part of the fire thus making it possible to raise 100 pounds of steam in four minutes or less. Although no large reserve of steam is carried, a sudden demand for steam is quickly supplied by the rapid steaming qualities of the boiler. Should a little soot lodge on the coils from starting the burner too quickly, the steaming qualities are not impaired, for the moment the fire is burning with proper combustion, the soot burns off again, and is carried out through the vent, thus doing away with the necessity of cleaning the boiler.

**1000 Pounds Test**

A very great feeling of safety accompanies the use of a boiler when it is known to have been tested to 1,000 pounds hydrostatic pressure. This is the test we put on our boilers and we shall be glad to give a demonstration to intending purchasers at any time. In fact our boilers will, without doubt, stand over 2,000 pounds pressure, for there are no weak points in their construction. No riveted or expanded tubes are subjected to the fire, as most trouble is caused by these. The joints in our boiler become tighter on being subjected to the fire. Our boilers will pass government inspection.

**We Advise Larger Size**

The flanges on the ordinary fire-tube boiler take up 1½ inches, and there is usually a ½ inch or more space between the flange and the water tank; therefore, as our boiler has no flanges, a size larger will go in the place of the boiler already in the car. Thus an 18 inch boiler of our make will go in place of the 16 inch fire-tube type. Although our boiler, size for size, is as good a steamer as the fire-tube boiler, we advise putting in the largest size possible, for the boilers in nearly all steam cars have been too small for satisfactory service. Moreover, a boiler large enough to supply the required steam without forcing it to its utmost is more economical on fuel.

We aim to get as much boiler in as possible and want to impress upon the purchaser the importance of a large generator.

**Special Outfit** We make a special boiler outfit 15½ inches in diameter to take the place of the 14 inch fire-tube boiler. This special outfit readily goes in place of the 14 inch fire-tube boiler, as explained in previous paragraphs. Although this boiler has supplied the model C Mason engine, we advise for new cars and heavy work an 18 or 20 inch boiler for use in connection with this engine. We make the 15½ inch boiler either 16½ or 18½ inches high, and will make the complete outfit either 22 or 23 inches high over all. When ordering state clearly which size you require.

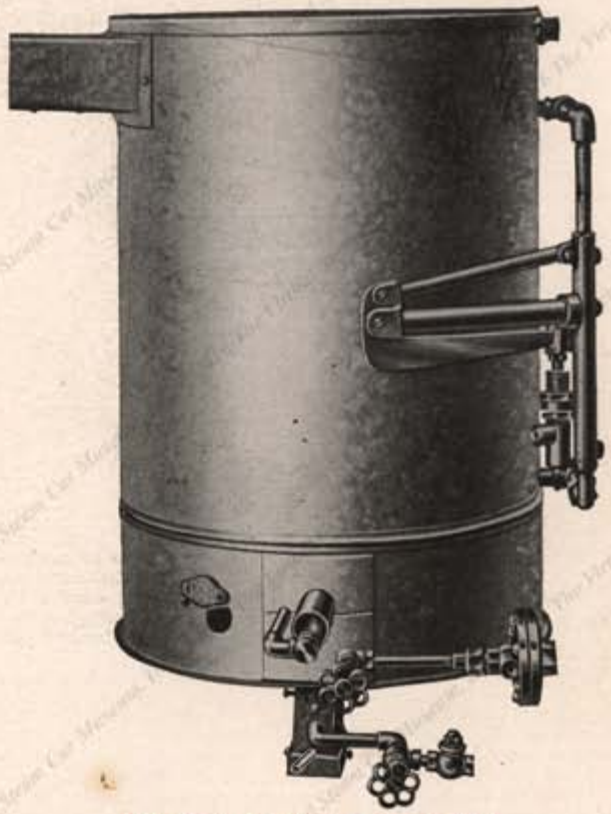
**When Installing** By consulting the line cut on folio thirty-one, patrons should not have any difficulty in installing our specialties. The pumps A and R are intended for opposite cross heads, but are placed as they are in the line cut to make the water feed and fuel systems clear.

We consider this the best fuel system yet devised. As shown, no hand air pumping is necessary, for the power air pump keeps a constant pressure on the fuel while running, and can be set to carry any desired pressure. By keeping the air pressure in the auxiliary air tank, the main fuel tank can be opened and refilled and when the air pressure is again let from the auxiliary tank the burner is ready to start. If the connections to the auxiliary air tank are made up tight sufficient air pressure for starting can be kept in the tank for a month at a time.

A seat control should be on every car and the main burner valve can be placed in a suitable position for this purpose. The fuel valve on the fuel line just outside the main fuel tank is a good thing on every car in case of accident, stoppage in fuel line, and for resetting the fuel regulator.

## PRICES

| Size | Height | Weight | H. P. | Each |
|---|---|---|---|---|
| 15½ inches | 17½ inches | 145 pounds | 4 to 6 | $ 90.00 |
| 16 " | 17½ " | 145 " | 4 " 6 | 90.00 |
| 18 " | 18 " | 165 " | 6 " 8 | 105.00 |
| 20 " | 20 " | 210 " | 8 " 10 | 140.00 |
| 22 " | 21 " | 300 " | 10 " 12 | 180.00 |
| 24 " | 21 " | 345 " | 12 " 15 | 225.00 |



## GENERATING OUTFIT COMPLETE.

| Diameter Outside Measurement | Height with Boiler Burner and Smoke Vent | Weight Complete | H. P. | Price Complete |
|---|---|---|---|---|
| 15½ inches | 22 inches | 175 pounds | 4 to 6 | $142.00 |
| 16 " | 22 " | 175 " | 4 " 6 | 142.00 |
| 18 " | 23 " | 200 " | 6 " 8 | 160.00 |
| 20 " | 25 " | 250 " | 8 " 10 | 200.00 |
| 22 " | 26 " | 300 " | 10 " 12 | 250.00 |
| 24 " | 26 " | 400 " | 12 " 15 | 300.00 |

# AUTOMATIC WATER REGULATOR.

**Does Away With Watching The Gauge Glass**

One of the principal objections to operating the steam car has been the constant nervous strain and annoyance caused by watching the gauge glass. Even when doing this the operator has often burned out the boiler. With our water regulator attached this danger is reduced to the minimum and the operator's mind is completely relieved of the gauge glass. This feature makes it particularly valuable when running at night and also does away with the gauge glass lamp. The water regulator increases the pleasure of running a steam car one hundred fold and no steamer is complete without it. Many unsuccessful attempts have been made to perfect a satisfactory automatic water regulator, but it remained for us to put this valuable device upon the market.

**The Parts**

The regulator consists of a water column 1 inch in diameter by 8 inches in height, tapped for ¼ inch connections on each end. A ¾ inch expansion tube, 6½ inches long, projects at right angles to the water column, into which it is securely screwed, being plugged at the opposite end. A lever, with the fulcrum braced from the top of the water column, is attached by a joint to the end of the expansion tube, with the lever free to operate the by-pass valve. The valve is of special construction and a ground joint is made in place of a stuffing box, thus avoiding the possibility of having the valve stem bind. Two lock nuts for adjusting the valve hold it in place on a lug projecting from the water column stand pipe. The upper and lower lugs on the opposite side of the water column from the expansion tube are for a gauge glass or indicator, when used in conjunction with our regulator; or for pet cocks. Valve and pet cock connections are ⅛ inch.

**The Action**

The closing and opening of the by-pass valve depend upon the expansion and contraction of the brass tube, when subjected to water at the boiling point and steam, which is over 150 degrees hotter. The water rises in the boiler, at the same time rising in the regulator water column, until it enters the expansion tube, causing the tube to contract and pulling on the lever, thus lifting the free end and opening the by-pass valve. When the water has been evaporated from the expansion tube, permitting the steam to enter, it expands and presses the lever out, thus closing and holding the by-pass valve shut. In actual operation the expansion tube finds the exact position to keep the water in the boiler always the same level. The fulcrum of the lever is 1 inch long and the arm 8 inches. If the expansion tube expands 1-64 of an inch the lever arm will be raised ⅛ of an inch, which is double what is required for a by-pass, and the valve positively opens this much. Should the valve by-pass too much water, or not enough, it can be adjusted to shut off closer or open wider by raising or lowering the valve. The regulator works the same with high or low pressure and on any make of car. This size is large enough for any automobile boiler and weighs three pounds.

**The Position**

When installed in conjunction with a gauge glass or indicator the regulator water column can be used in place of the ordinary water column; it can be attached to same, or it can be attached to the indicator line. The regulator water column should be placed as near the boiler as possible, with short connections at top and bottom, so that the steam will have free access at the top and water at the bottom. If the bottom of the regulator water column is attached to the boiler feed line, the circulation will assist the regulator a little in its action. No

new connections into the boiler are necessary to attach the regulator. The regulator should be placed so the expansion tube will be in a horizontal position, just half way up on the outside of the boiler; or higher if a higher water level is desired. The by-pass valve is connected to the boiler feed line between the water pump and the feed water heater, a check valve always being placed on the line between the by-pass connection and the boiler. When the boiler is cold the by-pass valve in its natural position is open, hence a globe valve should be placed between the boiler feed line and the regulator valve, for closing when it is necessary to pump water to the boiler by hand.

**The Pump** Positively with our boiler no gauge glass is required if the regulator is installed with it. If the pump fails, the only mishap is a fall of steam, which is an indication that something is wrong. When the regulator is installed with fire-tube boilers the gauge glass should be left on for consulting occasionally, to see if the water pump is working properly. The regulator will not do the work of the pump and if the pump is not large enough to supply the boiler with water, on the steepest grade, going three miles per hour, the barrel should be bored out and a larger plunger put in.

**Positive Reliable** We have had this regulator in operation for the past year and it is giving satisfaction wherever used. It is not a delicate device, nor is it heavy and cumbersome. It depends for operation upon the different degrees of water and steam, which is a positive quantity, and not upon the different degrees of steam, hence its reliability. There is no float to collapse or stick, neither is there any low water alarm or indicator to keep the mind on, but the regulator is placed under the seat or hood out of sight. In conjunction with our other specialties it simplifies the steam car to such an extent that it becomes the easiest of all makes to operate. In fact, it leaves nothing but the steering wheel and throttle to touch, and so very automatic does it make the whole outfit that our patrons write they have "Nothing To Watch But The Road."

**PRICE**

With ~~Gauge~~ Strainer and valve, complete, - - - **$15.00**

# FEED WATER HEATER.

**Its Importance** The value of a feed water heater is now acknowledged by all engineers and boiler-makers and its economy has been proven many times. The water fed to steam boilers must be heated from its normal temperature to 212° before it is turned into steam, and if cold water is fed to the boiler 25 per cent of the fuel which should be utilized for making steam will be used in heating the water to the boiling point. All the heat that can be imparted to the feed water just before it enters the boiler is so much saved, not only in cost of fuel but in capacity of boiler. It is essential that this be done by heat which otherwise would be wasted, and the exhaust steam is now generally used for this purpose. A feed water heater has become the auxiliary of every successful generating outfit and for the sake of economy every steam automobile should be fitted with one. Almost incredible have been the results in the saving of fuel and increase in speed where a small feed water heater has been installed.

**The Construction** Our heater consists of a coil of copper or iron pipe, encased in copper or galvanized iron. The ends of the coil project from one end of the heater for connecting to the boiler feed line. The case has a connection on one end for the steam from the engine to enter and another on the other end, or side (as desired), for the exhaust connection. A few small holes can be put into the bottom of the case to give vent for the condensation. The heater should be placed as near the boiler as possible. Our heaters contain from 25 to 50 feet of ¼ or ⅜ pipe and are made very strong to withstand the high pressure and intense heat which necessarily accompany the very high pressure used in automobiles.

We make special sizes to order to fit space at disposal in the car.

If copper pipe and case are desired add 20 per cent. to list price.

**Prices**

| Size | Weight | H.P. | Each |
|---|---|---|---|
| 6x12 inches | 12 pounds | 6 to 8 | $10.00 |
| 6x15 " | 15 " | 8 " 10 | 12.00 |
| 6x18 " | 20 " | 10 " 15 | 14.00 |

# AUTOMATIC FUEL REGULATOR.


**Fuel Control** The control of the fuel in the steam automobile has received a great amount of attention in the past, and for good reasons. Though small, the fuel regulator is a very important part of the generating outfit, and it is necessary that all the adjuncts be the best that can be secured. In our regulator we offer one which has stood the test of years. It is a reliable, simple device, which regulates the supply of the fuel to the burner in the exact proportion to the demand. If you have never used this regulator you have not had all the pleasure there is in operating a steam car.

**The Parts** The regulator consists of two concave brass discs with a steel diaphragm between them, held together with screws, leaving a small space on the under side of the diaphragm for steam and a space for fuel on the upper side. The valve consists of a brass seat in the center of the diaphragm, with a specially made hollow fitting which the valve rests against. This hollow tube is the end of the supply pipe to the burner and can be adjusted to shut off the fire at any desired steam pressure by breaking the union on the upper side of the regulator.

**The Action** When the steam pressure on the lower part of the diaphragm has reached a point where it is desired to shut off the fire, the diaphragm is pushed upward, pressing the metal seat upward until it closes against the special hollow fitting mentioned before, thus closing the valve. When the boiler pressure decreases, the natural spring of the diaphragm opens the fuel valve and starts the fire again. The fuel enters through the opening on the side and passes down into the space on the upper side of the diaphragm and through the union fitting to the burner. Where a pilot is used, we construct the fuel valve to shut off all the fuel supply to the main burner; but we also make it to shut off all but a small supply of fuel, just enough to keep the main burner lighted. Regulators are set for 225 pounds steam and 60 pounds air pressure, unless otherwise ordered. They are placed so as to control the liquid fuel only.

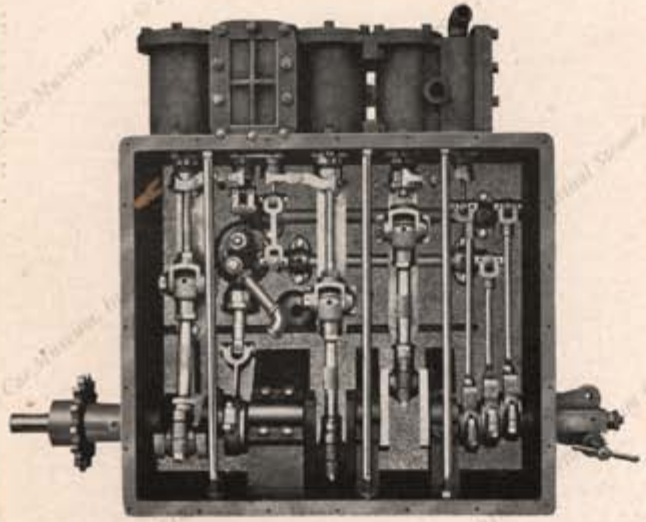
**Regulates Within Ten Pounds** In this regulator we have done away with packing boxes, thus saving the operator the care it requires to keep them tight, and removing the danger of crippling the operation of the diaphragm by screwing them too tightly. By using diaphragms all friction is done away with and so very accurate and positive is the action that it regulates within three to ten pounds. This enables the operator to take the hills with a full head of steam and with the fire open wide. The annoyance and delay caused by a slow acting regulator are eliminated.

**Special Size** For flash boilers and above 300 pounds steam pressure we make an extra heavy size. It will be tested to 700 pounds and is a valuable adjunct to the flash boiler.

**Prices**

| | |
|---|---|
| Regulator, up to 300 pounds..... | $5.00 |
| Regulator, above 300 pounds..... | 6.00 |

# THREE CYLINDER COMPOUND STEAM ENGINE.



**The Demand** The demand for a compound double acting steam engine for automobile purposes, of greater horse power than any so far offered the public, has influenced us to put upon the market this engine, which we believe will meet with the approval of all who desire a high grade engine for this work. It is suitable for heavy touring cars and trucks and is the only engine yet offered which has sufficient horse power to put the high powered steam car on an equal with the large gasolene car.

**Three-Cylinder Compound** This engine is compound double acting, with one high and two low pressure cylinders, being 3x4x4, with five-inch stroke, and arranged in order named at the end of the oil box. The L. P. cylinders are cast in one piece while the H. P. cylinder is a separate casting. The valve chest cover of the H. P. cylinder is at the side; the cover for the L. P. cylinder's valve chest is on top. A simpling device connects the H. P. Valve chest to the L. P. chest and is operated by a foot lever or hand valve.

The steam enters the H. P. valve chest through a ¾ inch connection in the end of the cylinder. The exhaust from the H. P. cylinder passes to the L. P. chest on the under side and the exhaust connection of 1½ inches is on the under side of the cylinders.

**Runs In Oil** It has been demonstrated, until there is no longer any doubt regarding the fact, that steam engines which run in oil last longer, run more easily and are more economical; yet steam automobile manufacturers have been slow in adopting them. In this engine the oil box is 28 inches wide by 23 inches long and 9 inches deep, and will be made of aluminum or iron, as desired. The crank shaft pillar block bearings are cast as an integral part of the oil box. The cylinders are bolted to one end of the oil box, as are also the sleeves on the side of the box where the shaft and reverse motion pass through. The power water pump is attached to the bottom on the inside of the oil box and is driven by an eccentric from the shaft. The water connections are made through the bottom of the box. A cover screwed to the top of the box keeps the oil from splashing out, and when removed every working part of the engine is exposed and can be adjusted without difficulty.

**Sliding Valves** The valves are of the sliding, or D type, and the two L.P. valves are in the one valve chest arranged in such a manner that one or the other cylinder is always taking steam. When the steam by-pass is opened the H. P. cylinder is neutralized and the live steam by-passes to the L. P. cylinders, making them simple engines; thus giving extraordinary power for starting and getting out of ruts. There is no dead centre, thus obviating the necessity of reversing when starting the car. Without question sliding valves are superior to all other types.

**Pistons, Rods, Etc** The pistons are of the ring type with two rings on each. The piston rods are tobin bronze ⅝ inch in diameter and large enough to stand any test which they may be put to. The cross-heads are also very heavy and are made of the best composition. The cross-head pins are made of machinery steel. The cross-head slides are attached to the bottom of the box and are of a type which we have found very satisfactory in our vapor motor. The connecting rods are of special design and, in fact, are the only ones of their kind made, for they do away with liners, gibs and keys and can be adjusted in one minute by hand without taking them out, or taking the bearings apart. The difficulty experienced in keeping stuffing boxes tight has been greatly exaggerated, for if they are properly constructed they will not give any trouble. Straps passing from one to the other hold the stuffing boxes in place when set.

**Reverse Motion** The reverse motion is of the spiral type and easily operated. Only one eccentric is required for each valve. The reverse is set at the end of the crank shaft and extends out through the side of the oil box, where it is connected to a small gear wheel. In either the forward or backward motion the reverse is held in place by the crank shaft. The engine can be reversed when in motion without closing the throttle, which is a valuable feature in case of emergency.

**The Crank** The crank is 1½ inches in diameter and is made of the best forged steel. One end extends out through the side of the oil box for the sprocket bearing. The other ends in the bearing nearest the opposite side of the box, and the reverse motion continues out through the oil box. The low pressure crank throws are set at right angles, and the high pressure throw at 45 degrees, or just half way between the two low pressure throws. The crank shaft bearings are made of tobin bronze babbitted with phoenix metal. A pin passing through the head of the bolts which hold the pillar block caps keeps the bolts from turning. The bearings of the crank and engine are all plain, thus doing away with troublesome ball bearings, for the babbitted bearing has proven to be the best, for various reasons, among them being the fact that the crank is not ruined should it overheat.

**Crank Connections** All connections on the engine not otherwise described are made of composition and are large enough to give the best service. The crank is fitted with one eccentric for the water pump. The valve eccentrics are situated close to the side of the oil box and the high pressure valve rod is connected directly to the valve. The two low pressure eccentrics are connected to two separate rocking shafts, which run across the oil box close to the bottom and in turn operate the valves. The sprocket will be made any diameter desired and with any number of teeth. Bearings, crossheads and all other wearing parts are adjustable, making it an easy matter to take up the lost motion.

**Horse Power** Every steam engine has a wide variation of horse-power, as it depends upon the steam pressure carried and the number of revolutions the crank shaft turns per minute, a fact not usually considered by those not familiar with steam engines. With 200 pounds of steam and 300 revolutions per minute this engine is 15 H. P.; with 300 pounds of steam and 600 revolutions per minute it becomes 45 H. P. This gives a range of horse power sufficient for all road conditions.

**Location** The engine is of the horizontal type and can be placed in any part of the car desired. It can be placed lengthwise in the frame of the car and connected to a live rear axle by chain, or to a counter shaft by chain or gear. It can also be placed crosswise in the frame of the car and connected to a deferential counter shaft by a bevel gear, using side chains for driving. The engine is 28 inches long, including oil box and cylinders, and the extreme width is 37 inches, from end of shaft to end of reverse motion. It is held in place by a strap under the front of the oil box and another at the back under a lug 1½ inches from top of the box. By placing the generator in front of the dash the burner can easily be lighted, the fumes can readily be carried away with a down draft and an up to date touring car can be built. To avoid getting fuel on the upholstery the fuel tank can also be placed in front, where it is more convenient for refilling. It is better to have the engine under the body of the car, for the radiation from it is less than from the generator: hence our reason for making this type of engine.

**Touring Cars** When used in touring cars we advise gearing this engine two to one, for it has sufficient horse-power to propel the ordinary touring car thus geared, even with 36 inch wheels. Under ordinary conditions it will propel such a car upwards of 35 miles per hour. The engine fitted with an aluminum oil box weighs 300 pounds and is preferable for pleasure vehicles. Our 24 inch generating outfit is the best size for this engine, for the rated 15 H. P. is very conservative and refers to the duplex simple engine.

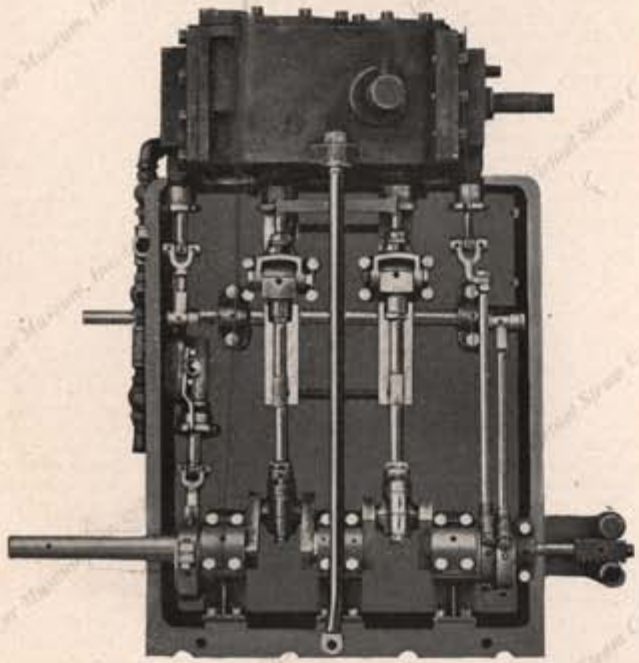
If greater speed than the above is desired, one of our steel boilers about 3 feet long by 2 feet wide by 2½ feet high with aluminum cover should be used. For a high powered generator it is exceedingly light.

**Trucks** When this engine is used for trucks the iron case will give good service and weighs complete 400 pounds. More than one engine should be installed in a truck where a load over 2½ tons is to be carried more than the weight of the car, and one of our 24" generating outfits will propel such a truck about 8 miles per hour loaded. In a truck of 5 ton capacity there should be two engines and two 24 inch outfits, or one large boiler about 3 feet long by 2 feet wide and 2½ feet high. This is the most practical engine yet made for trucking purposes and will fill a long felt want in this line.

**Prices**

With Aluminum Case ..... $760.00
With Iron Case ..... 625.00

# COMPOUND DOUBLE ACTING STEAM ENGINE.



**Compound versus Simple**

In a compound double acting engine there is but one high pressure cylinder to supply with live steam, while in the duplex simple engine there are two cylinders to supply with live steam. It stands to reason that it takes less steam to supply the former engine than the latter, and although the compound engine is a little heavier it will develop 30% more power for the same amount of steam consumed. The compound double acting engine is acknowledged by all marine and mechanical engineers and engine builders to be the most economical and best in every way.

**The Cylinders**

The cylinders are cast in one piece and are bolted to one end of the oil box. They are 2½x4, with four-inch stroke, and the valve chests are located at each side. The steam enters the H. P. valve chest through a ½ inch connection in the center of the valve chest cover, and exhausts around the cylinders to the L. P. valve chest. The steam exhausts through a ¾ inch connection at corner of valve chest on end of cylinder. A simpling connection for starting is made on top of the H. P. cylinder. The valves are the sliding or D type.

**Runs in Oil**

The oil box is 20 inches long by 16 inches wide and 8 inches deep. The extreme overall measurements of the engine are 30 inches from end of shaft to end of reverse motion by 27 inches long, including oil box and cylinders. The engine is held in place by a brace running under the front end of the oil box and another at the rear of the box on the end. The pistons, piston rods, crossheads, connecting rods, stuffing boxes, etc., are similar to those in the large engine and do not require any special description. The crank shaft is 1 inch in diameter and has plain bearings. The throws are set at right angles and by simpling the engine can be started without reversing. The sprocket will be made any diameter desired and with any number of teeth. The water pump runs in oil on the inside of the oil box and the connections are made through the side of the box. The reverse is identical with that on the three cylinder engine and does not require any further description.

**Location**

This engine is of the horizontal type and can be placed in any part of the car desired. If placed lengthwise in the frame it can be connected by chain to a live rear axle, or to a counter shaft by chain or gear having a side chain drive. If preferred, it can be placed cross-wise and connected to a counter shaft with a bevel gear, and a side chain drive can be used.

**Horse-Power**

With 200 pounds of steam and turning 400 revolutions per minute this engine is 6 H. P. With 300 pounds of steam and turning 600 revolutions it will develop 12 H. P. Geared 3 to 1 with 30 inch wheels it will drive a car 20 miles per hour. We advise an 18 inch generating outfit for this engine in very light runabouts, but for heavy runabouts and light touring cars it should have a 20 inch outfit. For light cars this is the best modern compound steam engine on the market.

**Prices**

With Aluminum Case, weight 125 lbs. $425.00
With Iron Case, weight 155 lbs..... 375.00

## SPECIAL NOTICE TO LOCAL TRADE.

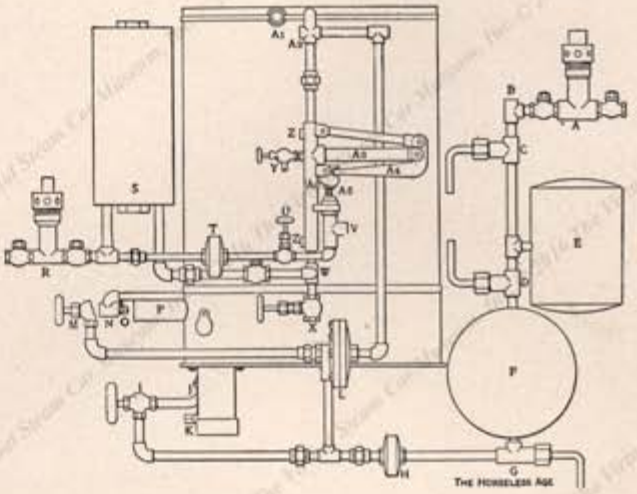
**Installing Outfits** We shall be glad to give a demonstration of our specialties to any persons interested, and cordially invite prospective buyers to visit us at our office and works. We will install our specialties for patrons; but we prefer to do so at our works whenever possible, owing to the greater conveniences of a well equipped machine shop. From the Hudson River towns and New York City cars can easily be sent to us by boat at an exceedingly low cost, our shop being adjacent to the steamboat dock. Wherever practicable, we will tow automobiles in to have our specialties installed, or for other repairs.

**Automobiles Assembled** We assemble from your own or our design steam runabouts or touring cars. We will equip these cars throughout with our specialties or utilize any parts our patrons may select. We also build steam trucks and stages of any capacity or H. P.

The above cut represents a touring car we assembled for a patron using a 10 H. P. engine and generating outfit, placing both under the hood.

If you contemplate building an experimental car, or one for your own use, let us assemble same, for we can save you money and equip the car with several valuable new features which will add greatly to its value.

## BOILER FEED AND FUEL SYSTEMS.




A Power Air Pump
B Hand Air Pump Connection
C Valve
D Valve
E Auxiliary Air Tank
F Main Fuel Pressure Tank
G Valve
H Gauze Fuel Strainer
I Pilot Valve
J Pilot Vaporizer
K Pilot Nozzle
L Fuel Regulator
M Main Burner Valve
N Burner Nozzle Fitting
O Main Burner Nozzle
P Mixing Tube
R Power Feed Water Pump
S Feed Water Heater
T By-pass Gauze Strainer
U Hand By-pass
V Overflow to Tank
W Connection for Boiler Feed, Water Regulator and Bottom Blow Down
X Bottom Blow Down
Y Pet Cock
Z-Z For Gauge Glass or Pet Cocks
A1 Main Steam Connection to Engine
A2 Connection for Water Regulator, Steam Gauge, Steam Blow Off and Fuel Regulator
A3 Water Regulator Expansion Tube
A4 Water Regulator Valve Lever
A5 Water Regulator Valve Stem
A6 Water Regulator Water Column

# Ofeldt's Steam Automobile Specialties

F. W. OFELDT & SONS

NYACK-ON-THE-HUDSON

NEW YORK