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# A Burner Book

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1905

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E. C. WALKER CO.,  
NEW ALBANY, IND., U. S. A.

May/05

*"The Best by Test"*

THE  
"LIGHTNING"

AUTOMOBILE  
BURNERS



FOR KEROSENE  
AND GASOLINE

Manufactured by

**E. C. Walker Co.**

New Albany, Ind. U. S. A.

WE hand you our catalog with the assurance that orders intrusted to us will have our best attention. Necessity forced us to invent the "LIGHTNING" for our own use. We made it to burn: not to sell.

We went into the burner business because we felt sure that every user of the steam vehicle was looking for a burner that would burn and not burn out.

The great demand for our product during the past two seasons and the many encouraging letters from our customers satisfied us that we were supplying a long felt want and that our efforts were appreciated.

If we were not sure that our burners are the best on the market we would quit the business.

To the discouraged user of the steamer, who is tired of burner troubles and the expense of buying fuel, we offer the "LIGHTNING" with the assurance that it will end his troubles and diminish his fuel bill.

We especially invite orders from the Auto manufacturer who consults his own best interests when he supplies the "LIGHTNING" on every carriage he builds. It adds to his reputation and thus to his trade.

## Common Sense Burner Talk.

Your automobile can be no better than its Burner. It is good or bad according to the efficiency of the burner, for the burner is the very source of all its power.

The engine may be in perfect condition, and economical in its use of steam; the boiler may have sufficient heating surface and be ready to do its duty, but it must have a fire under it and that a hot one. Without a good burner the best steam vehicle made cannot give satisfaction.

Has *your steamer* been giving you *satisfaction*? If *not*, may we ask what has been the source of most of your trouble? We are not good at guessing, but we think we could answer for you. If you have been satisfied with your *burner*, you have certainly been fortunate and an exception, for it is univernally conceded that the burner is the weakest part of the steam carriage and the most common source of trouble. Scarcely an article on the steam vehicle is published but what confirms this statement. Does *your own experience* not confirm it?

Perhaps you will say that you are satisfied with your burner and that it never gives you trouble. But let us cross-examine you.

Is it a *disagreeable* task to *raise steam* and get your carriage ready to go?

*How long* does it take you to *raise steam*?

Is your burner *economical*? Does your machine make the *mileage* per gallon the *manufacturer claimed* it would? If you do not know, it will pay you to figure it out. Perhaps you are *burning money*, liquid fuel comes high you know.

Does your burner *keep up ample steam pressure*? Do you have to stop on long hills to wait for steam?

Can you run as fast as you desire without the steam pressure falling back so that you have to slow down or stop and let some gasoline "puff wagon" pass you, while its operator looks back and gins?

Is your burner *indestructible*? Did it ever *warp* or *burn out* so that you had to *throw it away* and buy a new one? What kind did you get? A cast iron one? How long did it last without *cracking*? How far from home were you when your burner absolutely refused to burn, but would only "backburn" and get so hot that you feared it would melt?

Does your burner ever "back-burn" i. e. catch fire inside or at the nozzle? This you know will soon warp and burn out the sheet steel tubular type of burner. Even if you have a cast iron burner or one that is not injured by "back-burning" is it not annoying to have it "back-burn" every time the regulator is about to shut off the supply of gas, so that you have to wait till the steam pressure is reduced before you can relight the burner?

Does the *wind* affect the burner so that you *can't keep up steam on windy days*?

Is your burner *odorless*? If it throws off foul odors, it is certainly not economical. If combustion is as it should be, your automobile burner should make no more odor than a gasoline cooking stove.

Do you have to clean the boiler-flues from soot? Where combustion is right the burner will not foul the boiler-flues.

What fuel have you been using? GASOLINE? Are you not afraid of it? Have you ever thought how *expensive* it is? KEROSENE is not only *safer*, and *cheaper* in price per gallon, but a gallon of kerosene contains *twice as many heat units* as the same amount of gasoline, hence makes a *hotter fire* and drives the machine farther.

Now if after carefully considering all the above questions, you feel satisfied that you do not want a better burner than you now have, do not waste your time by reading further; but kindly hand this circular to some other user of the steam carriage who has perhaps not been so fortunate in his burner experiences as you.

It is our contention that burner troubles and the cost of fuel have been responsible for the wane in popularity of the steam vehicle.

We just as firmly contend that a perfectly reliable Kerosene burner *is to redeem the steamer to its former prestige and popularity.*

We believe in steam as a motive power: we have always believed in it: and we are not ready to forsake it now. Eighteen years ago our Mr. Clarence Walker built a steam vehicle and for want of a better name called it a "Steam Road Buggy." Of course it was crude as compared with the modern steam Automobile; but it *went*. Four years ago we built our first modern steam carriage, a machine that is giving us better service today than when it was built, (owing to the fact that it now has a reliable kerosene burner under it.)

We could tell you a great many experiences we have had in building, repairing and operating steam vehicles, that would perhaps interest you, but we want only to talk burners now and tell you how we came to invent the "LIGHTNING" and why we are in the burner business.

We shall not burden you by relating all our burner experiences: that is not within the scope of this catalog and perhaps you are already burdened enough with your own burner troubles.

Costly experience taught us the following facts:-

SHEET STEEL TUBULAR BURNERS soon *warp and burn out.* (One of this type that was re-

presented as being perfect and durable burned complete-out in six weeks.)

CAST IRON BURNERS are *heavy* and will not last. They *crack*. They are *slow* to first raise *steam* owing to the fact that the great mass of metal must first become hot before the fire can be turned on strong.

ALL BURNERS with air tubes through them *do not work* properly in the *wind* and even under favorable conditions they are *not* always *efficient*. Besides they are not adapted to burn kerosene.

Exhaustive tests of BURNERS WITHOUT AIR TUBES and with their only air supply through the mixing tube, proved to us that they are impracticable. They are too *extrabagant* in their consumption of fuel, as about half the gas passes out the stack unburned, leaving a trail of stench along the highway.

After long and expensive experience, we came to the conclusion that all of the burners on the market were far from perfect. We had tried all the different types and found that none of them were entirely satisfactory.

At last necessity forced us to try to devise a burner that might be free from all or at least the worst of these faults. After much experimenting, we devised a burner similar to the one shown in this circular, intending it for use only on our private carriage. After long and severe tests under all conditions, the results obtained were so eminently satisfactory that we decided to patent it and place it on the market. It has now been on the market two seasons and results have proved its merit.

It was made to BURN not to SELL.

But it has sold and is still selling. Why? Because it is just what the user of the steam carriage has been looking for.

It is made to *burn*; not to *burn out*.

There are a great many burners on the market. Say all the good things you can about the others, there yet remains one thing, true only of the "LIGHTNING;" IT IS THE BEST.

It is not the best because we say so. But we say it is so because it is the best.

It is best by test. It has passed the experimental epoch.

From the introduction of the "LIGHTNING" on the market, we have had all the business we could handle.

During the past season we equipped not only the various makes of American Steam Cars, but sent burners to Europe, Australia, Australasia, Sandwich Islands, and in fact every place where the Automobile is known. We have equipped all sizes of machines, from the little runabout to the forty horse power steam freight truck. We have burners under all types of boilers; - fire tube, water tube, flash and semi-flash. They are used not only for automobiles, but for steam launches, fire engines, stationary boilers, and for various mechanical purposes such as type melting, etc., and are giving universal satisfaction. We can recommend them for any purpose where a hot, smokeless, and odorless fire is required.

## The Construction of the "LIGHTNING."

The "LIGHTNING" burner is made of wrought iron pipe, the durability of which under intense heat is well recognized. You can't burn out the "LIGHTNING" and we offer to replace free any burner that does not outlast the carriage on which it is placed.

The design of the "LIGHTNING" is such that every inch of fire-box space is utilized and the flames are distributed evenly over the entire crown-sheet of the boiler.

The tubes are arranged in parallel series and screwed into the central gas chamber or manifold. They are so spaced that just the proper amount of air is admitted, and this air passes up in thin sheets between the burner tubes and mixing with the gas escaping from the thousands of perforations in the pipes produces a stiff solid blue flame of intense heat and free from smoke or odor.

There are other burners made of pipe, but the parallel arrangement of the tubes in the "LIGHTNING" gives it not only more heating surface than any burner of similar construction, but also results in perfect combustion, as only enough air for proper combustion is admitted and it passes up evenly between all the tubes, mixes with the issuing gas and makes a hotter fire than burners of other construction.



CUT NO. 1.

The accompanying illustration will make clear the construction of the "LIGHTNING." Compare it with other burners. (Suppose these burner tubes were, instead of being parallel, screwed into a circular central drum and radiated from it like the spokes of a wheel. By this radial construction not only would about half of the heating surface contained in the "LIGHTNING" be lost, but the air passages between the tubes would be irregular in shape. Near the central drum these air spaces would be very narrow while at the outer ends they would be very wide. Thus it is easily seen that the air passing up be-

tween the tubes would not be in even or proper amounts; the central part of burner not getting enough air, while the outer circumference would get too much. Result: not only wasted heating surface but improper combustion, and hence a waste of fuel.)

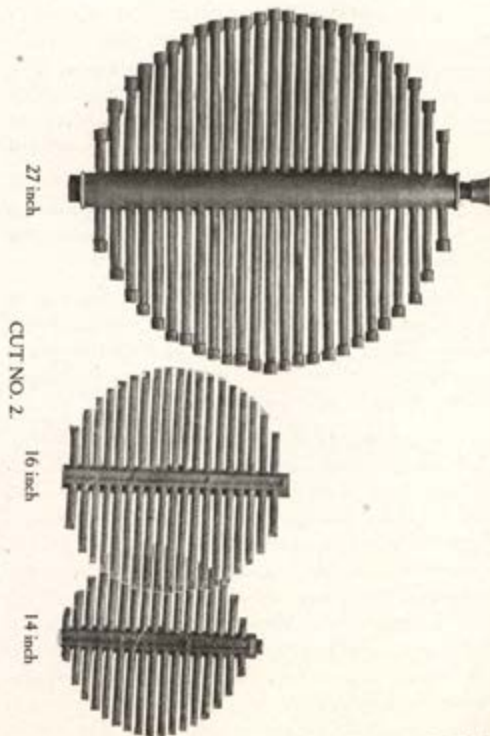
Along the top of each burner tube is drilled a double row of fine holes at an angle of about eighty degrees, so that the gas issuing from these jets comes in direct contact with the rising thin sheets of air between the tubes. The number of holes and their size is in exact proportion to the diameter and length of tubes. The drilling of the holes at an angle prevents all back-fire or draft downward through the burner.

The central manifold or gas chamber is proportionate to the size of burner so that gas is distributed equally to all the lateral tubes. (See Cut No. 2.)

The mixing tube enters central manifold in such a manner that gas is not only properly mixed but is supplied evenly to whole burner. Diameter of mixing tube varies according to size of burner and in all cases is right for perfect mixture of gas and air.

Another feature characteristic of the "LIGHTNING" is the damper air regulator. It consists of sheet steel perforated plates, so arranged that the top one may be shifted so that any amount of air needed may be admitted under burner. The two plates are slightly separated, thus even when damper is so shifted that holes are entirely closed, air is still admitted to supply combustion. By this construction the damper may be entirely closed if necessary on very windy days and the wind cannot have the slightest effect on fire. The bottom plate is flanged up around edge so that it overlaps bottom edge of fire-box thus forming a smooth and air tight-joint. The damper is held firmly in place by wing thumb-nuts so that it may

WE MAKE BURNERS ALL SIZES.



be easily removed, and by unscrewing two other nuts the whole burner may be taken out.

The construction of our burner is especially adapted for burning Kerosene, which requires a greater supply of air than is possible to secure through the tubular type of burner.

## The "LIGHTNING" Kerosene Generator.

Having perfected a gasoline burner, we began experimenting with kerosene, being well aware of the difficulties of burning such fuel, and knowing from experience how far from perfection such burners at present on the market are.

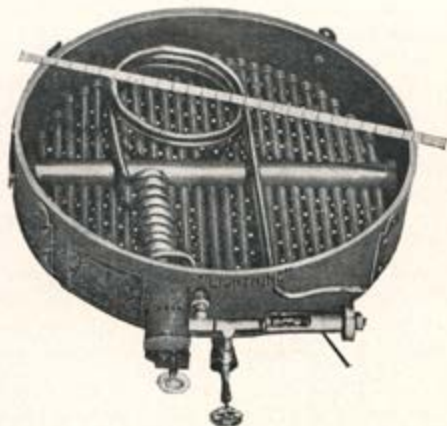
The problem is not to burn kerosene, but to properly vaporize it and at the same time prevent the carbonization or clogging of the generating system. Scientific study and experimenting enabled us to finally overcome all difficulties and produce a perfectly satisfactory generating outfit.

We refrained from offering anything to the public until we could offer a generator that would give perfect satisfaction and could be managed without trouble. We therefore tested our generator on our own demonstrating carriage during the season of 1903. We perfected it and proved by actual use under all conditions its *merit*.

We perfected it and proved by actual use its merit, before placing it on the market, and the hundreds that are now in use and which are giving our customers perfect satisfaction, prove that we are offering you something far superior to anything our competitors offer.



The accompanying illustration shows one of our Kerosene generating systems applied to a burner.



CUT NO. 3.

Kerosene enters coil of pipe above burner. Through the small spiral portion of this coil pilot flame passes keeping it red hot. The pilot flame not only enters fire-box, serving the double purpose of keeping generating coil hot and lighting main burner when it is turned on, but is carried back inside of the pilot house where it comes in contact with the veined portion of this auxiliary generator.

The "LIGHTNING" generator is easily and quickly started, requiring but little more time than a gasoline generator. First the valve to Pilot Light is opened slightly allowing the drip cup under same to fill with oil, the burning of which heats up the veins of Pilot Light and vaporizes the oil therein and then just before oil in drip cup is entirely burned out, Pilot Light is turned on and

is ignited, burning with a blue flame as previously described. After Pilot Light has burned for about two minutes, the oil in spiral portion of vaporizing coil will have been vaporized and then the main burner may be turned on, it being lighted by pilot flame.

This generator overcomes one of the most troublesome faults of most kerosene generators on the market, i. e. the necessity of draining off wet ungasified oil every time the burner is started, or in relighting the main burner after the carriage has been standing. Our generator furnishes perfectly dry gas at all times, hence no smoke results as in case where wet gas is sprayed into the burner. With the "LIGHTNING" there is no condensation of gas in pipes outside the fire-box when machine is allowed to stand.

After two season's use we could discover no evidences of carbonization. The carbon is reduced to a fine powder and passes out the nozzles.

The nozzles are all self-cleaning. The needle point of the valve stem passes through the gas orifice in nozzle every time valve is closed, hence these orifices cannot get clogged.

The stuffing boxes around valve stems are of special construction, preventing leakage of gas, which when kerosene is used as fuel is particularly objectionable, as it results in smoke and foul odors.

The entire outfit is of the best possible construction and workmanship.

We can supply kerosene generators either with or without automatic regulators.

The "LIGHTNING" Kerosene burner and generator is easily installed on any steam carriage, without making any changes in car whatever. Same tanks and pipe lines are used. Our kerosene burner requires but forty (40) pounds of air pressure on fuel. There is one kerosene

burner on the market that requires one hundred and twenty-five (125) pounds of air, (something very hard to maintain,) and separate tanks for generator and main burner.

Either kerosene or gasoline, or a mixture of the two fuels may be used with our outfit.

## The Advantages of Kerosene as Fuel.

Kerosene has many things to recommend it as a fuel for automobiles. It is absolutely safe. Should a fuel tank spring a leak or a pipe become broken off or fractured, there is no danger of the leaking kerosene being ignited and burning up the carriage and perhaps its occupants, as might be the case where volatile gasoline is used. A kerosene burning automobile may be stored in any building without invalidating the insurance on same.

Kerosene is cheaper than gasoline. Its first cost per gallon is less. A gallon of *Kerosene* contains *twice as many heat units* as the same amount of *gasoline*, hence will drive the carriage about twice as far, and at the same time makes a hotter fire, thus furnishing a super-abundance of steam.

The economy resulting from burning kerosene will soon pay for one of our burners, and you will be delighted with results.

Another advantage of kerosene as fuel is the fact that it can be obtained at any village store or even at a farm house; this point will appeal to the tourist or to any one who has been caught out in the country with an empty fuel tank.

The "LIGHTNING" will, however, burn either kerosene or gasoline or even a mixture of the two fuels.

## The Disadvantages of Kerosene.

We have briefly stated the advantages of kerosene, but there are some disadvantages which, to be honest with you, we must mention.

Kerosene is not as cleanly as gasoline. If it gets on the clothing it leaves its mark.

With kerosene it takes longer to start the fire, owing to the fact that it is not so easily vaporized as more volatile gasoline.

These are minor objections however. There is no need of getting the oil on the clothing, and as for the time required to start our improved generator will say that it takes but little longer than gasoline. When the burner is once started it raises steam faster than gasoline, since kerosene makes a much hotter fire.

We have repeatedly raised 220 pounds of steam from cold water in six minutes from the first lighting of the match.

We use kerosene on our own private carriage and would not think of going back to gasoline. Our customers are likewise enthusiastic over kerosene as fuel. We are sure that you will never burn gasoline again if you once give kerosene a trial, that is if you have a good kerosene burner. The "LIGHTNING" is the best burner on the market for either kerosene or gasoline.

Permit us to briefly summarize its PRAISEWORTHY FEATURES.

- 1st. It is simple.
- 2nd. It is the lightest burner made.
- 3rd. It is easily and quickly started and gives absolutely no trouble. The pilot light burns constantly and never goes out even in the wind. The carriage may be left standing all day with steam up ready to go the moment the operator opens the throttle.

4th. As soon as the "LIGHTNING" is lighted it burns perfectly, thus raising steam quickly, producing running pressure in from five to seven minutes, (with gasoline four to five minutes.)

5th. It is EFFICIENT. It makes the steam gauge needle fairly dance. With the fire turned on full it produces more steam than you can use. It is satisfying to know that one can run at full speed, if he cares to, or can ascend any hill no matter how long, and still have a surplus of steam. There is not a burner on the market that compares with the "LIGHTNING" in efficiency.

6th. It is INDESTRUCTIBLE. The "LIGHTNING" has no air tubes to burn out, no plates to warp or crack. It can't be destroyed. We guarantee every burner to outlast the carriage on which it is placed. If it ever burns out we will give you a new one free. Almost any other troubles can be remedied on the road; but burner troubles are seldom remediable even at home or at the repair station.

7th. It can't "back-burn," i. e. catch fire at the nozzle. If it were possible for it to do so, no damage could result therefrom.

8th. It is safe. It can't be flooded and thus set fire to your carriage.

9th. It is cleanly. Burning as it does with an intense blue flame, it produces no soot and hence does not foul the boiler flues.

10th. It can't clog up. It needs no cleaning as many burners do.

11th. It is odorless and economical. By using our damper air regulator any amount of air needed can be admitted to burner, thus securing perfect combustion.

Actual tests have proved that our burner saves from 25 to 40 per cent over gasoline as fuel.

12th. The "LIGHTNING" IS NOT AFFECTED BY WINDS. By partially or entirely closing the air damper just mentioned, wind or down-draft has no effect on the fire.

13th. The "LIGHTNING" contains MORE HEATING SURFACE than any burner of similar construction. It distributes the flames evenly over the entire crown sheet of the boiler and utilizes all the space in fire-box. Note the construction.

14th. It is the best possible burner for kerosene. Burners of other construction cannot give the air supply for perfect combustion of Kerosene, and besides afford no means of controlling air supply.

The adoption of this burner means a positive *saving of fuel*, uniform and *ample steam pressure*, *convenience* and *comfort* to the driver. It means *safety*. It means the end of burner troubles.

Each burner is carefully tested before leaving the factory, and is guaranteed to work perfectly and as represented.

See that your vehicle is equipped with the "LIGHTNING" Kerosene Burner and Generator.



CUT NO. 4.

It is made in any size or shape, and can be easily attached to any boiler.

If you want a hot, smokeless and odorless fire for any purpose, we can supply your wants.

Our prices are consistent with quality offered. If you pay less, you don't get Walker quality; if you pay more, you pay too much. Our terms are cash with order, and we cannot deviate from this rule.

## NET PRICES.

### STANDARD BURNERS.

Kerosene Burners, complete with fire-box, damper air regulator, generator and pilot light, automatic regulator and all valves, etc. all ready to attach to boiler.

14 inch	-	-	\$40.00
16 inch	-	-	\$45.00
18 inch	-	-	\$50.00
20 inch	-	-	\$55.00

Burners and fire-boxes with damper air regulators but without generators, suitable for gasoline.

14 inch	-	-	\$20.00
16 inch	-	-	\$24.00
18 inch	-	-	\$29.00
20 inch	-	-	\$34.00

In ordering, give specific instructions. Don't leave a lot to be guessed at. Tell us exact outside or inside diameter fire-box is to be and state how deep same can be without interfering with chain or brake rod.

## Special Toledo Kerosene Burner.



We have equipped a great number of Toledo Steamers with the "LIGHTNING" kerosene burners and customers are enthusiastic over results.

By our special construction, we get a full size 19 inch burner on the Toledo boiler while burners ordinarily found on same are really but 15½ or 16 inches. The boiler is 19 inch dia. why should the burner be less? The larger burner is not only more efficient, but there is positive economy in its use, for it does not require constant forcing as does the smaller burner. Customers using our special Toledo burners report that they get from 35 to 40 per cent more mileage per gallon of fuel, and at the same time have more steam than they can use.

If you have a Toledo, you can't afford to be without our burner; resulting economy will soon pay for it and it will outlast your car. If it ever burns out we will give you a new one free.

We have templates for making these Toledo burners so that they fit the boiler perfectly. No trouble whatever to install. No changes to make in car. Burner adds but two inches to depth of boiler and does not interfere with chain or brake rod.

Price complete including automatic regulator and everything ready to install, . . . \$55.00 net.

Address all correspondence to

## E. C. WALKER CO.,

New Albany, Indiana, U. S. A.

### TECHNICAL ADVICE.

To our customers who are building, experimenting with or using the steam propelled vehicle, we offer free the benefit of our experience, and will answer with pleasure any questions that may be *asked* us, to the best of our ability.



# STEAM CARRIAGE SPECIALTIES.

WE have catalogued  
a few appliances  
that are NECES-  
SITIES and that possess  
real merit. We wish to  
emphasize the fact that  
each article offered in  
this catalog is tried and  
true. The best is the  
cheapest. Nothing is too  
good for an Automobile.

N. B. If you don't see  
what you want, ask us  
about it. We can supply  
anything and at interesting  
prices.

## Moore Independent Steam Air Pump.



### A STRONG STURDY MACHINE.

The best that is. It keeps up the air pressure on fuel tanks and tires and eliminates all hand pumping. Pumping air by hand is hard work and an annoyance. Why do it?

This air pump pumps up 80 to 100 pounds of air according to steam pressure.

Price, \$25.00 net.

## Moore Independent Water Pump.



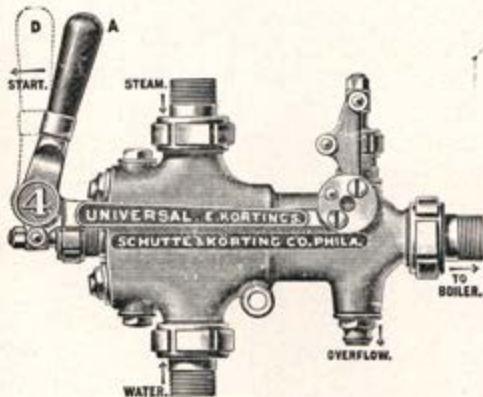
For feeding water to boiler. Price \$25.00 net.

## Moore Combined Water and Air Pump.



Price \$40.00 net.

## Korting Double Tube Injector.



This injector is entirely automatic, requiring no adjustment under varying pressures. It may be throttled to feed continuously, and will work even when suction pipe becomes heated.

To start the Korting injector, draw the handle out, thereby opening the steam valve; when water appears at the overflow, draw lever out fully, and the injector will feed the boiler.

Every Injector is fully warranted.

No. 0.  $\frac{1}{4}$  inch pipe connections, 110 Gals. per hour.

Price, \$21.00.

## Instantaneous Hand Torch.



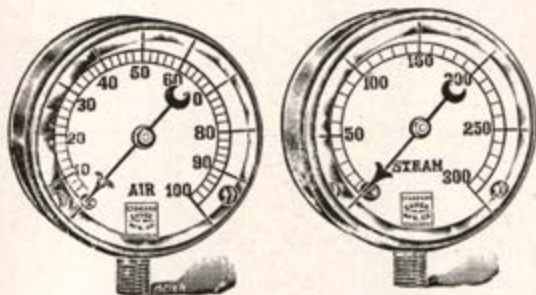
Not a toy, but a good serviceable torch. Lights with a match. Makes an intense blue flame and affords a convenient and expedient means of starting any type of Auto burner, whether gasoline or kerosene.

Self contained with pump in center of tank. Burner hangs on swivel, so that flame may be thrown in any direction.

Small enough to go in tool box of any carriage.

Price, \$2.00 net.

## Self Contained Pressure Gauges.



Particularly adapted for Automobiles and not injured by vibration.

Made with  $\frac{1}{8}$  inch male pipe connections.

### PRICES.

Air Gauge, Polished Nickel Case, Bevel Glass, \$3.00  
Steam Gauge, Polished Nickel Case, Bevel Glass, \$3.00

## Automatic Self-Closing Water Gauge.



Auto type.

Complete with Glass and Shield, Polished Nickel \$3.00



## Automatic Pop Safety Valves.



Fig. A. Half Size.



Fig. B. Half Size.

Adjustable to any pressure. Guaranteed not to leak.  
The kind that pops.

Fig. A Discharges steam into atmosphere. Boiler connection  $\frac{1}{8}$  inch female. Each \$2.70

Fig. B Discharge has  $\frac{1}{8}$  inch female pipe connection so that steam can be discharged into muffler or water tank. Has  $\frac{1}{8}$  inch female connection to boiler.

Each \$2.70

## PRICE LIST SEAMLESS STEEL BOILER SHELLS, INCLUDING SOLID BOTTOM.

INTERNAL DIAMETER	THICKNESS OF WALL	LIST PRICE OF LOOSE HEADS.					
		12"	14"	16"	18"	20"	
12"	.150"	\$ 8.70	\$ 9.15	\$ 9.90	\$10.80	\$12.00	\$ 2.10
14"	$\frac{1}{8}$ "	10.80	10.95	12.00	12.60	13.20	2.85
16"	$\frac{1}{8}$ "	12.75	13.35	13.80	14.25	* 14.85	4.05
16"	$\frac{1}{4}$ "	16.95	17.70	18.45	19.05	20.25	4.80
17"	$\frac{1}{8}$ "	17.25	17.85	18.30	* 18.90	* 19.80	4.35
17"	$\frac{1}{4}$ "	21.45	22.50	23.25	* 24.75	* 26.25	5.40
18"	$\frac{1}{8}$ "	18.75	19.32	19.80	* 19.97	* 20.97	5.00
18"	$\frac{1}{4}$ "	23.25	24.25	24.97	* 26.30	* 27.75	5.90
19"	$\frac{1}{8}$ "	20.25	20.70	* 21.30	* 22.05	.....	4.80
19"	$\frac{1}{4}$ "	25.05	25.95	* 26.70	* 28.05	* 29.25	6.30
20"	$\frac{1}{8}$ "	21.75	* 22.35	* 23.10	.....	.....	5.40
20"	$\frac{1}{4}$ "	27.00	* 28.35	* 29.70	* 31.20	.....	6.90

\* Stars indicate sizes, which, on account of deep drawing will cup up about  $\frac{1}{32}$ " scant in walls of shell body. Intermediate lengths at list prices of next higher.

## Seamless Steel Tanks.



Tinned and Tested to 400 Pounds.

Length in inches.	Internal Diameter in Inches.					
	6	7	8	9	10	12
12	\$6.30	\$6.40	....	....	....	....
15	6.40	6.50	....	....	....	....
18	6.50	6.60	6.70	6.80	7.00	7.20
20	6.60	6.90	7.10	7.20	7.30	7.60
24	7.00	7.60	7.90	8.00	8.10	8.40
28	7.80	8.40	8.70	8.80	9.00	9.40
30	8.40	8.80	9.00	9.20	9.40	9.80

Above prices include one tap, size 1 inch or under.

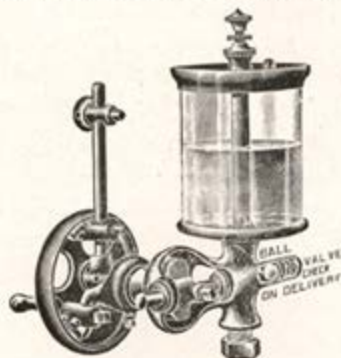
For extra taps add 15c, for sizes  $\frac{1}{4}$  inch,  $\frac{3}{8}$  inch,  $\frac{1}{2}$  inch and  $\frac{3}{4}$  inch; add 20c, for 1 and  $1\frac{1}{4}$  inch Net.

Special Brass Cover Cap, net 50c extra.

Area in inches multiplied by length, then divided by 231, gives approximate capacity of tank in gallons.

## Manzel Automobile Automatic Lubricator.

Patented Oct. 24, 1895. Other Patents Pend'g.



**MADE IN THREE SIZES.**

One-third Pint, Price, \$12.00.

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As the Steam and Gasoline Vehicles require perfect cylinder lubrication to reach their highest efficiency, this lubricating pump has been especially designed to meet the demand for economical and positive lubricating of Steam and Gasoline Carriages, Gas Engines, etc.

It is a well recognized fact that when super-heated steam is used a FORCE-FEED lubricator is an absolute necessity, for without a positive and regular supply of oil the valves and valve seats cut and score. This Lubricator can be depended upon. It will feed the oil as fast or as slowly as desired and you always know exactly what it is doing.

It is noiseless in operation, guaranteed to work on the highest speed Automobile Engine made.

Will feed all kinds of oil, also a mixture of oil and graphite—the variations of temperature not affecting its operation.

Starts and stops when engine stops, and does not feed the oil, as the Hydrostatic lubricator, when not in motion, only lubricates when engine is running; once regulated it requires no further attention, simply keep oil in reservoir, which requires no experienced person, no scalding of fingers, nor wrenches necessary. Ladies can fill the reservoir without soiling their hands.

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