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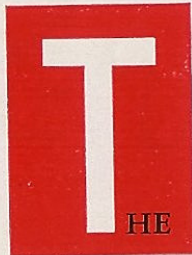
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**CLAYTON & LAMBERT
MANUFACTURING COMPANY**
LOUISVILLE 10, KENTUCKY • U. S. A.

Torch Pointers



THE USE AND CARE OF BLOW TORCHES



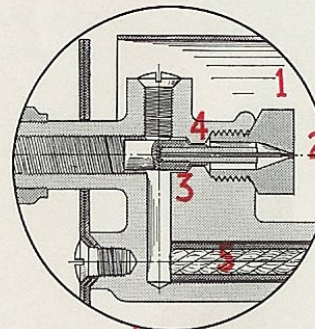
THE gasoline or kerosene blow torch is a useful heat tool in many types of everyday work, in many different industries. Few tools are so commonplace, have so many uses as the blow torch.

The object of "Torch Pointers" is to help in the instruction of the trades school student, the apprentice, and the novice. The experienced workman may find suggestions that will give him a new appreciation of the blow torch with which he is so familiar in his daily work.

"Torch Pointers" covers what a blow torch is, how to operate it, how to take care of it, some of its more important uses, types of blow torches, and safety hints.

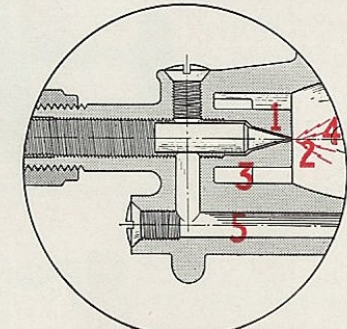
How a Blow Torch Works

Torch Burners Come in Two Grades



**Mechanic's Grade
Burners**

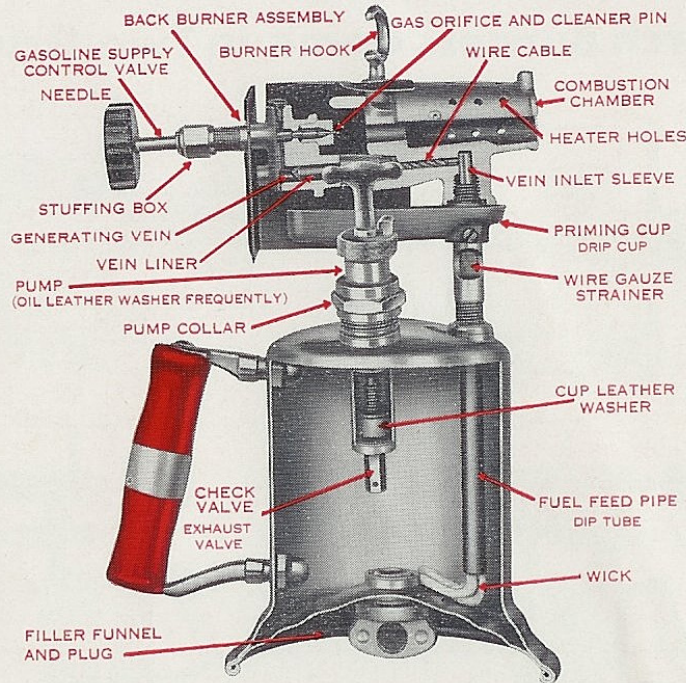
1. Jet block—renewable if damaged.
2. Cleaner pin—cannot enlarge the gas orifice.
3. Shut-off over $\frac{5}{8}$ " from gas orifice, making enlargement of orifice impossible.
4. Flame control—blue flame from wide open to somewhat less than one-half of full flame.
5. Vein construction—vein liners and cable, or rods, give smooth flame and long burning life before carbonizing.



**Sharp Pointed
Needle Burners**

1. Gas orifice formed in burner body.
2. Sharp point on needle (control valve stem) cleans orifice of carbon particles when shut off.
3. Shoulder on needle acts as shut-off and resists gas orifice enlargement.
4. Flame control—blue flame from wide open to somewhat less than one-half of full flame.
5. Vein construction—this type burner is the simplest construction that will give a good, hot, blue flame. The veins are easily cleaned.

What Your Torch Looks Like Inside



How the Torch Works Inside

- The gasoline in the tank is forced up to the burner through the feed pipe and veins by means of air compressed inside the tank.

Gasoline is vaporized as it passes through the generating veins by heat conducted from the burner.

Primary air comes in from the back of the burner. The gas vapors generated in the veins emerge from the orifice, mix with the primary air. This mixture ignites and begins to burn in the combustion chamber. At the mouth of the burner secondary air infiltrates into the flame to complete the burning of the gas vapors.

The holes near the front of the combustion chamber (called heater holes) are in the burner for just one purpose: to keep the burner from "running cold."

Operating Your Torch

WHAT ABOUT FUEL? Gasoline is the standard fuel for most blow torches.

Do not use "high test" gasoline or gasoline containing lead compounds, except in emergency. If torch has not been in recent use, dump out the old gasoline. Put in fresh gasoline. It contains less "gum."

Kerosene can be used only in the Mechanic's Grade burner. Replace the gasoline jet block with a kerosene jet block. Change to a smaller cleaner pin. Asbestos wicking should be placed in the priming cup.

HOW TO FILL YOUR TORCH—Turn torch upside down. Remove filler plug. Fill tank $\frac{3}{4}$ full from a clean receptacle. This provides space for the proper amount of compressed air to give an even flame without too much pumping. Some torches are top fillers (for example: C & L Torches Nos. 325 and 225) and require the use of a funnel.

After filling, screw in filler plug—tighten with wrench or pliers. Use enough force to seat the filler plug properly. Too much force will ruin the lead gasket, strip the threads. With care in tightening, the plug should last the life of the torch.

HOW TO START YOUR TORCH—Make sure the gasoline supply control valve is closed. Pump 10 strokes of air into the tank (5 for a pint). Be sure the pump CHECK VALVE does not leak. Test as follows: Unfasten pump PLUNGER from the catch that holds it locked-down and leave in unlocked position. Then, if the pump PLUNGER rises to the FULL LENGTH of its stroke, the check valve is leaking. Do not use torch until this leaky condition is corrected. Remove entire pump from tank and replace disc seat in check valve at lower end of pump.

Also examine the filler plug and other parts of the torch to make certain there are no leaks.

Place Torch on a steady level surface. Turn gasoline control valve slightly to left. This allows gasoline to flow slowly into priming cup. When about $\frac{3}{4}$ full, shut off valve. In case the gasoline should overflow, wipe the tank dry.

Light the gasoline in the priming cup.

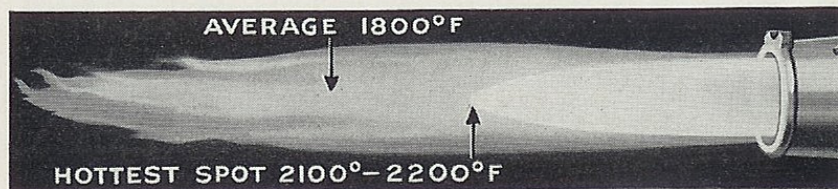
When gasoline in priming cup is nearly burned out, open the gasoline valve $\frac{1}{2}$ to $\frac{3}{4}$ turn (left turn). If necessary, light the burner flame. (Hold lighted match close to heater holes in combustion chamber, not in front of burner mouth.) An intense blue flame should result. If the flame is orange or yellow the burner has not been properly generated. If this happens, shut off the burner, allow it to cool. Take to a location more protected from the wind. Then repeat the above operation.

To increase flame volume, regulate the control valve and increase the pressure in the tank by pumping. Avoid too much pressure for best flame regulation.

HOW TO STOP YOUR TORCH—Close the gasoline supply control valve. Turn to the right, gently but firmly.

How Hot is a Torch Flame?

The temperature of the flame at any given tank pressure is fairly constant in various torch models but the volume (size) of the flame varies. The volume of flame is determined partly by the amount of air pressure, regulation of the control valve, and generally by the size of the mouth of the burner.



Caring for Your Torch

PUMP

1. Drop a little lubricating oil through pump cap hole frequently.
2. Occasionally check plunger assembly. Unscrew cap and pull out plunger. Soak cup leather in lubricating oil. Replace washer if too dry or cracked.
3. Test pump to see if check valve disc is functioning properly; it may need replacing. Refer Paragraph 3, Page 3.

THREADED JOINTS

1. Filler plug and pump collar have lead gaskets to insure proper seating. Do not substitute or add fibre or rubber washers. If lead gasket is damaged, replace or send to factory for repair.
2. Stuffing box on control valve stem has permanent packing of asbestos and graphite compound. To stop leaks, first shut off burner. Tighten stuffing box by screwing to the right.
3. Leaks around all other threaded joints may be stopped by removing the part, coating the threads with common brown laundry soap and reassembling.

FLAME

If the flame is too small and weak in force, check torch as follows: open and close control valve several times to clear orifice. This may take care of it and bring your flame back to normal. If not—the burner needs cleaning.

To Disassemble Burner:

1. Loosen pump and remove from tank.
2. Unscrew complete burner and feed pipe from tank. Remove the wick.
3. Remove windshield, if any.
4. Loosen set screw holding priming cup and remove; then unscrew feed pipe from burner proper. Joints which have been hot may stick. If necessary, tap gently around the joint with a light hammer.

5. Loosen stuffing box and remove gasoline control supply valve together with stuffing box from the back of the burner, by turning to the left. *Be careful of the point, so you do not break or bend it.*
6. Inspect wire gauze strainer in feed pipe. If blocked, replace.
7. Clean all passages (except needle and orifice passages). Blow out with compressed air or wash out with gasoline.
8. Reassemble, applying common brown soap on all joints. Screw up all joints good and tight. Replace wick.

Now, the torch should be in perfect working order, with a good flame. But before using the torch do these five things:

1. Fill the torch with gasoline and pump up pressure. Let torch stand about an hour.
2. Inspect for leaks and wet spots under torch.
3. Light torch and burn for several minutes to check flame operation.
4. If gas leaks around valve stem, shut off burner.
5. Wait for burner to cool; then tighten stuffing box nut.

Types of Blow Torches and Their Uses



MECHANIC'S FAVORITE TORCH

No. 32A C & L Mechanic's
Grade Burner

A general purpose torch with one quart capacity.

No. 238—similar to 32A but with one pint capacity. Fitted with smaller burner for smaller flame purposes.

These torches are ideal for average jobs such as soldering work.

SOLDERING—There are three types of soldering: (1) *common* or soft soldering (below red heat range), (2) *hard* or *silver soldering*, (3) *brazing*. Both hard soldering and brazing are sometimes referred to as high temperature soldering, are done at red heat.

When soft soldering is done with a flame, it is commonly known as sweating or torch soldering.

Types of Solder

Common solder is a combination of lead and tin.

Approximate Melting Points of Lead-Tin Solder

Lead %	Tin %	Degrees Fahrenheit
100	0	620
75	25	514
60	40	460
50	50	414
40	60	370
25	75	378
0	100	450

} most commonly used

In brazing, a brass solder is used, usually three parts copper to one of zinc. Brazing is common in the uniting of cast iron, steel, brass, and copper parts. The melting point of a brass solder is around 1600 degrees F.

In hard soldering—depending on the grade of silver solder used, the melting point varies from 1360—1510 degrees F.

Use a flux in soldering. The flux prevents oxidation from contact of the hot metal with the air, or with the gases used in heating. Zinc chloride for soft soldering and borax for hard soldering or brazing are most practical fluxes to use.

SWEATING—Parts are more easily joined together if they are fluxed and “tinned” separately before joining.

Such objects as big lugs for electrical wiring, brass pipe nipples, and large copper tubing are best heated by a flame.

One thing to remember: it is necessary in soldered joints to raise the temperature of the metals to the degree at which they alloy with the solder being used.

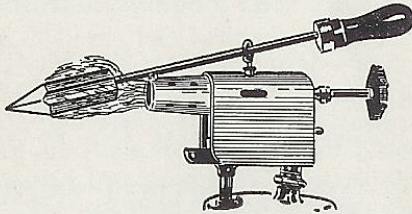
BRAZING—Light brazing is often done with a torch. Only small parts can be light brazed satisfactorily. Because the work must be raised to a high temperature it is necessary to surround the work with an intense heat. This can be done by building up a charcoal wall around the work. The charcoal becomes incandescent from the flame heat, sets up an additional amount of heat from its own combustion. You can even hold the work between two blocks of charcoal clamped firmly by a vise.

SOLDERING WITH A COPPER—The terms “soldering iron” and “soldering copper” are used interchangeably. A

soldering copper is best because it: (1) keeps hot longer, (2) conducts heat better, and (3) doesn't pit as easily.

Small size coppers up to 1½ lbs. can be heated on pint size torches. Coppers up to 3 lbs. should be heated on quart size torches. Copper sizes, as in this instance, are customarily given as the combined weight of a pair.

In using a copper, don't forget the heat delivered by the tip does the soldering. Keep the tip "tinned" (coated with solder). Unless it is "tinned," a crust forms that prevents proper heat. To keep from burning the "tinning" off the tip, play the flame on the heel of the copper instead of the tip. This can be done by placing the iron handle of the copper on the forward part of the burner, caught in the burner hook. Remember: "Never let the coppers get too hot."

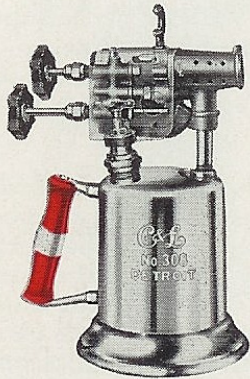


SUB-BURNER TORCH

No. 308 Mechanic's Grade Burner Quart Size Tank

A general purpose torch. Only torch of its kind. Burner equipped with a patented preheater which directs an intense preheating blast (1800 degrees) against the vaporizing veins of the back burner. In extremely cold or windy weather, keep sub-burner on and assure sufficient and constant gas generation.

This torch is particularly advantageous to maintenance men working up poles or in manholes. The sub-burner (low flame) can be kept going for maximum safety when the torch is being sent up or down . . . until the torch is ready for use.



ECONOMY MECHANIC'S TORCH

No. 144A Mechanic's Grade Burner

A general purpose torch. Medium-priced. Similar to 32A with the exception of burner. Produces somewhat smaller flame. One quart capacity.

HEAVY DUTY TORCH

No. 327 Mechanic's Grade Burner

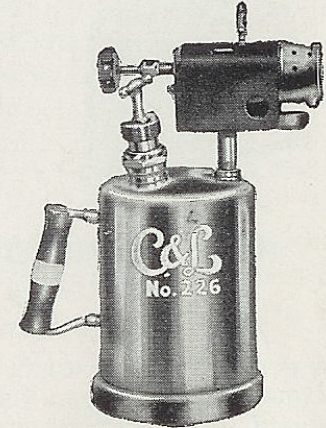
Has same burner as No. 226. Produces 10" blast flame which can be regulated. One quart capacity.

No. 226 HEAVY DUTY TORCH Mechanic's Grade Burner

Two quart capacity. Powerful burner generates strong blue flame 10" long. Can be regulated from high to low.

Typical torches for (1) pre-heating, (2) hardening small parts, (3) freeing frozen parts, (4) melting out soil pipe joints, and (5) soldering fittings on copper water and drain tubing from 1" to 6". For copper pipe over 6", use 2 torches.

In service with electric light, power, and telephone mechanics everywhere.

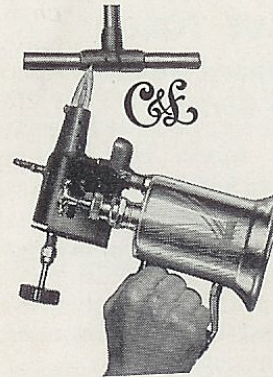


MIDGET-FLAME TORCH

No. 99 Mechanic's Grade Burner

Torch has a small pointed flame 5/8" in diameter by 1 3/4" long at reduced flame. Curved internal fuel pipe and heavy wicking allow torch to burn in any position. Pint capacity tank permits working in close quarters.

This is the torch to use for sweating plumbers' ordinary residential size copper tubing and fittings of 1/4" to 2".





TOOL KIT TORCH

No. 252 Mechanic's Grade Burner

Compact, flat tank, with broad base to prevent tipping. Pint capacity. Convenient to carry in tool kit, to use in corners and close places. Handy for repairmen, electricians. Excellent for soldering fittings up to 2½".

HIGHLY FINISHED TORCH

No. 158A Sharp Pointed Needle Burner

A general purpose torch. Produces 6½" flame when wide open. Full skirted windshield for protecting burner in windy weather. One quart capacity.

For home, garage, and farm use—in thawing, soldering, freeing "frozen" parts, starting heavy oil engines, etc.

No. 160A—Same as 158A with smaller burner, only one pint capacity.



HIGH VALUE TORCH

No. 600A Sharp Pointed Needle Burner

A general purpose torch. Has highly polished buffed brass finish.

This torch is ideal for home hobbyists because it works efficiently, is economical to buy and operate.

No. 700A—same as 600A with smaller burner, only one pint capacity.



PAINT BURNING NOZZLE

Nozzle for a chisel-shaped flame; produces a flat fan-shaped flame 3" to 3½" wide, either vertical or horizontal. Burns off paint fast and clean.

Fits into the end of the burner tube of the torch, is held securely in place by a set screw through a heater hole in the burner tube. Fits C & L Torches Nos. 158 A, 160 A, 600 A, 700 A, and 144 A.

HOW TO BURN OFF PAINT—You are less likely to leave burn spots if you use a nozzle.

When removing paint, start at the bottom and work up. Because heat goes up, the softened paint protects the surface. You avoid



darkening portions from which the paint has been removed. You also avoid making the surface uneven in color, thus harder to paint.

OTHER USES OF BLOW TORCHES

Heat treating of small parts, heating liquids, asphalt floor laying, tinning and retinning, soldering lugs on electric wires, melting out bearings, warming up ferrules, lead-burning tank seams, bending pipe, preheating before welding.

Safety Hints in Using a Torch

A little common sense is the best protection. Follow closely the instructions already mentioned in this booklet. In addition:

1. Don't work where the air may be filled with explosive dust or vapors. Remember, in closely confined quarters, a torch uses up a lot of air.
2. Don't leave a "going" torch; always know where the flame is pointed. You might endanger a passerby or start a fire.
3. Be careful of gasoline or kerosene spilled on the floor or spotting your clothes.
4. Don't fill torch while it's hot; don't even loosen filler plug.
5. Don't pump more air pressure than you need.
6. Be careful not to strike or drop your torch. If you accidentally do, examine it carefully for "unsafe" damage.
7. In using torches to melt materials that give off toxic fumes, such as lead and zinc, be sure you have plenty of fresh air at all times.
8. Too much heat on the tank may build up a dangerous pressure inside the tank. And just be careful about heat radiating from the working surface back onto the tank unless tank is protected with a heat-proof shield.
9. Before burning off paint from a wall, check surfaces for cracks and openings to prevent accidentally starting a fire inside the wall.

A blow torch is a safe and useful instrument when handled with a bit of ordinary caution and care. But it's just like an automobile; a moment of carelessness on the part of the driver may cause an accident.

YOU CAN GET C & L BLOW TORCH PARTS ANYWHERE IN THE U. S.

If your supply house does not stock repair parts, it will order them for you. Torches and burners sent to Clayton and Lambert will be repaired, tested, and returned promptly for a reasonable charge.

MORE THAN A HALF CENTURY OF MANUFACTURING SKILL IS BUILT INTO EVERY C & L TORCH

More C & L fire pots and torches are in use throughout the world than all others of similar high quality combined. Established in 1888, C & L has maintained a policy of uninterrupted manufacturing experience, continuous research, and product development based on precision engineering.

The long list of United States and foreign patents controlled by Clayton and Lambert testify that technical advances in fire pot and torch design are continually incorporated in C & L tools.

C & L torches are always ready for duty when continued service and dependability are most needed. That's why C & L torches are being drafted by the thousands to meet the demands of National Defense Production.

THE C & L FIRE POTS

C & L coil fire pots are the largest selling fire pots in the world. Favorites with experienced plumbers and public service corporations for 50 years. Send for bulletin. It tells you why C & L fire pots stand up. Always prepared to meet strenuous action and rough handling.
