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Hauck Manufacturing Company
3439 W. Brainard Rd. Cleveland, O

INDUSTRIAL BURNER

Combustion by **HAUCK**

DENNIS MARTIN

HAUCK MANUFACTURING COMPANY
3439 WEST BRAINARD ROAD
ROOM 204
CLEVELAND, OHIO 44122
PHONE: 216-831-8881



#853R Third Cut

J. GORDON GAINES ASSOCIATES, INC.

66 SOUTH MILLER ROAD

AKRON, OHIO 44313

TELEPHONE 888-9961

SUBJECT *Orbit Chemical Co.*

DATE *9-22-69*

FROM: *H. N. Benham Insurance Inc*
122 Sadi Street
Clyde, Ohio

Gentlemen,

*we would be able to insure
the waste solvent & combustion system
as follows:*

*Fire 1.77
E.C. .34*

**500* deductible*

The above are annual 80% rates.

The unit may be installed

RETURN TO:

*wherever the insured finds
convenient.*

We await your advice.

Thurt

SIGNATURE

RETURN THIS COPY TO ORIGINATOR

9/8/69

Obitts Chemcial Co.
Elyria, Ohio

We have copied the attached information for
our file.



John O. Thutt,
Excess-Surplus Department

J. Gordon Gaines Assoc., Inc.
66 S. Miller Road
Akron, Ohio 44313



HAUCK MANUFACTURING CO.

May 16, 1969

Obitts Chemical Co.
P.O. Box 375
Elyria, Ohio

Subject: Waste Solvent Combustion System

Gentlemen:

We are pleased to enclose our sketch covering subject installation.

This sketch shows pad requirements for the blower and pump set along with normal arrangement and pipe size.

The burner system will be equipped with electronic flame safety supervision as well as immediate shut down upon loss of power or fuel-air supply. A purge cycle has also been incorporated to insure safe start upon initial light off.

Should you have any questions or desire additional information, please do not hesitate to contact the writer.

Very truly yours,

HAUCK MANUFACTURING COMPANY

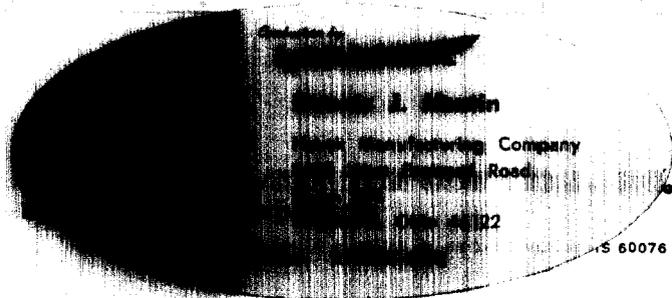
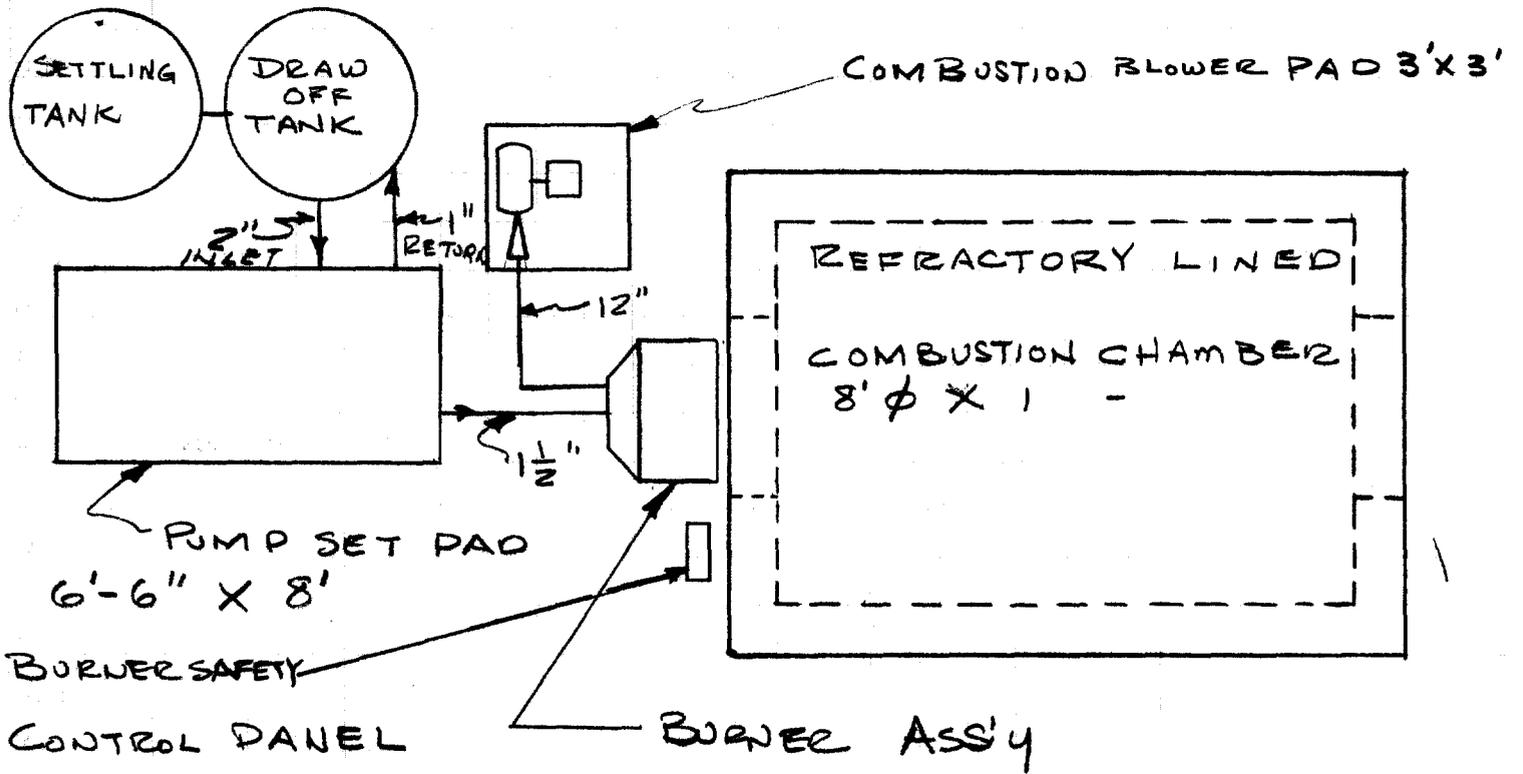
Dennis J. Martin
Dennis J. Martin

DJM/dc
enc: Sketch

60 YEARS IN COMBUSTION

OBITTS CHEMICAL CO.

5/15/69



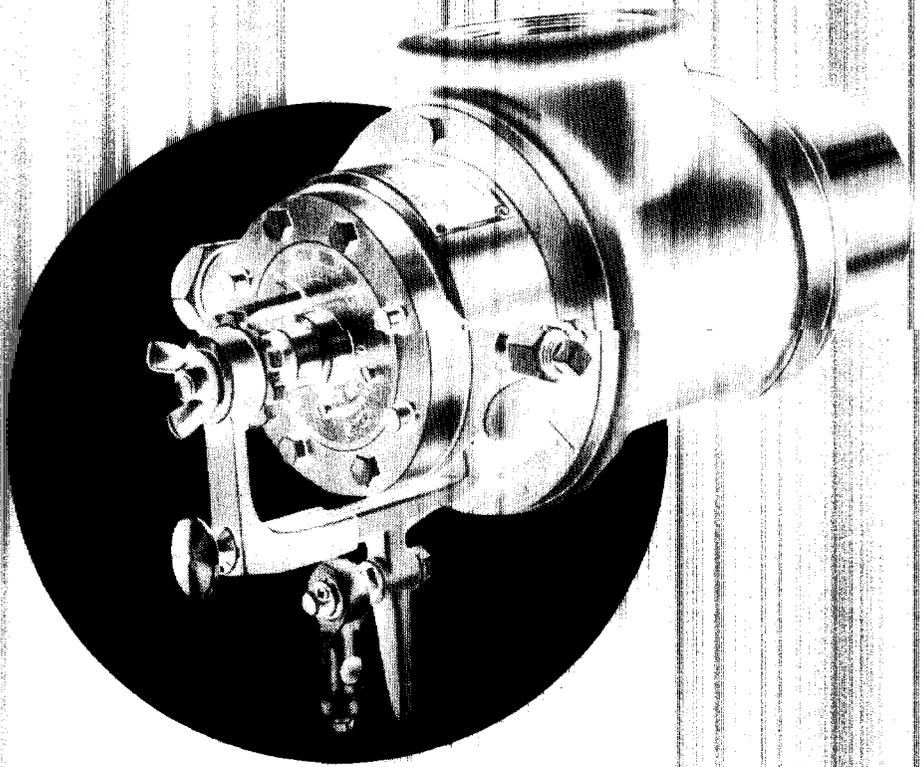
60076

Combustion by **HAUCK**
HAUCK MANUFACTURING CO.
P. O. BOX 90, LEBANON, PA. 17042

Obitts Chemical Company
P.O. Box 375
Elyria, Ohio



HAUCK



An Instrument
of Precision
for

Now

AVAILABLE WITH ALL THE LATEST DEVELOPMENTS
FOR "PUSH BUTTON" IGNITION, AUTOMATIC
CONTROL OF COMBUSTION, TEMPERATURE
AND FLAME SAFEGUARDS

For Industrial Process Heating Applications

Burns Any Grade of Fuel Oil

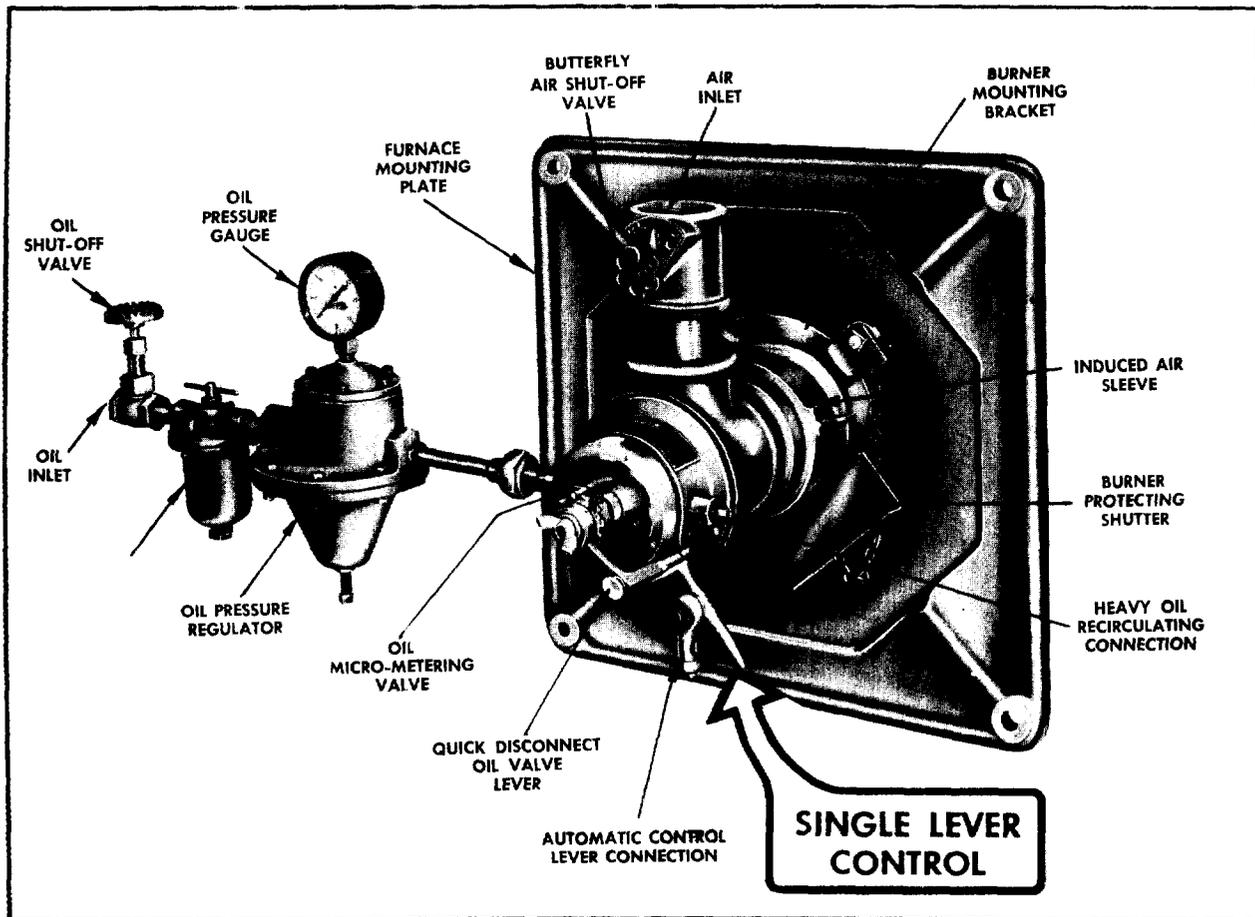


Fig. 1—Hauck Proportioning Oil Burner* (No. 779 to 786) Complete with Furnace Mounting Plate.

The movement of a single lever, simultaneously regulates and proportions the oil and air supply in each burner. Thus, a synchronized, precise mechanical means of ratio control replaces inaccurate manual control, making a simple operation of automatic or manual firing with less guesswork on the part of the operator. Any desired oil-air ratio once set, is automatically maintained thereafter.

a Simple Mechanism that

ASSURES

- Most Accurate Control of Combustion and Temperature
- Greater Fuel Economy
- Better Heating Uniformity

IS APPROVED BY

- Underwriters' Laboratories, Inc.

ELIMINATES

- Guesswork on air-oil ratios.
- Wide variations in temperature.
- Highly trained burner supervision.
- Production variations and losses.
- Waste of fuel.
- Smoke.
- Oil drip or trouble at low fire.

* U. S. Patent Nos. 2,134,471; 2,219,118; 2,219,119; 2,290,785; 2,290,783.

- Automatically and accurately proportions all the primary and secondary atomizing air and oil flowing through the burner, from minimum to maximum capacity.
- Maintains the desired furnace atmosphere, consistently giving CO₂ readings between 13 and 15% over the full range of the burner rating, and frequently reducing fuel consumption from 10 to 20%.
- Produces the greatest firing turndown ratio because it maintains full primary and secondary atomizing air pressure and velocity at the point of oil atomization. Gives uniform flame on all firing rates from low through any intermediate to high capacities.
- Has built-in straight line flow control of oil and air in each burner, not affected by other burners on the same furnace.
- Enables any number of burners on one furnace to be instantly and accurately regulated by one manual or automatically controlled movement of the connected burner levers.
- Avoids clogging of oil valve by means of an exclusive, unique V-groove orifice type micrometering mechanism that has a self-cleaning feature.
- Is easy to install and service, requiring only one air connection and having no external oil tubing. Can be installed for manual operation and, without additional equipment or changes in piping, can be converted to operation by automatic control.
- Is simple to operate; has indicator dials for duplicating burner settings.

Economical to Operate

Low pressure atomizing air is inexpensively produced by motor driven blowers. These blowers usually operate at about 1/4 the power consumption of air compressors for high pressure air atomizing burners and less than the cost of generating high pressure steam for steam atomizing burners. Longer and uninterrupted operating service and less maintenance expense are had from Hauck Low Pressure Air Turbo Blowers as compared to high pressure air compressors or steam generating equipment. Several smaller blowers can be used instead of one large central unit for multiple furnaces, to permit smaller and shorter main air piping or to decentralize the supplying of atomizing air.

AIR SUPPLY

The required atomizing air pressure at the burner for average applications is usually 16 oz. for light distillate fuel oils, and from 16 to 24 oz. for heavy residual oils such as No. 5 and No. 6 (Bunker C). Lower air pressures may be used for low temperature furnaces. The higher ranges of air pressure may be required for high furnace temperatures or greater oil burning capacities for maximum heat liberation in a given combustion space. The air supply piping should enter burner preferably from above, or to either side of burner body when necessary.

OIL SUPPLY

Oil pressure should be supplied up to the burner pressure regulator at about 20 pounds or more for light oils not requiring heating, and at about 35 pounds or more for heavy heated grades of oil. The pressure regulator then reduces the oil pressure and holds it constant to the required operating pressure which is usually from 2 to 10 pounds for the burner.

Heavy residual oils such as No. 5 and No. 6 (Bunker C) should be heated to enter burners at a viscosity not exceeding 80 to 90 seconds Saybolt Universal. The required oil temperature should be maintained constant to avoid variations in

burner firing rates. Our Engineering Staff will recommend the proper oil system for any application of Hauck Oil Burners.

EQUALLY EFFICIENT ON HEAVY OIL

In most burners, the air flow to the burner is controlled by a valve somewhere before it enters the burner and therefore does not always maintain constant primary and secondary atomizing air pressure in the burner. With such burners, when the air flow is reduced 50%, the atomizing air pressure is reduced 75%. However, in the Hauck Proportioning Oil Burner because the air flow is controlled at the nozzle outlet, constant full primary and secondary atomizing air pressure is maintained right AT THE POINT OF OIL ATOMIZATION, from maximum to minimum capacity, at all times. Thus, the characteristic of the Hauck Proportioning Burner to maintain full atomizing air pressure over the entire firing range enables it to completely atomize and successfully burn even the heaviest fuel oil.

In heavy oil heating systems, the Hauck Proportioning Burner is ideal because the hot oil can be circulated up to and through the oil control valve in each burner. Consequently, the oil temperature (even at a consumption as low as 1 g.p.h. per burner), can be easily maintained for uniform burner capacities. The oil does not cool off to cause unequal distribution, poor regulation and atomization due to change in viscosity, as is the case where the hot oil circulation for a number of burners stops at a distant control valve.

Where heavy oil is used, the quick-disconnect oil valve lever permits the burner oil valve to be easily disconnected from the air control and closed. This allows the hot oil to be circulated up to and through the valve without any oil entering the burner. When the oil in the valve reaches the proper temperature, the oil valve can be opened for lighting the burner easily. The lever is then snapped back into the proper position without readjustment.

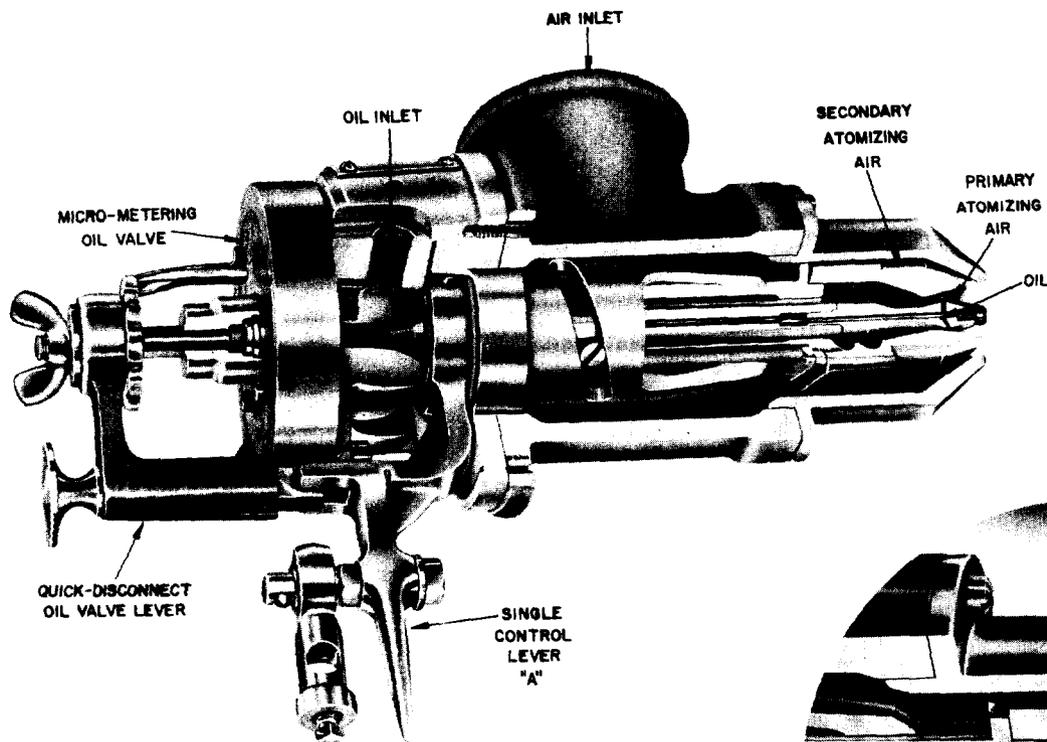


Fig. 2 — Sectional view of Hauck Proportioning Oil Burner and magnified view of nozzle section.

The operation of the Hauck Proportioning Oil Burner is simple. Therefore, the application of the burner to any heat processing equipment eliminates at once the many difficulties with a complicated mechanism that requires frequent manipulation of many valves and controls. It also eliminates variations in operating conditions which usually cause inefficient combustion.

As shown in the cut-away views of the burner, Fig. 2, all atomizing air enters the burner at a single inlet connection and is controlled simultaneously with the oil by the single control lever ("A").

Primary atomizing air enters the inner air nozzle (B) through tangential inlet openings (C) which give the air a whirling, rotary motion. As it approaches the space around the oil nozzle with a maximum velocity, it strikes and atomizes the oil coming from the oil orifices (D).

As the resulting air-oil mixture leaves the inner air nozzle in a diverging cone, it is hit by the secondary atomizing air coming from the outer air nozzle opening (F) in a converging cone. This impact further atomizes the oil, producing a fog-like mixture of oil and air which is quickly ignited and easily burned with better combustion and without smoke or carbon formation.

The inner and outer air nozzles form a double cone air valve giving straight line flow air discharge. Moving the air-oil control lever ("A") toward its high capacity position causes the inner air nozzle (B) to

move back from the stationary outer air nozzle (E), thereby simultaneously and uniformly increasing the air discharge areas of both nozzles and the Micro-metering oil valve orifice.

To decrease the air discharge and oil valve orifice areas, the control lever ("A") is simply moved to a lower capacity position. The butterfly air shut-off valve is used only for starting and stopping of the burner, and remains wide open when the burner is firing. Full atomizing air pressure is always maintained inside the burner throughout the entire range of capacity. The furnace operator can quickly get the required firing capacity and furnace atmosphere with the simple, single lever controlling both air and oil at the same time. All burners on one furnace can be regulated at once by coupling their levers together for manual or automatic firing control. Each burner can be set to always maintain a low fire flame whenever the lever is moved to the extreme low firing position.

Provides Automatic Control of Combustion with Ease and Precision

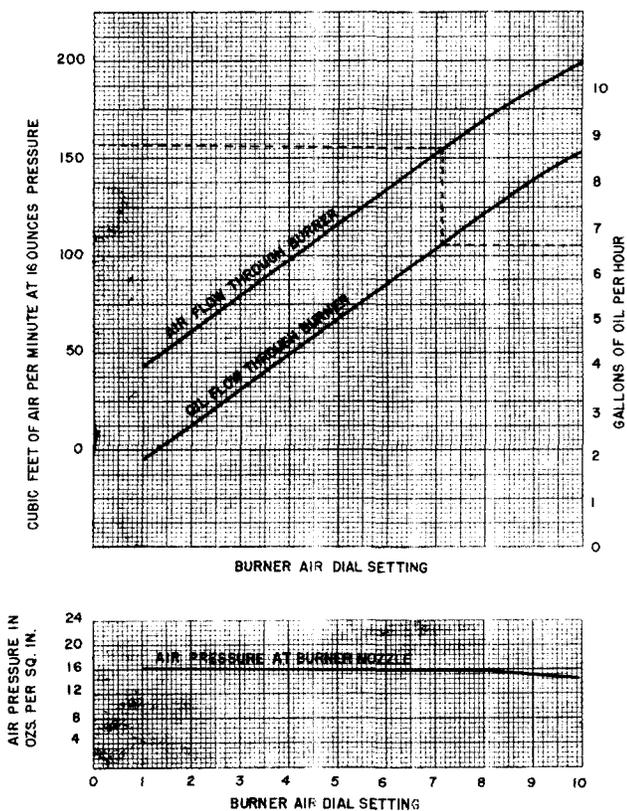
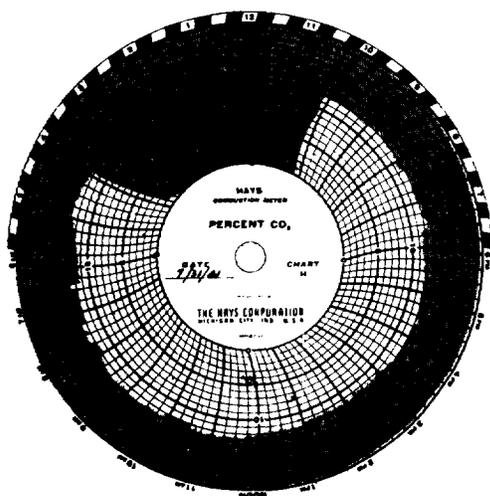


Fig. 3—Actual straight line proportioning of oil and air flow through the Hauck Proportioning Burner, with 100% of combustion air going through the burner. Note constant air pressure maintained throughout the entire range.



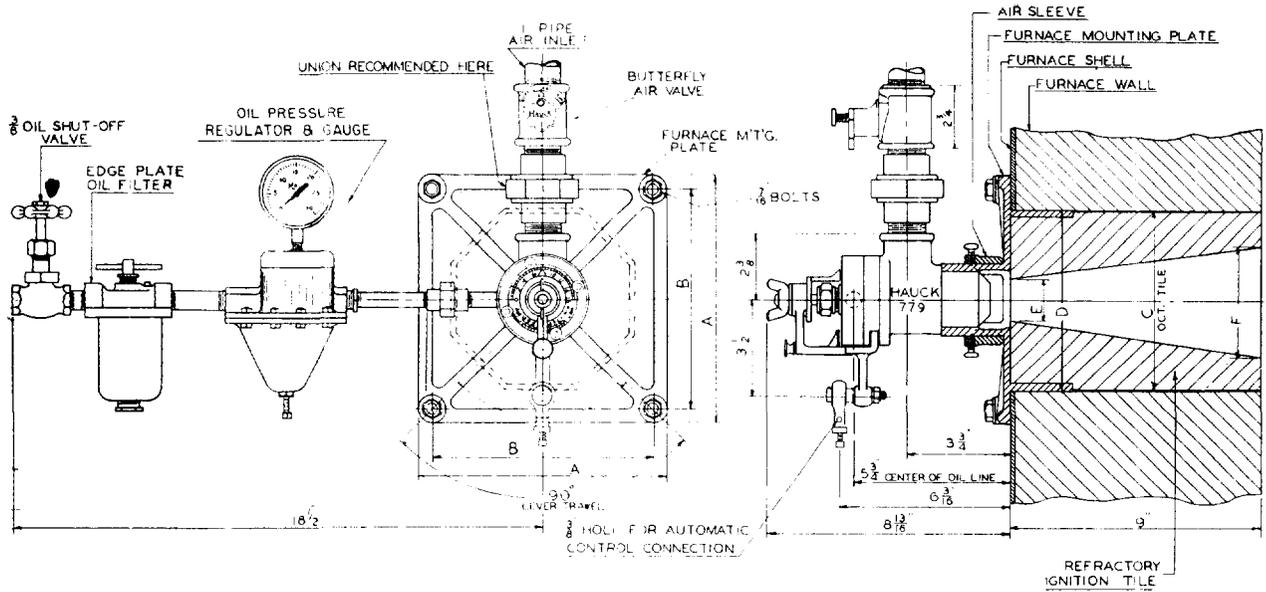
The Hauck Proportioning Burner is the best burner for Automatic Combustion Control because it has straight line oil and air flow control valves built into it. Being its own individual air and oil proportioning and mixing unit, it offers

THESE ADVANTAGES

- A turndown ratio of approximately 5 to 1 in firing capacity is obtained *without altering burner adjustments*, and maintaining perfect oil atomization over this entire range.
- The instantaneous control response makes the burner ideal for either proportional modulating, "floating" or high-low methods of automatic control instrumentation of the electric or pneumatic actuated type. The burner control lever can be operated at any speed. Thus required product heating programs are more easily obtained and within closer temperature limits.
- A uniform low fire flame can be maintained on each burner.
- A battery of burners on a furnace can be set for uniform or different oil burning capacities as required, and operated from one control motor. It does not matter whether all burners are on the same level of location on the furnace. Each burner can be individually set (a) to properly burn more or less oil, if desired; (b) to eliminate any possible effect of oil piping resistance which otherwise would cause a different mixture — all without interfering with the efficiency or capacity of other burners on the same furnace.
- Any Hauck Proportioning Burner in a firing group can be disconnected from the control shaft, adjusted and reconnected without affecting the others in any way. This is impractical with other type burners.
- Extremely accurate automatic atmosphere and temperature control can be easily secured with the Hauck Proportioning Burner because it will maintain maximum combustion efficiency, perfect atomization and constant combustion characteristics at all positions of the burner dial. It also means reduced fuel cost, more production, better product, consistent quality production, better working conditions with less spoilage, less maintenance and less attention.

Fig. 4—This chart is from a continuous absorption type CO₂ recorder, for a day's operation on a rotary forging furnace, fired with five Hauck Proportioning Burners, all operated by one automatic temperature control instrument. It shows how consistently the combustion was maintained during the day when the burners were varied from high to low by the automatic temperature controller to properly heat the required production of forgings.

DIMENSIONS OF No. 779 BURNER

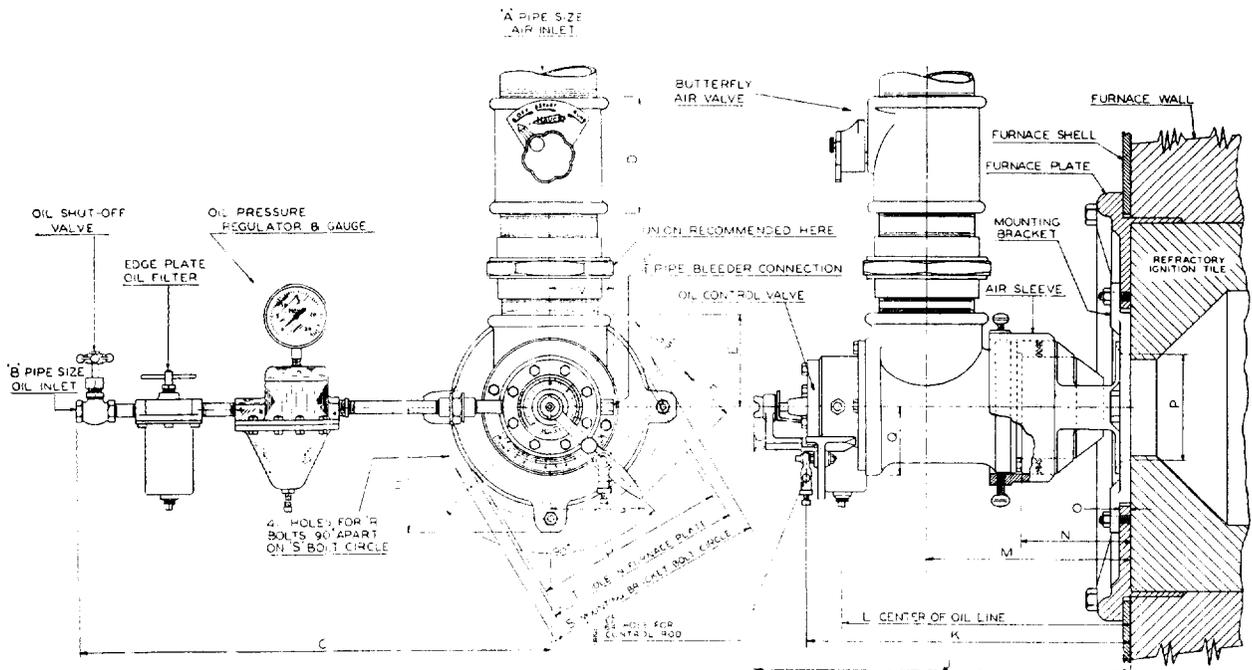


Mounting Plate & Tile	Dimensions in Inches					
	A	B	C	D	E	F
No. 779-STD	9	8	6 ⁷ / ₁₆	6 ⁵ / ₈	1 ¹ / ₂	4 ¹ / ₂
No. 779-HD & HDP	12	10 ³ / ₄	—	9 ³ / ₄	—	—
No. 578 Tile	—	—	9	—	2	5

Fig. 5—The No. 779-STD Mounting Plate (with 779-STD Tile) is recommended only for low oil capacities with no induced air, and light oil. The No. 779-HD Plate (and No. 578 Tile) is required for any heavy oil application, and also for larger oil capacities listed with induced air and light oil, and must be used when Electric Eye application is intended. Electric eye openings are provided, when specified.

For proper operating results the mounting plate and ignition tile are essential parts of the No. 779 size burner.

DIMENSIONS OF No. 780-786 BURNERS



Burner Number	DIMENSIONS IN INCHES																				
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V
780	1 ¹ / ₂	3 ³ / ₈	19	2 ³ / ₄	3	2	4	5 ¹ / ₂	12	9 ¹ / ₂	8 ¹ / ₄	5 ¹ / ₂	3	3 ³ / ₈	2 ⁵ / ₈	2 ¹ / ₄	5 ¹ / ₁₆	7 ¹ / ₈	5 ⁵ / ₈	4 ¹ / ₈	2 ⁵ / ₈
781	2	3 ³ / ₈	19	3	3 ¹ / ₂	2	4	7	13 ¹ / ₂	11	9 ³ / ₄	6 ⁷ / ₈	3 ³ / ₄	3 ³ / ₈	3 ⁵ / ₈	2 ³ / ₄	3 ³ / ₈	8 ¹¹ / ₁₆	7 ¹ / ₄	5	2 ⁵ / ₈
782	3	3 ³ / ₈	23	4 ⁵ / ₈	3 ⁷ / ₈	2	4 ³ / ₈	8	15 ⁷ / ₈	13 ¹ / ₂	12	8 ¹ / ₂	4 ³ / ₄	7 ¹ / ₁₆	4 ¹ / ₂	3 ¹ / ₈	1/2	9 ³ / ₄	8 ¹ / ₄	5 ¹ / ₂	3
783	4	3 ³ / ₈	23	4 ³ / ₄	4 ¹ / ₄	2	4 ³ / ₈	9	17 ¹ / ₂	15 ¹ / ₈	13 ¹ / ₂	9 ¹ / ₂	5	1/2	4 ⁷ / ₈	3 ³ / ₈	1/2	10 ⁷ / ₈	9 ¹ / ₄	6	3
784	6	1/2	23	6 ¹ / ₂	6 ³ / ₈	2	4 ³ / ₈	11	20 ¹ / ₄	18 ¹ / ₈	16 ³ / ₈	11 ¹ / ₄	5 ³ / ₄	3/8	6 ¹ / ₄	4 ¹ / ₄	1/2	13	11 ¹ / ₄	7 ¹ / ₄	3
785	6	1/2	23	6 ¹ / ₂	6 ³ / ₈	2	4 ³ / ₈	11	20 ¹ / ₄	18 ¹ / ₈	16 ³ / ₈	11 ¹ / ₄	5 ³ / ₄	3/8	6 ¹ / ₄	4 ¹ / ₄	1/2	13	11 ¹ / ₄	7 ¹ / ₄	3
*786	8	1/2	27	5 ¹ / ₂	9 ³ / ₈	2	4 ³ / ₈	12	27	24 ¹ / ₂	22 ¹ / ₂	15 ³ / ₄	7 ¹ / ₄	3/8	7 ¹ / ₂	4	1/2	14 ³ / ₄	12 ¹ / ₄	6	3

*No. 786 Burner has Pyramid Type Mtg. Bracket and Flanged Type Butterfly Air Valve.

Fig. 6

the Burner is Furnished Complete

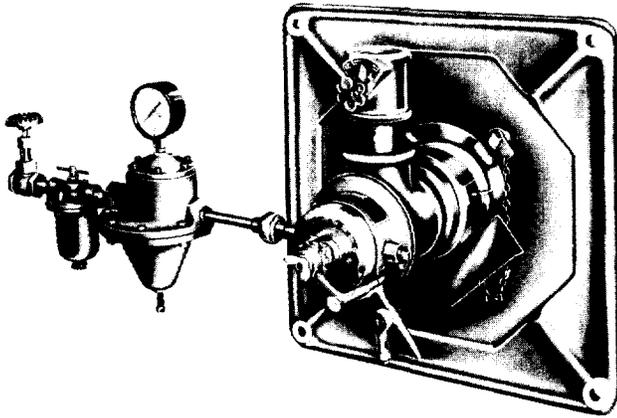


Fig. 7—No. 779-786 Proportioning Oil Burner assembly with furnace mounting plate.

No. 779 Proportioning Burner consists of the burner with furnace mounting plate and integral mounting bracket, protecting shutter, induced air control sleeve, refractory ignition tile, air shut-off valve, Micro-metering oil regulating valve, control lever connection, oil union, oil pressure gauge, oil pressure regulator, oil filter and oil shut-off valve.

No. 780 to 786 Proportioning Burners consist of the burner with furnace mounting plate, mounting bracket, protecting shutter, induced air control sleeve, air shut-off valve, Micro-metering oil regulating valve, control lever connection, oil union, oil pressure gauge, oil pressure regulator, oil filter and oil shut-off valve.

The oil pressure regulator is provided for two reasons: first, to select the oil pressure required to obtain a flow curve with the oil valve, parallel with the flow curve of the air mechanism and, second, to make sure that the exact oil pressure for this condition is constantly supplied to the burner regardless of burner capacity and main oil line pressure fluctuations. It is therefore a very essential part of each proportioning burner.

An oil pressure regulator on each burner is recommended for best results and most accurate oil-air ratio. When some variation in oil-air ratio is allowable, one regulator of proper size can be used to serve a multiple of 2, 3 or 4 burners.

BURNER CAPACITIES

BURNERS OPERATING WITH AIR SHUTTERS CLOSED NO AIR INDUCED AROUND BURNER																				
Burner No.	Inlet		8 oz. Air Pressure			12 oz. Air Pressure			16 oz. Air Pressure			20 oz. Air Pressure			24 oz. Air Pressure			32 oz. Air Pressure		
	Pipe Sizes		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.	
	Air	Oil		Max.	Max.		Min.	Max.		Max.	Min.		Max.	Max.		Min.	Max.		Max.	Min.
779	1"	3/8"	28	1.2	0.2	35	1.5	0.25	40	1.7	0.28	45	1.9	0.32	50	2.1	0.35	57	2.4	0.4
780	1 1/2"	3/8"	44	1.9	0.5	54	2.3	0.6	62	2.7	0.7	69	3.0	0.8	76	3.3	0.9	87	3.7	1.0
781	2"	3/8"	85	3.7	0.8	104	4.5	0.9	120	5.1	1.1	135	5.7	1.2	147	6.3	1.3	170	7.3	1.6
782	3"	3/8"	141	6.0	1.3	172	7.4	1.5	200	8.6	1.8	224	9.7	2.1	244	10.5	2.3	280	12.0	2.6
783	4"	3/8"	254	11.0	2.4	310	13.5	3.0	360	15.5	3.4	400	17.2	3.8	440	19.0	4.1	508	22.0	4.8
784	6"	1/2"	500	21.6	4.3	610	26.3	5.3	710	30.5	6.1	790	34.0	6.8	870	37.5	7.5	1000	43.0	8.6
785	6"	1/2"	670	28.0	4.5	820	35.0	5.5	950	40.0	6.4	1060	45.0	7.0	1160	50.0	7.9	1340	57.0	9.0
786	8"	1/2"	1230	51.0	7.0	1510	63.0	9.0	1750	73.0	10.0	1950	81.0	12.0	2140	90.0	13.0	2460	102.0	14.0

Where considerable draft exists such as in air heaters, dryers and combustion chambers operating under high suction which have or can be provided with secondary air openings to supply additional air, the above oil capacities can be tripled. However for normal operating conditions where combustion chamber drafts are from 0.1" to 0.2" of water the following table gives approximate burner capacities; with air induced around the burner at 33 1/3% for 8 oz. pressure, 37 1/2% for 12 oz. pressure, 41% for 16 oz. pressure, 45% for 20 oz. pressure, 47.5% for 24 oz. pressure, 50% for 32 oz. pressure.

Burner No.	Inlet		8 oz. Air Pressure			12 oz. Air Pressure			16 oz. Air Pressure			20 oz. Air Pressure			24 oz. Air Pressure			32 oz. Air Pressure		
	Pipe Sizes		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.		Air C.F.M.	Oil G.P.H.	
	Air	Oil		Max.	Max.		Min.	Max.		Max.	Min.		Max.	Max.		Min.	Max.		Max.	Min.
779	1"	3/8"	28	1.8	0.3	35	2.4	0.4	40	2.9	0.48	45	3.4	0.57	50	4.0	0.67	57	4.8	0.8
780	1 1/2"	3/8"	44	2.8	0.7	54	3.7	0.9	62	4.6	1.2	69	5.4	1.4	76	6.2	1.7	87	7.4	2.0
781	2"	3/8"	85	5.5	1.2	104	7.2	1.4	120	8.7	1.8	135	10.3	2.2	147	12.0	2.5	170	14.6	3.2
782	3"	3/8"	141	9.0	1.9	172	11.8	2.4	200	14.6	3.0	224	17.4	3.8	244	20.0	4.4	280	24.0	5.2
783	4"	3/8"	254	16.5	3.6	310	21.6	4.8	360	26.4	5.8	400	31.0	6.8	440	36.0	7.8	508	44.0	9.6
784	6"	1/2"	500	32.4	6.4	610	42.0	8.5	710	52.0	11.4	790	61.2	12.2	870	71.3	14.2	1000	86.0	17.2
785	6"	1/2"	670	42.0	6.8	820	56.0	8.8	950	68.0	11.8	1060	82.0	12.7	1160	95.0	15.0	1340	114.0	18.0
786	8"	1/2"	1230	77.0	10.0	1510	100.0	13.0	1750	124.0	14.0	1950	147.0	17.0	2140	172.0	19.0	2460	204.0	20.0

NOTE: The above oil capacities are for oil of 145,000 B.t.u. per gal. Lighter or heavier oils will vary the capacity according to the B.t.u. content of the oil.

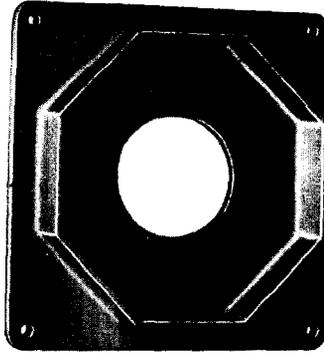
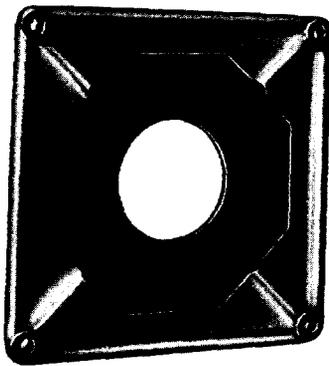


Fig. 8

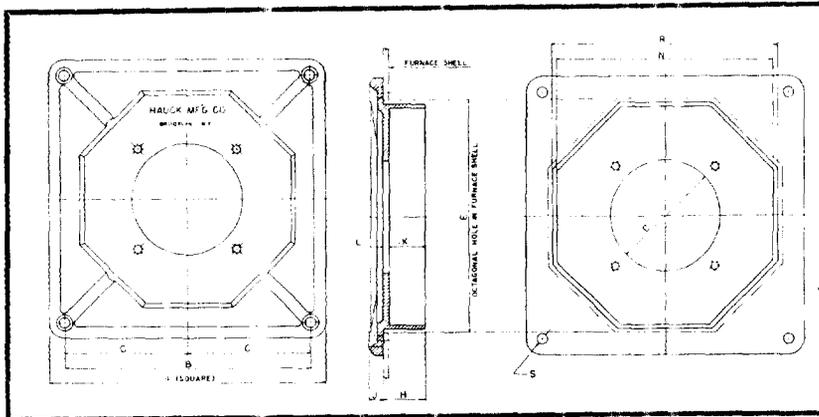


Fig. 9 —All sizes of Furnace Mounting Plates except No. 779-STD, can be furnished with holes for attachment of Electric Eye Assemblies; see page 11. The No. 779-STD and HD Mounting Plate and Mounting Bracket are of one-piece construction for the No. 779 Burner (page 8). When a 779 Pyramid Mounting Bracket is to be used, the No. 779-HDP Plate is required.

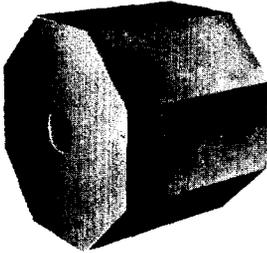
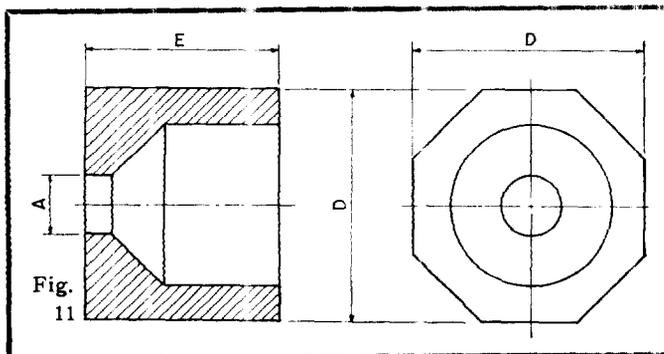


Fig. 10

The object of an ignition tile is to facilitate lighting, maintain ignition under all normal conditions and confine the air induced by the burner so that it will be properly mixed with the oil vapor and enter into combustion as rapidly as desired. The proper shape and dimension of an oil burner ignition tile or port is very important to the efficient operation of any oil burner — therefore, the specified tile is best suited for each size of burner, under normal operating conditions. For some operating conditions, smaller tiles and furnace mounting plates may be required. We will recommend the proper size on receipt of further details of intended application.



Superduty tiles are recommended and available for conditions where combustion chamber temperature will exceed 2250° F.

All sizes of Ignition Tiles, except No. 779-STD, can be furnished with holes for Electric Eye Operation.

See Dwg. Y-81D for tiles and plates with eye holes.

These furnace mounting plates hold the burner and the tile in the proper position and alignment on the furnace which is very essential and especially important with automatic control hook-ups. If the burner bracket is mounted directly on the furnace shell, the heat transmitted through the ignition tile and tile opening will buckle the shell away from the furnace, forcing all parts out of proper position and interfering with the efficient operation of the burner.

The plates are made of heat resisting iron with reinforcing ribs and have a flange to receive and to center the refractory ignition tile. Bolts are provided for the burner mounting bracket and bolt holes are drilled for installing the plate on the furnace. When it becomes necessary to replace the tile, the plate and the tile can be removed from the outside of the furnace, eliminating the necessity of cooling down the furnace to be able to work inside. A new tile is therefore easily and quickly installed.

PLATE DIMENSIONS IN INCHES

For Burner No.	779 STD	779 HD	779 HDP	780	781	782	783	784-785	786
A	9	12	12	16	18	20	20	23	23
B	8	10 $\frac{3}{4}$	10 $\frac{3}{4}$	14 $\frac{1}{4}$	16	18	18	20	20
C	4	5 $\frac{3}{8}$	5 $\frac{3}{8}$	7 $\frac{1}{8}$	8	9	9	10	10
D	2 $\frac{1}{2}$	2 $\frac{1}{2}$	4 $\frac{1}{8}$	5 $\frac{1}{8}$	7 $\frac{1}{4}$	8 $\frac{1}{4}$	9 $\frac{1}{4}$	11 $\frac{1}{4}$	12 $\frac{1}{4}$
E	6 $\frac{3}{4}$	10 $\frac{1}{8}$	10 $\frac{1}{8}$	13 $\frac{5}{8}$	15 $\frac{1}{4}$	18 $\frac{1}{16}$	18 $\frac{1}{8}$	*	*
H	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{5}{8}$	2 $\frac{5}{8}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	2 $\frac{7}{8}$	2 $\frac{7}{8}$
J	$\frac{1}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$
K	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$
L	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$
N	6 $\frac{1}{8}$	9 $\frac{1}{4}$	9 $\frac{1}{4}$	12 $\frac{5}{8}$	14 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$
R	6 $\frac{1}{8}$	9 $\frac{3}{4}$	9 $\frac{3}{4}$	13 $\frac{1}{8}$	14 $\frac{3}{4}$	17 $\frac{3}{4}$	17 $\frac{3}{4}$	17 $\frac{3}{4}$	17 $\frac{3}{4}$
S	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{4}$

*20" Round Hole. †Hole for Burner.

TILE DIMENSIONS — INCHES

For Burner No.	Tile No.	A	D	E
779	779-STD**	1 $\frac{3}{4}$	6 $\frac{1}{16}$ Octagonal	9
779	578	2	9 Octagonal	9
780	780 or 780A**	2 $\frac{1}{2}$	12 $\frac{1}{2}$ Octagonal	10 $\frac{1}{2}$
781	781	3 $\frac{1}{2}$	14 Octagonal	13 $\frac{1}{2}$
782	782	4 $\frac{1}{2}$	17 Octagonal	15
783	783	4 $\frac{1}{2}$	17 Octagonal	15
784	783** or 784	4 $\frac{1}{2}$ or 6	17 Octagonal or 19 $\frac{1}{2}$ Round	15 or 9*
785	784	6	19 $\frac{1}{2}$ Round	9*
786	786	6 $\frac{1}{2}$	19 $\frac{1}{2}$ Round	9*

*Half tile—the total length required is actually 18"; the remaining 9" of the larger cylindrical opening is constructed in the field of standard arch brick.

**For Light Oil, capacities listed without induced air.

The Pyramid Type Burner Mounting Bracket is the latest design. It was developed to provide for the application of gas or spark-gas pilots or direct electric spark ignition to Hauck Proportioning Oil Burners, as illustrated on page 13. This bracket is also recommended for installations where all induced air is to be excluded on sealed-in burners and also for furnaces operating with a back pressure up to 2 inches of water. For greater furnace back pressures, burners can be supplied with mounting flanges instead of brackets. The burner supporting section of the Pyramid Bracket is further away from the firing port and gives longer service. It can be used on all Furnace Mounting Plates except that No. 779 size Burner requires No. 779-HDP Plate.

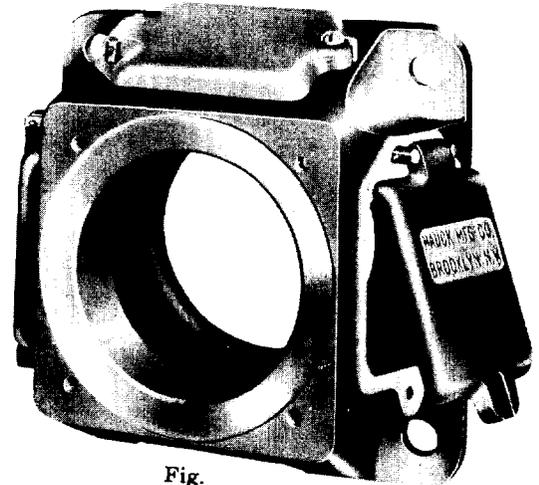


Fig. 12

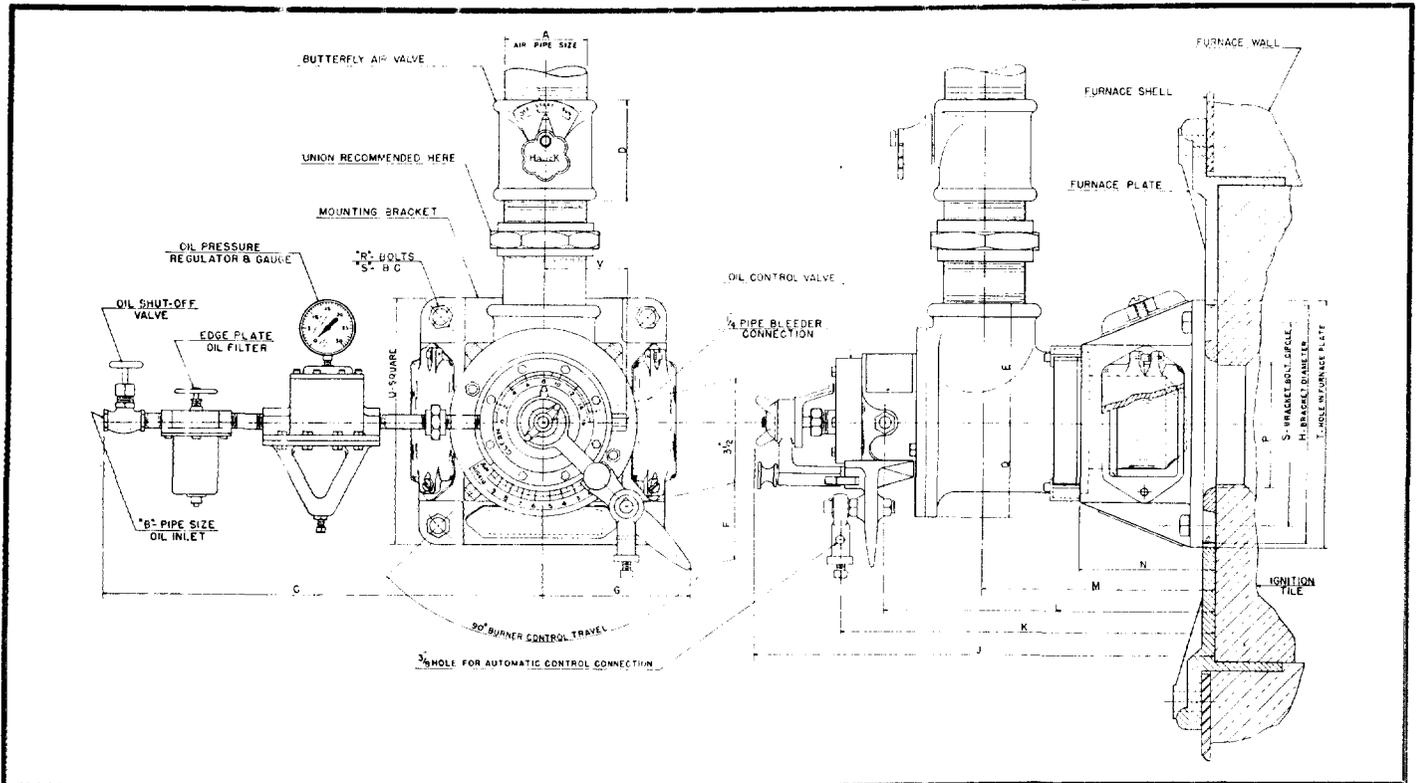


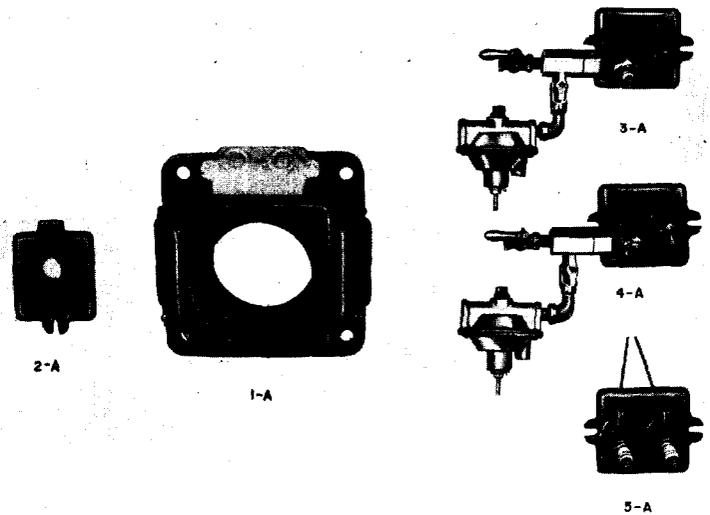
Fig. 13

Burner Number	DIMENSIONS IN INCHES																				
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V
779	1	3/8	18 1/2	2 3/4	2 3/8	—	3	4 1/4	8 7/8	6 7/8	5 3/4	3 3/4	2 1/8	1/4	2	1 5/8	1 1/8	5 1/4	4 7/8	4 3/8	2 5/8
780	1 1/2	3/8	19	2 3/4	3	2 1/8	4	5 1/2	12 1/8	9 1/2	8 7/8	5 1/2	3 1/4	3/8	2 5/8	2 1/8	1 1/8	7 1/8	5 1/2	5 3/4	2 5/8
781	2	3/8	19	3	3 1/2	2 1/8	4	7	13 1/2	11	9 3/4	6 7/8	4	3/8	3 5/8	2 1/2	3/8	8 1/2	7 1/4	7 1/4	2 5/8
782	3	3/8	23	4 5/8	3 7/8	2 1/8	4	8	15 7/8	13 1/2	12	8 1/2	5 7/8	1/8	4 1/2	3 1/8	1/2	9 3/4	8 1/4	8 3/8	3
783	4	3/8	23	4 3/4	4 1/4	2 1/8	4	9	17 1/2	15 1/8	13 1/8	9 1/2	5 7/8	1/2	4 7/8	3 1/8	1/2	10 7/8	9 1/4	9	3
784	6	1/2	23	6 1/2	6 3/8	2 3/8	4 1/4	11	20 1/4	18 1/8	16 7/8	11 1/4	5 7/8	5/8	6 1/4	4 1/8	1/2	13	11 1/4	11	3
785	6	1/2	23	6 1/2	6 3/8	2 3/8	4 1/4	11	20 1/4	18 1/8	16 7/8	11 1/4	5 7/8	5/8	6 1/4	4 1/8	1/2	13	11 1/4	11	3
786	8*	1/2	27	5 1/2	7 7/8	2 3/8	4 1/4	12	27	24 1/2	22 1/2	15 3/4	7 1/4	5/8	8	4 1/8	1/2	14 3/4	12 1/4	12	3

*125 Lb. Standard flange connection on butterfly air valve.

Fig. 14

- 1-A Pyramid Type Burner Mounting Bracket for top cover location of gas, spark-gas or direct electric spark ignition.
- 2-A Left Side Cover with threaded male connection (1 in. i.p.s.) to receive flame-rod for pilot flame protection or proving.
- 3-A Spark-Gas Blast Type Pilot with spark plug, air-gas mixer, air and gas cocks, pilot mounting cover with observation plug, and zero gas pressure regulator.
- 4-A Blast Type Gas Pilot (for manual lighting) with air-gas mixer, air and gas cocks, pilot mounting cover with observation plug, and zero gas pressure regulator. A spark plug for pilot ignition, can be added later by removing the brass plug on top of pilot.
- 5-A Spark Plugs (2) with mounting cover, for direct electric spark ignition.



The Spark-Gas Blast Type Pilot as shown in Fig. 15 is a most reliable means for general purpose lighting either heavy or light oil burners under most conditions. It is a mixed air-gas type, burning any gas and producing a concentrated blast type flame which is adjustable in size and intensity to suit existing requirements. The spark electrode is inside of the pilot gas nozzle and thus is away from the main burner flame.

This type pilot can be used for burners operating on high or low temperature combustion chambers with either suction or fluctuating draft or back pressure, and will operate with the same air pressure as supplied to the main burner.

"Push Button Ignition" — press a button and automatically the pilot spark ignition, the pilot gas and the atomized oil appear to permit instant lighting of the oil burner at its low-fire starting position. The low-fire micro starting switch (U.S. Patent No. 2,562,834, July 31, 1951) prevents igniting burners at full firing capacities. The additional required accessories for the "push button" system can be furnished to meet specific conditions.

Direct Electric Spark Ignition (Fig. 16) can be used only for lighting light grades of oil not requiring heating, where the burner atomizing air pressure does not exceed 16 oz., and on low temperature furnaces, air heaters, ovens, or boiler firing where combustion chamber temperatures are less than 2000°F., and operating only with a draft at low temperatures.

An "electric eye" flame failure device with manual restart relay and solenoid oil shut-off valve must be used in conjunction with direct electric spark ignition to protect against ignition failure.

The required accessories for "push button" ignition can be furnished to meet specific conditions.

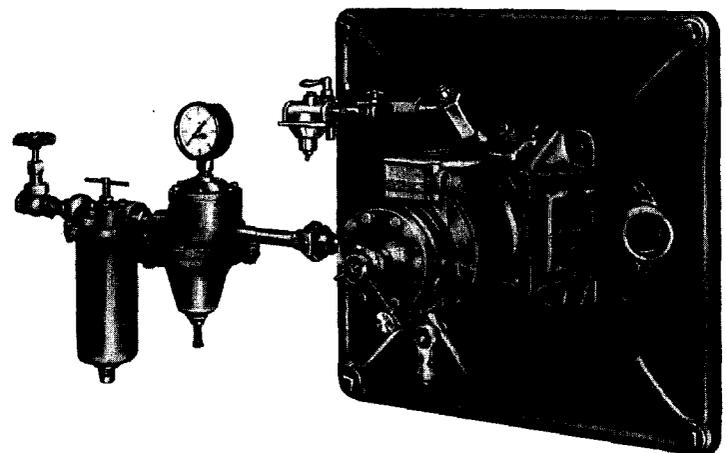


Fig. 15 —Hauck Proportioning Oil Burner with spark ignited blast type gas pilot on pyramid burner mounting bracket, low-fire micro starting switch and "electric eye" mounting bracket on furnace mounting plate with electric eye opening.

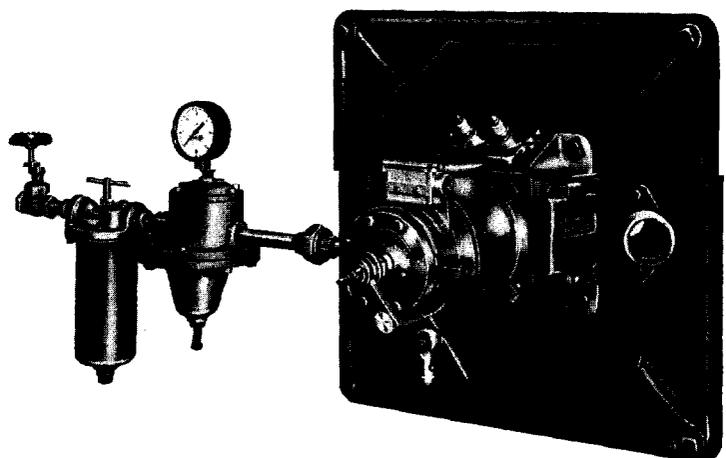


Fig. 16 —Hauck Proportioning Oil Burner with two spark plugs on pyramid burner mounting bracket, low-fire micro starting switch, and "electric eye" mounting bracket and opening on furnace mounting plate.

Where combustion safeguards are required by fire underwriters and insurance companies, the Electric Eye Safety Flame Control such as Wheelco, Brown Instrument, Minneapolis-Honeywell, Fireye, Mercoïd, etc., is used.

For such safety control, the Hauck Proportioning Burner has been used for many years in numerous applications. An electric eye opening is provided, when specified, in furnace mounting plates and tiles, that enables the eye to properly sight both the low and high fire flames. (U. S. Patent No. 2,360,166).

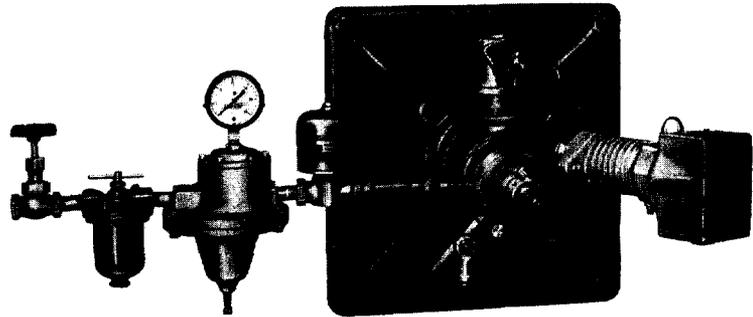


Fig. 17—The Wheelco Flame-eye attached to Hauck Electric Eye Mounting Bracket and Furnace Mounting Plate of a Hauck Proportioning Burner. A solenoid oil shut-off valve should be located after the oil pressure regulator, as shown.

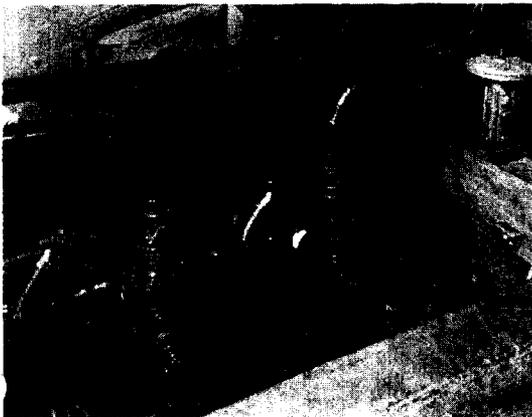


Fig. 18—Two Brown Photo-Electrode Protectoglos operating with 2 Hauck Proportioning Oil Burners on a boiler.

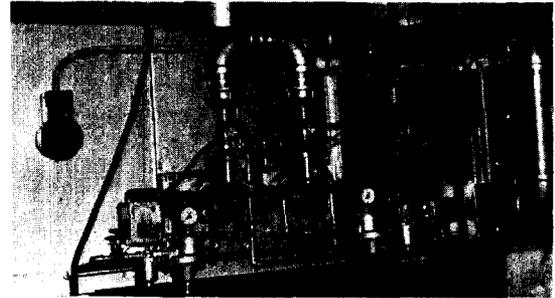


Fig. 19—Showing application of Electric Flame-Rod Safety Control of gas pilot flames on 2 Hauck Proportioning Oil Burners equipped with spark-ignited gas pilots, push-button ignition and low-fire starting switches on an indirect-fired air heater.

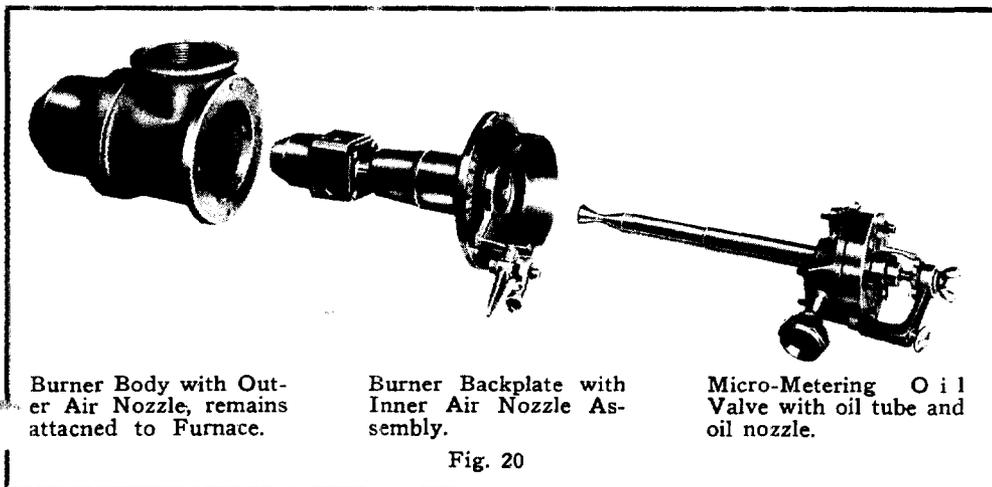
The Hauck Proportioning Oil Burner is simplicity itself for easy access to internal parts for cleaning, after considerable use.

1—The entire internal assembly can be taken out from rear of burner by just removing 2 to 4 cap screws. The inner air nozzle and other parts are then easily cleaned of any dirt that

may have been sucked in from the shop by the blower and lodged in the burner.

2—The Micro-metering Oil Valve, oil tube and oil nozzle assembly can be readily taken out by removing the holding screws. It can be easily cleaned by unscrewing the oil nozzle and blowing compressed air through the valve assembly. The self-clean type oil valve minimizes valve cleaning.

The burner body with the outer air nozzle can remain in position on the furnace, eliminating the need for removing the entire burner from piping and furnaces for cleaning or inspection.



Burner Body with Outer Air Nozzle, remains attached to Furnace.

Burner Backplate with Inner Air Nozzle Assembly.

Micro-Metering Oil Valve with oil tube and oil nozzle.

Fig. 20

Combustion by



INDUSTRIAL TORCHES

(gas and oil)

HAUCK has the most complete line of heating torches available to industry today. These torches are available through industrial mill supply outlets in all industrial centers.

SPECIAL NOTE TO CUSTOMERS:

HAUCK will design and engineer special torches for special applications.

INDUSTRIAL COMBUSTION

(gas and oil)

HAUCK is an organization of trained technical people, experienced and qualified in research, development, design, manufacture, and the application of combustion equipment and combustion control systems for heat processing in industry. All engineering and sales are handled directly by HAUCK combustion engineers, or HAUCK's technical manufacturer's representatives.

COMBUSTION SYSTEMS

Complete combustion systems specified, engineered, and equipment provided.

GAS BURNERS

Our line of gas burners is very complete. Many of our gas burners are of patented design, unique in their features to improve fuel efficiency, simplicity in operation, and low maintenance costs.

ASK FOR INFORMATION ON:

HAUCK nozzle mixing gas burners

high radiant heat gas burner — for furnaces up to 3200°F

high heat release gas burner — over 1,400,000 BTU/FT²/HR.

radiant tube gas burner — adjustable flame length for long, slender firing tubes

high capacity gas burner — usually permits one pipe size less on each burner

excess air gas burner — up to 1,000% excess air make each burner a small air heater for better furnace temperature distribution

rotary dryer gas burner — up to 150,000,000 BTU/HR.

rotary kiln gas burner — up to 150,000,000 BTU/HR.

luminous flame gas burner — up to 17,500,000 BTU/HR.; can be oil "enriched"

adjusta-flow air-gas mixer — capacity can be adjusted on the job; gives the accuracy of a fixed mixer; 6 sizes

Also:

Ask for more conventional gas burners of both the pre-mix type and the nozzle mixing type.

OIL BURNERS

Our 60 year reputation for burning oil is world-wide. Burner designs and heavy oil "know-how" combine to give you the best in oil burning today.

ASK FOR INFORMATION ON:

HAUCK low air pressure oil burners

the original proportioning oil burner — single lever control; "micro" metering of air and oil

radiant tube oil burners — adjustable flame length fits most tubes

blended flame oil burners (excess air, oil burner) — products of combustion down to 400 degrees F. per burner. (without forming formaldehyde); for better furnace temperature distribution

plenum chamber burner packages — 8 to 1 turndown; high burner capacities with 100% metered air

preheated air oil burners (refractory lined) — up to 5,000,000 BTU/HR. (35 gal/hr.)

rotary kiln oil burners — up to 150,000,000 BTU/HR. (1,050 gal/hr.)

rotary dryer oil burners — up to 150,000,000 BTU/HR. (1,050 gal/hr.)

HAUCK high pressure air (and steam) atomizing oil burners

— available in three types (flat flame, conical flame, cylindrical flame).

ACCESSORIES

VALVES

micro-metering oil valves

oil-air ratio regulating valves

air valves (port type, butterfly type)

gas valves (adjustable flow)

gas-air ratio regulating valves

zero pressure regulating gas valves

limiting orifice gas valve

automatic control valve packages

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OIL HEATERS

PACKAGED OIL SYSTEMS including valves, strainers, pumps, heaters

A HAUCK SPECIALTY — railroad car thawing (coal, ore, stone, etc.).

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Combustion by



HAUCK MANUFACTURING CO.

July 30, 1969

Obitts Chemical Co.
P.O. Box 375
Elyria, Ohio

Attention: Mr. Obitts,

Dear Sir,

Enclosed is the photo of the air heater per your request.

If we may be of service, please do not hesitate to contact our office.

Very truly yours,

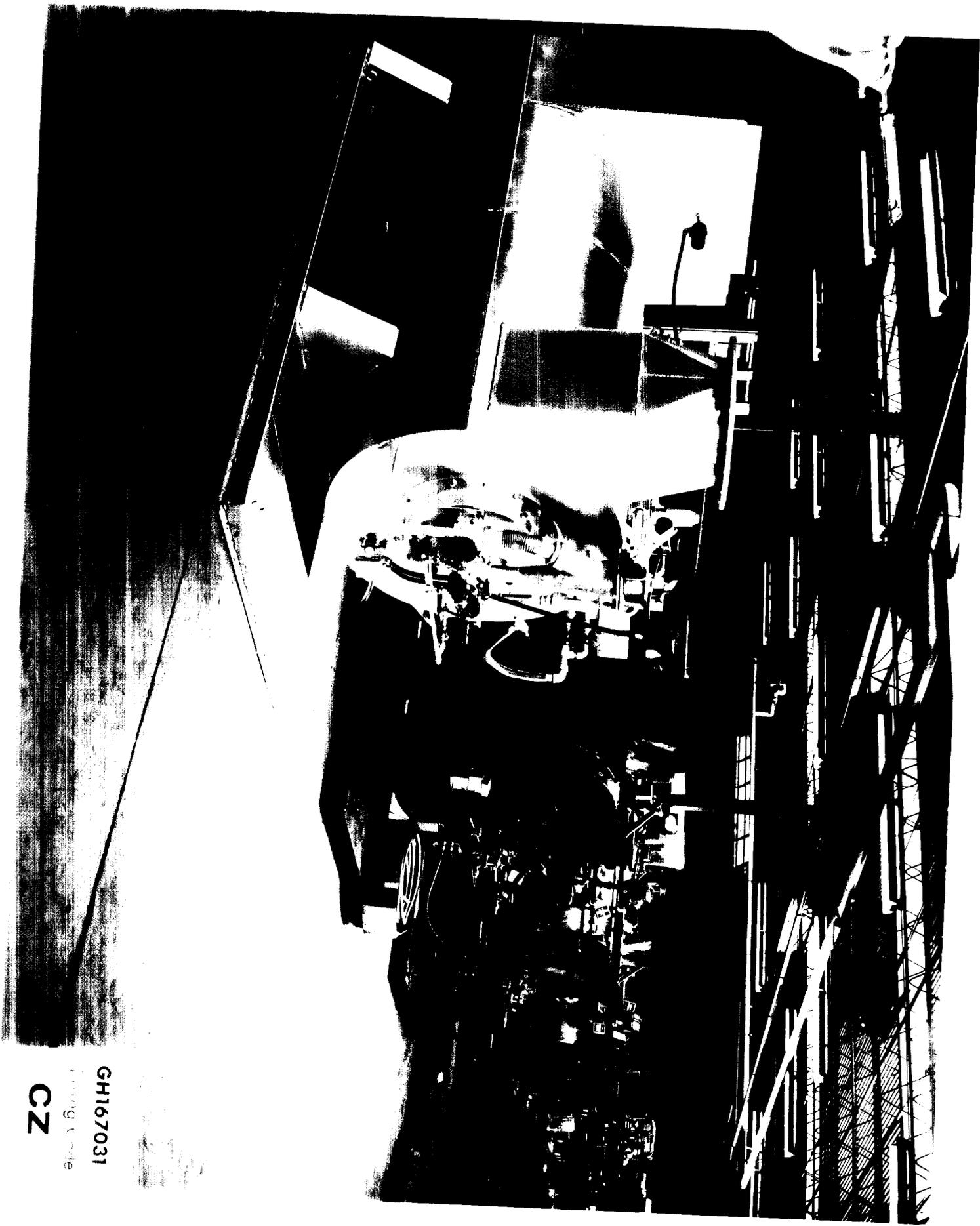
HAUCK MANUFACTURING COMPANY


Dennis J. Martin

DJM/dc
enc: photo

60 YEARS IN COMBUSTION

MAIN OFFICE: P.O. BOX 90, LEBANON, PA. 17042 • PHONE 717-272-3051 • CABLE - OILHAUCK CLEONA



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Combustion by



QUOTATION

TO
Obitts Chemical Company
P.O. Box 375
Elyria, Ohio

DATE May 8, 1969

REF:

PAGE 1 OF 1 PAGES

QUOTATION
NUMBER

C-0035

ITEM NO.	QUANTITY	DESCRIPTION	PRICE
1	1	Hauck combustion system having capacity of 200 GPH liquid pumpable solvent having BTU content of 140,000 BTU/Gal. Consisting of the following items: 786 P burner complete with burner tile and combustion block, accessory mounting bracket, spark ignited pilot, electric scanner adapter, micro valve, manual butterfly valve, pilot solenoid valve, electric gas valve, combustion air blower 25 H.P. for 444/3/60 operation pump assembly mounted on common base and prewired flame safety panel with ignition transformer, flame sensing eye, flame relay, purge timer, motor starter, signal lights, push buttons, fused disconnect switchin cabinet with key locking handle.	\$ 8623.50
Delivery: 6-8 weeks after entry of order			
Respectfully submitted: Hauck Manufacturing Company 3439 West Brainard Road Cleveland, Ohio 44122			

All prices F.O.B. factory unless otherwise noted.
Terms: Net 30 days for approved credit.

Please refer to the above quotation number on all correspondence.
See reverse side for conditions of sale

BY Dennis J. Martin

HAUCK MANUFACTURING CO.

MAIN OFFICE: P. O. BOX 90, LEBANON, PA. 17042 ☉ PHONE 717-272-3051 ☉ CABLE - OILHAUCK CLEONA

CONDITIONS AND TERMS OF SALE

1. **Warranty.** The Company warrants and guarantees to the original purchaser that all the equipment and parts manufactured by the Company and bearing its name plate are free from defects in workmanship and material. Any pieces of such equipment failing in normal service within a reasonable period of time, not exceeding twelve (12) months from the date of delivery, with the exception of all refractory materials, will be promptly replaced without cost to the original purchaser when returned to the factory of the Company. This warranty is given in lieu of all other warranties and guarantees of any kind which, except the implied warranty of title, are expressly negative, whether the same be implied, created by statute or otherwise.
2. **Representations.** Provided only that the equipment manufactured by the Company and sold hereunder shall be properly installed and correctly operated and maintained, the Company shall be fully responsible for all authorized written representations or statements of the capacity, rated service, and otherwise of such equipment. However, the Company cannot and does not accept responsibility for any other recommendations, representations, or statements concerning the equipment to be sold and the potential use of such equipment unless such statement is specifically set forth herein.
3. **Loss of Damage Occasioned by Use of Equipment.** The Company shall not be liable and the purchaser expressly indemnifies and agrees to save the Company harmless with respect to any loss or damage arising through the use by the purchaser or others of any equipment purchased from the Company.
4. **Shipment.** Unless otherwise provided, all shipment dates are approximate only and shipments will be made F.O.B. the factory of the Company at Lebanon, Pennsylvania. In the absence of shipping instructions, the Company shall not be responsible for loss, damage, or delay in transmittal.
5. **Claims for Shortages, Etc.** The purchaser agrees to inspect all merchandise promptly upon receipt and to notify the Company of any claim or shortage, damage, or otherwise, not later than thirty (30) days of such receipt.
6. **Taxes.** All prices shall be subject to the addition of any existing or future tax or governmental charge upon the production, shipment, installation, sale, or use of the equipment described herein to the extent that the Company is or shall be required by law or regulation to collect or pay the same. The amount of such taxes shall be paid immediately upon request or, in lieu thereof, a tax exemption certificate in form satisfactory to the taxing authority presented.
7. **Conditions Beyond the Control of the Company.** Performance of the terms and conditions hereof is necessarily subject to any delay caused by fire, flood, accident, civil disturbance, strike, lockout or other labor dispute, loss damage, or delay of carriers, shortage of fuel, inability to obtain material, war, embargo, or governmental restraint and requisition of whatsoever kind and any other cause beyond the reasonable control of the Company.
8. **Inconsistent Terms Superseded.** The purchase of all or any part of the equipment described shall be only upon the terms set forth herein. All other agreements, representations, or terms of sale, whether oral or in writing, including those made part of a purchaser's order form or other documents, shall be superseded by the provisions hereof unless specifically accepted in writing by an authorized officer of the Company.
9. **Returns.** Equipment may be returned only upon written consent of the Company. Generally such consent will be given within 30 days upon the condition that the buyer assumes all carrier charges, responsibilities for damage in transit, and a restocking charge of 20%.
10. **Service.** This order is for the sale of merchandise only. It does not include any inspection, demonstration, installation or service which can be obtained on request subject to the availability of personnel and payment of prevailing charges plus necessary travel expense.
11. **Seller represents that with respect to the production of the articles and/or the performance of the services covered by this invoice, it has fully complied with sections 6, 7 and 12 of the Fair Labor Standards Act, as amended, and regulations and orders of the United States Department of Labor issued under Section 14 thereof.**
12. **Payment Terms.** Unless otherwise specified, the terms are net thirty days to approved credit accounts. All equipment shall remain the personal property of the Company until payment in full has been made in cash, and the giving and accepting of drafts, notes or trade acceptances to evidence the payment due shall not constitute or be construed as payments so as to pass title until said drafts, notes or trade acceptances are paid in full in cash.
13. **Prices.**
 - (a) Unless otherwise stated, all prices quoted are firm for a period not to exceed sixty (60) days.
 - (b) Orders received without prior and/or prevailing quotation will be billed at current prevailing prices.
 - (c) The minimum net billing charge is \$5.00.
 - (d) The price of items purchased by the Company for resale will at all times be that prevailing at the time of shipment.
 - (e) The Company reserves the right to refuse or cancel any order based on a quotation containing a gross error without financial liability.
 - (f) If shipment is postponed at the request of the Purchaser after manufacture has begun, payment will be due on notice from the Company that the equipment is ready for shipment.
 - (g) Orders accepted with delayed or restricted deliveries are billed at prices in effect 30 days prior to the date each release is made.
 - (h) Pro rata payments shall be expected for partial shipments.
14. **Cancellation.** Cancellations or stop work requests on any order or part thereof must be made in writing and the purchaser agrees to pay the Company at its usual rates for all labor and costs incurred and materials purchased for that order, less the salvage value and/or restocking charges of the completed or partially completed goods.