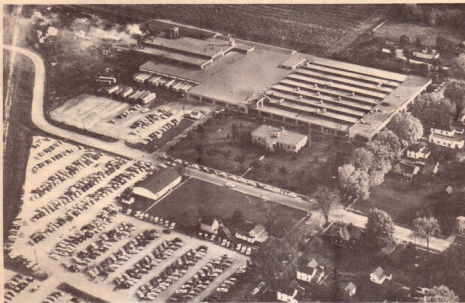




# OPEN HOUSE

MANUFACTURING PLANT



SERVICE DEPARTMENT



CLINTON ENGINES CORPORATION • MAQUOKETA, IOWA

## WELCOME

In behalf of the officers and employees of Clinton Engines Corporation, we want to welcome you. We hope that as a result of your trip through our facilities here you will get to know Clinton better.

In the years that Clinton has operated in Maquoketa, we have come to know the community and its people well. The wholehearted support and interest of our employees has helped Clinton become a major producer of a quality product in a highly competitive field.

The buildings and equipment represent an investment of millions of dollars. It is an example of how our enterprise system works through the mutual support of investors, management and labor. Without these groups working in harmony the company could not grow.

You will see how a Clinton engine is made. First stop will be in our foundry, the only complete one of its kind in the air-cooled engine industry. Here you will see the various steps taken from making a mold from sand and other ingredients to the finished product after molten metal has been poured into these molds.

After leaving the foundry building you will cross into the main plant to see how various parts, which go into the Clinton engine are machined, stamped, formed, refined and finally meet on an assembly line where the completed engine is tested, painted and packed, prior to shipping to our customers.

When you complete your tour and return to the refreshment tent, a snack will be available. We hope that you thoroughly enjoy your tour. For your own safety and that of our employees, observe the safety rules which have been posted.

We are very pleased that you could visit with us.



Martin Hoffinger  
Chairman of the Board  
Chief Executive Officer

# CLINTON ENGINES CORPORATION

## PRESENT OPERATION:

Manufacturing chainsaws, outboards and a complete line of air-cooled internal combustion engines between 2.5 and 10.3 horsepower.

## PLANT POTENTIAL:

Clinton is presently using about forty percent of its manufacturing capacity. Additional capacity is available in all departments as per attached list. Clinton has 200,000 square feet of manufacturing space, 65,000 square feet in the Foundry, 15,000 square feet in Die Cast and 70,000 square feet of Warehousing.

## MANUFACTURING CAPABILITIES:

Our equipment and manufacturing practices equal or better those standards set by the various associations such as American Foundry Associations, Die Casting Institute and others.

## TRANSPORTATION:

Clinton's Maquoketa plant is serviced by several large truck lines and has a railroad siding within five miles of main truck lines of Milwaukee and Burlington railroads.

## UTILITIES:

Served by Iowa Electric and Northern Natural Gas for adequate power and fuel supplies.

## LOCATION:

At Junction of US Highway 61 and Iowa 64.

## CONTACT:

Jack Berkow, Executive Vice President  
or Don L. McDonald, Vice President  
Wm. N. Mayberry, Manager, Customer Service  
VICE PRES

Clinton Engines Corporation  
Corner of Clark & Maple  
Maquoketa, Iowa 52060

ADDENDUM TO FACILITY LISTING OF MACHINERY

W Rex Spot Welder - 20 KVA

PS.

A-Frame 11' Gentry w/2 Ton Yale Chain Hoist

W Acro Spot Welder - 25 KVA

T.R.

Brown & Sharpe Hort. Mill

W Banner Spot Welder - 50 KVA

T.R.

Excello Double End Boring Machine  
( $\frac{1}{4}$ " X 6' Shear)

W Progressive Spot Welder - 50 KVA

T.R.

Gisholt Turret Lathe w/Bar Feed

W Banner Spot Welder - 75 KVA

PS.

Press Brake, 6', 50 Ton

W Siacky Spot Welder - 75 KVA

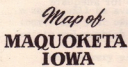
PS.

Press Brake 10', 150 Ton

F. ~~PS.~~ Mubea Ironworker---55 Ton  $\frac{1}{2}$ " Shear, 6' X  $\frac{5}{8}$ " Flats, 1" Punch through  $\frac{5}{8}$ ",  
 $\frac{3}{4}$ " through  $\frac{3}{4}$ " Section, 4" X  $\frac{1}{2}$ " Shear Angles,  
1- $\frac{5}{8}$ " Bar Shear Rounds, 1 $\frac{1}{2}$ " Square Cope Notcher,  
7/16' Plates

## Repl:

1



*Legend.*

RAILROADS	
HIGHWAYS	—
CHURCHES	†
SCHOOLS	x



## HISTORY- CLINTON ENGINES CORPORATION

Clinton Engines Corporation was established in 1946 to manufacture small general purpose air-cooled gasoline engines. Today the Corporation is one of the largest suppliers of these engines which are used principally on power lawnmowers, and for other home, farm and industrial uses. A complete chainsaw line and air-cooled outboards from 3 to 9.9 horsepower are also manufactured at the Maquoketa, Iowa plant.

Clinton engines are sold and serviced by more than 12,000 dealers in the United States plus outlets in 88 foreign countries. Hundreds of original equipment manufacturers use Clinton engines on their power equipment. First operations of the Corporation were in Clinton where 150 employees started producing a 1.5 horsepower engine. Initial production was approximately 225 engines a week.

Within the first year the company employed approximately 1,000 persons. The following year, 1948, two additional models were added to the line, one a 2 horsepower engine and the other a 3 horsepower engine. In 1950 the Corporation purchased a 200,000 square foot manufacturing facility in Maquoketa built five years previous for a manufacturer of farm equipment. Since then the plant has been enlarged to 250,000 square feet. From the original 1.5 horsepower, 4-cycle engine Clinton now makes a total of 16 basic models ranging from 2 1/2 to 10.3 horsepower, of 2-cycle and 4-cycle design, horizontal and vertical crankshaft.

Largest outlet for Clinton engines is the power lawnmower market. It is estimated that about two-thirds of the Corporation's engines go into this field. Among the Corporation's contributions to the industry are— the first mass produced vertical-shaft engines for rotary lawnmowers; first to introduce an automotive-type oil pump in a 4-cycle engine and the "dry type" automotive air filter; first to use the shell-moulded engines; first to use a cast-iron liner, cast as an integral part of the cylinder block, in lightweight aluminum engines; and similar other developments which have made these engines more versatile, easier to start and give longer usable operating life.

In 1952 Clinton introduced its own line of chainsaws. The saws are used in agriculture, home construction and by utility companies for clearing land, landscaping, and cutting timber and pulpwood.

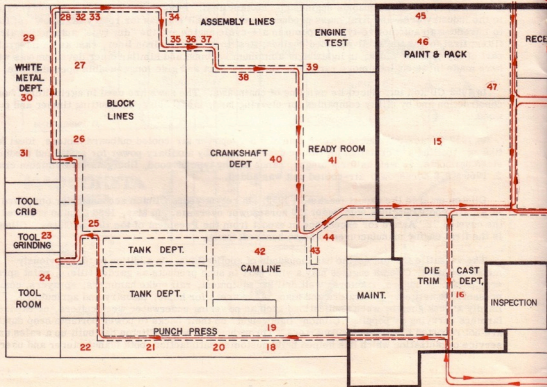
In 1957 Clinton introduced its own line of 5 horsepower air-cooled outboard motors, ideal for fishing, trolling and cruising. It can be used as stand-by auxiliary power for small and medium sized sailboats, as well as for a dinghy, canoe or any type of wood, fiberglass or aluminum craft. In 1966 a 9.9 horsepower air-cooled unit was added.

Clinton entered the export market in 1953. In recent years Clinton accounted for one-third of all air-cooled engines sold under 10 horsepower overseas. In May, 1966 Clinton received the coveted "E" Award for excellence in export from the President of the United States. Clinton is the first engine manufacturer to be so honored.

The versatile Clinton engine has thousands of applications. In addition to the previously mentioned uses, Clinton engines play a vital part in such products as garden tillers, paint sprayers, post-hole augers, tractors, well drilling equipment, rail spike hammers, sprayers, compressors, emergency generators and many other areas for home, industry and agriculture. Hardly a week goes by when applications such as powering underwater weed cutters, or Japanese farmers carrying a "popping" Clinton "lightweight" on their backs to power portable crop dusters, are not reported to Clinton headquarters. Throughout the world Clinton has built up a sales and service organization which has helped build customer satisfaction, both manufacturer and user.

13. GRINDING
14. PAINT LINE
15. STORAGE
16. DIE CAST TRIM
17. DIE CAST
18. PRESS DEPARTMENT
19. SHEARS
20. HYDRAULIC PRESS
21. BLOWER HOUSING LINE
22. PUNCH PRESS
23. TOOL GRINDING ROOM
24. TOOL ROOM

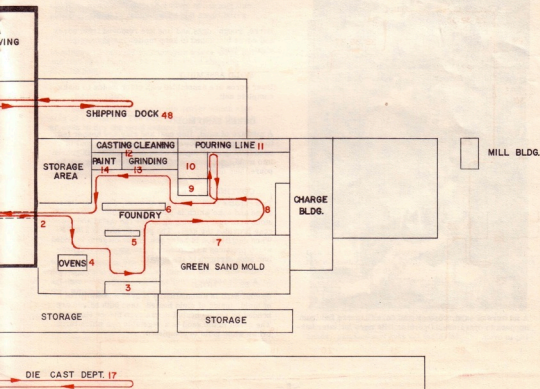
## New Building



# Engines Corporation

- 25. BLOCK LINE
- 26. BEARING PLATE
- 27. FLYWHEEL
- 28. OVERHEAD CONVEYOR
- 29. BASE LINE
- 30. ROD AND PISTON
- 31. MISCELLANEOUS DEPARTMENT
- 32. BLOCK STORAGE
- 33. DEGREASER
- 34. ASSEMBLY LINES
- 35. VALVE GRINDING BOOTH
- 36. SPECIAL ASSEMBLY HOPPERS

- 37. ASSEMBLY LINE
- 38. OUTBOARD ASSEMBLY
- 39. ENGINE TESTING
- 40. CRANK DEPARTMENT
- 41. READY ROOM
- 42. CAM DEPARTMENT
- 43. AIR COMPRESSOR  
(Horizontal)
- 44. MACHINE REBUILDING
- 45. SPRAY PAINT
- 46. OVEN
- 47. PACKING DEPARTMENT
- 48. SHIPPING





## FOUNDRY & MANUFACTURING FACILITIES

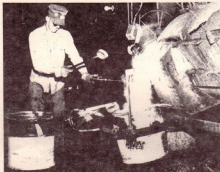
### SHIPPING AREA

Clinton engines move to all parts of the world from the 18 loading platforms. Packaged engines arrive here by conveyor belt from the assembly line and loaded by fork lift trucks.

### RECEIVING DOCK

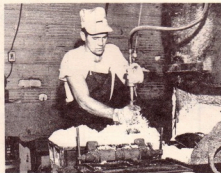
Parts not made in the plant and certain raw materials are received here including lumber and cardboard cartons for shipping finished engines, component parts from the Clinton, Michigan plant, etc.

### FOUNDRY



Engine blocks, flywheels, cams, and crankshafts are made here.

### CORE MAKING

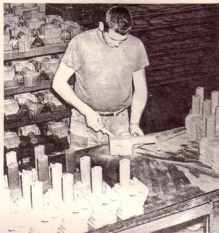


A mixture of sand, core oil and corn flour are fed from hoppers to operators. Operator fills core for later baking in oven.

### OVEN

Molds are heated at 450° F for 2 1/2 hours to remove oil and other moisture to solidify sand mold.

### CORE CLEANING



Burrs, rough edges and fins are removed from cores and cores blackened to keep molten metal from penetrating sand.

### MOLD ASSEMBLY

Inner cores are assembled with outer molds to make complete unit.

### GREEN SAND MOLD

A mixture of sand, fine coal and clay are hopper fed to form upper and lower part of mold. The coal is used to help sand expand when molten metal is poured into mold. An average of 100 complete molds can be poured per hour.

### CONTINUOUS MELTING

Two cupolas melt a mixture of steel, pig iron, limestone and coke which is poured into molds. The limestone acts as a cleaning agent for the metal and the coke provides the heat. The pouring heat is 2750°F. When ductile iron is being poured magnesium is added which produces a temporary flare-up. The magnesium adds strength to the metal.

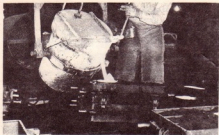
### SHELL MOLD

Special sand is automatically poured on both parts of mold, inside of mold heated, then both halves are bonded by resin, heated in gas oven before storage. The green in the sand is a vegetable dye which turns brown when mold is completed.

#### SHELL MOLD STORAGE

Shell molds are temporarily stored prior to pouring of molten metal.

#### POURING LINE



Dry Sand and shell molds have molten metal poured here. After pouring, molds are cooled on the conveyor line for 45 minutes before storing.

#### CASTING CLEANING

Castings are cleaned by shot blast of air and fine pieces of metal to remove sand and small burrs.

#### GRINDING

Castings are carried by conveyor where large burrs and fins are removed by grinding and chipping before inspection.

#### PAINT LINE

Castings are dipped in an oxide sealer which also acts as a primer. The conveyor line goes through an oven to dry the paint before storing.

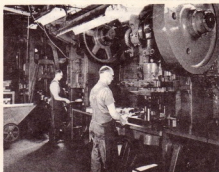
#### STORAGE AREA

Castings and molds are stored until required for production.

#### PUMP HOUSE

Water for cooling the cupolas, spot welding area, degreasers is pumped from this 10,000 gallon-storage tank at the rate of 200 gallons a minute from a well which has 130 feet of water.

#### PRESS DEPARTMENT

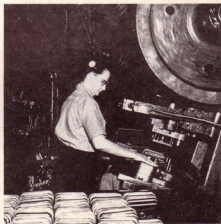


Equipment in this area draws, stamps, pierces, punches and blanks parts for various pieces of equipment used on engine.

#### SHEARS

Cuts various metals to shape for various operations in press department.

#### HYDRAULIC PRESS



Gas tank and blower housing parts are formed on this machine which exerts 250 tons pressure to make draws up to 4 1/8 inches deep.

#### BLOWER HOUSING LINE

Automatically performs up to five operations to form special parts. Coil stock is fed into machine and in successive steps the machine blanks, pierces, stamps, bends, punches and cuts off material.

#### PUNCH PRESS

These four machines complete operations on blower-housing assembly. These machines successively cut out hole for starter assembly, punch out holes for starter, punch four holes for bearing-plate bolts, notch outside for throttle-lever control.

#### TOOL GRINDING ROOM

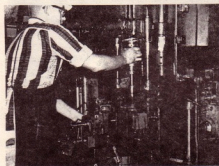


Special equipment for sharpening drills, reamers, taps, gear cutters, automatic machiner cut-off tools, boring tools, etc.

#### TOOL ROOM

New and special tools are built here and older tools rebuilt, also heat treating of cutting tools, and machine work for maintenance department.

#### BLOCK LINE



A battery of 36 machines perform various operations to take raw castings to finished products. One machine alone drills 16 holes at one time.

#### BEARING PLATE

Raw bearing plate castings are completed by machine which faces, turns, bores and presses in and bores crankshaft bushing and oil seal seat, drills three holes and presses oil seal.

#### FLYWHEEL

Machines two types of flywheels--cast iron and aluminum. Turns out completed part by drilling, turning and reaming operations, balances. Spans aluminum crankshaft taper, chare magneto in flywheels, wash and hang on overhead conveyor.

#### OVERHEAD CONVEYOR

This conveyor, more than four-fifths of a mile long, carries finished larger parts to assembly lines. Can carry up to 8,000 parts.

#### BASE LINE

Engine bases for lightweight and Clintalloy engines are milled, tapped, bored, reamed and counter sunk, loaded to conveyor to degreaser and assembly lines.

#### ROD AND PISTON



Rods and pistons are made for all engines. Rods are milled, bored and assembled. Pistons are drilled, turned, snap ringed, rough and finished grinding of piston O. D.

#### MISCELLANEOUS DEPARTMENT

Approximately 400 miscellaneous parts are machined here for engines.

#### BLOCK STORAGE

Special model blocks stored for assembly lines.

#### DEGREASER

Conveyor carried blocks, flywheels and other large parts through degreaser to remove all machining oils, chips, etc.

#### ASSEMBLY LINES

Assembly lines for each of the four-cycle engines made in Maquoketa--Clintalloy, Lightweight, Long Life and Red Horse.

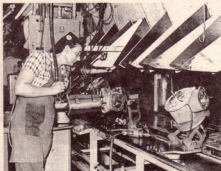
#### VALVE GRINDING BOOTH

Operator removes block from overhead conveyor, grinds, intake and exhaust valve seats, returns block to conveyor.

### SPECIAL ASSEMBLY HOPPERS

Faster operations in assembly made possible by these special bins which hold component parts for each operation on engine.

### ASSEMBLY LINE



At individual stations various parts are assembled to engine block which finishes product ready to run at end of line.

Complete assembly can be done in approximately three minutes.

- Installing valves in engine
- Installing crankshaft in engine
- Installing piston and rod in engine
- Installing carburetor
- Installing cylinder head
- Installing flywheel
- Installing blower housing and gas tank
- Installing engine base.

### READY ROOM

Completed machined parts and sub assemblies are kept ready for engine assembly.

### CRANK DEPARTMENT

On your right until you leave the building is the crank department. 190 machines take raw castings to finished part for assembly.

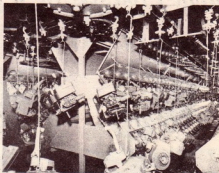
### ENGINE TESTING

Every engine is test run and carburetor, governor and idling speed are checked and adjusted. After checking, gas and oil are drained, engines are degreased before painting.

### SPRAY PAINT

Water booths collect paint spray so two different colors may be used at same time. More than 48 different shades of colors are used.

### OVEN



Paint is baked on engines by temperatures ranging from 170° F. to 240° F. Reflectors behind bulbs are gold plated. Engines are rotated through ovens at the rate of eight feet per minute.

### PACKING

Engines are given final inspection, mounted on plywood bases and packed in special cartons which are moved by overhead conveyor to shipping department.

### AUTOMATIC SCREW MACHINES

Eight machines make small parts for engines such as screws, nuts, bolts, shafts, tappets, wrist pins, etc.

### AIR COMPRESSOR

(Horizontal)

One of two compressors which pump air for production tools such as clamps, gauges, and machines.

### MACHINE REBUILDING

All machines are regularly overhauled and rebuilt to keep them in top operating condition.

### SCRAP DOCK

Metal shavings and chips are salvaged for resale or remelting.

### TRUCK REPAIR

Repair shop for mobile equipment used for inplant transportation of finished engines and parts.

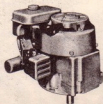
### SAMPLE DEPARTMENT

Special engines made to customer specifications are assembled prior to testing by customer.

### TEST AREA

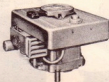
Random engines are selected from the production line for tests to make sure the engines are to specifications.

# Clinton Products In World-Wide Use



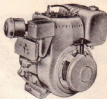
**SERIES 415**

An engine of 3.5 horsepower. Made of an aluminum alloy for use on rotary lawn mowers.



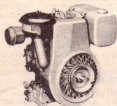
**SERIES 407**

Made of a cast iron alloy, it delivers 3.5 horsepower. Used on tillers and riding mowers.



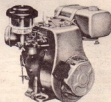
**SERIES 412**

Designed for use on tractors, this cast iron alloy engine provides 6 horsepower.



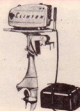
**SERIES 420**

A 9.6 horsepower cast iron engine for heavy duty industrial use, such as tractors and conveyors.



**SERIES 498**

A cast iron alloy engine of 4.5 horsepower for use on pumps, generators and tillers.



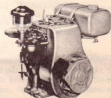
**CLINTON OUTBOARD MOTORS**

Ideal for fishing, the J-9 Clinton Outboard provides 5 horsepower.



**CLINTON CHAINSAWS**

A wide selection of chainsaws, 4 and 6 horsepower, for farm, home and commercial use.



**SERIES 494**

An engine of 3.5 horsepower, it is made of a cast iron alloy. For pumps, tillers and tractors.

Clinton's basic line of small, air-cooled gasoline engines for 1967-1968 comprise 17 basic models, ranging from 2½ to 10.3 horsepower, with two and four cycle as well as aluminum and iron blocks. The company produces one of the most complete lines in the industry in its horsepower range.

## CLINTON ENGINES CORPORATION

MAQUOKETA, IOWA



# Welcome to Clinton Engines Corporation

1. RECEIVING DOCK
2. FOUNDRY
3. CORE MAKING
4. OVEN
5. CORE CLEANING
6. MOLD ASSEMBLY
7. GREEN SAND MOLD
8. CONTINUOUS MELTING
9. SHELL MOLD
10. SHELL MOLD STORAGE
11. POURING LINE
12. CASTING CLEANING

13. GRINDING
14. PAINT LINE
15. STORAGE
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41. READY ROOM
42. CAM DEPARTMENT
43. AIR COMPRESSOR (Horizontal)
44. MACHINE REBUILDING
45. SPRAY PAINT
46. OVEN
47. PACKING DEPARTMENT
48. SHIPPING

## New Building

