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CARNEGIE STEEL COMPANY

PITTSBURGH, PENNSYLVANIA

U. S. A.



# CARNEGIE STEEL COMPANY

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GENERAL STATISTICS

AND

SPECIAL TREATISE

ON

HOMESTEAD STEEL WORKS

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PITTSBURGH, PENNSYLVANIA

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CARNEGIE STEEL COMPANY  
PITTSBURGH, PA.

First Edition, May, 1912

## CARNEGIE STEEL COMPANY

## GENERAL STATISTICS

Acreage covered by manufacturing properties and accessories . . . . .	2,358
Number of employes . . . . .	37,000
Average monthly pay roll . . . . .	\$2,275,000
Gross tons of ore consumed per 24 hour day . . . . .	40,000
Gross tons of coke consumed per 24 hour day . . . . .	19,500
Gross tons of coal consumed per 24 hour day . . . . .	8,000
Gross tons of limestone consumed per 24 hour day . . . . .	10,000
Cubic feet of natural gas consumed per 24 hour day . . . . .	106,000,000
Miles of Standard Gauge Railroad Track . . . . .	260
Steam horse power produced per 24 hour day . . . . .	7,250,000
Electric horse power produced per 24 hour day . . . . .	850,000
Total production in gross tons for 24 hour day . . . . .	95,000
Gross tons of finished materials produced per 24 hour day . . . . .	20,000
Gross tons of shipping capacity per 24 hour day . . . . .	22,000

## CARNEGIE STEEL COMPANY

### THEORETICAL CAPACITY IN GROSS TONS PER YEAR OF VARIOUS PRODUCTS

#### Blast Furnaces:

Pig Iron . . . . .	8,381,000
Spiegeleisen, Ferromanganese, etc. . . . .	108,000
Bessemer Ingots . . . . .	3,930,000
Basic Open Hearth Ingots . . . . .	5,058,000
Blooms, Billets and Slabs . . . . .	×6,980,000
Flue Dust Briquettes . . . . .	120,000
By-Product Coke . . . . .	500,000

×Tonnage of Blooms, Billets and Slabs is rolled in the various finishing mills to produce 6,760,000 G. T. of finished material.

## CARNEGIE STEEL COMPANY

## THEORETICAL CAPACITY IN GROSS TONS PER YEAR OF FINISHED MATERIAL

Sheet and Tin Bars . . . . .	1,640,000
Universal and Sheared Plates . . . . .	1,220,000
Beams, Channels, Angles, etc. . . . .	874,000
Rails . . . . .	868,000
Axles . . . . .	180,000
Steel Ties . . . . .	43,000
Steel Mine Timbers . . . . .	1,000
Steel Sheet Piling . . . . .	15,000
Splice Bars . . . . .	104,000
Slack Barrel and Keg Hoops . . . . .	18,000
Steel Wheels . . . . .	112,500
Twisted Bars . . . . .	45,000
Merchant Bars, Hoops, Cotton Ties, etc. . . . .	1,450,000
Tapered Spring Steel . . . . .	3,000
Ingot Moulds, Stools, Castings and Rolls . . . . .	175,000
Armor Plate . . . . .	12,000
Total . . . . .	6,760,500



CARNEGIE STEEL COMPANY

PLANTS

Duquesne Steel Works and Furnaces, South Duquesne, Pa.  
Edgar Thomson Steel Works and Furnaces, Bessemer, Pa.  
Homestead Steel Works, Munhall, Pa.  
Carrie Furnaces, Rankin, Pa.  
Edith Furnaces, Pittsburgh, Pa.  
Isabella Furnaces, Etna, Pa.  
Lucy Furnaces, Pittsburgh, Pa.  
Neville Furnace, Neville Island, Pa.  
Clark Mills, Pittsburgh, Pa.  
McCutcheon Mills, Pittsburgh, Pa.  
Painter Mills, Pittsburgh, Pa.  
Lower Union Mills, Pittsburgh, Pa.  
Upper Union Mills, Pittsburgh, Pa.  
Howard Axle Works, Homestead, Pa.  
Schoen Steel Wheel Works, McKees Rocks, Pa.  
Bellaire Steel Works and Furnaces, Bellaire, O.  
Clairton Steel Works and Furnaces, Clairton, Pa.



CARNEGIE STEEL COMPANY

PLANTS—Continued

Columbus Steel Works and Furnaces, Columbus, O.  
Mingo Steel Works and Furnaces, Mingo Junction, O.  
New Castle Steel Works and Furnaces, New Castle, Pa.  
Ohio Steel Works and Furnaces, Youngstown, O.  
Sharon Steel Works and Furnace, Sharon, Pa.  
South Sharon Steel Works and Furnaces, South Sharon, Pa.  
Greenville Mills, Greenville, Pa.  
Monessen Mills, Monessen, Pa.  
Lower Union Mills, Youngstown, O.  
Upper Union Mills, Youngstown, O.  
Niles Furnace, Niles, O.  
Steubenville Furnace, Steubenville, O.  
Zanesville Furnace, Zanesville, O.  
Waverly Warehouses, Newark, N. J.  
Pittsburgh Warehouse, Pittsburgh, Pa.  
Cleveland Warehouse, Cleveland, O.  
Baltimore Warehouse, Baltimore, Md.

## PRODUCTS

Pig Iron and Furnace Products

Ferromanganese and Spiegeleisen

Open Hearth and Bessemer Steel, Alloy Steels

Ingots, Billets, Blooms, Slabs and Sheet Bars

Armor and Vault Plate

Plates for Bridges, Ships, Tanks, Boilers and Cars

Rolled Structural Shapes

Beams, Channels, Angles, Tees and Zees

Steel Mine Timbers and Steel Sheet Piling

Bar Mill Products

Concrete Reinforcement Bars, Agricultural Shapes

Miscellaneous and Special Shapes

Merchant Bars

## PRODUCTS

Squares, Rounds, Half Rounds, Hexagons, Ovals, Half Ovals

Flats, Skelp, Bands, Hoops, Cotton Ties

Hoops for Slack Barrel Cooperage

Tire and Vehicle Spring Steel

Rails, Track Material

Rails and Splice Bars, Duquesne Rail Joints

Track Accessories

Steel Cross Ties

Forgings

Axles and Wheels

Connecting Rods, Crank Shafts and Arch Bars

Oil Derricks and Drilling Rigs

Steel Gear Blanks and Industrial Wheels

# CARNEGIE STEEL COMPANY

## GENERAL OFFICES

PITTSBURGH, Carnegie Building

## DISTRICT OFFICES

BIRMINGHAM, Brown-Marx Building  
BOSTON, 120 Franklin Street  
BUFFALO, Ellicott Square Building  
CHICAGO, Commerical National Bank Building  
CINCINNATI, Union Trust Building  
CLEVELAND, Rockefeller Building  
DENVER, First National Bank Building

DETROIT, Ford Building  
NEW ORLEANS, Maison Blanche  
NEW YORK, Hudson Terminal  
PHILADELPHIA, Pennsylvania Building  
PITTSBURGH, Carnegie Building  
ST. LOUIS, Third National Bank Building  
ST. PAUL, Pioneer Building

## PACIFIC COAST REPRESENTATIVES

UNITED STATES STEEL PRODUCTS COMPANY, PACIFIC COAST DEPARTMENT

LOS ANGELES, Jackson Street and Central Avenue  
PORTLAND, Selling Building

SAN FRANCISCO, Rialto Building  
SEATTLE, 4th Avenue South and Connecticut Avenue

## EXPORT REPRESENTATIVES

### UNITED STATES STEEL PRODUCTS COMPANY

#### GENERAL OFFICES

NEW YORK, Hudson Terminal

#### DISTRICT OFFICES

ANTWERP  
BATAVIA  
BOMBAY  
BRUSSELS  
BUENOS AIRES  
CAPETOWN

JOHANNESBURG  
LIMA  
LONDON  
MEXICO CITY  
MONTREAL  
RIO DE JANEIRO

SHANGHAI  
SYDNEY  
TORONTO  
VALPARAISO  
VANCOUVER  
WINNIPEG

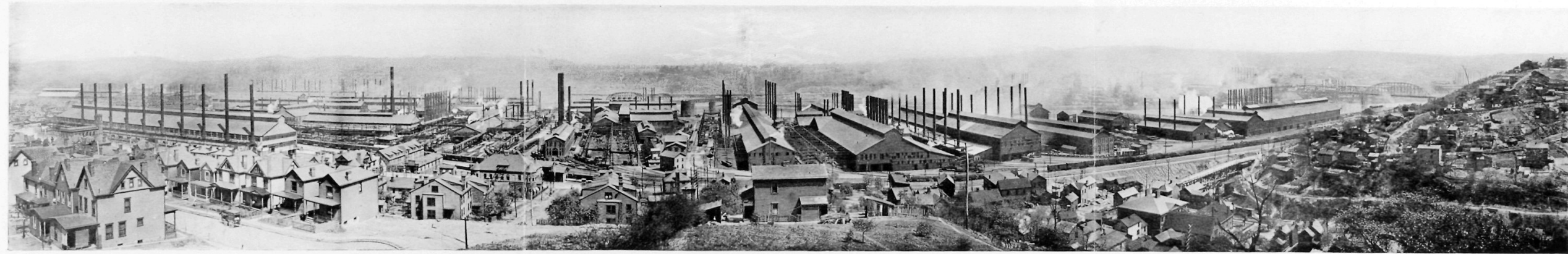
CARNEGIE STEEL COMPANY  
HOMESTEAD STEEL WORKS  
MUNHALL, PENNSYLVANIA



OFFICE

All "Visiting Passes" for Homestead Steel Works are issued at General Offices of the Carnegie Steel Company,  
1116 Carnegie Building, Pittsburgh, Pa.

GENERAL VIEW OF HOMESTEAD STEEL WORKS



GENERAL VIEW OF HOMESTEAD STEEL WORKS





The Homestead Steel Works is situated on the south bank of the Monongahela River at Munhall, Pennsylvania, eight miles from Pittsburgh.

The original plant was built by the Pittsburgh Bessemer Steel Company in 1880-81 and operated by them until its sale, in 1883, to Carnegie, Phipps & Company, when the plant was rebuilt and enlarged.

On July 1, 1892, the Carnegie Steel Company, Limited, took possession, and eight years later the present name of the Company was adopted.

Additional departments have been added from time to time by the Carnegie Steel Company until it is now the largest steel works in the United States.

The plant covers 123.8 acres.

## STATISTICS OF OPERATION

(Including Carrie Furnaces, Howard Axle Works and Schoen Steel Wheel Works)

Number of employees . . . . .	10,000
Number of cars handled per day . . . . .	1,630
Miles of car length . . . . .	12
Tons produced per day . . . . .	23,192
Tons produced per minute . . . . .	16
Tons produced per day per man . . . . .	2.4
Tons of finished product produced per day . . . . .	5,750
Tons Armor Department produces per day . . . . .	30
Tons of ore consumed per day . . . . .	5,818
Tons of coal consumed per day . . . . .	2,014
Cubic feet of natural gas consumed per day . . . . .	62,471,934
Miles of railroad track . . . . .	120
Length of stacks, in miles . . . . .	6.92
Acreage . . . . .	279.5
Acres under roof . . . . .	59.7
Steam horse power produced per day . . . . .	1,212,720
Electric horse power produced per day . . . . .	341,683

## STATISTICS OF PRODUCTION

The annual capacity, in gross tons, of Homestead Steel Works of finished and semi-finished products is about as follows:

Pig iron . . . . .	980,000
Ingots . . . . .	2,725,000
Universal plates . . . . .	338,000
Sheared plates . . . . .	550,000
Beams, channels, angles, piling, etc. . . . .	434,500
Steel railroad ties . . . . .	43,000
Axles . . . . .	180,000
Steel wheels, Schoen and Slick . . . . .	112,500
Small angles, rounds, squares, flats, etc. . . . .	34,000
Armor plate . . . . .	12,000
Castings . . . . .	4,500

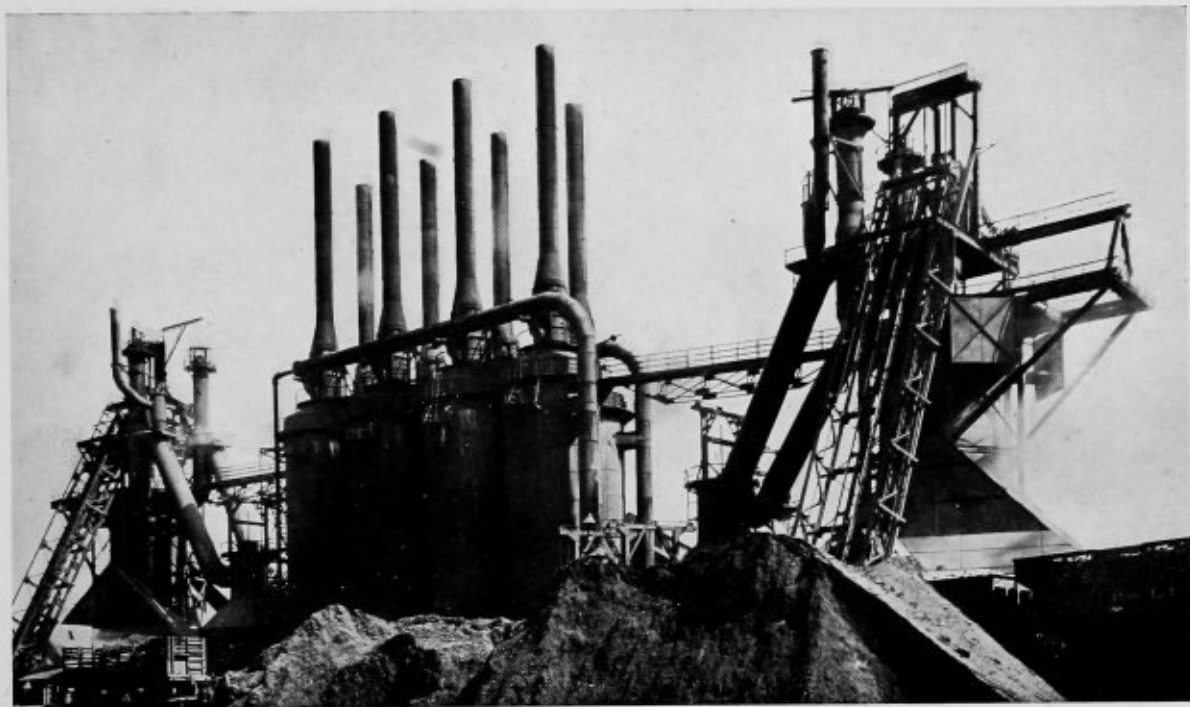
## THE BLAST FURNACE DEPARTMENT

This department of the Homestead Steel Works is located across the Monongahela River and operated under the name of Carrie Furnaces. This department consists of seven modern furnaces with all the necessary equipment to make it one of the most up-to-date blast furnace plants in the world. The Furnace Department is connected with the main plant by a hot metal bridge, built especially for the purpose of carrying the molten pig iron direct to the open hearth steel making departments in the main plant.

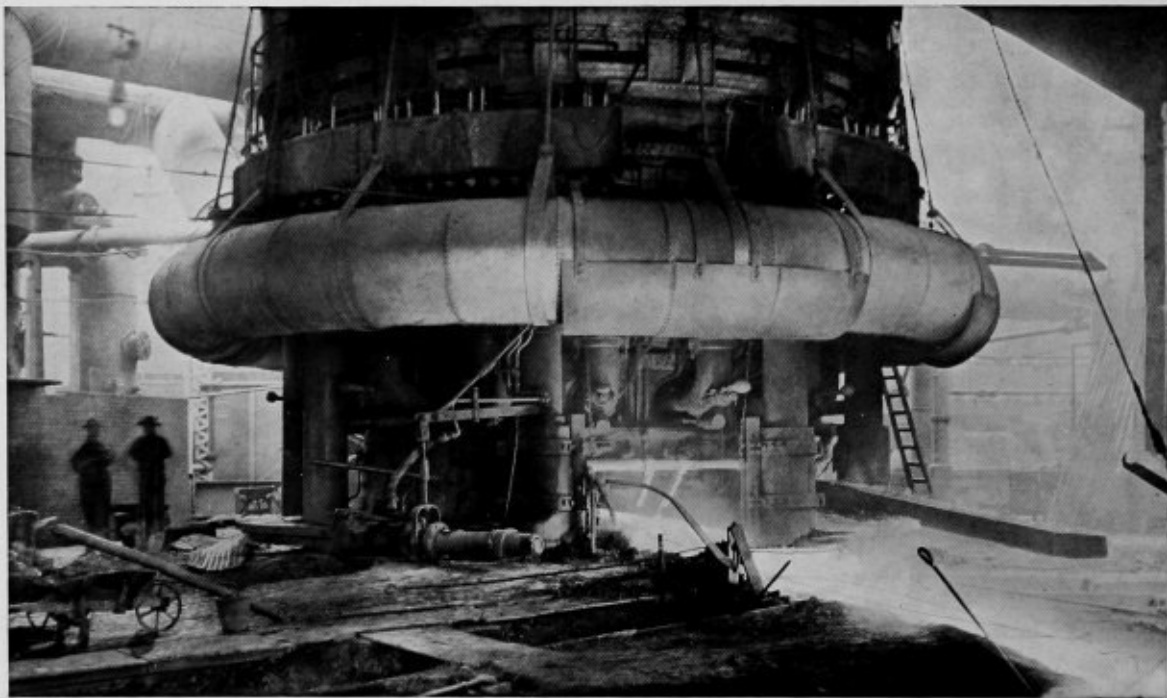
At this plant there are nine gas engines operated by the waste gas from the blast furnaces; five of these engines and one steam turbine operate A. C. generators that produce electric power for the use of the Homestead Steel Works and the Universal Portland Cement Plant.

There are also six steam engines driving D. C. generators.

Total power generated—15,200 K. W.

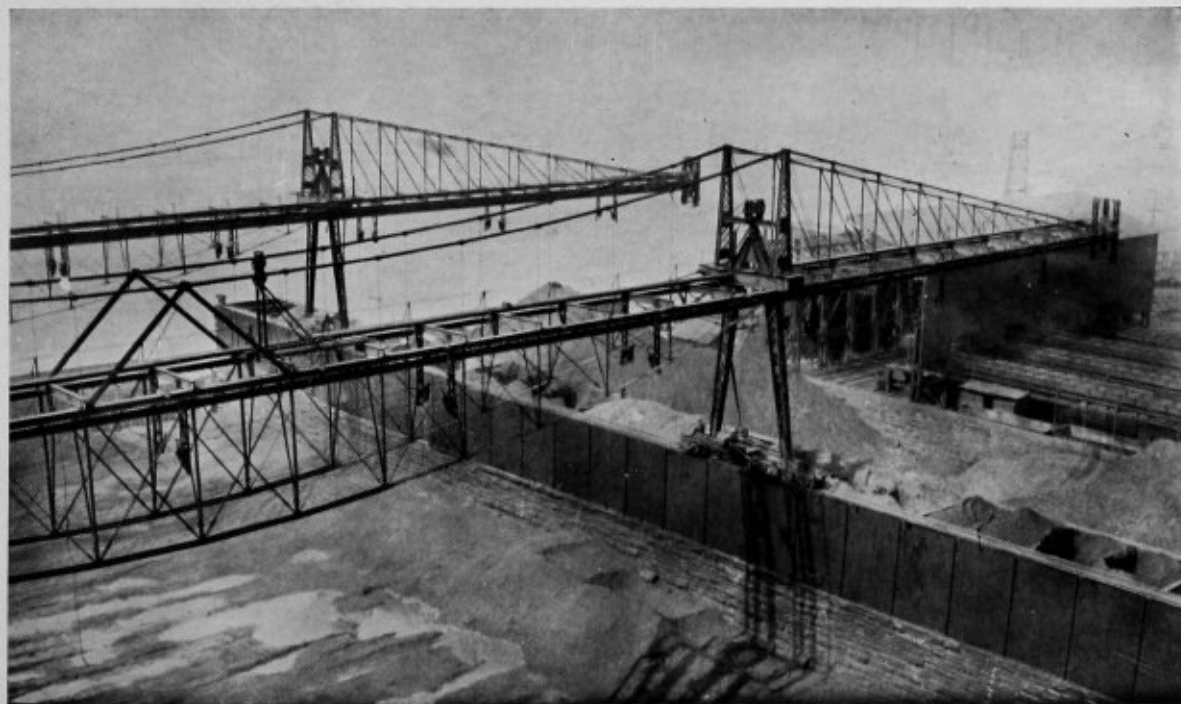


CARRIE BLAST FURNACES NOS. 6 AND 7



TAPPING—CARRIE FURNACES





ORE HANDLING PLANT—CARRIE FURNACES



MOLTEN PIG IRON RUNNING INTO LADLE

## ELECTRIC POWER STATION

The equipment of the Homestead Steel Works Power Station consists of:

Three D. C. generators of 800 K. W. each, driven by three tandem compound engines 27 & 46x42".

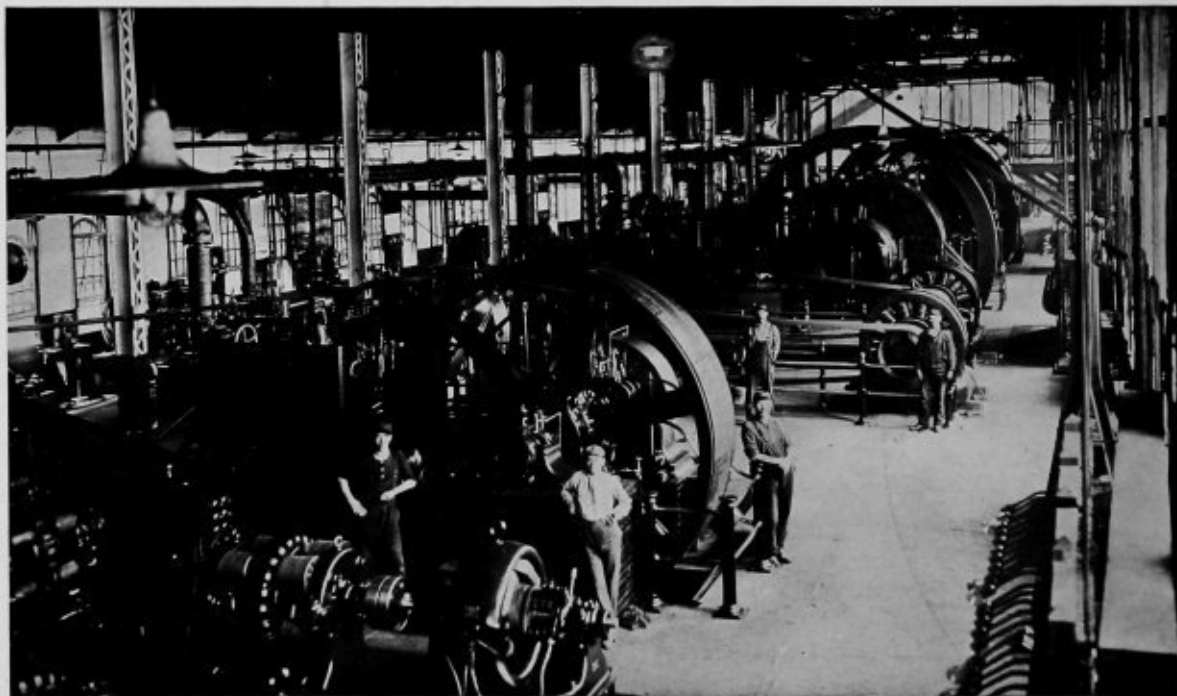
Two D. C. generators of 375 K. W. each, driven by two simple 24x42" engines.

Two D. C. generators of 150 K. W. each, driven by one simple engine 20x21" and one simple engine 19x20".

Two 500 K. W. motor generators. These two generators are driven by A. C. power from Carrie Furnaces Power Plant or from the Duquesne Power Plant, both these power plants being connected with Homestead Steel Works.

Seven arc machines, driven by a 20x36" simple engine.

Two arc machines, driven by two 100 H. P. motors.



ELECTRIC POWER STATION—HOMESTEAD STEEL WORKS

## THE OPEN HEARTH DEPARTMENT

This department consists of the following:

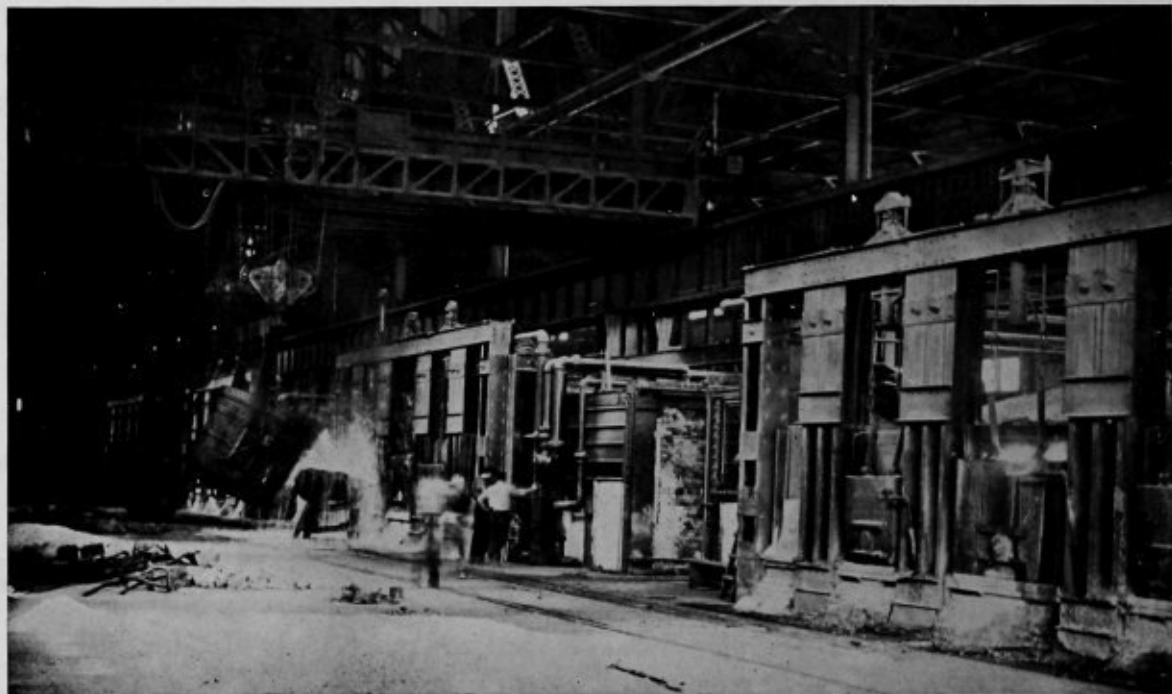
No. 1 Open Hearth, 10 Furnaces  $\left\{ \begin{array}{l} 7 \text{ 38-ton} \\ 2 \text{ 30-ton} \\ 1 \text{ 25-ton} \end{array} \right\}$  Natural Gas.

No. 2 Open Hearth, 17 Furnaces  $\left\{ \begin{array}{l} 8 \text{ 38-ton} \\ 4 \text{ 50-ton} \\ 4 \text{ 40-ton} \\ 1 \text{ 15-ton, Electricity or Gas.} \end{array} \right\}$

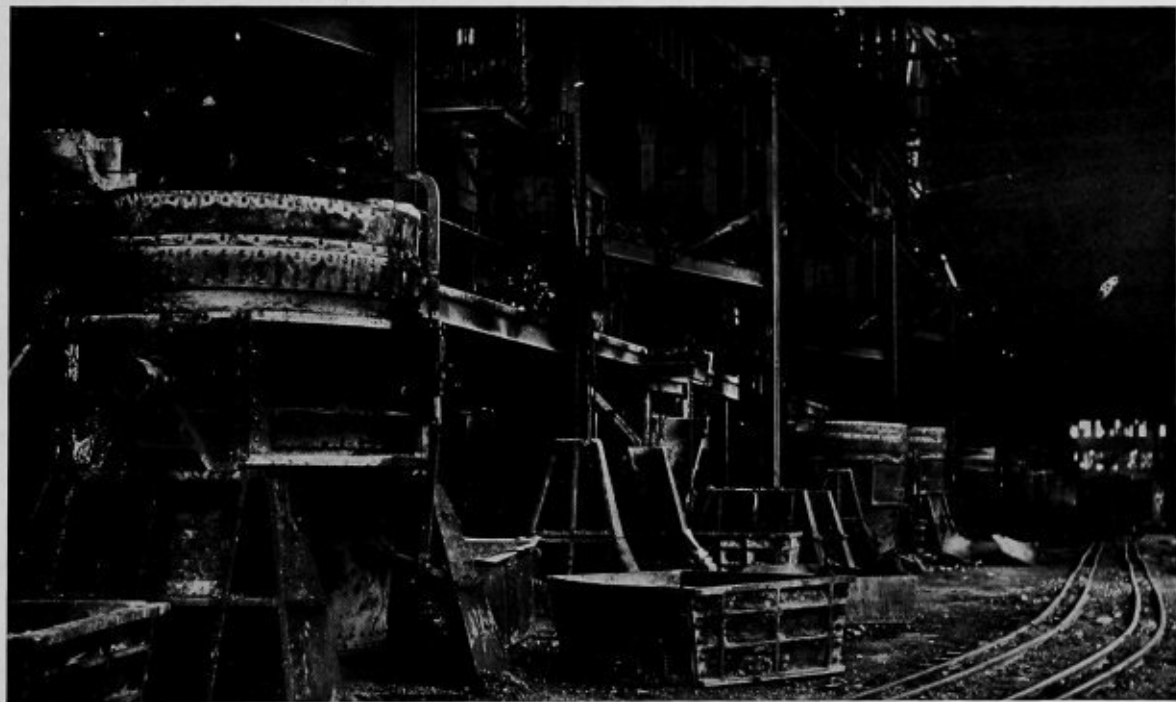
No. 3 Open Hearth, 24 Furnaces, all 50-ton, Natural Gas.

No. 4 Open Hearth, 14 Furnaces  $\left\{ \begin{array}{l} 10 \text{ 60-ton} \\ 4 \text{ 75-ton} \end{array} \right\}$  Natural Gas.

Total, 65 Furnaces, 50 tons per heat average capacity.



CHARGING SIDE OPEN HEARTH FURNACES—CHARGING HOT METAL



TAPPING SIDE OPEN HEARTH FURNACES—LADLES IN POSITION





FILLING INGOT MOULDS AT OPEN HEARTH FURNACES

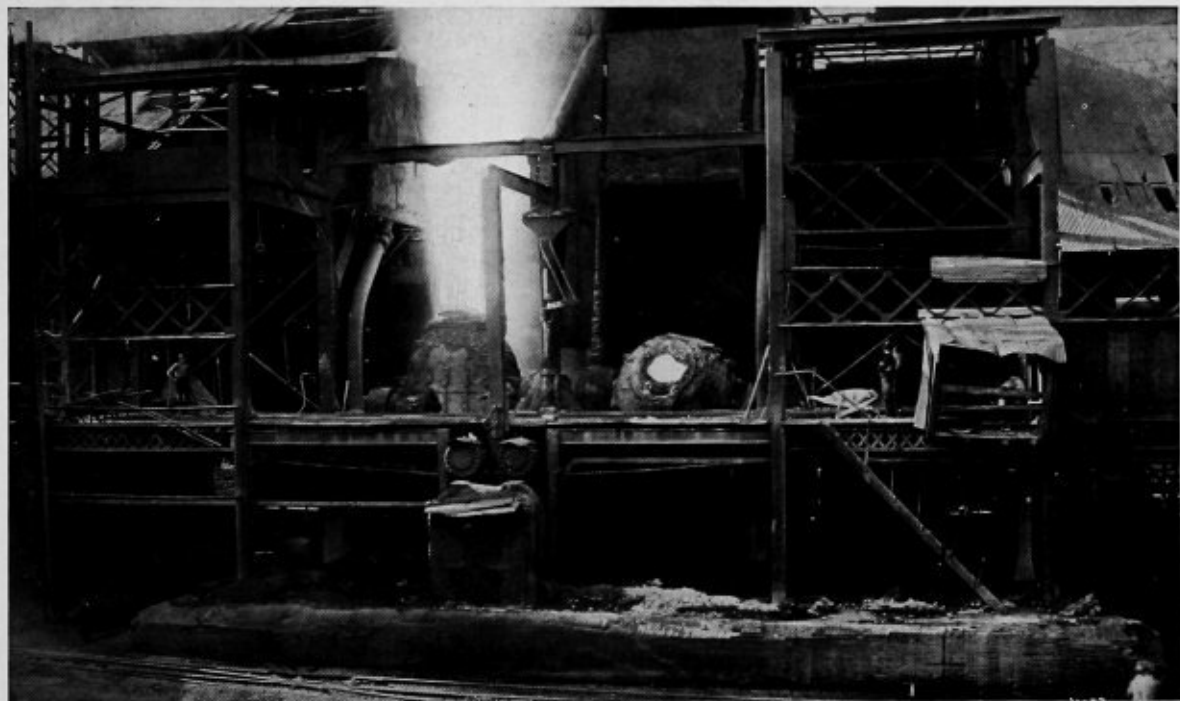


ELECTRIC STRIPPER—OPEN HEARTH NO. 4

## THE BESSEMER DEPARTMENT

This department consists of the following:

- 5 Iron cupolas, 10 feet in diameter by 30 feet in height.
- 2 Converting vessels, nominal capacity 10 tons each.



BLOWING AND POURING—BESSEMER DEPARTMENT

## BLOOMING AND SLABBING MILLS

28" and 38" Blooming Mills roll blooms 4x4" or over. These mills are served by four soaking pits of three holes and four of four holes respectively and are driven by a 28x48" and a 50x72" reversing engines respectively.

40" Blooming Mill rolls blooms for the 35" Structural Mill. It is served by four soaking pits of five holes each, two ingots per hole, and driven by a 55x60" reversing engine.

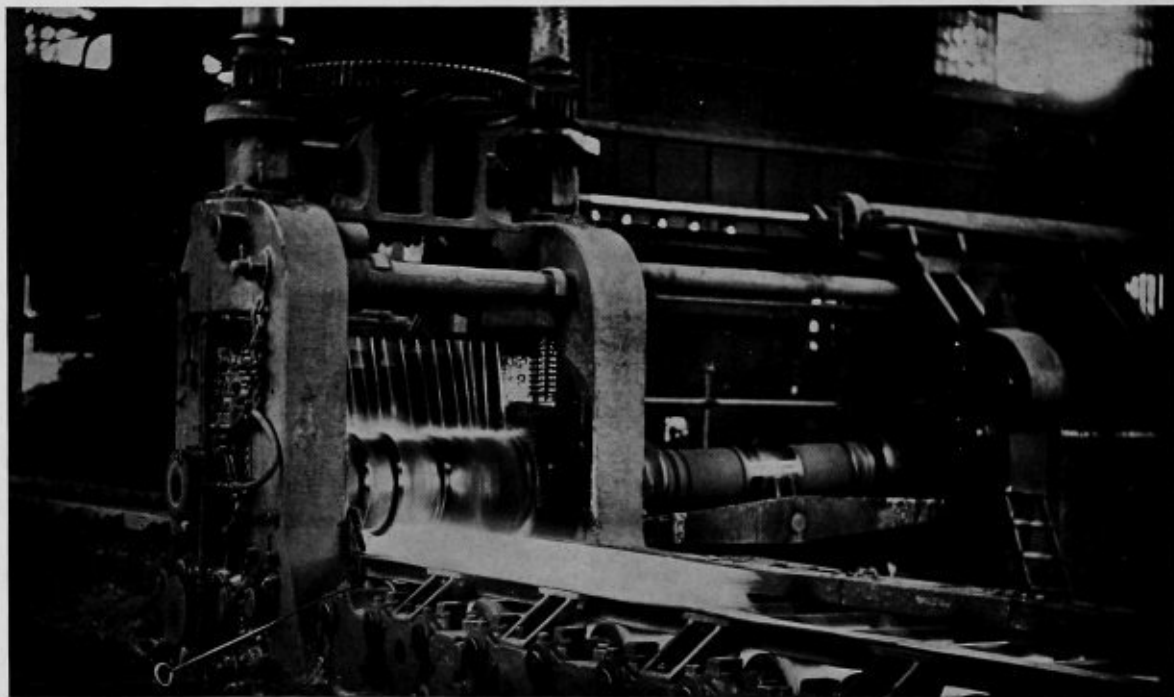
33" Blooming Mill rolls blooms for the 23" and 33" Structural Mills. It is served by two soaking pits of five holes each, four ingots per hole, and is driven by a 46x60" simple engine.

32" Slabbing Mill rolls slabs for the 140", 84" and 72" Sheared Plate Mills. It is served by six soaking pits, one of three, one of four, and four of five holes each, two ingots per hole, and is driven by one 30x54" and one 40x54" reversing engine.

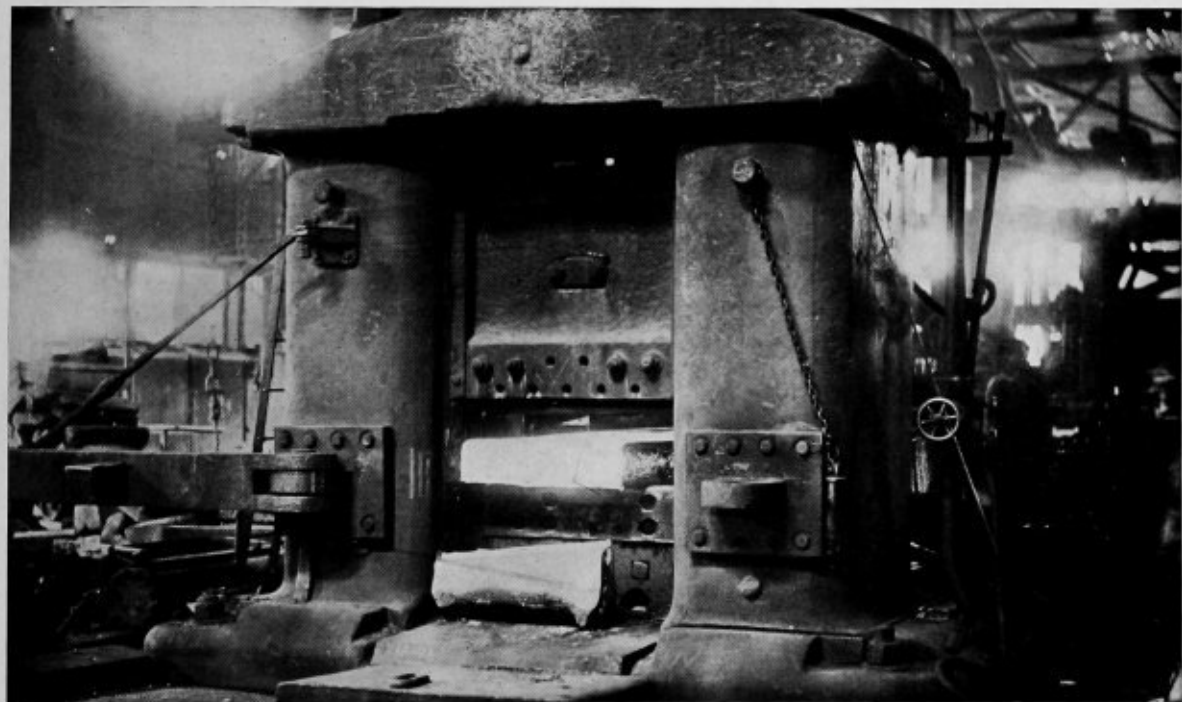
30" Slabbing Mill rolls slabs for the 128" Sheared Plate Mill and the 42" Universal Plate Mill. It is served by six soaking pits of four holes each, two ingots per hole and is driven by one 46x60" and one 28x48" reversing engine.



SOAKING PITS—INGOT BEING LOWERED INTO PIT



38" BLOOMING MILL



SHEARING SLABS—32" SLABBING MILL

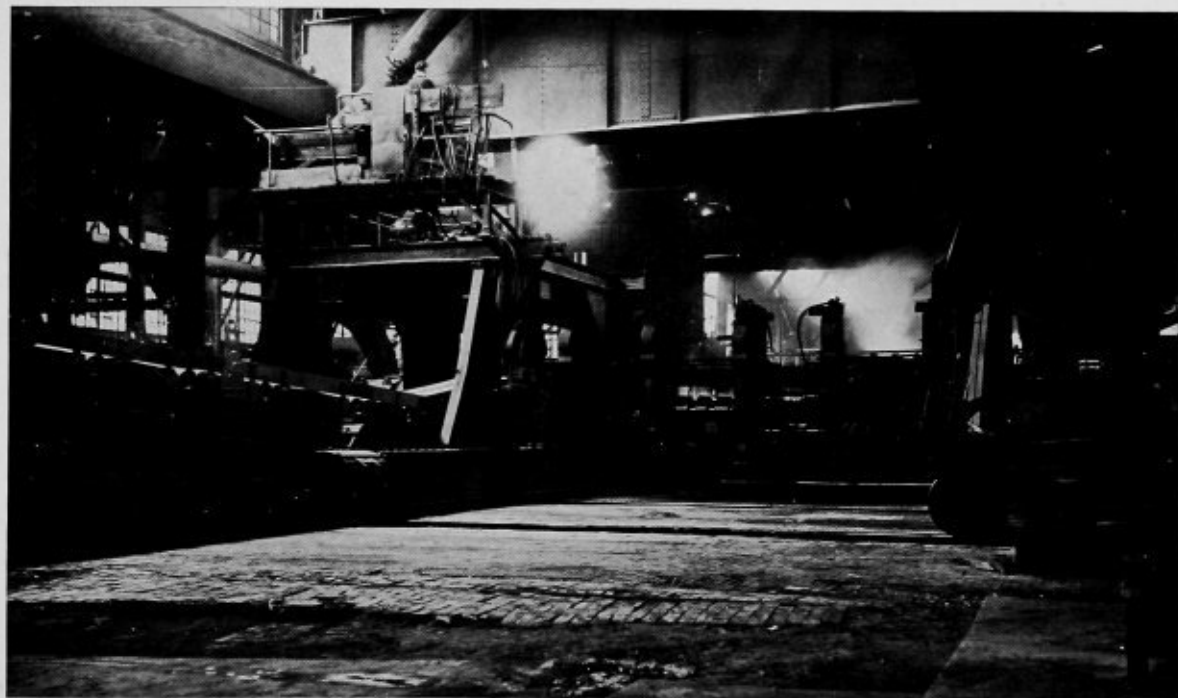


## STRUCTURAL MILLS

35" Structural Mill rolls 12" to 27" beams, channels and angles from blooms furnished by the 40" Blooming Mill, has one reheating furnace for emergencies, but rolls most blooms direct. It is driven by a tandem compound 52 & 78x60" engine.

33" Structural Mill rolls beams, channels and angles from blooms furnished by the 33" Blooming Mill, has two heating furnaces and is driven by a 54x66" simple engine.

23" Structural Mill rolls beams, channels and angles from blooms furnished by the 33" Blooming Mill, has three heating furnaces and is driven by a 42x48" simple engine.



35" STRUCTURAL MILL



35" BEAM YARD

## SHEARED PLATE MILLS

140" Sheared Plate Mill rolls plates from slabs furnished by the 32" Slabbing Mill. It is served by six heating furnaces and is driven by a 42 & 56x60" tandem compound engine.

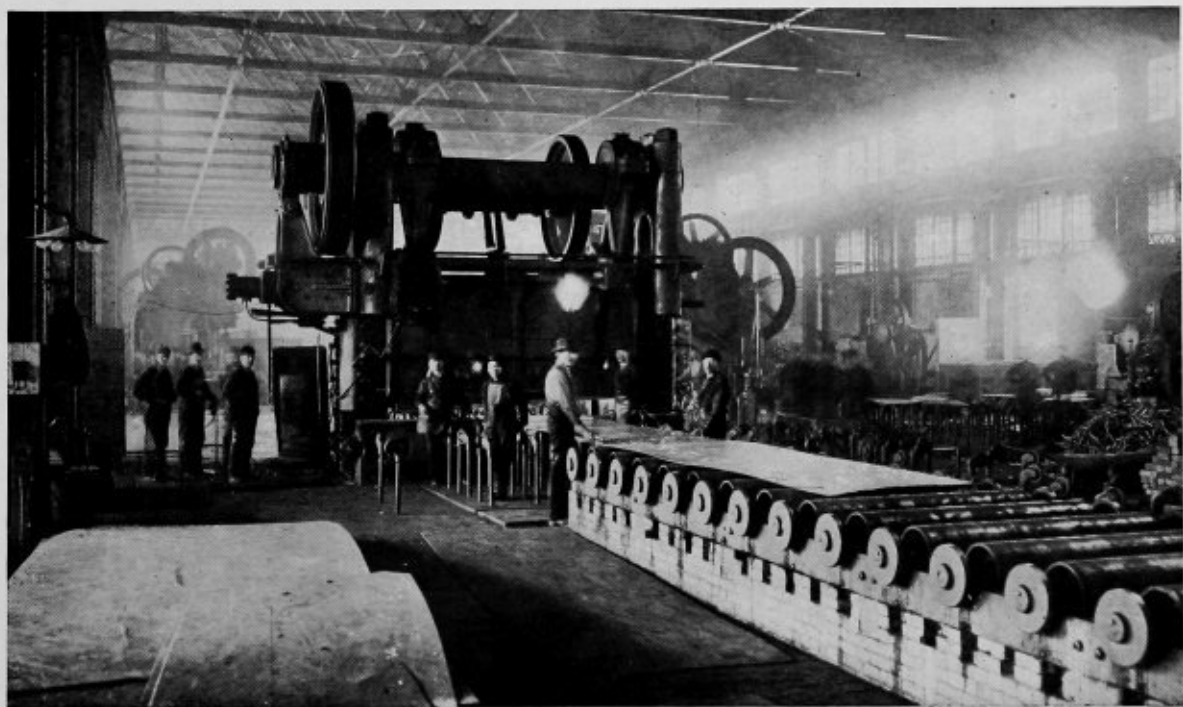
128" Sheared Plate Mill rolls plates from slabs furnished by the 30" Slabbing Mill. It is served by nine heating furnaces, which also serve the 42" Universal Plate Mill, and is driven by a 46x60" simple engine.

84" Sheared Plate Mill rolls plates from slabs furnished by the 32" Slabbing Mill. It is served by six heating furnaces and is driven by a 34 & 54x60" tandem compound engine.

72" Sheared Plate Mill rolls plates from slabs furnished by the 32" Slabbing Mill. It is served by four heating furnaces and is driven by a 32 & 52x60" tandem compound engine.



140" SHEARED PLATE MILL

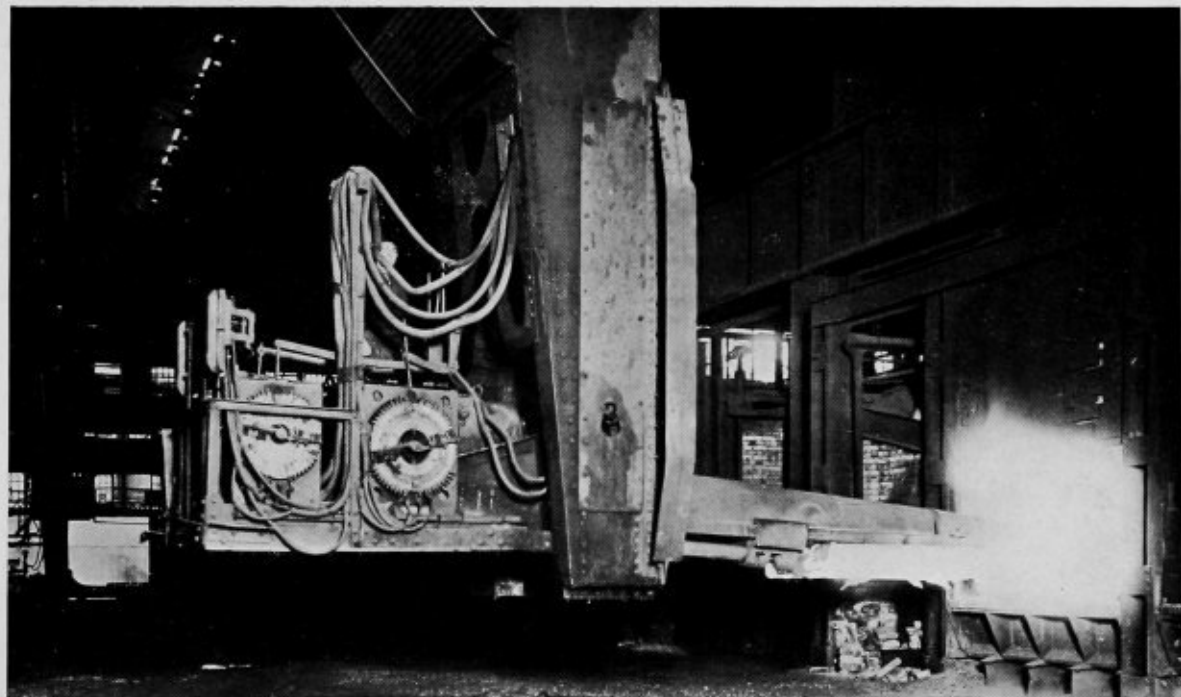


140" PLATE MILL SHEAR

### UNIVERSAL PLATE MILLS

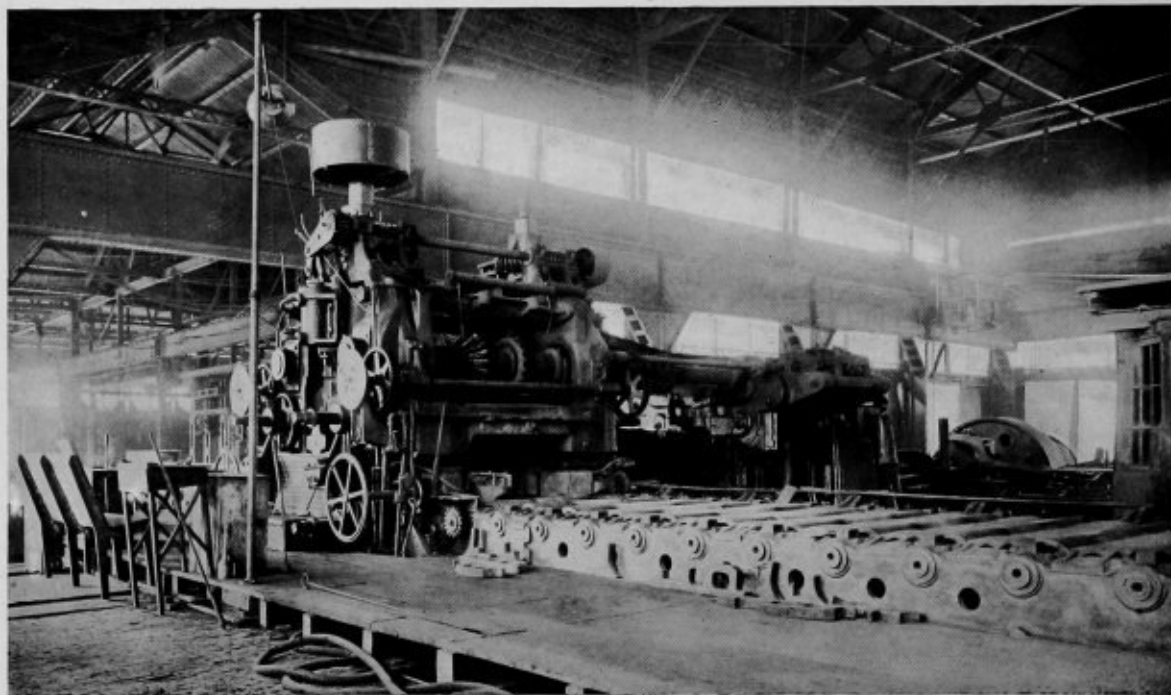
48" Universal Plate Mill rolls universal plates from slab ingots cast at Open Hearth Plants Nos. 1 and 2. It has six heating furnaces and is driven by a 50x60" reversing engine.

42" Universal Plate Mill rolls universal plates from slabs furnished by the 30" Slabbing Mill. It is served by the same nine heating furnaces that serve the 128" Sheared Plate Mill and is driven by a 42x60" reversing engine.

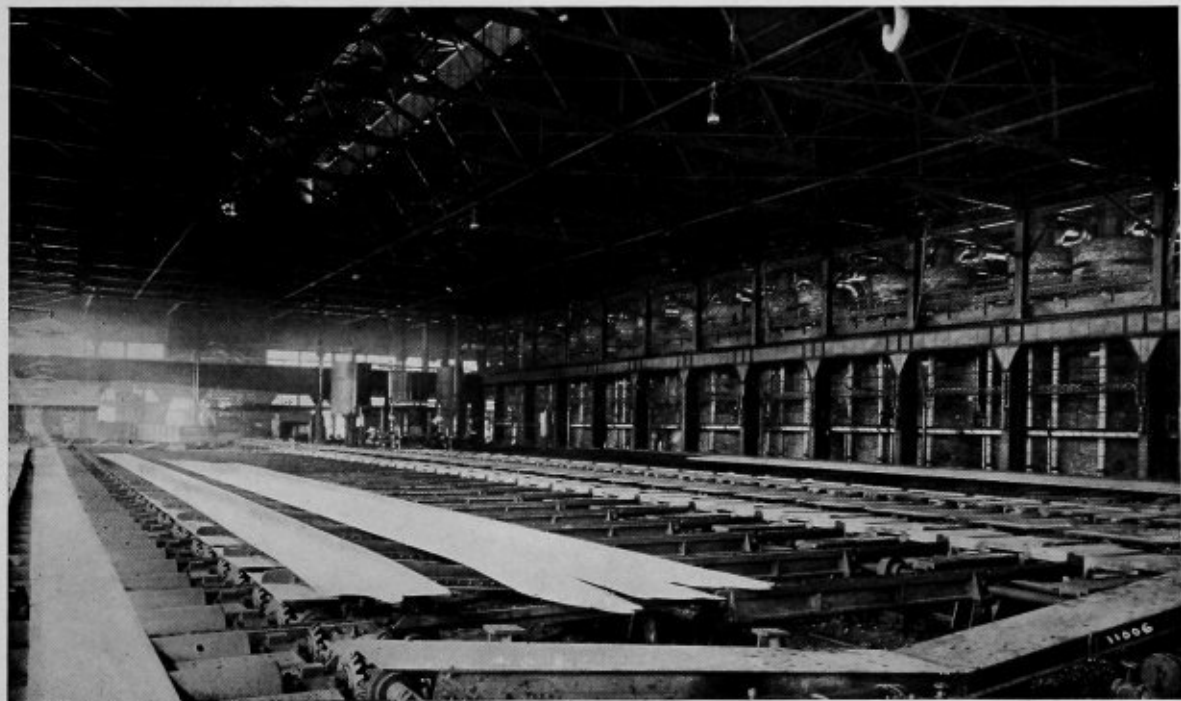


CHARGING MACHINE AND HEATING FURNACES—42" UNIVERSAL PLATE MILL





48" UNIVERSAL PLATE MILL



COOLING BED—48" UNIVERSAL PLATE MILL

### MERCHANT MILL

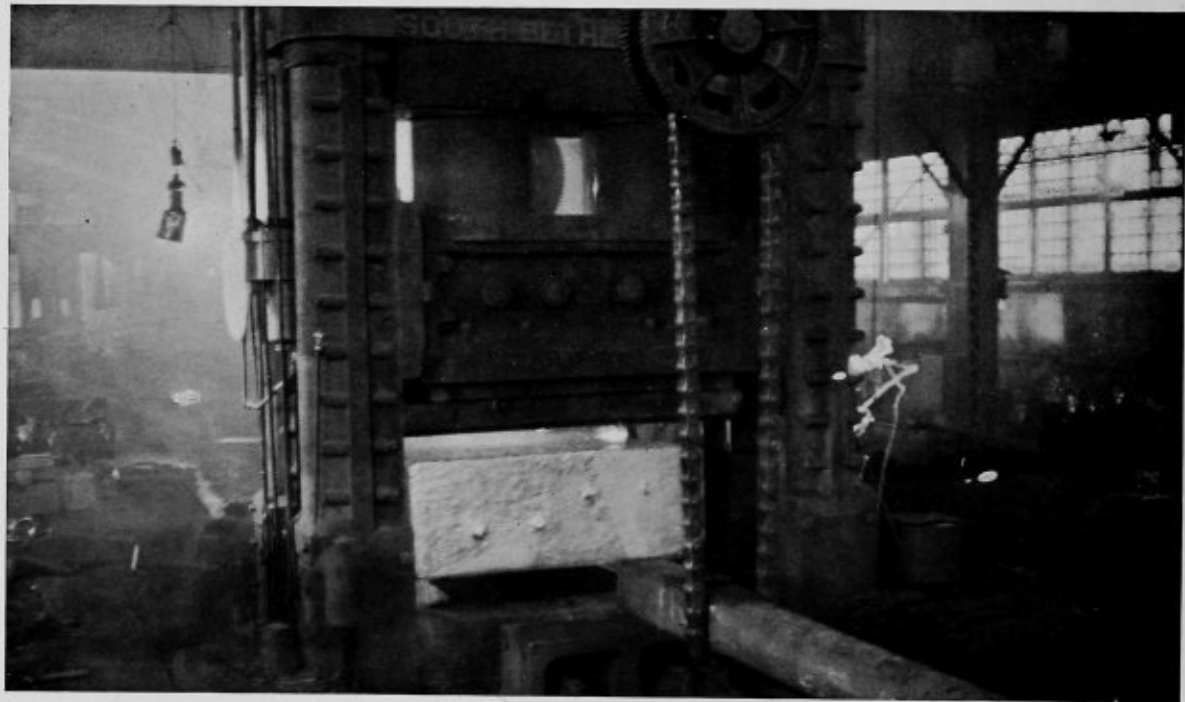
This mill consists of three stands of 16", three stands of 12" and two stands of 9" rolls. It is served by three heating furnaces. The 16" and 12" stands are driven by a 32 & 52x60" tandem compound engine and the 9" stand by a 300 H. P.—A. C. motor.

## ARMOR PLATE DEPARTMENT

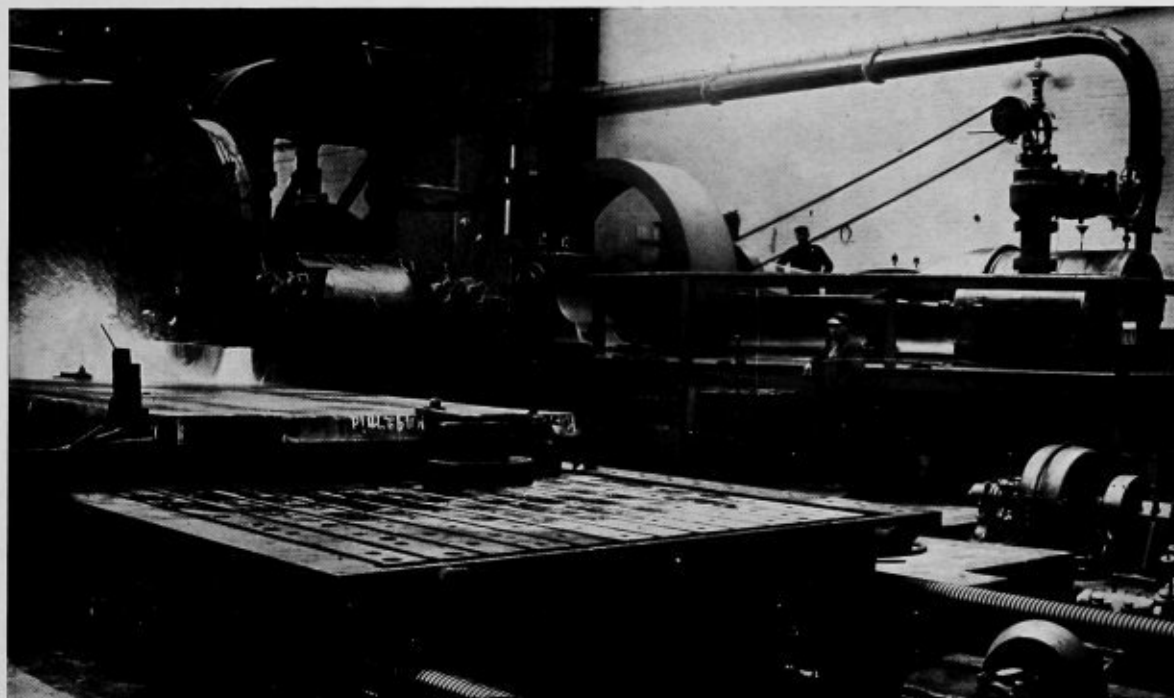
This department is an integral part of the Homestead Steel Works. It is here that all the armor plate made by the United States Steel Corporation is manufactured.

To this department visitors are not admitted.

The Vanadium Steel Department is included in the Armor Plate Department.



12,000-TON FORGING PRESS—ARMOR PLATE DEPARTMENT



HIGH SPEED COLD SAW IN ACTION—ARMOR PLATE DEPARTMENT

## GENERAL EQUIPMENT

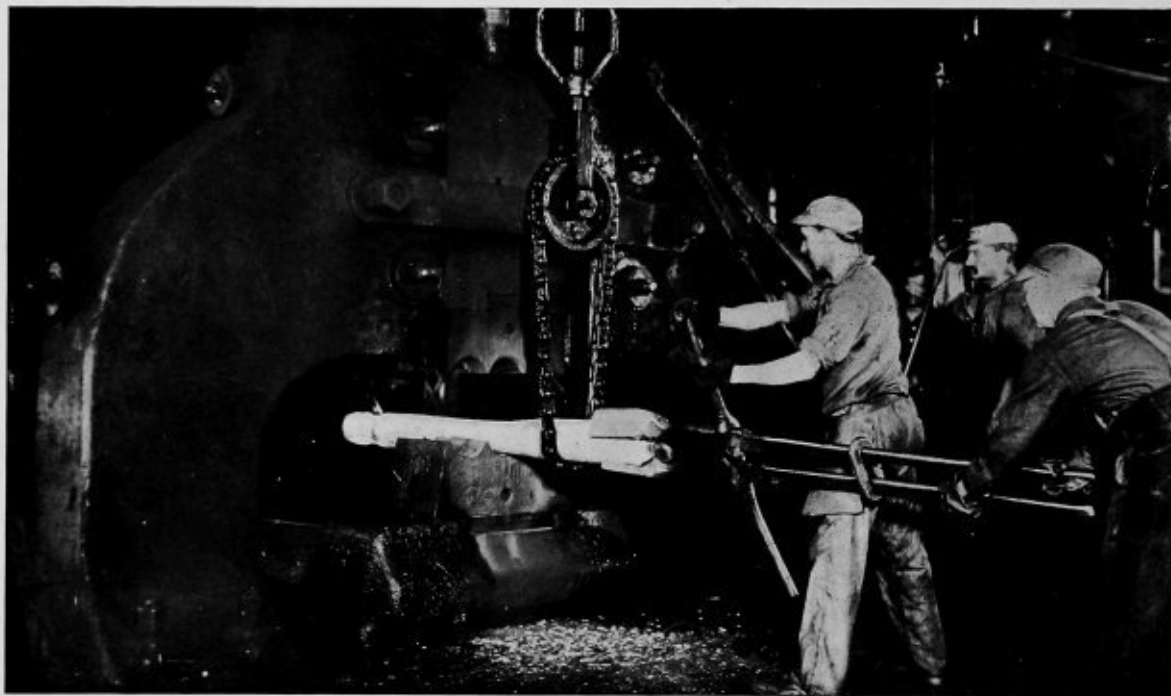
This plant is well rounded out with all necessary supplementary departments such as machine shops, boiler shops, blacksmiths' shop, carpenter shop, electric repair shop, roll turning department, steel foundry, narrow gauge and standard gauge engine repair shops, chemical laboratories, physical testing laboratory, all kinds of storage sheds and bins, scrap yard and an emergency hospital.

## AXLE DEPARTMENT

The Howard Axle Works is a separate plant, built in Homestead, in 1899, but is under the direct management of Homestead Steel Works. This department employs about 600 men and consists of three heating furnaces, twelve 7,000 pound hammers and two 7,500 pound hammers, three straightening presses, lathes and all the other necessary equipment to make it a very complete and efficient axle plant.

There is also a heat treating department at this plant, consisting of two furnaces with the necessary oil and water tanks for quenching.





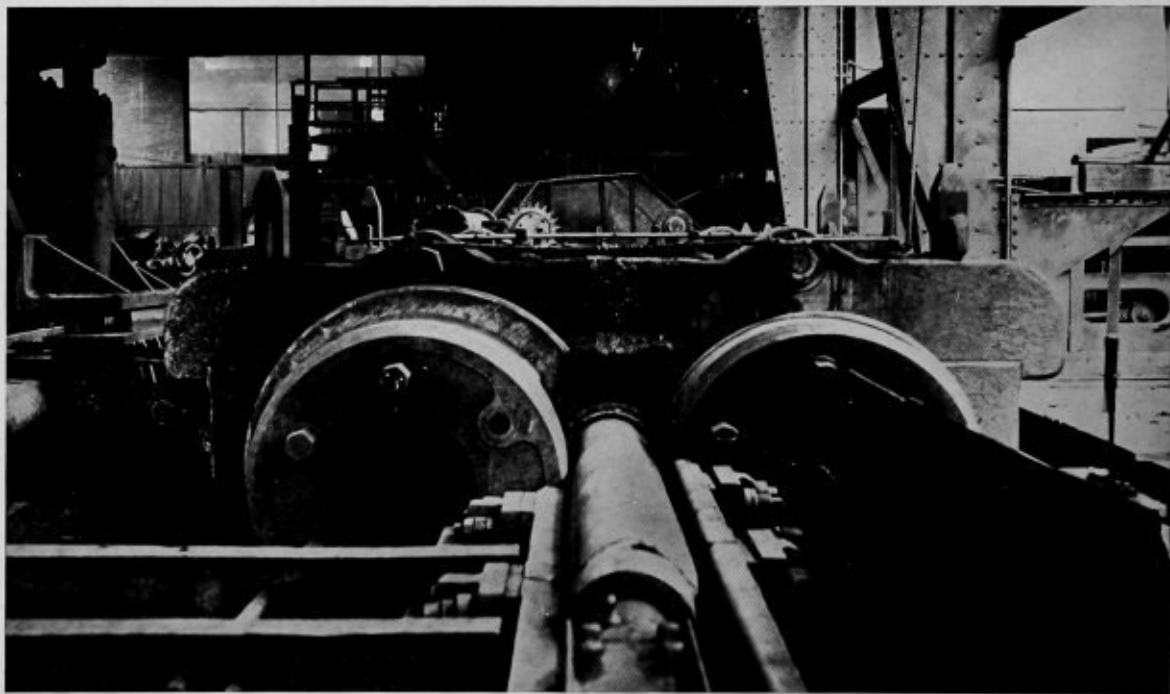
FORGING AN AXLE—HOWARD AXLE WORKS

## SLICK WHEEL DEPARTMENT

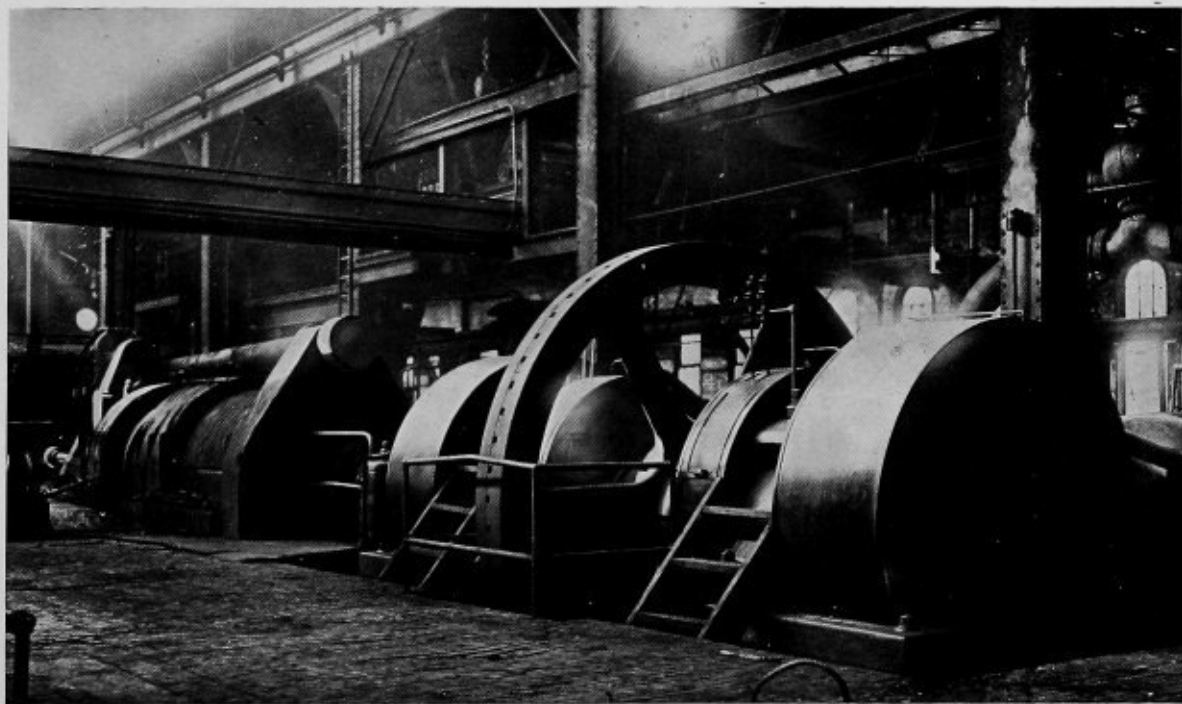
This department has been developed and constructed during the last three years under the direction of Mr. E. E. Slick, Mechanical Engineer of the Carnegie Steel Company.

The steel for this department is supplied in the form of ingots rolled into cylindrical blooms; sheared by a rotary shear into discs of various weights.

These discs are then rolled and finished by the Slick or Schoen process into fly wheels, gear blanks, turbine discs, car wheels and other similar forms from 15" to 36" in diameter.



SLICK ROTARY SHEAR—CUTTING CYLINDRICAL BLOOMS INTO DISCS



SLICK WHEEL ROLLING MILL

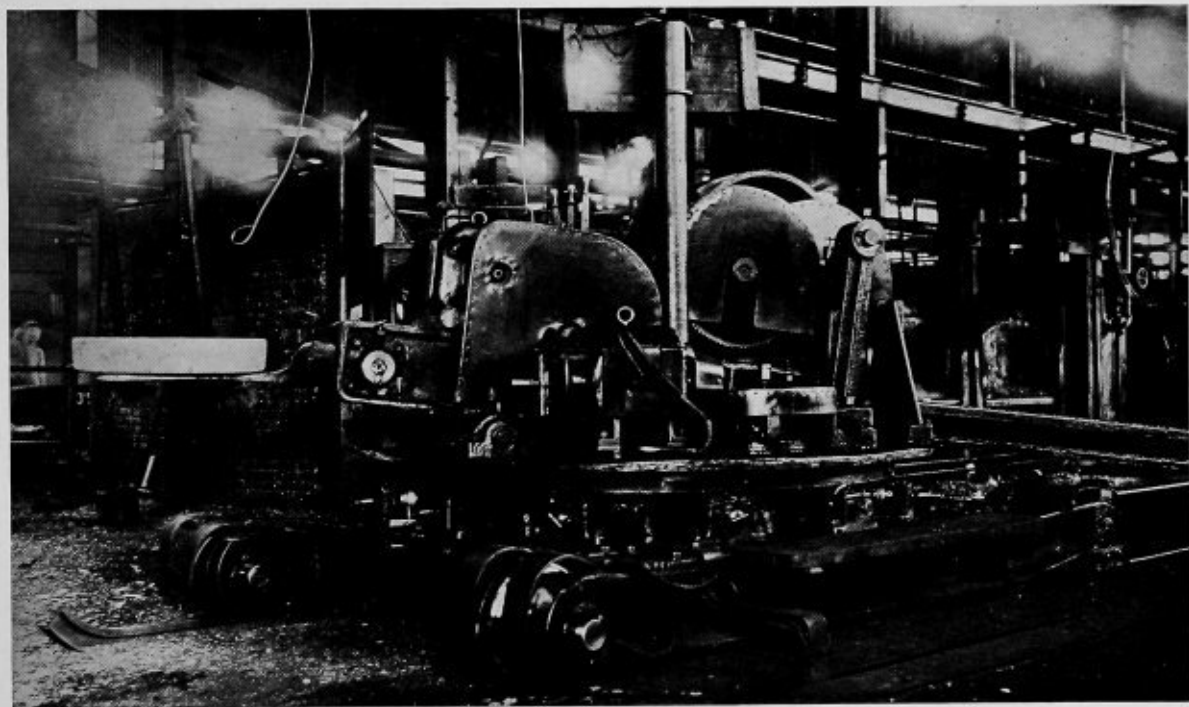
## SCHOEN STEEL WHEEL WORKS

This plant is located at McKees Rocks, Pa., and was purchased by the Carnegie Steel Company in 1908. The plant is operated under the direct management of the Homestead Steel Works and employs about 600 men.

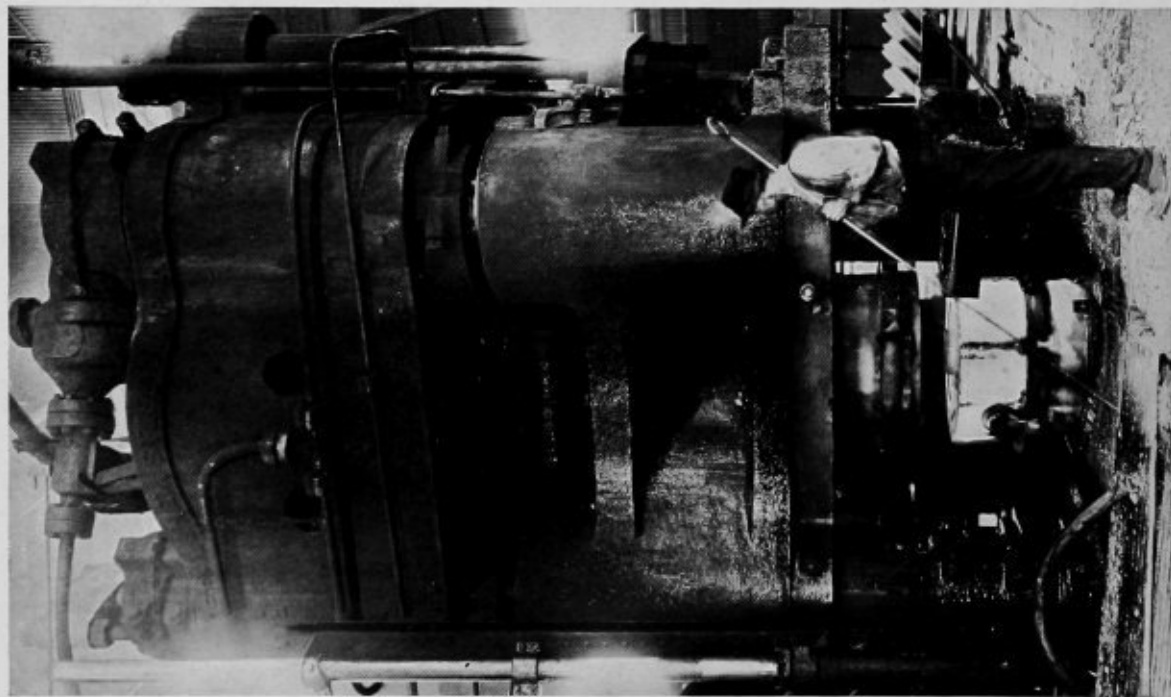
This was the first plant ever built to manufacture rolled steel wheels.

The steel for this plant comes from Homestead Steel Works in the form of discs, ready for forging and rolling, after having been rolled into cylindrical blooms and sheared by the Slick Rotary Shear to the desired weight.

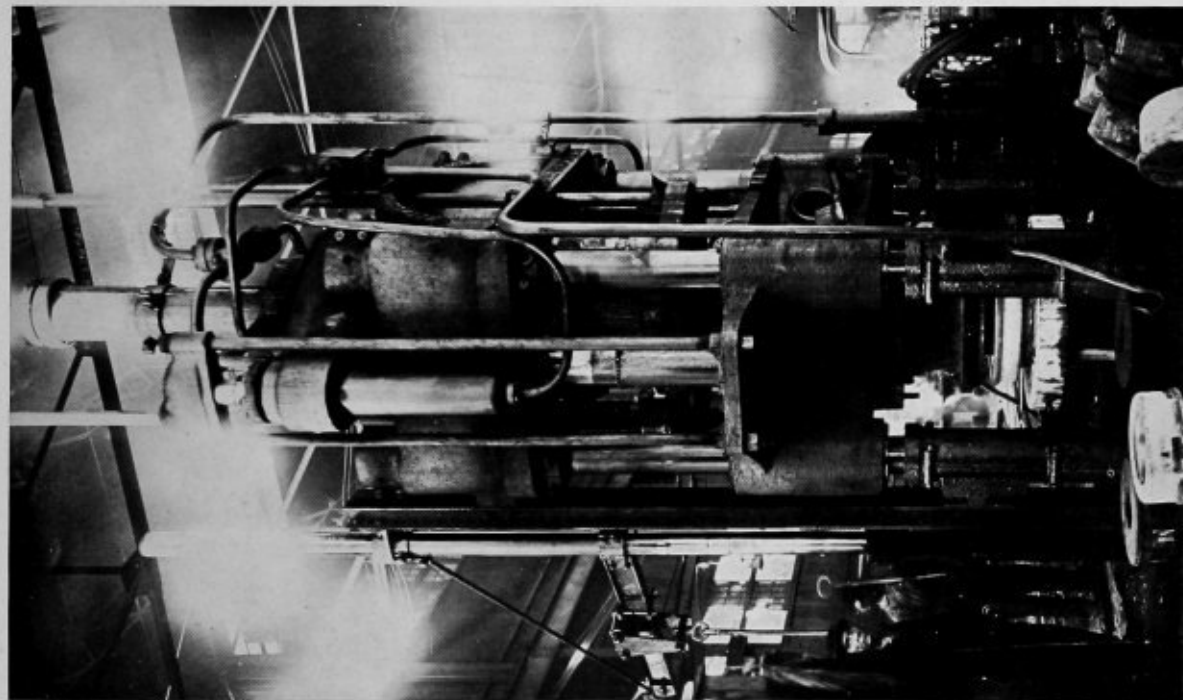
There are two Wheel Rolling Mills, and all the necessary equipment such as boilers, engines, forging presses, punches, lathes etc., to make it the equal of any steel wheel plant in the country.



CHARGING MACHINE—SCHOEN STEEL WHEEL WORKS

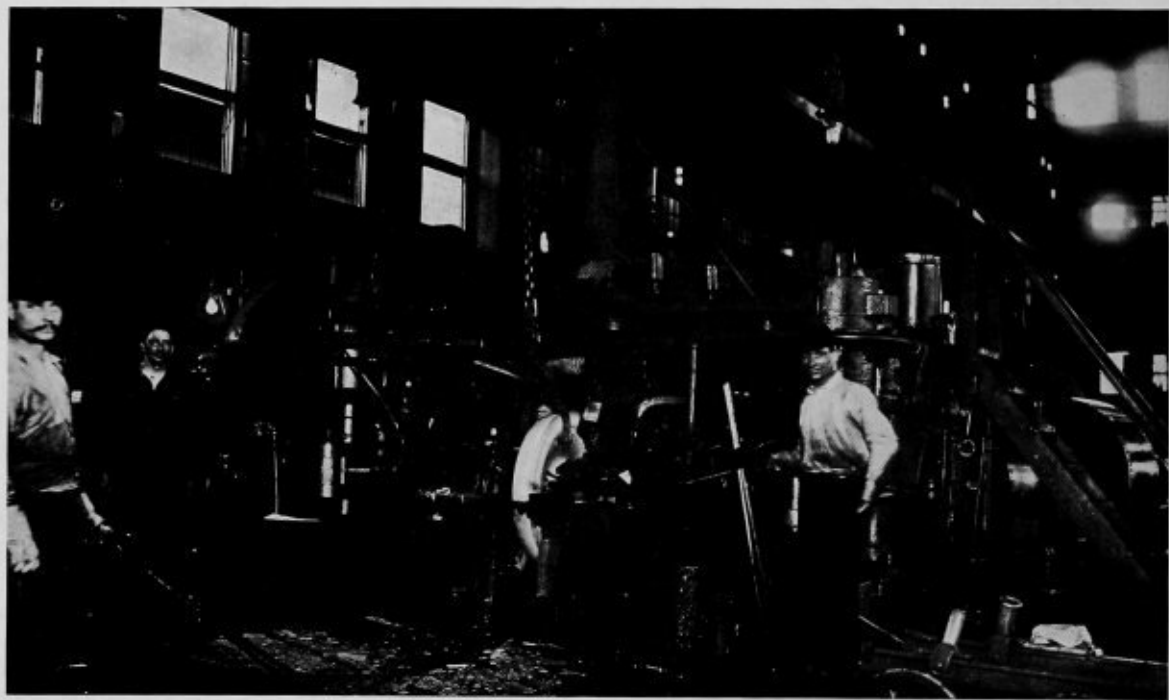


7,000-Ton Forging Press—Schoen Steel Wheel Works

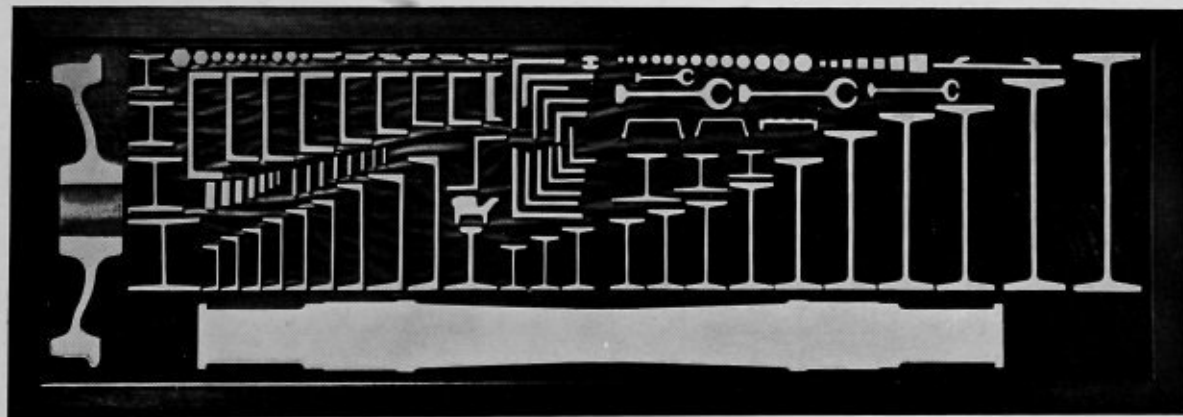


PUNCHING WHEELS—SCHOEN STEEL WHEEL WORKS

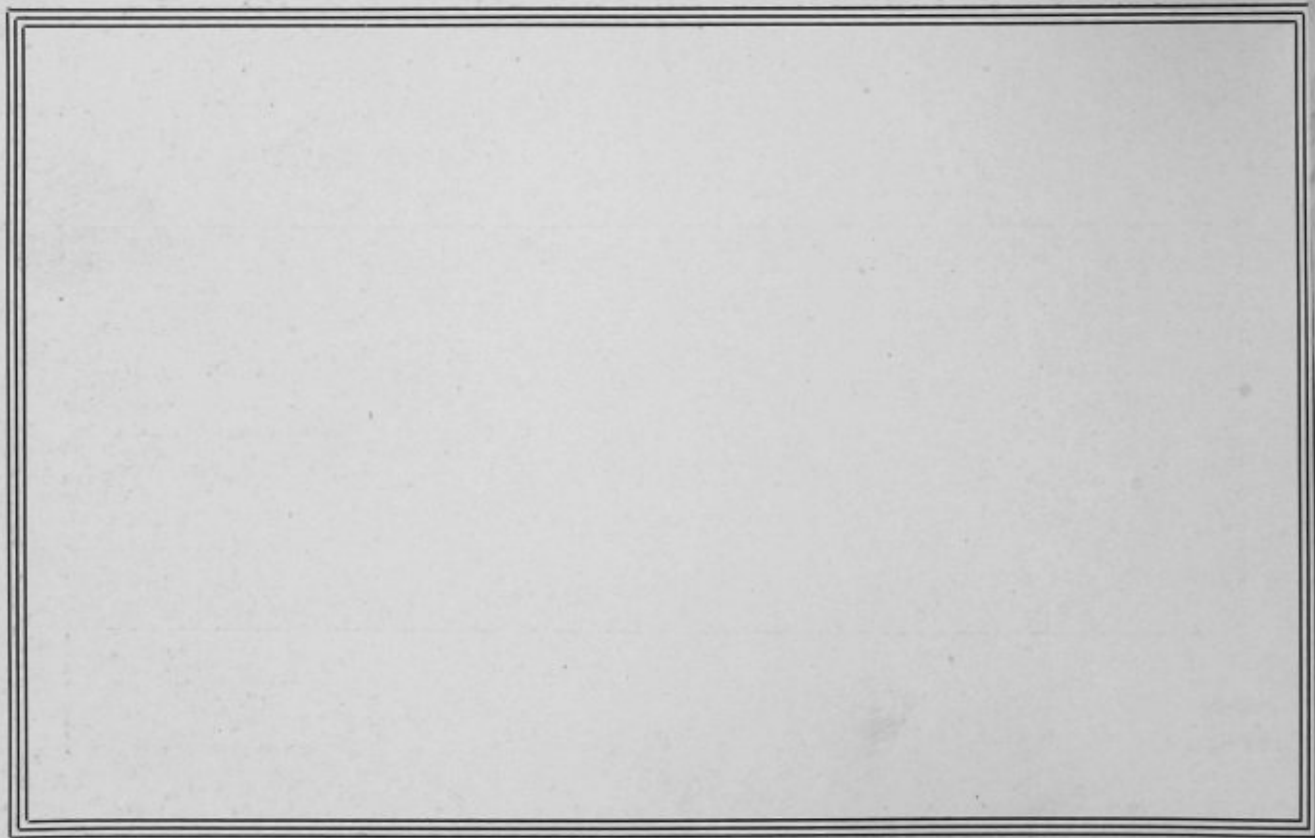


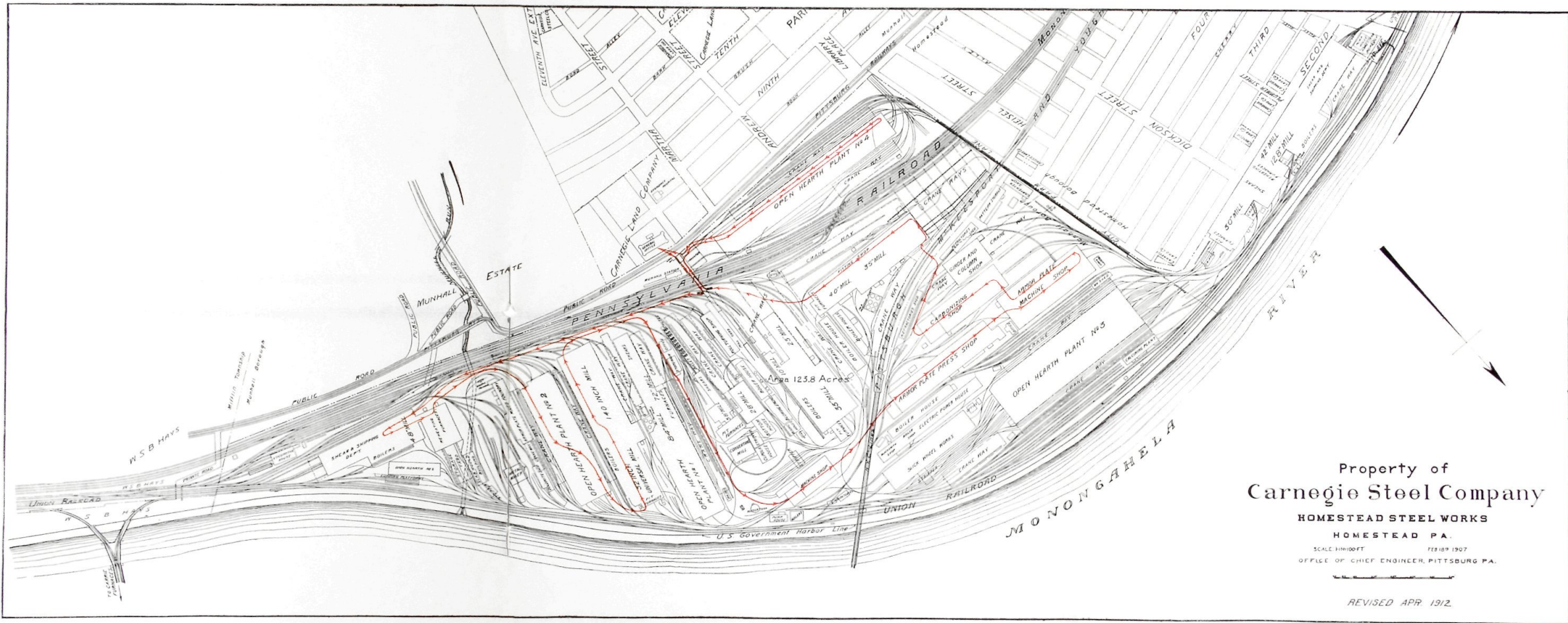


WHEEL ROLLING MILL—SCHOEN STEEL WHEEL WORKS



SECTIONS OF ALL FINISHED PRODUCTS MANUFACTURED BY HOMESTEAD STEEL WORKS





GENERAL PLAN OF WORKS SHOWING COURSE FOR VISITORS TO FOLLOW THROUGH THE MILL



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