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THE EDGAR THOMSON STEEL WORKS AND BLAST FURNACES.



THE BLAST FURNACES, FROM THE SOUTH.



THE

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EDGAR THOMSON

STEEL WORKS AND BLAST FURNACES.

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CARNEGIE BROTHERS & CO., LIMITED.



OFFICES,

48 FIFTH AVENUE, PITTSBURG, PA.

WORKS,

BESSEMER, PA.





# CARNEGIE BROTHERS & CO., LIMITED.

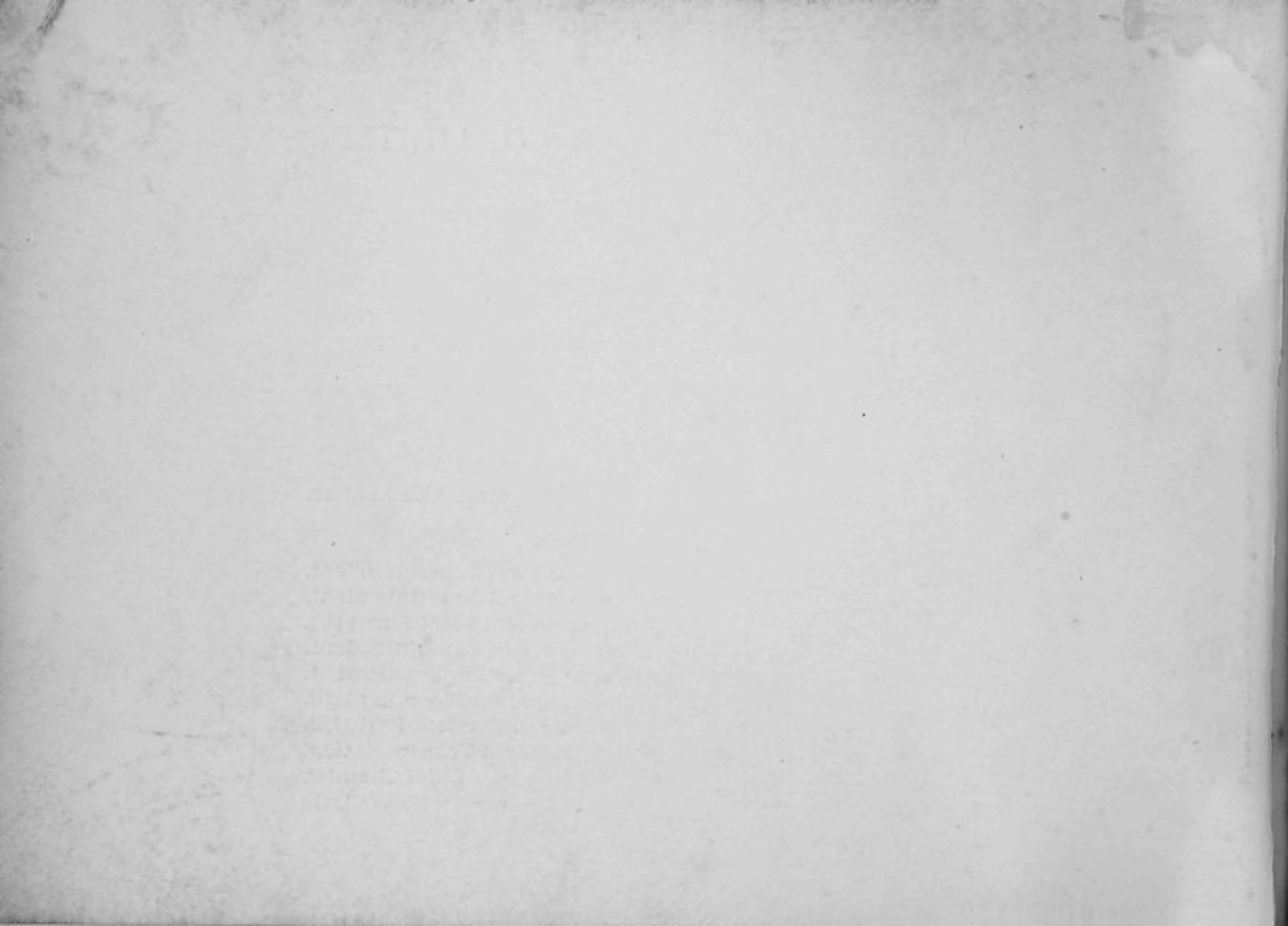
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THOMAS JAMES,	-	Assistant General Superintendent.
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JOHN HUTZEN,	-	Night Superintendent.
H. W. BENN,	-	Superintendent Converting Department.
D. L. MILLER,	-	Superintendent Blooming Mill.
THOS. L. LAPSLEY,	-	Superintendent Rail Mill.
THOMAS COSGROVE,	-	Superintendent Transportation.
S. A. FORD,	-	Chief Chemist.
C. C. TEETER,	- - - - -	Chief Clerk.



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# THE EDGAR THOMSON

## STEEL WORKS AND BLAST FURNACES.

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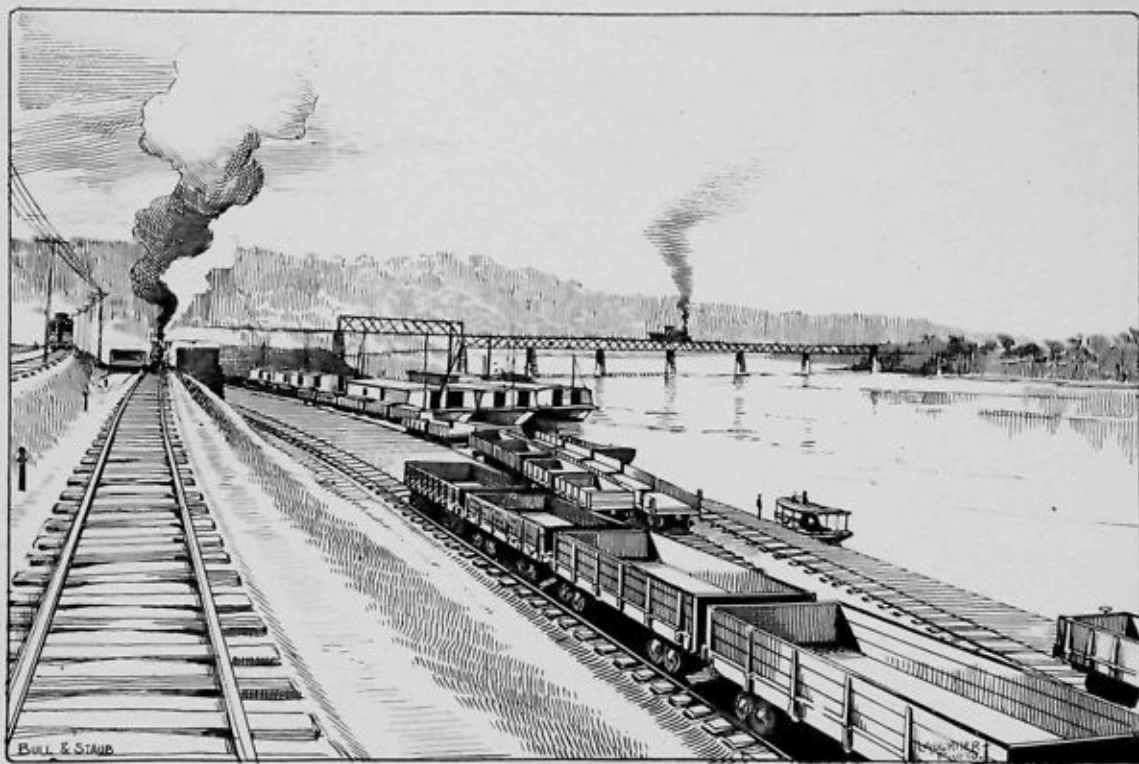
THE EDGAR THOMSON STEEL WORKS AND BLAST FURNACES are situated eleven miles East of Pittsburg, Pennsylvania, at Bessemer, a station on the main line of the Pennsylvania Railroad, which is on the North side of the works; the Baltimore and Ohio Railroad runs throughout the entire length of the plant and forms a line separating the Blast Furnaces from the Steel making and Rolling Department. The Pittsburg and Lake Erie Railroad is on the South side of the works. On the East side is the Turtle Creek, a small stream emptying into the Monongahela River, which is on the South side and on which the company's property has a wharfage of three thousand feet. On the West side is the town of Braddock.

The Monongahela River furnishes a constant water supply and gives facilities of water carriage over the whole Ohio and Mississippi system of navigation, while the three railroads transport material to and from the works in all directions.

The ground at this point is river bottom land, sloping from North to South sufficiently to make good building sites. The area occupied is one hundred and sixty acres, fifteen acres being covered by buildings.

The compensation of workmen is regulated by a SLIDING SCALE OF WAGES, based on the average price received for rails during the preceding month. The prices range from twenty-six to





3.—VIEW OF RIVER AND WHARF.

forty-eight dollars per ton of rails, a printed scale showing the amount to be paid each class of workmen, according to the price of rails as indicated. The scale moves on a fifty cent fluctuation. This has been in practical operation for the past three years, and appears to be satisfactory to both employe and employer.

The number of employes is about thirty-five hundred, representing a population of ten thousand people. Number Employed.

This plant is designed and arranged specially for the manufacture of BESSEMER STEEL RAILS, the melted pig iron from the Blast Furnaces being converted into steel DIRECT, instead of casting it and remelting in cupolas. The out-put per day of finished rails is sufficient to lay ten miles of single track road, with rails weighing sixty-eight pounds per yard. When the nine Blast Furnaces are all in blast, the daily production of metals is two thousand tons. The production recently has averaged about fifteen hundred and fifty tons of metal per day. Steel Rails, Out-put, etc.

The greatest out-put of any one Blast Furnace has been as follows: per day, four hundred and fifty-seven tons; per week, two thousand, four hundred and sixty-two tons; per month, ten thousand, six hundred and four tons of metal.

The out-put of finished rails has averaged, recently, ten hundred and seventy-five tons, the best record being fourteen hundred and seventeen tons per day; seven thousand, two hundred and twenty-two tons per week, and thirty thousand and five tons for the month.

The average out-puts stated above require the handling daily of ten thousand tons of materials.

THE GENERAL ARRANGEMENT of the plant can be seen by the folding plate at the end of the book, the numbers referring to it. Arrangement of Buildings.

There are Nine Blast Furnaces South of the Baltimore and Ohio Railroad. These are designated as A, B, C, D, E, F, G, H, and I, respectively. The stacks A to G, inclusive, are built in a row facing the river, while H and I are at right angles, for convenience of stock yards.



At the South-east corner are the Metal Mixers (No. 12), to which the molten metal from Furnaces is conveyed, and from which it is in turn taken over DIRECT PROCESS TRACK to the CONVERTING WORKS (No. 20), at the North-east corner.

West of the Converting Works are the Blooming Mill (No. 30), Old Rail Mill (No. 28), and New Rail Mill (No. 31 to No. 38).

North of the Converting Works are the Shops, Offices, etc.

All buildings are of brick, excepting the OLD RAIL MILL, which is iron, and all have iron frames and coverings.

Water  
Supply.

THE WATER SUPPLY is taken from the Monongahela River, by pumps located at different points and all connected to form one system. The main pumping stations are Nos. 7, 14, 17, 19½ and 39½.

The estimated consumption is twenty-five million gallons per day.

## THE BLAST FURNACE DEPARTMENT.



THE BLAST FURNACE DEPARTMENT is operated as four independent plants, <sup>Four Plants.</sup>

A, B and C constituting one, there being two furnaces in each of the others. Furnace "A" is used for the production of Spiegel and Ferro-manganese; the others for Bessemer Metal.

Lake Superior Ores are used. The Coke is from the Connellsville region, <sup>Ore, Coke, etc.</sup> from the extensive works of the H. C. Frick Coke Company. The Stock Yards are 1,280 feet by 60 feet and 368 feet by 100 feet. The coke is placed under roof, the limestone and ore, exposed to the weather.

During the week the furnaces are tapped into ladles, each of a capacity of 12 tons; on <sup>Tapping.</sup> Sunday, the metal is cast in chills.

All furnaces have Siemens-Cowper-Cochrane Stoves, except where otherwise noted. Each <sup>Equipment.</sup> set of furnaces has its own engines and boilers, and while all the boilers are connected, yet each engine house is practically dependent on its own boilers for steam supply. Each furnace is supplied with a double cage hoist operated by a 9" x 10" engine.

THE WATER SUPPLY for all the furnaces is furnished from No. 14 Pump House, 20' x 74', <sup>Water Supply for Blast Furnaces.</sup> and No. 7 Pump House, 34' x 73', there being the following pumps:—

3 Feed Pumps, 8" Plungers, 16" Steam Cylinder, 18" Stroke.

7 Feed Pumps, 7" Plungers, 14" Steam Cylinder, 10" Stroke.

2 Compound Duplex, 21" Plungers, 28" and 16" Steam Cylinders, 48" Stroke.

6 Compound Duplex, 20" Plungers, 25" and 16" Steam Cylinders, 36" Stroke.

1 Duplex, 15" Plunger, 22" Steam Cylinder, 36" Stroke.

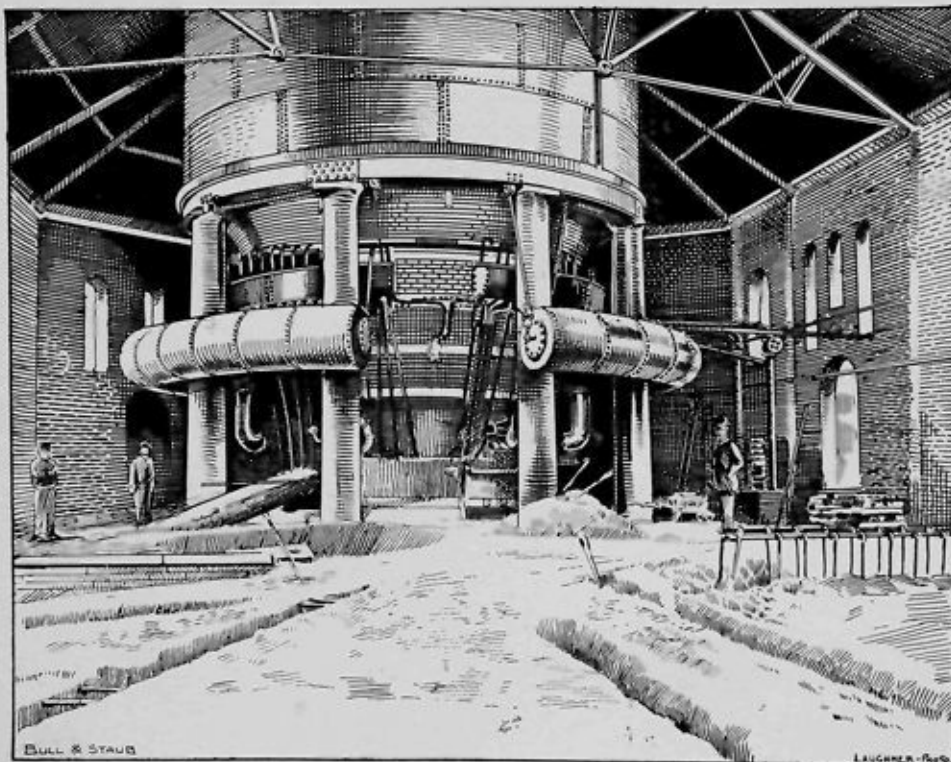
5 Stock Yard Pumps, 22" x 18", 12" Plungers.

Furnace  
"A."

FURNACE "A" was built in 1879, is 15' diameter of bosh and 65' high. It is equipped with four stoves, each 65' x 15'. The "A" Cast House is 50' x 98'

Furnaces  
"B" and "C."

Engine  
House,  
No. 15.



4.-FURNACE "F."

Boiler  
Houses,  
No. 13.

from three Boiler Houses, 56' x 130', 48' x 54', and 64' x 100', containing the following boilers:—

FURNACES "B" and "C" were built in 1880, are each 20' diameter of bosh and 80' high. They have eight stoves, six of which are 75' x 20', and two, 75' x 21'

These three furnaces are provided with nine Blowing Engines, six of which are 35" Steam Cylinders, 84" Air Cylinders, and 48" Stroke; two are 32" diameter Steam Cylinders, 84" Air Cylinders, and 48" Stroke; the ninth has a 40" Steam Cylinder, 84" Air Cylinder, and 60" Stroke.

Steam is furnished



8 Boilers, 54' 6" long, 50" diam.

Sub-boilers, 43' 6" long, 40" diam.

8 Boilers, 31' 10½" long, 48" diam.

Sub-boilers, 21' 7½" long, 36" diam.

In addition to the above, there are under construction eight new Boilers, 28' long, 54" diameter, with two flues, 18" diameter.

4 Boilers, 55' 3" long, 36" diam.

Sub-boilers, 46' 8" long, 28" diam.

12 Boilers, 55' 4" long, 42" diam.

Sub-boilers, 46' 8" long, 32" diam.

THE SECOND SET OF FURNACES IS "D" AND "E," built in 1881, each 23' diameter <sup>Furnaces</sup> "D" and "E." of bosh, and 80' high. There are six stoves, each 78' 6" x 21', and one Whitwell stove 78' x 20'. The Cast Houses are 54' x 180'.



5.—TAPPING FURNACE "F" INTO LADLES.

Blast is furnished by seven engines, each 35" diameter of Steam Cylinder, 84" Air Cylinders, and 48" Stroke.

Engine House, No. 8.

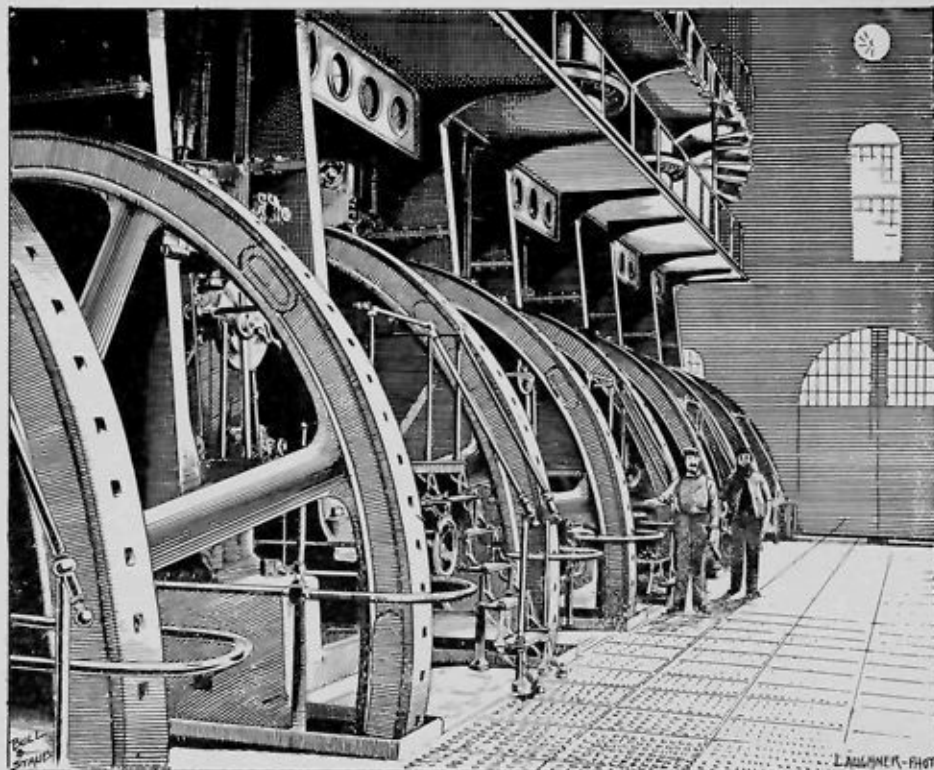
Steam is supplied from two Boiler Houses, 72' x 174' and 76' x 146', containing twenty Boilers, each 54' 10" long, 50" diameter, with Sub-boilers, each 44' 3" long and 40" diameter.

Boiler Houses, No. 6.

In addition to the above, there are under construction sixteen Boilers 54" x 28', two flues 18" diameter.

Furnaces  
"F" and "G."

THE THIRD SET OF FURNACES IS "F" AND "G," built in 1886 and 1887, each 22' diameter of bosh and 80' high. These have seven stoves, 78' 6" x 21'. The Cast Houses are 55' x 160'.



6.—"F" AND "G" ENGINE HOUSE.

Engine  
Houses,  
No. 4.

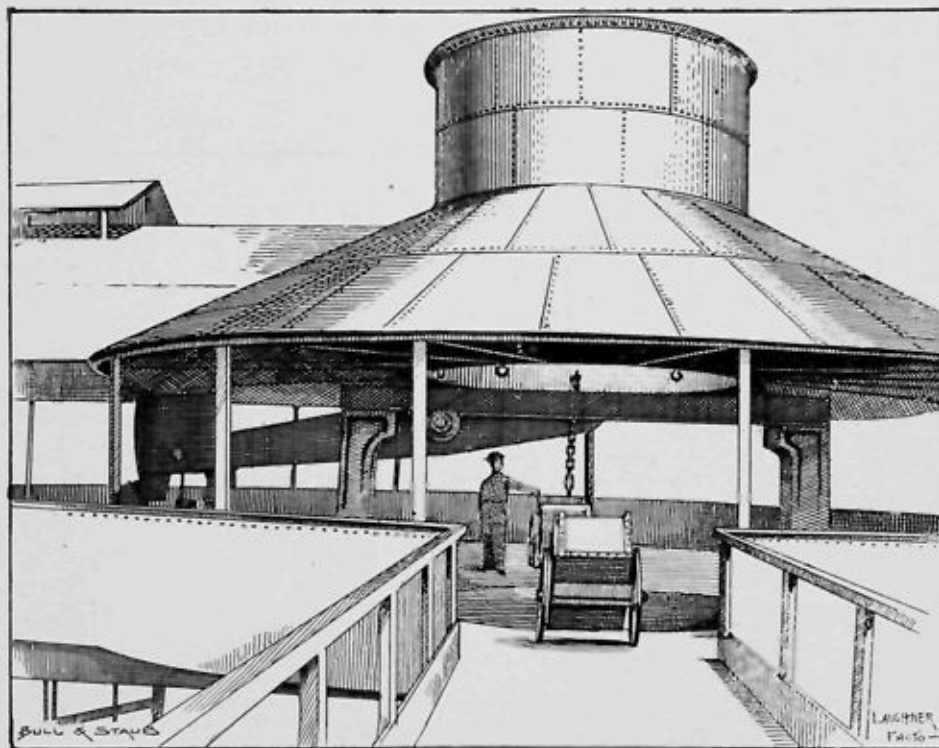
There are five Blowing Engines, each having a Steam Cylinder 40" diameter, Air Cylinder 84" diameter, and 60" Stroke.

Boiler  
House,  
No. 5.

Steam is supplied from a Boiler House, 100' x 200', having forty Boilers, 28' long, 54" diameter, with two 18" flues.

THE FOURTH SET OF BLAST FURNACES IS "H" AND "I," built in 1889 and 1890, <sup>Furnaces</sup> "H" and "I." and each 22' diameter of bosh and 90' high. These have seven stoves, each 78' 6" x 21' diameter.

The Cast Houses are 54' x 180'.



7.—TOP OF FURNACE "F."

The Engine House contains five Engines, each having a Steam Cylinder 40" diameter, Air Cylinders 84" diameter, and a Stroke of 60"

Engine  
House,  
No. 4.

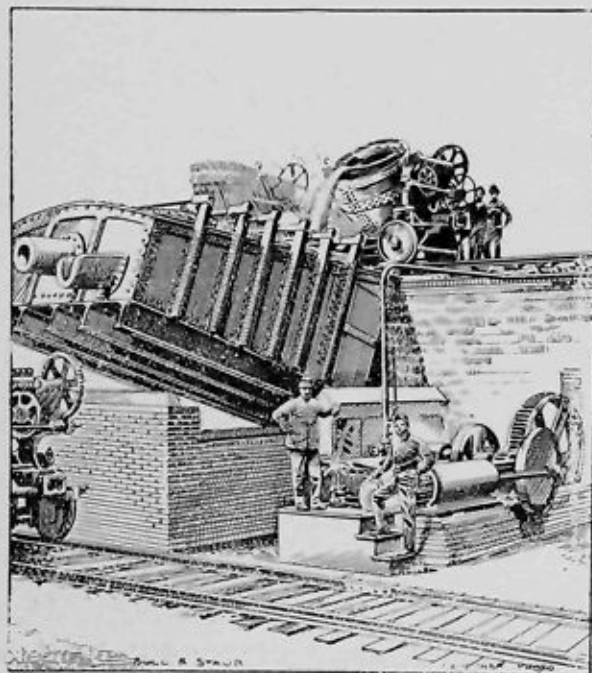
Boiler  
House,  
No. 3.

The Steam supplied is from a Boiler House 100' x 110', having twenty-four Boilers, each 28' long, 54" in diameter, with two 18" flues. In addition, there will be sixteen Boilers of the same size.

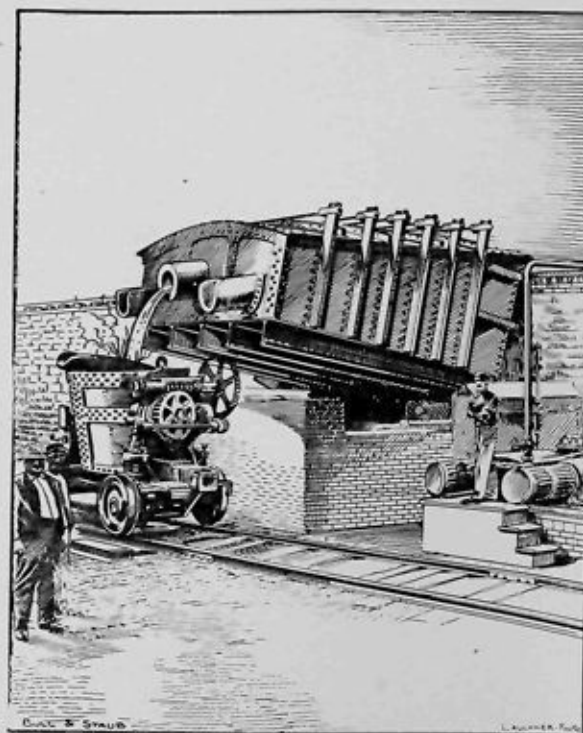
The "F" and "G" and "H" and "I" batteries are connected by a steam pipe.

Limestone  
Crusher,  
No. 49.

On the West side of the works is a Gates Mastodon Crusher, used for crushing limestone, and having a capacity of eight hundred tons per day. It is equipped with an elevator, for loading, with a Porter-Hamilton Engine, 14" x 18", and with four Steam Boilers, 28' x 54", having two flues, 14" diameter.



8.—CHARGING THE METAL MIXER.



9.—DRAWING THE METAL MIXER.

THE METAL MIXING PLANT consists of two MIXERS, two platform weighing scales, two double reversing engines 12" x 30", and two boilers for steam supply.

Metal  
Mixers,  
No. 12.

The Mixer itself is a huge iron box, heavily lined with fire brick, mounted on a shaft turned by an engine, and has a nominal capacity of one hundred tons. Actually, about eighty tons only are in the Mixer at any one time. At the rear end, on top, is a hopper, into which the metal is run from a ladle on the over-head track. Below, and in front of the Mixer, is another railroad track, with a platform weighing scale for each Mixer. The empty ladle is run on this scale, weighed and half-filled with molten metal from the tapping door, as the Mixer is turned down. The ladle then goes to the next Mixer, is filled and weighed. By the use of the metal Mixers a constantly uniform grade of Bessemer Iron is furnished the Converting Department.

The Blast Furnace Department has its own Office and Laboratory Buildings, Shops Metal House, Brick Sheds, Skull-Crackers, etc.

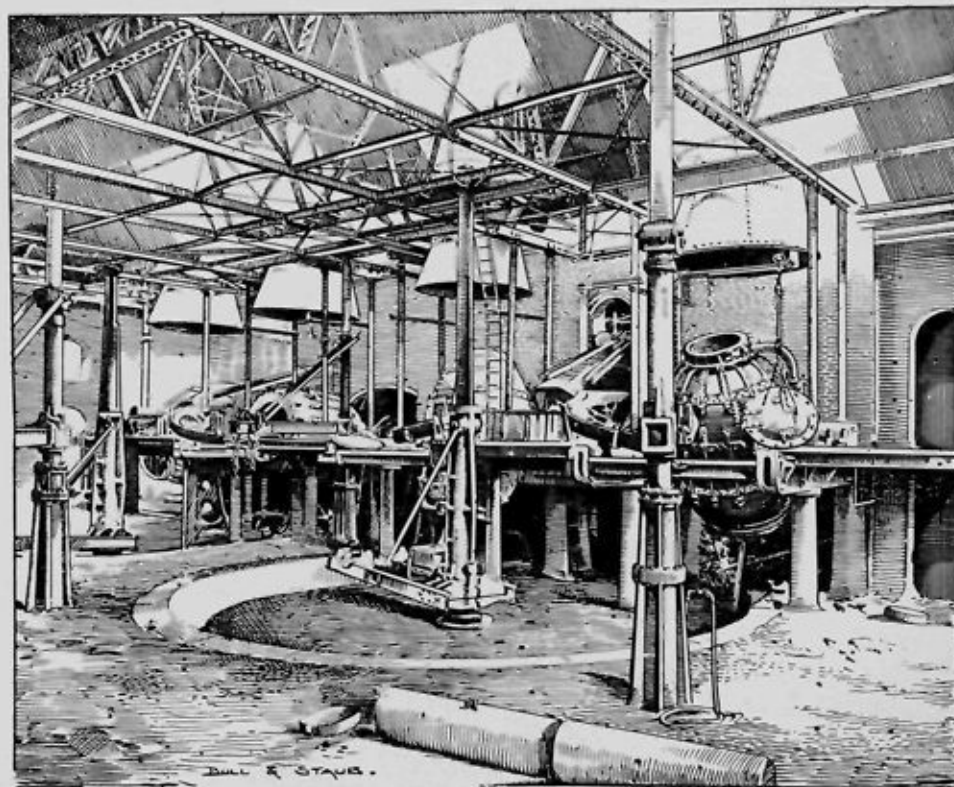




## THE STEEL DEPARTMENT.

Converting  
Department

From the Metal Mixers, the molten metal is carried over an elevated standard gauge Nos. 18-22. track to the Converting Works, where it is at once tapped into one of the four ten-ton vessels and converted into steel by the usual Bessemer practice.



10.—CONVERTING HOUSE.

The Converting House is 86' x 165', and contains four ten-ton vessels, two ten-ton hydraulic ladle cranes, four hydraulic ingot cranes, and one dumping crane. Two tracks pass through the building in front of the two casting pits.

Converting House,  
No. 20.

The Ladle House is in a wing 46' x 80', in front of the pits, and ladles are swung by the ingot crane to the front of the Ladle House, where they are taken up by another hydraulic crane.

Ladle House  
No. 21.

The Bottom House is on the East side, in a wing 46' x 80', and bottoms are run into it on cars and handled by a hydraulic crane.

Bottom House,  
No. 21½.

There are five cupolas back of the Converters in another wing 44' x 110'. These are not used since the introduction of the direct process.

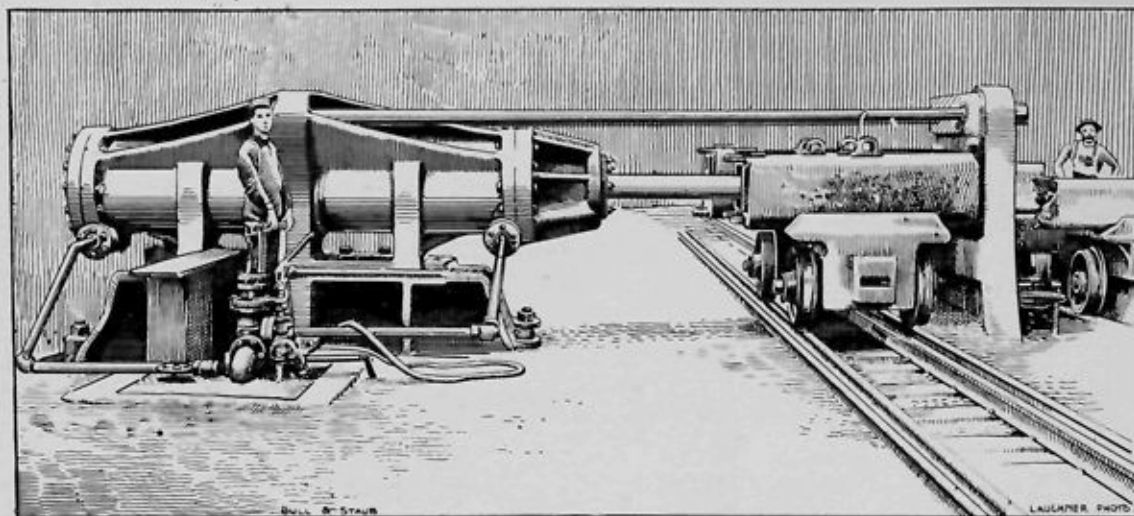
Cupolas,  
No. 22.

The Blowing Machinery consists of three Vertical Engines, with Steam Cylinders 42" diameter, 48" Stroke, and Air Cylinders 54" diameter; one Vertical Double Engine, with Steam Cylinder 36" diameter, 54" Stroke, and 54" Air Cylinder; four No. 7 Baker Blowers.

Blowing Engines,  
No. 19½.

The steel is cast in moulds seven feet long, 15½" x 17½" at top, 18½" x 20½" at bottom. The moulds are not stripped from ingots in the pit, but ingot and mould raised by a crane from the pit, placed on a car and removed outside to the hydraulic Pushers, of which there are two.

Moulds.  
Stripping.



11.—INGOT PUSHER.

Ingot  
Pusher.

The Ingot Pusher is a hydraulic cylinder mounted horizontally on a frame and provided with water supply pipe and valves to control its action. In front of the cylinder is an upright frame, connected with the cylinder-supporting frame by heavy brace rods. The ingot and mould on the car are moved between the cylinder and the frame, the mould bearing against the frame; the piston is started and pushes the ingot through the frame on to another car, by which it is conveyed to the ingot furnaces.

Ingot  
Furnaces,  
No. 29.

NINE INGOT FURNACES are arranged in three parallel lines, a car track running in front of each line. Four of these furnaces have four charging doors each, and five of them have five charging doors. These furnaces use natural gas. They are charged and drawn by

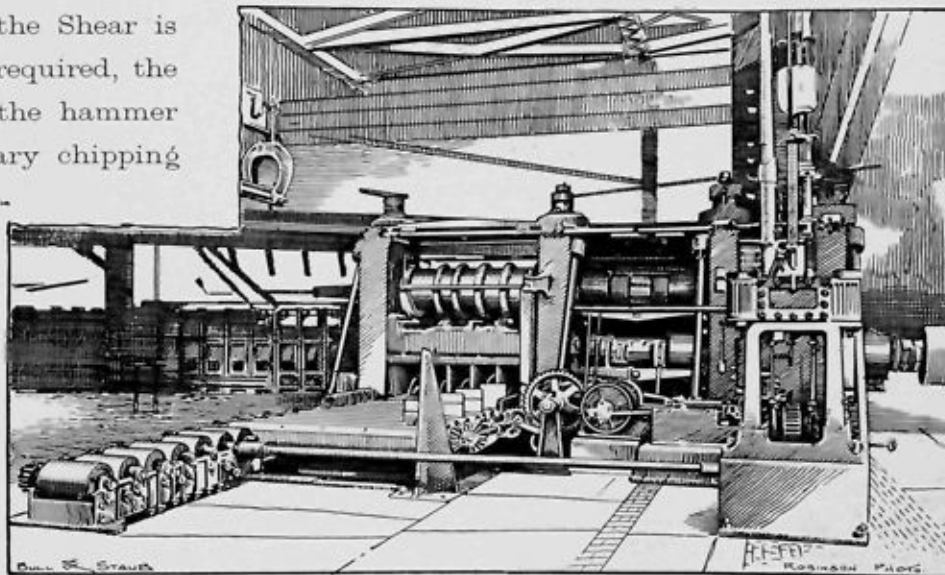
Ingot  
Chargers.

Ingot Chargers, of which there are three. The Charger is a large six-wheeled truck, running on rails and carrying boiler, engines and driving machinery, by which it can be propelled in front of a furnace, a tong moved forward, grasping the ingot, lifting it and projecting it into the furnace. Each charger is operated by two boys.

After reheating, the ingot is taken on a car to the three-high 36" Blooming Train, which is operated by an engine with 36" Cylinder and 72" Stroke. The tables are operated by an independent double 9" x 12" engine. The Bloom runs on tables and driven rollers to the Shear and is cut into lengths. The Shear Engine is 14" x 24". Near the Shear is a three-ton hammer, and, if required, the Blooms can be swung under the hammer by a crane and the necessary chipping done.

Blooming  
Mill,  
No. 30.

South of the Blooming Mill is the Old Rail Mill, not in use at present. It is a three-high 23" Roll Train, provided with hydraulic and automatic appliances for rolling. Power is furnished by a 46" x 48" engine. The rails are cut to length by hot saws, operated by a 14" x 24" engine.



Old Rail  
Mill,  
No. 28.

12.—BLOOMING MILL.

The rails are placed on hot beds by pushers driven by two engines, 9" x 12". This mill has four straightening presses and four drill presses, operated by an engine 18" by 24". In the Rail Mill Annex are one straightening press, two drill presses, and a 12" x 20" engine for operating them. There are also two cold saws, operated by engines, 11" x 20".

At present, the old mill not being in use, after passing the Chipping Hammer, the Blooms are delivered on a series of driven rollers, arranged on a curve, to the switch. The duty of

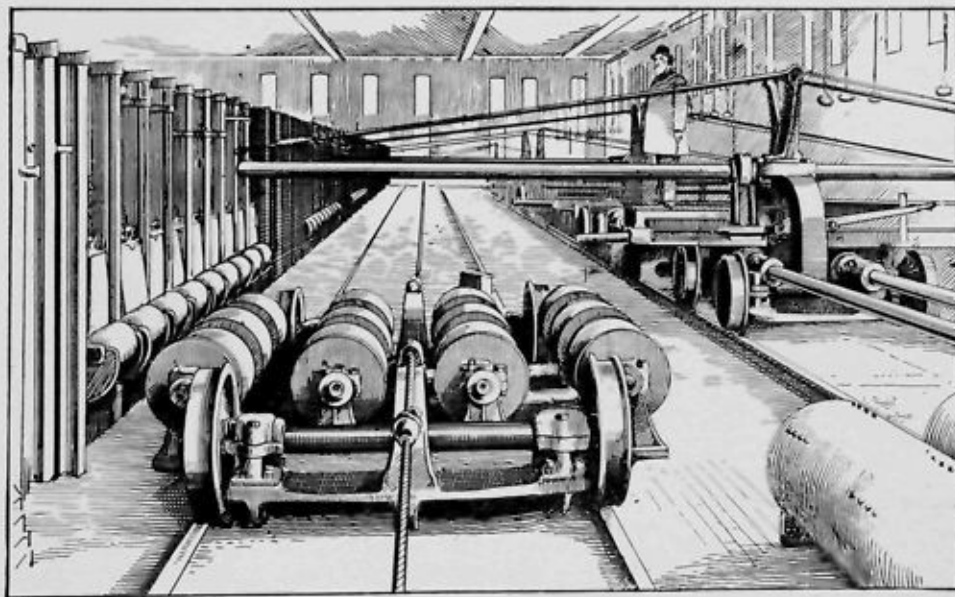
The Switch.

this switch is to distribute the blooms to a car running on a track back of a long line of reheating furnaces, of which there are five, each having nine working doors. By an endless iron rope wound on a drum, driven by a special engine, the car may be moved in front of any particular door of the series. Each furnace has a charger or pusher which pushes the bloom from the car into the furnaces. In front of the furnaces is a somewhat similar apparatus for drawing the heated blooms. A special engine runs an endless wire rope, to which is attached a car. Upon the latter, the drawing apparatus, with an ingenious grip, deposits the bloom; the car is run to driven rollers, which carry the bloom to the table of the first roughing train.

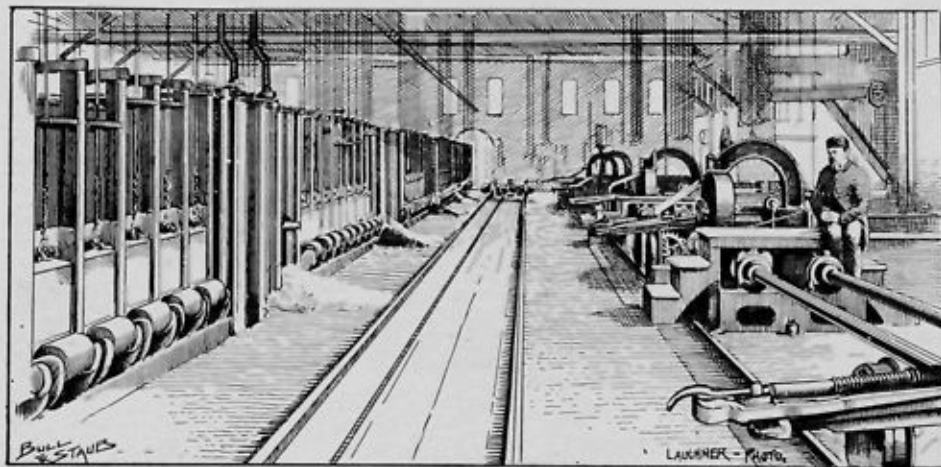


13.—THE SWITCH.





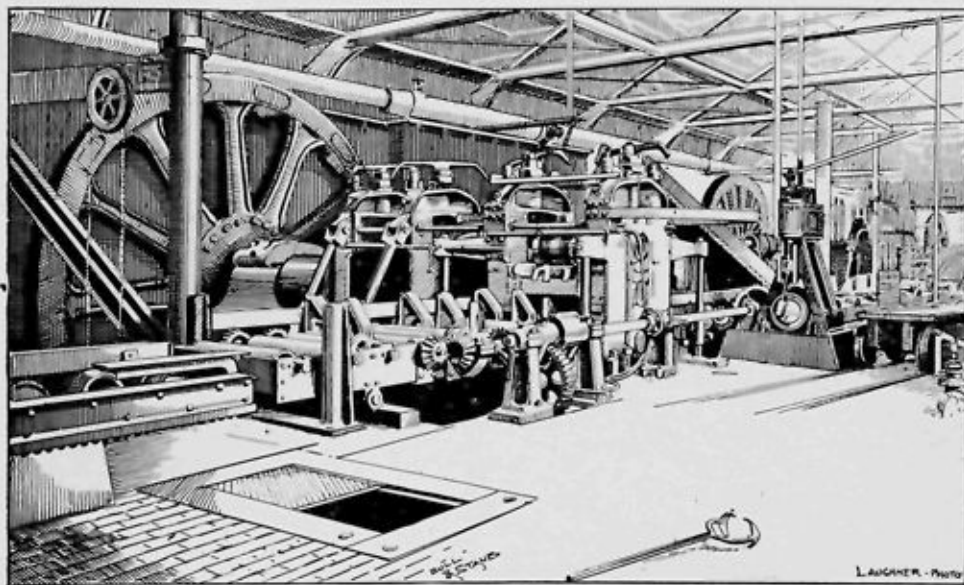
14.—CHARGING BLOOM FURNACES.



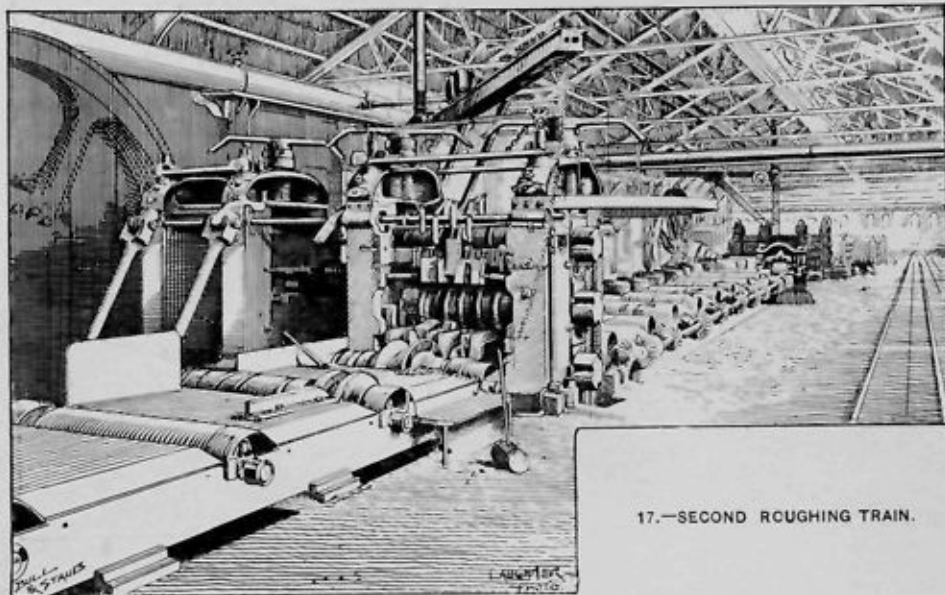
15.—DRAWING BLOOM FURNACES.

In the NEW MILL, the ordinary three-high rail train is divided into three trains, the first five passes being made in one three-high 24" train, the second five in a second three-

The New  
Rail Mill.  
No. 32.

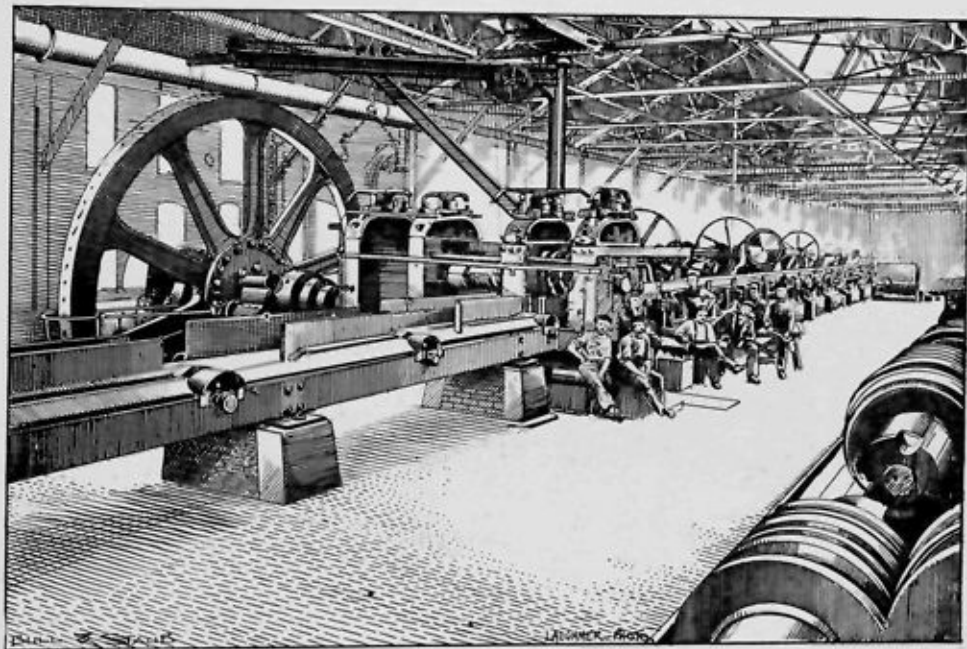


16.—FIRST ROUGHING TRAIN.



17.—SECOND ROUGHING TRAIN.

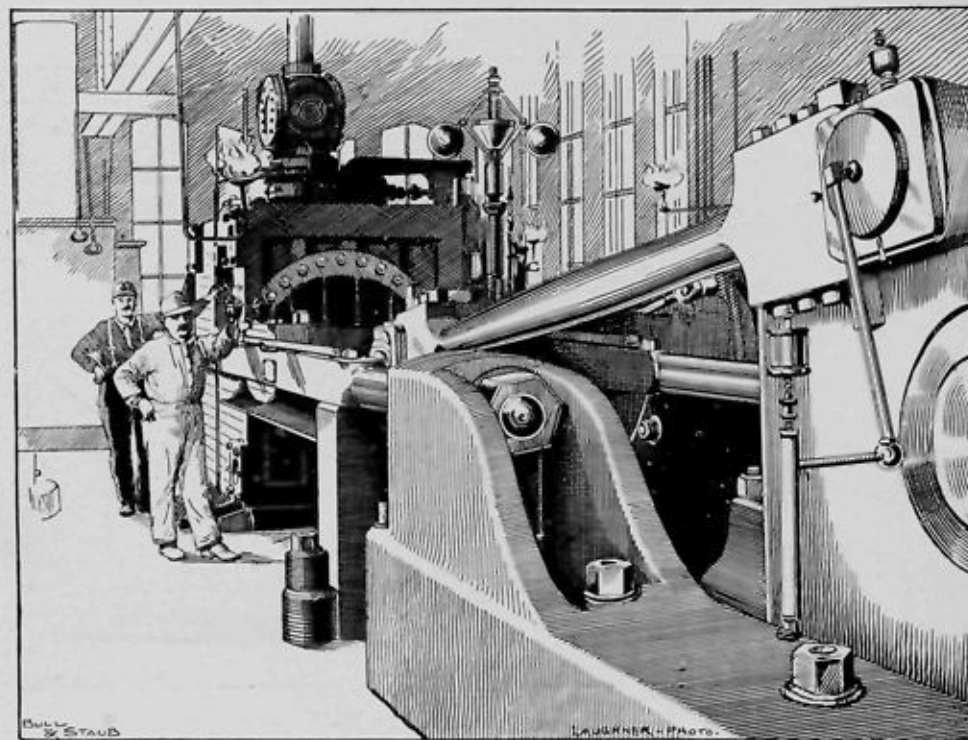
high 24" train, to which the first delivers directly, and the last finishing pass in a two-high No. 33.



18.—FINISHING TRAIN.



No. 34. train of 24" rolls. Each train is run by its own independent engine, the first and second being 46" x 60", and the third 30" x 48"



19.—SECOND ROUGHING TRAIN ENGINE.

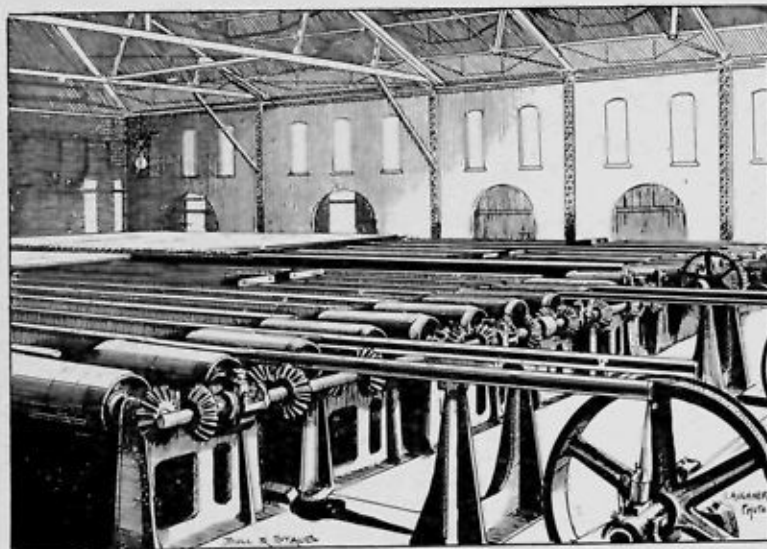
The Mill is nearly automatic, one man handling the levers which lift the tables, move the tumblers, etc. Each roll train has a hydraulic crane for changing rolls, which is done very quickly.

From the tables of the first train the billet goes to the second; from there, by driven rollers, to the finishing train. From the finishing train the rail is carried on driven rollers to the hot saws, where a three-length rail can be cut into lengths by the four revolving

Hot Saws,  
No. 35.

The rails cut to length, travel on another set of driven rollers, and are placed on two Hot Beds by pushers, driven by winding cables moved by special engines. The two Hot

Hot Beds,  
No. 36.



20.—HOT BEDS.

Beds are four feet above the floor, and each is composed of ten parallel rails, covering an area of 30' x 90'. The Hot Bed Wing is 110' x 78', and connects the Mill to the Finishing Department.

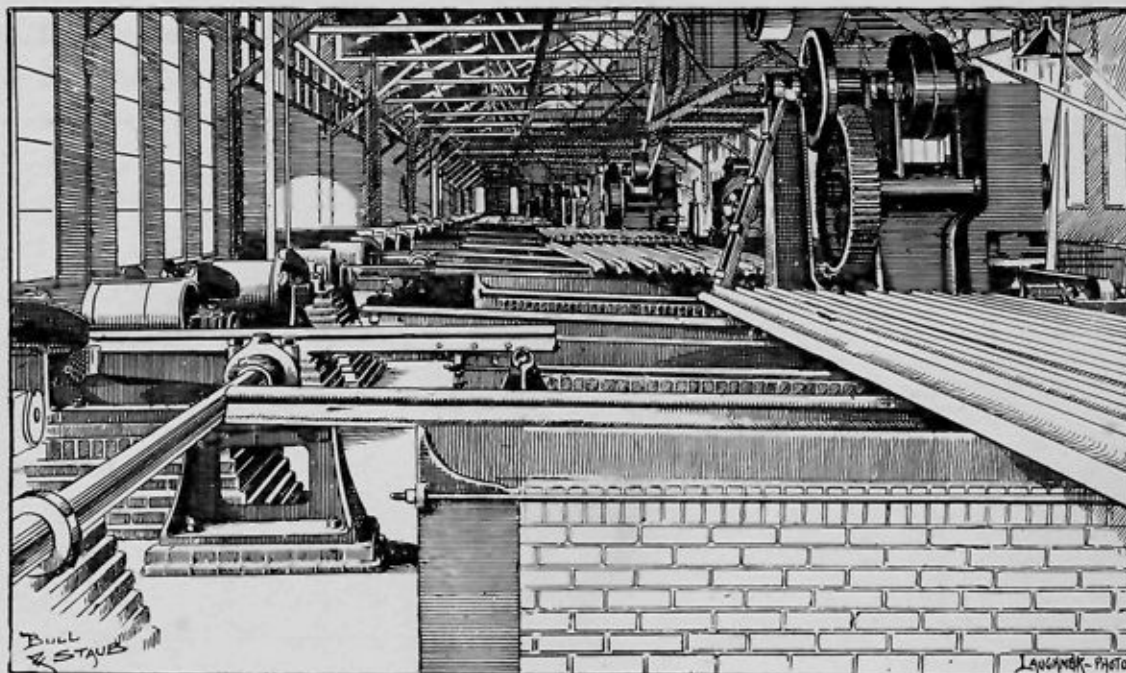
From the Bloom Furnaces to the Hot Beds, the three trains of rolls, tables and hot saws, are all in one long, straight building, 520' x 60', the Hot Beds being in a wing at right angles to this. After the rails have passed over the Hot Beds, they reach the Straightening Department, which

No. 37.

is another long building, 625' x 47', parallel to the Mill.

Finishing  
Department

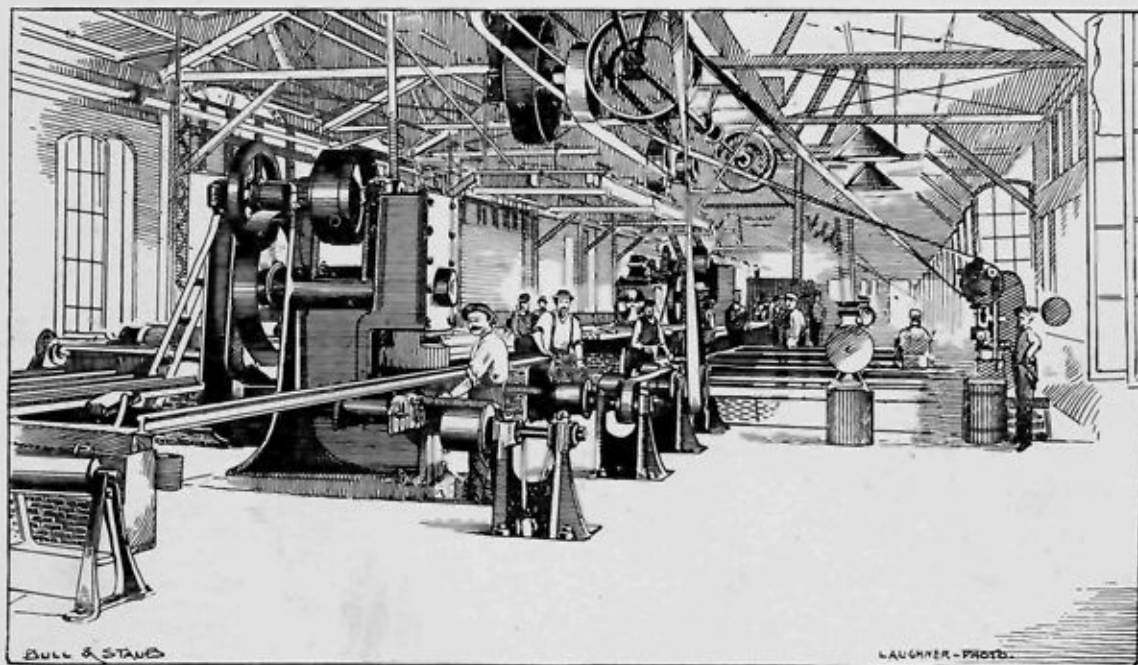
From the Hot Beds the rails are pushed onto a line of driven rollers, which extends the whole length of the Finishing Department, and by which they are carried along. The



21.—COLD BEDS AND STRAIGHTENING PRESSES.

rollers are driven by two small, double reversing engines, so that the rails can be sent forward or backward as desired. When a rail reaches the proper point, two arms are raised by the action of a steam cylinder and piston, controlled by a lever. These arms lift the

rail from the rollers, and, as the arms are inclined at a steep angle, the rail slides down on-  
to the Cold Bed, close to the Straightening Press. There are two Cold Beds for each of the



22.—STRAIGHTENING AND DRILL PRESSES.

eight Straightening Presses, and there are eight Drill Presses. These are operated by an engine, 16" x 21". The finished rails are pushed out of the side of the building to the Loading Beds, which cover a space of 650' x 54'. The Loading Beds are above the level of the common platform car, so that the loading to cars for shipment is very rapid.

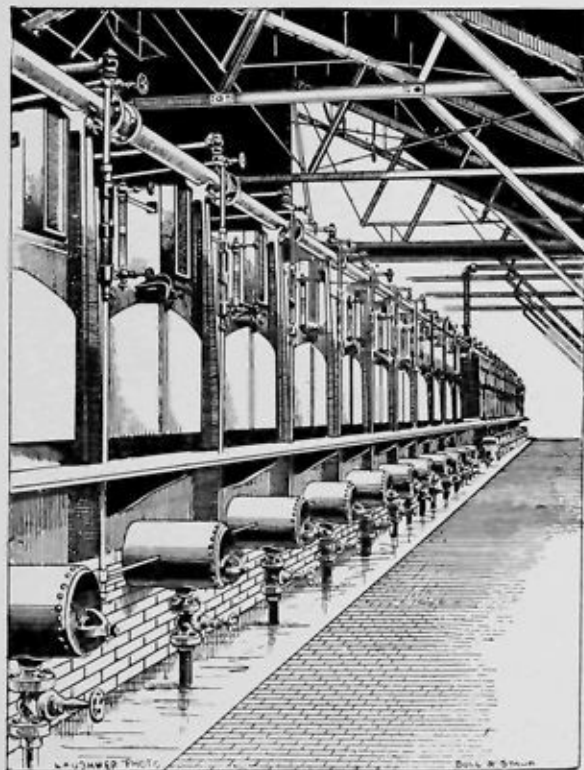
Loading  
Beds,  
No. 38.

Cold Saws. At the North-east end of the Finishing Department is a Cold Saw for cutting rails to special length.

In addition to the Finishing Department above, one Straightening Press, two Drill Presses and two Cold Saws, in the OLD RAIL MILL ANNEX, are in use.

Roll Shop,  
No. 40. THE ROLL SHOP is in a wing 60' x 60', on the North side of the Roll Trains. A platform, parallel to the line of roll trains, serves to store extra rolls. A rail track runs along-side this platform and between the roll trains and the platform, so that the rolls are easily conveyed on cars.





23.—RAIL MILL BOILERS.

THE STEAM FOR THE STEEL DEPARTMENT is furnished by the following boilers: Steam Boilers.

Twelve Boilers, 28' long, 54" diameter, two flues. No. 18.

Twenty Boilers, 28' long, 54" diameter, two flues. No. 24.

Four Boilers, 28' long, 48" diameter, two flues.

Eight Boilers, 28' long, 48" diameter, four flues.

Twenty-four Boilers, 28' long, 54" diameter, two flues, 18" diameter. No. 39.

Two Heine Boilers, 16' long, two flues, 30" diameter, with 113 tubes, 3 $\frac{1}{2}$ " diameter. At  
Blooming  
Mill.

In addition to the above, there are under construction, twenty Boilers, 28' x 54", each with two flues, 18" diameter.

Water. THE WATER FOR STEEL DEPARTMENT is obtained as follows:

No. 17. SUPPLY PUMPS, located in Tank House, 46' x 54',

Two Pumps, 16" Plungers, 36" Stroke, 22" Steam Cylinders.

Three Pumps, 14" Plungers, 10" Stroke, 15" Steam Cylinders.

PRESSURE PUMPS, all connected to operate all hydraulic machinery, are,

No. 19. Two Compound Duplex Pumps, Cylinders 21 $\frac{1}{2}$ " and 36 $\frac{3}{8}$ ", Stroke 36".

One Worthington Pump, 24" Cylinder, 25" Stroke.

No. 25. Three Worthington Pumps, 24" Cylinders, 25" Stroke.

No. 39 $\frac{1}{2}$ . Two Compound Duplex Pumps, Cylinders 21" and 36", Stroke 36".

FEED PUMPS for boilers are,

No. 25. Four Worthington Pumps, 10" Cylinders, 12" Stroke.

No. 39 $\frac{1}{2}$ . Two Pumps, 14" Cylinders, 18" Stroke.

Motive THE LOCOMOTIVE HOUSE for repairs is 54 feet by 124 feet.

Power,

No. 16. The Yard Transportation requires twelve broad gauge and fourteen narrow gauge locomotives.

THE ELECTRIC LIGHT PLANT consists of three Brush 65 light Dynamos, running about  
Electric 175 Arc Lamps. Power is provided by three eleven inch by twenty-two inch Buckeye  
No. 23. Engines.

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1	Stores,	.....	17	Pump House and Tank,	40 x 34	29 1/2	Pump House,	25 x 45
2	Stacks,	.....	18-22	Converting Department,	.....	40	Roll Shop,	60 x 60
H and I	Blast Furnaces,	22 x 90	18	Boiler House,	50 x 114	41	Pings,	60 x 72
	Cast House,	54 x 190	19	Blowing Engines and Pumps,	45 x 52	42	Warehouse,	37 x 64
3	Boiler House,	100 x 110	19 1/2		43 x 47	43	"	37 x 75
4	Engine House,	49 x 88	20	Converting House,	85 x 165	44	Office,	30 x 40
F and G	Blast Furnaces,	22 x 80	21	Ladle House,	40 x 90	45	Machine, Carpenter and Pattern Shops,	200 x 60
	Cast House,	50 x 190	21 1/2	Bottom House,	45 x 80	46	General Office, Laboratory, Drawing Room,	70 x 70
5	Boiler House,	100 x 200	22	Capitol,	44 x 110	47	Manganese Shed,	35 x 120
D and E	Blast Furnaces,	23 x 80	23	Electric Light House,	30 x 42	48	Boiler House,	38 x 45
	Cast House,	54 x 190	24	Boiler House,	50 x 280	49	Limestone Crusher,	.....
6	Boiler House,	72 x 174	25	Pump House,	35 x 52	50	Elevator,	.....
		76 x 146	26	Baker Houses,	28 x 48	51	Switch Tower,	.....
7	Pump House and Tank,	34 x 78	27	Boiler House,	50 x 162			
8	Engine House,	45 x 122	28	Old Rail Mill,	100 x 280			
A	Blast Furnace,	15 x 65	29	Ingot Furnaces,	100 x 120			
	Cast House,	50 x 98	30	Blowing Mill,	80 x 220			
Hand C	Blast Furnaces,	20 x 80	31-34	New Rail Mill,	.....			
	Cast House,	60 x 104	31	Bloom Furnaces,	78 x 185			
13	Boiler Houses,	56 x 182	32	First Roughing Train,	.....			
		48 x 54	33	Second " "	.....			
14	Pump House,	20 x 74	34	Finishing Train,	.....			
15	Engine House,	45 x 100	35	Hot Saws,	.....			
	" " Wing,	40 x 70	36	Hot Beds,	110 x 78			
12	Metal Mixer,	.....	37	Straightening and Drill Presses,	47 x 625			
9	Offices and Laboratory,	50 x 50	38	Loading Beds,	54 x 650			
10	Shops,	130 x 40	39	Boiler House,	200 x 60			
		48 x 56						
11	Warehouse,	28 x 90						
16	Locomotive House,	54 x 124						

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