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MACHINE-TOOL TRADE

IN

AUSTRIA-HUNGARY, DENMARK, RUSSIA, AND NETHERLANDS

WITH SUPPLEMENTARY REPORTS ON ITALY AND FRANCE

By

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with traveling for the firm, and two others undertake the supervision of the commercial branch.

The constant growth of the Wilton yards attests strongly the excellence of their work, and this development is in itself the firm's strongest recommendation.

SMULDERS SHIPBUILDING AND ENGINEERING WORKS.

The Smulders yards at Schiedam, just outside of Rotterdam, were working at the time of my visit (November, 1909) about 800 men. The full name and address of this plant is Werf Gusto, Firma A. F. Smulders, Schiedam-Rotterdam, Holland. Mr. F. Smulders, one of the partners, accorded the writer every facility for inspecting the shops.

The Smulders plant was located at Schiedam about five years ago, but the firm has a history extending over a period of nearly fifty years, starting originally as a small works in Bois-le-Duc, under the direction of the late A. F. Smulders. The firm originally undertook the repair of steam engines and the construction of small mechanical equipment. After eight years' existence in Bois-le-Duc the establishment, owing to its increase in importance, was transferred to Utrecht, where it was known for years under the name of the Utrecht Iron Foundry and Engine Works.

Shortly after locating in Utrecht, the Smulders undertook to manufacture dredging apparatus for shore work, and later constructed dredges for harbor and river work. It was realized that the firm labored under a disadvantage in not having a shipbuilding plant in connection with the Utrecht work, and in consequence of the increase in the dredging business, the firm bought out the yard known as the Industry, situated in Slikkerveer. A short time previous the boiler works of Rensan & Co., at Grace-Berleur, near Liege, had been purchased by Messrs. Smulders.

ESTABLISHMENT AND EXTENT OF NEW PLANT—MODERN EQUIPMENT.

It will be seen that the firm possessed boiler shops, shipyards, and engine works, all in separate localities. A natural disadvantage arose owing to the separation of the different departments, and in consequence it was decided to center all at one point. With this object in view the Smulders secured ground on the river Maas, at Schiedam, and in 1903 commenced the erection of the present works.

The area covered by the Smulders plant at Schiedam embraces 60,000 square meters (1 square meter = 1.196 square yards). The yards are in the form of an irregular quadrangle, and are bordered by the river Nieuwe Maas and the Eastern Harbor. The shipbuilding slips have been built along the western side of the yard and are all constructed on piles. The outermost of these slips has a breadth of 15 meters (1 meter = 1.09 yards), and can be enlarged to a length of 180 meters; the other slips have breadths of 10 meters. All slips are situated in such a manner that vessels can be launched directly into the river Maas, with 9 meters depth of water available at the launching point.

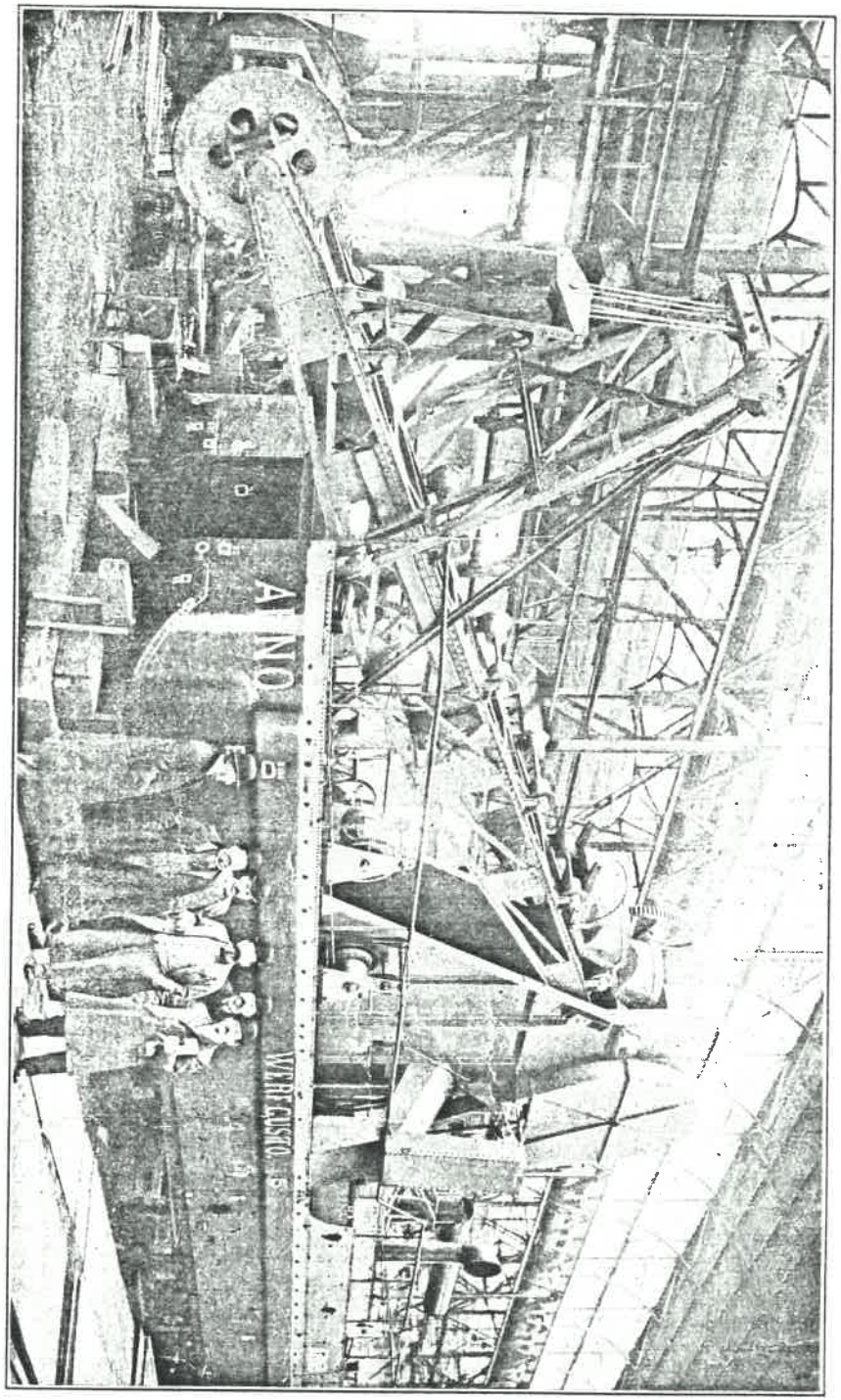

FIG. 24.—Interior view of shipbuilding hall, Smulders Works.

Seldom has the writer found works built with more regard to pleasing effect and to the comfort of the workmen than the new Smulders shops. The buildings are not only substantial in construction, but in many particulars may be described as ornate. The most modern appliances have been utilized to insure the comfort of the men and good sanitation. The blast system for the furnaces and the heating throughout is after the system of the Buffalo Forge Campany, of Buffalo, N. Y.

There are two main buildings at the Smulders yards devoted to machine work, and the machine-tool installation is necessarily found in these structures. Each of these main buildings is 140 meters long and 52 meters wide. The main office building is 30 meters long. Each of the main buildings is divided into three sections; in other words, a center building with two bays. The central hall has a breadth of 25 meters, and the width of each bay is 13½ meters. These buildings are all fitted with electric traveling cranes and connected with railways.

ELECTRIC POWER AND LIGHTING—APPRECIATION OF AMERICAN TOOLS.

The power plant is equipped with two direct-connected engines, each having an output of 168 kilowatts, and also 250-kilowatt dynamos. Vertical compound engines, two of 350 and one of 250 indicated horsepower, drive these dynamos. Foundations have been built for new engines, which it is expected will be required later. The current supplied from this station is 440 volts, and for lighting purposes this is divided into 2 by 220 volts.

In the eastern building there are five driving shafts each fitted separately and driven by its own motor. These shafts supply the power to the various machine tools. There are five electric traveling cranes in service in the east building, two of 15 tons and three of 5 tons lifting capacity.

The machine-tool installation comprises many American tools of high grade. There is the usual proportion of less recent English and Belgian tools and a small number of German tools, but Mr. Smulders, in speaking with the writer on the subject of American and foreign machines, said that the only objection he had to American machine tools was the price.

Mr. Smulders was asked to make some statement based on his experience with American and Continental tools, especially in reference to any defects apparent to him in American types, and having in view Continental needs. He has kindly made the following memorandum regarding his general view of American machine tools:

> I consider American machine tools very suitable, generally. They are well designed, and in the hands of a skillful machinist and with proper tools they turn out a good deal of work, especially when quantities of the same pattern are to be produced. As a rule, however, they are not worked to their utmost capacity, the speed being kept too low.
>
> An inconvenience is caused by the long and somewhat uncertain term of delivery, so that, as a rule, we are compelled to take a machine which happens to be in stock at one of the agencies. Another difficulty is experienced in obtaining spare parts; these are seldom to be found in stock at this end and consequently we have to pay very high, and, in some cases, prohibitive prices.

CHARACTER OF OUTPUT—COALING VESSELS A SPECIALTY.

The work carried on in the Smulders yards is confined largely to the building of steam, seagoing dredges; tugboats; gravel and bog dredges; coal-mining dredges; hopper and suction dredges; elevators, either fixed or floating, with single or double bucket chain; electrically driven elevators; coal elevators; steam hoppers; universal barges; excavators for canal and railway cutting; excavators for removing mounds; tugboats combined with suction and force pump; steamers of different degrees of horsepower; floating docks of the self-docking type, with independent pont tool, or of other systems; cranes, fixed and floating; patented coaling vessels; and steam pile-driving installations.

There are hardly any important government undertakings to which the Smulders plant has not contributed in recent years excavating equipment, including the Panama Canal. This firm has exported material to Russia, Belgium, Italy, Denmark, Portugal, Brazil, Chile, Uruguay, Tunis, Argentina, Siam, and China. It is doubtful if there are other firms in existence in Europe with a more extensive and varied knowledge regarding dredging and excavating work than the Smulders concern.

The Smulders firm is making a specialty of building coaling vessels. These vessels are self-propelling and have a hold which is divided into compartments by means of transverse bulkheads. One of these harbor coaling vessels has a capacity of 1,000 tons. By means of sliding doors the coal compartments empty themselves successively into buckets of the conveyor, which runs in a tunnel over the vessel's keel. The end of this conveyor, or bucket chain, is driven up by one of the two engines, which also propel the twin screws. Before reaching the upward bend, to pass on to the latter, elevator fashion, they run over an automatic weighing machine, and the coal is automatically weighed throughout the operation. The coal is hoisted, elevator fashion, and is delivered to the bunkers through a telescopic chute. As it is possible to make the chute as long as required, bunkering can be effected from a rather great distance. It is even possible to bunker the offside bunker ports or a steamer in a floating dock. It is stated that there is an output from these coaling vessels of over 250 tons of coal per hour. One great advantage secured is that the coal is not exposed to the air while passing from the lighter to the bunkers, and there is thus obviated the usual accompaniment of dust and dirt.

One of these coaling vessels was at work at the time of my visit, on the opposite side of the harbor. Mr. Smulders had just returned from an inspection, and was apparently very much pleased with the service.

CHARACTER AND PRICES OF AMERICAN MACHINE TOOLS.

In the eastern building the principal machine tools in service comprise 54 turning lathes, of which 8 are turning and boring lathes, 25 planing and mortising lathes, 3 heavy cylinder-boring lathes, 6 milling machines, and 15 boring machines.

The following-named American machine tools were observed in service, the prices wherever indicated being those which Messrs. Smulders stated to the writer were paid for the respective tools:

Name of maker.	Type and dimensions.	When purchased.	Price delivered in Rotterdam.
Jones & Lamson Machine Co., Springfield, Vt.	3 turret lathes		
	2" turret lathe	1902	$1,387
	do	1903	1,093
Browne & Sharpe Manufacturing Co., Providence, R. I.	No. 24 miller		
Bullard Machine Tool Co., Bridgeport, Conn.	Horizontal turning and boring mill.		
Do	Turret lathe	1906	1,246
Niles-Bement-Pond Co., New York, N. Y.	5' radial drill	1905	663
Buffalo Forge Co., Buffalo	Blower fans and exhausters		
Landis Tool Co., Waynesboro, Pa	Plain grinder, No. 28	1905	2,784
Do	Universal grinder, No. 4	1905	1,075
Cleveland Automatic Co., Cleveland, Ohio	1¼" automatic lathe	1906	1,126
Cincinnati Tool Works, Cincinnati	1 lathe	1906	583
Dreses, Muller & Co., Cincinnati	4' radial drill	1905	941
Dreses Machine Tool Co., Cincinnati	2 radial drills		
Lodge & Shipley Machine Tool Co., Cincinnati.	6 lathes, 14" swing	1906	400
American Tool Works Co., Cincinnati	Lathe		
Niles Tool Works, Hamilton	Horizontal turning and boring mill.		
Chicago Pneumatic Tool Co., Chicago, Ill.	Boyer drills		
W. F. & J. Barnes Co., Rockford	4 vertical drills		

Men at the Jones & Lamson machine tools are earning, it was said, about $5.34 per week.

The Brown & Sharpe tool was spoken of very highly. The Dreses radial drill is well liked, and was referred to as a very handy tool. Ingersoll-Sergeant engines are employed. There are many shapers in use in these shops without any names showing. The tools appear to be of Belgian origin.

Much of the steel worked up here, in connection especially with dredge hoppers, is of fluid steel.

FOREIGN TOOLS—SHOP HOURS AND WAGES.

Among the foreign tools in use the following were observed:

Billeter & Klunz A. G., of Aschersleben, Germany, power hammers controlled by foot; De Bergue Company, Manchester, multiple punch; J. Whitworth & Co., Manchester, punch; J. Bennie & Sons, Glasgow, punches; G. Muir & Co., Glasgow, lathes; Fetu-Defize, Liege, slotters; G. & A. Harvey, Glasgow, horizontal borers; Zimmermann, Chemnitz, horizontal borers; J. Deneffe, Liege, vertical millers; J. E. Reinecker, Chemnitz, hob machines.

English boring and lathe tools are in service and the Deutsche-Niles Werke have supplied several boring machines. The Smulders cut all teeth on hob machines from Reinecker, of Chemnitz.

A week's work at the Smulders plant comprises approximately 62 hours. The shop opens at 6 in the morning; there is an interval from 8 until 8.30, and an interval from 12 to 1; at 4 o'clock there is a third interval for 30 minutes, and the shops close at 7, except on Saturday, when work stops at 4 p. m.

The weekly wages paid in the Smulders Works are as follows (florin=40.2 cents):

Class of workmen.	Florins.	Class of workmen.	Florins.
Lathe men	14 to 18	Assembling-department hands	16 to 20
Planer hands	14 to 16	Vise men, assembling department	16 to 18
Milling-machine men	14 to 17	Molders	14 to 16
Boring-mill hands	12 to 16	Carpenters	14 to 18
Grinding-machine men	12 to 16	Pattern makers	14 to 18
Foremen	a 25 to 30	Forge men	15 to 20

a Plus extras.

FIJENOORD SHIP AND ENGINE BUILDING WORKS.

The Fijenoord shipyards of Rotterdam had 1,500 men at work in November, 1909, when the writer was granted by Mr. P. J. Biesta, of the administration department, the privilege of an inspection. All departments of this establishment were busy, but no occasion existed for night work. This is one of the best establishments of its kind in Netherlands. The machine-tool installation comprises many American tools of standard types; the character of the output is high, and there is a progressive spirit dominating all parts of the works. The full name and address is: Maatschappij voor Scheeps en Werktuigbouw Fijenoord, Feyenoorddyk 80, Rotterdam.

The firm is doing practically all the work required for shipbuilding. This includes not only hull work, but engines and boilers, propellers, shafting, and numerous small parts, outside of special articles. Broadly speaking, these works engage in the building and repairing of ships and in the making of engines for power installations. Several vessels, including torpedo boats, have been built at this yard for the Dutch navy. Boilers are also built, and there were at the time of the visit a number of orders on hand for heavy Scotch boilers, and for sugar machinery. No pneumatic tools were observed in service in connection with boiler work.

THE EQUIPMENT, BUILDINGS, AND GROWTH OF FIRM.

In the power station attention was attracted by three beautiful high-speed engines recently received from Belliss & Morcom, of Birmingham, England. These engines are self-lubricating and with direct connection. The Fijenoord firm is able, with its excellent foundry equipment, to cast practically all parts required for ship work.

The main erecting shop in this plant is a fine building measuring 230 by 130 feet. It is iron framed throughout and well lighted. There is a main bay, with two large side bays, and with still a fourth bay running at right angles to the building proper. This last bay is equipped in the manner of the main erecting shop. Overhead traveling cranes serve all parts of the building. It is noteworthy that in the erecting shops plenty of room is afforded. The flooring is of brick placed on edge. There appeared to be, however, some unevenness in spots, but it is assumed that these bricks can be as readily removed as in the case of block flooring.

The Fijenoord company has been in existence [illegible]