

Standard Mill
West Side Milling District
116-118 Portland Avenue South
Minneapolis
Hennepin County
Minnesota

HAER No. MN-14

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MINN
27-MINAP,
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

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27.

HISTORIC AMERICAN ENGINEERING RECORD

STANDARD MILL

Location: 116-118 Portland Avenue South, Minneapolis,
Hennepin County, Minnesota

UTM: 15:479600:4980530

Quad: Minneapolis South, Minnesota (1967, revised 1972)

Date of Construction: 1879 (alterations 1881, 1888, 1903, 1908, 1985)

Present Owner: Hayber Development Group (at time of renovation)

Present Use: The mill was renovated in 1985 for use as a hotel.

Significance: The Standard Mill is historically significant for its role in the development of Minneapolis' West Side Milling District, and for its association with the noted milling engineers William Dixon Gray and Otis Arkwright Pray. Designed by Gray and built by Pray in 1879, the Standard was one in a series of West Side mills constructed during the 1870s. The West Side mills helped establish Minneapolis as the flouring capital of the United States from 1880 to 1930. The Standard survived a wave of mill closures and demolitions during the 1930s, and is currently one of only four West Side mills still standing. In 1971, the Minnesota State Historic Preservation Office of the Minnesota Historical Society nominated the structure to the National Register of Historic Places as part of the St. Anthony Falls Historic District.

Historians: Demian Hess and Jeffrey A. Hess, January 1990

The Standard Mill is closely associated with the history of Minneapolis' "West Side Milling District." Built in 1879, the Standard was one of several mills constructed during the rapid expansion of West Side flour milling in the 1870s. Designed by William Dixon Gray, a noted mill engineer, and built by the firm of Otis A. Pray, one of the most respected mill furnishers in Minneapolis, the Standard was immediately hailed as a model establishment. The flour produced by the Standard and other West Side mills established Minneapolis as the largest flour producer in the United States from 1880 to 1930. This time period was also marked by extensive technological refinement and consolidation, and the history of the Standard Mill reflects these general trends. A wave of mill closures swept the West Side Milling District after Minneapolis ceded first place in flour production to Buffalo in 1930. Although altered by later construction, the Standard is currently one of only four extant West Side flour mills, and is thus an important visible reminder of the area's history.

The West Side Milling District lies on the west bank of the Mississippi River, adjacent to the Falls of St. Anthony. It is bounded by the river, Fourth Avenue South, South Second Street, and Eighth Avenue South. The area's industrial development dates from 1856, when the land was acquired by the Minneapolis Mill Company. In 1856-1858, Minneapolis Mill cooperated with the St. Anthony Falls Water Power Company, which owned land on the opposite shore of the river, to build a dam above the falls.¹

Shaped like a giant "V" pointing upstream, the new dam guided the river into mill ponds on either shore. On the West Side, Minneapolis Mill

built a power canal from the mill pond and along what is now South First Street. When completed in 1865, the canal was approximately 900 feet long, 50 feet wide, and 14 feet deep. Minneapolis Mill sold sites along the canal to manufacturers and leased the waterpower.

Due to Minneapolis Mill's improvements, a wide variety of industries settled in the West Side Milling District during the 1860s. By 1871, the area contained 25 waterpowered establishments. These consisted of ten flour mills, seven sawmills, two woolen mills, a cotton mill, a paper mill, an iron works, a sash mill, a planing mill, and a railroad machine shop. The district also contained several steam powered plants, including metal shops, woodworking establishments, and a small custom gristmill. Despite the industrial diversity of the 1860s, flour milling became the dominant industry in the 1870s. This industrial specialization was largely due to technological improvements which, almost overnight, made Minneapolis flour the most profitable product in the industry.

During the 1860s, Minneapolis millers relied on standard flouring techniques developed in Eastern flouring centers. Accordingly, millstones were set close together and run at high speeds to produce as much meal as possible from a single grinding. The meal was then sifted, or "bolted," through cloth to remove impurities. Although "low grinding" made an acceptable flour from winter wheat, the staple cereal of Eastern mills, it did not produce favorable results from spring wheat, which was grown in Minnesota. There were two problems. First, spring wheat had a more brittle husk, or bran, than winter wheat. In winter wheat, the bran separated under the millstones into large flakes that were easily removed during bolting. In spring wheat, however, the bran shattered into fine

particles that were difficult to remove and which discolored the flour. Secondly, although spring wheat had a much higher gluten content than winter wheat, its glutenous layer was also much harer--too hard, in fact, to be reduced in a single grinding. Instead of pulverizing spring wheat gluten, low-grinding methods merely granulated it into "middlings," which were sifted out of the flour during bolting. Speckled with bran and lacking in gluten, spring wheat flour was no match on the market for the winter wheat product.

To improve the quality of their flour, Minneapolis millers began experimenting in the late 1860s with a "New Process" that seemed better suited to spring wheat. The most important elements of the New Process were "high grinding" and the "middlings purifier." As milling historian Robert Frame explains:

In simplified form here is how the New Process and middlings purifier worked. The wheat kernel passed through millstones set just high enough to break it up, cracking the hard center and separating the bran. This meal was fed into the purifier on a vibrating sieve. Air blasts and suction removed the light bran; larger and heavier impurities remained on the sieve, and the now-purified, white middlings passed through. These would be put back through the millstones and reduced to flour.²

The New Process was first successfully used on a large scale in 1870, at Cadwallader C. Washburn's West Side "B Mill."³ New Process flour immediately proved popular, commanding a significantly higher price than winter wheat flour produced by low grinding. By 1875, New Process spring wheat flour was worth up to \$2.25 more per barrel than the traditional winter wheat product.⁴ To keep pace with soaring demand, Minneapolis millers dramatically expanded their production facilities during the 1870s. In this decade, they built seventeen new flour mills on the West

Side. Even disaster could not stem the rising tide of mill construction. When the Washburn "A Mill" exploded and leveled five other West Side mills in 1878, all six were rebuilt and operating within two years.

Concurrent with this increase in flour milling was a decrease in other types of industrial activity on the West Side. This decline resulted partly from general economic conditions and partly from the conscious policy of the Minneapolis Mill Company. Convinced that sawmilling operations wasted waterpower, the Minneapolis Mill Company, between 1876 and 1880, purchased most of the sawmills on the West Side and, within a decade, phased them out of production. Other businesses, such as the Monier Plow Works in 1875, and the Union Iron Works in 1879, left the district of their own accord to find more room for expansion. Still other firms, such as the Minneapolis Woolen Mill in 1875, and the Minneapolis Cotton Manufacturing Company in 1881, simply succumbed to the competitive pressures of an increasingly national market. By 1880, flour milling had become the main industry of the West Side District.

The West Side mills were visible symbols of the flour industry's hegemony in the West Side District. These new structures were among the largest of their kind ever built, and marked a new chapter in flour mill design. In the 1860s, a daily output of 500 barrels was considered extraordinary. However, as national demand for New Process flour rose, West Side mills grew steadily larger. By the early 1880s, daily outputs of 600 to 800 barrels were considered typical. After being rebuilt in 1880, the Washburn "A Mill" had a projected daily capacity of 3,000 barrels, making it the largest flour mill in the country. The building did not hold the title long, however, for it was surpassed in both size

and capacity by the Pillsbury "A Mill," built across the Mississippi from the West Side District in 1881.⁵

The West Side mills also ushered in an era of greater complexity in mill design and operation. Until the New Process, milling had not changed substantially since the innovations of Oliver Evans in the late-eighteenth century. The entire flour mill was typically run by a single millwright, who oversaw everything from maintenance to production. With the introduction of new machines and increased capacity, however, the solitary miller was replaced by a host of laborers, each performing specialized functions.⁶

The unique character of the West Side flour mills was not lost on the citizens of Minneapolis. The unprecedented scale of the mills became symbols of the city's industriousness, and the mills focal points of pride. New mill construction was watched with avid interest, being routinely reported in the press like so many home-team victories.⁷ When the Washburn A Mill was rebuilt in 1880, for example, the United States Miller boldly headlined the event: "MINNEAPOLIS' GLORY. The Largest and Finest Flouring Mill in the World. A Detailed Description of the Magnificent Washburn 'A' Mill. Its Daily Capacity Calculated to Astonish the Unititiate--3,000 Barrels of Flour in Twenty-Four Hours."⁸

In terms of mill construction, the years from 1878 to 1880 were among the most dramatic in the history of the West Side. In these years, the six flour mills destroyed by the 1878 explosion were completely rebuilt and substantially improved. In 1878, plans were also announced for two new mills which promised to be among the largest and best furnished in the city.⁹

One of the new mills was built by Ebenezer V. White and Dorilus Morrison, who had recently formed a partnership as E. V. White and Company. The name changed to D. Morrison and Company when White left the firm in 1883. According to the Northwestern Miller, White was "one of the leading mill men in Minnesota" He eventually became president of the Minneapolis Millers Association and the Minneapolis Chamber of Commerce. Morrison moved to Minnesota from Maine in 1854. Active in Minneapolis business and politics, he became the city's first mayor and was a founder of the Minneapolis Mill Company. He initially made his fortune in sawmilling, but entered the flour industry in the 1870s.¹⁰

White and Morrison planned to build their mill at the corner of South First Street and Sixth Avenue South (now Portland Avenue). They awarded the contracts for constructing and furnishing the mill in December, 1878. The Northwestern Miller wrote on December 13:

This week the contract was let for the new mill of E. V. White & Co. . . . Messrs. O. A. Pray & Co. had taken the contract for making the head race, wheel pit, tunnel for the tail race, the excavations for the foundations, and putting up the building ready to receive the machinery. The second contract . . . covers everything necessary to make the mill complete from the water wheel up The contract was awarded to E. P. Allis & Co., they being the lowest bidders.

It is the intentions of the proprietors to make it a model mill, containing all the very latest improvements in milling science. No pains or money will be spared to make it complete.¹¹

White and Morrison's choice of contractors revealed their commitment to build a "model" flouring plant. Otis Arkwright Pray, who was to erect the mill, was one of the most prominent millwrights in Minneapolis; and the Edward P. Allis Company of Milwaukee, which was to design and furnish the mill, was well respected for the excellent work of its chief engineer, William Dixon Gray.

Otis A. Pray learned the milling trade in the 1830s as an apprentice to Daniel Beedy of Lewiston, Maine. Pray settled in Minnesota in 1857 and eventually undertook the construction of several important mills, including the Cataract, which was the first constructed in the West Side Milling District, and the Washburn B Mill. In the mid-1860s, Pray and a partner opened a machine shop in Minneapolis to supply and manufacture milling equipment. In the 1870s, Pray produced many of the early middlings purifiers being developed for Cadwallader C. Washburn's B Mill.¹² In a biography of Pray, the Northwestern Miller wrote:

Among the names prominent in the history of the birth and growth of American new process milling that of Mr. O. A. Pray is one of the foremost, as he has been identified with the trade for the past thirty years in the various capacities of mill builder, mill owner, millfurnisher and inventor. During that time he has built many of the largest mills east and west, including that in which new process milling originated [the Washburn B Mill]¹³

Pray's head draftsman and chief milling engineer during the 1870s was William Dixon Gray. Gray entered the milling industry in his late-teens while living in Canada. After a brief stint as a railway engineer, he moved to Minneapolis in 1866 and entered the employ of Pray. In 1876, he relocated to Milwaukee to take charge of the flour mill construction division of the Edward P. Allis Company.¹⁴

At that time, the Edward P. Allis Company was marketing a European roller mill which, unfortunately, was plagued by technical problems. Gray redesigned the mill and also conceived of a totally new system for producing flour. Termed the "gradual reduction process," Gray's new system differed from the New Process in that it relied solely on roller mills and subjected the middlings to a much more elaborate and automatic series of grindings and purifications. The net result was faster

production of a much larger quantity of high-quality flour.

Gray first successfully applied his ideas in 1879, when he designed the Washburn "Experimental C Mill," located in the West Side Milling District. The C Mill thus became the world's first modern, automatic, all-roller, gradual reduction flouring plant. Although the importance of his achievement was not immediately recognized by Minneapolis millers, Gray was eventually hailed as a genius. In 1891, the Northwestern Miller declared: "In milling circles, the name of Wm. D. Gray occupies the highest pinnacle of fame as a milling engineer in the true sense of the expression, and as one who is largely responsible for the present high status of the milling art."¹⁵

Pray began to lay the foundation of White and Morrison's mill in April, 1879.¹⁶ On May 28, the Northwestern Miller reported that "O. A. Pray and Co., the contractors . . . , have completed the foundation . . . and will have the brick walls nearly completed to the second floor by Saturday night."¹⁷ By November, the mill was fully constructed and partially furnished. On December 12, the Northwestern Miller published a detailed tour of the new structure (see HAER Photo No. MN-14-51; also see copy of Northwestern Miller article in Supplementary Data Section).¹⁸

Fronting on Portland Avenue and measuring 55 x 155 feet, the mill was four-stories high with a full-length monitor and stone basement (see HAER Photo No. MN-14-1). Constructed of cream-colored brick, the mill's detailing was typical of other West Side brick mills.¹⁹ The principal (east) and rear (west) facades were divided vertically into three bays by brick pilaster strips (see HAER Photo Nos. MN-14-2, MN-14-8).²⁰ Each bay was capped by a decorative, corbelled, brick and iron cornice. A

corbelled brick cornice also extended along the south and north sides (see HAER Photo Nos. MN-14-3, MN-14-6). Segmental-arched, double-hung windows were regularly spaced throughout the mill. On the primary facade, these windows were centered in the bays, with a pair of windows located in the central bay on each floor.

The rear forty feet of the mill were partitioned by a brick firewall and used as a four-story grain elevator with a total capacity of 35,000 bushels. Nine square grain bins were grouped in a 3 x 3 configuration in the southwest corner of the elevator. The bins were constructed of wood cribbing and tied by eyerods. Rising from the second to the fourth floor, the bins were supported by heavy posts in the basement and wood framing on the first floor (see HAER Photo Nos. MN-14-23, MN-14-25, MN-14-26, MN-14-27, MN-14-37, MN-14-38).

A conveyor carried grain from the elevator to the monitor, where grading reels separated the grain into coarse and fine grades. The two grades then descended through the mill, passing through cleaning equipment on each floor, until reaching the basement. There, chilled iron rollers flattened the wheat, preparing it for grinding and purification (for more information on the mill's design, see Supplementary Data Section).

The mill was equipped with 20 runs of mill stones and 12 "Gray's patent noiseless belt roller mills." Although mill stones were placed in the basement, the main grinding operation was located on the first floor. Middlings purification and bolting operations were performed on the third and fourth floors. The mill was equipped with "Standard" purifiers, manufactured by the Minneapolis firm of Fenderson and Cutherson. "Eureka" flour packers and a bran packer were located on the second floor

to prepare the product for shipment. An elevated railroad siding along the north facade carried freight cars directly to the second floor for loading (see HAER Photo Nos. MN-14-9, MN-14-10).

Learning from the 1878 explosion of the Washburn A Mill, White and Morrison installed fire and dust control equipment in the Standard. Each floor was equipped with fire hoses and extinguishers, and all mill stones were fitted with "Berhn's patent exhaust" to capture flour dust generated by grinding. "Dust houses," located on the third and fourth floors, filtered dust from the exhaust of the middlings purifiers.

Water initially powered the entire mill. The Standard was equipped with a 44-inch "Victor" turbine, manufactured by the Stillwell and Bierce Manufacturing Company of Dayton, Ohio. Located beneath the northwest corner of the basement and operating under an approximate head of 35 feet, the turbine drove two shafts located in the basement (see HAER Photo Nos. MN-14-12, MN-14-13, MN-14-19, MN-14-21 for details of headrace arch and wheelpit). The main shaft tapered from 7" to 5" in diameter, and powered all runs of stones. A 24-inch wide, 180-foot-long belt carried power from the main shaft to a line shaft located on the fourth floor. This was bevel-gearred to an upright shaft which transmitted power to the monitor, "where is situated the necessary gearing for driving the elevators, bolting chests, etc." The second basement shaft tapered from 4 3/4" to 3 1/4" in diameter, and powered the roller mills, an exhaust fan, and the packing machinery.

The Northwestern Miller roundly applauded the new mill's efficient and rational design. In regard to the milling floor, the journal reported that "it is without doubt, one of the cleanest, lightest and best arranged

in the country." This, of course, had been White and Morrison's intention from the outset, and they proudly named the mill the "Standard" to call attention to its exemplary design.

The name proved apt, for although the owners had vowed to utilize "all the very latest improvements," the Standard was notable more for the typicality of its design than its innovations. Despite the fact that Gray had developed the first all-roller, gradual reduction mill early in 1879, he did not employ the method in the Standard Mill. White and Morrison apparently believed that the technology was too new, and chose to rely on the New Process and traditional mill stones. However, they were well aware of the increasing use of roller mills, the heart of the gradual reduction system. Consequently, White and Morrison employed rollers on a limited basis and planned for the mill's eventual technological conversion. As the Northwestern Miller explained: "While it [the Standard] cannot be termed a roller mill exclusively, rollers enter very largely into the programme There is plenty of room and power to add more rolls, and as fast as their superiority is fully established they will, without doubt, be added." Roller mills and the gradual reduction process did, in fact, prove their worth almost immediately after the Standard Mill's completion. The mill actually marked an important dividing point in Gray's career, for, as he later recalled, it was "the last mill of any size that I planned and built on what is known now as the old system [New Process]"21

The Standard began operation in November, 1879 with a daily production of approximately 500 barrels of flour. The mill probably did not reach its full rated capacity of 1,200 barrels until 1880.²² That year was also

significant for another reason. In 1880, due to mills like the Standard, Minneapolis became the largest flour producer in the country--a status it maintained for the next fifty years. Concurrently, the West Side also entered "an era of consolidation."²³ From 1880 to 1930, West Side mill owners made every effort to centralize operations and increase efficiency.

The trend toward consolidation was most obvious in terms of mill ownership. In 1882, two firms controlled approximately 51 percent of the daily production capacity of Minneapolis mills, while the remaining production was divided more or less evenly between sixteen different firms. By 1890, four large corporations controlled 87 percent of the city's milling capacity; and by 1900, three corporations managed 97 percent of the total flour production.²⁴

Consolidation also had a technological and architectural component. The years from 1880 to 1930 were essentially a period of intensive technological refinement. New production methods and equipment, such as the gradual reduction process and the roller mill, were perfected and gained general acceptance. Mill interiors became dense jungles of machinery, while exteriors were slowly surrounded by auxiliary structures, such as engine rooms, boiler houses, and grain elevators.

The history of the Standard Mill reflects the trend toward consolidation, particularly in terms of mill ownership. The dramatic increase in West Side flour milling during the 1870s had created serious over-competition by the mid-1880s, frequently forcing Dorilus Morrison to suspended operations at the Standard Mill. In 1886, the Northwestern Miller observed that "the Standard mill was shut down Saturday for an indefinite period, probably several weeks[, and] . . . as a matter of

fact, . . . has not run very steadily for a long time It is well known that Mr. Morrison does not believe in running except when he can see a profit in doing so, and he is not among those who would keep their mills in operation for the sake of giving their men employment."²⁵ In an attempt to gain economies of scale in an increasingly competitive market, Morrison and another Minneapolis milling company agreed in 1889 to form the Minneapolis Flour Manufacturing Company. The new company operated three mills, including the Standard, with an aggregate daily capacity of 3,400 barrels.²⁶

In 1899, Minneapolis Flour became the object of further consolidation when it was acquired by the United States Flour Milling Company. James R. McIntyre, a New York capitalist, had formed the company in 1898 with the intention of acquiring all of the principal flour mills supplying the Eastern United States. In addition to Minneapolis Flour, United States Flour eventually controlled the Northwestern Consolidated Milling Company, which was the third largest flour producer in Minneapolis, as well as major mills in Buffalo, Syracuse, Milwaukee and Duluth. In 1902, the firm was reorganized as the Standard Milling Company. Standard Milling placed all of its West Side properties under the command of Northwestern Consolidated, which it operated as a wholly-owned subsidiary.²⁷ Following conventional practice, Northwestern Consolidated assigned letters to its mills rather than names, the Standard being labeled the "F Mill."

From 1880 to 1930, the Standard's various owners made numerous technological and structural changes. In June 1881, the Northwestern Miller reported that two floors were being added: "Work will be commenced next week to add two stories to the Standard mill. This is to be done to

give the mill greater capacity, which will be increased to twelve or fifteen hundred barrels."²⁸ Apparently, however, Morrison and White only expanded the monitor to create a fifth story (see HAER Photo Nos. MN-14-8, MN-14-39, MN-14-40).²⁹ Additional changes over the next several years included the installation of more roller mills, improvements to the dust control system, and installation of an automatic sprinkler system. By 1890, the Standard's daily capacity had increased to 2,000 barrels.³⁰

Despite these improvements, when the Northwestern Consolidated Milling Company took control in 1902, it apparently considered the Standard Mill to be technologically antiquated. In 1903, therefore, Northwestern Consolidated completely refurnished the mill, increasing its daily capacity to approximately 3,500 barrels. In March, the Northwestern Miller wrote: "The work of tearing out the Standard mill, . . . preparatory to rebuilding and placing it upon a thoroughly modern basis, is about completed. This mill . . . was about the last . . . left on the falls of the old type." Northwestern Consolidated also added a wooden monitor, running from the front to the rear fire wall (see HAER Photo Nos. MN-14-2, MN-14-7, MN-14-45, MN-14-46).³¹

As capacities increased in the 1880s, so did the demand for waterpower. Unfortunately, West Side millers found that the falls could not meet the growing need. In an effort to "stretch the power," mill operators undertook extensive improvements throughout the 1880s and 1890s. At the Standard, the owners rebuilt the mill's head- and tailraces, and installed new turbines in 1887, 1896 and 1910.³²

Despite these efforts, power shortages continued to plague the West Side. By the late 1880s, therefore, most millers turned to steam as an

auxiliary power source.³³ In 1888, the owners of the Standard Mill followed suit, constructing a boiler house at the rear of the mill and installing a steam engine. The Northwestern Miller described the new steam plant:

D. Morrison & Co., owners of the Standard mill, have decided to put in a steam plant, and are now excavating for the building. The engine will be a 32 x 48 Reynolds-Corliss furnished by E. P. Allis & Co., and there will be two 200 hp Root water tube boilers. The building to contain the plant will be a one story brick structure, with galvanized roof, and will be divided into an engine and a boiler room, the former being 23 x 42. The smoke stack will be of terra cotta tiling and 90 feet high.³⁴

Northwestern Consolidated installed a larger steam engine as part of its 1903 remodelling, "providing the mill with one of the best steam plants" in the West Side.³⁵ However, sometime around 1908, the owners demolished half of the boiler house to make way for a railroad car shed (see HAER Photo Nos. MN-14-4, MN-14-5). In 1910, Northwestern Consolidated installed a central electric generating station in the boiler house of the nearby Crown Mill, replacing auxiliary steam operations in all of its mills with electricity.³⁶

After being remodelled in 1903, the Standard was one Northwestern Consolidated's largest mills.³⁷ Unfortunately, the 1930s witnessed a serious decline in the fortunes of the company and the West Side Milling District. Although Minneapolis reigned as the nation's leading flouring center from 1880 to 1930, significant changes in wheat quality, freight rate structure, and tariff policy slowly undermined its supremacy. These changes forced Northwestern Consolidated to reduce production and close many of its West Side mills in the late 1920s and 1930s. By 1933, Northwestern Consolidated's only active plants were the Crown, or "A

Mill," and the Standard.³⁸ Other Minneapolis flouring companies, such as Pillsbury and General Mills, also closed many of their Minneapolis mills, shifting operations to Chicago, Kansas City, and Buffalo. Due to these mill closures, Minneapolis finally ceded first place in flour production to Buffalo in 1930.

In an effort to halt its downward spiral, the Standard Milling Company reorganized its corporate structure in 1932, Northwestern Consolidated becoming a division of the company.³⁹ The next year, Standard Milling decided to sell its waterpower leases and electrify its remaining Minneapolis mills. Until that time, the company owned waterpower rights for six mills, although only the Crown and Standard were in operation. Standard decided it was more economical to sell the water rights and buy electricity from the local utility. The Northwestern Miller reported:

The Northwestern Consolidated Milling Division of the Standard Milling Co. has started work on probably the greatest departure in the last decade or two. It has sold its leases in the St. Anthony Falls water power and is electrifying its remaining active units.

The company formerly owned waterpower leases for six mills. Three of these mills have been razed in recent years. Of the three remaining mills only the A and F [Standard Mill] are being operated. The F mill is now closed and electric motors being installed. . . . When the F mill electrification is completed, it will take up the burden [of producing] until the A mill can be changed over.

The company sold its water leases to the Northern States Power Co. and entered into a contract with it for its needed power. In the changes now underway, water wheels and steam turbines, with a potential capacity of 8,400 h-p, will be replaced with sufficient electric power to drive about 3,200 h-p. This may be enlarged later to 4,300 h-p. The total expenditure may aggregate \$100,000, but the work is being undertaken as a matter of economy, because it was unprofitable to continue⁴⁰ owning six water leases, with only two mills actually in operation.

Standard Milling operated the Standard Mill until 1948, when it sold the building.⁴¹ The mill was then used primarily as a warehouse. In 1971, the Minnesota Historic Preservation Office (SHPO) of the Minnesota

Historical Society recognized the mill's historical significance by naming it a contributing property in the St. Anthony Falls Historic District.⁴² By that time, due to the widespread abandonment of the West Side Milling District during the 1930s, the Standard was one of only four flour mills still standing which dated to the district's heyday as the flouring capital of the United States.⁴³

In 1984, the Hayber Development Group of Minneapolis proposed to redevelop the Standard Mill as part of the so-called "Block 10 Project." In light of the building's significance, the Minneapolis City Council, SHPO, Hayber, and the Washington-based Advisory Council on Historic Preservation entered into a Memorandum of Agreement stipulating that, prior to any remodeling, the structure be recorded according to "Level II Standards" of the Historic American Buildings Survey/Historic American Engineering Record. This report is intended to fulfill the documentation requirements.

Following the completion of the requisite field survey and large-format photography, the Hayber Development Group renovated the Standard Mill into a 97-room, "European-style" luxury hotel. Major exterior alterations included the construction of a new two-story hotel entrance and tower on the southwest side of the mill; removal of the wooden monitor and construction of a full-length, brick monitor; creation of new window openings; and replacement of original 2/2, wooden sashes with metal ones of like construction. At the time of renovation, the mill no longer contained any milling equipment.

Notes

1. Unless otherwise noted, this history of the West Side Milling District and other portions of this report have been drawn from a study prepared by MacDonald and Mack Partnership and others for the Minneapolis Riverfront Development Coordination Board, entitled Saint Anthony Falls Rediscovered (Minneapolis: Minneapolis Riverfront Development Coordination Board, 1980). Jeffrey Hess, a joint author of this report, was responsible for the historical sections of the previous study. For additional information, see: Robert M. Frame, Millers to the World: Minnesota's Nineteenth Century Water Power Flour Mills (St. Paul: Minnesota Historical Society, 1977); Lucile M. Kane, The Falls of St. Anthony 2nd ed. (St. Paul: Minnesota Historical Society Press, 1987).
2. Frame, Millers to the World, p. 51.
3. For an extensive history of the New Process, see Robert M. Frame, "The Progressive Millers: A Cultural and Intellectual Portrait of the Flour Milling Industry, 1870-1930, Focusing on Minneapolis, Minnesota" (Ph.D. dissertation, University of Minnesota, 1980), pp. 41-59.
4. Ibid., p. 53.
5. In 1866, Cadwallader C. Washburn built the "B Mill," which was then the largest mill in Minneapolis, having a daily capacity of approximately 500 barrels; see Edward Duffield Neill, History of Hennepin County and the City of Minneapolis (Minneapolis: Northstar Publishing Company, 1881), p. 393. The mill was promptly dubbed "Washburn's Folly," for, as the Northwestern Miller observed: "An output of five hundred barrels of flour in those days of unprogressive methods was considered enormous" (E. B. Barnes, "The Milling History of Minneapolis," Northwestern Miller 30 [1890]: 30-35). By 1882, the West Side contained 19 mills, 13 of which produced 500 or more barrels of flour a day; see "The Mills of Minneapolis," Northwestern Miller 14 (October 15, 1882): 7. For a complete history of the construction of the Washburn and Pillsbury mills, see Frame, "The Progressive Millers," pp. 96-129; also see the documentation for the Washburn A Mill Complex, HAER No. MN-11, and the Pillsbury Milling Complex, HABS No. MN-29-5.
6. Frame, "The Progressive Millers," pp. 85-92, speaks extensively of the "growth of complexity" in Minneapolis mills. He summarizes the changes in both size and complexity when he writes:

"The rapid introduction and acceptance of the middlings purifier and the roller mill in the 1870s was followed by a dramatic increase in mill size and complexity. The new process and gradual reduction milling brought not only new machines but complex new arrangements of equipment, housed in giant new buildings, and operated by armies of workers. In time, there also were increasingly elaborate corporate structures to manage combinations of mills which were becoming involved in far-reaching networks of domestic and international trade"

(p. 85).

7. Ibid., 92-96. Frame writes:

" . . . In Minneapolis . . . it was not a matter of building merely large mills but huge, gigantic mills, which were immediately celebrated as being the largest flour mills in the world.

"Minnesota millers and non-millers alike, from the 1870s onward, were in absolute awe of the 'mammoth mills' which were erected at the Falls of St. Anthony" (p. 95).

8. United States Miller 9 (August 1880): 55, quoted in Frame, "The Progressive Millers," p. 106.

9. In 1878, plans were announced for the Standard and the Crown Roller Mill. When completed, the Crown was the second largest mill in the West Side, and the third largest mill in Minneapolis. See Demian Hess and Jeffrey A. Hess, "Historical Narrative of the Crown Roller Mill, HAER No. MN-12," U.S. Department of the Interior, Historic American Engineering Record, 1989.

10. Information on White and Morrison was drawn from: "The 'Standard,'" Northwestern Miller 8 (December 12, 1879): 377; Northwestern Miller 16 (September 14, 1883): 245. Additional information on White was provided by Minneapolis City Directories. For additional biographical data on Morrison, see St. Anthony Falls Rediscovered, p. 51.

11. Northwestern Miller 6 (December 13, 1878): 422.

12. For a description of Pray's life and career, see Frame, "The Progressive Millers," pp. 22-59.

13. "The Early History of New Process Milling.--IV," Northwestern Miller 16 (September 14, 1883): 248.

14. For a biographical sketch of Gray and his career (including a discussion of the gradual reduction process), see Frame, "The Progressive Millers," pp. 64-77.

15. "William D. Gray," Northwestern Miller 31 (May 22, 1891): 695, quoted in Frame, "The Progressive Millers," p. 68.

16. Northwestern Miller 7 (April 11, 1879): 223.

17. Ibid., 7 (May 28, 1879): 315.

18. The following description of the mill is based on: St. Anthony Falls Rediscovered, p. 50; Northwestern Miller, "The 'Standard.'"

19. St. Anthony Falls Rediscovered, pp. 40-41, describes typical brick flour mill construction:

" . . . In the West Side Milling District, styles are not readily definable. The mill buildings were merely collections of masonry

motifs used to break up otherwise unrelieved facades. Common decorative motifs used by the designers of these brick mills included recessed panels created by brick pilaster strips, window openings capped by patterned brick arches, and cornices of brick or brick and galvanized iron."

20. All cardinal directions in this study are based on the city street grid. According to this plan, Portland Avenue is assumed to run northward toward the river, while South First Street runs east to west. Using these cardinal points, the long axis of the Standard Mill runs east to west, with its front (east) side facing Portland Avenue.
21. William Dixon Gray, "A Quarter-Century of Milling," part 8, Northwestern Miller 48 (December 13, 1899): 1145, quoted in Frame, "The Progressive Millers," p. 75.
22. "'The Standard,'" Northwestern Miller.
23. The reference to these years as "an era of consolidation" is from the Northwestern Miller 28 (November 8, 1889): 547. The following discussion of consolidation is drawn from St. Anthony Falls Rediscovered, pp. 37-38.
24. The figure for 1882 was drawn from information contained in "The Mills of Minneapolis," Northwestern Miller. The statistics for 1890 and 1900 are from Saint Anthony Falls Rediscovered, p. 37.
25. Northwestern Miller 21 (May 7, 1886): 437.
26. Ibid., 28 (August 30, 1889): 230.
27. Paul M. German, "Standard Milling Company," unpublished corporate history, c. 1978 (copy provided by the Uhlmann Company, Kansas City, Missouri), pp. 3-6, 19-30.
28. Northwestern Miller 11 (June 24, 1881): 420.
29. Minneapolis, Minnesota, v. 1 (New York: Sanborn Map Publishing Company, 1885), plate 2 (hereafter referred to as "1885 Sanborn").
30. By 1885, the Standard was equipped with 51 sets of double rollers (1885 Sanborn). Many other changes were made to the roller-mill arrangements at the mill, as the following citations in the Northwestern Miller document: 18 (August 1, 1884): 103; 22 (October 15, 1886): 401; 24 (August 19, 1887): 197; 29 (January 24, 1890): 86. Automatic sprinklers were installed sometime between 1890 and 1892; see Minneapolis, Minnesota, v. 2 (New York: Sanborn Map Publishing Company, 1890), plate 2 (hereafter referred to as "1890 Sanborn"); Atlas of Minneapolis, v. 4 (Chicago: Rascher Insurance Map Publishing Company, 1892), plate 367 (hereafter referred to as "1892 Rascher"). For changes to the dust control system, see the following copies of the Northwestern Miller: 20 (November 20, 1885): 485; 22 (November 19, 1886): 523; 25 (March 23, 1888): 291. Due to these changes, production capacities rose steadily. By 1883, daily

capacity equalled 1,500 barrels; see Northwestern Miller 16 (August 24, 1883): 173. By 1889 it equalled 1,700 barrels; see Northwestern Miller, "The Milling History of Minneapolis". The figure for 1895 was drawn from Northwestern Miller 40 (September 13, 1895): 422.

31. Quote is from "Rebuilding the Standard Mill," Northwestern Miller 55 (March 18, 1903): 557. For additional information on the 1903 remodeling, see the following entries in the Northwestern Miller: "Standard Mill to be Rebuilt," 55 (February 25, 1903): 398; 55 (March 25, 1903): 609; 55 (April 1, 1903): 663; 55 (April 22, 1903): 819; 55 (May 13, 1903): 981; 56 (July 29, 1903): 237. In its March 18 issue, the Northwestern Miller gave a general description of the remodelling:

"Among the apparatus demolished were 54 hexagonal or round reels, 18 and 24 feet long. There are 8 runs of buhrs, and six will be retained . . . on which to reduce fine purified middlings. Aside from the 16 large Nordyke & Marmon square sifters, there will be introduced 18 double sets of rolls--9x24 and 9x30 in size. . . . In the new system to be introduced, five breaks will be made on wheat and eight on middlings. The prime object sought in rebuilding the mill is to materially lighten it up as to power required, by discarding old-fashioned reels and the addition of the sifter system."

32. See Kane, The Falls of St. Anthony, pp. 114-133 for a discussion of the increasing shortage of waterpower during the 1880s. For improvements to the Standard's waterpower system, see the following citations in the Northwestern Miller: 20 (July 24, 1885): 77; 24 (August 26, 1887): 221; 24 (December 9, 1887): 619; 32 (November 6, 1891): 631; 33 (June 10, 1892): 877; 34 (August 5, 1892): 185; 41 (February 21, 1896): 313; 83 (September 14, 1910): 666.

33. St. Anthony Falls Rediscovered, p. 54.

34. Northwestern Miller 26 (July 20, 1888): 68.

35. *Ibid.*, 55 (March 18, 1903): 557.

36. *Ibid.*, 83 (September 14, 1910): 666.

37. The only other mill of comparable size was the Crown Roller, which also had a daily capacity of approximately 3,500 barrels; see Demian Hess and Jeffrey A. Hess, "Historical Narrative for the Crown Roller Mill, HAER No. MN-12."

38. "N. W. Consolidated to Electrify Mill Units," Northwestern Miller 173 (February 15, 1933): 394.

39. German, "Standard Milling Company," pp. 54-61.

40. "N. W. Consolidated to Electrify Mill Units," Northwestern Miller.

41. Rock Island Holding Company, Warranty Deed to Sol Leader and others, February 6, 1948, in "Abstract of Title to Lot 13 in Block 16,

Minneapolis," City Side Development Company, Minneapolis.

42. Minnesota Historical Society, "National Register Nomination Form for St. Anthony Falls Historic District," unpublished, 1971; copy on file at the Minnesota State Historic Preservation Office, Minnesota Historical Society.

43. St. Anthony Falls Rediscovered, pp. 33-58.

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SUPPLEMENTARY DATA SECTION

The Northwestern Miller.

The Only Weekly Milling Newspaper Published in America.

VOLUME 8—NUMBER 24

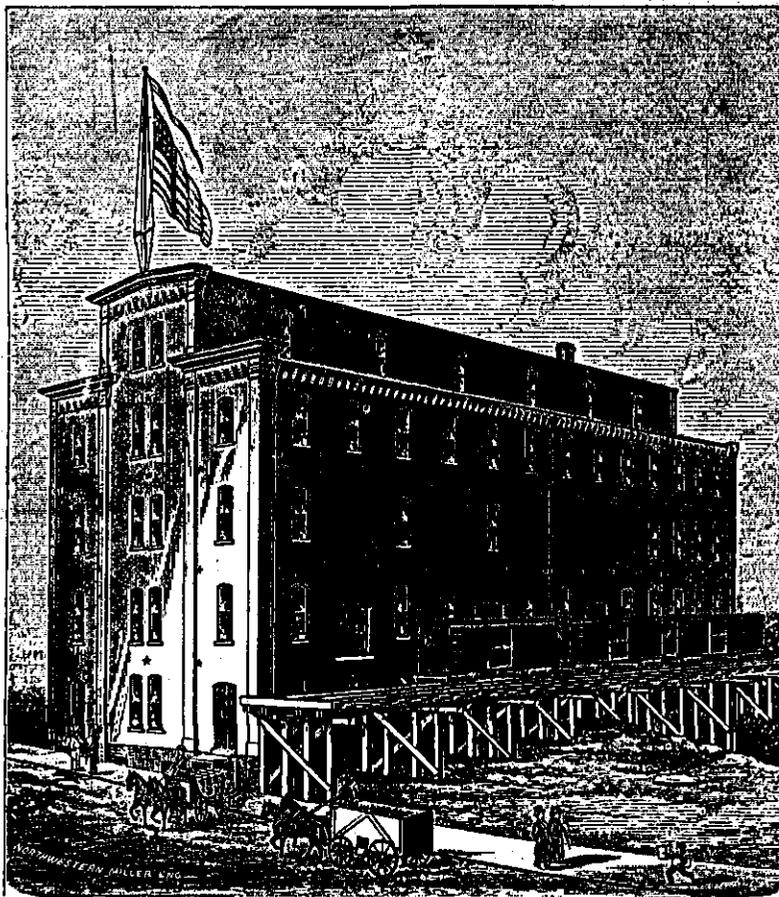
MINNEAPOLIS, MINN., DECEMBER 12, 1879.

THREE DOLLARS PER YEAR

THE "STANDARD."

Description of the New Mill
Just Started up by Messrs.
E. V. White & Co.

The year which is now about closing, has been an eventful one in the history of Minneapolis. Not only has there been a great increase in general business and especially in building operations; but the little plot of ground upon which stand twenty-one of the twenty-four merchant mills in this city now in operation or in process of completion, has been the scene of unparalleled activity. Besides a great amount of remodeling and additions to mills already built, five large merchant mills have been erected. Two of the mills are without doubt the largest structures designed for use in flouring mills in this country. Next to them in size is the mill of Messrs. E. V. White & Co., which has recently started up, and which, with a laudable determination to make it fully worthy of the name, they have called the "Standard." It was our fortune to look over the ruins of this mill destroyed by the great explosion in 1878, on the morning following the disaster in company with Mr. E. V. White, one of the owners of this mill, and while viewing the wreck of the Washburn mill A, we remarked to him that the milling interest of Minneapolis had received a severe blow. "Yes," said he, "but it will recover." His faith in the milling future of this city soon had a practical exemplification, for within the next few months he had made arrangements with Mr. D. Morrison to build a mill which should not be excelled by any in the city in the completeness of its appointments or in the quality of its work. No time was lost in getting the project under way, and early in October last, the contract for erecting the building, together with excavating for the foundations, rice, wheat pit and tunnel, was awarded to Messrs. O. A. Piny & Co., of this city. This contract covered furnishing the materials and finishing the building ready for the machinery. Shortly afterward the contract for furnishing the machinery and placing it in position was awarded to Messrs. E. P. Allis & Co., of Milwaukee. Active operations on erecting the building were begun about April 20th, and on the 30th of November, seven months later, the mill turned out its first



THE "STANDARD" MILL, MINNEAPOLIS, MINN.

barrel of flour. When it is considered that in this short time a mill capable of turning out from ten to twelve hundred barrels of flour per day, was literally constructed from the raw material and put into successful operation, it will readily be seen that no time was wasted.

The mill building proper fronts on Sixth Avenue South, between First and Second Streets, and is 55x115 feet on the ground and including the basement is six stories high. Adjoining the rear end of the mill and rising to the same height, and under the same roof, but separated from it by a brick fire wall, is an elevator 40x55 feet. The whole building, as shown in the accompanying illustration, is of handsome cream colored brick, and is 55 feet wide and 155 feet long. It was designed by W. D. Gray, designing millwright for Messrs. E. P. Allis & Co. He also prepared the programme upon

which the mill should be operated, and made the plans and specifications for locating the machinery. Before the programme to be followed was decided upon he traveled extensively in Europe, visiting the best mills there, so that this mill embodies many of the results of his observations. While it cannot be termed a roller mill exclusively, rollers enter very largely into the programme. The mill contains twenty runs of four and one-half feet French linn and twenty-six pairs of mill. There is plenty of room and power to add more rolls, and as fast as their superiority is fully established they will, without doubt, be added.

It is not possible, in the space we have at our command, to enter fully into a minute description of the machinery of the mill, or to trace the course of the wheat from the storage bins in the elevator to the flour in the barrel, but we will give a concise description of the general plan

and arrangement of the mill. Mr. Gray's reputation as a millwright, and the well-known position of Mr. White as one of the leading millmen of Minnesota, is sufficient assurance that it lacks nothing which is necessary to make it one of the most complete and advanced mills of the present day. Beginning with the elevator we find that the wheat, after being weighed in, is elevated by a storage elevator, and distributed into the bins, nine in number, having an aggregate storage capacity of 35,000 bushels. As used, the wheat is drawn from these bins, elevated to the fifth floor, where it is discharged into a grading reel, which separates it into two grades. These two grades are cleaned separately, each grade having its own set of cleaning machinery.

On the fourth floor of the elevator are two richmond separators, through which the wheat passes from the grading reel. It then goes through two richmond separating machines on the third floor, two richmond brush machines on the second floor and two more richmond brush machines on the first floor, after which it passes down into the basement, through the Victor wheat hoppers, and there the coarse and fine grades are each crushed separately on a set of 14x26 inch smooth chilled iron rollers, there being one set of rolls for each grade. In the basement, or rather below it, is the wheel pit, in which is a 44 inch Victor turbine wheel, which drives the mill, working under a head of 33 to 35 feet. The basement also contains the main gearing to drive the mill. The machinery of the mill, aside from the stones, rolls and flour packers, is driven by a 24 inch double leather belt, over 180 feet long, which passes up through the elevator to the fourth floor, from which point a shaft passes through the belt key well into the mill, where, by means of bevel gear and upright shaft, the power is transmitted to the fifth floor, or attic, where is situated the necessary gearing for driving the elevators, bolting chests, etc.

In the basement of the mill proper are twenty iron hulk frames, placed in two parallel lines of ten each, and resting on substantial brick and stone foundations. Between these parallel lines of hulk frames runs the main driving shaft,

Continued on Page 260.

Continued from Page 277.

which next to the water wheel gearing is seven inches in diameter, diminishing at the outer end to five inches. One line of hulk frames is close to the north side of the mill and the other is about in the center of the mill. Back of this line is a second line shaft, diminishing from 4 1/2 to 3 1/2 inches, from which the roller mills are driven. A forty inch Starvevant fan, which works the Behm's exhaust on the mill stones, is also driven from this shaft, and by means of gearing a counter-shaft is also driven, from which a belt drives the flour packers on the second floor above. In the basement below situated the machinery for operating the passenger elevator, which runs from the basement to the attic. The basement is floored with cement, and we may also say for the benefit of those of our readers who are strict temperance men (and what millers are not?) that it contains a living spring of pure cold water, where he that is athirst may refresh himself.

The first floor above the basement is the grinding floor, and it is without doubt, one of the cleanest, lightest and best arranged in this country. Entering it from the street, in the front left hand corner is the office. Stepping from the office into the grinding room, the visitor finds himself at the end of the two parallel lines of mill stones, each line consisting of ten runs, each run being fitted with the Behm's patent exhaust, one of the best things ever placed in a mill, being an absolute preventive of fire and explosion from the stones running together.

er beset with effecting a great saving in catching the dust which would otherwise go into the dust room or out of doors. One line is on the north side of the mill, and the other occupies the center of the floor. Right back of the center line of stones is a double line

of Gray's patent noiseless bolt roller mills. At present there are twelve of these mills in position, each mill having two pairs of nine by eighteen inch chilled iron rolls. There is room for ten more of these machines in the same double line. There are no spouts on the grinding floor, and only nine elevators

the floor of the cars standing on the elevated track of the Minneapolis & St. Louis railroad, shown in the cut, so that the flour can be rolled directly into the cars. The Chicago, Milwaukee & St. Paul road will also have a side track on the south side of the mill, and the packing floor is so arranged that cars can be

put purifiers, dust room for same, and the upper half of the bolting chests containing twenty sixteen foot reels, and two thousand bran dusts.

The fifth floor, or attic, is one-half the width of the mill building, and contains the gearing, shafts, etc., to drive the elevators and bolting chests, and four twenty-four foot and four eighteen foot reels.

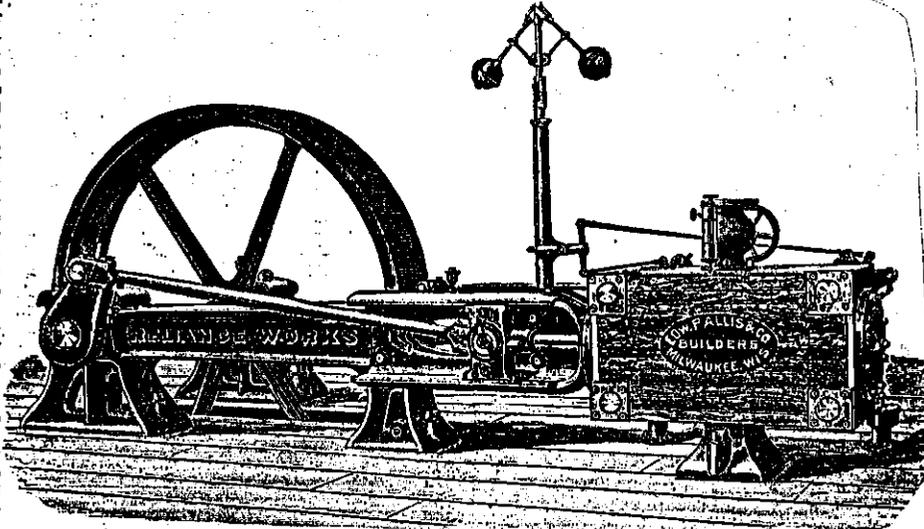
The above particulars regarding the construction and arrangement of the mill were furnished us by Mr. U. H. Todd, under whose excellent superintendence the work of putting in the machinery and starting up the mill has been done. Great credit is due Mr. W. D. Gray, the designer of this mill, for the convenient arrangement of the machinery; to Mr. Child for the faithful execution in which he has carried out Mr. Gray's designs; and to Messrs. Allis & Co. for the superior mechanical construction of the work. The mill will be under the charge of Mr. J. G. Meier, formerly in the employ of Mr. White at La Crosse and Lancaster.

The mill property, including the land upon which it stands and the water privileges, which together with the building, contains an invested capital of nearly or quite \$200,000, and is owned and will be operated by Messrs. E. V. White and D. Harrison, under the firm name of E. V. White & Co. It starts with a capacity of 450 to 500 barrels per day, which will be increased to 1,000 to 1,200 barrels when the mill is fully completed.

The mill has started very successfully, without the least trouble and the flour turned out is already ranking well up among the best.

Samples from the very first run barrels made were of such high grade as to elicit surprise and hearty commendation from expert dealers. Mr. White's name is well known in the eastern flour markets, and will

be sure really sale of all the flour the mill can make. The citizens of Minneapolis may well be glad that Mr. White decided to locate in their midst, and proud of the elegant mill which stands as a mark of his enterprise and his faith in the future of their city.



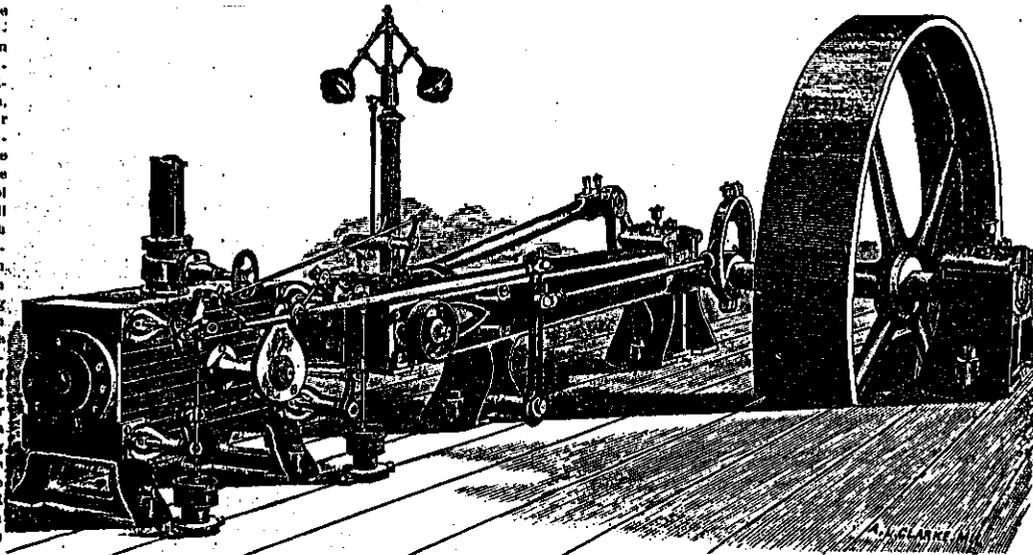
FRONT VIEW OF THE REYNOLDS-CORLISS ENGINE, BUILT BY E. P. ALLIS & CO.

pass through it, so it will be seen that this floor is very clean and free from obstructions. At the same time the stones and rolls are all directly under the eye of the miller. The only other machinery on this floor is a Frun water wheel governor and scales for weighing bran.

The next floor is the packing floor,

lined with flour or bran on either track with the least possible labor.

On the third floor of the mill are located ten "Standard" purifiers, built by Messrs. Fenner & Cathbertson, of this city. The bolting chests also begin on this floor, and in this story are twenty reels, each nineteen feet long. On the



BACK VIEW OF REYNOLDS-CORLISS ENGINE, SHOWING VALVE GEAR.

containing five Enoka flour packers and one bran packer. Here are also the stock gears and millings bins over the roller mills and the mill stones. The conveyors are all hung to the joists overhead, so that the floor is free from obstructions. This floor is on a level with

north side of the room is the dust room for the ten purifiers, and on the south side are the flour bins over the packers. On this floor are also two of Gray's purifiers and two thousand bran dusts, and the bins for bran and shorts. The fourth floor also contains ten "Standard

purifiers, dust room for same, and the upper half of the bolting chests containing twenty sixteen foot reels, and two thousand bran dusts.

er beset with effecting a great saving in catching the dust which would otherwise go into the dust room or out of doors. One line is on the north side of the mill, and the other occupies the center of the floor. Right back of the center line of stones is a double line