

“Development of the Sauk Rapids Granite Company”

(Sauk Rapids, Benton County, Minnesota)

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The article begins:

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This article, which begins on the next page,
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<http://quarriesandbeyond.org/>

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Sullivan Plug Drills at work, Sauk Rapids Granite Company

(photo caption) "Sullivan Plug Drills at work, Sauk Rapids Granite Company."

DEVELOPMENT OF THE SAUK RAPIDS GRANITE COMPANY

BY STANLEY G. HARWOOD, MECHANICAL ENGINEER*

The Sauk Rapids Granite Company is situated at Sauk Rapids, in Benton County, south central Minnesota, four miles from St. Cloud. This company, one of the youngest in the Minnesota granite district, was organized for the purpose of carrying on quarrying and finishing operations on a large scale, to the end that efficient handling of the quarry product, from monumental stock to crushed rock, might be attained.

Eight properties were purchased and welded into one system. There are four quarry groups, containing excellent granite of five different colors. These quarries are all connected with a spur of the Northern Pacific Railroad. Quarry No. 1 contains 48 acres in the form of a bluff 30 feet high. This is used to supply crushed rock, supplementing the waste from the other quarries. The company which formerly operated it has erected a crusher plant adjacent to the railroad.

Quarry No. 2, which was developed in conjunction with Quarry No. 1, by a former company, contains two deposits, one consisting of a good red and the other a dark gray granite, and was well opened when purchased by the Sauk Rapids Granite Company.

The group comprising quarries Nos. 3, 4, and 5 contains as fine a deposit of red and pink granite as can be found in the state. The group comprising quarries Nos. 6, 7, and 8 covers 40 acres and contains a fine grained light gray granite, suitable for high-grade monumental and building work.

In the town of Sauk Rapids the company purchased the property of the original Sauk Rapids Granite Company, consisting of a complete cutting and polishing plant. Additional land was acquired on which to build cutting sheds, storage yard craneways and machine shops for general service. This property

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adjoins the Northern Pacific main line and has access also to the Great Northern tracks. The purchase of the Monarch shed, with its adjoining property and excellent trackage facilities in St. Cloud, added a monument cutting plant to the system.

For the No. 1 crushed rock quarry a new and thoroughly up-to-date crushing plant was designed, including a No. 6 and No. 3 Gates Crusher and a Symons Disc Crusher. These machines are located in a pit below track level and receive the rock from the quarry as it is dumped from the cars. The crushed rock is carried to overhead screens and dropped into four bins which rest on a reinforced concrete table. These bins have a combined capacity of 400 cubic yards. Cars for shipping the material pass under the table and receive their load from the bin gates by gravity.

The old quarry, No. 2, now has three derricks, as shown in the picture on page 900. The two far derricks are operated by electricity and the one in the foreground by a steam plant.

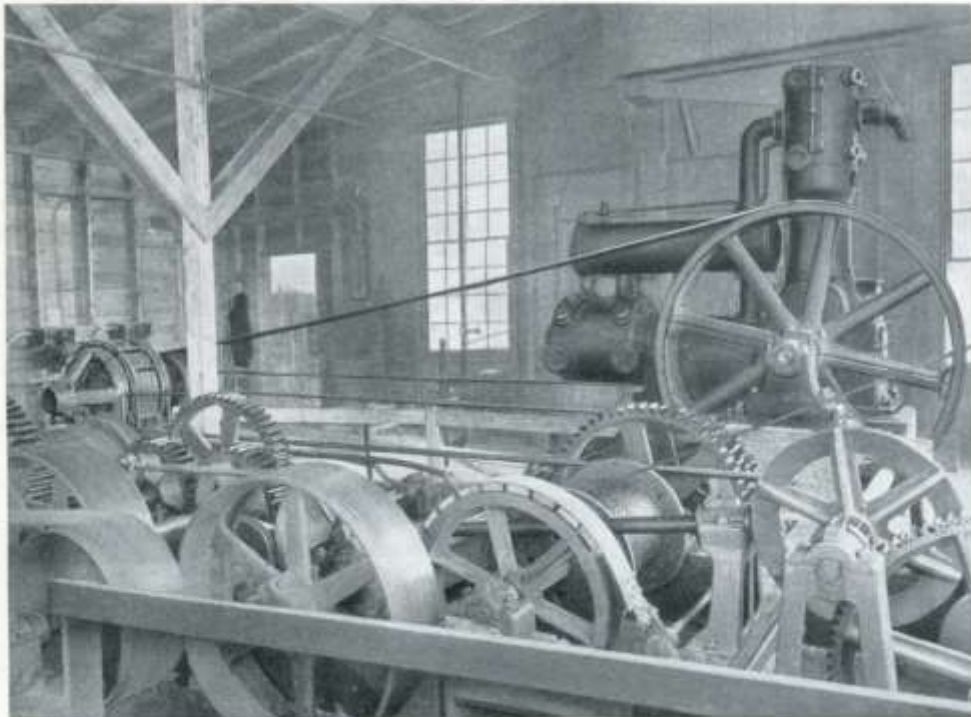
HOIST AND COMPRESSOR

The interior of the power plant operating the middle derrick is shown in the lower picture on page 900. In the foreground is shown the New Albany hoist, having a lifting capacity of 15 tons with single rope. This hoist is of the belted type, the power being taken off by friction pulleys. It has three drums, main fall, boom fall, and swivel, and is furnished with power by a 25 h. p. General Electric, Form L induction motor.

Behind the hoist is seen the Sullivan Angle Compound air compressor and its 100 h. p. G. E., Form L induction motor. This compressor, under normal load, furnishes 628 cubic feet of free air per minute at 100 pounds pressure. This air is discharged into a receiver, just outside the



Sauk Rapids Granite Company, Quarry No. 2, Sauk Rapids, Minn.



Hoist and Sullivan Angle Compound Air Compressor at No. 2 Quarry

(photo captions) "Sauk Rapids Company, Quarry No. 2, Sauk Rapids, Minnesota, & "Hoist and Sullivan Angle Compound Air Compressor at No. 2 Quarry"

power house and thence is conducted to the quarry. Another line runs along the railroad track, supplying the paving cutters with air. A pipe connection between this plant and the one on the right equalizes the pressure of the system and renders it more flexible.

QUARRY DRILLING

In this quarry (No. 2) a channel about 60 feet deep and ten feet wide was first taken out. The plan of this channel on the quarry floor is T-shaped, so that a very large amount of stone was liberated on three sides at once. The channel cuts are made with a $3\frac{1}{4}$ -inch reciprocating drill, mounted on a standard quarry bar. Cross bits are used, the holes being drilled about six inches apart on centers and the core or rock between the holes being broached out later with a broaching bar. For all other deep hole work the same type of $3\frac{1}{4}$ -inch drill is used, but mounted on standard universal tripods.

These drills are the Sullivan class "FL-3 Hyspeed" type, which have a 28-inch feed on the shell instead of the customary two-foot run. The valve motion of this drill is such that a small super-valve, actuated by a tappet, operates the main spool valve. This combination gives the positive action of the old tappet type of drill, combined with the speed of the differential valve type. This drill can be short-stroked for starting holes, etc., as readily as the differential type. It is also economical of air, as live air is not required to throw the main valve.

A large part of the quarrying is done with hammer drills. For shallow hole work the Sullivan "DP-33" Air Tube Rotators are used. Holes as deep as eight feet are drilled regularly, the drill being operated by one man. Hollow steel is used, so that a jet of air can pass through the steel and keep the hole free from cuttings. Six point "rose" bits were first used for this work, but experiments conducted by the superintendent, Mr. R. J. Colvin, demon-

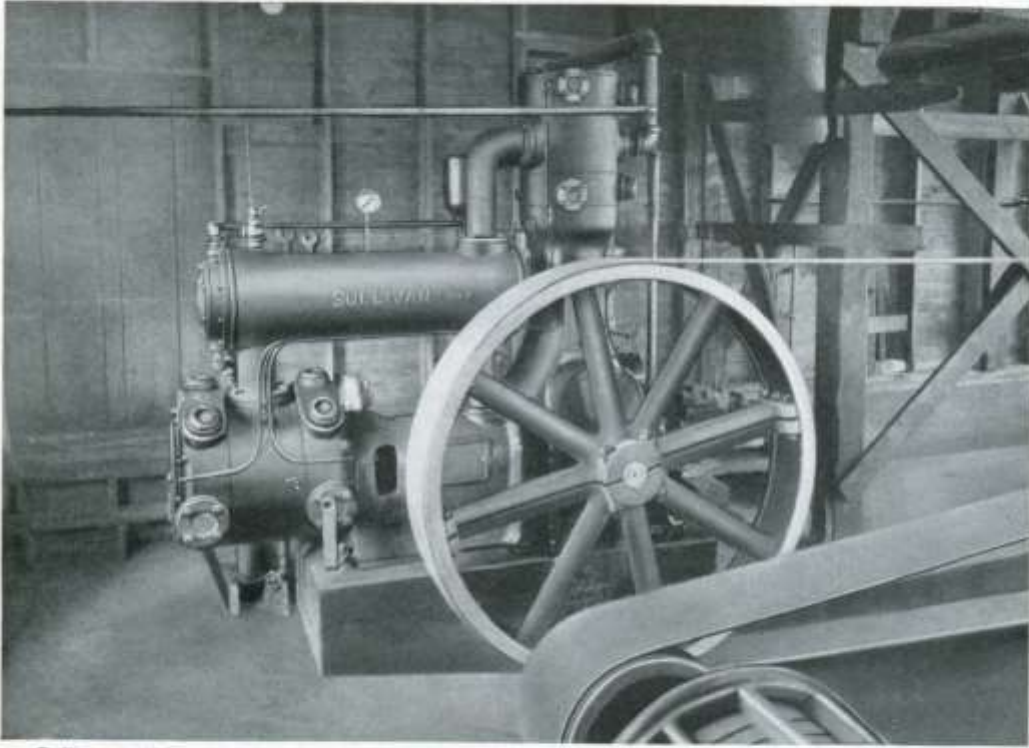
strated that a standard "bull" bit would hold the gauge better, drill nearly as fast, and require much less blacksmithing in this rock. The "Rotator" has a steel retainer which holds the steel in the drill, and is equipped with an automatic rotating device. Blocks of stone up to 15 tons in weight are taken out and then split to size by means of plugs and feathers. The plug drills used are the Sullivan "DF-3" type.

QUARRY NO. 3 POWER PLANT

Quarry No. 3, shown in the lower picture on page 902, has one power plant and main derrick and an auxiliary hand power derrick. A 75 h. p. General Electric, Form L induction motor with counter shafting runs the plant. A 15-ton New Albany Hoist operates the power derrick. The upper cut on page 902 shows the Sullivan Angle Compound air compressor which furnishes air power for the drills at this opening. This machine has a capacity of 445 cubic feet of free air per minute at a pressure of 100 pounds per square inch. As can be seen in the picture of quarry No. 3, a large amount of development work has been done and a fine lot of monumental and building stock has already been taken out. A straight channel was first made and quarrying is being done on one side of this channel.

Further equipment of the Sauk Rapids Granite Company consists of an American Hoist and Derrick locomotive crane which greatly increases the flexibility of the handling system.

The equipment of the company is so complete that every cubic foot of quarried material may be used to advantage. The rock formation of its quarries is favorable to the removal of blocks of any shape and size that can be gotten out within the capacity (15 tons) of the derricks. Much of the stone is suitable for the finest monumental and building work. Paving blocks, curbing, etc., absorb the "seconds" and the crushing plant takes care of the remainder of the output.



Sullivan 445-foot Angle-Compound Air Compressor, Quarry No. 3, Sauk Rapids Granite Company



Quarry No. 3, Sauk Rapids Granite Company. Sullivan Tripod Drills at work

(photo captions) "Sullivan 445-foot Angle-Compound Air Compressor, Quarry No. 3, Sauk Rapids Granite Company" & "Quarry No. 3, Sauk Rapids Granite Company. Sullivan Tripod Drills at work"

Situated in the Mississippi Valley, the Sauk Rapids Granite Company possesses an important advantage in freight rates over eastern quarries, giving it a large field in which its competitive position is very favorable.

Mr. George W. Bestor, president of the Sauk Rapids Granite Company, has been for many years prominently connected

with the stone industry. Mr. C. C. Dragoo, vice president, has been active in the granite business at Sauk Rapids and Mr. E. R. Kelm, secretary, has been in the granite business at St. Cloud. Mr. R. J. Colvin, general supt., has had a wide experience in handling quarrying operations. The engineering work has been done by the writer.
