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Ohio Mining Journal

Title: Visit to Russell & Co.'s Factory

Issue Date: Nov-1890

Citation: Ohio Mining Journal, no. 19 (November, 1890), 50-53.

URI: <http://hdl.handle.net/1811/32600>

Appears in Collections: [Ohio Mining Journal: Whole no. 19 \(November, 1890\)](#)

Visit to Russell & Co.'s Factory.

Accepting the invitation tendered the Mining Engineers by Russell & Co. to visit their great works we proceeded to the factory about 9:00 A. M., and were met at the entrance by Mr. J. W. McClymonds, President of the Company, C. O. Heggem, the Superintendent, and others. Under escort of these gentlemen we were first conducted through the iron working department. In one room we found in process, parts of Threshing Machines and Farm or Traction Engines, in another were seen much heavier details, being portions of the Stationary Automatic Engines. We could not help but note here the use of most approved machinery, and much of which was new and special—convenient cranes, pneumatic lifts and over-head tramways were seen on every hand, all tending to facilitate production. Still in the iron department we came to a comparatively new building called the erecting room. Some 30 feet above our heads, moving on rails supported by side walls of building was a power crane having a lifting capacity of 20 tons. The operator seated in his cage through various levers causes the crane to move backward and forwards and the trolley carrying block and chain in four directions. On the floor underneath are now being erected 40 Traction Engines and 5 Stationary Engines per week. Crossing to an adjoining building we come to the foun-

dry. The power for driving fans, blowers, etc., for the department is furnished by one of Russell & Co.'s Engines, a beauty in design and noiseless in its performance. The foundry building is large and airy; is equipped with two cupolas, having a capacity of 35 tons per day; massive cranes are scattered here and there ready to lift their heavy burdens.

At one end of the building are located core rooms and ovens, beyond is the brass foundry. Passing through we come to a very large room devoted to the cleaning of castings. Across the drive-way is a long building whose eaves are pierced with frequent chimneys; here is the blacksmith shop; 24 large fires are ablaze—shears, punches, hammers, all busy forming iron and steel to needed shapes.

We realize that boilers are made in this vicinity and pushing aside the sliding door we enter a large area full of noise and boilers in every stage of construction. Boilers of Locomotive and Tubular patterns are made in large quantities at an average rate of three per day. Rising on either side of, and overtopping the boiler shop are heavy brick walls, the sides of a new structure that will be 320 feet long and 80 feet wide. This building, when completed will be equipped with the most approved machinery for the manufacture of boilers, occupying two-thirds of its length, the balance of space will be devoted to the construction and erection of Farm or Traction Engines. There will be a 20 ton travelling crane traversing the whole length of this building. In the wings on the side will be located the smaller machines for working up detail, leaving the central area under the crane clear for assembling and putting together of parts.

To the north of this new building stands the great warehouse for storage, principally of Threshing machines. It has a length of 350 feet by 65 feet wide and is four stories in height. Directly west of this we enter the east and south wings of the original shops. Their three floors are given over to wood and iron working machinery for the preparation of Threshers and Saw mills. In the centre of a court formed by the wings of the original factory we come upon the engine house. The power for driving these works is furnished by one of Russell & Co.'s new Compound Engines of 200 H. P., having four valves operated by a shaft governor.

It was stated to the writer that the reduction in fuel with the new engine as against the old one removed, was fully 75 per cent. We saw here a successful application of the use of manilla rope in transmitting power. The face of the fly-wheel is cut into some 11 grooves, a pulley on line shaft is similarly arranged and has a tension carriage above. The entire power of the

engine is transmitted through a $1\frac{1}{4}$ rope of eleven strand, noiselessly and requiring in operation very little attention. The space occupied on face of fly-wheel by rope is 20 inches. To perform same work with double leather belt would require one 44 inches in width.

On the opposite side of the street from the main factory is situated another warehouse, 350 feet by 60 feet wide, $2\frac{1}{2}$ stories, occupied principally by Traction Engines and test-room for same; we saw here one of the horses of the highway at its best. A friction clutch on the engine shaft is used to throw gear for propelling ground wheels in and out of play, with a quick reversing device the operator on the foot board would drive his engine forward and backward with great speed, stopping again so quickly as to suggest the air brake. This company uses this engine in their yard to do hauling and switching of cars, displacing mule teams formerly necessary for this work.

Finally we entered another building where we found on testing blocks the newly completed Automatic Engines set up and running under steam and heavy brake loads that the correctness of their construction and performance might be determined and recorded. Near by we entered another room filled with engines and dynamos which this company operate to furnish lights for streets and stores.

Returning to the office, which we found elegant and commodious, we received from the company very handsomely illustrated publications descriptive of their products.

The plant of Russell & Co. occupies 20 acres of land, 12 of which is covered with buildings; all of these are of brick. Nearly 800 men find employment here. The annual capacity of the works is 200 automatic engines, 200 tubular boilers, 900 farm engines and boilers, 500 saw mills, 500 horse powers and 1,200 threshing machines.

Adieus were said to their escorts in the office after choice cigars had been passed among the tourists. The members of the Institute, under their guide, Senator Howells, proceeded to Reed & Co.'s glass works, where Mr. David Reed kindly conducted them around their plant. The party witnessed the manufacture of bottles and jars which was of great interest to many of them.

At 1:30 P. M. the members accompanied by several citizens and members of the press boarded a special train on the C., L. & W. R. R. and went to the Howells Coal Co.'s mine, known

as the Camp mine south of Justus. Along the route the party was delighted with the beauty of the rich agricultural section they traversed. On arriving at the mine a few descended to examine the points of interest below, while the remainder critically examined and discussed the practical features of the hoisting, dumping and other appliances for handling the coal.

Everybody was especially interested in the water which is pumped from the mine day and night without ceasing, through seven pipes of an average of seven inches in diameter. Senator Howells stated its volume as more than 3,000,000 gallons every twenty-four hours, enough to supply a city of 40,000 population. Assistant Mine Inspector Robert Bell held the attention of the party for some time at the top of the shaft, with an entertaining talk on safety catches, and the tourists returned to the city at 6 P. M.

The evening session was called to order at 8 o'clock by the President. And the paper on the program by Prof. F. W. Sperr of the School of Mines at the O. S. University on mine ventilation was changed to a short talk on the subject, in order to give R. M. Haseltine more of the evening that was then well spent, for his paper on Shaw's system of testing poisonous gases in mines and give an exhibition of its mode of operation. It being new to all present a great anxiety was manifested to discuss its merits.
