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BAND SAW MILLS FOR LOGS.

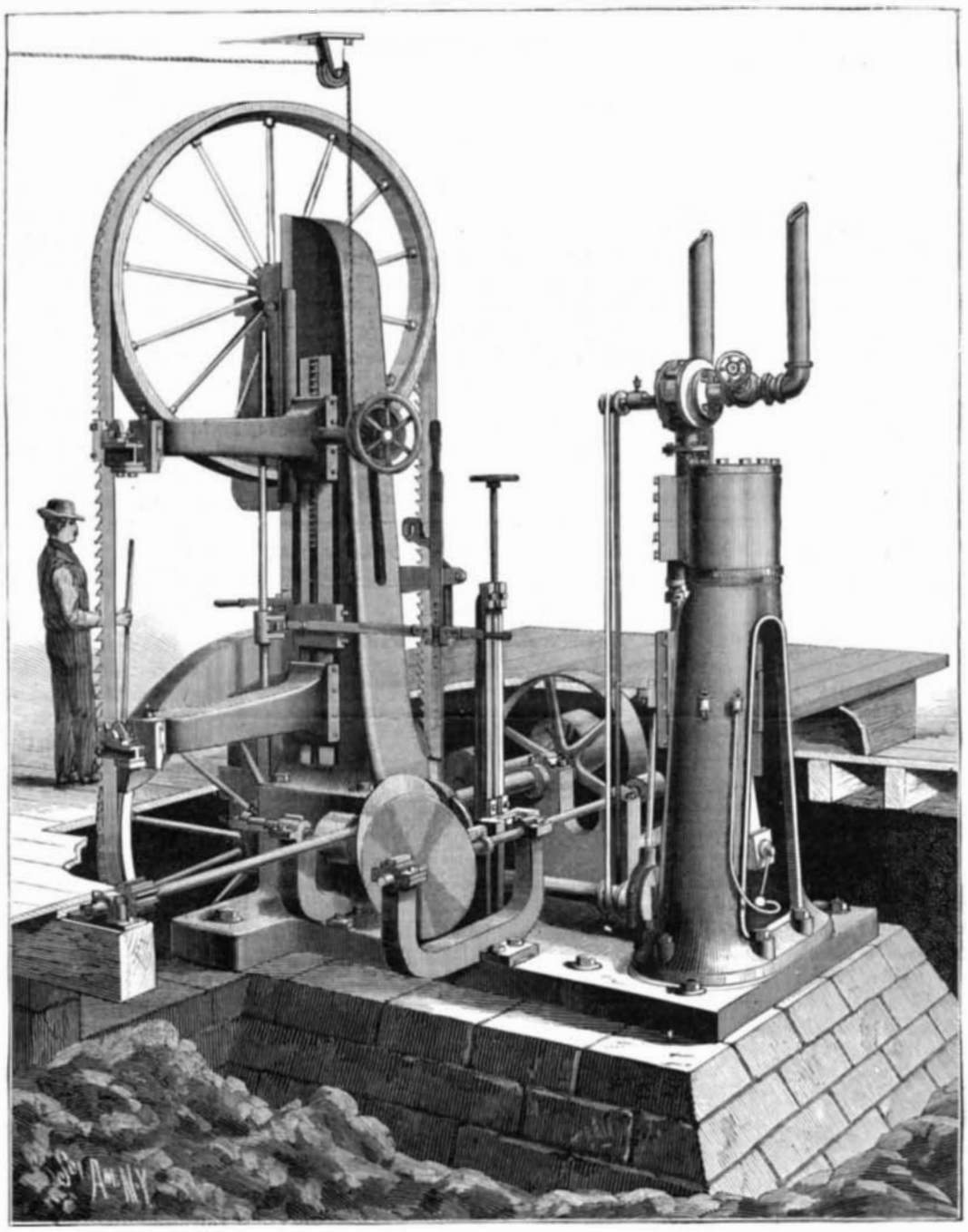
Some years ago we published a description of a band saw mill arranged for sawing logs, erected in New York city by the Atlantic Works, of Philadelphia. At that time such mills were little known, but the increasing demand for something more efficient and less wasteful than the circular mill has led to many improvements in band saw mills.

The wheels, the vital point of a band mill, are now eight feet in diameter, thus greatly reducing the flexure of the saw. They are kept as light as possible, consistent with great strength, these two points being essential—strength to withstand the great strain of the saw and lightness to reduce the force of inertia, and consequent sudden strain on the saw blade in entering the log.

The wheels are supported on steel shafts, and have bearings on each side close to the hub. The wheel shafts have ample provision made for adjustment in every direction, in order to permit of accurate alignment, and the adjustment of the upper wheel, which controls the position of the saw on the wheels, can be made while the mill is running.

The feed motion of the carriage is novel and beautiful, being powerful and yet capable of very wide variation. It consists of a delicate friction device, which is at the same time so powerful as to move the heaviest logs with ease. It is so completely under the control of the operator, that he can change the rate of feed instantly from zero to full speed, or alter the rate by an almost imperceptible variation.

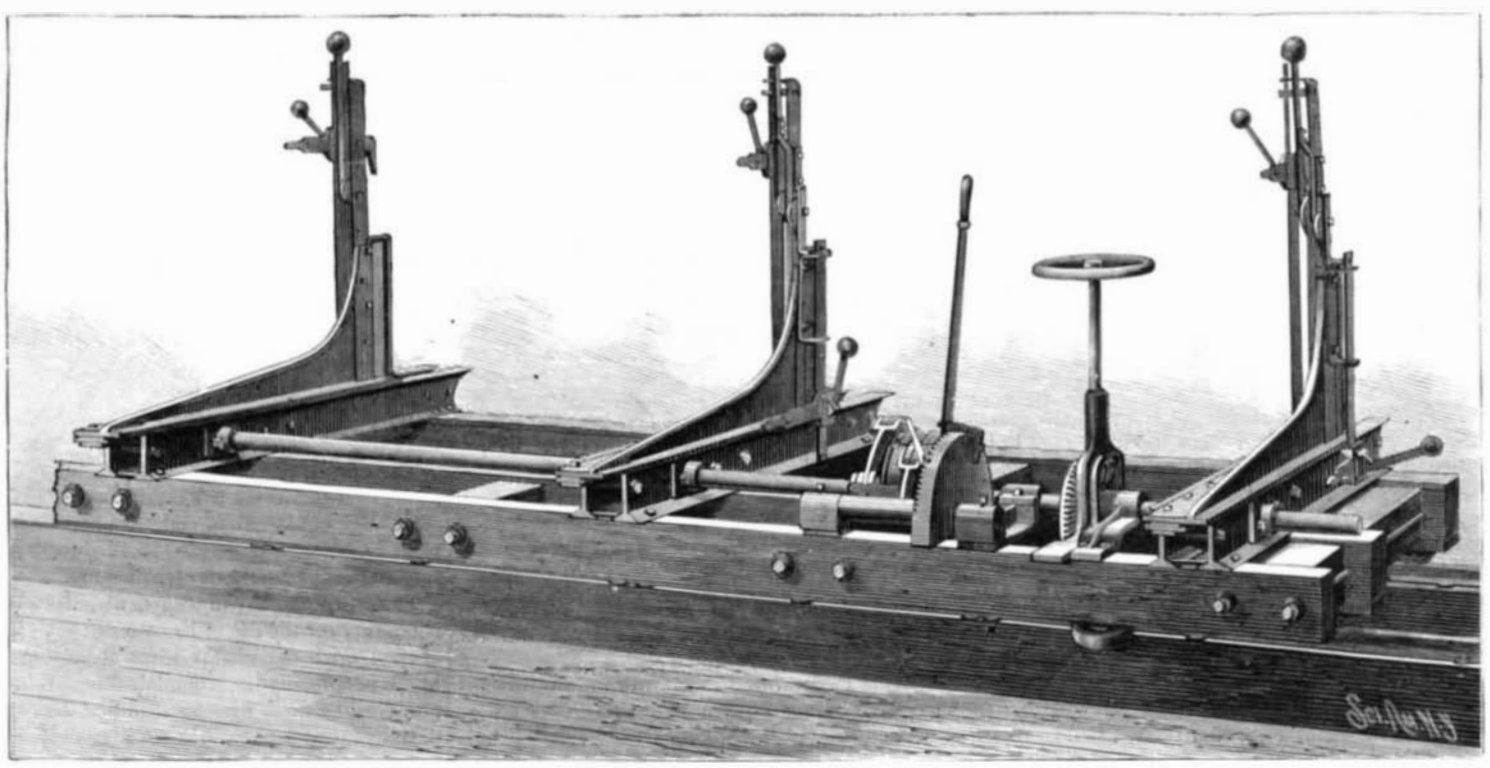
In order to avoid the loss of power experienced through friction and stiffness of belts, and as a superior mechanical construction, the mill is arranged to be driven by a vertical steam engine connected directly to the saw wheel shaft. The high rate of speed—300 revolutions per minute—at which the engine is required to run, calls for great care in this method of construction, but all obstacles have been successfully overcome. The entire mill, feed works, and engine, are bolted down to a massive sole plate, six feet wide and nine feet long, and the parts are made of such strength and rigidity as to insure the greatest stability. The engine is proportioned throughout for high speed, the working parts being capable of standing as high a mean effective pressure as a locomotive engine.



The guides are bored true with the cylinder, and the cross head pin is central in the cross head, permitting the pin to assume the position of least strain. The reciprocating parts are counterbalanced as far as possible, and the compression of the steam is so arranged as to take up all the shock arising from the inertia of the unbalanced weight. At 300 revolutions, or 600 feet, per minute, the motion is perfectly smooth and free from tremor. The position of the engine permits the operator to have complete access to all its parts without leaving the control of the mill. The engine is 10 inches bore, 12 inches stroke, and at 600 feet piston speed, with 70 pounds boiler pressure, will give ample power. All the parts of the engine can be oiled while in motion, and the bearing surfaces are so large as to run cool without requiring undue attention.

The saws used on this mill are about 50 feet long, 6 inches wide, and of the thickness known as 17 gauge. In order to strain such a saw to the tension required for cutting, the column and framing are made unusually strong. At first sight the mill appears heavy, but when the size of the saw is remembered, and also the fact that the mill can cut a log six feet in diameter, the proportions are seen to be correct.

A very important improvement in this mill, and one found in the same form in no other mill, is an attachment known as the saw deflector. This consists of a device so connected to the saw guides that when the motion



LONDON, BERRY & ORTON'S BAND SAW MILLS FOR LOGS.

of the carriage is reversed, the saw blade is automatically drawn back about one-quarter of an inch from the freshly cut surface of the log, and retained in that position until the forward motion of the carriage begins, when the saw is instantly restored to its exact former position. The advantages of this are obvious. The saw does not scratch the surface of the log on its back motion, while at the same time the speed of the quick return movement can be greatly increased.

Before this attachment was made, the return motion of the carriage was twice as fast as the maximum forward feed; with the deflector attached the back motion has been easily increased to three times the forward feed. This may not appear at first sight so important, but the firm suggest the following calculation relative to this point: In a year of 300 working days, without the deflector, 200 will be spent in cutting and 100 in running back the carriage; while with the deflector in use 225 days will be spent in cutting and only 75 days in running carriage back, a clean gain of 25 days' sawing.

The carriage on which the log is carried, together with the head blocks and dogs for supporting and holding it, as well as the set works and rails on which the carriage runs, all merit attention. Four different kinds of carriages are made for these mills in order to meet the varying wants of customers, but the style shown in the illustration is the most complete.

The head blocks are each made of double wrought iron I-beams, planed true and carrying strong knees to which the dogs are attached. These knees are made to recede 44, 48, or 54 inches from the saw, as required. Motion is transmitted from the set works to the knees through a steel shaft, carrying cut steel pinions working in cut steel racks. The ratchet wheels in the set works have forged steel rims, the ratchet teeth being machine cut, thus insuring the greatest accuracy in every respect. This set works is graduated to set to sixteenths. After the log has been entirely sawed, the knees can be brought back by power while the carriage is running back, or a few turns of the hand wheel on the carriage will bring them back simultaneously.

The dogs used for holding the log are the celebrated Knight's patent upper and lower dog. These dogs are so well known that it is only necessary to say that the upper and lower dogs can be adjusted separately or together, and that they will hold a log or flitch when nearly cut up, so that it is impossible for the board to spring away from the knees, thus permitting a log to be cut up true to the last board.

The trucks under the carriage are strong and heavy, to stand the strain of loading and turning heavy logs, and the rails on which the carriage runs are made of railroad iron planed true. The rail nearest the saw is planed to a V-shape, while the other one is flat.

These mills are made also to be driven by belt instead of direct engine, and can then be driven from any suitable source of power.

Band saw mills as above described are suitable for cutting the finest lumber in the country—walnut, poplar, pine; saving a large amount of lumber which would otherwise be cut into sawdust by the wide kerf of the wasteful circular mill. Their capacity is rapidly approaching that of circular mills. Messrs. London, Berry, & Orton tell us that with good logs they can already average 20,000 feet of lumber per day, and expect soon to see the day when 30,000 feet will be cut on band mills. Those who are interested in the subject should write Messrs. London, Berry & Orton, Atlantic Works, 22d Street above Arch Street, Philadelphia, Pa. They make the entire plant for band saw mills, including all described above, as well as log turners, edgers, cut-off saws, and saw mill machinery generally.

The American Institute Fair.

The fifty-third industrial exhibition of the American Institute was opened in its great building on Third Avenue, New York, on Wednesday, September 24. There was an audience estimated at 5,000 to listen to the opening address of the President, Cyrus H. Loutrell, who was followed in a most interesting speech by Hon. Abram S. Hewitt. The latter declared that the wealth of the world had been multiplied a hundred fold within a hundred years, by the aid of intelligent invention and the work of skilled mechanics. Science, he said, and not legislation, was the great lever which produced happy men and women; science revolutionized society for the better.

The lists of exhibits and exhibitors at this year's fair outnumber those of any previous year. The central part of the building, which is an eighth of a mile in circumference, has a concrete floor. Conterno's Ninth Regiment band is to give a concert each afternoon and evening. The machinery will be in motion from 10 to 12 o'clock in the morning, 2 to 5 o'clock in the afternoon, and 7 to 10 in the evening. One of the most interesting exhibits is an incubator in which chickens will be hatched; the eggs have been placed in at such intervals that chickens are expected to be hatched hourly, when they will be placed under an artificial mother, so that on the last day of the fair, it is counted, there will be chickens hatched by artificial means on the premises from one hour to two months old.

THE prediction of M. Ch. Montigny, of Brussels, that the past summer would be a very dry one—a prediction founded on his observations of the change in the character of stellar scintillation—has been **fulfilled to the letter.**

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(Illustrated articles are marked with an asterisk.)

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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 457,

For the Week ending October 4, 1884.

Price 10 cents. For sale by all newsdealers.

THE GREAT TELEPHONE SUIT.

After four years of preliminary work, the great telephone suit between the American Bell and the People's Telephone Co. has reached a hearing. In the interest of the inventions themselves, in the magnitude of the amount involved, and in the number of witnesses and size of record, the suit has no parallel. The four years' work and the accumulation of the vast amount of testimony is amply justified from the standpoint of the first two considerations.

The history of the litigation may be briefly stated. It is a suit brought by the American Bell Telephone Company upon letters patent issued to Alexander Graham Bell, dated March 7, 1876, and January 30, 1877, against the People's Telephone Company, of this city. The possession of these patents has given the Bell Company the control of the telephone market. They sue the People's Company as infringers. In their defense the People's Company allege priority of invention on the part of Daniel Drawbaugh, and the issue of infringement is waived, the defendants practically admitting that they do infringe upon the Bell patents. The defendants claim that the invention of these patents was made at a period long prior to their date of issue, by Daniel Drawbaugh, of Pennsylvania. Hence they say that the patent should not have been issued to Bell, as he was not the first inventor. In this way the Bell Company is put on the defensive to protect its own patents, and the nominal defendant is really the aggressor.

Daniel Drawbaugh was a native of Pennsylvania. He was born at Eberly's Mills, in Cumberland Co., where he always resided. He was a mechanical genius of the universal type, turning his hand to a variety of work in demand in such a country region as the one he inhabited. He repaired guns and clocks, made furniture and machinery, and painted the wagons, and the portraits of their owners, for the surrounding region. In this way he made his living, devoting his leisure time to electrical experiments. He was never well off, and had much of his small stock of money swept away by the war.

In the year 1860, it is claimed he first conceived the idea of conveying human speech by electricity. He describes almost pathetically one of his early troubles. He needed a co-operator, some one to talk back and to listen at the experimental telephones. This assistant he found in his daughter, a girl only six or seven years old, who has since died. Her voice, the Drawbaugh people say, was the first human intonation heard through a telephone. In her, Drawbaugh says, he found an obedient and docile assistant, and a companion in his work that would not laugh at his dreams.

Various sketches and primitive apparatus have been produced by the defense, showing what are claimed to have been the early inventions of Drawbaugh; among them are a telephone transmitter made out of a tea-cup, designed to work in connection with an equally primitive receiver, in whose construction a tin mustard-can plays a prominent part. As shown these are not "lover's telephones" by any means, but are genuine electrical ones. The early date of 1866 is assigned to this tea-cup and mustard-can combination. But the inventor kept on the road to perfection, and for the year 1867 or 1868 we are presented with a more highly developed production, a transmitter made out of a jelly tumbler. All the apparatus thus far described was designed for use with a battery. In 1870 it is claimed Drawbaugh found out that a battery was not needed, and substituted therefor a permanent magnet. A horseshoe magnet was used in contact with the cores of two parallel bobbins. Then for two years the inventor is said to have devoted his energies to reducing the size of the instrument. In 1873 or 1874 he is said to have produced a very compact and efficient transmitter, which is still in excellent working order. It is in the shape of a flat cylinder, and is about five inches in diameter. During the time of the trial it has frequently been used on telephone lines with good success. A still more compact instrument is shown, which is said to have been made in January, 1875. In this a spiral magnet is employed, and the instrument is only three inches in diameter by an inch and a half thick. A pair of these in perfect working order are still in existence. Finally a very perfect and compact carbon transmitter, attributed to the early part of 1876, is shown, along with a larger one dated in August of the same year. The latter has recently been tried, and found to transmit sound uttered twenty-three feet from its opening.

One very impressive feature of these claims is the statement that such perfection as above described was reached at so early a date by Drawbaugh. For the first Bell telephones, exhibited less than ten years ago, were quite indistinct, and hard to use. The early perfecting of the invention, under the disadvantages due to isolation and poverty, if proved, will render Daniel Drawbaugh's name forever most illustrious.

The People's Company, alleging these facts in their defense, aver that Bell's patents are invalid and void from want of priority of invention, and aver that Drawbaugh was the prior inventor, and entitled to the broadest possible patent for the telephone and the telephonic art.

The Bell Company of course disputes all the proofs, and is fighting for the life of its own patents. This brief *resumé* of the Drawbaugh claims gives some clue to the line of rebuttal adopted by the complainants. Witnesses have been produced by them who testified that Drawbaugh could not have had the telephones in working order and in successful operation at the period mentioned without their knowledge.

The examination was conducted in various places, principally in Pennsylvania. Drawbaugh gave his testimony, in