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Coal Gas.

The New York Gas-light Company have in operation three retort houses, containing 504 retorts, and over 160 furnaces. There are also purifying and condensing houses, together with the usual number of workshops and offices. They have two large chimneys over 150 feet high, with six telescope gasometers, exclusive of six distributing gasometers, at different parts of their district, which hold over 1,500,000 cubic feet of gas The total cost of these works amounts to over $500,000.

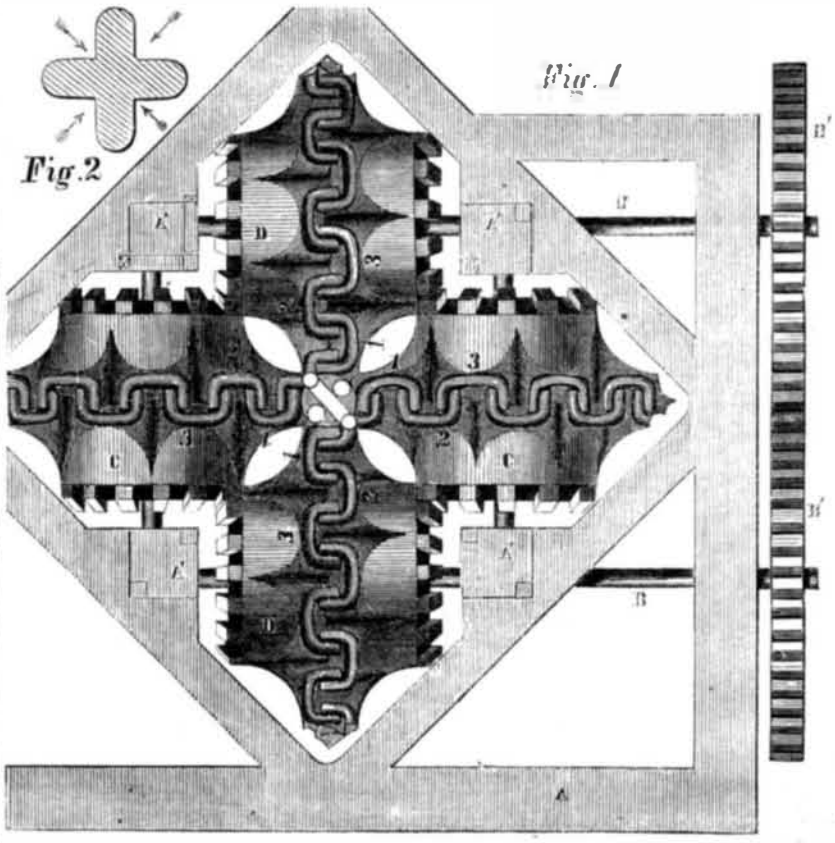
The company employs about 400 men, and manufactures 150,000,000 cubic feet of gas per year, consuming about 40,000 tuns of coal, from which over 25,000 tuns of coke are produced. Before 1849, the company manufactured their gas from oil and rosin, but now they use two-thirds of Cannel and one-third of Newcastle coal, and when the gasometers are not large enough to contain what is manufactured, the Cannel coal is exclusively used, as it is purer and makes more gas, although its market price is somewhat higher than Newcastle.

The process of manufacturing gas is as follows:—A panful of coal is put into an iron retort, under which is a furnace that heats the retort red hot, turning the coal partly into gas and partly into coke. The latter remains in the retort, while the gas passes out through a pipe half filled with water, called the hydraulic main, the force in the retort being sufficient to drive it through the water and over the surface; but it cannot pass back, as the water acts as a seal to secure it. Thence it is conducted into a condensing pipe to the condensing house, where its heat and volume are reduced. It is then transmitted to the purifying house, where it passes through three distinct beds of dry lime, which extract the sulphurous particles from it. There are test cocks attached to the purifiers, by which its purity is tested. The cock is turned to let gas out, and a piece of paper saturated in a solution of sugar of lead held over it, and if it stains the paper, it is impure. It is said that sugar of lead will detect one impure part in 40,000 cubic feet. The gas, when purified, is conveyed to the gasometer, from which it is distributed into the pipes throughout the city.

The company have over 125 miles of pipe laid, covering the whole of their district, which consists of all that part of the city south of Grand street.

The lecture hall of the Smithsonian Institution at Washington, D. C., is built in the form of a speaking trumpet; the lecturer stands, as it were, in the smaller end, and the slightest whisper can be heard all over the room. It was constructed under the direction of Professors Henry and Bache, and is a triumph of acoustical science applied to public buildings.

SLEPPY'S CHAIN-MAKING MACHINE.



Chain-making is an important manufacture, and on the strength and compactness of chains often depends a cargo of precious merchandize, the success of some great engineering undertaking, or, in fact, any of the thousand articles of worth that are daily being pulled, transported, or raised by this means. For all purposes where chains are employed, it is desirable to have them strong and cheap, therefore, wherever we can introduce machinery into their manufacture, we secure both. The ordinary process of forging a chain of any dimension is a tedious one. The bar of metal is heated to welding heat, and then the end bent in the form of a hook, which is cut off and welded into round or oval form; another piece of the bar is then taken and bent, cut and passed through the already formed link, and in its turn welded together, and so on to whatever length is desired.

The machine which is shown in our engraving is one which cuts a perfect chain out of a bar of metal. In Fig. 1, A is the frame. B B are the axles which are connected with the gearing wheels, B′ B′. C C are two solid iron wheels, working in boxes, A′, at right angles to D D. These four wheels, D D and C C, turn one another by means of cogs, and revolving the same way, meet in the center. On their edges are cut a series of grooves or dies, each forming one quarter of a link; thus when dies, 1 1 1 1, meet at the center, in turning round, any plastic material interposed would be cut by them into a link of a chain as would 2 2 2 2 or 3 3 3 3.

The operation is as follows:—A bar of iron or other metal heated to the welding heat, having the section shown in Fig. 2 is passed through the center of the wheels, D D and C C, which in revolving carry the bar downwards with them. In consequence of the dies or impressions on the periphery, however, it is cut; and, as each die is the quarter of a link when it is met by the four dies, the bar is cut into a perfect link, and this link cutting goes on as long as the bar is fed, thus turning out a chain of any length that may be desired. It may be driven by any convenient power, either steam, water or horse. The arrows in Fig. 2 indicate the direction of the pressure in the cutting process.

For further information and particulars, address the inventor and patentee, Christian Sleppy, Wilkesbarre, Pa.

Bank Note Paper.

A Bank of England note has some peculiar and interesting characteristics of manufacture, the paper being distinguished by its color, which is a peculiar white, such as is neither sold in the shops nor used for any other purpose; by its thinness and transparency, qualities which prevent any of the printed part of the note being washed out by turpentine, or removed by the knife, unless a hole is made in the place thus practiced on; by its characteristic feel, a peculiar crispness and toughness, by which those accustomed to handle it distinguish the true notes instantly; the wire or water mark, which is produced on the paper when in the state of pulp, and which is easily distinguished from a mark stamped on after the paper is completed; the three "deckle" edges—the mold contains two notes placed lengthwise, which are separated by a knife at a future stage of the process, this deckle or wooden frame of the paper mold producing the peculiar effect seen on the edges of uncut paper, and this edging being caused when the paper is in a state of pulp, precludes any successful imitation after the paper is made; also by the strength of the paper, which is made from new linen and cotton. In its "water leaf," or unsized condition, a bank note will support thirty-six pounds; and when one grain of size has been diffused through it, it will lift half a hundred weight.

If a little more care was taken by our State governments in regard to what sort of paper should be used in the printing of bank notes, the people would suffer much less from the spurious stuff now in circulation. In some respects we are a heedless people, and have yet something to learn from the old nations of Europe.

Brooklyn Water Works.

Water-works to supply the neighboring city of Brooklyn, Long Island, with water have been under contract for upwards of a year, but they appear at this date to be progressing very slowly. The plan is to obtain the water by collecting together several mill streams on the lower side of the island, and to lead them either in an open canal or closed conduit to a low point near the city, from which the water is to be forced up by steam pumping to the top of the highest ground in the vicinity, from whence pipes are to supply the city. The reservoir on this hill is partly finished, the canal partly excavated, and any quantity of designs and estimates have been received for the pumping apparatus, but nothing further has transpired, and we hear it reported that the extreme low level at which the canal will have to run has been found to involve such serious difficulties that it is contemplated to change the plan, and at an expense of a million dollars more, to substitute a canal running at a level higher than the streams, with a pumping engine at each stream, to elevate the water into it.

What is it?

One of the *savans* at the late convention of scientific men at Montreal insisted that coal was not of vegetable origin. All geologists at the present time say that it is, and we should like to know how he accounts for the gigantic ferns and monster pine trees which are found in nearly all coal formations, and seem to point directly to its vegetable origin. Soft coal is full of these, while anthracite contains comparatively few. This may be accounted for by the compact and hard nature of the latter, which would indicate that it has been subjected to greater pressure and changes in other ways sufficient to remove all traces of fossils either of animals or plants. There is, however, nothing like differing from the rest of the world, if you wish to be thought profound. We wish this wise one had given us his idea of what coal *did* originate from, for it is not good policy to pull down one system without you have another to build up in its place.

Science among the Japanese.

M. Von Siebold, the distinguished scientific author, states that the knowledge of the natural sciences amongst the Japanese is much more extensive and profound than is generally supposed. They possess a great many learned treatises thereupon, and an admirable geological map of their island by Buntsjo. They are well acquainted with the systems of European naturalists, and have translations of the more important of their works. They have also a botanical dictionary, in which an account is given of not fewer than 5,300 objects, and is embellished with numerous fine engravings.

Mr. J. R. Baird, of Vincennes, Ind., has sent us a specimen of his daughter's work*woman*ship—one of the most skillful and ingenious pieces of lady's work we have ever seen. It consists in four stockings, knitted at one operation, on only four needles. The stockings are one inside the other, and each distinct and separate. It is now on exhibition at the Crystal Palace.