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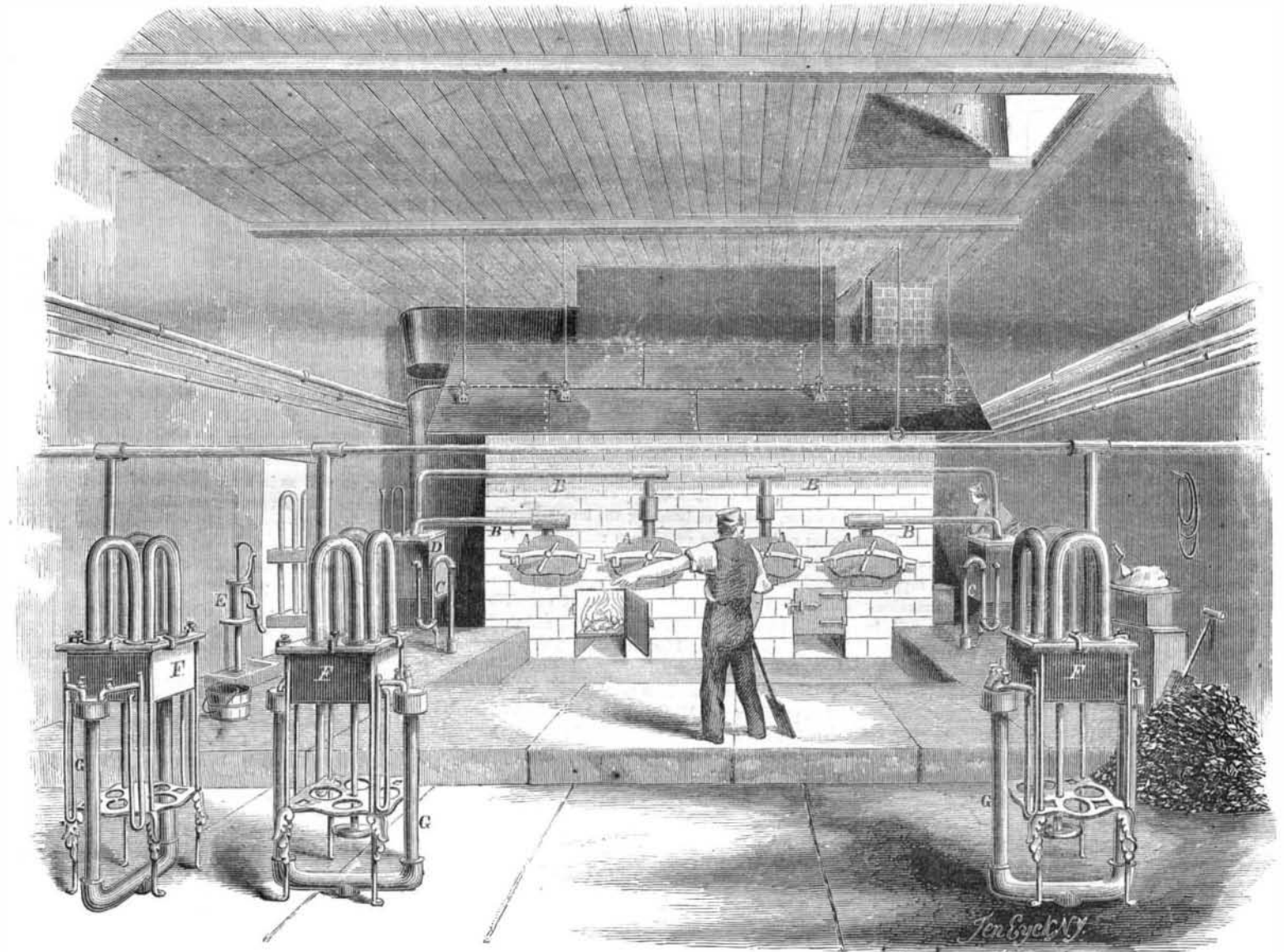
NEW SERIES.

THE GAS-WORKS AT THE ST. DENIS HOTEL.

One of the first and most respectable hotels in this city—the St. Denis, corner Broadway and Eleventh-street—has recently adopted the method of making its own gas for illuminating purposes, and the gas-works are so complete and worthy of imitation at all such establishments, factories, villages, and small communities generally, that we have engraved views of them for the benefit of such places. As to the question of cost, the proprietor, Mr. P. Degive, informs us that since these works were erected and have been working, his gas has

a large hood extends the whole length of the stack of retorts, and being connected with a chimney, carries off all odor far above the highest building; and so well does it do this that, on one occasion on which a retort was opened in our presence, we, standing out of the limits of the hood, though in the gas-house, could smell no more gas than if we had been a mile from such place. Fig. 1, which is an interior view of the gas-house, shows the arrangement of the retorts and condensers. The retorts, A, are so arranged that there are two to each fire, and the cokes which come out of them after the gas has been

gas cooled by a constant stream of water, the waste products being carried, by the waste water, which is always running, through the pipes, G, into the sewer, so that they can give off no offensive odor. The gas is now carried to the purifiers, which are in a separate room seen to the left of the picture through the door, but seen in detail in Fig. 2. I I' are the two purifiers, and J is the barrel containing the purifying liquid, which is a chemical solution. These purifiers are filled so that only one works at a time, and the man can clean one while the other is working, so that one of them is always clean.



THE GAS-WORKS AT THE ST. DENIS HOTEL, NEW YORK.

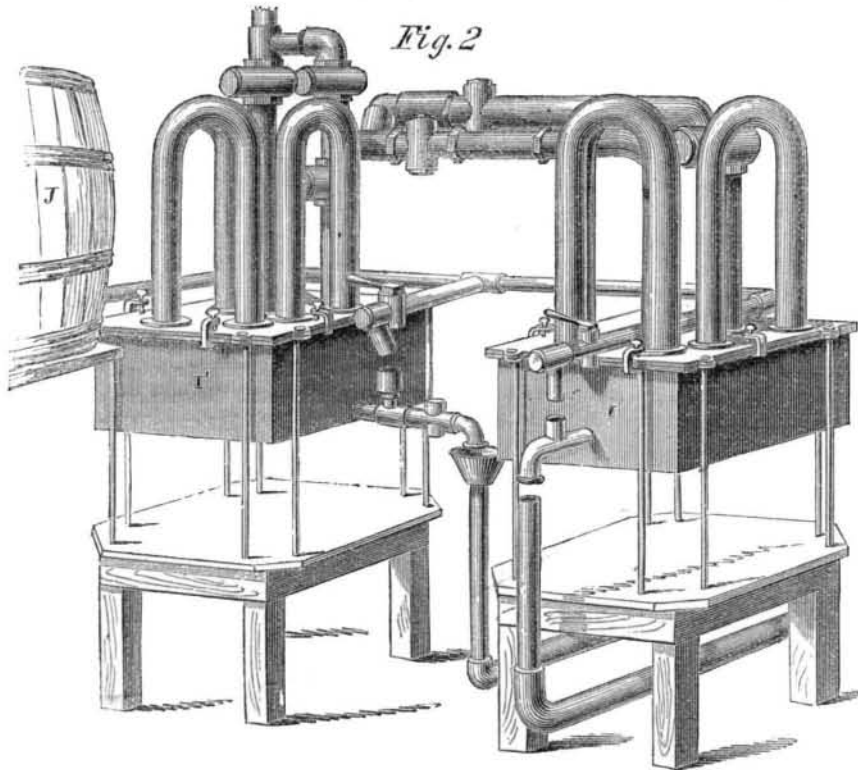
not cost over \$1 per 1,000 cubic feet, and that, adding the interest of the first cost of the buildings, apparatus, &c., it will not come to more than one-half the price of gas if procured from city companies; besides which profit, he heats all the water required for his large establishment with the waste heat from the retort furnaces or fires. The common complaint against small gas-works, close to the building in which the product is to be consumed, is, that the odor that is given off from the escape of gas at the charging and clearing the retorts is offensive and unhealthy. This may be so in some places, but it does not hold good in the St. Denis gas-works, where

made serves as fuel to the fires, and as there is an excess it also helps the kitchen fire. The gas is led from the retorts through pipes, B, in the two tar-boxes, D, where it meets with water, and here a certain quantity of tar is removed from the gas and passes, by the siphons, C, which keep the tar out of sight and smell, to the tar well underneath the floor, from which, when too much has accumulated, it can be removed by the tar-pump, E, and applied to some useful purpose. The gas then passes to the condensers, F, of which there are as many as there are retorts (three only being seen in our view), and in these all tarry and ammoniacal vapors are condensed, and the

The only cleaning that is required is the opening of one faucet, and the purifiers clean themselves. One great novelty of these works is, that they are perfectly safe, and cannot explode from excessive pressure or other cause, as each retort is provided with a safety-valve that is the special subject of one of the inventor's patents, and it is so arranged that the moment the pressure becomes too high the valve is raised and the gas escapes up the chimney, which is immediately perceived by the attendant. In fact, the great beauty of these gas-works is, that the laborer has only to turn on a faucet to clean any part of the apparatus, and although 500

lights are supplied nightly, it takes but one man half his time to attend to making the gas, which is of an excellent quality, giving a good, clear and steady light. The gasometer, H, is a dry one, being placed over the works, and it is made of half iron plate, the rest being vulcanized india-rubber, the rubber being on top and raising or lowering as the gas is forced in or is let out to supply the burners. The whole works occupy a space of

drank 10 acres of water in less than a week. The inference is, that the whole valley of the Mississippi, from its banks to the highlands, on either side, rests on a porous substratum, which absorbs the redundant waters, and thus prevents that degree of accumulation which would long since have swept New Orleans into the Gulf but for this provision of nature, to which alone her safety is attributable. In fact, if the alluvial bottoms of



only 18 by 20 feet, and are placed in a corner of the hotel yard. All the parts are durable and well made, and we have no doubt they will repay the proprietor for his good judgment in erecting this apparatus.

The inventors are the Messrs. Hendrickx Brothers, and the builders are the Gas Generating Company, of No. 512 Broadway, New York. We illustrated another arrangement of theirs on page 97, Vol. XIV., SCIENTIFIC AMERICAN, since which they have extended their operations considerably, and now fit up much larger but equally successful works. Every one who is interested in having gas in his premises at a cheap rate (and who is not?) should call at the St. Denis Hotel, or at the German Club-house, Nos. 104 and 106 Fourth-avenue, where a smaller apparatus, just as good, but to supply a less number of burners, is at work; or communicate with the company at their address, and they will be happy to give any information that we may have omitted.

MARVELS OF THE MISSISSIPPI.

We extract the following interesting information from the Memphis (Tenn.) *Avalanche*, regarding the "Father of Waters" and the valley through which it rolls its mighty flood:—

"The difference of level between high and low water-mark at Cairo is 50 feet. The width and depth of the river from Cairo and Memphis to New Orleans is not materially increased, yet immense additions are made to the quantity of the water in the channel by large streams from both the eastern and western sides of the Mississippi. The question naturally arises, what becomes of this vast added volume of water? It certainly never reaches New Orleans, and as certainly does not evaporate; and, of course, it is not confined to the channel of the river, for it would rise far above the entire region south of us.

If a well is sunk anywhere in the Arkansas bottom, water is found as soon as the water-level of the Mississippi is reached. When the Mississippi goes down, the water sinks accordingly in the well. The owner of a saw-mill, some 20 miles from the Mississippi, in Arkansas, dug a well to supply the boilers of his engine during the late flood. When the waters receded his well went down, until his hose would no longer reach the water, and finally his well was dry. He dug a ditch to an adjacent lake to let water into his well; the lake was drained, and the well was dry again, having literally

the Mississippi were like the shores of the Ohio, the vast plain from Cairo to New Orleans would to-day be part and parcel of the Gulf of Mexico, and the whole valley a fresh-water arm of the sea. Were the geological character of the valley different, the construction of levees, confining the waters of the Mississippi to its channel, would cause the rise in the river to become so great at the South that sufficient levees could not be built. The current would be stronger, and the accumulation of water greater, as the levees were extended north of us.

Such results were reasonably enough anticipated; but the water, instead of breaking the levees, permeates the porous soil, and the overflow is really beneath the surface of the swamps. Such, it seems to us, are the wise provisions of natural laws for the safety and ultimate reclamation of the rich country south of us. We believe that the levee system will be successful, and that the object of its adoption will be attained. The porousness of the materials used in making them has caused most, if not all the crevasses. Men may deem it a superhuman task to wall in the Mississippi from Cairo to New Orleans, but our levees are the work of pigmies when contrasted with the dykes of Holland. The flood-tide of the Mississippi is but a ripple on the surface of a glassy pool compared with the ocean billows that dash against the artificial shores of Holland. The country to be reclaimed by our levees—all of which will not for fifty years cost the people as much as those of the Dutch when originally built—would make a hundred of such kingdoms as that over which a Buonaparte once wielded the sceptre."

THE VELOCITY OF LIGHT.—The velocity with which light travels is so inconceivable that we require to make it intelligible by some illustrations. It moves from the sun to the earth in seven and a half minutes; whereas, a cannon-ball fired from the earth would require 17 years to reach the sun. Light moves through a space equal to the circumference of the earth, or about 25,000 miles, in about the eighth part of a second. The swiftest bird would require three weeks to perform this journey. Light would demonstrably require five years to move from the nearest fixed star to the earth and probably many thousand years from the most remote star seen by the telescope. Hence, if a remote visible star had been created at the time of the creation of man, it may not yet have become visible to our system.—*Encyclopædia Britannica.*

MOTHER-OF-PEARL.

A peculiar phenomena is noticed when wax, stearine, or a similar substance, especially if colored black by lamp-black or graphite, has been poured on a sheet of mother-of-pearl. It is that the inner surface of the congealed substance, in a certain position to the eye, appears with the same bright iridescence as the plate itself. This goes to prove that those colors are not owing to a particularity of the substance of mother-of-pearl, but solely to the condition of its surface, which consists of fine striæ that bend the rays of reflected light and resolve them into the various colors. Its being reflected light is proved by the complete disappearance of the variegated colors when the surface is exposed to homogeneous light, such as that from a lamp fed with alcohol containing chloride of sodium. Liquid wax or stearine poured on the surface will receive an impression of even the finest unevenness, only discernable with the glass, and therefore also striæ causing the iridescence. That the surface of mother-of-pearl gives this opalescence in a number of positions to the eye, and that obtained on wax only when held in a certain direction, is caused by the many laminae underlying each other in the original, as remarked by Breithaupt. Seen through a Nicol's prism (of course, with homogeneous light), in case the undulating prisma falls vertically upon that of the reflected rays, the surface of the wax impression appears dark, while that of the original will still be bright; for, although the plane of prisma be vertical to that of the rays proceeding from the surface, it intersects those from the underlying laminae under a different angle.

CIGAR-MAKING MACHINE.

We have recently examined a most ingenious machine, the invention of M. Louis Beauche of Paris, for making cigars. The machine is in two parts, one for rolling the filler (the *bunch*), and the other for putting on the wrapper; the last by the peculiar shape of the rollers forms the rounded end of the cigar (the *head*) which is put in the mouth, and the cigar is as easy to smoke and as nice in shape as any hand-made one. The wrappers are cut from a pile (*book*) of leaves to the proper shape by a novel cutting machine, and a great number can be cut at once. The motions of the hand are perfectly imitated, and the softness and elasticity of that member, which render it capable of such work, is obtained by endless bands of rubber moving over rollers and which roll the cigar into shape. Patents have been taken out in Europe and this country, as well as in some portions of South America and the tropics. At an examination of this machine at Madrid, made by royal order, the commission reported that it made 42 cigars in ten minutes, or 252 in one hour, and this was manifestly so great a saving that it would have been adopted by the Spanish government if that body had had other means of employing the number of persons which such a machine would throw out of employment, but it will eventually be adopted in Spain.

To show the value of such an invention to this country we may state that in New York city alone, there are about 200,000 smokers, each using two cigars per diem, which makes 400,000 cigars every day. These will cost for labor alone, at \$6 per thousand, the enormous sum of \$8,760,000 annually, when made by hand, and the inventor calculates that his machine, which can be attended to by women and children, will produce them for \$1 per thousand, making the total cost for a year to the smokers of this city for labor, only \$1,460,000, or one-sixth the present amount. This is an enormous saving, and deserves the attention of all who are interested in this branch of manufacture. From other States than our own we import annually, into this city alone, 12,000,000 pounds of tobacco, which is thus distributed:—Connecticut, 10,000 cases of 400 pounds each; Pennsylvania, 6,000 cases of 400 pounds each; Ohio, 10,000 cases of 370 pounds each. From New York we receive 5,000 cases of 400 pounds each; we also import 6,000,000 pounds from Havana, and a quantity from other Spanish ports, and as we are told that on the average 20 pounds of tobacco are required for every 1,000 cigars, we can easily calculate that there are 900,000,000 cigars made in this city alone in one year.

As we shall publish an engraving of this machine at some future time, a full description is unnecessary at present, and we conclude by calling attention to the invitation of M. Beauche in our advertising columns.