

so as to be, if necessary, detonated by an electric or other spark.

The time must come, if it has not already arrived, when electricity will be produced more cheaply than steam. Every mechanical and chemical change which takes place in bodies, results in setting free some electricity; thus, if two bodies are in contact and they are suddenly removed, there is an electrical disturbance. When water boils electricity passes off in the steam. The fire in the grate and the flame of the gas-lamps are evolving electricity.

Every chemical change in the constitution of bodies results in the development of electricity. A galvanic battery merely collects and applies the electricity evolved by the chemical changes going on in its cells. If some method could be discovered of making the products of the chemical action in the battery as valuable, or nearly as valuable, as the zinc or agents of which the battery is composed, the great problem would be solved, and electricity might take its place side by side with steam as a practical motive force.

In conclusion, I may observe that the proposed electric-gas engine and electric-gas gun are original ideas. It first struck me that electricity might be used as a motive force about 1849, when attending the lectures of a most able and amiable gentleman, whose admirable Treatise on Heat ranks him high amongst modern philosophers.

I may also perhaps mention that I gave notice, before the meeting of the British Association in last September, of my intention of reading a paper on this subject, but was prevented, by unavoidable circumstances, from going to Manchester.

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THE MANUFACTURE OF LEATHER CLOTH.

The manufacture of leather cloth as a substitute for Morocco leather, was commenced in the year 1849, in the city of Newark, U. S. The first specimen of it seen in this country, was exhibited in 1851. The Americans have had the merit of producing many labour-saving machines and articles of domestic convenience, and many of them are becoming increasingly known and extensively adopted in this country. It is certain that this article of leather cloth has superseded the use of leather for many purposes to which the old material has hitherto been applied, besides being put to uses for which leather is wholly unsuitable. Messrs. Crockett, the inventors and patentees, commenced the manufacture of leather cloth in England in 1855, and their factory was an old workhouse, situated in one of those dreary, unpicturesque marshes at West Ham, in Essex, a locality somewhat famous for its insalubrious manufactures. The firm was known as the "Crockett International Leather Cloth Company." In 1857 Messrs. Crockett surrendered their business to a company formed under the title of "The Leather Cloth Company Limited," which purchased the entire European business.

The new company, with a paid up capital of £90,000, and having Mr. A. Lonsont as their managing director, began the enterprise with great energy. They erected substantial and extensive premises, which cover ten acres of ground, employing upwards of 200 men. They produce daily

1000 pieces of 12 yards long and $1\frac{1}{2}$ yards wide, or 15,000 square yards; sufficient if laid end to end to reach from their factory to the warehouse in Cannon Street West—a distance of seven miles.

It will be evident that an article intended to resemble leather should be pliant, supple, and not liable to peel off or crack. These excellencies are to be attained by the peculiar ingredients of the composition with which the cloth is covered, and the method of applying it. On entering the factory our attention was first directed to the boiling room, in which there are 12 furnaces, with a large cauldron over each for boiling linseed oil. This process is attended with considerable danger from the liability of the boiling oil to generate gas and explode; hence, a man is stationed at each cauldron stirring gently the boiling mass and watching a thermometer inserted in it, and which at the time of our visit stood at 580°. The oil is supplied to the boiling house by pipes from an adjoining building, where there is a huge tank with nine compartments containing 3,200 gallons each, or 28,800 altogether, amounting to 122 tons of oil. The boiled oil being allowed to cool is conveyed on a tramway to the mixing-house, where, in a puddling machine, it receives several other ingredients, the principal ones being lampblack and turpentine, which being mixed into a composition is ready for use.

The cloth to which this composition is applied is known by the name of "greys," or unbleached cotton. It is of a peculiar manufacture, and made expressly for the company. The store room is a spacious building, and will contain an immense stock; at present it has 25,000 pieces, or 300,000 yards. Here the cloth is calendered, and cut into lengths of twelve yards. The two ends of each length are sewn together to make it endless; two sewing machines are in constant operation at this work. The pieces are then removed to the "milling" rooms, so called because they contain the mills in which the cloth receives the composition. These mills are rough looking wooden structures, having a drum at one end and a roller at the other, over which the cloth is passed, and then tightened by a crank and wheel at one end. A large frame-knife or scraper, is then dropped down close to the cloth, a measured quantity of composition being laid on the cloth along the edge of the knife, the mill revolves, and the cloth receives as much of the composition as can pass under the edge of the knife. The piece is then carried to the heating room adjoining, and hung up on the rack to dry till next morning.

There are on the premises six milling rooms, with three mills in each, and having three men attendant upon each mill. The adjoining rooms for drying are heated by three rows of pipes laid along the wall. These pipes, during the day are at a temperature of about 130°. The temperature is increased towards the evening, and during the night to 160°, and it is the duty of the watchman to open the doors for ventilation and cooling preparatory to the men resuming their work for the next coating.

Of course, in a building so greatly heated, and having so much inflammable material within it, the danger of fire is imminent, but every precaution has been taken which prudence could dictate.