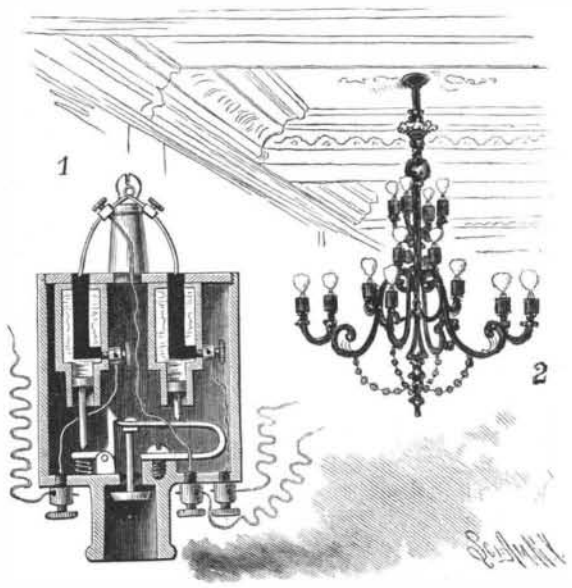
AN ELECTRICAL GAS LIGHTER AND EXTINGUISHER.

A device in which the turning on and shutting off of gas flowing to a burner is effected by the heating action of an electrical current, and in which the gas will be ignited by an incandescent wire, is illustrated herewith, and has been patented by Mr. George L. Hogan. In combination with a gas burner is a casing which has a collar fitting on the supply pipe, two cylinders filled with mercury being mounted in the casing, the lower ends of the cylinders being of reduced size, and provided with pistons having downwardly extending rods, as show in the sectional view, Fig 1. One of these pis-



HOGAN'S GAS LIGHTER AND EXTINGUISHER.

ton rods rests on the free end of a U-shaped spring, to which is attached a valve rod passing to a valve in the supply pipe, the free end of the spring, when pressed down sufficiently to open the valve, being caught by one arm of a right-angled spring catch lever, on the other arm of which rests the piston rod of the other cylinder. Three conductors are required to operate the burner. To turn on the gas, the current is sent through the right hand mercury cylinder, by means of an electrically insulated conductor surrounded by heat conducting material, whereby the expansion of the mercury will press the piston down and open the valve in the supply pipe, the end of the spring which presses on the valve rod being then caught and held by the catch lever. A looped platinum wire is supported in the circuit near the tip of the burner, and is sufficiently heated by the current to ignite the gas. To extinguish the gas the current is sent by the left hand wire through the other mercury cylinder, the expansion of the mercury pressing down its piston and releasing the catch lever by which the valve in the supply pipe is held open, the circuit being completed by the middle conducting wire rather than by the circuit of greater resistance through the platinum coil.

For further information relative to this invention address Messrs. Conway, Kelly & Co., of Lebanon, Ky.

Hydrocarbons and Rock Salt in Nature.

The frequent association of salt and bitumen or petroleum in the same deposits has often struck me as likely to lead to the development of some probable theory as to the formation of these hydrocarbons. Almost all specimens of rock salt, when struck or rubbed, give off more or less the characteristic odor of bitumen. Beds of rock salt are often colored brown by the bitumen they contain, and petroleum, on its emergence, is nearly always associated with brine. Deposits of rock salt are, as a rule, dry and anhydrous, though salt itself has a considerable attraction for moisture. But more than this, those salts of potassium and magnesium often occurring with it are still more greedy of water.

If the seemingly probable theory that all formations of rock salt are due to the evaporation of sea water be correct, then these deliquescent and hygrometric chlorides would almost always have been the last part deposited in every bed of rock salt; and though, owing to their great solubility, they may have been denuded and washed or melted away perhaps long afterward, it is probable that they generally formed the final layer at first. These would, by their affinity for water, both during their formation and subsequently, tend to withdraw that liquid from all surrounding substances.

Now most organic matter may be looked upon as a hydrocarbon combined with the elements of water. Withdraw the water, and the hydrocarbon remains. Metallic iron, if present, might modify the reaction. Is it not, then, a probable theory that most natural deposits of hydrocarbons owe their origin to this absorption of water, acting through the lapse of ages on organic matter, often aided by heat and pressure? If such be admitted, it would account for the frequent association of salt with hydrocarbons.—*F. Maxwell Lyte, F.C.S., in Chem. News.*

THE WATERHOUSE INSTANTANEOUS REGULATOR.

The Waterhouse Electric and Manufacturing Company, of Hartford, Conn., has established a large business on the basis of a system of electric illumination including a new dynamo, a new type of arc lamp, and an automatic current regulator, which is sufficiently quick in its action to completely control the current, so that a full complement of lamps or only a single lamp may be placed in the circuit, as circumstances may require, the automatic regulator adapting the current to the load, so that the current is always proportionate to the number of lamps in the circuit. This system of automatic regulation effects a great saving in power, and insures uniformity in the light.

The dynamo shown in perspective in Fig. 1, and diagrammatically in Fig. 2, has a closed circuit armature and is provided with three commutator brushes, *a*, *b*, *c*. The brushes, *a*, *b*, are arranged at diametrically opposite points on the commutator cylinder, the brush, *a*, being connected with the field magnet conductor, and the brush, *b*, with the outside circuit. The third brush, *c*, is arranged in advance of the brush, *a*, and is connected with one end of the resistance, R, the opposite end being connected with the remaining terminal of the field magnet. The resistance is made variable by the slide, which is controlled by the solenoid in the outside circuit. The current passes from the resistance to the outside circuit conductor through the slide. The brushes, *a*, *b*, *c*, are supported in a fixed position, the brushes, *a*, *b*, being arranged at the point of maximum commutation for the normal current.

It will be observed that by this arrangement the current passes from the armature to the outside conductor through the brush, *c*, and resistance, R, directly and indirectly from the brush, *a*, through the conductor of the field magnet and resistance, R. The sum of the currents passing over these two paths will

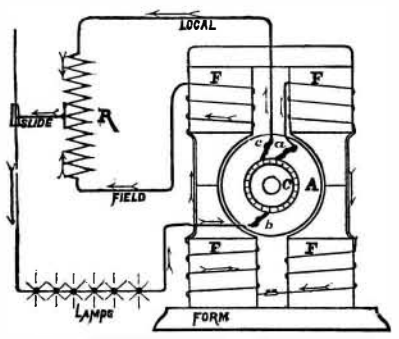


Fig. 2.—WATERHOUSE REGULATOR.

equal that used in the outside circuit, the current varying in the local and field circuits according to the position of the slide on the resistance and the resistance of the outside circuit.

By this arrangement, when the resistance of the outside circuit is decreased, the point of maximum commutation is carried forward toward the brush, *c*, and the current passing around the field magnet is diminished, thus reducing the pressure in the circuit, so that less power is required to drive the dynamo, at the same time a constant current is maintained on the lamp circuit.

The Waterhouse regulator varies the electromotive force directly with the resistance of the outside circuit, maintaining the standard current on the lamp line by balancing the field circuit and the outside circuit. This system, which is the invention of Mr. A. G. Waterhouse, is now lighting a large portion of the Centennial Exhibition at Cincinnati, Ohio. The plant consists of 240 arc lamps and a corresponding number of dynamos.

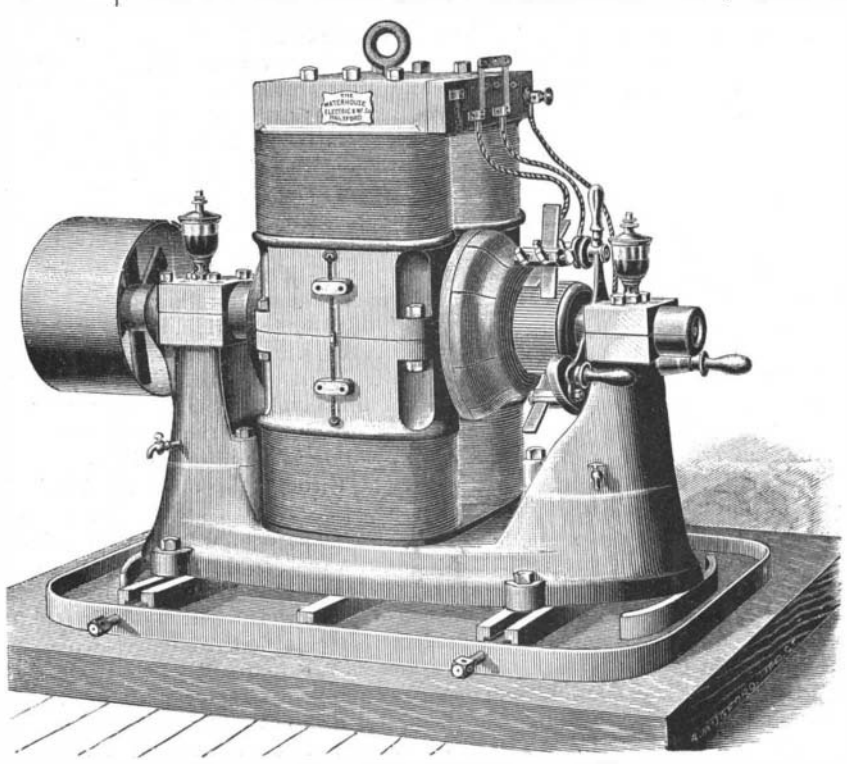
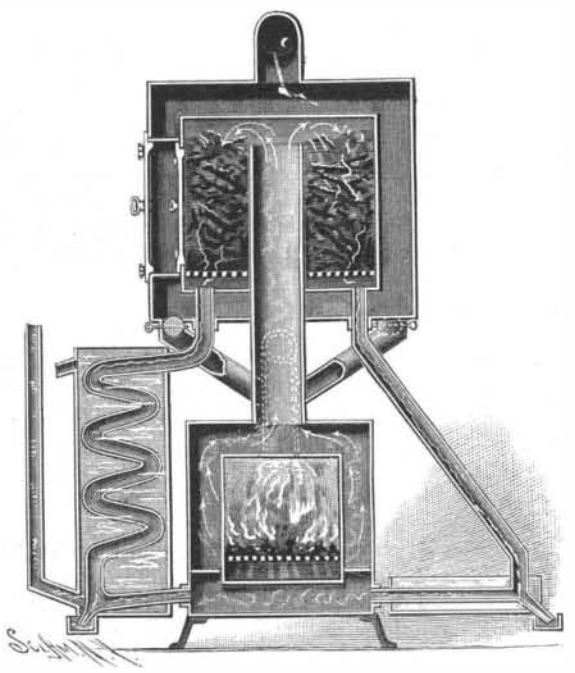


Fig. 1.—THE WATERHOUSE DYNAMO.

AN IMPROVED CHARCOAL BURNER.

A novel description of oven for burning charcoal in a chamber separated from the fire chamber, designed



SCHERFFIUS' CHARCOAL BURNING APPARATUS.

to continuously use the heated air, while gathering and condensing the products given off by the wood during the processes of charring, is illustrated herewith, and has been patented by Mr. Jacob Scherffius, of Winona, Minn. The fire chamber is surrounded by an inclosing case, and above the fire box is a box-like structure, with grates to receive the wood to be charred, a pipe leading from the chamber around the fire box nearly to the top of the charring oven, the latter having a jacket that is connected with the outlet of the fire-box by two or more pipes, with dampers, whereby the direct products of combustion pass through partitions in the jacket around the charring oven to the smoke pipe. A branch smoke pipe is connected with the fire box, whereby the products of combustion may pass off outside the jacket. The charring oven has two or more bottom outlets, to which pipes are connected by slip joints, these pipes on either side leading through water troughs, and being connected to the lower portion of the inclosing jacket of the fire chamber, in order that all moisture and other products driven off from the wood in charring may be condensed, and all cool air from the outside be prevented from entering the charring chamber. The discharge nozzles from the pipes leading through the water troughs on either lower corner dip within tanks, whereby a seal is formed preventing the admission of outside air. In commencing the charring process, the dampers are at first arranged to conduct the products of combustion outside of the jacket of the charring oven, and the pipes leading to it from the jacket around the fire box are disconnected, whereby the moisture first driven off from the wood will be expelled and pass to the outer air.

Chinese Have No Nerves.

The North China *Herald* says the quality of "nervelessness" distinguishes the Chinaman from the European. The Chinaman can write all day, work all day, stand in one position all day, weave, beat gold, carve ivory, do infinitely tedious jobs for ever and ever, and discover no more signs of weariness and irritation than if he were a machine. This quality appears early in life. There are no restless, naughty boys in China. They are all appallingly good, and will plod away in school without recesses or recreation of any kind. The Chinaman can do without exercise. Sport or play seems to him so much waste labor. He can sleep anywhere—amid rattling machinery, deafening uproar, squalling children, and quarreling adults. He can sleep on the ground, on the floor, on a bed, on a chair, in any position. It would be easy to raise in China an army of a million men—nay, of ten millions—tested by competitive examination as to their capacity to go to sleep across three wheelbarrows, head downward like a spider, their mouths wide open and a fly inside.