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GERARD'S ALTERNATING CURRENT MACHINE.

The machine represented in the annexed engraving consists of a movable inductor, whose alternate poles pass in front of an armature composed of a double number of oblong and flat bobbins, that are affixed to a circle firmly connected with the frame. There is a similar circle on each side of the inductor. The armature is stationary, and the wires that start from the bobbins are connected with terminals placed upon a wooden support that surmounts the machine.

This arrangement allows of every possible grouping of the currents according to requirements. Thus, the armature may be divided into two currents, so as to allow of carbons 30 mm. in diameter being burned, or else so as to have four, eight, twelve, twenty-four, or even forty-eight distinct circuits capable of being used altogether or in part.

This machine has been studied with a view of rendering the lamps independent; and there may be produced with it, for example, a voltaic arc of an intensity of from 250 to 600 carrels for the lighting of a courtyard, or it may be used for producing arcs of less intensity for shops, or for supplying incandescent lamps. As each of the circuits is independent, it becomes easy to light or extinguish any one of the lamps at will. Since the conductors are formed of ordinary simple wires, the cost attending the installation of 12 or 24 lamps amounts to just about the same as it would in the case of a single cable.

One of the annexed cuts represents a Corliss steam engine connected directly with an alternating current machine of the system under consideration. According to the inventor, this machine is capable of supplying 1,000 lamps of a special kind, called "slide lamps," and a larger number of incandescent ones.—*Revue Industrielle.*

New Explosive from Carbon Bisulphide.

According to a statement in the *Polytech. Notizblatt*, the gas manager's old foe, carbon bisulphide, is capable of new and surprising developments. M. Turpin, of Paris, has succeeded in making a most powerful explosive, which he has named "Panclastic" (break all), from a mixture of carbon bisulphide and hypouitric acid; the latter made by heating acetate of lead. The mixture will not explode by percussion alone, nor when heated to 200°C., but is fired by a charge of fulminate of mercury or gun powder. The most powerful effects are obtained from equal parts of each ingredient.

The new explosive is used for shells and torpedoes; and reports concerning experiments made with it at Cherbourg indicate that its force far exceeds that of dynamite. When not confined, the same mixture burns quietly with a brilliant white light, and can be used for spectacular effects, to imitate moonlight. For this use it is better to keep the liquids separate, and feed them through capillary tubes to a dish that serves as a burner, and which must be properly cooled. If some phosphorus is dissolved in the carbon bisulphide, the illuminating power of the mixture is increased, and it is then called "Heliophanite," or sunshine.

Protection of Iron from Rust.

The problem of protecting iron from rust is one of perennial interest, and new systems of painting or otherwise treating iron for this purpose are continually be-

ing proposed. It has been observed that iron lying still and exposed to the air, as in railways not in actual use, rusts more quickly than when the metal is strongly vibrated by constant traffic. From this it has been inferred that the vibration is attended with an electrical action that decreases the affinity of the iron for oxygen. In tearing down old masonry, iron clamps and bonds are sometimes met with

but the parts of plates that had been prolonged into empty space were so rusted that two-thirds of their substance had gone. It has been repeatedly observed that iron does not rust in water in which are dissolved small quantities of caustic alkalies, or alkaline earths, which neutralize every possible trace of acid.

These experiences are apparently the bases of a theory propounded by Herr Riegelmann, of Hanau. The paint that he uses contains caustic alkaline earth (baryta, strontia, etc.), so that the iron is in a condition analogous to that of the anchors of the chain bridges already mentioned. Although a thin coat of paint cannot contain so much alkali as a thick bed of mortar, the alkaline action will nevertheless have effect so long as the coating has a certain consistence. Under any circumstances, these new paints will be free from active acids. Riegelmann's paint, moreover, is said to contain a rust preventing composition which does not require the aid of any alkali in order to effect its purpose. Perhaps this is the same mixture described in the *Neueste Erfindung*, where it is stated that if 10 per cent of burnt magnesia, or even baryta or strontia, is mixed cold with ordinary linseed oil paint, and then enough mineral oil to envelop the alkaline earth, the free acid of the paint will be neutralized, while the iron will be protected by the permanent alkaline action of the paint. Iron to be buried in damp earth may be painted with a mixture of 100 parts of resin (colophony), 25 parts of gutta-percha, and 50 parts of paraffin, to which 20 parts of magnesia and some mineral oil have been added.

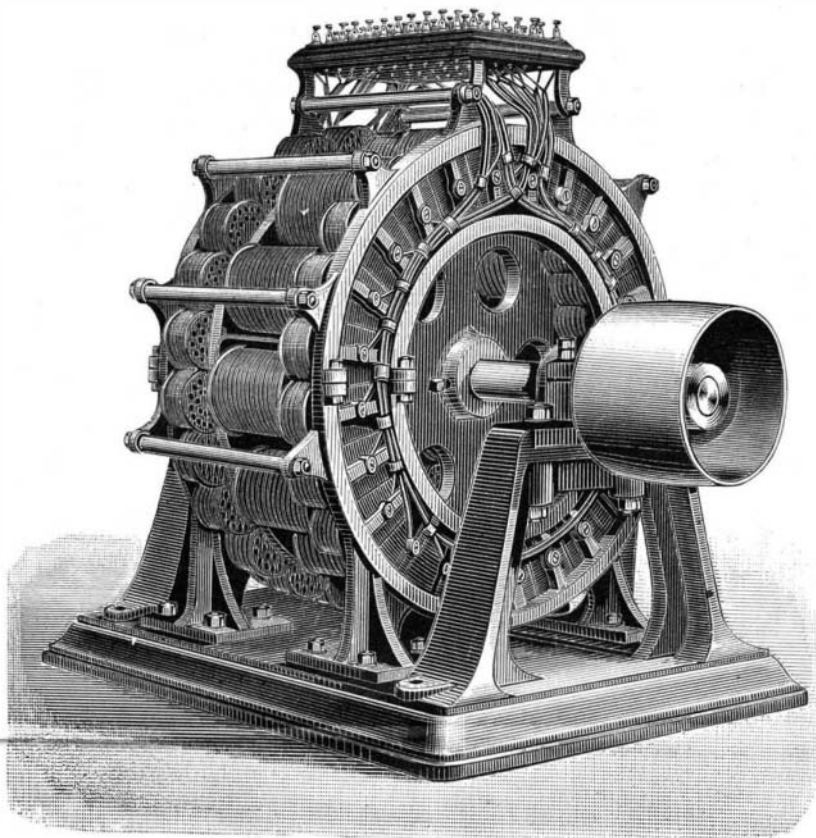
Waterproof Clothing.

For some time past the Belgian War Department has conducted a series of experiments at Valverde, on the water-proofing of soldiers' uniforms by means of liquid alumina. With respect to the hygienic side of the question, the medical authorities have satisfied themselves that the articles of dress thus treated permit the perspiration to pass off freely, and chemical analysis has proved that the preparation used in no way injures the materials or destroys their color. More than 10,000 meters (10,936 yards) of materials, redressed two or three times over, notwithstanding the rinsing and washing to which they have been subjected after having been soiled, and after constant wear, remained perfectly waterproof.

The only drawback to the process appears to be that it is not very economical, and, to insure the desired result, must be conducted on a large scale, which requires a considerable amount of plant.

The following, according to the *Journal d'Hygiene*, is the process employed: Acetate of alumina is obtained by making solutions of equal parts of alum and acetate of lead in separate vessels, and then mixing them together. Sulphate of lead will be thrown down, leaving acetate of alumina in solution, which must be decanted. The materials to be water-proofed are soaked in this solution, and then withdrawn without being wrung, and dried in the air.

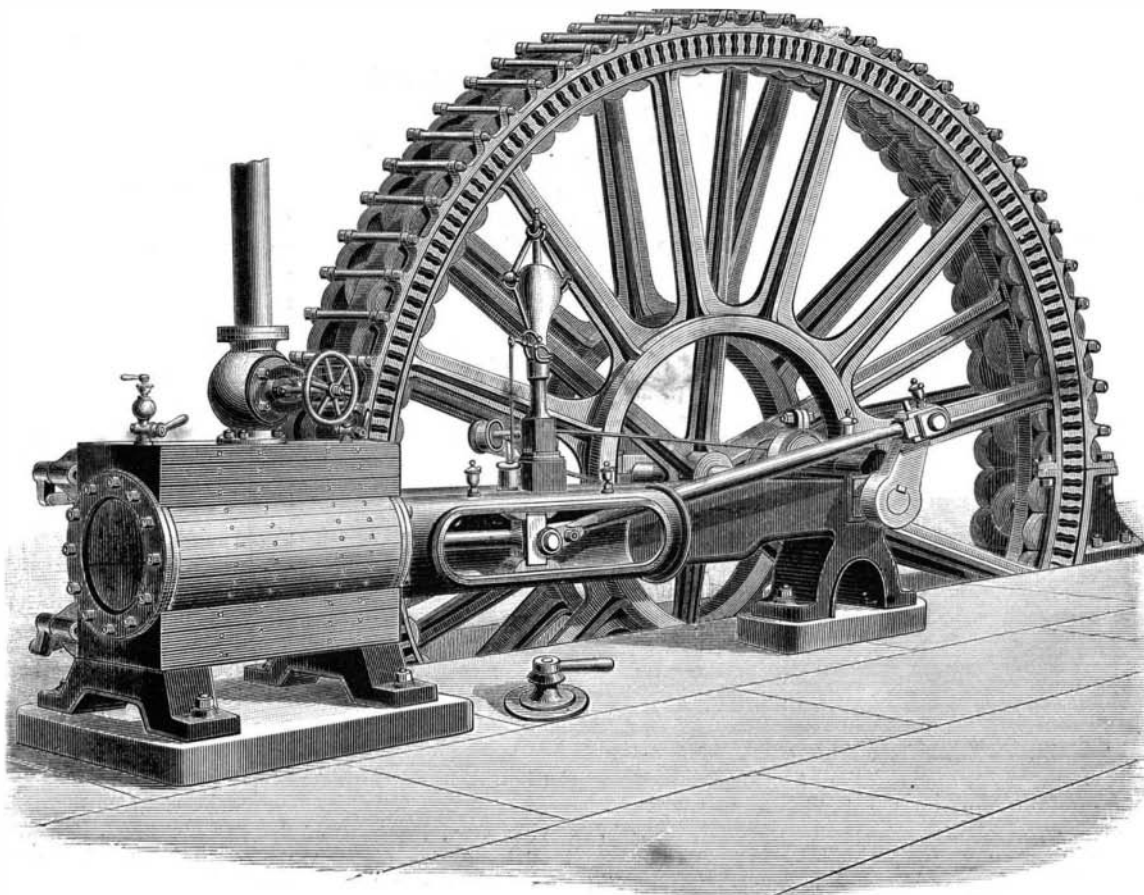
The immense crematory at Rome is in almost daily use. Cremation is daily becoming more popular, and bids fair soon to dispose of more corpses in the Italian capital than old-fashioned burial.



GERARD'S ALTERNATING ELECTRIC MACHINE.

which, when completely bedded in mortar, are as free from rust as when they left the blacksmith's hands.

A French engineer, says the *Polytech. Notizblatt*, observed this remarkable effect when uncovering the anchor plates of several chain bridges which had been built for about thirty years. Where the anchors had been covered with the fat lime mortar of the masonry, they showed no sign of rust;



GERARD'S 250 H. P. DIRECT CONNECTION ALTERNATING CURRENT STEAM DYNAMO-ELECTRIC MACHINE.