

air, gas, petroleum, compressed or rarified air, ammonia, carbonic acid gas; parts and fittings of such engines; hydraulic motor, wheels, turbines, water pressure engines, etc; wind mills and wind motors; gins, tumblers, spring counterweight and pedal motors, etc.

Class 21.—General Machinery: Apparatus for the transmission of power; shafting, plunger guides and slides, jointed systems; gearing; clutches, pawls; pulleys, belting and cables for transmission of power; funicular systems; governors and speed regulators; lubricators; recording instruments, engine counters, recorders, speed indicators, dynamometers, pressure gauges, weighing machines; machines for testing materials, apparatus for measuring fluids and gases; machines for moving loads; cranes, lifts, etc; machines for raising water; hand or steam pumps, norias, hydraulic rams; hydraulic presses and accumulators; water pipes and accessories; air compressors and piping; ventilators; power transmission and distribution at a distance by means of water, steam, air or vacuum; apparatus and associations for preventing accidents caused by machinery.

The exhibit of electrical apparatus is placed in group five, divided into five classes, as below:

Class 23.—Mechanical Production and Utilization of Electricity: Apparatus for generating electrical currents; continuous, alternate and polyphase current dynamos; transmission of power to a distance; continuous and alternate current motors; motors with rotating fields; alteration of currents; dynamo and alternate current transformers; application of electricity to transport purposes, electrical locomotives, electric tramways; application of electricity to mechanical purposes, such as elevators, winches, cranes, capstans, traversers, machine tools, magnetic warping; special methods of wiring; safety appliances and regulators.

Class 24.—Electro Chemistry: Batteries, accumulators; plant and processes generally used in electro-plating and electrotyping, production and refining of metals or alloys; application of electro chemistry to commercial purposes, such as bleaching, sugar refining, treatment of sewage water, manufacture of soda, chlorine, chlorine of potassium, etc.

Class 25.—Electric Lighting: Use of continuous or alternate currents; arc lamps; regulators; carbons for lighting purposes, incandescent lamps; special installations for factories, public buildings and private dwelling houses; central stations; application to light houses, navigation, military engineering, public works; safety and regulating apparatus; meters; photometry; appliances for determining the intensity, distribution and illuminating power of light; special electrical appliances, such as chandeliers, candelabra, ornaments, brackets, etc.

Class 26.—Telegraphy and Telephony: Telegraphic instruments; transmitters and receivers; multiplex instruments; multiplex telegraphy; various parts; relays; repeaters, lightning conductors; speaking instruments; telephones and microphones; telephone exchanges, bells, alarms, sounders; simultaneous telegraphy and telephony; wiring for telegraphs and telephones; overhead wires; subterranean and submarine cables.

Class 27.—Various Applications of Electricity: Scientific apparatus and measuring instruments; medical electricity; electric clock-work; application of electricity to railways, mines and public works; signals; exploders; distance indicators and recording apparatus for all kinds of phenomena; electric furnaces; electric welding; electric heating apparatus.

The Riordon Paper Mills Co. of Hawkesbury, Ont., are lighting their plant throughout by electricity. An order has been placed with the Royal Electric Company of Montreal for one of their 25 K. W. S. K. C. two-phase generators, wound to deliver 110 volts. There will be 200 incandescent lamps installed from this throughout their mills as well as ten alternating inclosed arc lamps. This is the fifth large mill or factory, which has within the past year installed alternating current apparatus of the S. K. C. two-phase type in preference to direct current apparatus, which the alternating current in three cases replaced, and in two cases were new plants. It shows the trend toward alternating current apparatus for all purposes, and the prediction is heard that before many months we will have alternating current street railway apparatus in use in Canada. It is already extensively used in Europe, especially in Switzerland, and the larger companies in the United States are experimenting with it and have already built a new road entirely equipped with alternating current apparatus, which is said to be giving perfect satisfaction. We may therefore in the near future have the alternating current in use for factory lighting, central station or street railway apparatus.

BLINDNESS FROM THE ELECTRIC ARC.

THE danger to one's sight from the light of an electric arc, no matter whether produced for a useful purpose, or the result of some chance short circuit, should be clearly understood by every one, writes Prof. Arthur J. Rowland, in the American Electrician. This is especially true, in view of the many uses of electric arcs, besides those so familiar in the common 1,200 and 2,000 candle power arc lamps.

If one's line of vision takes in such an arc as that in the ordinary arc lamp, or that due to an accidental short circuit, or one at the break of a large current at high potential, the eye suffers a sort of paralysis, and on looking away one sees as through a fog. This effect soon passes away, and at worst requires a sojourn of a day or two in a dark room to produce a cure.

With arcs taking large currents, and especially if one electrode is metal, the effects are quite different and much more serious. At night one notices the intense brilliance and is on his guard. In daylight the contrast is not so great, and so one is more likely to suffer because of lack of care. After working with such arcs the eye does not immediately feel the effect; but after a time, perhaps hours afterward, a slight scratching is felt in the eye, as though there were some fine dust or cinders there. As time goes on, this is followed by a feeling of dryness on the eyeball, accompanied by a very profuse shedding of tears, and all the symptoms of a heavy cold in the head are felt. If the attack is a bad one, the pain becomes a very intense aching and may be accompanied by a twitching of the eyelids. In these worse attacks the afflicted one can bear no light on the eyeball, and if the eyes are opened finds he is blinded.

In case of slight attack a simple eyewash is all that is necessary for a cure. Use one made of six grains of borax in a fluid ounce of infusion of sassafras pith, or one of ten grains of boric acid in an ounce of camphor water. I can vouch for the first and have almost equal confidence in the second. In a very bad case a physician will apply cocaine, that local anæsthetic so commonly used in the eye. No one but a physician should do this.

After a few hours the pain passes away, and by keeping in a darkened room and then wearing smoked glasses for a couple of days, the eye wash being kept in use, all ill affects pass away, leaving the patient with a firm resolve to avoid further experience in this direction.

It is found that the effect of the arc has been to produce an external burn—like a sunburn—on the conjunctiva, or outer membrane covering the front of the eye-ball. If one protects the eyes, this "sunburn" from the arc affects the skin; and results precisely like those after a day's outing at the seashore in midsummer are experienced.

In protecting the eyes against the burning power of such arcs it is not sufficient to simply wear such glasses as are made for those who adjust and repair common arc lights. Far too much of the light gets around them. It is necessary to use a mask covering the whole face. Even if one thinks to protect himself from all direct rays, by holding his hand before his eyes for example, there will still be likelihood of his suffering to some extent. In this way one who stops to look on may suffer from an eye trouble, the cause for which he has quite overlooked.