

F. Brush. There are two marked differences between this and other machines, the first of which consists in the peculiar method adopted for winding the armature; the latter is composed of a ring or endless band of iron, but instead of having a uniform cross section, like that of the Gramme machines, is provided with grooves or depressions whose direction is at right angles to its magnetic axis or length. These grooves, which may be of any suitable number, according to the uses for which the machine is designed, are wound full of insulated copper wire. The advantage of winding the wire in grooves or depressions in the armature is twofold; first, the projecting portions of the armature between the sections of wire may be made to revolve very close to the poles of the magnets from which the magnetic force is derived. By this means the inductive force of the magnets is utilized to a much greater extent than is possible in the case of annular armatures as ordinarily used, which are entirely covered with wire and cannot, therefore, be brought very near the magnets: second, owing to the exposure of a very considerable portion of the armature to the atmosphere, the heat, which is always developed by the rapidly succeeding magnetizations and demagnetizations of armatures in motion, is rapidly dissipated by radiation and convection. In the case of armatures entirely covered with wire the escape of the heat is very slow, so that they must run at a comparatively low rate of speed, with corresponding effect, in order to prevent injurious heating. The second difference lies in the manner of connecting the armature coils to the commutator, this being such that only the particular coils which contribute to the production of the current are in circuit at once. During the time they are passing through the neutral points in the magnetic field they are cut out one after the other, and thus, while idle, do not tend to weaken the effects of the machine by affording a path to divert the current generated in the active sections from its proper channel.

It would be an interesting matter, if the efficiency of all the different machines employed in the production of the electric light could be obtained and published, so as to be readily avail-