

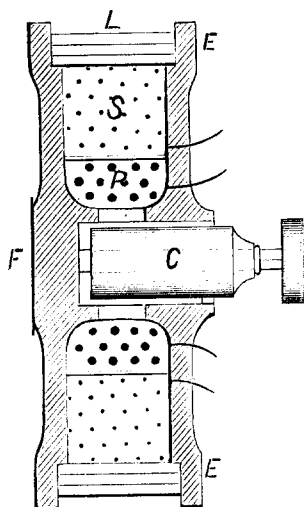
on the latter portion is thereby sufficient to cause a movement of the disc in the direction shown by the arrow. If a constant source of heat be placed at *H*, a slow rotation in the direction shown is maintained.

To ensure success, the disc must be sufficiently thin as to prevent its acquiring a uniform temperature. If the source of heat be at the same time applied at diametrically opposite portions of the disc, as at *H* and *D*, adjacent to the poles, the same effect will be produced. Since the amount of heat expended in producing motion of the disc is so enormous when compared with the force developed, it will be readily understood that this motor is of no value as such, but must be regarded as an interesting example of the interconvertibility of force.

INDUCTION APPARATUS FOR REVERSED CURRENTS.

By PROFS. ELIHU THOMSON and EDWIN J. HOUSTON.

The following apparatus was devised by the authors for the purpose of obtaining induced reversed currents for use in electric illumination. These currents we use with a vibrating lamp, somewhat similar in construction to a lamp, a description of which has already been published.



Our method of operation is as follows: A reversed primary current is caused to induce reversed secondary currents in secondary coils provided therefor. These secondary currents are caused to give vibrations to carbon electrodes, and thereby at the same time produce a partial arc between them. With sufficient strength of primary current, a considerable number of secondary currents are obtained, each of which is able to operate one of our vibrating lamps.

The use of a vibrating lamp admits of a wider range in the size of the carbons employed. When a light of very moderate intensity is desired, the carbons are made of very small size, and are placed in a closed glass vessel for protection from the atmosphere. To moderate the brilliancy, opalescent glass is used.

To obtain the highest efficiency of inductive action from a set of primary coils, the following form of induction of coil was devised: The primary coil *P*, surrounding the core *C*, is provided with a secondary coil *S*, adjacent to it. The ends *E* and *F*, of the bobbin, are made of disks of iron concentric with the core *C*, and slit from centre to circumference. The outer extremities of these disks are connected by wires or sheets of iron *L*, to one another, forming, in this manner, an induction coil encased in iron, or one whose core has its north and south extremities magnetically connected. The strength of the current developed in the secondary coil is greatest when the core *C*, which is movable, is inserted so that both of its extremities are in contact with *E* and *F*. By withdrawing this core, the currents in the secondary coil may be weakened to almost any desired extent. This coil is best adapted to the use of primary currents whose direction is constantly changing. All the wire being completely surrounded by iron whose direction of magnetic polarization is rapidly changed, the highest inductive effect is thereby produced in the secondary coil.

The variations in the intensity of the induced currents will, of course, be followed by variations in the intensity of the light emitted by the lamp. The movement of the core may, therefore, be made to increase or decrease the intensity of the light.

THE EFFECT OF CONTINUED AND PROGRESSIVELY INCREASING STRAIN UPON IRON.

BY CHARLES HUSTON.

I have observed repeatedly when a piece of iron was subjected to heavy strain in the testing machine, sufficient to produce more or less elongation, that if the strain was kept up for some time, say 24 hours or more, the iron underwent a change in its character. This change was shown in the fact that although an increase of elongation had been produced with each addition of 1000 lbs. to the square inch when applied without much interval, after the lapse of 24 hours it required 5000 lbs. to develop further elongation.

In order to investigate this subject with some system, I took five pieces from the same plate of bridge iron designated in the following table by Nos. 188, 189, 194, 195, 196. To enable the reader fully