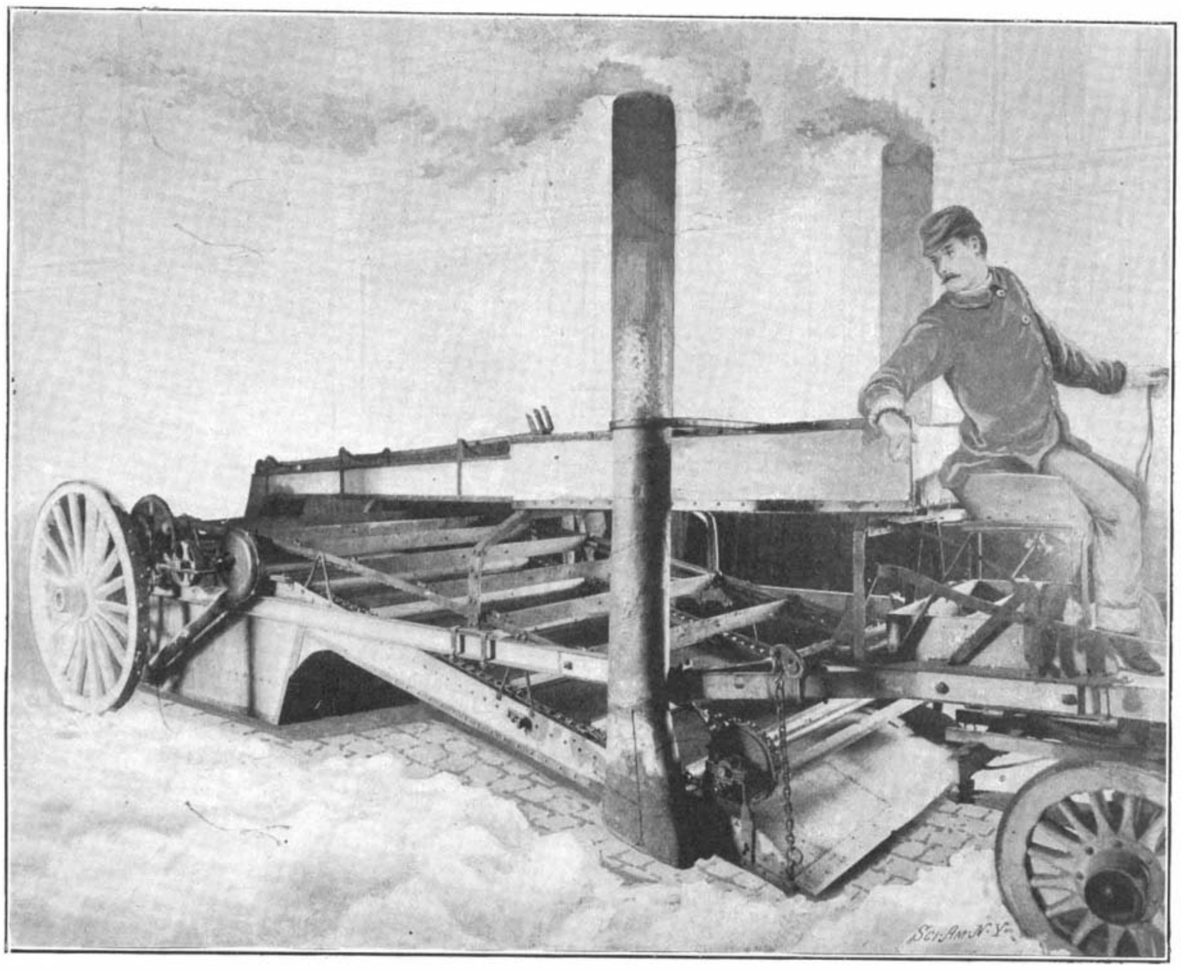
MACHINE FOR REMOVING AND DISPOSING OF SNOW.

While the problem of expeditiously removing snow from our city streets without seriously interfering with traffic is apparent to all, we venture to state that few people realize the seriousness of another problem which confronts the Street-cleaning Department, namely, the disposal of snow thus accumulated. A fall of but a few inches amounts to an astonishing figure when multiplied by the street area of a large city, and the snow gathered must often be carted immense distances before a dumping ground of sufficient capacity can be reached.

An improved method of surmounting these difficulties is afforded by the machine illustrated herewith, which is designed to scrape up the snow from the pavement and at the same time reduce it to water which flows off into the sewers. To this end the machine comprises a furnace or heater of peculiar shape mounted to swing between the side rails of the frame. The forward portion of this heater is inclined downward and terminates in a shoe or scraper adapted to scrape up the snow as the shoe is drawn along. The shoe may be raised, when desired to prevent it from engaging with the ground, by means of a lever adjacent to the driver's seat and having suitable connection with the forward end of the furnace. The smokestacks shown communicate with the forward end of the furnace, and a forced draft is provided by means of blowers having pipes leading to the ashpit. The snow scraped up onto the shoe is carried along the inclined surface of the furnace by an endless conveyer, and coming thus in contact with the heated surface is immediately melted. The endless conveyers and blowers are operated by chain and sprocket connections with the rear wheels of the machine. Above the conveyer is a coal bin from which a chute leads rearward and is inclined downward, so that the coal may pass to the rear platform when the fireman opens the gate at the end of the shoe. Mr. Jacob Mandrey, of Wakefield, N. Y., is the inventor of this machine.



MACHINE FOR MELTING AND REMOVING SNOW.

ELECTRO-MAGNETIC ROTATIONS.

BY HOWARD B. DAILEY.

There is nothing that so adds to the fascination of the study of physical science as an easily tried experiment. Those presented here, illustrating some of the rotational features of electro-magnetism, besides being of great historic interest, are of special value as aids in elementary study in that department of electro-dynamics dealing with the singuiar natural tendency of electric currents to move across the lines of force of a magnetic field. In 1821 in a series of brilliant experiments in which the illustrious Faraday showed the rotation of a current-bearing conductor round a magnetic pole, with its antithesis, the movement of a magnet round an electrical current, occurred the first utilization of this curious physical principle for the accomplishment of rotary mechanical motion; and in the beautifully ingenious forms of illustrative apparatus employed by him are to be recognized the earliest true examples of electric motors known—the embryonic prototypes of that most valuable and indispensable of mechanical appliances, the perfected modern motor, whose present universal adaptation to the countless uses of the mechanic arts testifies to the immense importance of this great contribution to electrical science. The first figure shows a simple method of demonstrating the phenomenon of current rotation round a magnetic pole. The apparatus is constructed from easily procurable materials, and has the advantage of comprising within itself the voltaic combination for producing the necessary electric current. A plate of carbon from an old dry battery, and a permanent bar magnet of quarter-inch round steel eight inches high are wired into electrical communication at their lower ends, and placed within a tall glass tumbler, the magnet upright in the center, and the carbon against the side of the glass, both being fixed in position with paraffine melted and poured into a depth sufficient to entirely cover all the metallic connection. To give the magnet a firm anchorage in the wax, a piece of sheet metal about the size of an old-fashioned penny is drilled through its middle and forced onto the magnet's lower end and soldered fast. To insure the perfect flow of the wax about the bases of carbon and magnet the operation of pouring should be done with the tumbler standing in a bath of hot water. A strip of sheet zinc one-fourth of an inch wide, shaped like an inverted U, with its two parallel legs about eleven-sixteenths of an inch apart has soldered in the middle of its bend a stiff sewing needle, its point extending downward about three-fourths of an inch and turning freely in a small indentation made in the end of the magnet before tempering. To insure good electrical contact here the needle sets in a small mercury cup formed with a short piece of rubber tubing on the magnet's upper end, care being taken to have the latter and the pivot point bright and clean. Bichromate battery fluid is now poured into the tumbler until its surface reaches a little more than midway between the magnet's two poles, immersing the ends of the zinc to a depth of about an inch, the fluid being prevented from touching the magnet by a covering of snugly fitting rubber tubing extending well down into the wax. It is evident that the arrangement forms a galvanic cell with a part of its closed circuit (the zinc) freely movable. As the poised strip with its current is well within the influence of the magnet's upper pole, it sets up a vigorous rotation about it in a direction depending upon which pole is uppermost. By using a larger containing vessel and two magnets with opposite poles above the fluid, both right and left handed rotations can be shown at once. After some hours running the ends of the zinc will have been eaten off by the acid; if, then, the instrument be desired for further use, new ends having some length so that they can be pushed down as they waste away may be bound on with small rubber bands.

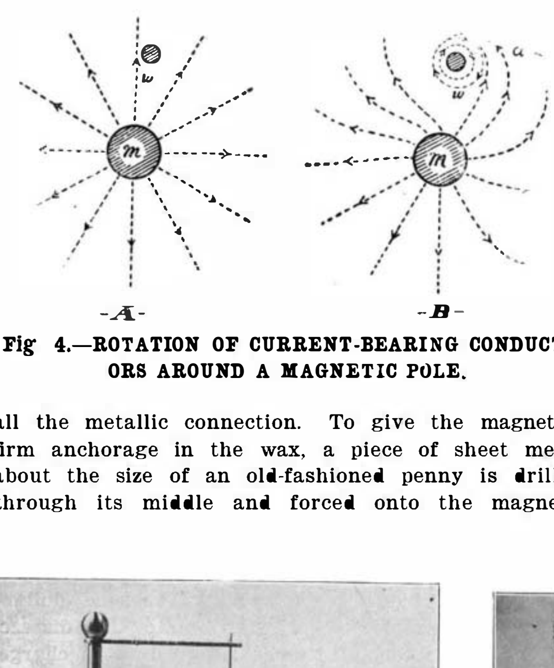


Fig 4.—ROTATION OF CURRENT-BEARING CONDUCTORS AROUND A MAGNETIC POLE.

To one having knowledge of the general significance of the term "Lines of Force," and of the methods of demonstrating their existence and action, the *rationale* of this class of phenomena is not difficult. In the diagram, *A* (Fig. 4), we may regard *m* and *w* as indicating respectively transverse sections of a bar magnet near one of its poles, and of a conducting wire with axis parallel with that of the magnet, the radial-arrow-directed lines representing the normal symmetrical arrangement of the lines of force in the magnetic field, when uninfluenced by the existence of any current in *w*. If, however, we start a flow of electricity through *w*, the conductor becomes the center of a system of lines of its own, which, however, unlike those of the magnet, arrange themselves in concentric circles surrounding the conductor throughout its whole length, these having either a right or left-handed directional sense, according as the current passes up or down in the wire. They are shown right-handed in *B* which represents in a general way the distorted condition of the field which their presence induces. In obedience to Faraday's well-known laws of electro-dynamic action by which lines running in like directions mutually repel, while those having contrary directional paths attract, and where near enough together tend to merge into one another, we find the magnet's lines at the left of *w* bending away and avoiding the wire, because of the similar direction of its own circular lines on that side, as shown by the arrow points. At the right,

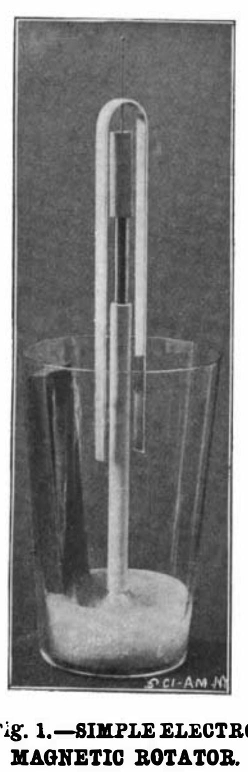


Fig. 1.—SIMPLE ELECTRO-MAGNETIC ROTATOR.

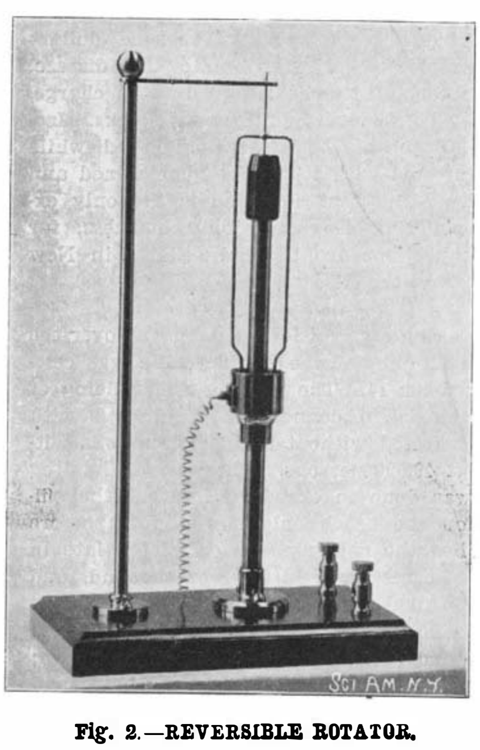


Fig. 2.—REVERSIBLE ROTATOR.

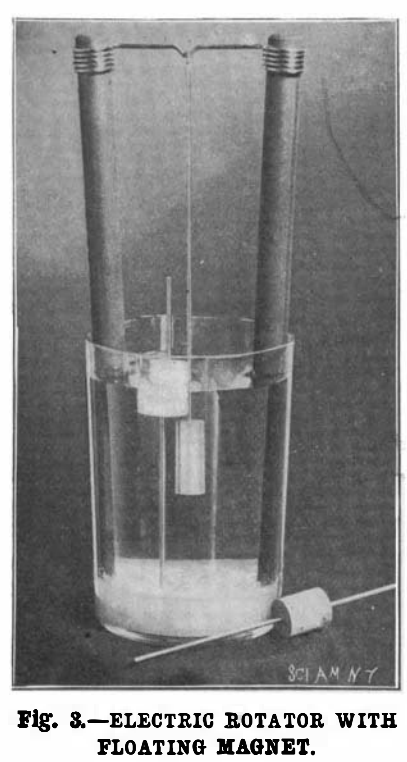


Fig. 3.—ELECTRIC ROTATOR WITH FLOATING MAGNET.