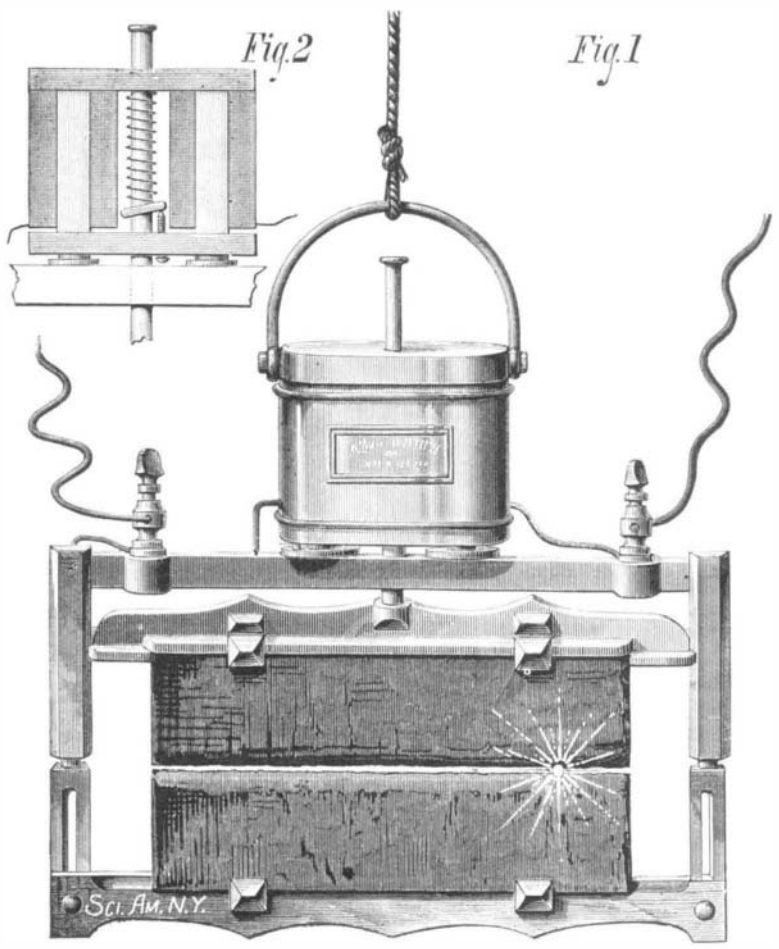
THE WALLACE-FARMER ELECTRIC LIGHT.

The Wallace-Farmer system of electric lighting has been brought prominently forward in England within the last few weeks, and is quietly being pushed forward in this country. The lamp, which is the subject of the accompanying illustration—Fig. 1 being a perspective view and Fig. 2 a sectional view of the magnet—consists of a metal frame of brass, fitted with terminals for the current, as shown. This frame carries the two gas carbons forming the electric wick. These carbons are in the form of short rods or slabs about 9 inches long by 3 inches broad, the upper, or positive, being about half an inch thick, and the lower, or negative, being only about a quarter of an inch thick. The lower carbon is fixed to the bottom of the frame, and the upper is carried by a crosspiece, which can slide up or down in grooves in the sides of the frame. The upper carbon is therefore movable, and can be drawn apart from the lower one to any adjusted distance, say one eighth of an inch, so as to determine the luminous arc. When the lamp is not in use, this upper carbon is let down into contact with the lower one, and rests upon it; but the act of putting on the current raises the upper carbon one eighth of an inch and establishes the light. This is effected by means of an ingenious electro-magnetic contrivance, supported above the frame and shown in Fig. 2. The vertical stem, which is fixed to the sliding crosspiece carrying the upper carbon, passes between the two bobbins of a double poled electro-magnet, shown in section. This magnet is inverted, the free poles and movable armature being undermost. This armature, which is perforated to allow the stem to pass through it, carries a screw, which, when the armature is attracted upward by the current, tilts a small metal ring, or washer, hung from a spiral spring, and inclosing the stem into an inclined position, so that it jams the stem tight and holds it fast in the manner delineated. The first act of the current, then, after it is put on, is to attract the armature until it jams the stem attached to the upper carbon, and the armature being further attracted into contact with the poles of the electro-magnet, it lifts the stem with it, and raises the upper carbon plate until its lower edge is about one eighth of an inch above the upper edge of the lower plate. The arc then either establishes itself at the points of least resistance between the two carbons, or it may be established at any place desired, say at one corner, by inserting a metal conductor for a moment between the two carbon edges. The arc once started continues to subsist at that point until the consumption of carbon widens it to such a degree that a shorter and less resisting path for the current is to be found at a neighboring point. The current then chooses this point, and the arc is established there, until waste of the carbons causes it to shift its place as before. In this way the arc travels slowly along the whole edge of the carbons, and when it reaches the other end it turns and comes back again. For 100 hours the light can, in this way, be maintained without change of carbons and at a cost of about two cents per hour per lamp for the latter. When the current is cut off, the armature falls away from the poles of the electro-magnet, the screw releases the clamping washer, the vertical stem is freed, and the upper carbon drops down into contact with the lower carbon. When the distance between the carbons becomes at any time too great and the current is enfeebled, the armature will of itself fall away from the poles, and the carbons will close up to each other in this manner. This causes the current to regain its full strength, and the armature being again raised, the upper carbon is again withdrawn from the lower and clamped, and the light thus restored automatically.

It will be understood from our description that the upper carbon cannot be withdrawn in this manner from the lower one to a distance over one eighth of an inch, the determined range through which the armature can move. Thus, however much the carbons may have been wasted away, at the resetting of the arc they are always withdrawn one eighth of an inch apart.

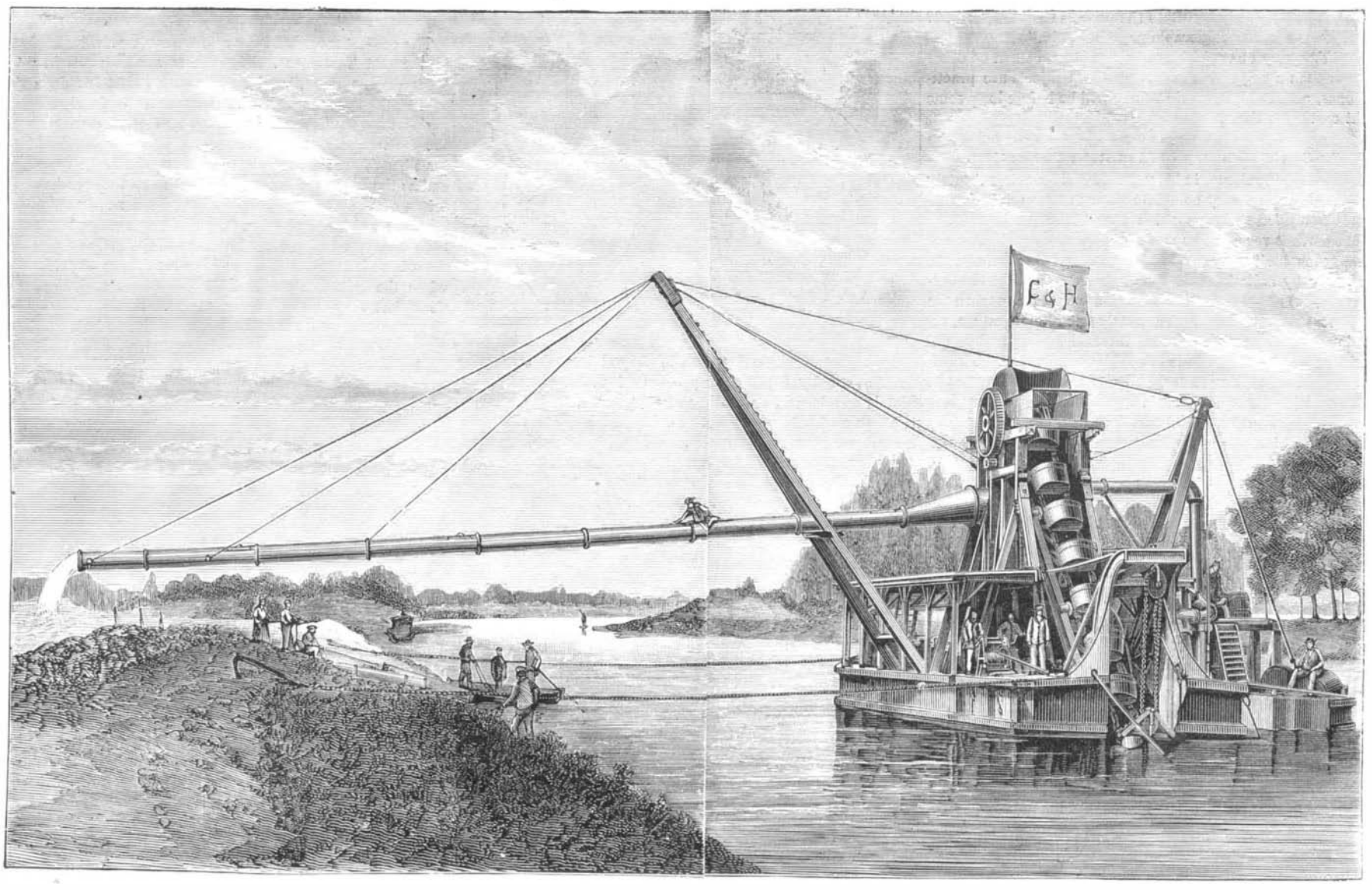


THE WALLACE-FARMER ELECTRIC LAMP.

EXCAVATOR ON THE GHENT AND TERNEUZEN SHIP CANAL, BELGIUM.

The floating dredgers employed in making the excavations on the Ghent and Terneuzen ship canal are 88 feet 7 inches long, 19 feet 8 inches wide, and 7 feet 9 inches deep; the arm is 39 feet 4 inches long, and passes through the hull. The axis of the driving wheel of the bucket chain is 26 feet 3 inches above the water level. A simple conductor has been used by which the sand and mud excavated can be delivered at a point 140 feet and 150 feet from the dredge and at a height of 13 feet above the water line. The excavated materials fall into the concave conductor, 6 feet below the point of their discharge, and, on falling, they encounter the action of a stream of water which is constantly pumped along the conductor, and by which they are converted into semi-liquid mud; the slope of the conductors is generally 1 in 2,000; it is supported by cables attached to a staging connected with the framing of the dredge, and the base of which rests on the deck of the vessel; the conductor is counterbalanced by a platform, on which is placed the portable engine and pump used for lifting the water into the conductor. This platform is suspended to the dredge in the same manner as the conductor itself, and the general arrangement is shown in the engraving. The supply and the maximum incline depend on the facility of disintegrating the ground, and on the quantity of water contained in the mixture. The proportions generally used are three parts of water to one of sand.

The floating excavators are placed on two hulls, carrying an iron framework on which is mounted the staging supporting the bucket wheel. The engines and boilers are installed in one of the hulls, and in the other is placed the pump and engine for driving it. The upper level of the conductor is 78 inches below the bucket wheel. The con-



EXCAVATOR ON THE GHENT AND TERNEUZEN SHIP CANAL BELGIUM.