THE COOPER HEWITT MERCURY VAPOR CONVERTER.

BY A. FREDERICK COLLINS.

The extended use of electric vehicles in cities has heretofore necessitated an equipment comprising a motor generator set in garages where an alternating current only was available, but these electro-mechanical combinations are not only costly in their initial installation, but in their upkeep as well, since any machine having revolving elements is subject to wear, requires oil and more or less attention. Herein lies the merit of the mercury vapor converter, for it has no running parts, being purely an electrical device, has a higher efficiency than a motor generator set, and requires no attention whatsoever. The direct current from the converter may ordinarily be used for any purpose for which a direct current is suitable, but various apparatus require different arrangements of circuits.

While the converter lends itself admirably to the operation of vapor lamps, etc., the commercial converter shown in the illustration is intended for charging storage batteries and for electrolytic work, though it will operate on a resistance load, such as incandescent lamps, very nicely. The outfit can be readily installed in any garage or automobile stable where only alternating current is available.

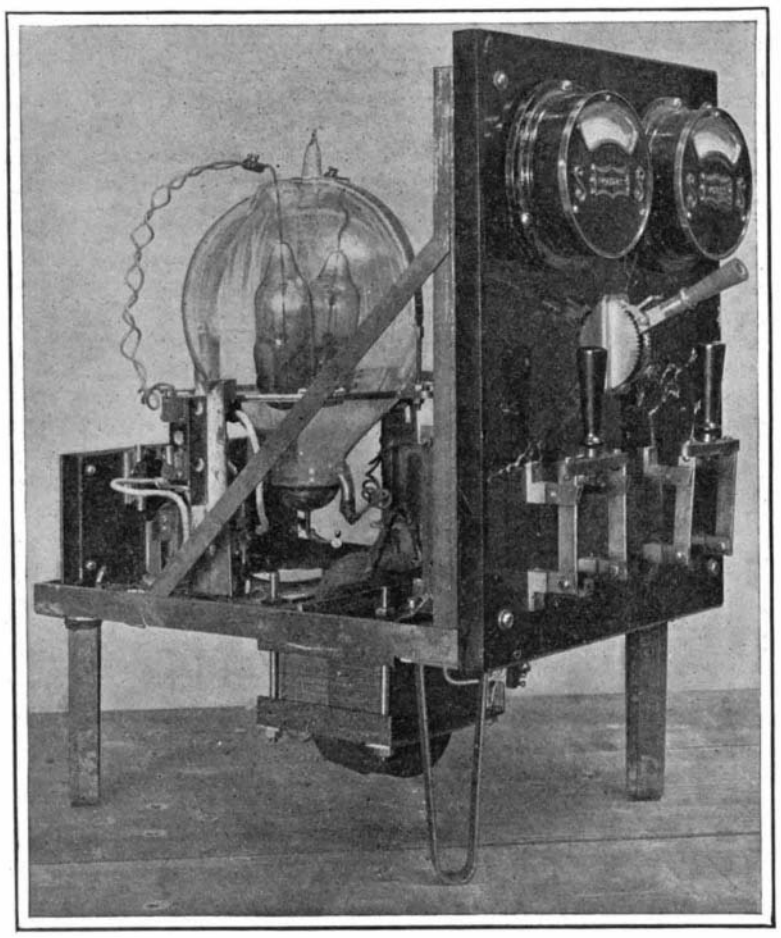
As there are practically no movable parts, the chance of anything getting out of order is reduced to a minimum and hence the converter will be found a simple, convenient, and feasible means for charging electric vehicles. The apparatus may be left running over night provided the batteries be not overcharged thereby.

The mercury vapor converter is automatic, namely, it starts on the closing of the alternating current and direct current switches. Should the converter go out, for any reason, it will start itself again provided the conditions of voltage, etc., are such as to make its operation possible; in other words, the apparatus may be left running with the assurance that, should it go out through any momentary failure of the alternating current supply, it will start again of its own accord on the return of voltage.

The apparatus may be made non-automatic by the opening of a switch, the current may be adjusted while running throughout the full range, and, further, it will operate through any reasonable range of voltage, rendering the equipment a stable and practical affair.

The converter consists of a glass bulb about 9 inches in diameter mounted in a suitable holder, which is entirely inclosed, with a small switchboard mounted in front. On the front of the board are placed a direct current ammeter, voltmeter, two double-pole switches, and a regulator to give current adjustment. The entire apparatus occupies a space of about 15 inches wide by 2 feet long by 20 inches deep; it can conveniently be placed on the floor or mounted against the wall.

With alternating current voltages not exceeding 400 volts, an auto-transformer is used for obtaining the proper potential for operating the converter. On higher voltages a transformer with separate primary and secondary is used. The maximum capacity of the converter is 30 amperes, continuous running, and the converter is adjustable to as low as 6 amperes. It may be adapted to any current up to 115 volts. Its efficiency is, at 30 amperes and 115 volts, approximately 90 per cent; and this efficiency tends to increase as the current falls off. The apparatus is designed for any single-phase constant-potential supply circuit of 60 cycles. In its general characteristics the converter has features in common with the mercury vapor lamp. In both devices the voltage is nearly constant for current of any amperage until a certain very small value is reached. Unlike the lamp, however, the purpose of the converter is not to give light, and so the distance between its metal positive and mercury negative electrodes is made exceedingly short and by this means the potential is reduced to about 115 volts.



COOPER HEWITT MERCURY CONVERTER FOR CHARGING STORAGE BATTERIES.

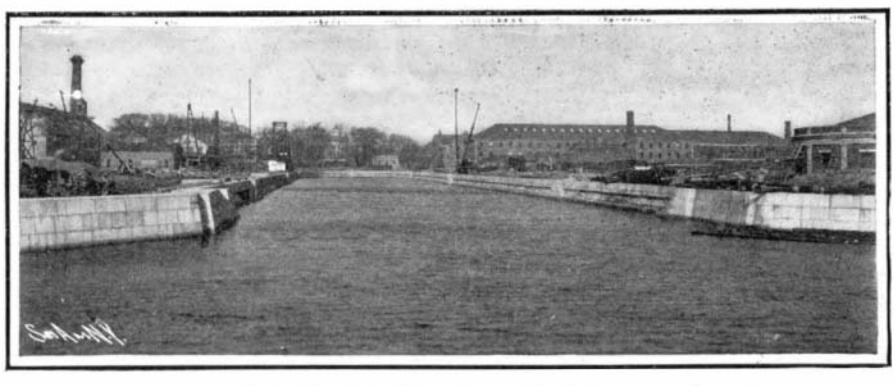
Where heavy currents are converted heat is developed to a considerable extent, and this naturally means loss of energy; to circumvent this undesirable condition the globe or container is given a large diameter and in this way a larger cooling surface is obtained. While the converter is in operation the mercury is carried upward in the form of a vapor, and this on condensing falls to the bottom again.

The converter just described is another practical application of a new series of distinct phenomena that have been evolved by Mr. Hewitt in the physics of electricity, of which the first is his well-known mercury vapor lamp.

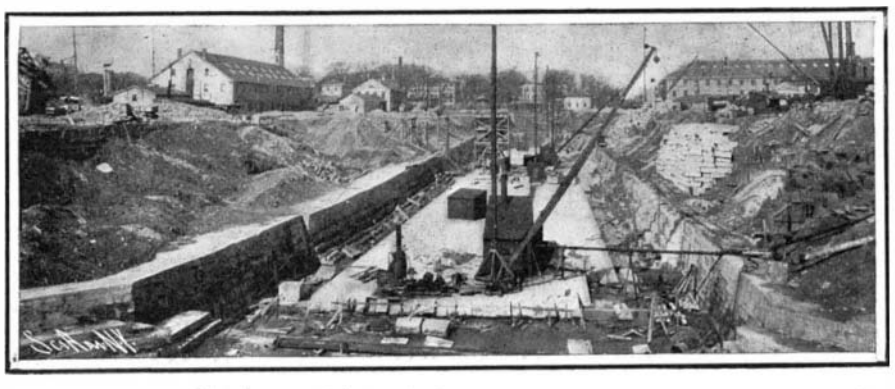
NEW MASONRY DRYDOCK AT THE BOSTON NAVY YARD.

The handsome stone-and-concrete drydock recently completed at the Boston navy yard is one of the largest docks in the world, and has taken about five years to construct. It embodies all the modern improvements which have been incorporated of late years in first-class dock construction, and it is built on such excellent natural foundation, and of such first-class materials and workmanship, that its period of life may be looked upon as practically indefinite. Not always has the United States government built its drydocks as wisely and well as this one has been built. For a period of many decades the navy was, unfortunately, obliged, by ill-advised motives of economy, to build its important drydocks of timber; and although some of these have given good service, others have been exceedingly troublesome, mainly because of leakage; the most notable case being the big drydock No. 3 at the New York navy yard. All of these docks, moreover, are, from the nature of the material of construction, perishable; and there must be a constant element of expense attached to them because of continually-recurring repairs and renewals.

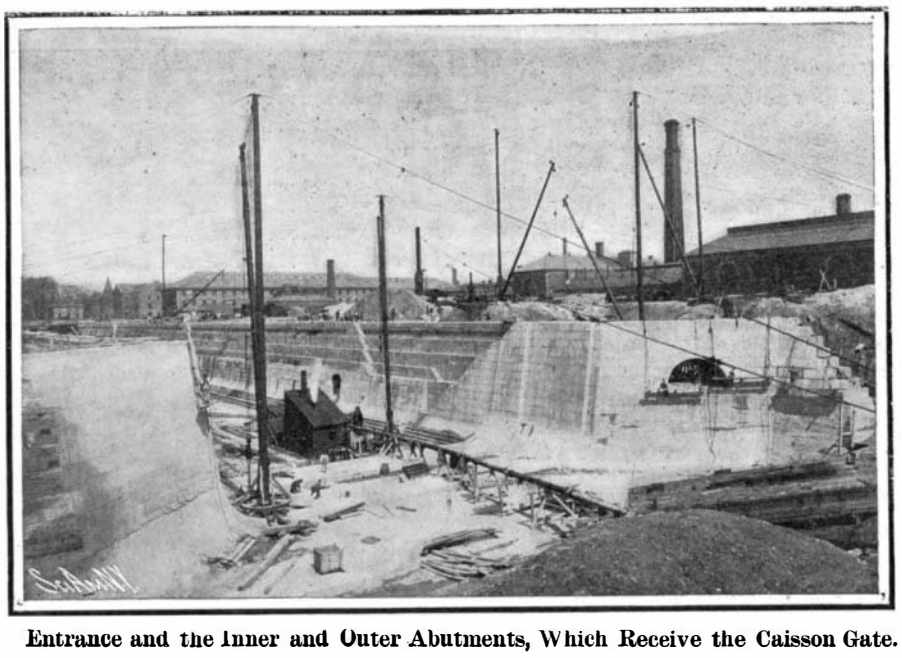
The new dock has a total length on coping, from head to outer end of table, of 788 feet; from head to outer gate sill of 750 feet; and the length on floor, from head to outer gate sill, is 729 feet. The width on the



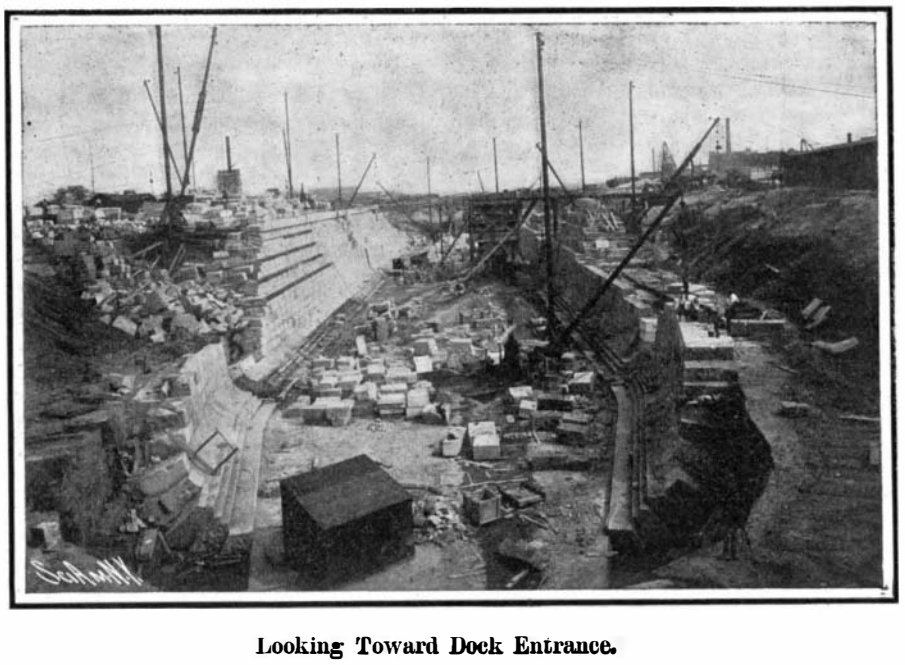
The Finished Dock from the Harbor.



View Looking from the Dock Bulkhead.



Entrance and the Inner and Outer Abutments, Which Receive the Caisson Gate.



Looking Toward Dock Entrance.

THE NEW GRANITE DRYDOCK, BOSTON NAVY YARD.