

It is evident from the above that the method gives accurate results when applied to a great variety of ores.

EAT CLAIRE, WISCONSIN.

A NEW SHAKING DEVICE FOR THE CHEMICAL LABORATORY.

BY J. M. CAMP.

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Among the various pieces of apparatus going to make up the equipment of the modern laboratory, it is the purpose of this article to describe the latest appliance, in the shape of a shaking device. It was designed and is particularly adapted for the purpose of hastening the precipitation of phosphorus by the well-known and almost exclusively used molybdic acid method, and in the solution of steels or pig irons for carbon combustion. But it is equally useful where agitation is desired in a flask for either dissolving or precipitating. As can be seen from the photograph, it consists of a frame supporting a vertical shaft, which is revolved by a six-inch pulley wheel. The upper part of the shaft is bent slightly from the perpendicular. Encircling the bent portion of the shaft is a hub which in turn supports a flat disc on which the flasks to be shaken are attached. The hub and disc are prevented from turning, when the shaft is revolved, by suitable teeth on the underside of the hub meshing into corresponding teeth on the top of the supporting frame.

On revolving the shaft the motion of the disc is ideal for the purpose intended, and can be best likened to the simultaneous pitching and tossing of the deck of a ship in a tumultuous sea. With each revolution of the shaft a wave travels around the flask or flasks on the disc exactly as in hand shaking, and by increasing or diminishing the number of revolutions the number and intensity of the wave movement is controlled. To obtain the maximum agitation and still retain the solutions in the flasks, without corking, from one hundred to one hundred and forty revolutions per minute has been found satisfactory. The disc is made to hold six flasks, any one of which can be placed in or removed from the machine in a fraction of a second. The gripping device is movable, up or down, enabling it to be quickly adjusted to hold any size flask from a six ounce to a twenty-four ounce Florence or Erlenmeyer. The electrical power required to operate it is twelve hundredths of an ampere on 250 volts, about the equivalent of the one twenty-fifth horse power, or less than the average desk fan motor is consuming, so that with the proper counter shaft to give the desired number of revolutions, any source of power may be used.

Heat can be applied to the apparatus if desired by means of a circular

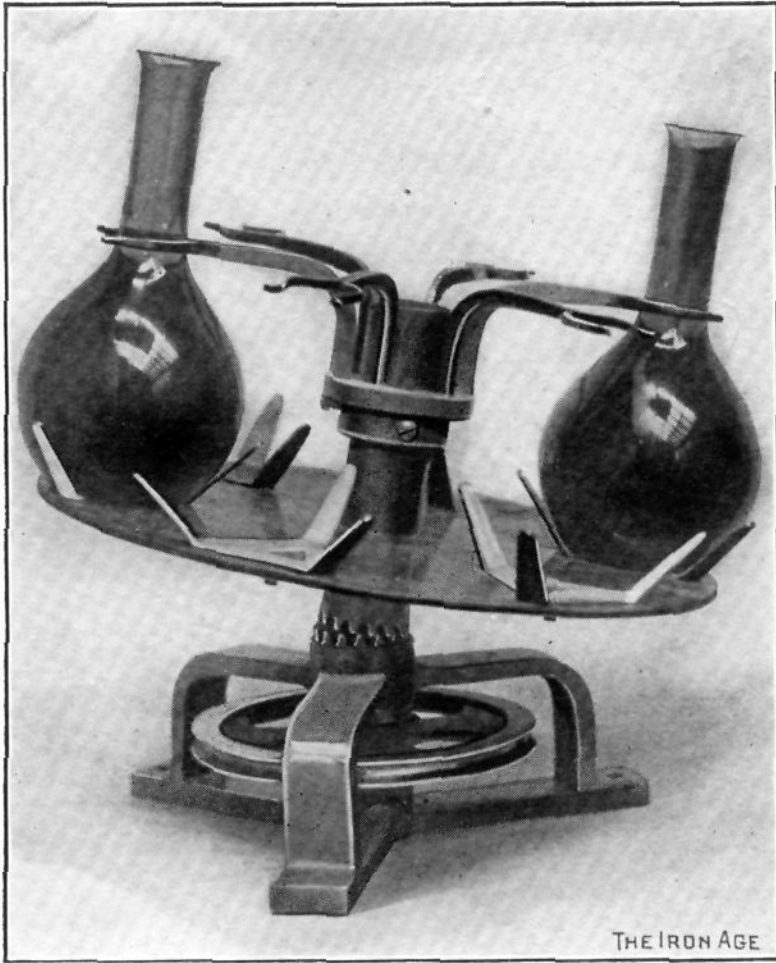


FIGURE 1

burner, but it has been found that by adding the hot liquid to the flask, or heating the contents of the flask before placing it in the machine, the same end is obtained.

The advantages of the machine over hand shaking are to the chemist only too obvious. During the time of shaking the operator can be doing other more profitable work, with the assurance that aside from being relieved from the fatigue of the operation, the machine is not striking the job—as is the natural disposition of mankind—resulting in false analysis, while with the machine the reverse is the case, it is always allowed to do its full quota of work. Then under its constant conditions, in phosphorus precipitation for instance, a precipitate of like crystallization is always obtained, aiding materially its estimation by judging its bulk, as is the practice in most busy open hearth steel work laboratories.

Too much can not be said in praise of the machine, its simplicity, ease of operation, quietness, and the readiness with which the flasks can be placed in and removed from the apparatus, and the fact that the flasks do not need to be corked will commend it to any one.

Application has been made and the claims granted for a patent covering the ideas embodied in this machine.

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METHOD FOR THE ESTIMATION OF METALLIC IRON IN THE PRESENCE OF ITS OXIDES.

By HENRY G. MARTIN.

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For several years the writer has used the following method for the determination of the amounts of metallic iron, ferrous oxide and ferric oxide present in furnace products. The total iron is determined by solution, fusion of the insoluble residue, and titration. The sum of the ferrous iron and the metallic iron is determined by solution in dilute hydrochloric acid, with exclusion of the air and titration of the solution. And finally the metallic iron is determined by measuring the hydrogen evolved on dissolving the substance in dilute sulphuric acid. The method can not, of course, lay claim to strict accuracy, since it disregards the ferrous iron of the insoluble residue and also assumes that the ferric iron present is not acted upon by the hydrogen evolved during the solution of the metallic iron. If manganese is present, other errors may be introduced, and if the manganese content is high, the results are uncertain.

The hydrogen evolved by the solution of the metallic iron is determined as follows: