ward by the rollers, which have an intermittent motion, and at each momentary pause the pricking pins enter the material, and are rapidly withdrawn from it. By degrees this fibrous descending curtain is delivered on to a sloping receiving table at the bottom of the machine, over which table the woody substance has previously passed to a receiver in a crushed and semipulverized condition and perfectly free from fiber. Three attendants are required for one machine; but, when large quantities of fiber have to be cleaned, the same attendants are sufficient for three or four of the machines placed alongside each other, as seen at Fig. 2 of our engravings, which represent the machines as arranged for rhea, jute, and hemp, which do not require the buffer.

In moist climates, when rhea has to be worked in its green state, it will be necessary to pass the stems first through another series of rollers to press out the sap before being fed to these machines. Flax straw is much shorter than the ramie and hemp stems, and besides requires a different treatment.

The attendants for one machine for flax are a boy or a girl to prepare straw in bundles, another to feed the straw to the machine, and a man to attend the buffer to clear off the broken woody portions. The two attendants who prepare the bundles and feed the straw can attend to two other machines; but each machine must have a man to buff or clean the flax.

The driving power for each machine is two horse power. Since we saw the machine at the Irish exhibition—and that was the first machine Mr. Wallace made on that pattern—he has applied it to the purpose of preparing jute, for which purpose it appears to be eminently adapted, according to the strong testimony of several leading jute spinners and that of manufacturers of this class of machinery. One important feature of this machine in connection with jute is that it will work the root ends of jute, which, under the ordinary system, have to be cut off, forming a considerable item of waste. The machines are also being put down at a factory in this country for preparing rhea fiber.—*Iron.*

NEW APPARATUS FOR THE CONCENTRATION OF EXTRACTS IN VACUO.

By L. A. ADRIAN.

As the result of attempts to avoid the decomposition of the organic substances contained in pharmaceutical extracts by heat and exposure to air during concentration, the author describes the following apparatus, by which the evaporation is effected with a minimum amount of change either in color, taste, or composition. Although the vacuum method has long been employed for the concentration of sugar solutions, the apparatus here described is considerably modified to meet conditions dependent on the nature of the substances under treatment.

The first apparatus, as shown in Fig. 1, was constructed in 1873, and comprises:

A, the vacuum pan, of about 1,000 liters capacity, is cylindrical and terminated above and below by hemispherical steam jackets. B, a cylindrical reservoir, serving as a trap for particles of liquid mechanically carried over during violent ebullition. C, a second reservoir in which the vapors are condensed by a shower of water supplied by the pipe, N. S and U are the connecting pipes conveying the vapors which are drawn over by the vacuum maintained through the pipe, M. N, a tank containing the liquid to be concentrated. G, a pipe conveying steam to the upper jacket. F, a pipe conveying steam after use in the upper jacket to the lower jacket. E, a cock for the introduction of cold water along with the steam to the lower jacket, in which any desired lower temperature may be thus maintained. D, outlet for the hot water or steam. R, sight glass to view the course of the evaporation. T, manhole for removing the finished product.

A vacuum having been established in the apparatus, about 150 kilos. of the liquid are let into A, and the heating is regulated by the several cocks and a thermometer inserted into A. To secure tightness in the vacuum pump, the pistons work under a cushion of water. The evaporator is fed with liquor until about 25 to 30 kilos. of extract are obtained, when it is removed through the manhole preparatory to introducing a fresh charge. The function of the upper steam jacket is simply to prevent condensation of the vapors in the evaporator. This apparatus has served with success in concentrating the mother-liquors of sulphate of quinine, but it presented two principal defects, first, that the curved bottom was unsuitable for a quick and complete removal of the finished product, especially if that were quite dry, and secondly, the absence of any kind of agitation was favorable to the formation of a crust on the surface of the liquid which hindered evaporation and required the application of an undesirably high temperature. The oscillating apparatus shown

in Fig. 2 was designed to overcome these defects, and has been in successful operation for two years.

A is an evaporator of tinned copper, with a flat bottom and a capacity of 700 liters, the diameter being equal to four times the height. There are two manholes at opposite sides. The evaporator is double jacketed above and below, D being heated by steam from F, of which the outlet is at G. The pump, V, injects warm water into the lower jacket, and ejects it through the pipe, X, in which a thermometer is placed to register the temperature. The evaporator is hung on an axis, Z, resting on the supports, M N, and an oscillating motion is communicated by a projecting piece from A, carrying a cam which works in an endless groove in the revolving cylinder, Q, geared to a shaft driven by a belt. The dome of the evaporator is connected by an India-rubber pipe, K, to the condens-

sustained by them, being removed, and replaced by a simple and ingenious arrangement of levers, which are few in number, with a consequent absence of complication. The section block is, as in earlier machines, driven by a friction bowl sliding upon a horizontal shaft, and connected by a forked lever to a shaft which is rocked by the regulating screw by means of an L lever coupled to the latter. On the presser shaft, which extends across the machine, is a cranked slotted lever, also connected, as is shown in the illustration, to the regulating screw, which is operated as before, by a ratchet. An indexed regulator plate is fixed as shown, behind which is a star wheel indicating the number of hundreds of revolutions. As this part of the mechanism is substantially unaltered, it is not necessary to further describe it. A pin fixed in a brass nut, sliding in a graduated slotted lever which adjoins the cranked

IMPROVED SECTIONAL WARPING MACHINE.

ing cylinder, J, containing 400 tubes through which cold water flows. The products of condensation are collected in C, which is in communication with the vacuum pump by the pipe, H. T is one of the sight glasses, to view the course of the evaporation, and to regulate the additions of liquid by the pipe dipping into the tank, E. The sides of the evaporator are covered with wood, to hinder condensation within. A charge of 80 liters of liquid is let into the evaporator, and water of 80° into the lower double jacket, steam being let into the upper one. On setting the oscillating movement to work, the evaporating liquid is kept in constant motion, exposing always a fresh surface for evaporation. This condition is very favorable to rapid evaporation and the maintenance of a low temperature, 50 liters of condensed water per hour being easily obtained with a temperature of 35° to 36° C. in the interior of the evaporator, and the desiccation of the residue may be made complete. If the residue be pasty it may be removed through the manhole by tilting the evaporator to one side, and if dry, raked out while still warm.—*Bul. Soc. Chim.*

IMPROVED SECTIONAL WARPING MACHINE.

RECENT experiments have been made by Mr. J. H. Stott, Rochdale, with a result of further improving these machines in the setting and regulating motions, and also, in addition, the value of the machine has been enhanced in several minor points. The machine, as a whole, stands as formerly, as will be seen from the annexed illustration. Still it will be necessary for us to give in detail the alterations made upon the hitherto existing mechanism. These alterations consist principally in the manner in which the presser and friction bowl are controlled, the curved levers, with the weight

lever, engages with the slot in the cranked lever. The position of the nut is adjusted by means of a screw on which it fits and which extends downward in the slot. The upper end of the screw has a hand-wheel fastened on it, so that it is easy to set the nut as required. The graduated lever swings on a pin, is cranked at its upper end, and has a pin fixed at the end of its cranked end. A hand lever, which is pivoted at its lower end to a lever on the presser shaft, is formed with a slot at its upper end, one side of the slot being provided with a recess with which the pin in the graduated lever engages. The lever on the presser shaft is arranged to come in contact with an arm fixed on the shaft, and in this way the necessary depression of the presser arm is obtained. The action of this mechanism is as follows: The section block being empty, the presser is in its highest position, and the friction bowl is pushed into its initial position. In this case, the cranked lever is drawn forward by means of the screw, and it and the graduated lever are then practically parallel. As is well known, the practice is to form a trial cheese so as to be sure that the mechanism is in its proper position to produce sections of the requisite length and properly wound. One of the features of the new arrangement requires special explanation. As has been pointed out, the hand lever is slotted at its upper part, and in beginning to form a trial cheese, a hundred yards or so are first run on to the barrel, the graduated and hand levers being disconnected. If the nut is properly set, the pin fastened in the horizontal arm of the graduated lever can slip into the recess, or the hand lever can be easily pushed on to the pin, but, if not, the nut is moved in the slot until the pin will slip in, after which it is locked. By noticing the position of the nut, a record is obtained of the various points at which it should be set, or sec-

FIG. 1.

FIG. 2.

NEW APPARATUS FOR THE CONCENTRATION OF EXTRACTS IN VACUO.