

## NEW GRADUATING APPARATUS.

This apparatus was designed to facilitate the accurate graduation of glass tubes—burettes used in volumetric analyses, technical assays, pharmaceutical work, etc.

The tube, A A, to be graduated is secured by brass clamps, *e e*, to the wooden frame, P. The piston, S, of brass, loosely packed with rubber, is rigidly connected by the brass rod, F, with the block, *b*. The smaller end of the glass tube, A', is tightly connected by a piece of rubber tubing with the glass tube, G, which joins, at right angles, the small upright graduated glass tube, E E'. This tube is continued downward, and connected by a short piece of rubber tubing with the feathered delivery tube, B, a pinch cock serving to stop the tube at O. The upper part of the tube, from *e* to *e'*, is graduated to contain one cubic centimeter of water, and this space is subdivided into tenths of a centimeter. Water from D is introduced into the tube through the small funnel. The hard-wood rod, T, has a fine steel point rigidly affixed at *i*, the other end being similarly fitted with a wedge-shaped blade, *p*.

In using the apparatus the tube to be graduated is uniformly coated with a thin film of white wax or collodion. A small quantity of water is then put into it, the piston adjusted so as to fit snugly but loosely, and the tube securely clamped in position, connection having been made with the tube, G, the pinch cock at O is opened, and the piston forced up to the end, A, of the tube, expelling the water (and air) through G and B. The pinch cock is then closed and water (at 60° Fah., or 16° C.) let into the tube, E, from D, until it is filled to the mark, C, any excess being drawn off through B.

The block, *b*, is then grasped and slowly drawn back until the water in E E' has fallen to *a*, the first mark on the scale. The steel point, *i*, on the rod, T, is then inserted in a fine hole, nick, or cut line on the upper side of the block, *b*, and held in position, while the blade, *p*, at the other end of the rod is brought down on the coated tube, and a fine line cut through the coating to the surface of the glass. The block, *b*, is again drawn back until the water in E E' falls to the next line on the scale, when the rod is brought into requisition, as before, and another mark made on the tube. These operations are repeated until the water in the tube, E E', falls to C', when it is again filled to C, from the reservoir, D, and so on, until the graduation of the tube, A A', is completed.

The lines are etched in by exposing the tube to gaseous hydrofluoric acid—evolved from a mixture of powdered fluor spar and warm oil of vitriol contained in a suitable leaden dish or by the use of liquid hydrofluoric acid. Wherever the film of wax or collodion has been cut so as to admit of contact between the acid and glass, the glass becomes sufficiently etched in a few minutes.

The wax may be removed from the glass by washing with benzene, the collodion by hot water and a brush.

Tubes graduated in this way are much more accurate than those graduated by the usual methods, or where variations in internal diameter of the tube are not taken into consideration. The time required in the operation is reduced nearly one half over the older methods of volumetric graduation.

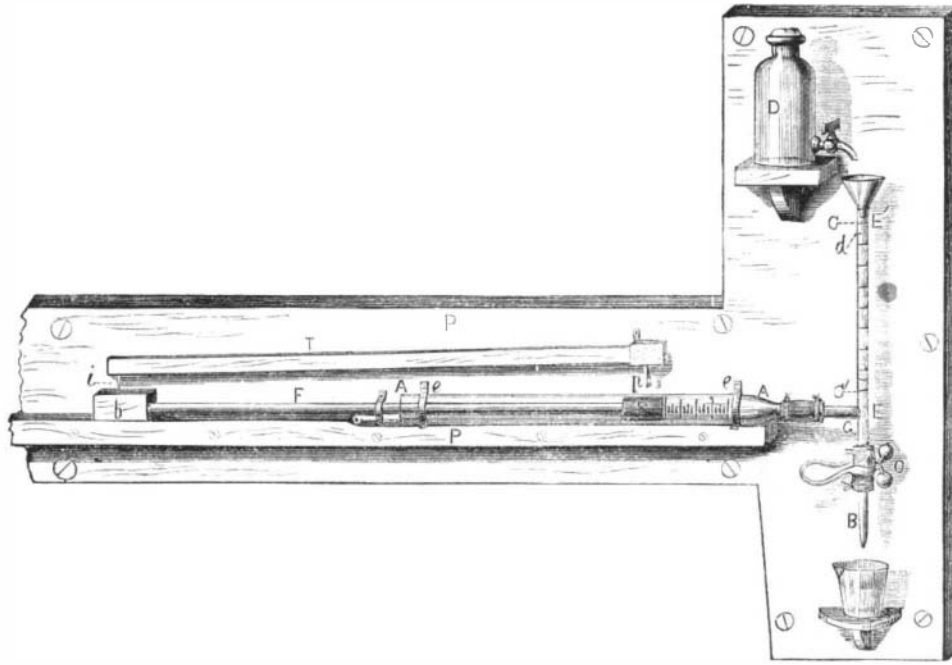
## Statue of Marco Polo in Venice.

A statue of Marco Polo, discovered in Canton, has been received at his native city, Venice. It is life-size, made of wood, and gilt. According to a foreign contemporary, the famous Venetian traveler is represented seated, wearing the Chinese attire, although the cloak and hat are after the European fashion. His moustache and beard, which surround his face, are tinged dark blue, and while the Chinese artist has given him a peculiar form, the features in no way resemble those of a Mongolian type. Opposite the large, red, easy armchair upon which Marco Polo is seated is placed a porcelain bowl, intended to receive perfumes, with which he was honored in the same manner as is the protecting genius of China in the temple of Canton. The statue has, at the foot, an inscription in Chinese characters.—*Builder.*

## The Faure Battery and the Electric Light.

Some experiments of considerable importance have lately been carried out by Mr. Keates, the Consulting Chemist to the Metropolitan Board of Works, in which a Faure accumulator has been employed in the production of the electric light. The lamps used on this occasion were respectively those of Maxim and Swan, one of each description being attached at a time. M. Faure states that in these experiments 40 cells represent about half an available horse power for three hours. The Maxim light being placed in connection with the accumulator, 30 cells were found to give the light of 16 candles. With the same number of cells the Swan lamp gave the light of 22.4 candles; with 35 cells the lights became respectively 45.3 candles and 65.6. With 40 cells the Maxim light rose to 101 candles, and the Swan to

141. Thus far the Swan light gave the greatest amount of candle power. But with 45 cells the Maxim light rose to 229 candles, while the Swan only displayed 204. The capacity of the latter was evidently being overtaxed, for in about a minute the carbon loop broke. A power of 50 cells was then connected with the Maxim light, which then rose to 333

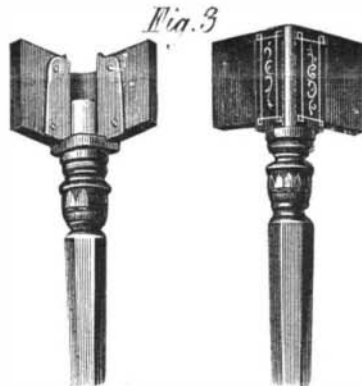


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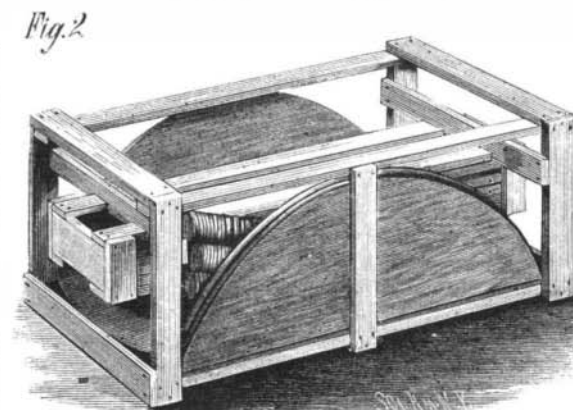
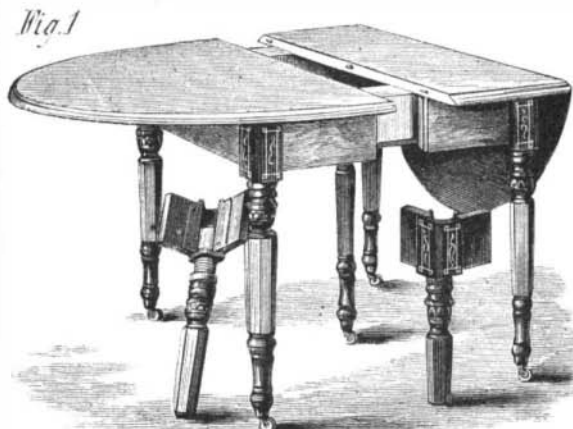
candles, but in about a minute the carbon loop shared the same fate as the Swan. The experiments are also interesting as showing the great increase of light obtained by a comparatively small increment of power. Thus, in the case of the Maxim lamp, taking 3) cells as the standard, an increase of one-sixth nearly trebled the light; an increase of two-sixths augmented the light more than six times; three-sixths increased it fourteen times, and four-sixths twenty-one times.

## IMPROVEMENT IN TABLES.

The engraving represents a simple and inexpensive device for uniting the rails of tables and the legs with the rails to



facilitate the "knocking down" and putting together of the table. The invention is a corner or angle plate provided with vertical wing sockets for the reception of the ends of opposite rails, and with inner central socket for receiving



LANGSTON'S IMPROVED TABLE.

the upper end of the table leg. Fig. 1 in the engraving shows a complete extension table having the improved corners attached. It also shows the inside and outside of the corner piece in detail. Figure 2 shows the table "knocked down" and ready for shipment, and Fig. 3 is an enlarged view of the angle plate. The

table corner is a casting having an outer corner or angle plate that fits against the outside of the table rails. To the inner angle of the plate, and forming an integral part of it, is attached a socket having opposite projecting side wings to fit against the inside of the table rails; these wings completing the sockets for receiving the ends of the table rails.

The cylindrical socket that extends upward from the lower edge of the angle brace, and within it, is of sufficient length to hold the table leg firmly, and the table is made fully as solid as with mortises and tenons. This socket may be screw-threaded and the table leg screwed in; or it may be plain inside, or fluted. From the upper edges of the wings sharp studs project for firmly holding the table top.

A table made in this way can be more readily put together or taken apart, knocked down for packing, and be more easily transported than those of ordinary construction, while at the same time it is strong, durable, and cheap.

Further information may be obtained by addressing the inventor, Mr. H. J. Langston, Garrettsville, Ohio.

## NEW INVENTIONS.

An improved stove mat for coffee pots and other utensils has been patented by Elizabeth C. Zumwalt, of Port Orford, Oregon. The invention consists in a mat made of a plate of sheet metal, having apertures and a handle to adapt the mat to be placed upon the top of a stove to receive a coffee pot or other utensil, the object being to prevent the bottom of the vessel from burning.

An improved balance for obtaining thelea of yarn has been patented by Mr. Thomas Finigan, of Mechanicsville, N. Y. The invention consists in a balanced scale beam provided at one end with a graduated scale, indicating the number of leas, and at the other end with a graduated scale with larger subdivisions, indicating the ply or number of strands of the thread, a movable unit weight being suspended from the latter end of the beam; whereas a certain length of the thread or yarn to be tested is suspended from the other end of the beam.

Mr. Curtis Griffin, of Middlefield, N. Y., has patented an improved adjustable frame as a substitute for the poles in raising hops. The invention consists in an upright having two crossed bars, with two cross pieces at the ends fastened to its top, which cross pieces have hooks at the ends to receive rings at the upper ends of a series of rods having rings fitting over the tops of a series of short posts around the upright, or on hooks at the upright, attached to their lower ends. The hop vines grow up on these rods, and the latter need only be unhooked when the crop is to be harvested.

An improved wagon brake has been patented by Mr. Robert Rutter, of Dillon, Montana Territory. The object of this invention is to facilitate the reversing of the brake roller, to allow the brake lever to be placed at the left-hand side of the wagon when the brake is to be put on by a man riding the near wheel horse, and to be placed at the right-hand side of the wagon when the brake is to be put on by the driver riding in the wagon.

Mr. Edward Ebi, of Cedar Rapids, Iowa, has patented an improved brake rod. The invention consists in a rod passing through journal bearings on the under side of the car, and provided at the ends with pivoted connecting bars having spring catches for keeping them united, which connecting bars are locked to the brake rods by means of a lever pivoted to the connecting bar and passing into notches of a loose and a rigid circular plate on the brake rod, so that all the brake rods of the several cars of a train will be revolved together and the brake shoes will be drawn against the wheels simultaneously.

An improved harrow has been patented by Mr. William J. Campbell, of Reed's Gap, Pa. The object of this invention is to provide means whereby the center bars of the harrow may be weighted by the side bars, and thus caused to make deeper cuts; and also to provide a harrow the tooth bars of which may be readily detached from each other for convenience in transportation and stowing away.

Messrs. Reuben R. James and Mirabeau N. Lynn, of Rising Sun, Ind., have patented an improvement in grain meters. This invention relates to apparatus for weighing and measuring the amount of grain that passes through it by devices actuated solely by the weight of the grain, and hence automatic in its operation. The invention is an improvement on the grain meter for which Letters Patent were granted to the same inventor February 22, 1881, No. 238,122.