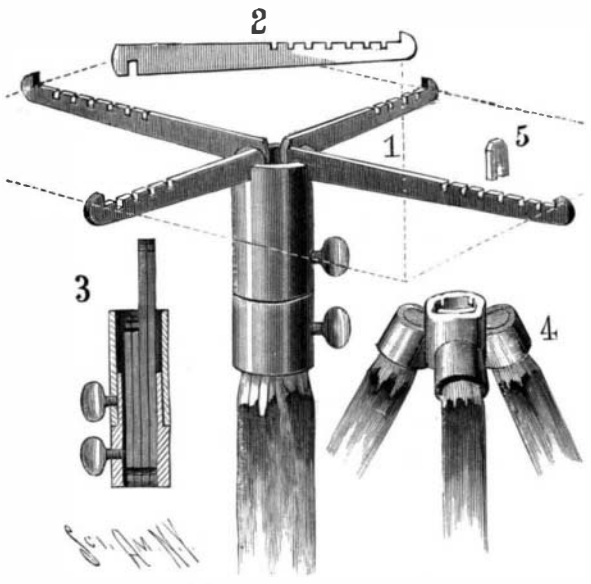
A HANDY CAMERA STAND.

The ingenious camera stand shown in the accompanying illustration has been patented by Mr. Lafayette Noble, of No. 40 Washington Street, Haverhill, Mass. It consists of a ferrule, which is adapted to be fitted on the top of a stick which has been driven into the ground for the purpose. It is secured in place by a thumbscrew, and its upper end is reduced to carry a cylinder, which is slipped on over the same, and also held in place by a thumbscrew. The upper end of this cylinder is provided with notches, which receive the hooked ends of four arms, which, when in place, extend at right angles to each other in a horizontal



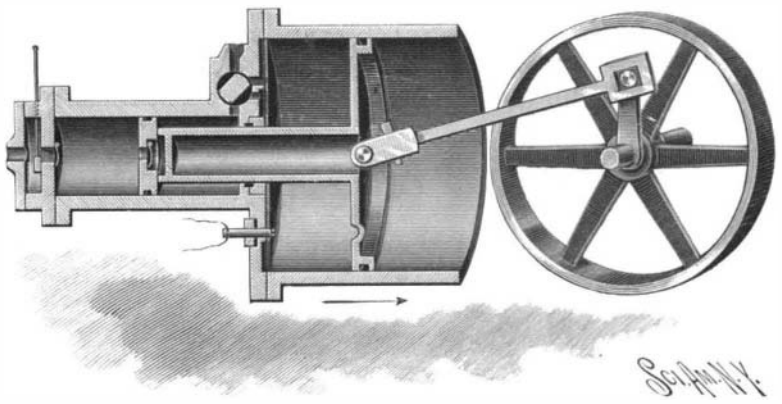
NOBLE'S CAMERA STAND.

plane, and form a base for the camera to rest on. The outer ends of these arms are provided with upwardly projecting lugs, which engage the ends and sides of the camera. The upper edges of the arms are notched to receive the lower forked end of a block, Fig. 5, which extends above the arm and engages a recess in the bottom of the camera. By this arrangement lateral and longitudinal movement of the camera are entirely prevented. It will be seen that, by loosening the upper thumbscrew, the cylinder, arms, and camera may be swung round into the desired position. If so desired, the lower ferrule may be formed to receive three supports, as shown in Fig. 4. It will be seen that when not in use the arms can be unhooked and slipped into the ferrule, as shown in Fig. 3, the whole apparatus occupying so little space that it can easily be carried in the pocket. On account of its handiness, it should specially meet the needs of the amateur photographer.

LORD RAYLEIGH has been appointed a foreign member of the Copenhagen Academy of Science.

IMPROVED GAS ENGINE.

Mr. Harry L. Parker, of Princeton, Illinois, has patented an improved gas engine, the details of which are shown in the accompanying illustration. The invention consists of an auxiliary cylinder, having a valved connection with the main cylinder, and provided with a valved piston moving in unison with, and traveling in the same direction as, the main piston. The main piston is connected at its front face by a pitman with the main driving shaft, and on the rear face it has a hollow piston stem which passes into an auxiliary cylinder, where it carries a piston. The two cylinders are connected by suitable ports and by a conical plug valve operated from the main shaft, whereby the explosive mixture may be admitted from the auxiliary to the main cylinder. The main cylinder is also provided with an exhaust port, which leads through said valve to the final exhaust as shown. In the engraving the engine is on the forward stroke, and the cylinders are connected through the valve; on the return stroke the valve will be thrown over, opening the exhaust from main cylinder and closing the ports between the two cylinders. The inner end of the main cylinder is provided with a diaphragm to prevent the mixture from burning faster than it enters the cylinder. The ignition is done by suitable electrodes set in the head of the cylinder. The auxiliary cylinder is provided with a chest at its outer end, connected with the gas and air supply, which contains a port operated by an outer valve and controlled by an inner self-closing valve as shown. A similar valve and port are provided in the auxiliary piston, said port being controlled by a self-closing valve. In operation, when the two pistons are on the forward stroke, the explosive mixture is drawn into the auxiliary cylinder, the amount being regulated by the outer valve in the chest. On the return stroke the mixture passes through the port in the auxiliary piston into the annular space between the hollow piston stem and the cylinder, where it is compressed to four or more atmospheres, according to the relative diameters of the cylinder and piston stem. The plug valve is now in the position shown in the engraving, and the mixture will pass into the main cylinder, and, becoming ignited, will propel the main piston. During this operation another charge will be drawn in for the following stroke. The construction is such that a 50 horse power engine could be started by means of a hand air pump and a small reservoir, carrying 20 or 30 pounds pressure.



PARKER'S IMPROVED GAS ENGINE.

PATENT AUTOMATIC COPYING LATHE WITH AUTOMATIC SCREW FEED.

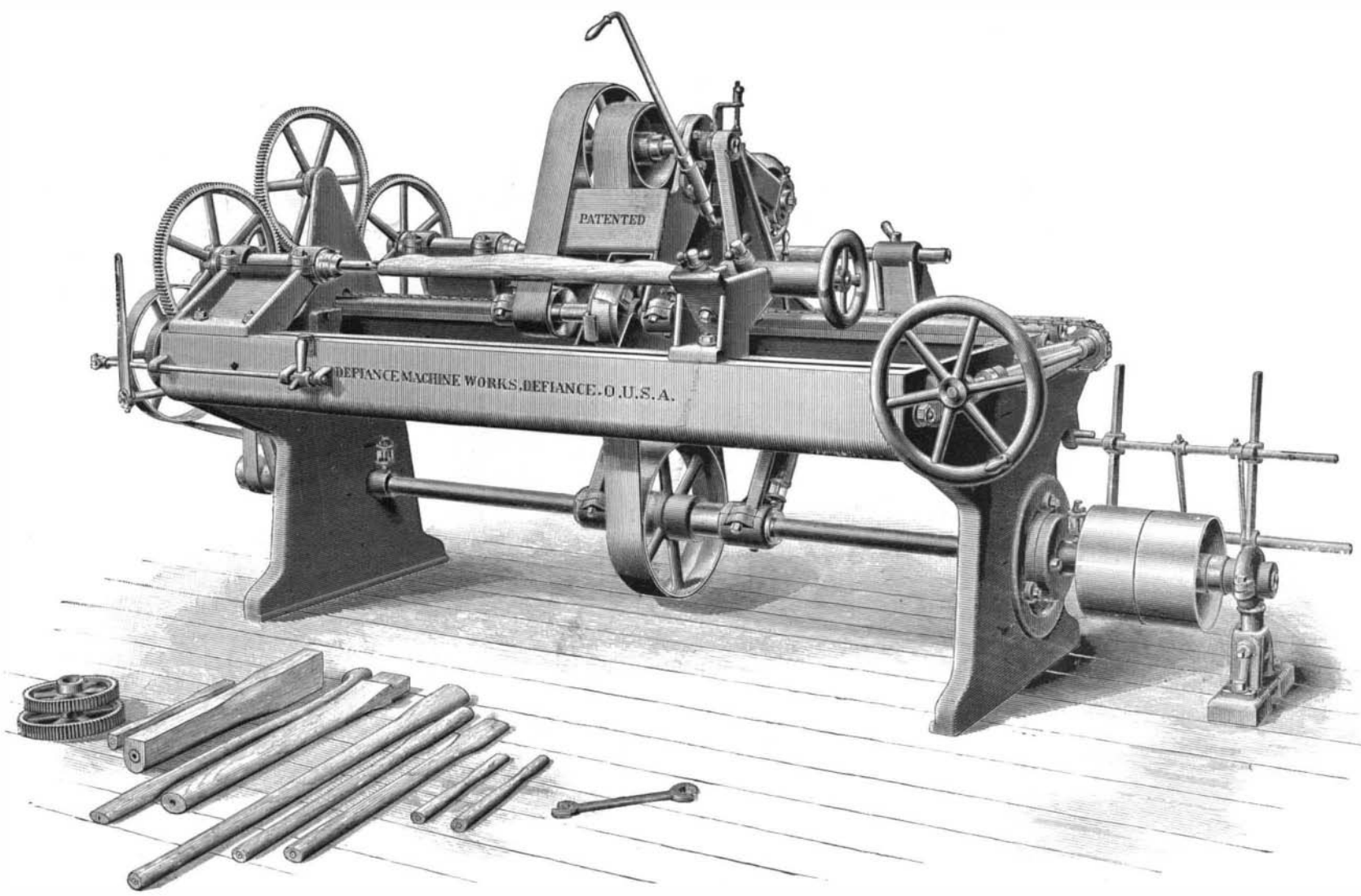
This machine has been designed for turning from patterns all kinds of irregular shapes, such as spokes, neck yokes, singletrees, hammer, hatchet, railroad, mining pick and ax handles, shoe lasts, gun stocks, and other similar wooden articles. It has been constructed from entirely new designs and embraces improved labor saving features, which increase the quality of the work and enable a facsimile of any pattern placed in the machine to be produced. It is massive and heavy, built from iron and steel throughout, and designed for the hardest service.

The cutter head is fitted to a heavy steel spindle, running in large bearings attached to a vibrating frame, which is traversed upon planed ways across the path of the material to be turned by means of a heavy screw. The hand lever projecting up over the carriage is used for bringing the cutter head up to the work, or locking it back out of the way when not in use. The feed can be instantly changed from right to left or from left to right, which effects a saving of time, as the machine is prepared to commence the cut at either end of the stick. It will be observed that the knives cut on the under side of the material, discharging the chips downward and overcoming any liability of injuring the operator.

The feed is very powerful, with three changes of speed, and automatic in its action, stopping instantly when the end of cut is reached, or arrested at any point desired. The tail stock is fitted on top of the frame, which is planed true, and is always in perfect alignment with the head center, and it can be quickly adjusted horizontally to or from the head center for short or long turning, taking 48 inches at the longest or anything shorter, and turning work from the smallest sizes up to 8 inches in diameter.

The pattern which guides the path of the cutter head and governs the shape of turning is placed upon centers at the rear portion of the machine, and it should be of an exact duplicate of the shape desired to turn, but the size of the article turned may be varied, either larger or smaller, from the same pattern.

This machine, which is manufactured by the Defiance Machine Works, Defiance, Ohio, works per-



PATENT AUTOMATIC COPYING LATHE WITH AUTOMATIC SCREW FEED.

fectly in the hardest seasoned timber, turning the work smooth and producing perfectly square corners without tearing, and it is extremely simple to operate.

The tight and loose pulleys are 10 inches diameter, 5 inches face, and should run 430 rotations per minute; the floor space occupied by this machine is 4½ feet by 8 feet.

A CUSHION PAVEMENT.

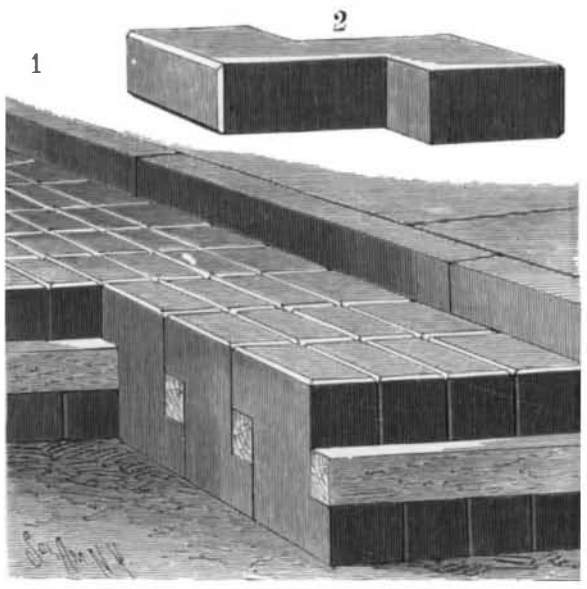
The improved street pavement herewith illustrated has been designed and patented by Mr. Daniel W. Campbell, of North Creek, Warren County, New York. The blocks are all made in one shape and size, being formed with plane faces on the top, bottom, and sides, but having offsets or ledges formed at each end, the front ledge being at the top and the rear ledge at the bottom of the block, as shown in the illustration.

The depth of the said ledges is such that when the blocks are laid together there will be a square void between them whose depth will be approximately one third the height of the blocks. In paving a street the brick or stone blocks are laid in rows transversely to the street, with their flush sides in contact, and the offsets forming a continuous ledge or step across the street as shown in the engraving. Upon this ledge is laid a strip of wood or other flexible material, and another row of blocks is then laid in place, its upper ledges overlapping and resting upon the upper face of the strip as shown. Such a form of construction presents a flexible pavement, which will be comparatively silent under a passing vehicle; and the longitudinal strips will assist in preventing the formation of ruts and hollows in the surface of the street. It will be seen that by completely overlapping the wooden strips the blocks exercise upon them merely a compressive strain, and do not tend to shear them off, as is the case when such strips are engaged by grooves formed in the adjoining faces of the blocks.

COPPERSMITHING.

The present illustrations represent the manufacture of the copper vacuum pans used principally by sugar manufacturers, distillers, etc. In the manufacture of sugar the sirup is run into these pans, where it is evaporated by means of steam to the point of crystallization. The pans range in size from about 3 feet to 15 feet in diameter and from 8 to 25 feet in height. The pans when completed consist of a dome, belt and bottom. The dome and bottom being beaten to the proper form by hand and the belt plates rolled into shape and brazed, the different sections then being placed in position and bolted together. Connected to the sides on the interior of the bottom sections are coils of copper pipe which are heated with steam for boiling the sirup.

The number of feet of pipe for each apparatus depends on the size of the pan and the amount of evaporation required. In the largest of these pans as many as 3,000 square feet is used. The pipes range, according to the size of the pan, from 2 to 6 inches in diameter. The copper comes from the mills to the coppersmith in sheet form cut into the proper shape.

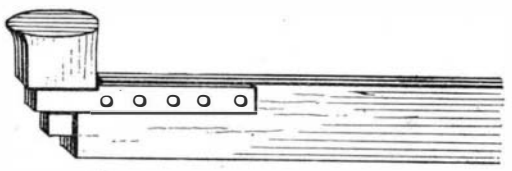


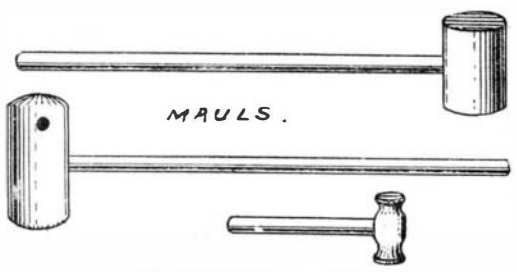
CAMPBELL'S CUSHION PAVEMENT.

The belt plates range from about 28 inches to 24 feet in length, from 14 inches to 12 feet in width, and from ⅛ to ⅝ of an inch in thickness. The belts are made in from two to eight pieces, according to the height and diameter of the pan. The copper plates for the dome and bottom come circular in shape and flat. They are first suspended over a forge containing a hot coke fire until they become red hot and then beaten into shape with wooden mauls. The furnace or forge is about 10 feet in length, about 4 feet in width and about 2½ feet in height. The copper sheet is suspended to within 4 inches of the fire until it becomes red hot, which takes about twenty minutes. Two operators then beat the heated metal with the mauls, beginning about half way from the center, the heavy blow causing the material to bend and form itself into the proper shape. During the beating process the metal is turned and held in position by an attendant with a pair of tongs. The mauls are about 12 inches in length, about 5 inches in diameter, and weigh 15 lb. each. It requires about two days to beat out a dome 8 feet in diameter and 30 inches in depth. The object of beating the metal while hot is to keep it a uniform thickness. After the beating process the dome or bottom is suspended on what is called a head. This head is about 8 inches square and made of steel, the top of which is slightly curved and smooth. The head rests in an iron brace which is fastened securely to the end of a heavy wooden beam about 5 feet from the floor. The under side of the dome or bottom rests on top of the head, the two operators who stand on a raised platform then hammering the metal smooth, hard and bright. The planishing hammers used weigh about 6 lb. each, and are very highly polished and made of steel. An attendant also turns the material during the hammering process, which takes about one and one-half days. The ends of the belt are then scarfed and rolled and the parts brazed. The ends of the belt to be brazed are placed over the forge fire, which is blown up to a temperature of about 1,800° Fah. A brazing spelter composed of about 60 per cent of copper and 40 per cent of zinc is then placed along the joint, which melts and unites the two parts solidly together. Bolt holes are then bored in the 5 inch flanges on the belt, bottom and dome and the sections then put together.

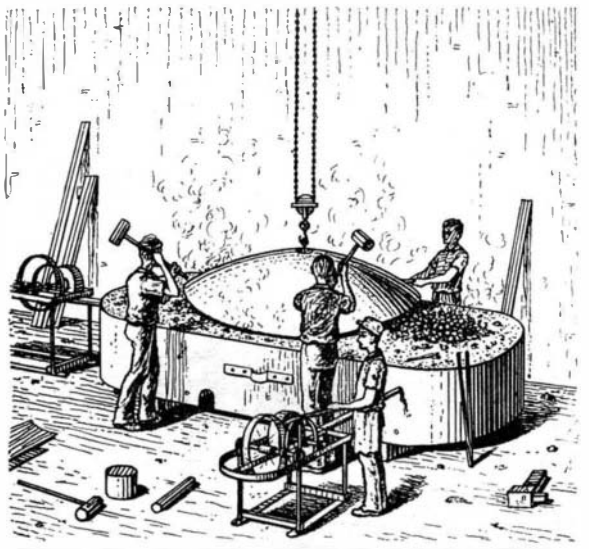
The copper pipe is placed in the bottom section in rows one above the other, between braces made of gun metal, the coils of pipe being placed about 10 inches apart. As the sections are put together a coating of putty, consisting of red and white lead and oakum, is put between the flanges, making it airtight when bolted. After the putty has been applied, two iron rings, one being placed on top of the flanges and the other on the bottom, are bolted securely together with ¾ inch iron bolts, about 3½ inches apart. The large copper vacuum pans, that measure 15 feet in diameter and containing about 3,000 feet of pipe, will weigh about 80,000 lb. To build one of these large pans it will require about four months with the labor of from twelve to fifteen men. The cost of these pans ranges from $500 up to about $15,000, according to the size and quantity of material used. The copper costs from 16 to 22 cents per pound, according to the size of sheet, the length and the width and thickness. The sketches were made at the North River Copper Works, New York.

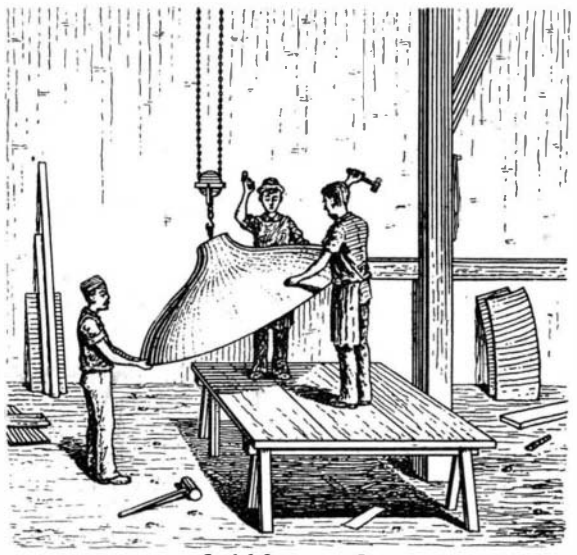
IT is said that the habit of turning around three or four times before lying down has survived in the domestic dog from his savage ancestry. It then served to break down the grass and make a bed.

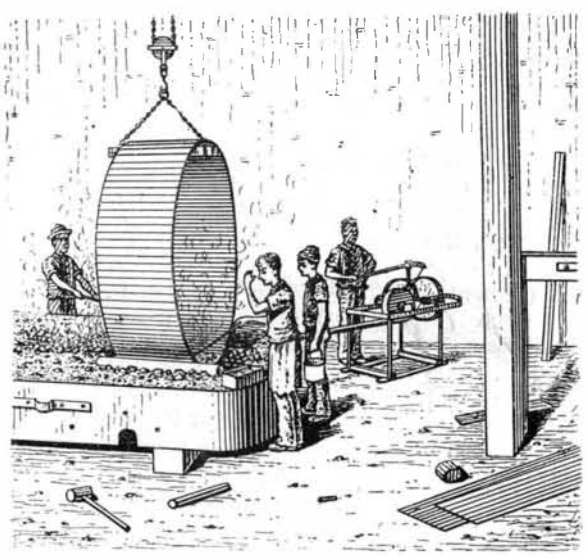

STEEL HEAD FOR SMOOTHING DOME.

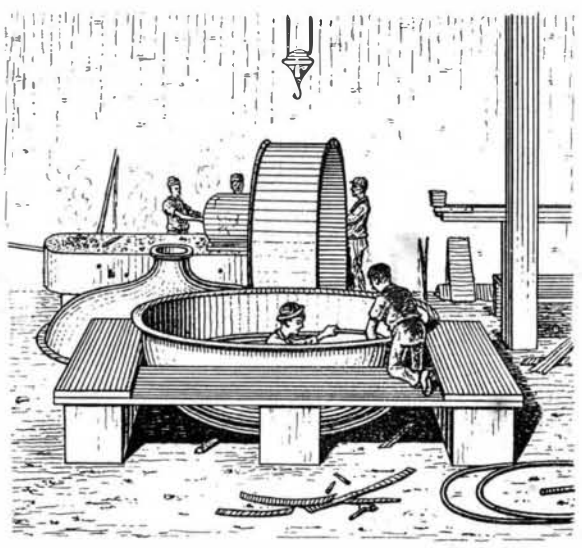


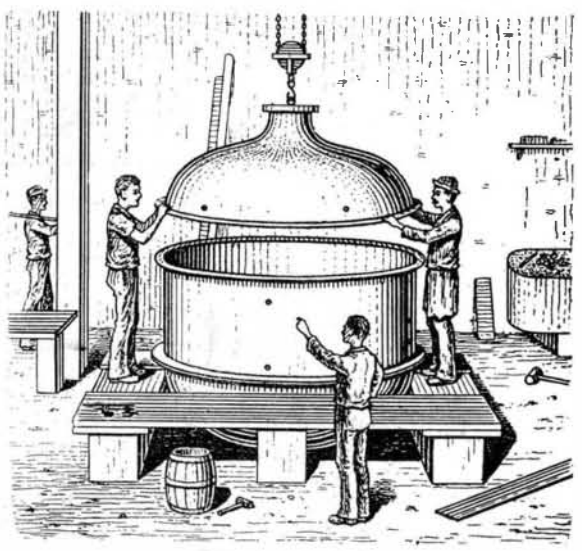
PLANISHING HAMMER


BEATING HEATED COPPER INTO SHAPE.


SMOOTHING.


BRAZING.


PUTTING PIPE IN PAN BOTTOM


SETTING UP.

THE MANUFACTURE OF COPPER VACUUM PANS.