

engine. It stands upon a space less than an inch in diameter. It is a high-pressure engine constructed principally of gold and silver, and is composed of over one hundred and fifty pieces. The diameter of the cylinder is one-sixteenth of an inch, length of stroke three-sixteenths of an inch, diameter of fly-wheel five-eighths of an inch. The cylinder, cross-head and beam are made of gold, the boiler of silver, and in five separate sheets. The screws which hold the several parts together are so small that the threads on them can scarcely be seen with the naked eye. The engine, boiler, stack, and plate on which the whole rests, weighs less than one-half ounce. It is believed to be the smallest working steam engine in the world, and will run about three thousand revolutions per minute.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Stamping Mill.—This invention relates, first, to a certain means employed for taking the powder or dust from the mortar chamber and conveying it to the deposit chamber; said means consisting of a blast generated by a fan or an equivalent device arranged in connection with a blast spout in such a manner that the dust will be taken from the mortar chamber and conveyed to the deposit chamber, and the same blast made to act continuously so as to avoid the admission of fresh external air and the consequent mixing of dirt and other light impurities held in suspension in the external air with the quartz powder or dust. The invention relates, second, to the employment of a valve arranged in connection with the mortar chamber and blast spout in such a manner that, by regulating or adjusting the valve, the quartz may be reduced to a greater or less degree of fineness. The invention relates, third, to an improved mode of securing the dies in the bed of the mortar, whereby said dies are firmly held in position and very readily adjusted in the mortar bed and detached therefrom. The invention relates, fourth, to an improvement in the construction of the frame of the mortar, whereby the frame is rendered extremely durable and well calculated to resist the jars and concussions caused by the stampers in the prosecution of their work. Zenas Wheeler, of San Francisco, Cal., is the inventor of this improvement.

Machine for cutting Lead-pencils.—The final operation in the manufacture of lead-pencils is that of cutting off the ends of the same after they are otherwise completely finished. This operation, simple as it appears to be, requires great care, because it must be done after the pencils are already varnished, and without proper precaution the varnish is liable to become tarnished, and, furthermore, in cutting the ends the edges of the wood and the ends of the lead are liable to splinter, and thereby the market value of the pencils is considerably deteriorated. For these reasons this operation requires particular care, and heretofore it has been accomplished entirely by hand labor at great expense and loss of time. The object of this invention is a machine by which the operation of cutting off the ends of lead-pencils is accomplished automatically, requiring no hand labor except that of feeding the pencils to the machine, which can be performed by a child, and leaving both the ends of the wood and those of the lead perfectly smooth. Albin Warth, of Stapleton, N. Y., is the inventor of this machine, and he has assigned his whole right to Aernard Taber, of 133 William street, New York.

Harvester.—This invention relates, first, to a novel and improved cutting device, the same consisting of two reciprocating cutters placed one above the other and working in opposite directions and through slotted fingers, each provided with a tongue which are between the two cutters, and all arranged in such a manner as to admit of a short stroke and rapid movement of the cutters with a very moderate application of expenditure of power, thereby insuring the work being done in a perfect manner and without the liability of the cutting device becoming choked or clogged. The invention relates, second, to an improved means employed for operating or driving the two cutters, which means consist of a rack at the inner end of each cutter and a vibrating toothed segment placed

between the two racks of the cutters and gearing into the former; the segment being operated by means of an arm connected by a ball-and-socket joint with a pitman connected with the driving shaft; all being arranged in such a manner as to cause the necessary motion to be transmitted from the driving shaft to the cutters in a very direct manner and with but little friction. The invention relates, third, to an improved arrangement and application of a supporting wheel for the cutter-bar, said wheel being attached to an arm which projects at right angles from the front side of a socket to which the inner end of the cutter-bar is attached, whereby the cutters are made to conform to the inequalities of the ground over which they may pass and be supported or retained at all times in a proper working position. The invention relates, fourth, to a novel and improved means for connecting and disconnecting the traction wheels of the machine with the sickle-driving mechanism, whereby the connection and disconnection may be made with the greatest facility and without subjecting any of the gears and working parts of the machine to the wear and tear hitherto consequent on such manipulation. The invention consists, fifth, in an improved mode of hanging the axle of the traction wheels of the machine as well as the driving shaft thereof, whereby all warping or springing of the frame of the machine is compensated for, and the working parts allowed to operate equally as well if the frame should warp or spring (a contingency of not unfrequent occurrence) as if it retained its proper shape. The invention consists, sixth, in an improved mode of bracing the cutter-bar so as to diminish side draught, and at the same time retain the cutter-bar in proper position. J. W. Prentiss and E. M. Birdsall, of Penn Yan, N. Y., are the inventors of this harvester.

Tanning Apparatus.—This invention consists in a platform revolving on the top of a tank or vat containing the tanning liquor, and provided with an open box or framework extending from its lower surface down into said tank or vat, in combination with frames on which the hides or skins are stretched, in such a manner that by placing said frame with the hides or skins in the open box and imparting to the platform a rotary motion, the tanning liquor is brought in intimate contact with all parts of the hides or skins, and the operation of tanning is considerably facilitated. It consists, also, in the employment of movable baskets in combination with the frames containing the hides or skins and with the revolving platform, open box and tank or vat, in such a manner that the introduction and removal of the frames containing the hides or skins into and from the tanning vat, can be effected with comparatively little labor and loss of time; it consists, finally, in the application of adjustable frames provided with movable bars and arranged in such a manner that each frame is capable of holding two sides of hides or two skins properly stretched, and at such a distance, one from the other, that the tanning liquor has free access to all their parts, and when the tanning is completed, the leather requires no further labor to be straightened or brought in the proper form. Henry Liebermann, of Paducah, Ky., is the inventor of this improvement.

Blast Furnace.—This invention consists, first, in a blast furnace, the hearth of which, when bisected by a horizontal plane, presents a narrow, long rectangle, the two short sides of which are to be used as working sides, and its two long sides for two or more rows of tuyeres, and whose long and short sides increase gradually from the hearth up to a point near the throat, in such a manner that a perfectly steady and gradual descent of the charges from the throat to the hearth is effected, and the ore, fuel and fluxes (as charged in horizontal layers), preserve the same relative position toward each other while descending from the throat to the hearth of the furnace; and, furthermore, the reduction of the ore can be effected in less time and with less fuel than it can in a furnace of the ordinary construction; it consists, further, in the employment, in combination with a long rectangular hearth, of a double row of tuyeres, each tuyere being placed so as to be between two of the opposite sides, in such a manner that a smelting and oxidizing zone of uniform temperature and little vertical depth is obtained throughout the entire length of the furnace, and the process of reducing the ore is effected with less fuel and in less time than in furnaces having

the tuyeres arranged in the ordinary manner. It consists, further, in the arrangement of one or more fire-places and fire-flues under the bottom and through the walls of the furnace, in such a manner that a uniform and quick heating of the external walls of the furnace during the erection of the same, and particularly previous to lighting the charge in its interior, can be effected, and thereby the successful working of the furnace is rendered practicable, and its durability considerably increased. It consists, finally, in the employment of slotted air-chambers in place of or in combination with the tuyeres, in such a manner that the cost of mechanism used for introducing the blast into the furnace is considerably reduced without diminishing or impairing the effect. Woldemar Raschette, of St. Petersburg, Russia, is the inventor of this furnace, and he has assigned it in full to Alex. Trippel, of No. 18 Exchange Place, New York, who is to be addressed for further information.

HEAT PRODUCED BY DIFFERENT KINDS OF FUEL.

Several men of science have undertaken series of experiments to ascertain the exact quantity of heat developed in burning a given quantity of various substances. The most satisfactory of these experiments are those of Andrews, and those of Favre Silberman. Andrews inclosed the substance to be burned, together with just the quantity of oxygen required to burn it, in a close copper vessel with thin walls, and immersed this vessel in water—the water being carefully weighed. The substance was then set on fire by an electric current, and the temperature of the water was measured before and after the burning by a thermometer so delicate that it indicated 1-500th of a degree. The apparatus of Favre & Silberman was essentially the same, though they adopted some extra precautions to guard against the influence of the external atmosphere. The table below gives the results obtained by these two experimenters. It will be observed that the rise in the temperature of the water is given in degrees of the centigrade thermometer, which may be reduced to Fahrenheit degrees by multiplying the amount by 9 and dividing by 5:—

Substances burned	Heat Units—Lbs. of water raised 1° C. by 1 lb. of each compound.	Lbs. of water raised 1° C. by combination of 1 lb. of oxygen	Compound formed	Observer.
Hydrogen.....	34462	4307	HO	Favre & Silberman.
Hydrogen.....	33808	4226	HO	Andrews.
Carbon.....	8080	3030	CO ₂	Favre & Silberman.
Carbon.....	7900	2962	CO ₂	Andrews.
Sulphur.....	2220	2220	SO ₂	Favre & Silberman.
Sulphur.....	2307	2307	SO ₂	Andrews.
Phosphorus....	5747	4509	PO ₅	Andrews.
Zinc.....	1301	5285	ZnO	Andrews.
Iron.....	1576	4134	Fe ₃ O ₄	Andrews.
Tin.....	1144	4230	SnO ₂	Andrews.
Copper.....	602	2394	CuO	Andrews.
Carbonic oxide.	2431	4258	CO ₂	Andrews.
Carbonic oxide.	2403	4205	CO ₂	Favre & Silberman.
Protioxide of tin	521	4349	SnO ₂	Andrews.
Suboxide of copper.....	256	2288	CuO	Andrews.
Marsh gas.....	13063	3266		Favre & Silberman.
Marsh gas.....	13108	3277		Andrews.
Olefiant gas....	11942	3483		Andrews.
Olefiant gas....	11858	3458		Favre & Silberman.
Alcohol.....	6850	3282		Andrews.
Alcohol.....	7183	3442		Favre & Silberman.
Ether.....	9027	3480		Favre & Silberman.
Oil of turpentine.....	10852	3294		Favre & Silberman.
Bisulphide of carbon....	3401	2692		Favre & Silberman.

SPECIAL NOTICES.

TIMOTHY ROSE, of Cortlandville, N. Y., has petitioned for the extension of a patent granted to him on Sept. 24, 1850, for an improvement in water wheels.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Sept. 5, 1864.

GEORGE K. SNOW, of Watertown, Mass., has petitioned for the extension of a patent granted to him on Oct. 15, 1850, for an improvement in machines for folding paper.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Sept. 26, 1864.

All persons interested are required to appear and show cause why said petitions should not be granted. Persons opposing the extensions are required to file their testimony in writing, at least twenty days before the final hearing.