

camphor is that exhibited by Hance Brothers & White, of Philadelphia. The rest of their exhibit, extracts and pills, belongs rather to pharmacy than chemistry. The latter statement may apply in part to the exhibit of Keasbey & Mattison, of Philadelphia; but some of their preparations, such as pancreatine, pepsine, crab orchard salts, Vichy salt, and compounds of lithia and bismuth, all on a grand scale, attract our notice.

The exhibit of Alexander Fries & Brothers, of New York, of artificial fruit and liquor essences, is particularly interesting as showing how far the chemist in his laboratory is able to imitate the natural productions of the plant. The number is very large, most of them being compound ethers derived from methylic alcohol or fusel oil, and imitate not only the flavor, but the composition, of the natural essences. The same exhibit contains a large specimen of carbamide,  $\text{CO}(\text{NH}_2)_2$ , a white crystalline solid, which has the honor of having been the first organic substance produced synthetically, a thing previously supposed to be impossible.

The United States Salicylic Acid Works, New York, exhibits the only specimen of American salicylic acid. The acid is both sublimed and crystallized, and compares favorably with the foreign specimens made under the immediate supervision of Professor Kolbe.

Aniline colors are exhibited by two firms only, and in such insignificant quantities as scarcely to deserve notice. The Silliman Chemical Works, of Philadelphia, exhibit six flasks holding about a quart each of as many different colored solutions of aniline dyes. The same company exhibit several other coal tar products, including the tar itself, dead oil, coke, benzol, toluol, xylol, rosolic acid, rosolate of lime, anthracene, and naphthaline: also a set of pure chemicals, designated in the catalogue as Fresenius' tests.

A much finer exhibit of coal tar products is made by Page, Kidder, & Fletcher, of this city. Besides the tar itself, they exhibit seventy five different derivatives thereof, among which we noticed the latest product of the synthetic chemist, artificial oil of spirea or salicylic aldehyde. Professor Kolbe's discovery of a new and certain method of preparing salicylic acid cheaply from carbolic acid has caused chemists to direct attention to its ethers and other derivatives, the result being the production of artificial oil of wintergreen (also exhibited here), or salicylate of methyl, the substance which was previously the source of salicylic acid having come at length to be a product of the latter. In addition to these two new and curious synthetic products obtained from salicylic acid, we noticed the following rare and interesting scientific preparations: Benzyl alcohol (oil of bitter almonds), pyrene ( $\text{C}_{16}\text{H}_{10}$ ), stilbene ( $\text{C}_{14}\text{H}_{12}$ ), chloranile, pyramic acid, pyridine ( $\text{C}_5\text{H}_5\text{N}$ ), picoline ( $\text{C}_6\text{H}_7\text{N}$ ), a substance isomeric with aniline yet of totally different properties, crude and refined anthracene, anthraquinone, alizarine, leucaniline, etc. A few aniline colors in small tubes are shown. One portion of this exhibit, and indeed the larger part, is devoted to creosote and its use in the preservation of timber. A model of the creosoting apparatus is shown; and numerous specimens, of wood decayed or bored by insects and wood protected by creosote, prove its efficiency.

J. Bishop exhibits a large variety of costly platinum utensils for chemical use.

E. B. Benjamin, of New York, exhibits a few chemicals, with some fine chemical glassware, in the educational department, and also in the United States government building. In his exhibit in the Main Building may be seen two of those new scientific puzzles called radiometers, which are usually in motion on a clear day, a fact not equally true of the dozen or more exhibited in the English department, by Mr. Hicks, of London.

In the exhibit of the Stevens Institute of Technology, Hoboken, may be seen a large dish of beautifully crystallized nitrate of uranium, and a full set of the other uranium salts used by President Henry Morton and Dr. H. C. Bolton, in their recent researches on the fluorescent spectra of these bodies.

There are several exhibits of gunpowder, but none of nitroglycerin, although there are plenty of the harmless materials from which it is made.

A few chemicals are met with scattered about in most unexpected places, especially in the United States government building, but the above embrace the most interesting exhibits in the Main Building.

CENTENNIAL NOTES.

A THREE HUNDRED DOLLAR HAT.

There are two exhibits in the Peruvian section which attract an unusual share of attention. The first is the hideous collection of mummies and fragmentary portions of the bodies of ancient Peruvians; and the second is what appears to be an ordinary Panama hat, until the sight of the price label, inscribed \$300, induces one to examine it more carefully. Close scrutiny elicits the fact that the article is woven with wonderful fineness; and by the aid of a lens, 108 stitches, or picks, as weavers would call them, may be counted to the inch, measured radially from the center. The hat is exhibited by Juan Daste, of Monte Christo, Peru. The material is *jipijapa*, a species of palm, the leaves of which are gathered before they unfold. After the veins and other coarse portions are removed, the leaves are made into bundles and macerated in boiling, and then in cold water until they become white. Bleaching in the shade follows and then the hats are plaited from the straw by the Indian natives of the country. For so fine a fabric as the hat exhibited at the Centennial, the above process would be too rough. The only wetting the straw receives is done by

the dew, to the influence of which it is exposed. Then the braiding is done in a dark damp room; and to produce a single hat, a woman often works from five to six hours daily for three or four months. When the article is finished it will wear indefinitely, provided there be no defective straws in it. Probably the \$300 hat exhibited in Philadelphia would outlast the lifetime of its purchaser, and serve as an heirloom to his descendants for years afterward.

FLEXIBLE SHAFTING.

Imagine a workman handling the nozzle of a short section of hose. In place of the nozzle, substitute an auger; and then conceive the astonishing appearance of the man directing the auger toward a block above his head, then to the floor, then sidewise in every direction, twisting the hose meanwhile into all sorts of kinks and curls, while the tool, wherever it touches, sinks into the solid material as if the latter were putty. Yet the hose does not rotate. Certainly the invention is a remarkably ingenious one, and it is as simple as it is effective. A long section of wire is made into a close spiral. Over this is wound more wire, the turns being, however, in reverse direction; then follows a third spiral envelope, and so on until suitable thickness is attained. The extremities of the flexible shaft thus formed are brazed. One end is feathered into a driving pulley; the other has a clutch for the tool. A piece of hose or other suitable covering envelopes the shaft, which transmits rotary motion to any desired distance from the source of power and through any number of curves, so that the power may be taken to the work instead of the work to the power. We were told that the device has been successfully applied to marble, granite, and other stone surfacing, polishing, and working; iron drilling and surfacing; wood boring, carving, and facing; horse cleaning and clipping; casting, cleaning, and emery grinding of all kinds. It has been tested, we learn, up to the transmission of 9 horse power.

A NEW STEERING APPARATUS.

This is exhibited in the Russian section in Machinery Hall, and is the invention of M. Nozikoff. The helm being located directly above the propeller shaft, motion is communicated from the latter by a bevel gear to a vertical shaft, which rises immediately abaft the wheel. By turning the latter in one or the other direction, one of two clutches is thrown into action, the effect of which is to communicate the motion of the vertical shaft to an ordinary hand wheel which moves the rudder in the usual way. The essential feature of the device is the mechanism whereby the power of the main engines is utilized to manoeuvre the helm, thus obviating the use of the additional small engine commonly employed in steam steering gear for a like purpose.

A PAINTING MACHINE.

Everyone who has had to paint slats or laths, or like narrow work, knows that doing so is a tedious and not over easy operation. Plenty of paint is wasted in using a big brush, and to employ a small one is to throw away time. Mr. W. Roberts, of Liverpool, exhibits, in the English section of Machinery Hall, a very ingenious little apparatus which performs this work very rapidly and in a much better manner than it could be done by hand. The paint is poured into a lower tray. Above are located, first, a pair of rollers, which seize the slat and draw it in between a series of brushes, one of which paints the upper side, another the lower side, while two more cover the edges. To keep these brushes wet with paint, two wheels beside the grasping rollers rotate partially in the paint in the tray beneath. These are so grooved as to carry up the liquid at every revolution and dash it on the brushes. The machine, we learn, will paint 6,000 running feet of lath per hour, without the aid of steam power.

SWEDISH GYMNASIC APPARATUS.

We can express no opinion as to the therapeutic value of the Swedish movement cure, other perhaps than to consider that the exercise which it provides for the muscles may be beneficial. We can express an opinion, however, on the machines employed in the various gymnastic exercises, a dozen or more of which are exhibited in Machinery Hall. Some of these are splendidly constructed; and as pieces of mechanism involving ingenious devices for obtaining odd motions, they are well worthy of study by mechanics. Some idea of what these motions are may be gained from the following brief description of the apparatus: One machine, when its handles are grasped by the patient, twists the arms, another exercises the flexor and extensor muscles of the wrist, a third pulls the arms back, a fourth exercises the knee muscles, a fifth exercises the muscles which carry the leg outward, and a sixth exercises the ankle muscles. On the seventh the patient lies down and is shaken up so that the extensor muscles of the back are exercised. Another machine is very complicated, and calculated to excite some dismay in the patient whose "thorax" (to quote the descriptive card) "is pulled upward by means of two levers, while a pad makes a horizontal pressure on the back. The trunk is thereby elongated a few inches, and the spine and walls of the chest are stretched." There is something about all this dismally suggestive of the rack. In another machine the patient is put through all the misery of horseback riding without any of the accompanying pleasures. He is seated on a saddle, and the latter then becomes possessed of a desire to shake him off. "This," we are informed, "causes the abdominal viscera to be kneaded and rubbed together against each other and the abdominal walls." There is still another machine, consisting of a couple of wheels having peripheries of padded bars. These, when revolved, serve to warm the feet, the latter being pressed against them. Lastly there is a hammering machine, which in any household might serve

as a mechanical child corrector. There are a number of vertical beaters which are set in rapid vibration, so as to hammer the patient in the small of the back or at any desired point. The reader can form his own idea of the possible condition of the sufferer after being treated by so formidable a series of apparatus.

Recent American and Foreign Patents.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED TUBING CHAIN WRENCH.

Orlando H. Smith, Kane City, Pa.—The object of this invention is the construction of a device whereby a section of the perpendicular tubing, such as that of oil wells, may be turned more or less on its axis, without danger of being cut, dented, bruised, or otherwise injured. The invention consists in joining together, by a reversible dog, a chain and hook; the latter, which is for the purpose of maintaining the hold of the chain on the pipe, has its point formed into an inwardly projecting claw, and is provided near the middle of its concavity with a slightly projecting blunt point. These projections form two of the bearing points against the tube over which the hook rests; the third is formed by the edge of the dog. To the free end of the chain is secured a ring, into which a lever is inserted when the device is to be used.

IMPROVED GRAIN CAR UNLOADER.

George M. Moulton, Chicago, Ill., assignor to himself and Joseph T. Moulton.—This apparatus is for unloading grain in bulk from railroad cars; and it consists in the employment of two sets of racks, so arranged that the first rack is operated by a crank placed on a shaft which receives its power from a convenient motor, the said rack giving motion to a pinion placed on a shaft which supports a larger wheel, that communicates a reciprocating motion to a longer rack supported on suitable frame work, and connected with drag ropes attached to scoops within the cars. The invention also consists in the peculiar arrangement of the supports for the guiding pulleys in the car. A hopper leads to the elevator leg, and is placed conveniently near the track, so that the grain may be readily discharged from the scoop into it. Two scoops are worked in each car, and a number of cars may be unloaded at the same time, and from both sides of the apparatus, by providing a number of sets of drag ropes.

IMPROVED BREECH-LOADING FIRE ARM.

Henry J. Altman, Birmingham, Great Britain.—This invention consists in a breech block, arranged to slide in grooves in the solid slides of the breech piece at right angles with the bore of the barrel, as it is carried up and down by the breech block holder. The arrangement of the lock lever is such that an accidental blow that might discharge the gun only pushes the lower end of the lock lever back and locks the trigger. Another advantage claimed is that, when the trigger is locked and the fore finger is placed upon it to discharge the arm, the said finger comes in contact with the lock lever, and can push it forward to unlock the trigger without being removed from the position required for firing the arm.

IMPROVED WATER WHEEL.

William H. Rector and Henry C. Black, Santa Rosa, Cal.—This invention consists of a reaction wheel of the S-shaped type, receiving water from the under side, and having a water tank or chamber on the shaft, subject to downward pressure of water to counterbalance the upward pressure on the under side. The chamber is packed watertight to prevent leakage.

IMPROVED NUT LOCK.

Thomas C. Conrad, Philadelphia, Pa.—This invention is an improved nut lock for rail joints, and other parts exposed to vibratory motion, the nut locks being so arranged and connected that the tendency of any one nut to work off tightens the other nuts, and that the expansion and contraction of the bolts, and change of position in the ends of rails by the difference in temperature, exert no influence upon the lock. It consists of a washer with recess for the nut to fit in slots in the circumference, and a circumferential recess at the backs, along which a stiff locking wire is passed that is bent outwardly through the top slot, and then downwardly to the next washer, and around the same to the top slot, and so on.

IMPROVED NAIL-FEEDING MACHINE.

Frank Toepfer, Milwaukee, Wis.—This invention consists of a descending trough, in which the nails hang by the heads, points downward, arranged so as to drop the nails horizontally into a hopper in advance of the sliding driver. The driver is to be worked by a foot treadle, and, in practice, a number of drivers, each having an automatic feeder, will be connected to a cross head or slide of suitable form to work as many drivers as there are nails to be driven into one side of the box to be nailed, and the drivers will be adjustably connected for shifting toward and from each other, according as the nails are to be driven more or less distant from each other.

IMPROVED STEAM BOILER.

Robert M. Beck, Westminster, Md.—This invention is an improvement in the class of vertical steam boilers, and consists in a dome, flue head, and smoke box formed of one casting, and certain peculiarities of shape, whereby certain functional and economic advantages are attained. The invention also relates to a tapered cast iron fire box.

IMPROVED CAR COUPLINGS.

Richard A. Kelly, Manchester, Iowa.—The first of these inventions is an improvement in the class of automatic car couplings, and consists in a hook and draw bar pivoted at their rear ends to a swiveled cross bar, and suspended free at their front ends from a sway bar or lever which is pivoted to the end of the car, so that it may be tilted to adjust the hooks and draw bars, for coupling or uncoupling. The invention also includes a peculiar device for adjusting the said sway bar. The second invention belongs to the same class of automatic car couplings as the above, and it relates to certain peculiarities in the coupling whereby ease in working and reliability and safety in its operation are obtained.

IMPROVED WATER WHEEL.

Reuben D. Sayre, Westville, Ohio.—This invention consists of the buckets of an overshot or breast wheel, pivoted to the wheel rims so as to remain upright and hold the water until the center is reached at the bottom, when they are tilted by a cam to empty the water, by which the wheel retains all the water as long as it can do any good, and the weight can be applied farther from the center of the wheel by pivoting the buckets at the periphery of the wheel rims. The buckets are pivoted to the wheel rims at or near the periphery so as to remain upright and hold all the water as long as it is efficient, when they are tilted by a crank and cam and the water emptied, after which they return to the upright position again while ascending to the place for receiving the water, the cam being continued up to the top to prevent the buckets from tilting too far to come back again to the upright position. In front of each bucket is a cross bar, to prevent it from being overturned by the water falling into it from the spout. In practice, the cam for tilting the buckets will be constructed so as to revolve, to lessen the friction as much as possible.