

pulley and belt, D. The rotary valve, E, can be worked by a pulley on the shaft, or worked independent of the pumps. This valve is of peculiar construction and is covered by a separate patent. It opens and closes communication alternately with the well and the atmosphere and the vessels, B and C. The pipe, F, on which this valve is placed leads into both vessels. By the action of the valve, then, a charge of compressed air is forced down upon the surface of the oil in the pipe or chamber, G; the result is, that the oil takes the course indicated by the arrows, and rises into the chamber, H; by the continued actions of the rotating valve, E, the compressed air is exhausted immediately, so that the oil from below, at I, comes rushing up through the valve, J, to supply the vacuum, and thus raises the oil forced by the percussive action of the compressed air into the tank through the pipe, K. Of course the return of the oil is also prevented by the same valves. Where there is a sufficient amount or height of oil or water in the well, only one receiver would be in use until the water was exhausted sufficiently to require the other; in such a case the pressure is relieved, by the valve only, to a sufficient amount to allow the chamber or vacuum to fill the pressure is counterbalanced, and the column of air vibrates back and forth.

For mines, or sluggish wells, or those rendered useless by the seams getting filled up, a chamber twenty or thirty feet, in a state of vacuum thirty or more times a minute, would draw in most everything but the rock. F is a stop-cock, and when closed it fairly seals the well up, for nothing can raise the valve or get into the lower chamber. L is the ordinary seed bag by which the tube is packed. M is a jacket to be filled with water to keep the air pumps cool.

Two patents have already been granted on this invention through the Scientific American Patent Agency, dated as follows—March 21 and March 28, 1865. Another application is pending before the Patent Office. Patents have also been secured through this Office in foreign countries. For further information address the patentee, F. S. Pease, Buffalo, N. Y.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening May 17, 1865, the President, S. D. Tillman, Esq., in the chair.

THE GEOLOGY OF NEW YORK CITY.

Dr. Stevens said that the Lyceum of Natural History had appointed a committee to examine the geology and mineralogy of Manhattan Island, and the geological examination was assigned to him. He then gave a detailed description of the appearance of the rocks as exhibited in the numerous excavations made in grading the streets, and stated the conclusion to which he had arrived.

The lowest deposit was a mud rock which has since been metamorphosed by chemical action into gneiss—stratified granite. Over this was a deposit of limestone. After the rocks were hardened, by one of those slow changes in the crust of the earth which are constantly going on, there came a very gradual pressure from the east toward the west, forcing the edges of the rock toward each other and bending the strata into folds. There are five of these folds between the Hudson and East rivers.

Mr. Ely remarked that this island is very rich in curious minerals. He had quite a collection gathered here; among them one that was a perfect plum.

Dr. Stevens said that that was doubtless a fossil which had been brought in by glacial action from the rocks above Haverstraw. The rocks of the island contain no fossils.

THE NEW THREE-CENT COIN.

Mr. Feuchtwanger presented for inspection one of the new three-cent pieces, and stated that it was composed of 75 per cent copper and 25 per cent nickel, which makes a very hard alloy. It takes 254 of the pieces to weigh a pound, and they cost the Government just half a cent apiece.

SOLID FLOATING ON MOLTEN METAL.

Dr. Parmelee observed that Mr. L. L. Smith was probably known to many persons present as a skillful electroplater of unusual scientific attainments.

Mr. Stewart.—He has made the finest electroplates ever made in the country.

Mr. Parmelee.—Yes. Well, Mr. Smith made an experiment to ascertain whether solid zinc will float on melted zinc, and he found that it would not. The kettle of melted zinc was 20 inches wide, and 12 inches deep; the melted metal within 3 inches of the top. The solid pieces of zinc were 6 inches long, 4 inches wide and 1 inch thick, and they would invariably sink.

Dr. Rowell.—If the solid zinc is of about the same temperature as the melted zinc it will always float; I have tried it twenty times. Perhaps Mr. Smith may have got a piece of metal cold enough to sink.

TUNNELING.

This being the regular subject of the evening, the President called on Mr. Stewart to open the discussion.

Mr. Stewart read a paper giving a description of a new tunneling machine invented by Major Plas. The machine is in the form of a car, with four radiating legs or arms by means of which it can be keyed firmly into the tunnel. A wheel, the diameter of which is nearly the same as that of the tunnel, carries several series of steel chisels disposed in concentric rings—these rings being two or three feet apart. By means of an engine driven by compressed air, the wheel is made to revolve slowly, the chisels at the same time being drawn back by means of cams, and then driven violently forward by stiff springs, thus striking the rock with their sharpened ends a series of rapid blows. In this way narrow circular grooves are cut in the rock to the depth of some two feet, when the workmen withdraw the wheel that bears the chisels, and insert steel wedges in the grooves. Then a massive iron ram is driven forward by the engine with great force, driving the wedges into the grooves and breaking the rock into blocks which can be readily removed.

Mr. Montgomery, of Brooklyn, said that the most interesting question connected with tunneling, was the plan of the great tunnel which is to be constructed under Broadway. Several years ago he filed a caveat for a plan which he still thought the best of any yet suggested. It amounts to sinking the present street right down to a level with the cellar floors, and constructing an iron street at the level of the present one. The lower street is to be provided with a double track railroad, with cars to be drawn by an endless wire rope, which will pass around immense drums at the two ends of the track, and be supported along the line by grooved wheels in the usual manner. The rope will have a constant motion, and the cars will be attached to it by an instrument something like the human hand, which can be opened to release its hold whenever it is desired to stop the cars. It can be demonstrated that the additional rent of the cellars for a single year will more than pay the whole expense of constructing this tunnel, that two cents fare from each passenger will yield a large interest on the stock, and that the speed may be three times greater than that of the present horse cars.

The subject of city transportation was selected for the next evening.

RECENT ENGLISH PATENTS.

By late mails we have received our usual full supply of foreign journals; from some of them we make the following selections. Let no one pass them over as uninteresting, for many valuable hints and suggestions can be found in this list:—

PATENT ORGAN PIPES.

In constructing organ pipes according to this invention they are composed of lead, or an alloy of it, and antimony, or other alloy of lead coated or plated with tin, or an alloy of tin, on one or both of its sides; this they do by making the pipes from sheets of metal made by coating a sheet of lead or alloy of lead on one or both of its sides with a sheet of tin or alloy of tin; or the plated sheets of metal from which the pipes are manufactured may be made by first coating an ingot of the alloy of lead with tin or alloy of tin, and rolling down such coated ingots into sheets of the required thickness for making into pipes.

PATENT DRESS FASTENINGS.

These improvements relate to buckles, clasps, hooks, and all kinds of fastenings generally, as also

to the methods of manufacturing and ornamenting such articles, and, consist, first, in a new method of manufacturing and uniting the tongues and frames of buckles by stamping in a die, and then uniting the parts by pressure without the aid of solder. Secondly, in an improved method of connecting the several parts of the buckles, hooks, or other articles by means of eyelets, which are formed of a single piece with the frame, and folded down or turned over to permit of the passage of the pin or rivets uniting the parts of the buckle. Thirdly, in a method of attaching or fixing a ribbon or waist belt to the buckle or clasp without sewing. This the inventor effects by cutting two slits in the frame of the buckle in which the ribbon is doubled over, in order to fix it in position. The connection of the parts is effected in this case in a similar manner to that above described. Fourthly, the ornamentation of the improved pins, buckles, and other articles, by means of rivets having facets, or otherwise ornamented, which he fixes in the article, and then rivets at back on a second plate of similar form, in which is made the eyelet forming the improved fastenings. Fifthly, the buckles may be further furnished with a plate in their interior, the edge of which is turned up in the form of a hook, whereby it may be connected to the frame of the buckle, which is similarly formed at one end; in this case the buckle is solid, and without any openings; the exterior surface may also be ornamented in any suitable manner.

PATENT CATCH FOR INK BOTTLES.

This invention consists in the use of an additional catch or fastener, so arranged and constructed as to lock with that on the ink-bottle or box, and thus prevent its becoming accidentally opened. The usual aperture made for the reception of the hasp, such as is in use on the ink bottles at present manufactured, the inventor causes to be carried right through the lid of the box, and it is up and down this opening— which is made smaller on the outside than the inside—so as to retain the fastener in its proper position, that the improved system of catch is applied.

PATENT TOOTHED CHAINS.

According to this invention the sides of the chain are composed of as many links as required, and made of any desired ditch and strength. The distance between the inner links depends upon the thickness of the wheel, but over the pins which constitute the pitch and hold the links together he places hoops or ferrules, so fitted that they can turn on the pins, but not shake, which hoops or ferrules, are intended to substitute the solid links or pins before in use.

PATENT FLAT CHAIN.

This invention consists in forming flat chain either in bands for pit chains, driving bands for machinery, and other similar uses, or in sheets for armor plating, bridge building, and various other like purposes, by interlacing or screwing together separate lengths of coiled metal rods or wires. Each of these metal rods or wires is first formed into an open twist or coil of any desirable length and thickness. Two of these coils are then screwed or interlaced together, coil within coil, and any additional number of coiled rods or wires is similarly interlaced until the length or area of the chain is formed.

Use of Waste Heat in Kilns.

A correspondent of the London *Builder*, who appears to be a practical man, referring to the gases arising from Portland cement, says that while it is burning in the kilns a great heat is obtained by consuming the gases, and then passing the same under a drying floor. When alight, the gases are like a rolling sea of fire, and this will travel a great distance before it requires a chimney-shaft; that is to say, if the flues are in a straight line, the heat from the gas will dry well for a distance of 120 ft. in length, and 60 ft. in width. The kilns he speaks of hold, when burnt, 150 casks. There is a greater improvement, however, which, our correspondent suggests, could be made; first, to let the heat work another set of flues while the men are taking off the stuff, and as soon as they have it off they could shut off another bay; or they might shut off nineteen flues out of twenty, and let the heat work up the one, which would be much better for men working on these hot flues. Secondly, by having a coke oven beside the furnace the gas from this would pass through the coke

fire, and the coke from the oven would supply the furnace and much more heat. This plan of furnace would consume but a small quantity of coke, and could be applied to any kind of works for drying, and for material of any description, and if properly constructed would, he thinks, be preferable to any other.

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:—

Boiler for Kitchen Ranges.—This invention relates to a very important improvement in the mode of securing the plate constituting the side or body portion of a kitchen boiler, to and upon the head plates of the same; it consists in so forming the head plates that when the body of the boiler has been soldered, or in any other proper manner fastened thereto, both the expansion and contraction of the metal composing the boiler shall be resisted in an equal degree—a result which has never before been accomplished in such boilers, and the importance of which as regards economy and safety is manifest to all. The inventor is Joseph H. Ash, of Brooklyn, N. Y.

Breech-loading Fire-arm.—The object of this invention is to convert, in an easy and simple manner, ordinary Springfield muskets to breech-loaders without disturbing the lock or any part connected therewith. The invention consists in the application of a tapering socket in the cone seat of a musket to receive a wedge-shaped projection, extending from the side of the breech block, which is hinged to the top of the barrel, and with a plunger passing through said wedge-shaped projection in place of the cone, in combination with the ordinary lock and hammer, in such a manner that a cartridge placed in the barrel can be exploded by the action of said hammer without disturbing its original position or changing any other portion of the lock; at the same time, by the wedge-shaped projection, a shoulder is formed which assists in holding the breech block in place when it is locked. A spring bolt, with a tapering head, which drops into a conical seat in the breech of the barrel, serves to lock the breech block; and a tongue or ridge, projecting from the inner surface of the breech block, and catching into a notch or groove in the barrel when the breech block is closed down, takes up the recoil and relieves the pivot connecting the breech block with the barrel from all strain. From the hinged breech block, or from its pivot, extends a spring arm which is applied in combination with an ejecter, in such a manner that, on throwing the breech block open, after a cartridge has been fired, the empty shell is withdrawn from the barrel, and a new cartridge can be introduced without loss of time. W. H. and G. W. Miller, of West Meriden, Conn.

Carpenter's Gage.—This invention relates to a gage which is provided with a stationary bead of the ordinary construction on one side, and with a movable slide provided with a band on the opposite side of its shank, in such a manner that the gage can be readily set for gaging the width and the thickness of a board. The head is adjustable by means of a wedge which can be readily fastened and unfastened without loss of time, and a set screw passing through the same serves to retain the slide for gaging the thickness. An additional adjustable band on that side of the chuck which contains the slide, acts in combination with the brad in the said slide as a mortise gage. Martin Horton, of Brooklyn, N. Y., is the inventor.

Needle for Knitting Machines.—This invention consists in the application to the needle of a cam so shaped that when the needle is drawn back after having received the yarn, it is made to raise the point of the sliding latch, and to carry it over the point of the hooks, thereby allowing the old stitch to drop over the new stitch without the liability of catching; it consists, also, in a stop applied to the latch and operating in combination with a space in the edge of the needle, in such a manner that said latch is held in a proper position while the needle is being thrust forward to receive the yarn for a new stitch, and to allow the old stitch to slip back over the point of the latch which, in this position, is covered by a slot or groove in the needle; further, in making the additional latch of one thickness, so that they may be operated in the same slot of the needle bed; and, finally, in

the application to the latch of a stop and of a curved point, in combination with the cam of the needle, in such a manner that when the needle recedes the point of the latch is compelled to drop over the hook of the needle, and the operation of casting off the old stitch is rendered certain. L. L. Otis, of Florence, Mass., and Samuel L. Otis, Manchester, Conn., are the inventors.

Ore Grinder and Amalgamator.—This is an improved machine for grinding ores in a dry state and for amalgamating the precious metals contained therein to separate them from the foreign substances. The invention consists in an improved manner of attaching the shoes to the muller, whereby said shoes are enabled to adjust themselves to the bed or bottom of the pan, thereby compensating for the wear of the shoes and causing the bed or pan bottom to be preserved at all times, which adds greatly to the efficiency of the machine. This device is now in operation and works well. M. B. Dodge, of New York City, is the inventor.

Horse-power.—This invention relates, first, to a useful means for regulating the speed of the horse-power, whereby a steady and uniform motion of the same is obtained by an automatic mechanism. This speed-regulating mechanism consists of a ball-governor combined with a brake, the latter being arranged to operate against the balance or fly-wheel of the machinery. This invention relates, second, to a new and useful improvement in the construction of the endless platform whereby it is rendered rigid or inflexible in one direction, namely, under the downward pressure, due to the weight of the animal; and, at the same time, rendered flexible in the other or opposite direction, and the use of rollers in the platform dispensed with, the platform, being allowed to work on rollers and with much less friction than the ordinary platforms in use. Third, to a brake attachment for stopping the machine in case the belt of the same should break, a contingency of frequent occurrence, and which is liable to injure either the horse or the machine. Fourth, to an improved means for giving the machine and consequently the endless platform a greater or less degree of inclination as may be required. Fifth, to the manner of hanging the machine whereby the adjustment referred to may be made without affecting the belt by which motion is transmitted from the machine to the machinery to be driven. D. W. Hunt, San Francisco, Cal., is the inventor.

The Review of Sherman's Army.

The Washington correspondent of the *Times* says of the review of Sherman's army on the 24th:—

"The men who marched from the Ohio to the Tennessee under Buell, only to march back again; who first penetrated down into Alabama under the daring and nervous Mitchell; who fought at Perrysville under McCook, and checked the advancing tide of the rebellion to again send it reeling southward, at Stone River, under the chivalrous Rosecrans; who toiled over the rugged passes of the Cumberland Mountains, and seized the great natural fortress of Chattanooga; who held the left with a tenacity that saved them from defeat at Chickamauga, under the ever-victorious Thomas; who stormed Lookout Mountain, and fought above the clouds with Hooker; who cut their way from Chattanooga to Atlanta, and from Atlanta to the sea; who swept the Carolinas as with a besom of destruction, and who gave the finishing blow to the great rebellion, in following the lead of Sherman, and Howard, and Slocum—these were the men who received to-day the enthusiastic plaudits of a hundred thousand spectators.

"The interest of to-day has exceeded that of yesterday. The Army of the Potomac is our old acquaintance, but the Armies of Georgia and Tennessee few people here had ever seen. The most eager interest was therefore exhibited to view the veterans of the West, whose marches can only be counted by thousands of miles.

"The magnificent physique of the men at once elicits the admiration of all; tall, erect, broad-shouldered, stalwart men, the peasantry of the West—the best material in the whole world for armies. The brigades move by with elastic, springing step, in excellent order, and fully equal to the marching of yesterday, save that the intervals between brigades and divisions were longer, though the regiments them-

selves were kept well closed up. At the head of each brigade was a battalion of black pioneers, the simon-pure contraband, in the garments he wore on the plantation, with shovel and ax on the shoulder, marching with even front, sturdy step and lofty air.

"The rear of Gen. Barnum's brigade was brought up by the first genuine pack-mule train ever seen in Washington. I will warrant Barnum had an eye to letting his friends see with what a degree of comfort he travels. It was a most nonchalant, grotesque spectacle—two very diminutive white donkeys bestrode by two diminutive black contrabands. If that is not a paradox, a dozen patient pack-mules, mounted with Mexican pack saddles, camp equipage on one side and boxes of hard tack on the other; half-a-dozen contraband females on foot; a dozen contraband males leading the mules; a white soldier or two on horseback, to see that everything was all right; the servants of the mess, and the mess-kit, and, scattered about on the panniers of the mules, reclining very domestically, half a dozen game cocks, a brace of young coons, and a sure-footed goat, all presenting such a scene as brought laughter and cheers from end to end of the avenue.

"To give an idea of the length of the column, it is only necessary to state that when the rear of the Fourteenth corps passed over Long Bridge the head of the Twentieth had already crossed the river on the pontoon bridge at the foot of Twentieth street, the route being from the first-named bridge along Maryland avenue to the Capitol, around the Capitol on the south side to Third street east, along that northwardly to Maryland avenue, thence westwardly to the Capitol, passing around on the north side to Pennsylvania avenue, up this avenue westwardly by way of Fifteenth street to Twentieth street, and thence south to the river. The entire distance of this column was fully seven miles. These two corps did not embrace more than half the entire force reviewed, which would make the whole column about fifteen miles long. It required a little more than six hours to pass any given point."

MISCELLANEOUS SUMMARY.

THE TUNNEL RAILROAD.—Gov. Fenton has vetoed the recent act of the Legislature authorizing a company to construct an underground railroad in this city. He objects to it on the ground that no limit is assigned in which such road is to be completed; and furthermore, that the bill authorizes the transfer of State and city property for the use of the company.

DUTCH GAP CANAL NAVIGABLE.—The Dutch Gap Canal, it seems, has not been altogether a failure, for the *Richmond Whig* says that General Mulford arrived there from Fortress Monroe, having passed through Butler's Dutch Gap Canal on the steamer *Clyde*. This is the first steamer that has passed through.

For some years to come, old iron will be plenty enough around Petersburg, Va., to supply several large founderies. East and south of the city, plowing is dangerous, as exploding shells are very likely to send horse and driver high in the air.

ACCORDING to Dr. James Johnston, 800,000,000 of men smoke different sorts of tobacco; 400,000 smoke opium and its compounds; 300,000 hemp and hashish; 100,000 betel, and 40,000 the American plant coca.

THE directors of the Oporto Crystal Palace Company and the exhibition committee have fixed Monday, the 21st of August, 1865, as the opening day of the exhibition.

TUNS upon tuns of used-up, worn out "hoops" are annually worked up in cannon, shafts for machinery, etc., at the iron works of Lazell, Perkins & Co., Bridgewater, Mass.

It is stated that George Cutler, Brattleboro, Vt., has apples sound and fresh, grown in 1863. He kept them in a cellar made in his garden, and packed in walnut saw-dust.

THE two large reservoirs at East Killingly, Conn., built to supply water to several cotton mills, gave way one night last week, causing damage to the amount of \$30,000.

THE very low price of wheat in England has induced farmers there to feed it to stock quite extensively. Sheep eat it at the rate of about a pint a day