

patented an improved platform gear for wagons. The invention consists in a platform gear into which the two outside bars are made of metal and U-shaped in their transverse section, and are provided at their ends with plates bolted on or between their walls to the head block and front brace bar, wooden or other filling pieces being inserted in the outside bars. This construction furnishes a platform gear of light and durable character, and a rigid frame is formed having the upper surface of its bars level for receiving the bearing circle.

Mr. Stephen D. Engle, of Hazleton, Pa., has patented an improved pantograph engraving machine for engraving on metal, for reducing maps and drawings, and similar work. This machine can do almost any kind of engraving from a pattern. It enables an unskilled person to do a good job of engraving.

Messrs. Robert Barber and Burchard H. A. Siefken, of Omaha, Neb., have patented a machine which will separate from auriferous sand or earth the fine as well as the larger particles of gold with the use of only a small quantity of water. The invention consists, principally, of a washing tank communicating with a tailing tank, in which revolves a wheel provided with pivoted or swinging scoops or buckets for removing the tailings without unnecessary waste of water, the washing tank being provided with suitable conveyers, riffles, and amalgamated plates.

An improved station indicator has been patented by Mr. Virgil H. Sprague, of Greene, Me. The inventor makes use of endless belts or chains, carrying the namecards or plates, and fitted with mechanism for giving step-by-step movement to the belt, whereby the cards are successively exposed.

An improved station indicator has been patented by Mr. Zebina M. Hibbard, of St. Louis, Mich. This invention is designed as an improvement on the station indicator for which Letters Patent Nos. 209,122 and 214,776 were issued to the same inventor October 22, 1878, and April 2, 1879, respectively.

An improved type-writer has been patented by Mr. George H. Herrington, of Wichita, Kan. The object of the invention is to furnish type writing or printing machines occupying small space and adapted for use in banks, stores, and other places for registering time, amounts, and other information in connection with money received and paid. A dial and a type wheel operated by a stem carrying a hand for indicating on the dial the position of the type wheel are used. Combined with these is a paper-carrying cylinder fitted for rotation and transverse movement. The dial, type wheel, and rotating mechanism are all carried by a ring-shaped case having a tubular boss and connected by a knuckle joint with the top of a post, whereby the case may be swung to and from the platen. The shaft which operates the rotating mechanism extends through the boss of the case and is manipulated by a knob outside of the latter. This shaft or stem is moved longitudinally to set the type to and from the paper and to move the cylinder carrying the paper the necessary space between the letters. An elastic band serves to hold the types in place and to raise them after an impression.

IMPROVED DINNER BUCKET.

In the dinner bucket shown in the engraving, the body, A, tapers and its ends are rounded. In one end of the body there is a vessel, B, for holding fluids, such as coffee, tea, and milk. In the other end of the body there is a box, C, having one or more compartments for holding articles of food, such as meats and preserves. These two vessels are removable from the bucket.

The cover, D, is crowned, forming a chamber which is closed by the plate, E. This chamber is used for holding articles that may be safely carried either side up. This forms a very compact dinner bucket of very convenient form. It is the invention of Mr. John B. Schneider, of St. Jacobs, Ill.

Photographing in Theaters.

In one of the new theaters now approaching completion there will be a photograph gallery, where the portraits of visitors can be taken by lime light. This is a capital idea, and many people, especially ladies, will doubtless avail themselves of the opportunity to be taken in evening dress, the facilities for which purpose are not at present great. A photograph is pre-eminently a thing done in a hurry and on the impulse, and few people would send a ball dress to the photographer's the day before and put it on by daylight in his boudoir; while the other alternative, of driving in evening dress down street at noon, is still more distasteful. Quite naturally you go from the dinner table to the theater, and in the same dress from your box to the operating room.—*London Court Circular.*

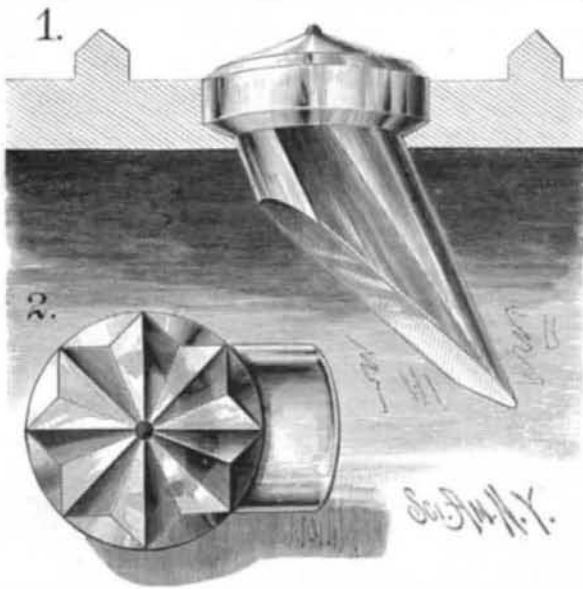
A NOVEL TOOL CHEST.—A burglar recently arrested in Leadville, but discharged for lack of evidence, is now limping about Colorado with the tools of his profession neatly concealed in his wooden leg. This convenient receptacle was not discovered by the jailer until after he had received instructions to release his prisoner.

TILE FOR ILLUMINATING PURPOSES.

The engraving shows a novel illuminating tile for pavements, vault covers, and similar purposes. The object of the improvement is to increase the quantity of light admitted and to diffuse it over a large surface.

The invention consists in an illuminating lens of semi-prism form having a very large reflecting surface.

The engraving shows a portion of a vault or pavement plate or frame fitted with the illuminating lens made of crown glass. The lens or semi-prism is formed with a flanged top portion to fit a flanged opening in the plate. The upper surface is formed with a raised center and with radiating grooves having beveled sides to increase the extent of surface. The beveled surfaces being depressed are protected from abrasion. The upper surface may, however, be of simple conical form, or in certain situations a plain flat sur-



PENNYCUICK'S ILLUMINATING TILE.

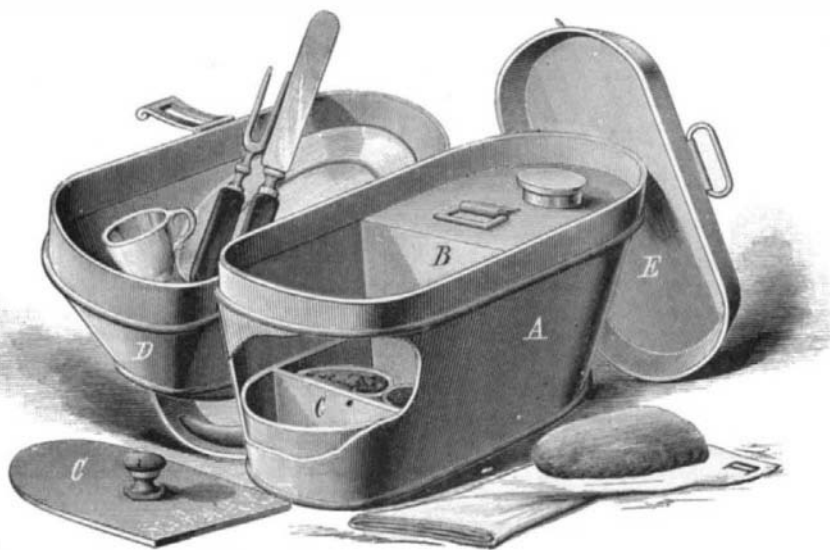
face may be used. The downwardly extending portion of the lens is a semi-prism having an inclined flat reflecting surface and an inclined back face that may be flat or nearly flat, convex, or concave. The angle of the flat surface will vary according to location, and is of the first importance. For a pavement light it should be slightly less than forty-five degrees to the plane of frame. It is lengthened by the inclination of the back surface from the head to the lower point, so that while only a limited amount of material is used, thereby saving weight and loss of light, an extensive reflecting surface is obtained at the proper angle.

At the center of the upper surface there is a metal spur which projects slightly and protects the surface. The iron frame is formed with knobs or projections between the tiles, so that the feet of persons walking over the frame shall be kept entirely off the lens, and slipping will be prevented.

This invention has been patented by Mr. J. G. Pennyquick, of Boston, Mass.

The Names of the States.

The Hon. Hamilton B. Staples read a paper at the annual meeting of the American Antiquarian Society in Worcester,



IMPROVED DINNER BUCKET.

on the 21st inst., in which he discussed the origin of the names of several of the States. His conclusions were as follows:

New Hampshire gets its name from Hampshire, England. Massachusetts is derived from an Indian name, first given to the bay, signifying "near the great hills." Rhode Island has an obscure origin; the island of Rhodes, the "Island of the Roads," and a Dutch origin, "Red Island," were mentioned, the first seeming to have the best historical support. Connecticut is an Indian name, signifying "land on a long tidal river." New York, New Jersey, Pennsylvania, Delaware, and Maryland were passed over. Virginia, the Carolinas, and Georgia have a royal origin. Maine was named from the fact that it was supposed to contain the "mayne

portion" of New England. Vermont has no especial question, except that it is claimed to have first been an alias—New Connecticut, alias Vermont. Kentucky popularly signifies either a "dark and bloody ground," or a "bloody river," but its origin signifies "the head of a river," or "the long river." Tennessee comes from its river, the name being derived from the name of an Indian village on the river—"Tanasee." Ohio is named after an Indian name, signifying "something great," with an accent of admiration. Indiana comes from the name of an early land company. Illinois comes from the Indian—the name of a tribe. Michigan is claimed to mean "lake country;" it probably came from the name of the lake, "Great Lake," which bore this name before the land adjacent was named. Louisiana is from the French. Arkansas and Missouri are Indian, the former being doubtful; the latter is claimed to mean in its original "muddy water," which describes the river. Iowa is also Indian, with doubtful meaning. Texas is popularly supposed to be Indian, but may be Spanish. Florida is Spanish, "a flowery land." Oregon has a conjectural origin. It is probably Indian, but a Spanish origin is claimed. California comes from a Spanish romance of 1510. Nevada takes its name from the mountains, who get theirs from a resemblance to the Nevadas of South America. Minnesota is Indian, "sky-tinted water." Nebraska is variously rendered "shallow water" and "flat country." Kansas is from an Indian root, Kaw, corrupted by the French. Mississippi is "great water," or "whole river." Alabama is Indian, the name of a fortress and a tribe, signifying, as is claimed, "here we rest."

Southern Woods and Ores at the Atlanta Exhibition.

One of the notable exhibits at the Cotton Fair is a fine display of Southern woods, both rough and polished. It includes the sweet gum, a light colored wood, often worked up for coffins; the tupello, a tree that cuts like cheese, but cannot be split, used by the negroes for corks; the famous (and infamous) palmetto; the Spanish bayonet, with stiff blades sharp as needles and serrated edges; the swamp cypress, with its pointed excrescences three feet high springing from the root; and the curled pine, which takes a grain polish like the curled maple, but infinitely more vivid and beautiful.

The Georgia saw mills—there are eight hundred of them in the State—have sent in some colossal pine logs, one of them a sylvan monarch, straight as a needle, seventy feet long, twenty inches in diameter at the smaller butt, and some four feet thick at the base.

In the same building are two collections of Southern minerals, chiefly from Georgia, remarkable for their variety, utility, and number. Among them are fine specimens of copper and copper ore, sheets of clear mica a foot square, coal blocks weighing half a dozen tons, crystals, stalactites, and gold nuggets, one of the latter worth five hundred dollars.

Odd Things that have been Found about the Wrecks of Vessels.

The Coast Wrecking Company has in its office, in this city, a curious collection of relics from old wrecks and other odd bits taken from the sea. The collection embraces quaint pieces of furniture, explosive shells, and shells of the ocean, shreds of ladies' dresses, rude weapons of savage races, huge starfish, and many curious things, the use and purpose of which are still unknown. The collection contains the broken bell brought up from the ill-fated steamer Atlantic, of the White Star line, which was wrecked on Golden Rule Rock, on the Nova Scotia coast, on April 1, 1873, with a loss of 557 out of 1,007 souls on board. There is also a rusty, hiltless sword, dug out of the sand eight years ago, near the hulk of the British bark Thistle, which was lost on Squan Beach, N. J., in 1811. There are also several bottles of sweet oil, holding a pint and a half each, with the original corks intact, and the oil as clear as crystal, taken in November, 1877, from the wreck of the British bark Robert, which went down in 1844, with a cargo of lead and oil, and five of her crew, off the place where Atlantic City now stands. There is a South Sea Island canteen, ingeniously constructed of coconut shells, which was fished up from a wreck in seventy feet of water on the coast of Maine;

also a mussel shell firmly embedded four inches in depth in a well which was found one hundred and forty feet above the sealevel on the Jersey coast; also a pelican's skull and bill, measuring two feet from back to tip (making an excellent though wide dipper) which was found near the wreck of the bark Robert Fletcher, on the south beach of Long Island, and which is said to have been used to bail out the boat by the crew when endeavoring to escape. The jaws of a shark, killed on the South Carolina coast, which have been preserved, can easily be passed over the shoulders and down the body of a full-grown man. One of the most curious relics is a lamp chimney taken from the remains of the ironclad Merimac. Oysters three inches long were found attached to the glass, and four large oysters which had grown about the

brass base of the chimney, form an irregular square. The hilts of several swords and some old firearms are also incrusting with oyster shells.—*New York Sun.*

STEAM BOILER NOTES.

On the 29th of October the Cincinnati Board of Aldermen passed to be engrossed an ordinance making the use of an effective smoke-consuming furnace compulsory on the part of all manufacturers and others whose business requires the use of a chimney that has become a nuisance to the neighborhood. Organizations, including a society of ladies, have been formed in Cincinnati for the purpose of procuring the abatement of the smoke nuisance.

In regions where bituminous or other smoky fuel is used because it is readily obtained and cheap, an enormous waste is made, not only from imperfect combustion, which results in the smoke nuisance, but also from the sooting of the fire surfaces of the boiler. Considerable improvement has been made in Eastern cities of this country by the introduction of deeper boiler furnaces and devices for supplying air above the fire to complete the combustion and by skillful firing so as to coke the coal near the mouth of the furnace. But it is probable that very much fuel, not only bituminous but anthracite also, is still sent out of the boiler chimney in the shape of invisible gas of a combustible nature as well as black smoke. The remedy, both for the smoke nuisance and loss incident to the collection of soot on the boiler fire surfaces, is no doubt attainable, and should engage the attention of inventors with a view of producing a cheap and simple regenerating gas boiler furnace. As showing what may be possible in this direction we abstract from a paper by William Metcalf, of Pittsburg, Pa., which was read before the Engineers' Society of Western Pennsylvania, and which we find in the *Iron Age*. He shows how much money is annually wasted through the smokestacks of Allegheny County, Pa., in shape of dense black smoke and the still more wasteful burning gas at the top of iron furnace stacks. The loss is made apparent by a comparison of the old and the new style of iron puddling and reheating furnaces, the old being the common reverberating and the new style the regenerating gas furnace. The quantity of coal used in the old furnace is from 30 to 40 bushels per ton of puddled iron, while in the gas furnace 20 to 30 bushels of slack, costing half as much per bushel, will produce a ton of iron, and after deducting the cost of gas making in the new process the net gain in cost of fuel is 38½ per cent in the puddling process. In the reheating furnaces the saving in cost of fuel is 30 per cent. Moreover, the loss by oxidation or scaling in the old furnaces is 224 pounds per ton, while in the new furnaces the loss is only 134 pounds. Estimating the loss in dollars, or rather the possible saving, it aggregates nearly four dollars per ton of bar iron once reheated. Allegheny County appears to have made, in 1878, 250,000 gross tons of rolled iron, so that its contribution to the smoke nuisance and the red chimney torches cost about \$1,000,000. Steam users will do well to make a note of this. A good gas boiler furnace appears to be an object worth looking for.

The boiler of a thrashing machine engine exploded at Martville village, N. Y., Oct. 29, killing Frank Milliman and terribly injuring eight others. Milliman was completely dismembered and died in half an hour. Frank Timerson, the owner, had a piece of iron driven through his groin and cannot recover. One little boy had his hip broken in two places and his knee shattered. Another had his skull fractured, and there is little hope of his recovery. Others had their arms and legs broken and badly shattered. One man was blown twenty feet. Low water in the boiler is assigned as the cause.

It is to be regretted that the idea so generally prevails that some steam boilers will not explode while they contain the usual supply of water, because when low water is assigned and believed to be a sufficient cause in any case it seems to cut off further inquiry. No fact in engineering is more fully established than this, that boilers have exploded, meaning broken into fragments with similar detonating phenomena to that which attends the bursting of rocks on igniting a contained charge of gunpowder, while they are known to have contained sufficient water to fully protect the plates from overheating. This has been abundantly proved by experiment, and it is being almost daily confirmed by accidental explosions. Formerly when Cornish and Lancashire boilers having unsupported tubular furnaces were more in vogue, so much so as to be the prevailing types, the collapse of the furnaces from the softening of their uncovered tops was very frequent in England, but since the custom of properly staying such parts has become prevalent, and since every attendant knows that his first duty is to see that such boilers have an ample supply of water, their failure from this cause is very rare, so much so, a celebrated English authority has declared, that it is probable that more flues and furnace tubes collapse from irregularity of form and from other weaknesses than from shortness of water. The locomotive and other forms of internally fired boilers are often injured by overheating of the furnace tops. But this injury is not always fatal unless accompanied by a higher pressure than the crown braces or stays can sustain. Crown plates are often bagged between the braces, which is pretty strong evidence of overheating, and if such a condition existed of the crown plate of an exploded boiler it would be strong evidence that the water had been too low or the pressure too high, and if in addition to the stretching or bagging of the plate between the braces it bore other evidence of the effects of heat on a dry plate, such as the cracking off of the surface

scales and a change of color to a peculiar shade, their low water might be confidently assigned as a cause of the explosion, because it has so weakened the boiler that it broke down under its load.

But the once popular notion that an explosive gas is generated in a boiler by overheating its fire surfaces should be entirely set at rest by the late experience in tubular coil boilers, which have water regularly thrown upon their heated surfaces and which send over to the engine steam as in explosive as that coming from the surface of water in old styles of boilers. This experience should likewise demolish the theory of the evolution of steam with an explosive suddenness capable of instantly shattering the strongest boiler.

The discoloration of plates of exploded boilers which occurs from a sharp bending of the plate while wet, is often mistaken for evidence of overheating, but it has quite a different shade, and when fresh is covered with a recent layer of red oxide resulting from the exposure of the bright fibers or small particles of the metal to moisture and air.

It has not only been well established that boilers do explode while containing sufficient water, but it is now believed that much the larger percentage of explosions result from weakness, either congenital or acquired, or from overpressure resulting from sticking of the safety valve. Although many defects in construction result disastrously, still it seems trivial to cavil and dispute about the weakest point in the construction of a boiler when it can be shown that even that weak point was many times stronger than what was supposed to be the yielding point of the safety valve, and when an extensive acquired weakness, such as a cracked or grooved seam or an absolutely immovable safety valve, is found among the ruins after the explosion, or, in their absence, plenty of circumstantial evidence all pointing to such fatal defects. Intelligent and experienced boiler inspectors often criticize construction, as of right they should do, but they are not generally captious critics of construction that has proved amply safe if they find the boiler has exploded because the steam could not otherwise escape.

From the *St. Thomas Journal*, of late date, we learn that a most distressing accident occurred on board the propeller *Canada*, at the docks of the New England Transportation Line, which, from evident suppression, escaped the press until developed by a fatal termination and a coroner's inquest. The boiler of the *Canada* needed cleaning. The second engineer, Thomas Brown, went inside of it, while fireman Muir held a light at the man-hole. John Clark, one of the hands, passed in some oil for loosening the scale. The boiler was a trifle warm, and the oil, scattering somewhat, caused an escape of gas, and ignition, and then a fearful explosion. John Muir was blown ten feet away, and his eyesight in an instant obliterated forever. The engineer crawled out a mass of fire and flames, his shirt burned and his flesh roasted. In this terrible condition he lingered until Thursday and died in untold agony.

In the *SCIENTIFIC AMERICAN SUPPLEMENT* of March 13, 1880, was published an illustrated account of experiments with gas-fired steam boilers made by Mr. Haupt, of Brieg, at the works of the Lower Silesian Mining Union. The illustrations include sixteen drawings of boiler furnaces and gas producers, and show the best methods of bringing the gas and air in contact and the steps by which the most favorable results were obtained.

A trial was then made, continuing for eleven hours, in the most practical manner, by placing gas burning and coal burning furnaces in competition. The result was that the coal burning furnace evaporated about 2½ pounds of water per square foot of heating surface per hour, and under similar conditions the gas burning furnace evaporated from 4.4 to 5 pounds per square foot per hour. The economic result is not given in pounds of water evaporated per pound of fuel, but in experiments made previously by MM. Müller and Ficht, of Paris, an economy of 32 per cent of fuel is stated to have been attained in Upper Silesia, Dortmund, and at Essen.

A boiler at the Worcester (Mass.) Dye and Bleach Works exploded October 24. William Ronayne was scalded badly and had a leg broken. Wm. Dick and Martin Davis were also scalded.

The boiler in Samuel Johnson's sawmill, near Gistville, Henry County, Ky., exploded October 31, killing David Hoover and mortally wounding John L. Johnson, Pleasant Hensley, and Jennes Hall. Five others were seriously injured.

Sanitary Work and Needs in New York.

The annual meeting of the Medical Society of the County of New York, October 24, was devoted mainly to the report of the Committee on Hygiene. The chairman of the committee, Dr. John C. Peters, said that as far back as 1865, a council of hygiene, composed of the best physicians in the city, decided that diphtheria and scarlet fever were more virulent and abundant in the neighborhood of filthy stables than in other localities. It was the same with infectious pneumonia and severe diseases of the eyes. There is a cheap process of baling manure which could be easily adopted in large car, omnibus, and livery stables. This prevented fermentation, rotting, and offensive odors, and made the manure a valuable article of export to the Southern States, as it was easily and cheaply handled. In small stables it might be packed in barrels, and Dr. Peters said it had long been carried on steamboats in this way without its presence being known. These plans would do away with all the manure vaults in the city of New York, many of

which were under the sidewalks, and exceedingly offensive. As the stables were for the most part in the best sections of the city, the abatement of this nuisance would add more to the health and comfort of the people than any one thing except the suppression of the 15,000 or 20,000 privy vaults, only too many of which were in the central part of the city between Fourth and Sixth Avenues. These vaults were said by the Board of Health to cause more sickness and death than any other one thing, and the manure vaults were only second to them.

Reports were read from Sanitary Inspector Day, stating that the Board of Health would ask for four additional sanitary inspectors, two meat inspectors, of which none now existed, two additional disinfectors, two additions to the vaccinating corps, and three engineers to enforce the provisions of the new plumbing bill, all of which, and more, the Committee on Hygiene hoped would be granted.

The Board of Health had made 94,000 inspections, of which 24,000 were of tenement houses, and 5,400 were found objectionable. The Board inspected 8,000 privy vaults, of which 4,300 were found to be full, filthy, or out of order. Thirteen hundred inspections of stables were made, and 475 were discovered to be in a filthy condition. The first six months of the present year 3,400 dead horses, 8,500 dead dogs and cats, 80,000 pounds of bad meat, and 70,000 barrels and boxes of decaying fruit and vegetables were removed. Eight hundred and forty barrels of zinc and iron disinfectants were used, and, although made of old tin cans, pails, and the like, served the purpose remarkably well. One thousand gallons of carbolic acid and 13,000 gallons of dead oil were also used. During the past nine months there had been 14,000 cases of contagious diseases, of which 1,100 were smallpox, 5,000 scarlet fever, 4,000 diphtheria, 2,000 measles, 600 spotted typhus fever, 600 typhoid fever, and 500 cerebro-spinal meningitis. The wealthier classes were responsible for a great deal, as they owned the better part of the worst tenement houses and stables, with their disgusting vaults and manure pits.

A communication was read from Dr. Janeway, Commissioner of Health, and also a member of the Committee on Hygiene, calling attention to the provisions of the new plumbing bill, and stating that typhus fever had been absolutely eradicated. Diphtheria had prevailed more extensively during the last three months than at any time since 1875. Dr. Janeway thought the greatest sanitary need of New York was an increased supply of water, and he believes that to the short supply was due a great many deaths. The death rate at one period reached 56 in 1,000. At the same date the death rate in London was only 18 in 1,000. For many weeks, Dr. Peters stated, it had been above 30 and 40, and in London it rarely reached 20. The highest death rate in London was 31, and that was reached only once.

The society elected the following officers for the ensuing year: Dr. F. R. Sturgis, President; Dr. W. Gill Wylie, Vice-President; Dr. W. M. Carpenter, Secretary; Dr. P. B. Porter, Assistant Secretary; Dr. O. B. Douglas, Treasurer; Drs. D. Lewis, E. F. Ward, E. B. Bronson, D. Webster, and A. Jacobi, Censors.

MISCELLANEOUS INVENTIONS.

A changeable and perpetual calendar, of durable construction and in convenient form, has been patented by Mr. Jabez Bath, of Brooklyn, N. Y. This invention consists in a combination of cards and numbered blocks indicating respectively the year, month, days of the week, and days of the month, or a slide will suffice for the days of the week. These devices are inserted within suitable recesses on removing slides in the frame for the purpose.

Mr. Philip Herbold, Jr., of Galion, Ohio, has patented an improved bed lounge having hinged sections. It is so made that the mattress will not be obstructed by any central ridge in the center, and when used as a bed the center rails are firmly supported.

An improved whip socket, patented by Mr. William A. Bradley, Jr., of Bridgeport, Conn., consists of a glass socket having a hole in the bottom for the escape of any water that may enter. It is provided with a simple clamp, by means of which it may be fixed to the dash board.

An improved coal shovel, which can also be used to sift ashes and separate them from the cinders, has been patented by Mr. Charles H. Starin, of Brooklyn, N. Y. The invention consists in a slotted or perforated shovel with a plate pivoted to each longitudinal edge of the bottom, which plates can be raised to close and cover the perforated or slotted bottom by means of a wire pivoted in the handle and provided with an extension, which can be depressed very conveniently by the person holding the shovel.

An improved compound cut-off cock has been patented by Mr. James Mullaney, of New York city. The object of this invention is to facilitate the controlling of a water supply from two distinct sources through the same delivery pipes.

An improved running gear for vehicles has been patented by Mr. Er Harder, of Berkshire, Ohio. The object of this invention is to construct a wagon or bob-sled gear especially adapted for use on rough roads and for making short turns. The front and rear axles are pivoted and connected together by chains.

Messrs. Charles W. Spickerman and Jeremy R. Martin, of Winnebago City, Minn., have patented an adjustable square for marking siding boards for a house, in order to cut perfect joints when the house casings or corner boards are beveling or drawn back by nailing.