

Editorial Summary.

SLAUGHTER PITS.—The Collieries of England sacrifice nearly one thousand lives outright every year, not to speak of the shortening of life by an unhealthy subterranean occupation. The late explosions at Barnsley, destroying some 425 lives, were by far the most destructive on record. Experience, science and legislative authority seem to have exhausted their resources in the ineffectual endeavor to cope with the subtle and invisible foe which prevades all the cavities of a coal so abundant in hydrogen as that of England. Sir Humphrey Davy's safety lamp, (covered with a wire gauze through which air and light, but not flame, can be communicated) has been in use over half a century; yet only the ratio, hardly the aggregate, of violent deaths in coal mines, has been diminished. As long as mankind are fallible—and the most prudent are liable to be off their guard at some fatal moment—the safety lamp must remain but a partial protection. Still the problem has not been given up, and undoubtedly the parliament at its next session will make a fresh effort to bring invention to the rescue. Some mechanical means of removing, or some chemical means of indicating or neutralizing the explosive gas—explosive when mingled with air—is now earnestly sought. It would seem, however, that ventilation, even if perfected so as to obviate the accumulation of the gas, must be powerless against its sudden irruption from concealed reservoirs.

NUTRITION OF THE TEETH.—Dr. Henry S. Chase, in the *Medical Investigator*, estimates that a mother and child under eighteen months, together require for the nutrition of the dental and osseous systems, 55 grains per day of phosphate of lime for the former, and 27 grains for the latter. These 87 grains, he says, are contained in 10 ounces of cheese, in 31 ounces of peas, in 35 ounces of fresh mutton, beef or unbolted wheat flour, or in one hundred and seventy-five ounces (nearly 11 pounds) of fine flour, such as we commonly use—enough to make a dozen loaves of baker's bread of the largest size. Think of a woman eating a dozen of those loaves daily to sustain the osseous system! It is consoling that bread is a minor item in the diet of most persons. Want of backbone or any bone at all would result from a diet of fine wheaten bread, if these calculations are not at fault somewhere. Living on "bread and butter" of this sort is too common, however, among the women and children of America. There is a "fatal facility" about it. We must have a new "staff of life" with more bone in it, and equally handy.

WINTER GARDENS may be made with beautiful effect in front of dwellings, by a tasteful arrangement of evergreens in parterres, having regard to the varieties and contrasts in their shades of color, forms and sizes. The *Prairie Farmer* suggests the following arrangement:—A group of three or more of the upright junipers, from three to four feet high, in the center, and one of these decidedly taller than the rest. Around these a single row of low Canada balsams, taking the form of the bed, but not crowded too closely. Outside of the balsam a row of arbutuses, or a ring of snug little red cedars, very compact and low. Next a circle of bear grass, with its long pointed leaves, so as to make a continuous band of their pale green. Here, Lastly a prostrate broad-leaved evergreen, the vinca minor, often called the ground myrtle will come in as a fine contrast.

CHEAP SOURCE OF OXYGEN.—Highly oxygenated compounds such as the chromates and manganates, can be partially deprived of oxygen by steam, for which they immediately compensate themselves from the air. A method has been patented in France for making this process continuous, and thus drawing a steady supply of oxygen from the atmosphere. A current of steam is passed through a retort containing one of these compounds, and carries off with it a current of oxygen, which is collected in a gas holder where the steam is condensed to water. Following this, a current of hot dry air is passed through the retort and re-oxygenates the compound, which is then ready to yield again. An improvement of the apparatus so as to de-oxygenate and re-oxygenate simultaneously, would seem to be desirable.

IRRIGATION.—Over a million acres of land, in the counties of Fresno, Merced, Stanislaus and San Joaquin, Cal., are to be reclaimed by artificial irrigation. A Stockton paper states that a San Francisco Company have surveyed the work, and will commence early in the spring a canal that is to bring a perpetual and abundant supply of water from Tulare Lake, through a level country requiring no locks or aqueducts, at once irrigating the land and forming a highway that will convey the products of the whole region to the San Francisco market. It is supposed that it will be the cheapest canal ever built.

It is said that Wm. H. James, who is reported to have been the inventor in 1820 of tubular boilers, is living in England at the age of seventy years in abject poverty. It was ascertained that he had been living without food for several days and had supported existence for a year by pawning his clothes, tools, and furniture. A subscription was started for his relief which promises to place him beyond future want.

The largest anchor in the world, according to Chas. Ryland's *Iron Trade Report* has lately been finished at H. P. Parkes' Works, Tipton, Staffordshire. It is intended for the *Great Eastern* and weighs eight tuns exclusive of the stock. Its dimensions are; length of shank, twenty feet six inches; of woodstock nineteen feet six inches; trend of arms seven feet four inches. It is somewhat different in form from ordinary anchors, the palms or blades being divided or split so that it may more readily pierce the sea bottom.

CAPTAIN NORTON'S INVENTIONS.—In response to the demand for evidence of his priority in the invention of improved shot, Capt. Norton favors us with an extract from the *United Service Gazette* of Dec. 8, 1866, being a statement under the name of "Richard Airey, Quartermaster General," dated Horse Guards, 22d June, 1860, to the effect that when quartered with him at Woolwich, in 1823, Capt. Norton invented and exhibited an elongated expanding shot and shell, identical in principle with the present Minie bullet, of which he (Airey) frequently witnessed the operation at that time.—For armor-penetrating shot, Capt. Norton asserts that a flat-headed bolt is preferable to the ogival form, and this was known and acted on by the old British archers. In 1827, he pierced with a flat-headed bolt a guardsman's cuirass which had resisted an ogival-headed bolt, both being of steel. Allowing these facts, Government trials, however, have resulted in the rejection of this form for cannon shot, as it breaks on heavy armor instead of penetrating, and is subject also to deviation.

GOVERNMENT ITEMS.—The conversion of Springfield muskets into breech-loaders has been commenced at the armory, at the rate of 50 per day. Martin's new "central-fire cartridge" is to be the ammunition; the advantage being that the anvil on which the fulminate rests is not blown out by the explosion, but remains in the shell.—The House Post-office Committee are reported to be in favor of the telegraphic post-route scheme. The question is now upon buying or leasing old lines, or constructing new. The Postmaster General is in favor of the latter.—A further appropriation is asked, and will probably be granted by Congress, to carry out the plans of the New York Commissioners relative to the representation of our country in the Paris Exposition.—The New York Post-office bill has passed both houses of Congress.

THE CRANMER MACHINE GUN.—This appears, as described in the local papers, to be a California product. It is said to be capable of throwing 6½ tons of half-ounce bullets in twenty-four hours, with the force of the ordinary rifle. This would be rather a useless operation, but we are permitted to infer that the machine could discharge 300 such shots per minute, which would be something to the purpose. It is operated by a crank, like the successful Gatling gun, and claims the usual advantages of simplicity and exemption from derangement—usual in claims, but rarest of all things in fact. We have no doubt that hand shooting will eventually be superseded by machine shooting, precisely as steam printing has taken the place of hand presswork: i. e., for all except fine work and small jobs.

COTTON AND CORN.—The official estimate for 1866, is 1,750,000 bales of cotton, of 400 lbs. each, or a million and a half of the actual size. This makes 750,000,000 lbs. The largest product is that of Texas, 300,000 bales. Mississippi follows with 270,000 bales; Alabama, 220,000; Georgia, 205,000; Arkansas, 182,000; Tennessee, 148,000; Louisiana, 109,000; South Carolina, 102,000; North Carolina, 91,000; Florida, 36,000; other States, 67,000. The corn crop of 1866, is estimated at 880,000,000 bushels. A diminution appears in the product of 22 Northern States, (679,000,000) of 25,000,000 in quantity and the equivalent of 75,000,000 in quality. The 11 lately insurgent states return 185,000,000 bushels against 274,000,000 in 1859, the year last reported.

BREECH LOADERS FOR THE NEW YORK MILITIA.—The State Board of Officers for the examination of improvements in breech-loading small arms, and particularly methods of converting muzzle-loaders, reconvened at the State Arsenal on the 22d January. The following officers comprise the board: Brig-Gen. Geo. W. Palmer, Commissary General of Ordnance; Brig-Gen. Wm. G. Ward, commanding First Brigade National Guard; Col. Geo. M. Baker, commanding Seventy-fourth Regiment National Guard; Col. Silas W. Burr, Assistant Inspector General.

The population of London is gradually decreasing. This may be a startling assertion, but nevertheless it is true. The last census shows that the city proper numbers only 100,000 actual residents, and this number is diminishing, dwellings being displaced by warehouses. The solid men who give the city its importance are nearly all non-residents. The actual population is largely composed mainly of the working classes and those in the humbler walks of life, and constitute but forty per cent of the number of persons who transact business there. The city of London proper is not much of London after all. Its surroundings count millions.

THE PARISIAN COSTAR.—The rat exterminators of France have a unique mode of advertising the merits of their preparations. We learn that a singular equipage consisting of a van covered all over with dead rats, to the number of more than 500, has been creating a sensation in the streets of Paris. These animals were victims to a new process invented by M. Bergeot, of Orleans, a noted destroyer of rats, who has acquired a great reputation from the immense number he has killed at Marseilles and Havre.

THE TROY MAMMOTH.—The remains of the mastodon excavated a month or two since near Cohoes, have been presented by Mr. Alfred Wild, to the New York Cabinet of Natural History, and have been deposited in the State Geological Museum. As the fossils show a tendency to crumble, they must be treated with oil for some months before being placed on public exhibition.

FRENCH MEASURES.—The decimeter (one tenth of a meter) is five times the diameter of our new five-cent piece or 3.83 inches. The weight of the piece is exactly five French grammes.

EFFECT OF VIBRATION ON IRON.—The theory that wrought iron loses its tenacity by crystallization, in consequence of long-continued vibratory shocks, was suggested by the appearance of many rails and axles, which had given way, and confirmed by the analogy of the supposed cause and effect to percussion and its results. At length, this theory has been impugned by a machinist in Berlin, who has observed the same crystallized condition in bars that had failed without having been subjected to vibration, and has produced in his experiments fractures by protracted vibration (if we understand him) without the exhibition of crystallization. Hence he infers that the crystallization so generally if not universally observed in broken railroad axles, probably existed as an original defect in the iron. A more improbable supposition than this can hardly be entertained, and it will require far more conclusive evidence than we have seen to commend it to belief. The subject, however, is worthy of more exact investigation than it has received.

ICE FOR EUROPEAN CITIES.—The glaciers of the Alps are now mines of wealth and tributaries to luxury—inexhaustible in both respects. They are worked (says Dr. Prime) precisely like stone quarries and their product is transported by rail to Paris and other continental cities. Not only so, but they are excavated into galleries, chambers, and magnificent saloons. The depths of snow on the surface exclude the sunbeams, but calcium lights shed a brilliant lustre reflected as from a thousand mirrors of glass, and, in small apartments fitted up for the purpose, the furniture of a well-appointed parlor invites to cool but not inhospitable repose."

GOLD IN OHIO.—The Irish proverb "there's paraties every where," will probably come to be applied to gold. In the vicinity of Belleville, Ohio, gold has lately been discovered in minute grains and flakes in the sand. The "placer" has been purchased, and a company has been organized to work it!

ECONOMY OF CHEESE FACTORIES.—A Canada cotemporary supplies data from the books of the West Oxford Cheese Factory as follows:—R. A. G. supplied 101,331 lbs. of milk from 32 cows, from May 7th to Oct 12th, for which he realized \$1,064; a return of \$33 25 or 21½ cents per day from each cow. J. G. supplied 80,959 lbs. of milk from 26 cows, realizing \$849 or \$33 69 per cow, for the same period. The price realized for the milk was about 1½ cents per lb. A quart of rich milk weighs about 2½ lbs., hence the price obtained per quart was a little less than 2½ cents.

CAR FERRY.—A powerful iron railroad steamer, to carry trains of cars in the manner proposed between Dover and Calais, has been running between the respective termini of the Michigan Central and Great Western Railroads, at Detroit and Windsor (C. W.), since January 1st. She takes eight cars and their contents, without "breaking bulk," and is built to break her way through the ice whenever necessary.

The Unit of Heat.

Two distinct units of heat have been proposed and are in use. First, the quantity of heat which is required to raise the temperature of one gramme of water 1° cent. Second, the quantity of heat required to raise the temperature of one pound of water 1° Fah. These are very far from having an equal value. By the combustion of 1 gramme of carbon 8,000 grammes of water may be heated 1° cent.; and also it is evident that 1 lb. of carbon will heat 8,000 lbs. of water 1° cent. In other words any given weight of combustible will raise the temperature of the same weight of water an invariable number of degrees. Thus tables of heating values of substances will be composed of the same numbers, whether representing grammes, pounds or any other weights, provided that the same thermometric scale be followed. A change of the thermometric scale requires however a change of all the numbers of the tables to correspond with the difference of value of the degrees.—5° cent.—9° Fah. or 1° cent.—2° Fah. and 1° Fah.—5° cent. To reduce a cent. table therefore to the Fah. multiply all the numbers by 5/9. Thus the heating value of carbon is 8,000 units by the Cent. scale and 14,400 by the Fah. scale.

This difference of scales has been the source of a considerable confusion in discussions on heat. English writers are obliged to use both scales and thus are in great danger of mixing them up. Inconsistencies on this account may be found in some of our best books. I make these statements in order that I may claim a little sympathy on account of a mistake, I made last week in my calculation on the "Clash of Atoms." I stated the heat value of carbon to be 8,000 units, which was correct enough by the centigrade scale, but what I needed was the number 14,400, which represents the units by the Fah. scale. Thus it will be seen that my great figures were far too small. I regret it, for I fear that their very greatness will bring doubt on the beautiful theory of the "Clash of Atoms." CHARLES A. SEELY.

Ice Boat Race.

Two of the Poughkeepsie ice boats (*Haze* and *Snow Flake*) ran on the 15th of Jan. from Poughkeepsie to Newburgh, as a reconnaissance for the proposed regatta. The time made was fifty miles per hour, on very rough ice. The *Snow Flake* plunged through the drifts and crashed over the "hummocks" with full mainsail, at a fearful rate, beating her companion four miles. Afterwards in crossing the river at the rate of a mile a minute, the *Snow Flake* had her whole standing rigging raked off in an instant by a shake of wind, the party on board being all luckily to windward and so escaping injury. —A sleighing race for a purse of \$1,000, was run the same day from Providence to Boston, 42 miles, winning time three hours forty-two minutes, or 11½ miles per hour.

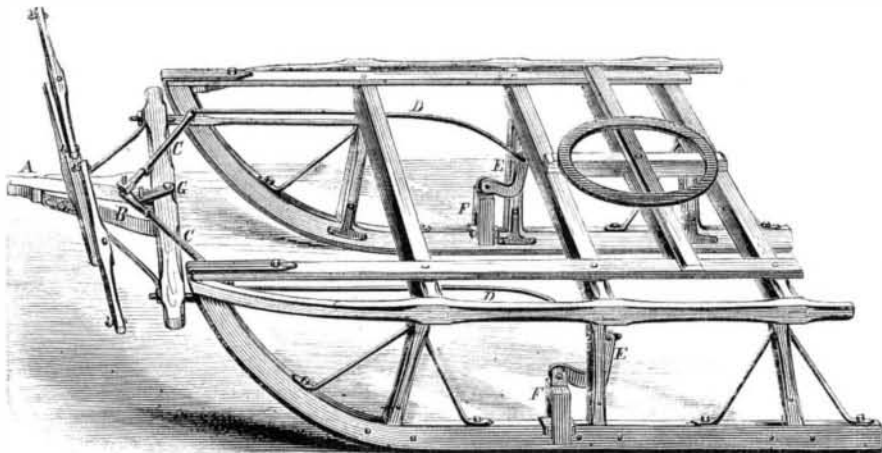
Improved Sled Brake.

Brakes for receiving the gravitation of the load on inclines are in frequent use on wheeled vehicles, and similar appendages have been applied to runners traveling on snow. None, however, seem to be more effective and simpler than that illustrated in the engraving. Its construction and operation may be easily comprehended.

The pole, A, is allowed to move backward and forward in the "hounds," B, being kept in place by a bolt passing through the "hounds," and a slot in the pole, or by any other suitable mechanical device. To the end of the pole, on the top is secured by a bolt, two levers, C, which are connected with bars, D, to a bell crank, E, on each runner. This bell crank engages with a forked slide, F, extending on each side the runner and working vertically in a simple guide.

When the horses are backed they throw the slides into the snow or ice by means of the retrogression of the pole through the medium of the levers. If while no pulling force is exerted by the draft animals the driver desires that the brakes shall not act, he has only to move with his foot a simple lever stop, G, which holds the pole extended.

It is evidently a simple contrivance, efficient, and not liable to become deranged in using. One advantage is, that the edges of the brake are narrow and do not cut up and ruin the road. It was patented by H. L. Naramore, of Cummington, Mass., through the Scientific American Patent Agency, Sept. 11th, 1866. For more details and for purchase of rights and territory, address Mr. Naramore as above.

**NARAMORE'S SLED BRAKE.****RAILROAD ITEMS.**

The United States have 36,896.26 miles of railroad completed and now in working order. This is an increase of road brought into use during the year of 1,535 miles, exclusive of some 200 miles of city railroads added to the length reported a year ago. The State of Pennsylvania owns 4,650 miles of track. Ohio ranks second, with 3,401 miles, followed by Illinois with 3,250 miles, and New York with 3,025 miles of road now in working order. Distributed into geographical regions, the New England and six Southern interior States own each one ninth; the five Middle Atlantic States one quarter; the twelve Northern interior States two fifths; the two Pacific States one seventh; and the five Southern Atlantic States one seventh, of the total length given above. In cost per mile the highest priced roads are the through lines of New Jersey, the Hudson River, the Baltimore and Ohio, and the Reading Railroads, in their order. The total cost of all the roads in the country amounts to \$1,502,464,085, at an average cost per mile of \$40,723. From a length of only three miles in 1828, the railroads of the country have steadily increased, until now the United States are traversed by a longer track than is found in all other parts of the world together, and sufficient to girdle the whole earth at the equator with a double track line.

The organization of a new Pacific Railroad Company composed of Southern capitalists and prominent men is announced. The route proposed is from some convenient point on the Gulf of Mexico, by an air-line route 1,268 miles long to the Pacific Ocean. The aid of Congress in constructing thereon is relied on, as the company claim that if the annual expenses to the government for military purposes along the line of their proposed route were to be capitalized, and the bonds thus created loaned to the company as the road progresses, the road would be completed without incurring expense to the country above what otherwise must be expended for years to come in furnishing military protection to the region through which the road is to pass.

A memorial has been presented to Congress praying for a charter to build a railroad from Galveston to Kansas. The project is to build a double track, to be owned either by the state or by a corporation, and has this peculiarity, that like the canals the track is to left open for free competition to all individuals and transportation companies. The rolling stock will be owned and run by these parties, they paying a certain toll the owners of the track. By this arrangement the capacity of the road, it is claimed, may be increased tenfold and the cost of transportation reduced one half.

The estimates of the cost of the Northern Pacific Railroad prepared by Brevet Brig.-Gen. Simpson are as follows:—For construction of 204 miles of road, \$150,000,000; for rolling stock and fixtures at \$11,200 per mile, \$23,000,000; for steamers on the Missouri and Columbia Rivers, \$3,000,000; for engineering and contingencies, \$10,000,000; for tunneling, beyond the estimated average per mile, \$11,078,000. These and other items make a total of \$206,600,000, or an average per mile of \$101,040.

The Central Pacific Railroad Company have received from the United States 42,000 acres of land. This area was granted by a patent prepared at the General Land Office, which is prefaced by a beautiful map of the United States, handsomely colored, exhibiting all the states and territories with great distinctness, as also the line of the Pacific Railroad from the Mississippi to the Pacific Ocean.

The rolling stock owned by the railways of Great Britain and Ireland at the close of the year 1866 comprised 7,414 locomotives, nearly 18,000 passenger carriages, nearly 7,000 other cars attached to passenger trains, more than 220,000 freight cars, making in all more than a quarter of a million carriages, locomotives and cars, the increase for the year being 15,061.

Some of the New York railroads at the last session of the State Legislature succeeded in obtaining an official condemnation of the practice of granting free passes over the roads. These roads are now as anxiously petitioning the same body to repeal the prohibitory enactment. The cause of complaint is not that the principle is not right, but that rival railroads

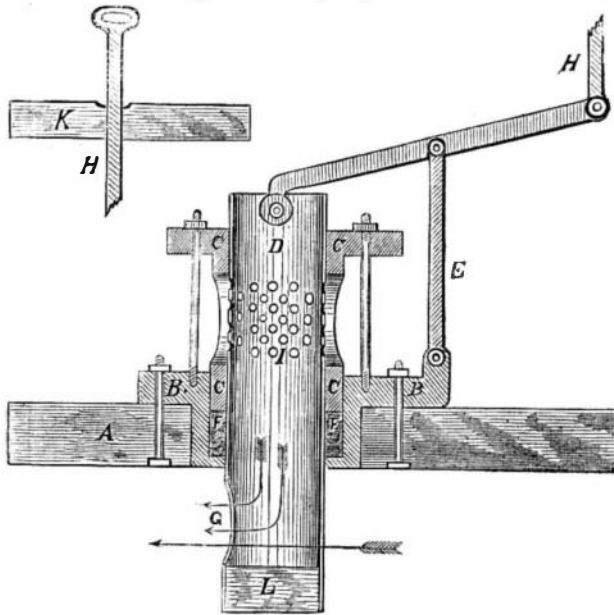
of other states have secured a large increase of business by a liberal distribution of passes among the freight shippers and drovers of the West.

The New York Pneumatic Company, recently organized, are taking the preliminary steps toward uniting this city with Brooklyn and Jersey City. A party of engineers are now engaged in taking soundings in the East and North Rivers, with a view of locating a line for the proposed pneumatic railway. The data obtained so far are said to be highly favorable.

BAGLEY'S PATENT BILGE WATER DISCHARGE.

The annexed engraving represents a sectional view of this new device for discharging water from the holds of vessels of any kind. A represents the bottom planking of a vessel; B is a cast-iron bed plate secured firmly down with bolts; C is a cast-iron gland, with three orifices, firmly secured down on the packing, F. D is a plunger made of gas pipe; E is a fulcrum, and F the packing of rubber; G is an orifice in the lower end of the plunger; H is an iron rod that connects to the lever; I are the orifices in the upper end of the plunger; L is a wooden plug in the lower end of the plunger; K is a sectional portion of the deck.

The operation of this new machine is as follows: A current of water, running past the plunger in the direction of the



straight arrow, forms a vacuum at the orifice, G; consequently a suction is thereby formed through the plunger. The bilge water in the vessel will flow through the orifices in the gland, C, thence through the orifices in the plunger, down in the direction of the bent arrows, and out at the orifice, G. By this means all the bilge water may escape from the vessel. By raising the lever the plunger is forced down; then the machine is in motion. As soon as the bilge water is all discharged, to close it up push the lever down to the deck, K, which will bring the orifice, G, above the packing, F, making it perfectly water-tight and safe.

The working of this invention is all the same whether the vessel is moving through the water, or is stationary and the current is flowing past her.

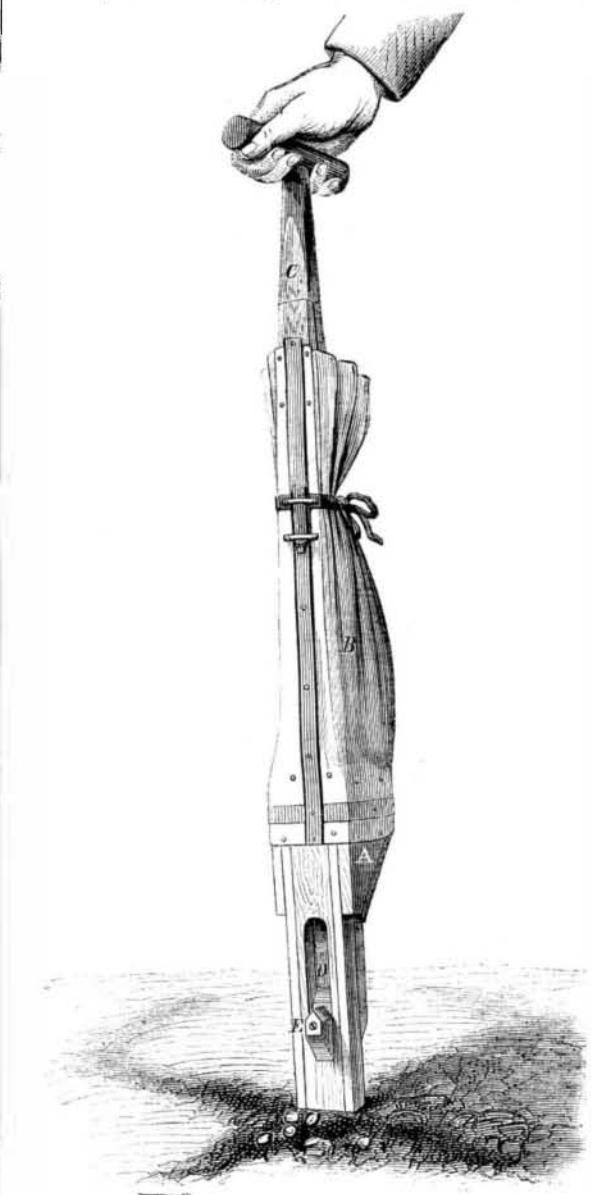
Port rights for sale on reasonable terms by applying to J. M. Bagley, 422½ North Third street, St. Louis, Mo., or M. F. Bagley, Alton, Ill.

A DEEP MINE.—A coal mine at Dunkensfield, Cheshire, England, is 2060 feet deep to the bottom of the shaft, whence an inclined plane is excavated, having a dip of sixty degrees for 1000 yards, at which point the depth below the earth's surface is estimated at more than two thirds of a mile.

MC CONAUGHEY'S PATENT SEED PLANTER.

Placing corn in the hill by dropping it from the hand is a slow, laborious, and often a vexatious process, owing to high winds, which sometimes prevail at corn planting seasons. At such times the corn is blown about and the kernels lodge in improper places, as the seed of the sower in one of the parables, and possibly the mistake is not discovered until the crop appears above the soil, too late to remedy the error.

The simple device herewith illustrated prevents the seed from being dissipated by the wind, and insures its regular dropping in such quantities as the operator may choose. It is a tube of wood made by securing sides to a center piece and having attached a seed reservoir, A, the capacity of which is enlarged by the bag, B. The plunger, C, has recesses cut in it, which take from the reservoir, A, the proper number of kernels as the plunger is raised, and discharge them at D, where they are divided by the beveled center piece, E, and distributed. The operation is understood by the engraving. The apparatus is carried by the handle and the lower end of it placed in the hill, or at the intersection of the cross



furrows. A light pull on the handle discharges the seed as shown. The number of kernels, or the amount of seed, can be regulated by a simple device (not shown), which changes the action of the plunger, so that it can be adapted to different seeds.

The device was patented through the SCIENTIFIC AMERICAN Patent Agency, Dec. 4th, 1866, by Thomas B. McConaughey, of Newark, Del., to whom application should be made for territory in this country, excluding the States of Pennsylvania, Delaware, and Maryland.

MILK AND WATER.—It makes a great difference whether water is given to the cow or to the can. Dr. Dancel, in a communication to the French Academy of Sciences (quoted in the *Nation*), adduces proof that the yield of milk can be considerably increased by giving salt to incite cows to drink large quantities of water, and by moistening their food, with very little if any of the peculiar effect produced by the experiments of milkmen at a later stage of the operation. According to Dancel's observations, when a cow begins to give milk she drinks from eleven to as much as forty-five quarts of water per day, more than before. All cows that drink fifty quarts per day were found to be excellent milkers, yielding nineteen to twenty-three quarts per day. Less than twenty-seven quarts invariably marked a very poor milker. Of course the experiment of artificial stimulation by means of salt was intended only for scientific purposes. The importance of an abundant and convenient supply of pure water at all times, as much as the animal will take, is the practical deduction.

A NEW DELICACY.—The Paris epicures have found that snails possess a flavor superior to frogs. Consequently the trade in the latter has been for some time noticeably decreasing. The new favorites are sent in great numbers from the surrounding country to Paris, Burgundy and Champagne alone supplying 100,000 snails daily. Frenchmen eat horse meat, snails, fried Hottentot and other outlandish dishes with a relish. The French Zouave eats rats, cats and puppies. A French cook can make good soup out of dried sole leather.