

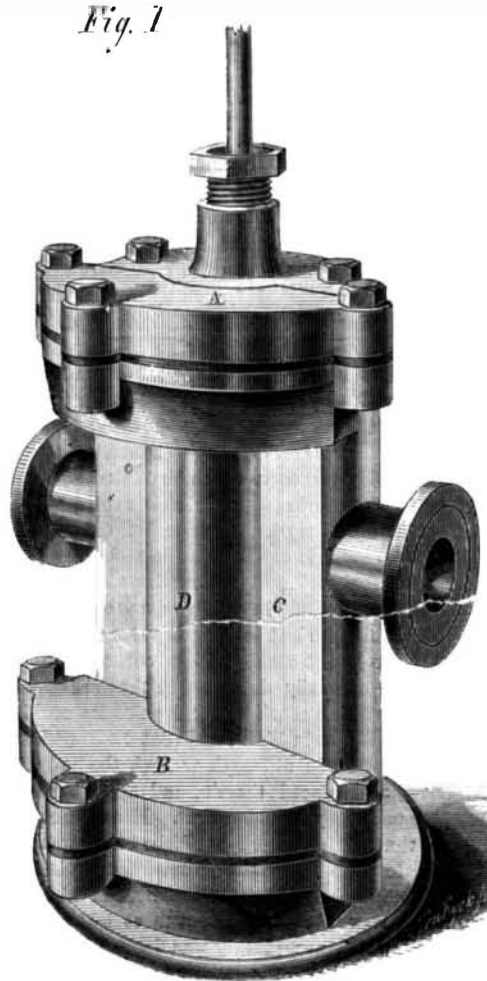
Fire-damp in Collieries.

A beautiful application of that mechanical power which resides on the surface of bodies, and which is especially developed in those having a porous structure, known to us as exosmose and endosmose, has been made by Mr. G. F. Ansell, of her Majesty's Mint. It will be well known to most of our readers that Professor Graham has been engaged for many years in examining all the phenomena connected with the action of porous bodies, organic or inorganic, upon gases or liquids. As the phenomena which Mr. Graham groups under the general term of osmose force may not be familiar to all, a brief explanation may be desirable. If salt and water be placed in a bladder, and this be placed in a vessel containing pure water, the salt will pass out of the bladder into the water. Recently an application of this experiment has been made in Glasgow with much success. In salting meat a large quantity of albuminous fluid flows out of it with the deliquescent salt, and this, a valuable because nutritive portion of the animal matter, is lost. Now, this albuminous brine is placed in a bladder, and this again in a vessel of water; by virtue of osmose force all the salt passes through the animal membrane, and pure albumen, or considerable commercial value, is left behind. If in the place of a membrane of this kind we employ a porous diaphragm of baked clay, of plaster of Paris, or the like, the same action takes place. By this means we may separate bodies from each other which are mechanically mixed, and even in many cases when mechanically combined. Pursuing inquiries of this character, Mr. Ansell has been led to a discovery which promises, above all others, to give us easy methods by which we may determine the presence of carbureted hydrogen in our coal mines, and he has invented a simple apparatus which promises to indicate the accumulation of fire-damp before it becomes and either to give the miner notice of it, or to convey that notice to the surface by its connection with some simple electro-telegraphic arrangement. Mr. Ansell has given two or three forms to his apparatus. The first is that of a thin india-rubber ball, which is filled with ordinary atmospheric air, and is placed on a stand under a lever which slightly presses its upper surface. This lever is connected with a spring, which it liberates when from any cause the lever is raised, and the liberation of the spring sets a bell in vibration. This arrangement being placed in a vessel containing but five per cent of ordinary coal gas exhibits the phenomenon of endosmose with much rapidity. By the passing in of the carbureted hydrogen, the india-rubber ball swells, the lever is of course raised, and the bell is rung. Experiments made with the light carbureted hydrogen gas of the coal mines show that the action is precisely the same in character. This little apparatus, the cost of which will be very trifling, may be placed in any part of a colliery with the certainty of its indicating the presence of fire-damp when yet in small quantities, and before there is any real danger. If the spring of this little instrument be so arranged that it makes or breaks connection with an electrical battery, the signal of accumulating danger may be at once conveyed by wires into the office, or any house on the surface of the colliery, and, either by ringing a bell or moving a magnetic needle, give the necessary warning to the owner or manager. Another form of arrangement assumes the shape of a barometer. A glass tube is bent into the form of a U, and upon one of the arms is fixed either a porous earthenware cell or a slice of graphite. The lower portion of the tube U holds a few inches of mercury. The moment a current of air, mixed with either heavy or light carbureted hydrogen gas, even in small proportions, passes over the graphite diaphragm, or blows against the porous cell, the mercury is depressed in one arm of the tube, and consequently raised in the other. By an arrangement precisely similar to that which is adopted in the wheel barometer, an index may be moved over a dial, and made thus to indicate with accuracy the appearance of dangerous gas in a colliery, and register its accumulation. It is not often that a more refined application of a scientific discovery than this has been made, while the arrangements, which have been patented by the inventor (Mr. G. F. Ansell), are so simple that they may be placed with confidence in the hands of any man to whom a safety lamp would be intrusted. As an unerring indicator

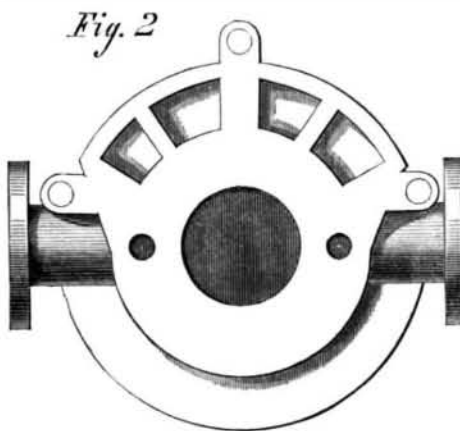
of the presence of the collier's deadly enemy—fire-damp—we cannot but regard this invention as one of the highest value.—*London Engineer.*

SMITH'S LIFT AND FORCE PUMP.

It is well known to mechanics, or other persons using pumps, that they are frequently inoperative from derangement of the valves. It is a simple matter to inspect these when accessible, but very many



manufacturers seem to take special pains to put them in the most inconvenient and difficult positions; as also to fasten the bonnets, covering them with innumerable bolts, so that it is an hour's work to break the joints.



These engravings represent a simple lift and force pump, which is conveniently arranged with regard to its valves. The bonnets, A and B, cover, respectively, the top and bottom suction and discharge valves, and communicate with the channels, C, and the pump barrel, D, in the usual manner. By merely unscrewing three nuts, the valves can be examined at any time, or renewed with facility when worn out. Fig. 2 represents a plan of the valve seats, which are both alike at the top and bottom. A patent is now pending on this invention through the Scientific American Patent Agency, by T. C. Smith; for further information address him at Chicago, Ill.

THE Bergen tunnel, on the Erie Railroad, which has been the scene of so many accidents, is now lighted with a calcium light.

Purification of Petroleum.

In treating for disinfecting and removing the impurities from petroleum and products thereof, it has been usual to employ chloride of lime in a dry state and in combination with other matters, but which, however, is very imperfect in its action and far from obtaining the desired results. According to an invention which has been patented by Mr. B. Azular, of Rotherhithe, the oils are treated with a saturated solution of chloride of lime, and, as it were, washed in the solution. For this purpose the oil is placed in a suitable vat or vessel and the solution poured over it, the solution sinks through the oil, and is drawn up from the bottom, and by a pump or other means is elevated again to the top, and so a circulation of the solution in the oil is kept up, and the impurities thus abstracted from the oil, which is rendered clean and quite free from offensive smell, besides enhancing its lighting properties. If the oil is not very bad the same solution may be used again. If the oil is very bad it may be found necessary to repeat the process with a fresh solution, in that case a second vat is provided, the top of which would reach the oil tap of the first vat; the treated oil is then drawn from the first into the second vat and washed in water. After the oil has been separated from the water, the latter is drawn off and a second solution is then thrown on the oil, and the process proceeds as before. Instead of the solution of chloride of lime being applied at the top and drawn up from the bottom of a vessel, the oil may be forced in at the bottom of a vessel containing the solution of chloride of lime, when it will rise through the solution and may be drawn off at the top, repeating the operation as often as may be necessary according to the quality of the oil operated upon.—*Mechanics' Magazine.*

Death of a Distinguished Naval Officer.

Edwin J. De Haven, a lieutenant in the United States Navy, died at Philadelphia on the 2d inst., in the forty-sixth year of his age. He has been repeatedly noticed for his gallantry and skill, and was also celebrated for his fine scientific attainments. He was attached to the Washington Observatory, and constructed the famous ocean charts for which the rebel Maury received so much credit. He was selected to command the Grinnell Expedition to the North Sea in 1850, and, on his return, was employed in the Survey Department on the Southern coast. In 1857 his eye-sight became so much impaired that he was compelled to retire from active service.

NOTES AND QUERIES.

We are continually in receipt of letters from parties inclosing three cents, accompanied with a request to write them by return mail on the size of boiler flues, where to obtain bolts, and all sorts of miscellaneous information. We are pleased to answer these letters, but not by return mail, and all replies to such correspondence will be found in the "Notes and Queries" column at the back part of each paper.

SPECIAL NOTICE.

GEO. W. OTIS, Lynn, Mass., has petitioned for the extension of a patent granted to him on the 20th day of August, 1851, for an improvement in insulators for lightning rods.

Parties wishing to oppose the above extension must appear and show cause on the 7th day of August next, at 12 o'clock, M., when the petition will be heard.

At the last sitting of the Academy of Sciences, M. M. Engard and Philippon sent in a new hygrometer, formed out of a flat piece of ivory cut out of the tusk perpendicularly of its axis, and then formed into a spiral. The instrument is extremely sensitive, the spiral either being dilated or contracted circularly, but it has not yet been compared with other hygrometers.

In consequence of the increasing difficulties in the tunneling operations at Mont Cenis, it is now computed that the works cannot be completed within the former estimate of ten years, instead of four or five years. Geologists predict that a stratum of granite will sadly interfere with the progress of the work.

Common-sense Political Economy.

We find the following in an exchange. The writer displays rare common sense:—It is very common for agricultural writers to lament the decline of domestic manufacturing, and to advise farmers to raise as great a variety of crops as possible, on the assumption that the nearer a family can come to the production, by their own skill and industry, of all they need, the more prosperous and independent it will be. In reply to an article written for the purpose of recommending a return to the good old customs of our fathers in this respect, we find the following off-hand comments in the *Prairie Farmer*:—As "revolutions never go backward," we like the "bright side" view of the writer.

"Now, when I was a boy, fifty years ago, I went through this mill, and know exactly how it grinds, and from such a farmer's life may the good Lord deliver us. My father had a large family, and I do not think his store bill amounted to twenty-five dollars a year.

"We made our own sugar from the maple grove, we grew our own wool and flax, and it was manufactured in the house. The shoemaker and tailor came twice a year and made our shoes and clothes; the girls did the spinning and weaving, made the straw hats, bonnets, etc. By the most diligent industry of every member of the family, young and old, and the most frugal economy, we made a plain, substantial living, and were coarsely but warmly clad. But by doing so many things, we must necessarily do everything on a small scale, and in consequence had very little to sell, and the end of the year found us with very little if any profit. The wealth of men as well communities depends upon the amount they produce more than they consume, and to do this we must have a division of labor. I want to furnish some man that has machinery driven by water or steam with the raw material, and let him do the manufacturing while I feed him. If farmers turn mechanics manufacturers must of necessity turn farmers. I should be sorry to see the day when farmers were obliged again to use the hand-loom in their domestic economy.

"I can grow a bushel of wheat or a pound of wool much easier than I could make a jack-knife or cambric needle. They are both articles I need, and the man that makes them needs my wheat and wool, and as long as needles and knives are made I have no fear about getting them, provided always that I have the wheat and wool.

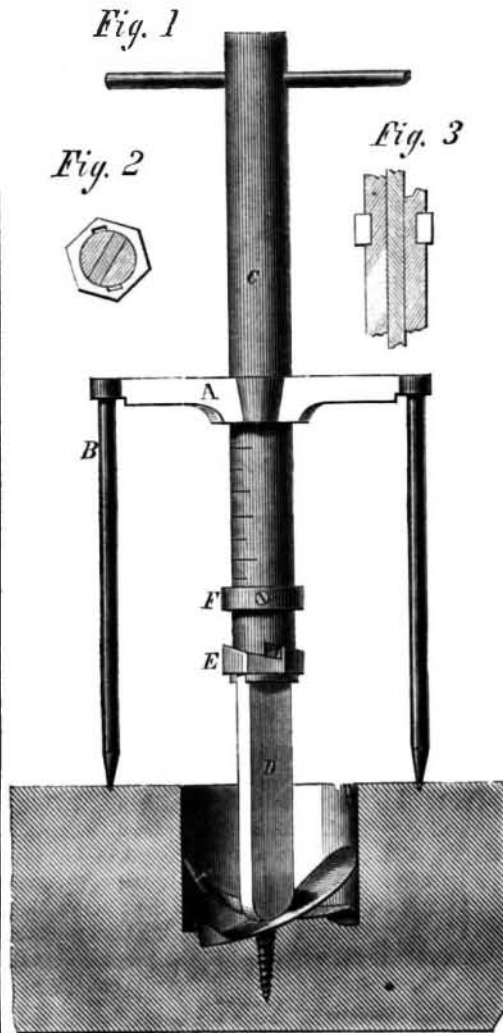
"If the broad prairies of Iowa and Illinois were not calculated for grazing and woolgrowing on a large scale, I cannot understand what they were intended for. If every farmer pursued the course suggested you would have no such city as Chicago, and very little use for your magnificent network of railroads."

GILLETTE'S IMPROVED AUGER.

Boring holes with ordinary augers or bits is not a very satisfactory performance, for after going a certain depth the chips jam in the twists, causing a great deal of labor to overcome the resistance caused thereby, and frequently heating the cutting edges so that the temper is drawn; besides this, time is wasted in raising the tool so as to clear the hole out and complete the work. For want of a guide, also, the operator has no way of determining whether the tool is going straight or not, and holes are often bored untrue from this cause.

The object of the improvements illustrated in this connection, is to provide means for boring holes perfectly true and to relieve the unnecessary friction caused by carrying the chips around. To attain these objects, the inventor provides a guide, consisting of a bar, A, supported by legs, B; this bar carries the shaft, C, in the end of which the bit, D, is fitted. This bit is merely a straight flat bar, notched on one end where it fits in the shank, and armed on the cutting end with blades, which act as the common auger does. On the auger shaft there is a sleeve, E, which has stops, so that it cannot be turned too far. When in the right position, that is, so that the slots in it coincide with one in the auger shaft, Fig. 2, the tool can be inserted, and by turning the sleeve, E, held firmly in place; the top of said bit being held by another sleeve, F. Figure 3 shows the adjustment of

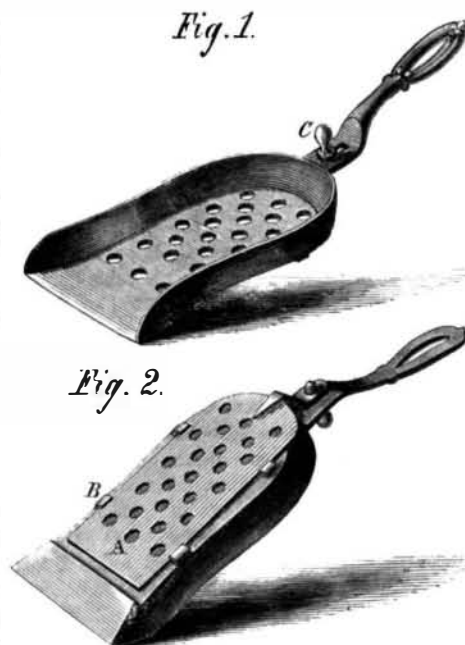
the sleeve on the shaft so that it cannot slip. By making a graduated scale on the auger shaft, a hole can be bored to any depth without removing the auger until the work is done to try the distance. This tool will cut remarkably free, easy and true, and is desirable in framing houses, ship-building, or any



place where similar tools are used. It was patented on March 14, 1865, through the Scientific American Patent Agency, by E. C. Gillette, a resident of San Francisco, Cal. For further information address Henry Lyon, 119 Nassau street, New York.

SCHAAP'S FIRE SHOVEL AND SIFTER.

This utensil is designed to be employed as a shovel or scoop, and, on occasion, to sift ashes to extract the



cinders therefrom, so that they may be again used for fuel. Scoops with perforated bottoms are not new, but the manner of constructing the one here shown is novel and ingenious. With common perforated

scoops, the contents are apt to fall through in the act of carrying them from the stove to the ash box; live coals also drop out, and damage the rug or carpet if they fall upon it. This scoop is made with a sliding bottom, A, which is retained in place by clasps, B; in the handle of the scoop is a slot through which a knob, C, projects, said knob being fastened to the plate below. When this knob is pushed down, as in Fig. 1, the holes in the scoop and plate coincide, so that it may be used as a sifter; but when the plate is reversed the holes are closed and the bottom is solid, allowing nothing to fall through. This invention was patented March 21, 1865, through the Scientific American Patent Agency. The patent is for sale; orders for shovels supplied. For further information address the patentee, Richard Schaap, Jr., 128 Myrtle avenue, Brooklyn, N. Y.

MISCELLANEOUS SUMMARY.

THE HARDENING OF HYDRAULIC CEMENT.—Dr. Feichtinger, in a paper "On Winkler's Theory of the Hardening of Portland Cement," states his opinion that the hardening results from the formation of chemical compound of lime and silica, or lime and a silicate. In all hydraulic limes, he states, free lime is contained. He has already shown that, when Portland cement is made up with a strong solution of carbonate of ammonia, no hardening takes place, even when the excess of ammonia is washed out, in consequence of the lime becoming converted into carbonate; but if some hydrate of lime is added, the cement hardens, as well as fresh cement.

BELL MUSIC FOR PARIS.—The tower of the church of St. Germain L'Auxerrois is about to receive a very perfect chime, consisting of no less than forty bells, which will play twice every day; and the machinery setting them in motion is so arranged that any number of tunes may be played upon them. The well-known mechanic, Collin, has constructed a gas engine, in which the air is condensed to twenty-one atmospheres, and thus sets in motion a number of small cylinders, which act upon the bells, on the musical-box principle. M. Collin is engaged upon a series of experiments in which elasticity forms the motive power.—*Builder.*

OIL TANK WITH A WATER BOTTOM.—A Cincinnati, now in the Venango oil regions, is stated to have become short of barrels to secure the fluid. His ingenuity was set to work, and he immediately put a bottomless tank into the water and directed the stream from his flowing well into it. The lighter quality of the oil kept it above the water, and when the receptacle became filled the enterprising miner cut loose his moorings and floated down the river to the refinery.

THE funeral procession of Abraham Lincoln in the length of its passage, in the number of mourners, in solemnity, depth and extent of grief, surpassed all that had preceded it. The one that came nearest to it in previous history was that of Alexander the Great, whose body was borne on a golden chariot from Babylon in Asia to Alexandria in Egypt.

REDUCTION IN COAL.—The coal trade is unusually depressed, and owners find it impossible to effect sales at present high prices. A large reduction has therefore taken place in wholesale prices, which will or ought to cause a reduction of two dollars a ton to consumers, with a prospect of a further decline soon.

THE Wheeler & Wilson Sewing Machine Co., located at Bridgeport, Conn., turn out a machine every three minutes, or twenty in a working hour! There are nine hundred men employed, and an invested capital of \$1,000,000.

ONE hundred barrels of crude oil will yield from seventy to eighty barrels of refined, according to the skill of the refiner, and the perfection of machinery employed for such work.

THE present rate of wages in the Pennsylvania oil regions is moderate. Drillers and engineers get from \$2 to \$2 50 per day, and board; mechanics get from \$3 to \$5.

THE manufacture of American flags has been commenced in Lowell. Hitherto such flags have been made of foreign bunting.

THE Herald of the 6th inst. says, the Government has reduced its coal orders from 10,000 tons per day to 9,000 tons per week.