LOCOMOTIVE FOR THE MONT CENIS RAILWAY.

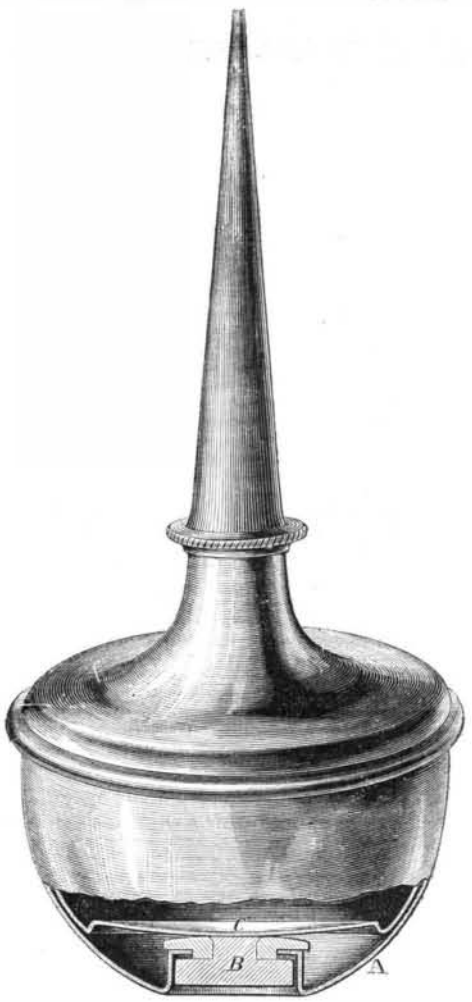
In the line of railway communication between France and Italy there at present exists a break, about forty-eight miles in length, between St. Michel on the French, and Susa on the Italian side of Mont Cenis. Between these towns the entire traffic, both of passengers and merchandise, is now carried on by horse traction, there being a very good road from 30 to 32 feet wide between the two places. The passenger traffic is carried on by diligences, which are bound by contract to perform the journey in nine hours during the summer, and ten and a half during the winter months. The tunnel which is now being made through Mont Cenis is intended, by directly connecting the French and Italian lines, to obviate the necessity for a passage over the mountain; but the difficulties which have to be surmounted before it can be constructed are such that it seems scarcely probably that it can be completed in less than eleven years and a half from the present date. This being the case, it has been proposed by Mr. Fell to carry a line of railway over the mountain, and to form it upon the road already existing. The French Government, when applied to, consented to grant a concession for the construction of that portion of the line which was to be situated within the French dominions, on condition that the practicability of the scheme should be satisfactorily proved; and the Italian Government also promised a concession for the line constructed within their territory, provided that the French should be satisfied with the experiments. In consequence of this, an experimental line has been constructed, 1,960 meters, or about one and one-fourth miles in length, over the most difficult and exposed portion of the road, the site having been chosen by the French Commissioners. It commences at Lanslebourg, at an elevation of 5,322 feet, and terminates near the summit at a hight of 5,815 feet above the sea. The average gradient is therefore about 1 in 13, while the maximum gradient is 1 in 12. On about two-fifths of the length of the line the curves are very sharp, varying from two to five chains' radius; the curve of two chains' radius being necessary to bring the railway round the elbow formed by the junction of the third and fourth "zig-zags" of the present road upon which the line is formed.

The cylinders, of which there are in this engine one pair only, are fixed between the frames under the smoke-box, and are furnished with pistons, the rods of which pass through both back and front cylinder covers. That part of each piston rod which passes through the front cylinder cover is attached in the ordinary way to a crosshead, working between guides fastened to the front cylinder cover and the leading buffer plate. Through the cross head there is a vertical slot, which receives a pin fixed at the end of an arm, which is, in turn, fixed upon one of the rocking shafts already mentioned. The portion of each piston rod which is carried through the back cylinder cover is also attached to a crosshead, but in this instance the guide bar between which the crosshead works are placed on each side of, instead of above and below it. To these crossheads are attached connecting rods, the other ends of which are coupled to cranks placed at the upper ends of the two vertical shafts on which the hind pair of horizontal wheels are fixed. Below these connecting rods, but attached to the same crank pin, are placed coupling rods connecting the cranks just mentioned with others fixed at the upper ends of the vertical axes of the front pair of horizontal wheels. The shafts upon which the hind pair of horizontal wheels are placed, have also fixed upon them pinions gearing into other pinions, turning on pins attached to the underside of a strong stay, carried across the engine between the frames; these two last pinions gear into one another. The horizontal wheels, being driven by the same cylinders as the bearing wheels, are, of course, of the same diameter as the latter, viz., two feet three inches, and they are placed at a distance apart longitudinally of 2 feet 4 inches from center to center. The shafts of the horizontal wheels revolve in bearings carried by sliding frames, of which there are two, one to each of the engines. These frames work between guides fixed to transverse stays between the engine frames, and they are pressed towards the center of the engine by six volute springs bearing on the back of each. The amount of the pressure exerted by these springs is regulated by bars bearing upon them, which bars are capable of adjustment by means of a shaft extending across the engine, and furnished with right and left handed screws. This shaft carries at the end of it a worm wheel, into which gears a worm connected by shafts and bevel gear, with a hand wheel on the foot plate, and the pressure put upon the horizontal wheels can thus be regulated by the driver.

The slide valves are driven by eccentrics fixed upon the leading axle, the eccentric rods being coupled to the lower end of arms or levers working on a shaft, carried across the front of the engine between the cylinder and the large rocking shaft to which the piston rods are connected. The valve spindles are carried through the front end of the steam chest and coupled the upper ends of the arms just mentioned. The boiler is 8 feet 4½ inches long, and 3 feet 2 inches in diameter; it is made with a "flush" fire-box casting, and contains 158 tubes 1½ inches external diameter. The total heating surface of fire box and tubes is 600 square feet, and the fire-grate area is 10 square feet. The boiler is worked at a maximum pressure of 120 pounds. The water is carried in a pair of tanks fixed upon the foot plate, and the engine is furnished with a brake of the ordinary description, acting on the trailing wheels only. The total weight of the engine in working order is about 17 tuns, and its net weight 13 tuns, of which about two tuns 13 cwt. is due to the extra machinery for working the horizontal wheels. The pressure upon the horizontal wheels is, as we have already mentioned, adjustable; during the experiments it amounted to 2½ tuns or ten tuns altogether, but this pressure can be increased if necessary to six tuns on each wheel, making the total pressure 24 tuns. It is found to run very steadily, and to pass round the sharpest curves without any jolting or grinding of the tire flanges, being perfectly guided by the pressure of the horizontal wheels against the center rail.—*Egineeriag.*

BROUGHTON'S OILER.

In cold weather the contents of oil cans congeal so that they cannot be used until thawed out. Of course a stove, if convenient, is the first resort in such an emergency, and the oil cup is immediately placed on it. As a consequence the bottom, which is spun in and soldered, gets leaky, with disagreeable results.



Moreover, as spring-bottom oil cups are usually made, the bottom is often "set" or dished by unnecessary pressure, so that in a short time it is useless for its office.

In this invention, as shown by the engraving, these evils are effectually overcome. The first one, by placing the cup within a false bottom, A, as shown in the broken-out part, and the second by inserting a button or cap, B, in the false bottom, so that it bears on the true bottom, as at C, but is prevented from springing it in too much by coming in contact with a shoulder turned on the false bottom. This cap is flush with the said bottom, and does not interfere with it in any way. It will be seen that, by its rotundity, it tends to preserve an upright form, so that the nozzle is always erect when the can is full; when it is empty it makes no difference how the cup stands.

These improvements add to the durability and efficiency of the utensil. Application for a patent is pending through the Scientific American Patent Agency by John Broughton. For further information address Broughton & Oatman, No. 41 Center street, New York.

EXTENSION OF THE PHOTOGRAPHIC ART.

We have in previous numbers of our paper fully described the simple and beautiful process of Mr. Woodbury, of England, by which photographic pictures may be transferred to metallic plates and then printed—much in the same way that copper-plate engravings are produced.

We have lately had the pleasure of receiving, from the editor of the London *Photographic News*, a specimen of this new art of printing, which, in its details of light and shadow, softness and artistic finish, is all that could be desired.

This new process is exceedingly simple, and there is hardly any limit to its application. It is admirably adapted to book illustrations, and for many purposes will supersede wood and plate engrayings. Natural objects can be photographed and then reproduced upon metallic plates for printing with a fidelity and harmony in the gradation of tints which hand work cannot possibly imitate.

We publish an interesting account of the process, from the *News*, in another column.

The Proposed Channel Ferry

The phrase "London to Paris in ten hours" is on which is familiar to most of us, yet, notwithstanding the well known shortness of the time in which a trip between the two capitals can be performed, there are many people who regard the journey with a certain amount of dread, arising in a great measure from the discomforts attending upon the passage across the Channel. We are sure, therefore, that the proposal for forming a Channel ferry, which is now before Parliament, is one which, if properly carried out, will meet with great public favor. It is intended that the steamers forming the ferry shall be one-third longer than those now running between Holyhead and Kingstown; that they shall be roofed over, and the trains—coming, say, from London—shall be run bodily on to their decks, carried across the Channel, and transhipped to the French lines on the other side. The new boats are, under ordinary circumstances, to perform the passage in one hour, during which time the passengers may either remain in the carriages or avail themselves of the waiting and refreshment rooms with which the steamers will be furnished, The Custom House officers can also examine the luggage during the passage; and it is expected that the whole journey from London to Paris can thus be performed in eight hours. Owing to the great size of the steamers, it is expected that little inconvenience will be caused by the short chopping seas of the Channel. It is expected that the ferry may be brought into operation in two years' time.—*Mechanics' Magazine.*

THE Yorkshire Locomotive Works, England, are announced as capable of building 400 locomotives per annum, or over one a day.

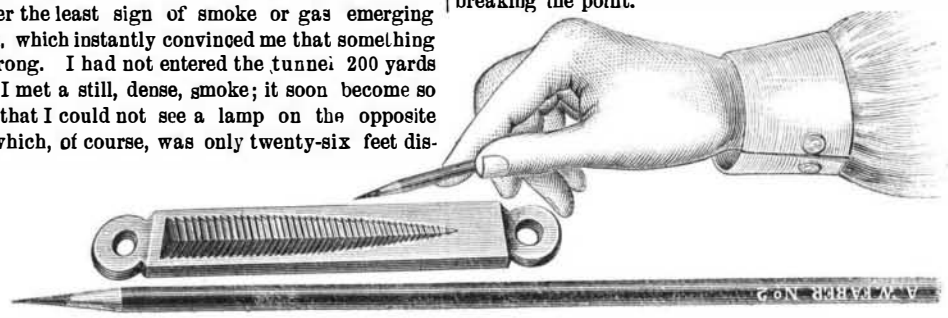
Mont Cenis Tunnel.

In a communication from Pico Mulera, Italy, dated Jan. 4th, Mr. H. Hoskings writes to the London *Journal*: "The mortality among the workmen employed in the Mont Cenis Tunnel is so great, in consequence of powder smoke and bad ventilation, that they have refused to work any more. The work is now at a stand still;" and the statement is especially interesting, from the precise manner in which it confirms the opinion expressed in the *Mining Journal* of Jan. 2, 1864, by our esteemed correspondent Mr. Nicolas Ennor, in the account of his visit to the tunnel. He then stated—"I next turn to the air department. The moment I came to the tunnel I looked to its mouth, and to my suprise I could not discover the least sign of smoke or gas emerging from it, which instantly convinced me that something was wrong. I had not entered the tunnel 200 yards before I met a still, dense, smoke; it soon become so dense that I could not see a lamp on the opposite side, which, of course, was only twenty-six feet distant. The horses and wagons passed but I could not see them. This continued up to within 100 yards of the end, where a light could be seen for twenty yards. Here air was liberated sufficiently to support the men with the machine, but as it passed back, where the sidemen were at work, it was all devoured by the men and lamps. I took the mallet to strike the man's borer, to say I had helped to drive the tunnel, but I could not see the head of it; so I threw down the mallet and took a pick and worked out a little. I now leave it for practical men to say what they think of working in such a place as this, and they are now in only three-quarters of a mile, and have nearly three miles more to drive. I was in about an hour, and when I came out I spit as black as though I had dined on lampblack—so did the gentlemen who accompanied me. I think I have had over 55 years' actual mine practice, and I have come to the conclusion that this work will never be accomplished without other means than the present be adopted. I am satisfied that there is nothing deserving or eulogizing to the French or Italian engineering for what is doing to carry out this undertaking, notwithstanding that they have an abundance of water-power at command, and machinery that, I should judge from a momentary glance, cost £40,000. I will not, however, stop here to describe the machinery already erected." Mr. Ennor contended that there was not a quarter air enough, and a man without that would decline and die; but beyond this he proposed a remedy. He said that there is water-power sufficient in the valley to drive in a 3-foot tube full of compressed air; this would drive out all the smoke and contaminated air, or, if exhausted, by this tube bringing out the foul air, and let the fresh supply go in through the tunnel. The same machinery could be tried each way, to prove which is the most effective. The work could not go on well till there was an effective circulating current in and out. He next suggested as a second means to bring a large tube down from the mountain top, and carry it into the tunnel end. This would produce a rapid current, or, if this be found sufficient, put a furnace to it, as used in coal mines. Air in that situation can be carried, he said, to an unlimited extent. The first thing to be looked after is to have a circulating current of air—this attained, the tunnel would go through, but not otherwise.

A Terrible disease is raging in some parts of Germany. An insect called *trichina* infests pork, and eaters of this flesh uncooked, or only partially cooked, take it into the system, where it speedily causes death. The sufferings of the patients are most horrible. But one case is known to have occurred in this country—that of a young lady at Detroit—but several instances where parties have been supposed poisoned by eating ham were from this insect. Avoid raw or half-raw pork, such as Bologna sausage.

SHAVER'S PATENT PENCIL SHARPENER.

The accompanying engraving represents a convenient, durable, and desirable pencil pointer, just introduced into the market. It is made from the best cast steel, hardened, tempered, and finely polished. The file groove is finely cut at its small end for pointing lead pencils after the wood has been cut away, or more particularly adapted to pointing the leads of any of the well-known extension or propelling pencils, which do not require the cutting away of the wood, but can be easily adjusted and brought up to any kind of a point to suit the user. The wide end of the groove is coarser cut, which is intended for sharpening slate pencils, which it does quickly and without breaking the point.



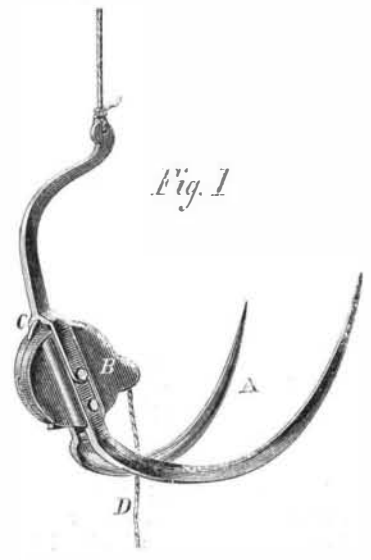
This pencil sharpener is adapted for the counting-room, artist's studio, and is especially useful in the school room, as it will relieve the teacher from that oft-repeated request, "Please sharpen my pencil."

We are informed that this article is already in the hands of the largest wholesale and jobbing stationers of New York and other large cities, and, no doubt, will soon find its way into banks, insurance, and other offices, academies, and schools throughout the United States. They are sold at 25 cents each; a liberal discount to the trade.

This invention is covered by patents in this country and in England and France. For further particulars address the inventor, A. G. Shaver, New Haven, Conn.

REYNOLDS'S HAY FORK.

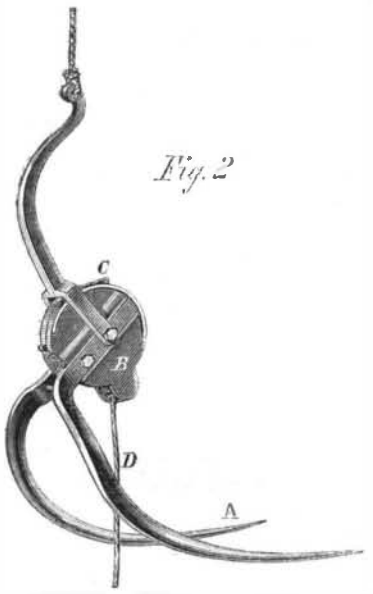
This fork is one that has lately been introduced at the West, where it is said to have proved satisfactory in its operation and otherwise become popular. In



construction it is quite simple, having two tines, A, connected to a circular shank, B, which contains the tripping apparatus to discharge the load. This is simply a latch, C, so arranged that, by pulling a line, D, the latch is released and the load discharged—the parts reconnecting themselves again in the act of reloading the fork.

This implement is made of iron and has only two tines, but these are found quite as efficient as any greater number. The fork can be used for stacking as well as for loading, and the inventor sends directions to do this work in his circulars. The weight of the fork is twenty-five pounds, and it is sold very low. Many certificates of its utility have been shown us, but we cannot publish them here. The proprietor wishes to sell rights.

It was patented through the Scientific American Patent Agency on October 18, 1864. For further information address the patentee, E. Reynolds, Hartwellville, Mich.



Extraordinary Discoveries of Oil.

The Pithole region, where oil has been found in large quantities, has lately been the scene of extraordinary excitement. The *Record*, published at that place, says:—

The whole ground seems saturated with oil. One man dug a hole in the ground about a foot deep, and in a few minutes got a pailful of oil for his trouble. The ground is now being riddled with shallow holes in which large quantities of oil ooze up, and the scene forcibly reminds us of gold digging.

At one of the springs belonging to the Buffalo House the proprietor had gathered four barrels of oil with a tin dipper, and there are many others who have been equally fortunate.

Oil was found in a great many cellars yesterday. Mr. Bernand Morahan filled a large washtub with oil from his water pipe; a number of others have done the same.

A well belonging to the Confer Hotel (late Hubbs's House) has been found to have oil on it; another oil spring has been found in the rear of Fifth street, so that we may presume that every man will be able to dig his own oil before long.

Many ludicrous incidents are narrated of the manner in which some of them took their sudden accession of fortune.

Yesterday morning, men, women and boys could be seen with tin pails, wooden pails, teakettles, etc., in their hands, vainly searching for pure water. Oil might buy coffee and tea, but not make it, so that urchins who had to be water-carriers appeared to think there might be too much of a good thing, even if it is oil! Nor are they alone in their grief, for a cow walked up to her accustomed watering place smelt the oil, and evidently thought petroleum would make butter taste bad.

At the first discovery of the wells the excitement began to increase, and a man who has heard of the various fractions used in the oil trade, offered to pump all day for one-thirty-seventh of the oil; others were more selfish, for they would pump all the time but wanted half the oil, and were willing to take the washerwoman into the bargain.

An Irishman, who had a small spring, was highly elated at the turn fortune was taking. Said he, "Yesterday, I wasn't worth a cint, and, be jabers, to-day I'm worth thousands upon thousands."

Gas Purification.—Experimemts are being now made at the Crystal Palace District, and other gas-works, to test the practical value of a recent discovery by Dr. Letheby, who, besides his many other engagements, is now consulting engineer to several gas companies. He had found that the waste material of the soda manufacture, and known as "soda waste," is unexpectedly effective in absorbing the sulphur compounds in crude coal gas, and especially the obstinate bisulphide of carbon. The soda waste is employed in the purifiers in layers, as much as oxide of iron is now generally employed to arrest the sulphureted hydrogen,