

"What! Good—in this cage? Do you mean to say we are boxed up in this hole with—?"

"Yes," returning his tin cylinder to the pail, and replacing the tin cover, "that is nitro-glycerin—one of twenty cartridges we are about to use in blasting."

I reflected; here I was, in a box four feet by three feet, no escape from a pail containing enough nitro-glycerin to send us up that shaft, and into eternity for the matter of that, and I had been confounding the "perilous stuff" with hot coffee. There was no help for it now, and as the heavy beat of the steam pumps and warm temperature rendered conversation difficult, I certainly felt as if I had put my foot into it, or something like it.

But we are at the bottom of the shaft.

"Stand clear there, glycerin!"

"All right, sir."

"Where's our car?"

"Here, ready; can I help you?"

"Only by keeping clear with your flaring lamps; push on."

And now, impelled by a brakeman, our car is rapidly driven to a small caboose, or cupboard, some three hundred yards from the shaft, the trip relieved by an inquiry:

"How is it the water's so high?"

"A pump gave out last night; water's been gaining since; the machinist will soon fix it."

My companion now unlocked the door of this little caboose on the left side of the tunnel, examined briefly the signal apparatus, an electric magnet and gong, then the switch or brake, which turns off the current from the wires leading to the heading, and assures himself that whilst charging the drill-holes, no electric spark can pass over the wires by any tampering with the instrument above ground; this done, he resumed the pails, and we now rapidly pushed on to the heading, about one hundred yards distant, the way enlivened by a gushing stream of water; ascending the two benches of rock, we now came upon twelve miners, each with his candle, and the foreman busy examining the finished drill-holes.

"Mr. Gregory, will you send your men back?"

"Hands back from the heading! Glycerin, lads! Pick up your tools; hurry up there, and mind you don't run foul of this man!"

"Where are your holes?"

"Here they are, good and strong."

Eighteen holes are now counted, their diameter and depth gaged; these are found to vary from twenty-six to thirty-two inches in depth, and at various angles, and in various directions from the face, each of them being capable of receiving a cartridge eleven inches long, and one and one-fourth in diameter.

"You need not stay, foreman."

"I see no fear; I'll just help a bit. Don't mind me; I see glycerin afore."

Carefully and deliberately a cartridge is removed from the pail; an insulated wire, with priming, exploder, and cork attached thereto, closes the open mouth of the tin cartridge; and still more carefully the cartridge, with its mischievous little wire and fulminating exploder, is now passed into the drill-hole, and pressed down to the extreme end, leaving the wire pendant therefrom like a rat's tail; when this performance has taken place in eighteen holes, a count is made—eighteen.

Now the conducting main wire is brought forward and attached to one of these pendant wires, which, by the way, on close examination, consists of two wires, when attached to one of these, the other is carried to one of the double wires of the next hole, until each of the eighteen holes is linked with the one next to it, and that to the next, forming a series of links, the first connected with the conducting, the latter with the return wire.

Then two wires, when the switch or break is suitably disposed, connect the cartridges in the holes with the electrical machine, 1,500 feet distant above ground, in the timekeeper's office.

Now, bear in mind, there is a break, one-tenth of an inch from each other, of the points of the wires in each hole, and this break is armed with a sensitive priming, so that the electric spark, as it leaps from one wire to the other, ignites it; this fires a fulminate, and the explosion of this fulminate explodes the nitro-glycerin, and the nitro-glycerin plays the— with the stubborn, tough, solid rock.

But my mining friend is scrutinizing every connection, and now he counts every hole; none have been missed.

"All back!"

We now turn our backs (with a very satisfactory shrug on my part) on the masses of rock, burrowed with the eighteen drill-holes, each charged with sufficient nitro-glycerin to hurl it into fragments, aye, from the very bottom of these holes, and to send a blast of liberated gases that will hurl a puff of steam and air out of the shaft, 1,500 feet distant.

That pail, I perceive, our companion carries with him. We descend the first bench; at the second he deposits his pail, and we all hurry back to the caboose, where the miner's lights, like the *ignes fatui* seem right welcome.

But where is there a recess, a safe recess, where I may avoid the consequences of my curiosity? Narrowly watching the miners, I am aroused by the inquiry, sharp and quick in tone:

"All back away from the heading?"

"All back."

"Look out for yourselves!"

And then our sober, decided friend enters the caboose; the door is locked; the miners converse; I endeavor to secure a position by which a good number of miners are between me and that heading, and sit me down on an iron pipe, which, Mr. Gregory informs me, is to supply air to the machine drills.

"Look out, now!"

Instantly, I notice the miners carry their hands to their ears; instinctively I follow suit; the hum of conversation has ceased; a dead silence succeeds; the pulsation of the steam

pump throbs; the breath comes quick;—oh, this suspense—a singular exaltation of excitement thrills through one.

"Boom—oom—oom!"

A rush of air—my hat has gone with it; pitch dark, for every light and lantern is extinguished.

"Who's got a match?—no one, I bet."

"Yes; here's one."

"A heavy blast, that; she got it that time."

And now the foreman, our companion, and myself, make for the heading; the miners are told to keep back.

We return to where the ingenious arrangement of wires, aided by the electric machine, above ground, has effected this discharge.

As we approach within fifty feet of the heading, a warm, sweetish vapor is looming up; still on, on, on: here is a mass of rock; move carefully, there may have been a cartridge thrown out unexploded, laying at your feet. If so, don't trample on it, that's all.

Scrambling over the masses of torn broken rock, the heading is at last reached—ragged, indented, a scarred witness of the tremendous power of nitro-glycerin.

After carefully noting that each and every hole has been blown out, we return towards the miners. At the second bench, our friend picks up his pail, and assures himself of the safety of the two remaining cartridges.

We soon come to the miners; the word is passed, all safe; another foreman takes in his gang for another eighteen holes, to be drilled in eight hours, the time allotted for each shaft, and pushed back to the shaft, the truck running into the cage.

Signal being given, we commence our ascent—or, better described, now the shaft rushes down, down, down past us.

Daylight once again, and the pleasant warmth of the tunnel is exchanged for the keen north wind, and 6 deg. below zero temperature. We follow the man with the pails, over the drifting snow, to a shanty, where a good breakfast, and a hot and glowing fire, await him.

"Breakfast ready, Hoecake?"

"All ready. Blast go off all right, sah?"

"Made two feet heading—hurry up that coffee."

"What do you think of blasting, Mr.—?"

"Well, I think it gives a fellow a sort of a kind of—new sensation, decidedly."

DANGERS OF THE USE OF THE LIGHTER PRODUCTS OF PETROLEUM.

Two disastrous accidents occurring from the explosion of the lighter products of the distillation of petroleum, one in Ohio and another in Pennsylvania, may be considered as warnings to those who use or deal with these highly inflammable substances. The first was in East Cleveland, Ohio, where the escaping gas from a reservoir of gasoline destroyed a handsome dwelling and seriously injured several of the inmates. The building was lighted by an independent gas apparatus, the reservoir of the liquid gasoline being at some distance from the house, the vapor being conducted to and through the dwelling by pipes in the ordinary manner, as is the common gas. Steam was used to heat the gas generator in excessively cold weather; but the gas pipes in the building had been leaking for some time, and the flame of a candle ignited the free gas in the basement, producing an explosion that nearly destroyed the building, the fire thus engendered finishing the work. Several of the inmates were severely injured.

The other case we notice occurred at Miller's Farm, just below Titusville, Pa., where a tank of benzine exploded; two men being burned to death and the distillery, or refinery in which the tank was located, destroyed.

The terms "gasoline," "benzine," "benzole," and "naphtha" are generally used indiscriminately to denote the more volatile portions of natural earth oil, or petroleum, released during the process of distillation or refining. Chemists use these terms in a more restricted or exact sense; but these products are so little removed from a gaseous state that they continually and spontaneously give off inflammable and explosive vapors at comparatively low temperatures, which require but a spark or a flame to instantly ignite, when the result is similar to the explosion of gunpowder.

REFORMS NEEDED IN THE CONSTRUCTION OF SOME ARTICLES IN COMMON USE.

The age in which utilitarianism took precedence of everything else has passed. It is no longer enough that an article designed for common use shall simply be useful, a cultivated taste requires that it shall also be beautiful. This is right; and if our designers would content themselves with the proper combination of usefulness with beauty of form, there would be no need to criticize their work. The truth is, however, that in aiming to render their work as fair to the eye as possible they forget in many cases the claims of utility.

Household furniture and table and cooking utensils, are particularly open to criticism on this score. We set ourselves to season our food from a graceful pepper-box having so narrow a neck that the finely-pulverized condiment clogs the passage, and free delivery of the pepper is impeded, while delivery of pungent expletives against the petty cause of our annoyance becomes altogether too free. Tell us also, ye artisans who invent those marvelous instruments of torture called chairs, why we should not revenge our aching backs, and affections of the spine, by wishing your handiwork at the bottom of the ocean. Beautiful to look upon are your carvings and your upholstery, but to sit upon most wearisome. True, you sometimes give us a luxurious arm chair, with angles properly inclined, and soft luxurious cushions that lap us as comfortably as a mother her child. That shows what you can do when you take into consideration the proper use of a chair. But those cushioned inclined planes, with backs for ornament not

for use, since if you lean back against them you must exert yourself to keep from sliding off the seat upon the carpet, why condemn us to these persecutors and destroyers of vertebral columns? Why put casters on delusive footstools that no sooner feel the weight of your weary limbs than they commence a struggle to run off and shirk their duty? Why make our writing desks and tables so high that in order to avoid that lancinating torment under our right shoulder blade, we must amputate their legs and thus secure comfort for ourselves by a sacrifice of the comeliness of your handiwork, for whose graceful proportions you have made us pay liberally in dollars and cents, as well as in patience, while we yet hesitated to mutilate them?

But it is not alone of household furniture or utensils that we find reason to complain. The same criticism can be made upon nearly all the articles which we most commonly use. Is it not possible to combine utility with beauty in the construction of such articles? We answer, yes. But if it were not possible, we for our part, would pronounce in favor of comfort minus beauty rather than beauty minus comfort.

The New Orleans Elevator.

Large elevators seem to be coming more and more into use throughout the country. The rapidity with which these are being erected at different points is a demonstration of the great value and convenience to the grain dealers. A new one, of very large proportions, has just been completed at New Orleans, a description of which we extract from the *New Orleans Crescent*:

The storage capacity of elevator, which is situated 240 feet from edge of wharf and across the street and sidewalk, is 750,000 bushels; built after the style and material of Chicago, Milwaukee, and St. Louis elevators. The marine elevator at edge of wharf is 102 feet high—will take grain out of the largest or smallest vessel in high or low water at the rate of 6,000 bushels per hour. The grain is carried into elevator 240 feet through the conveyor building over wharf and street, so the handling and exposure to the air are equal to ordinary drying machines.

The drying machine is built in a fire-proof house attached, and the drying is done through tiles rapidly at the rate of 2,000 bushels per hour, and all by machinery, and so constructed and done there is no risk from fire, and at the trifling expense above.

The warehouse has a storage capacity of 60,000 barrels, which covers the whole wharf, 2,000 by 275 feet, one story, covered with plastic slate roof and sides, and doors of iron. Two large iron tanks of water of 200 barrels capacity stand on top of the elevator, kept constantly full by a force pump, with iron pipes which run down through each story of the building, arranged so hose can be attached in each story, and carry water anywhere in elevator or warehouse or boat or wharf.

Editorial Summary.

THE managers of the Erie Railway Company have introduced a reform worthy of imitation by other roads. It is that of advertising for proposals for supplies, instead of buying them, as is too often the case, from some director or favored official, at his own price. The Erie Company invite all the manufacturers of spikes, chairs, nails, car springs, car axles, locks, and other hardware, and dealers in lumber, to come forward and name the terms at which they will furnish the articles wanted.

INK.—W. R. Shelmore, of Philadelphia, writes us that he has succeeded in making a good copying ink from common violet writing ink, by the addition of 6 parts of glycerin to 8 parts of the ink. Using only 5 parts of glycerin to 8 of the ink, he has found the ink to copy well fifteen minutes after it has been used. He says with fine white copying paper the ink will copy well without the use of a press.

ACCORDING to the *Mechanics' Magazine*, a patent has been taken out in France for making crucibles from magnesia, which forms the best materials for crucibles to melt platinum, iron, or steel in. They are molded by pressure, and are then exposed to the heat of an oxyhydrogen flame, by which they are brought to a semi-pasty condition, when the magnesia acquires its greatest density, cohesion, and hardness.

DAMAGES RECOVERED AGAINST A BROOKLYN DRUGGIST.—Damages amounting to five thousand dollars were recently recovered from a South Brooklyn druggist, for having sent in October 1867, to a patient, an over dose of morphine which caused her death. Our recent article on "Poisonous Drugs and Cosmetics," was written before this judgement was rendered.

AN expedition has started from Germany to visit Egypt, for the purpose of making a collection of photographic views of ancient inscriptions and monuments. An attempt has been made to photograph subterranean chambers at Memphis, by the use of the magnesium light.

THE American Institute proposes to test the merits of the various petroleum burners, those who desire to find out the relative merits of their inventions can address John W. Chambers, care of the Institute, New York.

EMPLOYERS in any business would subserve their own interests by so closely observing the behavior of their help as to note their attempts to do their duty, rather than to watch for every infraction of rules.

AMOUNT of material used is no proper estimate of the product. The watch spring is more costly than the spike. Labor costs, generally, more than material; brains, than iron.

IN using the grindstone it is more important to sharpen the tool than to raze the stone. It does not require a hundred pounds pressure to the square inch to grind an ax.