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Contents:

(Illustrated articles are marked with an asterisk.)

AN INVENTION WANTED TO CLEAN THE STREETS OF SNOW. SOLUTION OF THE PROBLEM TO BE FOUND IN STEAM.

The municipal government of the city of New York pays, we understand, fifty cents per load of twenty-seven cubic feet for carting away the snow from the streets. During the last few days, heavy snow storms have visited the city, and the bill for street cleaning will amount to a large sum. Besides, the method is a very slow one, and the carts employed increase the blockade of vehicles which any obstruction to travel is sure to cause in our crowded thoroughfares.

On the principal horse railway lines the companies labor, at great expense, and with terrible exactions upon their over-worked horses, to maintain their roads in a barely passable condition. As fast as their snowplows throw the slush to the sides of the tracks, it is thrown back again by the constantly plying carts, omnibusses, and other vehicles, and the work has to be repeated over and over again, until such time as sun and south wind shall diminish the volume of impeding snow so much as to render the snowplows superfluous. During the thaws the water runs to the center of the streets (the gutters being obstructed by snow and ice) and, freezing, renders the services of an army of men necessary to clean out, with ice picks and shovels, the obstructed tramways.

In reflecting upon ways and means whereby all this trouble and expense—or at least a great portion of it—might be saved, we have come to the conclusion that steam offers a complete solution of the problem. We shall explain the general principles upon which we base this belief, leaving it for inventors to devise means for their practical application.

Various authorities give as the weight of a cubic foot of snow one eighth to one fourth that of a cubic foot of water. In other words, a cubic foot of snow, melted, will make from one eighth to one quarter its bulk of water. We consider this a large estimate, but, admitting its truth, a fair average of light and heavy snow would give three sixteenths of a cubic foot of water for every cubic foot of snow melted, or 11·72 pounds of water.

To change a pound of ice or snow at 32° Fah., to water at 32° requires an expenditure of 142·4 heat units. To change a cubic foot of snow at 32° Fah. (weight 11·72 pounds) to water at 32° Fah. will require 1668·93 heat units. But as the average temperature of the snow is less than 32° Fah.—say probably about 20°—an addition of 6·1 heat units must be added for each pound melted, or 71·5 heat units for each cubic foot of snow, making the total 1740·43 heat units required to melt a cubic foot of snow at 20° into water at 32°. Probably, also, to secure the fluidity of the water until it could run off into the sewers, the temperature would need to be raised to 40° by the addition of 8 heat units more per pound melted, or 94 heat units per cubic foot of snow, making a total of 1834·43 heat units for every cubic foot of snow run off.

Steam at 212° contains 1178 heat units per pound. A pound of steam condensed to water at 40° would therefore give off 1138 heat units, and it would take 1·6 pounds of steam to melt a cubic foot of snow.

The cost of removing the snow by carting is, at present rates, a trifle over 1·85 cents per cubic foot.

A cubic foot of water is, in good steam boilers, converted into steam at 212° by the consumption of ten pounds of coal. Some boilers will do much better than this, and some do worse, but we wish to be within bounds in our calculations. Supposing the cost of the coal to be $6 per tun, the cost of fuel to evaporate a cubic foot of water is 3 cents, but the 62·5 pounds of steam at 212°, thus produced, would, according to our preceding calculations, melt and run off 39 cubic feet of snow, at a cost of .077 of a cent per cubic foot, as against 1·85 cents per cubic foot now paid. The cost of attendance and working of the boiler would, of course, have to be added to the cost of fuel in making a complete comparison of steam with the present system of carting, which would diminish the margin somewhat, but the latter will stand a large percentage of diminution, and still show an enormous saving.

The rapidity with which steam melts snow is only appreciated by those who have tried it. Let any one who is skeptical run a rubber hose from a boiler, and let a jet of steam escape directly into the heart of a huge snow bank, and he will be astonished at the rapid collapse of the drift. Whether it would be better to use hose from boilers in the manner indicated, or in other ways that suggest themselves, we leave to inventors, not doubting that the hints given in this article will open their eyes to a new and profitable field of invention.

The use of steam would get rid of the obstruction at once and permanently; an important consideration to horse-railroad companies, and one they would not be slow to see, should some ingenious engineer put these ideas into a practical form.

THE ADULTERATION OF PETROLEUM.

The systematic adulteration of petroleum is a constantly increasing evil, and one that demands immediate reform. It is high time that the attention of the police, of the fire department, and of the press, was concentrated upon the discovery of a full and speedy remedy. The enormous manufacture of naphtha as an incidental product, for which there is little demand, offers a great temptation to dealers in petroleum to increase their profits by the admixture of the dangerous ether; and the lax state of our laws, and the carelessness of the insurance patrol, tend to perpetuate an evil that ought not to be tolerated for a moment in any well regulated and civilized community.

What can be done to prevent the dangerous adulteration of refined petroleum, is a question of the utmost importance to all who burn it as an illuminating material.

Unfortunately, most of the regulations adopted by the police, or by the legislature, have thrown impediments in the way of trade, without producing any good results. The authorities are in the habit of representing petroleum as a highly inflammable and dangerous substance, when in fact, the refined article, free from naphtha, is scarcely more dangerous than sperm oil. The storage of large quantities of petroleum in the business portions of cities, has been prohibited under severe penalties, and these regulations have been prepared as if petroleum were gunpowder. The idea seems to prevail that the refined article is just as explosive as the crude, while it is really less inflammable than alcohol, about the storage of which no such stringent rules are laid. Alcohol takes fire the moment a burning match is applied to it; properly refined petroleum does not ignite, does not flash, as it is called, until it has been heated up to 100° or 110° Fah. Alcohol more readily evolves combustible vapors; well refined petroleum forms neither gases nor vapors, and evaporates, even when exposed in shallow vessels, very slowly, and in the summer does not occasion the formation of explosive gas mixtures; in fact, it is not nearly so dangerous as we are in the habit of suspecting. Throwing obstacles in the way of its sale does not appear to be the best measure to prevent accidents. If the authorities, in the interest of the public, are willing to take the matter in hand, it will not be difficult to suggest a remedy. It will only be necessary to make a distinction between a safe and a dangerous petroleum, and to publish a single test, by the use of which, this point can be easily settled. The taking of the specific gravity is worthless, because the adulteration by the lighter naphtha can be disguised by the addition of a heavy oil. The color and odor are also not to be relied upon. The only reliable test is the temperature of the flashing point; that is, the temperature at which the petroleum takes fire when a burning match is applied to its surface. The test can be easily applied. Into a flat dish or saucer, pour the oil to be tried, until it is at least half an inch deep; then hold a burning match or taper near the surface. At the point of contact the combustion is often very lively, as the taper draws up some of the liquid, but if the petroleum be safe and free from naphtha, the flame does not spread over the surface. If the petroleum have been adulterated, as soon as the match touches the surface a blue lambent flame flashes across it, and in a few moments the body of the oil will be on fire. Such an oil is dangerous—liable to explode in lamps, and to give off inflammable vapors at all times. Any oil which takes fire when a match is held near its surface, and continues to burn, ought te be condemned at once and thrown into the streets. We lay some stress upon this experiment, because we have actually seen a country merchant pour petroleum into a saucer and ignite it in this way as a proof that it was not dangerous.

There is no doubt whatsoever, that all of the accidents can be traced to adulterated and worthless petroleum. The pure article never explodes in lamps, even when they are filled at night, with a candle by their side; but it is never safe to try this experiment, as we cannot rely upon the quality of the oil we buy. The sale of petroleum containing naphtha ought to be stopped at all hazard, and if a police officer were detailed to walk up and down before the store to warn all customers of danger, and the names of the iniquitous tradesmen were to be publicly posted, and heavy fines were to be imposed, the great loss of life and property that has been occasioned by this nefarious business would justify the severity of the measures adopted to repress the evil. We need some stringent laws on the subject, and after they are passed, let them be enforced without fear or favor.

"AND THERE WERE GIANTS IN THOSE DAYS."---THE LARGEST INVENTOR YET---A MOST REMARKABLE FAMILY OF GIGANTIC TURKS.

On Friday, January 27, the floor of our office trembled under the tread of the largest client that ever pressed its boards since Munn & Co. commenced business. Seating himself at our desk, on a chair (as much out of proportion to his bulk as an ordinary baby's chair would be to a common-sized man) this huge individual explained to us the nature of an invention for which he was desirous to secure a patent. Having transacted his business, and created a very unusual sensation among the numerous attachés of the office, he rose to depart. On his way out, our associate editor adroitly approached him, and succeeded in gaining from him the following statement, the publication of which, in our sober columns, will, we are sure, minister to that love of the marvelous, a trace of which always remains, even in the most philosophic bosom.

The name of the individual referred to is Colonel Ruth Goshen, and he resides at present in Algonquin, Ill. He is a native of Turkey in Asia, and was born among the hills of Palestine. He is the fifteenth, and last child (the baby) of a family of fifteen—ten sons and five daughters—sired by a patriarch now 90 years old, living in the valley of Damascus, and by occupation a coffee planter. This venerable sire weighs, at the present time, 520 pounds avoirdupois, and his wife, aged 67, weighs 560 pounds.

The entire family are living, and not one of them weighs less than 500 pounds. The oldest son weighs 630 pounds, and the youngest, our huge client, outstripping them all, weighs 650 pounds. Not one of the family is less than 7 feet in hight, and the Colonel is a stripling of only 7 feet 8 inches in his stockings. He is not an unduly fat man, is merely what would be called moderately portly, and is 33 years old.

He was a colonel in the Austrian army in 1859, and a colonel commanding in the Mexican army at the battle of Puebla, May 5th, 1862, in which the Mexicans were victorious. His father at one time resided in Leeds, Eng., but returned to Turkey in 1845.

The colonel states that there has never been any sickness in the family to speak of, and that all are—so far as he knows—well and hearty. It was at Leipsic, Germany, that the colonel met his fate in the person of a fair *mädchen*, weighing 190 pounds, and 5 feet 9 inches in hight, and the union has been blessed with two sons, who give promise of rivalling their father in stature.

The colonel is a finely-proportioned man, and walks with a firm and elastic step. He is as straight as an arrow, and has coal-black eyes, hair, and mustache.

He is an actor by profession. He informs us that his last engagement was at Simm's Theater, in Baltimore, and that he expects to play an engagement in New York during the present season.

EXCAVATION AND EMBANKMENT TABLES.

The preparation of these tables, for the use of engineers and contractors, involves an amount of labor, even when worked out by means of differences or increments, which those who have calculated them can well appreciate. The labor in calculating, say a table increasing by one tenth of a foot, up to seventy-five feet in depth or hight; with one hundred feet stations, or less, by the rules of areas and distances, would be immense; and the table liable to errors, there being no general check on its accuracy; and by differences or increments, the labor would still be great, and the liability to error not much decreased.

We have lately been shown a simple, rapid, and correct method for making such tables, discovered by G. R. Nash, C.E., of North Adams, Mass., which we insert for the benefit of engineers and others, whereby much valuable time may be saved. Rule—

1. Arrange the hights or depths for calculation in vertical columns, each of 27 lines.

2. In any three (3) columns, the third column is equal to twice the second, plus 81, minus the first column (where the depths increase by tenths of a foot, with 100 feet stations).

Note—

1. For shorter or longer stations than 100 feet, add the proportional part, or multiple, of the quantity required to be added for 100 feet.

2. For increasing the series of hights and depths, multiply 81 by the square of the increment in tenths, and the product will be the constant number to add.

3. Verify in any table calculated, the last column, which proves the whole, as any error in any of the preceding columns, increases in geometrical progression to that column, and being greatly magnified, is at once discovered.

4. In compiling any table, it is necessary to calculate, by areas and distances, the first two columns, after which the table can be extended to any length by the above process.

If any one knows an easier, more rapid, or more accurate method than this, we should be glad to hear of it.

THE ALLOYS OF COPPER.

From time immemorial, copper has been extensively used for forming compounds with other metals. The ancients whose works of art still remain to us, appear to have wrought