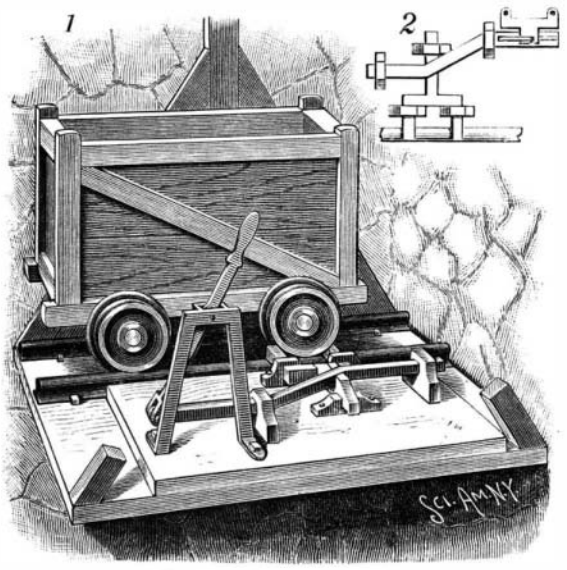
AN IMPROVED CAR STOP.

A simple device for restraining mining or other cars from movement on the tracks of hoisting carriages in mining shafts, etc., is illustrated herewith, and has been patented by Mr. William Walker, of Jermyn, Pa. On a base plate adjoining the car rail are guides, in which are mounted to slide across the rail the rigid arms of a forked chock block, adapted to catch both sides of the car wheel, the chock block being pro-



WALKER'S CAR STOP.

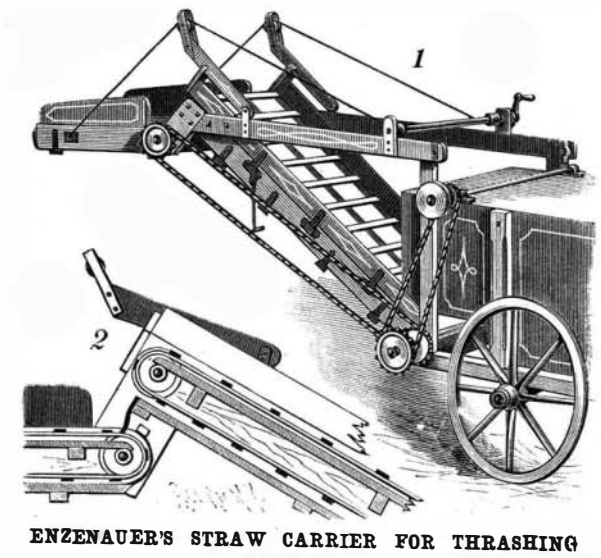
jected and retracted by means of an upright handle lever pivotally connected with a cam bar, arranged at right angles to the direction of motion of the chock block.

Additional Water Supply Required for New York.

Mr. Church, chief engineer of the Croton aqueduct, in a recent report to the commissioners, fixes the probable date of the completion of the new aqueduct to its connection with the old aqueduct mains in Tenth Avenue, near 135th Street, at July 1, 1889, and to the Central Park reservoir at December 31, 1889. For the maximum supply he gives the approximate figure of 318,000,000 gallons. In 1890 Mr. Church estimates that the city will have a population of 1,665,875; and, according to the tables of statistics which he presents, he demonstrates that the consumption will exhaust the storage of that year, and the daily supply will be short 79,600,000 gallons.

IMPROVED STRAW CARRIER FOR THRASHING MACHINES.

A machine whereby straw, chaff, etc., may be delivered, without spilling, to the stacker from the separator, is illustrated herewith, and has been patented by Mr. Peter Enzenauer, of Red Bud, Ill. The carrier is made in two hinged sections, the lower or main one being attached to standards forming a rear portion of the separator, and held at an inclination by side braces, while the upper section, when the carrier is not in use, may be folded under and held in folded position by hooks. The carrier has parallel side pieces, with a rigidly attached bottom, an upper floor being secured to the side pieces to afford a space above the bottom, and a curved metal plate inclosing the lower end of the



ENZENAUER'S STRAW CARRIER FOR THRASHING MACHINES

body, at each end of which a shaft is journaled, carrying an endless belt. The straw or chaff carried by the belt over the upper floor section, and not falling into the short section, drops into the space between the bottom and the upper floor of the carrier, and is carried by the lower section of the belt to the floor or table, to pass upward with the main body of the material, there being an apron to prevent any of the material carried upward by the belt of the main section dropping into the space between the upper floor of the short section and the end plate.

London Fogs.

As these lines are being written (says the *Journal of Gas Lighting* of Nov. 6), London lies literally gasping for breath under one of the blackest and most persistent fogs that have ever visited the valley of the Thames. It is a perfect example of that variety of the London fog which has been distinguished of late years from the traditional "pea soup" fogs so clearly described by Dickens in his tales of London life. We still get too many specimens of this type of fog to forget what it is like. It is the thickness of what has to serve for air, which makes the eyes smart and weep, chokes respiration, and blurs the visual aspect of outer objects. Lights are almost powerless to penetrate this mixture of mist and smoke. Scarcely can the wayfarer see one street gas lamp at a time; he certainly cannot see the second. Drivers of vehicles are compelled to lead their horses, and make sure of their course by observations of the curb of the street pavement; and when they have to navigate a wide crossing, they must trust to fate for getting to the corner for which they aim. The usual street noises are either hushed or strangely muffled and changed; but the improved acoustic properties of the thickened atmosphere are witnessed to by the startling distinctness of sounds usually unheard or diminished. All this, be it remarked, is characteristic of an old-fashioned yellow fog, which strangled our forefathers in the streets of London just as it does their successors to-day. The "London particular," however, is no longer confined strictly to the metropolis. The growth of towns in different parts of the country has prepared conditions as favorable to the development of the densest kind of fogs as used to be found in London alone; and consequently, at the present day, Manchester and other places are occasionally plagued with fogs which do not yield in vileness of character to anything that London can show. The other variety of fog, which we have already remarked as distinct from this deadly mixture of antique repute, is not so thick upon the ground, but is much blacker overhead. It does not so acutely affect the eyes or the lungs, and in this respect is more endurable; but no words can adequately describe the gloom where it enthrones itself on the housetops. To look up toward what should be the open sky is like gazing into a coal cellar. Wayfarers flit along the streets like disembodied spirits, and vehicular traffic is carried on as though in a cavern. The general aspect of the streets and shops is much the same as that presented on a murky, wretched night. The window glass seems dirty, and the gas looks bad, yet comfortable, for everybody hastens to light up in order to dispel the unnatural dusk. If a fog of this kind were to happen at night, it would not be very noticeable except for the deadness of the air, which renders breathing unpleasant, although not in the same way as a pungent yellow fog. The influence of the invisible carbonic acid, which is probably present in abnormal proportion in the stagnant air, is sensibly felt by all animate beings. This and the blackness at midday combine to make London in a fog of the kind now under notice a place to be shunned during the continuance of the infliction. Fortunately, these fogs are frequently very local, and the slightest movement of the air clears them away.

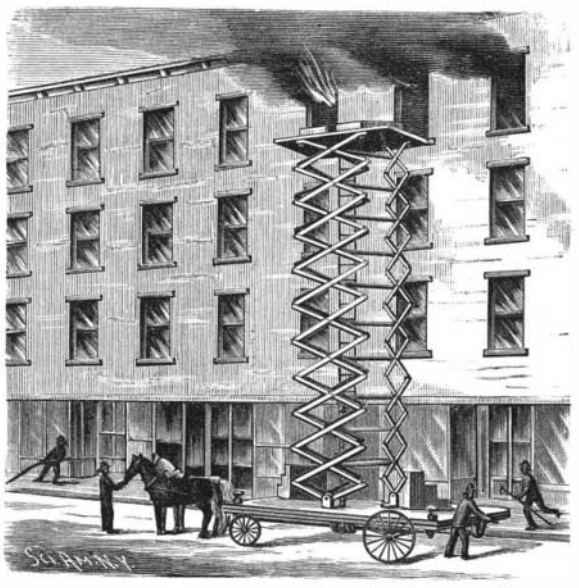
Balls of Earth on Evergreens.

It is more essential to retain balls, or rather cakes, of earth on the roots of evergreen trees in removing them than for deciduous trees, because the roots of the latter will bear longer exposure to the air. Where the distance for removal is short, or from one part of the grounds to another, there is no difficulty in carrying large masses of earth on the roots, and in preventing any failure in the operation. Evergreen trees may be carried several miles in a spring wagon, or on a sled in winter, if there is enough earth adhering to the roots to hold them upright during the transit. There will be no difficulty for trees six or seven feet high, but more care and labor are required for those much larger. We have conveyed twelve-foot trees of the white pine several miles without any loss. They were taken from the borders of a wooded swamp, the rich muck in which they grew resting on hardpan eight inches below, and allowing the muck, which held all the roots, to be lifted easily with the tree. This is the best condition of soil for taking up masses of earth with the roots, and has always been attended with moderate labor and entire success with arbor vitæ, hemlock, and other evergreens. When the trees stand on a gravelly soil alone, the difficulty of taking them up is much greater.

These remarks do not apply to small nursery trees two or three feet high, which have been prepared for removal by previous transplanting, or to larger evergreens which have been several times transplanted, and on which the balls of earth are of less importance. When this previous preparation has not been given, it is a good plan in late autumn to fit them for a second or third year's removal by digging a trench around them at a proper distance and deep enough to cut off all the horizontal roots, and then filling it again. Every root thus cut sends out a number of fibers, which are of more value to the tree in removal than a single long root.—*The Cultivator.*

AN IMPROVED FIRE ESCAPE.

A portable fire escape, constructed with three systems of lazy tongs connected together and arranged to be elevated and lowered by a screw mounted in the platform of a truck, is illustrated herewith, and has been patented by Mr. Louis P. Santy, of Clements, Kansas. The platform on which the tongs are mounted has screws at its corners, whereby the escape may be held upright or tipped against the walls of a building. The



SANTY'S FIRE ESCAPE.

tongs are united by a series of triangles, a set of lazy tongs being arranged at each corner of the triangle, each set bracing the others. A screw for elevating the system is mounted in the center of the platform, a triangular plate being attached at its corners to the lowermost set of lazy tongs, and having at its center an internally screw-threaded boss in which the screw works, being operated by beveled gears and crank shafts extending to the ends of the truck. By turning the cranks the three sets of lazy tongs will be rapidly elevated, and by reversing the motion as rapidly lowered. At the top of the lazy tongs is a platform or cage on which persons may step from the window of a building, and be lowered to the ground by turning the cranks, or they may descend by a rope ladder suspended from an aperture in the center of the cage.

A SIMPLE CHURN DASH.

An improvement readily applicable to almost any form of churn, and by which it is designed to make fine flake butter quickly and with little labor, is illustrated herewith, and has been patented by Mr. Lambert Snyder, of Midland Park, N. J. It consists of a dash loosely hung upon a bracket in the lid of the churn, a double conical frame being hung upon the stem of the dash, the apex of one cone being at the lower end of the frame, while that of the other cone is above, and designed to come near the surface of the milk. The vertical pieces of the frame have each a longitudinal slot, which, with the cross bars and pins, are designed to cut and break the cream as the dash is rotated. The upper end of the dash spindle has a grooved pulley, through which

SNYDER'S CHURN.

the dash is reciprocated by means of a bow, the cord of which is easily sprung into the groove of the pulley to make one complete turn thereon, and requiring but little tension. The device is so simple that it is not likely to get out of order, can be readily cleaned, and is easily operated. As the dash rotates in opposite directions, with each stroke of the bow, the frames draw the cream from the top and bottom toward the center, where it is broken by the rods and cut in its passage through the slots in the frames. The device is cheap of construction, easy of manipulation, and efficient and rapid in action.

Bellite.

An ideal explosive for engineering purposes would naturally require to be flameless, perfectly safe in handling, and, although slow in action, exertive of extreme energy, so as to bring down huge masses of rock or coal without shattering, as unavoidably results from using quick explosives, such as dynamite and others of the nitro-glycerine group. The experiments we had the privilege of watching recently at the Clarence Iron Works, Middlesborough, were mainly intended to demonstrate that in the new Swedish compound, bellite, the invention of M. Carl Lamm, the managing director of the Rotebro Explosive Works, Stockholm, science has secured what practically amounts to an ideal explosive. For the manifestation of this point the programme drawn up by Mr. Napier Hake, F.I.C., who conducted the trials, was excellently conceived, and the numerous civil engineers, owners of collieries, and chemists present appeared to be pleased. Of course, we possess explosives of far higher potency, and others that are fairly safe to use, but hitherto the complaint against the former has been that they act too rapidly, destroying locally all adjacent; while, with one or two exceptions, the safer compounds have not exhibited any phenomenal disruptive force.

The first test to which bellite was submitted was almost crucial, as regarded the problem of security, half a ton weight of iron being dropped 20 ft. on to a packet of cartridges, resting on a thick iron slab, without producing explosion, while, beyond causing breakage, the ignition of 1 lb. of gunpowder inside a paper parcel containing naked cartridges proved similarly harmless. Nor was the fire experiment less successful, a lump of bellite thrown on cinders blown to a white heat merely melting or fusing away with scarcely appreciable ignition. In each case, it should be said, a second experiment was made to prove that the explosive itself had been submitted to the previous test.

Perhaps more interest attached to the next series of trials, in which bellite competed with dynamite, the object being to show that while exerting even greater force than Mr. Nobel's discovery, the new Swedish explosive diffused its energy over a wider surface—in other words, the gases generate a little more slowly. These successive tests were made upon ⅜ in. boiler plates and 70 lb. iron rails in fairly good condition, the charges ranging from 1 oz. to 4 oz., being laid upon the plates, and in the case of the rails—resting on their sides—on the web. In most instances the charges were tamped with a handful of wet mud, but in two tests were exploded without any covering except the usual wrappers. With regard to these latter, dynamite must be considered to have had the best of it, its quicker action bursting a small hole through the plate, and also through the rail web, the competing explosive merely causing extensive bulging with prolonged fracture. In all the other trials, however, bellite produced much the most damage, the surface injuredor wrecked being some 30 per cent greater.

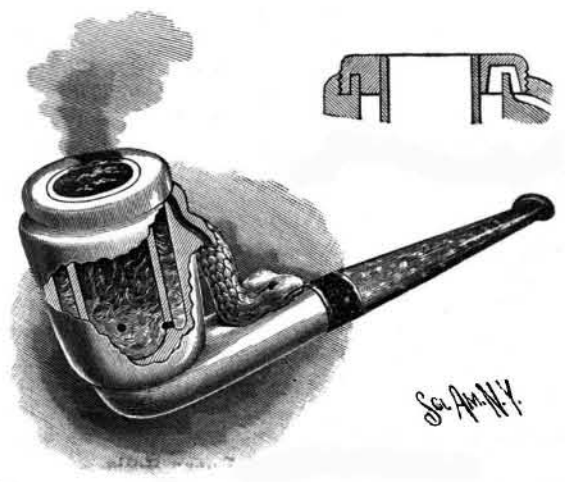
An earlier test, which had failed, namely, exploding a bellite cartridge upon the ⅜ in. to ½ in. lid of a deal box filled with the same, and which resulted in the explosion of the contents, was now repeated on a ¾ in. lid successfully, the box being merely broken to pieces and the cartridges inside fractured and dispersed; the first day's proceedings ending with the explosion of earth and submarine mines, 3 lb. of bellite raising masses of earth to a height certainly not less than 100 ft., and probably half as high again, and leaving a hole found on after measurement to be 11 ft. in diameter, and nearly as deep to the loose earth. The submarine explosion was equally effective.

The second day's experiments were made in the ironstone mines at Middlesborough, owned by Messrs. Bolckow, Vaughan & Co., and, in the opinion of the experts present, were absolutely successful, the stone being thrown out in large and easily removable blocks, while the absence of offensive gases was particularly remarked. In regard to the other claims advanced for bellite, namely, its flameless character and security against explosion by lightning or electricity, no opportunities were afforded for forming a conclusion, but the fact that it is carried as ordinary merchandise in Sweden leaves little room for doubt as to the sufficiencies of previous tests in these directions. During the first day's trials a distinct flash was visible when dynamite was exploded, but not so when bellite was discharged. The new explosive is a compound of nitrate of ammonium with di- or tri-nitro-benzole, in the proportions of about five of the former to one of the latter.—The above is from the *Engineer*.

Bellite, says *Industries*, closely resembles roburite and gremite, and consists of five parts in weight of nitrate of ammonia, mixed with one part of di- or tri-nitro-benzole, and is manufactured either in the form of a loose powder, yellowish in color, or in compressed cartridges; and in taste and smell is similar to the nitrate of ammonia of commerce. It is claimed for bellite that it is more powerful than gun cotton or dynamite; cannot be exploded by shock, pressure, lightning, electricity, friction, fire, or indeed under any conditions except by aid of a detonating cap, and is, therefore, perfectly safe; gives off no offensive gas, as with dynamite and other nitro-glycerine compounds; is entirely flameless when exploded, and can, therefore, be safely used in coal mines; presents no danger in manufacture even in tropical climates, and in Arctic cold requires no thawing; is absolutely safe in transport, and is, in fact, carried by the Swedish railway companies as ordinary merchandise; and when made expressly for subterranean blasting, does not shatter like dynamite, rather forcing the coal or rock out in large blocks, and causing but a small percentage of dust. It is further claimed that bellite shells might be fired from ordinary cannon, without the slightest fear of the concussion produced by igniting the gun charge exploding the shell and bursting the gun.

AN IMPROVED SMOKING PIPE.

A pipe designed to extract the nicotine from the smoke before the latter enters the stem, and wherein the smoke will be cool upon reaching the mouthpiece, and dirt and sediment will be prevented from settling in the stem, is illustrated herewith, and has been patented by Mr. George H. Wartman, of Montesano, Washington Territory. The bowl has a central receptacle for tobacco, which may be detachable if desired, and there is an annular chamber between the inner walls of the bowl and the outer walls of the tobacco receptacle, adapted to be ordinarily filled with cotton or other equivalent, there being small apertures in the sides of the tobacco holder, allowing the smoke to be drawn therefrom through the cotton. The neck to which the stem is attached has a channel connecting with an annular groove in the upper edge of the



WARTMAN'S PIPE.

bowl, formed by the rim or cap shown in the sectional view. This construction is especially adapted to meerschaum or other bowls to be colored, as the heated tobacco does not come in contact with the bowl.

Chimneys for Boiler Plants.

Referring to the 335 foot chimney of the Clark Thread Company, at Newark, N. J., which of late has been very widely noticed, as being probably the tallest boiler chimney in the world, and which was illustrated in the SCIENTIFIC AMERICAN, Oct. 20, 1888, calls to mind the fact that a large number of chimneys now in existence are of much greater height than the requirements actually call for. There seems to be a prevailing notion that the greater the height the greater, in direct proportion, the draft-producing power of a chimney—a most natural error perhaps on the part of the average power men, but, at the same time, one which has been responsible for much unnecessary outlay in chimney construction. As a matter of fact, the draft-producing capacities of chimneys, having flues of the same size, are in proportion to the square roots of their heights, so that if one was to have double the power of the other, it would have to be four times as high. Attention has been more than once directed to the circumstance that beauty of design, from an architectural point of view, has had much to do with the unnecessarily great heights so frequently encountered, a much favored rule being to make the height of the chimney equal to about 25 times the diameter of the flue. A little consideration will show that by rigidly adhering to this ratio some rather peculiar results will be reached, chimneys for small plants turning out to be much lower, and those for larger boiler plants becoming much higher than is necessary. The area of cross section of the chimney flues in all cases should be made to depend upon the combined areas of the boiler flues, and this with a height of stack of 100 feet, shown by extended experience to be a very satisfactory figure, will furnish ample draft to burn any of the commonly used fuels. Applying the 25 to 1 ratio to two plants of say two and ten boilers respectively, all of the same size, and proportioning the flue areas of the chimneys in the way we have just indicated, will afford a very striking illustration of the shortcomings of the rule. One hundred and fifty feet represent what has on good authority been given as the maximum height of chimney necessary in any case for producing the requisite draft, always provided, however, that the flue area has been properly proportioned. Proprietors of steam plants boasting of chimneys which must exceed this figure in height may indulge in some profitable reflections as to the money needlessly spent in having such structures raised.—*The Iron Age.*

The Dreams of a Hasheesh Smoker.

Science describes the experiences of a gentleman who placed himself under the influence of hasheesh. He smoked it until he felt a profound sense of well-being, and then put the pipe aside. After a few minutes he seemed to become two persons; he was conscious of his real self reclining on a lounge and of why he was there; his double was in a vast building of gold and marble, splendidly brilliant, and beautiful beyond all description. He felt an extreme gratification, and believed himself in heaven. This double personality suddenly vanished, but reappeared in a few minutes. His real self was undergoing rhythmical spasms throughout his body; the double was a marvelous instrument, producing sounds of exquisite sweetness and perfect rhythm. Then sleep ensued, and all ended. Upon another occasion sleep and waking came and went so rapidly that they seemed to be confused. His double seemed to be the sea, bright and tossing as the wind blew, then a continent. Again, he smoked a double dose, and sat at his table pencil in hand, to record the effects. He lost all conception of time. He rose to open a door, and it seemed to take a million years. He went to pacify an angry dog, and endless ages seemed to have passed when he returned. Conceptions of space retained their normal character. He felt an unusual fullness of mental impressions—enough to fill volumes. He understood clairvoyance, hypnotism, and all else. He was not one man or two, but several men living at the same time in different places, with different occupations. He could not write one word without hurrying to the next, his thoughts flowing with enormous rapidity. The few words he did write meant nothing.

Cocoanut Fiber as a Defensive War Material.

In the last report of the Curator of the Nilgiri Gardens attention is drawn to a new use for the refuse fiber of cocoanuts. Dr. Lawson says that his attention was drawn to the subject by Mr. Money, a planter in the Nilgiris, who sent him an article in the *Revue des Deux Mondes* for August 1, 1886, by M. De la Barriere, entitled "Batiment de Combat et de la Guerre," in which the author described how the refuse of cocoanut, after the process of retting, might be used for backing the iron plates of ships of war. The method of proceeding was to take a quantity of the powdered refuse before it was quite dry, and subject it to pressure, when the natural viscidity of the macerated cellular substance of the nut caused the whole to cohere and to form a plate, which in general appearance was like a mill-board, only much more brittle.

Owing to the hygroscopicity of this substance, if a hole is made through it, the parts adjacent to the puncture absorb water, swell up, and immediately close the orifice. Dr. Lawson got a sack of this refuse and made a plate 18 in. square by about ¾ in. in thickness, which he placed between two boards, and then fastened it to one side of a box, which contained a head of one foot of water. A bullet half an inch in diameter was fired through it, but not a drop oozed out. This experiment was repeated three times with the same result. Then a ¾ in. bullet was fired through the plate, when a few drops only made their way through. Lastly, a bullet nearly 1 in. in diameter was fired through the plate, when a large jet of water shot through, but in the course of a few seconds the stream decreased in volume, and in less than a minute had ceased to flow altogether. Whether or not this material could be advantageously used for the purpose which M. De la Barriere suggested, or for any other purpose, is a matter worth considering, for, as he truly says in his article, millions of tons float away annually down our rivers in India.

Deep Sea Soundings.

Her Majesty's surveying ship Egeria, under the command of Captain P. Aldrich, R. N., has, during a recent sounding cruise and search for reported banks to the south of the Friendly Islands, obtained two very deep soundings of 4,295 fathoms and 4,430 fathoms, equal to five English miles, respectively, the latter in latitude 24 deg. 37 min. S., longitude 175 deg. 8 min. W., the other about 12 miles to the southward. These depths are more than 1,000 fathoms greater than any before obtained in the Southern Hemisphere, and are only surpassed, as far as is yet known, in three spots in the world—one of 4,655 fathoms off the northeast coast of Japan, found by the United States steamship Tuscarora; one of 4,475 fathoms south of the Ladrone Islands, by the Challenger; and one of 4,561 fathoms north of Porto Rico, by the United States ship Blake. Captain Aldrich's soundings were obtained with a Lucas sounding machine and galvanized wire. The deeper one occupied three hours, and was obtained in a considerably confused sea, a specimen of the bottom being successfully recovered. Temperature of the bottom, 33·7 deg. Fahr.