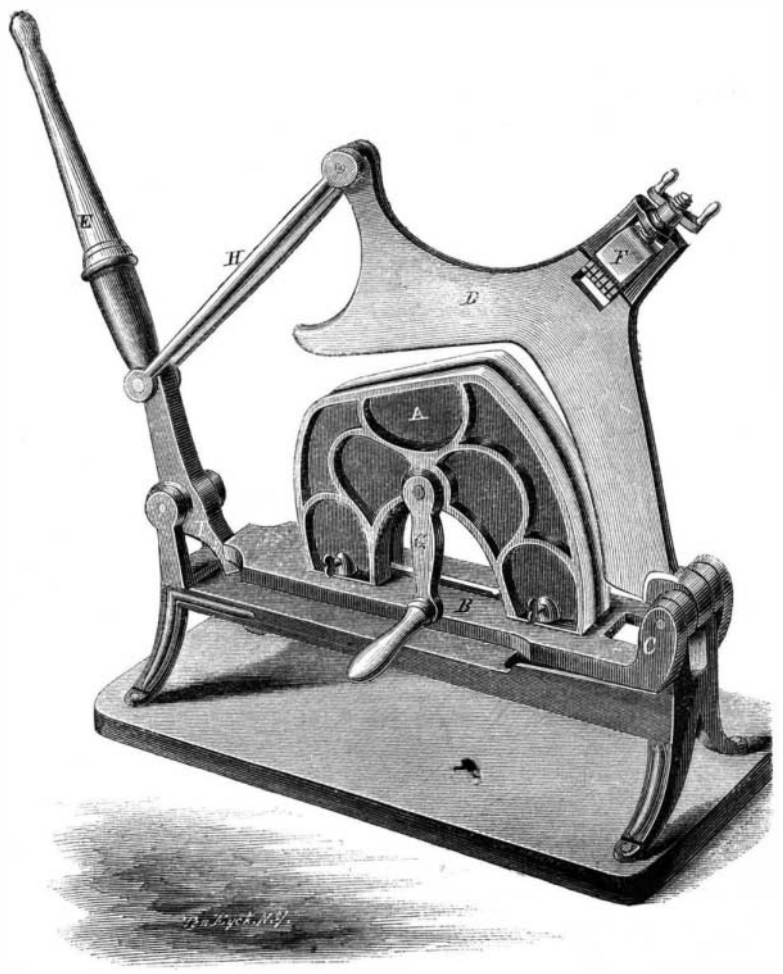
Improved Boot Crimper.

The subjoined engravings represent a new and improved boot crimping machine lately invented, the novelty of which consists in a movable crimping plate, combined with pressure plates, in such a manner that both may receive a motion in opposite directions, whereby the operations are much facilitated.

The machine consists of the pressure plates, A, fastened to the frame, B, by a joint, C, on which they work easily; between these plates the crimping plate, D, works through the agency of the lever. Upon the upper part of the plate, D, will be seen a clamping device, F, which holds the boot front; and in the side of the pressure plates there is fitted a strong screw, worked by the handle, G. When the front to be crimped is placed on the plate devoted to that purpose, the handle of the lever, E, is brought down, when the double action of the same, through the links, H, and the toe, I, causes both parts to approach each other, as before mentioned; there are also two small set screws at the bottom of the pressure plate, by which the width of the same can be quickly and easily adjusted.

These combinations, it is claimed, will effect the crimping of a boot front more expeditiously than by any other machine now in use. The apparatus is very conveniently arranged, being especially adapted to the purpose for which it is designed; it is simple and strong, and, we think, will prove a success.

An application for a patent is now pending through the Scientific American Patent Agency, by Thomas Madgett. Further information may be had by addressing George Parr, assignee, Buffalo, N. Y.



MADGETT'S PATENT BOOT CRIMPER.

DISCOVERIES AND INVENTIONS ABROAD.

Red Coal Tar Color.—A patent has been taken out by Wm. Spence, of Manchester, England, for making a red coloring agent from phenic or carbolicacid, obtained from coal tar as follows:—About 23 lb. of phenic or carbolic acid; from about 10 to 20 lb. of oxalic acid; and from about 7 to 14 lb. of sulphuric acid. This mixture is heated until the coloring matter is formed of the requisite color and consistence. When this operation is considered to be finished, the matter is washed with boiling water, in order to remove the excess of acid. It is then in the state of a light pitch, and with a green shade of cantharides. It may be dried and reduced to powder. To prepare it for dyeing, the inventor takes about 2½ lbs. of this and 5½ lbs. of common ammonia; places them in a closed metallic vessel, then heats to a temperature of about 270° Fah., for about three hours. This is allowed to cool, and then the vessel is opened. The matter originally introduced therein becomes completely dissolved in the ammonia, yielding a liquor rather thick, and possessed of considerable coloring matter. This liquor when heated by acids furnishes a deep red precipitate, which is a fast coloring matter, capable of dyeing silk, wool, and other textile materials red. The matter thus prepared is called "peonine," and is applicable to dyeing and printing generally.

Blue Color.—Mr. Spence also produces a blue color from the peonine thus obtained, as follows:—To 5 lbs. of peonine, 6 lbs. of aniline are added, and the mixture is heated to a temperature near the boiling point, which heating is maintained for some hours, until the material is completely transformed. The result thence obtained is a blue coloring matter, which is purified by successive washings; first, with boiling water acidulated with sulphuric, hydrochloric, or other acids; secondly, with heated coal oil; and thirdly, with a dilute solution of caustc, soda, potash, or other alkalies. The matter thus obtained is passed into acidulated boiling water, then dried. It is then in a state of powder, with golden shades, soluble in alcohol, methyle, and other spirits, and the solutions of which may be used directly for dyeing and printing. The coloring matter thus obtained is called "azuline," and is applicable to dyeing and printing generally.

Coating Iron and Steel with Copper.—A patent has been secured by W. & H. Bowser, of Glasgow, for coating iron and steel in plates or bars, with copper or brass, as follows:—A reverberatory furnace for heating the iron or steel is provided, and a coating chamber is used in close communication with the furnace. The iron, or steel having its surface cleaned, is raised to a welding heat in the reverberatory furnace; it is then moved to the coating chamber, where the copper is applied to its surface, in the form of grains, or in sheets. The heat of the iron or steel melts the copper on its surface, and the two metals thus become united, the copper forming a thick coating. It is stated that when these operations are performed skillfully, the coating metal becomes so intimately and firmly united to the more oxidizable metal, that it may be reheated, rolled, and hammered without the metals becoming separated.

Rifle Telescopes.—The English have borrowed the use of the telescope for rifles from America, and they are now making some of their target rifles with telescopes, almost similar to those which have been used here for over twenty years. A patent has been taken out by D. Davidson, of Edinburgh, for an improvement on such telescopes. The field bar of his telescope is furnished with two slides, moving at right angles to each other, each slide carrying a cross hair, or line; one of such slides being horizontal and the other vertical, both worked by screws for adjusting them. The horizontal line is for minute adjustment of the telescope in elevation; the vertical line is for allowance for side wind, and the point of intersection by these two hair lines is the sight, which is thus most conveniently adjusted. Fixed hair lines are used in some of the American rifles. The telescope of Mr. Davidson is also capable of being elevated or depressed, by a joint at the eyepiece, and it is applied at the side of the barrel, instead of the top, as in American rifles.

The Hoosac Tunnel.

The great tunnel through the Hoosac mountain, which has been suspended for some time, is not to be given up. The *Commercial Bulletin* says respecting it:

"Under the act passed by the last Legislature, and the deed of surrender and conveyance to the State executed by the Troy & Greenfield Railroad Company, preparations are being made for the speedy prosecution of this important enterprise—this time we trust to its final completion. Workmen and machinery are being got in readiness for the purpose: an agent has been dispatched to Europe for models of an excavating apparatus (such, we believe, as is now in use in the great Alpine tunnel under Mont Cenis), and it is understood the best engineering skill to be had, here or elsewhere, will be put in requisition when the work is resumed. In regard to the work which has already been done outside the tunnel, the State Commissioners report that the line, as now located, is essentially a contractor's line, in which everything has apparently been sacrificed to save present outlay. All this will ultimately have to be changed, they say, and thus involve the necessity of doing much of the work over again.

"If the people of Massachusetts are to foot the bills for seven and a half or eight years more labor upon this 'big bore,' at an estimated cost of $5,719,330, they will require it to be done in a thorough manner, so that it may prove a real acquisition to the interests of commerce, and stand as a monument of American engineering skill. This can only be done by discarding the contract system as far as practicable, and by having the work executed under the immediate supervision of State agents."

Sleep.

Death from old age has been compared to falling asleep, never to awaken again in this world; and hence the transition is easy to a lucid consideration of the phenomena of sleep, "nature's soft nurse," so necessary to our existence. Death or madness must be the result of a long continued absence of this great restorer: so felt and said Byron in his last illness. Sir Benjamin Brodie mentions the case of a gentleman who, from intense anxiety, passed six entire days without sleep. At the end of this time he became affected with illusions of such a nature that it was necessary to place him in confinement. After some time he recovered perfectly. He had never shown any signs of mental derangement before, nor had any one of his family, and he has never been similarly affected since. Those who have been subjected to cruel tortures have declared that the most intolerable was the deprivation of sleep; and as this was one of the modes of treating the unhappy old women who fell into the hands of the witch-finders, it may account for some of their illusions, and the crazy confessions they made. The sick-nurse frequently has recourse to stimulants, which indeed remove for a time the uneasiness and languor occasioned by the want of sleep. But the temporary relief is dearly purchased, and those who have recourse to alcohol on such occasions, should know that it does not create nervous power, but only enables the recipients to use up that which is left, leaving them in more need of rest than ever, when the stimulus has ceased to act.

Phenomena of Camphor in Water.

The following exceedingly interesting scientific gossip, respecting the peculiarities of camphor in water, is condensed from the London *Photographic News*:—

When small pieces of camphor are dropped on the surface of a glass of water several curious phenomena may be observed. They immediately commence to rotate, and move about with remarkable energy; varying sometimes in rapidity, but usually conducting their gyrations in a strange and erratic manner. In order to obtain the best effects, some precautions are necessary: thus, the camphor should be tolerably pure, the piece employed should be cut and separated from the larger lump with a perfectly clean instrument, and contact with the fingers should be scrupulously avoided. Moreover, the glass should be quite clean and the water pure. When these conditions are satisfied, the phenomena are really very striking, and well merit more attention than is generally devoted to such things. Several physicists have observed these curious motions of camphor; amongst others may be specially named Mr. Tomlinson and Mr. Lightfoot. The former gentleman has been attracted more to the physical phenomena involved in the movements, whilst Mr. Lightfoot has principally studied the chemistry of the subject. Each is of interest, but it is to some results recently found out in respect to the latter branch of inquiry that we desire at present to draw attention. If, instead of using a torn or cut fragment from a lump of camphor, one or two fine crystals are detached with a clean needle-point from the cork of a phial in which camphor is kept, and these are let fall on clean water, they at once begin to move about with wonderfully increased rapidity, darting away in various directions, as if shot from some miniature engine, or, endowed with life and a will of their own; each crystal quivering and rocking on the water with an apparent high degree of indignation at its forced contact with the humid surface. This fury gradually diminishes, and a regular dance begins; the various particles select partners, to some of which they will seem to cling with pertinacity; whilst others will either remain indifferent, or, if attracted, will only stay a very short time in embrace, and wander again in search of more congenial floating associates. The explanation which Mr. Lightfoot gives of these movements, is the emanation of a vapor from the volatile camphor, which has a very low tension; the water upon which it floats being capable of dissolving and diffusing this vapor more readily in certain directions of the crystalline axes, thereby removes sufficient vapor pressure at those points for the opposite side to drive about (by recoil) the nicely suspended particle. In certain positions two crystals of camphor will attract each other, whilst in other situations there is a mutual repulsion. It will sometimes happen that two crystals of camphor may be thrown on the water and not have any tendency to locomotion. When this is the case a continual trembling or vibration will be noticed in the crystal. When two such stationary vibrating crystals come in contact by attraction, immediately an eccentric, irregular change of place occurs, as if the force agitating each previous to the grouping, produced a new resultant force, in obedience to which the combined crystals move.

In describing the method of separating and placing the camphor on the water, we laid some stress on the fact that everything should be quite clean, and that the fingers should not touch the camphor in any stage. The reason of this is obvious. If, whilst camphor is actively moving on water, the most minute particle of certain greasy substances touch the water, instantaneously, as if by some magic, the camphor is deprived of all motion. The scene of previous activity is changed into immobility. This curious property has been made use of by Mr. Lightfoot to detect grease in quantities so extremely minute as would appear almost fabulous, for camphor cannot be made to rotate on water containing the most infinitesimal portion of grease. Mr. Lightfoot has made use of this test in a most ingenious manner, to distinguish between the two different methods of dyeing cloth with madder and with garancine. It is difficult and often impossible for calico-printers and merchants to distinguish between the two; and as the garancine dye is more fugitive than the first, and also of less intrinsic worth, it is sometimes substituted for it. There is, however, a slight difference in the process of manufacture—madder-dyed goods are, in one stage of the process, passed through a solution of soap to fix the color, whilst in garancine-dyed goods the soap is replaced by hypochlorite of lime. By proceeding as follows, it is easy to distinguish between the two kinds of dye:—Let camphor rotate on water in any glass vessel, as previously described, then immerse a small strip of the cloth to be tested. If the rotation stops, we infer the presence of soap, and conclude it to have been dyed with madder. But if, on plunging in the small piece of cloth, the rotation is not stopped, we then arrive at the conclusion that garancine was the dyeing material used. Before using the distilled water for any photographic purpose, it should always be tested by pouring a little into a wine glass, and then dropping a fragment of camphor on to the surface. The degree of purity of the liquid is at once shown by the energy of the movements of the camphor.

Light.

In analysing a ray of light, if the spectrum be divided into 360 parts, the red will occupy 45 parts; orange, 27; yellow, 48; green, 60; blue, 60; indigo, 40; violet, 80.

Light travels at the rate of 192,500 miles in a second of time, according to Herschel.

In the prismatic spectrum, violet rays indicate heat as 1, green as 4, yellow as 8 and red as 16. Beyond the red no peculiar action exists.

The colors of bodies depend upon the size of their atoms, and the chemical character of the local atmospheres of their atoms and interstices. Black has small atoms, and absorbs light; white large and reflects it. Reds are of oxygen character, according to Ellis; greens, nitrogen; and violet, hydrogen. Their minute parts decompose incident lights; absorb some, and reflect others; an oxygen body combining with hydrogen, and reflecting red; and the contrary with others; thus, a hydrogen atmosphere absorbs red, &c., and reflects blue and indigo, &c.; and a nitrogen absorbs red and violet, and reflects green or white, orange or blue.

The complementary colors are—for black, white; white, black; red, blue green; orange, blue; yellow, indigo; green, violet red; blue, orange red; indigo, orange yellow; violet, bluish green.

When the shadows of the same object projected on a wall by two lights are equally dark, the lights themselves are equally intense; but if not, the darkest shadow will be protected by the interruption of the brightest of the lights; and if this brightest light be then removed further from the wall, till both shadows become equally dark, and the distances of the lights from the wall be measured in that situation, the intensity of each will be in proportion to the square of its distance. For example, if two lights give shadows equally black or dark, when their distances from the wall are respectively five and seven feet, the intensity or quantity of light emitted from them will be respectively as 25 (or $5 + 5$) and 49 (or 7×7).

Bodies which refract most reflect most, or are more splendid. The local atmosphere which increases one increases the other.

Reflection is in intensity as difference of refractive power in the media.

The full moon produces no heat.

The optic nerve enters the eye .11 of an inch from the axis of the eye, on the nasal side; the axis is .91.

Angle of vision taken in by the fixed eye, 110 degrees.

Impressions on the eye are permanently continuous which are repeated 7 times in a second. When the sea is a blue color, it is deep water; and when green shallow. The film of a soap bubble about to burst is only about three-fourths of the millionth of an inch in thickness.

New Infernal Machine.—The rebels recently floated some new infernal machines down upon our vessels in Charleston harbor with the design of blowing them up. The following is a description of the torpedoes:—Three oval metallic cases filled with powder are fastened together by wires; upon these cases there are nipples for percussion caps, the caps being covered with gutta percha; above this there are a series of hammers, delicately set, so that by coming in contact with a ship they would be liberated, and discharge the contents of the case. These machines were all discovered in time to prevent any damage from them.

Accidents from the Use of Steam.

The following letter from a correspondent of the London *Times*, embodies sound common sense, and practical knowledge: two indispensables in commenting and deciding upon the cause of boiler explosions:—

Every one must have been struck with the frequent record in your columns of steam boiler explosions; but they only who have witnessed their effects can form an adequate conception of the havoc which they occasion. It has fallen to my lot to visit the scene shortly after the occurrence of three of these terrific accidents, and my pen is powerless to describe what I beheld. I have seen the devastation presented in one of the strongest fortresses in Europe shortly after its reduction by siege, and I have often been the spectator of experiments with the stupendous artillery of modern times; but I have no hesitation in declaring that steam, as an agent of destruction, has astonished and impressed me not less vividly than gunpowder. Imagine a boiler of tough wrought iron, 30 feet or 40 feet long, rent as though it were made of tissue paper, torn from its solid bed, and scattered in huge fragments far and wide, red hot bricks sent flying in all directions through the air, thick walls knocked down, roofs crushed in, buildings strong enough to have endured for ages ruined in a moment, and human beings, full of life and vigor, blown headless, armless and legless, like chaff before the wind. This, sir, is not a highly-colored description, written with a view to a "sensation effect," but a fair and simple statement of what has often occurred.

I have performed the wearisome work of wading through numerous records of boiler explosions which have been published in France, in the United States and in Great Britain; and I therefore venture, with your permission, to state in as few words as possible, the impression produced on my mind by this investigation. I do not propose to submit to you specific evidence, as that would require an amount of space in your columns which it would be unreasonable to expect at this season. My impression then is that, not only in the majority, but in the great majority of instances, the accidents were wholly preventible, and would not have taken place if the most ordinary precautions had not been neglected. The causes which have been assigned for boiler explosions are very varied, and some of them have not the slightest foundation. Gross carelessness, and working the boiler after it has become fairly worn out, seem to be the chief.

You are, sir, no doubt aware that an "Association, for the Prevention of Steam Boiler Explosions" has existed in Manchester during many years, and the results have been most satisfactory. The boilers of members of this institution who pay an annual subscription are regularly inspected by competent persons. The following important extract is from the report of 1861, by Mr. Lavington E. Fletcher, chief engineer:—

"I found that due care and periodical inspection with the application, where necessary, of the hydraulic test, would have prevented every one of these explosions, and thus that the word 'accident' could not be applied to any one of them. I meet every day with increasing evidence that the mystery in which boiler explosions are often shrouded should be dispelled, and consider that, by due attention to correct principles in the construction of boilers in the first place, and by care in their working in the second, the recurrence of the explosions would be prevented."

The Manchester people have voluntarily organized an effective system of inspection, such as is now sought from the Government with reference to all steam boilers. Although I will not venture to express an opinion on the expediency of requesting the Government to undertake this somewhat paternal duty, yet, before we do so, I think, sir, you will agree with me that we ought, at least, to try what we can do for ourselves. The Manchester people have set the example, and shown us how much may be done without official, or, as it is too apt to become, officious inspection.