

within the scope of the original invention as described, but as an ambiguous expression not consistent with the other words in the specification, which clearly described the absorbent, its properties and functions, all of which properties and functions might appertain to a substance explosive under some conditions, but inexplorable under those conditions which made nitro-glycerin explosive by concussion. The court grants the preliminary injunctions asked, holding that the complainants are not limited to treat as infringements the use of such equivalents only as are actually inexplorable, but they are entitled to the exclusive use of such equivalents as are inexplorable as compared with nitro-glycerin, and which, while complying with the other requisites of the infusorial earth in the combination, will also, when combined with nitro-glycerin, form out of the two ingredients a composition which, without losing the great explosive power of nitro-glycerin, is more safe and convenient for transportation, storage, and use than nitro-glycerin.

New Inventions.

Mr. S. P. Cox, of Brooklyn, N. Y., has patented an improved form of Bracelet made of stone, jet, or other material, but especially of stone. It consists in a series of blocks or plates strung upon spring wires, having sufficient elasticity to hold the bracelet upon the arm when the edges of the bracelet are brought together and secured by a fastening similar to a butt hinge. The same inventor has also designed a Locket, so constructed that no metal is visible except the eye or loop to receive the guard.

A new Fire Escape, the invention of Mr. J. S. Shaw, of Joplin, Mo., consists of a folding ladder, made of links and rounds bent of one piece of wire, which is stowed compactly in the hollow sill of a window and suitably secured at its upper end, and is always ready for use.

Mr. Sylvester Snell, of Watertown, N. Y., has patented an improvement upon that form of Animal Trap in which the weight of the animal upon a tilting platform is made to close the doors of the cage. The inventor adds an ingenious mechanical device, operated by the weight of the animal's fore feet, which unceremoniously precipitates him into a pit below.

An improved photographic Camera Shutter, invented by Mr. A. Johnson, of Kewanee, Ill., consists of an interior swinging shutter of novel construction, arranged to shut off the light passing through the camera tube, the object being to provide a means of opening and closing the tube without the knowledge of the sitter.

An improved Thill Coupling, recently patented by Mr. W. L. Wheeler, of Birmingham, Ill., is designed to admit of the thills or pole being readily detached when desired. To the axle is secured a thill clip, having lugs to receive the pin which fastens the irons of the thill or tongue. By means of a pivoted and slotted lever the pin may be easily withdrawn or locked into position by a key forming the outer end of the lever.

Mr. G. L. Reynolds, of Oakland, Cal., has made an improvement in the class of Window Screens, in which the upper and lower wire screens are attached at one end directly to the sashes, so that when the latter are raised or lowered to open them, the screen will be extended over the opening and thus exclude flies, mosquitoes, or other insects without excluding air. The improvement consists in journaling a screen roller in a groove formed in the meeting rail of a sash, and in attaching to said screen roller one balance cord of the journal of the roller and the other balance cord to the sash.

An improved School Desk, patented by Mr. J. P. Pies, of Spades, Ind., belongs to that class of desks which are so made as to be raised or lowered at will. The improvement consists in a new device by which the desk can be readily adjusted and firmly secured in the desired position.

A new Leather Dressing Compound, for boots and shoes, harness, trunks, etc., designed to impart a lustrous black gloss, as well as to preserve and protect the leather, has been patented by Messrs. Norman Quinlan and J. H. Quinlan, Jr., of Glen Falls, N. Y. It is made of shellac, ivory black, alcohol, castor oil, and turpentine in certain proportions.

Mr. J. F. Johnson, of Yocum Station, Va., has made an improvement in Pen Holders, designed to render the pen yielding to pressure upon the point, and to adapt it to be carried in the pocket. It consists in arranging the pen socket in a tubular case, so as to slide freely, with a spiral spring behind the same, which tends to project the pen beyond the tube to its working position, the pen being retracted in the tubular case by means of a stud extending through a longitudinal slot in the said case, and secured by being turned axially into a notch.

Mr. David Healy of Los Angeles, Cal., has patented a Waste Trap designed to prevent the escape of sewer gas, to prevent siphoning, and to supply hot and cold water to

a basin through concealed pipes. It has two water seals arranged in a peculiar manner, and a float valve which when subjected to suction adheres more closely to its seat, thus preventing the removal of water from the trap.

An improved Blackboard arrangement has been invented by Mr. H. W. Eastman, of Baltimore, Md., in which the blackboard proper is pivoted in a frame, in which it slides up and down, so that it may be reversed in position to bring either side to the front. The special point consists in balancing the blackboard by means of a sliding frame adapted

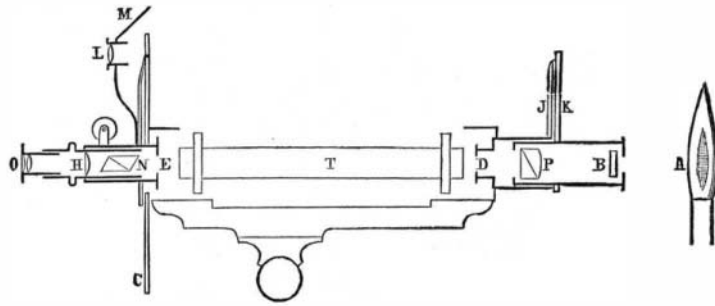


Fig. 1.—SACCHAROMETER IN SECTION.

for holding alphabetical or arithmetical tablets, said board and tablet frame being connected by ropes which pass over pulleys at the top of the fixed frame, in which the movable parts slide vertically; the arrangement being such that the blackboard is prevented from turning on its pivots when the tableholder is lowered into the required position behind it.

An Improved Buckle for harness, which may be disengaged from the strap or trace in connection with which it

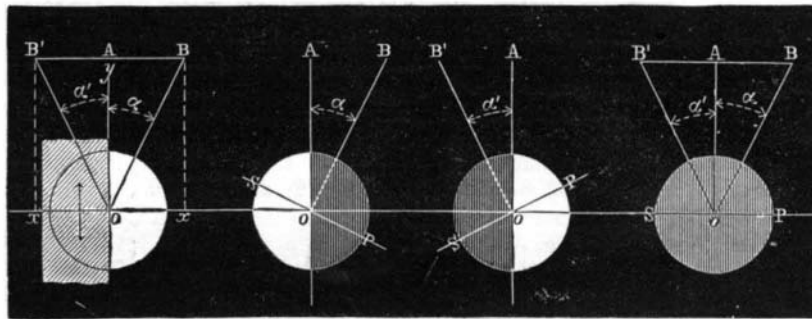


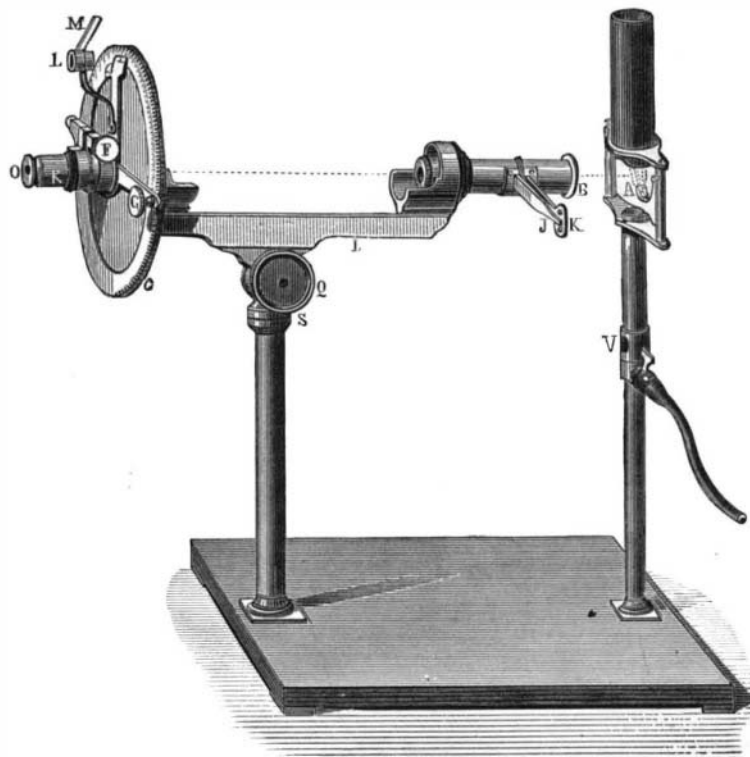
Fig. 2.

Fig. 3.

Fig. 4.

Fig 5

is used, without the necessity of drawing upon the strap or trace to release the buckle tongue, has been patented by Mr. R. J. S. Graham, of 79 Murray street, New York city (care of Edward A. Boyd). It has an open frame, which may be drawn together or spread apart by an adjusting screw, and has a movable bar which hooks over the sides of the frame when the buckle is in use, but is released, so as to liberate the buckle tongue, by turning the adjusting screw.



THE NEW LAURENT SACCHAROMETER.

Mr. J. W. McGarrett, Jr., of Nashua, N. H., has devised a movable Copy Holder for children when learning to write, the advantage of which is that the copy may be moved down the page as the writing progresses, so that the learner may always have his copy before him, instead of using the line last written as a copy for the next. The holder is made of tin, wood, or other suitable material, and has flanges upon its edges to receive the copy slip, and feet which support it at the right inclination.

THE NEW LAURENT SACCHAROMETER.

We are indebted to *La Nature* for the annexed illustrations of an improved saccharometer, by which, it is stated, observations of unusual accuracy may be made. The apparatus is represented in longitudinal section in Fig. 1. A is a yellow monochromatic flame, placed at an invariable distance from the instrument. The burner is constructed so as largely to augment the intensity of the flame. B is a diaphragm containing a plate of bichromate of potash, which absorbs the violet and blue rays which exist in the flame, while allowing the useful yellow rays to pass. P is a bi-refracting prism, in which the second image is diverged to one side and intercepted by diaphragms. It turns on the axis, O E. D is a diaphragm carrying a thin plate of quartz parallel to the axis, the thickness of which is one half wave for the yellow rays. This is fixed and covers but the half of the diaphragm. E is another diaphragm; N, the analyzing Nicol; H, the objective; O, concave eye piece. The system, O H N, is mounted on an alidade, which turns on the disk, C, around the axis, O E. T is the tube containing the solution to be tested. C is a graduated disk having one or two divisions; one especially for sugar, the other in half degrees of the circle for any rotary substances. L is a lens for reading the scale.

M is a mirror throwing the light of the burner on the divisions and thus obviating the need of any additional light. The new optical disposition consists in the polarizing system, which is composed of two distinct parts—the bi-refracting prism, P, which turns, and the diaphragm, D, which with its half plate of quartz is fixed. In Fig. 2 this diaphragm is represented enlarged, as it is seen on looking into the instrument. The left half is covered by the quartz plate, the axis of which is also parallel to the line of separation, O A, and the right half being open allows of the passage without deviation of the polarized light from the polarizer, P, Fig. 1.

Let it first be supposed that the plane of polarization is parallel to O A. If this be left fixed and the analyzer, N, be turned, there will be a progressive passage from total extinction to maximum illumination, and the two halves of the disk will always remain equal to each other in intensity exactly as if the quartz plate did not exist. The plate being always fixed, let the polarizer be turned so that the principal section comes at O B, making with the axis, O A, any angle, α . Let a vibration occur in the plane represented by O B. This vibration, represented in length by O B, may be decomposed into two others

—one, O Y, parallel to the axis, O A, of the plate, and the other, O X, perpendicular. This vibration will pass without deviation on the right side, but on the left it will be deviated by the plate. The ordinate, O Y, being parallel to the axis of the quartz will not change sign, but the abscissa, O X, which is perpendicular thereto, will change sign, and will come to O X' at 180° , since the plate is a half wave in thickness; so that at the left side the vibration resulting will occur in the plane, O B', making with O A an angle, α' , symmetrical and equal to α . This plate therefore has for its object to determine at the left side a principal section, O B', placed with relation to the line of separation, O A, symmetrically to the principal section, O B, on the right side. If the polarizer be left fixed in this position, and the analyzer be turned so as to render the principal section, S P, perpendicular to O B, Fig. 3, there will be total extinction at the right side, but partial at the left side, as shown. Reciprocally, if the principal section, S P, of the analyzer is perpendicular to O A (Fig. 4) there will be total extinction on the left and only partial on the right side. Finally, if the section, S P, be perpendicular to O A (Fig. 5) there will be partial extinction for both sides and equality of tone, since $\alpha = \alpha'$.

If the analyzer be left fixed in this last position, and the polarizer be turned so that the principal section makes with O A angles varying from 0° to 45° , the two semi-disks will always remain relatively equal in intensity, but together will change their common intensity, passing from complete extinction to maximum illumination. In other words, if the apparatus is regulated at zero—that is to say, at the equality of tones—and if the polarizer be turned while their relative intensity will not be changed, their common one will pass through all degrees.

If, however, after causing the polarizer to make any angle whatever with O A, and leaving it fixed in this position, the analyzer be turned over a small angle in either direction from S P, Fig. 5, then the equality of tones in the two semi-disks is at once broken, and one becomes dark and the other light. This sudden change allows of the determination, with great precision, of the position of the analyzer; that is, of the zero of the instrument when no substance is interposed. If by interposing a substance possessing rotary power the equality of tones is destroyed, it is necessary to turn the analyzer until this equality is re-established, and the angle over which the analyzer is moved shows the rotary power of the substance.