straight and cross belt, or by having friction pullies to reverse the motion, situated behind the table near the saw; or by the men who edge and split the lumber, simply by extending a light shipping-pole or rope along and over the table, out of the way and within their reach at all times.

In Fig. 2 we have a section of the edging table and its machinery. The table itself runs on the large friction rollers, A, which work on journal boxes set in the frame, B. The table and platform on which the workman stands are both driven by the rack and pinion seen at C, and the platform is supported by the small friction rollers, one of which is shown at D. The feed rolls, A, in Fig. 1 (perspective view), can be adjusted to suit any sized log, and the timber to be sawed is supported on the carriages, E, and taken as it issues on the further end by the head seen in the background. By attaching a block and fall to the upper part of the building, the feed rolls can be swung up out of the way entirely, and easy access obtained to the saws or other parts of the machinery. The width of the saws is regulated by iron guides or gages, F, inserted in a frame at the end of the saws; and the general arrangement of the mill is workmanlike, ingenious, and convenient, and reflects credit on the skill and enterprise of the inventor.

The advantages of this machinery may be summed up as follows:—It enables the mill to do more work, and it also saves a great deal of lumber, inasmuch as it economizes time, giving the men opportunity to adjust the timber to the saw more carefully upon the table, literally preventing the haste which makes waste. These improvements, having been in use during the last two years, almost constantly, summer and winter, are recommended to mill-owners and manufacturers as valuable. They may be easily attached to the present gearing of any mill, with slight alterations, and at small expense.

The patent for this invention was procured through the Scientific American Patent Agency, on Jan. 6, 1863, by A. Cushing, of St. Johns, N. B. Further information can be obtained by addressing the inventor as above.

The Action of the Sun.

Every mechanical action on the earth's surface, every manifestation of power, organic or inorganic, vital and physical, is produced by the sun. His warmth keeps the sea liquid and the atmosphere a gas, and all the storms which agitate both are blown by the mechanical force of the sun. He lifts the river and the glaciers up the mountains, and thus the cataract and the avalanche shoot with an energy derived immediately from him. Thunder and lightning are also his transmuted strength. Every fire that burns and every flame that glows dispenses light and heat which originally belonged to the sun. In these days, unhappily, the news of battle is familiar to us, but every shock and every charge is an application or mis-application of the mechanical force of the sun. He blows the trumpet, he urges the projectile, he bursts the bomb! And, remember, this is not poetry, but rigid mechanical truth. He rears, as I have said, the whole vegetable world, and through it the animal; the lilies of the field are his workmanship, the verdure of the meadows, and the cattle upon a thousand hills. He forms the music, he urges the blood, he builds the brain. His fleetness is in the lion's foot; he springs in the panther, he soars in the eagle, he slides in the snake. He builds the forest and hews it down—the power which raises the tree and wields the axe being the same. The clover sprouts and blossoms, and the scythe of the mower swings by the operation of the same force. The sun digs the ore from our mines, he rolls the iron, he rivets the plates, he boils the water, he draws the train. He not only grows the cotton, but he spins the fiber and weaves the web. There is not a hammer raised, a wheel turned, or a shuttle thrown, that is not raised and turned and thrown by the sun. His energy is poured forth into space, but our world is a halting place where his energy is conditioned. Here the Proteus works his spells.—*Heat considered as a Mode of Motion, by Professor Tyndall.*

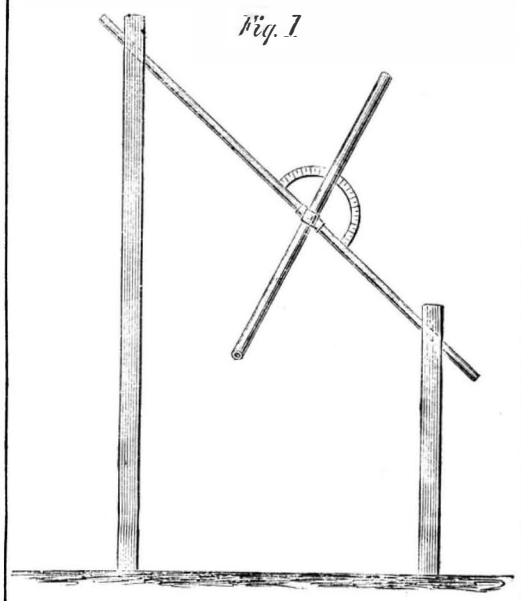
Scollay's Burial-case.—Mr. George B. Boyle has left this city recently to establish an agency in New Orleans for Dr. Scollay's deodorizing burial-case, which is extensively used now for preserving deceased persons intact for many weeks.

A LESSON IN ASTRONOMY.

Ingenious mechanicians have constructed orreries, celestial globes, maps and numerous other instruments to aid us in obtaining a correct conception of the motions of the heavenly bodies; but for understanding the *apparent* motions, none of these artificial devices are so good as the heavens themselves—that great celestial globe which was fashioned by the Architect of the Universe, and which, suspended on its two pivots, rolls daily around us. We have only to watch the sun, the moon and the stars, to perceive that they are apparently set in a hollow shell, in the center of which we stand, and which is slowly rolling from the east to the west, over our heads and under our feet perpetually.

A very simple instrument, which any school-boy can construct, will aid materially in watching these motions of the heavenly bodies, and will illustrate the principle on which a large part of the astronomical observations are made. Let two posts be set in the ground, the second considerably shorter than the first and due south of it, so that a rod passing through holes in the upper ends of the posts may point exactly towards the north pole of the heavens.

Fig. 1



To find the position of the north pole we must first find that most brilliant and best known of all the constellations, and which is variably called "The Big Dipper," "Charles's Wain" or "The Great Bear"—in the Latin, *Ursa Major*. The two stars in the end of the "Big Dipper" point very nearly towards the "North Star," and that is situated in the end of the handle of the "Little Dipper" or the end of the tail of *Ursa Minor*. The north pole of the heavens is at this time about two degrees from the "North Star," its position being indicated in our engraving by the cross.

Fig 2

The rod should fit the holes in the posts so loosely that it can be turned upon its axis, and a tube is secured to it near the middle by a pivot so that the tube may be inclined at any angle with the rod.

Now if the tube is set at right angles with the rod and the rod is turned round upon its axis, the tube will describe a great circle in the heavens midway between the north and south pole. This circle is called the equinoctial. If the tube is pointed at any star and the rod is turned upon its axis, the tube will describe the circle in the heavens which the star will travel during the 24 hours.

When the tube is pointed towards a star, the angle of its variation from a right angle with the rod gives the declination of the star, either north or south, and this may be measured by a graduated arc attached to the rod.

If clockwork is connected with the rod so as to turn it from east to west upon its axis just half as fast as the hour hand of a clock, that is, once in 24 hours, and the tube is then pointed towards any star in the heavens, it will continue to point towards the same star during the whole of its circuit.

A telescope mounted in this way is said to be *equatorially* mounted; and in our large astronomical observatories many thousands of dollars are expended in mounting the great telescopes with sufficient solidity and delicacy to follow precisely the tracks of the stars.

The rod is parallel with the axis of the earth, and if the axis of the earth pointed to the center of the "North Star," as the star is larger than the earth, the rod would point at some part of the star. The distances of the stars are so great that the apparatus works practically the same as if the rod was right at the axis of the earth.

Is a Patent Skate adapted to breaking Horses?

A correspondent, writing to *Goward's Real Estate Register*, gets off the following excellent story about our worthy cotemporary, Otis Brewer, the editor of the Boston *Cultivator*:—

"In the Scientific American for March 2, 1861, [Vol. IV. (new series) No. 9,] is a fine engraving of an apparatus, or gearing, for breaking ugly, fractious horses; and just below, on the same page, is an engraving of the 'Arctic skate,' invented and extensively manufactured in Uxbridge, Mass., by Bradford Stetson. Hastily looking over that page [136] and getting the two inventions slightly mixed, Mr. Brewer wrote a note to Mr. Stetson, the skate inventor, and requested permission to publish (in the *Cultivator*) the engraving of his original 'horse-breaker,' as he though it 'a nice thing.'

"Stetson, who is something of a wag, as well as the best mechanic in New England, wrote back that he thought Mr. Brewer had drawn a too hasty conclusion in calling his invention a 'horse-breaker!' The old article was sometimes called *head-breaker*, but, by the improvement of the gearing, and the entire absence of buckles, spurs and strings, this new invention, with much truth, could, in the language of Mr. Brewer, be called 'a n-*ice* thing!' Brewer, who is one of the best men alive, but as free from fun as a chicken from wool, did not fully understand Stetson's letter, and, after waiting a few months, wrote again for the engraving of the 'horse-breaker.' Stetson replied in the same vein as before, complimenting the agricultural editor on his good judgment in approving his invention, but again suggesting the propriety of examining the cut carefully, to see if it was truly the one he wanted, although he added, 'Those who have tried it pronounce it 'the biggest thing on ice!'

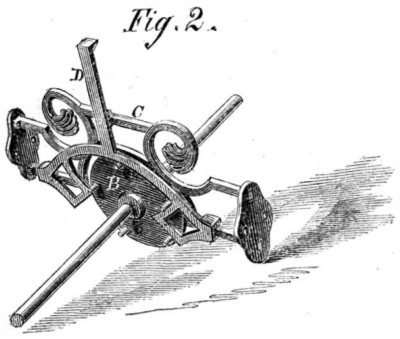
"For nearly two years this correspondence has been carried on, with good humor on one side, and wonder on the other, that he did not receive the engraving for the patent 'horse-breaker;' and he will now learn for the first time, through this letter, that he has been corresponding with the inventor of the 'Arctic skate.' Is it not a remarkable fact that all great inventive geniuses have a passion for fun? This fact has impressed itself on my mind for many years. Stetson is a genius, and is as well known as any mechanic in America. His Arctic skate has, during the past winter, superseded everything in the market. The skate is peculiarly formed, having no curls, loops or rings to catch sticks or strings to throw the wearer; it has no buckles, screws or strings to fasten with, but is made firm to the foot by two broad leather straps, with no visible ends."

Destruction of the Tredegar Iron-works in Richmond, Va.—About eight days after the celebrated raid of Stoneman carried terror into the heart of the Virginia people, the Tredegar Iron-works took fire, and were burned to the ground. The fine machinery in the buildings was entirely ruined, and many of the workmen lost from three to five hundred dollars' worth of tools. In the works were sixteen new guns, which had just been cast and finished for the new gunboats recently constructed for the defense of Richmond. These guns were ready for mounting, wanting only the finishing of the touch-holes, and were rendered perfectly useless by the intense heat to which they were subjected. From the Tredegar Works the flames communicated to the woolen factory opposite, which was the largest in Virginia, and which was also reduced to ashes. The origin of the fire is involved in mystery.

Improved Hand Cultivator and Seed Planter.

This machine is designed to fill a place in horticulture between planting and hoeing by hand, and planting and cultivating with horses. Fig. 1, shows the arrangement of the machine. The frame, B, in front of the wheel is stationary and supports a corresponding frame, C, to which the tools are attached; it is made to slide up and down, and is held in its place with guides, and regulated to the proper depth by an adjusting apparatus composed of the perforated plate, D, pin and spring, E, and the rod, F, and pinion, C, working in a rack on the movable frame, C. This frame may be taken off by removing the guides. Similar frames with different kinds of tools may be attached for cultivating between rows of plants by hand. The quantity and size of the seed sown is regulated by adjustable cells in vibrating or sliding plates (the plates being also removable when desired), working in the seed box A. The seed passing through the tube, H, is covered by a share following the same, and packed if desired, by the wheel of the machine passing over it; if not desired to pack, the machine can be reversed and the seed planted after the wheel. The seed box, A, is held in its place by pins, and may be taken off when desired, leaving the cultivator unincumbered. By changing the frames any kind of garden tools adapted to the machine may be employed. The distance at which the seed are planted is regulated by the actuating device, I, seen at the right of the wheel; also shown on a larger scale in Fig. 2, in which B is a wheel on the driving shaft, with an odd number of pins or projections on the periphery, from one to any number desired. One permanent pin and two made to screw off on one side, with five permanent ones on the other side, will be found as convenient as any other plan. The frame, C, is fitted with rods for the sliding device, D to work on; a pin pressing against a double bevel joint on one end of the slide, pushes it forward, while another pin pressing the double bevel joint at the other end of the slide,

Fig. 2.

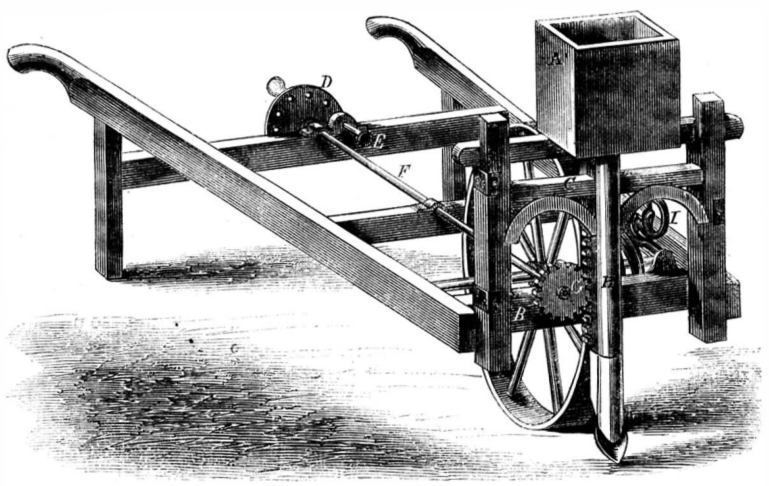


pushes it backwards. The slide, D, is held in its place with springs or screws, and can be applied to each side of the wheel. The distance at which the seed are planted is regulated by the number of pins on the wheel, B (Fig. 2), the size of the driving wheel and the orifices in the feed plates, enabling it to plant from one inch to four feet apart, a continuous stream, or even a single turnip, or larger seed at a time as wanted, such as beans or corn. These improvements in seed planters are also adapted to horse-power machines. This invention was patented by James K. Dugdale of Richmond, Ind., on May 13, 1862, and again on April 7, 1863; further information can be had by addressing him as above.

A Splendid New Sleeping Car.

A new sleeping car, which cost $4,000, has lately been placed upon the Chicago & Rock Island Railroad It is 56 feet long—8 feet longer than the ordinary car. It contains three rooms. The main room is 38 feet long and contains twenty beds. At each end there is a saloon 9 feet long; both finished and furnished alike. Each saloon contains a sink, a washroom, with elegant marble-top stand and silver-plated fixtures, a sofa, an elegant mirror, coat-hooks and other accommodations. In the center of the roof, running the entire length, is an aperture 1 foot wide. Over this is raised a "steamboat roof," 2 feet high and 3 feet wide, with registers for ventilation; through this all the impure air (which has ever been the bane of sleeping cars) escapes. The upper berths are thus made as pleasant as the lower ones. To each upper berth there are two ventilators, one at each end, which the occupants can regulate at will.

Fig. 1



DUGDALE'S HAND CULTIVATOR AND SEED PLANTER.

The mattresses are all made of hair. The windows are filled with double sashes, so as to keep out dust, and are provided with brocade curtains instead of blinds. The car is splendidly lighted by lamps and reflectors in the roof, and carpeted with Brussels carpet throughout.

LOCKWOOD'S PATENT SHOT-HOLE STOPPER.

It is well known to most persons that shot-holes

Fig. 1

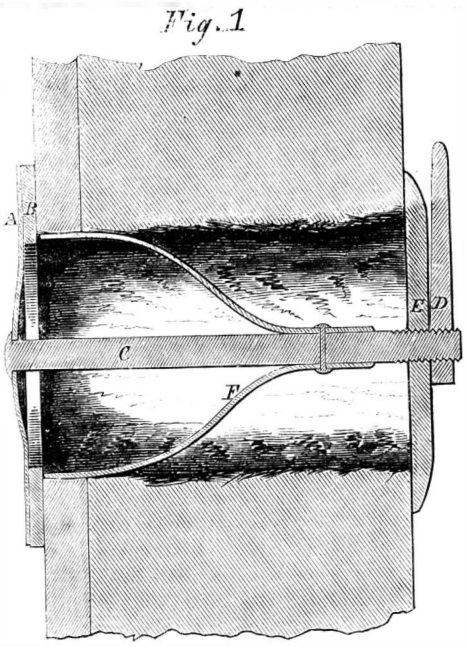
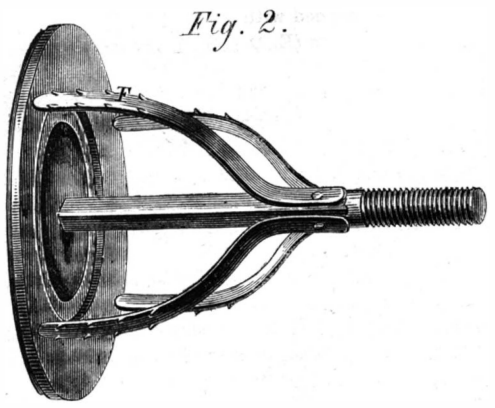


Fig. 2.



through the side of a ship, when below the water-line, greatly endanger the safety of the vessel and cargo, and that they are sometimes very difficult to stop on account of their ragged nature and irregular form. We illustrate herewith a device for stopping leaks of the kind in question; Fig. 1 shows a section of a vessel breached by a shot, and Fig. 2 is a perspective view of the invention. The metallic plate, A, is curved in a suitable manner to make it strong, and is faced with felt, B, or any elastic substance deemed best for the purpose. The stem, C, has a thread on the end, and is also provided with a nut, D, and washer, E. To the stem is riveted the springs, F; these serve to center the outside plate over the hole, so that it will seat itself properly and cover all parts of the aperture. These details comprise the invention. The operation is easily seen at a glance. The locality of the leak being ascertained, it is only necessary to dive down or reach it by other means (such as fastening the plate on the end of a boat-hook) and shove the plate over the leak. The springs center the apparatus properly, and the barbs on the same prevent it from slipping out before the nut is applied; it only remains to screw up the nut on the inside, and the leak is stopped. This is a very convenient and easily-adjusted device; it is much better than the ordinary wooden plugs used for the purpose, and is applicable to all classes of vessels, iron-clad and otherwise. It was patented by Edmund Lockwood, of Ulster, Pa., on Feb. 25, 1862. Any further information may be had by addressing him as above.

Honor to the Discoverer of Photography.

The degree of LL.D. was, on the first of April last, conferred upon William H. Fox Talbot, Esq., in the University of Edinburgh, Scotland, upon which occasion Prof. Muirhead made the following address:—

VICE-CHANCELLOR:—I now present to you, as also accounted by the Senatus Academicus worthy to have conferred upon him the honorary degree of Doctor of Laws in this University, William Henry Fox Talbot, Esq., a Master of Arts of Cambridge and a Fellow of the Royal Society. It is not because of his political services that I present Mr. Talbot to your notice (though he, too, has had a seat in the Legislative Council of the nation), but because of his pre-eminence in literature and science, and the benefits his discoveries have conferred upon society. When I tell you, sir, that at Cambridge, Mr. Talbot was in mathematics a wrangler, and in classics the Chancellor's medalist, I but mention some of those early honors that were looked upon as earnests of his future triumphs. His subsequent career has not been behind his academic promise. Literature owns with gratitude her obligations to his philological inquiries. Oriental antiquities—and, in particular, the cuneiform inscriptions of Assyria—have been materially elucidated by his investigations. The transactions of our learned bodies and the medal awarded him by the Royal Society in 1838 bear witness to the value of his mathematical researches, especially in the field of optics; and chemistry has profited not a little by his experiments in connection with the spectrum analysis. But all these claims of his to grateful recognition pass into the shade when contrasted with that one which no man, sir, is better able to appreciate than you—his claim to our acknowledgments as the discoverer of the art of photography. Wedgewood and Davy, indeed, had early in the century some faint idea of the secret; the elder Niepce had experimented not entirely without success; Daguerre had announced that he had overcome the difficulties that had baffled his predecessors; but it was Mr. Talbot who first made known that method of photogenic operation which, however imperfect originally, has yet formed the basis of all that is valuable in the subsequent development of the art. The photography of the present day—far still, no doubt, from perfection, yet productive of exquisitely-beautiful results, and capable of application to innumerable industrial and æsthetical purposes——owes its existence to him. The discoveries of Herschel, Niepce de St. Victor, and Archer, much as they contributed to the advancement of the art, yet all were based upon the conclusions at which Mr. Talbot had arrived after years of patient scientific investigation and experiment. Niepce and Daguerre, who had attained results hardly less evanescent than the sunbeams that imprinted them, reaped substantial reward from a Government proud to claim for France the honor of their comparatively worthless discoveries. Mr. Talbot is left to obtain his acknowledgment in the gratitude of his countrymen, and the distinctions which we, and others who appreciate his labors and know their intrinsic value, have it in our power to bestow. Confer, then, upon him also, I pray you, sir, the honor for which I now present him, and of which his literary and scientific attainments, his philosophical and philological researches and the important services he has rendered to industrial and æsthetical art, make him eminently worthy.

The Vice-Chancellor (Sir D. Brewster) then, amid great applause, conferred the degree upon Mr. Talbot. The body of the hall was crowded with students, and the galleries were filled with ladies.