Nebraska Coal.

Professor L. E. Hicks, of the University of Nebraska, writing in the *American Journal of Science*, says:

It has long been a mooted question, both in the minds of geologists and of practical miners, whether there is coal in Nebraska that will pay for mining. The citizens of Brownville, Nemaha County, have been making a practical test of this matter, for which they deserve much credit, since their test well has brought to light facts of great scientific interest and value irrespective of the economical results.

The boring was begun at an elevation of 919 feet above the level of the sea, and carried to the depth of 1,000 feet 10 inches, or 81 feet 10 inches below sea level. The surface rocks at Brownville are upper carboniferous, and show traces of coal, as, for instance, in the west bank of the Missouri River just above the railway station. The drill penetrated the lower coal measures, but did not pass through them. These are the productive measures of the carboniferous in Iowa and in the States farther east. Here, therefore, is the place to find coal if it exists at all in paying quantities in Nebraska. The only seam found in the lower coal measures was one of bituminous coal of fair quality, 30 inches in thickness, at a depth of 820 feet 8 inches. The boring was carried 180 feet further without encountering any more coal. Below the 30-inch seam nothing was encountered but the shales, limestones, and sandstones ordinarily found in the lower coal measures. This renders it improbable that any more coal would be found at greater depths, although the demonstration would have been more complete if the hole had been put down one or two hundred feet deeper.

Above the 30-inch seam three other thin seams were found; one 8 inches thick at a depth of 93 feet, another 14 inches thick at a depth of 242 feet, and a third 10 inches thick at a depth of 375 feet. These evidently belong to the upper coal measures, as there is an interval of nearly 400 feet of barren rocks between them and the 30-inch seam. Immediately below the 14-inch seam is a stratum of sandstone, 20 feet thick, containing water strongly impregnated with salt and other minerals in solution, which flowed out at the top of the well.

Whether the 30-inch seam can be profitably worked at a depth of 820 feet is a question for the practical miner rather than for the geologist. It would at once be answered in the negative where fuel is plenty, but in this land of prairies and magnificent distances from productive mines the answer is not so much a matter of course.

IMPROVED TRICYCLE.

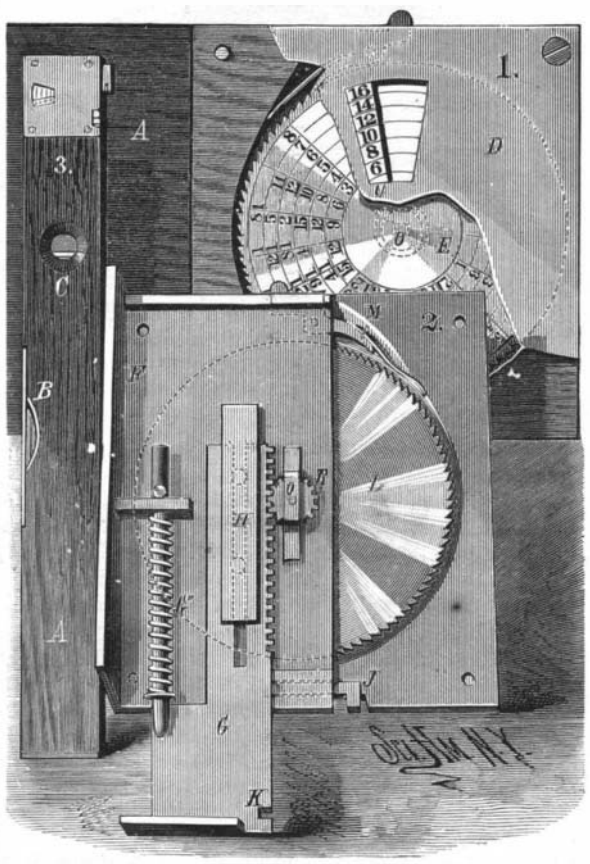
The two driving wheels are mounted rigidly on the axle supporting the vehicle frame, which is provided at its rear end with two standards carrying the seat. The steering wheel is journaled in a fork turning in the front part of the frame; the wheel is turned by means of a rod extending to within easy reach of the rider. Near one end of the axle is mounted a pinion, which engages with a cogwheel mounted outside of the frame, on a shaft placed parallel with and a short distance in front of the axle. On the shaft are two ratchet wheels, at each of which is a rocking pawl frame, which has a weight on one end and pedals on the other. The weights swing the front ends of the frames down to give the pawls a fresh grip. The two frames are depressed alternately, and by means of their pawls acting on the ratchet wheels they revolve the axle through the gearing, which is so arranged that every time a rocking frame is depressed the driving wheels make one revolution. Great speed is thus obtained. The tricycle is simple in construction and strong.

VOSSMER'S IMPROVED TRICYCLE.

This invention has been patented by Mr. F. W. Vossmer, of 726 West Huntingdon Street, Philadelphia, Pa.

IMPROVED SPIRIT LEVEL.

In the accompanying engraving of a spirit level patented by Mr. William Grams, of Sturgis, Dakota, Fig. 1 is an enlarged side view, partly broken away, of one end of the level, Fig. 2 is an inside view of the end casing, and its mechanism for moving the indicator dial, and Fig. 3 is a face view of the level. The body, A, of the level is fitted with the usual leveling tubes, B and C. The metal plate, D, is formed with an opening, through which the numerals on the dial may be read, and is let flush into the face of the level. An angle plate, F, has an inner flange plate lying just behind the dial and an end plate covering the end of the level. The slide bar, G, has a foot plate which rests on the work to be leveled. This bar is held so as to slide on the plate, F, by means of pins, fixed on which is the plate, H; these pins work in a slot in the bar. A spring on the rod, G″, acts to force the slide bar outward, as indicated in Fig. 2. A slide pin, J, may be passed into the notch, K, to hold the slide bar flush with the edge of the level, so that it will not interfere with the use of the level in setting work plumb by the spirit glass, C. The indicator dial is formed upon a plate, L, having ratchet teeth which are engaged by a pawl pivoted to the plate, F. The dial is fixed rigidly to a shaft, O, which carries a pinion, R, meshing with teeth formed on the edge of the bar, G. As the bar is moved in and out, the dial will be turned to carry its radial rows of figures in front of the opening in the plate, D. The dial is divided into spaces by concentric and radial lines. Each space represents by one radial row of figures sixteenths of an inch, while the larger radially arranged figures represent full inches. The graduations of the spaces indicate the extent to which the work is out of level, and as each space passes the opening, the numerals placed at U, along one edge of the opening, serve by comparison with the numerals of the spaces to show the extent to which the work stands out of level for any given length, all the numerals reading outward. The dial is graduated according to the length of the level. The pawl, M, extends beyond the upper edge of the level, so as to be pressed with the finger.



GRAMS' IMPROVED SPIRIT LEVEL.

The bolt, J, being withdrawn from the notch, the bar, G, is forced outward by the spring, the teeth of the dial escaping freely past the end of the pawl. The level is then laid on the work, the end of the pawl is depressed by the finger to disengage it from the dial, and the end of the level is depressed to carry the bar, G, inward until the spirit glass, B, indicates that the tool between its lower end and the foot of the bar, G, stands level. The pawl then being released holds the dial in the exact position to which it was carried when the true level was indicated. The dial will then show just how much the work stands out of level for any given length in the level, shown up to sixteen feet in length, and for any length beyond that the variation from a true level may be readily calculated.

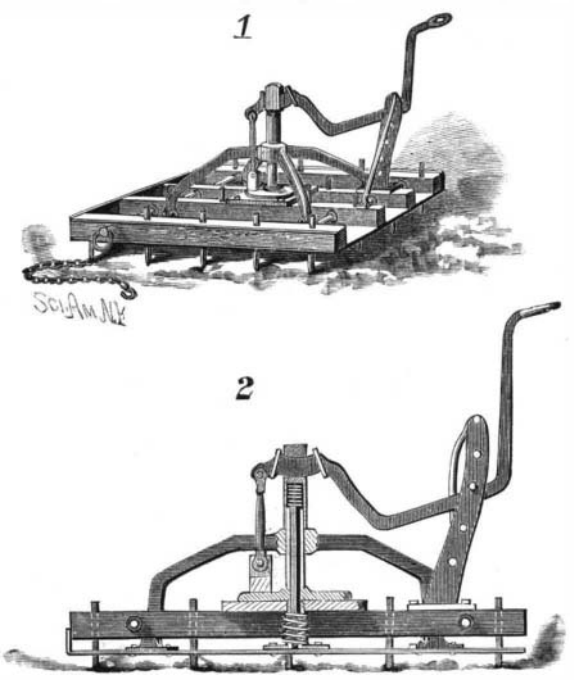
A FRIEND at our elbow says he is tired of hearing the cry of *overproduction* so generally repeated as the cause of our hard times. He suggests, for a change, *lack of consumption* to be the cause.

Genius Should Be Recognized.

It is not generous to withhold an expression of sympathy for those who have failed in the accomplishment of great undertakings, in which they have embarked all their pecuniary, physical, and intellectual resources. As a general rule, people are hardly considerate enough toward the unsuccessful. There is too much disposition to forget their pluck and perseverance, and sneer at their trustfulness. We ought to bear in mind that it is this sublime audacity of faith to which we are indebted for the marvelous achievements of our age. The struggles, trials, repulses, defeats, which have preceded most, if not all, of the triumphs of ingenuity which steam and electricity have wrought must have been very wearing to the nervous system. The patience and courage of inventors are proverbially heroic, but we seldom know, or care to know, anything about them till they have won the crown of victory. Happily, genius is irrepressible, and not easily daunted because it lacks appreciation. It is continually astonishing the its world with fresh exploits, and there is little fear that its progress will be stayed by obstacles of any sort. Still, it could be wished that the recognition and commendation of every effort to benefit mankind were more general and hearty than they are. It is a wise policy to encourage and foster the inventive spirit, in whatever useful channel it may be directed. The mechanical arts have been completely revolutionized within a generation by the introduction of novel machinery. In our own trade these appliances for utilizing labor have been wonderfully multiplied, and are constantly increasing. The results of them are seen in such a limitless capacity for production that the only way we can prevent the supply from running ahead of the demand is by lightening the toils of our artisans.

IMPROVED HARROW.

A thin plate of steel or iron, of the same area as the harrow, is fitted on the teeth in such a manner that it can be moved up to the under side of the frame or down to the points of the teeth, in order to force down the trash collecting on the teeth and make it leave the points; it is also used as a gauge to regulate the depth of the teeth in the ground, and also for a smoothing plate to smooth the surface of the ground, by setting it down to the points of the teeth, when it will run upon the surface. To the center of the top of the plate is connected a rod which extends through a tubular standard supported on top of the frame. This standard acts as a stay for the rod and as a guide for a spider frame, the lower ends of the arms of which are attached to the plate. The top of the rod connects with a presser which surrounds the top of the standard, and rests on top of the hub of the spider frame. The upper end of the presser is joined to a hand lever, whose short arm is connected to a link jointed to the top of the harrow frame. The long arm of the lever swings along a standard attached to the top of the frame, and formed with a series of pin holes to hold the lever in different positions, according to the distance it is required to set the plate down along the teeth. The plate is raised by a coiled spring surrounding the lower end of the rod. A second coiled spring, fitted in the socket of the presser, is so arranged as to act in conjunction with the lower spring to lift the plate. The lever passes through a slot in the upper part of the presser, and has a curved notch in the upper side—the presser being correspondingly curved—to form a good bearing and easy working joint. The plate is formed with flanges on its forward edges to prevent earth from collecting between it and the under side of the frame.



DREW, LEISNER & NELSON'S IMPROVED HARROW.

This invention has been patented by Messrs. C. Drew, A. W. Leisner, and Philip Nelson, and further particulars can be obtained by addressing the latter at Las Vegas, New Mexico.