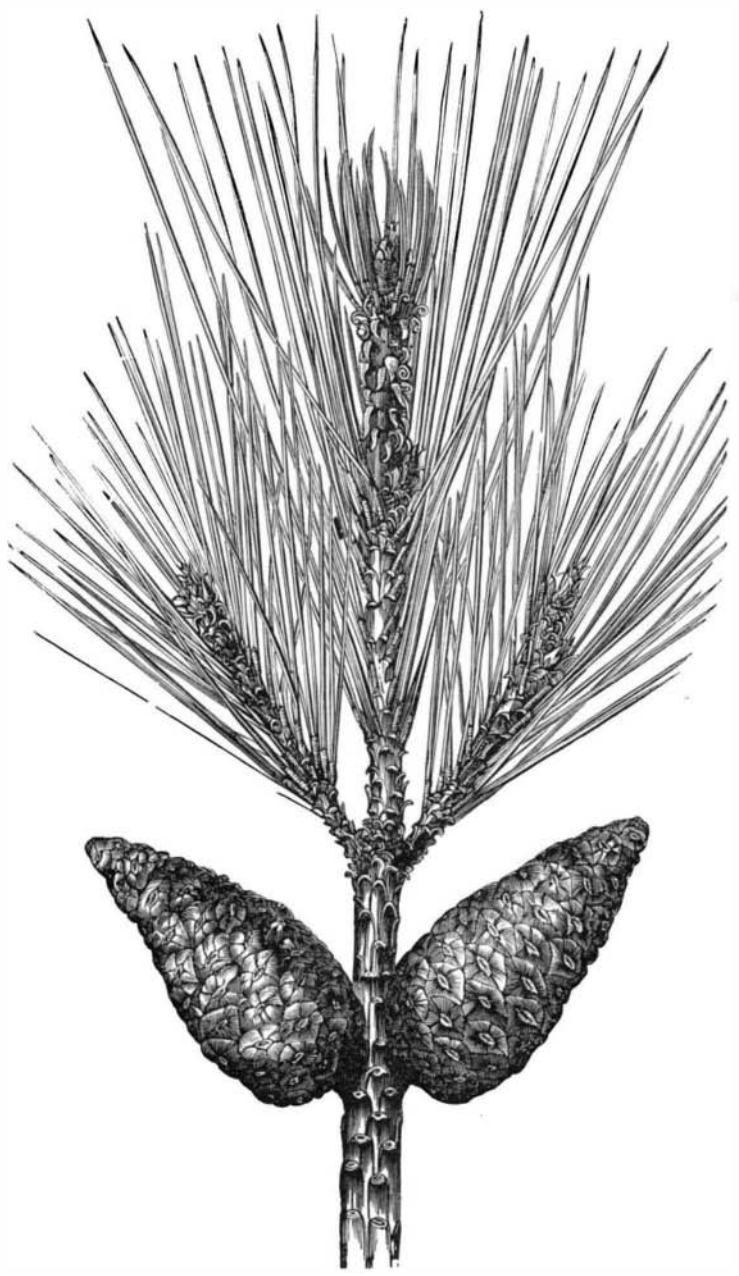
noon, and night. The third day the number of ants had greatly diminished, and on the fourth there were none. He at once concluded the ants had all been destroyed, but in the attics he found a few feeding on dead house flies, which led him to suppose that the remainder had become suspicious of the sweet cake. He accordingly distributed through the house pieces of bacon, which were afterwards found swarming with ants. This was repeated with the same result for several days, when, in like manner with the cake, the ants finally ceased to visit the bacon. Pieces of cheese were next tried, with the same results, but with an undoubted thinning in the multitude of ants. When the cheese proved no longer attractive, recollecting the feast on dead flies in the attic, dead grasshoppers were supplied from the garden. These again proved too much for the ants, and after a few days' trial neither grasshoppers nor anything else attracted them. They appear to have been thoroughly exterminated, nor has the house since been infested with them. Professor Leidy regards the action of the ants as indicating a ready disposition to become circumspect.

THE PYRENEAN PINE.

The foliage of this tree is very distinct, quite unlike that of any other conifer. The leaves are in twos, of a beautiful grass-green color, and from 6 inches to 7 inches in length. It can easily be distinguished from other pines on account of the deep yellow colored bark on its young shoots; the cones are about 2½ inches long, rather egg-shaped, on short footstalks, sometimes in twos, but mostly solitary. It is found on the Pyrenean mountains, where it forms extensive forests. This tree is highly ornamental, especially when young, its fine, upright-growing, light green leaves, and the orange colored bark on the terminal shoots being its most striking and beautiful features during that stage; but when older, it assumes a coarser habit of growth; its branches become stout, wide-spreading, and straggling, and altogether its general appearance is far from attractive. This pine has never been very extensively planted, on account of its scarce use in the trades, and the difficulty in procuring seed true to name. The wood is of inferior quality. We copy the illustration from the *Garden*.



THE PYRENEAN PINE.

Presence of Indigo in the Human System.

At a recent meeting of the Pathological Society, of London, Dr. Ord exhibited a specimen of a renal calculus containing indigo. He remarked that indigo, as well as a substance which yielded indigo blue under certain reagents, was sometimes met with in normal urine; but it had never before been met with in the form of a calculus. The specimen consisted of a black mass of the size of a half walnut, lodged in the pelvis of one of the kidneys. When heated on platinum foil it gave off a peculiar smoke, which had a sooty character; after incineration a small amount of a deposit of phosphate of lime was left behind. With the microscope, bluish-black masses and crystals could be seen; and after treatment with hydrochloric acid a black residue was obtained. On sublimation it yielded crystals in the form of six-sided tablets, just like indigo. After trituration with strong sulphuric acid, it gave a blue fluid, which finally had the spectroscopic characters of indigo, a single broad absorption band in the yellow and orange part of the spectrum. In regard to the formation of the substance, Dr. Ord stated that there had been nothing peculiar in the patient's food to produce it. Indol, which bears some relation to indigo, is formed by the action of the pancreatic juice and pepsones, and is present in the fæces. When indol is injected into the blood of a dog, indican appears in the urine. Now indican, richer in carbon and hydrogen than indigo, is decomposed by the action of acids into a mixture of indigo blue and glucine; and hence it is said that in this is to be found the reason of the presence of indigo in the urine of cholera, and in cases of obstruction of the passage of the fæces through the intestine. It is also found in pus, the greenish blue color of which is due to a substance allied to indigo. In the present case, pus contained in one of the kidneys may have been the source of the indican, which, being reabsorbed by the blood, was excreted by the other kidney, and precipitated as the colored indigo-blue by its contact with the acid urine. Whatever the explanation, it pointed to a direction in which the urine might be studied with profit. Dr. Thudicum remarked that the first urine of cholera contains a very large quantity of indican, so that the albumen in the urine is precipitated of a black color. But even if a substance was present only in a small amount, it was not, therefore, to be regarded of no importance, but the contrary.

RECENT experiments by Professor McNab on the rate of the ascent of fluids in plants, ascertained by the employment of spectroscopic examination of the diffusion of lithium citrate, gave a maximum result of 24 inches per hour

THE OIL BEARING SANDS OF PENNSYLVANIA.

The question as to the precise spot in which a well may be sunk with a sure prospect of "striking oil" is one of great importance to petroleum miners, and yet one which the most experienced and best informed oil men fail to answer with certainty; and, in fact, one that must await the completion of the present geological survey of Pennsylvania for its correct solution. Pending this result, however, Mr. Ashburner, one of the assistants of the survey, has, in a paper read before the Engineers' Club, of Philadelphia, given us some valuable information as to the rock formations and the relative positions of all the oil horizons of Western Pennsylvania, together with an estimate of the daily production of each horizon. That portion of the State in which petroleum has been found lies entirely west of a line drawn across the State, from its boundary at the southeastern corner of Greene County, to that at the northeastern corner of McKean County. The oil regions may be divided, for convenience of description, into three districts, the southwestern, the western, and the northern.

The southwestern district may be said to include that part of the State south of the Ohio river and west of the Monongahela river; the western, known among the producers as the "lower country," lies in the water basin of the Alleghany river, between Pittsburg on the south and the Philadelphia and Erie Railroad on the north; and the third, or northern district, lies entirely north of the Philadelphia and Erie Railroad, in the counties of Warren and McKean, and extends ten miles into the State of New York.

The strata of Western Pennsylvania lie comparatively horizontal, and their average dip from Bradford, near the State line, to Pittsburg, is about eighteen feet to the mile. Three thousand feet of the stratified rocks of the Carboniferous and Devonian ages in Pennsylvania have been found to contain petroleum. The highest stratum in which oil is found occurs in the coal measures, 165 feet below the Pittsburg coal seam, in Greene County; while the lowest occurs about 3,200 feet below the geological position of the Pittsburg coal seam in McKean County. If we should drill a well in Greene County 3,200 feet deep, starting on the Pittsburg coal, we would pass through the horizon of all the sands and sandstones in which the petroleum of the State has been found. The rocks are subject to very marked and rapid changes in their thicknesses, in comparatively short distances. What the changes in thickness may prove to be between McKean and Greene counties is not yet known; nor is it easy to say whether the total thickness of the stratified rocks between the Pittsburg coal and the "Sartwell" (or lowest) horizon will be found of a variable quantity, or much greater or much less than the above estimate at localities between the two counties.

The petroleum in the southwestern district comes from the highest rocks. The "oil-sand group" of this district is about 800 feet thick, and is composed of three sandstone members, separated by intervals containing coal seams, slates, and shales. The first, or upper, oil sandstone, 260 feet thick, shows considerable variation, and is often replaced by shale; in such cases the shale contains no oil. The second, or Mahoning, sandstone is quite constant in thickness, 135 feet being the average. It is the principal repository of the petroleum of the southwestern district. The third, or lower, sandstone is made up of three members, separated by about thirty or forty feet of shale and coal. The thickness of the whole is about 400 feet. The upper member is regarded as the oil bearing rock; the lower is the representative of the coal conglomerate or millstone grit. Some of the features of this district are very different from those of the other two. Small crevices in the oil sands are of frequent occurrence; and it is a striking fact that the oil is said never to have been found except where a crevice has been so struck. By some this feature has been considered a necessary one to the original production of the oil. Professor Stevenson, however, states that the oil in nowise owes its origin to a disturbance of the strata, but that the only effect of the latter has been to provide reservoirs for the oil in the rock already oil bearing. Between the bottom of the coal conglomerate (the lowest member of the lowest oil-producing sandstone of the district under consideration) and the "first oil sand" (the highest producing sandstone of the western district) there is an interval of from 650 to 700 feet of shales and sandstones, forming the barren oil measures, or mountain sand group. These rocks are perfectly destitute of any economical strata, containing no coal, iron, or oil.

The petroleum producing sands of the western district are found intermediate between the high rocks of the southwestern district and the low rocks of the northern. The total thickness of the group is 315 feet, and consists of three strata separated by two intervals of 105 feet and 110 feet respectively. The first sand produces a heavy lubricating oil, of from 30° to 35° gravity; the second, an oil of about 40°; and the third, the usual light oil, of from 45° to 50° gravity. The latter sand is the most productive, and yields most of the oil of commerce. The well records along the "green oil belt," in Venango County, show great uniformity in the arrangement of the sand rocks, being sharply defined, massive, and lying at regular intervals. Going southeast from this belt, they gradually split into several members, becoming finer and finer in their composition, and shade off into shales. Going to the northwest, the third sand terminates quite abruptly; the second sand overlaps it and continues a mile or two farther; the first sand overlaps the second, and extends in some places a long distance beyond. Most of the wells producing from the first and second sands are located along these overlapping edges of the sand rocks. Wherever the lowest sand is adapted to the production of oil, the main deposit is found in it, and not in the sands above. The first and second sands do not produce oil along the center of the belt. In some wells oil has been obtained from all three of the sands; but in such cases the wells are not on the axis, but near the edge of the third sand; and but a short distance farther from the center no third sand can be found. These facts are suggestive, and seem to point to the conclusion that the oil sands are merely reservoirs which have acted as sponges in absorbing the oil that has ascended from a much greater depth. In such a case the oil would not be a product of the rock in which it is found.

The petroleum of the northern district comes from the lowest rocks. Between the "third oil sand" of the western district and the Warren sand of the northern district there is an interval of about 600 feet of shale, which is entirely barren. The Warren oil sand is very irregular in character, and the oil is found at horizons varying from 600 to 800 feet below the Venango third sand. In quality it very much resembles the "third sand oil." By many of the producers it is known as "slush oil," on account of the poor quality of the sand, and the rapid diminution of the product of the wells, which yield largely when first struck. The productive horizon of the Bradford oil belt in McKean County and Cattaraugus County, N. Y., occurs probably 300 feet, more or less, below the Warren horizon. The sand in this belt is of a finer and closer texture, and is more constant in character over a wide area than that of any other producing belt in Pennsylvania. This belt is the surest and safest territory in which to operate. The oil is of about the same gravity as that of the "third sand oil," but somewhat different in character. On account of these differences in the sand and oil, the Bradford wells are never pumped continuously, but "by heads," or at regular intervals. This is found necessary to keep the sand open or porous. A great deal of the oil obtained from the Bradford belt, along the State line, is found several hundred feet above the regular producing sand. The lowest oil of the northern district, and in fact in Pennsylvania, comes from the "Sartwell oil sand," but recently discovered in Liberty Township, McKean County.

This horizon is probably 400 feet below the Bradford sand, and has not yet been tested thoroughly. At present it is non-productive.

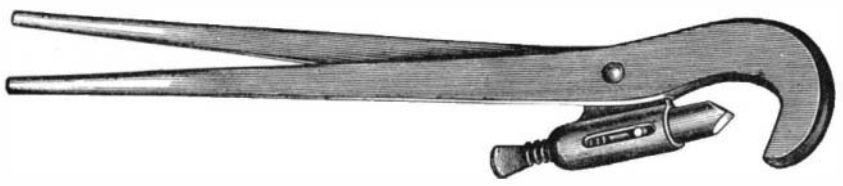
Petroleum has never been found in the three groups of oil measures in the same locality. Since the oil sands of the southwestern and western districts come to the surface in the northern district, we may never expect to find oil in them north of the Philadelphia and Erie Railroad. The question as to whether the northern district oil will ever be found in the western district, and the oil of both these districts in the southwestern district, is yet to be determined. If future explorations should prove this to be the case, it is safe to assert that, at the present price of crude oil, the wells would be too deep and too expensive to warrant their development.

IMPROVED PIPE TONGS.

We illustrate herewith an improved adjustable pipe tongs, so made that no smith's work is needed for dressing up, a few minutes' grinding being all that is required to keep the implement in good working order.

The gripping edge consists of a cylindrical piece of best cast steel, which is quickly adjusted to the pipe by the thumbscrew, and which, as shown in the illustration, has two edges. When the edge in use has become dull, the bit can be reversed, and it will be found that the friction on the lower edge has sharpened the one not hitherto used. The bits are easily removed, and may be re-ground until worn away, when they can be replaced by any mechanic, being simply pieces of round cast steel with an obtuse chisel edge. The thumbscrews have square threads, and are case-hardened to insure durability and prevent spreading at the point, and generally the tool is made in an excellent and substantial manner.

For further particulars address the manufacturers, Messrs. Pancoast & Maule, 243 and 245 South Third street, Philadelphia, Pa.



THORNTON'S ADJUSTABLE PIPE TONGS.

IMPROVED RECEIVER AND STENCH TRAP.

We illustrate herewith a new receiver and stench trap, made of cast iron, and fixed upon a level with the street gutter. It is connected with the sewer, and constructed as follows: A is a basin which is always full of water to the level of the bottom of the sewer, B. C is a door dipping three inches into the water in the basin, and resting upon a flange each side and along the top. Upon this flange packing is laid, and the door is closed and compressed upon the packing and flanges by a crossbar, D, which is forced by an inclined plane against the door. The door thus aids in forming a trap, which prevents the escape of any foul gas from the sewer into the street. The earth being excavated to the shape of the outside of the receiver box, the latter is lowered and fixed in its proper place, level with the gutter; and grout, composed of sand and hydraulic cement, is poured underneath and around the bottom, giving to the basin a firm bed. The space between the sides and ends of the receiver box is filled in with concrete.

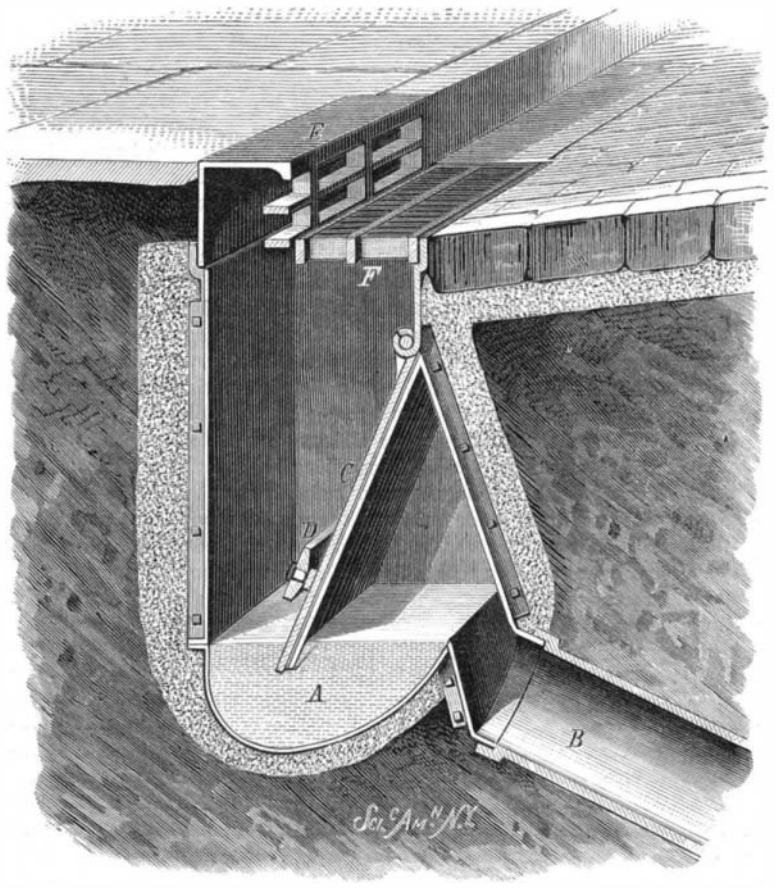
The street gutter is covered with a flat cast iron grate, F, which conducts the water from the street gutter into the receiver box. The grate, E, is fixed in the line level with the top part of the curbing, and is anchored at both ends on the top into the curbstone, and also on each side of the cast iron receiver.

In case the flat grate gets choked with leaves and street washing, the water will pass through the upright grate into the receiver box, thereby preventing the overflow of the street with water. That part of the receiver underneath the sidewalk is covered with a cast iron plate, connected with the horizontal grate.

The receiver is constructed in such a manner as to be self-cleansing. The front end being made at an angle, and that part of the basin which receives the water near the bottom of the door being contracted to equal the size of a fifteen inch sewer, the water, falling four feet from the level of the street gutter to the level of the water in the basin, will force all the sand and silt out of the trap and wash it through the sewer.

In order to take out obstructions and clean the sewer, it is necessary to remove the crossbar, D, and open the door or trap; when this is done, by using rods about four feet long, each with union joints, any tool necessary for cleaning the sewer may be connected to the rods, and the sewer can be cleansed from the receiver box to its connection with the main without breaking up the street.

The device is stated in numerous testimonials by city engineers and others to be exceedingly efficient in operation, and effectually to prevent any escape of sewer gas. For further particulars as to rights, etc., address the inventor, Mr. Thomas Dark, 408 North Division street, Buffalo, N. Y.



DARK'S CAST IRON RECEIVER AND STENCH TRAP.

THE ordinary work of a horse is stated at 22,500 lbs. raised one foot in a minute for eight hours a day.

INFLUENCE OF COSMICAL MATTER.

Some weeks ago we noticed Professor Doolittle's suggestion that shooting stars may have played an important part in determining planetary velocities. Immediately Professor Winchell entered a claim of priority, and sustained it by citations from a lecture delivered last December. Professor Doolittle promptly acknowledged the justness of the claim, but insisted that he was first in the deduction of consequences and relations. "So far as I can learn," he wrote, "Professor Winchell has the honor of having been the first to furnish a demonstration thereof whose soundness no scientific man can question. I think, however, that I may fairly claim to have preceded him in forming an approach to a proper estimate of its importance. Otherwise, I should regard him as inexcusable for having dismissed the subject with so brief a paragraph in a popular lecture, without making any other attempt to bring it to the attention of the scientific world."

Professor Doolittle "formed the conception of aerolithic acceleration of planetary velocities" in February last: Professor Winchell announced the same conception in December, 1877. Now there arises a new claimant in the person of Rev. S. Parsons, who discussed the same idea in an article on the nebular hypothesis, in the *Methodist Quarterly*, January, 1877. While showing that cosmical dust must, in the course of ages, present a sensible resistance to the motion of bodies through the universe, Mr. Parsons said:

"Professor Newton, of Yale College, estimates the number of shooting stars encountered by the earth during each year at about 400,000,000 (not for each day as Professor Winchell states). Calculations based on their apparent magnitude, as viewed from different points of the earth's surface, give them a diameter ranging from 80 to 120 feet. Supposing their density to be the same as hydrogen, the lightest known substance, the earth during the past 100,000,000 years has encountered and absorbed into itself a mass of matter equal to about one twelve thousandth ($\frac{1}{12184}$) of its own mass. Such an amount of resistance would be sufficient to change the earth's orbit from an extreme oval into its present shape, since in addition to diminishing the mean distance, and accelerating the velocity, the effect of the resisting medium is much greater in aphelion when the motion is slower, than it is in perihelion."

The history of this conception is worth preserving, since it is one of the most important of recent contributions to the science of astronomy. According to Professor Doolittle it helps to furnish the most satisfactory explanation of the following classes of phenomena: 1. The want of coincidence between the solar equatorial plane and the planetary orbital and equatorial planes. 2. The eccentricities of the planetary orbits. 3. The position of the inner moon of Mars. 4. The irregularities of the periods of Encke's comet.

From the shifting of the planetary planes, Professor Doolittle estimates that the earth, so far from being born full-grown, has more than doubled its mass since it commenced its career; but from geological considerations it must be supposed that by far the greater part of this acquisition was made before it solidified into a record-keeping condition. While geological confirmation of the theory is, therefore, not essential, it is still very desirable; and he infers that the theory will add new interest, and, perhaps, to some extent, give new direction to geological investigation.

American Horses in England.

The exportation of horses from this country to England, for use on street railways, began two years ago, and already over 5,000 of the Canadian and Morgan breeds have been shipped from this port and from Quebec. The English cart horse is too heavy and slow for tramway service, and as English breeders have given their attention almost exclusively to cart horses and blooded saddle and coach horses, they could furnish no animals suitable for the new want. The supply of light-built and enduring horses had been drawn chiefly from Ireland, but this source is almost exhausted. The American horses were at first used only on street railways, but they are now becoming favorites for family use. The Anglo-Russian complications have largely increased the demand this year, and it is expected that the exportation will amount to many thousands more than ever before.

New Agricultural Inventions.

Mr. W. K. Hill, of Brush Creek, Iowa, has patented a convenient apparatus for Cooking Feed with Steam, which is claimed to be especially economical of fuel. The fire chamber is entirely surrounded by water except at its door, the feed water is warmed before entering the steamer, and the supply is regulated automatically by a float valve.

A portable Scale for Weighing Bales has been patented by Mr. G. R. Williams, of Dardanelle, Ark. It is a beam scale suspended from the center of a yoke-shaped axle of the supporting wheels. From the beam are suspended, by crossbar and chains, V-shaped hooks, which take hold of the bale and are operated by guiding cords. The bale is raised by depressing the handle frame of the apparatus, the leverage rendering this easy.

Mr. G. C. Clark, of Freehold, N. Y., has patented an Improved Horse Potato Fork, consisting of a head attached to a tongue, and provided with adjustable teeth, and with spring catches for securing the handles of the implement to the head.

Mr. A. A. Russell, of Polo, Ill., has invented an Implement for Cleaning Horses, which is made by uniting a horse brush and currycomb in such a manner that the teeth of the currycomb may be caused at will to project beyond the face of the brush, by pressure applied by the fingers of the hand by which the brush is held and operated. Thus the comb may be brought into action whenever desired, and applied gently or forcibly. There is also a cleaning device in connection with the brush.

Mr. Jacob Künstler, of Thomas Hill, Mo., has invented an instrument for Paring Horses' Hoofs. It consists of a pair of hinged jaws, one ending in an arm, which rests against the hoof, and the other in a knife of suitable shape, and operated by lever handles.

Mr. E. J. Camp, of Alpharetta, Ga., has made an improvement upon the Plow forming the subject of letters patent No. 58,119. The invention consists in the construction of the standards, by which they may be attached to the beam on different sides, and thus adapt the plow for use as a subsoiler, or for "breaking up," and other purposes.

In a new Cultivator, the invention of Mr. T. J. Brown, of Fairfield, Texas, the essential feature, a circular rotating frame, carrying plows and rollers on caster wheels, is supported in guides in the main frame, and is directly attached to the tongue, so as to turn with it.

An improved Seed Planter, invented by Mr. T. B. Swan, is claimed to possess important advantages, among which is its adaptability for use in planting seeds of different sizes and kinds.

Mr. Benjamin Slusser, of Sidney, O., has patented an improved Earth Scraper, the novel feature of which consists in arranging the forward end of the handle in a socket attached to the scraper, and fastening the handle by a clamp, which is also attached to the extended ends of the tie rod, which holds together the sides of the scraper.

A Revolving Earth Scraper, patented by the same inventor, possesses some new points, designed to lessen the liability to revolve and empty itself while being filled or transported. The scraper is pivoted to the handles well back and near its center of burden, and right angled catches are attached to the rear ends of the bail, which operate in conjunction with two circular locking irons on the forward sides of the scraper, so that the scraper cannot revolve until the position of the handle is so changed at the will of the driver as to effect the disengagement of the locking devices.