

IMPROVED GRINDING MILL.

We give herewith engravings of an improved grinding mill recently patented by Mr. Stephen P. Walling, of South Edmeston, N. Y. The improvement relates to means for adjusting the stones and to the general construction of the mill. Fig. 1 is a central vertical section, and Figs. 2 and 3 are plan views. The mill represented in the engraving is a horizontal mill of the portable class, but the improvements may be applied to vertical and stationary mills.

The husk frame, A, supports the stationary stone and contains the spindle, B, upon which is mounted the running stone. The spindle rests in a step in the lever, D, fulcrumed in the lower part of the frame, A. This lever is connected with the shorter arm of the lever, E, which is weighted sufficiently to overbalance the weight of the spindle and running stone. At the upper end of the spindle there is a hardened steel plug that receives the end of the adjusting screw, F. This screw is prevented from becoming accidentally loosened by a packing of flexible rubber which takes the place of a jam nut. The spindle is held up against the adjusting screw by the counterweight on the lever, E, which keeps the running stone up to its work and at the same time allows it to yield whenever a hard substance chances to get into the mill, and brings it back into its normal position after the hard substance is discharged from between the stones. The adjustable plates, G, fill the spaces in the casing between the pillars and prevent the escape of flour dust. The spindle, B, is made in two parts, which are connected by the coupling, C. This coupling is capable of yielding so that a slight lateral motion in one part of the spindle does not affect the other part. The spindle is provided with means for continuous lubrication, and if by any means it becomes slightly heated the expansion tends to relieve the stones rather than to cause them to bind, as in the ordinary construction. In addition to these advantages the mill can be readily taken apart and the stones conveniently removed for dressing.

Further information may be obtained by addressing the inventor as above.

A NEW RAILROAD TIE.

The enormous consumption of timber for railroad ties, especially in this country, where we do not take time to use things to the best advantage, is making the right kinds of wood for the purpose more and more scarce every year. The *Lumberman's Gazette* estimates that as we have now about 90,000 miles of railroads the annual consumption of ties or sleepers alone is 40,000,000, or thirty years' growth of 75,000 acres. This tremendous destruction of cross-tie timber, only certain kinds and sizes of which can be used for the purpose, is using up the stock within reach so fast, and good ties are in consequence becoming so hard to get in many quarters, that railway managers are seriously turning their thoughts toward some substitute. Of course the only available rival of wood is iron, and the price of that article from various causes is, and is likely to be for a long time to come, so low that the difference in price between it and wood as a material for the purpose is not the insuperable objection to its use that it was only a few years ago. Indeed many of the European government railways, notably those of Belgium, have decided to lay only iron ties in the future. The German railway management have also advised the same, and it will doubtless soon be adopted. Some of the English railways are also trying them on a large scale. Taking a series of years, iron, from its almost endless durability, is so much cheaper than wood that it must eventually take its place, not only for railroad ties but for many other structural uses now monopolized by wood.

The accompanying engravings illustrate a new wrought iron cross-tie patented in the United States, May 11, 1875, and April 8 and May 20, 1879, by Mr. Henry Reese, of Baltimore, Md., and for which patents are now pending in England, France, Germany, Belgium, Austria, Italy, and

Spain. This tie is claimed to meet fully all the requirements of simplicity, cheapness, strength united with elasticity, ease of construction and of laying in track, and to be in all respects a practical solution of the question.

The large illustration is a perspective view of a section of track laid with this tie. Fig. 1 is a plan view of one end of a tie with the rail fastenings and a section of the rail. Fig.

effect is obvious. The springs by their reaction against the tie draw the permanent lugs with force against the rail base, and as these lugs alternate on opposite sides of the bar at short distances apart, the effect is to hold the rails firmly to the ties and make a solid substantial superstructure, at the same time allowing the rails to expand and contract with summer's heat and winter's cold.

Further information may be obtained from the patentee at 209 W. Pratt Street, Baltimore, Md.

ENGINEERING INVENTIONS.

An improved governor for marine and other engines, in which the speed is controlled by centrifugal balls, has been patented by Mr. Samuel Whitney, of Wheeler, Ala. In this device a worm gear is acted upon by a pinion in such a way as to rotate the governor spindle when the engine runs normally, but when the speed is suddenly increased, it will lift the valve stem and check its engine.

A meter for measuring the amount of steam consumed for heating purposes in stores, houses, etc., has been patented by Mr. Joseph A. Cook, of Auburn, N. Y. It consists of a reservoir for receiving water, and a float placed in the reservoir and moved by the water, so as to operate a pair of arms that move the registering mechanism. The same inventor has patented a self-adjusting valve for regulating the pressure and supply of steam for heating purposes.

An improved railway gate, constructed so that it will be opened by an approaching train and held open until the train passes, has been patented by Messrs. Lewis C. Pope and Obed N. Tencher, of Paola, Kan.

Mr. Samuel G. Martin, of South Amboy, N. J., has recently secured two patents for steam steering apparatus for vessels. By the use of two separate piston heads, in a single cylinder, the rudder can be held centrally or to either side. For double-ended vessels two steam cylinders are used, and chains pass to both rudders from the pistons, so by the movement of the pistons the rudders will be turned.

Mr. Horatio Nelson, of New York city, has patented an improved enameled screw propeller which will not corrode, and works in the water with less friction than the ordinary wheels.

An improved balanced steam engine has been patented by Mr. James O. Baird, of Brooklyn, N. Y. This engine has three cylinders, with pistons working alternately upon diametrically opposite cranks. The engine is provided with a balanced steam valve of peculiar form.

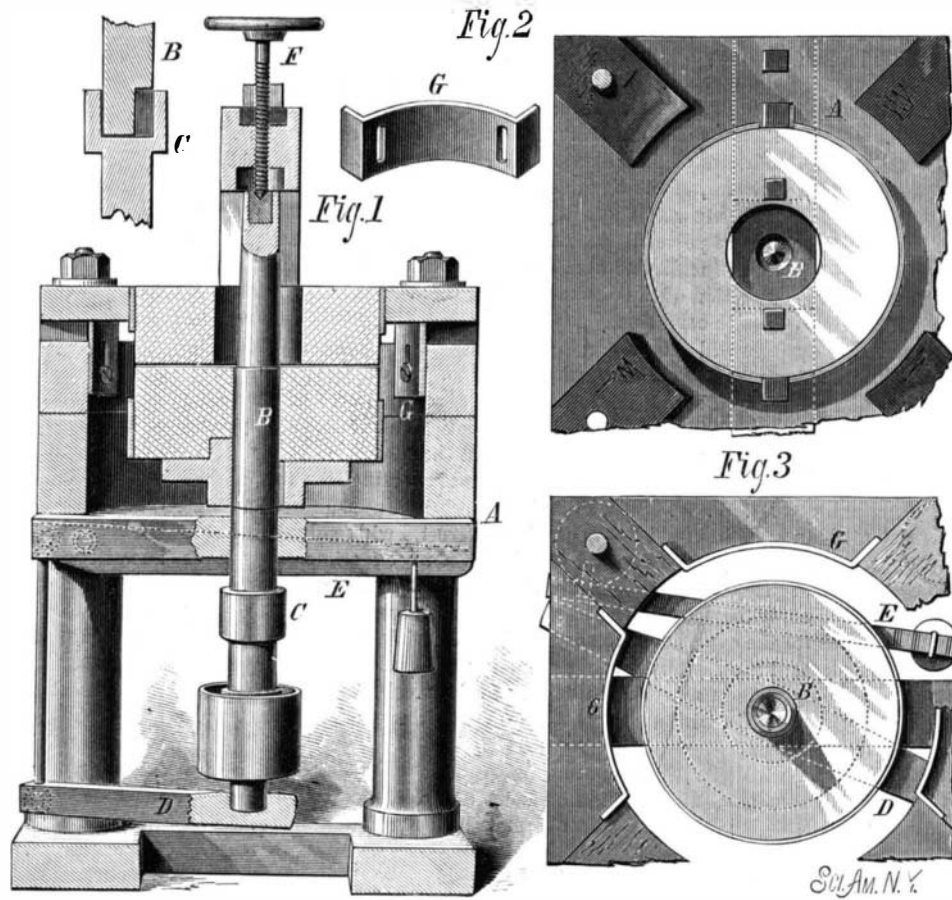
An improved dynamometrical governor has been patented by Mr. Ernest A. Bourry, of St. Gallen, Switzerland. In this device, by suitable appliances, the variations of the power load, or resistance, are utilized directly to operate the throttle valve.

Mr. John L. Custer, of Bonaparte, Iowa, has devised a machine for excavating ditches to a true water line and finishing them for the laying of drain tile. The construction of the machine cannot be readily described without an engraving.

Mr. Paul S. Forbes, of New York city, has invented a steam boiler provided with serpentine fire flues, so arranged that their bends or coils may pass alternately through the upper part of the water space and the lower part of the steam space. It is said that with this construction steam will be generated faster and with less quantity of fuel than when boilers of the ordinary construction are used.

Mr. John H. Fairbank, of McKeesport, Pa., has invented an improved balanced valve for steam engines. The advantages of this valve over others lie in its cheapness and simplicity, its fewer number of parts, and the ease with which it can be adjusted or loosened or tightened upon the valve seats.

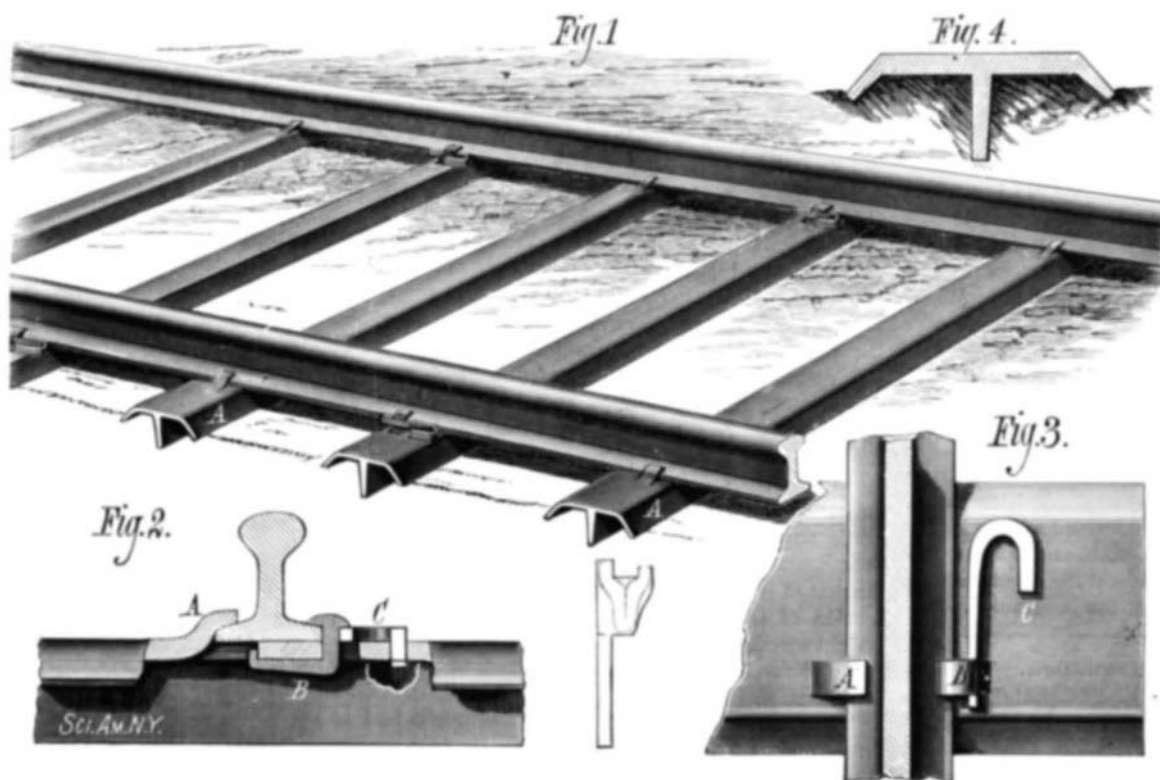
An improved dredging apparatus has been patented by Mr. John Grant, of New Orleans, La. This invention is an improvement upon the dredging apparatus for which letters patent were granted to the same inventor, July 18, 1876. The present invention consists in a vertically adjustable deflecting plate extending throughout the broadside of



WALLING'S IMPROVED MILL.

2 is a side elevation of the same, with part of one flange of the tie and of the vertical web broken away to show the shape, situation, and arrangement of the fastening parts. Fig. 3 is a cross section of the body of the tie, and Fig. 4 is an elevation of the spring, made of flat steel, as shown in the perspective view; the dotted lines in the same figure show the same spring as made of round steel.

A, Figs. 1 and 2, show the permanent lug, which is turned up from the upper plate of the tie, and against and under which one base flange of the rail is firmly held, while the other flange is held in the same way by the movable clamp, B, which is pressed firmly against (embracing both) the flange and the top plate of the tie by the spring, C. The part of the clamp, B, which goes under the tie has at its end an up-turned toe which rises into the opening left by turning up the lug, A. The object of this toe is to prevent the removal of the clamp from its place in case of the malicious or accidental removal of the spring, C, as the clamp is pressed up to the tie by the ballast and can only be taken out by its removal. The spring, C, rests at its free end under a shoulder of the clamp, B, and its fast end is socketed in a slot in the top plate, and has a hook or projection, shown at a, Fig. 4, to go under the top plate and keep the spring in position. The object of reversing the alternate ties end for end, as shown, is to bring the permanent lugs, and also the movable clamps, on both sides of the base flanges of the rails. The



REESE'S RAILROAD TIE.

the boat, and mounted upon a framework which is sustained upon two sliding spuds, and is made vertically adjustable as a whole. It also consists in combining with the deflecting plate a longitudinally reciprocating rake, which is made adjustable with the deflecting plate, and which is used to stir the bed whenever it is of such a nature as not to be easily disintegrated by the unassisted action of the water.

An improvement in brakes for wagons and cars has been patented by Messrs. Mathew C. Franklin and Nathaniel Landrum, of Prairie Lea, Texas. The invention consists in a peculiar arrangement of the brake bar, a cam bar, and a foot lever, which insures a powerful action.

Mr. James Montgomery, of Jersey City, N. J., has invented an improved car wheel, which consists in providing a car wheel with slots which radiate from the eye, and in reinforcements around the edges of said slots; also in the construction and application of an elastic packing to inclose three sides of the tread piece of the wheel and form a bed for the tread in the peripheral groove of the wheel.

An improvement in car couplings has been patented by Mr. Milton Logan, of Foxburg, Pa. The invention is an improvement upon letters patent granted to the same inventor, July 30, 1878, and relates to means for operating the hook-ended draw bars shown in that patent. The coupling may be readily operated from either the platform or from the ground at one side of the car. It is also connected by a rod with the short arm of the lever pivoted on the top of the car, so that it may be operated from the top.

Mr. William Loudon, of Superior, Neb., has patented an improvement in pumps, the object of which is to prevent the accumulation of sand around submerged pump cylinders and the stoppage of the inflow of water to the cylinder. The cylinder is provided with a cylindrical shield, placed so as to leave a space between it and the cylinder, so that the water can pass to the cylinder and enter the same, said shield being composed of foraminated cylindrical shells, with a layer of wire gauze between, which offers a free passage to the water, but prevents the sand from coming in contact with the cylinder.

An improved railroad switch, patented by Mr. William L. Potter, of Mechanicsville, N. Y., consists in an arrangement of movable guide bars that cause the wheels to take the track for which the switch is set and permit the passage of a train from either direction or upon either track without danger of the wheels leaving the rails and without jolt.

Mr. Joseph W. Riley, of Hollidaysburg, Pa., has patented an improvement in side trusses for bridges. The trusses are formed of the longitudinal bars, cross bars, cross rods or bolts, studs, and elliptical braces, arranged so as to secure the greatest possible rigidity and strength with the smallest expense.

An improved device for cutting railroad rails, patented by Mr. John M. Peterson, of Michigamme, Mich., consists of two arms, pivoted together at one end, and the opposite free ends adapted to receive cutters, which are applied to opposite sides of the rail, and forced against the same by a ratchet lever screwing a nut upon a shaft joining the ends of the arms, whereby the knives or cutters are made to cut through the rail.

Recent Decisions Relating to Patents.

BY THE U. S. CIRCUIT COURT—EASTERN DISTRICT OF VIRGINIA.

Sayles v. Richmond, Fredericksburg and Potomac Railroad Company.—1. Where a patent has been granted for fourteen years and extended for seven years, a suit may be brought against an infringer for profits that accrued at any time during the twenty-one years, if brought within six years after the extended patent expires.

2. The United States circuit court has jurisdiction of suits in equity relating to patents between citizens of different States. It is doubted whether the circuit court has jurisdiction in patent cases, except by injunction, where the parties are citizens of the same State.

3. Where it is sought to recover in equity profits resulting to the defendant from using, through a series of years, a mechanical invention without the owners' consent or authority, which profits do not consist in specific sums of money received by the defendant in so using the invention, but simply consist in the advantage and convenience derived from using them, and such advantage is a matter to be estimated as a whole, it is not a matter of accounts, and, therefore, a bill cannot be sustained for an account. Where there is an adequate common law remedy, equity cannot take jurisdiction of a bill for profits arising from the use of a patent solely on the ground of constructive trusteeship.

BY THE ACTING COMMISSIONER OF PATENTS.

Ex parte Holcomb.—Even though an old form of article is much improved and rendered far more salable by a certain method of making it, yet, as that method consisted in the employment of means within the knowledge or grasp of those acquainted with the business, such method does not constitute an invention within the statutory enumeration of inventions for which letters patent can be granted.

American Institute Exhibition.

The forty-eighth exhibition of this Institute will open September 17th, in this city. Parties having novelties which they intend to bring to public notice should at once address the General Superintendent for blanks and information. The medals, it is said, have been increased, and special awards will be made upon a number of articles.

Correspondence.

Magnetization of Molten Iron.

To the Editor of the Scientific American:

In your issue of July 5th I notice a report of "Magnetizing Molten Iron," the experiment having been made by Mr. Chernoff and reported by Dr. C. W. Siemens. I do not know that it is a matter of much importance, but believe I was the first person to try the experiment, which I did in the foundry of the Fall River Iron Works in 1872. I had never thought it important enough to report in the scientific press, though I at the time reported it to some of my friends, among them Prof. John H. Appleton, of Brown University; Prof. Barker, of Pennsylvania University; and afterward Prof. Farmer, of the U. S. Torpedo Station.

I had two objects in view, one of which was the production of powerful permanent magnets, the other the production of malleable iron by a polarization of the atoms in the direction of the current, during the change from a molten to a solid condition. In the first I failed, as I believe every one else will; for, since heat destroys a magnet, heat will also prevent permanent magnetization. In the second I succeeded to a certain degree, and samples of the iron I made, heated to a cherry red, and drawn under the hammer to chisel points, are now, or were at one time, in the possession of Mr. A. A. Pope, President of the Cleveland Malleable Iron Co., and of Dr. W. W. Keen, Philadelphia.

If it would be of sufficient interest, I will send you a sketch of my apparatus and description of my experiments. I made use of the 60 cup Bunsen battery, of Brown University, kindly loaned me by Prof. Appleton, and was unable to carry the experiment to the end I would wish, because of the evolution of nitrous acid from my battery, which nearly suffocated the workmen at the foundry. I would like to try it again with a powerful Brush machine, for the results were very interesting.

My bars of iron came out of the mould solid, and if hollow ones were produced by some one else, the reason must be sought in some defect of making the mould or pouring.

SPENCER BORDEN.

Fall River, Mass., July 11, 1879.

Edison's Dynamometer.—An Improvement Suggested.

To the Editor of the Scientific American:

Noticing in your last issue the dynamometer invented by Mr. Edison, it occurred to me as rather odd for him to adopt such coarse devices for measuring power, however effective they may be. Why did he not apply the principle of the tasimeter to this purpose? It seems feasible enough to a layman. Suppose the driving and driven shaft to be placed axially in line, but not connected; provide each with an arm, allow the arms to overlap each other at the ends, and place between the ends of the arms a carbon button having electrical connections as in the tasimeter. The button would be pressed more or less, according to the power consumed by the driven shaft, and its electrical conductivity would be changed with every variation of pressure.

To insure accuracy in the indications of the galvanometer, another tasimeter arranged to receive a variable amount of pressure should be connected with a switch, so that it could at any moment be thrown into the electrical circuit in place of the button carried by the arms.

If the tasimeter is so sensitive and so accurate for exceedingly small pressures, why should it not be more accurate in indicating heavy pressure? X.

The Edison Dynamometer.

To the Editor of the Scientific American:

In your issue of July 26th, you remark that Mr. Edison's new dynamometer is "in principle something like other dynamometers." Are you aware how much it is like one devised by Mr. Horatio Allen and used in the government experiments on steam expansion in 1865?

As described by Prof. Fairman Rogers, at a meeting of the Franklin Institute, March 16th, 1865, and published in my report as secretary, it appears as follows (see *Journal of the Franklin Institute*, vol. 49, page 281):

"The shaft being cut between the engine and the first fan, a grooved pulley is keyed upon the engine shaft and one exactly similar upon the fan shaft. An endless rope is laid over these two pulleys in such a way that the bight of the rope hangs down before and behind. In these bights are hung two grooved pulleys of a diameter equal to the distance of the large pulleys apart, and to these smaller pulleys equal weights, so that the rope is held tightly in the grooves of the large pulleys. The engine pulley being turned by the engine, sufficient extra weight is added to the hanging pulley on the driving side of the rope to equal the strain on the rope, which represents the resistance of the fans, when the whole system will be in equilibrium, and the amount of power to drive the fans will be measured by the tension of the rope, and consequently by half the extra weight which has been added.

"If the resistance of the fans increases by any means, the weight rises; if the resistance diminishes, the weight falls, and a spring balance is fastened to the weight and to the floor to take up these irregularities.

"A rod attached to the weight and carrying a pencil, moving over the surface of a cylinder running from the shaft, serves to register the power required to run the fans.

"By the apparatus the friction of the fan shaft can be measured and any change in the resistance from varying density of the air is immediately indicated."

HENRY MORTON.

Stevens Institute of Technology,
Hoboken, N. J., July 18, 1879.

Ocean Currents at St. Paul's Rocks.

These rocks are about 540 miles distant from the coast of South America, and 350 miles from the island of Fernando do Noronha. The group of rocks is scarcely more than half a mile in circumference, and their highest point is only 64 feet above sea level.

Their smallness is the striking feature in their appearance as they are approached. They show themselves as five small projecting peaks, which are black at their bases and white with birds' dung on their summits. A yellowish white band shows out about tide mark.

The sea was dashing up in foam at the southeast end of the rocks, and a long line of breakers stretching from the opposite end marked the course of the equatorial current. The birds were to be seen hovering over the island in thousands. Only three kinds inhabit it—two noddies and the booby. The noddies (*Anous stolidus* and *A. melanogenys*) are small terns or sea swallows, black all over, with the exception of a small white patch on the head. The booby (*Sula leucogaster*) is a kind of gannet. The full grown birds are white on the belly, with a black head and throat, the black ending on the neck, where it joins the white in a straight conspicuous line. The back is dark. The younger birds are brown all over. Some few of both birds soon came off to have a look at the ship.

We moved gradually up to the islands, sounding as we went; the Captain and Lieutenant Tiyard mounted into the foretop and steered the vessel from thence, looking out for rocks. The water is deep right up to the rocks, and a hawser was sent on shore in a boat and made fast round a projecting lump of rock, and the ship was moored by means of it in about 100 fathoms of water, although not more than 100 yards distant from shore.

Such an arrangement is only possible under the peculiar circumstances which occur here. The wind and current are constantly in the same direction, and keep a ship fastened to the rock always as far off from it as the rope will allow. I never properly realized the strength of an oceanic current until I saw the equatorial current running past St. Paul's Rocks.

Ordinarily at sea the current, of course, does not make itself visible in any way; one merely has its existence brought to one's notice by finding at midday, when the position of the ship is made known, that the ship is 20 miles or so nearer or farther off from port than dead reckoning had led one to suppose she would be, and one is correspondingly elated or depressed.

But St. Paul's Rocks is a small fixed point in the midst of a great ocean current, which is to be seen rushing past the rocks like a mill race, and a ship's boat is seen to be baffled in its attempts to pull against the stream.—*Mosely, Notes by a Naturalist.*

NEW AGRICULTURAL INVENTIONS.

Mr. Joseph S. Noyes, of Ransom Center, Mich., has patented an improved gate, which is supported on a hinged bar, so that it may be raised or lowered by the simple movement of a lever. It is also provided with a peculiar arrangement of latches.

An improved implement for leveling and smoothing the ground in preparing it to receive seed, has been patented by Mr. Charles A. Meeker, of Green's Farms, Conn. The invention consists in the combination of two sets of rollers and disks, the disks of the rear set being placed at a less distance apart than those of the forward set. The implement is provided with a scraper.

A device by which the sides and tops of hedges can be trimmed accurately and quickly, and with much less labor than by other trimmers now in use, has been patented by Mr. Henry Unkrich, of Fairfield, Iowa.

An improved machine for trimming hedges, which is so constructed as to trim the top and one side of the hedge at one operation, and which may be adjusted to work upon level or inclined ground, is the invention of Messrs. Albert G. Rogers and Harlow M. Freeman, of Lathrop, Mo.

Mr. Morris C. Pennock, of Alliance, O., has invented an improvement in churns, which is provided with a novel form of rotary dasher, and with slotted journal bearings and other new points, which render it convenient and efficient.

An improvement in the class of machines that are adapted for both distributing guano, or other fertilizer, and depositing and covering seed simultaneously, has been patented by Mr. John W. F. Gilreath, of Cassville, Ga. The improvement consists in the arrangement of parts by which the guano and seed conducting tubes or sprouts, and also the furrow-openers and seed-coverers, are simultaneously raised and lowered by the same means.

M. DE LESSEPS has issued the prospectus of the Darien Canal Company. The capital is fixed at 400,000,000 francs. Only 125 francs per share will be called up in the first instance. Interest at the rate of five per centum will be paid on the actual money received during the course of construction. M. De Lesseps estimates an income of 90,000,000 francs from the canal.