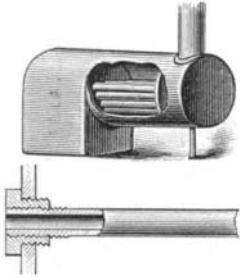


## ENGINEERING INVENTIONS.

## An Improvement in Boiler Flues.

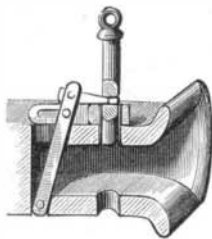
Mr. Horace L. Trout, of Troutsville, Botetourt county, Va., has patented an improved manner of attaching boiler flues to the flue sheets, that is shown in the accompanying engraving, in which the flue sheets are of the ordinary construction, each provided with a series of opposite holes threaded on their peripheries. The flue for the passage of the products of combustion through the boiler is a straight tube, with a thread cut exteriorly on both its ends. The flues are connected to the flue sheets by copper nuts threaded on the outside to engage with threads in the hole in the flue sheet, and on the inside to engage threads on the outside of the pipes. In the ordinary construction the flues are inserted in opposite holes in the flue plates, and the ends of the flues are spread out and bent over or riveted to the flue sheets, and if it becomes necessary to remove a flue a skilled workman must be employed. By this construction it will be seen that the flues are detachable and can be inserted or removed by an ordinary workman, and they serve also as braces to the flue sheets. The inventor claims that by the employment of copper nuts a galvanic action is created between the copper nuts and the iron threads on the ends of the flue which prevents the iron threads from rusting, whereby their strength is impaired, and the copper nuts will not oxidize.



## An Improved Car Coupling Device.

An invention for converting ordinary draw-bars of cars into automatic couplers with but little alteration of the draw-bar, and in a simple and inexpensive manner, securing to trainmen all the benefits of automatic coupling, is shown in the annexed cut.

A is a draw-bar, such as is in ordinary use on cars. In the bottom of the draw-bar is pivoted a vertical trigger-bar, whose upper end projects through a slot cut in the top of the draw-bar just back of the pin hole. When this bar leans forward on its pivot it is in position to be struck by the entering link. When it moves back, however, it retires into a vertical recess made to receive it, so that the solid abutments of the draw-bar receive the main concussion of the link and the trigger-bar is protected. To the top of this bar is joined a latch that, when the coupling pin is raised, enters a hole near its lower end and holds it up to keep the pin steady and erect. When it is raised a detachable piece is placed upon the top of the draw-bar formed with an eye at its front end, and is connected at its back end to the trigger-bar, by which it is held in place, the eye encircling the pin and holding it in position to drop quickly down when the latch is removed. Various modifications of this device are shown in the drawings forming a part of the patent. For uncoupling the cars without going between them, to each end of the car is attached a bracket, which carries a pulley whose plane is parallel with the end of the car. To the pin is attached a chain which passes over the pulley to the outside of the car and is held by a suitable fastening. To this chain, between the pulley and the pin, is fastened a chain that extends to the top of the car and is fastened, and by either of these the pin may be raised.



This device is patented by Mr. Charles E. Macarthy, of Forsyth, Monroe County, Ga.

## A New Car Coupling.

Mr. Charles P. Williams, of Summit Point, Jefferson county, W. Va., has patented an improved automatic car coupler, illustrated by the accompanying engraving, in which the drawbar, provided with drawheads, has the usual opening for the reception of draw links or hooks. This opening is enlarged at its rear end, and is provided with opposite shoulders against which rest a rectangular plate, the plate being pressed against the shoulders by the tension of a spiral spring placed behind it, whereby an elastic bearing is furnished the link or drawhook in coupling cars. The drawheads are made semicircular on their upper and lower face, and the front end is curved. The drawhook is made of a rectangular plate provided with opposite shoulders near its rear end, and an arm adapted to enter the opening in the drawhead, and has a slot in its rear end for the passage of a coupling pin, which also passes through



suitable holes in the drawhead. To the upper and lower faces of the drawhook are secured blocks whose inner faces next to the drawhead are cut away with the same radius as the circle of the end of the head, so that the drawhooks will

be capable of a slight vertical motion on the arc of a circle whose center is the coupling pin. Their front faces are also cut in the arcs of vertical and horizontal circles, as shown. The forward end of the drawhook is rounded and provided on its upper surface with a curved plate, with a curved plate secured to it having a round convex edge extending from its rear part. A similar plate, except that its rear part is convex, is secured to the lower side of the drawhook. By this construction the drawhooks are adapted to rise and lower for cars of different height, and when coupled the upper convex plate of one hook riding under the lower concave of the opposite hook. They couple automatically when the cars are pushed together, and are uncoupled by a cord attached to the drawhook and extending to the top of the car. It will also be seen that should the cars leave the track they uncouple, and one car does not drag others from the track.

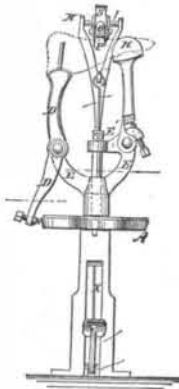
## MECHANICAL INVENTIONS.

## A Novel Lasting Jack.

A novel and ingenious device for lasting boots and shoes, shown in the accompanying drawing, is patented by Mr. George W. Hutchins, of Dover, Strafford county, N. H.

A is a frame, one end of which fits against a shoe bench and has perforated lugs to receive screws that fasten it to the bench. In the sides and outer end of the frame are formed deep recesses, and the forward parts of the edge, between these recesses, are curved so as to serve as a cam to guide the lower end of a lever, D. The lever is hinged to one end of a forked bar, which has a hub at its center to receive and work upon a spindle formed upon the frame, A. The other end of the forked bar has an arm projecting in formed upon it, that has a hole at its inner end to receive and work upon the upper part of the spindle, the forked bar being thus provided with two bearings to give it steadiness. To the end of this bar is hinged the lower end of an arm that has a concave head formed on its upper end to receive and support the forward end or toe of the last.

The heel of the last is perforated to receive a pin formed upon the upper end of the lever, D. Into a hole in the lower end of the lever is secured a set screw, the end of which rests against the cam formed on the frame, A, so that by turning the set screw the lever will be adjusted to receive large or small lasts. A lasting bar, M, is pivoted to lugs formed on the under side of the rear-middle part of the frame, A, and to a lug formed on its upper part a rod is hinged that passes down through a slot in the middle of the frame, A, and its lower end is attached to a treadle. To the upper part of the lasting bar is attached a curved arm hinged to the bar, and provided with prongs and springs holding the curved arm down and the hinged bar back, whereby the upper leather can be drawn into place upon the last. These devices are all adjustable to different sized lasts.



## An Improved Lifting Jack.

An improvement in lifting jacks, as shown in the accompanying engraving, is patented by Mr. Johnathan Beihl, of Slippery Rock, Butler county, Pa.

The standard of the lifting jack is made in two parts, one part being formed with a channel extending from its upper to near its lower end, and the other part serving as a face plate to cover the channel in the first part. In the channel is placed a rack bar which moves vertically, and which receives motion from a pinion journaled in plates secured to the face plate of the standard, and back of the plates is a slot in the face plate, through which the cogs of the pinion and of the rack bar engage. The shaft upon which the pinion is journaled is extended at one of its ends beyond the journal plate, and has a square enlargement, and a power lever is pivoted to this enlargement by a pin which passes through the lever and rests in a groove formed across one side of the enlargement. By this means the lever has a lateral motion to and from the pinion. The side of the pinion next to the lever is formed with projections with which the lever engages for turning the pinion to elevate the rack bar. The opposite side of the pinion is formed with a ratchet, with which a pawl, that is pivoted in a notch formed in the upper part of the frame, engages for holding the pinion from backward movement and holding the rack bar and weight at any desired point. This jack is simple, compact, cheaply made, and easy to operate.

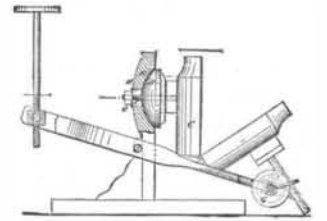


## Frame and Treadle for Glass Moulds.

A novel and ingenious invention relating to frames and treadles for holding and closing the moulds in which articles of glass are made, has been recently patented by Mr. Niles Granger, of Saratoga Springs, Saratoga County, N. Y. The invention is illustrated by the annexed cut.

To an upright standard extending from a cast iron bed is attached a vertically divided bottle mould, the two halves of which are connected together at their lower ends by a hinge. The mouth end of the mould is upright when it is closed.

The mould section, C, has attached to its back a section of a ball, which is free to work or be adjusted in a socket in the upright part of the frame, the whole being secured together and adjusted by a bolt. This adjustment of the mould provides for setting it in a true upright position, which is very essential for making good and perfect work. The opening and closing section of the mould opens by its own weight when



pressure is removed from a treadle with which it is connected, and that closes and controls it. This treadle is made in part of two side arms, which rock on bearings attached to the upright of the frame, and which are combined at one end with an adjustable crosshead, G. This crosshead is used for closing the mould and for letting the opening section down easily when opening under the pressure of the treadle. Arranged loosely upon the cross head is a grooved roller, in the groove of which the handle of the opening section of the mould rests, and by which the friction is reduced, and the roller being loose on its shaft and free to move, all sideways crowding of the mould is prevented.

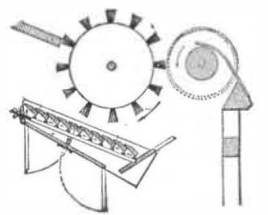
## A Cotton Cleaning Attachment for Gins.

A device by which sand, dirt, or trash may be removed from cotton while it is being ginned is patented by Messrs. Jesse W. Thames and Robert I. Riley, both of Greenville, Butler County, Ala., and is shown in the annexed cut, in which a is the saw cylinder, b the brush cylinder, and c the flue of a cotton gin of ordinary construction.

In the flue, c, and at a proper distance from the brush, is placed a cleaner, extending out at the back part of the gin and forming the bottom of the flue. The cleaner has tapering side boards, the narrow ends of which are toward the back of the gin and are above the broader ends, and are connected by an inclined transverse board.

A series of movable slats are journaled in the side boards and adapted to rock therein like slats in and blind, and beveled so as to fit closely upon each other when the slats are shut. A rod passes transversely under the middle of the slats and is connected by a series of staples to eyes, one in each slat, whereby the slats are opened or closed in unison by moving the rod. A regulating screw which passes through the end board of the cleaner is secured to the upper end of the movable rod by which the motion of the slats is regulated and adjusted. Below the slats is a receptacle, closed with properly secured doors at the bottom, and in the center of which is placed a board to prevent too strong a current of air from the brush cylinder in the back part of the cleaner. When the slats are opened the current of air generated by the brush cylinder will carry the sand and dirt through the openings into the receptacle below them, the cleaned cotton passing over the tops of them into the lint room.

By the use of this cleaner those who run public gins can suit any customer by ginning his cotton just as he desires it.

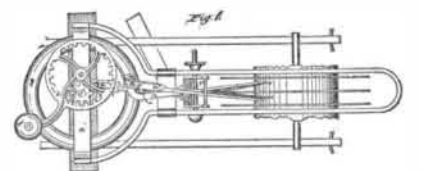


## Machine for Filing Gin Saws.

The accompanying engraving illustrates an improved machine for filing gin saws, patented by Mr. Elias W. South, of Anderson Court House, Anderson county, S. C.

With this machine the saw cylinder to be sharpened is removed from the gin and supported horizontally on trestles or other suitable manner, a plank being laid across the trestles in front of the saw cylinder for the support of the frame of the machine, pins on the under side of which pass through the plank and hold it in position. a is a vertical rectangular frame, to the sides of which are secured two curved arms opposite to each other. At the outer ends of their curves project two parallel straight arms, with an opening between them for the introduction of several of the saws of the saw cylinder, the ends of the arms being curved and joined together.

A cranked shaft is journaled in the horizontal sides of the frame, and has secured to it a flywheel of usual construction. An interiorly geared wheel journaled by a short vertical shaft to the upper horizontal bar of the frame is provided with a handle by which rotary motion is imparted to a gear which meshes with a small pinion fast on the upper end of the crankshaft, and imparts a rapid rotary motion to the shaft. A short pitman is journaled to the shaft, the outer end of which passes through a hole in the curved end of the lower file holder. The upper and lower file holders are suitably connected together, and are so arranged that they cross each other, and a spring is placed between the rear bent ends, whereby the files are kept pressed together when in operation. They also pass through a loose guide to hold them in a proper position

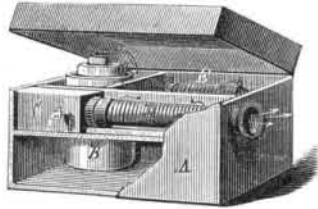


for their work. When the handle of the machine is turned a rapid vibratory motion is given to the files and the tooth of the saw is quickly and nicely filed.

**ELECTRICAL INVENTION.**

**Apparatus for Continuous Production of Ozone.**

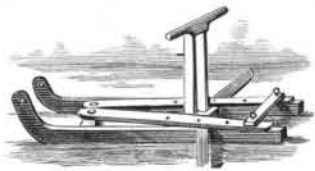
The engraving shows an improved apparatus for the continuous production of ozone, which has lately been patented by Theodore J. Yost, of Mahwah, Bergen county, N. J. In the engraving, B is a galvanic battery, and C a motor, consisting of spring power clockwork. D is the ozonizer, and E is an induction coil. The ozonizer is a glass tube attached at its inner end to a short metal tube, at its outer to the mouthpiece, c. A rod or wire is sustained centrally in the glass tube and covered by protecting material, put on in sections. The outer end of this wire connects with the induction coil, and a wire from the other end of the coil passes to the inner end of the glass tube, around which it is wound to near the outer end. Between the sections (before mentioned) are placed disks of metal foil having serrated edges that allow passage of air. The induction coil connects to the battery, E. A fan blower, run by the motor, C, being set in motion, a continuous current of air is forced through the ozonizer, and during its passage it is charged with ozone by the silent discharge of the electric current through the glass. The operations being automatic and continuous, a constant discharge of ozone takes place from the mouthpiece, c, and a comparatively small apparatus will answer all ordinary purposes.



**AGRICULTURAL INVENTIONS.**

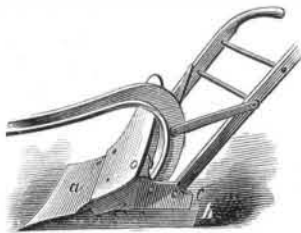
**A New Cotton Stalk Cutter.**

Among the new inventions we find a simple and ingenious device for cutting down cotton stalks, in preparing the ground for a new crop, that is patented by Mr. Francis M. Thompson, of McKinney, Collins county, Texas. It is clearly shown by the annexed engraving. A sled is constructed of such a width as to pass readily between the rows of stalks. And the lower parts of the runners are made thin, so that they will bed themselves in the ground to steady the sled against lateral movement. To the middle part of the front cross bar and at a little distance apart are hinged by bolts the forward ends of two adjustable bars, the rear ends of which are held at the desired distance apart by a cross bar located at the rear end of the sled and secured to it by pins or other suitable means. Several holes are formed in the adjustable bars and in the sled runners to receive pins, so that cutters can be adjusted to such a distance apart as the width of the rows may require. To the adjustable bars, a little in the rear of their centers, are securely attached the inner ends of two knives which incline to the rearward. They are also inclined downward, slightly, toward their outer ends, so that they will cut the stalks close to the ground as the machine is drawn forward between the rows. To the rear part of the sled is attached a platform for the driver while using the machine, and standards are provided to take hold of to give him more security. The device is intended to be drawn by one horse, or by two, driven tandem.



**An Improved Plow.**

A novel arrangement of the parts of a plow is patented by Mr. Joseph George, of Fayetteville, Washington county, Ark. In the accompanying engraving a is the share and b the shaft bar of a plow, made in one piece. c is the land-side, having a lug secured to its inner face which projects below its lower edge and is bolted to the share bar, whereby the land-side and share bar are secured to each other. The forward end of the land-side is bent angularly to its plane, so as to form a wing through which a bolt passes, securing it to the mould board. The colter forms a continuation of the land-side, abuts against its front vertical edge, and projects beyond the mould board. It is provided with a front cutting edge and is bolted to the land-side and share bar. A brace having bent ends is attached at one end to the inner rear face of the share bar and at the other to the inner faces of the mould board and share. The handles are of usual construction, and bolted one to inner face of the land-side and the other to the mould board in the usual manner, and braces extend from the handles to the beam. The beam is curved near its end, so as to form a plow standard, and flattened out near its

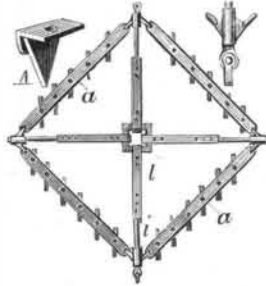


lower end and bolted to the land-side and share bar. It will be seen that by this construction the several parts of the plow are securely attached to each other, and the arrangement is compact.

**An Improved Harrow.**

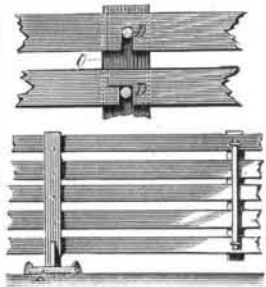
An ingeniously constructed harrow, in which all its parts in its movements in any direction will conform to the undulations of the ground, is patented by Messrs. Henry R. Burger and Joseph B. Simpson, of Fincastle, Botetourt county, Va., and is quite clearly shown in the accompanying engraving.

a a are the outer beams of the harrow to which the teeth are attached, and forming a square harrow. Each beam is formed of angle iron, the flange, b, of the iron projecting upward on the outer edge of the beam, thus making a barrow beam stronger and lighter than the ordinary construction. The ends of the beams are perforated to receive hooks that project upwardly from opposite corners of a triangular metallic block. This block has a central socket extending its entire length, into which is inserted an adjustable rod, i, which passes thence through a hole in a flange projecting downward from the metallic plate, l (provided with a series of adjustable holes), into any one of which the threaded inner end of the rod, i, may be inserted and secured by a nut. The inner end of these plates are formed into downward projecting books, each of which engages with the side of a central opening made in a metallic block placed at the center of the harrow. Clevises are secured to the outer ends of two of the rods, lying in line with each other. In the normal condition of the harrow the four beams form a square; but if it is desired to widen the harrow in one direction it may be readily accomplished by adjusting the inner ends of the rods, i, along the line in which the harrow is to be widened and placing them in holes nearer the outer ends of the plates, l. By this construction it will be seen that the outer harrow beams are pivoted to each other at the ends, and will conform to the undulations of the ground. The tooth of this harrow is triangular, the triangle being formed of sides of unequal length, and is attached to the side of the tooth holder by a bolt and nut passing through holes in the tooth that hold it at either of its angles, and the tooth holder is bolted to the frame of the harrow.



**New Portable Fence.**

Mr. Oscar E. H. N. Reichling, of Marion, Grant county, Iowa, has patented an improved portable fence, that is easily erected or taken down and stands firmly when erected. The construction is shown by the accompanying cut. A base plate, A, is provided with a slot into which the lower end of the upright board, C, is placed. This board is provided with a series of apertures to receive the ends of transverse pins, D, which have a greater diameter in the middle than at the ends. The opposite ends of the pins are passed into an upright board corresponding with the first, but which rests on the base plate. The two uprights are then pressed together by means of wedges driven into the base plate through apertures provided for this purpose. The upright boards are prevented from coming together by the thickness of the middle part of the pin, D, and in the opening between the boards are placed the slats which have a shoulder formed at each end that rests upon the pin, D, and prevents swaying endwise. The upper slat is provided with notches in its under edge into which the pins, D, pass and thus serves to bind the several posts together. The slats are stiffened by means of a board, H, resting upon and crossing them on one side, and provided with a loop at the top and bottom, through which a bar is passed resting on the other side. The base plate is held to the ground by wooden spikes driven through it, or by pins having heads that catch on the plate.

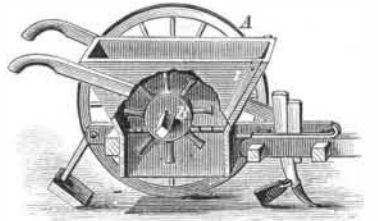


The slats of any panel can be opened at any time, conveniently and rapidly, by removing the board, H, and the rod. This is easily done, as none of the parts are nailed together.

**A Combined Cotton Planter and Fertilizer Distributer.**

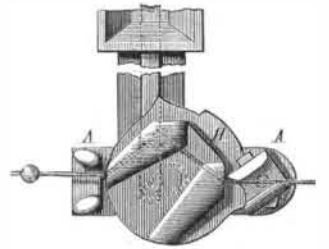
The device shown in the accompanying engraving is a peculiarly arranged and constructed cotton planter and fertilizer distributer combined. A A are wheels revolving on an axle B, and having on the inner ends of their hubs notched bands. The axle, B, is made square next to its journaled ends, and upon its squared parts are placed clutch bars, D, which may be moved upon the axle to enter or be withdrawn from the notches in the bands of the hubs of the wheels to cause the wheels to carry the axle with them in their revolution, or to revolve on their journals. The axle,

B, is made round at its point of intersection with the frame, E, and its rounded parts revolve in bearings attached to the side bars of the frame, to the forward end of which is attached a tongue, and a hook to receive the draught. A hopper is placed over the middle part of the frame, E, and is attached at its corners to the upper end of four bars, I, the lower ends of which are attached to the frame. The ends of the hopper extend below the frame to serve as ends to the discharge chamber. The sides of the discharge chamber are hinged at their upper edges to the side bars of the frame, so that the opening may be larger or smaller for more or less seed or finer or coarser fertilizer to be distributed. To the square part of the axle within the hopper is attached a hub having radial arms, to force the seed or fertilizer into and out of the discharge chamber. To the middle forward part of the frame, E, is attached a plow to open a furrow to receive the seed, and to its rear is hinged a block to pack the sides of the furrow and prevent the soil from falling in. The furrow is filled and the seed is covered by a coverer attached to the rear part of the frame, E. By the above construction it will be seen that the machine may be used as a cart for carrying the fertilizer to the field by sliding the clutch bars along the axle so as not to engage with the hubs, and when the machine is at the field the clutch bars are made to engage with the hubs and the fertilizer distributed.



**A Novel Check Row Corn Planter.**

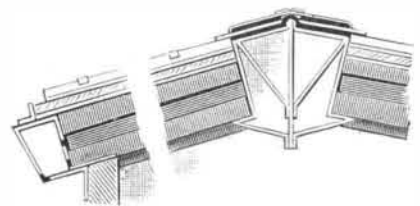
We find among the recent patents a novel device calculated to simplify and cheapen the construction, and insure accuracy in the operation of corn planters, of the class in which the seed dropping mechanism is operated by a cord or wire extending across the field. It is the invention of Mr. Lycurgus J. Bosworth, of Monmouth, Warren county, Ill., and is shown in the annexed cut. To the forward end of a frame, A, is attached a forked guide, to bring the cord into proper position for the balls attached to it at suitable distances to enter the guide channels attached to or formed upon the wheel, H. These channels allow the cords and balls to pass through freely, but have slots to their inner sides that will allow the cord, but not the balls, to pass through, and are made with an outward bend, near their rear ends, for the balls to draw against and turn the wheel, H. To the rear end of the frame, A, is pivoted a forked guide, the arms of which are made so that the pressure of the cord may have sufficient leverage to turn it, and to its base is attached a double pawl to engage with shoulders formed upon the rim of the wheel, H, to prevent the wheel from rebounding out of position. The channels in the wheel, H, are so arranged that when the rear end of either is opposite the rear guide, the forward end of the other will be opposite the forward guide. The wheel, H, is pivoted to a bearing attached to the frame, A, and to the lower end of the pivot is formed a crank to which is pivoted a seed dropping slide. With this construction the reciprocating motion of the wheel, H, will operate the slide and the seed will be dropped.



**An Improved Skylight.**

The accompanying engraving shows a peculiar construction, by which the metallic bars, ribs, and rafters of skylights are so adapted to each other that troublesome fitting is avoided, and strength, simplicity, and cheapness are secured. It is also formed so that the moisture resulting from condensation is amply provided for, and the glass securely held without the use of putty, at the same time allowing free contraction and expansion without permitting the glass to rattle.

This very desirable result is accomplished by the inventor by making the ridge bars of metallic plates, so bent as to form upper shelves and lower ledges when they are riveted to a central vertical plate. The ridge bar is strengthened by



bracing plates reaching from the vertical plate to the upper shelves.

The rafter bars are also formed of bent plates having upper ledges, and in the center of the sides water gutters are formed. These plates are also riveted together. Upon the top of the rafter bars is placed a strip of felt, which has