M. & S. PENNOCK.

Grain-Drill.

No. 1,999.

Patented Mar. 12, 1841.

Fig. 2.

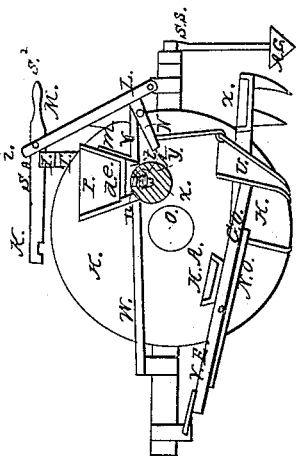


Fig. 7.

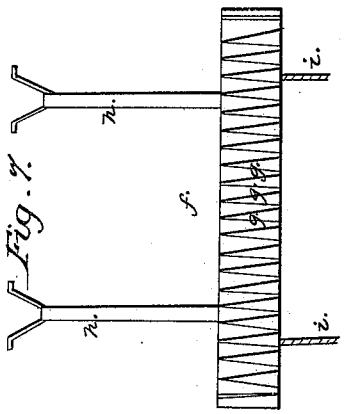


Fig. 1.

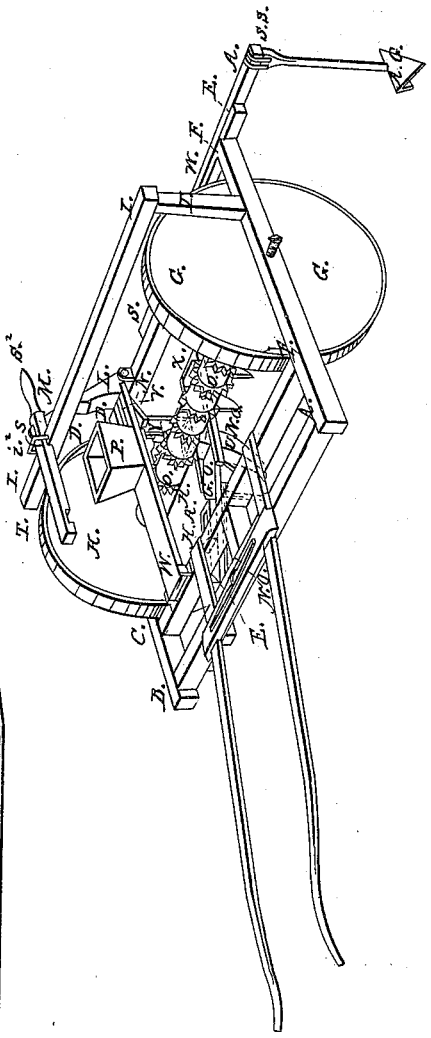


Fig. 4. Fig. 5. Fig. 6.

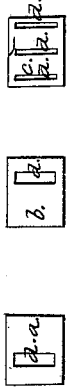
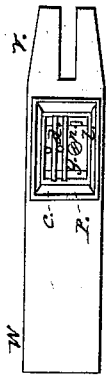


Fig. 3.



UNITED STATES PATENT OFFICE.

MOSES PENNOCK AND SAMUEL PENNOCK, OF EAST MARLBOROUGH, PA.

IMPROVEMENT IN SEED-PLANTERS.

Specification forming part of Letters Patent No. **1,999**, dated March 12, 1841.

To all whom it may concern:

Be it known that we, MOSES PENNOCK and SAMUEL PENNOCK, of East Marlborough, in the county of Chester and State of Pennsylvania, have invented a new and useful Improvement in the Grain and Seed Drill called the "Lion Drill;" and we hereby declare that the following is a full and exact description of the machine and the manner of using it, together with the part which we claim as our invention.

First. A double rectangular frame of wood, A B C D E F. The beams A B, F C, and E D are each six feet eleven inches long, two and one-fourth inches wide, and three and three-fourths inches deep. The beams A E and B D are each four feet nine inches long, and of the same lateral and vertical dimensions as the former. The three former are fitted by mortise and tenon to the two latter, the beams A E and B D projecting nearly three inches beyond the beams A B and E D. To the front beams A B and C F is attached either a pair of shafts or a tongue, so as to use the machine with one or two horses. It is indeed an advantage to have both, to be taken off or put on at pleasure, according to the kind of work to be performed. It is obvious that when the machine is in operation the part A B of the frame is foremost.

Second. The beams A E and B D are perforated midway between F and E and between C and D with holes, through which pass two iron screws nearly an inch in diameter and four inches long, with square heads. These are screwed into the wooden beams A E and B D at right angles to them and parallel to A B. Each of these screws terminates in a smooth round obtuse point, which fits and turns in a socket or thimble of cast-iron or steel fixed immovably in each end of the axle of the machine.

Third. The axle O O, made of wood, is six feet six inches long and three and one-third inches in diameter. It is parallel to the beam A B. On the extremities of this axle and inside of the frame are placed the wheels G G H H. They are each three feet in diameter, composed of solid plank, with an iron band, or composed of fellies and spokes, at pleasure. One of these wheels is fixed firmly on the axle, so that they must revolve together. The other is adjusted to turn, when necessary, on the axle, being kept steadily to its place by two semicircular plates screwed to the side of the wheel, embracing the axle, and running in a groove cut into it.

Fourth. On the axle are fitted, at intervals of nine inches, seven cast-iron spur-wheels, each wheel containing twenty-eight teeth. These wheels are severally composed of two semicircles, and are firmly attached to the axle by screw-nails passing through ears, which project from their sides, into the wood.

Fifth. About ten inches behind the axle of the machine two upright posts, T T, are mortised into the beams A E and B D, and at the height of sixteen inches support, by means of mortise and tenon, a horizontal beam, I I, parallel to the axle, six feet eleven inches long, two inches wide, and two and one-fourth inches deep. On the upper side of this beam are placed at intervals of nine inches seven rectangular staples, i^2, large enough to allow a square slider, s^2, an inch and a half in the side, to play freely in each of them. These staples may be made of cast-iron and secured to the beam I I by screws, or of wrought-iron with tangs passing into the frame.

Sixth. Seven wooden sliders, S K, two feet in length and one and one-half inch square, rest at right angles on the beam I I and slide backward and forward in the staples described in the last article. The hinder end of each slider is formed into a handle. The slider plays lengthwise thirteen inches, having a notch on the under side near its forward end, at K, which, when the slider is drawn back, falls on and fits to the beam I I. Just beyond this notch is a pin projecting from the under side of the slider, which prevents it from being drawn out of the staple. Thirteen inches from the former is a second notch, at S, on the under side of the slider, which, when it is pushed forward, fits to the beam I I. These notches are cut to nearly half the depth of the slider.

Seventh. Immediately behind the notch S in the slider, and between it and the handle, is a vertical mortise three inches long and one-half an inch wide, through which passes loosely a tenon working on a pin, with a screw-nut, which passes horizontally through the slider. A joint is thus formed which plays backward and forward with facility. The tenon just mentioned is formed on the upper end of a vertical lever, L M, about twenty inches long and two inches square at the lower end, tapering

toward the top. The lower end, L, of this lever falls into an open clamp of cast-iron, which is screwed to the beam E D, having an iron pin to pass horizontally through the lever and sides of the clamp, so as to form a fulcrum on which the lever plays backward and forward. By means of these fulcrums or joints at the ends of the vertical lever the slider may be readily moved so that either notch shall fall on the beam I I.

Eighth. A second or horizontal lever, L N, is fitted at right angles into the vertical lever L M, by mortise and tenon, immediately above the lower fulcrum. This horizontal lever, which points forward, is about fourteen inches long, one inch wide, and from three inches at the shoulder to one and one-fourth inch at the extremity in depth. This lever and the vertical one to which it is attached compose a bent lever, (bent at right angles,) having the fulcrum near the angle. Of course, when the slider attached to the upper end of this compound lever is drawn back, so that the notch K falls on the beam I I, the forward end, N, of the horizontal arm will be elevated; but when the handle of the slider is pushed forward, so that the notch S falls on the beam I I, this extremity of the lever must be depressed.

Ninth. A frame, V W, to support the hopper is fitted at one end by a cast-iron open clamp to the beam F C, where it works with a vertical joint and extends horizontally over the axle. This frame consists of two pieces, each three feet two inches long, three inches wide, and one inch deep. (In the drawings, the frame is represented as composed of one piece only.) These pieces are connected near their ends by two turned studs of wood with round tenons, so as to give the frame a width of about eight inches. The stud connecting the side pieces at their hinder end, V, rests on the horizontal arm L N of the compound lever, and rises or falls as the latter is elevated or depressed. When the machine is in operation this stud lies in the compound lever, and is retained there by an angle of the cleat nailed on the arm L M a short distance above the angle. The vertical joint at the beam F C is formed by an open clamp, secured to the beam by screw-nails, which embraces the end of the frame and holds it to its place by a cylindrical projection from each side of the clamp passing into a hole in the frame.

Tenth. The hopper P for containing the seed is the frustum of a wedge, ten and one-half inches by seven in the clear at the top and five inches square at the bottom, the depth being about ten inches. Two strips of wood are nailed inside of its smaller end, so as to leave the opening about five inches in the direction of the axle of the machine and a little more than three inches in the transverse direction. On these strips repose the sides of a cast-iron grate, which forms the bottom of the hopper. Four iron screw-nails, passing through holes in the sides of this grate and through the strips of wood on which they rest into the wooden frame, secure the hopper in its place. The opening in the hopper's bottom is divided by small bars in the iron grate into five apertures, three inches long in the direction transverse to the axle, the middle and the two outside apertures being each about three-eighths of an inch wide and each of the other two seven-eighths of an inch. To adapt these apertures to the various kinds of seed or grain to be sown, a number of wooden bottoms, *a b c*, are formed to fit into the hopper and not on the grate. In each of these one or more apertures, *d*, are formed, corresponding exactly with an equal number of those in the grate. Thus for wheat or rye a bottom must be used having an aperture corresponding to one of the larger ones in the grate, and for Indian corn a bottom with an aperture corresponding to the other; but for clover-seed a bottom must be employed with three apertures corresponding to the three small ones in the grate.

Eleventh. Directly under the hopper is a roller, *y*, four and one-fourth inches long and about four inches in diameter. Its axis is parallel to that of the principal axle. This roller turns on an iron axis which passes through it, and works at each end in a box secured by screw-nails to the under side of the frame on which the hopper rests. To one end of the roller is fixed by screw-nails a cast-iron spur-wheel concentric with the roller and turning with it on the same axis. The circumference of this spur-wheel and the number of teeth correspond exactly with those of one of the wheels described in the fourth article. When the machine is in operation the teeth of the spur-wheel on the roller work in those on the axle. They of course revolve simultaneously.

Twelfth. A number of holes in the roller are made to a small depth at regular intervals, to receive from the hopper through the apertures in its bottom the seed or grain to be scattered. These holes in regard to number and size are calculated to receive the quantity of seed designed to be dropped at one revolution of the wheels. Thus, if in that part of the roller which revolves under one of the larger apertures in the hopper's bottom we have ten holes, each capable of receiving a grain of Indian corn, so situated as to divide the circumference of the roller into ten equal parts, the grain will be dropped a little more than eleven inches apart. In like manner for any other kind of grain, the contents of one line of holes in the circumference of the roller must be equal to the quantity designed to be discharged through the corresponding aperture in the hopper-bottom during one revolution of the wheels. The roller runs close to the grated bottom of the hopper, which is rendered concave to fit the convexity of the former. There is of course no way for the seed to escape from the hopper but by falling into these holes. If the frame of the grated bottom at the extremity of all the apertures was made to fit close upon the roller, it might frequently happen that a grain of the larger kind—as Indian corn, beans, or even wheat—having fallen partly into a hole in the roller

and remaining partly above it, would be caught against the side of the grate and cut in two. To prevent this destruction of the seed, an indentation is made on the under side of the grate, opposite the hinder extremity of each larger aperture, of a size to admit the passage of a grain. This indentation is filled up by a small wooden bolt furnished with a shoulder resting against the grate, so as to prevent the bolt from being pushed forward to press upon the roller. A spring fixed on the outside of the hopper presses against the outer end of the bolt and keeps it in its place. When a grain partly in a hole in the roller, but standing above its surface, is brought in contact with the end of this bolt, it pushes it back against the spring, which, yielding to the pressure, either permits the grain to pass through and drop with the others or by a rebound throw it back into the hopper.

Thirteenth. Immediately under the roller is the drill U, the mouth of which is large enough to catch all the seed that falls from any part of the roller. The drill is composed chiefly of cast-iron, the opening at the top being about eight inches square and the depth fourteen inches. The front curves a little toward the point, which projects forward like the colter of a plow. The opening at the lower extremity is about one and one-half inch long by one inch wide. The front plate of the drill as well as the lower half of the side ones from the point upward are composed of cast-iron. The back plate and upper portion of the side ones may be made of tin or zinc. Across the top, on the hinder side of the drill, is extended an iron rod or bail, having a loop in the middle, to which a rope is attached to support the drill. (In the drawings the bail is not used, the cord represented as passing through a hole in the drill.) The drill is cast with a socket projecting from its front plate, about two inches square in the clear. Into this socket a lever, G O V E, is firmly fitted, with its end pressing against the drill. The lever is two inches wide and three inches deep at the drill, where it extends one inch below the open socket, whence it tapers to a depth of two inches at the other end. The length is two feet four inches. On the under side of this lever is a strong iron strap, N O, two inches wide and two feet long. This strap at the forward end, V E, or that farthest from the drill, is fastened to the lever by iron bolts passing through them. At the hinder end, N O, the strap is a small distance from the lever, and has on its upper side, secured by screw-nails, a wedge of wood of the same width as the strap, ten inches long, and from one and one-fourth inches deep at the base or hinder end to one-half an inch at the other. Through this strap, thus compounded of wood and iron, near the end N O, passes a harrow-tooth fourteen inches long and one inch square at the strap. The hinder side of this tooth through the lower half of its length is straight. The width from the strap downward is gradually reduced and the front formed into a convex curve, so as to terminate in a dull point. The upper half of this tooth is reduced to a cylinder five-eighths of an inch in diameter, leaving a shoulder on the back part of the tooth which presses against the under side of the iron strap. On this cylindrical part a screw is cut, which, after passing through the iron strap and the contiguous wedge, is screwed into the lever G O V E. By this screw the depth which the tooth runs into the ground may be varied. On this screw, between the wedge and lever, a nut is fixed, to screw down hard on the wedge and prevent the strap from sliding up and down on the tooth. This is fixed to run about two inches before the point of the drill, and to penetrate a little deeper into the ground. It thus catches and carries with it those portions of grass or weeds which would otherwise collect on the drill itself and obstruct the discharge of the seed. Fixed to the forward end, V E, of this lever by the bolts above mentioned, which pass through the lever and iron strap, is a forked hinge eight inches long, spreading at the forward extremity nearly nine inches. This hinge works at the extremities of its branches in a pair of iron strap-hooks, which are secured by screw-nails to the front of the beam A B. A narrow strip is fixed by screw-nails to the front of the beam A B, running lengthwise with it, just above the hooks, to prevent the hinges from slipping out of them. On the lever between the hinge and the drill is a small open box, H A, for holding a weight when necessary to sink the drill more deeply into the ground. The rope attached to the loop in the bail of the drill passes into an open mortise in the end N of the horizontal arm of the compound lever described in Article 8, and has a loop thrown over a pin in the same. This rope is prevented from slipping out of the open mortise by a screw-nail passing horizontally through the lever a short distance beyond the rope.

Fourteenth. As there are seven spur-wheels on the axle of the machine, there are seven rollers and seven drills of the kind above described. The distance from the middle of one wheel to that of the other is just six feet, and the seven drills are so located as to divide this space into eight sections of nine inches each. Consequently when all the drills are used the seed is deposited in rows nine inches apart; but these drills and the levers that sustain them are connected with the frame in such manner that any one or more of them can be taken off and the others left for use.

Fifteenth. To each of the two outside drills is attached, in a manner to be taken off or put on at pleasure, a box, X, by side straps of iron, so as to allow a vertical motion, but keeping the box directly behind the drill. This box is composed of boards and is open at top, the dimensions six inches by ten in the clear, so as to contain a small weight. On the under side of this box are fixed two shovel-formed teeth so located as to cast a ridge of earth on the line traveled by the point of the drill.

Sixteenth. When the sliders described in the

sixth article are pushed forward so that the notch S nearest the handle falls on the beam I I, the horizontal arm L N of the compound lever assumes its proper horizontal position, the drill is at liberty to sink into the ground, the hinder stud of the frame V W, which supports the hopper, rests in the angle of the lever, and the teeth of the spur-wheel on the roller fall in with and catch upon those of the principal axle. Consequently the revolution of the axle caused by the progressive movement of the machine must, under this circumstance, cause the roller to revolve. Of course, when the sliders are all in the position just noticed the machine is in gear; but when the slider is drawn back until the other notch, K, falls on the beam I I the forward end, N, of the compound lever is elevated, the drill is raised out of the ground, and the teeth of the roller are lifted clear of those on the axle. When all the sliders are thus situated the machine is totally out of gear. From the manner in which the sliders are situated, it is clear that any one or more of the drills may be thrown out of gear without affecting the others. This is a great convenience in case of point lands.

Seventeenth. In the middle of the beam E D a hole is bored horizontally to receive a bolt, on which is made to revolve vertically a lever or arm, S E, five feet two inches long and two inches by three and a half in its other dimensions. This arm, when in a horizontal position, rests in a hook which is formed of an iron rod six or seven inches long, bent at right angles, with one branch secured to end of the beam A E or B D and the other standing vertically. This hook serves to retain the arm in its place while in use. When the arm is placed in a vertical position, as it must be when turning at the end, the handles of the contiguous sliders, being drawn back to throw the machine out of gear, retain it in its place. To this lever is fitted a slider, W A, six feet long and one and one-half inch square. It slides along the lever or arm S E in two strong iron clasps which are fixed on the lever. These clasps are composed of iron rods with one end fixed on the lever S E and bent, so as to embrace the slider. This slider may be drawn out to various distances, so as to compose with the lever a compound arm of various lengths. These lengths are marked by numbers on the slider passing a fixed point on the lever S E. Two portions of the slider, near its outer end four or five inches apart, are cut into a cylindrical form, each of these cylinders being about two inches long. Round these cylindrical portions of the slider are bent two iron straps, the ends of which are riveted to the flattened end of a tracer, S S. These bent straps thus form eyes, by means of which the tracer is kept at right angles to the slider and permitted to revolve upon it in that position. The tracer is three feet nine inches in length. The lower end of the tracer carries an instrument called the "marker," A G. This marker is composed of a plate of strong sheet-iron cut into a rhombus ten inches in the side and bent along its shorter diagonal nearly into a right angle. Into this dihedral angle, or angle formed by the two frames a block of wood is fitted, through which and the center of the rhomboidal plate a round hole is made to receive the end of the tracer. The marker is thus firmly fixed on the end of the tracer in such manner that when the arm S E is brought to its horizontal position the marker will be on the ground with its ridge or dihedral angle pointing forward and inclined to the horizon in an angle of about forty-five degrees. When the machine is set in motion this marker, acting in the manner of a shovel-plow, will trace on the mellow ground a shallow furrow, along which the horse on his return may walk. By properly adjusting the length of the arm composed of the lever S E and slider W A, the machine may be driven backward and forward across the field in parallel lines at such distances as the nature of the case may require.

The manner of using the machine may be briefly given as follows: In the first place the ground must be well plowed and harrowed so as to be reduced to a smooth and mellow condition. For wheat or rye all the drills are adjusted to their places and the machine put in gear, as described in the sixteenth article. The wooden bottom, with an aperture over the line of holes in the roller designed for wheat, must be put into each hopper and the proper supply of seed put in. The machine being then put in motion, the rollers are turned by the spur-wheels on the axle. The seed discharged from the holes in the rollers falls into the open drills below, and, descending to the point, is deposited in the earth as the point plows its way through the mellow soil. The earth, falling back into the furrow of the drill, covers all the seed which is deposited at the bottom. Seven parallel rows nine inches asunder are thus lodged in the earth by each passage of the machine. The slider described in the seventeenth article must be so far drawn out that the horse or one of the horses, returning along the furrow made by the marker, may cause one wheel of the machine to follow the line traced by the outer drill. In this manner a uniform distance will be maintained between the contiguous rows. Upon coming to the end the lever S E, which carries the marker, must be raised to a vertical position, the handles of the sliders drawn back to throw the machine out of gear, and all things left in that situation till the machine is brought to its proper place for commencing its return. The handles of the sliders are then pushed forward and the marker brought again to rest on the ground. In case of point lands the proper number of drills may be kept in use and the rest thrown out of gear. For Indian corn the drills next to the wheels are retained and the other five taken off. In this case the shafts and a single horse will be most convenient. The proper wooden bottom and the requisite quantity of seed being put into each of the outside hoppers, the slider

must be drawn out, so as to make the arm of the marker nine feet long. To these drills may now be attached the boxes X, described in the fifteenth article, with the needful weight in each. A straight line being then traced across the field, two rows four feet six inches apart are planted and a ridge of earth thrown on each of them by the teeth in the box. At the same time a path is formed by the marker for the horse to follow on his return, so as to make the following row four feet six inches from the former. The number of grains dropped at each revolution of the wheels will correspond to the number of holes made in circumference of the roller. For beets or rutabaga the middle and the two outside drills may be used; but in that case the screws *n* in the bottom of the seed-holes for wheat, as represented in the drawings, Figs. 2, 3, are to be screwed out even with the surface of the roller, in the end of which a hole is drilled sufficiently large to carry out at least one beet-seed. The arm of the marker must now be made six feet nine inches in length. The rows in this case will be twenty-seven inches apart. For clover-seed all the drills are taken off; but the hoppers are all supplied with seed, and the second bottom in each has three apertures, corresponding to the three small ones in the grate. The holes in the rollers are calculated to distribute five quarts on an acre. To scatter the seed regularly over the ground, a board, *f*, five feet six inches long, ten inches wide, is suspended obliquely under the rollers. This board is furnished with narrow strips *g*, nailed across it, so as to scatter the seed as it falls from the rollers regularly along its whole length. The suspension of the board is effected by attaching to it at right angles, sixteen or seventeen inches from its ends, two slender arms, *h*, the extremities of which work on the under side of the beam A B, in the place of the two penultimate drill-levers described in the thirteenth article, and two ropes, *i*, fixed to the board near its ends, are attached to the contiguous arms of the compound levers.

What we claim as our invention, and which we desire to secure by Letters Patent, consists—

1. In the arrangement of the spur-wheels for the purpose of connecting the seed-roller Y and hopper P to the shaft O, as before described.

2. The combination of the rectangular staple i^2, the beam I, the slider S^2, the compound lever L M N, and the hopper-frame V W, for the purpose of throwing the hoppers in and out of operation when sowing point and other land without stopping the horse, as well as for planting seeds that require cultivation in rows, and also for raising the drill U above or allowing it to sink into the ground a sufficient distance, in the manner above described, or in any other substantially the same.

February 16, A. D. 1841.

MOSES PENNOCK.
SAMUEL PENNOCK.

Witnesses:
SAMUEL JACOBS,
CALEB JACKSON.