

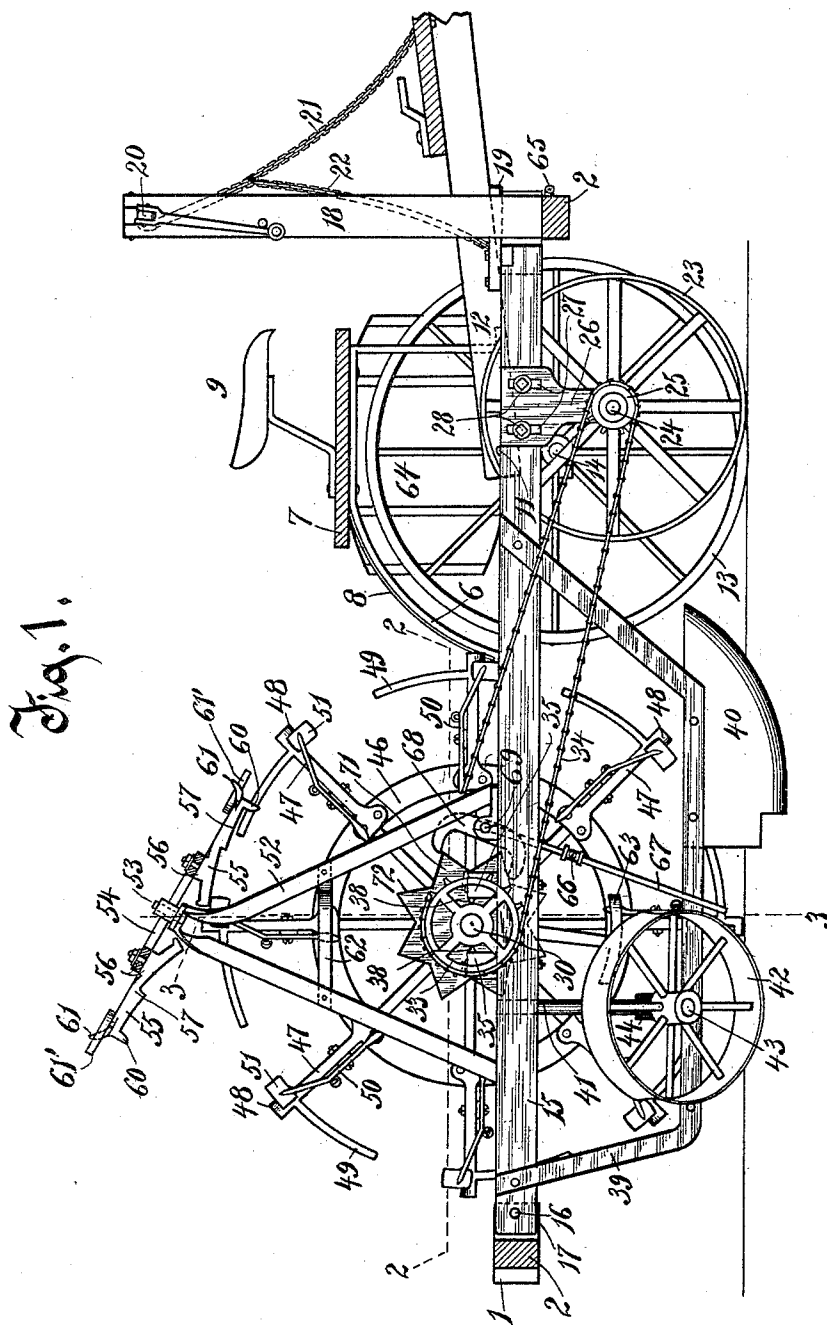
(No Model.)

3 Sheets—Sheet 1.

J. M. SAILER.
TRANSPLANTING MACHINE.

No. 491,597.

Patented Feb. 14, 1893.



Witnesses:

A. Keeney,
Anna V. Faust.

Inventor.

John M. Sailer,
By
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Attorneys.

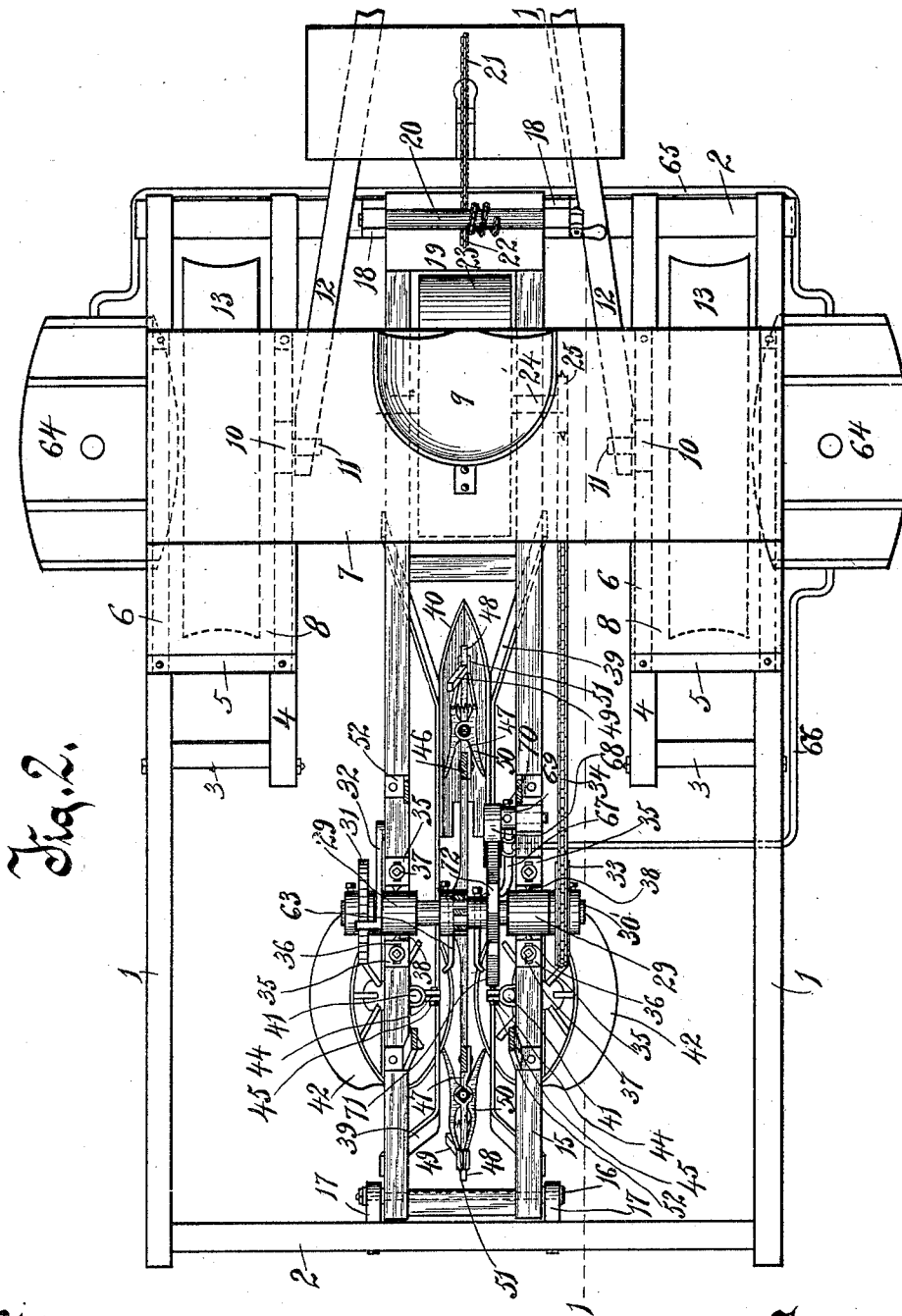
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3 Sheets—Sheet 2.

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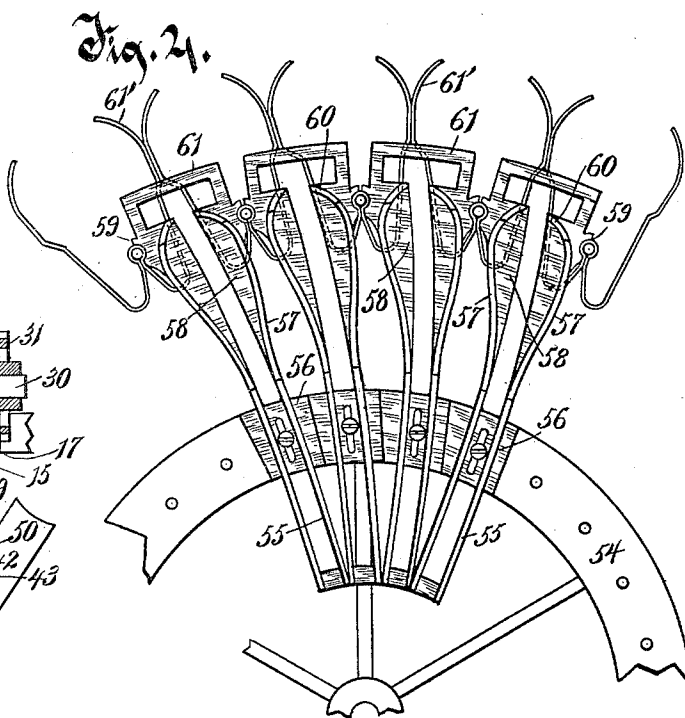
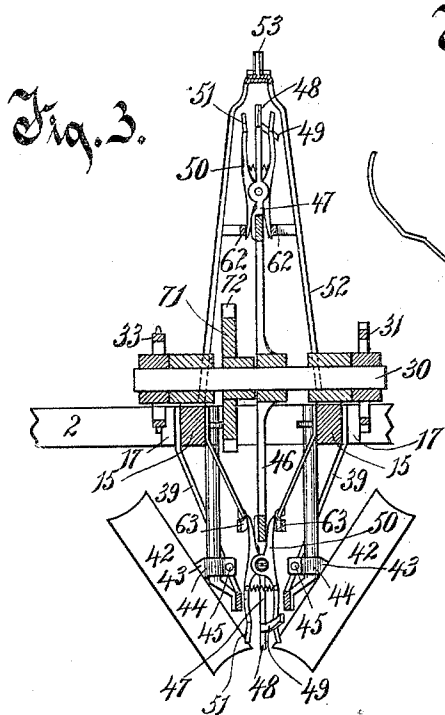
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TRANSPLANTING MACHINE.

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Patented Feb. 14, 1893.



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UNITED STATES PATENT OFFICE.

JOHN M. SAILER, OF JANESVILLE, WISCONSIN, ASSIGNOR TO JAMES R. MOLE, OF SAME PLACE.

TRANSPLANTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 491,597, dated February 14, 1893.

Application filed March 28, 1892. Serial No. 426,661. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. SAILER, a citizen of the United States, residing at Janesville, in the county of Rock and State of Wisconsin, have invented a new and useful Improvement in Transplanting-Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements in transplanting machines, particularly adapted for small sprouts or plants, such as tobacco, cabbage, tomatoes, &c.

The invention consists in the improved construction and combination of parts as will hereinafter more fully appear.

In the accompanying drawings, Figure 1, is a longitudinal vertical sectional view taken on a plane indicated by line 1—1 of Fig. 2, the rotating table, however, being shown in horizontal section. Fig. 2, is a plan view, with a part in horizontal section, as indicated by the line 2—2 of Fig. 1. Fig. 3, is a transverse, vertical section through the conveying wheel and axle looking toward the rear of the machine. Fig. 4, is a fragment of the rotating table, looking upon it in inverted plan.

Like numerals of reference refer to like parts throughout the several views.

The main frame of the machine, preferably rectangular in form, consists of the side pieces 1, 1, and the rear and front cross pieces 2, 2, the latter or front cross piece secured to the undersides of pieces 1, 1, at their forward ends. Extending inwardly from the opposite side pieces of this frame are short strips 3, 3 which form foot rests, for the attendants operating the machine, and are connected with the front transverse piece of the frame by means of longitudinal beams 4, 4.

The numerals 5, 5, indicate medial transverse strips, arranged slightly forward of the rear strips 3. The ends of curved supports, 6, are secured to the side pieces of frame 1 and to the longitudinal beams, 4, and are adapted to support a transverse seat board 7. From the seat board metal sheathings, 8, 8, extend down to the medial transverse strips 5 upon opposite sides of the machine. The driver's seat, carried centrally by the seat board, is indicated by the numeral 9. Se-

cured upon the tops of the longitudinal beams, 4, 4, are blocks, 10, 10, provided with laterally extending pins 11, 11, which form pivots for the inner ends of the tongue 12.

The main forward drive wheels 13, 13, are journaled on separate shafts 14, 14, said shafts each having their bearings in the side pieces, 1, 1, of the main frame and in the longitudinal beams 4, 4.

The numeral 15 indicates an interior frame, pivoted at its rear end upon a transverse bolt, 16, having its bearings in apertured ears, 17, 17, extending from the rear end piece of the main frame. The forward end of this pivoted frame terminates slightly to the rear of the forward transverse end piece 2. This front transverse piece, 2, has projecting upwardly therefrom posts or standards, 18, 18. A guide strip, 19, projects from the forward end of the pivoted frame 15, between said posts or uprights 18, forming properly an extension of frame 15. A drum 20, is journaled in the upper ends of these posts, and has wound thereon a chain, 21, said chain having its lower end connected to the tongue or pole of the machine. From this chain extends a branch chain, 22, extending rearward slightly to connect with the forward end of the pivoted frame, 15.

The numeral 23 indicates a forward roller which is adapted to crush hard lumps and also forms a guide for regulating the depth of the plow, which latter function will more clearly appear hereinafter. This roller is carried upon a transverse shaft 24, said shaft also carrying a sprocket wheel 25, and journaled in bearings, 26, 26, depending from the side pieces of the pivoted frame. These bearings are provided with elongated slots, 27, 27, which receive set screws 28, 28.

Journaled in the rear of the pivoted frame in bearings 29, 29, secured to the tops of the side pieces thereof, is a second transverse shaft 30, having mounted upon one end a ratchet wheel 31, adapted to be engaged by a pawl, 32, pivoted to the frame, so as to allow said shaft to be rotated in one direction, but prevent its rotation in the opposite direction. This shaft has mounted upon its opposite end a sprocket wheel 33. The bearings 29, 29, are located between blocks, 35, 35, which are pro-

vided with elongated slots, 36, 36, receiving set screws 37, 37, engaging pins 38, 38, the pointed ends of said pins, in turn, engaging the bearings and holding the same in adjusted position.

It will be noticed that the set screws 28, passing through the elongated slots 27, of bearings 26, not only provide for the adjustment of said bearings vertically, but also in the arc of a circle. This latter secures a ready means of taking up any slack which may occur in the sprocket chain.

Extending down from the side pieces of the pivoted frame are yokes 39, 39, to the forward ends of which are attached the furrow blades 40, 40, said blades meeting at a point along the length of their lower edges, and cut away or notched at their rear edges. Secured at their upper ends to the sides of the pivoted frame are depending rods 41, 41.

The numerals 42, 42, indicate the covering wheels, the axles 43, 43, extending inwardly at an incline, and provided with bifurcated extensions or clamps, 44, 44, at an angle thereto, said furcated or clamping portions adapted to embrace the rods 41 and held tightly therearound by means of bolts, 45. In this way the vertical position of the covering wheels may be regulated by unloosening the collar, and sliding the clamps to the proper position upon rods 41, or the clamps may be rotated upon the rods so as to bring the forward and rear edges of the peripheries of the covering wheels closer together or farther apart, as may be desired. The effect of adjusting the covering wheels vertically will be to pack the dirt tightly when adjusted downwardly, or vice versa to more loosely pack the dirt when adjusted up vertically. The effect of swinging the covering wheels in an arc of a circle, and securing them in such adjusted position, is, that when the peripheries of the wheels are spread apart at their forward portion to converge the dirt toward the plant, the greater the convergence, the greater of the amount of earth thus collected. It will further be noted from the drawings that the peripheries of the covering wheels are made concave for the purpose of pressing the dirt around the lower ends or roots of the plant, as well as to form a ridge in which the plant sets. This will be found particularly desirable in the case of young plants as the dirt is thus prevented from falling over on them.

Mounted centrally on shaft 30 between the side pieces of the pivoted frame is a wheel 46. Secured to the rim or periphery of this wheel, in line with the spokes thereof, is a series of arms, 47, having extending from one edge, at the upper end, a slightly beveled lug, 48, and also having extending from the opposite edge a segmental arm, 49, said segment being out of line laterally with the arm of which it forms a part as clearly shown in Figs. 2 and 3.

Pivoted to the arms 47, are spring clamps, 50, the upper ends thereof being formed into

projecting jaws, 51. The lower ends of these spring arms are diverged slightly so as to be readily spread apart and the upper clamping ends thereby brought together.

The numeral 52 indicates a supporting medium consisting of four upright posts converged at their top and provided with an obliquely projecting non-rotatable shaft or pin, 53, upon which an annular table rotates. This table consists of a wheel, 54, having connected to the periphery thereof a series of guides 55. These guides consist of a casting of two parallel arms, with a general deflection or bend toward the right, when looking upon the same in plan. They are connected medially by a transverse piece, 56, provided with a bolt hole which admits of the same being secured to the rim of wheel 54. A short distance forward of this transverse piece, the arms bulge or curve outwardly, as indicated at 57, 57, while their top edges are formed with inwardly extending flanges 58, 58 co-extensive in length with the outwardly bulged portions. Extending up from the top of the forward end of the arms of the guide are semicircularly recessed ears 59, 59, while extending downwardly therefrom are lugs 60, 60. From the extreme forward end projects a loop, 61, which has a sharp upward curve.

The numeral 61' indicates a series of springs arranged in the manner clearly shown in Fig. 4. These springs each consist of a flat metal strip bent inwardly at its center and terminating at such central point in a circular head, which is surrounded by the registering semicircularly recessed ears of the contiguous guides. From this central portion the metal is bent around and flared out in a straight line, terminating in outwardly curved ends, one of the curved ends or arms of each of the adjacent springs contacting and passing through the loop 61, of each guide. Between these contacting arms the sprouts or plants are placed by attendants, who may conveniently sit upon the seat-plank or board, with their feet resting upon foot rests 3, 3. As these sprouts are taken from the rotating table and conveyed to the ground for planting, in the manner to be hereinafter pointed out, they are replaced by the attendants, so that the contacting springs, as far as practicable, are continuously kept supplied.

It will be apparent that as the machine traverses the ground, the forward axle 24 through the medium of the sprocket chain, 31, will cause the rotation of the rear axle, and with this rotation the conveying mechanism, consisting of the wheel 46 and radial arms 47 is also rotated. As the lug 48 at the upper end of one of these arms reaches a guide carried by the rotating table (one of said lugs being shown as about entering the guide at the upper part of the conveying mechanism in Fig. 1) it passes into the slot of said guide, while the projecting jaws, 51, of the spring clamps are spread apart by reason of the lower ends of said clamps passing into the contracted

space formed by curved cross pieces, 62, 62, connecting sets of the uprights or standards of the supporting medium 52. The clamping jaws are thus held open until they reach the widened bulged portions 57, 57. At this point, the lower ends of the spring clamps have left the contracted space of the cross pieces, 62, and the jaws then take on to or bear against the bulges, so that in the further progress of the lug through the slot the spring jaws are held open by said bulges. After the lug 48 has passed clear of the guide, the segmental arm 49 passes between the depending forward lugs, 60, 60, as clearly illustrated in the case of the first arm 47, to the right of the arm located in a vertical position in Fig. 1. The action of lug 48 and segment 49 upon the guide, in the manner above described, has the effect of turning the rotating table one-twenty-eighth of a revolution, one-half of this movement being accomplished by lug 48, and the other half by segment 49. Rotation is imparted to the table in view of the fact that the slots in the guides are slightly curved, or out of a true straight line, while on the other hand, the segments 49 which subsequently act between the downwardly extending lugs 60, are out of line laterally with arms 47 of which they form a part. It is also important to note that the lug 48 after leaving the slot of the guide passes between the contacting arms of the adjacent springs and forces the same apart. The edge of said lug being beveled as previously explained in order to more readily effect this result. At the same time the spring is opened, however, the clamping jaws 51, 51 receive between them the plant or sprout which is released by the opening of the springs, said jaws closing upon the sprout by reason of having completed their contact with the bulges 57, 57. In other words, the opening of the springs and the closing of the clamping jaws upon the plant are practically simultaneous movements. This prevents tearing or marring of the plant or sprout, and also secures a positive delivery of the same to the conveying mechanism.

The transverse connecting pieces of the loops 61 serve as a guide to the attendant in placing the sprouts between the jaws of the spring, that is to say, it insures the placing of the sprout at the proper distance to provide for the transferring of the plant to the conveying mechanism as just explained.

In practice, I prefer to employ twenty-eight of the guides 55, in the horizontally rotating table, said guides being so located with relation to each other that after lug 48 and segmental arm 49, of one spoke have performed their function, the one-twenty-eighth of a revolution imparted to said rotating table is sufficient to bring the next guide in position for action by similar parts carried by the next spoke of the conveying mechanism. When the clamps carrying the plant reach the proper point for deposit into the furrow made by the plow, the diverged ends of said clamps pass

between the contracted space of curved bars, 63, 63, so as to force the opposite ends of said clamps apart and cause the release of the plant and its deposit into the furrow.

Referring to the means for raising and lowering the two frames of the machine, it will be seen that when the chain 21 is wound upon the drum, it will exert a pull upon the tongue of the vehicle which is pivoted at its rear end to the stationary frame upon the trunnions 11, 11. As the forward end of the tongue or pole is held practically stationary by its connection with the neck yoke and other portion of the harness, the winding of the chain upon the drum of course has the effect of exerting a downward pressure upon the posts or standards in which said drum is journaled. The lower ends of these posts or standards bear upon the front connecting piece, 2, of the main frame and thus necessarily, in turn, cause a downward pressure upon said connecting piece, which pressure is sufficient to cause the tilting of the rear portion of the stationary frame, thereby lifting the plow and covering wheels clear of the ground. This movement of the frame is found desirable when the machine is turning a corner or when it is required to transport the same without throwing its operating parts into play. It is to be further observed that the same time the chain 21 is wound upon the drum, branch chain 22 is elevated or raised. As this chain connects with the forward free end of the pivoted frame, it of course likewise raises said end of the frame. It follows, therefore, that as the rear end of the main frame is elevated the forward end of the pivoted frame is simultaneously elevated.

Water reservoirs, 64, 64, are suitably supported upon the sides of the main frame of the machine in a position over the axle so that the heft of the machine is not changed when at work. These reservoirs are connected by a pipe, 65, and one of said reservoirs has leading therefrom a supply pipe, 66, which connects with a depending movable pipe 67.

The numeral 68 indicates an escapement which is provided with a laterally extending pin or trunnion 69, which turns in a bearing formed in one of the side pieces of the pivoted frame. Through the enlarged portion of this pin or trunnion passes the upper end of pipe 67, the vertical adjustment of said pipe being regulated by a set screw 70.

Upon the rear transverse shaft 30 is mounted rigidly a wheel, 71, the periphery of which is provided with a series of cam surfaces or projections, 72, corresponding in number with the number of spokes of the conveying wheel. In the position shown in Fig. 1 one of said cam surfaces is about to act upon the lower arm of the escapement. The continued revolution of the conveying mechanism, therefore, has the effect of throwing this arm forward and the upper arm rearward, at the same time causing the pin or trunnion of the escapement to rotate from left to right, and consequently

carrying the lower end of pipe 67 toward the rear of the plow or the forward part of the machine. The further rotation of the conveying mechanism will next bring the following cam surface into contact with the upper arm of the escapement and consequently throw said arm forward and the lower arm rearward, at the same time turning the pin or trunnion from right to left and consequently bringing the lower end of pipe 67 back toward the rear of the machine. Fig. 1 also shows the position of the escapement immediately after one of the cam surfaces has engaged the upper arm of said escapement. The movement just described is continued throughout the rotation of the conveying mechanism, a cam surface for instance, first engaging the upper arm of the escapement, then passing between the two arms, and finally engaging the lower arm, the arrangement being such that when the spring clamps have released the plant or sprout and the same is in the act of being deposited, pipe 67 at the same time is in proper position to water the plant during the process of depositing. It will be understood that the water is poured continuously from pipe 67, but inasmuch as it is in a fine stream very little is wasted between the deposited plants. In many machines in which a water supply is provided, the water is poured into the furrow before the placing of the plant. In my arrangement, however, the stream of water is directed into the furrow during the entire time the plant is being placed in position therein.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is:

1. In a transplanting machine, the combination, of a horizontal table adapted to hold a series of plants or sprouts, of conveying mechanism turning in a circle at right angles thereto, said conveying mechanism constructed to engage the horizontal table, to partly rotate the same and to take the plants successively from said table at each partial revolution thereof and to deposit said plant in the ground, substantially as set forth.

2. In a transplanting machine, the combination, with a horizontal table having a series of radial guides secured to the periphery thereof, curved or deflected from a straight line and provided with slots throughout their lengths, of conveying mechanism turning in a circle at right angles to the table said conveying mechanism constructed to engage the slots of each successive guide, to partly rotate the table, and to take the plants successively from the guides upon the partial revolution and deposit the same in the ground, substantially as set forth.

3. In a transplanting machine, the combination of a table having a series of radial guides secured to the periphery thereof, said guides curved or deflected from a straight line and also provided at their forward ends with depending lugs, of conveying mechanism

consisting of a wheel turning in a circle at right angles to the circle of the table, and a series of arms secured to the periphery of said wheel provided upon one edge with a laterally projecting lug and upon the opposite edge with a segment, the latter out of line laterally with the arm of which it forms a part, said laterally projecting lug constructed to engage the slot of the guide and the segment to enter between the depending lugs thereof after the former has passed through the slot, whereby the table is given a partial revolution and the peripheral arms constructed to take the plant successively from the guides upon each partial revolution and deposit the same in the ground, substantially as set forth.

4. In a transplanting machine, the combination, of a horizontal table adapted to hold a series of plants or sprouts, a wheel turning in a circle at right angles thereto, arms projecting radially from the wheel, said arms constructed to successively engage the table partly rotate the same, and release the plant therefrom and clamping jaws secured to the arms and constructed to automatically engage the plants as they are released from the table and to deposit the same in the ground after the automatic opening of the jaws, substantially as set forth.

5. In a transplanting machine, the combination, of a rotating table, a series of guides secured thereto, deflected or curved from a straight line, each guide being slotted throughout its length and provided with side bulges, and at its forward end with an upwardly extending loop, a series of springs having their contacting arms passing through these loops, a conveying wheel, radial arms extending from said wheel constructed to engage the slots of the guides to give the table a partial revolution and to spread apart the springs in order to release the plants, sets of upper and lower inwardly curved arms, and spring clamps, the jaws thereof constructed to be held apart by the contracted space of the upper set of curved arms and to be subsequently held apart by the bulges of the guides as the peripheral arms traverse the slots thereof and upon leaving the bulged surfaces to automatically close upon the plant which is simultaneously released by the action of the peripheral arms in spreading the spring apart, said clamps conducting the plant to the furrow, where it is automatically released by the passage of the clamps into the narrow space of the lower set of curved arms, substantially as set forth.

6. In a transplanting machine, the combination, of a main frame, a medial frame pivoted to the rear thereof, a plow and covering wheels carried by the pivoted frame, and means for simultaneously raising the rear end of the main frame and the forward end of the pivoted frame, substantially as set forth.

7. In a transplanting machine, the combination, of a main frame, a tongue having its rear ends pivoted to said main frame, a me-

dial frame pivoted to the rear of the main frame, uprights or standards projecting from the front of the main frame, a drum journaled between said uprights or standards, a chain 5 connected to the tongue and wound upon the drum, and a branch chain connected to the front end of the pivoted frame, substantially as set forth.

8. In a transplanting machine, the combination, of a frame, rods depending therefrom 10 and covering wheels having the extended ends of their axles formed into clamps to engage the rods, said clamps receiving screws to retain them in their adjusted position, substantially 15 as set forth.

9. In a transplanting machine, the combination of mechanism constructed to convey the plant to the furrow, a depending water pipe, and means in connection with said conveying mechanism for imparting to the pipe 20 an oscillating movement during the rotation of the conveying mechanism, whereby the plant is watered during the time it is being automatically planted, substantially as set 25 forth.

10. In a transplanter, the combination, of mechanism constructed through its rotation

to convey the plant to the furrow, a cam wheel mounted upon the shaft of said conveying mechanism and turning therewith, an escape- 30 ment oscillated by contact of the cam surfaces therewith, and a pipe connected with said escapement and oscillating therewith, substantially as set forth.

11. In a transplanting machine, the combination, of mechanism constructed through its 35 rotation to convey the plant to the furrow, a cam wheel mounted upon the shaft of said conveying mechanism and turning therewith, an escapement provided with a laterally extending trunnion or pin having its bearing 40 in the frame of the machine, and also provided with upper and lower rearwardly extending arms constructed to be alternately engaged by the cam surfaces, and a water pipe 45 having its upper end passing through the pin or trunnion of the escapement, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN M. SAILER.

Witnesses:

GEO. G. SUTHERLAND,
W. W. WILSON.