

Oct. 23, 1923.

N. E. MCGUIRE ET AL
MACHINE FOR LAYING MULCHES

1,471,796

Filed July 9, 1923

4 Sheets-Sheet 1

Fig. 1.

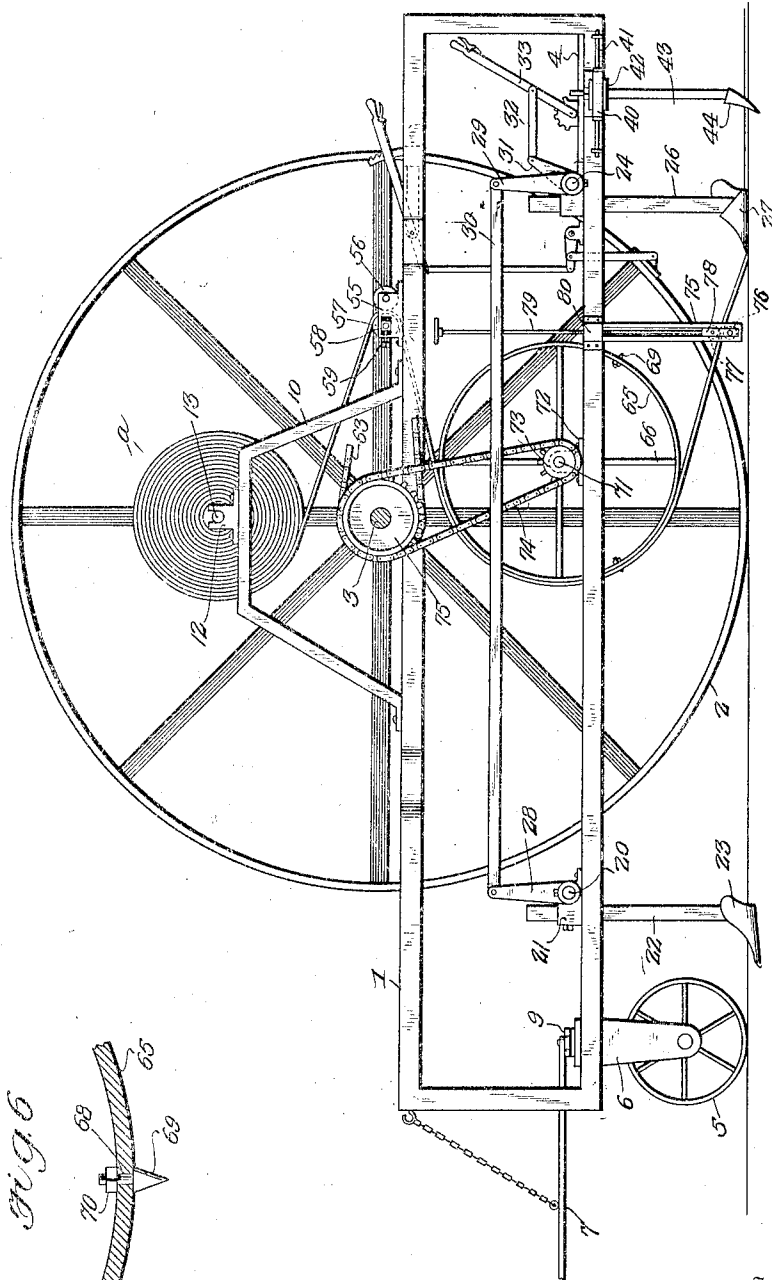
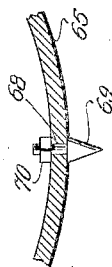


Fig. 6



Inventor

Norman B. McGuire
Andrew Guild

By

O'Neill & Bunn

Attorneys

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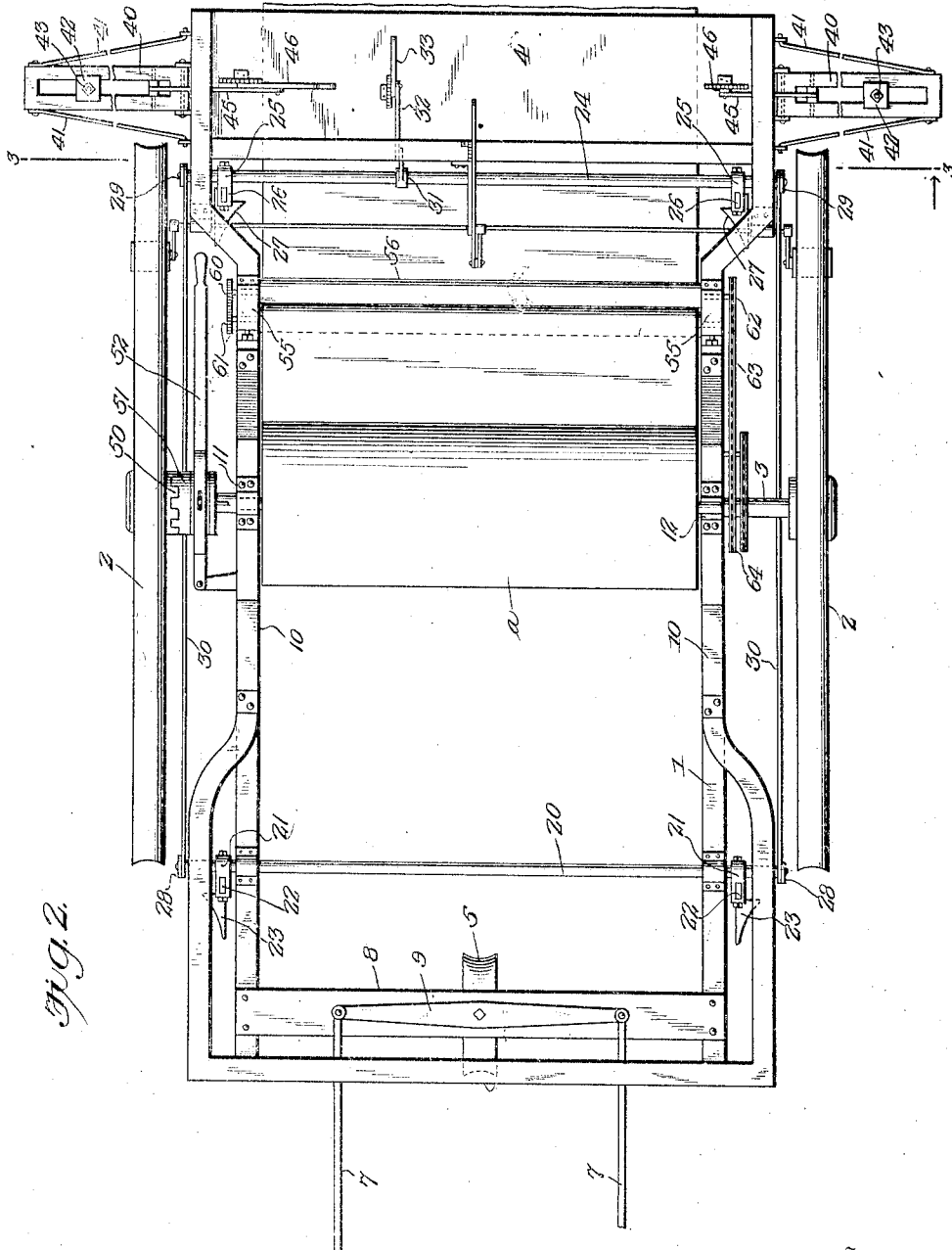


Fig. 2.

Inventors

Norman B. McGuire
Andrew Guild

By

O'Neill & Bunn

Attorneys

Oct. 23, 1923.

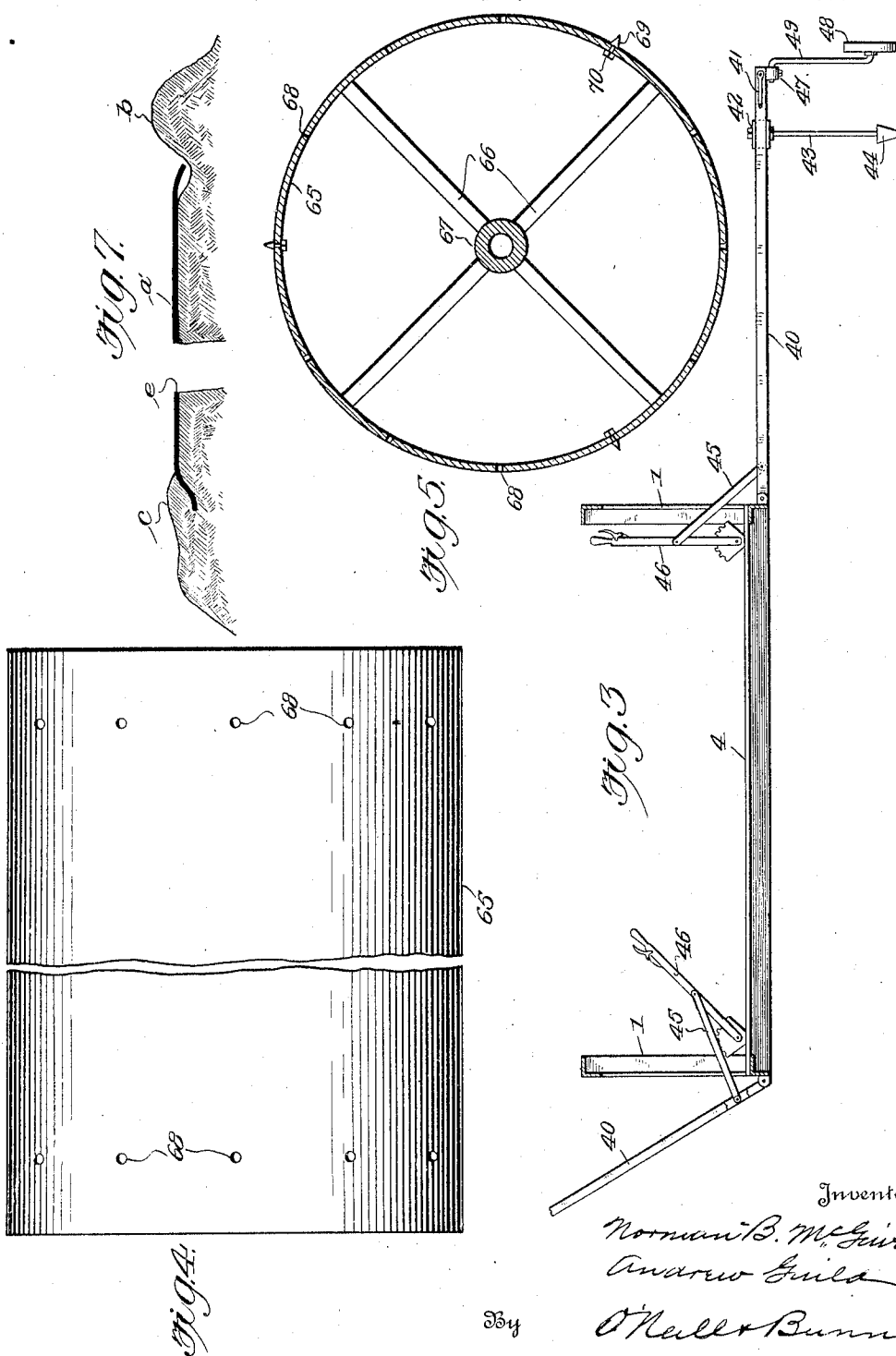
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4 Sheets-Sheet 3



Inventor

Norman B. McGuire
Andrew Guild

By

O'Keefe & Bunn

Attorneys

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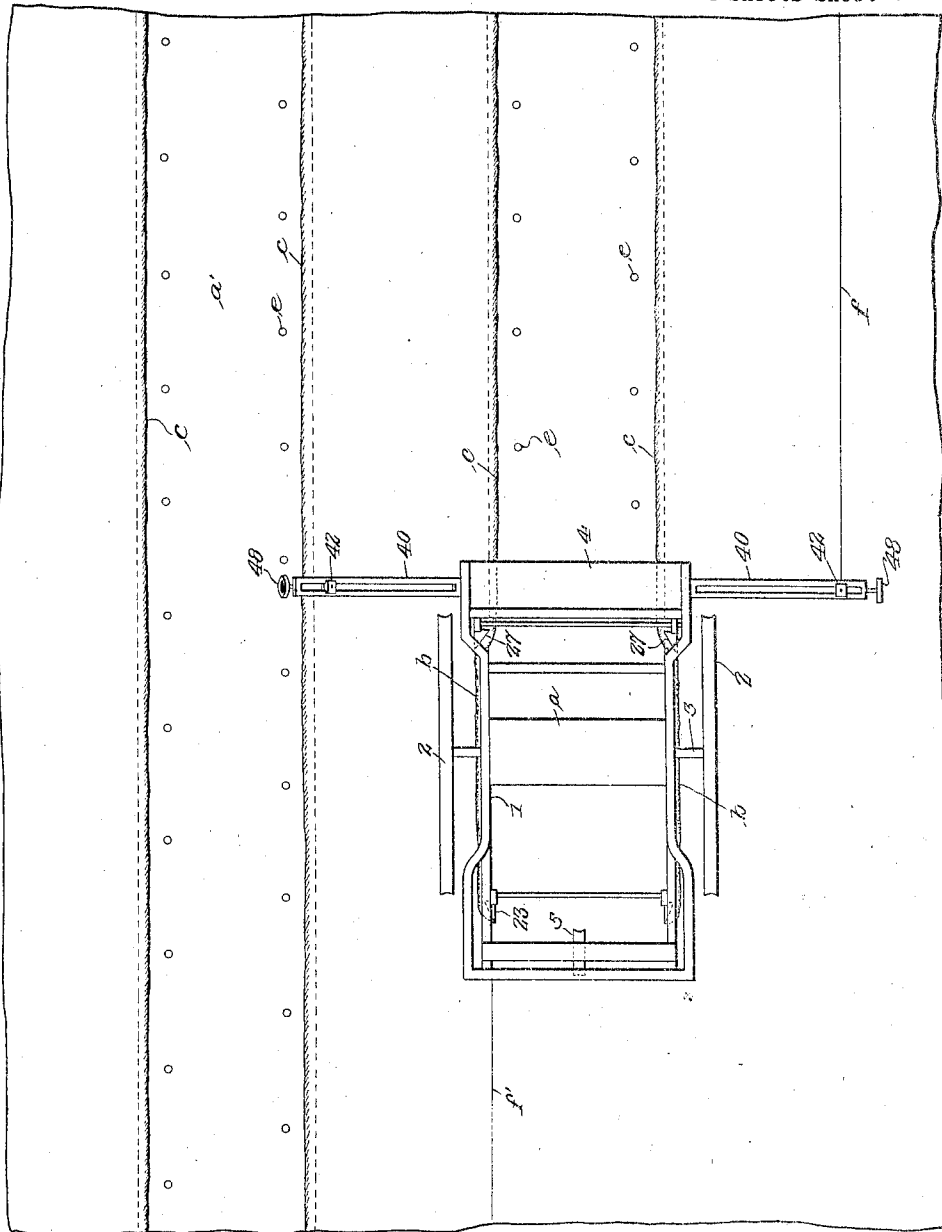


Fig. 8.

Inventor

Norman B. McGuire

Andrew Guild

By

O'Neill & Bunn

Attorneys

UNITED STATES PATENT OFFICE.

NORMAN B. McGUIRE, OF WAHIAWA, OAHU, AND ANDREW GUILD, OF HONOLULU,
TERRITORY OF HAWAII.

MACHINE FOR LAYING MULCHES.

Application filed July 9, 1923. Serial No. 650,476.

To all whom it may concern:

Be it known that we, NORMAN B. McGUIRE and ANDREW GUILD, citizens of the United States, residing at Wahiawa, Oahu, Territory of Hawaii, and Honolulu, Territory of Hawaii, respectively, have invented certain new and useful Improvements in Machines for Laying Mulches; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of the invention is to provide a unitary machine to receive the mulching material, in the form of a roll, to spread the material in properly disposed rows on the ground, to secure the edges of the strips of material constituting the rows, to prevent displacement of the strips, by depositing layers of soil over and onto said edges, to mark and preferably perforate each mulching strip, as the latter is being laid, at regular intervals defining the planting areas, and to define the relative position of a succeeding laterally displaced strip during the laying of a given strip.

The invention is illustrated in the accompanying drawings, in which:—

Fig. 1 is a side elevation, partly in section of the machine.

Fig. 2 is a plan view.

Fig. 3 is a sectional elevation on line 3—3 of Fig. 2.

Fig. 4 is a front elevation of the marking drum.

Fig. 5 is a sectional end view of the same.

Fig. 6 is an enlarged fragmentary section of the drum showing one of the marking devices.

Fig. 7 is a transverse section of a soil area, showing the mode of applying and securing a mulching strip in position.

Fig. 8 is a diagrammatic plan view, illustrating a section of the field having one mulching strip applied, a second strip in course of application by the machine, and the marking of a line in the soil, by the machine, to indicate the position of the next succeeding strip.

Referring to the drawings, 1 indicates a skeleton box-like frame, preferably made of angle bars, or other appropriate metal shapes, provided with traction wheels 2, 2,

journaled on a transverse axle 3, which, in turn, is revolubly mounted in suitable bearings, not shown, on the upper members of the frame 1. Spanning the lower side members of the frame 1 at the rear of the machine, is an operator's platform 4. Pivotally mounted on a cross bar 8 at the front portion of the frame 1 is a pendent yoke 6, carrying a supporting and guiding wheel 5, the pivoting stud of said yoke 6 having rigidly secured thereto a whiffle tree 9, to the ends of which are secured thills or tug bars 7, by means of which a draft animal may be hitched to the machine for the purpose of drawing the same over the ground.

Secured to the upper longitudinal members of the frame 1 and spanning the axle 3, are arch bars 10, 10, one of which carries on its upper side a closed journal bearing 11 and the other an open journal bearing 12, which latter may be provided, if desired, with a suitable complementary cap, the particular arrangement of journal bearings being designed to facilitate the ready insertion and removal of a shaft 13, adapted to be passed through the core of a roll *a* of mulching material, which is usually in the form of relatively heavy paper of uniform width, adapted to be laid on the ground in regular rows at predetermined intervals to cover the ground in which the plants or seeds are applied, for the purpose of preventing the growth of weeds in the covered area, to conserve moisture and store up heat within the soil, and to enhance the growth of the plants. If desired, the forward portion of the machine may be provided with a suitable rack, secured to the upper frame members 1, for the purpose of receiving additional rolls of mulching material.

Mounted in suitable bearings on the lower side members of the frame 1, toward the front of the machine, is a shaft 20 upon which are rigidly secured two bracket members 21, provided with rectangular openings to receive rectangular supporting bars 22, to the lower ends of which are attached plows 23, adapted to turn shallow furrows in the prepared surface of the field in which the mulching strips are to be applied. The bars 22 are vertically adjustable in the brackets 21, so as to regulate the depth of the furrows turned by the plows 23. Similarly disposed on the rear portion of the

lower bars of the frame 1 is a shaft 24, near the outer ends of which are fixed brackets 25, in which the suspension bars 26, carrying plows 27, are mounted for vertical adjustment, the plows 27 being so disposed as to engage the soil thrown out of the furrows by the forward plows 23 and deposit such soil upon the lateral edges of the mulching strips, as will be hereinafter explained. One or both ends of the shafts 20 and 24 have rigidly connected thereto rock arms 28 and 29, respectively, which rock arms are connected by rods 30, so that both shafts 20 and 24, and the plows supported thereby, may be simultaneously moved to bring the plows into and out of engagement with the soil. In order to effect these adjustments of the respective plows, the shaft 24 has secured thereto, intermediate its length, a rock arm 30, which is connected by a pull rod 32 with a suitable ratchet lever 33 mounted on platform 4, within easy reach of the operator. As illustrated in Figs. 1 and 2, the plows 23 and 27 are in operative position. In order to swing them into inoperative position, the hand lever 33 is released from its locked position and moved forward, thereby rotating shaft 24, and with it shaft 20, by means of the connections between said shafts, so that the plows will be swung backwardly and upwardly to the necessary extent to clear the surface of the ground.

As heretofore indicated, a roll α of the mulching material is mounted on the shaft or spindle 13, which latter is passed through the core of the roll and engaged with the journal bearings 11 and 12. In order to properly feed the mulching material and maintain the same under proper tension to lay the same smoothly on the surface of the prepared soil, suitable feed rollers 56 and 57 are journaled in bearing blocks 55 mounted on the upper members of frame 1, the feed roller 56 being relatively stationary, while the roller 57 is slidably mounted in adjustable journal bearings in the slotted portions 58 of the blocks 55, the adjustment of the rollers toward and from each other being effected by means of set screws 59, which may be associated with suitable compression springs to provide a yielding tension on the sheets, as will be understood. The spindles of the feed rollers are connected by gears 60 and 61 to effect the proper relative rotation of the rollers, and on the opposite end of the spindle of the roller 56 is mounted a sprocket wheel 62, which is engaged by a chain 63, which, in turn, is driven from a sprocket wheel 64 fast to the axle 3 of the machine. Rotary motion is imparted to the axle 3 by means of a clutch, having one member 50 formed on the hub of one of the traction wheels 2 and the mating member 51 of the clutch slidably mounted on the

axle and connected to the latter by a suitable spline. A lever 52, connected to the clutch member 51, serves as a means for engaging and disengaging the clutch members.

Journaled in bearing blocks 72 on the lower side members of the frame 1 is a shaft 71, upon which is mounted a hollow drum 65, provided with radial spokes 66 connecting with a central hub member or members 67 fast to the shaft 71. A sprocket wheel 73, connected to the outboard end of the shaft 71, is driven by sprocket chain 74, engaging a sprocket 75 fast to the axle 3. The surface of the drum 65 is provided with rows of perforations 68 disposed at a proper distance from the lateral edges of the drum, the perforations receiving an appropriate number of marking means adapted to mark and, preferably, perforate the mulching material at regular and predetermined intervals to indicate the planting areas in the mulching material, as the latter is being laid. In the particular exemplification of the marking and perforating elements illustrated, the same comprise conical studs 69 having screw threaded shanks passing through selected openings 68 in the drum and secured in position by nuts 70, as particularly illustrated in Figs. 5 and 6. A sufficient number of perforations 68 is provided, so that proper spacing of the planting areas may be effected, according to the character of the particular plants to be grown. Preferably, the perforating studs on opposite sides of the drum are arranged in staggered relation, so as to provide proper intervals between the plants in each row and in adjacent rows. The perforating studs 69 may be given any appropriate form to incise openings in the mulching material best adapted to the plants which are to occupy the openings. For example, the studs may be so formed as to cut cross slits through the mulching strips to provide flaps which may be turned back during the planting operation, or may cut out square or relatively large round openings, with or without flaps, as will be understood.

Mounted on the opposite sides of the lower side members of the frame 1 in pendent guides 75 are adjustable guide rollers 76 and 77, which extend transversely of the machine and serve to guide and lay the mulching strip flat upon the surface of the soil, the adjustment of the rollers being effected by means of a screw threaded rod 79 engaging brackets 80 on the frame and carrying blocks 78 on their lower ends in which the rollers are journaled. By turning the rod 79 by means of a hand wheel at the upper ends thereof, the proper adjustment of the guide rollers with respect to the surface of the soil may be accurately regulated.

In order to properly space and maintain

the parallel relation of the successive rows of mulching material as the same is laid upon the soil, the machine is provided with means for marking or defining the position of the adjacent edge of the next successive strip, during the laying of a given strip, said marking means comprising longitudinally slotted arms 40 pivoted on the lower members of frame 1 opposite the sides of the platform 4, each member 40 being reinforced by brace rods 41 connected at the outer ends of the corresponding arms and pivoted at their inner ends to the lower frame members, as particularly illustrated in Figs. 1 and 2. Slidably mounted in each slotted arm 40 is a clamping block 42, in which is secured a pendent arm 43 on the lower end of which is attached a marker point 44, which engages the surface of the soil and defines, in the form of a shallow furrow, the line to be followed by one or the other of the furrowing plows 23, when the machine traverses the field to lay the next successive mulching strip. Obviously, only one of the markers is employed at a given time and, under such circumstances, the other marker will be withdrawn from operation, which is effected by swinging the arm of the particular marker upward on its pivot by means of a ratchet lever 46, mounted on the platform 4 and connected to the arm by means of a link 45, as illustrated in Fig. 3. The position of the marking point 44, relative to the side frame of the machine, may be readily adjusted to regulate the distance between successive rows of mulching strips by slacking off the nuts on the top of the clamping blocks 42 and sliding the blocks in the slotted arms 40 toward or from the machine, and when the markers have been properly adjusted, they are locked in such position by setting up the nuts on the tops of the slides 42.

Preferably, the machine is provided with a suitable hand brake co-operating with the traction wheels 2 to regulate the speed of the machine, particularly when the latter is travelling down hill.

The machine, as described, operates as follows: The field to be planted and to have the mulching material applied to the surface thereof in uniformly spaced rows, is first brought to condition by plowing, harrowing, and, if necessary, rolling, to render the surface as smooth as feasible and the machine, drawn by a draft animal or a tractor, is positioned at one side of the field, with a roll of the mulching material mounted on the shaft or spindle 13, so that the roll is freely rotatable. The free end of the mulching material is then drawn out and passed through the feed rollers 56 and 57, thence over the drum 65 and through the guide rollers 76 and 77. As the machine crosses the marginal end of the field or soil area to be mulched, the two sets of plows 23 and 27 are moved into operative position by means of the hand lever 33 and the machine is started along a definite course marked out by a line stretched across the field, or applied to the soil by any appropriate means, the operator guiding the course of the machine from his position on the platform 4, so that the machine will be caused to follow the prescribed course. The plows 23 turn shallow furrows in the soil just inside the traction wheels 2 and throw the loose soil from the furrows outwardly and laterally. The clutch lever 52 having been operated to engage the clutch members 50 and 51, the axle 3 is rotated by a traction wheel 2, carrying the clutch member 50, and drives the feed rollers 56 and 57 and also the drum 65 in proper cooperative relation to withdraw the mulching material from the roll *a*, and, through the cooperation of the guide rollers 76 and 77, to lay the same on the surface of the soil as the machine progresses, so that the lateral edges of the mulching strip will fall within the furrows opened by the plows 23, the flexibility of the mulching material being such that the lateral edges bend or incline automatically toward the bottoms of the furrows. As the mulching material passes around the drum 65, the markers 69 on the periphery of the drum perforate the material at properly predetermined intervals on each side of the strip, and at proper distances from the lateral edges of the latter, to indicate the areas in which the planting is to be effected. The edges of the mulching strip drop into the furrows formed by the plows 23 just ahead of the covering plows 27, which latter engage the loose soil thrown out of the furrows and turn the same over and onto the lateral edges of the mulching strip, thereby securing the mulching strip, against accidental displacement, as by the wind or by careless workmen, to the soil throughout the entire length of the strip, by the superposed strips or rows of soil deposited in practically uniform layers upon the lateral edges of the mulch, as illustrated at *c* in the left hand portion of Fig. 7. The right hand portion illustrating the mulch with one lateral edge occupying the furrow formed by the corresponding plow 23, before the soil *b* turned from the furrow has been thrown back into the furrow and over the edge of the mulch occupying the furrow.

During the progress of the machine in laying one strip of the mulch, the appropriate marker arm 40 is lowered into operative position, by the attendant on the platform 4, and the marking point 44 carried by the outboard end of said arm, scratches a small furrow *f* in the surface of the soil parallel with the lateral edge of the laid mulch, thereby defining the next

line of travel to be pursued by the machine in laying the succeeding mulching strip. When the end of the particular row to be mulching has been reached, the machine is stopped and the laid portion of the mulch severed from the body of the mulching material carried by the machine, and the machine is then reversed and traverses the field in the opposite direction. With the furrowing plow 23 following the line defined by the marking point 44 in the preceding operation. This operation is repeated until the entire field or area to be planted has been laid with parallel rows of mulching material, each row being securely locked in position by the superposed layers of earth, which are turned by the covering plows over and onto the lateral marginal edges of the mulching strips, as hereinbefore described. If desired, the outboard end of the marker arms 40 may be supported by a suitable ground wheel 48 carried by a pendent arm 49, secured in a bracket 47 on the end of the arm 40.

It is to be noted that a machine constructed and operated as described will effectively perform the services of a relatively large number of laborers and produce a much better and more uniform result than could possibly be obtained by hand labor alone, however, skilled the latter may be. For example, when a machine of the type described is employed for mulching a large field for the planting of pineapples, it will automatically effect all of the necessary operations incident to laying and locking the mulching strips to the soil ready for the planting operation. As heretofore carried out, this work involved five separate operations, described as follows:

1. After the field has been brought to proper condition by plowing, harrowing, pulverizing and, if necessary, rolling, it is marked off with stakes to conform with the proper widths of the paper and the distance between the rows of the mulching paper.

2. A team of mules with a driver and helper draws a six inch plow backward and forward across the field to separately throw furrows thirty inches apart, representing the distance between the opposite edges of a mulching strip and also the space between adjacent mulching strips.

3. The rolls of mulching paper are then opened and rolled out between the furrows that were made by the second operation, so that both edges of a given mulching strip will lie in a corresponding pair of parallel furrows.

4. A gang of men with hoes, or similar implements, then pass along both edges of the mulching strip and scrape or hoe the soil from the area between the mulching strip and the next mulching strip over the

lateral edges of the laid strip to lock the strip to the soil and prevent the same being blown away by the wind or disturbed by careless workmen.

5. After the field has been completely laid out in successive parallel rows of mulching strips, the mulching paper being usually thirty-six in width, with the successive rows from twenty inches to twenty-four inches apart, a wire or similar line, called a planting line, marked off at regular intervals, for example, twenty inches, is laid eight inches from each edge of the given mulching strip and for the entire length of the latter, the marked wire forming a guide for the planter, who effects the planting operation by driving his planting stick through the paper and into the soil and inserting the plant, or seed through the opening, after the planting stick has been withdrawn.

As indicated, a single machine will perform the several operations specified, after the ground has been properly prepared, except the actual operation of planting, which latter, however, may be effected at a minimum of labor and expense, as it is only necessary for the planters to follow the machine and insert the plants or seeds through the regularly spaced openings adjacent each edge of the several mulching strips.

What we claim is:

1. A machine for laying mulches in strips and covering the lateral edges with soil, comprising means cooperating with the laying means for marking the mulches at points disposed at regular intervals where the planting is to be effected.

2. A machine for laying mulches in strips and covering the lateral edges with soil, comprising means cooperating with the laying means for marking the mulches along each lateral edge thereof where planting is to be effected.

3. A machine for laying mulches in strips and covering the lateral edges with soil, comprising means cooperating with the laying means for perforating the mulches at points disposed at regular intervals where the planting is to be effected.

4. A machine for laying mulches in strips and covering the lateral edges with soil, comprising means cooperating with the laying means for perforating the mulches along each lateral edge thereof where planting is to be effected.

5. A mulch laying machine comprising a wheeled frame, plows at the front and rear of the frame for forming parallel furrows to receive the edges of a mulching strip and to turn the soil from the furrow over and onto said edges respectively, means for supporting a roll of mulching material rotatably on said frame, feeding means operated

by the movement of the wheeled frame for unwinding the material from the roll, and means carried by the frame for marking the planting areas on the strip.

5 6. A mulch laying machine comprising a wheeled frame, plows at the front and rear of the frame for forming parallel furrows to receive the edges of a mulching strip and to turn the soil from the furrows over and onto
10 said edges respectively, means for supporting a roll of mulching material rotatably on said frame, feeding means operated by the movement of the wheeled frame for unwinding the material from the roll, and means
15 for forming openings in the strip defining the planting areas.

7. A mulch laying machine comprising a wheeled frame, plows at the front and rear of the frame for forming parallel furrows to receive the edges of a mulching strip and
20 turning the soil from the furrows over and onto said edges respectively, means for supporting a roll of mulching material rotatably on said frame, feed rollers for unwinding the material from the roll driving means
25 connecting the feed rollers with a traction wheel of the machine, and means carried by the frame for marking the planting areas on the strip.

30 8. A mulch laying machine comprising a wheeled frame, plows at the front and rear of the frame for forming parallel furrows to receive the edges of a mulching strip and turning the soil from the furrows over and
35 onto said edges respectively, means for supporting a roll of mulching material rotatably on said frame, feed rollers for unwinding the material from the roll, driving means connecting the feed rollers with a traction
40 wheel of the machine, and means for forming openings in the strip defining the planting areas.

9. A mulch laying machine comprising a wheeled frame, plows at the front and rear of the frame for forming parallel furrows to receive the edges of a mulching strip and
45 turning the soil from the furrows over and onto said edges respectively, means for supporting a roll of mulching material rotatably on said frame, feeding means operated by the movement of the wheeled frame for
50 unwinding the material from the roll, a drum journaled on the frame and driven from the traction wheel to receive and guide the material from the feed rollers, and
55 means on the drum for marking the planting areas on the strip.

10. A mulch laying machine comprising a wheeled frame, plows at the front and rear of the frame for forming parallel furrows to receive the edges of a mulching strip and turning the soil from the furrows
60 over and onto said edges respectively, means for supporting a roll of mulching material rotatably on said frame, feeding means

operated by the movement of the wheeled frame for unwinding the material from the roll, a drum journaled on the frame and driven from the traction wheel to receive and guide the material from the feed rollers,
70 and means on the drum for forming openings in the strip defining the planting areas.

11. A mulch laying machine comprising a wheeled frame, plows at the front and rear of the frame for forming parallel furrows to receive the edges of a mulching strip and
75 turning the soil from the furrows over and onto said edges respectively, means for supporting a roll of mulching material rotatably on said frame, feeding means operated by the movement of the wheeled frame for
80 unwinding the material from the roll, a drum journaled on the frame and driven from the traction wheel to receive and guide the material from the feed rollers, guide
85 rolls to the rear of the drum for directing the material onto the surface of the soil, and means on the drum for forming openings in the strip defining the planting areas.

12. A mulch laying machine comprising a wheeled frame, plows at the front and rear of the frame for forming parallel furrows to receive the edges of a mulching strip and turning the soil from the furrows
90 over and onto said edges respectively, means for supporting a roll of mulching material rotatably on said frame, feeding means operated by the movement of the wheeled frame for unwinding the material from the
95 roll, a drum journaled on the frame and driven from the traction wheel to receive and guide the material from the feed rollers, vertically adjustable guide rolls to the rear of the drum for directing the material onto
100 the surface of the soil, and means on the drum for marking the planting areas on the strip.

13. A machine for laying mulches comprising a wheeled frame, means for supporting a roll of mulching material on said
110 frame, a rotatable drum on the frame over the surface of which drum the material passes, and means on said drum for marking the planting areas on the strip of mulching material.

14. A machine for laying mulches comprising a wheeled frame, means for supporting a roll of mulching material on said
120 frame, a rotatable drum on the frame over the surface of which drum the material passes, and means on said drum for forming openings in the mulching material defining the planting areas.

15. A machine for laying mulches comprising a wheeled frame, means for supporting a roll of mulching material thereon,
125 means for feeding and spreading the material on the ground in a predetermined strip or row, means for securing the lateral edges of the laid strip to the adjacent soil, and
130

means for marking the surface of the soil with a guide index for the succeeding row or strip.

16. A machine for laying mulches comprising a wheeled frame, means for supporting a roll of mulching material thereon, means for feeding and spreading the material on the ground in a predetermined strip or row, means for securing the lateral edges

of the laid strip to the adjacent soil, and means adjustable laterally of the machine for marking the surface of the soil with a guide index for the succeeding row or strip. 10

In testimony whereof we affix our signatures.

NORMAN B. McGUIRE.
ANDREW GUILD.