Jan. 3, 1928. 1,654,861

O. CERATI

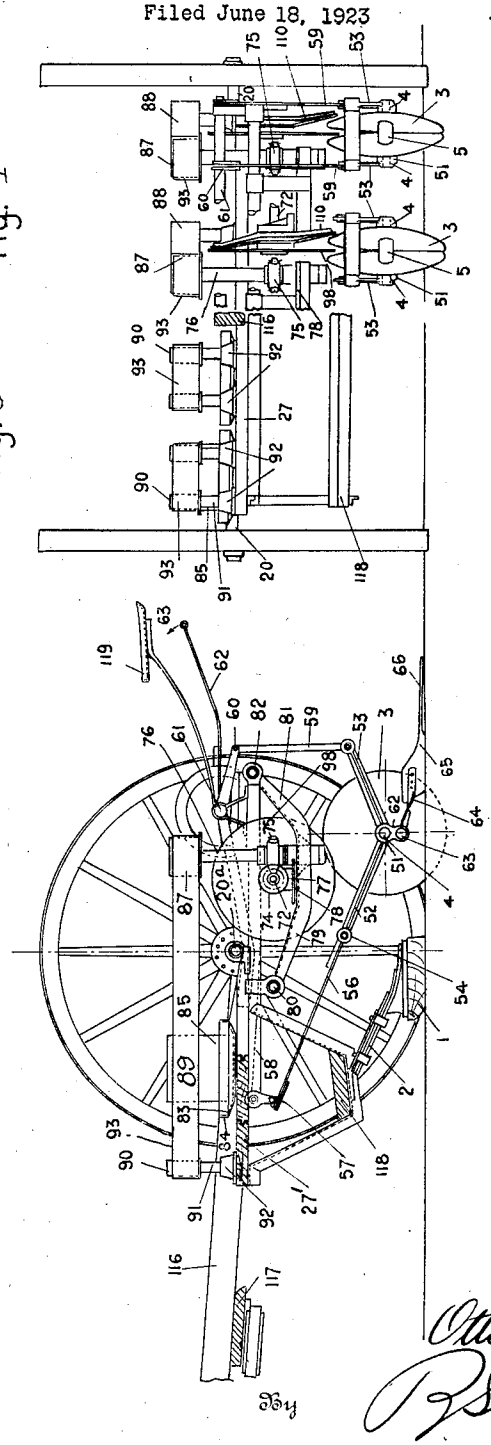
TRANSPLANTING MACHINE, PARTICULARLY FOR RICE PLANTS AND THE LIKE

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Fig. 4

Fig. 3

Fig. 1



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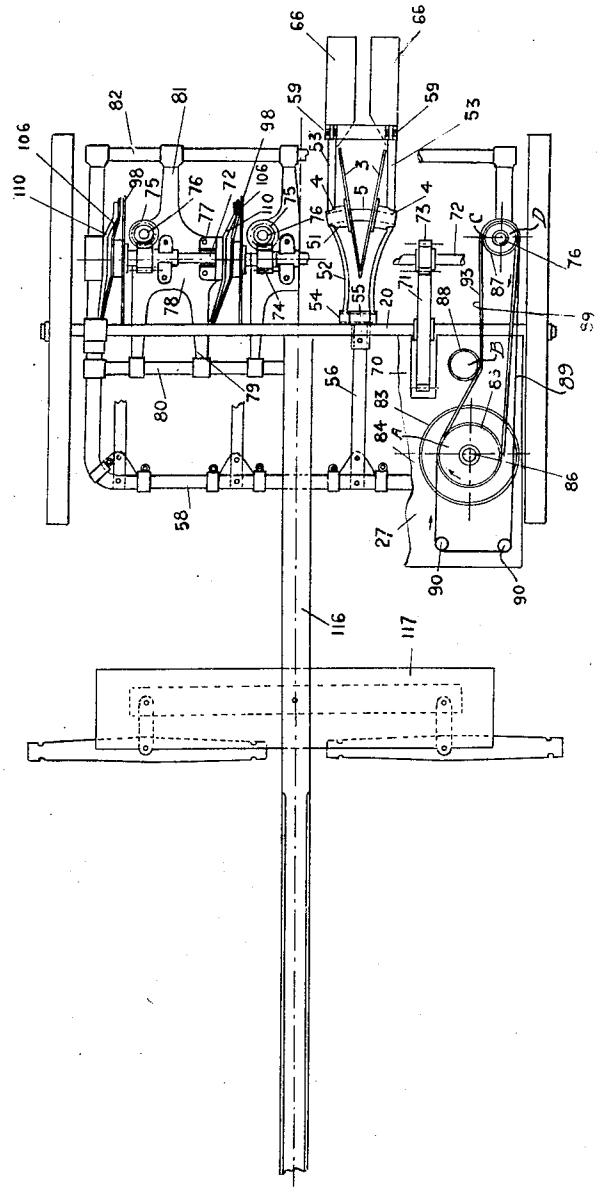


Fig. 2.

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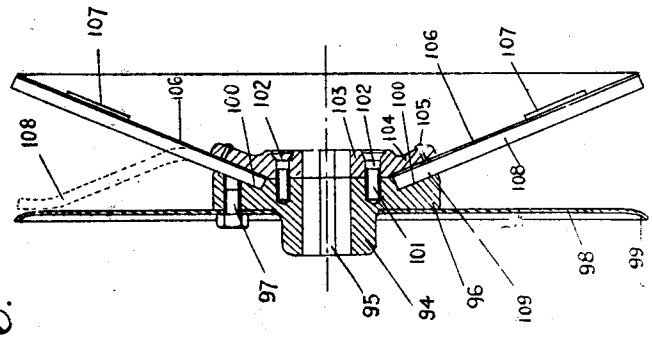


Fig. 6.

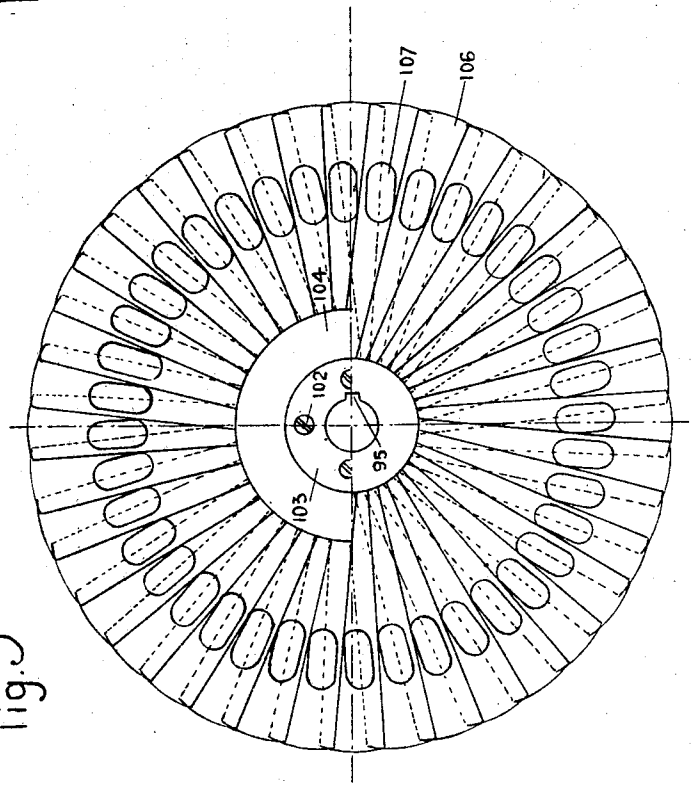


Fig. 5

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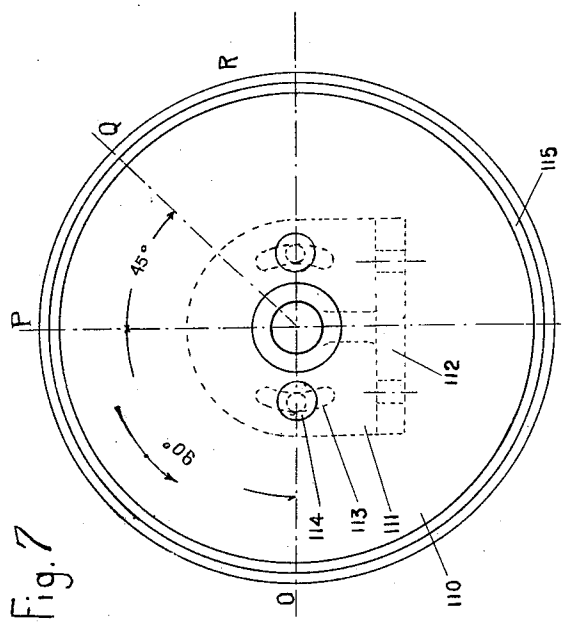


Fig. 7

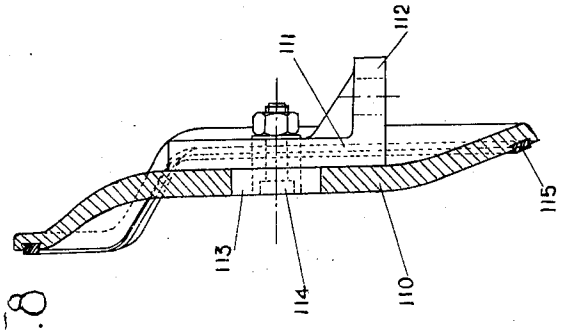


Fig. 8

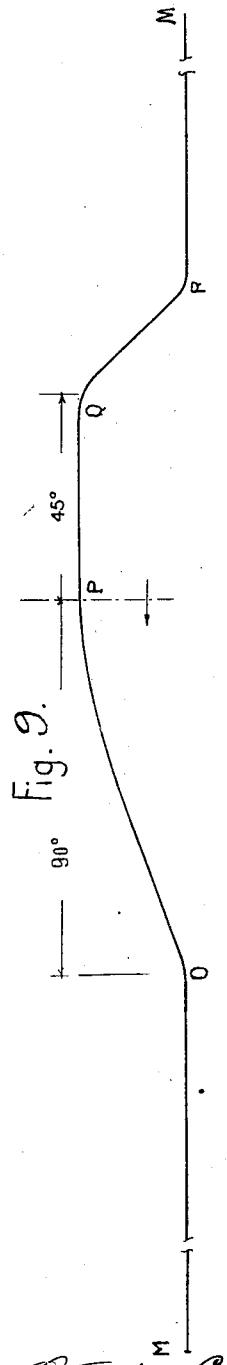


Fig. 9.

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UNITED STATES PATENT OFFICE.

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TRANSPLANTING MACHINE, PARTICULARLY FOR RICE PLANTS AND THE LIKE.

Application filed June 18, 1923, Serial No. 646,273, and in Italy June 23, 1922.

This invention relates to machines for mechanically planting or transplanting rice and like plants, and has for its object to provide improved means to facilitate and improve the said operation.

The invention consists in the construction, combination and arrangement of devices hereinafter described and claimed.

In the drawings

Figure 1 is a vertical, longitudinal, sectional view of a transplanting machine constructed according to my invention.

Figure 2 is a top plan view partly broken away.

Figure 3 is a front elevation of the same.

Figure 4 is a rear elevation of the same.

Figure 5 is a front elevation of the cone of blades with certain parts removed.

Figure 6 is a detail sectional view of one of the discs 98 and the associated cone of blades.

Figures 7 and 8 are respectively a front elevation and a detail vertical section of the cam which cooperates with the cone of blades.

Figure 9 is a diagram of the development of said cam.

The leveller consists of a cross plank 1 arranged to slide on the ground through the entire breadth of the machine and under the pressure of a pair of leaf springs 2 fastened at one end to the frame and at the other end to the leveller.

The furrowing device comprises a number of pairs of discs 3, made preferably of steel, a pair of which is shown in Figure 2. The discs of each pair are arranged at an angle to each other and diverge rearwardly. The discs 3 are adapted to turn about pivots 4 suitably inclined, each pair of pivots having a central connecting and spacing sleeve 5. 27 extends transversely of the machine frame and in front of the axle 20, and has a suitable opening 70 (Figure 2) to allow the toothed wheel 71 fastened to said axle to pass therethrough while turning with the latter to transmit rotation to a secondary shaft 72, a toothed pinion 73 of which engages the said wheel 71.

The transverse secondary shaft 72 is provided with a number of worms 74 which engage worm wheels 75 of vertical shafts 76. The secondary shaft 72 is supported upon suitable bearings 77 fastened to a transverse lower platform 78 supported by arms 79 to a transverse bar 80, and by arms 81 to the rear bar 82 of the frame.

Upon the platform 27 there is provided a number of circular basins 83, each having a flange or folded edge 84, each basin being integral with a drum 85 rotatable about a vertical pivot 86. The shafts 76 are provided with driving pulleys 87, an intermediate tension pulley 88 being preferably provided to keep in tension a rubber, or like endless belt 89 embracing the pulley 87 of each shaft 76 and operatively connecting the latter to the drum 85. A pair of loose pulleys 90, rotatable on pivots 91 fastened by suitable base pieces 92 to the platform 27 near the front edge thereof, are embraced by another belt 93 running around the pulley 87 and passing between the drum 85 and pulley 88.

The pulleys and belts are so arranged that the latter will run closely adherent to each other through the portion A B C D, and after the detachment from the pulley 87 at D they will diverge from each other.

The plants are disposed by the operator around the drum 85, with their roots in the flat portion of the basin 83 and outwardly of the portion of belt 89 embracing the drum, in such a manner that while the latter is turning and both belts are running in the direction shown by the arrows, the plants will be caught and transported, substantially vertical and parallel to themselves along the path A B C D of the belts, to the point of divergency D of the latter.

In connection with each group or set of drums, pulleys and belts, there is mounted upon the axle 72 a disc and cam gripping device, details of which are shown in Figures 5 to 9, and which will be detailed with reference thereto.

Each disc and cam gripping device comprises a bush 94 suitably connected or keyed by example as shown at 95, to the shaft 72. Said bush is provided with a flange 96 upon one face of which is fastened, say by bolts 97, a sheet disc 98 having a slightly flanged edge 99 to strengthen the same. The opposite face of the flange 96 is provided with a circular angular groove 100 and a number of bores 101 to fit fixing screws 102 securing a shoulder 103 provided with a flange 104 parallel to the larger side of the circular indenture or groove 100. The shoulder 103 has fastened to it, say by means of counter-

sunk rivets 105, a number of substantially radial metallic blades 106, each of which partially overlies the other like fan blades, and being provided on their rear faces with friction pieces 107 at a determined distance from their ends. For sake of clearness, the projection of such blades and pieces is not shown in the side view, Figure 6.

The metallic blades form a cone. A lining cone of rubber or the like 108 is supported thereby and its inner edge 109 is arranged between the flanges 96 and 104. The peripheral portion of the cone may be bent against the sheet metal disc 98, as shown in dotted lines by 108', Figure 6.

Opposite the cone of blades 106 there is mounted on the axle 72 a disc cam 110 supported by a bracket 111 having a base 112 which may be bolted to the required position to the lower platform 78. The bracket will be preferably provided with elongated openings 113 to allow the cam to be suitably adjusted by fixing bolts 114 as the case may require. Upon the front face of the disc cam 110 there is fixed, near its circumference, a ring of soft material 115. The ring 115 in connection with the cam 110 by bearing against the friction pieces 107 causes each peripheral portion of the cone, once during each rotation of the cone, to be closed against the disc 98 as shown in dotted lines at 108' of Figure 9.

Figure 9 shows in plane development the amount of the projection of the cam edge, or eccentricity, about the ground plane M N. It will be seen that the cam is traced in such a way that, assuming the arrows to show the direction of its rotation in respect of the cone of blades, the portion O P will tend to press the blades and rubber cone against the sheet metal disc 98 as hereinbefore stated. The section P Q will keep such parts close against said disc, as shown by 108' of Figure 6, while the section Q R will allow them to relatively quickly remove away from the disc.

The disc and cam gripping devices are so mounted under each plant carrying assembly 87 (Figure 2) that the projection portion O P Q of the cam 110 becomes operative substantially after the belts 89 and 93 pass the point D of said pulley.

The plants having been inserted between said belts will therefore be able to be gradually caught between the edges of the disc 98 and rubber lining 108 through the path O P, to be kept by the said edges through the portion P Q, and to be allowed to fall in the furrow while the fan blades 106 and relative lining rubber 108 run opposite the portion Q R of the cam and are hence opened therefrom.

In the example shown, designed for horse traction, the machine is provided with a pole 116, a bench 117 and a foot rest 118 suitably supported on the frame, for the operator, and a rear seat 119 for the driver.

In the operation, the apparatus is driven in suitable direction and at a relatively low speed across ploughed ground, and will produce the planting in uninterrupted rows, the only hand operation being to arrange the plants a suitable distance apart in the distributor, that is, around either the drum 9 or 85.

It will be understood that considerable variations are possible in the details of the construction without departing from the spirit of my said invention, and therefore I do not intend to limit myself to the specific forms herein shown and described.

Having thus described my invention, what I claim is:

1. In a transplanting machine distributing means adapted to automatically supply plants, a revoluble disc, a cone revoluble therewith and on one side thereof, said cone comprising fan-like elastic metal blades each partially overlying the next adjacent blade by one of its radial edges to form a substantially conical surface, a flexible conical lining fitted on said cone of blades on the side facing said disc and means to press each peripheral portion of the lining and blade cones successively against said disc during each rotation of the said cone.

2. In a transplanting machine distributing means adapted to automatically supply plants comprising a revoluble disc, a cone revoluble therewith and on one side thereof, said cone comprising fan-like elastic metal blades each partially overlying the next adjacent blade by one of its radial edges to form a substantially conical surface, a flexible conical lining fitted on said cone of blades, and a cam to press each peripheral portion of the lining and blade cones successively against said disc during each rotation of the said cone.

In witness whereof I have hereunto signed my name.

OTTORINO CERATI.