July 21, 1936. D. C. HEIM 2,048,505

DISTRIBUTING NOZZLE

Filed May 8, 1933 2 Sheets-Sheet 1

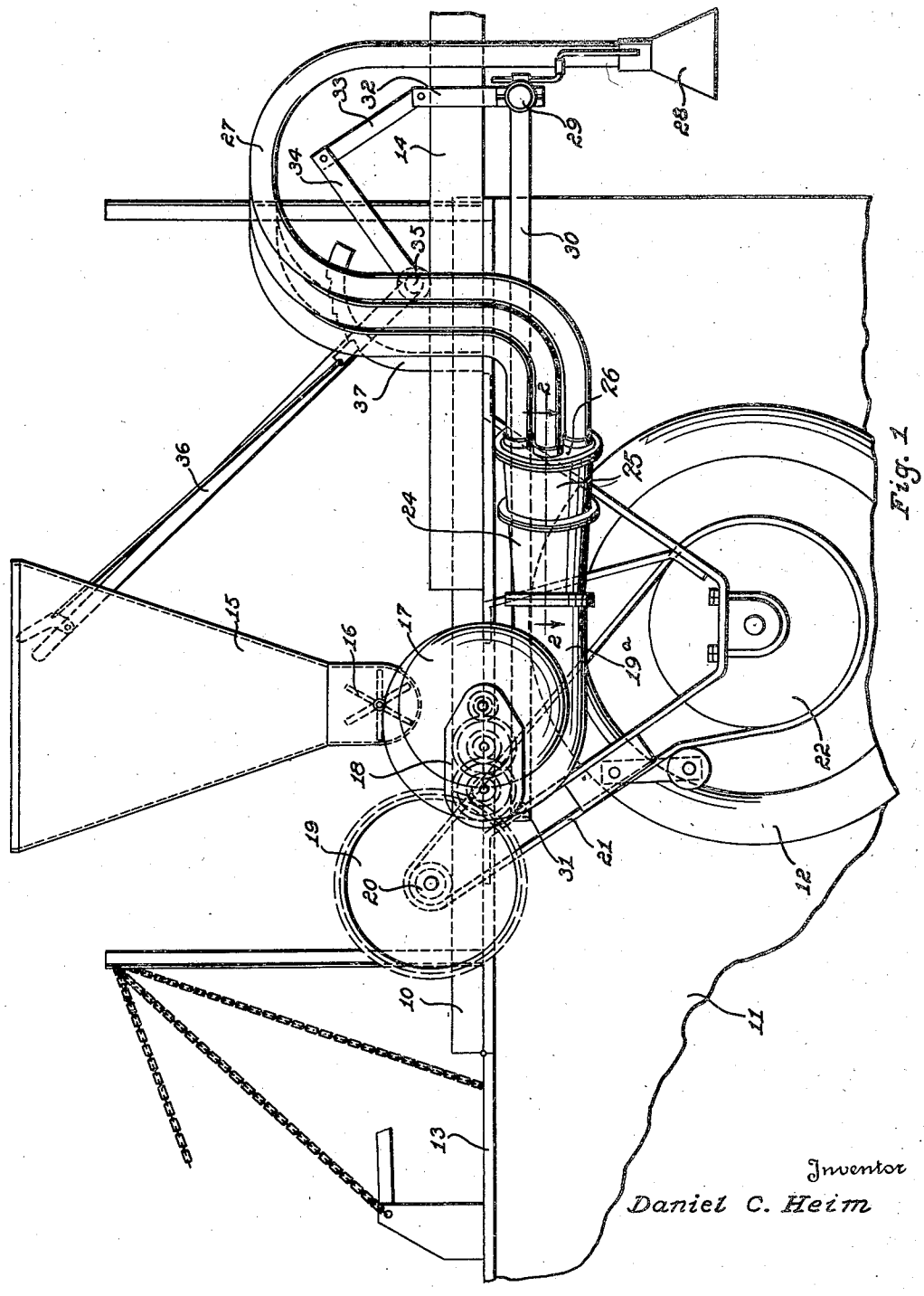


Fig. 1

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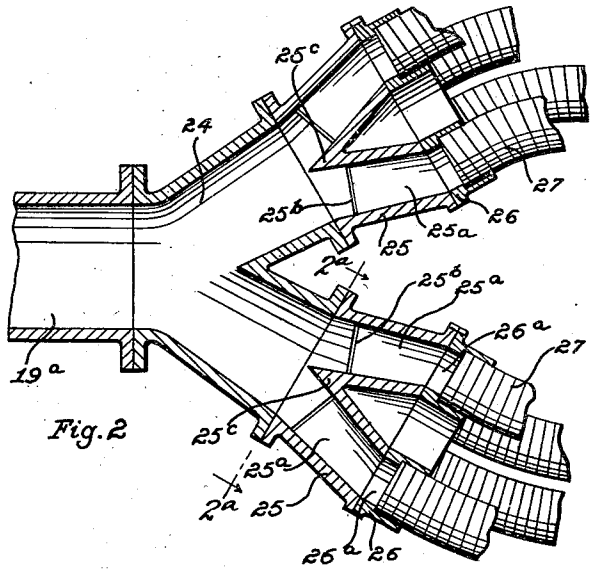


Fig. 2

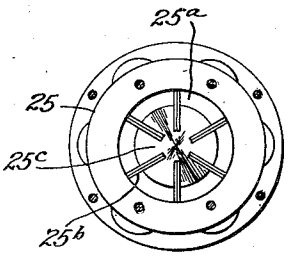


Fig. 2a

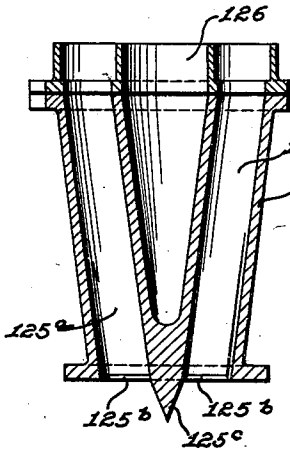


Fig. 3

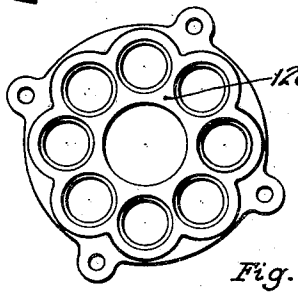


Fig. 4

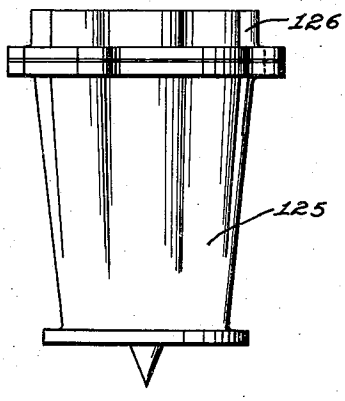


Fig. 6

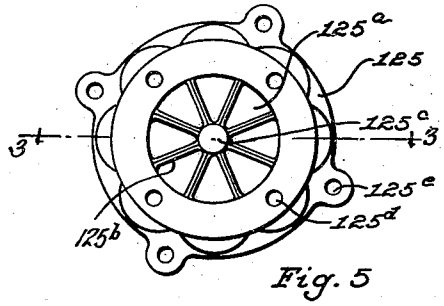


Fig. 5

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Patented July 21, 1936

2,048,505

UNITED STATES PATENT OFFICE

2,048,505

DISTRIBUTING NOZZLE

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Application May 8, 1933, Serial No. 669,995

3 Claims. (Cl. 43—148)

This invention relates to dusting devices for plants and has particular relation to means for separating the dust laden air into a plurality of separate parts for delivery to the nozzles.

In dusting machines, the blower mechanism gathers dust and delivers it to a delivery tube. The delivery tube then conducts the dust laden air through means for separating the air into as many parts as there are delivery nozzles, the air then passing through small tubes to the nozzles.

In providing means to divide the air volume into equal parts for delivery to the tubes, great difficulty has been experienced in dividing the current of air equally without providing a large number of bulky fittings.

The primary object of this invention is the provision of an improved device for dividing a tube of air into a plurality of small streams of equal size and velocity.

Another and further object of the invention is the provision of an improved device for separating an air stream into small streams of a combined cross section substantially equal to the large stream and with a minimum loss due to friction and eddy currents.

Another and still further object of my invention is the provision of a fitting which will receive a cylindrical stream of air, will divide it into sections and deliver it in equal streams of a cylindrical shape, at its delivery end.

Other and further objects will be apparent to those skilled in the art from a reading of the complete specification and claims.

Referring to the drawings wherein I have illustrated an embodiment of my invention,

Figure 1 is an elevation view of my invention as applied to a dusting machine,

Figure 2 is a fragmental horizontal cross sectional view on the line 2—2 of Figure 1 showing details of the hose connecting means. Fig. 2*a* is a view of the nozzle taken on the line 2*a*—2*a* of Fig. 2.

Figure 3 is a cross section of a modified form of the device as divided into eight streams of air, the view being taken on the line 3—3 of Fig. 5.

Figure 4 is a view of the outlet end of Figure 3,

Figure 5 is an opposite end view of Figure 3,

Figure 6 is an elevation view of the modified form of the invention.

The same reference characters refer to the same or similar parts throughout the drawings.

Referring particularly to Figure 1, 10 designates the main frame and platform of a dusting machine, 11 its folding curtain, 12 one of its supporting wheels and 13 its folding rear curtain frame. At its forward end is located a draft tongue 14, which may be drawn by tractor, horses or in any suitable manner.

On the platform 10 is located a hopper 15 which is provided with a suitably driven beater at its bottom. A blower 17 is located adjacent to the bottom of the hopper 15 and is connected thereto by a suitable passage through which the dust passes. The blower 17 is connected to a suitable speed-up gear mechanism 18 which is driven by a drive gear 19. This drive gear 19 is mounted on the shaft with the pinion 20 which is driven by a power chain 21 which passes over a power gear 22 mounted on the ground wheel 12.

Connected to the outlet 19ª from the blower 19 is a Y-connector 24, to which are connected, in the embodiment herein illustrated, two distributing nozzles 25. In the embodiment illustrated in Figures 1 and 2, these distributing nozzles each have six passages 25ª therethrough. These passages at their inlet ends are substantially sectoral in cross section in the preferred form as in the modified form shown in Figure 5. At their outlet ends which are substantially circular in cross section, are passages 26ª of fitting 26 which has one passage 26ª for and registering with, each corresponding opening of a passage 25ª. In the passages 26ª are secured the ends of the respective flexible tubes 27 which extend to the nozzles 28. There are two tubes 27 and two nozzles 28 for each row of plants to be treated. In this embodiment illustrated in Figures 1 and 2, there being six passages 25ª in each distributing nozzle, provision is made for six rows of plants to be treated on each trip through the field.

In order to raise and lower the nozzles, there is provided a suitable mechanism illustrated in Figure 1. A bar 29 extends across the front of the duster, to which are connected two rearwardly extending reach rods 30 pivoted at their rear ends to the main frame 10, as at 31. Secured to the bar 29 are hangers 32 which have at their upper ends, pivoted connections to the lower ends of the links 33. The opposite ends of the links 33 are pivotally connected to crank lever arms 34 which are secured to a crank shaft 35 suitably journaled on the main frame 10.

A lever 36 is suitably secured to the crank shaft 35 and is provided with suitable dog operating mechanism which operates a dog to cooperate with notches in a segment 37. By operating the lever 36, the height of the nozzles with relation to the plants, may be controlled.

The upper edges of the partitions between the passages are preferably wedge-shape or sharp-

ened at the inlet end as shown at 25b on Figure 2. The openings at the inlet end of the passages 25a are preferably circumferentially spaced about a center as shown for the modification illustrated in Figure 5. At substantially the center is placed a deflecting point which is illustrated as a cone 25c. This cone 25c acts to divide the fluid current as dust-laden air into the several parts for delivery to the passages 25a.

In Figures 3, 4, 5, and 6, I have illustrated a distributing nozzle 125 having eight passages 125a. This modification is similar in its general construction to the distributing nozzle 25 already described. The eight passages are provided for use on a four-row duster without the Y-connection 24 or by using the Y-connection 24, provision is made for connection of two such distributing nozzles 125, thus providing passages for an eight row duster.

At the inlet end of the partitions between the passages 125a, the partitions are provided with sharpened edges 125b to deflect the fluid current into the passages 125a. A deflecting member 125c of cone shape is provided in the center of the circumferentially spaced openings of the passages 125a.

A fitting 126 is provided and is constructed to fit the end of the distributing nozzle 125 in a manner similar to the way the fitting 26 fits the distributing nozzle 25.

Suitable securing means are provided at the openings 125d, 125e to secure the distributing nozzle 125 to adjacent parts. Similar parts are provided for the distributing nozzle 25 but are not illustrated in detail.

The body of the nozzle through which the passages extend, is a unitary and integral one piece structure. At the entering end, the diverging straight walls, between the passages which form the sectoral-shape entering ends of the passages, come together at their inner edges and merge at the ends of the passages into a cone which acts to deflect the fluid to the several passages. In the form of the invention shown in Figs. 3, 4, 5, and 6, the cone extends outwardly beyond the sectoral portions of the passages. Preferably, the straight walls come together at the entering end of the passages to form acute angles with adjacent walls.

In both distributing nozzles 25 and 125, the respective passages 25a, 125a, gradually change their shape from substantially sectoral or pie-shaped cross section at the inlet end, to substantially circular cross section at the outlet to provide for connection to the flexible tubes 27 already described. The area of cross-section of the passages is preferably substantially the same throughout their lengths and the sum of their cross sections is preferably substantially equal to the cross section of the tube which delivers the current, and also to the combined areas of the cross sections of the flexible tubes 27.

It is thus clear that I have produced a distributing nozzle which is adapted for use on the various types of dusters, and which will separate the dust-laden air into the desired number of parts so that the current will be divided without great losses from constrictions or eddy currents.

While I have shown and described in detail embodiments of my invention, it is to be understood that the disclosure is merely illustrative and that modifications and changes may be made without departing from the spirit of the invention and within the scope of the appended claims.

Having described my invention what I claim and desire to secure by Letters Patent is:

1. A distributing nozzle having a unitary and integral body portion, a series of passages aligned circumferentially and extending through the body portion, the passages at the entering end being of substantially sectoral shape in cross section and of substantially circular cross section at the delivery end, the diverging straight walls of the sectoral portions of the passages merging into a cone to deflect the fluid to the several passages, the cone and all of the walls of the passages being formed of one and the same piece of material.

2. A distributing nozzle having a unitary and integral body portion, a series of passages aligned circumferentially and extending through the body portion, the passages at the entering end being of substantially sectoral shape in cross section and of substantially circular cross section at the delivery end, the passages between the openings at opposite ends having a gradual change from one shape to the other, some of the walls of the passages being radial and coming together at the center of the nozzle and forming substantially acute angles with adjacent radial walls and at the center merging into a small cone to deflect the fluid to the several passages, the cone and all of the walls of the passages being formed of one and the same piece of material.

3. A distributing nozzle having a unitary and integral body portion, a series of passages aligned circumferentially and extending through the body portion, the passages at the entering end being of substantially sectoral shape in cross section and of substantially circular cross section at the delivery end, the passages between the openings at opposite ends having a gradual change from one shape to the other, some of the walls of the passages being radial and coming together at the center of the nozzle and forming substantially acute angles with adjacent radial walls and at the center merging into a small cone to deflect the fluid to the several passages, the cone and all of the walls of the passages being formed of one and the same piece of material, said cone projecting outwardly beyond the sectoral portions of the passages.

DANIEL CLAUDE HEIM.