

July 4, 1967

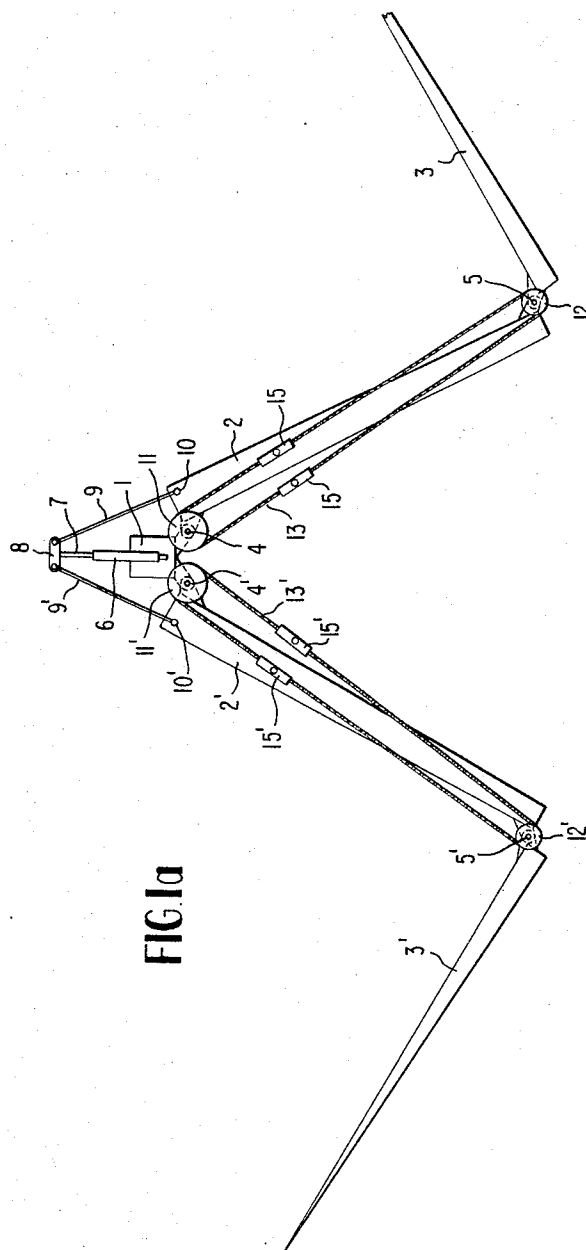
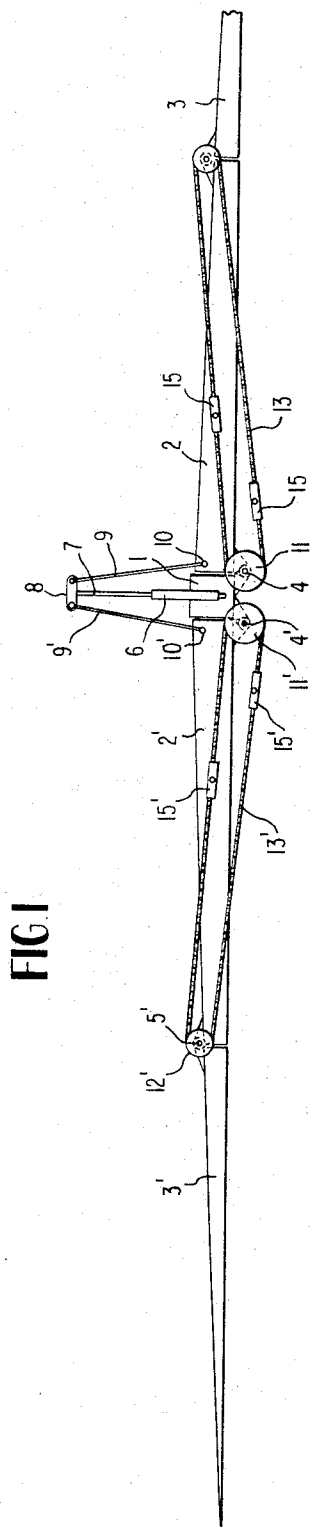
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3,329,030

APPLICATOR LINKAGE

Filed July 27, 1965

3 Sheets-Sheet 1



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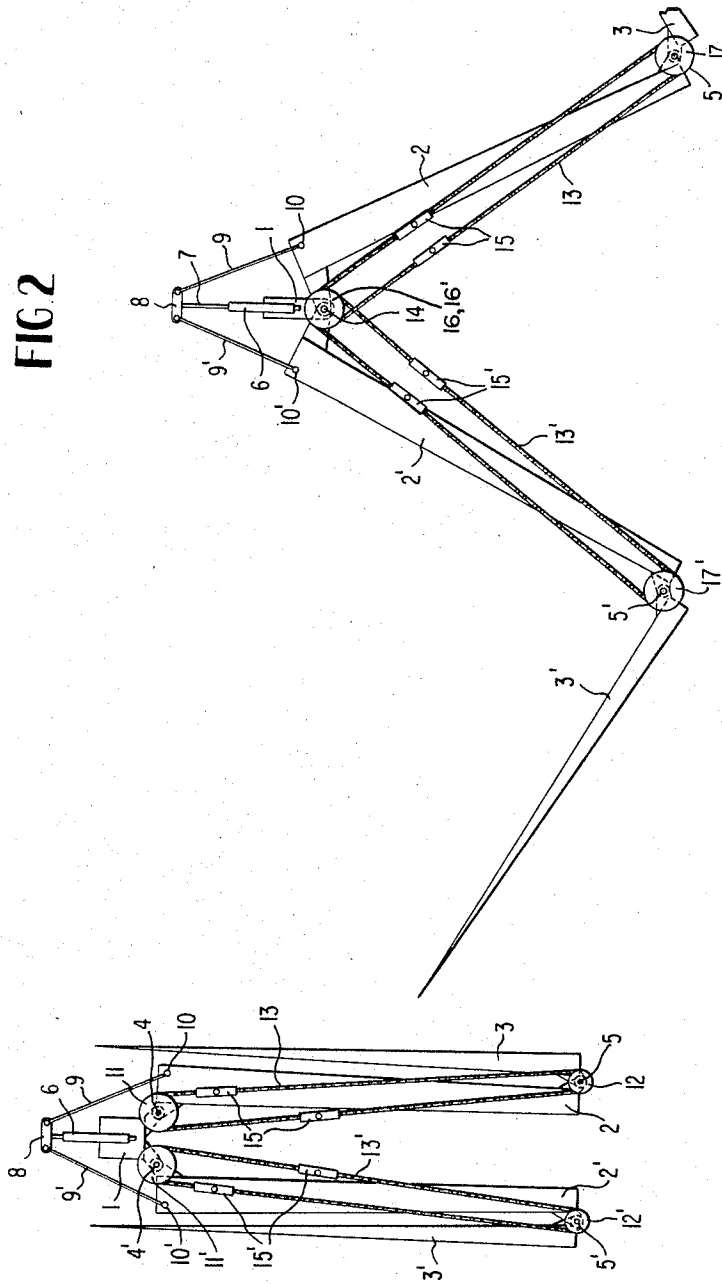
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FIG 2

FIG 1b



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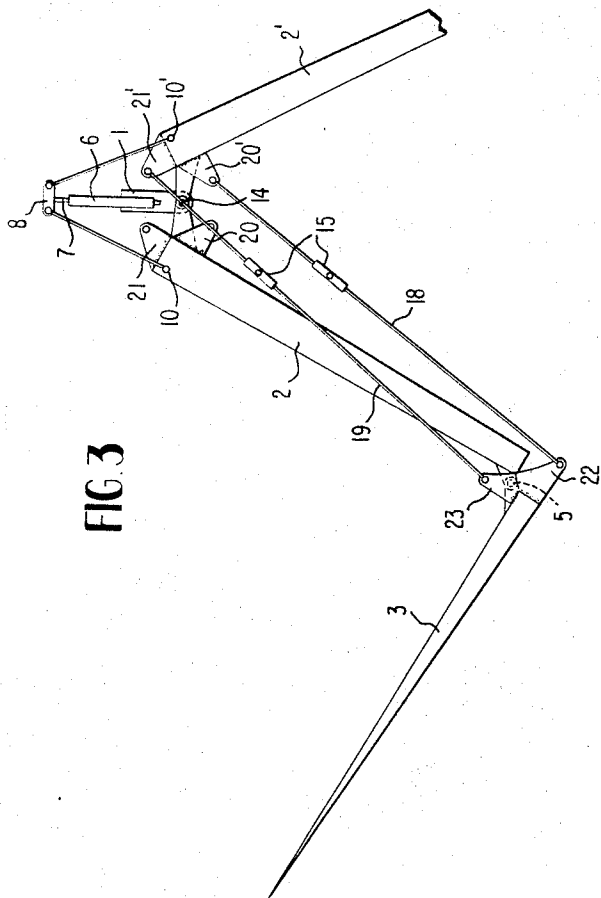


FIG. 3

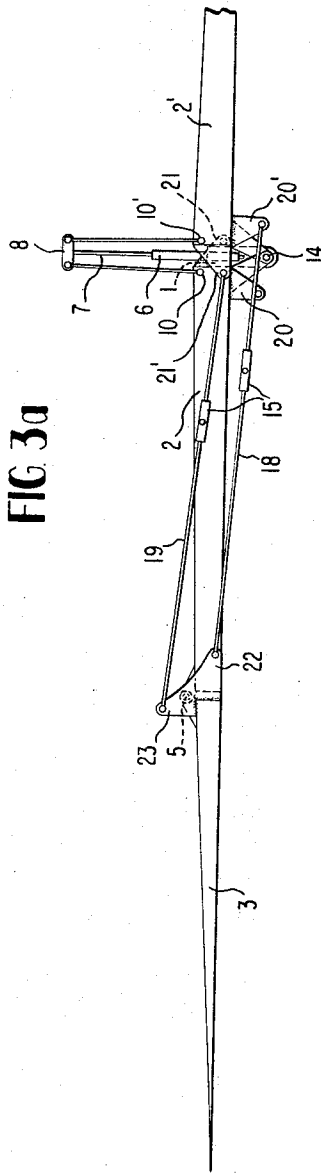


FIG. 3a

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APPLICATOR LINKAGE

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5 Claims. (Cl. 74—105)

The present invention relates to a device for applying a pest control agent, such as a planticide or insecticide.

More particularly, the present invention relates to a pesticide applicator which is especially adapted for being mounted on a vehicle.

There exist various types of applicators which incorporate applicator beams which themselves are constituted by two side pieces each of which is pivotally connected to a common carrier, the arrangement being such that these side pieces are mounted for pivoting about vertical axes so that they can be pivoted from an operative position in which they extend transversely to the direction of movement of the vehicle into an inoperative or transport position in which the parts are folded in. Each of these side pieces is composed of an inner part and an outer part, the two parts on each side of the applicator being connected to each other for pivotal movement about a vertical axis. In this way, the over-all width of the applicator can be reduced, that is to say, the hinged parts can be folded in so as to make it possible for the applicator as a whole to be driven over ordinary vehicular streets. In this way, the applicator, though very wide when in its fully extended position, can be made sufficiently narrow to enable the applicator to be moved about from one place to another.

Conventionally, such foldable applicators are provided with separate drives by means of which the parts on one side of the vehicle can be folded in independently of the parts on the other side of the vehicle. There thus results the problem that, at times, the parts on one side of the vehicle will be folded in more quickly than the parts on the other side, which causes the vehicle as a whole to become unbalanced, and this, in turn, gives rise to the possibility that the vehicle will tip over. This danger is not avoided by using separate hydraulic drives which are fed by a common pressure pump, because even then, as experience has shown, the two parts will not be folded in so as to remain, at all times, in mirror image symmetry, i.e., the parts will not be folded in simultaneously and at the same angular velocities.

It is therefore, the primary object of the present invention to provide an arrangement which overcomes the afore-mentioned drawbacks, and, with this object in view, the present invention resides, basically, in a pesticide applicator mountable on a vehicle and comprising a carrier and right and left applicator components, the same being arranged on opposite sides of the carrier, respectively. Each component includes an elongated inner part which, at one end thereof, is pivotally connected to the carrier for pivotal movement about a first generally vertical axis, and an elongated outer part which, at one end thereof, is pivotally connected to the inner part, at the other end thereof, for pivotal movement about a second generally vertical axis. Also, motion transmitting means are provided for effectuating pivotal motion of the parts which is symmetrical with respect to the carrier.

In practice, the applicator, further comprises a single drive connected to the components for pivoting the parts thereof about the various axes.

The motion transmitting means may be constituted by a sprocket wheel and sprocket chain mechanism, or by a linkage, as will be described more fully below.

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Additional objects and advantages of the present invention will become apparent from consideration of the following description when taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a plan view of one embodiment of an applicator according to the present invention, the same being shown in the fully extended or operative position.

FIGURE 1a is a plan view of the applicator, the right and left components being in the half folded in position.

FIGURE 1b is a plan view of the applicator in the fully folded position, this being the position in which the applicator is transported.

FIGURE 2 is a plan view of another embodiment of the applicator beam according to the present invention, equipped with a different pivoting arrangement to the central carrier and the parts being shown in the half folded in position.

FIGURE 3 is a plan view of yet another embodiment of an applicator according to the present invention, the parts being shown in their half folded in position.

FIGURE 3a shows the applicator of FIGURE 3 in the fully extended position, this being the operative position of the applicator.

Referring now to the drawings and first to FIGURES 1, 1a and 1b, the spray-type applicator comprises, essentially, two side pieces or applicator components constituted by elongated inner parts 2 and 2' and elongated outer parts 3 and 3'. The outer parts 3 and 3' are pivotally connected at one end thereof, to one end of the inner parts 2 and 2', by means of generally vertical pivot axes 5 and 5', such that they can be pivoted with respect to the inner parts 2 and 2' through an angle of 180°.

In the embodiment shown in FIGURES 1, 1a and 1b, the inner parts 2 and 2' are pivotally connected at their inner ends, via two generally vertical pivot axes 4 and 4', to a common carrier 1 so as to be pivotable through an angle of 90°. This pivotal arrangement of the applicator makes it possible for it to be folded into the transport position shown in FIGURE 1b, and also to place it on a vehicle (not shown) arranged above, if the carrier 1 of the applicator is mounted on the vehicle so as to be capable of being raised and lowered. The carrier 1 may also be longer than illustrated, and may be a part which itself is part of the total or effective length of the applicator. Alternatively, the carrier 1 may be shorter.

The carrier 1 carries a fluid operated, that is to say, pneumatic or hydraulic, piston drive which is capable of being reciprocated in both directions and which comprises a cylinder 6 whose axis extends in the direction of transport. The piston drive also includes a piston rod 7, the end of which carries an end piece 8, there being connecting links 9 and 9' which are pivotally connected to the piece 8 and to pivot points 10 and 10' on the inner parts 2 and 2', the pivot points 10 and 10' being spaced from the pivot axes 4 and 4'. In this way, the two inner parts 2 and 2' can be pivoted simultaneously with respect to the carrier 1. In practice, the piston rod 7 will be sufficiently rigid and strong in order to effect this pivotal movement, or a suitable guide may be provided for guiding the piece 8 in the direction of travel of the vehicle.

In order to swing out the outer parts 3 and 3' by 180° at the same time as the inner parts 2 and 2' are pivoted by 90°, there are provided sprocket wheels 11 and 11' which are coaxial with the pivot axes 4 and 4' and sprocket wheels 12 and 12' which are coaxial with the pivot axes 5 and 5'. The inner sprocket wheels 11 and 11' are non-rotatably mounted on the carrier 1 and the outer sprocket wheels 12 and 12' are non-rotatably connected to the outer parts 3 and 3'.

A sprocket chain 13 is placed about the sprocket wheels 11 and 12, and a further sprocket chain 13' is placed

about the sprocket wheels 11' and 12'. The diameter of the inner sprocket wheels 11 and 11' is twice as large as the diameter of the outer sprocket wheels 12 and 12', so that when the inner parts 2 and 2' are pivoted by 90°, by means of the piston drive 6, 7, the outer parts 3 and 3' are pivoted by 180° with respect to the inner parts 2 and 2'. In practice, the sprocket chains 13 and 13' need be constituted of chain-type link elements throughout only those portions of the length of the respective chains that pass over the sprocket wheels 11, 12; 11', 12'. The remaining parts of the sprocket chain can be constituted by wires or rods, thereby reducing the over-all costs.

In order to make it possible to adjust the pivot angle and the neutral position of the parts, the sprocket chains 13 and 13' are provided with turnbuckles 15, 15', there being one such turnbuckle in each reach of each chain.

It will thus be seen that the above-described sprocket wheels and sprocket chains serve as the motion transmitting means which interconnect the parts 2, 3, 2', 3', of the right and left applicator components in such a manner as to effect pivotal motion which is symmetrical with respect to the carrier 1. The pivotal motion is, in the applicator according to the present invention, brought about by the single drive 6, 7, 8, which, through the intermediary of the links 9 and 9', is connected to these components.

In the embodiment shown in FIGURE 2, the inner parts 2 and 2' are mounted for pivotal rotation about a common vertical pivot axis 14. Two sprocket wheels 16 and 16' are provided, these sprocket wheels being coaxial with the pivot axis 14 and lying in two different planes. The sprocket wheel 16 is connected to the inner part 2 and the sprocket wheel 16' is connected to the part 2'.

FIGURE 2 also shows a sprocket wheel 17 connected to the part 3, the sprocket wheel being coaxial with the pivot axis 5 between the outer part 3 and the inner part 2. The sprocket chain 13 is passed over this sprocket wheel 17 and over the sprocket wheel 16' which is connected to the inner part 2' on the other side. Similarly, the sprocket chain 13' is passed over the sprocket wheel 17', which is connected to the outer part 3' and is coaxial with the pivot axis 5' between the parts 2' and 3', and the sprocket wheel 16 connected to the other inner part 2.

The sprocket wheels 16, 16', 17, 17' have the same diameter, so that the transmission ratio from the sprocket wheel 16 to the sprocket wheel 17' and the transmission ratio from the sprocket wheel 16' to the sprocket wheel 17 will be 1:1. This is so because, in the embodiment of FIGURE 2, the inner parts 2 and 2' will be angularly displaced with respect to each other by 180° which is also the angle which the parts 2 and 3, and the parts 2' and 3' will be displaced relative to each other.

In the embodiment shown in FIGURES 3 and 3a, the transmission ratio is likewise 1:1. Here, the motion transmission means are constituted, in lieu of sprocket wheels and sprocket chains, by rods 18 and 19, the same being connected to arm-like extensions 22 and 23 of the outer part 3 and to arm-like extensions 20' and 21' of the inner part 2' arranged on the opposite side. Similarly, the part 2 is provided with arm-like extensions 20 and 21, the same being connected via further connecting rods to similar arm-like extensions on the part 3'. Neither the latter extensions nor the connecting rods attached thereto are illustrated, in order to avoid unnecessarily complicating the drawings. Each set of extensions, together with the corresponding rods, thus forms a parallelogram-type linkage, as shown in the drawing.

It will be understood that the above description of the present invention is susceptible to various modifications, changes and adaptations, and the same are intended to be comprehended within the meaning and range of equivalents of the appended claims.

What is claimed is:

1. A pesticide applicator mountable on a vehicle and comprising, in combination:

- (a) a carrier;
- (b) a right applicator component and a left applicator component arranged on opposite sides of said carrier, respectively, each component including an elongated inner part, which, at one end thereof, is pivotally connected to said carrier for pivotal movement about a first generally vertical axis and an elongated outer part which at one end thereof, is pivotally connected to said inner part, at the other end thereof, for pivotal movement about a second generally vertical axis;
- (c) motion transmitting means for effectuating pivotal motion of said inner and outer parts which is symmetrical with respect to said carrier; and
- (d) a single drive arranged on said carrier and connected to the inner parts of both of said components, said drive comprising a fluid-actuated drive having a cylinder which is mounted on said carrier, a piston arranged in said cylinder for reciprocatory movement in the direction of travel of the vehicle, and symmetrical links connected to said piston and to said two inner parts, at points thereon spaced from the respective first axes.

2. A pesticide applicator mountable on a vehicle and comprising, in combination:

- (a) a carrier;
- (b) a right applicator component and a left applicator component arranged on opposite sides of said carrier, respectively, each component including an elongated innerpart which, at one end thereof, is pivotally connected to said carrier for pivotal movement about a first generally vertical axis and an elongated outer part which, at one end thereof, is pivotally connected to said inner part, at the other end thereof, for pivotal movement about a second generally vertical axis, said first axis of said right applicator component and said first axis of said left applicator component being coincident with each other; and
- (c) motion transmitting means for effectuating pivotal motion of said inner and outer parts which is symmetrical with respect to said carrier, said motion transmitting means comprising a first sprocket wheel which is coaxial with said coincident axis and which is non-rotatably connected with said inner part of said right applicator component; a second sprocket wheel which is also coaxial with said coincident axis and which is non-rotatably connected with said inner part of said left applicator component; a third sprocket wheel which is coaxial with said second axis of said left applicator component and which is non-rotatably connected with said outer part of said left applicator component; a fourth sprocket wheel which is coaxial with said second axis of said right applicator component and which is non-rotatably connected with said outer part of said right applicator component; a first sprocket chain passing over said first and third sprocket wheels; and a second sprocket chain passing over said second and fourth sprocket wheels.

3. An applicator as defined in claim 2 wherein the diameter of all of the sprocket wheels are equal to each other, in consequence of which the angle through which each outer part is pivoted with respect to its corresponding inner part is equal to the angle through which said two inner parts are pivoted with respect to each other.

4. A pesticide applicator mountable on a vehicle and comprising, a combination;

- (a) a carrier;
- (b) a right applicator component and a left applicator component arranged on opposite sides of said carrier, respectively, each component including an elongated inner part which, at one end thereof, is pivotally connected to said carrier for pivotal movement

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about a first generally vertical axis and an elongated outer part which, at one end thereof, is pivotally connected to said inner part, at the other end thereof, for pivotal movement about a second generally vertical axis, said first axis of said right applicator component and said first axis of said left applicator component being coincident with each other; and

(c) motion transmitting means for effectuating pivotal motion of said inner and outer parts which is symmetrical with respect to said carrier, said motion transmitting means comprising a first linkage interconnecting said one end of said inner part of said right applicator component and said one end of said outer part of said left applicator component; and a second linkage interconnecting said one end of said inner part of said left applicator component and said

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one end of said outer part of said right applicator component.

5. An applicator as defined in claim 4 wherein each of said linkages is a parallelogram-type linkage.

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