The present invention relates to a novel hinge for a spray boom, and especially to a novel hinge construction and assembly for resiliently and yieldably attaching an end boom section upon a right boom section in such manner that the end section may be quickly adjusted and held in a horizontal or any angle above or below horizontal, to permit spraying on sloping roadsides or spraying rows of shrubs, hedges, small trees, and the like, through gates, etc.

Among the objects of the present invention is the provision of a novel hinge arrangement for a sectional spray boom in which the boom provides rigidity necessary to maintain the proper spray pattern, yet is sufficiently flexible to prevent breaking or damage when the end boom section or sections strike an obstruction.

The present invention further comprehends the provision of a novel hinge assembly pivotally connecting a fixed and a swingable boom section in such manner that the latter may be quickly adjusted to any angular position and in which adjusted position it is held from whipping forward or backward.

A further object of the present invention is the provision in a boom assembly or a hinge adjustable in such manner that such section accidently strikes a post, stump, rock or other solid or stationary object, such section is permitted movement about a vertical axis sufficient for this section to clear the object without damage to the boom assembly, and when the object is cleared, the end boom section is automatically returned to its initially adjusted position.

A still further object of the present invention is the provision of a novel boom and hinge assembly including a fixed and an adjustable boom section suspended from a boom chain in an adjustable, operative position and with the adjustable boom section hinged and tensionally connected to the fixed boom section in such manner that when the adjustable boom section is swung backward through an angle of approximately 90°, the hinge assembly automatically turns the adjustable boom section over at a right angle to its normal operative position so as to expose and locate the spray nozzles thereon for ready and most effective assembly, disassembly, inspection or servicing of these nozzles and associated mechanism. This greatly facilitates such assembly or disassembly and eliminates the necessity of bending or stooping to secure access to these nozzles or their connections.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

The invention further resides in the construction, combination and arrangement of parts illustrated in the accompanying drawings, and while there is shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

In the drawings:

Figure 1 is a view in front elevation of a sprayer equipped with the novel boom construction and hinge assembly and with one end boom section elevated and the other in horizontal operative position for field spraying.

Fig. 2 is an enlarged fragmentary view in front elevation of the novel hinge assembly for pivotally and yieldably connecting an end boom section to the center section of the boom, a portion of the angle arm of the end boom section being broken away to show the manner of protecting the pipe or tubing.

Fig. 3 is a top plan view of Fig. 2.

Fig. 4 is a fragmentary top plan view like Fig. 3, but showing the end boom section moved rearwardly and at an angle with respect to the central boom section.

Fig. 5 is a fragmentary view in front elevation showing the end boom section elevated by being turned or rotated about the pivot pin through an angle of approximately 90° from the position shown in Fig. 4.

Referring more particularly to the disclosure in the drawings in which there is shown an illustrative embodiment of a novel hinged boom assembly for a power sprayer for effectively spraying an insecticide, fungicide, disinfectant, weed killer or other soluble solution in a uniform amount and in a uniform pattern. The boom assembly may be mounted at the front of a vehicle or at the rear of a power sprayer and comprises a center boom section and two elongated end or boom sections 2 and 3, there being one boom at each side of the center section, and each boom section consisting of a spray tube or pipe 4 disposed within and beneath a protecting angle bar 5 suspended at suitable height by the outer end of a chain 6. Each spray tube or pipe is held anchored in its angle iron by suitable clamps or clamping brackets 7 and provided at spaced intervals with depending spray nozzles 8. A flexible supply tube 8 leading from a receptacle 11 of the power sprayer and containing the spray solution discharges into a fitting 12 for distributing the solution to the spray tube or pipe of the central boom section 1 and through the flexible tubes 13 to the spray tubes or pipes 4 in the end boom sections 2 and 3.

The center section 1 terminates at each end in a clevis-like head consisting of two clevises 14.
and 15 pivotally or rotatably connected by a pivot pin 16, the clevis 15 being secured to and carrying a plate 17 provided adjacent each end with a laterally and outwardly opening slot 18 and having at the juncture of this plate and the clevis 15 an upwardly and a downwardly projecting ear or lug 19 to which the inner ends of an upper and a lower coil spring 21 and 22 are connected. These springs have their outer ends connected to pivot plates 23 pivotally connected upwardly and downwardly from the angle bar 5. At its inner end this bar 5 is provided with a cross-head 24 comprising an upper plate 25 and a lower plate 26 welded or otherwise rigidly connected to the bar 5 and maintained in spaced relation. Adjacent the opposite ends of this cross-head 24 are provided transversely extending pins 27 spaced apart in such manner as to seat in the slots 18 when the end boom section 3 is in longitudinal alignment with the stationary or fixed section 1.

It will be apparent from the disclosure of this hinge mounting that either end boom section 2 or 3 may be raised and lowered by tilting it about the pivot pin 18, and also that either end section may be swung laterally, forwardly or backwardly from its normal operative position, in which case one or the other of the cross or boom head 24 consisting of the plates 25 and 26, moves away from the plate 17 with the springs 21 and 22 serving to return the end boom section to its normal or longitudinally aligned position with the fixed section 1.

It will be observed that the springs 21 and 22 constitute the sole means for holding the boom section head 24 in cooperative relation with the stationary head or plate 17, and permit the end boom section to give sufficiently should it strike a post, stump, tree, rock or other substantially rigid object and thus to clear such object. When the object is cleared, the springs 21 and 22 retract the end boom section into correct operative position.

When in normal operative position, the pins 27 in the slots 18 prevent a lateral displacement of the boom head and the springs prevent separation of the heads. Tilting movement, however, in either direction is permitted when pressure exerted laterally upon the boom withdraws one of the pins 21 from its slot 18, while the other pin in its respective slot serves as the offset hinge pivot about which the boom swings.

Should such tilting or lateral movement continue to a position where the end boom section is swung rearwardly approximately 90° as shown in Fig. 4, this section is then automatically turned over or pivoted about the hinge pin 18 (see Fig. 5) and elevated through an angle of approximately 90°, and in this position fully exposes the spray pipe or tube 4 for inspecting, changing or servicing the tube or spray nozzles without bending or stooping to secure access thereto. This turning up or elevating of either end boom section when swung back through an angle of approximately 90° from its normal operative position (Fig. 3), is due to the offset of the hinge (Fig. 4) and the connection of the outer end of the supporting boom chain 6 to its end boom section.

Having thus described the invention, I claim:

1. In a spray boom having a fixed boom section and one or more end boom sections each containing a spray tube and nozzles for receiving and dispensing a spray solution, a hinge assembly for pivotally connecting the fixed and end boom sections to permit the latter to be held at any angle with respect to the vertical and comprising a pair of pivotally connected members mounted on the end of the fixed section, a plate head comprising spaced plate members secured to the end boom section and adapted to be received in a slot in said plate whereby when the boom sections are in longitudinal alignment said plate is disposed within the boom head and the end boom section may be swung laterally from such position of alignment and pivot about one of the pins, and tension means for returning the end boom section from such lateral position to its normal position aligned longitudinally with the fixed boom section.

2. In a spray boom having a fixed boom section and one or more end boom sections each containing a spray tube and nozzles for receiving and dispensing a spray solution, a hinge assembly for pivotally connecting the fixed and end boom sections to permit the latter to be held at any angle with respect to the vertical and to be swung laterally from the fixed boom section, said hinge assembly comprising a pair of pivotally connected members mounted on the end of the fixed section, a plate head comprising spaced plate members and having a slot adjacent its opposite ends, a boom head comprising spaced plate members secured to the end boom section adapted to receive said plate therewith and a pin disposed between these spaced members adjacent each end thereof adapted to be received in the slot in said plate whereby when the boom sections are in longitudinal alignment said plate is disposed within the boom head and the end boom section is free to pivot vertically, and when in this position the end boom section may be swung laterally from such aligned position with the fixed boom section, and tension springs connecting the end boom section to the plate for returning the end boom section to its normal position aligned longitudinally with the fixed boom section.

3. In a spray boom having a fixed boom section and an end boom section, hinge means for pivotally connecting the end section to the fixed section for swinging the end section about a horizontal as well as a vertical axis to permit the end boom section to pivot and be held in any desired angle with respect to the vertical and also to pivot laterally when striking an object, said hinge means comprising a clevis head having a part secured to the fixed section and a part pivotally connected to the part secured to the fixed section and connected to the end section to permit the latter to pivot and be held at any desired angle with the vertical, a plate secured to the pivotal part, a head head secured to the end section and adapted to receive the plate, a pivotal connection between the plate and head to permit the end section to swing laterally with respect to the fixed section and from its normal position in which the sections are in longitudinal alignment, and tension means connecting the end section to the plate for returning the end section to its normal position after it has swung laterally.

4. A spray boom hinge assembly for pivotally connecting an end boom section to a fixed boom section whereby the end section may be swung vertically and held in the desired position to permit spraying on sloping terrain, rows of shrubbery, hedges, small trees and the like and to
tion, I wish to be understood as being limited solely by the scope of the appended claim, rather than by any details of the illustrative showing and foregoing description.

I claim as my invention—

A feed spreader comprising a hopper wheel-supported for translation and including an imperforate bottom member, a discharge aperture centrally of and intersecting the hopper front wall transverse to the direction of translation with the aperture lower margin spaced upwardly from said bottom member, an inclined floor in said hopper cooperating with the aperture lower margin for the direction of hopper contents to and through the aperture and cooperating with said bottom member to define a collecting chamber therebetween at the lower end of the hopper, an access door opening to said collecting chamber through the hopper rear wall, a perforated section in said floor for the diversion of hopper contents therethrough and to said collecting chamber, a reciprocable gate spring urged into closing relation with said aperture, means for manually shifting said gate against the pressure of its spring and into various uncovering relations with said aperture for the regulation of hopper contents discharge therethrough, a housing juxtaposed and closing against the front wall of said hopper about and in covering relation with said aperture and having a discharge opening at one side thereof through which material may be ejected transversely of the direction of hopper travel and a horizontal floor on the level with the lower margin of said aperture, and an impeller power-rotatable in said housing about an axis paralleling the direction of assembly translation and across said aperture for the ejection of hopper contents discharge through the housing side opening and laterally of the assembly.

WILLIAM BURKART.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>981,160</td>
<td>Bickerstaff</td>
<td>Jan. 10, 1911</td>
</tr>
<tr>
<td>2,003,628</td>
<td>Chadwick</td>
<td>June 4, 1935</td>
</tr>
<tr>
<td>2,430,020</td>
<td>Johnson</td>
<td>Nov. 4, 1947</td>
</tr>
<tr>
<td>2,487,503</td>
<td>Witter</td>
<td>Nov. 8, 1949</td>
</tr>
<tr>
<td>2,617,181</td>
<td>Weston</td>
<td>Aug. 1, 1950</td>
</tr>
</tbody>
</table>

FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>597,224</td>
<td>Great Britain</td>
<td>Jan. 21, 1948</td>
</tr>
</tbody>
</table>