United States Patent

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[54] **INTEGRATED SINGLE-PIVOT AUGER BOX**
16 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **214/83.26,** 214/83.32, 198/64
[51] **Int. Cl.** **B60p 1/40**
[50] **Field of Search** 214/83.26, 83.32, 521, 522; 198/64, 53

[56] **References Cited**

UNITED STATES PATENTS

2,772,767	12/1956	Seifert	214/83.26X
3,171,558	3/1965	Sharp	214/83.32X
3,322,257	5/1967	Phillips	214/522X
3,265,253	8/1966	Niewold	214/83.26X
3,337,068	8/1967	MeHarry	214/83.26
3,391,778	7/1968	Lasiter	214/83.26X

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ABSTRACT: There is disclosed an integrated single-pivot auger box including a box body having a discharge opening and an elongated auger tube mounted on the box body for pivoting about a pivotal axis and having an aperture therein in registration with the discharge opening, the pivot axis being disposed at an acute angle of about 50° with respect to the horizontal and at an acute angle of about 65° with respect to the longitudinal axis of the box body, the auger tube being pivotal among a rest position disposed adjacent to the box body and a high discharge position extending outwardly and upwardly from the discharge opening with the discharge end well above the support surface and a low discharge position extending horizontally outwardly and with the discharge end disposed a short distance above the support surface; in a modification, a spreader attachment is provided on the box body in position to receive material from the auger tube when disposed in the rest position thereof.

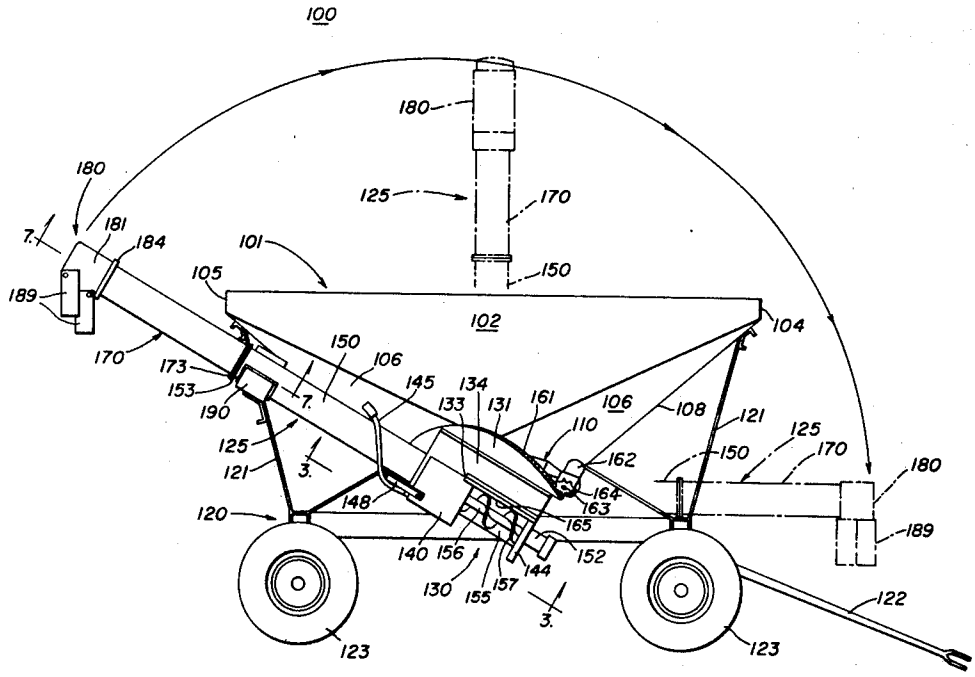


FIG. 1A

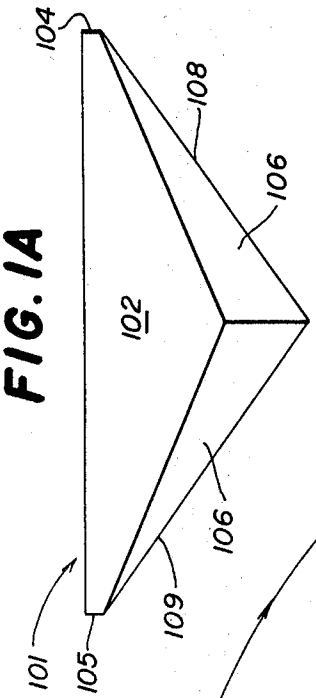


FIG. 1

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FIG. 2

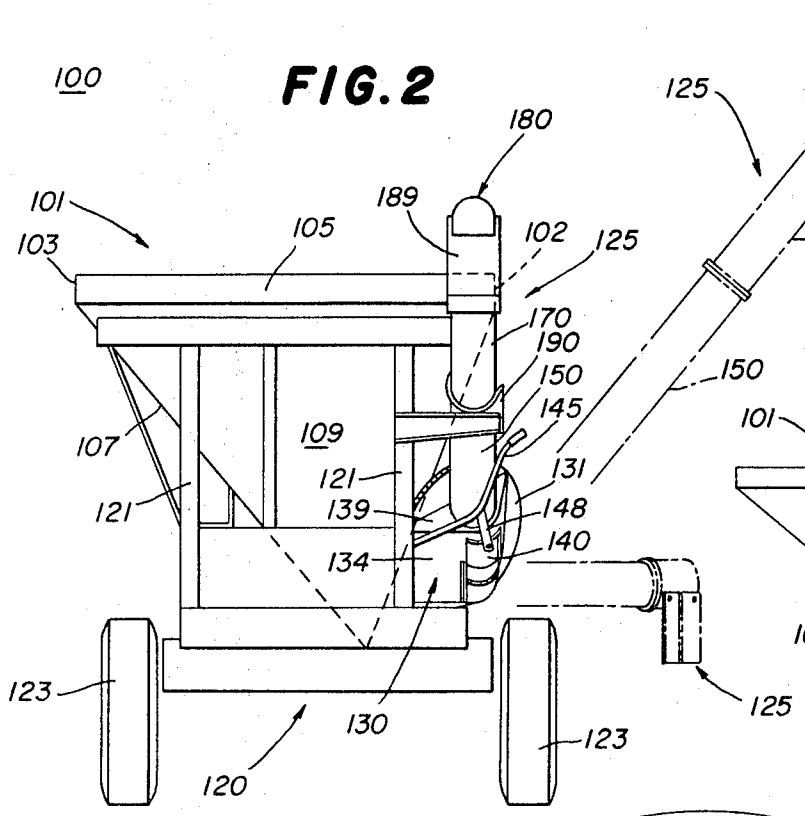


FIG. 2A

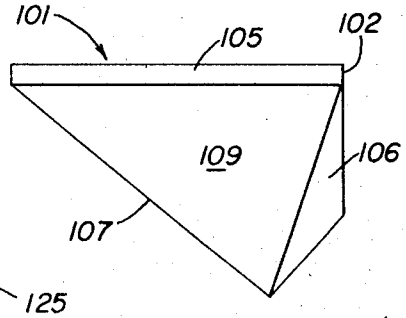


FIG. 3

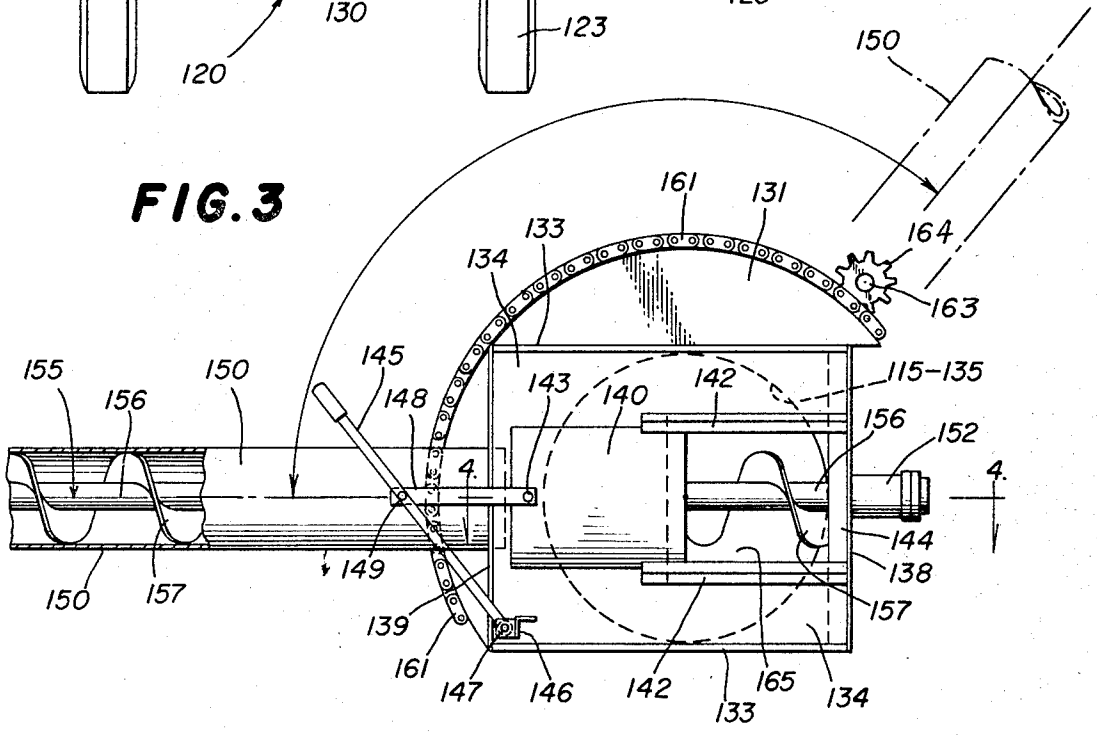


FIG. 4

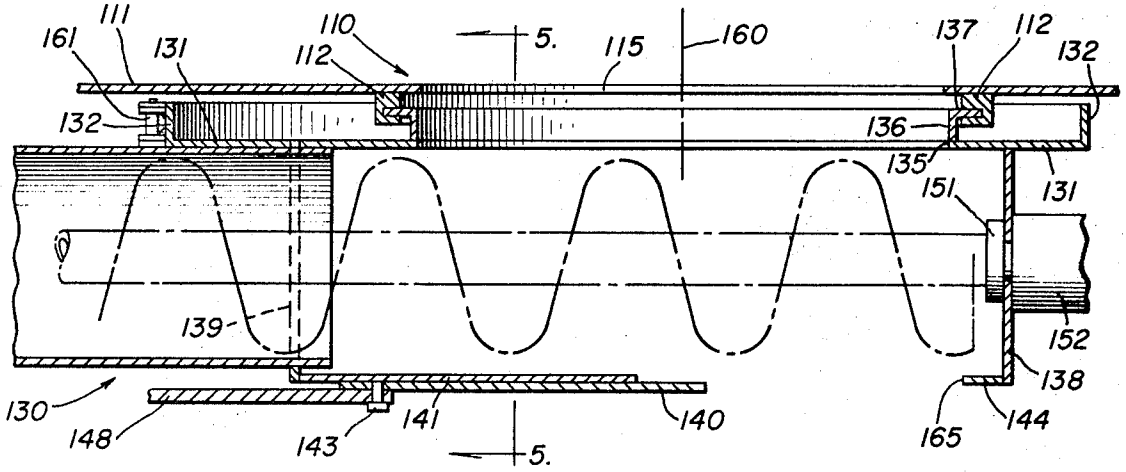


FIG. 5

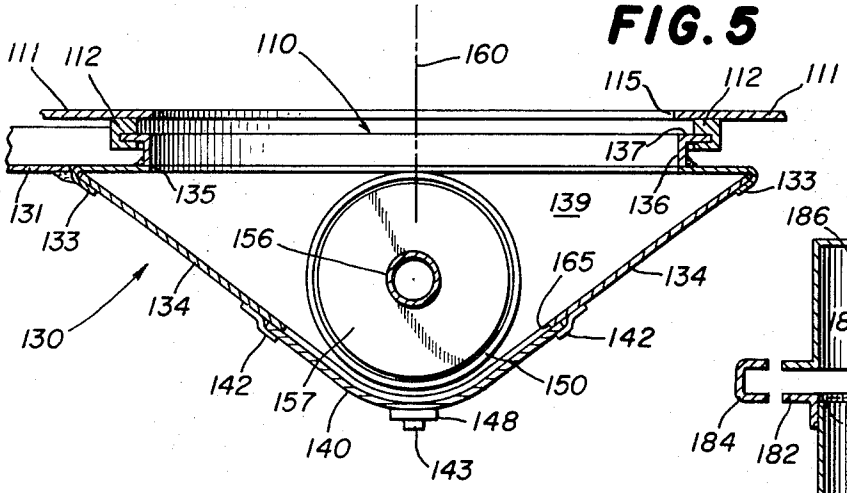


FIG. 6

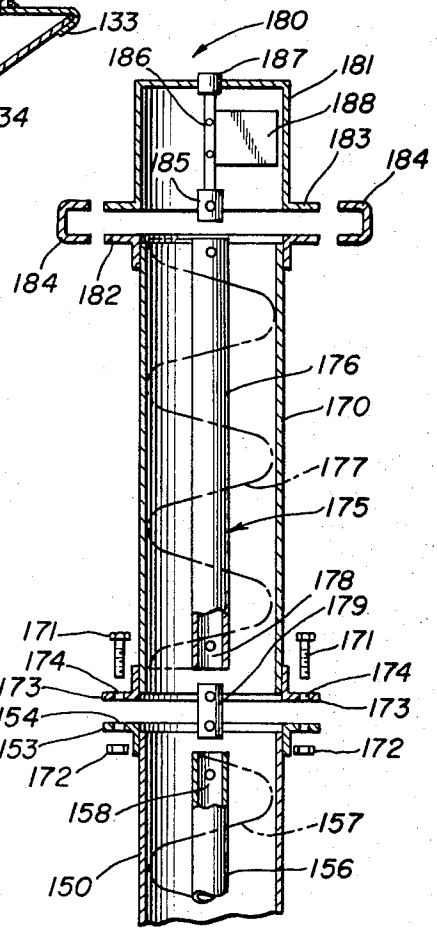
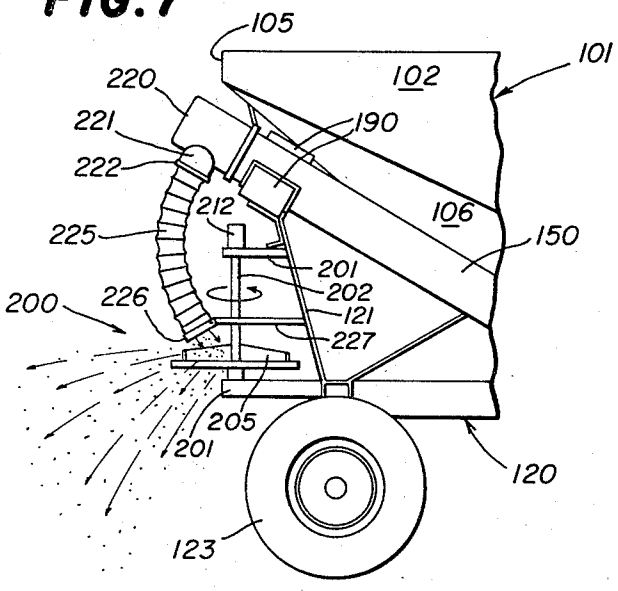


FIG. 7



INTEGRATED SINGLE-PIVOT AUGER BOX

The present invention is directed to an integrated single-pivot auger box wherein the auger tube pivots about a single axis among a rest position disposed adjacent to the box body and a high discharge position wherein the discharge end is disposed well above the support surface and a low discharge position wherein the discharge end is disposed a short distance above the support surface.

It is an important object of the present invention to provide an integrated single-pivot box of the type set forth including a box body defining a storage chamber for support upon an underlying support surface and having a discharge opening therein adjacent to the lower portion thereof, an elongated auger tube mounted on the box body for pivoting about a pivot axis disposed at an angle with respect to the longitudinal axis of the auger tube, the auger tube having an aperture in one end thereof in registration with the discharge opening in all of the pivoted positions of the auger tube, the pivot axis being disposed in use at an acute angle less than 90° with respect to the horizontal and being disposed in use at an acute angle less than 90° with respect to the longitudinal axis of the box body, the auger tube being pivotal between a rest position and a discharge position, the auger tube in the rest position thereof being disposed adjacent to the box body and extending upwardly from the discharge opening, the auger tube in the discharge position thereof extending laterally from the box body with the discharge end thereof disposed above the underlying support surface, and an auger in the auger tube for carrying the material from the discharge opening to the discharge end of the auger tube when the auger tube is in the rest position and is in the discharge position.

In connection with the foregoing object, it is another object of the invention to provide an integrated single pivot auger box of the type set forth wherein the pivot axis is disposed normal to the longitudinal axis of the auger tube and the pivot axis is disposed in use at an acute angle of about 50° with respect to the horizontal and is disposed in use at an acute angle of about 65° with respect to the longitudinal axis of the box body.

Another object of the invention is to provide an integrated single-pivot auger box of the type set forth, wherein the auger tube is pivotal among a rest position and a high discharge position and a low discharge position, the auger tube in the high discharge position extending laterally from the box body and upwardly from the discharge opening with the discharge end thereof disposed well above the underlying support surface, the auger tube in the low discharge position extending outwardly from the box body and substantially horizontally from the discharge opening with the discharge end thereof disposed a short distance above the underlying support surface.

Another object of the invention is to provide a single-pivot auger box of the type set forth wherein a housing is provided around the end of the auger adjacent to the discharge opening, the housing having a door therein movable between closed and open positions, the door in the open position permitting rapid discharge of the contents of the box body by gravity only.

Another object of the invention is to provide an integrated single-pivot auger box of the type set forth wherein the auger assembly includes an auger extension at the outer end thereof removable from the main portion of the auger assembly to facilitate transport of the auger box with the auger assembly in the rest position thereof.

A further object of the invention is to provide an integrated single-pivot auger box of the type set forth including a spreader mechanism mounted on the box body at a point disposed adjacent to but spaced below the discharge end of the auger tube when in the rest position thereof, and a conduit for directing material from the discharge end of the auger tube onto the spreader mechanism, whereby to move material from the box body through the discharge opening and up the auger tube and downwardly through the conduit onto the spreader mechanism for spreading the same.

Further features of the invention pertain to the particular arrangement of the parts of the integrated single-pivot auger box, whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification taken in connection with the accompanying drawings, in which:

FIG. **1** is a side elevational view of an integrated single pivot auger box made in accordance with and embodying the principles of the present invention, the auger tube being illustrated in the rest position thereof in solid lines and being illustrated in the high discharge position thereof and in the low discharge position thereof in dashed lines;

FIG. **1A** is a schematic and diagrammatic view of the shape of the side of the auger box viewed in FIG. **1**;

FIG. **2** is a rear elevational view of the integrated single-pivot auger box of FIG. **1**;

FIG. **2A** is a schematic and diagrammatic view of the shape of the auger box as seen in FIG. **2**;

FIG. **3** is a fragmentary sectional view with certain parts broken away as seen in the direction of the arrows along the lines **3–3** in FIG. **1**;

FIG. **4** is an enlarged fragmentary view in section along the lines **4–4** of FIG. **3**;

FIG. **5** is a view in section along the lines **5–5** of FIG. **4**;

FIG. **6** is an exploded view in vertical section of the upper portion of the auger assembly illustrating the auger extension tube and the auger end assembly; and

FIG. **7** is a fragmentary side elevational view of a modification of the present invention wherein the auger box is provided with a spreader mechanism on the rear thereof for receiving material from the auger box via the auger assembly.

Referring to FIGS. **1** and **2** of the drawings, there is illustrated an integrated single-pivot auger box **100** made in accordance with and embodying the principles of the present invention. The auger box **100** includes a box body **101** that is generally rectangular in plan view and includes a pair of opposed upper sidewalls **102** and **103** and a pair of opposed upper end walls **104** and **105** disposed perpendicular to the upper sidewalls **102** and **103** to provide a rectangular configuration at the upper end of the box body **101**. The upper sidewall **101** is generally triangular in shape as viewed in FIGS. **1** and **1A** and has integral with the lower edges thereof a pair of identically-shaped lower sidewalls **106**, the general configuration of the various sidewalls **102** and **106** being illustrated in FIG. **1A**, it being understood that this illustration is diagrammatic and does not take into account discharge openings and the like provided in the walls **102** and **106**. The upper sidewall **103** has integral therewith a generally rectangular sidewall **107**, the lower sidewalls **106** and **107** converging downwardly toward one another and meeting at the lower portion of the box body (see FIG. **2**). The upper end wall **104** is provided with a lower end wall **108** and the upper end wall **105** is provided with a lower end wall **109**, the end walls **108** and **109** being formed as mirror images, one of the other, and interconnecting the lower sidewalls **106** and **107** as is diagrammatically illustrated in FIG. **2A**, again it being pointed out that FIG. **2A** is schematic and diagrammatic and does not illustrate the various opening in the several walls. The several walls of the box body **101** are high slope in character, the lower edges of the sidewalls **106** being disposed at angles of about 36° with respect to the horizontal in use, while the lower edge of the end wall **109** disposed to the left in FIG. **2A** is disposed at an angle of 38° with respect to the horizontal in use, while the juncture of the sidewalls **106** is disposed at an angle of about 50° with respect to the horizontal in use. The resulting box body will quickly direct material downwardly to the lower portion thereof as is understood by those skilled in the art.

Disposed in the lower portion of the box body **101** and specifically at the juncture of the sidewalls **106**, is a hopper **110**

including a front panel 111 having a discharge opening 115 therein, the details of construction of these parts being best illustrated in FIGS. 4 and 5 of the drawings. Disposed around the opening 115 is an adapter ring 112 which is circular in outline and serves to mount on the box body 101 an auger assembly 125 to be described more fully hereinafter.

The box body 101 is illustrated as being mounted upon a chassis 120 provided with four road wheels 123, a plurality of frame members 121 being illustrated as supporting the box body 101 in the operative position on the chassis 120. A drawbar 122 is shown for connecting the chassis 120 to a suitable vehicle, such as a tractor or the like, for transport of the auger box 100 in the usual manner.

The auger assembly 125 includes an auger housing 130 that cooperates with the hopper 110 and more specifically is rotatably mounted thereon, the housing 130 comprising an adapter plate 131, a pair of side panels 134, an end panel 138, an end panel 139, a longer bottom panel 141 and a shorter bottom panel 144. The adapter plate 131 has the shape illustrated in FIG. 3, i.e., has a part-circular periphery at the top and left thereof as illustrated and has straight sides to the right and bottom as illustrated, and has an opening 135 therein that is positioned in registry with the discharge opening 115 in the hopper 110. Disposed around a portion of the periphery of the adapter plate 131, and specifically around the part-circular portion thereof is an outer flange 132, and disposed essentially tangent to the openings 115—135 are two parallel side flanges 133. Also mounted on the adapter plate 131 and extending therefrom in the same direction as the outer flange 132 and surrounding the opening 135 is a mounting flange 136, the outer edge of the mounting flange 136 carrying an out turned flange 137 that is rotatably received within and is supported by the adapter ring 112, whereby the housing 130 of which the adapter plate 131 is a part is free to rotate with respect to the hopper 110 about a pivot axis designated by the numeral 160. As illustrated in FIG. 5, the side panels 134 are disposed at acute angles with respect to the adapter plate 131 and are fixedly secured to the inner surfaces of the side flanges 133 and extend toward each other to form a generally triangular cross section for the housing 130. The end panel 138 closes one end of the housing 130, while the end panel 139 closes the other end of the housing 130. The longer bottom panel 141 is secured to the outer edge of the end panel 139, while the shorter bottom panel 144 is secured to the end panel 138. Access to the interior of the housing 130 is provided through a generally rectangular opening 165 provided with a sliding door 140 that is held in operative position by a pair of guide flanges 142 suitably secured as by welding to the side panels 134, the cross section of the door 140 being best illustrated in FIG. 5.

The door 140 is shaped and arranged to close the opening 165 which is bounded by the adjacent edges of the bottom panels 141 and 144 and the guide flanges 142. In order to move the door 140 between the open and closed positions thereof, an elongated handle 145 has been provided which is pivotally mounted on one of the side panels 134 by means of a bracket 146 pivotally connected to one end of the handle 145 as at the pivot 147. A link 148 interconnects the door 140 to the handle 145, one end of the link 148 being pivoted as at 143 to the door 140 and the other end of the link 148 being pivoted as at 149 intermediate the ends of the handle 145. It will be appreciated that the handle 145 may be used manually to shift the door 140 between a position closing the opening 165 into the housing 130 and a position illustrated in FIG. 3, i.e., providing ready flow of material through the opening 165 from the housing 130.

Fixedly mounted on the end panel 139 is a generally cylindrical auger tube 150 which supports therein the usual auger 155. The lower end of the auger 155 is supported in a bearing 151 mounted on the end panel 138, a drive motor 152 also being mounted on the end panel 138 and drivingly connected to the auger 155, the motor 152 preferably being a hydraulic motor. The auger 155 includes an auger shaft 156 carrying thereon an auger flight 157 that extends from the end of the shaft 156 adjacent to the bearing 151 to adjacent the outer or discharge end of the auger tube 150 (see FIG. 6).

In accordance with the present invention, the auger assembly 125 including the auger housing 130 and the auger tube 150 mounted thereon pivot about the pivot axis 160 and with respect to the hopper 110 among a rest position illustrated by solid lines in FIGS. 1 and 2, a high discharge position illustrated by dashed lines in the center of FIG. 1 and by dashed lines extending at a 50° angle upwardly in FIG. 2, and a low discharge position illustrated in dashed lines to the lower right in each of FIGS. 1 and 2. Motive power for causing such movement of the auger housing 130 is provided by a motor 162 (see FIG. 1) driving a gear segment 161 formed by a sprocket chain suitably secured as by welding to the part circular periphery of the adapter plate 131. The motor 162 has a motor output shaft 163 carrying a sprocket 164 drivingly engaging the gear segment 161 to move the parts among the three positions illustrated.

In order to accommodate such movement of the auger assembly 125 including the auger housing 130 and the various parts mounted thereon, the pivot axis 160 must be disposed in a predetermined position in use, and more specifically is disposed at an acute angle less than 90° with respect to the longitudinal axis of the box body 101. In the preferred embodiment illustrated in FIGS. 1 to 6 of the drawings, the pivot axis 160 is disposed at an acute angle of about 50° with respect to the horizontal and at an acute angle of about 65° with respect to the longitudinal axis of the box body 101. With this disposition of the pivot axis 160, and with the longitudinal axis of the auger tube 150 disposed at right angles with respect thereto, the auger tube 150 can be pivoted among the rest position and the high discharge position and the low discharge position noted. When the auger assembly 125 is in the rest position thereof, the auger tube 150 is disposed adjacent to the box body 101 and specifically adjacent to the associated lower sidewall 106 thereof and extends upwardly away from the hopper 110 at an angle of about 30° with respect to the horizontal. In the high discharge position of the auger assembly 125, the auger tube 150 extends laterally outwardly from the box body 101 substantially normal to the longitudinal axis thereof (see FIG. 1) and is disposed at an angle of about 50° with respect to the horizontal (see FIG. 2), with the discharge end of the auger assembly 125 disposed well above the underlying support surface. In the low discharge position of the auger assembly 125, the auger tube 150 extends substantially horizontally from the hopper 110 and at an angle with respect to the longitudinal axis of the box body 101 and in a direction opposite to the rest position thereof with the discharge end of the auger assembly 125 disposed a short distance above the underlying support surface.

There is provided for the outer end of the auger tube 150, an auger extension tube 170 (see FIGS. 1 and 6, particularly), the outer end of the auger tube 150 being provided with a ring 153 therearound having holes 154 therein. The adjacent end of the tube 170 carries a ring 173 like the ring 153, the ring 173 having holes 174 therein which can be placed in alignment with the holes 154, the aligned holes 154—174 receiving bolts 171 therethrough provided with the usual cooperating nuts 172 to clamp the tube 170 to the outer end of the tube 150. Disposed within the tube 170 is an auger extension 175 provided with a shaft 176 and carrying an auger flight 177 shaped like the auger flight 157 described above. The adjacent ends of the auger shafts 156 and 176 are provided with openings 158 and 178, respectively, to accommodate a connector 179 that serves to interconnect the auger shafts 156 and 176.

There is provided on the outer end of the auger extension tube 170, an auger end assembly 180 including an enclosing housing 181. The adjacent ends of the tube 170 and the housing 181 are provided with cooperating rings 182 and 183, respectively, which can be clamped together by a ring clamp 184. In order to provide an outer bearing for the auger shaft

176, a connector 185 has been provided in the housing 181, the connector 185 being adapted to be connected, such as by a pin, to the outer end of the auger shaft 176 and being mounted on a shaft 186 supported in a bearing 187 in the housing 181. A deflector blade 188 is provided on the portion of the shaft 186 disposed between the connector 185 and the bearing 187, whereby to prevent collection of material within the housing 181. The housing 181 has a discharge opening therein for the discharge of material therethrough, a pair of deflectors 189 being pivotally mounted upon the housing 181 at the discharge opening therein to guide material being discharged therefrom.

During the normal discharge of materials from the box body 101, the auger extension 170 is provided thereon so as to permit delivery of material to a greater elevation and at a greater distance from the auger box 100. During the travel of the auger box 100, it is preferred that the auger extension tube 170 and the associated parts including the auger end assembly 180 be removed from the auger tube 150. There further is provided a support cradle 190 mounted upon one of the frame members 121 and positioned to receive and to support the upper end of the auger tube 150 during travel of the auger box 100.

Both the motor 152 for driving the auger and the motor 162 for positioning the auger housing 130 are hydraulic motors, and preferably are provided with the necessary operating fluid under pressure from the associated drive vehicle, such as a tractor, the controls for the motors 152 and 162 being mounted on the associated tractor. With this arrangement, it will be appreciated that the complete control for the unloading of material, such as corn, from the box body 101 can be controlled from the tractor seat. More specifically, the positioning of the auger assembly 125 is controlled from the tractor seat as is the operation of the augers 155—175. The steep slope of the sides of the box body 101 provides for rapid feed of the material into the hopper 110 for unloading therefrom by means of the auger assembly 125.

In a constructional example of the auger box 100, the openings 115—135 have a diameter of 24 inches, while the auger tubes 150—170 have a diameter of 8 inches, whereby the auger box 100 is particularly adapted to handle high-moisture corn. The position of the auger assembly 125 with respect to the box body 101 can be operated from the associated tractor seat and over an arc of about 130°. The auger assembly 125 with the extension 170 in position can be used to unload material into semitrailers at a height of 10 feet in the high discharge position of the auger assembly 125, or can discharge into a 3-feet high box when the auger assembly 125 is in the low discharge position thereof.

When it is desired rapidly to discharge the contents of the box body 101, for example, into a bin disposed therebelow, or when it is desired to clean the hopper 110 and the associated parts including the auger housing 130, the door 140 is manually opened utilizing the handle 145. The high-sloping sides of the box body 101 provide rapid and complete discharge of the material from the box body 101 through the large opening provided as at 165. The large opening 165 thus provided also permits ready access to all of the parts for the cleaning purpose.

There is illustrated in FIG. 7 of the drawings, a modification of the invention, wherein the auger box 100 described above has had added to the rear thereof a spreader mechanism generally designated by the numeral 200. The spreader mechanism 200 includes a frame 201 mounted on the rear of the chassis 120 and supporting a vertically arranged shaft 202 carrying the usual spreader 205 at the lower end thereof. The upper end of the shaft 201 has connected thereto a drive motor 212 which is preferably hydraulically driven as are the motors 152 and 162 described above. Material to be spread is provided in the box body 101 and is fed therefrom through the hopper 110 and the auger housing 130 upwardly through the auger tube 150 to the outer discharge end thereof. Attached to the discharge end of the auger 150 is an auger end assembly 220 constructed substantially like the auger end assembly 180 but provided with a cylindrical output tube 221. Connected by means of a ring clamp 222 to the tube 221 is a flexible conduit 225 that connects to a discharge fixture 226 mounted immediately above the spreader 205 by a support arm 227. It will be appreciated that when the motor 212 is operating to rotate the spreader 205, the material is fed from the box body 101 through the hopper 110 into the housing 130 by gravity, and from the housing 130 upwardly through the auger tube 150 to the end assembly 220 and then again by gravity through the tube 221, the conduit 225 and the discharge fixture 226 onto the spreader 205. In this manner, the material within the box body 101 can be rapidly and quickly spread.

While there have been described what are at present considered to be certain preferred embodiments of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

We claim:

1. An integrated single-pivot auger box comprising a box body defining a storage chamber for support upon an underlying support surface and having a discharge opening therein adjacent to the lower portion thereof, an elongated auger tube mounted on said box body for pivoting only about a single fixed pivot axis disposed at an angle with respect to the longitudinal axis of said auger tube, said auger tube having an aperture in one end thereof in registration with said discharge opening in all of the pivoted positions of said auger tube, said pivot axis being disposed in use at an acute angle less than 90° with respect to the horizontal and being disposed in use at an acute angle less than 90° with respect to the longitudinal axis of said box body, said auger tube being pivotal between a rest position and a discharge position, said auger tube in the rest position thereof being disposed adjacent to said box body and extending upwardly from said discharge opening, said auger tube in the discharge position thereof extending laterally from said box body with the discharge end thereof disposed above the underlying support surface, and an auger in said auger tube for carrying material from said discharge opening to the discharge end of said auger tube when said auger tube is in said rest position and said discharge position.

2. The integrated single-pivot auger box set forth in claim 1, wherein said box body is mounted upon a wheeled chassis for ready transport thereof.

3. The integrated single-pivot auger box set forth in claim 1, wherein the sides of said box body defining said storage chamber all slope toward said discharge opening to provide rapid and complete discharge of material from said box body.

4. The integrated single-pivot auger box set forth in claim 1, wherein said pivot axis is disposed normal to the longitudinal axis of said auger tube.

5. The integrated single-pivot auger box set forth in claim 1, wherein said pivot axis is disposed in use at an acute angle of about 50° with respect to the horizontal and is disposed in use at an acute angle of about 65° with respect to the longitudinal axis of said box body.

6. The integrated single-pivot auger box set forth in claim 1, wherein said auger tube in the discharge position thereof may be disposed at an angle of at least about 50° with respect to the horizontal.

7. The integrated single-pivot auger box set forth in claim 1, and further comprising a cradle mounted on said box body and receiving and supporting said auger tube in the rest position thereof.

8. The integrated single-pivot auger box set forth in claim 1, and further comprising hydraulic motors for driving said auger and for pivoting said auger tube with respect to said box body.

9. An integrated single-pivot auger box comprising a box body defining a storage chamber for support upon an underlying support surface and having a discharge opening therein adjacent to the lower portion thereof, an elongated

auger tube mounted on said box body for pivoting only about a single fixed pivot axis disposed at an angle with respect to the longitudinal axis of said auger tube, said auger tube having an aperture in one end thereof in registration with said discharge opening in all of the pivoted positions of said auger tube, said pivot axis being disposed in use at an acute angle less than 90° with respect to the horizontal and being disposed in use at an acute angle less than 90° with respect to the longitudinal axis of said box body, said auger tube being pivotal among a rest position and a high discharge position and a low discharge position, said auger tube in the rest position thereof being disposed adjacent to said box body and extending upwardly from said discharge opening, said auger tube in the high discharge position thereof extending laterally from said box body and upwardly from said discharge opening with the discharge end thereof disposed well above the underlying support surface, said auger tube in the low discharge position thereof extending outwardly from said box body and substantially horizontally from said discharge opening with the discharge end thereof disposed a short distance above the underlying support surface, and an auger in said auger tube for carrying material from said discharge opening to the discharge end of said auger tube when said auger tube is in said rest position and said high discharge position and said low discharge position.

10. The integrated single-pivot auger box set forth in claim **9**, wherein said auger tube in the high discharge position thereof is disposed substantially normal to the longitudinal axis of said box body, and said auger tube in the low discharge position thereof extending from said discharge opening in a direction away from the rest position of said auger tube.

11. An integral single-pivot auger box comprising a box body defining a storage chamber for support upon an underlying support surface and having a discharge opening therein adjacent to the lower portion thereof, a hopper mounted on said auger box in position to receive material from said discharge opening and having a delivery opening therein to pass material therethrough, an elongated auger tube mounted on said hopper for pivoting only about a single fixed pivot axis disposed at an angle with respect to the longitudinal axis of said auger tube, said auger tube having an aperture in one end thereof in registration with said delivery opening in all of the pivoted positions of said auger tube, said pivot axis being disposed in use at an acute angle less than 90° with respect to the horizontal and being disposed in use at an acute angle less than 90° with respect to the longitudinal axis of said box body, said auger tube being pivotal between a rest position and a discharge position, said auger tube in the rest position thereof being disposed adjacent to said box body and extending upwardly from said hopper, said auger tube in the discharge position thereof extending laterally from said box body with the discharge end thereof disposed above the underlying support surface, and an auger in said auger tube for carrying material from said hopper through said delivery opening to the discharge end of said auger tube.

12. An integral single-pivot auger box comprising a box body defining a storage chamber for support upon an underlying support surface and having a discharge opening therein adjacent to the lower portion thereof, a hopper mounted on said auger box in position to receive material from said discharge opening and having a delivery opening therein to pass material therethrough, an elongated auger tube mounted on said hopper for pivoting a single fixed pivot axis disposed at an angle with respect to the longitudinal axis of said auger tube, said pivot axis being disposed in use at an acute angle less than 90° with respect to the horizontal and being disposed in use at an acute angle less than 90° with respect to the longitudinal axis of said box body, said auger tube being pivotal among a rest position and a high discharge position and a low discharge position, said auger tube in the rest position thereof being disposed adjacent to said box body and extending upwardly from said hopper, said auger tube in

the high discharge position thereof extending laterally from said box body and upwardly from said hopper with the discharge end thereof disposed well above the underlying support surface, said auger tube in the low discharge position thereof extending outwardly from said box body and substantially horizontally from said hopper with the discharge end thereof disposed a short distance above the underlying support surface, and an auger in said auger tube for carrying material from said hopper through said delivery opening to the discharge end of said auger tube.

13. An integral single-pivot auger box comprising a box body defining a storage chamber for support upon an underlying support surface and having a discharge opening therein adjacent to the lower portion thereof, a hopper mounted on said auger box in position to receive material from said discharge opening, a housing mounted on said hopper for rotation with respect thereto about a pivot axis and disposed in position to receive material therefrom, said housing having a first delivery opening therein to pass material therethrough and having a second delivery opening therein to pass material therethrough, said pivot axis being disposed in use at an acute angle less than 90° with respect to the horizontal and being disposed in use at an acute angle less than 90° with respect to the longitudinal axis of said box body, an elongated auger tube mounted on said housing for movement therewith and having one end in communication with said first delivery opening in all positions of said housing, said auger tube being pivotal with said housing between a rest position and a discharge position, said auger tube in the rest position thereof being disposed adjacent to said box body and extending upwardly from said hopper, said auger tube in the discharge position thereof extending laterally from said box body with the discharge end thereof disposed above the underlying support surface, an auger in said housing and said auger tube for carrying material from said hopper through said first delivery opening to the discharge end of said auger tube, and a door mounted on said housing and movable between a first position closing said second delivery opening and a second position uncovering at least a portion of said second delivery opening to pass material therethrough.

14. The integrated single-pivot auger box set forth in claim **13**, wherein said door is slidably mounted upon said housing.

15. The integral pivot and auger box set forth in claim **13**, wherein said door is manually shiftable between the first and second positions thereof.

16. An integrated single-pivot auger box comprising a box body defining a storage chamber for support upon an underlying support surface and having a discharge opening therein adjacent to the lower portion thereof, an elongated lower auger tube mounted on said auger box for pivoting only about a single fixed pivot axis disposed at an angle with respect to the longitudinal axis of said lower auger tube, said lower auger tube having an aperture in one end thereof in registration with said discharge opening in all of the pivoted positions of said lower auger tube, said pivot axis being disposed in use at an acute angle less than 90° with respect to the horizontal and being disposed in use at an acute angle less than 90° with respect to the longitudinal axis of said box body, said lower auger tube being pivotal between a rest position and a discharge position, said lower auger tube in the rest position thereof being disposed adjacent to said box body and extending upwardly from said discharge opening, said lower auger tube in the discharge position thereof extending laterally from said box body with the discharge end thereof disposed above the underlying support surface, an auger in said lower auger tube for carrying material from said discharge opening to the discharge end of said lower auger tube, and an outer auger tube removably mountable on the outer end of said lower auger tube for use thereon when said lower auger tube is in the discharge position thereof, said outer auger tube being removable from said lower auger tube when said lower auger tube is in the rest position thereof.