C. A. BULLARD.

CORN HARVESTER.

APPLICATION FILED MAY 27, 1907.

923,326.

Patented June 1, 1909.

7 SHEETS—SHEET 1

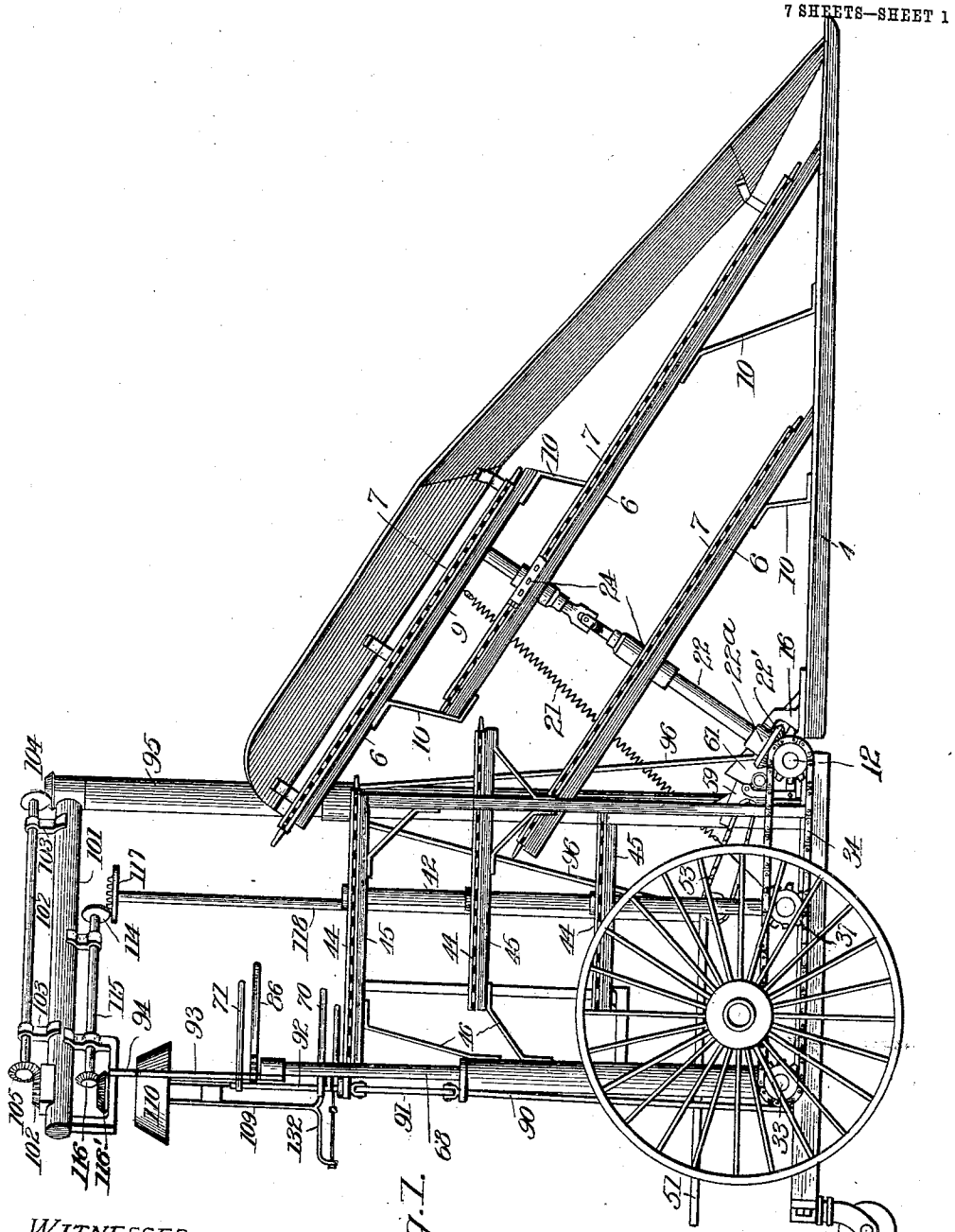


Fig. 1.

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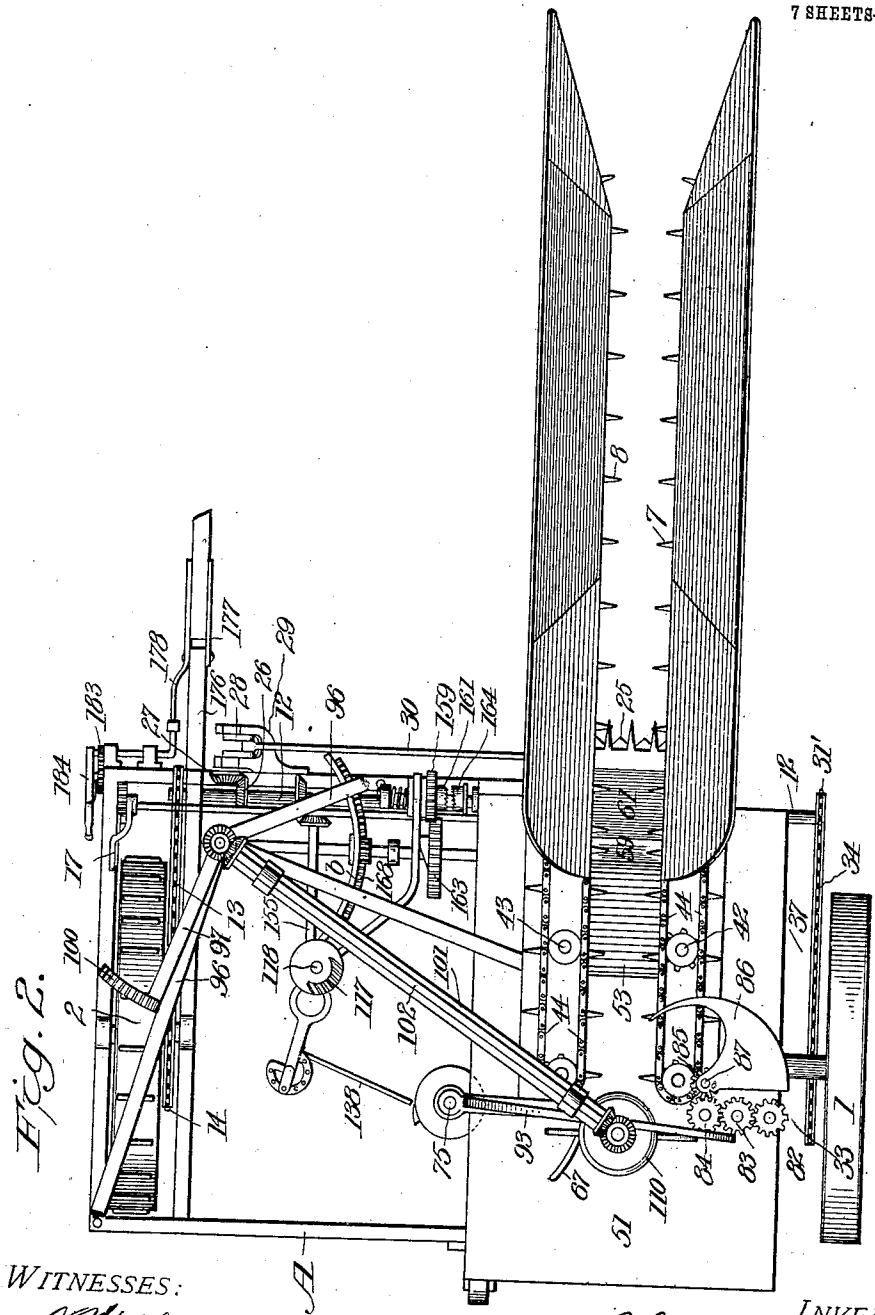


Fig. 2.

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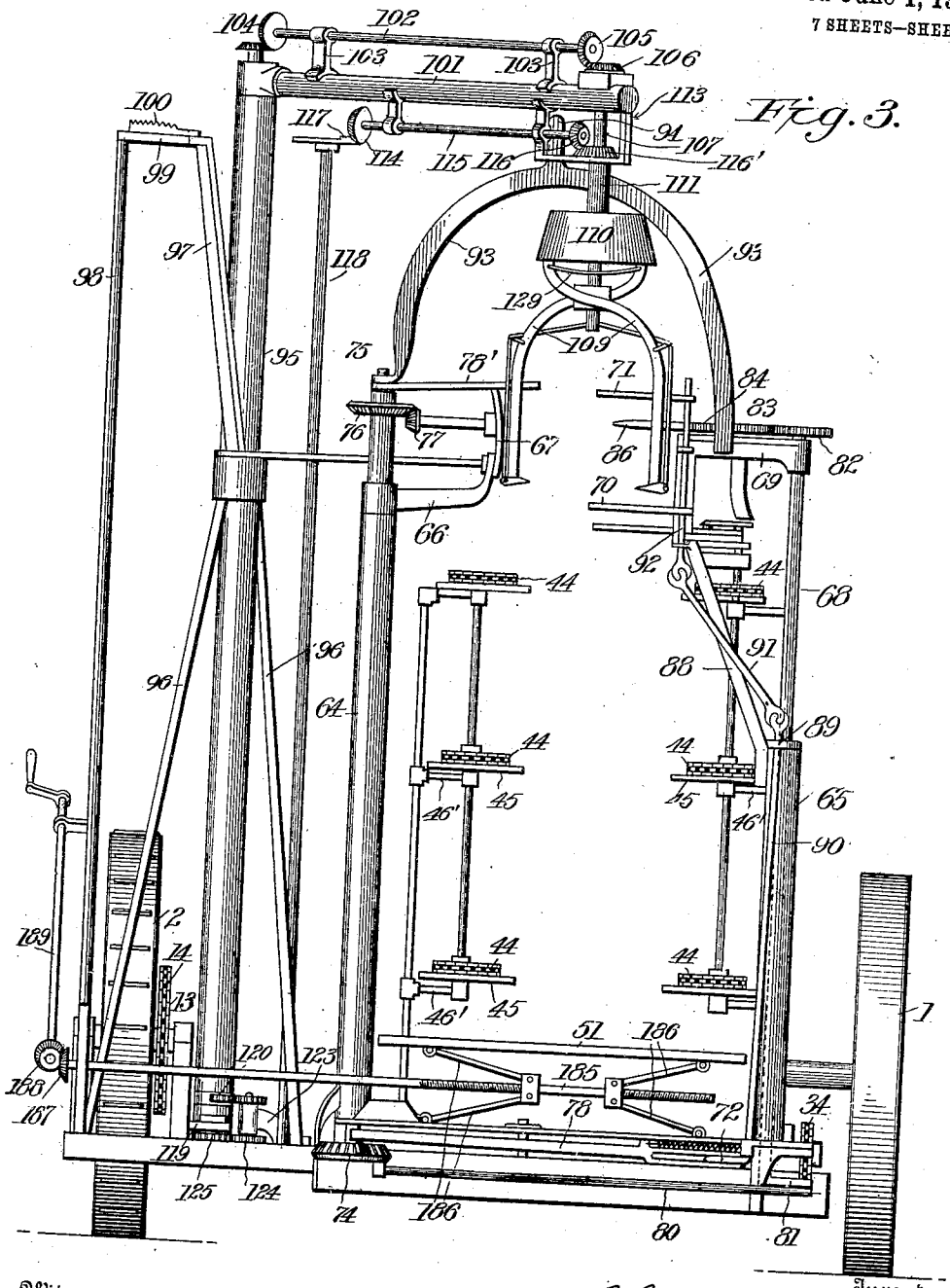
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7 SHEETS—SHEET 3.

Fig. 3.



Witnesses

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7 SHEETS—SHEET 4.

Fig. 10.

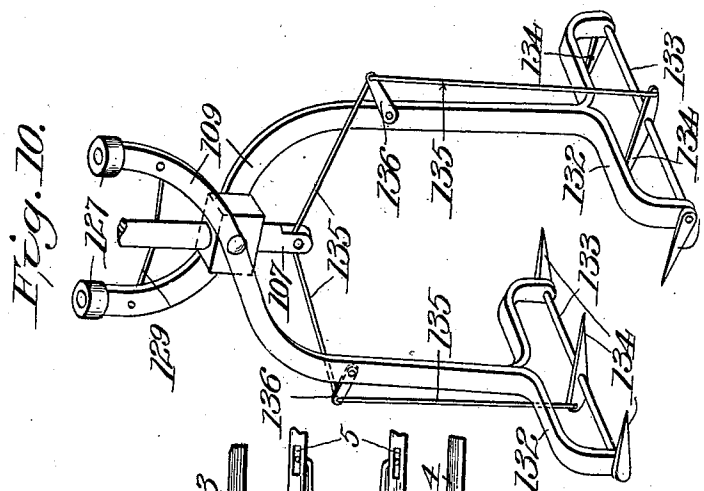


Fig. 4.

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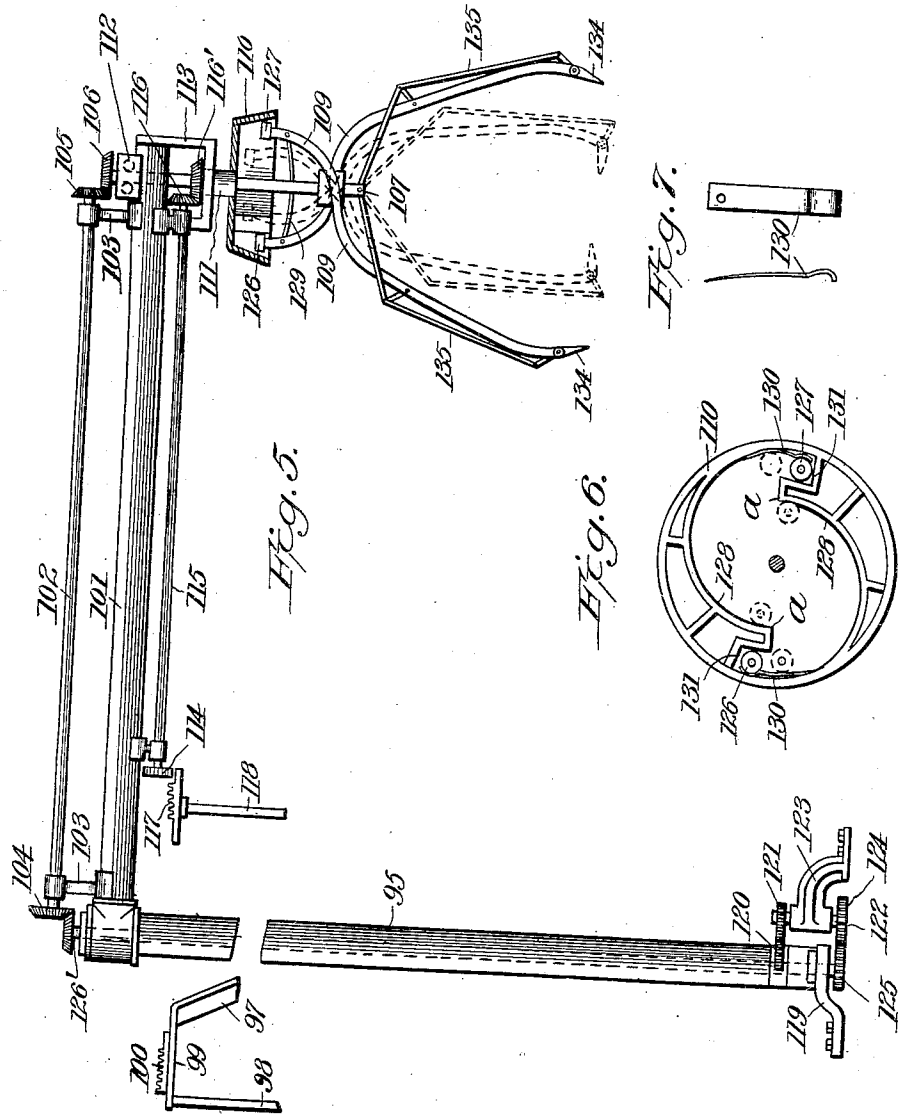


Fig. 5.

Fig. 7.

Fig. 6.

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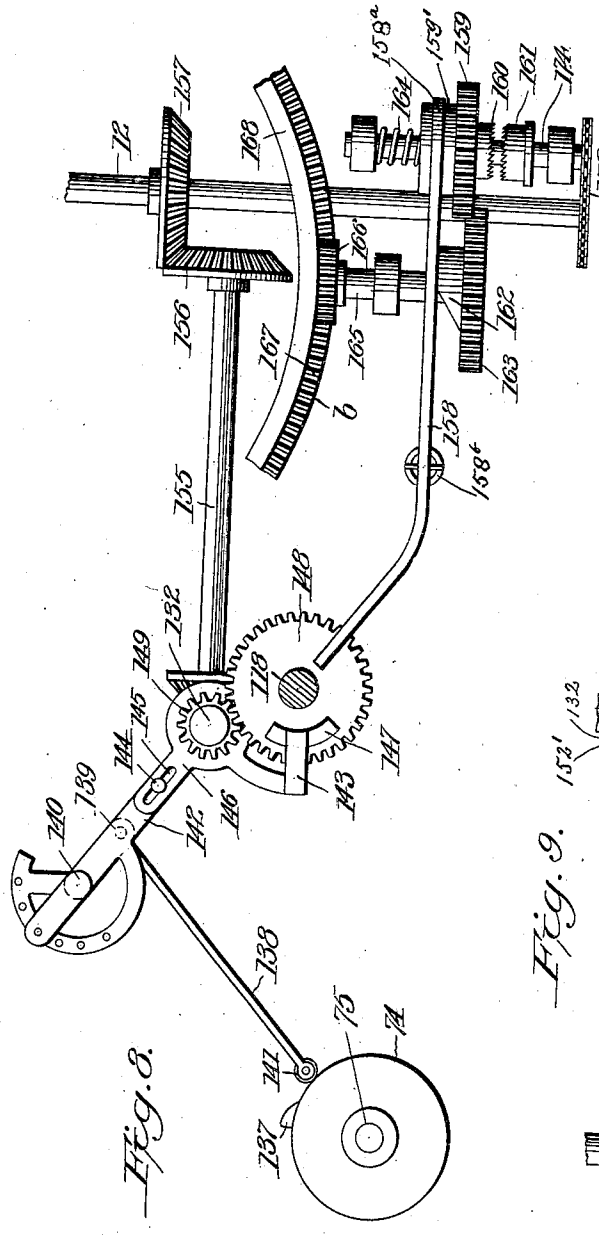


Fig. 8.

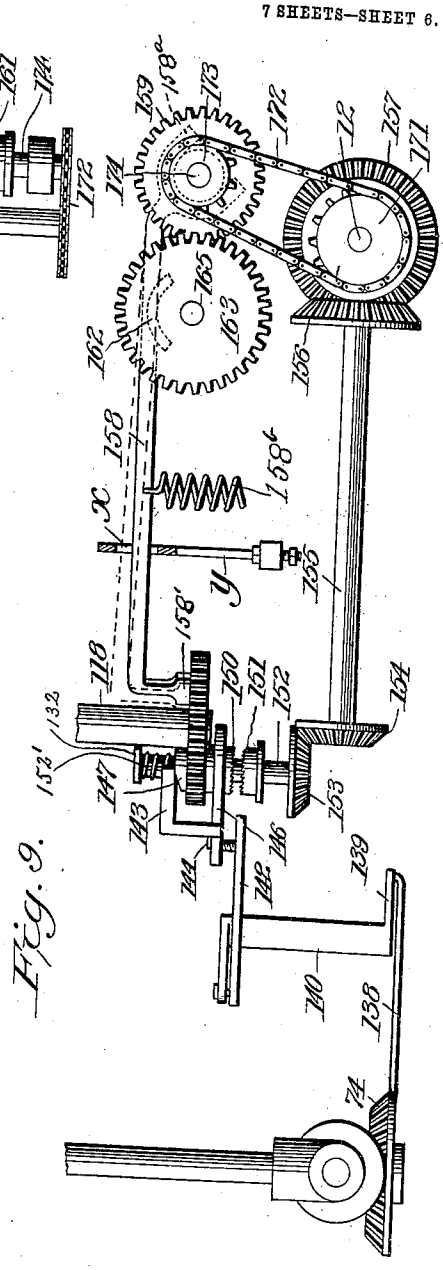


Fig. 9.

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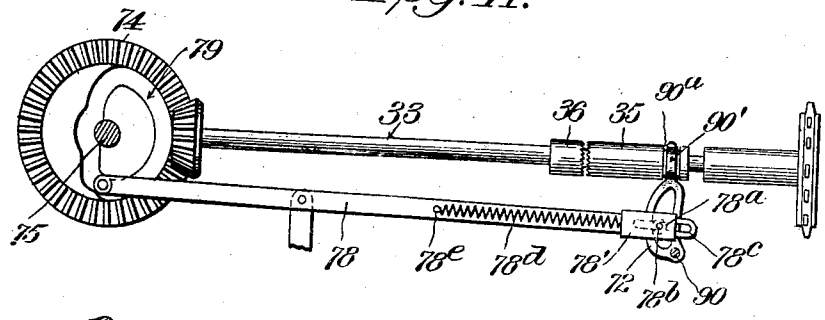
C. A. BULLARD.
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923,326.

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7 SHEETS—SHEET 7.

Fig. 11.



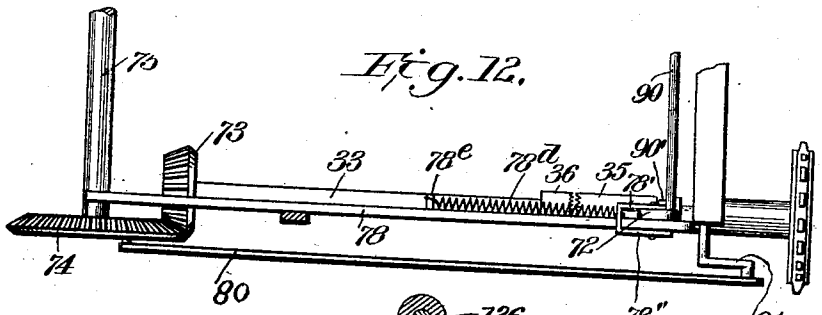


Fig. 14.

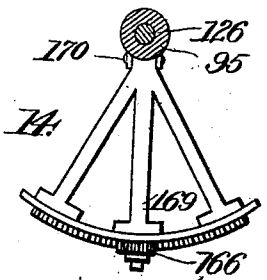


Fig. 13.

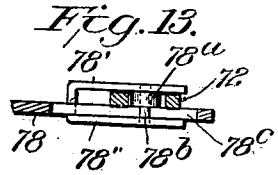
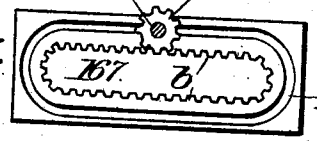


Fig. 15.



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UNITED STATES PATENT OFFICE.

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CORN-HARVESTER.

No. 923,326. Specification of Letters Patent. Patented June 1, 1909.

Application filed May 27, 1907. Serial No. 375,905.

To all whom it may concern:

Be it known that I, CHARLES A. BULLARD, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Corn-Harvesters, of which the following is a specification.

This invention relates to corn harvesters and shockers.

One object of the invention is to provide a machine of the character stated provided with a crane mechanism operable to remove the shock clear of the machine and deposit it upon the ground in upright position out of the path of the machine in cutting the next row.

Another object of the invention is to provide a crane mechanism of the character stated embodying among other characteristics means whereby the shock may be rotated upon its own axis to spread the lower ends of the stalks composing the shock to provide a substantial base to support the shock in upright position upon the ground when released from the crane mechanism.

A still further object of the invention is to provide a crane mechanism with means for firmly holding the shock so that it may hang free therefrom and rotate said means upon its own axis to cause a spreading of the butts of the stalks incident to the centrifugal action due to rotation of said means, whereby I provide a perfect base for the shock to stand upon in the field when discharged from the crane mechanism.

A further object of the invention is to provide an automatically operated crane mechanism adapted to take up the bound shock and give it such centrifugal action during the travel of the crane in one direction as to spread out the lower ends of the shock to give the latter a large base to obviate any danger of the shock falling over at or after the time of its delivery to the ground.

It is still further designed to provide a crane mechanism operable automatically and having such characteristics that when the crane has swung around far enough to dispose the shock clear of the machine and out of the way of the next round, the shock holding elements may be automatically tripped and the shock still rotating fall to the ground standing solidly or firmly in an upright position, after which the crane mechanism may automatically return to its original position ready for the next shock.

With the above and other objects in view, the present invention consists in the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes may be made in the form, proportion, size and minor details, without departing from the spirit or sacrificing any of the advantages thereof.

In the drawings:—Figure 1 is a side elevation of my invention. Fig. 2 is a top plan view. Fig. 3 is a rear elevation. Fig. 4 is a horizontal sectional view. Fig. 5 is a detail view partly in elevation and partly in section, illustrating the crane mechanism. Fig. 6 is a detail inverted plan view of the double acting cam of the crane mechanism. Fig. 7 embraces two views of the spring member of the cam. Fig. 8 is a detail top plan view, illustrating the manner in which the motion is conveyed to the crane mechanism for operating the latter. Fig. 9 is a side elevation of the structure illustrated in Fig. 8. Fig. 10 is a detail perspective view of the grapple arms of the crane mechanism. Fig. 11 is a plan view of a portion of the means for setting the crane mechanism in operation. Fig. 12 is a side elevation of the mechanism illustrated in Fig. 11. Fig. 13 is a sectional view through the outer end of the lever 78 and also through the relieving block. Fig. 14 is a detail view of the arm for swinging the crane mechanism. Fig. 15 is a face view of the arm shown in Fig. 14.

In the accompanying drawings there is illustrated sufficient parts of a corn harvester and shocker as will intelligently disclose the adaptation and operation of my improved means or crane mechanism for taking the bound shock from the machine and depositing it upon the ground in the manner herein set forth.

The character 95 indicates the mast of the crane suitably supported by means of braces 96.

97 indicates a brace connected to the upper end of a pipe or other upright 98, which latter is secured in any suitable manner at its lower end to the frame of the machine. This

brace 97 and upright 98 are so arranged with respect to each other as to provide a support 99 for the stationary sector plate 100.

101 indicates the boom of the crane.

102 indicates a shaft journaled in suitable supports 103 carried by the boom and has at one end a beveled gear 104 and at its opposite end a beveled gear 105 adapted to mesh with the gear 106 to rotate the shaft 107 to which the clasping or grapple arms 109 are pivotally connected at the lower end thereof.

110 indicates a double eccentric cam which closes the clasping arms around the shock, and this double eccentric cam is attached to the lower end of a sleeve 111, upon the upper end of which latter, is mounted the beveled gear 116′. To facilitate operation of the shaft 107 I provide a ball bearing 112. The bearings of the sleeve 111 are rotated on the frame 113 suspended from the boom 101 just below the bevel gear 106.

114 indicates a spur gear on the end of the shaft 115 journaled in suitable bearings suspended from the boom 101 and through the instrumentality of which the power is transmitted to the cam by means of the beveled gear 116 and gear 116′, the sector gear 117 and the gear 114.

The mast 95 of the crane mechanism is hollow and the lower end thereof rests upon the bearing casting 119. The mast has a sector gear 120 mounted thereupon slightly above the bearing 119 adapted to mesh with the gear 121 mounted upon the upper end of a short shaft 122 rotatably mounted in the head of the bearing plate 123. Upon the lower end of this shaft 122 is a gear 124 designed to mesh with the gear 125 carried at the lower end of the shaft 126′ mounted in the hollow mast, and through which shaft 126′ power is transmitted to automatically rotate the clasping or grappling arms 108 and 109 by reason of the gear 126ª on said shaft 126′ meshing with the aforesaid gear 104 of shaft 102.

The aforesaid sector gear 100 is fixed against movement and is adapted to engage with the gear 114 when the boom of the mast is swung around, and has the effect of rotating the cam bell 110 (it having been revolved by sector gear 117 and bevel gear 114 through shaft 115 and gears 116 and 116′, so that the rollers 126 and 127 of the grapple arms, respectively, rest at a point *a* on cam surfaces 128 of the cam bell 110, or in other words at the narrowest width of the cam bell 110) to just beyond that point, when by the resiliency of the spring 129, they are forced apart and rest upon the inside of the circumference of the cam bell 110, allowing the shock while still rotating to drop to the ground.

130 indicates oppositely disposed socket retaining springs (see Fig. 6) which are adapted to hold the rollers 126 and 127 of the grapple arms in their proper position upon the return of the boom to its original or initial position. The cam faces of the cam 110 are recessed as indicated at 131 to allow the rollers 126 and 127 to work back freely when the crane upon its return movement reverses the motion of the gear 114 while it is in mesh with the sector 100.

As shown in Fig. 10 each grapple arm has a forked lower end 132 in which is mounted a rotatable rod 133 carrying the series of fingers 134. These fingers 134 are moved toward and away from each other by the opening and closing of the grapple arms through the instrumentality of the lever rods 135 pivotally attached to the lower end of the shaft 107, to the rocking arms 136 pivotally attached to the grappling arms, and to the intermediate finger of each series of fingers 134. When the clasping or grappling arms are closed the fingers of each set project inwardly toward each other and pass into the shock, firmly holding the shock while it is being swung outwardly and around to the side of the machine. When the clasping arms open to discharge the shock these fingers drop downward at their points, allowing the shock to slide out easily, (see Fig. 5).

The conveyer prongs pass on either side of the row in the usual manner, the prongs of the conveyer chains picking up and straightening the stalks as the machine moves along. The stalks are severed in any suitable manner as they leave the conveyer prongs and pass to a binding mechanism of any suitable type, where, if a sufficient quantity has been gathered, they are bound in any suitable manner at the tops. The bound bundle or shock is then ejected in any suitable manner out of the binding mechanism and deposited just under the grapple arms 109, which latter, when the crane is at rest depend from the crane over the rear part of the machine.

Reference to Figs. 8 and 9 will disclose the position of the various operative parts of the crane mechanism when the latter is at rest, and in order that the operation of these parts may be readily understood by those skilled in this particular art, I deem it entirely unnecessary to refer specifically to the conveyer, the cutting mechanism, the binding mechanism and the ejector. I therefore explain the operation of the crane mechanism operating parts as they are set into operation to lift the bound shock from the rear of the machine after the bound shock has been positioned beneath the grapple arms 109, as stated. Therefore, assuming that the shock has been bound and ejected from the binding mechanism, it will be understood that up to this time the crane mechanism has been in a state of rest. However, just as soon as the bound shock

or bundle is ejected from the binding mechanism, such ejection causes the part 90 of the binder trip rod to revolve and partially rotate the trip 72 which is fixedly secured to the lower end of the rod 90, causing the collar 90′ fitting in the groove 90ª of the clutch member 25 to shift the latter into clutching relation with the clutch member 36 on the shaft 33 and thereby causing rotation of the upright shaft 75 incident to the gear 73 of the shaft 33 meshing with the gear 74 on the said shaft 75. When the gear 74 has made a complete revolution, the clutch 35—36 is uncoupled by the action of the lever 78 and the cam loop 79 and the yoke or trip 72. A relieving block 78′ is mounted upon one end of the lever 78 and slides thereon, and yoke 72 operates between the leg 72″ of said block and the upper face of the lever 78. This block 78′ carries a roller and pin 78ª and 78ᵇ, respectively, the roller engaging the inner face of the yoke 72 and the pin passing downwardly through the block and roller and the slot 78ᶜ in one end of the lever 78 and into the lower leg 78″ of the block on the underside of the lever 78. A spring 78ᵈ is attached to one end of the block 78′ and at its other end connected to a stud 78ᵉ on the lever 78. The object of this block 78′ and the spring 78ᵈ is to relieve the strain incident to the operation of the element 79 and the yoke 72. Thus when the clutch 35—36 is coupled the gears 73 and 74 operate together to cause the grapple arms 109 to automatically grasp the shock or bundle, forcing their fingers into the latter below the band formed by the binding mechanism. Thus the crane mechanism is set into operation automatically and after the bundle or shock has been grasped by the grapple arms, the next step in the operation is for the crane to start on its outward swing to carry the bundle or shock clear of the machine and deposit it in upright position on the ground, and this operation is started by the trip dog 137 on the aforesaid beveled gear 74 of the binder shaft 75 engaging the roller 141 on one end of the crank rod 138. The opposite end of this crank rod is secured to the crank portion 139 of the rotatable shaft 140, and when the aforesaid dog 137 engages the crank rod 138 on its roller 141, the shaft 140 is rotated, causing the pin 144 of the lever 142 to shift the lever 146 which throws the dog 143 off of the cam 147 of the gear 148. While the gear mechanism is at rest, said dog 143 is disposed upon the cam 147 of the gear 148 and as it rides upon said cam 147 there is a consequent lifting of the gear 149 against the tension of the spring 152′ (see Fig. 9), around the upper end of the shaft 152, the extreme upper end of the shaft 152 having a head 132, if desired. Thus the clutch face 150 being carried by the gear 149 and the latter being lifted, the clutch face 150 is moved out of engagement with the cooperating clutch face 151 on the shaft 152, as shown in Fig. 9, but just as soon as the aforesaid dog 143 is tripped and thrown out of operative engagement with the cam 147 in the manner above stated, said clutch faces 150 and 151, are thrown into coöperative relation causing revolution of the gears 148 and 149 by virtue of the shaft 155 having geared connection 153—154 with the aforesaid shaft 152 and gear connections 156—157 with the main drive shaft 12. The said gear 148 being consequently rotated, it causes its cam 147 to move under the rear end 158′ of the trip bar 158, whose forward end is provided with a bearing 158ª for engagement with the collar 159′ of the gear 159 on the shaft 174, so that it may have pivotal movement, said bar 158 having pivotal movement in a vertical direction and having its rear end 158′ held normally in engagement with the said gear 148 through the instrumentality of a suitable spring 158ᵇ connected thereto at one of its ends and having its opposite end connected in any desired manner to any suitable part of the framework of the machine. It will be seen that the rear end of the bar 158 is passed through a slot x in the upper end of a fulcrum support y, which latter is secured in any suitable manner to any suitable part of the framework of the machine. The slot x is of such a size as to permit of the aforesaid vertical movement of the rear end of the bar 158 and also to permit of the horizontal movement hereinafter described for the lever 158.

The aforesaid cam 147 engages the rear end of the trip bar 158, the forward end of the trip bar 158 holding the clutch face 160 carried by the gear 159 out of coöperative engagement with the clutch face 161 on said shaft 174, the shaft 174 being operated from the shaft 12 through the medium of the chain and sprocket connection 172. The spring 164 on the shaft 174 has a normal tendency to force the clutch faces 160 and 161 into cooperative engagement. By virtue of the fact that the trip bar 158 is secured at its forward end to the sleeve of the gear 159, the trip bar 158 has horizontal as well as vertical movement, because as the gear 159 and its clutch face 160 is moved longitudinally of the shaft 174, the trip bar must move accordingly. The vertical movement takes place when the cam 147 on the gear 148 engages with the rear end 158′ thereof, thereby releasing the trip bar 158 from engagement with the cam 162 on the gear 163. When the cam 162 moves into engagement with the forward end of the trip bar 158, the clutch faces 160 and 161 are operated, the horizontal movement of the trip bar 158 being made through the movement of the movable clutch face 160 on the shaft 174 and the fact that the trip bar 158 is fulcrumed in the

slot x of the fulcrum post y. Just as soon as the cam 162 on the gear 163 is moved out of engagement with the trip bar 158, the spring 164 on the outer end of the shaft 174 forces the gear 159 with its clutch face 160 along the shaft 174 until the clutch face 160 meshes with the clutch face 161 on said shaft. Thus, just as soon as the trip bar 158 is tripped by the cam 147 on the gear 148 against the action of the spring 158^b, the bar 158 is raised clear of the cam 162 on the gear 163 of the shaft 165, the pressure of the spring 164 on the shaft 175 then forcing the clutch faces 160 and 161 into coöperative relation, resulting in the rotation of the meshing gears 159 and 163 to rotate the shaft 165. As the gear 163 rotates, it carries the cam 162 out of the way of the bar 158, which latter is then pulled down to its normal position by the spring 158^b in position to engage the cam 162 when the gear 163 completes its revolution, thus throwing the clutch faces 160 and 161 out of coöperative relation, thereby bringing the gear operating mechanism to a state of rest. When the shaft 165 rotates, as just explained, the pinion 166 on said shaft 165 being in mesh with the circular row of teeth b of the mangle gear 167 attached to the curved portion 168 of the quadrant-like frame 169 hingedly mounted directly upon the mast 95 of the crane, the said pinion 166 travels around said circular rack b, the said frame 169 swinging to its full course to and from its initial position. Thus the crane shifting mechanism is operated automatically through the instrumentality of the main drive shaft 12 and the mechanism disposed between the latter and the crane. The grapple arms firmly hold the shock and depend freely from the boom of the crane. These grapple arms are rotated, as stated, and consequently the shock held by the arms is rotated upon its own axis, causing a spreading of the butts of the stalks due to the centrifugal action incident to rotation. The grasping arms are automatically tripped after the crane has swung around far enough to carry the shock clear of the machine and out of the path of the next row, and it will be understood that the grapple arms are tripped while the shock is still rotating upon its own axis. As the shock falls toward the ground still rotating upon its own axis, its base permits it to stand solidly in an upright position, after which the crane returns automatically to its initial position ready for the next shock.

The operation of the invention may be briefly stated as follows: The conveyer prongs pass on either side of the row in the usual manner, the conveyer prong chains picking up and straightening the stalks as the machine is drawn along. The stalks are severed in any suitable manner while passing through or between the conveyer prongs and pass to a suitable binding mechanism, where, after a sufficient quantity has been gathered, they are bound in any suitable manner at their tops.

What is claimed is:—

1. In a corn harvester and shocker, the combination with a crane mechanism, of means for swinging the crane, clasping arms having connection with the crane and adapted to rotate during the swinging of the crane.

2. In a corn harvester and shocker, the combination with a crane mechanism, a rotatable double cam carried by the crane mechanism, clasping arms supported by the crane mechanism and carrying rollers for engagement with the cam faces of said cam, and means for rotating the cam to open the clasping arms.

3. In a corn harvester and shocker, the combination with a crane mechanism, a rotatable double cam carried by the crane mechanism, clasping arms supported by the crane mechanism and carrying rollers for engagement with the cam faces of said cam, means for rotating the cam to open the arms, the arms rotating with the cam when in their closed positions.

4. In a self binding corn harvester and shocker, a swinging crane mechanism, a double eccentric cam carried by the crane mechanism, each cam having a slotted recess, clasping arms mounted in the double eccentric cam, the inner ends of the arms engaging in the recesses of the cam when the crane mechanism is at one limit of its movement and starts to return to its initial position, and means for operating the crane mechanism.

5. In a self binding corn harvester and shocker, the combination with a crane mechanism, including a boom, a double eccentric cam carried by the boom, clasping arms associated with the cam and opened and closed thereby, each cam surface of the double eccentric cam being recessed to receive the upper ends of the clasping arms after the shock is discharged from the crane and the latter starts to return to its initial position, and means for automatically operating the same.

6. In a self binding corn harvester and shocker, a crane mechanism including a boom, a double eccentric cam carried by the boom, clasping arms carried by the boom, each cam surface of the double eccentric cam having a recess, each clasping arm having a roller at its upper end for engagement with the cam surfaces of the double eccentric cam and for engagement in the recesses of the cams when the shock is discharged and the crane starts to return to its initial position, a spring extending into each recess of each cam and having one end formed to provide a socket to retain the clasping arms in their

proper position while the crane is returning to its initial position, and means for operating the crane.

7. In a self binding corn harvester and shocker, a swinging crane, clasping arms carried by the crane, a set of fingers movably attached to the lower end of each clasping arm, and connections between the fingers, the arms and the crane mechanism, whereby the fingers may be operated upon opening and closing of the arms.

8. In a corn harvesting machine, a crane mechanism, means for operating the crane mechanism, a double eccentric cam carried by the crane mechanism, a pair of clasping arms carried by the crane mechanism and cooperating with said double eccentric cam, and fingers carried by the arms operable upon operation of said arms, the arms being operable by said cam.

9. In a corn harvesting machine, an automatically operating crane mechanism, automatically operating clasping arms carried by the crane mechanism, and a set of automatically operating fingers connected to the arms and coöperating with the arms during operation of the latter.

10. In a corn harvester and shocker, the combination with a crane mechanism, a rotatable double cam carried by the crane mechanism, clasping arms supported by the crane mechanism and having coöperative engagement with the cam faces of said cam, and means for swinging the crane.

11. In a corn harvesting machine, the combination with a frame, of a crane mechanism including clasping arms arranged to grasp the shock, means for operating said arms during operation of the crane mechanism to spread the base of the shock, and means for releasing the shock from the clasping arms at one limit of movement of the crane mechanism to discharge the shock and drop it upon the ground in upright position.

12. In a corn harvesting machine, a crane, means engaging the shock to swing and carry it clear of the machine, means for rotating the shock upon its own axis during the entire outward swing of the crane to cause a spreading of the butts of the shock to provide a substantial base for the latter, and means for releasing the shock from said shock engaging means while the shock is still rotating, whereby the shock may be disposed upon its base in an upright position.

13. In a corn harvesting machine, a crane, means for engaging the shock to swing and carry it clear of the machine, means for automatically rotating the shock upon its own axis, and means for automatically releasing the shock from the shock engaging means to deposit the shock in upright position upon the ground.

14. In a corn harvesting machine, a crane, shock grasping means carried by the crane, a rotatable member interposed between the crane and grasping means to rotate the latter and means for automatically operating said rotatable member.

15. In a corn harvesting machine, a swinging crane mechanism including a boom, grasping arms having connection with the boom to grasp the shock, means constructed and arranged whereby the grasping arms will revolve during the outward swing of the crane mechanism to revolve the shock and spread the base end of the latter, and means for automatically releasing the shock from the grasping arms when the crane mechanism has reached the limit of its outward swing.

16. In a corn harvesting machine, a frame, a crane mechanism, means carried by the crane mechanism to grasp the shock, means constructed and arranged to revolve said grasping means during the entire outward swing of the crane mechanism to revolve the shock and spread the base end of the latter, and means for releasing the shock from said grasping means to discharge the shock upon the ground in upright position.

17. In a corn harvesting machine, a crane, means engaging the shock to carry it clear of the machine when the crane is operated, means for automatically rotating the shock during an outward swing of the crane, and means for releasing the shock from said shock engaging means while the shock is still rotating.

18. In a corn harvesting machine, a crane mechanism including means to grasp the shock, automatic means operating upon the shock to spread the base end of the latter, and means for releasing the shock from the grasping means to deposit the shock upon the ground in upright position.

19. In a corn harvesting machine, a frame, a crane mechanism including arms arranged to grasp the shock while the crane mechanism is at rest, means for operating the crane mechanism, and means for effecting a disengagement of the grasping arms from the shock when the crane mechanism has reached the limit of its outward swing.

20. In a corn harvesting machine, a frame, a crane mechanism including means arranged to grasp the shock while the crane mechanism is at rest, means for rotating the shock engaging means upon its own axis during operation of the crane mechanism, means for operating the crane mechanism, and means for effecting a disengagement of the shock engaging means from the shock when the crane mechanism has reached the limit of its outward swing and while said shock engaging means is still rotating.

21. In a crane mechanism, a hollow mast, a boom disposed at the upper end of the mast, a shaft disposed in the mast and car-

rying a gear at one end, a shaft mounted near the free end of the boom and carrying a gear, a shaft supported upon the boom and carrying a gear at each end for mesh with the gears of the aforesaid shafts, another shaft having a segment, a sleeve mounted upon the shaft which is disposed near the free end of the boom and carrying a gear, a shaft suspended from the boom and having a gear at each end for mesh with said segment and the gear of said sleeve, a double cam carried by said sleeve, arms carried by the shaft which is disposed near the free end of the boom, said arms having operative engagement with the cam faces of said double cam, fingers coöperating with said arm, and means for operating said elements.

22. In a crane mechanism, a hollow mast, a boom disposed at the uper end of the mast, a shaft disposed in the mast and carrying a gear at one end, a shaft mounted near the free end of the boom and carrying a gear, a shaft supported upon the boom and carrying a gear at each end for mesh with the gears of the aforesaid shaft, another shaft having a segment, a sleeve mounted upon the shaft which is disposed near the free end of the boom and carrying a gear, a shaft suspended from the boom and having a gear at each end for mesh with said segment and the gear of said sleeve, a double cam carried by said sleeve, arms carried by the shaft which is disposed near the free end of the boom, said arms having operative engagement with the cam faces of said double cam, and means for operating said elements.

23. In a crane mechanism, a hollow mast, a boom disposed at the upper end of the mast, a shaft disposed in the mast and carrying a gear at one end, a shaft mounted near the free end of the boom and carrying a gear, a shaft supported upon the boom and carrying a gear at each end for mesh with the gears of the aforesaid shafts, another shaft having a segment, a sleeve mounted upon the shaft which is disposed near the free end of the boom, said sleeve carrying a gear, a shaft suspended from the boom and having a gear at each end, one for mesh with said segment and the other for mesh with the gear of said sleeve, a double cam carried by said sleeve, arms connected with said shaft which is disposed near the free end of the boom and having operative engagement with the cam faces of said double cam, fingers coöperating with said arms, a support having a segment with which latter one of the gears of the aforesaid suspending shaft coöperates, and means for operating said elements.

24. In a crane mechanism, a hollow mast, a boom disposed at the upper end of the mast, a shaft disposed in the mast and carrying a gear at one end, a shaft mounted near the free end of the boom and carrying a gear, a shaft supported upon the boom and carrying a gear at each end for mesh with the gears of the aforesaid shafts, another shaft having a segment, a sleeve mounted upon the said shaft which is disposed near the free end of the boom, said sleeve carrying a gear, a shaft suspended from the boom and having a gear at each end, one for mesh with said segment and the other for mesh with the gear of said sleeve, a double cam carried by said sleeve, arms connected with said shaft which is disposed near the free end of the boom and having operative engagement with the cam faces of said double cam, a support having a segment with which latter one of the gears of the aforesaid suspending shaft coöperates, and means for operating said elements.

25. A crane mechanism of the character described embodying means whereby the shock may be automatically rotated upon its own axis during the entire movement of the crane in one direction, and means for operating the crane.

26. In a corn harvesting machine, a crane, means engaging the shock to swing it and carrying it clear of the machine, and means to automatically rotate the shock upon its own axis to cause a spreading of the butts of the shock to provide a substantial base for the latter.

27. In a corn harvesting machine, a crane to carry the shock clear of the machine, means for automatically rotating the shock, and means for releasing the shock from the crane while the shock is still rotating.

28. In a corn harvesting machine, a crane to carry the shock clear of the machine, means for automatically rotating the shock upon its own axis to spread the butts thereof and provide a substantial base end to the shock, and means for releasing the shock from the crane while the shock is still rotating.

29. A crane mechanism of the character described embodying means whereby the shock is automatically subjected to centrifugal action to provide a substantial base for the support of the shock in the field.

30. In a corn harvesting machine, a crane mechanism operating to carry the shock clear of the machine, means constructed and arranged to automatically rotate the shock continuously upon its own axis as it is carried from the machine, means constructed and arranged to automatically release the shock while it is still rotating to deposit the same upon the ground in upright position.

31. In a corn harvesting machine, a crane, means engaging the shock to swing it and carry it clear of the machine, and means to automatically rotate the shock upon its own axis to cause a spreading of the butts to provide a substantial base for the latter.

32. In a corn harvesting machine, a crane to carry the shock clear of the machine, means for automatically rotating the shock upon its own axis to spread the butts thereof and provide a substantial base end to the shock, and means for automatically releasing the shock from the crane while the shock is still rotating.

33. In a corn harvesting machine, a crane, mechanism operating to carry the shock clear of the machine, means constructed and arranged to rotate the shock continuously upon its own axis from the time it leaves the machine until it strikes the ground, whereby the centrifugal force generated by rotating the shock upon its own axis will spread the butts of the shock to provide a substantial base upon which the shock may stand when it reaches the ground.

34. In a corn harvesting machine, a crane mechanism operating to swing the bound shock from its vertical position on the machine and carry it in its vertical position clear of the machine, means constructed and arranged to rotate the shock on its own axis as it is carried from the machine, and means constructed and arranged to release the shock while it is still rotating and drop it to the ground in vertical position.

35. In a corn harvesting machine, a swinging crane mechanism including a boom, arms having connection with the boom to grasp the shock, means constructed and arranged whereby the grasping arms will revolve during the outward swing of the crane mechanism to revolve the shock and spread the base end of the latter, and means for releasing the shock from the grasping arms when the crane mechanism has reached the limit of its outward swing.

36. In a corn harvesting machine, a crane mechanism operating to carry the shock clear of the machine, means constructed and arranged to automatically rotate the shock continuously upon its own axis from the time it leaves the machine until it strikes the ground, whereby the centrifugal force generated by rotating the shock upon its own axis will spread the butts of the shock to provide a substantial base upon which the shock may stand when it reaches the ground.

In testimony whereof I affix my signature, in presence of two witnesses.

CHARLES A. BULLARD.

Witnesses:

ROBERT CAMPBELL,

FLORENCE LATIMER.