J. McCORMICK.

GRAIN SHOCKER.

APPLICATION FILED JAN. 29, 1906.

962,656.

Patented June 28, 1910.

6 SHEETS—SHEET 1.

Fig 13.

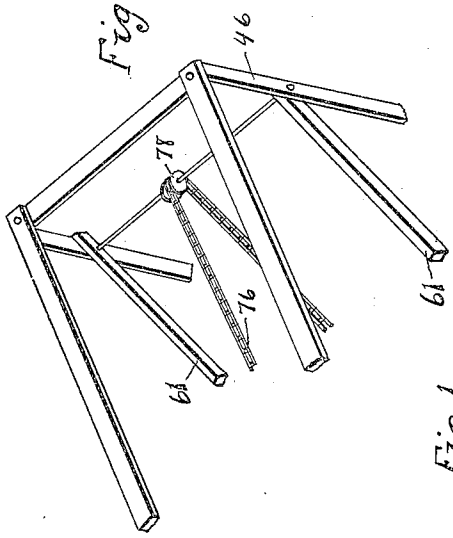

Fig 1.

Witnesses.

A. E. Woody.

J. B. Smutney

Inventor John McCormick.

By Owen & Lane Atty's

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6 SHEETS—SHEET 2.

Fig 15.

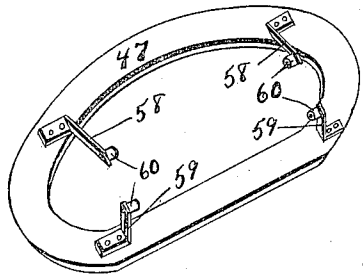

Fig 2.

Witnesses.

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6 SHEETS—SHEET 3.

Fig. 16.

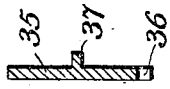
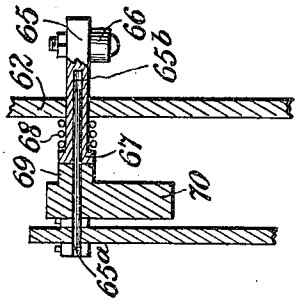


Fig. 17.



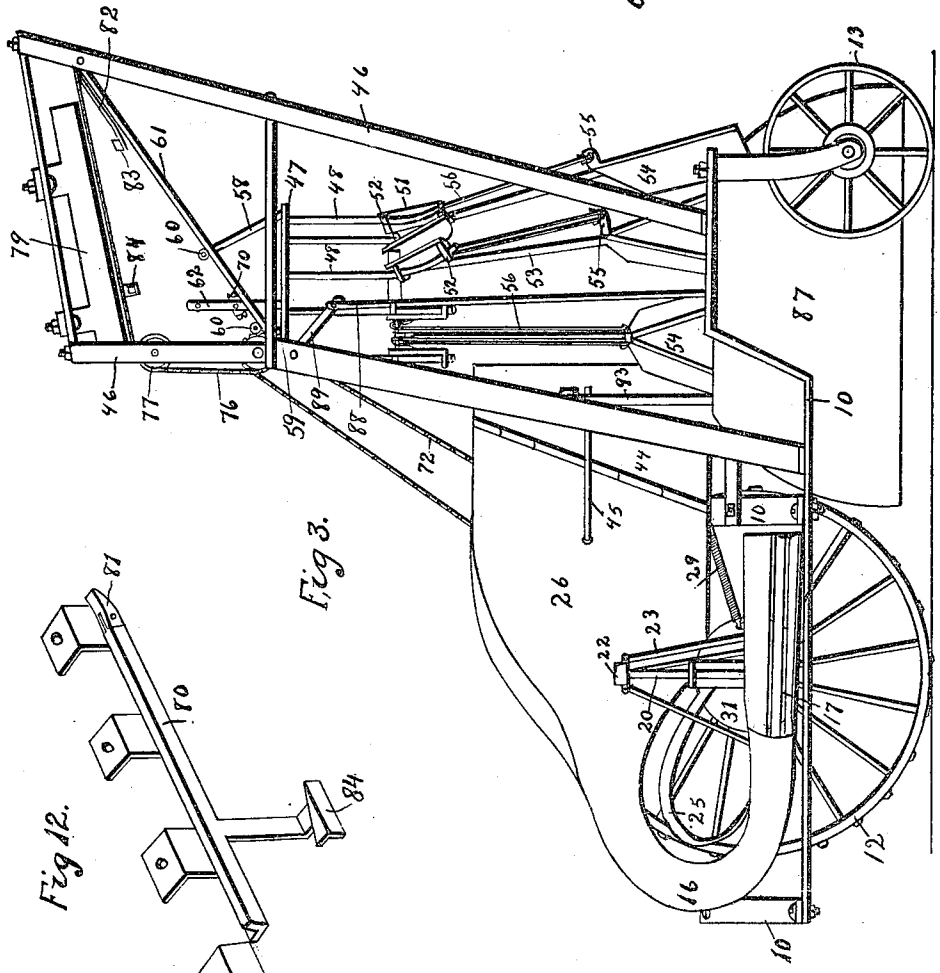


Fig 3.

Fig 12.

Witnesses:
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By Owing Lane Attys

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6 SHEETS—SHEET 4.

Fig 5.

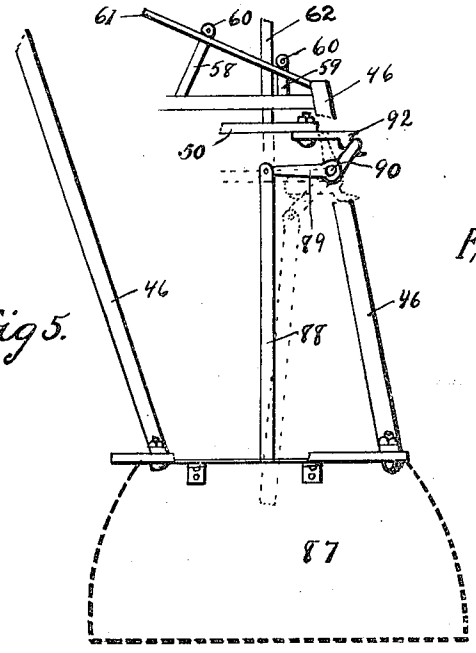


Fig 6.

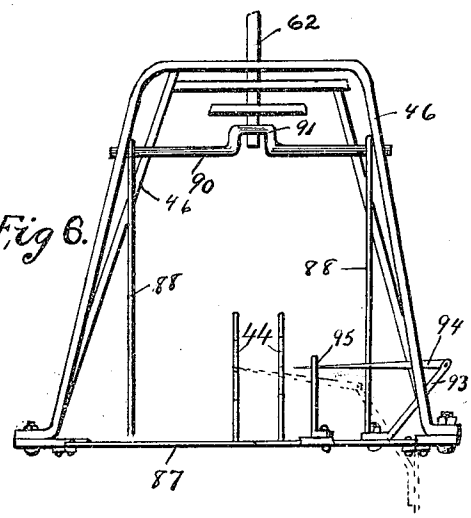
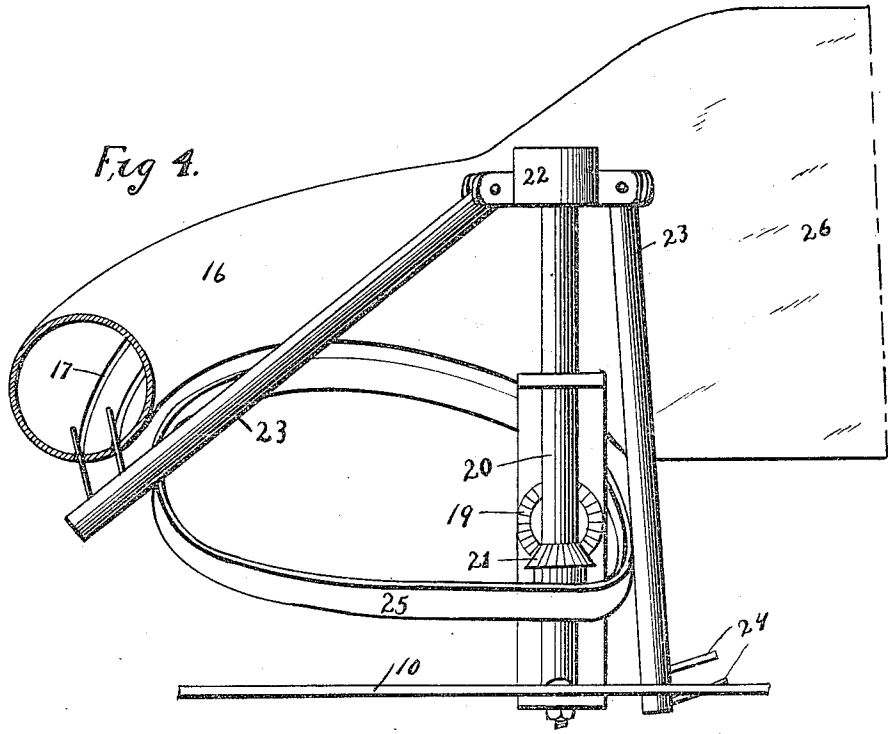


Fig 4.



Witnesses

A. E. Woody.

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6 SHEETS—SHEET 5.

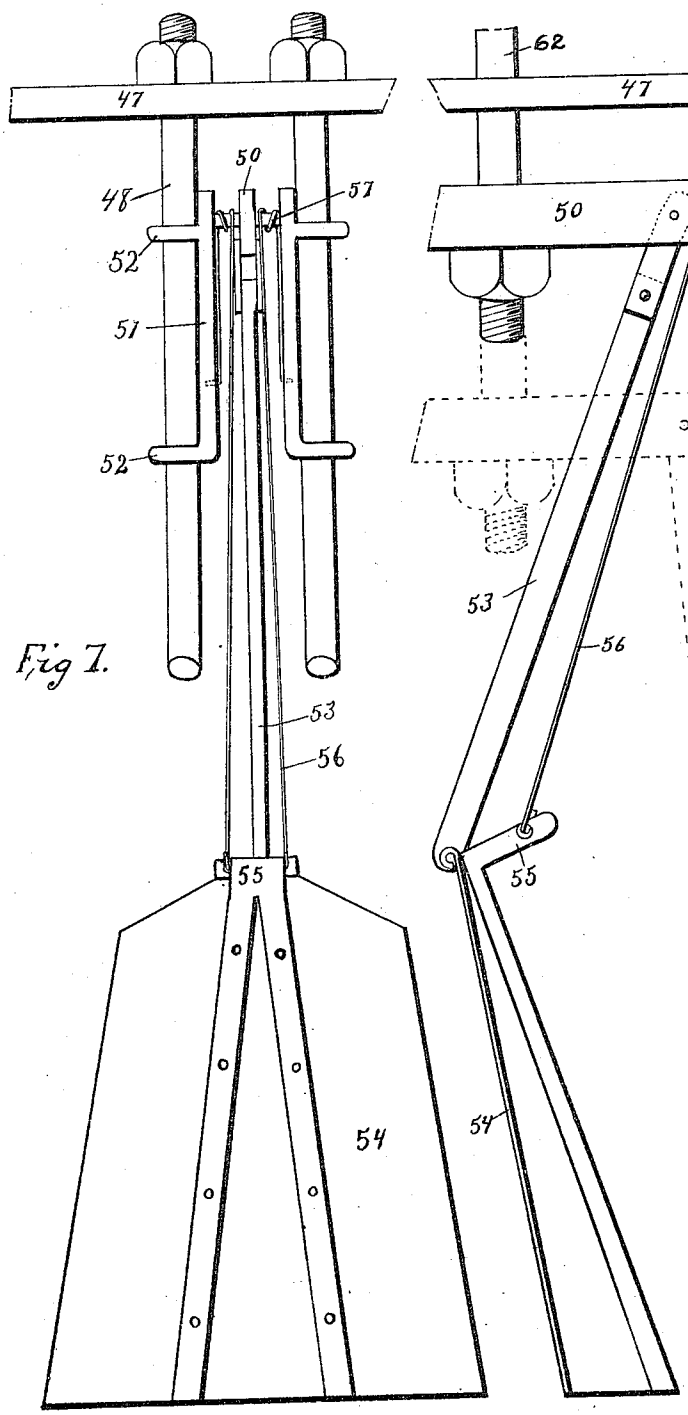

Fig 7.

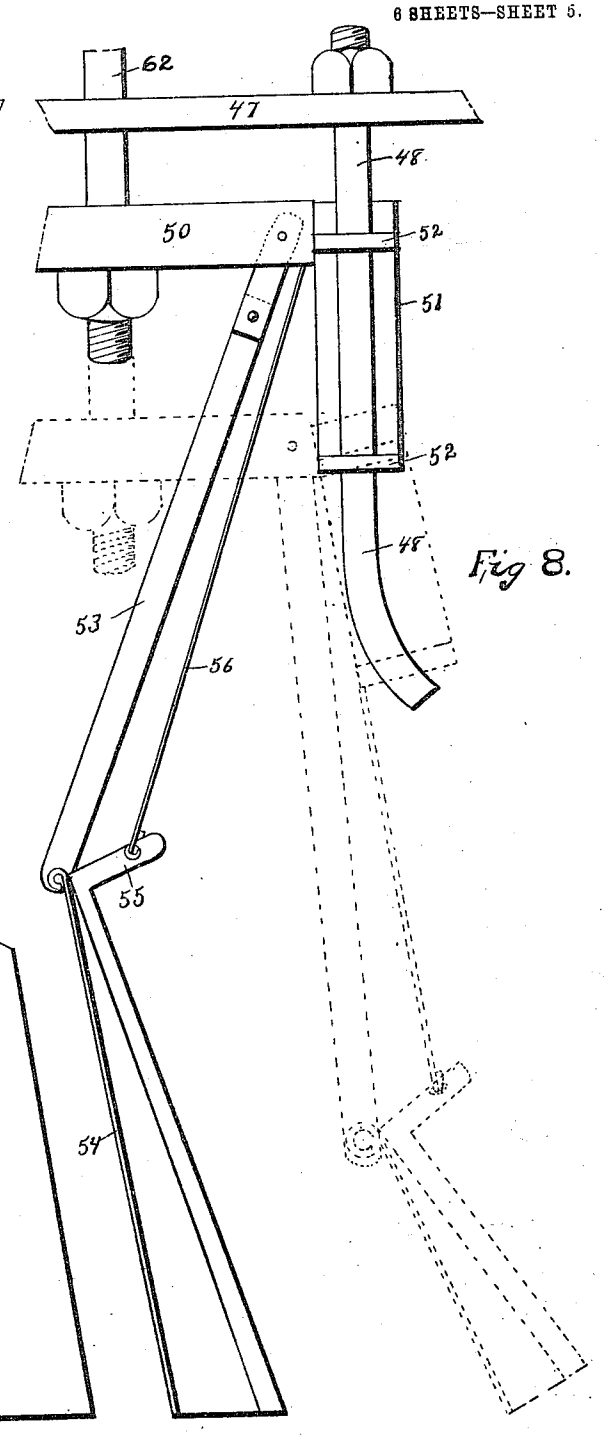

Fig 8.

Witnesses.
A. E. Woody.
J. B. Smutney.

Inventor John McCormick.
By Orwig & Lane Attys

J. McCORMICK.

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6 SHEETS—SHEET 6.

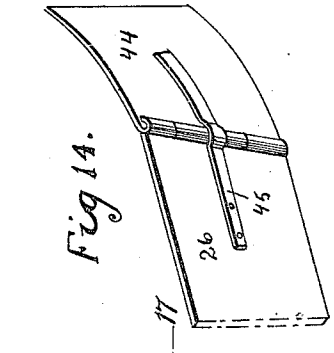

Fig 14.

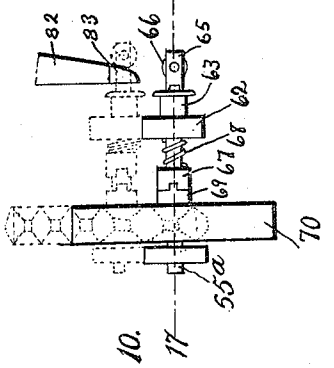

Fig 10.

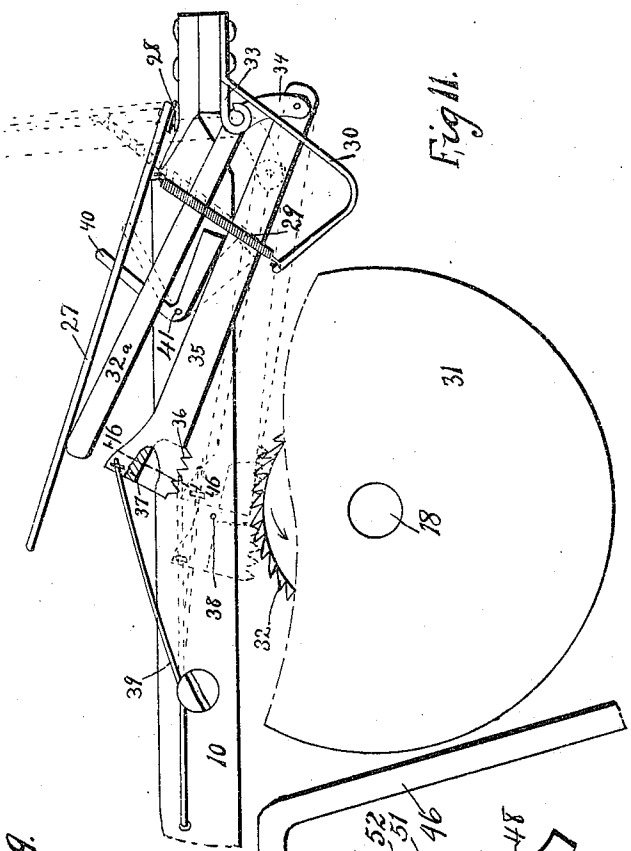

Fig 11.

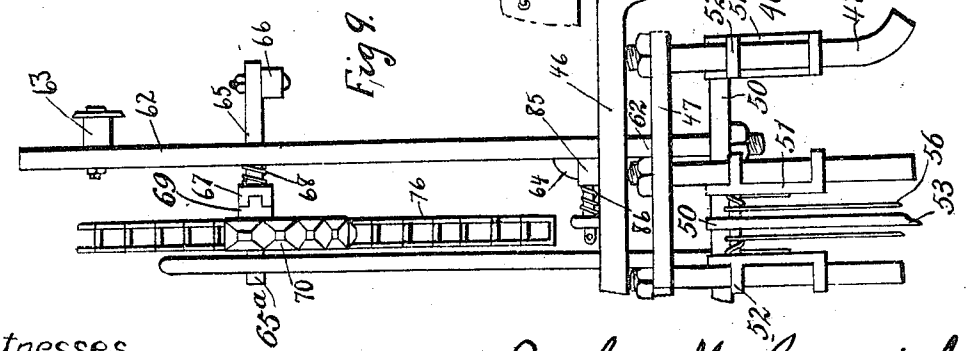

Fig 9.

Witnesses
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J.B. Smutney.

Inventor John McCormick
By Orwig & Lane Att'ys

UNITED STATES PATENT OFFICE.

JOHN McCORMICK, OF NORTHVILLE, SOUTH DAKOTA.

GRAIN-SHOCKER.

962,656. Specification of Letters Patent. Patented June 28, 1910.

Application filed January 29, 1906. Serial No. 298,378.

To all whom it may concern:

Be it known that I, JOHN McCORMICK, a citizen of the United States, residing at Northville, in the county of Spink and State of South Dakota, have invented a certain new and useful Grain-Shocker, of which the following is a specification.

My object is to provide a machine of simple, durable and inexpensive construction, designed to be attached to and advanced over a field beside a grain binder and to receive from the binder bundles of grain to form said bundles into a shock and to deposit the shock upon the field in an upright position without the necessity of handling the bundles or binding the shock together with twine.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, in which—

Figure 1 shows a front elevation of the complete machine with a portion of a grain binder in position adjacent thereto. Fig. 2 shows a top or plan view of same. Fig. 3 shows a side elevation of the shocker. Fig. 4 shows an enlarged, detail view partly in section, illustrating the means for conveying bundles of grain to the shocker platform. Fig. 5 shows a detail side view illustrating a part of the shocker platform and means for releasing it to discharge the shock. The dotted lines show the part of the shocker platform in its lowered position. Fig. 6 shows a rear end elevation of the shocker platform and connected parts, the dotted lines illustrating the bundle retaining device in its extended position. Fig. 7 shows an enlarged detail side view of one of the shock forming plates and connected parts. Fig. 8 shows a side view of same. The dotted lines illustrate the position of same when discharging a shock. Fig. 9 shows a detail front elevation illustrating the means for carrying the platform that supports the shock forming plates and shows the platform in its uppermost position. Fig. 10 shows a detail plan view of the means for automatically reversing the movement of the carriage that supports the shock forming plates, the dotted lines illustrating the parts in a changed position. Fig. 11 shows a detail view illustrating the means for automatically actuating the bundle tilting platform to convey bundles from the carrier tube to the shocking platform. Fig. 12 shows an enlarged perspective view of the track for supporting the carriage. Fig. 13 shows a detail, perspective view of the upper rear end of the machine frame. Fig. 14 shows a detail, perspective view of one of the upright sides with the hinged side piece connected therewith. Fig. 15 shows a detail, perspective view of the carriage for supporting the shock forming device. Fig. 16 shows a detail, sectional view taken on the line 16—16 of Fig. 11, and Fig. 17 shows a detail, sectional view taken on the line 17—17 of Fig. 10.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate the machine frame which is supported upon an axle 11 carrying a traction wheel 12. At the rear of said frame are the caster wheels 13.

At one side of the frame 10 is a bundle receiving platform 15 designed to receive bundles discharged from the grain binder. At its forward end, this platform 15 connects with a bundle advancing tube 16 which tube extends forwardly, then laterally and discharges rearwardly near the center of the machine frame. The said platform 15 and tube 16 are provided with the longitudinal slots 17, for purposes hereinafter made clear.

I provide means for conveying bundles to the discharge end of the tube 16 as follows: The numeral 18 indicates an extension of the axle 11 and this extension is provided with a beveled gear wheel 19. Supported on the machine frame by means of a suitable support is an upright shaft 20 having a beveled gear wheel 21 in mesh with the beveled gear wheel 19 so that the shaft 20 is continuously rotated during the advance of the machine over the field. At the top of the shaft 20 is a bracket 22 in which a number of arms 23 are pivoted to hang downwardly and each arm is provided with tines 24 at its lower end. Fixed to the machine frame adjacent to the tube 16 is an irregular track or guide 25, supported by braces 25^a and shaped to engage the arms 23 and as said arms are revolved by the shaft 20 to direct them in such manner that their tines 24 will project through the slots 17 of the platform 15 and engage bundles of grain resting on said platform. Said tines will traverse the entire length of said slots 17 and carry the

bundles to the discharge end of the tube 16 and then withdraw from the slots and enter them again in the platform 15. At the discharge end of the tube 16, the sides 26 of the tube are enlarged and arranged vertically, and parallel with each other to form the sides of the bundle tilting platform.

When the bundles are discharged from the tubes 16, they will lie in a substantially horizontal plane with the heads of the grain projecting toward the front of the machine. I have provided for automatically tilting the bundles to an upright position and forcing them outwardly through the sides 26 as follows: 27 indicates a flat platform slightly inclined, when in its normal position, provided with a hinge 28 at its rear end to permit it to tilt to a vertical position. When in its horizontal position, this platform forms a continuation of the bottom of the tube 16 to receive bundles of grain therefrom. The platform is normally held in its horizontal position by means of the contractible coil springs 29 fixed to the arm 30 and connected to the under surface of the platform 27. I provide for automatically tilting the platform as follows: Fixed to the axle 8 is a shield disk 31 and adjacent to the disk is a ratchet wheel 32. Hinged beneath the platform 27 is an arm 32^a supported in the bracket 33 and having an extension 34 extended downwardly and rearwardly. Pivoted to said extension is an arm 35 having at its forward end a toothed portion 36 and a laterally extending shoulder 37 above the toothed portion 36. 38 indicates a pin fixed to the frame 10 and in position to be engaged by the shoulder 37 and to hold the toothed portion 36 in engagement with the ratchet wheel 32 during the time the said toothed portion is passing under the pin 38, the said arm 35 is normally elevated by the spring 39. I have provided for forcing the arm 35 against the pressure of the spring 39 and into contact with the ratchet wheel 32 as follows: 40 indicates a lever having one arm projected upwardly through an opening in the platform 27 and the central portion pivoted at 41 and its lower end in position to engage the arm 35. The operation of this part of the device is as follows: Assuming that a bundle of grain is placed upon the platform 27, it will strike the arm 40, cause it to tilt to the position shown by dotted lines in Fig. 11 which will move the arm 35 downwardly to position in engagement with the ratchet wheel 32. This ratchet wheel will advance in the direction indicated by the arrow in Fig. 11 and will carry the shoulder 37 under the pin 38 and hold the toothed portion 36 in engagement with the ratchet wheel 32 until the shoulder 37 passes forwardly beyond the pin 38, whereupon the arm 35 will be free to rise. During this movement, the forward pull upon the arm 35 will cause the arm 32^a to raise the platform 27 to the position shown by dotted lines in Fig. 11, which operation will, of course, place the bundle in an upright position between the sides 26 and after the arm 35 is released from engagement with the ratchet wheel 32, the spring 29 will quickly return the platform 27 and connected parts to their starting position.

In the rear of the hinged platform 27 is a slanted stationary platform 42 and the sides 26 above the platform 42 are provided with springing bundle retainers 43 fixed to yield and permit bundles to pass rearwardly and to automatically spring out after said bundles have passed rearwardly to prevent them from falling forwardly on the platform 27 said springing retainers each comprising a spring wire secured at its forward end to the sides 26, and extended rearwardly and toward the center of the machine, and then straight laterally through said sides, as clearly shown in Fig. 2. Hinged to the rear edges of the sides 26 are the extension sides 44 normally inclined inwardly toward each other by the springs 45. These extension sides 44 will yield and swing apart when bundles are forced through between them.

Erected on the frame 10 is the upright frame 46 designed to support the shock forming mechanism. Mounted on this frame 46 in a manner that will be described hereinafter is a carriage 47 as shown in Fig. 15. This carriage supports a number of guide arms 48, which project downwardly and have their lower ends curved outwardly as shown in Figs. 3 and 8. Said guide arms 48 are arranged substantially in a circle. Arranged below the carriage 47 is a series of supporting arms 50, that support the shock former and are pivotally connected to the guiding brackets 51. Each guiding bracket 51 is provided with lugs 52 at its top and bottom, which slide upon the guide arms 48. By this arrangement and assuming that the arms 50 move downwardly relative to the carriage 47, they will carry with them all of the guide brackets 51 and said brackets will, when they strike the outwardly inclined portions of the guide rods 48 be tilted outwardly at their lower ends and when the arms 50 are again elevated all of the guide brackets 51 will be returned to their starting position. Pivoted to each of the arms 50 is an arm 53 projecting downwardly and inwardly toward the center of the carriage and having a shock forming plate 54 pivoted to its lower end. Each shock forming plate is provided with an arm 55 projected outwardly from its upper end. I have provided means for yieldingly holding each of the shock forming plates in proper position for forming a shock as follows: Attached to each of the arms 55 are two rods 56, each having a spring coil 57

near its upper end and each having an extension extended downwardly and fixed to the adjacent guide bracket 51, as shown in Fig. 7. These spring actuated rods 56 being fixed to the arms 55 of the plates 54, serve to yieldingly hold the arms 53 to which the plates 54 are attached, to their inner limit of movement and as bundles of grain are forced between the shock forming plates, said spring rods will yield sufficiently to hold said shock in compact form. The said spring rods 56, by being attached to the arms 55 will hold the shock forming plates in about the position relative to the arms 53, shown in Fig. 8. However, when the guide brackets 51 are at their lower limit of movement and the lower ends of said brackets are tilted outwardly, then the tension upon the coils of the spring rods 56 will be relieved and said arms 53 and shock forming plates 54 will freely swing outwardly, as shown by dotted lines in Fig. 8. In practical use, this portion of my machine operates as follows: Before there are any bundles of grain between the shock forming plates, said plates stand relatively close together, arranged in an approximately circular form. As fast as the bundles of grain are introduced between them, they are forced outwardly against the pressure of the spring rods 56 and hence as the shock increases in size, it will be more tightly compressed and the bundles will be arranged in form with their upper ends closer together than their lower ends as required to produce a shock with a broad base and a narrow top that will readily stand in a field and when there are sufficient number of bundles within the shock former, they will be supported alone by the shock forming plates, even if the shock forming platform, hereinafter described, has been removed, because the bundles will all be tightly wedged between the shock forming plates, at least tight enough to support the weight of the shock, even if the shock forming platform has been removed. Then when the rod 49 is moved downwardly, all of the guide brackets 51 will move with it and when their lower ends are tilted outwardly by the curved lower ends of the guide rods 48, the tension on the springs 56 will be relieved, the shock forming plates will spread and permit the shock to drop to the ground surface.

When the shock former is full, it is moved downwardly, in a manner hereinafter described, to place the shock upon the ground surface. Then it is desirable to quickly move the shock former rearwardly and upwardly, so that it will disengage from the shock in time so as not to tilt the shock over. To accomplish this movement of the shock former, I have provided two arms 58 and 59 attached to the carriage 47 and carrying rollers 60, which are supported on an inclined track 61. This track supports the weight of the shock former when in position for forming a shock and also when it is traveling upwardly and rearwardly. An upright 62 supports the arms 50 of the shock former and passes through the carriage 47 and has a roller 63 at its top and a lug 64 near its lower end above the frame 46. This upright 62 also supports a short square shaft 65 as clearly shown in Fig. 10 which is slidingly mounted therein and which is provided on one end with a roller 66. A clutch member 67 is fixed to the square shaft 65 and an extensible coil spring 68 mounted on the shaft engages said clutch member 67 and the adjacent side of the upright 62 and the said clutch member 67 is normally held by said springs 68 in engagement with the clutch member 69 which is slidingly mounted on the shaft 65^a which extends into the shaft 65, as shown in Fig. 17, and which is part of the segmental sprocket wheel 70. The smooth face of this sprocket wheel is shown by solid lines in Fig. 10 and the toothed face is shown by dotted lines in said figure and is also shown by solid lines in Fig. 9. The arrangement is such that when the shaft 65 is at one limit of its movement, the clutch 67 thereon will disengage from the clutch 69, and when said shaft is released, the spring 68 will force the clutch 67 into engagement with the clutch 69. Fixed to the axle 11 is a sprocket wheel 71 connected by a sprocket chain 72 with a sprocket wheel 73 fixed to a shaft 74 mounted in the frame 46, as shown in Fig. 1. This shaft 74 is designed to drive a sprocket wheel 75 which in turn imparts motion to a sprocket chain 76 which chain is passed around the wheels 77 and 78, thus arranging the said sprocket chain 76 in a substantially triangular form. Supported at the top of the frame is a track hanger 79 having a short track 80 thereon provided with a pivoted switch point 81, which track is designed to engage and support the roller 63. Mounted adjacent to the track 61 is an arm 82 bearing a guide lug 83, which lug is so arranged and disposed relative to the roller 66 that when the said roller 66 is being carried upwardly with the carriage on the track 61, it will strike the lug 83 as shown in Figs. 3 and 10 and cause the clutch members 67 and 69 to disengage from each other allowing the segmental sprocket 70 to turn over and disengage from the chain 76. The roller 63 then strikes the switch point 81 and passes above it, so that the upright 62 will be carried by the roller 63 on the track 80 until the roller 66 strikes a lug 84. This will permit the segmental sprocket wheel 70 to turn far enough to disengage from the sprocket chain 76. When this occurs, the lug 64 on the upright 62 will strike upon the slide bolt 85 and thus sup-

port the upright in its elevated position with the sprocket wheel 70 freed from the sprocket chain, then before the carriage may again descend the slide bolt 85 must be withdrawn to clear the lug 64. This slide bolt 85 is provided with a spring 86 normally holding it in position to be engaged by the lug 64 and this bolt is manually operated to disengage from the lug 64 when it is desired to discharge a shock of grain from the shock former. This bolt 85 may be manually operated by having the operator grasp it, or he may attach a rope to it for convenience in operating it. In practical use with this part of the device and assuming the parts to be in the position shown in Fig. 3, that is in position where the shock former has just discharged a shock. Then the next movement of the device will be that of the entire shock former returning to its position for receiving a new shock. This is accomplished as follows: The chain 76 will be operated to move the carriage 47 upwardly and rearwardly until the roller 66 strikes the lug 83. This will cause the sprocket wheel 70 to disengage from the lower part of the chain 76, turn over a part revolution and again engage the top portion of the chain 76 and the roller 63 will travel on the track 80 forwardly to the lug 84, whereupon the sprocket wheel 70 will again be turned a part revolution and be disengaged from the sprocket chain. The carriage 47 will move downwardly and forwardly on the track 61, while the roller 63 is traveling forwardly on the track 80 and when the carriage 47 is returned to its forward limit of movement, the upright 62 will be retained at its upper limit in position to hold the shock forming plates in position to receive bundles of grain and the parts will remain in this position until the operator pulls the slide bolt 85, as before described whereupon the upright 62 and the guide brackets connected therewith will descend by gravity on their guide rods to position, shown in Fig. 3 with the sprocket wheel 70 in engagement with the lower part of chain 76.

Hinged to the sides of the machine frame are the shock supporting leaves 87 to swing downwardly and outwardly. In one position, these leaves stand in a substantially horizontal position beneath the shock forming plates and where they will receive bundles from the tilting platform 27. They are normally held in their horizontal position by means of the rods 88 pivoted thereto and extended upwardly and attached to the arms 89, which arms are fixed to a shaft 90, mounted in the machine frame and provided at its central portion with a crank arm 91. This crank arm is in the path of a hook 92 on the part 50 as shown in Fig. 5. Hence when the part 50 is in its elevated position, the hook 92 engages the crank arm 91 and holds it in the position shown by solid lines in Fig. 5, thus supporting the leaves 87 in their horizontal position. Then when the hook 92 descends with the shock former, it will disengage from the crank arm 91, thus permitting the leaves 87 to drop by gravity where they will remain until the hook 92 has moved with the shock former on its track and has returned to position in engagement with the arm 91, whereupon the crank arm 91 will be pushed outwardly from the position shown by dotted lines in Fig. 5 to the position shown by solid lines in said Fig. 5, elevating the hinged leaves.

It is desirable to prevent bundles of grain from passing beyond the platform 42 during the time that the hinged leaves 87 are lowered and I accomplish this automatically as follows: Fixed to one of the leaves 87 is an arm 93 having a pointed rod 94 pivoted to it and passed through a guide 95 on the machine frame. The pointed end of this rod 94 is designed to pass through one of the hinged side pieces 44 when the hinged leaf 87 is in its lowered position and thereby prevent bundles of grain from passing from the platform 42 until the hinged leaves 87 are again elevated and the pointed rod 94 withdrawn. In Fig. 6 of the drawings the pointed rod 94 is shown by solid lines in its withdrawn position and by dotted lines in position extended through one of the hinged side pieces 44 to prevent grain from passing beyond the platform 32.

In practical operation and assuming that my improved shocking device was being advanced over a field at the side of a binder, obviously bundles of grain from the binder would be discharged to the platform 15 and from thence carried to the chute 16 to the tilting platform 27. This platform will automatically stand the bundles in an upright position upon the platform 42 between the spring actuated sides 44. From this platform they will be pushed off by the following bundles to the shock former comprising the hinged leaves 87 and the shock forming plates. These shock forming plates will expand as bundles are successively forced between them and they will give shape to the shocks, compressing the tops thereof and permitting the butts thereof to expand to form a broad base. When a sufficient number of bundles have been forced within the shock former, the operator releases the slide bolt 85 in the manner before described, thus permitting the arms 50 that support the shock forming plates to descend and as they descend the shock forming plates will be tilted outwardly away from each other to release from the shock which drops to the ground. The hinged leaves 87 will be automatically released at the commencement of this downward movement. Then as soon as the frame that carries the shock forming

blades has reached its lower limit of movement the segmental sprocket wheel 70 will engage the chain 76 and the carriage supporting the frame of the shock former will jointly with the sprocket wheel 70 move rearwardly and upwardly on the track 61. When near the rear end of the frame, the roller 66 will strike the lug 83 and the further movement of the shock former will cause the sprocket wheel 70 to turn a part revolution and engage the portion of the sprocket chain 76 that moves forwardly and at the same time, the rollers 63 will engage the elevated track 80, then as the carriage moves forwardly and downwardly on the track 61, the frame of the carriage that supports the shock forming plates will move forwardly, but not downwardly, as rapidly as the carriage, thus moving the guide brackets 51 to the top of their guide arms. Then when the carriage bearing the hook 92 reaches its forward limit of movement, it will rock the shaft 90 as required to elevate the leaves 87 to position. The pointed rod 94 automatically prevents any bundles from reaching the platform 42 during the time that the leaves 87 are dropped.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States, therefor is—

1. In a grain shocker, the combination of a bundle receiving platform, a chute adjacent to the platform and extended forwardly, laterally and then rearwardly and means actuated by the advance of the machine for forcing bundles of grain from the platform through said chute.

2. In a grain shocker, the combination of a bundle receiving platform, a chute adjacent to the platform and extended forwardly, laterally, upwardly and then rearwardly and means actuated by the advance of the machine for forcing bundles of grain from the platform through said chute.

3. In a machine of the class described, the combination of a bundle receiving platform a chute extending forwardly, laterally, upwardly and rearwardly from the platform, said chute formed with slots therein, tines projected through said slots to engage bundles and means actuated by the advance of the machine for moving said tines along said slots.

4. In a machine of the class described, a frame, a traction wheel, a shaft operated by the traction wheel, a number of arms hinged thereto, tines on said arms, a stationary guide to be engaged by said arms, a bundle receiving platform a chute connecting therewith, said chute formed with slots to receive said tines and said guide holding the tines in said slots.

5. In a machine of the class described, a tilting platform, means for depositing bundles of grain on said platform, means actuated by the advance of the machine for elevating said platform, a trigger to be engaged by a bundle on the platform for releasing the mechanism for elevating the platform and spring actuated means for returning the platform.

6. In a machine of the class described, a frame, a traction wheel, a ratchet wheel rotated by the traction wheel, a tilting platform, a toothed arm for elevating the platform, a trigger projecting through the platform to be engaged by a bundle thereon for moving the toothed arm into engagement with the said ratchet wheel, means for holding the toothed arm in engagement with the ratchet wheel for a part of the revolution of said ratchet wheel, a spring for removing the toothed arm out of engagement with the ratchet wheel and a spring for returning the platform.

7. In a machine of the class described, the combination of a tilting platform, upright sides adjacent to the platform and yielding bundle holders connected with said upright sides.

8. In a machine of the class described, the combination of a tilting platform, upright sides adjacent to the platform and hinged leaves connected with said upright sides.

9. In a machine of the class described, the combination of a tilting platform, upright sides adjacent to the platform and spring actuated hinged leaves connected with said upright sides.

10. In a machine of the class described, a platform, stationary upright sides adjacent to the platform, yielding bundle holders connected with said stationary sides, hinged upright leaves at the ends of the stationary sides and springs for normally holding said leaves inclined toward each other.

11. The combination of a machine frame, hinged shock supporting leaves, a tilting platform, upright sides adjacent to the tilting platform and means actuated by a movement of the shock supporting leaves for retaining bundles between the upright sides.

12. The combination of a machine frame, hinged shock supporting leaves, a tilting platform, upright sides adjacent to the tilting platform, an arm connected with one of the hinged leaves and a pointed rod pivoted to said arm and designed to be projecting through one of the upright sides when the leaf to which it is connected is in its lowered position.

13. The combination of a withdrawable shock supporting platform, spring actuated shock forming plates above the platform and means for moving said plates jointly downward toward the ground as the shock supporting platform has been withdrawn.

14. The combination of two shock supporting leaves hinged at their sides and capable of swinging downwardly away from

each other, yielding shock forming plates above said leaves and means for jointly moving said plates downwardly when the leaves are dropped to deposit a shock upon the ground surface.

15. In a machine of the class described, a number of shock forming plates arranged substantially in circular form, an independent yielding pressure device for each plate normally holding them toward a common center and means for jointly moving said plates downwardly.

16. In a machine of the class described, a number of shock forming plates, arranged substantially in circular form, an independent yielding pressure device for each plate normally holding them toward a common center, means for jointly moving said plates downwardly and means for spreading said plates apart as they approach their downward limit of movement.

17. In a machine of the class described, a number of shock forming plates arranged substantially in circular form, an independent yielding pressure device for each plate normally holding them toward a common center, means for jointly moving said plates downwardly, means for spreading said plates apart as they approach their downward limit of movement and means for jointly moving said plates upwardly and rearwardly after they have reached their downward limit of movement.

18. In a machine of the class described, a number of shock forming plates arranged substantially in circular form, an independent yielding pressure device for each plate normally holding them toward a common center, means for jointly moving said plates downwardly, means for spreading said plates apart as they approach their downward limit of movement, means for jointly moving said plates upwardly and rearwardly after they have reached their downward limit of movement and means for returning said plates to position adjacent to a common center.

19. The combination of a guide arm, a guide bracket slidingly mounted thereon, a spring actuated arm connected with the guide bracket and a shock forming plate connected with the said arm.

20. The combination of a guide arm extended downwardly and outwardly, a guide bracket slidingly mounted thereon, a spring actuated arm connected with the guide bracket, a shock forming plate carried by said arm and means for moving the guide bracket up and down on the guide rod to thereby move the lower end of the spring actuated arm inwardly and outwardly.

21. The combination of a number of guide arms arranged in substantially circular form and extended downwardly and outwardly, guide brackets mounted thereon, spring actuated arms connected with the guide brackets, shock forming plates carried by said arms and means for jointly moving said guide brackets up and down on the guide arms to thereby move the shock forming plates to and from a common center.

22. The combination of a carriage, a number of shock forming plates supported by the carriage and movable up and down relative to the carriage, means for forcing said plates apart as they are moved downwardly from the carriage and for forcing them together after they are moved upwardly, a track for the carriage extending upwardly and rearwardly, means for conveying the carriage upwardly and rearwardly on said track and means for elevating the said plates relative to the carriage as it is moved forwardly on said track.

23. In a machine of the class described, the combination of a carriage, a number of shock forming plates supported by the carriage, an arm connected with the shock forming plates to move them toward each other as the arm is elevated relative to the carriage, a track for supporting the carriage inclined upwardly and rearwardly, means for moving the carriage upwardly and rearwardly on said track and means for automatically engaging the said arm and moving it forwardly at the same time the carriage is moved forwardly and downwardly to thereby elevate said arm relative to the carriage.

24. In a machine of the class described, the combination of a carriage, a number of shock forming plates supported by the carriage, an arm slidingly mounted in the carriage, means actuated by said arm for moving the shock forming plates to and from each other, a second track, means on said arm for engaging the second track, means for jointly moving the carriage and the said arm upwardly and rearwardly on the first track and means for automatically supporting the arm on the second track and for moving it forwardly while the carriage returns on the first track to thereby elevate the arm relative to the carriage.

25. In a machine of the class described, the combination of a carriage, an upright supported by the carriage, a number of shock forming plates connected to said upright, means for moving said plates toward each other as the upright is elevated relative to the carriage and for forcing said plates apart as the upright is lowered relative to the carriage, an inclined track for the carriage, a sprocket chain traveling parallel with the inclined track, means for releasing the said upright to permit it to drop by gravity, a device carried by the upright for engaging the said sprocket chain when the upright is dropped, means for releasing said device from the chain when it approaches the rear end of said track, a roller on the

upright, a second track formed with a switch point to be engaged by said roller, said second track diverging from the first to elevate the said upright relative to the carriage as the carriage moves forwardly on its track.

26. The combination of a machine frame, hinged shock supporting leaves, a series of shock forming plates, means for supporting the shock forming plates in an elevated position, means for jointly releasing the shock forming plates and the said leaves and means for automatically returning the shock forming plates to position and for elevating the shock supporting leaves.

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Witnesses:
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