March 16, 1937. D. H. GILSON 2,073,742

CORN SHELLER

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FIG. 1

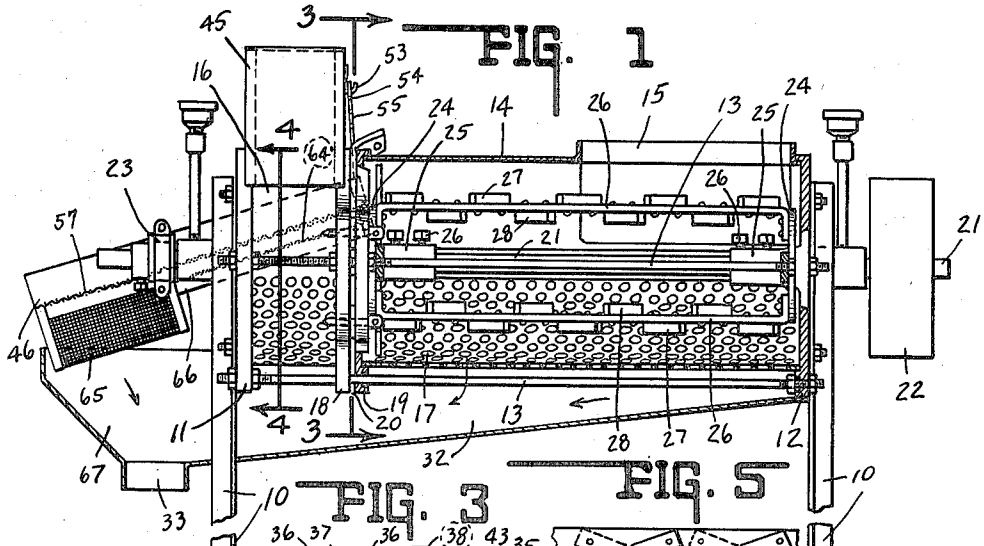


FIG. 5

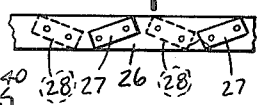


FIG. 3

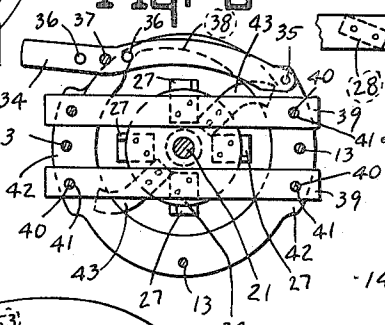


FIG. 6

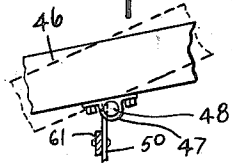


FIG. 4

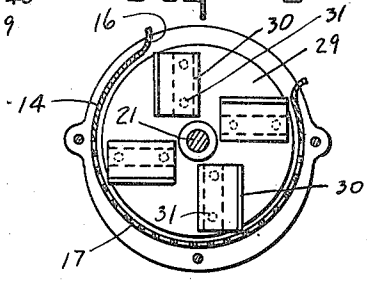


FIG. 2

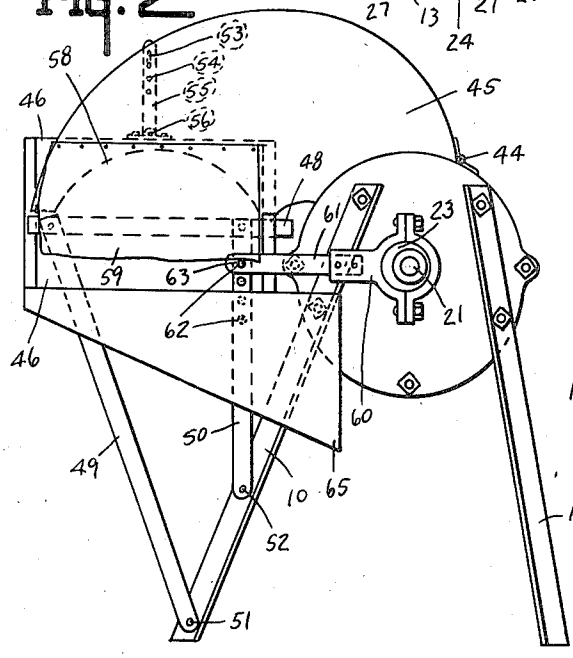
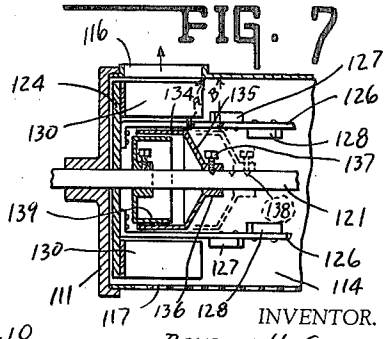


FIG. 7



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FIG. 8

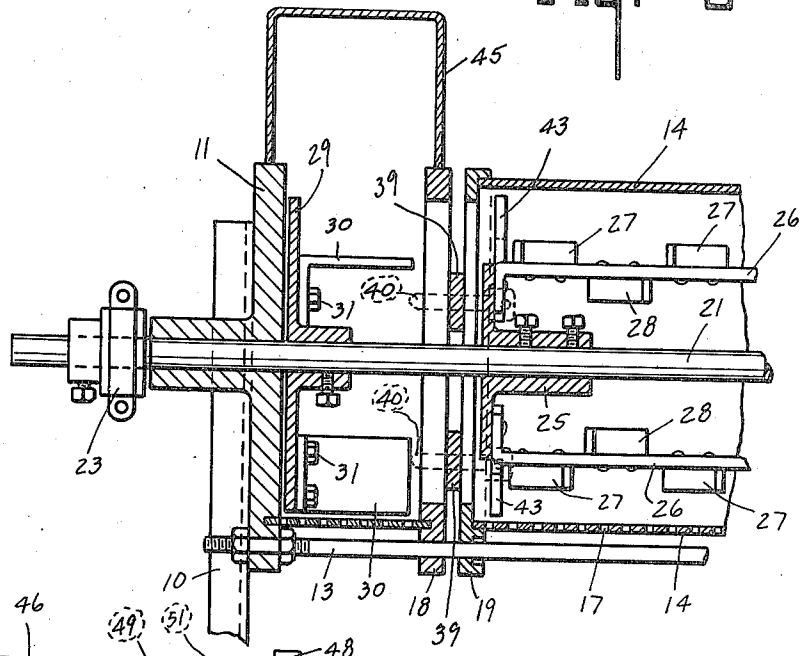
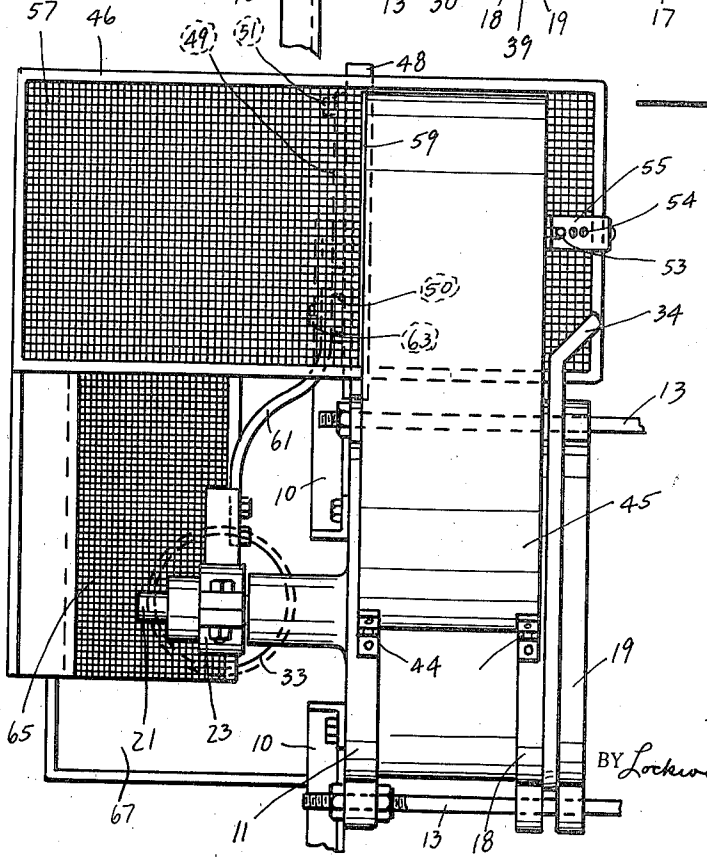


FIG. 9



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CORN SHELLER

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Application January 15, 1934, Serial No. 706,704

6 Claims. (Cl. 130—6)

This invention relates to a corn sheller.

The chief object of the invention is to provide a corn sheller which will have a capacity at least twice that of present standard corn shellers, and which will operate on clean corn as well as so-called dirty or partially husked ears.

It has been determined that when operating upon clean and dry ears, the capacity of the invention disclosed herein, is substantially three times that of the present commercial devices. This increase in capacity is attributed to the particular type of shelling rotor which, herein, is disclosed as an open work rotor or shelling reel.

One cause for the relatively low capacity of present commercial corn sheller when cleaning so-called dirty corn, is the sheller jams or clogs due to the inability of the machine to successfully discharge cobs or parts of the cobs, and the husks, and the like, fast enough to conform to the shelling capacity.

The present invention also contemplates the provision of an adjustable arrangement, whereby the discharge from the sheller is regulated so that cobs will not pass through the sheller without having substantially all the corn grains shelled therefrom.

Another object of the invention is to separate from the discharged cobs, husks and the like, such shelled corn as may have been carried over or removed from the sheller by reason of the removal action of the means that positively removes the cobs and the husks from the sheller.

In addition to the accomplishment of the aforesaid objects, other objects will appear more fully, as specific features are set forth hereinafter.

The full nature of the invention will be understood from the accompanying drawing and the following specification and claims:—

In the drawing, Fig. 1 is a side elevation of one embodiment of the invention in its entirety, parts being broken away to show other parts in section.

Fig. 2 is an end elevation, looking at the discharge end of the machine.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1, and in the direction of the arrows.

Fig. 4 is a similar view, taken on line 4—4 of Fig. 1, and in the direction of the arrows.

Fig. 5 is an elevational view of a portion of one of the reel bars.

Fig. 6 is an end elevational view of a portion of the riddle and its mounting.

Fig. 7 is a central sectional view through a portion of a modified form of the invention, showing another adjustable throat construction.

Fig. 8 is an enlarged central sectional view of the discharge end of the sheller.

Fig. 9 is an enlarged top plan view of riddle and discharge end of the sheller.

In Figs. 1 to 6, inclusive, 10 indicates the end frames in the form of a pair of bars that support the end castings 11 and 12. These are secured together in spaced relation by means of the rods 13 and the chamber 14 and these rods lie along said tubular chamber 14 having the inlet portion 15, supplied by a hopper not shown, and an outlet portion or discharge 16. The tubular portion 14 has its lower portion perforated as at 17.

Herein between the two end plates 12 and 13 are interposed a pair of complementary plates 18 and 19 secured in spaced relation with the space 20 therebetween. Rotatably supported in the two end plates 11 and 12, is a shaft 21 which projects beyond said end plates and at one end mounts a suitable driving mechanism in the form of a pulley 22 and at its opposite end mounts an eccentric 23 to which reference will be had more fully hereinafter.

Suitably secured to the shaft 21 and within the tubular chamber 14, is a shelling reel. Herein the same includes the end plates 24 having hubs 25 secured as at 26 to said shaft. Extending from end plate 24 to end plate 24, are a plurality of longitudinally directed bars 26 arranged in spaced relation. Herein four of said bars are provided and suitably secured to the plate portions 24.

Each bar, as shown clearly in Figs. 1 and 5, is provided upon its exterior and interior with inclined lugs 27 and 28 respectively. The lugs on the exterior of each bar are spaced longitudinally and the lugs on the interior of each bar are spaced longitudinally and the spacing is so offset that the lugs successively secured to the bars in longitudinal arrangement are alternately positioned upon the interior and exterior, as shown. Also preferably, the exterior lugs upon adjacent bars are offset longitudinally of each other and similarly, the interiorly positioned lugs upon adjacent bars are offset longitudinally. The inclination or biasing of the lugs is shown clearly in Figs. 1 and 5.

The resulting construction constitutes an open rotor or shelling reel and by reason of this construction, the invention is enabled to not only shell corn from the ears that are interposed between the reel and the tubular body portion 14, but also between the shaft and the reel and within the reel as well.

Suitably secured to the shaft 21 is a plate 29 that has mounted upon it blades 30 as at 31. The aforesaid constitutes an ejector as well as a suction fan and blower. As the unshelled ears, husked or partially husked, or completely husked, are supplied to the chamber 14 through the opening 15, the initial engagement with the reel serves to break up the long cobs into shorter lengths and serves also to separate the husks from the ears. Continued rotation of the ears or movement of the ears longitudinally accompanied by partial rotation of the same from the intake opening 15 to the discharge opening 16, results in the ears, working one upon the other together with the ears working upon the inside of the chamber 14, together with the working of the ears upon the shaft and the reel, all to secure relatively complete shelling of the corn grains from the ear.

The corn that is shelled from the cob falls through the reel and passes out through the openings 17 and into the collecting chamber 32 and discharges therefrom through the spout 33. The husks and shelled cobs follow through the machine toward the discharge end. They are ejected by the rotor construction including the blades 30, and through the opening 16. This rotor also serves to create a suction to lift the light chaff and dirt in chamber 14 and serves to pull it also out of the discharge opening. Thus, a cleaning action also results.

It has been determined that the rate of flow of the ears through the machine should be varied, according to the condition of the corn to be operated upon. Accordingly, between the plates 18 and 19 and in the space 20, there is positioned a movable gate 34 pivoted at 35 and provided with a plurality of openings 36. A pin 37 positioned in the opening is adapted to regulate the controlling position of the movable gate 34. Each of the castings 18 and 19 do not have a large circular opening, but have an enlargement thereon at one portion as at 38.

To provide an impediment or obstruction in the chamber 14, there is provided a pair of bars 39 which are adapted to be detachably positioned by means of pins 40 positioned in openings 41 in the projecting lugs 42 of the plates 18 and 19. If when desired, removal of the pins 40 from said plates and the bars permits the removal of either or both of said bars 39. The two bars 39 straddle the shaft 21.

As shown in Figs. 1 and 3, there is suitably secured to the plate 24, a pair of arms 43. These arms terminate adjacent the inside wall of the chamber 14, and are diametrically arranged and provided with angular ends. They serve as agitators, and the like, to insure rotational movement of the cobs, husks, et cetera, that are to pass through the machine and be ejected as waste.

In the present form of the invention, it will be noted that the chamber is divided into two parts, one of which constitutes an ejector and fan chamber and the other of which constitutes primarily a shelling chamber.

Pivotally supported, or otherwise suitably secured, as at 44 is a passage forming construction 45 and the same communicates at one end with the discharge opening 16—see Fig. 4. The discharge end of the construction 45 terminates above a riddle or shaking screen 46.

The shaking screen 46 is pivotally supported as at 47 upon a member 48. The member 48 in turn is supported by two upwardly directed members 49 and 50 suitably supported as at 51 and 52, respectively, upon one of the frame members 10. A hook 53 is operatively associated with one of a plurality of the holes 54 in a strap 55 secured as at 56 to the back end of the riddle 46. Thus, the inclination of the riddle having the screen 57 is adjusted by means of the strap 55. When relatively clean corn, having reference to practically all of the husks being removed therefrom, is handled, the inclination of the screen will be at a maximum. When so-called dirty corn is handled, the inclination of the screen will be at a minimum. The reason for this is that with the inclination at a minimum, it will require more agitation to cause the refuse to move along the screen from where it is deposited thereon near the upper end to its discharge at the lower end. The flow rate is thus lessened.

The discharge opening in the member 45 is indicated by the numeral 58, and the latter is covered by a flexible member, such as the blanket 59, the lower end of which more or less rides on the screen surface 57. It may, however, terminate short thereof. The screen 57 is moved back and forth at right angles to its longitudinal direction, that is, the direction of flow of the material over the same, by means of the eccentric 23 that is associated with the strap construction 60.

The strap 60 by means of arms 61 has a detachable connection at 62 with the support member 50 through the pin 63. When the arm 61 is associated with the uppermost hole 62, then it will be apparent the maximum reciprocation due to the eccentric is imparted to the riddle; in other words, full stroke is obtained. When associated with the lowermost of the holes 62, it will be apparent that full stroke reciprocation of the eccentric does not secure the same stroke or reciprocation of the riddle but such reciprocation will be of a lesser amount, although in the same timed relation.

Below the screen portion 57 of the riddle 46 is another screen of finer mesh, the same being indicated by the numeral 64. This screen has an outlet or discharge 65. Below the first mentioned, if desired, may be a plate 66. The purpose of the aforesaid is as follows:

The husks and cobs, after being deposited upon the riddle, pass along the same from the point of deposition to the end shown to the extreme left in Fig. 1. In the movement of the refuse along and down the riddle, the corn grains that have been accidentally carried over and from the sheller proper by reason of the ejector or because they have become intermingled or included with the mass of refuse, gradually separate or pass out through the larger mesh in the screen portion 57 and fall upon the smaller mesh screen 64 and discharge as at 65 into the hopper portion 67 that has the same outlet 33. The dirt, and the like, that might normally separate out at this point passes on through the screen 64 and on to the plate 66 and is otherwise disposed of. Thus, the riddle serves not only as a separator but as a cleaner as well.

As shown clearly, in Fig. 1, the right hand portion of the chamber wherein the blower and ejector are mounted, is also perforated at the bottom and the separated corn grains or shelled corn passes through the opening 17 into the same hopper or collector 32.

From the foregoing, it will be apparent that if the corn varies from that which is well cleaned and husked to that which is only partially husked, the primary adjustment for regulation of the throat can be made by the bar, or bars, 39. The

extension of the member 34 is so arranged that it is readily accessible, and upon the machine indicating its becoming clogged, elevation of member 34 for a moment or two will immediately clear the machine and permit the attempted obstruction to pass on. As before set forth, the wings or members 43 serve to prevent packing of the material near the discharge end of the machine and keep the obstruction moving.

In Fig. 7 there is illustrated a modified form of the invention and with this form it is to be understood that there is no necessity for the intermediate plates 18 and 19 so that the chamber 14 may be substantially continuous. In this form of the invention the end plate 111 rotatably supports shaft 121. The end plate 124 of the reel structure provided with the bars 126 having the interior and exterior lugs 128 and 127 thereon respectively, also supports the blades 130 of the combination fan and ejector and the same rotates in the chamber 114 perforated, as before mentioned, as at 117.

The dicharge opening is indicated by the numeral 116 and the blades of the rotor serve as an ejector and throw out the husks and the like, from the chamber 114 through said opening to the riddle mechanism, such as illustrated fully in Figs. 1 and 2. Projecting inwardly from the plate 124 is a cylinder 139 and the same is stationarily secured so as to rotate with the reel. Obviously, adjacent thereto, the reel bars 126 are not provided with any interior lugs and exteriorly, of course, are not provided with any lugs, because of the fan blades 130.

There is a slight space between the bars 126 and the cylinder 139, and telescopically associated with the latter is a cylinder member 134 which has an open end for such telescopic association, and an opposite tapered end 135 terminating in a hub 136 that is slidably mounted on the shaft 121 and is suitably secured in axially adjusted position on said shaft by the set screw 137 seatable in any one of the preformed recesses 138 provided in the shaft. As indicated, when the two members 139 and 134 are fully telescoped, the dimension "A" represents the greatest throat for maximum capacity discharge. When the members are extended to their maximum position, the minimum throat is provided, as indicated, by the dimension "B"—see Fig. 7.

It will be perfectly obvious that since the reel is of an open-work character and since the hood 45 in Figs. 1 and 2 is hinged at 44, the opening 116 is readily accessible and the farmer can readily adjust the telescopic member 134 on the shaft in the desired position for most efficient shelling of the particular type of corn then to be operated upon.

While the member 134 is shown provided with the conical end 135, the same may be of any other desired conformation. This cone, in addition to the throat regulation, prevents the accumulation of cobs, and the like, at the discharge end of the machine and inside the reel. In other words, all of the cobs, husks, and the like, that are inside the reel near the discharge end are forced outwardly therefrom at said end and are positively ejected by the blades 130.

While the invention has been described in great detail in the foregoing specification and several modifications have been set forth and illustrated, the same is to be considered as illustrative and not restrictive in character. Such modifications as well as others which will readily suggest themselves to persons skilled in this art, are all considered to be within the broad scope of this invention, reference being had to the appended claims.

The invention claimed is:—

1. In a corn sheller, the combination of a tubular chamber having an inlet at one end and a discharge at the opopsite end and perforations along its underside sufficient in area solely for the discharge of shelled corn, a reel type shelling rotor in said chamber, and means thereon for simultaneously shelling cobs both internally and externally of the rotor, said reel being positioned in spaced relation with respect to the side wall of the chamber.

2. In a corn sheller, the combination of a tubular chamber having an inlet at one end and a discharge at the opposite end and perforations along its underside sufficiently in area solely for the gravity discharge of shelled corn, a reel type rotor in said chamber, and means upon the interior of the reel forming structure for internally shelling ears within the reel.

3. In a corn sheller, the combination of a shelling chamber having an inlet and a discharge and perforations on its lower side for shelled corn discharge, a shelling rotor therein, a rotary ejector adjacent the discharge and in the chamber, and means constituting an adjustable barrier in juxtaposition relative to the ejector for the purpose set forth, including a movable element for varying the size of the throat between the shelling area of the chamber and the ejecting area of the chamber, said element being movable longitudinally in the general direction of cob movement from inlet to discharge.

4. In a corn sheller, the combination of a shelling chamber and a shelling reel therein, including a plurality of bars arranged in spaced relation relative to each other and spaced radially from the common axis of rotation, said reel being rotatable in said chamber, and a plurality of longitudinally spaced internal shelling members carried by each bar and biased relative thereto, said shelling portion of said members being positioned internally relative to said bars.

5. In a corn sheller, the combination of a shelling chamber and a shelling reel therein, including a plurality of bars arranged in spaced relation relative to each other and spaced radially from the common axis of rotation, said reel being rotatable in said chamber, and a plurality of longitudinally spaced shelling members carried by each bar and biased relative thereto, said shelling portion of said members being positioned both externally and internally relative to said bars for simultaneous external and internal shelling respectively.

6. In a corn sheller, the combination of a shelling chamber and a shelling reel therein, including a plurality of bars arranged in spaced relation relative to each other and spaced radially from the common axis of rotation, said reel being rotatable in said chamber, and a plurality of longitudinally spaced shelling members carried by each bar and biased relative thereto, said shelling portion of said members being positioned both externally and internally relative to said bars for simultaneous external and internal shelling respectively, said shelling portions of said members upon each of said bars in longitudinal succession being successively arranged relative to the exterior and interior of said bar.

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