A. S. BEYMER.

CORN GRADER.

APPLICATION FILED FEB. 9, 1907.

917,240.

Patented Apr. 6, 1909.

3 SHEETS—SHEET 1.

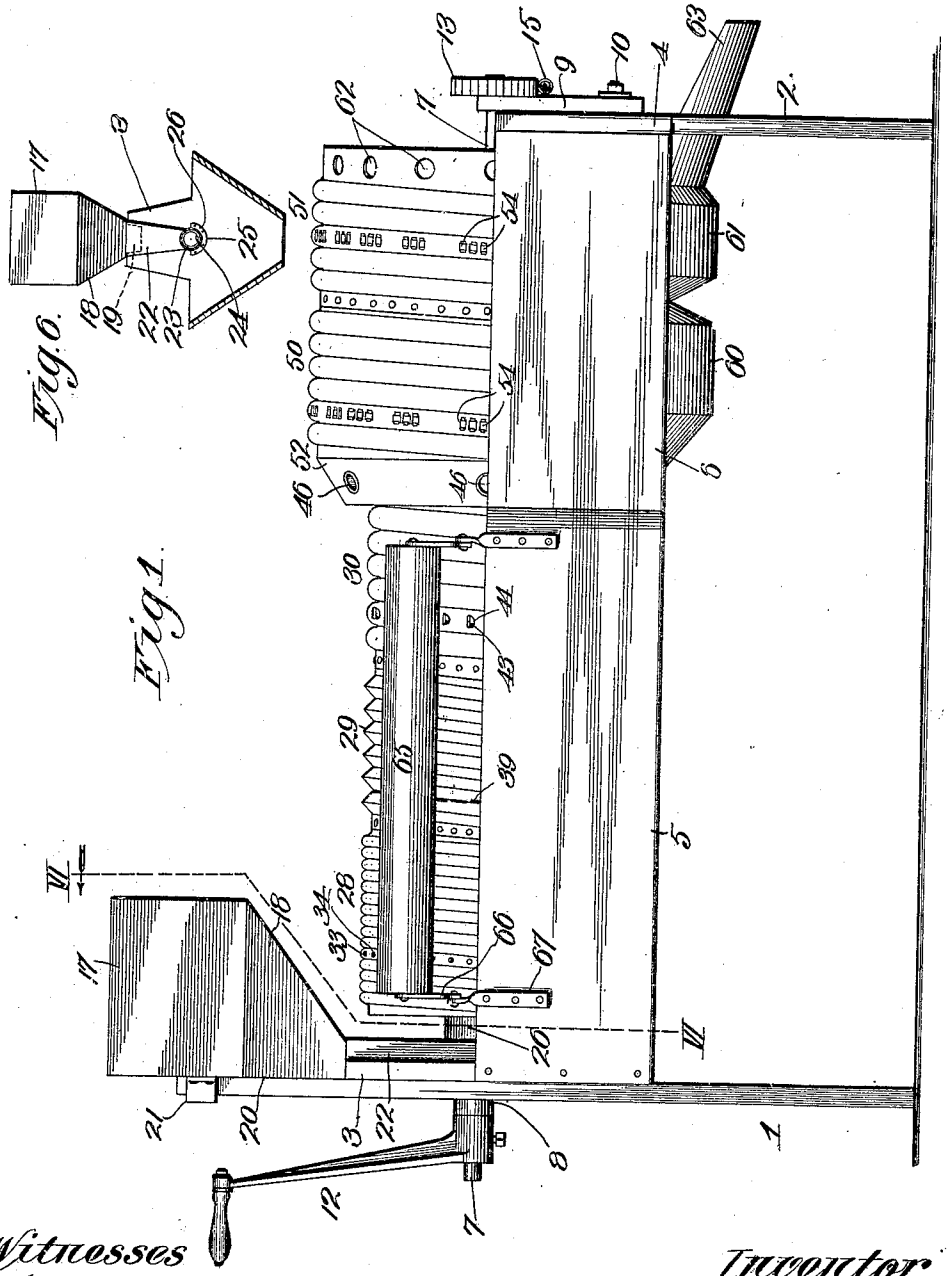


Fig. 1.

Fig. 6.

Witnesses

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3 SHEETS—SHEET 2.

Fig 12

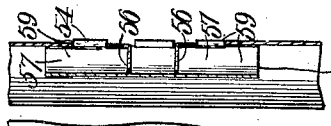


Fig 11

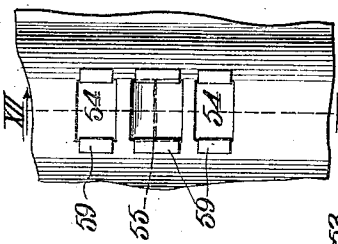
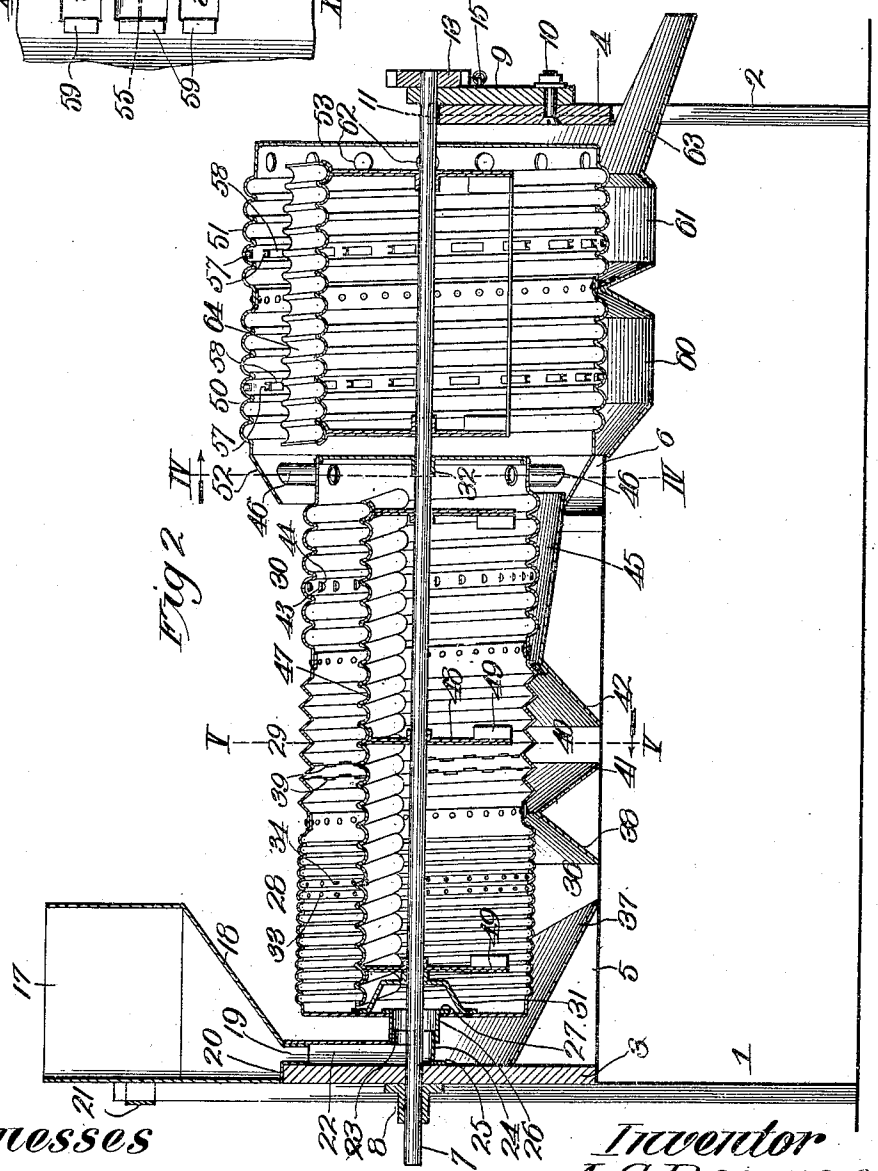


Fig 2



Witnesses

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3 SHEETS—SHEET 3.

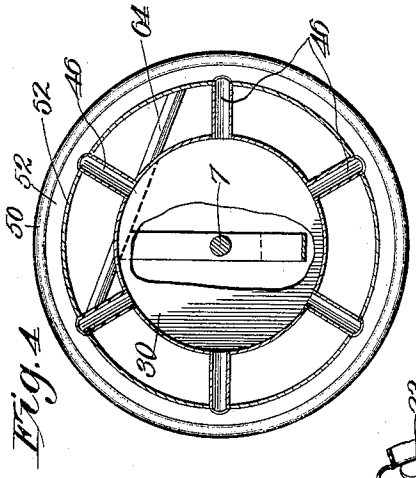


Fig. 4.

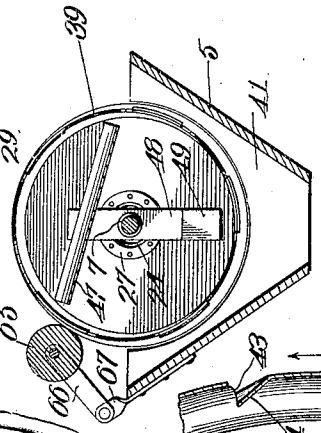


Fig. 5.

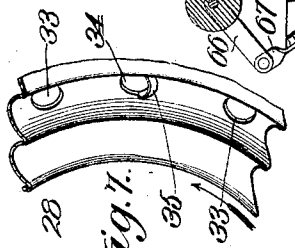


Fig. 7.

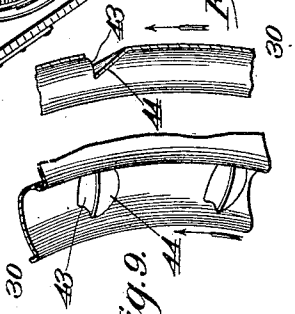


Fig. 9.

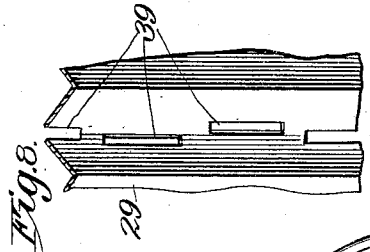


Fig. 8.

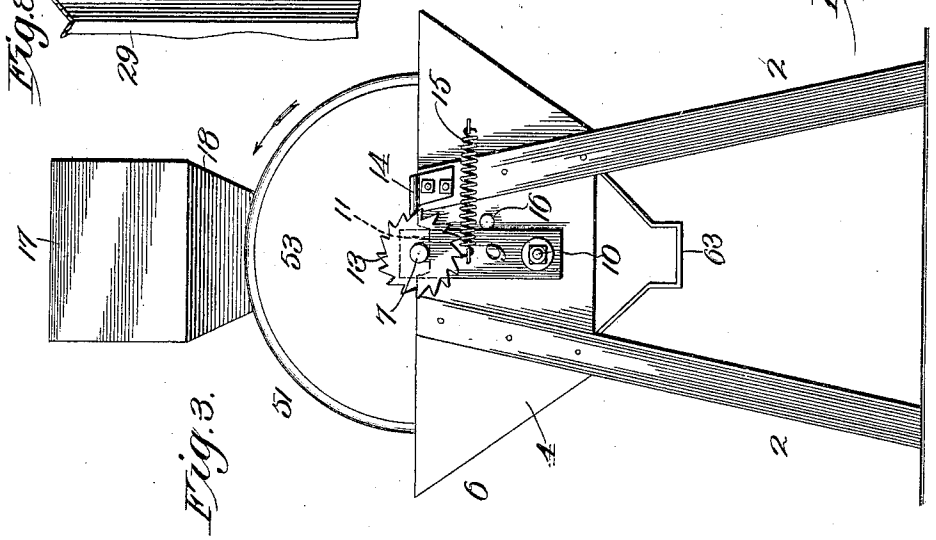


Fig. 3.

Fig. 10.

Witnesses

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UNITED STATES PATENT OFFICE.

ADELBERT S. BEYMER, OF KANSAS CITY, MISSOURI.

CORN-GRADER.

No. 917,240. Specification of Letters Patent. Patented April 6, 1909.

Application filed February 9, 1907. Serial No. 356,566.

To all whom it may concern:

Be it known that I, ADELBERT S. BEYMER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Corn-Graders, of which the following is a specification.

This invention relates to corn graders and has for its object to produce a machine of this character by which the grains of predetermined size and form may be efficiently and expeditiously separated from the others, and which can be manufactured and sold cheaply.

To this end the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1, is a side elevation of a corn grader embodying my invention. Fig. 2, is a central vertical longitudinal section of the machine. Fig. 3, is a rear end view of the machine. Fig. 4, is a section on the line IV—IV of Fig. 2. Fig. 5, is a section on the line V—V of Fig. 2. Fig. 6, is a reduced section on the line VI—VI of Fig. 1. Fig. 7, is a sectional perspective view of one of the grader sections. Fig. 8, is a fragmentary view of another sorting section. Fig. 9, is a sectional perspective view and Fig. 10, a vertical section of a third grading section. Fig. 11, is an outer face view of a part of a supplemental grading section. Fig. 12, is a section on the line XII—XII of Fig. 11.

In the said drawings 1 indicates a pair of comparatively long and upwardly converging legs and 2 a pair of shorter upwardly converging legs. A trough carried by said legs comprises the following parts: 3 indicates a head board secured to legs 1 and 4 a tail board secured to legs 2. 5 indicates downwardly converging sides connecting the head and tail boards.

In the construction shown herein the rear portion of the trough or hopper formed by said sides is increased in width as at 6 for a purpose hereinafter explained.

7 indicates a longitudinal shaft journaled in a bearing plate 8, secured to head board 3 and journaled at its opposite end in an arm 9 pivoted as at 10 to tail board 4, the latter having a recess 11 in its upper edge in which said shaft may have lateral play. The shaft is equipped at its front end with a crank handle 12 and at its rear end with a ratchet wheel 13, arranged with its teeth for successive engagement with the obstruction 14 secured to one of the legs 2, a retractile spring 15 connecting the pivoted arm 9 with the tail board for the purpose of holding the ratchet wheel pressed yieldingly against said obstruction, a stop 16 on the tail board limiting the movement of the ratchet wheel toward the obstruction.

17 indicates a hopper having a tapering bottom 18 terminating in a vertical spout 19, disposed inward and centrally of head 3, the hopper having a shoulder 20 to rest on the upper end of the head and a loop 21 to fit over the upper ends of the legs 1.

22 indicates a tapering channel piece which receives the depending spout 19 of the hopper and fits against the inner side of the head 3, it being of course apparent that the channel piece and head together constitute a tube or conduit. At its lower end the channel piece is provided with a semi-circular arched flange 23, and rests upon a semi-tube 24 and forms in conjunction therewith a circular exit opening in tube 22, concentrically surrounding shaft 7, the semi-tube having a flange 25 by which it is adapted to be secured to the head 3 in any suitable manner.

26 indicates a sleeve fitting snugly upon the tube formed by flange 23 and semi-tube 24 and said sleeve is provided at its rear end with an outwardly projecting annular flange 27 riveted or otherwise secured to the front end of a tubular casing consisting of a plurality of sections, in this instance sections 28, 29 and 30, the first and last-named sections being secured to the front and rear ends respectively of the intermediate section.

To secure the casing rigidly on the shaft, a bracket 31 is secured to its front end and to the shaft, being of substantially U-shape so as to leave the passage of the grain from the hopper to the casing as free and unobstructed as possible, the rear end of said casing being secured as at 32 to the shaft. The cross sectional form of the casing may vary, but is shown in this instance as circular. The sections of the casing are identified by different numbers primarily because they are intended to effect the ejectment of grains of corn of

different size and form, that is because they are provided with openings or perforations of different shapes and sizes. From the first section it is intended to effect the removal as far as practicable of small and long slim grains, and to accomplish this purpose the section is provided with small holes 33, some of which, numbered 34, may be provided with inwardly and forwardly projecting lips 35 produced by stamping from the body of the metal or otherwise. The grains of the character described which are ejected from the section will fall therefrom only when below the plane of the axis of the section and therefore will fall into a chute 36 formed by downwardly converging plates 37 and 38 connecting the sides 5 of the trough.

The section 29 is intended to effect the escape of very thin grains of any length and breadth, and is therefore provided with long narrow slits 39 extending circumferentially of the section. The grains ejected from this section, 29, fall into a chute 40 formed by downwardly converging plates 41 and 42, connecting the sides of the trough.

Section 30, is provided with narrow openings formed by preference by cutting longitudinal slits in the section with such slits arranged in circumferential series, and then stamping or pressing the metal inward to produce narrow openings 43 and inwardly projecting lips 44 said lips projecting in the direction of rotation of the section and adapted like lips 35 to provide obstructions which tend to pick up and effect the discharge of the grains of corn, it being intended that through the openings 43 the choicest seed corn shall pass, and fall into any suitable receptacle not shown, when section 30 constitutes the last section of the machine. As arranged however, the machine is equipped with supplemental sections and consequently in this case the choicest grains or seed from section 30 will fall onto a removable chute 45 which is adapted to be secured in the trough in any suitable manner, being shown with its upper or front end flanged over and resting on plate 42 and with its lower end supported as hereinafter explained.

I have found by experiment that the most efficacious way of removing the long slim grains through perforations of diameter less than the length of such grains, is to compel such grains to approach the perforations endwise, and to accomplish this purpose I have found it advantageous to provide the casing with internal channels or recesses, the preferred construction being to provide a single continuous channel, as a spiral, as shown most clearly in Fig. 2, the perforations occurring in said channel, though I have also found that a casing provided with internal recesses or channels arranged circumferentially and therefore extending transversely of the length of the cylinder, induce the long grains to assume the proper positions to be engaged by the lips and thus compel them to pass through the adjacent apertures. The section 28 which is adapted as hereinbefore stated to accommodate small and long slim grains is provided with comparatively narrow channels. Section 29 is shown as provided with V-shaped channels and it will also be noticed that the openings 39 are disposed along the center and at opposite sides of the center of the channels so as to be adapted to the escape of corn standing at different angles to the axis of the section. Section 30 is in all essential particulars the same as section 28 except that the openings are elongated in a direction transversely of openings 39 and are narrower than the openings of section 28. The very large grains and in fact all that do not escape before, eventually pass through the discharge openings 46, which openings are preferably in the form of radially arranged tubes when it is desired to subject the grains escaping through the openings of section 30 to an additional sorting.

The provision of a separating casing with a spiral internal channel expedites the operation of the machine because such channel will tend to feed the grain toward the discharge end of the casing and to still further expedite and facilitate the sorting operation, I preferably arrange within the casing and above the shaft, an inclined table, 47, which table is also preferably channeled at its upper side with the channels pitched at an angle so that when the corn drops on the table at one end of the channel it shall slide thereacross and be at the same time advanced slightly in its progress through the machine, that is will escape from the table nearer the discharge end of the machine than the point at which it fell upon the table, it being understood that the corn which falls upon the table is that which may lodge in the openings of the sections or on the lips of the openings and being too large to pass through the latter will be carried up and fall down upon the table. In practice it will be found that the majority of the grains which fall upon the table at any particular point are grains which cannot pass through the openings of the sections which they at that time may occupy and that for this reason it is desirable to have the table channeled obliquely as explained in order to facilitate the progress through the machine of such grains so that they will enter the section through the openings of which they are adapted to esape. The table is provided with depending arms 48 pivotally mounted on the shaft and equipped below the latter with weights 49 so that the table shall always be maintained above the shaft but be capable of a vibratory or slight rocking motion, which will tend to insure movement of the grain from one side to the other.

As hereinbefore suggested, when it is de-

sired to subject the grain escaping from the openings of the last section to one or more additional sorting operations the openings 46 are in the form of tubes or hollow spokes connecting the casing described to the tapering front and open end 52 of a casing shown in this instance as composed of two sections 50 and 51, the last-named section having a closed end 53. These sections are preferably circular in cross section and like the sections described are preferably formed with internal spiral channels and with openings 54 arranged in the bases of the channels and therefore in circumferential series. Between each pair of openings 54, the casing is slit horizontally and circumferentially as indicated in dotted lines Fig. 11, the portion above and below the horizontal portion of the slit being bent inward to form the bottoms 56 of similar but inverted pockets 57, from which openings 54 are outlets. The back and side walls of each pair of pockets consist of a U-shaped plate 58 and said plate is preferably secured in position by having tongues 59 which are projected through the openings and then bent flatly against the outer face of the section, it being understood of course that the special method of supporting these plates is immaterial.

When the supplemental casing 50 and 51 is employed the chute 45 projects into and is supported by the open or tapered end 52 so that the grains from section 30 shall enter the section 50, the channels of said section tending to cause the grain to enter the pockets disposed with their open ends in the direction of rotation, of the section so that they shall tend to scoop up the grain, grains of certain size being adapted to fall through the registering openings 54 and into a spout 60 carried by the trough. Grains in the pocket of such length that they cannot fall through the openings will be carried around and dumped out of said pocket. Eventually they will enter section 51 which has openings of such size that all of the choice grains will escape and drop into spout 61 carried by the trough. The extremely large grains will remain in section 51 until they reach openings 62 and will fall through the latter onto spout 63 as will be readily understood. In this connection it will be noticed that the large casing composed of sections 50, 51 is provided with a table 64, which slopes downward and in the opposite direction from table 47 in order that grains falling out of the pockets onto the table shall be advanced toward the discharge end of the machine by traveling along the channels of such table and shall also fall therefrom which grains or some of them fall into the rear or rearwardly opening pockets of said sections and thus have an opportunity to escape through the registering openings 54, a first opportunity being when the grains occupy the forwardly opening pockets as hereinbefore explained.

The grain deposited into the hopper will pass in a continuous stream into the first section of the casing and then follow the course which has been traced and which therefore needs no recapitulation, it being noted that as the ratchet wheel revolves in the direction indicated by the arrow Fig. 3, each tooth pushes the casing laterally under engagement by the unyielding obstruction 14, the spring 15 immediately jerking the casing back to its original position as such tooth clears said obstruction. The lateral movement is very slight but it is sufficient in conjunction with the rotative movement of the casing induced by the manipulation of the crank 12 or otherwise, to keep the grain agitated and moving toward the point of discharge.

In the event that grains become wedged in and project outward beyond one of the openings of sections 28, 29 and 30, they will be forced back into their respective sections by being brought into contact by the revolution of the casing, with a roller 65 arranged longitudinally and resting against the casing, said roller being carried by swing arms 66 pivoted to bracket 67 secured to the trough. By this arrangement the roller is capable of yielding and moving out of the path of grains which it is impossible for it to dislodge as well as performing its dislodging function as explained.

The drawings show the casings provided with only a few openings for the escape of the grains of different sizes and shapes, it being understood of course that, in practice, the holes will be distributed throughout the entire area of the casings and very close together. It is to be understood also that the number of sections or rather the number of openings of different form and size provided in the casing will determine how finely the corn shall be graded. The sections 28, 29, and 30 separate choice grains of a substantially predetermined width and thickness from other grains but do not separate the grains as to length, that is, the choice grains while substantially uniform as to thickness and breadth may vary materially in length, I therefore contemplate the employment of sections 50 and 51 which differ from each other only in varying the distances between the bottoms of the pockets and the openings communicating with said pockets, through which openings grains of different length may fall, it being noted that the separation as to length is insured because the grains are compelled to enter the pockets endwise.

From the above description it will be apparent that I have produced a corn grader possessing the features of advantage enumerated as desirable and I wish it to be understood that I do not desire to be restricted to

the exact details of construction shown and described as obvious modifications will suggest themselves to one skilled in the art.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:—

1. In a corn grader, a tubular casing provided with openings and inwardly projecting lips, and a longitudinally extending table within the casing and provided with channels in its upper side.

2. In a corn grader, a tubular casing provided with an internal spiral channel with openings at the base of said channel, and a table within said casing and pitched downwardly and laterally and provided in its upper side with channels having their lower or discharge ends forward of their upper or receiving ends.

3. A corn grader, comprising a suitable frame, a shaft journaled therein, a tubular casing secured on the shaft and provided with inlet and discharge openings at opposite ends and with intermediate openings and lips at the margins of said openings to deflect through the latter grains of corn which may come in contact with the lips, and a table disposed longitudinally of and within the casing and pitched downwardly and laterally, arms depending from the table and journaled on said shaft and counter balance weights secured to the lower ends of said arms.

4. In a corn grader, a tubular casing provided with an inlet opening at one end and discharge openings at the other and with openings for the escape of grain, along the length of the casing, a second casing secured on the shaft and surrounding the discharge end of the first-named casing and provided with openings for the escape of grain, along its length, tubes connecting said casings and adapted to convey the grain from the discharge openings of the first-named casing to the outer side of the last-named casing, and a spout to convey grain which escapes through the openings along the length of the first-named casing, into the last-named casing.

5. In a corn grader, a tubular casing provided with openings and internal pockets, the latter being arranged at right angles substantially with the length of the casing and communicating with the openings of the latter, each pocket having its inner wall completely bridging one of said openings and its end wall or bottom disposed some distance away from the adjacent margin of the bridged opening.

6. In a corn grader, a tubular casing having a circumferential internal channel provided with openings and pockets, the pockets being arranged endwise in the channel and communicating with the openings of the latter and having their inner walls projecting beyond the margins of said openings which extend transversely of the channel.

7. In a corn grader, a tubular casing having a circumferential internal channel and openings communicating with such channel, and pockets arranged longitudinally in the channel and open at one end, the said openings of the channel communicating with the pockets between the open and closed ends thereof and lying wholly between their sides.

8. In a corn grader, a tubular casing having a circumferential internal channel and openings communicating therewith and pockets disposed longitudinally within the channel and open at one end and closed at the other and at the sides, the said openings of the channel communicating with the said pockets and being completely bridged thereby, some of the pockets opening in one direction and the balance in the opposite direction.

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

ADELBERT S. BEYMER.

Witnesses:

H. C. RODGERS,

G. Y. THORPE.