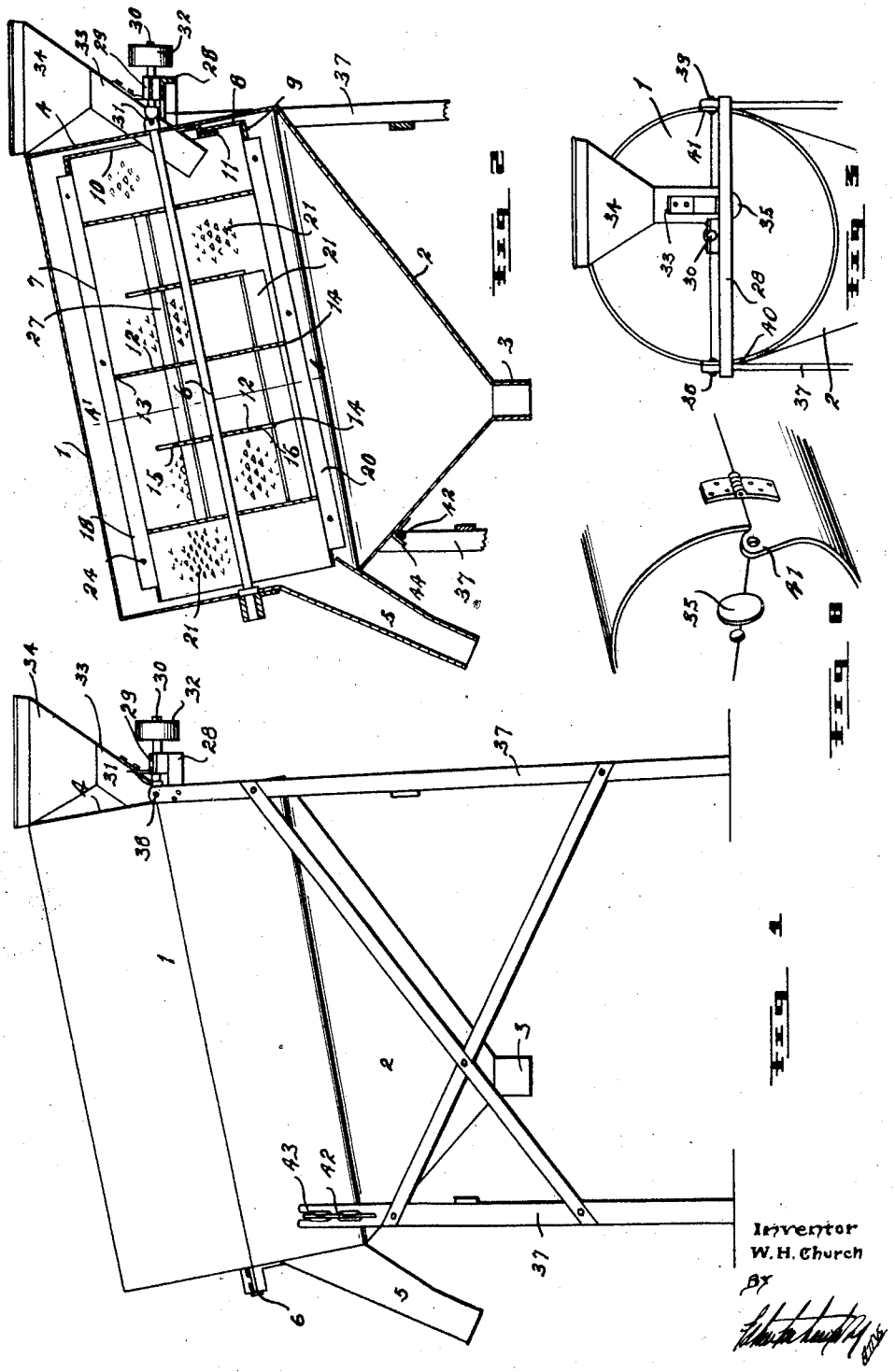
May 8, 1928. 1,668,629

W. H. CHURCH

GRAIN CLEANING MACHINE

Filed June 15, 1926 2 Sheets-Sheet 1



May 8, 1928. 1,668,629

W. H. CHURCH

GRAIN CLEANING MACHINE

Filed June 15, 1926 2 Sheets-Sheet 2

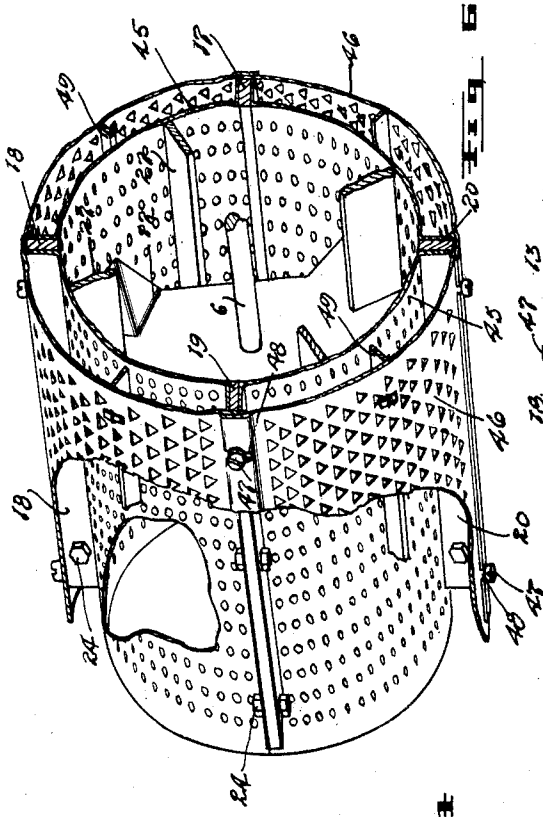


Fig. 6.

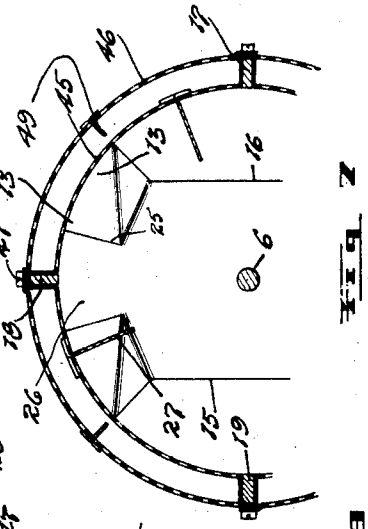


Fig. 7.

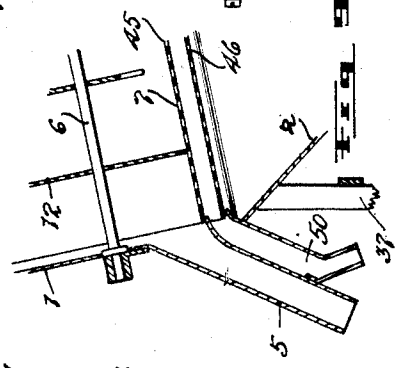


Fig. 8.

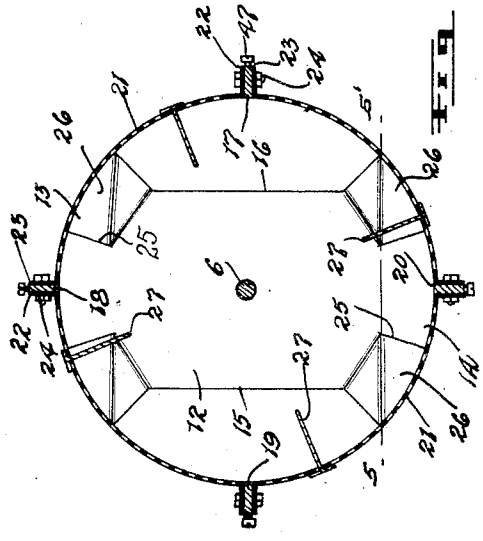


Fig. 4.

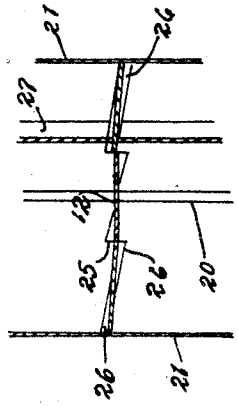


Fig. 5.

Inventor
W. H. Church
By
Attorney

Patented May 8, 1928. 1,668,629

UNITED STATES PATENT OFFICE.

WILLIAM H. CHURCH, OF CALGARY, ALBERTA, CANADA.

GRAIN-CLEANING MACHINE.

Application filed June 15, 1926, Serial No. 116,216, and in Canada April 30, 1926.

The invention relates to improvements in grain cleaning machines and an object of the invention is to provide a machine particularly adapted for efficiently separating weed seeds from wheat and to construct the machine also such that with slight modifications, it can be utilized to separate wild oats and other weed seeds from wheat.

A further object of the invention is to provide a machine which can be constructed in a simple, durable and inexpensive manner and which is arranged so that the drum forming screens thereof can be readily dismounted to permit of the use of screens having various types of mesh.

A further object of the invention is to provide a machine wherein the grain is separated by an inclined revolving perforated drum, the drum being so mounted that it can be adjusted to vary the inclination thereof and the interior of the drum being so arranged that the gravitating grain is spread within the drum to give the weed seeds every opportunity to escape through the perforations.

With the above more important objects in view, the invention consists essentially in the arrangement and construction of parts hereinafter more particularly described, reference being had to the accompanying drawings, in which:—

Fig. 1 is a side view of the complete machine.

Fig. 2 is a vertical sectional view longitudinally and centrally through the same.

Fig. 3 is a front end view of the machine with the driving wheel removed.

Fig. 4 is an enlarged detailed vertical sectional view at 4—4′ Figure 2.

Fig. 5 is a horizontal sectional view at 5—5′ Figure 4.

Fig. 6 is a perspective view showing a modified type of drum.

Fig. 7 is a cross sectional view through a portion of the drum appearing in Figure 6.

Fig. 8 is a perspective view of the portion of the upper end of the casing.

Fig. 9 is a vertical sectional view through the lower end of the modified type of machine and showing the additional discharge spout provided.

In the drawings like characters of reference indicate corresponding parts in the several figures.

The machine presents a more or less cylindrical two part casing 1 having the under side thereof provided with a collecting hopper 2 which terminates in a discharge spout 3 and the upper end thereof closed as indicated at 4 and the lower end thereof supplied with a further discharge spout 5. The said casing is longitudinally split and the top half is hinged at one side to the lower half so that the upper half can be readily opened to admit the drum later described.

The ends of the casing support rotatably a centrally disposed shaft 6 which carries a drum 7 which has the lower end thereof open and the upper end thereof closed by a cap 8 which presents an inwardly extending flange 9 surrounding the feed opening 10 to the drum. The lower half of the casing carries a guard plate 11 which overlies the flange 9 and prevents the grain which might work up in the drum from becoming lodged between the cap and the end of the casing.

On the shaft I mount a plurality of similar arresting plates 12 which are permanently fastened to the shaft in spaced relation and which have arcuate or rim portions 13 and 14 concentric to the shaft and cut away side portions as indicated at 15 and 16. The plates are placed on the shaft so that they alternate, that is, such that the cut away portions of any one plate are opposite the rim portions of the next adjacent plate.

The plates 12 carry four equi-spaced longitudinally extending bars 17, 18, 19 and 20 set on edge and having the inner edges permanently welded or otherwise fastened to the rim portions of the plates. The rim portions of the plates and these bars form a rigid skeleton structure on which I mount and to which I attach the screen sections 21 which are all similar.

There are four screen sections employed and the sections are each fitted at their edges with outstanding flanges 22 and 23 and the flanges of adjacent sections are demountably fastened together by suitably located bolts 24 passing through such flanges and through the intervening bar 18, 19, 20 or 21 as the case may be. The screen sections are curved concentric to the shaft and lie on the rim portions of the plates and when applied they form the perforated drum hereinbefore mentioned, the drum having a length somewhat less than the length of the casing in which it revolves.

After the screen sections have been bolted

in place, the cap 8 hereinbefore mentioned is applied on the upper end and it will also be observed that the lowermost end of the drum overlies the upper end of the spout 5 so that all the material retained within the drum is discharged into the spout 5. The rim portions of the plates are radially slit as indicated at 25 to provide vanes or paddles 26 and the paddles are bent in the manner best shown in Figure 5 so that in the rotation of the drum they will act to work the grain upwardly within the drum, that is, in the opposite direction to that which it naturally moves under the action of gravity.

To each screen section, I secure in any suitable manner longitudinally extending and radially disposed beaters 27 which are positioned in respect to the openings 15 and 16 in the manner best shown in Figure 4 and which appear in groups of four between all the plates. I have not herein shown any beaters at the entrance or discharge ends of the drum as it is desirable to have a free flow at these points. Obviously, however, one or more could be put in if desired.

To the upper end of the casing, I attach in any suitable manner a horizontally extending bracket 28 which is provided with a centrally disposed bearing 29 and this bearing receives rotatably a driving shaft 30 which is connected by the well known type of universal joint 31 to the upper end of the shaft 6. A driving wheel 32 is secured to the outer end of the shaft 30 and power may be applied to the wheel in any suitable manner in order to rotate the drum.

The bracket supports the lower end of a feed chute 33, the upper end of which carries a hopper 34 into which the grain to be cleaned is fed. The chute 33 passes through a suitable opening 35 provided in the end of the casing and through the opening 10 into the interior of the drum.

The casing can be mounted on any suitable support, provided that one end is pivotally mounted and the other end is adjustably suspended. In the present instance, I have shown suitably braced corner legs 37 arranged in front and rear pairs, the upper ends of the rear legs being pivotally connected by pivot pins 38 and 39 to hangers 40 and 41 suitably secured to the lower half of the casing. The universal joint 31 is axially aligned with the pivot pins 38 and 39 so that the lower end of the casing can be readily raised or lowered without interfering with the driving of the drum.

The lower end of the drum is adjustably supported by an adjusting chain 42 which has one end permanently fastened to one of the front legs and the other end passing into the forked end 43 of the other of the front legs. A stop bar 44 prevents the chain from slipping up on the inclined face of the hopper 2. Obviously by adjusting the chain, I can increase or decrease the inclination of the drum, the adjustment being made to accommodate the particular kind of grain being cleaned.

When the machine above described is to be used to clean grain such as wheat from wild seeds, the casing is adjusted by manipulating the chain to whatever inclination the operator considers best for the grain to be cleaned. He then feeds the grain into the hopper and starts the drum rotating. The grain has a natural tendency to flow by gravity downwardly towards the lower end thereof and in passage, it is arrested and worked back by the plates 12 and is thrown about by the beaters, the action of the plates and beaters being such that the grain is thoroughly agitated and spread with the result that the smaller seeds are given every opportunity to clear out through the holes provided in the screens, the said holes being of such a size that they will retain wheat. The seeds escaping through the holes from the drum are collected in the hopper 2 and discharged through the spout 3 whilst those which are retained within the drum are cleared through the spout 5.

I have herein shown the holes in the screens as triangular in shape as such shape permits wild buckwheat to go through. It will, however, be understood that as the screens are demountable, one can readily substitute screens having different perforations therein, the type of screen used being selected by an experienced operator to suit the work in hand.

This type of machine with slight modifications, can also be used for separating wheat from wild oats and the smaller weed seeds and in such a case, the drum is provided with double screens such as shown best in Figures 6 and 7. In such a case, inner screen sections 45 having circular openings are substituted for those 21 and then four screen sections 46 similar to those 21 but somewhat wider are provided to enclose the inner screen and form an outer screen drum surrounding and spaced from the inner one. The bars 17, 18, 19 and 20 are provided with jam screws 47 and the edges of the screen sections 46 are slotted at 48 to receive the jam screws, adjacent screen sections having their edges lapped.

Obviously then by tightening up the jam screws, the outer screen sections 46 are held firmly in place although they can be removed when desired. Between the outer and inner screens I place beaters 49 similar to those 27, these being secured to the outer screens. When this type of machine is used, a further chute 50 is provided at the lower end of the machine to collect the grain discharged from the lower end of the outer drum.

In this type of machine, the wild oats will be retained within the inner drum and the smaller seeds and wheat will go through, then the smaller seeds will pass out through the perforations of the outer drum and wheat will be discharged from the lower end of the same. The wild oats will be received in the chute 5, the wheat in the chute 50 and the weed seeds in the chute 3.

Whilst I have shown this machine supported on legs so that it can be used conveniently in a barn or such like place, I wish it to be noted that the machine can be readily mounted for use on a grain threshing machine to receive the cleaned grain discharged therefrom in which case, my machine will reclean that grain and discharge it through the chutes provided. When so used the separating machine will be provided with suitable supports to carry my machine and flexible spouts will be provided to deliver the separated grains to suitable points of discharge.

What I claim as my invention is:—

1. A grain cleaning machine comprising in combination, a closure casing, a downwardly inclining perforated drum rotatably mounted within the casing, means for rotating the drum, spaced arresting plates crossing the drum and rotating therewith, said plates being provided with cut out portions providing escape openings between the plates and the drum shell, beaters extending between the plates and carried by the drum shell, a hopper formed as part of the casing and underlying the drum and adapted to gather and discharge the seeds escaping through the drum and a delivery chute extending from the casing and underlying the lower end of the drum and adapted to receive the grain discharging from the lower end of the drum.

2. A grain cleaning machine comprising, in combination, a closure casing, a downwardly inclining perforated drum rotatably mounted within the casing, means for rotating the drum, spaced arresting plates crossing the drum and having the ends thereof permanently secured to the drum and the edges thereof spaced from the drum to provide escape openings, the said escape openings in adjacent plates being alternated, beaters carried by the drum shell and extending lengthwise thereof and located between the plates, a hopper formed as part of the casing and underlying the drum and adapted to collect and discharge the seeds passing through the drum and a delivery chute underlying the lower end of the drum and adapted to receive the grain discharging from the lower end of the drum.

3. In a grain cleaning machine, a rotatably mounted perforated grain cleaning drum comprising a rotatably mounted shaft, similar suitably spaced plates secured to the shaft and extending radially therefrom, said plates presenting arcuate rim portions, a plurality of equi-spaced longitudinally extending bars permanently secured to the rim portions of the plates, similar arcuate screen sections concentric to the shaft and interposed between the bars and bearing on the rim portions of the plates, bolts detachably securing the edges of the screens to the bars and longitudinally extending beaters located between the plates and carried by the screens.

4. In a grain cleaning machine, in combination, a rotatably mounted shaft, a cylindrical, perforated drum concentrically mounted on the shaft, a plurality of spaced plates secured to the shaft and having their ends terminating in rim portions secured to the drum and the edges thereof arranged in respect to the drum to provide escape openings therebetween, said plates being alternated and having the rim portions thereof radially slit and bent to provide paddles and beaters interposed between the plates and secured to the drum.

Signed at Winnipeg this 27th day of May, 1926.

WILLIAM H. CHURCH.