Jan. 30, 1923. 1,443,524

C. W. CARTER ET AL.
GRAIN SEPARATOR.
FILED APR. 25, 1921.

2 SHEETS-SHEET 1

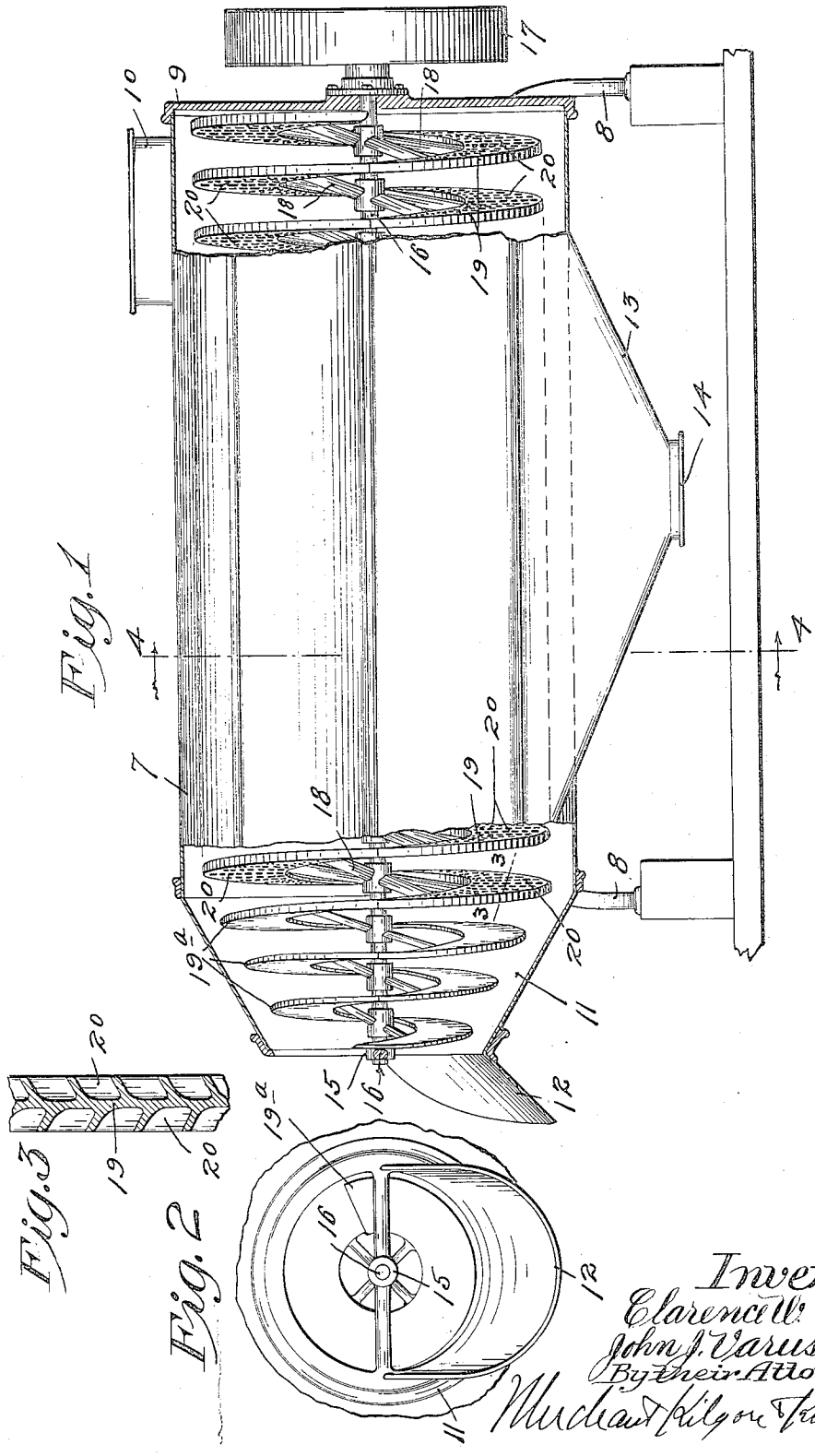


Fig. 1

Fig. 3

Fig. 2

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Fig. 4

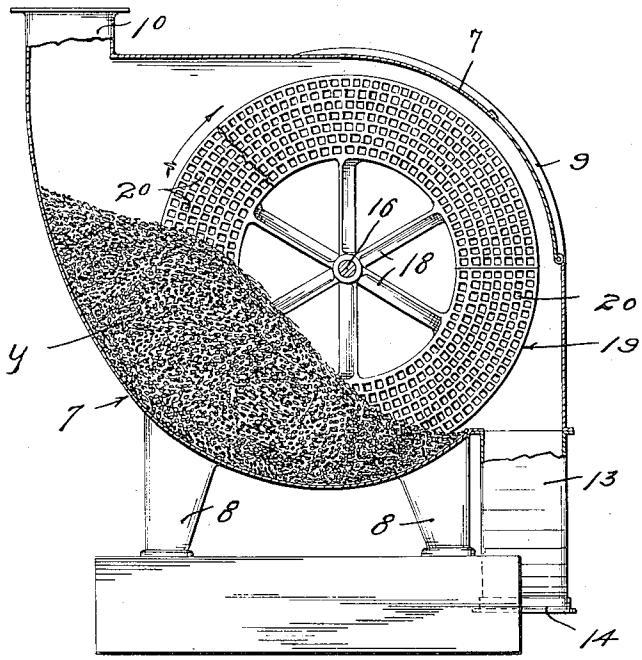


Fig. 5

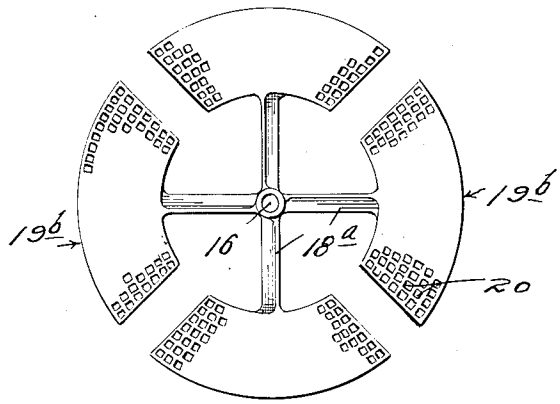
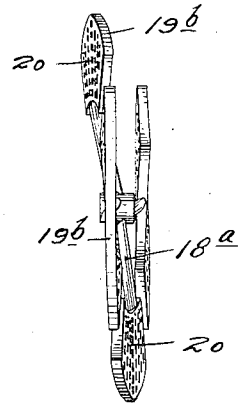


Fig. 6



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UNITED STATES PATENT OFFICE.

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GRAIN SEPARATOR.

Application filed April 25, 1921. Serial No. 464,274.

To all whom it may concern:

Be it known that we, CLARENCE W. CARTER and JOHN J. VARUSKY, citizens of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Grain Separators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our present invention relates particularly to grain separators or separators for the separation of mixtures of wheat, oats and seeds frequently designated as "succotash", but is capable of use very generally for the separation of different kinds of materials of different sizes or shapes. In a sense, the invention is in the nature of an improvement on or modification of the separator disclosed and claimed in the prior Patent #1,364,246, granted to said Carter of date January 24, 1921.

As a salient feature, the present invention involves the use of a spirally arranged separating plate or plates having separating surfaces capable of receiving and picking up certain kinds of grain or material and of rejecting other kinds of grain or material. The separating plate or surface may be a continuous spiral or may be made up of sections arranged to form, in effect, a continuous spiral or such plates may be separated so as to form what may be designated as a broken or interrupted spiral.

One important advantage in the use of this spiral surface or surfaces is found in the fact that such surfaces will not only act as separating surfaces but as a propeller to move the grain or stock progressively through the container or casing of the separator.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a view partly in elevation and partly in vertical section, some parts being broken away;

Fig. 2 is an elevation looking at the discharge end of the separator;

Fig. 3 is an enlarged fragmentary section taken on the line 3—3 of Fig. 1;

Fig. 4 is a section taken approximately on the line 4—4 of Fig. 1;

Fig. 5 is a face elevation illustrating a modified or broken arrangement of the spiral separating blade or plate; and

Fig. 6 is an edge elevation of a portion of the spiral blade or plate illustrated in Fig. 5.

Referring first to the construction illustrated in Figs. 1 to 4, inclusive, the numeral 7 indicates a container for the succotash or commingled material to be separated, and which container is in the nature of a drum-like casing which may be conveniently supported by legs 8. At its receiving end, this casing is closed by a head 9 and is provided at one side with a substantially tangential inlet spout 10, through which the grain is introduced into the casing. At its delivery end, the casing 7 has a conical discharge section 11 that leads to a discharge spout 12. At one side, to wit at the side opposite to the inlet spout 10, said casing is provided with a depending substantially tangential receiving hopper 13 that has a discharge opening 14 that may lead to a discharge spout, not shown.

Mounted in and extended through the fixed head 9 of the casing and in a transverse bearing bar 15 secured to the outer end of the contracted discharge section 11, is a horizontal shaft 16, which, at one end, is shown as provided with a pulley 17 over which a power-driven belt, not shown, is adapted to run to impart rotary motion to said shaft in the direction of the arrow indicated on Fig. 4, or, in other words, in a clockwise direction in respect to Fig. 4.

In this preferred arrangement, the shaft 16 has radial arms or spokes 18 in spiral arrangement and which carry a spiral separating blade or plate 19. Throughout the main body of the casing 7, the spiral blade 19 preferably has a constant diameter and runs with considerable clearance from the inner surface thereof, but within the con-

tracted section 11, said spiral blade is gradually contracted in diameter so that it maintains about the same clearance from the interior of said contracted section 11, as indicated at 19ª.

As already indicated, this spiral blade may be continuous, but, for convenience in manufacture, would preferably be made up of sections assembled to form a spiral. Preferably, as shown, the spiral blade is spaced from a shaft and connected thereto by arms or spokes, but this is only a preferred arrangement and said blades might be continuous to or carried by the shaft in any suitable way.

In the preferred arrangment illustrated, the spiral separating blade has separating surfaces formed by pockets substantially such as those illustrated in the drawings of said prior patent above identified, and these pockets are indicated by the numeral 20.

The separator will be described in its use for the separation of wheats and oats, which are introduced into the casing and which, under rotation of the spiral in the direction indicated, will be caused to drift toward one side of the casing and away from the receiving hopper 13, as indicated at *y*, Fig. 4.

As the pocketed separating surfaces of the spiral move upward through this body of grain, the wheat will be picked up by said pockets and carried from the mass but the oats will be rejected, or, if any oats be picked up, such oats will be quickly dropped back onto the mass, while the wheat will be carried on upward and over and discharged into the receiving hopper 13. By reference to Fig. 3, it will be noted that the pockets 20 are undercut backward in respect to the direction of rotation, so as to assist in the above selection of the wheat and rejection of the oats. The separation thus maintained is due partly to centrifugal force, and it should be here stated that the speed of rotation of the spiral will be such that it will assist in throwing the picked-up and selected wheat from the pockets over into the receiving hopper 13.

In the preferred arrangement, the contracted portion 19ª of the spiral is made smooth or without pockets, and, hence, will act to discharge any large or coarse material such as straw or sticks very directly and rapidly, but will also gradually work out and discharge the oats from which the wheat has been taken. The contraction of the discharge end of the casing prevents too free discharge of the grain and keeps the same worked back so that the pocketed surfaces of the spiral will be given the best possible chance to take out all of the wheat from the last part of the stock where the oats predominate and the wheat is in but very small proportion to the oats. Of course, the commingled stock will be worked gradually rearward through the casing by the direct action of the spiral while it is performing the separating action, and, hence, in practice, the spiral should have but very gradual spiral advance or trend and, in practice, might have much less pitch or travel than indicated in the drawings.

The arrangement of the spiral separating blade illustrated in Figs. 5 and 6 is of the same general character as that already described in detail, but here, such blade is made up of a plurality of circumferentially separated segmental sections 19ᵇ carried from the shaft 16 by radial arms 18ª. These segmental sections 19ᵇ are provided with pockets 20 arranged as in the spiral blade 19 previously described. The action of this broken or interrupted spiral, in so far as its separating action is concerned, will be substantially the same as the continuous spiral but the gaps between sections will cause said sections to produce a greater agitation or commingling of the stock in its movement therethrough.

From what has been said, it will be understood that the term "spiral separating surface," as used in its broadest sense, means a separating surface having a spiral trend or set so that, under rotation, it will advance the stock while performing the separating action.

By having large pockets in the spiral separating blades or plates, the separating surface can be so formed that it can pick up all kinds of grain and carry the same into the lateral receiving hopper, leaving sticks, straw, corn cobs or any other large articles to be fed out of the delivery end of the casing. A machine thus designed would act as a scalper. The pockets, moreover, can be formed by perforations in the spiral blades or plates.

What we claim is:

1. In a separator of the kind described, the combination with a container for material to be separated, of a rotary spiral separating surface formed by pockets arranged to move through the stock in said container.

2. In a separator of the kind described, the combination with a container for material to be separated, of a rotary spiral separating blade movable through and above the stock in said container and having a separating surface formed by pockets adapted to receive certain kinds of material and to reject other kinds of material.

3. In a separator of the kind described, the combination with a container for material to be separated, of a rotary spiral separating blade movable through and above the stock in said container and having a separating surface formed by pockets adapted to receive certain kinds of material and to reject other kinds of material, said container having a receiving hopper at one side into

which the selected material is adapted to be deposited under rotation of said blade.

4. In a separator of the kind described, the combination with a container for material to be separated, of a rotary spiral separating surface arranged to move through the stock in said container, said separating surface being formed by closely associated pockets.

5. In a separator of the kind described, the combination with a container for material to be separated, of a rotary spiral separating blade movable through and above the stock in said container and having a separating surface adapted to receive certain kinds of material and to reject other kinds of material, said separating surface being formed by pockets formed in said spiral blade.

6. In a separator of the kind described, the combination with a container for material to be separated, of a rotary spiral separating blade movable through and above the stock in said container and having a separating surface adapted to receive certain kinds of material and to reject other kinds of material, said container having a receiving hopper at one side into which the selected material is adapted to be deposited under rotation of said blade, said separating surface being afforded by pockets formed on both faces of said spiral blade.

7. In a separator of the kind described, the combination with a container for material to be separated, of a rotary spiral separating blade movable through and above the stock in said container and having a separating surface formed by pockets adapted to receive certain kinds of material and to reject other kinds of material, said container having a receiving hopper at one side into which the selected material is adapted to be deposited under rotation of said blade, and which spiral surface has an advancing trend approximately through said casing and said casing having an intake passage near one end and a discharge passage near its other end.

8. In a separator of the kind described, the combination with a container for the material to be separated, of a spiral separating surface formed by pockets and rotatable on an approximately horizontal axis, and movable through and above the stock in said container and operative to receive certain kinds of material and to reject other kinds of material.

9. In a separator of the kind described, the combination with a container for the material to be separated, of a spiral separating blade rotatable on an approximately horizontal axis and movable through and above the stock in said container and having separating surfaces on both of its faces, adapted to receive certain kinds of material and to reject other kinds of material.

10. In a separator of the kind described, the combination with a container for the material to be separated, of a spiral separating blade rotatable on an approximately horizontal axis and movable through and above the stock in said container and having separating surfaces on both of its faces, said container having a receiving hopper at one side into which the selected material is adapted to be deposited under rotation of said blade.

11. In a separator of the kind described, the combination with a container for the material to be separated, of a spiral separating blade rotatable on an approximately horizontal axis and movable through and above the stock in said container and having separating surfaces on both of its faces, said container having a receiving hopper at one side into which the selected material is adapted to be deposited under rotation of said blade, and said container having an inlet near one end and an outlet near its other end, said spiral blade operating to progressively feed the stock in a direction from said inlet toward said outlet.

In testimony whereof we affix our signatures.

CLARENCE W. CARTER.
JOHN J. VARUSKY.