

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) **A1**

(22) Date de dépôt/Filing Date: 2000/05/10

(41) Mise à la disp. pub./Open to Public Insp.: 2001/11/10

(51) Cl.Int.⁷/Int.Cl.⁷ B01F 7/24, A01K 5/00

(71) Demandeur/Applicant:

LOEWEN WELDING & MANUFACTURING LTD., CA

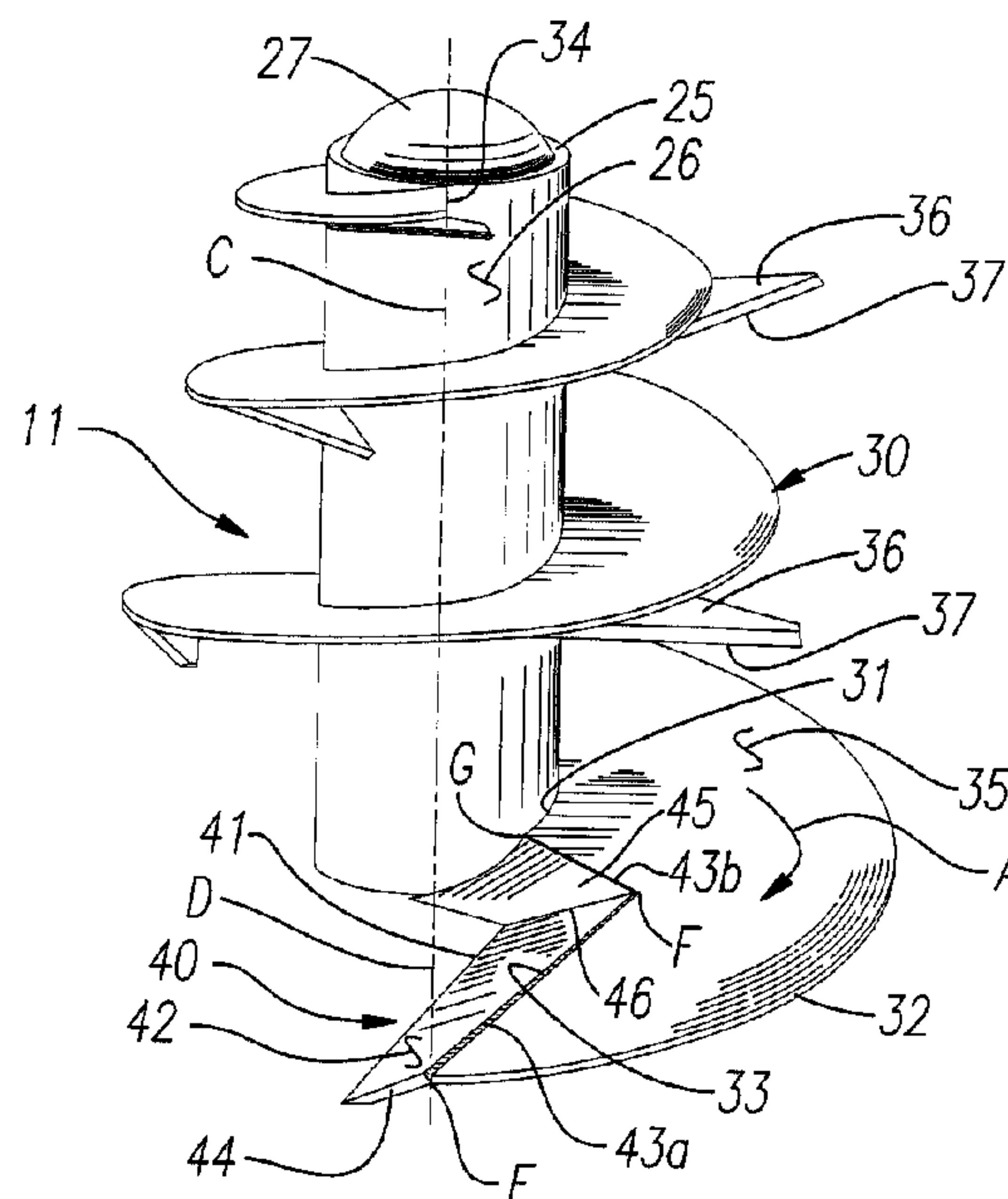
(72) Inventeurs/Inventors:

LOEWEN, ERNEST ANTON, CA;
RAICHE, LOUIS WAYNE, CA

(74) Agent: PARKS, WILLIAM D.

(54) Titre : ROTOR DE MELANGEUR D'ALIMENTS MUNI D'UN SOC A L'AVANT POUR DIRIGER LES ALIMENTS

(54) Title: FEED MIXER ROTOR HAVING A FEED DIRECTING FRONT EDGE PLOW



(57) **Abrégé/Abstract:**

The invention pertains to a rotor in an agricultural feed mixer used in preparation of livestock feed, the mixer being of the type having an open topped tub defining therein an upper circular surface of a flat bottom above which is mounted the rotor for rotation about a vertical central axis. The rotor includes a central column with a flighting spiralling about the column from a lower forward edge to an upper trailing edge and providing an upper feed conveying surface inclined upwardly continuously from the forward edge. The forward edge is disposed a short distance above the upper surface of the bottom and extends inwardly from an outer point at an outer periphery of the flighting to an inner point at an outer surface of the column. At least a portion of the forward edge deviates rearwardly in relation to direction of rotation from a radial line extending from the central axis of the rotor to the outer point at the outer periphery. A feed directing plow is located in front of the forward edge and is slanted upwardly from a lower edge proximate the upper surface of the bottom to the forward edge of the flighting at a steeper inclination than that of the flighting. The engagement of a front face of the feed directing plow deflects the flow of feed upwardly and slightly inwardly towards the central column to accomplish thorough mixing quickly while making efficient use of input power.

ABSTRACT

The invention pertains to a rotor in an agricultural feed mixer used in preparation of livestock feed, the mixer being of the type having an open topped tub defining therein an upper circular surface of a flat bottom above which is mounted the rotor for rotation about a vertical central axis. The rotor includes a central column with a flighting spiralling about the column from a lower forward edge to an upper trailing edge and providing an upper feed conveying surface inclined upwardly continuously from the forward edge. The forward edge is disposed a short distance above the upper surface of the bottom and extends inwardly from an outer point at an outer periphery of the flighting to an inner point at an outer surface of the column. At least a portion of the forward edge deviates rearwardly in relation to direction of rotation from a radial line extending from the central axis of the rotor to the outer point at the outer periphery. A feed directing plow is located in front of the forward edge and is slanted upwardly from a lower edge proximate the upper surface of the bottom to the forward edge of the flighting at a steeper inclination than that of the flighting. The engagement of a front face of the feed directing plow deflects the flow of feed upwardly and slightly inwardly towards the central column to accomplish thorough mixing quickly while making efficient use of input power.

FEED MIXER ROTOR HAVING FEED DIRECTION**FRONT EDGE PLOW****DESCRIPTION****Field of the Invention**

5 This invention relates to agricultural feed mixers of the type utilized in preparing feed for livestock, and more particularly to a rotor provided with a pick-up plow device at a lower front edge of the rotor for use in such mixers.

Background of Invention

10 Feed mixers are in common use for preparing feed for livestock, and in the main cattle which may be relatively confined, such as dairy cattle or beef cattle in feed lots. The mixers are designed to comminute feeds, including silage, baled hay and the like, and to at the same time mix together different types of feeds, such as grains and other supplements being added to the ration being fed. The most popular type of such mixers now utilized is in the form of an open-topped tub having a
15 mixing rotor driven about a central, vertical axis within the tub. These mixers may include a pair of side-by-side rotors or one single rotor, and such mixers may be designed to be drawn by a tractor and wherein the driven components, such as the rotor and unloading conveyor, or other actuated mechanisms derive their power from the tractor. Some larger models may be completely self-contained in that they
20 are permanently mounted on a self-driven chassis.

 Important operating characteristics are that the mixer is capable of breaking up the feed while obtaining thorough mixing and then emptying the mixer in a relatively short time. Moreover, it is highly desirable that this can be carried out in an efficient manner with respect to the required power input. Not only is the fuel
25 consumption an important factor in this regard, but with less power input requirement for a particular size of mixer it is possible to utilize a smaller prime

mover, such as a tractor of less horsepower output for the tractor pulled type of mixer.

Various features have been incorporated into mixer designs to enhance the mixing characteristics, such as shown in U.S. Patents No. 5,456,416, October 10, 1995; No. 5,615,839, April 1, 1997, both of G. Hartwig; and in U.S. Patent No. 5,601,362, February 11, 1997 to R.L. Schuler

Summary of Invention

It is an object of the present invention to provide an agricultural feed mixer rotor which is of an economical design for manufacture and will yet provide quick and thorough mixing while requiring relatively low power input.

According to the present invention there is provided a rotor for use in an agricultural feed mixer of the type including a tub having a flat bottom defining an upper floor surface of substantially circular shape and an upwardly extending wall joined to and encircling the floor so as to form therewith an open topped mixing chamber. The mixer includes a rotor drive means disposed at the bottom for rotating the rotor about an axis which is centrally disposed relative to the floor and extends upwardly substantially normal to the floor. The rotor of the present invention includes a central column for coaxial disposition relative to the vertical axis within the mixing chamber. A flighting of the rotor is affixed at an inner edge to an outer surface of the column and commences at a lower forward edge above the floor surface and spirals about the column to an upper rear edge. The flighting provides an upper feed conveying surface projecting from the inner edge thereof to an outer peripheral edge of the flighting, the upper surface extending continuously at an inclination rearwardly and upwardly from the forward edge to the rear edge. The forward edge of the flighting commences at an outer end located at a point of intersection of the outer periphery of the flighting and a radial line projecting

outwardly from the centrally disposed axis, and the forward edge extends inwardly from the outer end to a point adjacent the outer surface of the columns, at least a portion of the forward edge diverging rearwardly of the radial line. The rotor further includes a feed plow means affixed to the flighting at the forward edge and
5 defining a front feed engaging surface along in front of the forward edge, the feed engaging surface sloping rearwardly and upwardly to the forward edge from a lower edge proximate the floor surface, the slope of the front feed engaging surface being at a steeper incline than the inclination of the upper surface of the surface.

As will become apparent from the more detailed description below, the feed
10 directing plow means not only functions as a feed pick-up device to raise the feed from the floor so as to assist its flow upwardly from the floor surface and onto the upper feed conveying surface, but because of its angular relationship due to its joining with the rearwardly diverging forward edge of the flighting, the impact of the front feed engaging surface of the rotating feed plow means with the feed
15 imparts a component of direction of flow of feed toward the central column of the flighting. Thus, a more significant portion of the feed being pushed up the upper surface of the flighting closer to the column remains on the flighting and therefore flows onto the upper surface of the flighting and travels further up the feed conveying surface before falling back towards the floor so as to accomplish more
20 effective mixing.

Brief Description of Drawings

In the drawings which illustrate preferred embodiments of the invention by way of examples:

Figure 1 is a side view of an agricultural feed mixer of the type in which the
25 rotor of the present invention may be effectively utilized;

Figure 2 is a top view of the mixer of Figure 1 showing one embodiment of

the rotor of the present invention installed therein.

Figure 3 is an enlarged perspective view of one embodiment of the rotor of the present invention as shown in Figure 2;

Figure 4 is a sectional-plan view of a very lowermost portion of the rotor
5 illustrating the embodiment of the feed directing plow means of Figure 3;

Figure 5 is a side view of the lower portion of the rotor having the feed directing plow means of Figure 3;

Figure 6 is an enlarged partial sectional view as seen from line 6--6 of Figure 4 illustrating the relationship of the feed directing plow means relative to the
10 forward edge of the flighting;

Figure 7 is a perspective view of another embodiment of the rotor of the present invention and without the projecting feed cutting knives shown in Figure 3 in order to simplify the illustration; and

Figure 8 is a perspective view like that of Figure 7 but of yet another
15 embodiment of the present invention.

Detailed Description of Preferred Embodiments of the Present Invention

Reference is first made to Figures 1 and 2, which show a typical form of an agricultural feed mixer 10 for which a rotor 11 of the present invention has been developed. As indicated above, the rotor 11 may be alternatively utilized in larger
20 mixers which may have two or more like rotors and/or may be of a self-contained type including its own prime mover and drive system. The illustrated feed mixer 10 of Figures 1 and 2 is of the tractor drawn type, including a main frame 12 carried on a pair of wheels 13, and having a hitch 14 at the front end of the frame for attachment to a draw bar of a tractor (not shown). The mixer 10 includes a tub 15
25 carried on the frame 12. The tub has a flat bottom defining an upper floor surface 16 (Figure 2) which is of substantially circular shape with an upwardly extending

wall 17 joined at 18 to the bottom at the periphery of the upper floor surface 16 so as to encircle it. The wall 17 flares upwardly and outwardly and terminates at an open-top edge 20 shown to be of substantially elliptical shape in plan view (Figure 2). At the front of wall 17 there is provided an outlet opening 21 which is normally closed by a door 22 having opening means (not shown), such as a hydraulic cylinder for raising the door to an open position during discharge of the mixed feed from tub 15. The mixed feed exiting the tub is carried to one side of the mixer by a conveyor 23. Located beneath the bottom of the tub 15 is a rotor drive means 24 which is connected through the floor to the rotor for rotating the rotor 11 during mixing and unloading of the tub 15. In the mixer 10 of the type shown, power for rotating the rotor 11, as well as for driving the conveyor 23 and raising the door 22 is derived from a tractor by way of pressurized hydraulic fluid from the hydraulic system of the tractor and/or power derived from the PTO drive of the tractor.

The rotor is mounted above the upper floor surface 16 for rotation in the direction of arrow A about a vertical axis C which extends upwardly normal to the upper floor surface (Figure 3), the vertical axis being disposed substantially coaxial with the centre of the circular periphery of the upper floor surface where it joins the bottom of wall 17 at 18. The rotor includes a central shaft or column 25 which is shown as being formed by a hollow tubular member defining an outer surface 26 of cylindrical configuration (Figure 3). The central column 25 is closed at the top by way of a dome shaped cover member 27 affixed thereto to prevent entry of feed to the interior of the central column 25.

A continuous flighting 30 is affixed along an inner edge 31 to the outer surface 26 of the central column and projects radially outward from the central column to an outer peripheral edge 32, thus providing a continuous upper feed conveying surface 35 spiralling about the outer surface 26 of the central column from a lower lead or forward edge 33 to an upper trailing or rear edge 34 adjacent

the top of central column 25. The upper surface 35 is thus continuously inclined rearwardly and upwardly from the forward edge 33 which commences slightly above the upper floor surface 16 to the rear edge 34.

A radial line D extending outwardly from the central axis C to a point E of
5 its intersection with the outer periphery 32 of the flighting outer periphery also depicts a point at the outer end of the leading edge 33. The length of the radial line from the central axis to the point E is only slightly less than one half of the diameter of the upper floor surface 16 so that during rotation of the rotor, as denoted by the arrow A, the front lower corner of the flighting travels in close proximity to the wall
10 16 and slightly above the circle line of joiner 18 between the bottom of the tub and the wall 17. The width of the upper surface 35 of the flighting, i.e. the radial distance between inner edge 31 and outer peripheral edge 32, commences to decrease upwardly from the beginning of the flighting at point E. Preferably, the rate of decrease of the distance between the outer surface 26 of the central column
15 and the outer periphery 32 of the column is more rapid within the lower or first complete spiral of the flighting about the column, and although there may be a continuous decrease through to the rear edge 34 at the top or last spiral, at some point, such as at the beginning of the last complete spiral, the rate of decrease may be significantly reduced or even reach zero.

20 In the embodiment illustrated in Figures 2 and 3 the rotor includes a plurality of knife members 36 attached to the flighting at spaced intervals along the outer peripheral edge 32. Such knife members 36 provide sharpened front edges 37 which project outwardly and rearwardly from the outer peripheral edge 32 and are provided for shredding and distributing material dumped into the open top of the
25 tub 15, particularly material in the form of baled hay and the like. The knife members 36 are well known in commercial embodiments of agricultural feed mixers and do not form part of the present invention. For the sake of clarity, such knife

members 36 have been omitted from Figure 5 and from the Figures illustrating the other embodiments of the invention.

There is provided at the forward edge 33 of the rotor 11 a feed directing plow means 40 which projects forwardly and downwardly relative to the forward edge in relation to the direction of rotation A of the rotor. In the embodiment of the invention illustrated in Figures 3 to 6, it may be readily observed that the forward edge 33, commences at the point E, which is the intersection of the outer peripheral edge 32 of the flighting 30 and the radial line D projecting outwardly from the vertical axis C of the rotor, and this forward edge 33 extends inwardly to the outer surface 26 of the central column 25, with at least a portion of this forward edge 33 diverging rearwardly in relation to the direction of rotation, relative to the radial line D. More specifically, in the embodiment illustrated in Figures 3 to 6, the forward edge 33 has a first portion extending as a straight line inwardly from the point E at the outer periphery 32 of the flighting and rearwardly to a vertex F and a second portion, also as a straight line, extending inwardly and forwardly from the vertex F to a point of intersection G with the outer surface 26 of the central column 25.

The feed directing plow means 40 has a lower front edge 41 proximate the upper floor surface 16 and a front feed engaging front surface 42 sloping rearwardly and upwardly to the forward edge 33 of the flighting 30. The upper part of the feed directing plow means 40 is affixed along joinder lines 43a and 43b at the two portions of the forward edge 33, such as by welding. As is readily visible in Figure 6, the slope of the front face 42 of the feed directing plow means 40 is considerably steeper than the inclination of the flighting 30. The feed directing plow means 40 shown in the embodiment of the invention illustrated in Figures 3 to 6 may be formed of two plate sections, preferably made of flat steel stock, an outer or first plate section 44 being joined by the first portion 43a of the joinder line of the

forward edge extending inwardly and rearwardly from the point E to the vertex F. An inner plate section 45 is joined to the second portion of the joiner line 43b extending inwardly from the vertex F to the point G on the outer surface 26 of the central column.

5 The inner end of the outer plate section 44 is shown as meeting with an outer end of inner plate section 45 along an upwardly and rearwardly line of joiner 46 which also may be in the form of a weld line, thus forming a valley between the abutting ends of the inner and outer plate sections. Because outer plate section 44 extends rearwardly of the radial line D, and the flighting 30 is continuously inclined
10 upwardly from its foremost point at E, the outer plate section 44 is shown as increasing in depth from its outer end towards its inner end at the line of joiner 46. It is apparent that while upper edges of the plate section 44,45 are shown as being welded to the forward edge 33 of the flighting along joiner lines 43a, 43b, respectively, the upper portion could project above the upper surface 35, and the
15 joiner edge 33 could be welded to back surfaces of the plate sections 44,45 below their upper edges.

Referring now to the embodiment shown in Figure 7, it may be noted that the feed directing plow means 40' is of a somewhat simpler design, but it still provides the more important improved operating characteristic of the earlier described
20 embodiment. It consists of a single plate section 44' which is of a configuration similar to the outer plate section 44 of the earlier described embodiment, but it can be observed that the forward edge 33' of the flighting 30 continues on a single straight line which slants inwardly and rearwardly of the radial line D from the point E to a point G' of intersection with the outer surface 26 of the central column
25 25. The upper part of the single plate section is therefore affixed along its length to the full length of forward edge 33'. The lower front edge 41' of the plate section 44' thus extends from the outer end of the plate section 44' to the outer surface 26 of the

central column 25 at the lower end of the central column. Again the width of the plate section 44' increases towards the column 11 because the height of the fighting 30 from the upper floor surface 16 is greater at point G' than at point E due to the continuous inclination of the fighting which is less steep than the upward and rearward slant of the plate section 44'. In a modified form of the plate section 44', it could be made with an upper edge parallel to its lower edge 41'. In this form the upper edge would be flush with the upper surface 35 of fighting 30 at point G', but would project above the upper surface 35 an increasing amount toward its outer corner at point E.

10 In the embodiment illustrating the feed directing plow means 40" in Figure 8, the forward edge 33" is shown as being continuously curved from the point E where it commences at the outer peripheral edge 32 of the fighting 30 to the point G" where it intersects the outer surface 26 of the central column 25. The forward edge 33" of the fighting 30 preferably deviates most sharply rearwardly relative to the radius line D as it commences inwardly from point E, and subsequently curves more directly towards the outer surface 26 of the central column. Then on approaching the central column, the forward edge 33" may curve even more forwardly towards the radial line D before intersecting the outer surface 26 of the central column 25 at the point G". As in the case of the embodiment shown in Figure 7, the member 44" provides a continuous feed engaging front surface 42" extending from the outer peripheral edge 32 of the fighting 30 to the outer surface 26 of the central column 25. The curved member 44" is joined at its upper curved edge, or somewhat below this upper edge, to the curved forward edge 33" of the fighting 30. The front surface 44" slants upwardly from the front edge 41", which in plan view is of an arcuate shape, extending substantially in parallelism to the curved forward edge 33" of the fighting to the line of joinder 43" with the forward edge 33" of the fighting 30. Rather than being a straight line slant, the forward surface of the member 44"

could be slightly concaved to enhance the lifting effect of the feed from the upper floor surface 16.

A purpose of the feed directing plow means 40 as shown in Figures 3 to 6 is to provide a pick-up for the feed from the upper floor surface 26. As the lower front edge 41 is in close proximity to the floor surface it effectively sweeps the entire floor area between the columns 25 and line of joinder 18 between the wall 17 and the flat bottom of the tub 15 on each revolution of the rotor. Due to the upward slope of the feed engaging front surface 42 defined by the plate sections 44 and 45 in the embodiment of the invention shown in Figures 3 to 6, the impact of the front surface 42 with the particles of feed which have fallen to the bottom of the tub provides an uplifting component to the direction of travel of the particles to thereby assist their flow onto the upper surface 35 of the flighting behind the forward edge 33. Moreover, because the upper portion of the outer plate section 44 is affixed to the portion of the front edge which slants rearwardly relative to the radial line B, the front surface 42 of the feed directing plow means 40 formed by the outer plate section 44 provides a component of deflection to the particles towards the central column 25. The result of the presences of the rearwardly slanted outer plate section 49 is to cause, therefore, the particles being engaged and lifted by this outer plate section to be shifted more towards the inner edge 31 of the flighting as it is moved up the upper surface 35 during rotation of the rotor 11. While the effect of the orientation of the inner plate section 45 on its engagement with the particles of feed nearer the central column 25 is to lift the feed and shift it more away from the central column, it is readily apparent that in addition to the outer plate section 44 being of greater length than the inner plate section 45, the further a unit of plate length is from the centre of rotation, the greater amount of feed engaged on each revolution, and the more momentum it imparts to the particles of feed because of the higher linear speed towards the outer end of the plate section 44. Accordingly,

while the inner plate section 45 functions to remove any build up of feed adjacent the central column 25, a much higher volume of feed is shifted inwardly on the upper surface 35 by the outer plate section 44 than is moved in a direction away from the central column 25 by inner plate section 45.

5 During the mixing operation as the bales of hay are shredded and other types of feed are added, the feed falls by gravity towards the upper floor surface 16, and while some of it reaches the upper floor surface, much of the falling feed lands on the upper surface 35 of the flighting before reaching the bottom, particularly landing on the outer portion of the lower flighting which projects more radially
10 outward than that of the higher flighting. All of the feed which reaches the upper floor surface 16 is picked up from the upper floor surface by the feed directing plow means 40, and is directed onto the upper surface 35 of the flighting. As the feed is pushed up the upper surface 35 due to the rotation of the rotor 11, a continuing increasing portion of feed moving up to the flighting 30 of the rotor is pushed over
15 the outer peripheral edge 32 due to the narrowing width of the flighting and falls to a lower level of the flighting or back to the upper floor surface 16. Some of the feed travels to the top of the rotor and falls from the rear edge 35 of the flighting. Once mixing is complete, the door 22 is opened and the rotation of the rotor 11 is continued so that the feed falling from the rear edge 35 tumbles from the peripheral
20 edge and cascades down over the outer peripheral edge 32 and through the outlet opening 21. Moreover, the feed is also pushed to some extent through the outlet opening 21 by the engagement of the moving outer peripheral edge 32 of the flighting 30 of the rotor 11 past the outlet opening 21 of the tub.

 In the invention, the presence of the feed directing plow means 40 more
25 efficiently raises the feed onto the upper surface 35 of the flighting and at the same time directs the feed in a manner to distribute the feed on upper surface 35 of the flighting closer to the central column 25, thus ensuring that a higher proportion of

the feed travels to a greater height before cascading downwardly. Reduced power input requirements with the thoroughness of mixing reaching acceptable levels in a shorter time period indicates more efficient flow of material providing lower mixing costs.

5 Because the speed of travel of the front edge 41 of the feed directing plow means near the central column 25 is very low compared to the speed towards its outer end, the capability of pick-up is considerably reduced in that area, and depending on the flow characteristics of the feed, there may be a tendency for feed to accumulate adjacent the central column 25 and therefore experience less mixing
10 action. In the embodiment shown in Figures 3 to 6, the inner plate section 45, by directing the feed away from the central column ensures more uniform mixing. Overall, the shape of the forward edge 33" and the associated feed directing plow means 40" of Figure 8 may be such to achieve the proper distribution of the flow of feed onto the upper surface 35 of the flighting by directing the feed more towards
15 the column while at the same time having an inner portion of the plate 44" directing feed on the upper floor surface 16 away from the central column 25 as discussed above in relation to the first embodiment.

 In the embodiment shown in Figure 7, on the other hand, the function of the entire feed directing plow means is to lift the feed and direct it slightly in the
20 direction toward the column as it flows onto the upper surface 35. Thus, as in the case of the other two embodiments, it is capable in the main of obtaining more efficient mixing as described above. While it does not provide the function of the inner plate section 45 of the embodiment of Figures 3 to 6, the overall capability of efficient mixing by the embodiment of Figure 7 may nearly equal that of the other
25 embodiments for most types of feeds.

Other modifications within the spirit of the present invention as defined in the accompanying claims will be apparent to those skilled in the art.

CLAIMS

1. A rotor for use in an agricultural feed mixer of the type including a tub having a flat bottom defining an upper floor surface of substantially circular shape and an upwardly extending wall joined to and encircling said floor so as to form therewith an open topped mixing chamber, and a rotor drive means disposed at said bottom for
5 rotating said rotor about an axis centrally disposed relative to said floor surface and extending substantially normal thereto;

said rotor comprising:

a central column for coaxial disposition relative to the centrally disposed axis within said mixing chamber,

10 a flighting affixed at an inner edge to an outer surface of said column and commencing at a lower forward edge above said floor surface and spiraling about said column to an upper rear edge,

said flighting providing an upper feed conveying surface projecting outwardly of said central column from said inner edge to an outer peripheral edge of said
15 flighting,

said upper surface extending continuously at an inclination rearwardly and upwardly from said forward edge to said rear edge,

said forward edge commencing at an outer end located at an outer point of intersection of said outer periphery of said flighting and a radial line projecting
20 outwardly from the central axis,

said forward edge extending inwardly from said outer end to an inner point adjacent said outer surface of said column and at least a portion of said forward edge diverging rearwardly of said radial line, and

a feed directing plow means affixed to said flighting at said forward edge,
25 said feed directing plow means defining a front feed engaging surface in front

of the forward edge and sloping rearwardly and upwardly to said forward edge from a lower edge proximate said floor surface at a steeper incline than said inclination of said upper surface of said flighting.

5 2. A rotor as defined in claim 1, wherein said forward edge of said flighting includes a first straight line portion extending inwardly from said outer point and rearwardly in relation to said radial line to a vertex point between said inner edge and peripheral edge of said flighting and a second straight line portion extending forwardly relative to said radial line and inwardly from said vertex point to said inner
10 point adjacent said outer surface of said central column.

3. A rotor as defined in claim 2, wherein said feed directing plow means is formed by two plate sections including an outer plate section and an inner plate section, said outer plate section having an upper portion thereof affixed by an outer
15 line of joinder along said first straight line portion of said forward edge of said flighting, and said inner plate section having an upper portion thereof affixed by an inner line of joinder along said second straight line portion of said forward edge of said flighting.

20 4. A rotor as defined in claim 3, wherein said outer plate section has an inner end adjacent an outer end of said inner plate section, there being formed therebetween a valley defined by an upwardly and rearwardly extending line of joinder of said outer and inner plate sections.

25 5. A rotor as defined in claim 2, wherein said feed directing plow means is formed by two separate plate sections including an outer plate section and an inner plate section, said outer plate section having a lower edge forming a first portion of

said forward edge of said feed directing plow means and an upper edge extending along its length adjacent said first straight line portion of said forward edge of said
flighting, said inner plate section having a lower edge forming a second portion of
said forward edge of said feed directing plow means and an upper edge extending
5 along its length adjacent said second straight line portion of said forward edge of said
flighting.

6. A rotor as defined in claims 3, 4 or 5, wherein said first and second plate
sections are formed of a flat plate stock.

10

7. A rotor as defined in claim 1, wherein said forward edge of said flighting
includes a straight line portion extending inwardly from said outer point and
rearwardly in relation to said radial point to said inner point adjacent said outer
surface of said central column.

15

8. A rotor as defined in claim 7, wherein said feed directing plow means is
formed by a plate section having an upper portion thereof affixed to said forward
edge of said flighting on a line of joinder along said straight line portion of said
forward edge of said flighting.

20

9. A rotor as defined in claim 8, wherein said plate section has a lower edge
forming said forward edge of said feed directing plow means and an upper edge
extending along its length adjacent said straight line portion of said forward edge of
said flighting, said upper edge of said plate section diverging upwardly relative to
25 said lower edge of said plate section and in an inward direction from said outer point
to said inner point at a rate to substantially coincide with the increasing height of the
upper flighting above said upper floor surface of said bottom of said tub, whereby

said front feed engaging surface of said feed directing plow means is defined in a plane of increasing width in a direction from an outer end of said plate section at said outer point to an inner end of said plate section at said inner point.

5 10. A rotor as defined in claim 1, wherein said forward edge of said flighting is defined by a curved line having an outer first portion extending inwardly from said outer point and rearwardly relative to said radial line, and a second portion contiguous with said outer first portion extending inwardly from said outer first portion towards said inner point at said outer surface of said central column, said
10 second portion of said curved line have a lesser rearward directed component than said first portion.

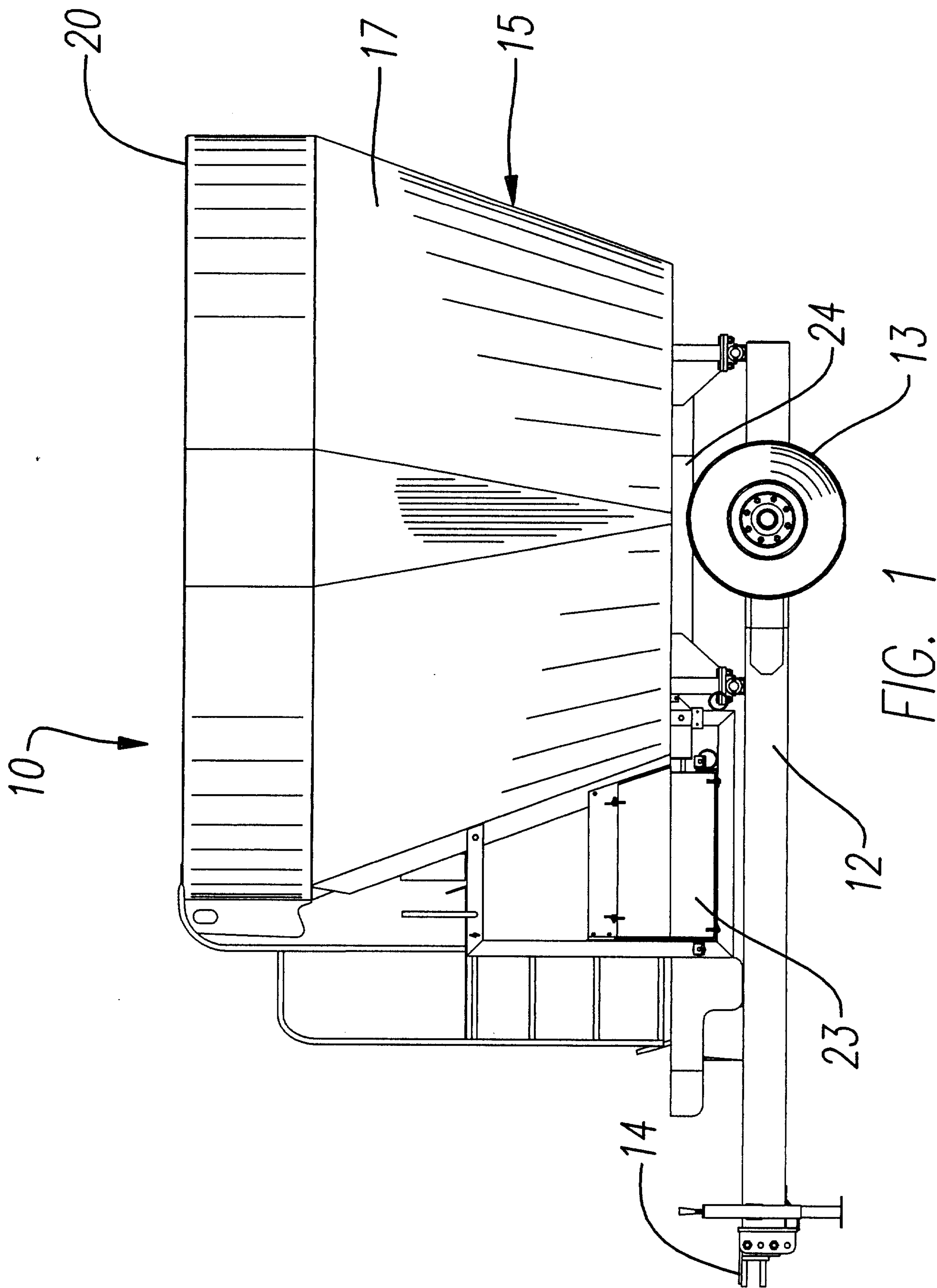
11. A rotor as defined in claim 10, wherein said curved line defining said forward edge of said flighting has an inner third portion contiguous with said second portion
15 and extending inwardly and forwardly relative to said radial line and connecting said second portion of said curved line to said inner point at said outer surface of said central column.

12. A rotor as defined in claim 11, wherein said feed directing plow means is
20 formed by a member having an upper portion of the same curvature as said curved line defining said forward edge of said flighting.

13. A rotor as defined in claim 12, wherein said forward edge of said feed directing plow means is of a curvature extending in substantial parallelism in plan
25 view to that of the said curved line defining said forward edge of said flighting.

14. A rotor as defined in claim 13, wherein said member forming said feed

directing plow means has a curved upper edge coinciding with said curved line defining said forward edge of said flighting, and said upper edge of said feed plow means and said front edge of said flighting are connected along a continuous line of joiner.



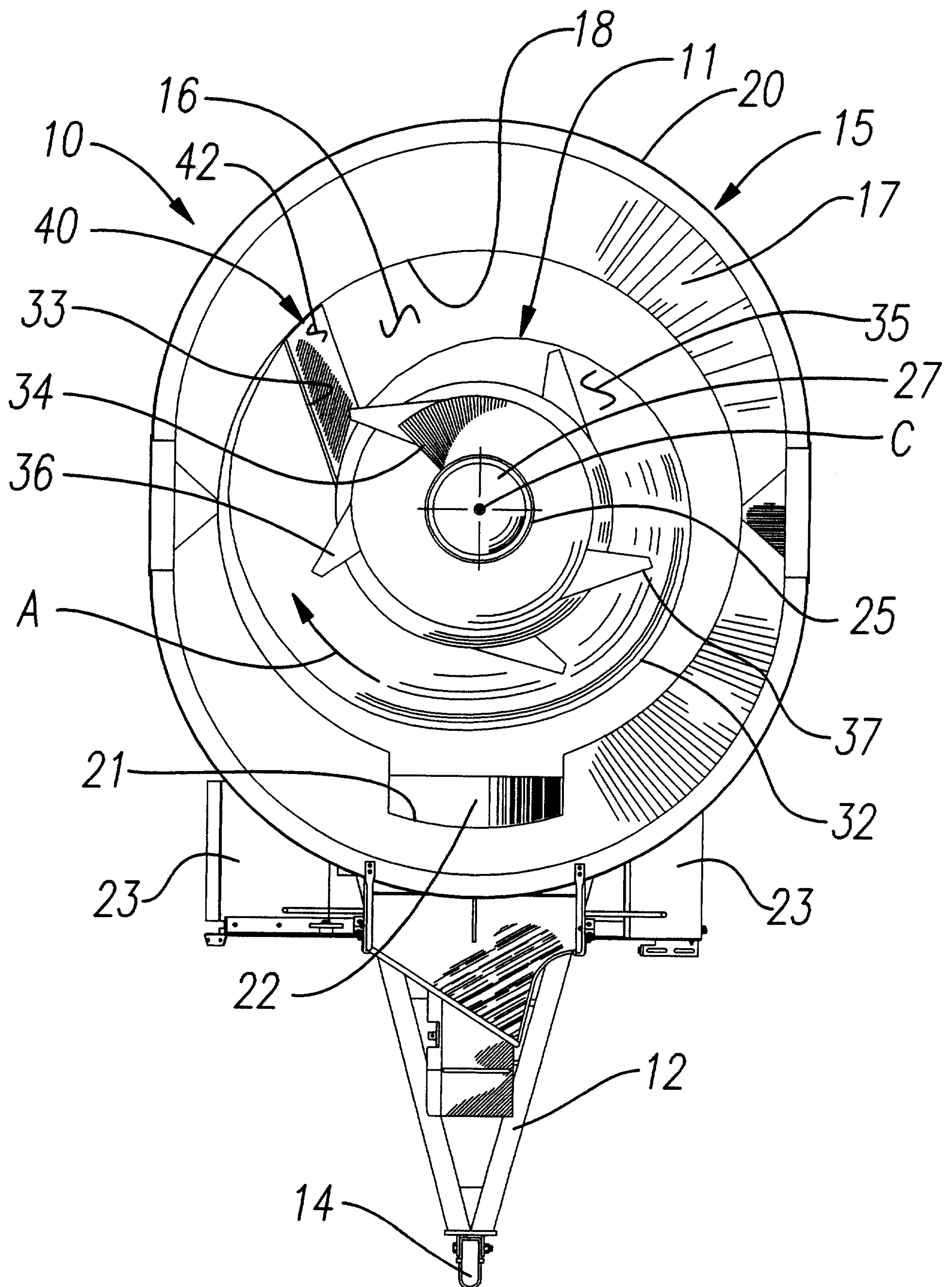


FIG. 2

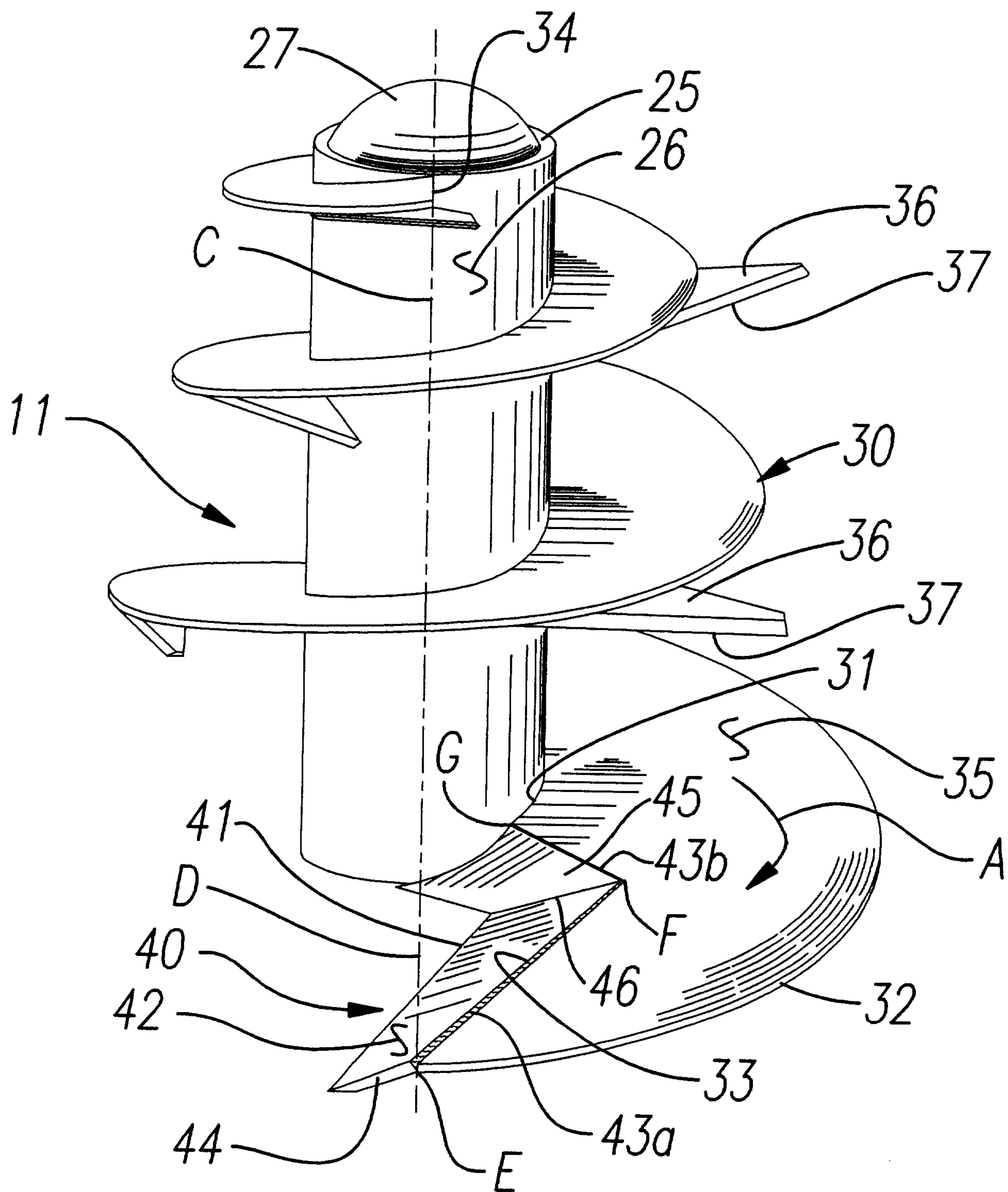


FIG. 3

