July 7, 1964 P. RUTTEN ETAL 3,139,860

BUNK FEEDER

Filed Oct. 25, 1962 3 Sheets-Sheet 1

Fig. 1.

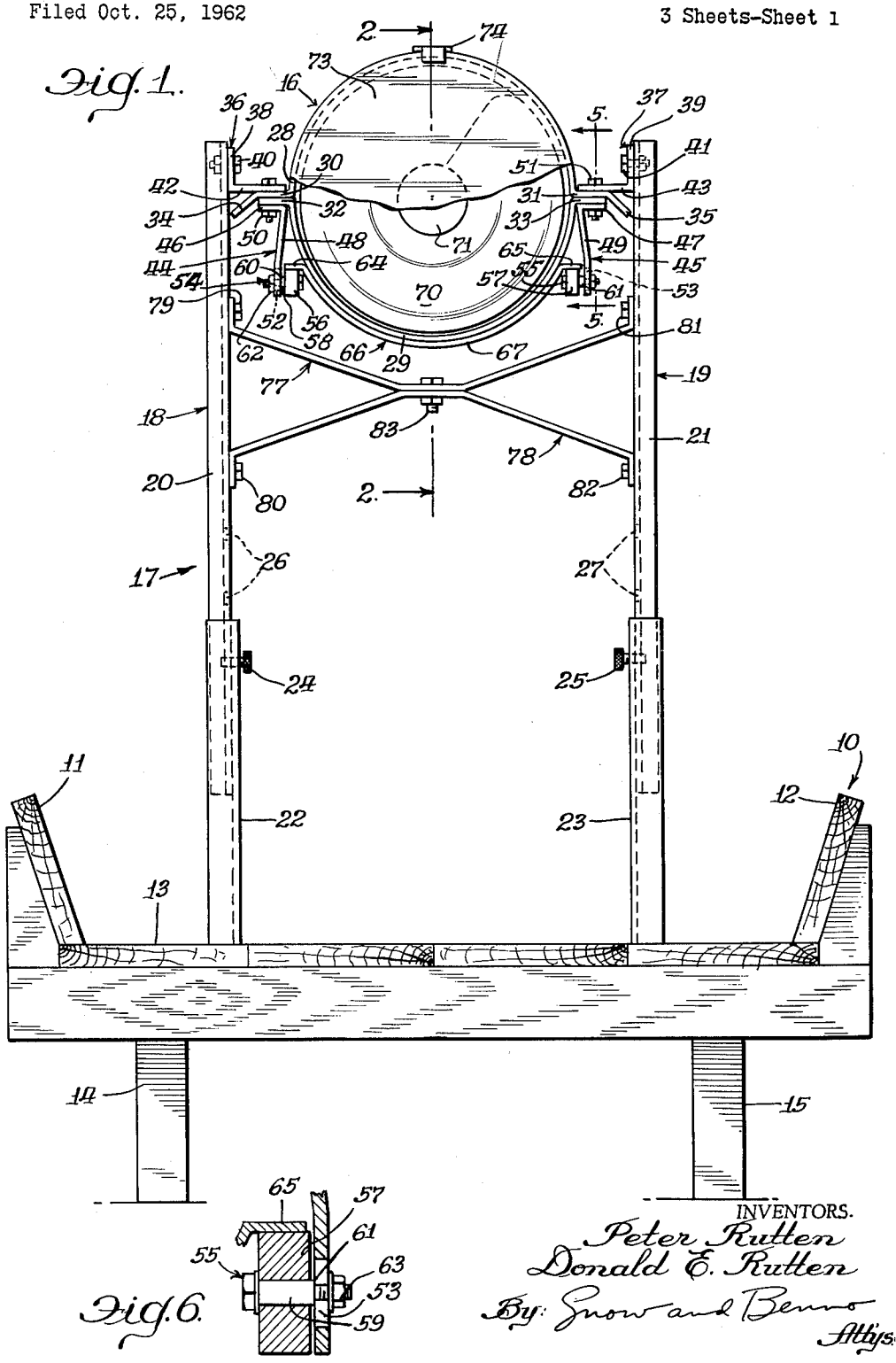


Fig. 6.

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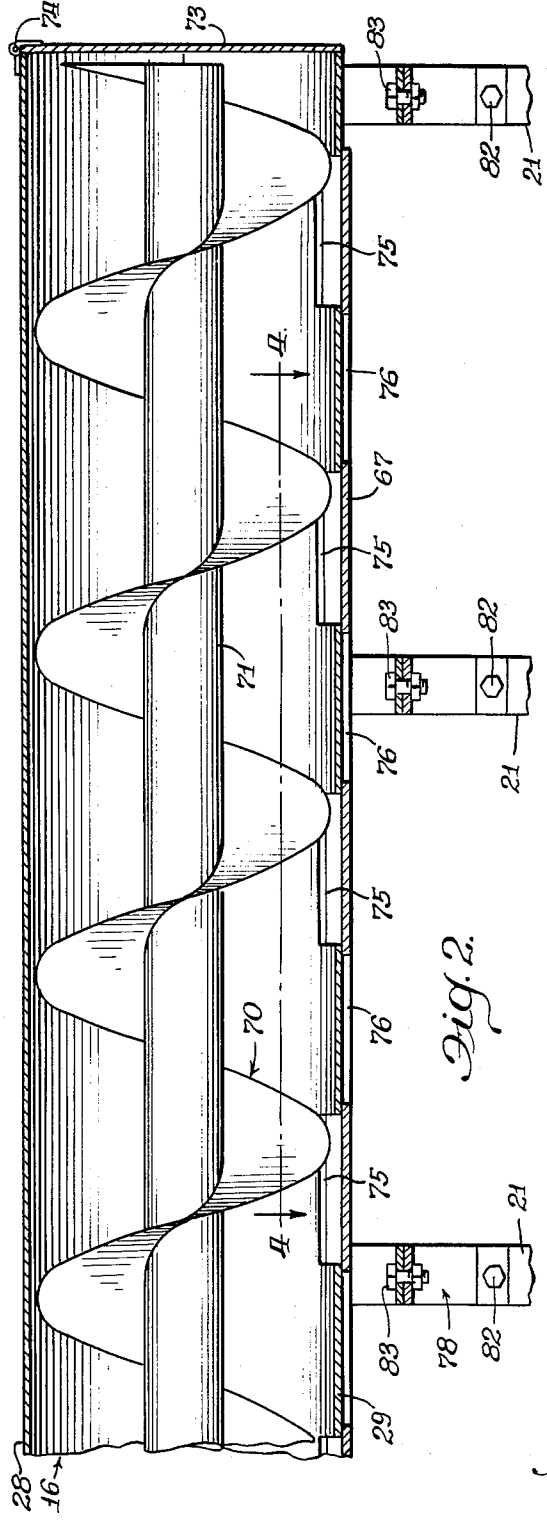


Fig. 2.

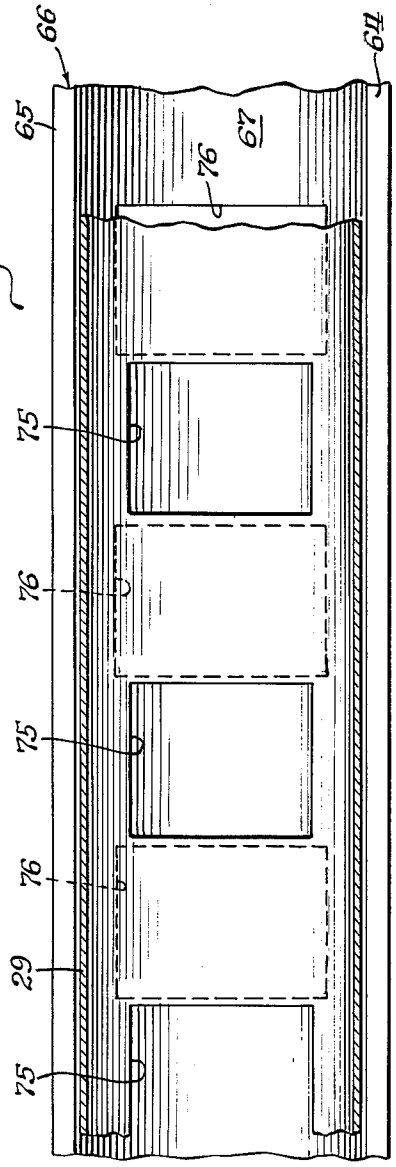


Fig. 4.

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BUNK FEEDER

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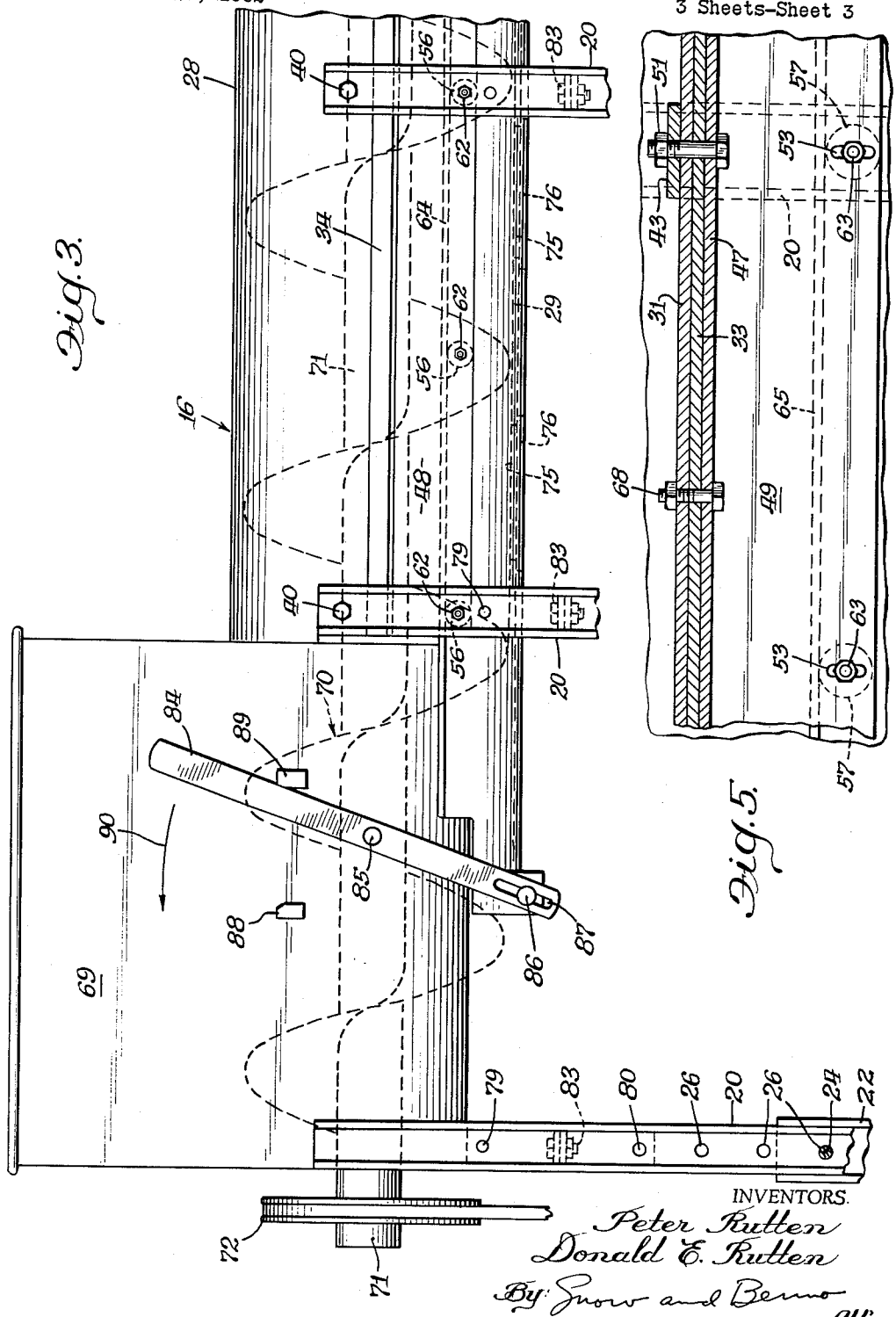


Fig. 3.

Fig. 5.

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BUNK FEEDER

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Filed Oct. 25, 1962, Ser. No. 233,046
5 Claims. (Cl. 119—52)

This invention relates to a new and improved bunk feeder.

The bunk feeder of this invention is an improvement and a modification over our pending application entitled Feeder, Serial No. 228,117, filed October 3, 1962. As stated in our copending application, the mechanization of feeding large herds of animals is becoming more and more important to the success of any farm operation. The present device concerns a bunk feeder capable of cooperating with other elements to improve the automation of feeding animals blended diets of silage grain and vitamins in predetermined desired amounts.

It is a principal object of the present invention to provide a distributing tube portion of a bunk feeder fabricated from opposing semi-cylindrical sections joined by overlapping flanges.

Another important object of this invention is the provision of horizontal flanges for a fabricated tube of a bunk feeder in which the flanges of the upper section have extensions bent downwardly and outwardly to act as rain and snow shields for the joint between the fabricated tube portions.

Still another important object of this invention is to provide rail members flanking the sides of the tube portion of a bunk feeder and the rails carrying a plurality of spaced apart rollers thereon to support a closure member located beneath the fabricated tube and having longitudinal reciprocable movement to provide for the opening and/or closing of a plurality of spaced apart openings in the bottom section of the fabricated tube.

A still further important object of this invention is to supply vertical elongated slots in the rail members whereby the roller members carried by the rails may be vertically adjusted to accomplish an adjustment of the longitudinally movable closure member relative to the bottom of the tube portion of the bunk feeder of this invention.

An important object of this invention lies in the construction of the leg supports utilized to carry the tube portion of the bunk feeder of this invention and wherein the leg portions are constructed of channel members telescopically disposed one within the other to effect variable lengths of the leg supports.

Still another important object of this invention is to provide angle supports associated with leg supporting members to carry the tube portion of a bunk feeder and particularly to engage the top surfaces of overlying flanges of a two-piece fabricated tube whereby one bolt may be used to join the overlying flanges of the two-piece tube member, an included rail member, and the angle support from which the tube is suspended.

Other and further important objects and advantages will become apparent from the disclosures in the following specification and accompanying drawings.

In the drawings:

FIGURE 1 is an end elevational view of the bunk feeder of this invention.

FIGURE 2 is a sectional view taken on the line 2—2 of FIGURE 1, showing the outer end of the bunk feeder and with the closure member openings in non-registration with the openings in the discharge tube.

FIGURE 3 is a side elevational view of the hopper or feed end of the bunk feeder of this invention.

FIGURE 4 is a sectional view taken on the line 4—4 of FIGURE 2.

FIGURE 5 is a sectional view taken on the line 5—5 of FIGURE 1.

FIGURE 6 is an enlarged detail of the roller mounting of the device of this invention.

As shown in the drawings:

The reference numeral 10 indicates generally an elongated open top bunk feeder having spaced apart side walls 11 and 12 and a bottom 13 spanning the space between the walls 11 and 12. The bunk feeder 10 is provided with spaced apart ground engaging legs 14 and 15. As a general rule, bunk feeders are utilized in conjunction with silos or other feed storage receptacles so that feed can be distributed to a great number of animals in the shortest possible period of time. The animal yard located around a generally centrally disposed silo may be divided into numerous pens which are served by feed bunks extending radially outwardly from a silo. The bunks are made to accommodate many animals and hence are sufficiently long so that animals may feed from the bunk in side-by-side relationship without crowding. With this in mind, though, it is important to deliver equal quantities of feed to the full length of the bunk. Present day feeds usually consist of silage, grain and vitamins and it is essential that these mixtures be continued in the same proportion for the full length of the bunk.

A cylindrical tube 16 is disposed above the center of the bunk 10. The tube 16 is carried on a supporting structure 17. The supporting structure includes spaced apart height adjustable legs 18 and 19. These leg members include upper channel members 20 and 21 and lower channel members 22 and 23, respectively, within which the upper channel members 20 and 21 slide for effecting vertical adjustment. Locking pins 24 and 25 act to set the telescopic extent of the upper and lower channel members of the legs 18 and 19. The adjustable length of the legs is accomplished by providing a plurality of vertically spaced apart openings 26 and 27 in the base wall of the channel members 20 and 21. The pins 24 and 25 are pulled outwardly from their normal engagement with the lower larger channel members 22 and 23 and thereupon the upper channel members 20 and 21 are slid relatively within the larger channels so that other of the holes 26 and 27 come into alignment with the locking pins 24 and 25 to accomplish any desired vertical adjusment of the legs 18 and 19. The inter-engagement of the channel members and their locking in any relative extension is shown in detail in FIGURES 1 and 3.

The tube 16 is fabricated from two semi-cylindrical sections 28 and 29. The sections 28 and 29 are disposed one over the other with the member 28 constituting the cover and the member 29 constituting the bottom. The joint between the two semi-cylindrical sections is provided by outwardly extending flanges on the adjoining edges as shown at 30 and 31 on the top section 28, and 32 and 33 on the bottom section 29. These horizontally

disposed flanges 30, 31, 32 and 33 lie one on top of the other and enable the bolting of the sections together. The flanges 30 and 31 of the top section 28 are further provided with downwardly and outwardly angling end extending portions 34 and 35 which act as rain or snow shields for the joint between the fabricated tube sections 28 and 29.

Angle support members 36 and 37 are mounted on the legs 18 and 19, respectively. The angles 36 and 37 include vertically disposed walls 38 and 39 which are engaged by bolts 40 and 41 to hold angles 36 and 37 in securely fastened relationship to the channels 20 and 21 of the legs 18 and 19. The angles 36 and 37 also include horizontally disposed walls 42 and 43. These horizontal walls lie in overlying relationship with respect to the adjoining flanges 30 and 32, and 31 and 33, respectively.

Rail members 44 and 45 flank the sides of the fabricated tube 16 and are generally parallel one to the other. The rails 44 and 45 include top, horizontally disposed flanges 46 and 47 and generally vertically disposed portions 48 and 49. The rails are a generally inverted L-shape. As best shown in enlarged FIGURE 5, bolts 50 and 51 are arranged and constructed to pass through the overlying or abutting flanges 42, 30, 32 and 46, and 43, 31, 33 and 47. These bolts act to lock the fabricated tube portions together as a unit and to support the fabricated tube on the leg supports 18 and 19. Further, the rails 44 and 45 are rigidly mounted relative to the fabricated tube by reason of the common bolt members 50 and 51.

The rail members 44 and 45 are equipped on their vertically disposed walls 48 and 49 with vertically extending elongated slots 52 and 53, which are disposed at spaced apart positions along the rails 44 and 45. Bolts 54 and 55 pass through the elongated openings or slots 52 and 53, respectively, and are adapted to carry rollers 56 and 57. The bolts 54 and 55 are equipped with sleeves 58 and 59 for the journal reception of the somewhat narrower rollers 56 and 57. The sleeves 58 and 59 form shoulders 60 and 61 which engage with the walls 48 and 49 of the rails and by means of nuts 62 and 63 the bolts 54 and 55 may be drawn up tightly with respect to these vertical walls of the rails to prevent slipping of the bolts in the elongated slots. Thus, when the bolts are adjusted in their desired vertical position, they will remain in that position throughout their intended use. The sleeves 58 and 59 are slightly longer than the width of the rollers 56 and 57 so that the rollers are free to rotate on the bolt members 54 and 55 during their slidable carrying of oppositely extending, horizontally disposed side flanges 64 and 65 of a closure member 66 operating in conjunction with openings, to be hereafter described, in the bottom of the fabricated tube 16. The closure member has a concave central portion 67 with substantially the same curvature as the underside of the semi-cylindrical portion 29 of the fabricated tube 16.

As best shown in FIGURES 1 and 5, the side flanges 64 and 65 ride on the rollers 56 and 57. Further, as shown in FIGURE 5, the fabricated tube sections and the unitary rails 44 and 45 are fastened intermediate the leg supports by additional bolts 68. The only difference between the bolts 51 and 68 is that the bolts 68 are shorter in length because they do not have to accommodate the angle members 36 and 37 which are disposed at each of the leg portions 18 and 19.

As best shown in FIGURE 3, a feed receiving hopper 69 is provided at one end of the fabricated tube 16. An auger conveyor 70 commences within the hopper 69 and runs through the length of the fabricated cylindrical tube 16 to the outer end thereof. The auger conveyor 70 is provided with a shaft 71 which is journaled at one end within the end of the hopper 69. The shaft 71 is equipped with a V-pulley 72 on its end outside the hopper 69. It is through this pulley 72 that drive is imparted to the auger conveyor 70.

As best shown in FIGURE 2, a gate 73 is provided at the end of the tube 16 opposite the hopper 69. The end gate 73 is preferably hinged at 74 to permit outward swinging. This insures that feed transported by the auger conveyor 70 and reaching the end of the tube will readily move the gate 73 upwardly and outwardly. The tube 16 is provided with openable apertures in the bottom thereof to be subsequently described. The end gate 73 thus acts as a control means and insures that the tube 16 is full of feed throughout its length prior to the opening of the discharge apertures. The utilization of an end gate 73 as a means to directly effect opening and closing of a closure member or to signal the filling of the tube with feed throughout its length is not a specific part of the present invention and thus the details theerof have not been shown.

The bottom of the tube 16 is provided with regularly spaced apart rectangular openings 75 which are disposed in general longitudinal alignment along the concave bottom 67 of the tube. The elongated closure member 66 is used to cooperate with the downwardly curved bottom of the tube to accomplish either an opening or a closing of the spaced apart rectangular openings 75. The closure member is provided with regularly spaced apart rectangular openings 76 disposed in a longitudinal path along the concave central portion 67 of the closure member 66. The rectangular openings 76 in the closure member are slightly larger than the rectangular openings 75 in the tube 16. The larger openings 76 are easily moved to a registering position with the openings 75 in the cylindrical fabricated tube 16 and the largeness of the closure member openings prevents any blocking of the openings 75 in the tube when it is desired to permit discharge of feed therefrom.

Brace members 77 and 78 form an X reinforcement between the legs 18 and 19 to give greater stability to the leg supports which carry the fabricated tube 16. Bolts 79 and 80 are arranged to fasten the brace members to the channel member 20 of the leg 18. Similarly, bolts 81 and 82 fasten the brace members 77 and 78 to the channel member 21 of the leg 19. At the central portion of the X the brace members 77 and 78 are fastened together by a bolt 83. It is preferable that the leg supports 18 and 19 and their cross bracing 77 and 78 be located at a position spaced between the openings 75 so as not to impair or impede the discharge of feed material from the fabricated tube 16 down into the bunk 10.

As best shown in FIGURE 3, an operating lever 84 is provided on the hopper 69. The lever is hingedly mounted on a pin 85 for swinging movement theerabout. A pin 86 on the end of the closure member 66 is adapted to engage an elongated slot 87 in one end of the lever 84. Swinging movement of the lever 84 causes the closure member 66 to slide longitudinally on the plurality of spaced apart rollers 56 and 57. Limit stops 88 and 89 are mounted on the side of the hopper 69 and are engaged by the lever 84 in its endmost positions thereof. When the lever 84 is abutting the stop 89, the preferably larger openings 76 of the closure member are in registration with the somewhat smaller openings 75 in the bottom 29 of the fabricated cylindrical tube 16. In this position of the closure member where its openings are in registration with the tube openings, the far end of the closure member 66 is disposed short of the outer end of the tube. Conversely, when the lever 84 is swung about its hinge mounting 85 for engagement with the spaced apart limit stop 88 located on the side of the hopper the closure member has been pushed outwardly as shown in FIGURE 2 so that its outer end is closely adjacent the outer end of the tube and the solid portions thereof act to close the openings 75 in the bottom of the tube 16.

The tube 16 is filled with feed by operation of the auger conveyor 70 as it moves material from the hopper 69 throughout the length of the tube. When the tube is filled and the end gate 73 is swung outwardly by reason of the feed reaching that position, there is either an automatic

operation or a manual operation to move the closure member so that its openings **76** are in registration with the openings **75** in the tube, causing the feed within the tube to be dropped into the elongated receptacle or bunk **10** as the auger conveyor **70** is rotated. The bunk is provided with quantities of feed at regular spaced apart positions throughout its full length. Such feed dumping positions correspond to the location of the apertures in the bottom of the fabricated tube **16**. The fact that the tube **16** is filled throughout its length preliminary to dumping makes the uniform filling of the bunk possible. An arrow **90** indicates the direction of the arcuate movement of the lever **84**. The rollers **56** and **57** are spaced sufficiently close together to provide for easy sliding of the closure member inwardly or outwardly in its operation to open or close the openings in the bottom of the feed tube.

In the operation of the device of this invention the feed bunk **10** is generally arranged in a farm yard in a line radiating outwardly from a silo or feed storage bin. Feed in the form of silage, grain or a combination of silage and grain with vitamins, if desired, is delivered from the storage tank to the bunk feeder of this invention. The hopper **69** is preferably positioned close to the stored feed so that feed may be directly deposited in the hopper from the silo or other storage receptacle. The auger conveyor **70** is rotated, causing the feed dropped into the hopper to be carried throughout the tube **16** until such time as the feed fills the tube to the outer end thereof. When the tube is full and the feed strikes the end gate **73**, the gate either acts directly or indirectly to move the closure member **66** so that its openings **76** are in registration with the openings **75** in the tube **16**, thereby permitting the feed in the tube to be dumped into the bunk **10**. In the present device the movement of the closure member is accomplished by the operating lever **84** located on the hopper **69**. The lever is swung to engage the limit stop **89**, such as shown in the FIGURE 3, causing the openings in the closure member to be in registration with the openings in the tube, thus permitting the feed in the tube to be dropped down into the receptacle or bunk **10**. Continued operation of the auger conveyor **70** insures quick discharge of the mixed feed from the tube to the bunk when the holes are in discharging registration. The closure member **66** is in closed position over the openings in the bottom of the tube when the lever is abutting the limit stop **88**. Mixing of the feed is continuously accomplished in either open or closed position of the closure member because of the continuous operation of the auger conveyor **70**. All animals eating at the bunk, whether at the inner or outer ends thereof, receive the same diet, thereby insuring a uniformly fed herd or flock at the same instant.

In the present embodiment the closure member is arranged and constructed so that when the inner end thereof is pulled inwardly beneath the hopper, the holes are in registration for discharging the feed from the tube **16**. In this position the lever **84** abuts the limit stop **89**. A pulling of the lever in the direction of the arrow **90** causes the closure member to be pushed outwardly toward the end of the tube. This causes the openings **75** to be closed by the solid portions of the closure member located intermediate the openings **76** therein. Such a construction and operation avoids the pinching of material between the closure plate and the tube when the openings are to be closed and filling of the tube proceeds without interruption from the hopper **69**.

In the present device also the rollers **56** and **57** may be easily adjusted for vertical positioning on the rail member **44** and **45** to thereby locate the closure member **66** in proper sealing relationship with respect to the fabricated cylindrial tube **16**. The rollers permit convenient rolling or sliding of the closure member **66** thereon to provide for the discharge of feed from the enclosed tube **16** or the holding of feed in the tube while the tube is being filled from a supply in the hopper **69**. The device herein constitutes a bunk feeder capable of uniform delivery of feeds of any formula of large or small particles throughout the length of an elongated bunk. The dietary value of the feed delivered by the feeder of this invention is constant from one end of the feed bunk to the other. This is accomplished by a continued mixing of the feed by the continuously running auger **70** in the fully closed fabricated tube **16** throughout its length as feed is moved from the hopper **69** to and through the tube **16**.

We are aware that numerous details of construction may be varied throughout a wide range without departing from the principles disclosed herein and we, therefore, do not propose limiting the patent granted hereon otherwise than as necessitated by the appended claims.

What is claimed is:

1. A generally horizontally disposed animal feeder comprising two semi-cylindrically shaped members forming a tubular housing, each of said semi-cylindrically shaped members having outwardly projecting horizontally disposed flanges on each side thereof, means removably fastening one of said semi-cylindrical members to the top of the other semi-cylindrical member with the horizontal flanges in overlapping relationship, said tubular housing having discharge openings in the bottom thereof, closure means associated with the bottom of said tubular housing arranged and constructed to open or close said discharge openings, means mounting said closure means for longitudinal sliding movement, a rail member flanking each side of said tubular housing, said rail members having a horizontally disposed flange for abutment with the overlapping flanges of the two semi-cylindrically shaped members, said means removably fastening said semi-cylindrical members together including the fastening of said rail members thereto, said closure means carried on said rail members, each of said rail members having a generally vertically disposed depending wall, said vertically disposed depending walls having longitudinally spaced apart, vertically disposed elongated slots therein, roller members adjustably carried in said elongated slots, and said closure means having outwardly projecting flanges for riding on said roller members to thereby facilitate longitudinal sliding movement of said closure means.

2. A device as set forth in claim 1 in which said closure means has a concave central portion between said outwardly projecting flanges to conform to the bottom of said tubular housing.

3. A device as set forth in claim 1 in which said outwardly projecting horizontally disposed flanges of the upper semi-cylindrically shaped member are provided with outwardly and downwardly inclined extensions, said engagement of the roller members with the outwardly projecting flanges of the closure means being located laterally inwardly of the outwardly and downwardly inclined extensions of the horizontally disposed flanges of the upper semi-cylindrically shaped member, whereby the joints between the upper and lower semi-cylindrically shaped members and the engagement of the rollers with the closure means are shielded from direct contact by rain or snow.

4. A generally horizontally disposed animal feeder comprising supporting standards, two semi-cylindrically shaped members forming a tubular housing, each of said semi-cylindrically shaped members having outwardly projecting horizontally disposed flanges on each side thereof, one of said semi-cylindrical members disposed on top of the other semi-cylindrical member with the horizontal flanges in overlapping relationship, angle members having one arm thereof fastened to said supporting standards and having another arm thereof joining said overlapped horizontal flanges, bolt means passing through said overlapping flanges and the included angle member arm, said tubular housing having discharge openings in the bottom thereof, closure means associated with the bottom of said tubular housing arranged and constructed to open or close said discharge openings, means mounting said

closure means for longitudinal sliding movement, inverted L-shaped rail members flanking the tubular housing and having the horizontal flanges thereof abutting the overlapped flanges of the tubular housing and the included arm of the angle member, and means vertically adjustably carrying said closure means on the vertical flanges of said L-shaped rail members.

5. A device as set forth in claim 4 in which said means vertically adjustably carrying said closure means includes said vertical flanges having longitudinally spaced apart vertically disposed elongated slots, shouldered bolt shafts and cooperative nuts engaging said elongated slots, rollers journally mounted on said shouldered bolt shafts, and spaced apart horizontally disposed flanges on said closure means adapted to slidably carry said closure means on said rollers.

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