Dec. 3, 1957 F. V. HANSON 2,815,001

SELF-FEEDING BUNKER OR TRENCH SILO CONSTRUCTION

Filed Sept. 25, 1956 3 Sheets-Sheet 1

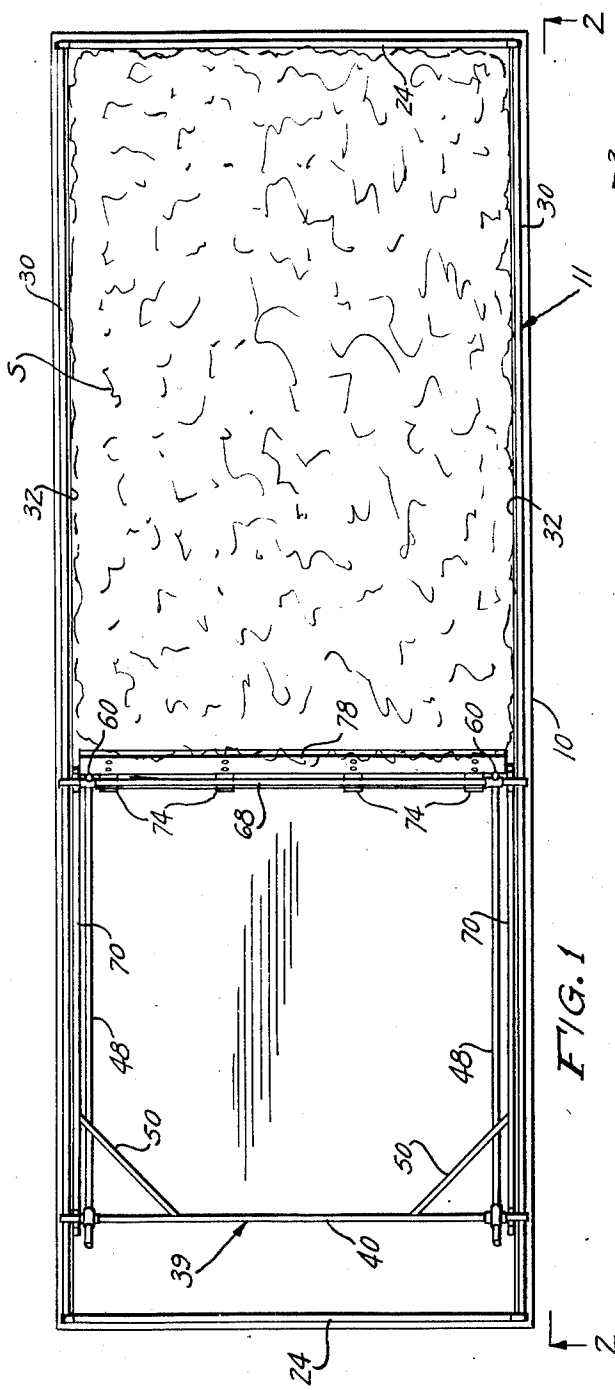


FIG. 1

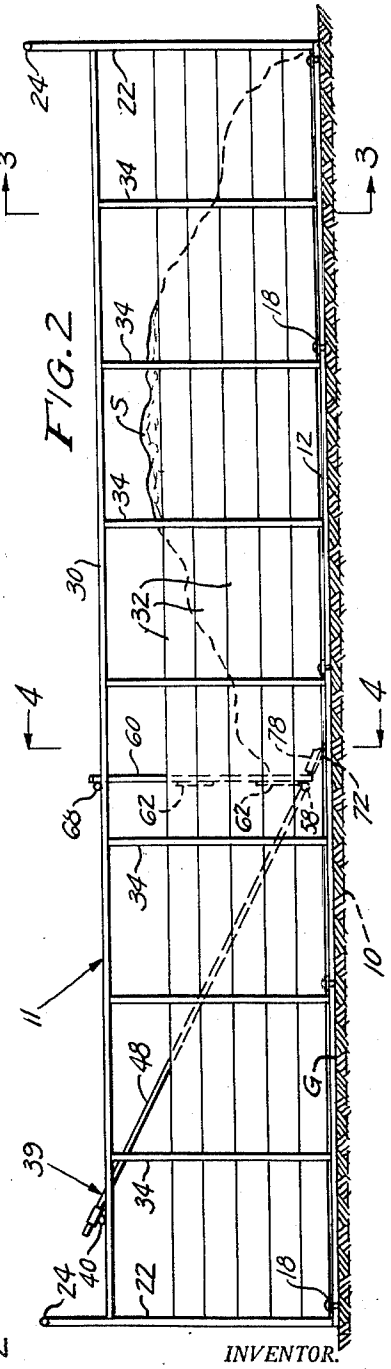


FIG. 2

INVENTOR.
FLOYD V. HANSON
BY
McMorrow, Berman & Davidson
ATTORNEYS

Dec. 3, 1957 F. V. HANSON 2,815,001

SELF-FEEDING BUNKER OR TRENCH SILO CONSTRUCTION

Filed Sept. 25, 1956 3 Sheets-Sheet 2

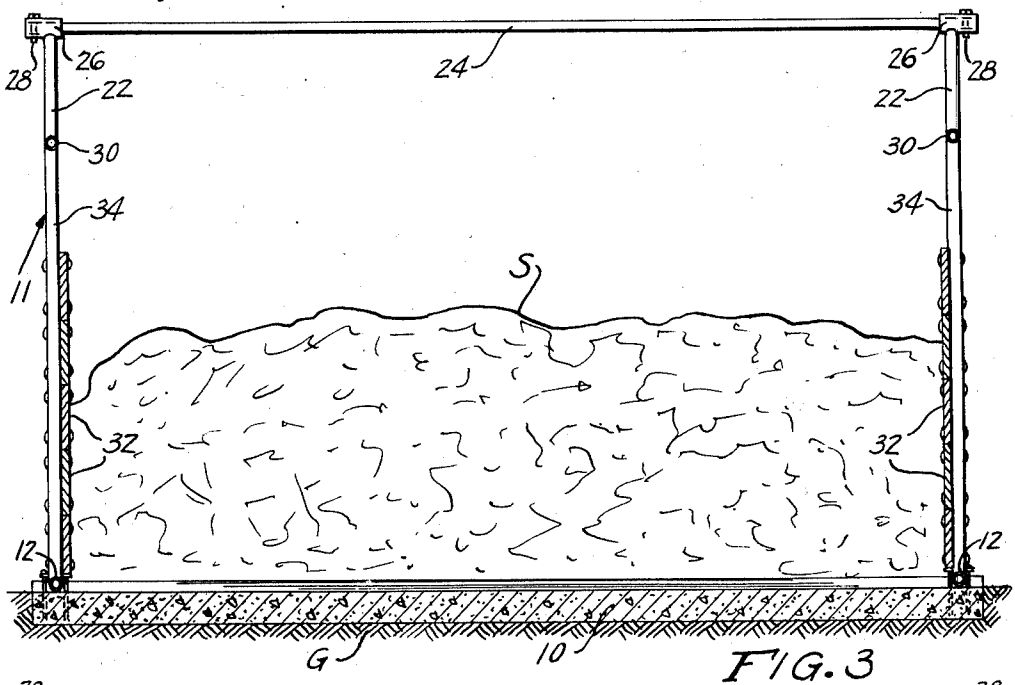


FIG. 3

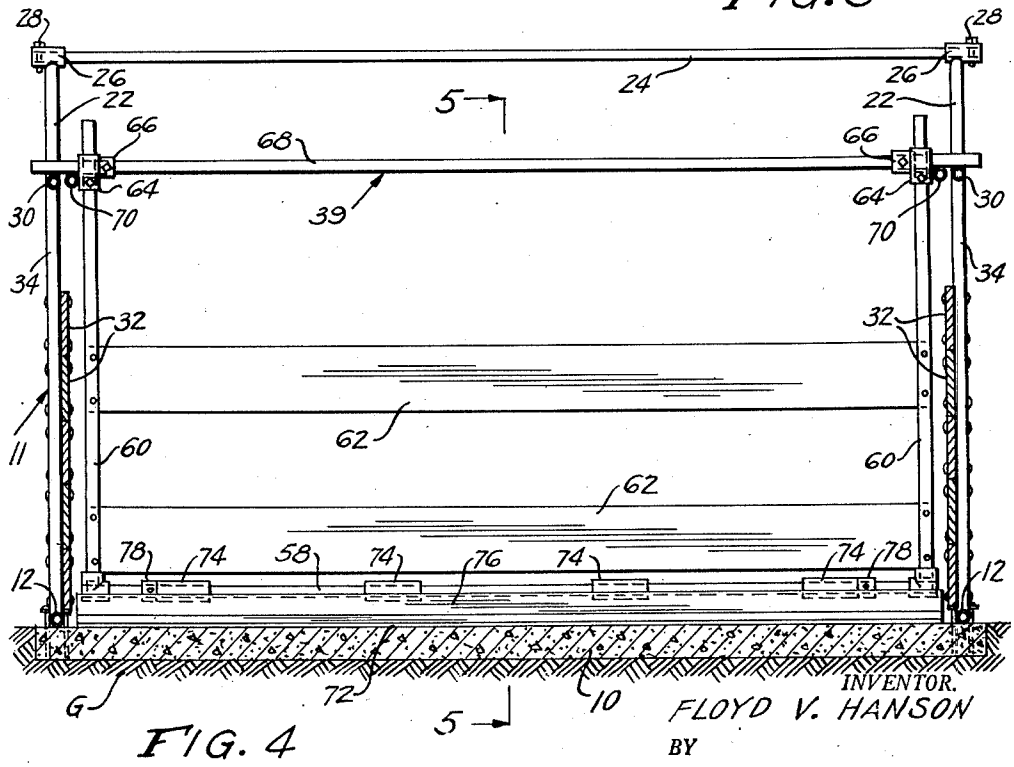


FIG. 4

INVENTOR.
FLOYD V. HANSON
BY

McMorrow, Berman & Davidson
ATTORNEYS

Dec. 3, 1957 F. V. HANSON 2,815,001

SELF-FEEDING BUNKER OR TRENCH SILO CONSTRUCTION

Filed Sept. 25, 1956 3 Sheets-Sheet 3

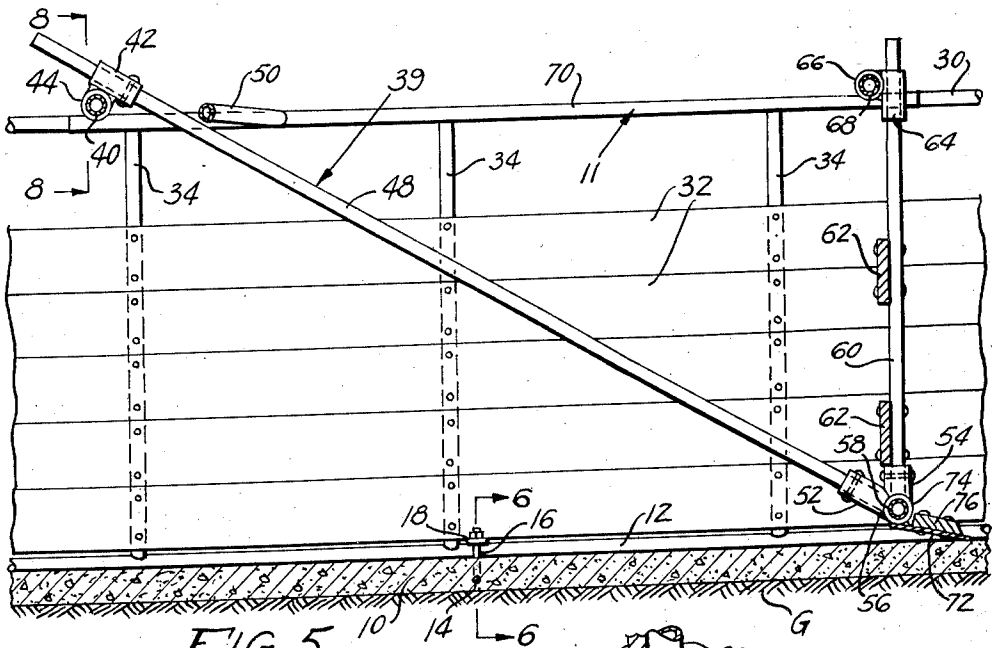


FIG. 5

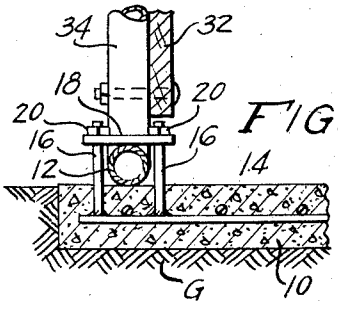


FIG. 6

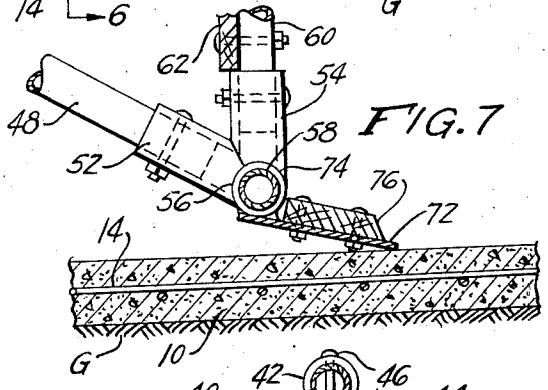


FIG. 7

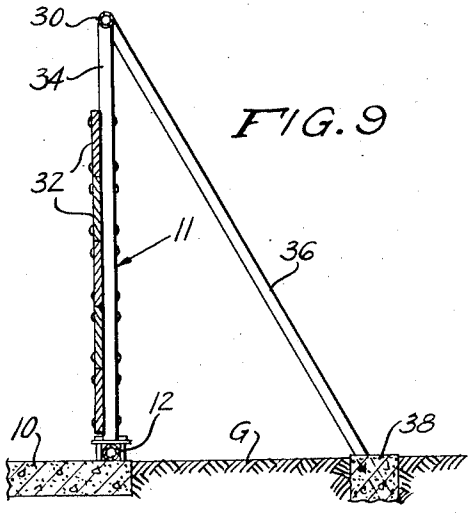


FIG. 9

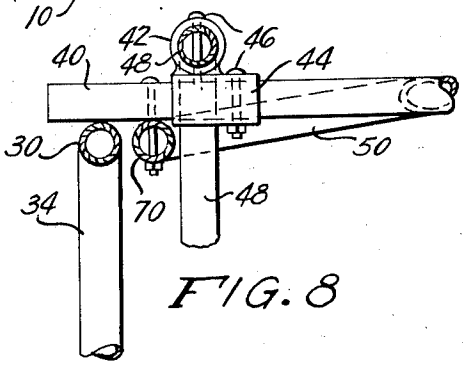


FIG. 8

INVENTOR.
FLOYD V. HANSON
BY

McMorrow, Berman & Davidson
ATTORNEYS

United States Patent Office 2,815,001
Patented Dec. 3, 1957

2,815,001

SELF-FEEDING BUNKER OR TRENCH SILO CONSTRUCTION

Floyd V. Hanson, Gypsum, Kans.

Application September 25, 1956, Serial No. 611,937

3 Claims. (Cl. 119—58)

This invention relates to a self-feeding bunker or trench type silo.

The invention, summarized briefly, comprises an elongated, open-ended structure having parallel, upstanding side walls. This structure may be mounted in a trench, or alternatively, upon the normal ground surface and is adapted to receive a quantity of feed or silage. Within the structure there is provided a movable panel or abutment assembly, sliding upon the side walls, and movable against one end of the quantity of feed. This includes a vertical wall extending transversely of and slidable upon the side walls of the elongated support structure, with the transversely extending wall having vertically or horizontally spaced boards. At the lower end of the vertical wall is hinged a flap sliding along the base of the stationary support structure. Spaced longitudinally of said support structure from the vertical wall is a cross bar also sliding upon the side walls of the support structure, and connected between the cross bar and the vertical wall are horizontal and inclined braces, extending along the inner surfaces of the side walls of said structure.

One important object is to provide a generally improved structure of the character described which will not have the deficiencies noted in connection with structures of the same type previously devised. It has been noted that trench or bunker silos tend, during cold weather, toward freezing of the relative movable components, preventing access to the feed contained in the device, and one important object of the present invention is to provide a structure of the character described wherein the sliding abutment assembly will at all times be freely shiftable longitudinally of the supporting structure, so that it may be pushed periodically into engagement with the heap of silage, so as to always remain at the end of the heap, despite regular depletion of the feed by the feeding stock.

Another object is to provide a structure of the character described that will be characterized by its particularly great strength and resistance to the pressures exerted thereagainst by the feeding stock, so as to be usable over a long period of time without requiring maintenance or repair.

Another object is to form the device in such a manner as to adapt the same for erection either in a trench or upon the normal ground surface, without more than minimum modification and redesign of the basic construction.

Another object is to permit erection of the device at a low cost, considering the side and strength thereof.

A further object is to form a self-feeding bunker or trench type silo that can be formed entirely from easily obtained materials, namely pipe stock, boards, conventional pipe fittings, etc.

A further object is to design the silo in such a manner that merely by changing in the size thereof, it can be used as a hog feeder.

Other objects will apear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a top plan view of a self-feeding silo according to the invention;

Figure 2 is a side elevational view thereof as seen from the line 2—2 of Figure 1;

Figure 3 is an enlarged transverse sectional view on line 3—3 of Figure 2;

Figure 4 is an enlarged transverse sectional view on line 4—4 of Figure 2;

Figure 5 is an enlarged longitudinal section through the sliding abutment panel assembly, substantially on line 5—5 of Figure 4;

Figure 6 is a transverse, detail sectional view, the scale being enlarged still further, substantially on line 6—6 of Figure 5, showing the hold-down means for the frame;

Figure 7 is a detail sectional view on the same cutting plane as Figure 5, the scale being enlarged above that in Figure 5, showing the details of the scoop or flap;

Figure 8 is a detail sectional view on line 8—8 of Figure 5, showing the details of the connections at the rear end of the abutment panel assembly; and

Figure 9 is a transverse sectional view on the same scale as Figure 3 showing side brace means that may be employed.

Embedded in the ground G is a concrete slab **10** of rectangular shape and substantial length. It is not desired to restrict the protection sought to a structure having particular dimensions or materials and no other, and hence, since the device can be made in various (depending, for example, on whether cattle or hogs are to use the same) the dimensions are not critical and will not be specified herein for each and every component of the device.

Stationarily mounted on slab **10** is a support frame generally designated **11** including upstanding, parallel side walls and cross-braced, open ends.

Resting upon the respective side edge portions of slab **10** (see Figure 6) are elongated, longitudinal bottom rails **12** of the respective side walls, extending from end to end of the stationary support structure or frame. These are clamped at selected locations along their lengths to slab **10** as shown in Figure 6, through the provision of transversely and longitudinally extending reinforcing rods **14** embedded in slab **10**. Laterally spaced, upstanding anchoring bolts **16** are rigid with and extend upwardly from the ends of the transverse rods at opposite sides of each bottom rail **12**. A clamping strap **18** has smooth-walled openings in its ends receiving the bolts **16**, and clamping nuts **20** are threaded on the bolts to force the strap **18** against rail **12**, to clamp the rail between the strap and the slab.

Welded to and projecting upwardly from the ends of bottom rails **12** are end posts **22**. These rise to a height sufficient to permit the livestock, or the farm workers, to pass freely under cross members **24** fixedly connected between the upper ends of posts **22** at each end of the structure (see Figure 3). The fixed connection of the cross members **24** is effected by extension of the ends of the cross members into sleeves **26**, with said ends being pinned at **28** to the sleeves, the sleeves being welded or otherwise fastened to the upper ends of posts **22**.

Welded at their opposite ends to the upper end portions of posts **22**, at locations spaced downwardly a distance of perhaps two feet from the upper ends of the posts, are upper horizontal rails **30**. At each side of the structure, base rail **12** and upper rail **30** are in a common vertical plane, and to provide the side walls of the structure, elongated, horizontally extending planks **32** having their edges in longitudinally contacting relation are bolted or otherwise fixedly secured to vertical posts **34**. Posts **34** are spaced uniformly apart longitudinally of the structure between the end posts as best shown in Figure 2, in the vertical plane of rails **12, 30.**

It is thus seen that vertical, elongated side walls are provided upon structure, extending from end to end thereof, with said side walls being cross-braced by the members **24**, and being fixedly secured to and projecting upwardly from the opposite sides of the slab **10**. Confined between the side walls is the silage or feed S.

The structure described can be mounted in a trench, to provide a trench type silo, and in this event, instead of planks **32** being used, the side walls could be provided by disposing forms against the inner surfaces of the wall frames defined by rails **12**, **30** and posts **22**, **34**. Concrete would be poured to a selected height within said forms.

In the illustrated example, however, a ground level or bunker type silo is shown and in this event it may be and probably would be desirable to provide side brace means to prevent the side walls of the structure from being forced outwardly by the feed or by the stock. To this end, as shown in Figure 9, spaced uniformly apart along the length of each side wall would be inclined braces **36** welded or otherwise fixedly secured at their upper ends to the top rails **30** and inclining downwardly, outwardly from said top rails. The lower or outer ends of braces **36** are embedded in concrete bases **38** spaced outwardly from slab **10**.

Designated generally at **39** is a sliding abutment panel assembly. This is extended transversely of the structure between the side walls, and is adapted to slide longitudinally of the device from end to end thereof, to be maintained continuously against one end of the mass of silage S. The assembly **39** is so designed that it may be used in a silo in which the pitch of slab **10** is greatly increased over the slab pitch of self-feeding silos previously designed. This is for the purpose of reducing greatly the amount of cleaning of the silo floor necessary after its use by the stock.

Abutment panel assembly **39** includes a rear or outer cross bar **40** the ends of which rest upon and are slidable longitudinally of the upper rails **30** as best shown in Figures 1 and 2. Provided at opposite ends of the outer cross bar **40** are connecting brackets each of which includes a sleeve **42** normal to the length of cross bar **40**, and a sleeve **44** welded to and extending perpendicularly to sleeve **42** to receive the adjacent end of the cross bar **40**. The brackets are disposed inwardly a short distance from the side rails **30**, and as shown in Figure 8 the sleeves **42**, **44** are pinned at **46** to cross bar **40** and to inclined side members **48** of the abutment panel assembly. The side members **48** are disposed in closely spaced relation to the respective side walls of the support structure.

The side members **48**, at their inner, lower ends, are received in sleeves **52** inclined correspondingly to the side members as shown in Figures 5 and 7. Sleeves **52** are welded to upwardly opening, vertically disposed sleeves **54**, and are also welded or otherwise fixedly connected to horizontally, inwardly extending sleeves **56** receiving the ends of a lower inner cross bar **58** of assembly **39**.

Received at their lower ends in the upwardly opening sleeves **54** are vertical side members **60** of assembly **39**, and as shown in Figures 4 and 5, fixedly connected at their opposite ends to and extending between the side members **60** are retaining boards or plates **62**. These are spaced apart, with the spacing to be selected according to the particular use to which the silo is to be put.

Members **48**, **58**, **60** are pinned within their associated sleeves **52**, **56**, **54** respectively.

The upper ends of the vertical side members **60** are extended into and are pinned to sleeves **64**, welded at right angles to sleeves **66** that receive an upper inner cross bar **68** the ends of which rest upon and are freely slidable upon the side rails **30** of the support structure in the same manner as the ends of the outer cross bar **40** of assembly **39**.

To brace the panel assembly longitudinally in cooperation with the inclined members **48**, there are provided, at opposite side of said assembly, horizontally disposed, longitudinally extending longitudinal brace members **70** secured at their ends to the undersides of the cross bars **40**, **68**. Diagonally extending brace elements **50** are fixedly connected between members **70** and cross bar **40**. The longitudinal members **70** are disposed in a horizontal plane common to that of the upper side rails **30** of the support structure, and are in substantially longitudinally contacting relation to said rails **30** as shown in Figure 4, thus to provide guide means during the sliding movement of the assembly **39**. Any tendency of the assembly **39** to shift laterally in either direction is limited by engagement of the members **70** against the respective side rails **30**, so as to assure at all times free sliding movement of the assembly **39** within the support structure.

A sliding flap or scoop means is provided at the inner end of the assembly **39**, said scoop freely sliding upon the surface of the slab **10** and extending the full width of the abutment panel assembly. The flap or scoop includes a bottom plate **72**, having a back edge welded to the undersides of hinge sleeves **74** that are spaced uniformly apart along the length of and are freely rotatable upon the lower inner cross bar **58** (see Figure 4). Bolted or otherwise fixedly secured to the top surface of the plate **72** is a plank **76** the forward edge of which may be beveled as shown in Figure 7. Plate **72** slides along the slab surface, so as to scoop up any silage or feed in its path, to prevent said silage from moving under the abutment panel assembly in a manner that would tend to leave a deposit of said silage upon the slab, or that might tend to clog the space between the slab and the abutment panel assembly, in circumstances that might prevent freezing of the relative movable components.

To limit the swinging flap against endwise movement, said collars **78** are secured to the cross bar **58**, bearing against the outermost hinge sleeves **74** (see Figure 4).

As will be apparent, the structure can be made of any desired size, and in a typical embodiment used in the feeding of cattle, the side walls of the support structure would be 40 feet long and approximately 7 feet high, with the end posts **22** rising to a height of approximately 9 feet. As previously mentioned, the dimensions might be varied, but these are provided to give some idea as to the overall size of the size of the structure. When the device is used in the feeding of hogs, it would be of smaller size, but basically, the design would remain unchanged. In this manner, the grain might be allowed to fall through the rear part of the flap or scoop, into another catch scoop so that the hogs can feed conveniently therefrom.

When used during the feeding of cattle, the abutment panel assembly **39** is periodically shifted to the right in Figure 2, so that the silage S is accessible to the cattle, which feed through the space between the boards **62**, with the silage being conveniently disposed to be consumed by the stock. The provision of the scoop, of course, prevents silage from moving under the abutment panel, thus preventing waste thereof. The abutment panel assembly, and in particular the vertically disposed portion thereof defined by the vertical members **60** and transversely extending plates **62**, defines a feed rack or manger, so designed that the feed can be readily withdrawn by the feeding stock.

Another important characteristic of the invention resides in the fact that the abutment panel assembly is so designed as to be freely slidable upon the side walls of the support structure, so that there is no danger of freezing of the feed rack or manger in a particular position along the length of the side walls. At the same time, a very strong, relatively inexpensive structure is provided, that would require a minimum of maintenance or repair.

Sleeves **26** may be secured to posts **22** at an angle such that the posts may diverge in a direction upwardly from the slab with the sleeves still extending horizontally to

receive bar 24. The silo would thus have sides sloping in a direction upwardly outwardly from the slab. The angle of sleeves 64, 66, 44, and 42 would be changed in these circumstances sufficiently to cause assembly 39 to remain at a constant, close distance from the sloped side walls of the silo. It would also be necessary to change the angle on sleeves 52 and 54 which are fastened to sleeve 56. Pipes 58, 40, and 68, and bracing posts 36, may be lengthened or shortened as desired.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. A self-feeding silo comprising a support structure including elongated side walls transversely spaced for deposit of silage therebetween; and an abutment panel assembly freely slidable upon the side walls and extending transversely therebetween, said assembly including a feed rack disposed in a vertical plane, the feed rack including along its upper edge a pair of longitudinally spaced crossbars the ends of which rest upon and slide on the top edges of the side walls, means connecting said crossbars together and engageable with said side walls for holding said assembly against lateral movement, said rack being formed intermediate its top and bottom edges with a space through which the silage is accessible to feeding stock, and a flap hinged to the lower edge of the feed rack and extending substantially the full distance between the side walls, said flap gravitating into engagement with the bottom of the support structure to prevent silage from moving under the feed rack.

2. A self-feeding silo comprising a support structure including elongated side walls transversely spaced for deposit of silage therebetween; and an abutment panel assembly freely slidable upon the side walls and extending transversely therebetween, said assembly including a feed rack disposed in a vertical plane, the feed rack including along its upper edge a cross bar the ends of which rest upon and slide on the top edges of the side walls, said rack being formed intermediate its top and bottom edges with a space through which the silage is accessible to feeding stock, and a flap hinged to the lower edge of the feed rack and extending substantially the full distance between the side walls, said flap gravitating into engagement with the bottom of the support structure to prevent silage from moving under the feed rack, said assembly further including a second cross bar spaced longitudinally of the side walls from the first named cross bar with its ends also resting upon and freely slidable on the top edges of the side walls, including side members fixedly connected between the end portions of the second named cross bar and the lower corners of the feed rack, and horizontal side members fixedly connected between the upper corners of the feed rack and the end portions of the second-named cross bar.

3. A self-feeding silo comprising a support structure including elongated side walls transversely spaced for deposit of silage therebetween; and an abutment panel assembly freely slidable upon the side walls and extending transversely therebetween, said assembly including a feed rack disposed in a vertical plane, the feed rack including along its upper edge a cross bar the ends of which rest upon and slide on the top edges of the side walls, said rack being formed intermediate its top and bottom edges with a space through which the silage is accessible to feeding stock, and a flap hinged to the lower edge of the feed rack and extending substantially the full distance between the side walls, said flap gravitating into engagement with the bottom of the support structure to prevent silage from moving under the feed rack, said assembly further including a second cross bar spaced longitudinally of the side walls from the first named cross bar with its ends also resting upon and freely slidable on the top edges of the side walls, inclined side members fixedly connected between the end portions of the second named cross bar and the lower corners of the feed rack, and horizontal side members fixedly connected between the upper corners of the feed rack and the end portions of the second-named cross bar, the horizontal side members being disposed in closely spaced, parallel relation to the top edges of the side walls, to guide said assembly during its sliding movement along the side walls.

References Cited in the file of this patent

UNITED STATES PATENTS

2,520,555	Major	Aug. 29, 1950
2,691,359	Antiss et al.	Oct. 2, 1954
2,768,607	McClure	Oct. 30, 1956