Oct. 9, 1928. 1,686,871

G. A. MEEK

COMBINATION CORNCRIB AND GRAIN BIN

Filed Oct. 27, 1924

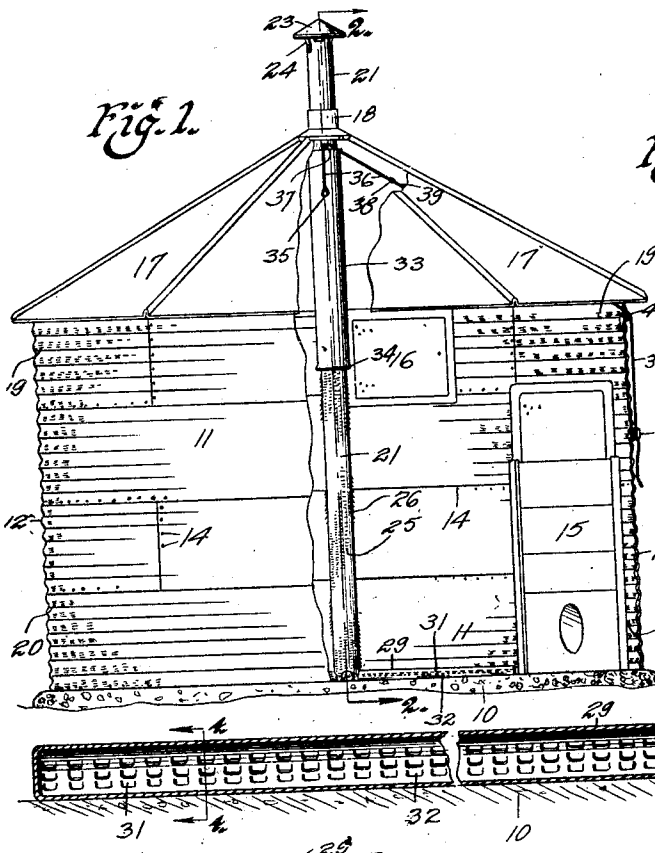


Fig. 1.

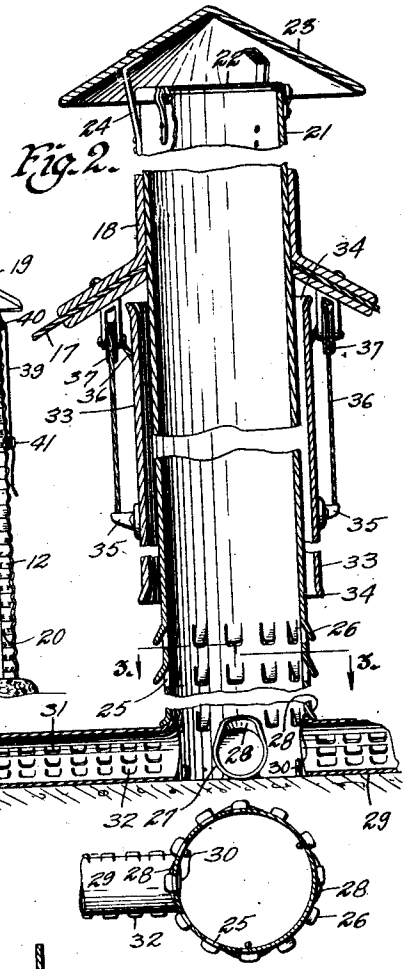


Fig. 2.

Fig. 3.

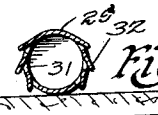


Fig. 4.

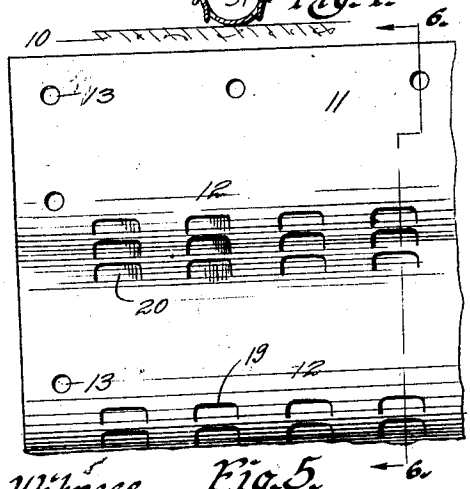


Fig. 5.

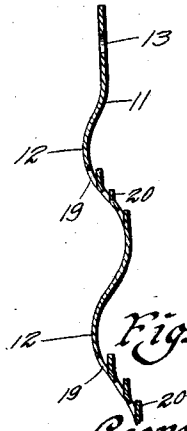


Fig. 6.

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Patented Oct. 9, 1928. 1,686,871

UNITED STATES PATENT OFFICE.

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COMBINATION CORNCRIB AND GRAIN BIN.

Application filed October 27, 1924. Serial No. 746,184.

My invention has to do with bins or cribs for holding grains, such for instance, corn, oats, wheat, barley, etc.

The purpose of my invention is to provide such a bin, which can be constructed simply and easily and which would be very durable and require a minimum of repairs, and which can be used for the storage of corn in the ear, shelled corn, or small grain, as wheat, barley, etc., without any change in structure.

A further object is to provide such a grain bin having certain advantages of structure which contribute to securing a satisfactory ventilation and aerating of the contents.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device in the location, shape, size, form and frequency of the openings for ventilation in the side walls of the crib or bin and in the main and secondary pipes or ventilating shafts and in a sliding sleeve for the main ventilating pipe or shaft, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 shows a side elevation of a bin embodying my invention, parts being broken away to better illustrate the interior.

Figure 2 is a detail, sectional view enlarged, taken on the line 2—2 of Figure 1.

Figure 3 is a horizontal, sectional view of the ventilating shaft taken on the line 3—3 of Figure 2.

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

Figure 5 is a side elevation of a part of the corrugated sheets or plates used on the wall of my improved bin, showing location, shape or form, size and frequency of the openings for ventilation, in the ventilating system.

Figure 6 is a sectional view taken on the line 6—6 of Figure 5.

In the accompanying drawings, I have used the reference numeral 10 to indicate generally the base or foundation upon which my improved bin rests. For this purpose, I have preferably used a concrete floor slab which serves both as a foundation and a floor and may, if desired, be covered with galvanized or sheet iron. As many units of the ventilating system as may be needed or desired, according to the size and shape of the bin, may be employed.

The bin itself may be of any desired shape or size. For purposes of illustrating my invention, I have shown a round bin with a tapered cone shaped top.

It is my purpose to provide a bin having walls such that the structure may be used for storing small grain: such as oats or wheat, or for storing corn, whether shelled or on the cob, or as a general storage room.

I, therefore, build my walls of strips of horizontally corrugated metal, a portion of one of these strips I have shown somewhat in detail in Figures 5 and 6.

The strip is indicated by the reference character 11, and it is provided with the regularly placed horizontal corrugations 12, which in a round tank are preferably arranged circumferentially of the entire tank.

The strips 11 may be provided with suitable holes 13 to receive the rivets 14 or bolts or the like by which the strips are fastened together to make a wall.

A suitable door structure 15 may be provided and a movable window or door device 16 may also be provided for the wall of the bin, the structure 16 being arranged just below the eve of the bin roof.

The metal of the strips 11 is preferably galvanized iron or other material of such character and so treated as to resist rust.

The bin is preferably provided with a sheet metal conical cover 17, having at its apex an opening, and central sleeve 18.

The corrugations 12 serve the important function of strengthening the wall of the bin. They also make possible another important feature of my structure. It is well known that it is highly desirable that the air should have free access to any stored grain.

In order to provide for a free circulation of air through the walls of my bin, I preferably provide in the lower overhanging portions of each corrugation 12, a series of rows of openings 19 formed by cutting the metal on three sides of tongues 20, leaving the tongues attached at their lower edges. These tongues are then forced inwardly at their upper portions, as clearly illustrated in Figures 5 and 6.

The openings 19 afford free passage for

air for permitting the circulation thereof within the bin.

Being arranged below the centers of the corrugations and in the underhanging portions thereof, water will flow downwardly and past the openings 19 on the outside of the bin, but will not flow through the walls to the interior of the bin.

The holes 19 and tongues 20 are of such size and shape and so arranged that they will not permit the escape of wheat or other small grain. It is desirable that the grain should be aerated at points inwardly from the walls of the bin, and for accomplishing circulation of air at points inwardly from the walls, I have provided the following means.

Extending through the sleeve 18 is a pipe 21, which projects downwardly into the bin to the bottom thereof. A screen cover 22 is hinged to the top of the pipe 21 to prevent the entrance of birds and the like. A conical rain top 23 is supported above the upper end of the pipe 21 by means of brackets 24.

The lower part of the pipe 21, from the bottom thereof upwardly to a point close to the height at which the grain is likely to stand, is provided with numerous openings similar to the openings 19, except that they are shorter horizontally, outwardly and downwardly projecting tongues 26 similar to the tongues 20.

At the bottom of the pipe 21 are larger openings 27 (see Figure 2) at their upper portions having overhanging lips 28.

Extending away from the bottom of the pipes 21 radially are pipes 29, closed at their outer ends and having at their inner ends at their upper portions, projecting lips 30 adapted to cooperate with the lips 28 so that the pipes 29 can be tilted for inserting the lips 30 under the lips 28 and then swung downwardly to horizontal position, as illustrated in Figure 2, where they will be held in position registering with the openings 27 against accidental removal.

The pipes 29 are so connected with the pipe 21 as to permit them to be lifted out of the way for shoveling the grain from the floor of the bin and for cleaning the floor of the bin.

The upper portions of the pipe 29 and the outer ends are closed, but at the sides of the pipe 29 rows of holes 31, similar to the holes 19, are cut therein and tongues 32 are pressed outwardly so as to stand outwardly and downwardly.

It will thus be seen that air can circulate freely through the wall of the bin and through the pipes 29 to and through the pipe 21. The use of the pipe 21 creates a draft for drawing the air through the grain and the pipes 29 and through the perforated wall of the lower part of the pipe 21 for forcing a circulation.

I find that where the level of the grain in the bin is lowered substantially below the upper row of tongues 26, the air will pass outwardly through the upper openings 25 into the upper empty part of the bin and the draft effect of the upper imperforate part of the pipe 21 is largely lost.

In order to maintain effectiveness of the pipe 21 for insuring a draft upwardly through the center of the bin, I have provided for the upper part of the pipe 21, a sliding outside sleeve 33, shown in Figure 2.

The sleeve 33 has its upper and lower ends slightly bell shaped, as at 34.

On the sleeve 33 are brackets 35 to which are secured ropes or the like 36 extending upwardly and over pulleys 37 supported from the top 17.

The ropes 36 then converge, as at 38 (Figure 1) and are connected with a single rope 39 extending to a point outside the bin and over a pulley 40 and thence downwardly through a fastening device 41 outside the bin.

When the bin is practically full of grain, the sleeve 33 is held in its upper position till part of the grain in the bin is removed. The sleeve 33 may then be lowered over the upper exposed holes 25 so as to keep its lower end in the grain and thus insuring the upward draft of air in the pipe instead of permitting air to escape through the upper holes 25 into the upper part of the bin.

It will be seen from the foregoing, that I have provided a grain bin of simple and very durable construction. This bin can be readily and easily manufactured or built largely from corrugated sheet metal. When completed, the walls are amply strong enough for the purpose, and are provided with perforations, which permit free circulation of air therethrough.

It should be mentioned, that the walls in square or oblong bins are to be suitably reinforced or braced as with angle or T irons set upright against the walls at intervals of from three to four feet and connected across the bin with tie rods.

The openings 19 in the corrugated wall plates 11 are so made that no mice, rats or squirrels or the like can get into the bin through them.

The openings 19 in the corrugated plates 11 are so made and arranged that the upper part of the corrugations 12 forms a part of the water shed and the lip 20 being cut with the corners slightly rounded and the upper edge being forced slightly inward completes the water shed so that no water can enter the bin.

The openings 19 are made of such size that no grain such as wheat, barley, etc., can pass through.

The openings 19, are made of such size, form and frequency that sufficient air will

be admitted to the bin that all grains stored therein will be thoroughly aerated and cured, or preserved.

The arrangement of the openings 19 in the side plates 11, and the openings 25 in the pipe 21, and the openings 31 in the pipes 29 and the wall plates 11 and the pipes 21 and 29 is such that a forced circulation of air through grain stored in the bin is assured at all times.

The arrangement of the wall plates and the pipes 21 and 29 and the openings in them as stated above, is such that the air enters the bin through the openings 19 in the wall plates 11, passes through the grain and through the openings 25, in the ventilating pipe 21 and the openings 31 in the secondary ventilating pipes 29 in to the pipes 29 and 21 and on through them out of the bin through the screen 22 to the open air.

The circulation herein described is such that should the grain stored in the bin develop any heat at any time an increased circulation would be developed as warm air tends to rise through the course of least resistance thereby creating a natural draft along the course herein described, thereby drying and curing the grain stored in the bin.

When the level of the grain in the bin is lowered, the sleeve 33 may be correspondingly lowered.

When it is desired to clean out the bin, the pipes 29 can be swung upwardly at their outer ends until the lips 30 clear the lips 28 whereupon the pipes 29 may be moved out of the way.

Changes may be made in the details and structure and arrangement of parts of my improved grain bin without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. In a device of the class described, a grain bin, a ventilating pipe extending from above the bin downwardly to the lower portion thereof, ventilation tubes detachably connected with the lower part of said first pipe said tubes being loosely connected with the first pipe whereby their outer ends may be raised to permit their removal for the use of the bin floor, said tubes extending radially therefrom, the outer ends of said tubes terminating short of the wall of said grain bin, and ventilating holes in said tubes, said ventilating holes having tongues extending outwardly and downwardly from the upper sides thereof.

2. In a grain bin structure, a floor, a perforated circular wall, a perforated ventilator tube at the center thereof, radial perforated tubes resting on said floor and communicating with said ventilator tube, said radial tubes being detachably connected with said ventilator tube, means for such connection comprising openings in the lower end of the ventilator tube to receive the innermost ends of the radial tubes and lips on said inner ends coacting with the upper sides of said openings to maintain said radial tubes in position.

Des Moines, Iowa, October 10, 1924.

GEORGE A. MEEK.