Feb. 11, 1969 V. B. STEFFEN 3,426,445

BASE FOR STEEL STORAGE BIN

Original Filed July 30, 1964

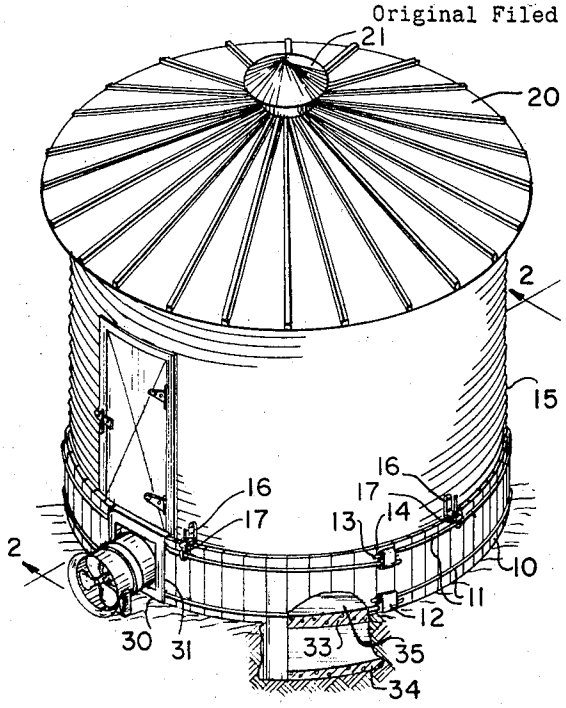


FIG. 1

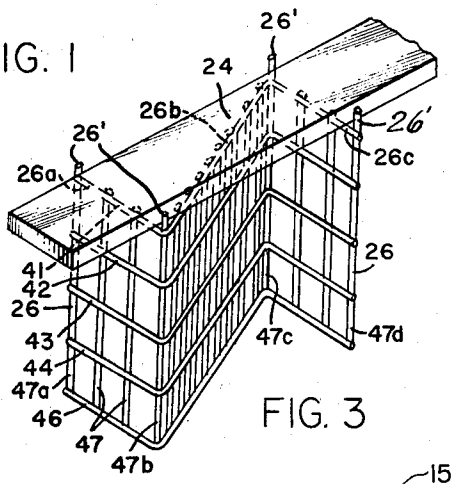


FIG. 3

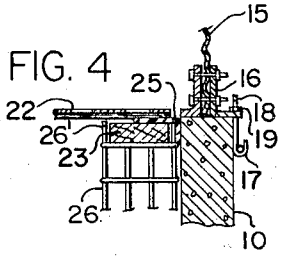
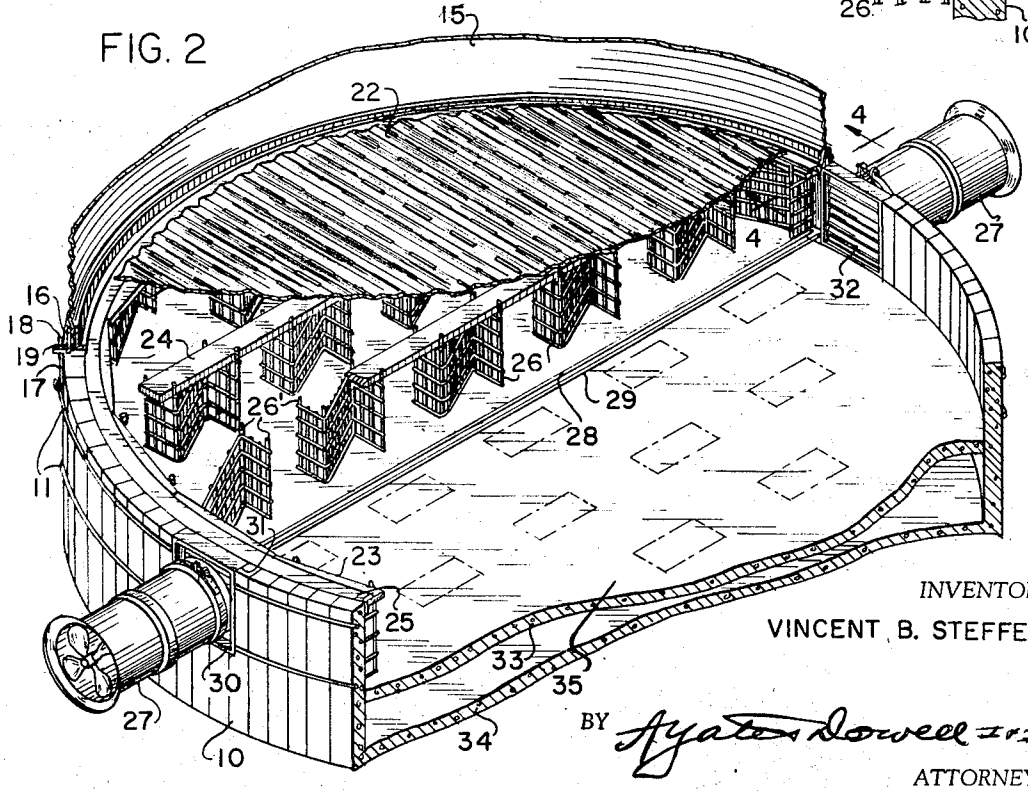


FIG. 4

FIG. 2



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BASE FOR STEEL STORAGE BIN

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Continuation of application Ser. No. 386,181, July 30, 1964, now abandoned. This application Aug. 22, 1966, Ser. No. 581,411
U.S. Cl. 34—233 7 Claims
Int. Cl. F26b 25/10; E04h 7/30

ABSTRACT OF THE DISCLOSURE

This invention relates particularly to a base for supporting a floor in a storage bin used for storing grains and other crops, which base comprises a plurality of identical, mesh-type supports, each support of a substantial, Z-shaped open work provided with a combination of generally horizontally disposed members and generally vertically disposed members, all of which are integral, of heavy gage wire or rod stock for supporting the floor.

This is a continuation of application Ser. No. 386,181 filed July 30, 1964, and now abandoned.

The invention relates particularly to a base for a storage bin used for storing grains and other crops immediately after they are harvested and without the necessity of having to delay or give consideration to the excess moisture contained and is an improvement over the invention disclosed in Patent 2,818,009.

In the above indicated prior patent, the floor is supported on masonry blocks or the like which are bulky, did not allow full and free circulation of the air, were costly, and in order to produce adequate air distribution, it was necessary to use air directing baffles.

It is an object of the invention to simplify and improve the structure of the above identified patent and to provide a base for a storage bin in which instead of blocks being used to support the floor, prefabricated skeleton-type simple inexpensive lightweight floor units are provided of rugged open-work construction, a number of which can be used to support the floor of the storage bin, and which floor units will not interfere with the circulation of air, and which can be readily moved, stacked and stored.

Another object of the invention is to provide a storage bin with ventilating means including fans or blowers, located in opposed relation in order to produce maximum air circulation without ducts and baffles, means for modimying the temperature of the air, and which fans or blowers may be operated independently or simultaneously, and with a gravity-type shutter or structure for closing the opening to the fan when the latter is inoperative, the construction including L-shaped flashing attached to the wood sills and lying under the floor in a manner not to obstruct delivery of air to the grain directly above it without removing the flashing when the floor is removed to facilitate cleaning the inner chamber, the arrangement eliminating extra electric wiring and gas piping necessary to operate the fans and heating elements on the opposite sides of the bin, and minimizing labor, materials, and cost of installation.

Other objects and advantages of the invention will be apparent from the following description considered in conjunction with the accompanying drawing wherein:

FIG. 1 is a perspective of a storage bin with a base illustrating one application of the invention;

FIG. 2, an enlarged fragmentary detail perspective of the base with portions borken away and illustrating the open-work rugged floor supporting units or members, flashing for the margin of the floor, and opposed combination heater and blower units set apart by automatic shutters;

FIG. 3, a perspective of one of the floor supporting units in beam supporting position; and

FIG. 4, a fragmentary section on the line 4—4 of FIG. 2.

Briefly stated the storage bin base of the present invention is composed of an upright wall of posts or staves arranged in a circular manner and held together by tension hoops. At the top of this foundation structure is located a perforated floor supported by means of beams mounted on supporting units, a flashing being provided around the margin of such floor to provide a substantially tight joint or seal between the walls of the storage bin and the supporting air chamber forming base. Upon the base is mounted a conventional bin having a door and a roof. A pair of combination motor-driven heater and fan units are removably located in openings in said upright wall and on the interior, such openings are provided with gravity-operated louvers or shutters so that when one unit is not operating, the shutters will seal the opening to the unit and the exterior.

With continued reference to the drawing, an air-chamber forming base **10** is composed of concrete posts or staves arranged in circular or other form and bound together by hoops or bands **11**, the ends of which extend through connectors **12** and have threaded ends **13** on which are secured nuts **14**.

On this base **10** is mounted a bin forming wall **15** having attached thereto perforated brackets **16** through which J-clamps **17** are disposed having threaded ends **18** on which are received nuts **19**. The J-clamps engage the uppermost band **11** and thus bind the bin forming wall **15** to the base **10**.

The bin may have a cover **20** with a ventilator **21** at the top center of the same and a perforated floor **22** supported by floor supports or joists **23** and longer supports or joists **24**. The supports **23** are located around the margin and the supports **24** across mid-portion of the enclosure, an L-shaped flashing **25** being provided for sealing around the marginal edge of the floor.

In order to provide a support for the floor joists **23** and **24** in a manner to permit free substantially unobstructed circulation of air, a series of substantially Z-shaped open-work supports **26** are provided of upright and generally horizontally disposed members of heavy gauge wire or rod stock. This results in a lightweight structure without cracks or crevices for vermin or rodents and effects a substantial saving over a concrete block-type support. The supports **26** have generally rectangular upright terminals with corner posts **26'** extending upwardly beyond the top of the same which serve to retain the supports or floor joists **24** thereon.

Each support **26** has a trio of portions **26*a***, **26*b*** and **26*c*** (FIG. 3) which form in an integral manner the uppermost first member **41** of a plurality of generally Z-shaped, horizontally disposed, vertically spaced first members, the remaining first members being indicated **42, 43, 44** and **46**. The first members are joined, as by welding, by a plurality of substantially vertically disposed, horizontally spaced second members, all of which are identified by the numeral **47** (FIG. 3), and which second mem-

bers are identical and comprise straight rods; with the four corner rods or posts 47*a*, 47*b*, 47*c*, and 47*d* having the extensions 26' at their upper ends. Due to the identical, integral and stationary shape of the supports 26, they may readily be stacked for storage and transportation purposes. Additionally, as best shown in FIG. 2, the supports 26 are placed in alignment within a plurality of parallel rows, and wherein within each row each support is placed in an identical position relative to the other supports 26 located in the same row.

Grain and the like placed in the storage bin 15 frequently contain excess moisture, a substantial portion of which must be removed in order to preserve the grain, and to accomplish this purpose, opposed combination motorized fans or blower arrangements 27 are provided which also may include heating or temperature modification means supplied through lines 28 and 29 with fuel or electrical energy for operating the fans or blowers and each unit having a frame 30 disposed in an opening 31 in the wall 10. Each frame 31 is provided with closure means for closing off the interior of the bin 15 to the fan 27 mounted therein, in the form of conventional louvers 32 which close by gravity and which remain closed until they are opened by the force of air produced by the fan. Thus air is introduced from each of the fan-heating units 27 independently or in unison and when one is in operation the other will be closed but when both are in operation, since the projection of air is toward the center of the air chamber in the base, the air will be dispersed or distributed over the entire area. If desired, in addition to the base 33, an additional moisture barrier 34 may be employed for the air chamber 35.

It will be apparent from the foregoing that a base is provided for a storage bin, which base defines an air chamber containing simple sturdy open-mesh floor units which allow free circulation of the air as well as adequately support a floor and along the boundary of the floor is provided an L-shaped flashing which does not obstruct the delivery of air through the floor to the grain above, and which flashing need not be removed when the floor is removed to facilitate cleaning of the air chamber. Also, by using two motor-driven smaller fans in opposed relation, the cost is less than for a single larger fan, and the manner of use likewise will result in a saving while delivering air more satisfactorily to say nothing of a saving in the cost of wiring and the elimination of ducts with their inefficiency. On the other hand, there is obtained maximum efficiency in air delivery without turbulence and invariably losses caused by the ducts and the increase of air velocity and loss of volume in the ducts.

It will be further apparent that by the use of the automatically operating shutters in the wall separating the interior of the base from the exteriorly mounted fans, the fans may be started and operated independently or together, the fans being connected directly to the housing of the air delivering fan and with such housing provided with suitable heating means.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is illustrated in the drawing and described in the specification, but only as indicated in the accompanying claims.

I claim:

1. A base for a storage bin comprising:
- a series of staves located in circular upright, side by side relation and defining an annular wall;
- floor supports for a perforated floor across the upper portion of said wall;
- a series of independently spaced substantially Z-shaped mesh-type units distributed beneath and supporting said floor supports, said units having corner posts extending upwardly beyond the top of the same for retaining said floor supports in place;

- a pair of indepently controlled opposed combination blower-heater units mounted to project an air stream in said base in opposition one to the other thereby to produce distribution of air in said base; and
- gravity-operated louvers for closing the discharge from said blower-heater units to the interior of said base, whereby the louvers adjacent one of the blower-heater units will be closed except when held open by a blast of air from such unit.

2. The structure of claim 1, including means for heating the air circulated by said blowers.

3. A base for a storage bin comprising:
- an annular wall;
- floor supports for a perforated floor across the upper portion of said wall;
- a series of independently spaced stackable mesh-type units distributed beneath and supporting said floor supports, said units having corner posts extending upwardly beyond the top of the same for retaining said floor supports in place;
- a pair of independently controlled opposed combination blower-heater units mounted to project air streams in said base in opposition one to the other to cause distribution of air in said base; and
- gravity-operated louvers for closing the discharge from said blower-heater units to the interior of said base, said louvers being openable by the force of air from said blowers.

4. A base for a storage bin having an annular wall, a ground floor, and a perforated floor spaced above the ground floor, the base comprising:
- a series of independently spaced substantially Z-shaped mesh-type units distributed in aligned relationship on the ground floor; and
- a series of independently spaced floor support joints of an elongated nature, each joint supported at longitudinally spaced intervals by more than one of said units; said joists being supported in parallel relation to each other, and wherein said joists engage the undersurface of the perforated floor for support thereof.

5. In a storage bin having an upstanding wall:
- a perforated floor supported within the wall;
- a series of wire mesh-type units distributed beneath and supporting said floor, said units placed in alignment in parallel rows and having identical placement in each row relative to the other units in the said each row, each unit including a plurality of substantially horizontally disposed, vertically spaced integral, angularly related first members, and a plurality of vertically disposed, horizontally spaced second members secured to said first members; and
- means associated with the bin for forcing air into the bin beneath said floor.

6. A frame for a storage bin as defined in claim 5, and further wherein said floor is supported by a plurality of elongated floor supports disposed across the upper portion of said wall, each unit having corner posts extending upwardly beyond the top of same for retaining a respective floor support in place.

7. A frame for supporting a floor comprising a continuous open-work unit, said unit including a plurality of substantially horizontally disposed, vertically spaced first members, and a plurality of substantially vertically disposed, horizontally spaced second members secured to said first members;
- said second members having upper ends of which form in plan view a plurality of locations through which a pair of parallel lines may be drawn;
- each portion of said unit being identical, Z-shaped in plan view and stackable with other said portions in a nested manner.

(References on following page)

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References Cited

UNITED STATES PATENTS

349,059	9/1886	Scarles	52—687
503,573	8/1893	Beckley	211——181
902,357	10/1908	Wohlpart	52—676
2,252,179	8/1941	Hueglin	98—116
1,717,772	6/1929	Greenwald	126—332 X
1,570,814	1/1926	Wolley	52—687
2,679,736	6/1954	Duchin	248—175
2,081,602	5/1937	Rubenstein	248—175 X

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2,818,009	12/1957	Steffen	98—55
3,028,928	4/1962	Juculano	182—178

FOREIGN PATENTS

1,353,191	1/1964	France.

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U.S. Cl. X.R.

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