Nov. 14, 1950 S. J. MALECEK 2,529,953

GRAIN DRIER

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Fig. 1.

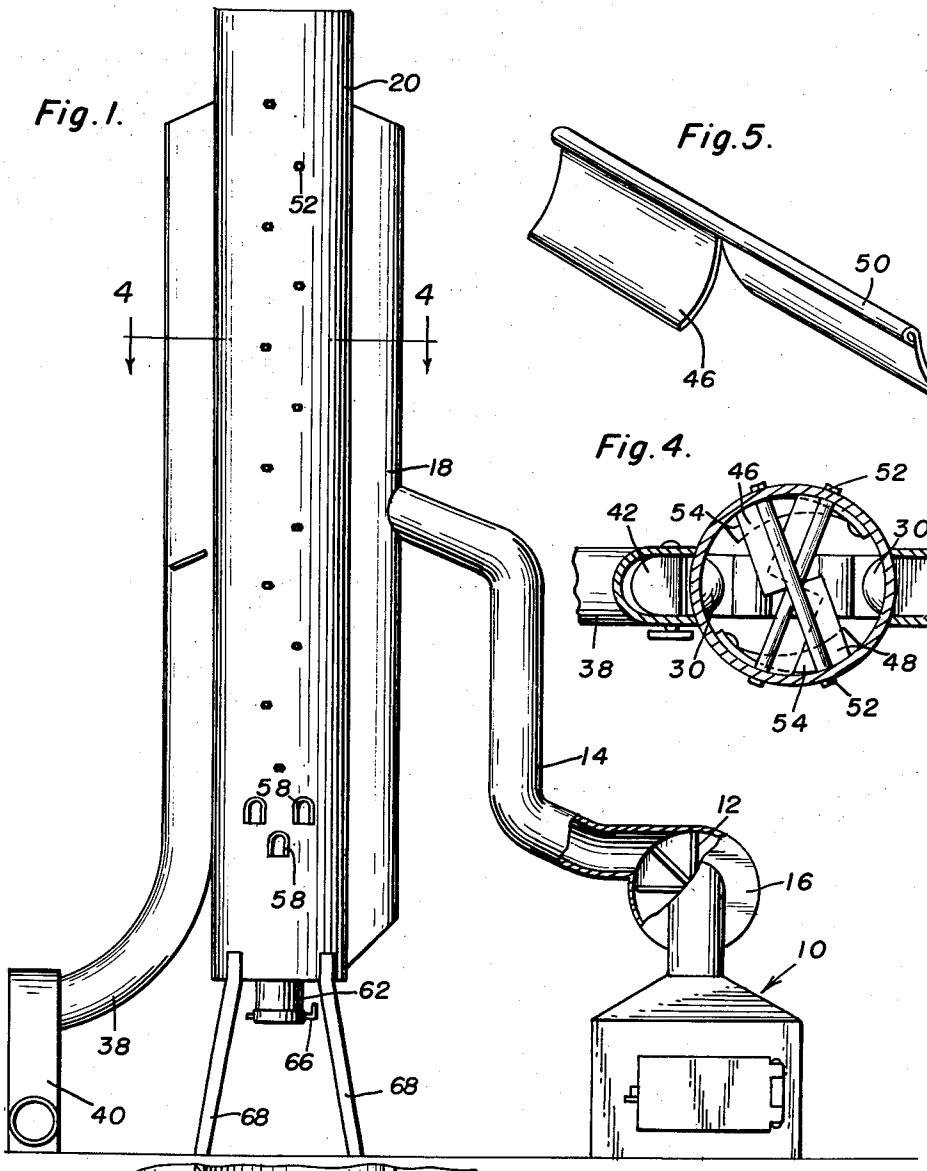


Fig. 5.

Fig. 4.

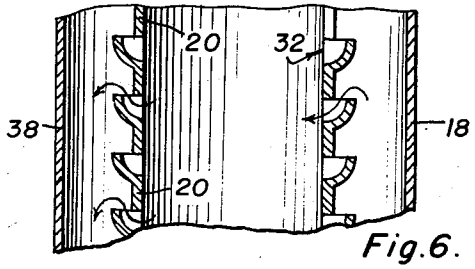


Fig. 6.

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Fig. 2.

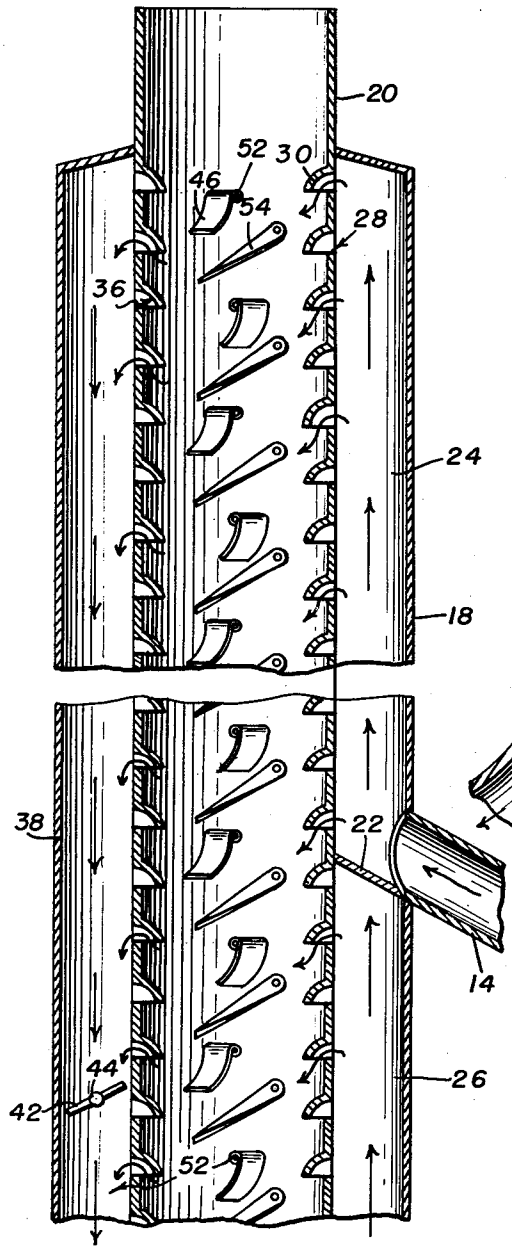
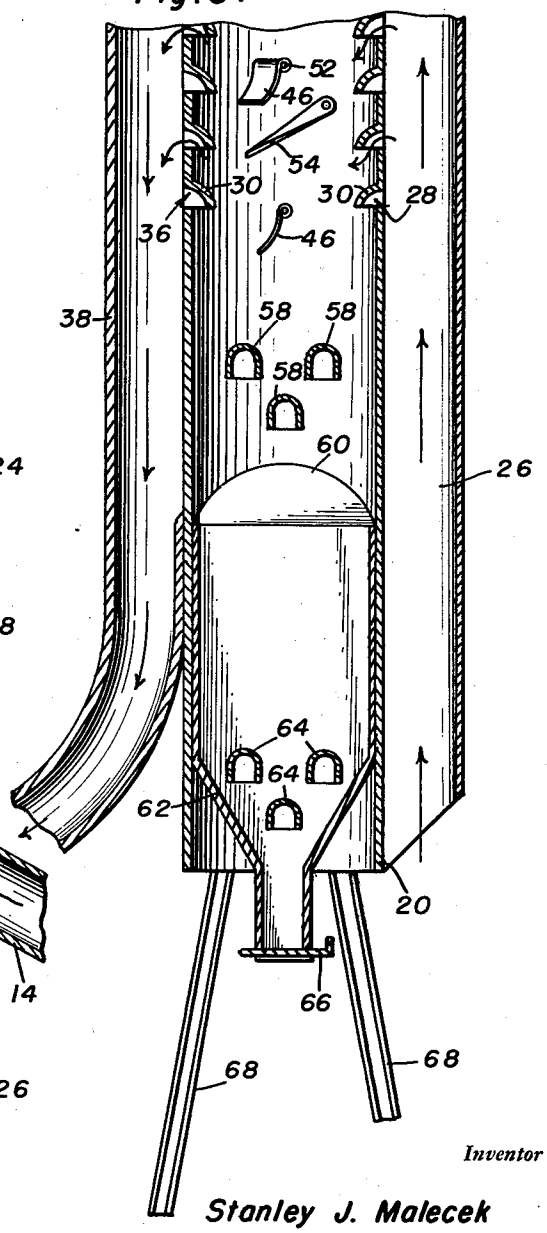


Fig. 3.



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GRAIN DRIER

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6 Claims. (Cl. 34—65)

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This invention appertains to novel and useful improvements in devices for conditioning grain and other similar farm products.

The prime object of this invention is to condition grain by the application of heated air, while the grain is being agitated, separated, dispersed and scattered.

Another object of this invention is to provide means for receiving grain therein having improved baffle means for dispersing and scattering grain therein.

Another object of this invention is to provide common means for conducting conditioned air within said housing and for conducting spent air from said housing, the second purpose of said means being to assist in baffling or dispersing the grain.

A further object of this invention is to provide fluid flow control means within a selected duct which is utilized for conducting air to and from said housing.

A still further object of this invention is to provide means for preventing conditioned air from entering a selected portion of one of said air ducts, thereby permitting the other portion of said air ducts to receive fresh air therein, thereby introducing it within the said housing.

Another purpose of this invention is to provide improved baffle means for utility within the said housing, said baffle means being characterized particularly by oppositely inclined, arcuate segments whereby the baffle means may be agitated slightly during the utility thereof.

Another purpose of this invention is to provide an extremely efficient, inexpensive device of the character described.

Ancillary objects and features of novelty will become apparent to those skilled in the art, in following the description of the preferred embodiment of the present invention, illustrated in the accompanying drawings, wherein:

Figure 1 is an elevational view of the preferred form of the present invention, portions being shown in section to illustrate details of construction;

Figure 2 is a fragmentary longitudinal sectional view of the housing and air duct means forming an important part of the present invention;

Figure 3 is a fragmentary sectional view of the invention disclosed in Figure 1, showing particularly the lower portion of the housing means therein;

Figure 4 is a transverse sectional view of the invention disclosed in Figure 1 and taken substantially on the line 4—4 thereof and in the direction of the arrows;

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Figure 5 is a perspective view of the baffle means utilized in conjunction with the present invention; and

Figure 6 is a fragmentary sectional view of the tube and duct system utilized in conjunction with the present invention and exemplifying a modified form thereof.

Referring now in detail to the illustrated preferred embodiment of the present invention, like reference characters are used throughout to indicate similar elements thereof.

This invention has been developed to provide a device for conditioning grain particularly prior to storage or for any other useful purpose. The operation of the invention sets forth the general principles thereof, and, accordingly, a short description of the operation of the invention will be set forth at this time.

A source of heat energy is provided for the purpose of conditioning air prior to entry into a selected portion of an air duct. This aid duct extends longitudinally of a louvered housing and only a selected portion of said air duct receives this conditioned air. The conditioned air extends through a housing wherein grain is supplied. The grain is pulled by the force of gravity to the lower portion of said housing, being scattered, dispersed and otherwise agitated on its way to the lowermost portion of the housing.

The conditioned air, after circulating throughout portions of the housing, is received through a second set of louvers, thence through an outlet air duct. By means of the circulation of air through the duct and housing, a vacuum is created adjacent the lower portion of the first-mentioned air duct which is utilized for the purpose of drawing fresh air into the system. The amount of conditioning air utilized in the housing is regulated by means of a conventional butterfly valve positioned within the outlet air duct. It will be noted, also, that to assist in the operation and for greater efficiency, an exhaust fan may be provided at the terminal portion of the said outlet duct. The flow of grain through the housing is regulated by means of a valve positioned adjacent the terminal portion thereof. Obviously, the amount of grain poured into the housing may be manually regulated, or, if desired, a conventional mechanical means may be supplied.

The baffle means within the said housing are of several types, one of which is the pivotal arrangement of a baffle having arcuately, oppositely inclined segments. Also, the baffle itself is slightly

staggered relative to the next adjacent baffle thereby forming a continuous helix of baffles within the housing.

A heat generating plant, generally indicated at 10, is provided preferably with conditioned air-impelling means associated therewith. This air-impelling means may be a conventional fan 12 and may be of any desired type. Of course, conventional impelling means may be utilized for the purpose of turning the fan blades.

Conduit means 14 extend from the outlet portion of the fan housing 16 and the said conduit means terminates in communication with an air duct 18. This air duct is rigidly secured to a housing 20 which is preferably tubular in configuration.

The said air duct 18 has a baffle 22 therein which is positioned adjacent the junction of the air duct 18 and the conduit means 14. Inspection of Figure 2 clearly discloses that the said baffle 22 substantially renders the air duct 18 two separate elements 24 and 26.

The housing 20 is provided with a plurality of louvers therein. The said louvers are preferably separated in two banks, distinguished as inlet and outlet means. The inlet means or louvers, generally indicated at 28, are in communication with the inlet duct means 18. It is noted, at this point, that the said inlet louvers are provided with curvilinear portions which are inwardly inclined and serve the dual purpose of baffling or directing the conditioned or inlet air, as well as baffling or guiding the incoming grain. The said curvilinear portions 30 are conventional in shape. However, they serve the dual function as mentioned above.

Referring now to Figure 6, there is disclosed a second embodiment of the present invention wherein the louvers, generally indicated at 32, are outwardly inclined, facing the duct means. In this embodiment of the present invention, the louver means does not serve the second function as set forth above.

The outlet louvers, generally indicated at 36, are preferably oppositely opposed to the said inlet louvers 28 and are of the exact configuration of the said louvers 28. These last-mentioned louvers 36 also serve the dual function of baffling grain and conducting spent air from the housing 20.

An outlet air conducting means or duct 38 is secured to the housing 20 and is in communication with the outlet louvers 36. This outlet duct 38 may be supplied with an exhaust fan 40 for the purpose of assisting in exhausting air from the system. Of course, the fan 40 is also conventional in construction.

Means for controlling the amount of air flow through the system may be viewed in Figures 1 and 2. This means is preferably a simple butterfly valve 42 positioned on a conventional pivot pin 44. As is seen in Figure 2, particularly, the said butterfly valve 42 is within the outlet duct 38.

In utility of the invention, air flows through the duct and housing, as indicated by the arrows. It will be noted further that the lower portion of the said duct 18, which is indicated by the numeral 26, projects below the said baffle 22 and, accordingly, does not receive conditioned or heated air therein. On the contrary, the lower portion of the extension 26 is open to the atmosphere, and due to the circulation through the housing, a vacuum is created at the lower portion thereof. This vacuum tends to relieve itself (as conventional) and fresh air is received within the extension 26. This fresh air travels through a selected portion of the louvers 28 and is received in the housing 30. Of course, the fresh air, along with the conditioned air, is exhausted through the outlet louvers 36.

Grain or the like is poured or otherwise inserted the upper portion of the said housing 20 and permitted to drop therethrough. As the grain is sifted downwardly through the housing 20, it is acted upon by means of several types of baffles.

One type of baffle has been described above, being the baffle member 30 cooperating to form the louvers.

The second type of baffle may be seen best in Figure 5, wherein there is disclosed a single body member having arcuate, oppositely inclined segments 46 and 48, respectively, extending therefrom. A bight 50 extends across the said segments 46 and 48 for the purpose of receiving a pivot pin 52 therethrough. This pivot pin also extends through the walls of the said housing 20 and progressive pins are slightly off center relative to the next adjacent pin. This, of course, provides a staggering system, simulating a continuous helix.

As is seen in Figures 2 and 4, a plurality of downwardly inclined, arcuate, stationary baffles 54 are supplied along the interior surface of the said housing 20. These last-mentioned baffles 54 assist in dispersing and scattering the grain as it falls through the housing 20.

Going now to Figure 3, there is disclosed a plurality of curvilinear arms 58 extending transversely of the said housing 20. As is well known, these arms serve the purpose of separating grain and are conventionally known as separators.

Downwardly and inwardly inclined plates 60 are secured within the said housing 20 for the purpose of guiding grain, after separation, into a hopper 62.

Positioned within the said hopper 62 there is a plurality of arms 64 identical to those numbered 58. Of course, the arms 64 also serve the purpose of separating means and being positioned adjacent the spout of the said hopper 62, provide a final separating function prior to emission from the hopper 62.

Slidably received in suitable apertures in the spout of the hopper 62, there is a plate, slide or valve 66. Obviously, this valve serves the purpose of regulating the amount of grain emitted from the hopper.

If so desired, a plurality of legs 68 may be secured to the housing 20 for the obvious purpose of supporting the same at a suitable height so that receptacles may be placed under the spout of the hopper 62.

It is apparent that various changes may be made herein without departing from the inventive concept. Accordingly, limitation is sought only in accordance with the scope of the following claims.

Having described the invention, what is claimed as new is:

1. In a grain conditioning apparatus, a vertical housing, means for feeding grain into the top of the housing, means for removing grain at the bottom of the housing, treating gas inlet openings in one vertical wall of the housing, treating gas outlet openings in the opposite housing wall, a supply duct for said inlet openings, an exhaust duct for said gas outlet openings, baffles adjacent the gas inlets and outlets and extending inwardly, further inverted U-shaped baffle means at the bottom of said housing adjacent the grain removing means, and pivotally mounted baffles vertically spaced within the housing.

2. In a grain conditioning apparatus, a vertical housing, means for feeding grain into the top of the housing, means for removing grain at the bottom of the housing, treating gas inlet openings in one vertical wall of the housing, treating gas outlet openings in the opposite housing wall, a supply duct for said inlet openings, an exhaust duct for said gas outlet openings, baffles adjacent the gas inlets and outlets and extending inwardly, further baffle means at the bottom of said housing and disposed transversely across the housing adjacent the grain removing means, and pivotally mounted baffles vertically spaced within the housing.

3. The combination of claim 1 wherein said further baffle means includes rods having convexed upper surfaces.

4. A grain conditioning apparatus comprising a vertical housing having treating gas inlet openings in one vertical wall thereof and treating gas outlet openings in the opposite housing wall, a vertical supply duct secured to the housing for the inlet openings, said supply duct being closed at its upper end and open at its lower end, a conditioned air conduit entering the supply duct intermediate the ends of the supply duct, a baffle fixed within the supply duct adjacent the junction of the conduit and the supply duct, said inlet openings being located above and below the baffle, baffles adjacent the inlet and outlet openings, and extending inwardly, means at the bottom of the housing for removing grain from the bottom of the housing, further baffle means at the bottom of the housing adjacent said grain removing means, pivotally mounted baffles vertically spaced within the housing, and an exhaust duct mounted on said housing for said outlet openings.

5. The combination of claim 4 and a manually operated valve within the exhaust duct for controlling the flow of gas leaving the exhaust duct.

6. The combination of claim 1 wherein said first named baffles include curvilinear plates integrally formed with the housing at said inlet and outlet openings, said curvilinear plates being located within the housing and forming baffles for air as well as grain entering the housing.

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