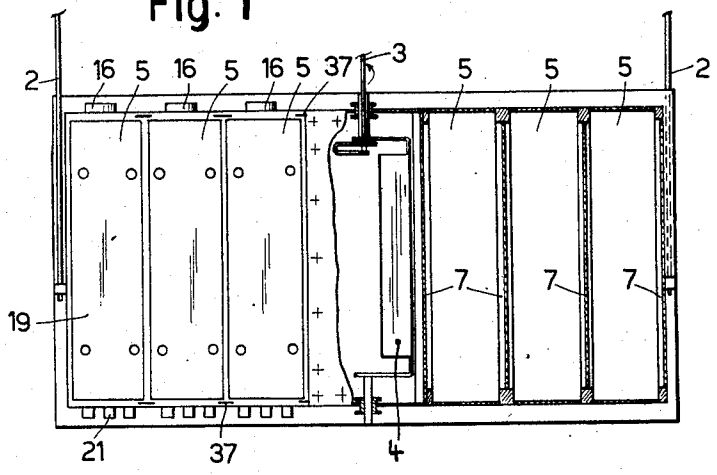
Aug. 25, 1959 P. EPPENBERGER 2,901,109

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Fig. 1



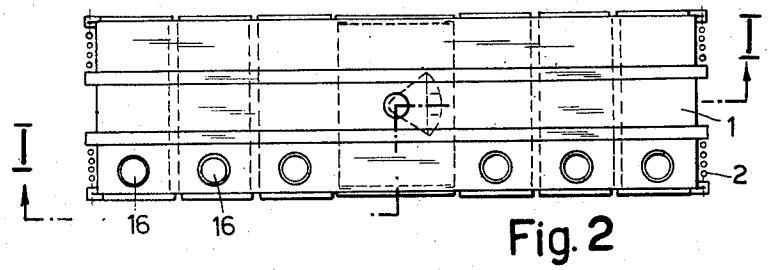


Fig. 2

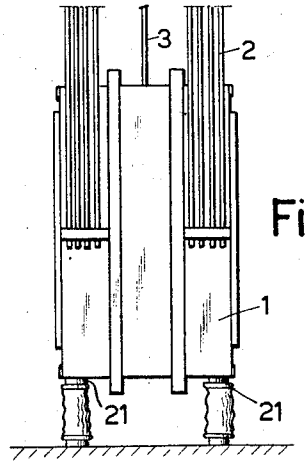


Fig. 3

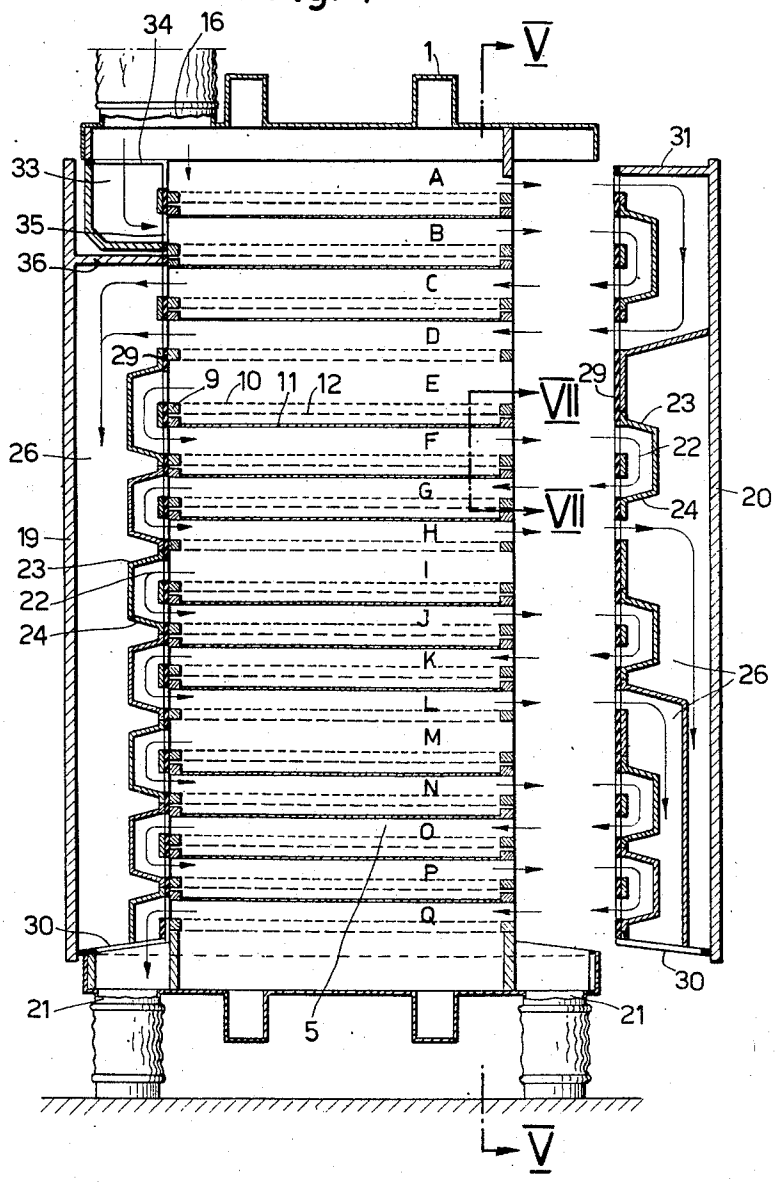
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Fig. 4



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Fig. 5

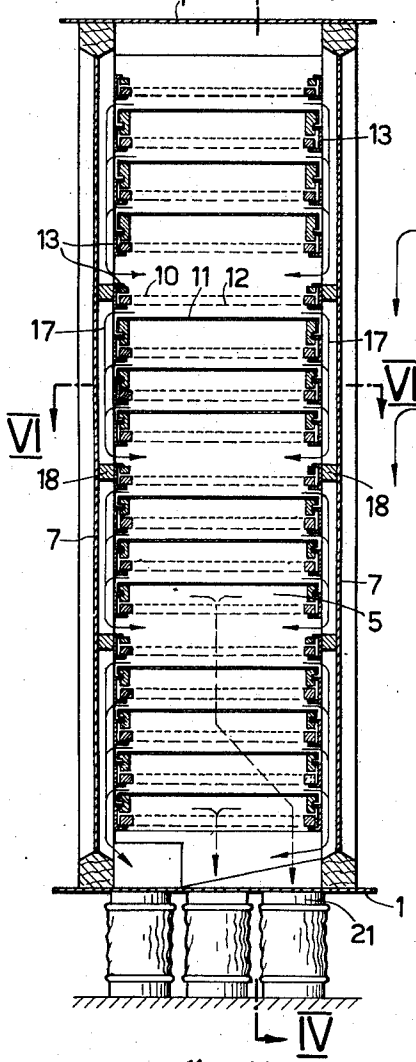


Fig. 7

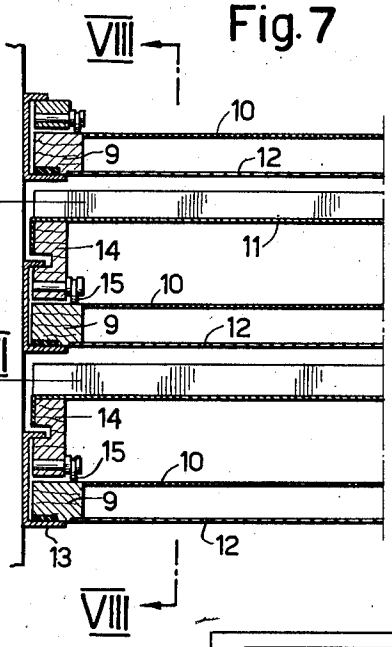


Fig. 14

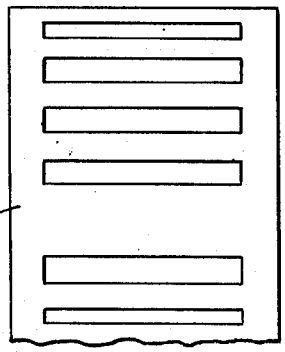
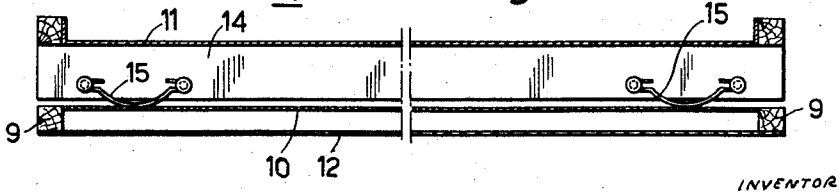


Fig. 8



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Fig. 6

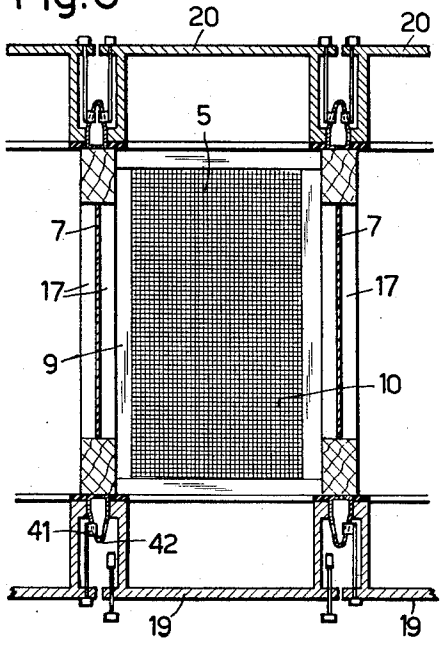


Fig. 10

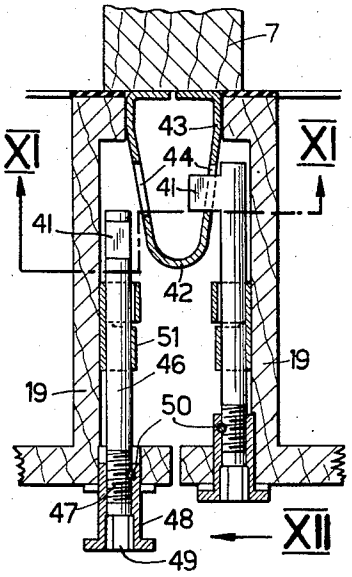


Fig. 12

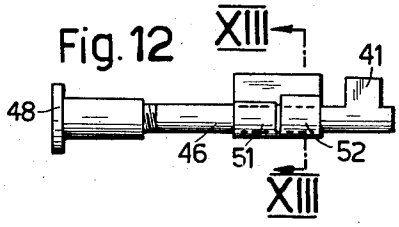
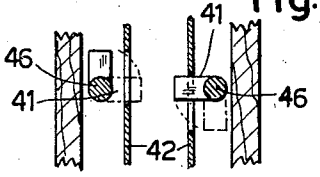


Fig. 11



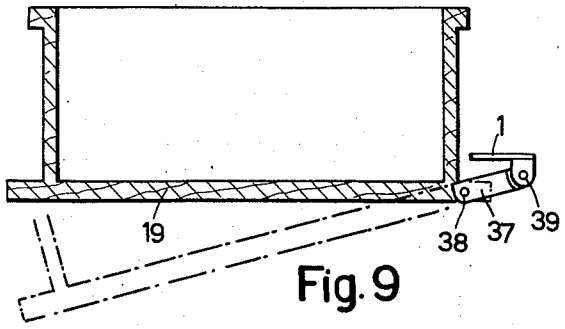


Fig. 9

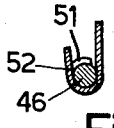


Fig. 13

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United States Patent Office 2,901,109 Patented Aug. 25, 1959

2,901,109

PLANSIFTER COMPARTMENT

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Application November 20, 1957, Serial No. 697,571
7 Claims. (Cl. 209—316)

Plansifters generally are used for separating, assorting or classifying fractions of a product, in particular in flour mills. My present invention relates to a plansifter compartment including a plurality of superposed sifters and collecting bottoms disposed in a casing in which the chutes for the passing fractions extend laterally of said bottoms and sifters, and in which the by-pass ducts and chutes for the overriding and rejected fractions, respectively, are disposed in special terminal boxes at both sifter ends. In the following description and claims, the term "overriding" designates such fractions of product introduced into the plansifter which are led laterally from a higher onto a lower sifter without passing through the bolting cloth of the higher sifter. The term "rejected" designates such fractions which pass from a sifter directly toward and through an outlet of the plansifter without passing over another sifter. The plansifter compartment disclosed by the present invention is characterized in that the terminal boxes comprise sealing faces in only two junction planes of which one is vertical and the other is substantially horizontal at the lower end of each box.

The objects of my improvement are to render the plansifter compartment readily accessible and to provide positive sealing and a good closure. Such compartment permits the flow of fractions without development of bottlenecks, and prevents accumulation of goods in dead corners. The flow diagram is clear and distinct and readily variable. The flow may be routed in many different ways.

A preferred form of the invention is schematically shown in the drawing, in which—

Fig. 1 is a front elevational view, partly in section taken on line I—I of Fig. 2, Fig. 2 is a plan view, and Fig. 3 is a side elevational view of a plansifter comprising a plurality of compartments constructed in accordance with my invention; Fig. 4 is an enlarged section through a plansifter compartment taken on line IV—IV of Fig. 5, the right-hand terminal box being shown separated from the compartment casing; Fig. 5 is a section on line V—V of Fig. 4; Fig. 6 is a section taken on line VI—VI of Fig. 5; Fig. 7 is an enlarged section taken on line VII—VII of Fig. 4; Fig. 8 is a section taken on line VIII—VIII of Fig. 7; Fig. 9 shows in a plan view the connection between a terminal box or duct carrier and the casing; Fig. 10 shows the lower right-hand corner of Fig. 9 drawn to a larger scale; Fig. 11 is a section on line XI—XI of Fig. 10 with one rotary locking bolt in idle and another bolt in operative position; Fig. 12 shows a bolt with its bearing as seen in the direction of arrow XII in Fig. 10; Fig. 13 is a section taken on line XIII—XIII of Fig. 12; and Fig. 14 is fragmentary side elevational view of a sealing face.

The plansifter casing 1 (Figs. 1 to 3) is secured to hangers 2. In casing 1 is mounted a flyweight 4 which is driven by a shaft 3. On each side of flyweight 4 are arranged plansifter compartments 5 which are separated from each other by partitions 7 secured to casing 1.

A compartment 5 (Figs. 4 to 6) comprises superposed sifters in which the fineness of the bolting cloth increases from the top to the bottom and which are designated by the letters A to Q. Each sifter comprises a frame 9 across the upper side of which is stretched a bolting cloth 10, and across the underside of which is stretched a wide-mesh wire cloth 12 which carries pieces of belting, balls or like means (not shown) for cleaning the bolting cloth 10. In place of these cleaning means could be used a conventional brush arrangement. To most of the sifters is associated a collecting bottom 11 which is mounted on two long-side battens 14. The frames 9 and bottoms 11 are slidably inserted in channels 13 and are held apart and pressed against the flanges of the latter by springs 15.

The product fractions to be assorted or classified enter the plansifter through the intake 16. The passing fractions, i.e. those passing through the bolting cloths 10 onto the collecting bottoms 11, are carried away laterally of said bottoms and frames through ducts 17 until they are deflected again by battens 18 onto a lower sifter. At the ends of the frames 9 are disposed two special terminal boxes 19, 20 which comprise by-pass ducts 22, 26 for detouring and discharging respectively overriding and rejected fractions. The ducts 22, 26 extend over the entire width of the sifter frames 9. The rejected fractions pass through the ducts 26 and are discharged from said boxes 19, 20 through outlets 21. The ducts 22 for the overriding fractions are provided with walls 23, 24 which define a U-shaped path. The lower walls 24 are inclined with respect to the frames 9 to facilitate the movement of the products. The upper walls 23 are inclined to fall off outwardly and downwardly to avoid accumulations thereon. Ducts 26 for the rejected fractions are situated outside of the ducts 22, i.e. they are more distant from frames 9. In order to make the scheme of the plansifter compartments variable, the walls of the ducts 22, 26 are exchangeable.

The terminal boxes 19, 20 are provided with vertically alined seals or sealing faces 29 and with substantially horizontal seals or sealing faces 30. In order to facilitate the mounting of the boxes 19, 20 and to improve the degree of sealing in a downward direction, the junction plane of seals or sealing faces 30 is slightly inclined. Each sealing face 29 is formed with a plurality of cutouts through which the overriding and rejected fractions can pass into ducts 22, 26, respectively, of terminal boxes 19, 20. Sealing faces 30, too, are formed with one or more cutouts through which the rejected fractions can enter into respective outlets 21. Fig. 14 illustrates a portion of the sealing face 29 which is applied to the left-hand vertical side of terminal box 20 shown in Fig. 4. Box 20 is provided with an upper wall 31 and therefore seals are required in only two planes which allows for application of a proper bearing pressure. The product is fed through intake 16 into an inlet box 33 with two apertured sealing faces 34, 35 which box is secured to casing 1. Box 19 comprises a top closure wall 36 disposed below inlet box 33 and also requires only two sealing faces 29, 30 which are situated in non-parallel planes. The plansifter compartment may be opened, i.e. its terminal boxes may be removed or swung open, without requiring disconnection of intake 16 or outlets 21.

To allow of mounting the terminal boxes 19, 20 in the form of doors on casing 1, hinges 37 are provided of which each has two joints 38, 39. Fig. 9 shows that box 19 first has to be withdrawn in a direction away from frames 9 into the position shown in solid lines before it can be swung open. Its movement, therefore, is not hindered by the terminal boxes of the adjacent compartments 5.

In order to hold the boxes 19, 20 in closed position, rotary bolts 46 are provided. To the vertical edges of the partitions 7 in casing 1 are connected stirrup-like sockets 42 with slanting faces 43 and apertures 44 which can receive the noses 41 of bolts 46. The shank of each bolt 46 is turnable by means of a hexagonal socket key (not shown) insertable into a hexagonal bore 49 of an internally threaded sleeve 48. Threaded portion 47 of each bolt 46 is provided with a thread brake in the form of a "nylon"-pin 50. Bolt 46 is axially movable in a bear-

ing 51 fixed to the terminal box. In order to secure box 19 to casing 1, bolt nose 41 is pushed inwardly and turned by means of sleeve 48 which receives the externally threaded portion of the shank of bolt 46. The bolt nose 41 is taken along by pin 50 until it extends into aperture 44. When sleeve 48 is further rotated, the friction of pin 50 is overcome and sleeve 48 is braced against box 19. For opening, sleeve 48 is turned in the other direction, and as soon as the bracing action is released, bolt nose 41 is turned in threaded portion 47 by the friction of pin 50 and disengaged.

Bearings 51 are mounted externally and laterally of the boxes 19, 20 and serve as guides and stops for the shanks of bolts 46. Each bearing is provided with a cradle 52 which retains the retracted bolt nose in its open position (Fig. 13). Bearings 51 prevent bolt noses 41 from being withdrawn, and thus each sleeve 48 may be used as a knob for opening the door. In the arrangement of Fig. 11, the two rotary bolts have to be turned clockwise in order to hold box 19 in closed position.

The operation of the plansifter compartment is as follows. The product to be classified is divided into two streams by means of a distributor known per se (not shown). The first stream is conducted into sifter A. The passing fraction drops onto the respective collecting bottom 11, while the overriding fraction is conducted into sifter D by passing in the direction of arrows through the upper part of terminal box 20 (see Fig. 4). The second stream is conducted into sifter B, where the passing fraction is collected on the appurtenant bottom 11 therebelow and the overriding fraction is conducted into sifter C through the duct in the upper part of terminal box 20. The fractions rejected by the bolting cloths 10 of the sifters C and D unite in duct 26 of box 19 and are carried away from the plansifter compartment as the coarsest product through one of the outlets 21, i.e., the left-hand outlet in Fig. 4. The goods assembled on the collecting bottoms of the sifters A to C are carried away laterally through the ducts 17 and drop onto the sifter E where they join the goods which have passed directly through the bolting cloth 10 of sifter D (Fig. 5). The fraction rejected by the series-connected sifters E to H moves out of the plansifter compartment through the outside duct 26 of duct carrier 20 (see Fig. 4). The passing fraction drops onto sifter M, and the fraction rejected by the series-connected sifters M to Q moves out of the compartment at box 19 below. The passing fraction is conducted into terminal box 20 and leaves same through the left-hand outlet 21 in Fig. 5.

It was assumed in the above description of the plansifter's operation that the product introduced through inlet 16 requires separation into five fractions of different fineness. Thus, the first group of sieves A—D, which are of coarse mesh, rejects only the coarsest fraction while the four finer fractions fall through sieves A—D onto the sieve E. The second group of sieves E—H rejects the second coarsest fraction while the three finer fractions pass through sieves E—H onto the sieve I. The next group of finer-mesh sieves I—L rejects the next coarsest fraction but permits the passage of two finest fractions therethrough onto the sieve M. The last group of sieves M—Q rejects the next coarser fraction and permits the passage of the finest fraction therethrough.

It is, of course, possible to widely vary the scheme of the product flow through the plansifter compartment. For example, the inflowing product stream need not be subdivided or it may be subdivided into more than two streams. The number of outlets also is variable. The plansifter may be readily adapted to the requirements of any particular mill and to the properties and qualities of the product.

What I claim as new and desire to secure by Letters Patent is:

1. A plansifter compartment comprising, in combination: a casing having an intake for the product to be assorted and classified and a plurality of outlets for the assorted and classified fractions of the product; a plurality of superposed sifters and collecting bottoms in said casing, each sifter and each collecting bottom having two lateral sides and two ends; ducts in said casing for the passing fractions of the product disposed laterally of said sifters and collecting bottoms; a pair of terminal boxes connected to said casing, one at each end of said sifters and collecting bottoms, each terminal box having an upper end, a lower end, a substantially vertical side adjacent to the respective ends of said sifters and collecting bottoms, and comprising bypassing and carrying-away ducts for the overriding and rejected fractions of the product, respectively; a vertical sealing face connected to the side of each terminal box and extending between the upper and lower ends thereof, each sealing face having a plurality of cutouts constituting passages between said sifters and collecting bottoms on the one hand and said bypassing and carrying-away ducts on the other hand; and a substantially horizontal sealing face fixed to the lower end of each terminal box, each said last mentioned sealing face having at least one cutout for the passage of product fractions from the ducts in said terminal boxes into said outlets.

2. The plansifter compartment as set forth in claim 1, further comprising an inlet box connected to said casing between the intake and the upper end of one of said terminal boxes, the inlet box having a top through which it communicates with said intake and a side adjacent to said casing; an apertured substantially horizontal sealing face fixed to the top of said inlet box; and an apertured vertical sealing face fixed to the side of said inlet box.

3. The plansifter compartment as set forth in claim 1, wherein each terminal box has two vertical edges and further comprising hinge means for pivotally connecting one edge of each terminal box to said casing, each hinge means having two joints one of which permits movements of respective terminal box in a direction away from said sifters and the other of which permits pivotal movements of respective terminal box thereabout.

4. The plansifter compartment as set forth in claim 3, further comprising rotary locking bolts connected to the other edge of each terminal box for releasably locking same to said casing.

5. The plansifter compartment as set forth in claim 4, wherein each of said bolts has a nose, and further comprising a yoke-like socket for each bolt fixed to said casing, each socket having an aperture for reception of the nose therein to maintain the terminal box in locked position.

6. The plansifter compartment as set forth in claim 5, wherein each bolt is axially movable with respect to respective terminal box and comprises an externally threaded shank, an internally threaded sleeve on said shank, the sleeve having a rim which abuts against the respective terminal box when the bolt is axially displaced in a direction to move the sleeve toward the terminal box, and a thread brake between said shank and said sleeve.

7. The plansifter compartment as set forth in claim 6, further comprising a bearing for each bolt, each bearing being connected to respective terminal box for axially guiding the bolt and comprising stop means against which the nose of respective bolt abuts when the bolt is axially moved in a direction away from the respective socket.

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