United States Patent

Hartley

[15] **3,707,222**

[45] **Dec. 26, 1972**

[54] **HOPPER WITH SLIDE PLATES**

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[73] Assignee: **Hartley Controls Corporation**, Neenah, Wis.

[22] Filed: **Feb. 25, 1971**

[21] Appl. No.: **118,758**

[52] **U.S. Cl.** **198/57**

[51] **Int. Cl.** **B65g 47/18**

[58] **Field of Search** 198/47, 53, 54, 56, 57, 58

[56] **References Cited**

UNITED STATES PATENTS

1,962,017	6/1934	Jellinhaus	198/58 X
3,144,655	8/1965	Frazel	198/53

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Assistant Examiner—Douglas D. Watts
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[57] **ABSTRACT**

A hopper for granular material is superposed over a belt conveyor. The hopper has side walls leading toward a discharge mouth opening onto the belt. The hopper side walls are provided with a longitudinal series of paired slidable plates extending through the side walls and toward the discharge mouth to shape the flow path of hopper contents intercepted by the plates. A preferred arrangement is to dispose the inner edges of the plates progressively closer to the centerline of the belt from the downstream to the upstream end of the hopper, whereby the flow path shaped by the plates is wider at its downstream end than its upstream end.

6 Claims, 4 Drawing Figures

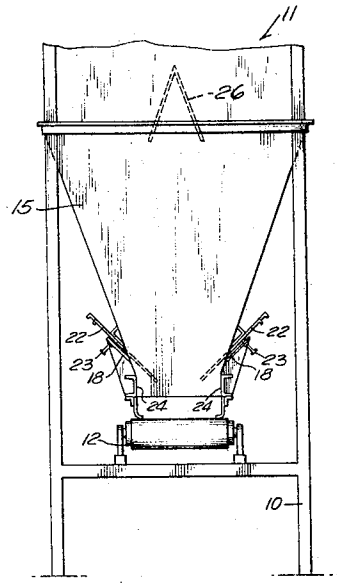
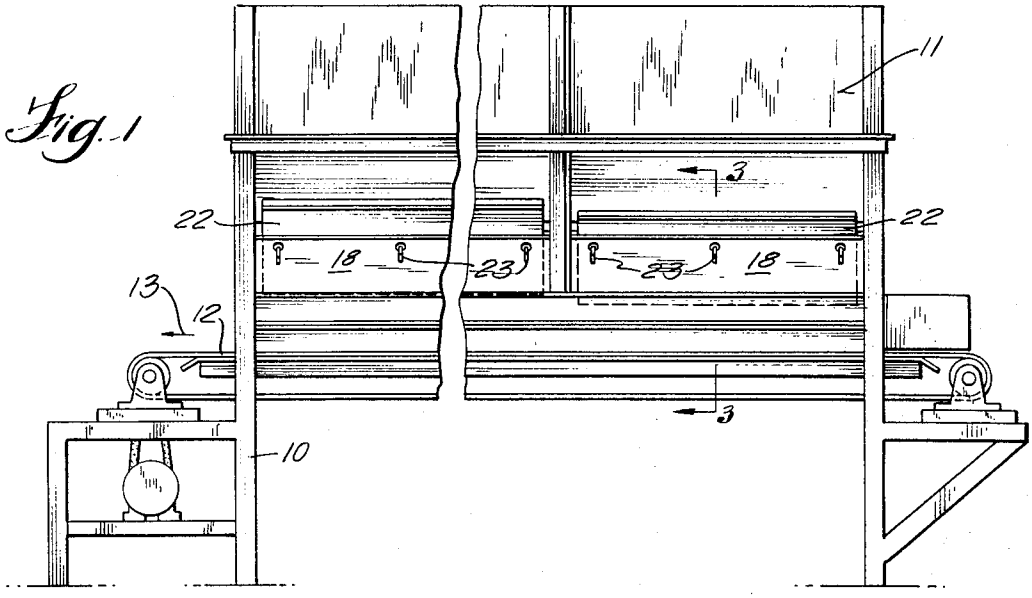


Fig. 1



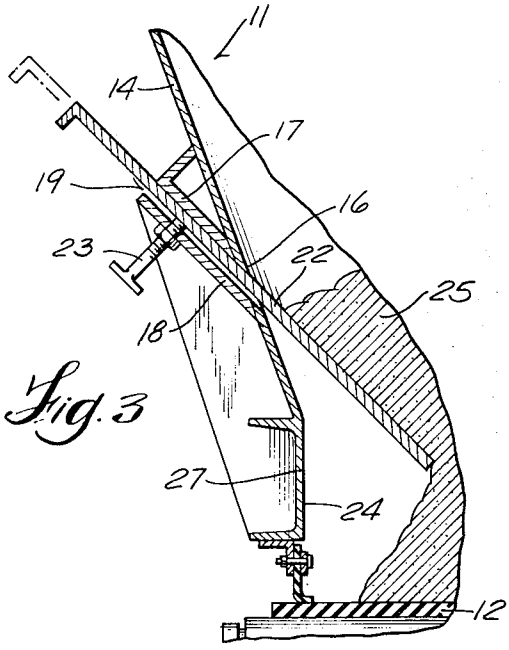


Fig. 3

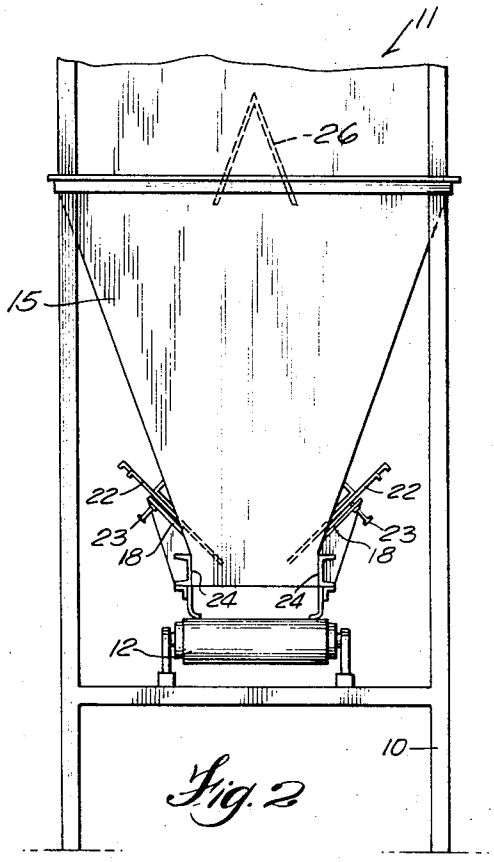


Fig. 2

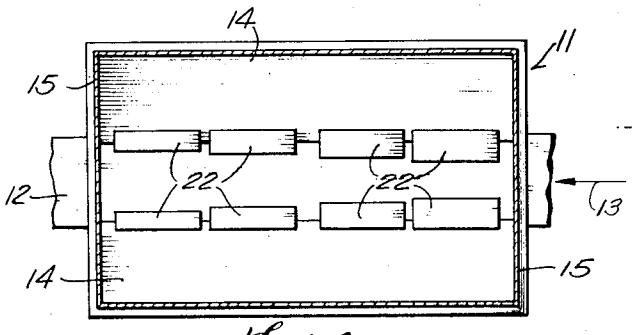


Fig. 4

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HOPPER WITH SLIDE PLATES

BACKGROUND OF THE INVENTION

My U.S. Pat. No. 3,399,466 shows a hopper which provides an even and uniform flow of granular hopper contents onto an underlying moving belt. Said hopper is specially shaped with side walls which diverge from the upstream toward the downstream end of the hopper, to facilitate loading the belt with granular material flowing out of downstream zones within the hopper.

SUMMARY OF THE INVENTION

In accordance with the present invention, a hopper of more conventional shape and which has non-diverging side walls can be modified to achieve the superior flow path of my U.S. Pat. No. 3,399,466 by providing the opposite side walls with slidable plates which extend inwardly toward each other, thus to shape the flow path of hopper contents as desired. To achieve the desirable flow pattern of my prior patent, the inner ends of the plates will be disposed progressively closer to the centerline of the belt, from the downstream to the upstream end of the hopper.

Accordingly, the present invention obviates the need for fabricating a specially shaped hopper but still provides for shaping the flow in a desirable pattern.

Other objects, features and advantages of the invention will appear from the disclosure.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary side view of apparatus embodying the invention.

FIG. 2 is an end view of the apparatus shown in FIG. 1.

FIG. 3 is a fragmentary vertical section taken along the line 3—3 of FIG. 1.

FIG. 4 is a plan view of apparatus embodying the invention, the inverted V-shaped hood being removed to expose details.

DESCRIPTION OF PREFERRED EMBODIMENT

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. The scope of the invention is defined in the claims appended hereto.

The over-all arrangement is similar to that shown in my prior U.S. Pat. No. 3,399,466. Structural supports **10** carry hopper **11** over an endless traveling belt **12**, the top run of which travels in the direction of arrow **13**. The hopper **11** has side walls **14** and end walls **15**. The walls **14, 15** are connected in a generally rectangular outline, as shown in FIG. **4**.

In the disclosed embodiment of the present invention, the side walls **14** at both sides of the hopper **11** are provided with horizontally extending slots **16** (FIG. **3**) and the exterior of the walls **14** are provided with guide plates **17, 18** which are spaced apart to form a slideway **19**.

Extending through the slideway **19** and slot **16** is a longitudinally spaced series of slide plates **22** which extend into the interior of the hopper. In the illustrated embodiment (FIG. **4**), there are four matched pairs of

such plates **22** arranged in facing relation at opposite sides of the hopper. The respective plates are fastened by any convenient fastening mechanism, such as the set screws **23**.

Hoppers vary in size. Each plate **22** is desirably about 3 or 4 feet long. For a hopper about 18 feet long a series of four pairs of plates, each about 4 feet long, will serve nicely. Such a hopper is illustrated in FIG. **4**.

As indicated in FIG. **3**, the plates **22** are desirably disposed at the same angle of inclination with the vertical, desirably about 60°, so that they project downwardly as well as inwardly into the hopper. Accordingly, the normal discharge mouth **24** of the hopper, formed by beams **27** at the lower ends of the side walls **14**, no longer shapes the flow pattern of granular material **25** onto the belt **12**. The inwardly projecting plates intercept the flow of material, thus to shape the flow to a new shape, as determined by the arrangement of the inner edges of the plates **22**.

To produce a flow pattern similar to that shown in my prior patent aforesaid, the plates are disposed with their inner edges progressively closer to the centerline of the belt from the downstream end to the upstream end of the hopper, as shown in FIG. **4**. Accordingly, the flow path is wider at its downstream end than at its upstream end. This arrangement promotes flow of granular material **25** from downstream zones in the hopper onto unloaded portions of the belt, as explained in my prior patent and promotes the easy and uniform flow of granular material completely along the length of the hopper, thus to avoid dead spots, stagnant areas, etc. The easy adjustability of the plates provides for a fine adjustment of the degree of narrowing of the flow path toward the upstream end of the hopper, and also provides for the establishment of other desired flow patterns.

As in my prior patent, I also provide an inverted V-shaped hood or baffle **26** (FIG. **2**) which helps distribute the flow of granular material. This hood is omitted for clarity of illustration in FIG. **4**.

I claim:

1. In the combination of a belt conveyor and a superimposed hopper for granular material, said hopper having side walls leading toward a hopper discharge mouth over said belt, the improvement in which said hopper is provided with a longitudinal series of slidable plates disposed at the same angle of inclination and extending through said side walls and over said discharge mouth to shape the flow path of hopper contents intercepted by the plates, said plates extending inwardly from the side wall to progressively greater extent and being disposed with their inner edges progressively closer to the centerline of the belt from the downstream to the upstream end of the hopper whereby the flow path is wider at its downstream end than at its upstream end.

2. The invention of claim **1** in which said plates are disposed in matched pairs at both sides of the hopper.

3. The invention of claim **1** in which said plates are inclined downwardly toward the belt.

4. The invention of claim **1** in which said plates are arranged at both sides of the hopper in matched pairs, are inclined downwardly toward the belt and in which paired plates near the upstream end of the hopper have their inner edges closer to the centerline of the belt than the paired plates near the downstream end of the

hopper, whereby the flow path is narrower at said upstream end than at said downstream end.

5. In the combination of a belt conveyor and a superimposed hopper for granular material, said hopper being substantially rectangular in plan and having side walls leading toward a rectangular discharge mouth opening toward said belt, the improvement in which said side walls are provided with slideways, said hopper being provided with a longitudinal series of slidable plates extending through said slideways at the same angle to the vertical and projecting inwardly from said side walls over said discharge mouth to shape the flow path of hopper contents intercepted by the plates, said plates extending inwardly from the side walls to progressively greater extent and being disposed with their inner edges progressively closer to the centerline of the belt from the downstream to the upstream end of the hopper, whereby the flow path is wider at its downstream end than at its upstream end.

6. The invention of claim 5 in which said plates are arranged in matched pairs at both sides of the hopper.

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