Nov. 11, 1952 C. C. PALMER 2,617,531

DOCKAGE AND DUST CONTROL FOR GRAIN ELEVATORS

Filed March 12, 1949 2 SHEETS—SHEET 1

FIG. 1.

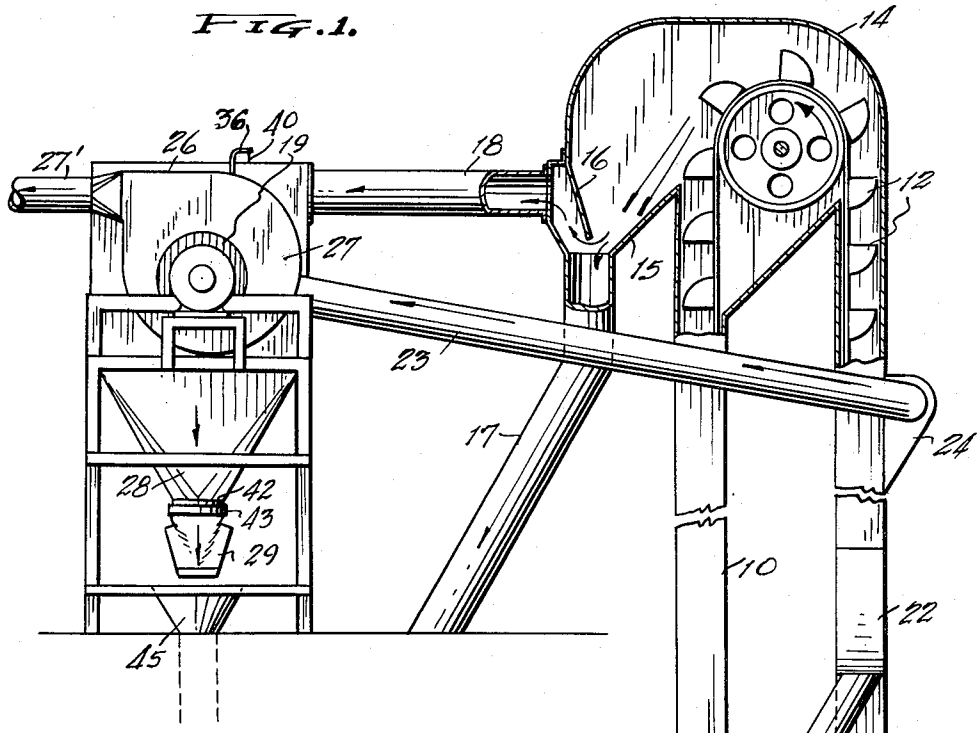


FIG. 3.

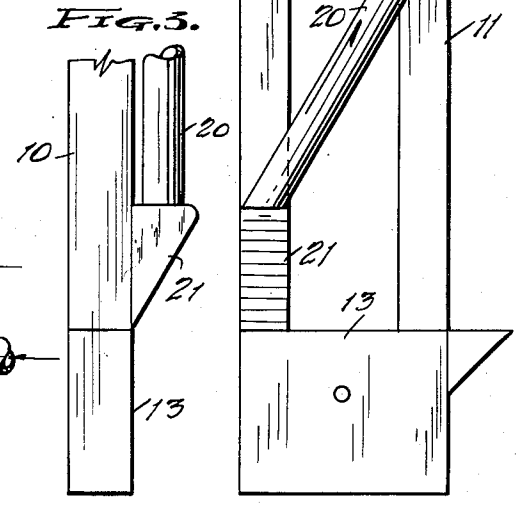
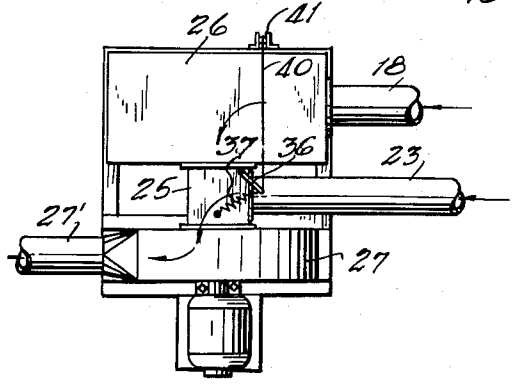


FIG. 2.



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FIG. 4.

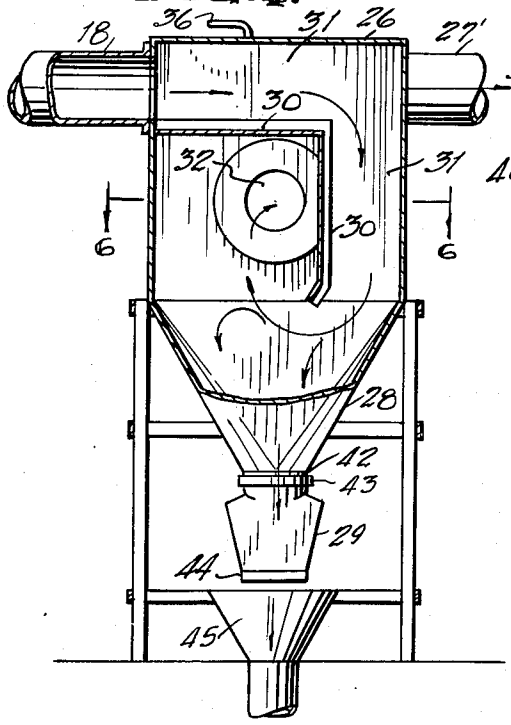


FIG. 5.

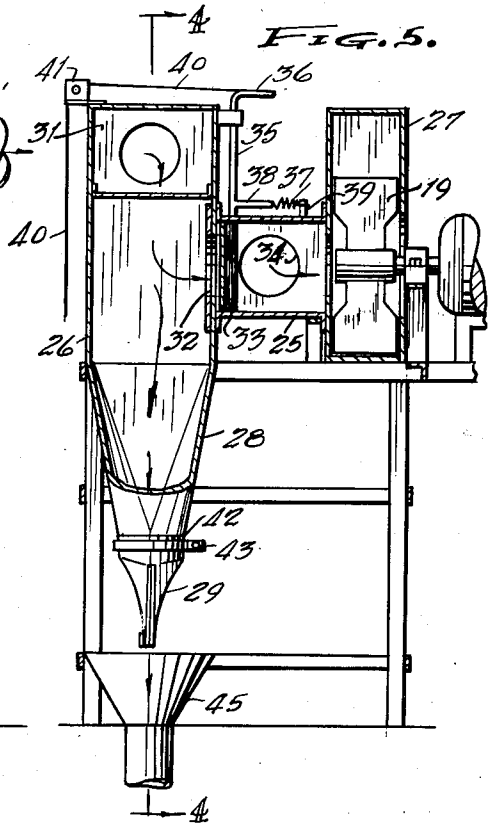


FIG. 7.

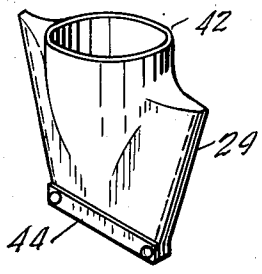


FIG. 8.

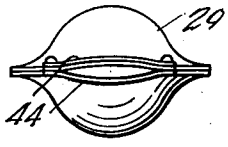
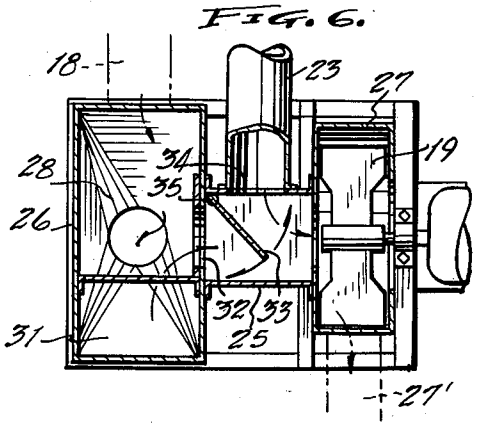


FIG. 6.



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UNITED STATES PATENT OFFICE

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DOCKAGE AND DUST CONTROL FOR GRAIN ELEVATORS

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Application March 12, 1949, Serial No. 81,149

3 Claims. (Cl. 209—147)

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This invention relates to grain handling devices, and it has particular reference to cleaning apparatus designed for collecting dockage and separating the valuable and usable particles of grain from the dust and chaff commonly mixed therewith, embodying improvements in a Dockage Collecting and Separating Device covered by Letters Patent No. 1,813,948, dated July 14, 1931, and issued to Clyde C. Palmer, and its principal object resides in the provision of an improved structure capable of accomplishing a more thorough and effective separation operation than the devices conventionally employed for such purposes, whereby a larger volume of grain salvage can be accomplished and which is generally freer from dust and chaff than when the product is treated by conventional apparatus.

A further object of the invention resides in the provision of a simple and economical structure capable of being installed in such proximity to the elevator leg as to eliminate much of the labor and material costs involved in such installations, and minimizing the efforts and labor required in the operation of the structure, thus resulting in great savings in operation costs as well as in the salvage of products which would otherwise be regarded as simply waste material.

Broadly, the invention contemplates the provision of a collecting casing for receiving the dockage discharged from the grain in handling operations through the elevator leg, affording means for conducting the dockage directly from the leg to separating apparatus, as well as through the head, to remove the dust and chaff to the atmosphere while salvaging the otherwise wasted small and imperfect grain particles.

While the foregoing objects are paramount, other and lesser objects will become manifest as the description proceeds, taken in connection with the appended drawings wherein:

Figure 1 is a side elevational view of an elevator leg, the head being partly broken away to illustrate the internal parts, and showing the separating assembly in elevation connected with the leg.

Figure 2 is a plan view of the separating assembly.

Figure 3 is a fragmentary rear view of the leg, illustrating a duct connected therewith.

Figure 4 is a partial vertical cross-sectional view, on lines 4—4 of Figure 5, illustrating the circuitous passage therethrough, and showing the discharge spout in elevation.

Figure 5 is a vertical sectional view, taken through the collector casing and exhaust fan.

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Figure 6 is a lateral sectional view, taken on lines 6—6 of Figure 4, illustrating the fan, the casing, and the valve chamber connecting the same.

Figure 7 is a perspective view of the discharge spout, and

Figure 8 is an inverted plan view of the discharge spout.

Accordingly, with reference to the drawings, the vertical elevator leg is constructed generally in two sections 10 and 11, the bucket-conveyor 12 passing upwardly through the section 11 and downwardly through the opposite section 10, raising the grain from the boot 13 at the bottom of the leg. A head 14 is arranged at the top of the assembly, as shown in Figure 1, where it is discharged through the conventional distributor hopper 15 in the head 14. An inclined baffle or hood wall 16 is arranged to extend downwardly, partially over the discharge pipe 17 from the hopper 15, to aid in separating the dust and chaff from the grain delivered to the latter.

The prime object of the invention being to more effectively separate the dockage, or relatively fine and defective particles of grain, from the dust and chaff discharged through the suction pipe 18 leading from the head 14 to the suction fan 19, it is contemplated that such separating operations begin near the base of the leg assembly, or the boot 13, so that as the dust and chaff in the grain is disturbed in the handling operations a portion thereof will pass out through a discharge pipe 20 connected by a hood 21 to the section 10 of the elevator leg near its low end, as illustrated in Figures 1 and 3, and extending upwardly to connect into another hood 22 in the opposite section 11 of the leg conducting the dust and chaff upwardly with the movement of the elevator buckets 12.

A substantial quantity of the dust which is relatively free of grain products will be accumulated in the upper portion of the section 11 of the leg and can be withdrawn therefrom through a conduit 23 connected ito the section 11 by a hood 24 and extending to a valve chamber 25 which connects the collector casing 26 with the suction fan housing 27. The collector casing 26 is formed with a discharge hopper 28 at its lower end and has a spout 29 at its lower end which will be presently described.

The casing 26 is rectangular in form and has a division 30 therein defining an L-shaped passage 31 extending along the top and down the rear wall so that the lighter dust and chaff, with

its burden of light and defective grain particles, delivered into the casing 26 through the pipe 18 can be thoroughly scrubbed in its movement through the passage 31 to deposit the heavier grain particles in the hopper 28 while the lighter dust and chaff is exhausted through the port 32 into the valve chamber 25 thence out to the atmosphere through the fan housing 27 and its tangential exhaust pipe 27' by the action of the exhaust fan 19 therein.

The purpose of the valve chamber 25 is to afford a means for controlling the relative suctions exerted through the pipes 18 and 23 through the medium of a valve disk 33 hingedly supported in the chamber 25 so as to be capable of alternately closing the inlet ports 32 and 34 from the casing 26 and the pipe 23 which are arranged at right angles to each other, as apparent in Figure 6. The valve disk 33 is secured on a vertical valve rod 35 which is arranged through the top of the chamber 26 and extends above the top of the casing 26 and has an angular portion on its upper end providing a lever 36 by which the disk 33 can be manipulated.

A pull spring 37 is connected to a projecting arm 38 on the rod 35 and secured at its opposite end to a lug 39 on the top of the chamber 25 to normally retain the disk 33 in position to close the port 32 from the casing 26, as shown in Figure 5. A cable 40 is connected to the lever 36 and arranged over a suitable pulley 41 to an operative position to provide for the manual operation of the valve as desired. In operation, however, the action of the exhaust fan 19 will normally retain the valve disk 33 in the intermediate position shown in Figure 6.

It is desirable to control the suctions through the pipe 23 and the casing 26 in order to direct the exhaust through the casing 26 when the body of the grain carries relatively light quantities of dust and chaff, closing the port 34 from the pipe 23. On the other hand, by adjusting the valve disk 33 to close or partially close the port 32 from the casing 26, the pipe 23 will aid in carrying of the dust and chaff from grain containing relatively large quantities thereof.

The discharge spout 29 is comprised of a tubular structure of a pliable impervious fabric or rubber material and having a neck portion 42 adapting the device to be attached to the lower outlet end of the hopper 28, in the manner shown in Figures 1, 4 and 5, by a suitable fastening ring 43. The sides and edges of the spout 29 converge toward the discharge end and the mouth is normally closed by thin strips 44 of metal, or other suitable materials, which yield outwardly to permit the mouth to open and discharge the accumulated contents under sufficient weights. The internal suction of the casing 26 will also aid in maintaining the spout 29 closed.

In Figures 4, 5 and 6 is illustrated by arrows the flow of dust and chaff and light grain through the ducts 18 and 23 into and through the casing 26, around the passage 31 therein and out through the port 32, and through the valve chamber 25. The fan 19 creates a suction through these ducts and the duct 20 and when the material is processed through the relatively long circuitous route much of the heavier grain particles carried with the lighter dust and chaff is deposited into the hopper 28 to accumulate in the discharge spout 29 where it passes out automatically in a relatively continuous stream to storage through the chute 45 therebelow. By the accumulation of the grain in the spout 29 the suction in the casing 26 and its connecting ducts 18 and 23 cannot be seriously impaired.

By the use of the auxiliary duct 20 connecting the lower end of the rear section 10 of the leg with the forward section 11 thereof a large bulk of the dust and chaff can be drawn off from the grain and discharged through the duct 23 before it reaches the head 14. In this manner a more thorough salvage of the dockage materials can be accomplished.

Manifestly, the structure herein shown and described is capable of considerable modification, from time to time, by persons skilled in the art without departing from the spirit and intent of the invention or the scope of the appended claims.

What is claimed is:

1. In a grain dockage collector, in combination with a grain elevator head and leg, a collector casing having a passage arranged in its upper portion and a hopper formed on its lower end, an outlet opening in one side of said casing, a flow duct connecting said elevator head with said passage, a suction fan in a housing arranged in operative relationship to said casing and at said outlet opening, a valve chamber providing a communication between said fan housing and said casing, a dockage duct connecting the said elevator leg with said valve chamber, and a valve operatively arranged in said chamber capable of closing either the said casing outlet or said dockage duct to said fan housing.

2. In a dockage collector for grain elevators, in combination with an elevator head and leg, a collector casing having a passage arranged therein across the upper end thereof and down one side, an outlet opening in said casing, a hopper formed on the lower end of said casing, a flow duct providing a communication between said head and said passage, a suction fan in a housing arranged in operative association with said casing and said outlet therein, a communication chamber between said fan housing and said casing having a dockage duct from said elevator leg connected therein, and a valve in said chamber capable of alternately closing said chamber to said casing or said dockage duct.

3. In a dockage collector for grain elevators, in combination with an elevator head and leg and a collector casing, an L-shaped passage formed in said casing having a flow duct connected thereinto communicating with said head, a hopper formed at the lower end of said casing, an outlet opening in said casing, a suction fan in a housing arranged in operative association with said casing, an outlet chamber connected to said outlet opening providing a connection between said casing and said fan housing, a dockage duct connecting said elevator leg with said outlet chamber, and valve means in said chamber for selectively closing said casing outlet or said dockage duct.

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