Nov. 24, 1925. 1,562,946

R. L. DOWDALL

DEVICE FOR REMOVING DUST FROM GRAIN ELEVATORS

Filed Aug. 7, 1924

Fig. 1.

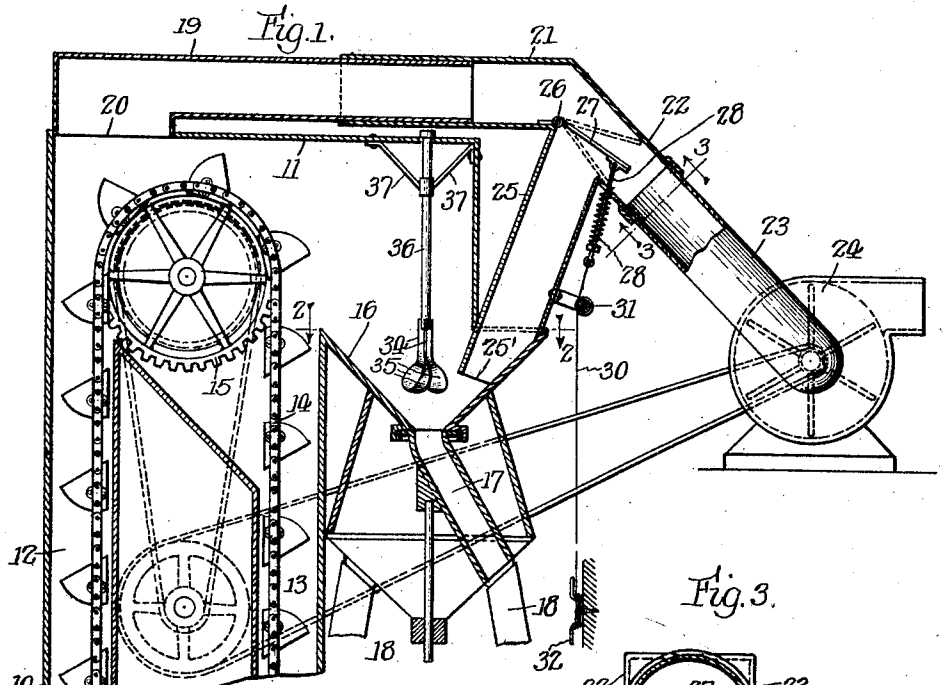


Fig. 3.

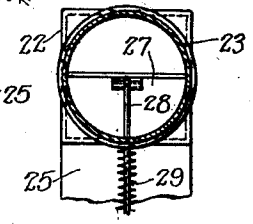


Fig. 2.

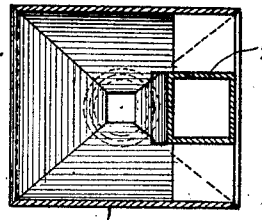


Fig. 4.

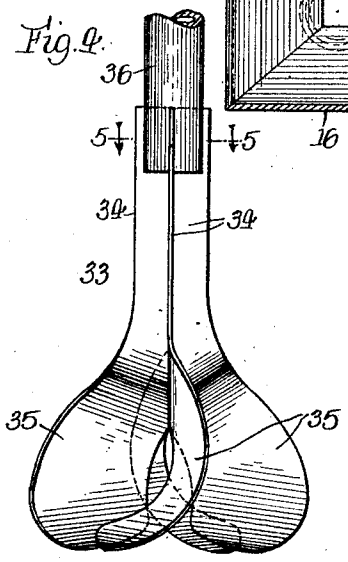
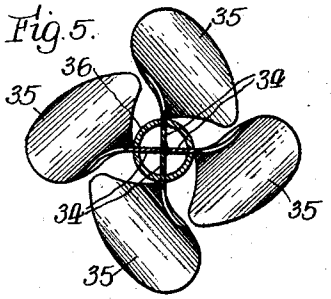


Fig. 5.



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UNITED STATES PATENT OFFICE.

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DEVICE FOR REMOVING DUST FROM GRAIN ELEVATORS.

Application filed August 7, 1924. Serial No. 730,573.

To all whom it may concern:

Be it known that I, ROY L. DOWDALL, a citizen of the United States, residing at Oberlin, in the county of Decatur and State of Kansas, have invented certain new and useful Improvements in Devices for Removing Dust from Grain Elevators, of which the following is a specification.

This invention relates to devices for freeing the head, leg and pit of a grain elevator from dust and also for separating out from the main body of grain the chaff and light particles of grain that are commonly utilized as chicken and stock feed. My present invention is in the nature of an improvement upon a device for the same general purposes forming the subject matter of Letters Patent No. 1,508,682, granted to me on the 16th day of September, 1924.

The purposes and objects of my present invention are substantially the same as those set forth in my former patent, above identified, and in addition thereto to provide a simplified form of mechanism that may readily be applied to standard forms of elevator heads, requiring only a single opening in the top of the latter, to provide a device adjustable in length so that it can be made to fit heads of various widths, to provide a device affording a strong suction draft across the grain as it falls from the elevator buckets into the distributor pan or hopper and a relatively weak draft in the elevator head sufficient to draw off the dust without removing sound particles of grain, to provide a device reducing the number of elbows and bends in the suction pipe, thus requiring less power to run the suction fan for the removal of dust, chaff, light particles of grain and foreign particles than has heretofore been necessary, to provide a device wherein the valve controlling the division of the draft between the head and the distributor pan or hopper can be readily operated from the ground floor of the elevator, to provide an improved spreader for the grain as it falls from the elevator buckets into the distributor, and, in general, to provide an improved, simplified, and more efficient apparatus of the character and for the purpose stated, than has heretofore been known.

Still other objects and attendant advantages of the invention will be understood by persons skilled in the art to which the improvement relates from the following detailed description, taken in connection with the accompanying drawings, in which I have illustrated a practical embodiment of the invention, which in service has been found to satisfactorily effectuate the stated purposes and objects thereof, and wherein

Fig. 1 is a view mainly in vertical section of the head and upper portion of the leg of a grain elevator, showing my present improvements applied thereto;

Fig. 2 is a horizontal section, looking down, on the line 2—2 of Fig. 1.

Fig. 3 is a cross-section, enlarged on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged detail view in side elevation of the spreader; and

Fig. 5 is a horizontal section, looking down, on the line 5—5 of Fig. 4.

Referring to the drawings, 10 designates as an entirety the vertical elevator leg, 11 the head thereof, and 12 and 13 the rear and front vertical passage ways of the leg, in which travel respectively, the ascending and descending limbs of the usual bucket conveyor 14, running over a pulley 15 mounted in the head 11, by which conveyor the grain is elevated from the pit to the head and discharged into the latter. Within the head 11, and on the delivery side of the bucket elevator, is located the usual distributor pan or hopper 16, the lower end of which communicates with an inclined swiveled delivery spout 17, that may be revolved on the axis of the hopper so as to communicate with any one of the usual distributor spouts 18.

19 designates a horizontal pipe of rectangular cross-section that overlies the head 10 of the elevator and communicates with the latter through its top wall directly above the ascending passage way 12 through a mouth 20, which, as shown, is of greater cross-sectional area than the pipe 19 for a purpose later disclosed. The pipe 19 forms a telescoping joint with a similar pipe 21 of rectangular cross-section continuous with which is a downwardly inclined extension 22. To the lower end of the extension pipe 22 is suitably jointed a round pipe 23 leading into the suction side of a fan blower 24 of the ordinary centrifugal type.

25 designates a branch pipe of rectangular cross-section, that extends from the lower side of the extension pipe 22, downwardly into the distributor pan or hopper 16. The

pipe 25, as shown, has its opposite side walls beveled off at the lower portions to fit against one inclined wall of the hopper 16, and the lower end or mouth 25′ of the pipe 25 is thereby reduced in width about one-half, which has the effect of increasing the suction or pull of the air current at that point. Hinged to the upper end of one wall of the pipe 25 is a valve 27 that is movable between the two dotted line positions shown, in one of which the suction through the pipes 19 and 21 is completely cut off, and in the other of which the suction through the pipe 25 is completely cut off. In the intermediate position of the valve, shown by full lines, the suction is divided.

This valve is manipulated from the ground or other floor of the elevator by the operating mechanism, comprising a depending pivoted rod 28 extending through a slot in the lower side of the pipe 22, a pull spring 29 anchored at its upper end to the under side of the pipe 22, and at its lower end to the rod 28, by which the valve is yieldably held in the upper dotted line position, and a pull cord 30 attached to the rod 28 and extending over a guide pulley 31 down to a hitch 32 at the ground or other floor of the elevator. A downward pull of the cord 31 shifts the valve to the lower dotted line position, or to any intermediate position.

33 designates as a whole an improved grain spreader which I have devised for effectively spreading and scattering each charge of grain thrown off the elevator bucket into the pan or hopper 16, so that the air current induced by the fan through the pipe 25 can act most efficiently to draw off the dust, chaff, light particles of grain and other foreign particles. This distributor is best shown in detail views Figs. 4 and 5, and comprises as herein shown, four vertical ribs or fins 34 disposed ninety degrees apart around a common axis, and each terminating at its lower end in a widened and downwardly and laterally curved share or spoon 35, the lower ends of which approach a horizontal position, so that the body of grain striking the same is spread and scattered throughout substantially the full cross-sectional area of the pan or hopper 16 in the plane of the lower ends of the share, whereby the air current effectively permeates the entire body of grain and frees it of the matter to be removed.

The spreader is attached to the lower end of a rod 36 that is suspended from the head 10 and held against lateral swinging by suitable braces 37.

As heretofore stated, the narrowing of the lower end or mouth 25′ of the suction pipe 25, increases the strength of the draft at this point; while the relative widening of the suction mouth 20 of the pipe 19 which communicates with the elevator head, correspondingly reduces the strength of the draft at this point; so that the most of the dust from the head, leg and pit is drawn off through the pipes 19 and 21, without taking any grain with it, while the light grain and foreign stuff, which is heavier than the dust, is pulled off through the pipe 25.

In addition to the variations in the strength of the suction draft, at the head and distributor pan or hopper, produced by widening the mouth of the pipe 19 and narrowing the mouth of the pipe 25, the relative strengths may be further changed by adjustment of the valve 27, as the particular grain handled or other conditions may require.

The telescopic joint of the pipes 19 and 21 enables the attachment to be lengthened or shortened within the limits of the telescopic joint to fit elevator heads of various widths. The fan 24 and the pipe sections 21, 23 and 25 always occupy the same relative positions to the head. The inner telescoping pipe section 19 also always occupies the same relative position to the head. Consequently, if the apparatus be applied to a narrow head, the telescopic joint between the pipes 19 and 21 will be relatively long and if the device be applied to a wide head said telescopic joint will be relatively short.

I claim—

1. In an apparatus of the character described, the combination with the head and leg of a grain elevator, a bucket conveyor therein, and a hopper into which the grain is discharged from the conveyor buckets, of a suction fan, a pipe communicating at one end directly with the top wall of the elevator head and at its other end with the suction side of said fan, and another pipe communicating at one end directly with said hopper and at its other end with the suction side of said fan.

2. In an apparatus of the character described, the combination with the head and leg of a grain elevator, a bucket conveyor therein, and a hopper into which the grain is discharged from the conveyor buckets, of a suction fan, a main suction pipe communicating at one end directly with the top wall of the elevator head and at the other end with the suction side of said fan, a branch pipe communicating at its upper end with said main pipe and at its lower end entering said hopper, a valve at the junction of said pipes, and means for shifting said valve so as to vary the relative strengths of the suction drafts flowing through said pipes.

3. In an apparatus of the character described, the combination with the head and leg of a grain elevator, a bucket conveyor therein, and a hopper receiving grain discharged by the conveyor bucket, of a suction fan, a main suction pipe connected at one end directly into said head at a point above the top of said conveyor and at its

other end connected into the suction side of said fan, a branch pipe leading from said main pipe into said hopper, a draft controlling valve at the junction of said pipes, and a grain speader in said hopper located substantially opposite the mouth of said branch pipe.

4. In the apparatus of the character described, the combination with the head and leg of a grain elevator, and a bucket conveyor therein, of a suction fan, and a pipe connecting the suction side of said fan with said head through the top wall of the latter, said pipe communicating with said head through a mouth of greater area than the cross-sectional area of said pipe, whereby the strength of the draft at said mouth is reduced.

5. In an apparatus of the character described, the combination with the head and leg of a grain elevator, a bucket conveyor therein, and a hopper into which the grain is discharged from the conveyor buckets, of a suction fan, and a pipe connecting the suction side of said fan with said hopper, said pipe communicating with said hopper through a mouth of less area than the cross-sectional area of said pipe, whereby the strength of the draft at said mouth is increased.

6. In an apparatus of the character described, the combination with the head and leg of a grain elevator, a bucket conveyor therein, and a hopper into which the grain is discharged from the conveyor buckets, of a suction fan, a pipe connecting the suction side of said fan with said head and communicating with the latter through a mouth of greater area than the cross-sectional area of said pipe, whereby the strength of the draft at said mouth is reduced, and a second pipe communicating at one end with the suction side of said fan and at its other end with said hopper through a mouth of less area than the cross-sectional area of said second pipe, whereby the strength of the draft at said last named mouth is increased.

7. In an apparatus of the character described, the combination with the head and leg of a grain elevator, a bucket conveyor therein, and a hopper into which the grain is discharged from the conveyor bucket, of a suction fan, a main suction pipe connecting the suction side of said fan with the top of said head and communicating with the latter through a mouth of greater area than the cross-sectional area of said pipe, a branch pipe directly communicating at one end with said main pipe and at the other end communicating with said hopper through a mouth of less area than the cross-sectional area of said branch pipe, and a draft controlling valve at the junction of said pipes.

8. A grain spreader to facilitate the pneumatic cleaning of grain discharged from the buckets of an elevator conveyor, comprising a stationary group of downwardly and laterally curved blades spaced around a common vertical axis, and located in the path of the grain falling from the conveyor buckets.

9. A grain spreader to facilitate the pneumatic cleaning of grain discharged from the buckets of an elevator conveyor, comprising a plurality of stationary vertical fins radially grouped around a common axis and at their lower ends carrying a corresponding plurality of downwardly and laterally curved blades or shares located in the path of grain falling from the conveyor buckets.

10. The combination with a grain elevator and a bucket conveyor mounted therein, of a rod suspended from the head of said elevator, and a grain spreader rigidly attached to the lower end of said rod, said spreader comprising a group of radially disposed vertical fins spaced ninety degrees apart and terminating at their lower ends in a corresponding group of widened, downwardly and laterally curved blades or shares, located in the path of grain discharged from the conveyor buckets.

11. In an apparatus of the character described, the combination with the head of a grain elevator, and a suction fan, of a pipe communicating at one end with the top wall of said head and at its other end with the suction side of said fan, said pipe overlying said head and formed with a telescopic joint adapting it to application to heads of various widths.

ROY L. DOWDALL.