Oct. 25, 1938. W. A. HALE 2,134,365

GRAIN ELEVATOR MECHANISM

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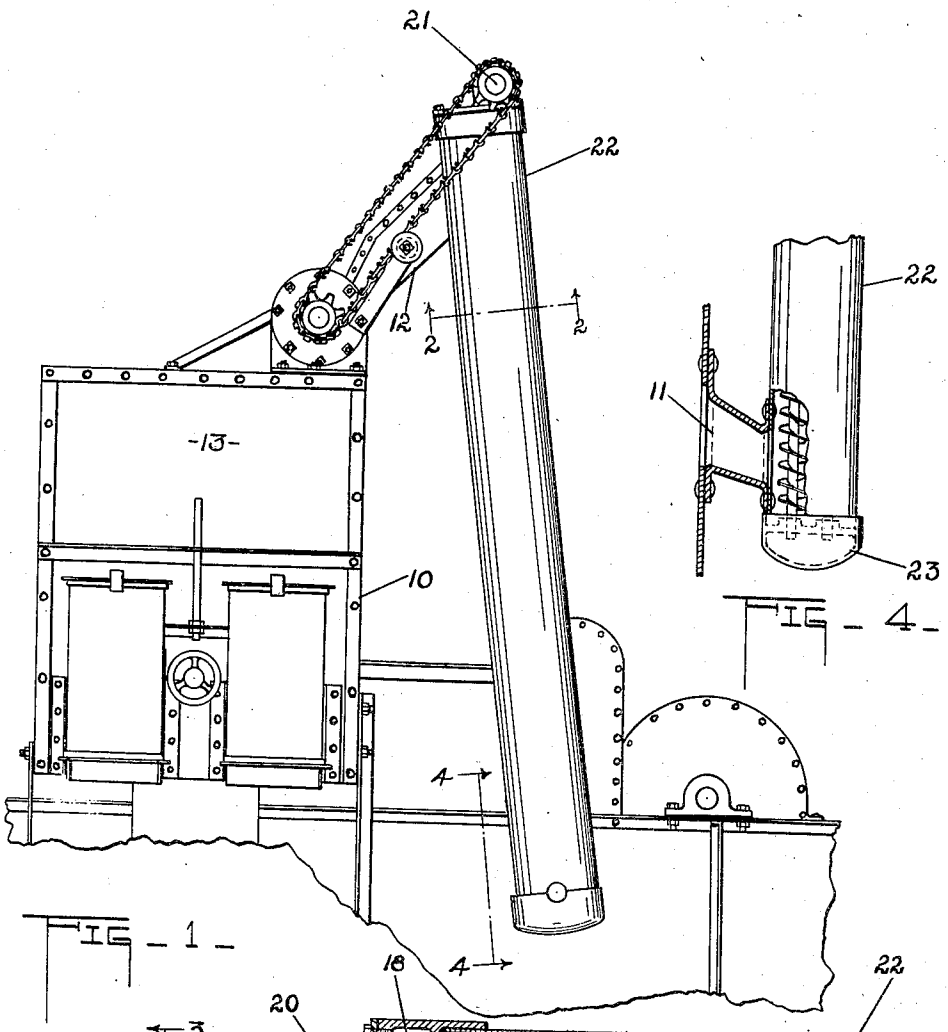


FIG. 1.

FIG. 4.

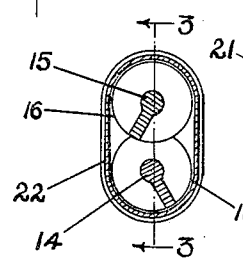


FIG. 2.

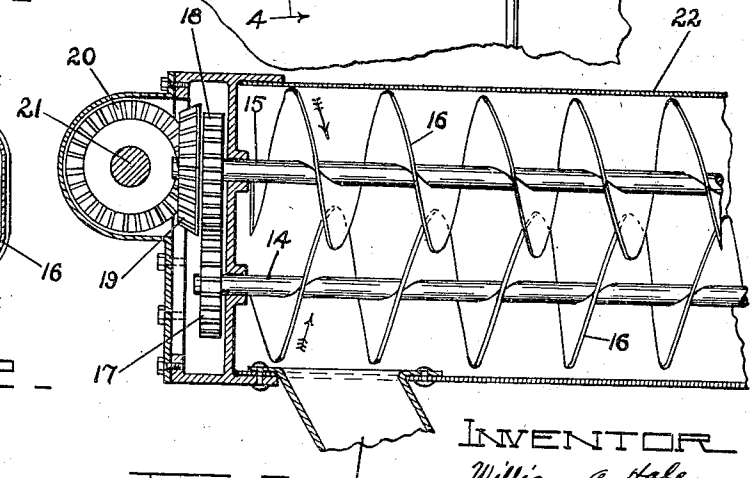


FIG. 3.

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GRAIN ELEVATOR MECHANISM

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Application January 13, 1936, Serial No. 58,887

1 Claim. (Cl. 198—213)

This invention has reference to conveyors for elevating grain and the like, and has for its object to provide a novel mechanism, applicable to threshing machines and the like, for transporting grain from one part of the thresher to another and being adapted to operate efficiently when disposed at various angles.

In carrying out my invention I provide mechanism disclosed in the following description and accompanying drawing, in which:

Fig. 1 is a side elevational view illustrating an embodiment of my invention;

Fig. 2 is a sectional plan view taken on line 2—2 in Fig. 1;

Fig. 3 is a fragmental sectional elevational view taken on line 3—3 in Fig. 2; and,

Fig. 4 is a broken, partly sectioned elevational view taken from line 4—4 in Fig. 1.

For the purpose of illustration I show my invention applied to a grain processing apparatus 10 which will not be described in detail further than to say that grain originating in the lower part is fed into my elevator through a chute or duct 11, Fig. 4, and is elevated and discharged at the top through a pipe 12 into an elevated hopper 13. Devices such as threshers and shellers of the type requiring elevating conveyors are well known and further description is thought unnecessary.

My invention comprises a pair of screw flight conveyors arranged with their shafts 14 and 15 parallel and the edges of the flights 16 overlapping, as shown in Fig. 3.

The screws are driven in opposite directions by means of gears 17 and 18 secured to the shafts. Shaft 15 carries a mitre gear 19 meshed with a mitre 20 mounted on a horizontal shaft 21 suitably journalled in bearings affixed to the top of the casing 22 of the device. Shaft 21 is driven through a chain and sprocket connection with any rotating element of the apparatus 10.

In operation the grain is fed into the boot 23 through the duct 11 to be elevated by the rotating screws and discharged into the hopper 13 through the pipe 12.

It is well known that with single flight conveyors, grain being elevated moves longitudinally of the conveyor, but in addition to this longitudinal movement there is a certain amount of rotary movement induced by the screw. This is especially true when the screw is not completely submerged in the grain. Rotary movement is obviously lost motion.

When using a single screw to elevate grain, efficient operation can only be expected when the dimensions of the screw and casing are such that the amount of grain fed to it is sufficient to completely fill the casing. In case the rate of feed becomes substantially less than the capacity of the conveyor it will not be propelled in a continuous stream but will regurgitate in the casing until a sufficient amount accumulates to fill the casing, whence the amount accumulated will be elevated and discharged. Following this there will be another period of regurgitation and so on.

As a result of such intermittent operation the grain is undesirably abraded and damaged.

The conditions under which threshers and shellers operate make it impossible to feed a stream of any predetermined size. The size of the stream varies with the amount and quality of grain being processed. It may at times be quite heavy and at other times light.

To be used in connection with such machinery, the conveyor must necessarily have sufficient capacity to dispose of the heaviest feed, but this will obviously be too large for satisfactory operation on a light feed.

It will be noted that the flights of the parallel augers of my device overlap and that they wind about the shafts in opposite directions. It will now become apparent that with the shafts rotating in opposite directions, grain caught up by the lower ends of the flights will rotate therewith until the grain on one flight meets that on the opposite flight moving in opposite direction. The two quantities of grain thus are brought into opposition with each other and rotary movement of the grain is thus obstructed whereupon longitudinal movement is imparted and elevation of the grain begins.

The opposing action of the two streams continues and the grain thus eventually reaches the discharge end. It will be seen that my novel arrangement of conveyors is adapted to elevate small streams of grain as well as heavy ones and is for this reason particularly adapted to operate efficiently under the feed conditions usually present in threshing and shelling.

As shown in the drawing the blades of the twin screw conveyors are not merely disposed in staggered and overlapping relation to each other but also substantially in surface contact throughout the areas of overlap. This specific relative arrangement wherein the twin blades are so closely associated as to obviate the possibility of flow of the slippery grain kernels between the overlapped portions of the blades constitutes the sole reason for successful operation of the con-

veyors to elevate grain as, if these overlapped blade portions were spaced appreciably from each other, there would be no action on the grain other than an agitation thereof.

What I claim is:

A grain elevator including a casing of substantially elliptical cross-section, a pair of equal parallel conventional screw conveyors presenting respectively right and left helical blades disposed with their said blades partially overlapped and substantially in contact with each other for preventing grain from becoming disposed between said overlapped portions of said blades, said casing presenting opposed arcuate walls snugly embracing the peripheral edges of said conveyors, and mechanism for actuating said conveyors in unison in respectively opposite directions at equal speed.

WILLIAM A. HALE.