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GRAIN HANDLING MACHINERY

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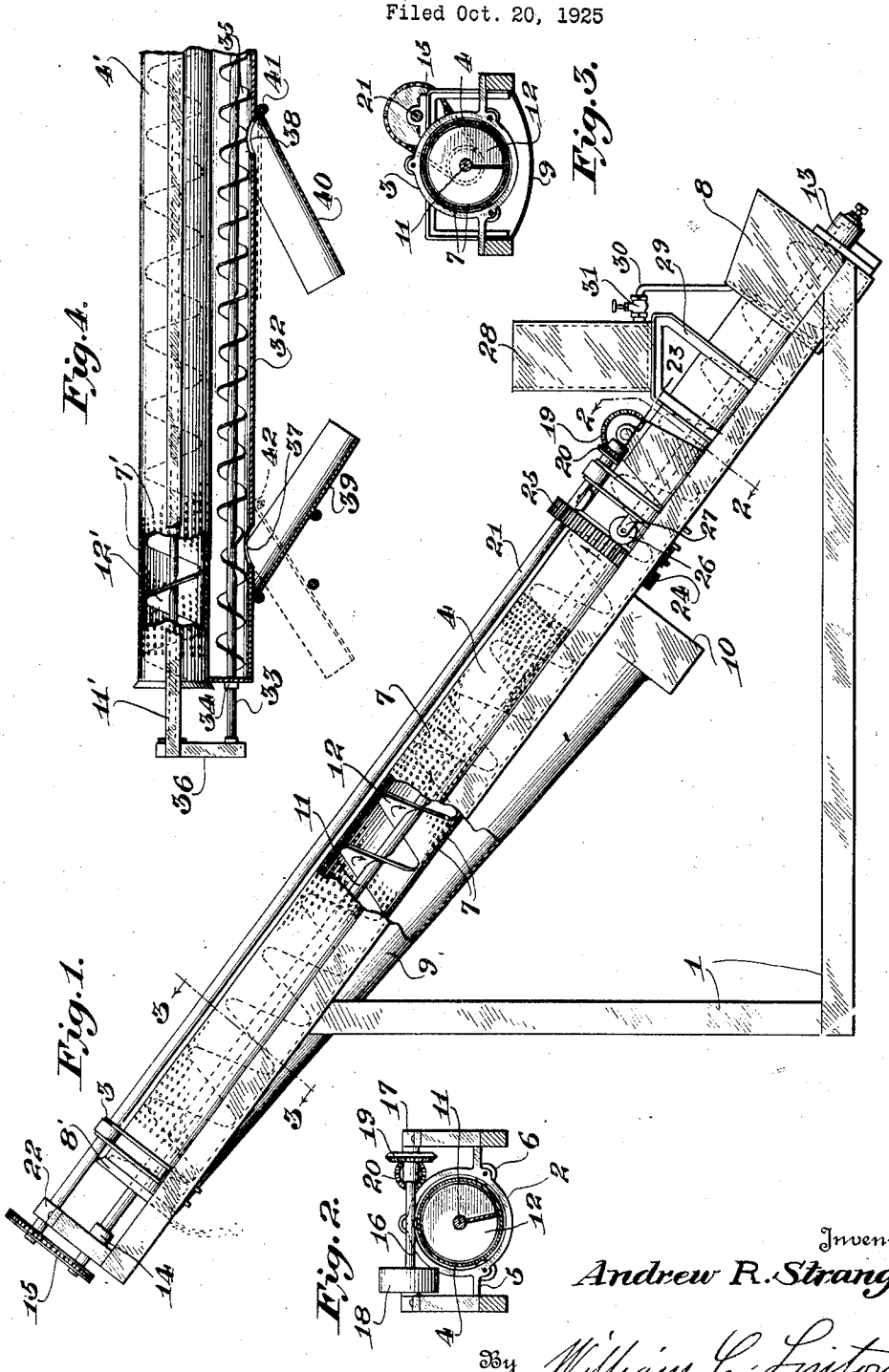


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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GRAIN-HANDLING MACHINERY.

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This invention relates to improvements in grain handling machinery, having for an object to provide a machine for screening, elevating and loading grain of such construction as will permit grain to be discharged thereinto from a thresher or other separator, separated from that dockage or undesirable matter remaining with the same, and elevated for loading or discharge into a receiving device in a single and continuous operation.

It is likewise an equally important object of the invention to provide a device of the character mentioned wherein the conveyor tube is arranged and constructed for rotation and effectually serves as a screening means for separating the grain from dockage, while conveying means rotating in an opposite direction therein are adapted to distribute the grain longitudinally of the tube and to elevate it therein to a point whereat discharge thereof from the device is effected.

Another object of the invention may be stated to reside in the provision of the screening device with means for not only receiving chaff and other dockage from the grain for process of separation, but also, functioning effectually to remove all other undesirable seed and like matter therefrom, hence, causing the discharge of a pure flow of grain into a receiving means.

Other objects of the invention will be in part obvious, and in part pointed out hereinafter.

In order that the invention and its mode of operation may be readily understood by persons skilled in the art, I have in the accompanying illustrative drawings, and in the detailed following description based thereupon, set out several possible embodiments of the same.

In these drawings:—

Figure 1 is a side elevation of the improved device having a portion thereof broken away and shown in section;

Figure 2 is a transverse section taken on the line 2—2 of Figure 1, looking in the direction in which the arrows point;

Figure 3 is a similar section taken on the line 3—3 of Figure 1, looking in the direction in which the arrows point; and,

Figure 4 is a fragmentary detail, partly in longitudinal section, of a slightly modified form of grain handling device.

Having more particular reference to the drawings, in connection with which like characters of reference will designate corresponding parts throughout, the improved grain handling device may be stated, first, to comprise a supporting frame consisting of angularly positioned timbers or other suitable supporting devices generally indicated herein by the numeral 1, such frame, of course, being suitably braced whereby to lend rigidity and stability to the same.

Disposed longitudinally of the supporting frame 1 and rotatably mounted upon annular supporting brackets 2 and 3 is a tubular casing 4, it being noted in this connection that the annular brackets 2 are provided with laterally extending supporting arms 5 fixedly engaging adjacent portions of the supporting frame 1, while supporting rollers 6 are journalled in bearings at intervals throughout the circumference of the annular brackets 2 and serve as anti-frictional supports for facilitating the rotatable mounting of the tubular casing 4. This tubular casing 4, as shown in the Figure 1, is foraminated throughout a portion of its length, as is indicated by the numeral 7, thus providing an effectual screening surface for the device, while to permit of the discharge of grain to be separted into the lower end of the conveyor 4, a hopper-like device 8 is mounted upon an adjacent portion of the supporting frame 1 and communicates with the lower open end of such conveyor, as is indicated in the Figure 1. The upper end of the tubular casing 4 is flared outwardly, as indicated by the numeral 8′, whereby to facilitate the discharge of the separate grain therefrom in the manner as indicated.

To receive the dockage, chaff, or other foreign matter separated from the grain passing over the screen-like portion of the tubular casing 4, an apron, semi-circular in cross section, designated herein by the numeral 9 is secured to and extended longitudinally

of the supporting frame 1 in alignment with the said tubular casing 4 and directly there beneath as indicated in the Figure 1. The bottom of this apron 9 is inclined with respect to the lower portion of the tubular casing 4 and terminates in a discharge mouth 10 at its lower end, thus permitting dockage to be received from the grain passing through the tubular casing 4 and to effect its discharge into a suitable receiving receptacle provided therefor. At this point, it is of moment to note that the discharge apron 9 extends completely throughout the entire length of the foraminated portion 7 of the tubular casing 4 and by consequence, will serve to positively receive the dockage separated from the grain passing through the device.

In order to provide the tubular casing 4 with means for elevating and discharging the grain from the device, a shaft 11 is extended longitudinally and internally through the tubular casing 4 and has a spiral conveyor 12 arranged thereupon throughout the greater portion of its length; the lower end of such shaft 11 being supported at its lower end upon an adjustable thrust bearing 13, while the upper end thereof is extended for a distance beyond the casing 4 through a supporting bearing 14 carried upon the upper end portion of the supporting frame, whereupon it is provided with a fixedly mounted sprocket wheel adapted to receive one portion of an endless sprocket chain 15 thereabout, the utility of which will be presently described.

Means for rotating the tubular casing 4 and the shaft 11 carrying the spiral conveyor 12 in opposite directions are provided for in form of a driving shaft 16 disposed transversely of the basal portion of that part of the supporting frame 1 receiving the tubular casing 4 in the manner indicated in the Figure 2, the extremity of said driving shaft being rotatably mounted in suitable bearings 17 secured to such part of the supporting frame and being adapted to receive rotary motion from suitable belt gearing or similar means engaging over the peripheral portion of a belt pulley 18; a bevel gear 19 being fixedly mounted on opposite portion of said driving shaft 16 and continually meshing with a similar but right angularly positioned gear 20 carried fixedly on the lower end of an elongated shaft 21 mounted in suitable bearings 22 and 23 at the opposite ends of that part of the supporting frame 1 receiving the tubular casing 4. The upper end of the shaft 21 is extended beyond its particular bearing 22 and carries a sprocket wheel about which the remaining end of the endless sprocket chain 15 passes, thus interconnecting said shaft 21 and the shaft 11 whereby rotary motion will be transmitted from the former to the latter.

To transmit motion to the tubular casing 4, a ring gear 24 is fixedly mounted upon the lower peripheral portion of said casing 4 and is adapted to mesh with a pinion 25 fixedly mounted upon an adjacent portion of the shaft 21. End thrust rollers 26 are mounted in suitable brackets 27 upon adjacent portions of the annular brackets 2 and have rolling contact with the adjacent marginal portion of the lower end of the casing 4, thus ensuring proper positioning of such casing 4 with respect to the discharge apron 9 and similarly, maintaining the ring gear 24 in alignment with and in mesh as respects the pinion 25 aforesaid.

Should it be desired to chemically treat the grain whereby to free the same of smut or germs that are in it before seeding, formaldehyde or other suitable matter may be discharged thereonto, a receptacle 28 being provided for this purpose and supported upon suitable arms 29 fixedly secured to adjacent portions of the lower part of the supporting frame; a discharge conduit or pipe 30 extending from the receptacle into the hopper 8 whereby the liquid may be properly directed thereinto. It is preferable, also, that a manually operable control valve 31 be interposed as between the pipe 30 and the receptacle 28 whereby the control of the liquid from the receptacle may be regulated, to the desired nicety.

In operation of that form of the invention disclosed in the Figures 1, 2 and 3, grain is discharged into the hopper 8, whereupon the same is directed into the open lower end of the rotating tubular casing 4. Simultaneously, with the introduction of the grain into the open lower end of the tubular casing 4, it will be engaged by the lower end of the spiral conveyor 12, which conveyor, as will be appreciated, is rotating in a direction opposite to the direction of rotation of the rotatable tubular casing 4 because of the manner in which rotary motion is imparted thereto from the driving shaft 16. Grain will be now elevated or carried upwardly over the angularly positioned tubular casing 4, moving over the foraminated or screening surface 7 thereof, whereupon the dockage will pass through the foraminations of the screen surface onto the discharge apron 9 and from the same by way of the discharge mouth 10 thereof; the grain being retained within the tubular casing and continuing on in its upward longitudinal movement through the same to a point whereat it is discharged from the flared open upper end 8′ into a suitable receiving receptacle.

In the Figure 4, I have shown a slightly modified form of the invention, wherein a tubular rotatable casing 4′ is employed, having a shaft 11′ extended therethrough carrying a spiral conveyor 12′, which conveyor,

as will be noted, is arranged internally of and extended longitudinally with respect to said tubular casing 4′ in order that grain passing therein will be elevated and caused to move over the screening surface or foraminated portion 7′ of such casing 4′. A trough-like receptacle 32 is fixedly supported beneath and adjacent to the tubular casing 4′ upon a suitable supporting platform, not shown herein, the same being extended longitudinally with respect to such casing 4′ throughout the length thereof and having a shaft 33 passed longitudinally therethrough and journalled in suitable bearings at the opposite ends of said receptacle, as indicated at 34. A spiral conveyor 35 is carried upon the shaft 33 and serves to conduct matter discharged into the receptacle 32 longitudinally through and over the bottom of the same. The upper end of the shaft 33 is extended for a distance beyond the adjacent end of the receptacle 32 and carries a sprocket wheel thereon which has a sprocket chain 36 engaged thereabout, the opposite end of said chain passing about a similar sprocket wheel carried upon a correspondingly extended end of a shaft 11′.

Discharge openings 37 and 38 are formed in the bottom of the trough-like receptacle 32 and each of the same are provided with discharge chutes 39 and 40, such chutes 39 and 40 being hinged to adjacent portions of the receptacle 32, as indicated at 41, whereby the same may be swung to angular positions to effect the conduction of matter delivered thereonto from the respective openings 37 and 38 into suitable receiving receptacles. Likewise, if desired, the particular openings 37 and 38 of the chutes 39 and 40 may be closed by swinging such chutes to a closed position as indicated in dotted lines in the Figure 4.

In operation of the modified form of the invention shown in the Figure 4, the grain to be separated is passed over the foraminated screening surface 7′ of the tubular casing 4′, whereupon the dockage will pass through the foraminations of such tubular casing into the trough-like receptacle 32, whereupon the same will be engaged by the rotating spiral conveyor 35 and moved upwardly and longitudinally over the bottom of such receptacle 32. In this way, it is to be understood that various undesired matter is removed from the grain; weeds, mustard, and other small seeds passing through the opening 38 and being discharged by way of the now open chute 40 into a suitable receiving receptacle, while the remaining dockage within the matter is carried upwardly and longitudinally through the trough-like receptacle 32 and discharged therefrom by way of the opening 37 onto the chute 39 into a receiving device not shown. If desired, the opening 38 may be closed by swinging the chute 40 upwardly to that position as shown in dotted lines, whereupon the entire amount of dockage discharge into the receptacle 32 will be directed upwardly for discharge through the opening 37.

If the grain is not required to be screened after leaving the elevator of the cleansing device discharging the grain into the invention, the chute 40 is closed while the chute 39 is reversed in its position and hinged as at 42, whereupon the dockage will be passed from the receptacle 32 to the opening 37 down the chute 39 and delivered from the device.

Instead of the spiral conveyor 12′ and the tubular casing 4′ revolving in opposite directions as described in connection with the aforesaid embodiment, they may, if desired, rotate in the same direction, the spiral conveyor being rotated at a greater speed with respect to the casing.

Manifestly, the construction shown is capable of considerable modification, and such modification as is within the scope of my claims, I consider within the spirit of my invention.

I claim:

1. A grain cleaning and loading machine comprising spaced side bars, screening and conveying means rotatably supported between said bars, an apron suspended from the spaced bars for receiving and discharging the screenings from the screening and conveying means, and a frame supporting said bars with the screening and conveying means, and apron in an inclined position.

2. A grain cleaning and loading machine comprising spaced side bars, a tubular casing rotatably supported by and between said bars, a portion of said casing being foraminated, a conveyor within the casing, an apron suspended from the spaced bars and disposed longitudinally of said casing for a portion of its length adapted to receive and discharge screenings from the same, and a frame secured to the side bars and supporting the latter with said casing and apron in an inclined position.

3. A grain cleaning and loading machine comprising spaced parallel bars, a tubular casing rotatably supported by and between said bars, and being foraminated throughout a portion of its length, a spiral conveyor within the casing, means to rotatate said casing and conveyor in opposite directions, an apron secured to the underside of the spaced bars and extending below the entire length of the foraminated portion of the tubular casing, and a frame secured to the bars and supporting the latter with said casing and apron in an inclined position.

4. A grain cleaning and loading machine comprising spaced parallel bars, a tubular casing rotatably supported by and between

said bars and being foraminated throughout a portion of its length a spiral conveyor within said casing, means to rotate the casing and conveyer in opposite directions, a feeding hopper carried by the spaced bars and communicating with one end of the casing and conveyer, an apron secured to the underside of said bars and disposed below the entire length of the foraminated portion of the casing, the bottom of said apron being inclined with respect to the casing, and an angular frame secured to portions of said bars and supporting the latter with the casing and apron in an inclined position.

In witness whereof I have hereunto set my hand.

ANDREW R. STRANG.