Feb. 2, 1932. S. E. RASMUSSEN 1,843,404

GRAIN CLEANER AND LOADER

Filed April 11, 1929 4 Sheets-Sheet 1

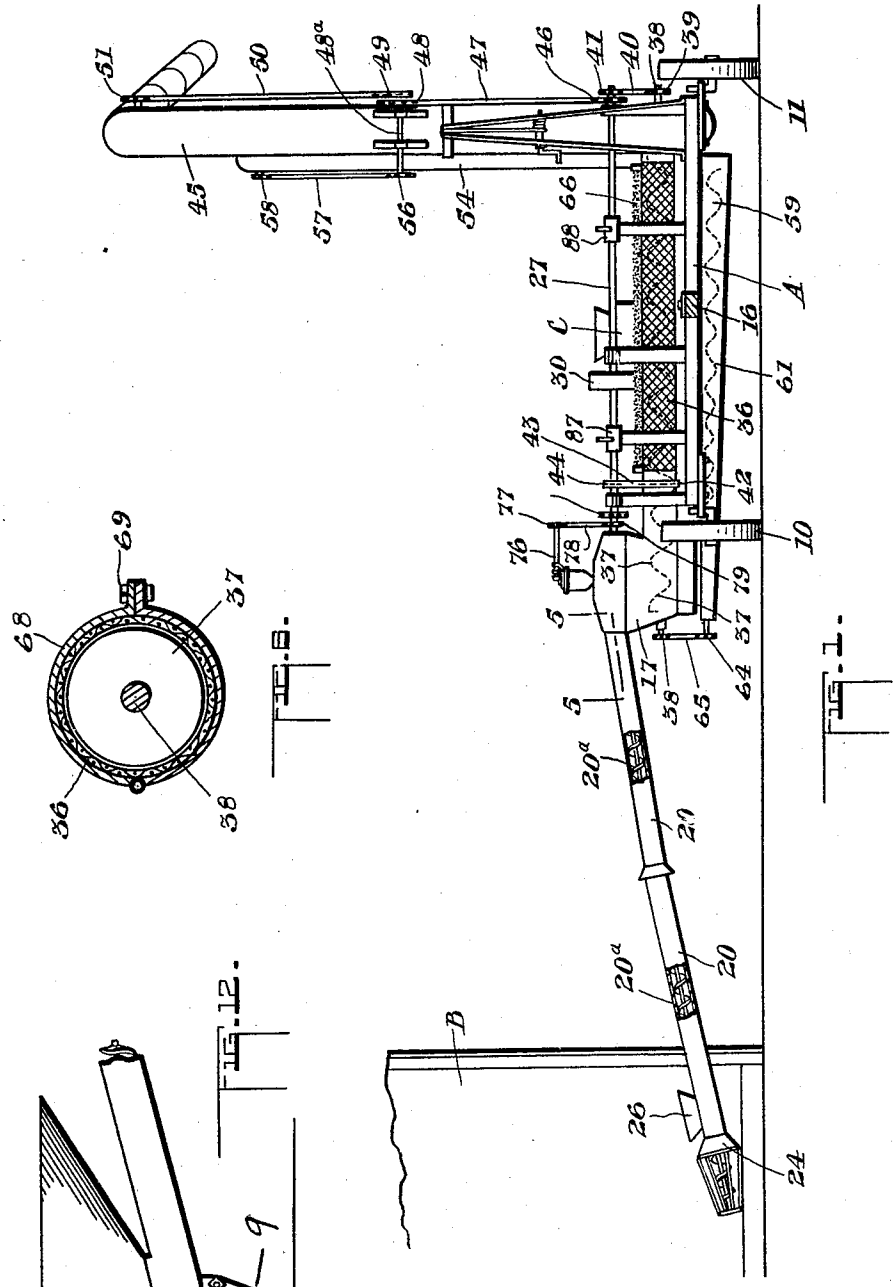


FIG. 1.

FIG. 8.

FIG. 12.

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GRAIN CLEANER AND LOADER

Filed April 11, 1929 4 Sheets-Sheet 2

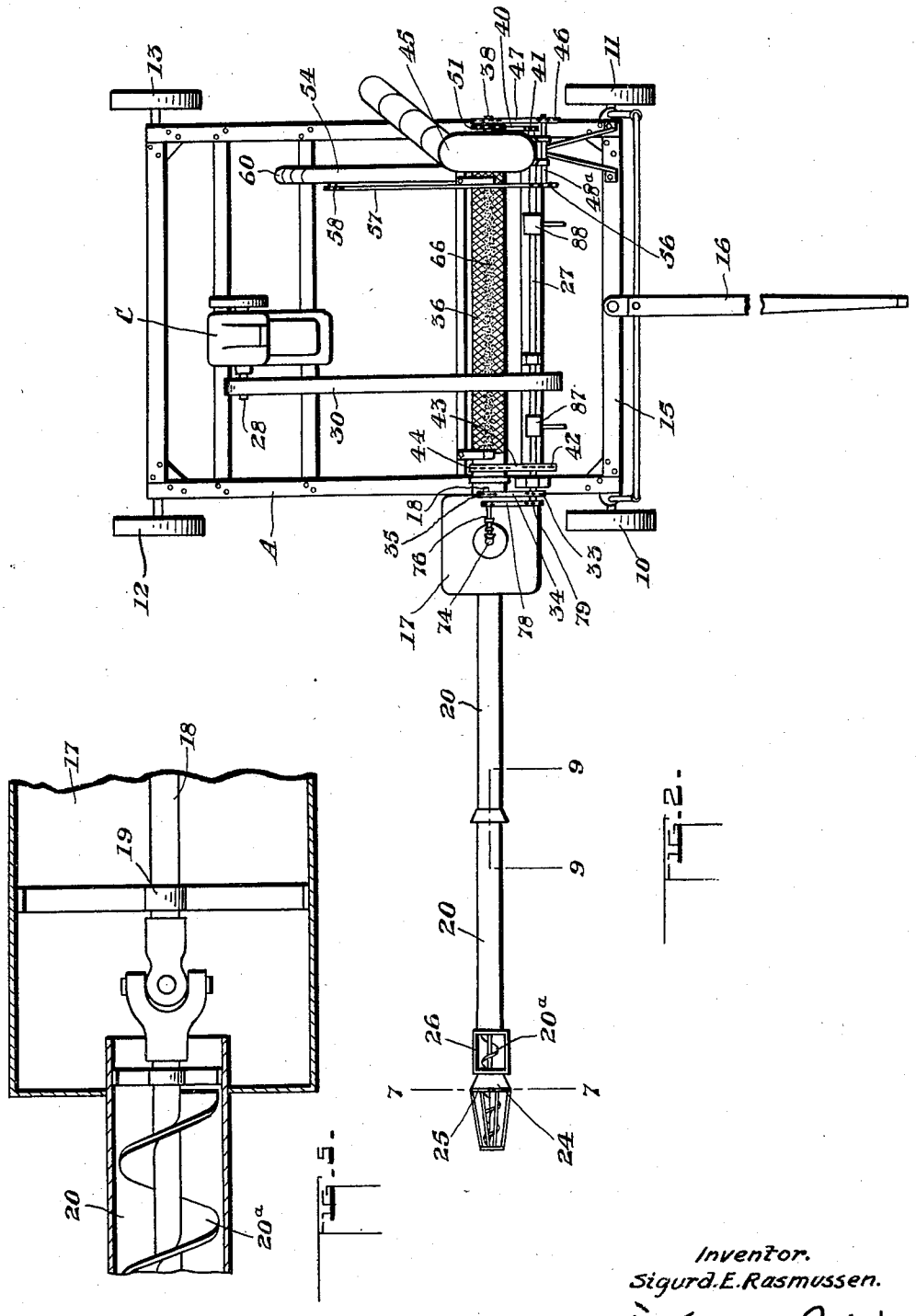


FIG. 2.

FIG. 5.

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GRAIN CLEANER AND LOADER

Filed April 11, 1929 4 Sheets-Sheet 3

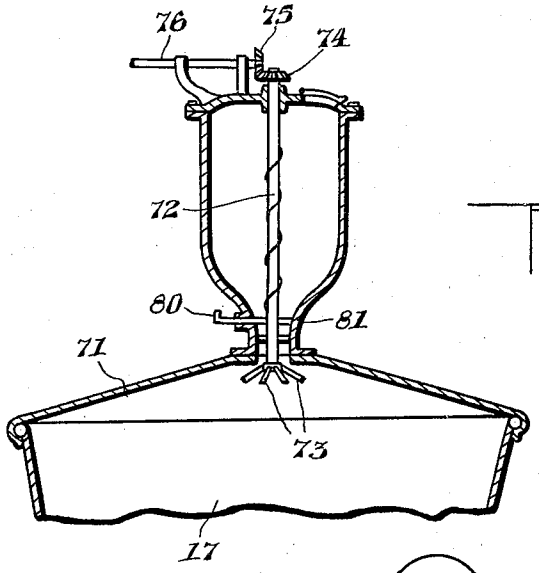


FIG. 4.

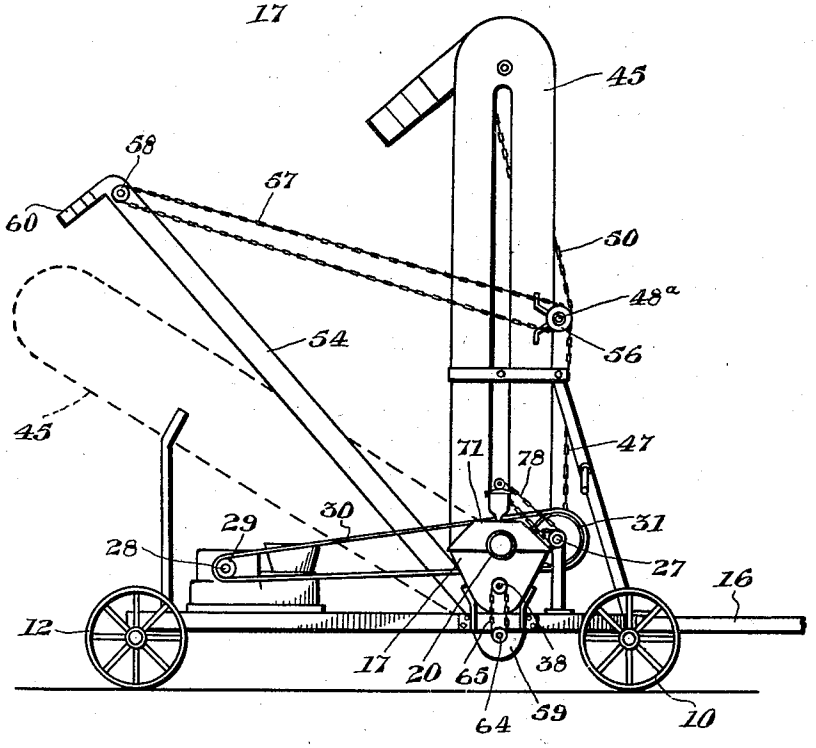


FIG. 3.

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GRAIN CLEANER AND LOADER

Filed April 11, 1929 4 Sheets-Sheet 4

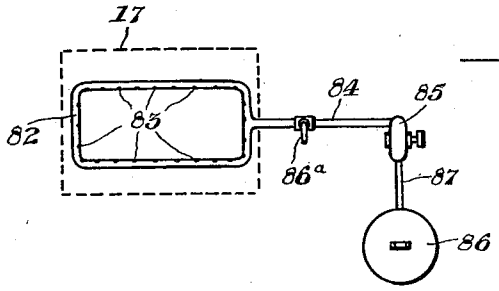


FIG. 11.

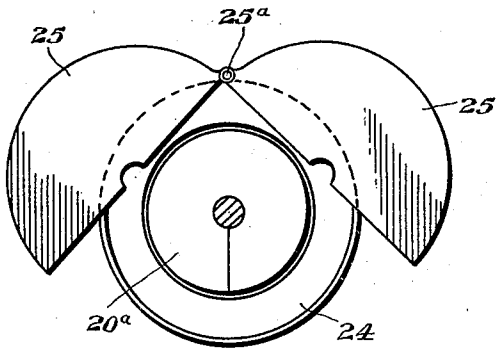


FIG. 7.

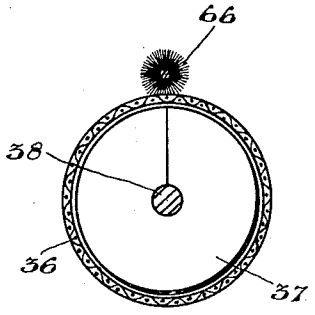


FIG. 8.

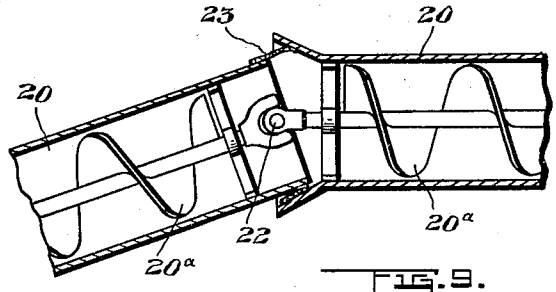


FIG. 9.

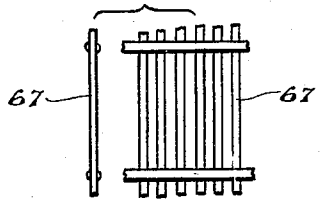


FIG. 10.

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UNITED STATES PATENT OFFICE

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GRAIN CLEANER AND LOADER

Application filed April 11, 1929. Serial No. 354,318.

The invention relates to improvements in grain cleaners and loaders and more particularly to a grain cleaner and loader of the class employed with waggons.

A further object of the invention is to provide improved apparatus for loading, cleaning and conveying grain of a portable character, which can be readily applied to waggons and in which the different mechanisms can be operated selectively and collectively.

Yet another object of the invention is to provide a portable apparatus especially adapted for receiving material, cleaning and elevating it for diversion into a bin or other place of accumulation, and is particularly designed for handling farm products and the like.

Another object of my invention is to provide a simply constructed loading and cleaning apparatus which can be adapted to grain waggons, or the like, in such manner that power is provided on the waggon or remote therefrom and can be readily applied for operating same. The apparatus being so adapted to the waggon that extension parts be fitted thereto for loading grain, or the like, from varying distances and elevations.

Furthermore, the invention relates to improvements in portable corn and grain loaders and cleaners adapted to be conveniently moved from place to place to facilitate the loading or unloading of grain, or the like, and of light and durable construction that can be built and placed on the market at a reasonable price.

With the foregoing, and other objects hereinafter more fully referred to, the novel features of the invention consists in the combination with an elevator of a flexibly jointed conveyor or drag adapted to receive and convey grain, or the like, and means intermediate of the elevator and the drag or conveyor selectively or collectively operable therewith for cleaning and treating the grain in transit therethrough. The apparatus as a whole being portably mounted on a wheel supported frame.

Referring now to the drawings in which like characters of reference indicate corresponding parts in each figure,

Fig. 1 is a front elevation of the apparatus as a whole.

Fig. 2 is a top plan view.

Fig. 3 is a side elevation.

Fig. 4 is an enlarged sectional detail of the powder treating attachment.

Fig. 5 is a section on line 5—5 of Fig. 1.

Fig. 6 is a cross sectional detail through the screen, and indicating an outside closure member therefor.

Fig. 7 is a section on line 7—7 Fig. 2.

Fig. 8 is a sectional detail through the screen showing the cleaning brush.

Fig. 9 is a sectional detail taken on the line 9—9, showing the flexible joint.

Fig. 10 is a detail of the screen body showing the longitudinal ribs supporting the wires.

Fig. 11 is a diagrammatical detail of a modified form indicating liquid treating means for the grain.

Fig. 12 is a side elevation of the wagon hopper provided with adjustable supporting legs.

Referring now more particularly to the drawings in which an example of my improved apparatus is disclosed. A designates a frame of any suitable construction provided with front wheels 10 and 11 and rear wheels 12 and 13. Associated with the front cross bar 15 of the frame is hitching means 16 of any well known construction, although it must be understood that the frame A can be motor driven, or otherwise moved from place to place, if so desired. As here shown a grain bin B is disclosed adjacent the apparatus and is hereinafter more fully referred to.

Mounted on the frame A is a casing or hopper 17 within which is a shaft 18 supported in suitable bearings as at 19, while associated with the hopper 17 is a second casing 20 adapted to house an auger 20*a*. This auger casing 20 is formed in sections connected as illustrated in Fig. 9 by flexible or universal joints 22, and provided at each joint with suitable pad elements 23 to prevent leakage of the grain, or the like, being converted therethrough by the auger or conveyor 20*a*.

At the outer end of the casing member 20 is an open sided funnel 24 of substantially cone shape, and adapted to be inserted in an accumulation of grain here shown as being contained in a bin B, so that on the auger being operated the grain will be automatically conveyed from the bin. If required, the head 24 of the conveyor can be closed by means of shutters 25 pivotally mounted thereon as at 25*a* see Fig. 7, without interfering with the operation of the auger 20*a*, will prevent any grain from being taken up through the funnel 24. In this way a hopper 26 adjacent the outer end of the chute or casing 20 communicating therewith may be used and grain, or the like, shoveled thereinto as circumstances may require when it is not possible or convenient to use the auger direct.

The countershaft 27 is driven as here shown by a prime mover or engine C mounted on the frame A with drive shaft 28 provided with a pulley 29 connected by a belt 30 to a pulley 31 on the countershaft 27 which in turn is connected to the shaft 18 by means of a sprocket wheel 33, chain 34 and sprocket 35 on the shaft 18. This shaft communicates with the auger or conveyor 20*a*. It should here be noted that the joints for the casings 17 and 20 housing the universal joints for the auger shaft 18 are of the bayonet type and being of male and female design are easily drawn apart.

It will be seen from the foregoing that on the engine C being operated the countershaft 27 will be rotated operating the shaft 18 and the auger 20*a* to convey grain from the bin B or the hopper 26. It will also be seen that the shaft 18 operating the auger is, through universal joints extensible to any required length, and that the casing 20, through the specially formed flexible joints, co-operating with the universal joints is also extensible.

Co-operating with the auger member 20*a* to deliver grain or the like thereto, is a rotatably mounted screen 36 in the center of which is an auger 37 driven by a shaft 38, connected through a sprocket 39 and chain 40 with a sprocket 41 on the countershaft 27. This auger 37, as will be more fully explained, performs the function of a conveyor, while the screen acts as a convertible casing, both travelling in the same direction, but at different rates of speed made possible by the difference in the diameter of the pulleys or sprockets on the countershaft, which drive the screen and the auger respectively. The screen is driven from the countershaft 27 through a sprocket or wide wheel 42, connected by a belt or chain 43 with a pulley 44, on the countershaft. Co-operating with the screen I provide an elevator 45 whereby the cleaned grain from the screen is elevated and disposed in any required type, and is driven from the countershaft 27 through pulley 46, belt 47 and pulley 48. A secondary countershaft 48*a* is connected through sprocket 49, chain 50 to sprocket 51 on the elevator, whereby the latter is driven from the top. The grain being delivered from the screen 36 to the elevator. A chaff or waste pipe 54 is provided with a suction fan or auger operable at the outer end, and driven by means of shaft 48*a* on the elevator which is provided with a sprocket wheel 56, the chain 57 and sprocket wheel 58 being connected to a fan or other suitable elevating means.

The pipe 54 communicates at its lower end with the chaff member or trough 59 at its upper end with a flexible and extensible discharge spout 60. This pipe can also be used as an auxiliary elevator, but is generally adapted for discharging chaff or dirt delivered thereto from the screen 36 and auger 37. The trough or chaff member 59 is preferably formed with a slant, see Fig. 1, and is also provided with an auger 61 connected through a sprocket 64 and chain 65 to the shaft 38, whereby on the screen being operated, the trough auger 61 is also operated.

Co-operating with the screen 36 is a rotatably mounted brush 66 suitably mounted in bracket bearings, parallel to and in contact with the screen 36 which when revolved causes the brush to revolve also, through friction, and the fact that the bristles enter between the wire 67, see Fig. 10 of the screen and push away any grain, or the like, which may have accumulated therebetween. As illustrated in Fig. 5, I provide the screen with a hinged cover 68 which may be made in suitable sections, and is securely fitted thereto, by means of bolts 69 or the like, so that when the screen is not used for cleaning grain, it can be utilized as a chute for conveying the grain from the intake 17 to the elevator 45. The screen terminates at the end remote from the elevator 45 in the hopper 17, which is called the main hopper, into which the auger 20*a* in the extension truck loader 20 discharges when in use, and which, of course, under certain conditions may be entirely dispensed with, permitting the grain or material to be delivered directly to the main hopper 17, and thence to the screen 36, and finally to the elevator 45.

In connection with this main hopper 17 and as illustrated in Fig. 4, a powder treating attachment for treating the grain may be used and also as illuustrated in Fig. 11, a liquid treating attachment or these attachments may be dispensed with, and the main hopper fed by shovel, or otherwise, if so desired.

For operating the powder attachment as shown in Fig. 1 and Fig. 4 is a hopper shaped casing 71 expanded to fit on the main hopper 17, and in which is a vertical auger shaft 72 formed at its lower end with disintegrating branches 73 and provided at its upper end with a gear wheel 74, the whole being mount-

ed in suitable bearings in the top of the casing 71. Meshing with the gear 74 is a gear 75 on a shaft 76 provided with a gear 77, connected by a chain 78 with a gear 79 on the countershaft 27, a slide 80 operable from without the hopper casing 71 is also provided in the neck 81 to regulate the flow of powder into the main hopper containing the grain.

For treating the grain in the main powder with liquid, I provide as illustrated in Fig. 11 a rectangular pipe 82 to fit into the top of the hopper and provided all around with a plurality of jet openings 83. The pipe is connected through a main stem 84, to a pump 85, in turn connected to a reservoir 86 by a pipe 87 whereby liquid for treating the grain is supplied under pressure to jet openings 83, a control valve 86*a* is provided in the pipe 84 to regulate the supply of liquid to be sprayed.

A feature of the invention resides in the fact that the several mechanisms associated with, and forming the apparatus as a whole, may be operated separately or collectively. To do this, I provide in connection with a countershaft 27, two clutch members 87 and 88, whereby on clutch 87 being operated, the screen 36 is thrown out of gear and ceases to rotate, while the auger 37 will continue to rotate and on the cover being applied to the screen, the latter will become a conveyor for grain or the like to the elevator 45 which also continues to operate, as well as the trough auger 61. At the same time, the auger 20*a* also will be placed out of gear permitting the grain or the like to be supplied to the main hopper 17 in any suitable manner. Again on the clutch 88 being operated, the elevator 45 and the screen auger 37 will be thrown out of gear and the trough auger 61 will be thrown out of gear, and the screen with the auger 20*a* and powder or fluid treating mechanism left in gear.

With reference to the different rates of speed at which the auger 37 and the screen 36 are rotated, which as previously mentioned, is due to variation in the diameter of the members 42 and 44 and the members 39 and 41, the former being considerably larger than the latter, so that in operation the screen will rotate at a lower rate of speed than the auger 37 within it.

From the foregoing the complete operation of the apparatus will be readily understood and is as follows:

Assuming that the bin B containing grain to be conveyed, cleaned and diverted to another point, the drag comprising the flexibly jointed and extensible casing 20 and universal jointed auger 20*a* therein is inserted within the bin, the other end being connected to the main hopper 17 within which is the auger 30 extending through the screen 36.

The engine C is then started and the countershaft 27 rotated, causing through the connections 42, 43 and 44, the screen 36 to rotate and through the connections 39, 40 and 41, the auger therein to rotate in the same direction but at different speed. At the same time, the auger 20*a* having been connected to the countershaft 27 by a universal joint is rotated to convey the grain from the bin B to the main hopper 70 and from thence by the auger 37 to the screen where it is cleaned and the screen automatically kept clean by contact with the brush 66. From the screen, the cleaned grain passes to the elevator 45 simultaneously operable through members 46, 47 and 48 by the countershaft 27, and from the elevator it is distributed to any desired point, unto waggons, trucks or into ships. During the foregoing operation, the chaff and foreign matter eliminated by the screen, drops into the trough or receptacle 59 which is provided with an auger 61, driven from the shaft for disposing the waste pipe or auxiliary elevator 54 is provided and may be furnished with a suction, or other suitable means for withdrawing the waste material and disclosing it. To treat the grain with powder or fluid as it passes through the hopper 17, is readily accomplished by detachable mechanism driven from the countershaft 27 and already fully described. It will thus be seen that no phase or step for the satisfactory conveying, treating, cleaning, elevating and disposing of grain with what amounts to a moltum in parvo apparatus is overlooked. Furthermore, and another feature of the invention is that the drag portion of the conveyor system is detachable, as well as flexible, and extensible and that the treating means are also detachable, as well as the elevator, but the trough, the clutches 87 and 88, the different mechanisms may be separately or collectively operated. The different elements being detachable enables them to be readily and conveniently assembled for transport where not in use, and the fact that the whole outfit as in the example shown can be readily mounted and operated on a truck, is another novel and important feature.

While a specific embodiment of this invention is herein shown and described, it should be clearly understood that the detailed parts in the preferred forms, and also that the preferred forms may be varied from time to time, depending upon the circumstances and conditions governing, and governed by, the development of this invention and the arts to which it is incident, so the interested inquirer is directed to interpret the scope of this invention from the claims, in which its spirit is broadly generalized.

What I claim for my invention is:

1. In a grain cleaner and loader of the character described, a transportable frame, a hopper on the frame, a drive shaft suitably mounted on the frame, a counter shaft cooperating with the drive shaft, a rotatably mounted convertible screen and a conveyor

co-operating with the screen and with the hopper, means of variable proportions operatively connecting the counter shaft with the screen and the conveyor respectively whereby variable speeds of rotation are simultaneously imparted to the screen relatively, prime mover mechanism for driving the counter shaft and means operable by the rotation of the screen for automatically cleaning the screen and means associated with the hopper for treating the grain before being screened, an elevator co-operating with the screen and means also associated with the screen for receiving and disposing of the chaff and waste from the screen, clutch means associated with the counter shaft for selectively and collectively operating the aforesaid means.

2. The invention according to claim 1, in which a clutch is associated with the counter shaft for operating the elevator and rotating the conveyor within the screen while permitting the screen to remain rigid.

3. The invention according to claim 1, in which the chaff-collecting and distributing means comprise a trough provided with a conveyor and a discharge chute and mechanism of variable proportions operatively connecting the aforesaid means with the counter shaft.

In witness whereof I hereunto set my hand.

SIGARD E. RASMUSSEN.