H. HOFMANN.

GRAIN SEPARATOR.

APPLICATION FILED APR. 1, 1913.

1,093,853.

Patented Apr. 21, 1914.

4 SHEETS—SHEET 1.

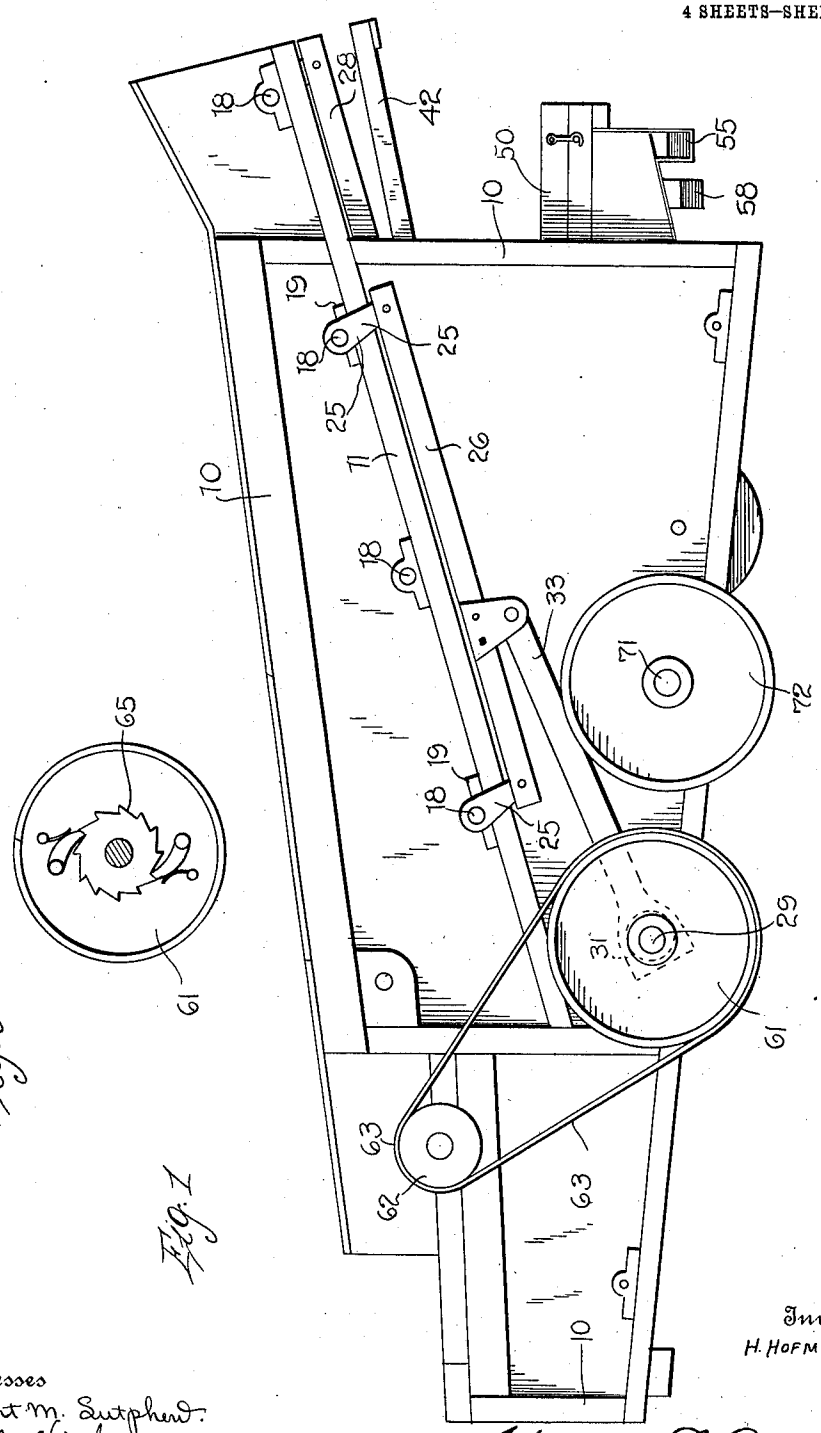


Fig. 6

Fig. 1

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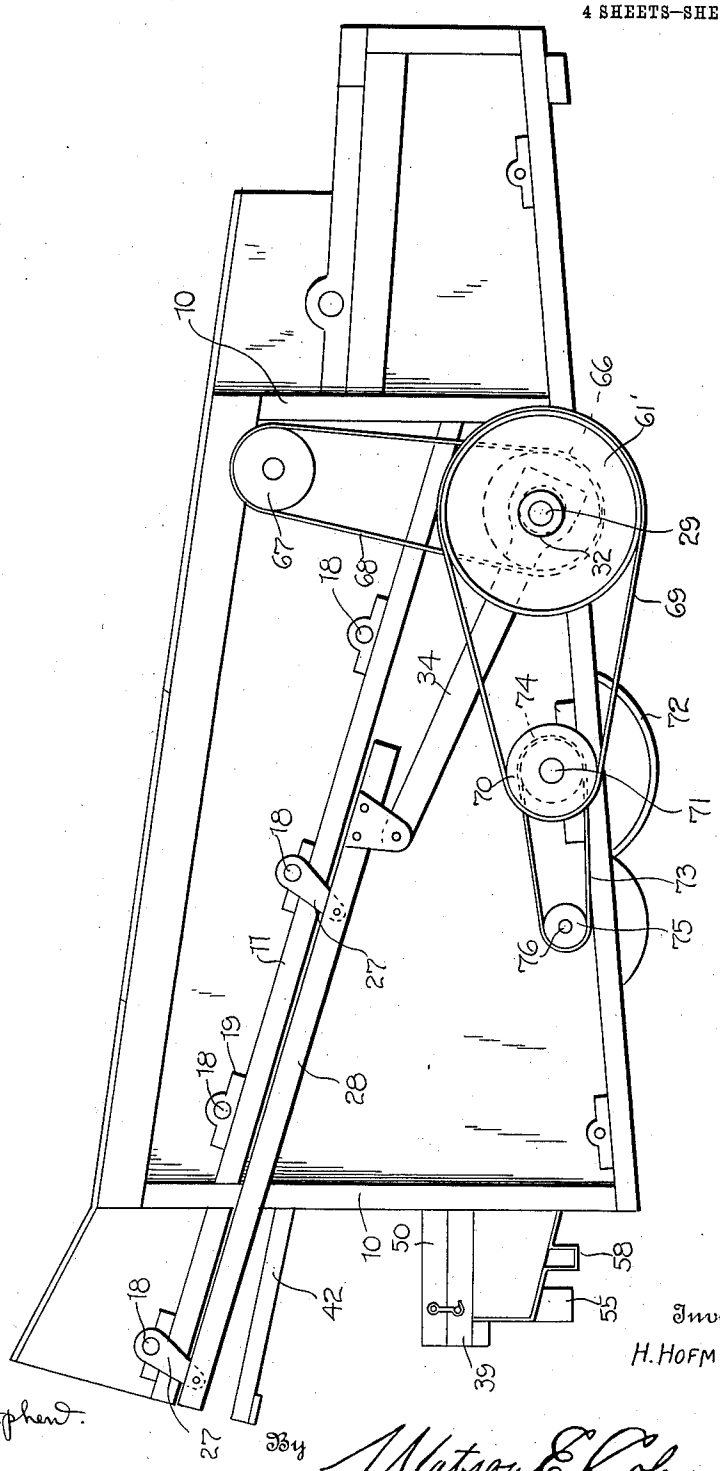
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4 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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4 SHEETS—SHEET 3.

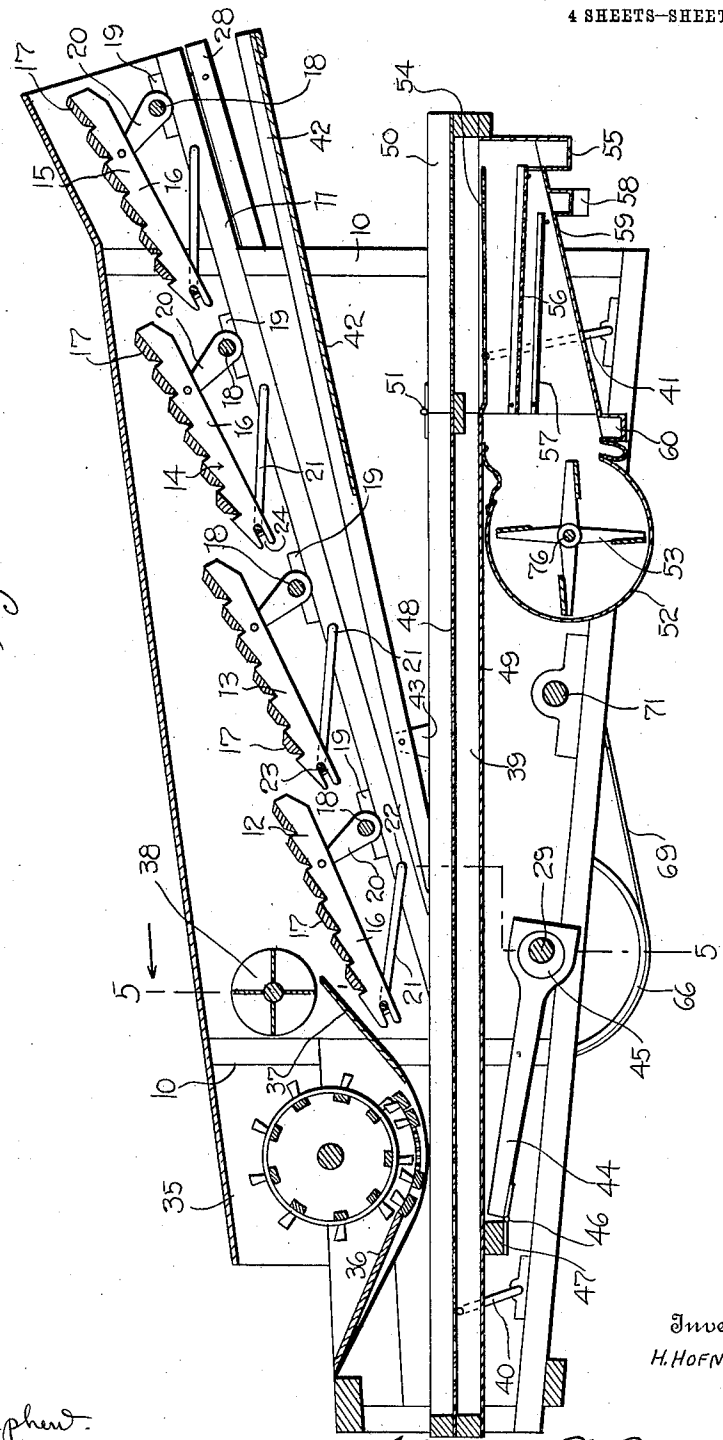


Fig. 3

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4 SHEETS—SHEET 4.

Fig. 4

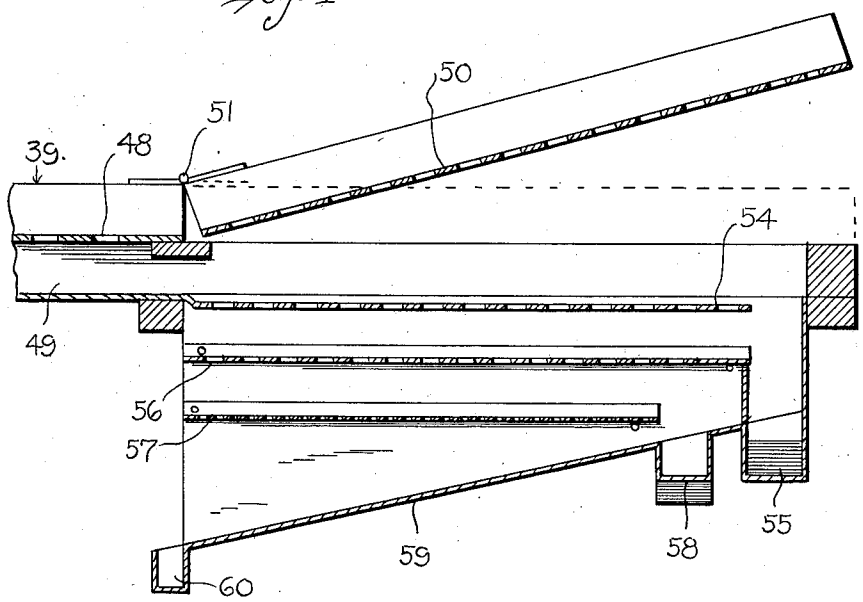
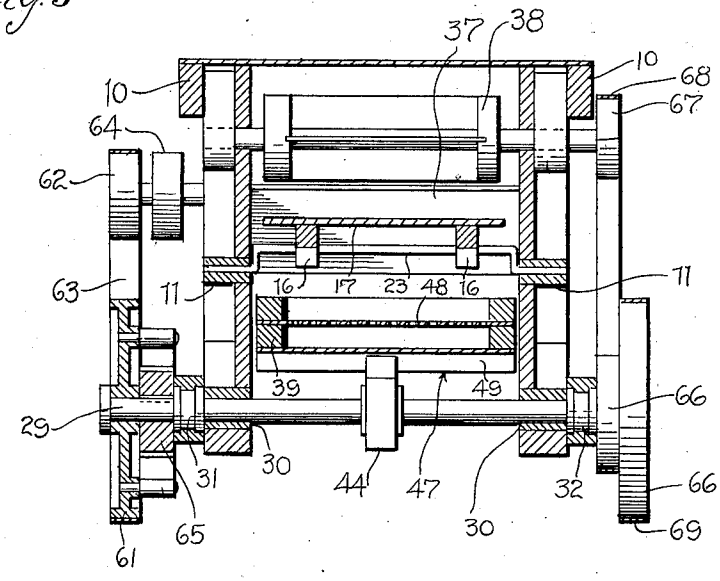


Fig. 5



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UNITED STATES PATENT OFFICE.

HERMAN HOFMANN, OF FONTANELLE, IOWA.

GRAIN-SEPARATOR.

1,093,853. Specification of Letters Patent. Patented Apr. 21, 1914.

Application filed April 1, 1913. Serial No. 758,213.

To all whom it may concern:

Be it known that I, HERMAN HOFMANN, a citizen of the United States, residing at Fontanelle, in the county of Adair and State of Iowa, have invented certain new and useful Improvements in Grain-Separators, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to grain separators and has for an object to provide novel means for separating clover seed from timothy seed and collecting these grains in separate bulks.

A further object is to provide a novel straw rack and novel means for actuating the same.

A still further object is to provide an extremely simple and effective shaking frame which carries the grain separating and collecting devices.

With the above objects in view the invention consists of certain novel details of construction and combination of parts hereinafter fully described and claimed, it being understood that various modifications may be made in the minor details of construction within the scope of the appended claim.

In the accompanying drawings illustrating this invention:—Figure 1 is a side elevation showing one side of the separator. Fig. 2 is a side elevation showing the opposite side of the separator. Fig. 3 is a longitudinal sectional view through the separator. Fig. 4 is an enlarged longitudinal sectional view showing the hinged chaffer, together with the grain separating riddles. Fig. 5 is a cross sectional view taken on the line 5—5 Fig. 3. Fig. 6 is a view showing the ratchet mechanism of the main driving pulley.

Referring now to the drawings in which like characters of reference designate similar parts, 10 designates the separator casing which is of the usual and well known type. Secured to the inner side walls of the casing are parallel downwardly and forwardly inclined bars 11 which constitute supports for the straw rack.

There are four downwardly and forwardly inclined straw shakers 12, 13, 14 and 15 arranged in stepped relation to form the straw rack. these shakers occupying substantially the entire width of the casing. Each shaker comprises parallel side bars 16 and parallel cross bars 17 connecting the side bars. Each shaker is supported at the upper end upon a rock shaft 18 that is journaled in suitable bearings 19 disposed on the supporting bars 11, the shaft carrying integral crank arms 20 which are pivotally connected to the side bars of the shaker. Each shaker is further supported at the lower end upon an inverted U-shaped rock frame 21 that is journaled at the ends in suitable openings 22 formed in the supporting bars, the bridge bar 23 of the frame being pivotally engaged in suitable openings 24 formed in the lower ends of the side bars.

In carrying out my invention, I employ an extremely simple means for rocking the alternate straw shakers 12 and 14 in the same direction and oppositely to the alternate straw shakers 13 and 15. To attain this end there are downwardly extending crank arms 25 disposed on the right hand ends of the rock shafts of the straw shakers 12 and 14, which crank arms have wrist pin connections with a reciprocating connecting rod 26, as shown in Fig. 1. Also there are downwardly extending crank arms 27 disposed on the left hand ends of the rock shafts of the straw shakers 13 and 15, which crank arms have wrist pin connection with a reciprocating rod 28, as shown in Fig. 2. The reciprocating rods 26 and 28 are actuated in opposite directions, as will now be described.

A main driving shaft 29 is journaled in suitable bearings 30 disposed on opposite sides of the separator casing, and cams 31 and 32 are disposed on this shaft, such cams being set at 180 degrees apart. These cams are operatively connected to eccentric rods 33 and 34 which are pivotally connected respectively to the reciprocating rods 26 and 28. Consequently, upon actuation of the driving shaft the eccentric rods 33 and 34 will be actuated in opposite directions with a corresponding actuation of the related reciprocating rods 26 and 28 in opposite directions, which produces the above described rocking of the alternate straw shakers 12 and 14 in the same direction and opposite to the alternate straw shakers 13 and 15.

As usual in grain separators the straw is fed down between the threshing cylinder 35 and concaves 36 from whence it passes up over the rack 37 and is there operated upon by the beater 38, which latter beats the grain down through the thin layer of straw, the straw then passing on to the above described straw rack where the grain which has escaped being beaten out by the

beater is shaken from the straw. The above referred to parts are of well known construction and will not be further described.

The grain collecting, cleaning, and assorting apparatus are carried on a single vibratory frame which is designated in general by the numeral 39. This frame extends throughout the full length of the casing from front to rear and is supported at the front and rear ends respectively by rock links 40 and 41 that are pivotally connected to the sides of the frame and are pivotally attached at the lower ends to the separator casing as shown best in Fig. 3. A return pan 42 is secured to the frame by brackets 43, this pan serving to return the grain shaken from the straw by the shakers to the front end of the grain conveyer, as usual. The frame is vibrated by means of an eccentric rod 44 that is operated by a cam 45 on the main driving shaft 29 and is further hinged as shown at 46 to a cross bar 47 which connects the bottom edges of the sides of the frame 39.

A grain conveyer in the nature of a perforated sheet metal plate 48 is secured marginally to the frame 39 and extends from the front end thereof nearly to the rear end. A grain pan 49 in the nature of an imperforate sheet metal plate is secured marginally to the frame below and parallel with the conveyer and is substantially equal in length to the latter, the grain accumulating on this pan after dropping through the conveyer perforations. Owing to the frame 39 being vibrated as above described the uncleaned grain together with the chaff is thus worked rearwardly upon the conveyer while the cleaned grain is also worked rearwardly upon the grain pan.

A chaffer 50 in the nature of a screen or perforated plate is hinged as shown at 51 to the frame 39 whereby it may be rocked upwardly when desired. There is a fan casing 52 and fan 53 of ordinary construction carried by the frame 39 below and forwardly of the chaffer, the draft from this fan being directed upwardly through the chaffer and thus blowing the chaff out through the rear end of the separator casing.

A shoe sieve 54 is carried by the frame 39 below and parallel with the chaffer, this sieve forming a continuation of the grain pan 49 and receiving the grain from the latter. The sieve terminates short of the rear end of the frame and discharges the tailings from its free end into a tailing chute 55 carried by the frame 39.

A riddle 56 is disposed below the shoe sieve and receives the grain from the latter, this riddle being formed with perforations of such size that both the clover seed and the timothy seed can drop through or gravitate. The draft from the fan is also directed through this riddle whereby the seed is further cleaned, the riddle communicating at the end with the tailing chamber and discharging the tailings into the tailing chute 55.

For separating the clover seed from the timothy seed, I provide a riddle 57 that is disposed directly below the riddle 56 and terminates short of the end of the latter, the riddle 57 being provided with openings of such size that the timothy seed can gravitate therethrough while the clover seed travels along the riddle and is discharged from the end thereof into a delivery spout 58 from which the clover seed may be collected in bulk.

The timothy seed which gravitates from the riddle 57 falls upon a downwardly and forwardly inclined delivery board 59 which carries the timothy seed forwardly and discharges the same into a delivery spout 60 from which the timothy seed may be collected in bulk.

From the above description it will be seen that the grain conveyer, the grain pan, the chaffer, the shoe sieve, and the separating riddles are all carried on a single vibratory frame, the motion of which enables the above mentioned parts to effectively function as described.

The driving shaft 29 is equipped with a belt pulley 61 over which and a pulley 62 on the threshing cylinder shaft a driving belt 63 is trained. The power pulley 64 is secured to the threshing cylinder shaft and through the instrumentality of the belt 63 drives the driving shaft 29. The pulley 61 is equipped with a ratchet mechanism designated in general by the numeral 65 which permits of the driving shaft being rotated only in a forward direction. The driving shaft is further equipped with a pulley 66 over which and a pulley 67 secured to the shaft of the beater 38 a driving belt 68 is trained.

For imparting a uniform movement to the moving parts, there is a driving belt 69 trained over the pulley 66 and over a pulley 70 that is secured to a shaft 71 which is equipped with a balanced wheel 72 which latter functions to steady the movement of the moving parts. For driving the fan 53 a driving belt 73 is trained over a pulley 74 on the shaft 71 and over a pulley 75 on the fan shaft 76.

It is to be understood that the above described mechanism may be altered as subsequent manufacture will prove to be advantageous without departing from the spirit or sacrificing any of the advantages of the invention.

What is claimed is:—

In a grain separator, the combination with a main frame, a plurality of transverse shafts mounted for oscillation thereon, and crank arms carried on said shafts; of a plu-

rality of shakers consisting of side bars and a plurality of transverse bars, the side bars of said shakers being pivotally connected adjacent one of their ends to the outer ends of said crank arms, the opposite ends of the side bars of said shakers being slotted to provide bearings therein, U-shaped rock frames having the arms thereon pivotally mounted on said main frame in planes adjacent the transverse shafts and the base portions thereof loosely received in the bearings at the outer ends of the side bars of said shakers, said rock frames being of a length greater than the length of the crank arms, said crank arms and rock frames being arranged on the main frame in such position as to normally dispose said shakers in stepped relation thereon, and means to oscillate said transverse shafts whereby to actuate said shakers.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

HERMAN HOFMANN.

Witnesses:

LOYD SWANGEN,

WILLIE BITTNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."