March 1, 1932. T. A. HEYDEN 1,847,530

SEPARATOR

Filed July 27, 1929 4 Sheets-Sheet 1

Fig. 1

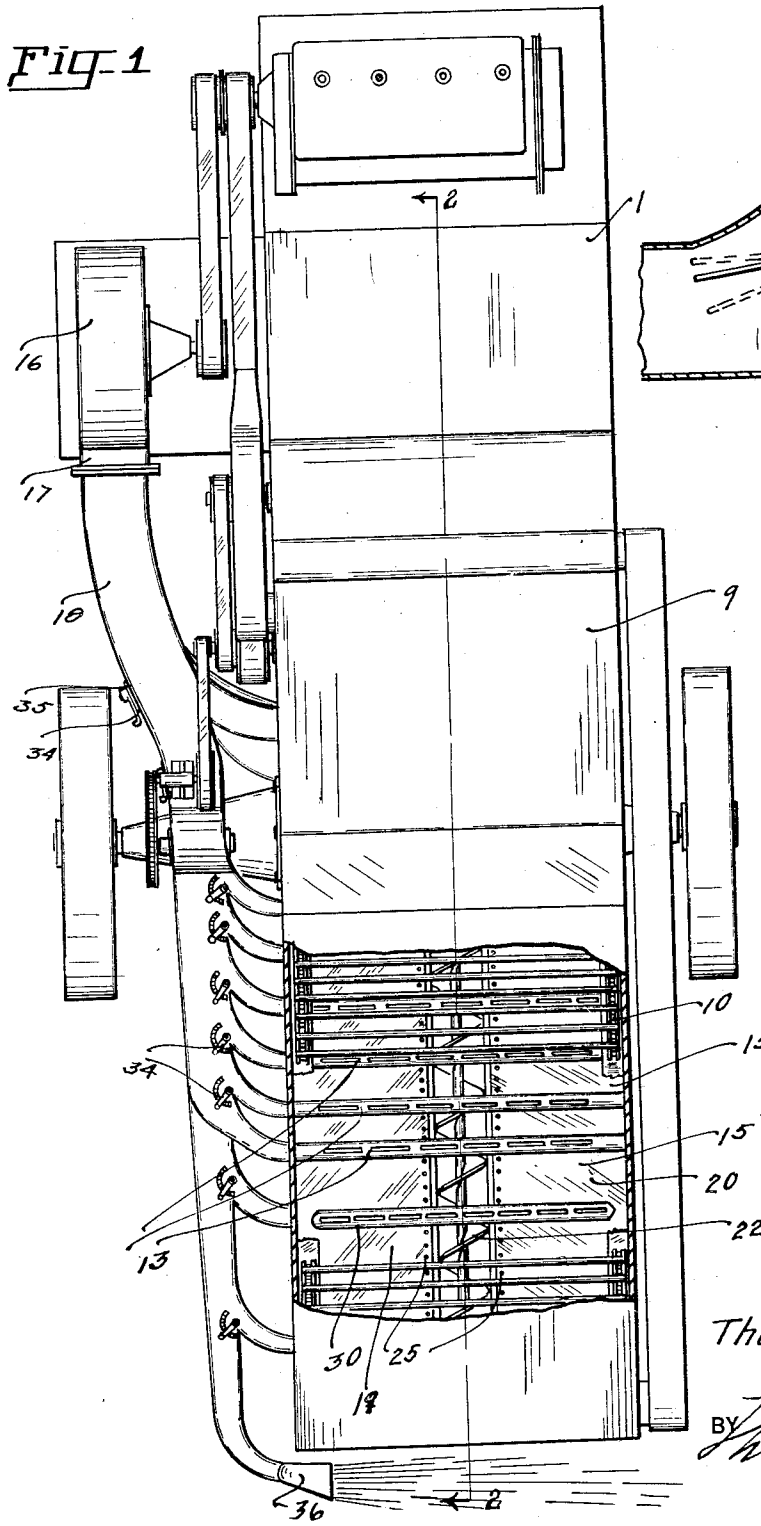
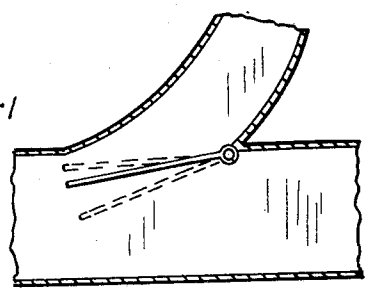


Fig. 6



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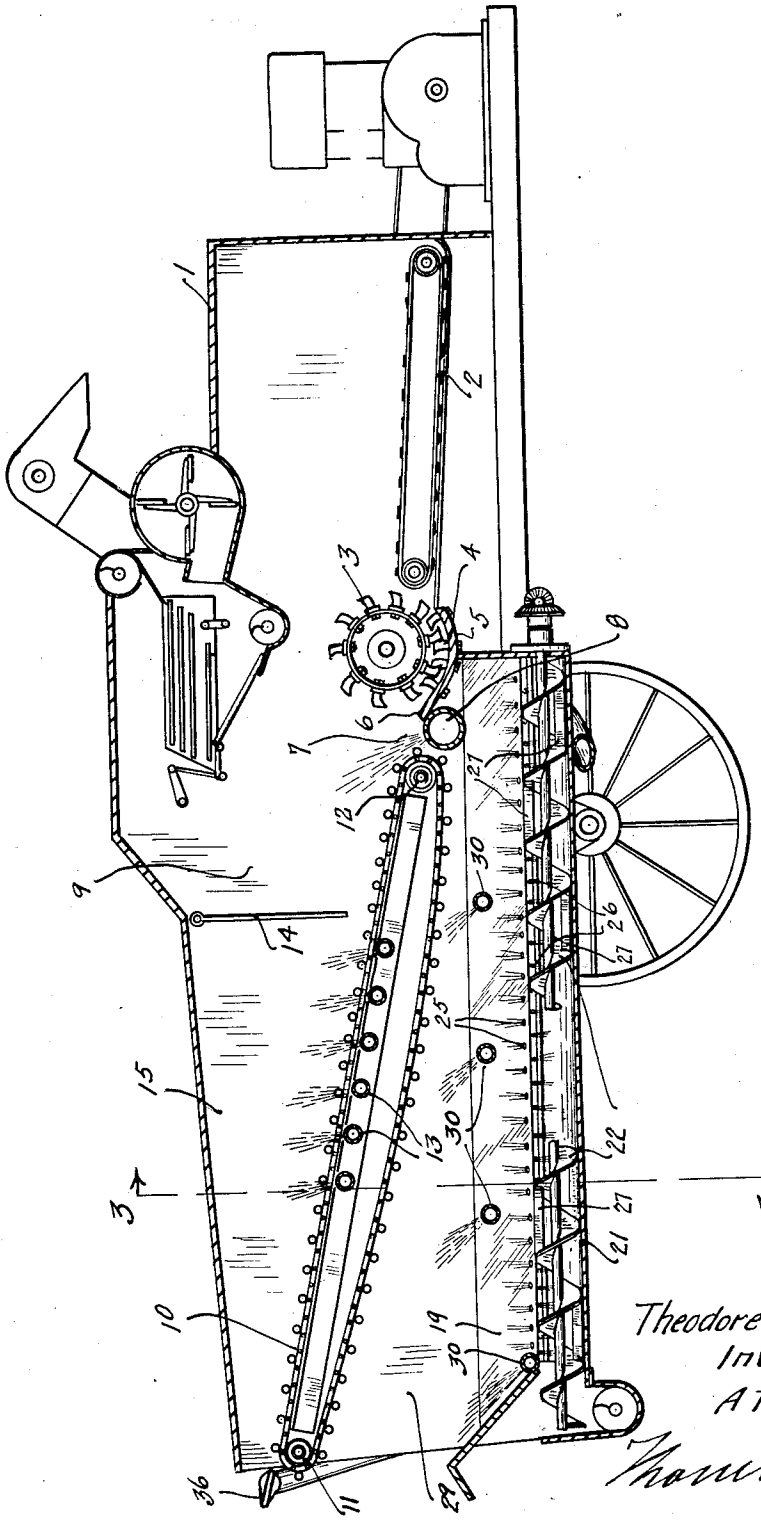


Fig. 2

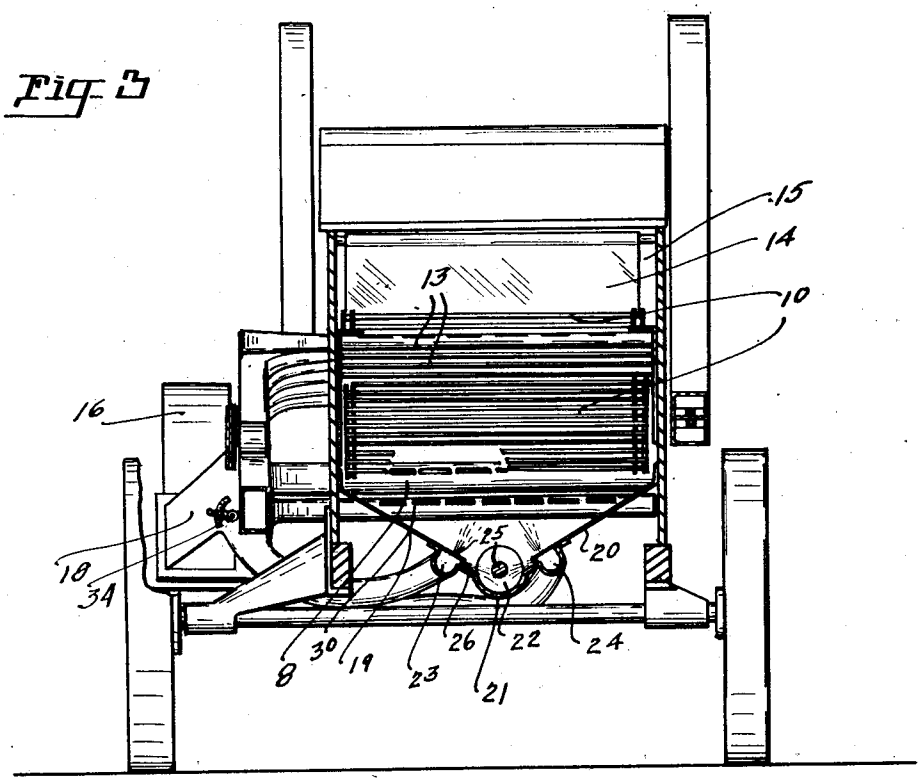
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March 1, 1932. T. A. HEYDEN 1,847,530

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Fig. 3



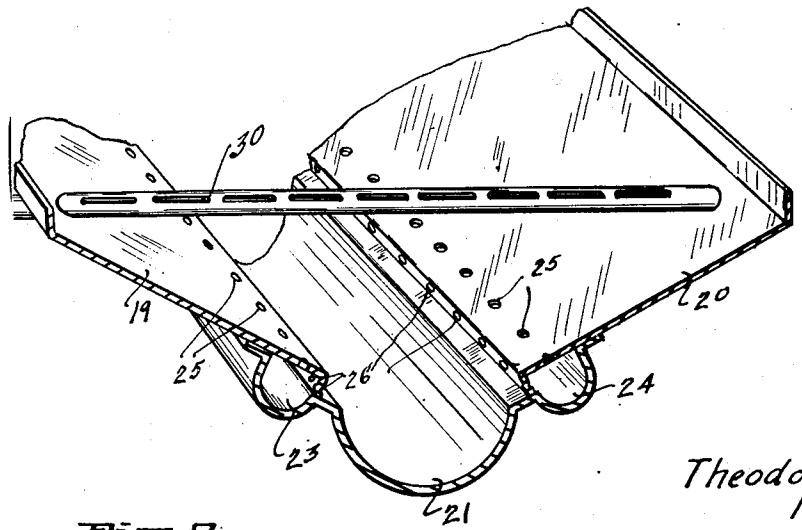


Fig. 7

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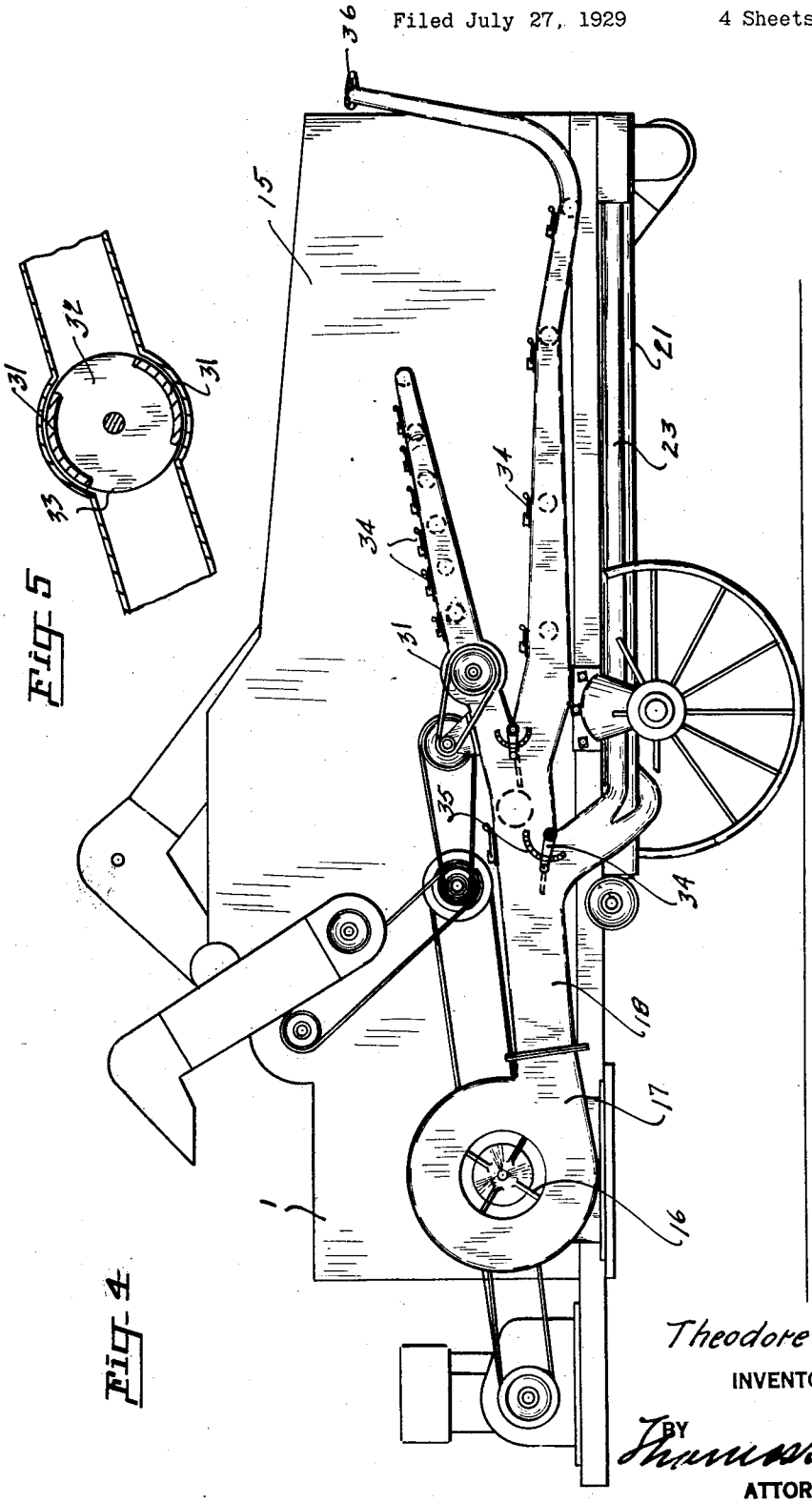


Fig. 5

Fig. 4

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Patented Mar. 1, 1932 1,847,530

UNITED STATES PATENT OFFICE

THEODORE A. HEYDEN, OF PENDLETON, OREGON

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Application filed July 27, 1929. Serial No. 381,551.

My invention is intended for use upon threshing machines for farm products and is especially adapted for use upon combined harvesters.

The invention consists primarily of a self-feeding separator having a cylinder and concaves of standard and customary design and having means for conveying the mass through the machine and outward therefrom after the same has passed through the cylinder and concaves.

Heretofore, it has been the general custom to agitate the mass passing through the cylinder and the concaves by mechanical means. Mechanical, agitating elements are expensive to make and offer operating difficulties for maintaining the same in efficient, operating condition. When the machine has been used a few seasons, frequent shut downs for repairs are necessary, if efficient work is to be done by the harvesting machine.

In my new and improved device the agitating is done by pneumatic means. Through the use of pneumatic agitation, a more violent agitation results and at the same time provides a more efficient and longer lifed operating mechanism and one that may be operated over relatively long periods with a minimum of operating annoyances. In the construction of the device I provide simple means for momentarily stopping the flow of the agitating air to thereby impart pulsations to the agitating air. The pulsations further increase the agitating of the mass that has passed through the cylinder of the machine.

After the mass passes through the device, the separated particles of heavy specific gravity drop down into a base conveyor. Means are provided for cleaning and separating the heavier particles after the same is fed through the device.

The primary object of my device is to eliminate mechanical construction costs and to lessen mechanical operating difficulties encountered in machines of the standard design.

A further object of my device consists in providing simple means for pneumatically cleaning the recovered grain in the threshing operation.

A further object of my invention consists in providing pneumatic means for the redistributing of the straw over the ground in the cutting and threshing operation on combined harvesters.

With these and incidental objects in view, the invention consists in certain novel features of construction and combination of parts, the essential elements of which are set forth in the appended claim, and a preferred form of embodiment of which is hereinafter shown with reference to the drawings which accompany and form a part of this specification.

In the drawings:

Fig. 1 is a top, plan view, partially in section, of an assembled threshing machine of the combined harvester type.

Fig. 2 is a longitudinal, vertical, sectional view of the assembled device, the same being taken on line 2—2 of Fig. 1 looking in the direction indicated.

Fig. 3 is a transverse, sectional view of the assembled device, the same being taken on line 3—3 of Fig. 2 looking in the direction indicated.

Fig. 4 is a side elevation of the assembled device, the same being made on the pneumatic, manifold side of the device.

Fig. 5 is a cross section view of a pulsating valve disposed within the air line leading from the blower to the various transverse pipes disposed within the discharge chamber of the separator.

Fig. 6 is a sectional view of the main discharge pipe leading from the blower to the various air discharge pipes illustrating a settable wing disposed within the line for predetermining the amount of air permitted to flow from the main air line to the transverse pipe.

Fig. 7 is a perspective, end view of the main pipe line into which the grain to be saved gravitates, illustrating air passageways parallelly disposed with that of the main separator line in which the screw conveyor is disposed.

Like reference characters refer to like parts throughout the several views.

1 is the feeding end of the threshing machine having a feeding belt 2 mechanically driven for feeding the grain from the source of supply into the cylinder 3. The straw passes through and between the cylinder 3 and the concaves 4 disposed therebelow. The concave teeth 4 are fastened to a shoe 5 disposed upwardly upon its discharge end 6 so that all material passing through the cylinder and the concaves is discharged over the gap 7. Disposed immediately below the gap 7 is the primary air pipe 8. Air under substantial pressure and in great volume is admitted into the primary pipe 8 and is discharged in a blast upward and into the gap 7. This causes a great agitation of the mass passing through the cylinders and being delivered within and into the separating chamber 9 disposed within the central portion of the body of the machine. An endless straw conveyor 10 is trained about supporting rollers 11 and 12 disposed at oppositely disposed ends of the straw rack conveyor and a plurality of air pipes 13 are disposed in spaced relationship transversely of the rearward portion of the body element. A hinged baffle 14 is disposed between the central separating chamber 9 and the discharge chamber 15 comprising the primary compartments of the body element. Air is fed into the pipes and a pulsation is maintained in the air line and is released from suitable openings disposed upon the upper surface thereof and immediately beneath the straw conveyor so that great agitation is maintained within the straw to separate the grain from the straw. Air is supplied under substantial pressure and in great volume from the blower 16 that is disposed within a suitable housing 17 placed upon the outside of the body element. A conveyor pipe 18 conducts the air from the blower 16 and from the housing 17 and a plurality of discharge heads lead from the conveyor pipe 18. The primary discharge pipe 8 leads transversely of the machine and is disposed immediately below a gap disposed between the shoe 5 and the straw conveyor 10. The first agitation to the mass which has passed through the cylinder occurs by the air being released from the primary pipe 8 and a very great portion of the grain is separated at this point by the pneumatic agitation of the mass. The separated grain gravitates into the base of the machine which is illustrated in perspective view in Fig. 7, wherein downwardly sloping side walls 19 and 20 are disposed at either side of the central half-cylindrical base section 21. A grain auger 22 is disposed within the base 21 and the grain is transported longitudinally of the base 21 by the power driven grain auger. The auger is driven by any suitable and convenient driving means. Air passages 23 and 24 are disposed parallelly of the base 21 and air under pressure is delivered therethrough from the discharge pipe 18. Spaced holes 25 and 26 are disposed at either side of the base for further agitating the materials being gravitated into the base 21. I have found that best results are obtained in the agitation wherein bars or agitating blades 27 are disposed within the auger for further separating and agitating the materials that have gravitated into the base 21. These bars are spaced conveniently along the outer periphery and between the blades of the auger in order to pick up the grain being deposited within the base for further cleaning of the same. Disposed transversely of the lower portion 29 of the body of the machine are additional air pipes 30 for separating the chaff and other materials from the grain. I have found best results are obtained wherein the various pipes leading transversely of the machine have a cylindrical valve 31 disposed therein having outlets 32 and 33 disposed at oppositely disposed sides of the valve body so that as the valve 31 is rotated within its housing, a pulsating action is imparted to the air by the frequent opening and closing of the air passage. The rotation of the valve causes a pulsating agitation to the mass being passed through the machine. In each of the passageways is disposed a settable damper valve 34 operated in conjunction with a toothed ratchet 35 so that the amount of air to be admitted into the various discharge air pipes is settably predeterminable.

One of the difficulties in combined harvesters has been in the redistribution of the straw over the ground after the threshing operation has been completed. Unless the straw is uniformly distributed over the ground, the reseeding of the ground is difficult and where the same is deposited in rows or in assembled bunches, it is necessary to burn the same before the reconditioning of the ground and the plowing operation can be undertaken. I have found that by the placing of a blower 36 adjacent the discharge end of the straw conveyor 10, the straw can be redistributed over the ground in fairly uniform thickness. This eliminates the difficulty of replowing when the straw is distributed otherwise and at the same time, makes it possible to turn the straw under in the plowing operation and thereby maintain the fertilizer value of the straw. The distributing of the straw by the blowing process eliminates the necessity of following the combined harvester to burn the straw as is done at the present time. It may be found necessary to pass the grain through the machine one or more times in order to thoroughly separate and clean the same.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form of embodiment

herein shown and described, as it is susceptible of embodiment in various forms, all coming within the scope of the claim which follows.

What I claim is:

In a threshing machine, a base comprising a central half-cylinder section running longitudinally of the threshing machine, downwardly sloping walls disposed upon each side of the base section, air passageways secured to the lower sides of the side walls and disposed longitudinally of the base section, openings disposed in spaced relationship through the side walls and leading to the air passageways, an auger rotatably disposed within the base section, and agitating bars disposed within the base section, said bars being spaced along the outer periphery of the auger and between its blades.

THEODORE A. HEYDEN.