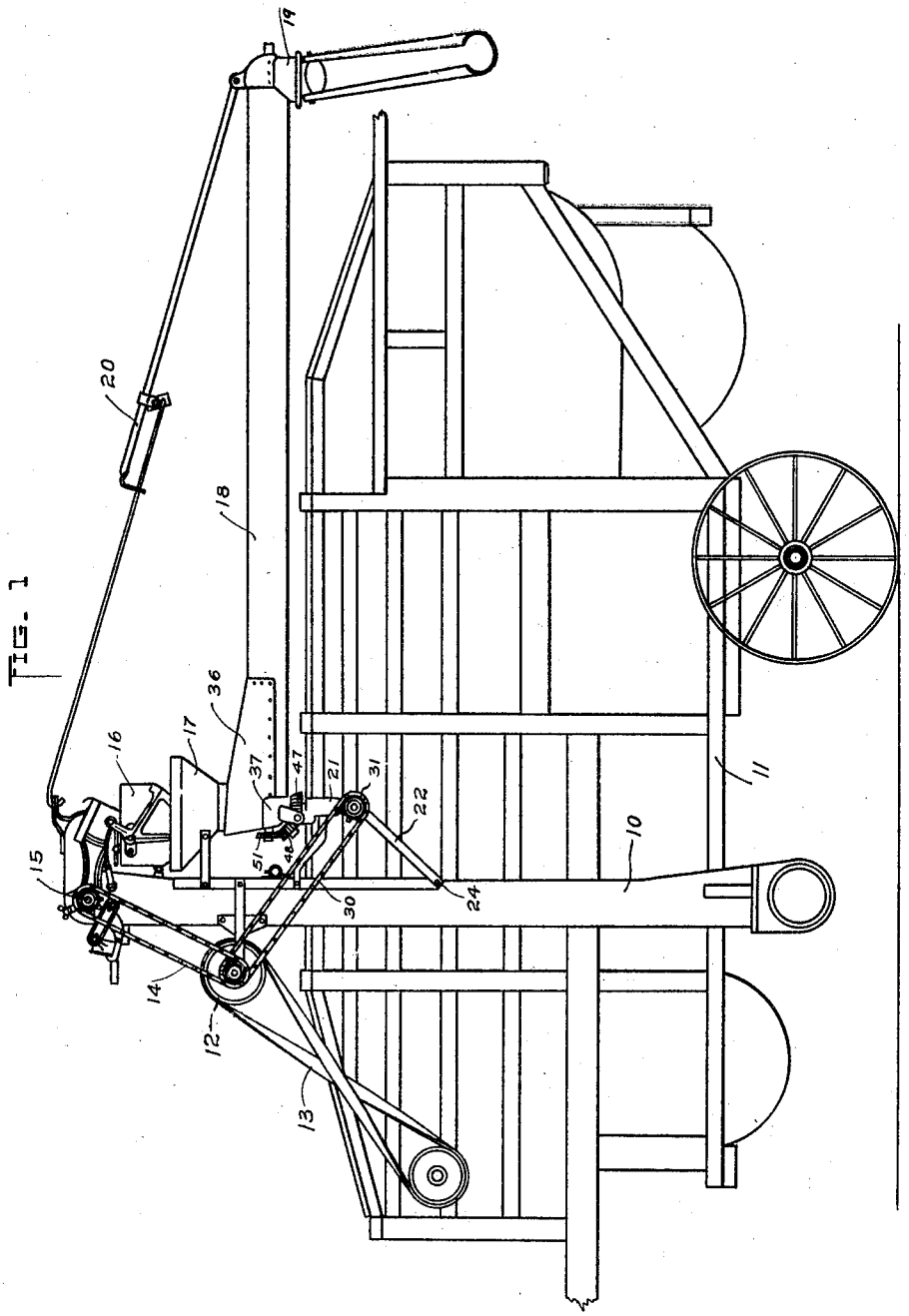
Sept. 17, 1929. A. J. HARTLEY ET AL 1,728,680

DRIVING MECHANISM FOR CONVEYERS

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FIG. 1



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FIG. 2

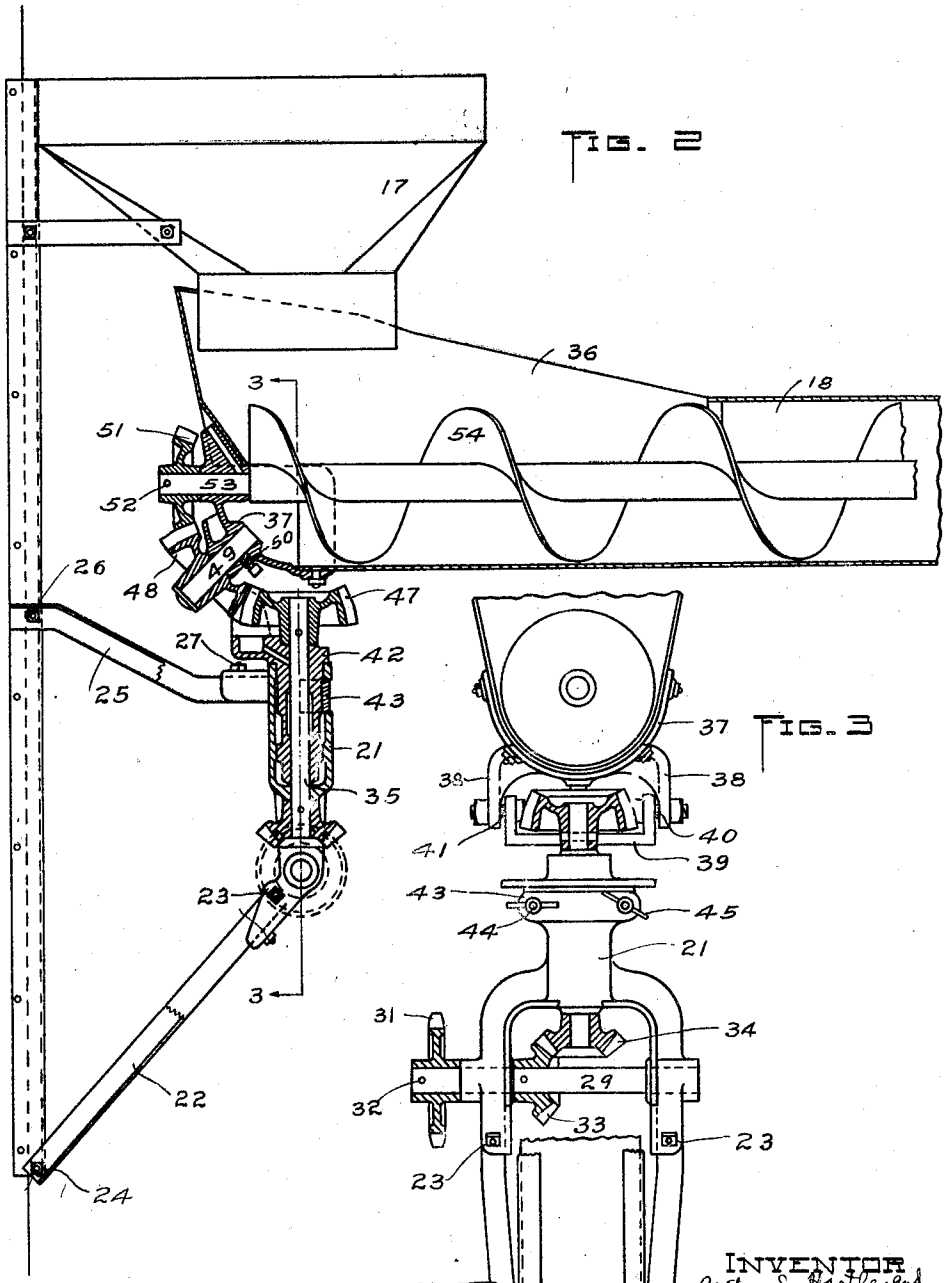


FIG. 3

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FIG. 4

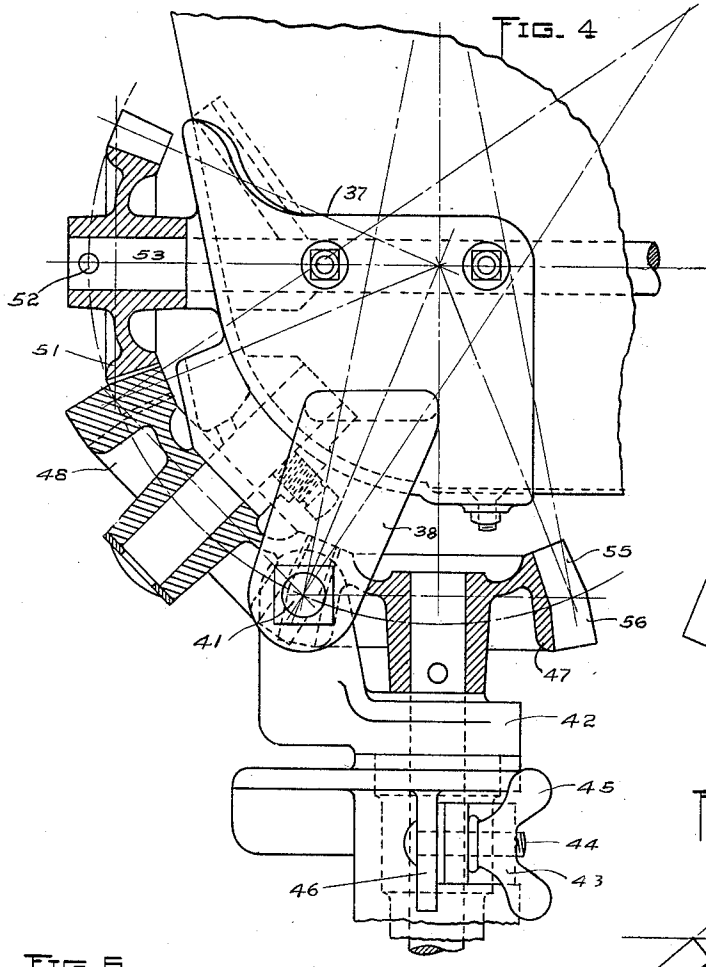


FIG. 7

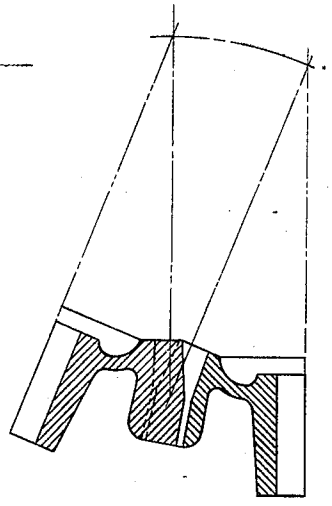


FIG. 8

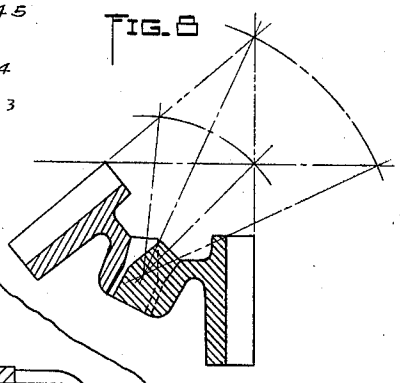


FIG. 6

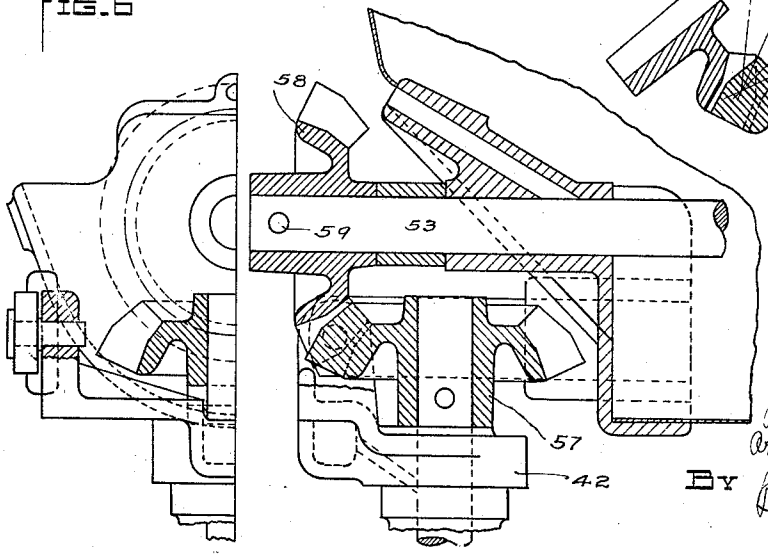


FIG. 5

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UNITED STATES PATENT OFFICE

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DRIVING MECHANISM FOR CONVEYERS

Application filed July 12, 1926. Serial No. 121,799.

This invention relates to grain elevators, and conveyers, and more particularly to the conveying device and power means for driving same.

One of the objects of the invention is in the provision of a power driven conveying device for use in connection with grain elevating devices, said conveying device being supported in an adjustable manner, and having driving means provided therefor which permits efficient operation of said conveyer in all positions of adjustment.

Another object is in the provision of a grain elevating and conveying device, wherein the conveyer is horizontally and vertically adjustable, driving means therefor being provided which permits efficient operation of the conveyer in all positions of adjustment.

Still another object lies in the provision of an adjustably mounted conveyer member having a power connection therefor, including a series of gear members fashioned in a manner to permit efficient driving of the conveyer in all positions of adjustment.

A further object is in the provision of an adjustable power driven conveyer member, the driving means therefor including adjacent gear members fashioned to permit movement of one of said gears with respect to the other without decreasing the driving efficiency therebetween.

A still further object lies in the provision of an adjustable conveyer member having a pivotal mounting to permit vertical movement and driving means for said conveyer, including intermeshing gear members disposed in such manner that their pitch lines intersect the pivotal point of the conveyer.

Yet another object lies in the provision of gear driving mechanism for a power conveyer, which permits efficient power transmission to the conveyer in all positions of adjustment, said gears being disposed in such manner that their pitch lines intersect the pivotal mounting of the conveyer, the teeth of the gears being fashioned to insure at all times the same proportion of teeth engaging surface between said gears, irrespective of the position of said gears.

Other objects will appear in the following specification, taken in connection with the annexed drawings, in which—

Fig. 1 is a side elevation showing the manner of mounting a well known grain elevating and power conveying mechanism upon a threshing machine;

Fig. 2 is a side elevation, portions thereof being broken away, of the special gear driving means for the conveyer;

Fig. 3 is an elevation taken on the line 3—3 of Fig. 2;

Fig. 4 is a side elevation, partially in section, for a more detailed view of the gear driving means and mounting therefor;

Fig. 5 is a side elevation, partially in section, of another form of gear drive mechanism from that shown in the above mentioned figures;

Fig. 6 is an end elevation of the same parts shown in Fig. 5; and

Figs. 7 and 8 are detail views showing the position of the engaging gear teeth in different positions of adjustment.

Referring to the drawings, there is shown generally the mounting of a well known grain elevating and conveying device upon a threshing machine. In view of the fact that the present application is directed specifically to the particular driving means for the power conveyer, only a general reference is considered necessary to the elevator and driving means therefor.

A well known type of grain elevator is shown at 10, supported in any manner desired, upon one side of a threshing machine 11. Power means for driving the flight portions, not shown, of the elevator, is provided in a pulley 12, driven by the belt member 13. There is a chain connection 14 between said pulley and the drive shaft 15 of the elevator. A well known grain weighing member is shown at 16 and a receiving hopper at 17. The conveyer, generally referred to as 18, is supported at its distributing end 19 by automatically adjustable rod connections 20.

The structure above described is ordinary, with the exception of the automatically adjustable supporting means 20, so far as grain elevating and power conveying means are concerned. As a matter of fact, the structure

above described represents practically all structures of this type now in use. Applicants have manufactured such well known structures for a great many years, and the advance that they have made over such well known structures lies in the supporting and driving means for the conveyer 18, now to be described.

It might be stated at this time that heretofore there has been provided power means for driving the conveyer, and in some instances it has been possible, to a slight degree, to drive the conveyer when in a slightly elevated position, but this driving connection being attended only with an unnatural meshing of the driving gears, and with a resultant loss of power and strain upon the conveying structure and driving means, applicants have devised the following mechanism, which permits not only driving of the conveyer in any position of horizontal adjustment, which is well known, but also an efficient driving of the conveyer when elevated to a considerable degree, which has heretofore not been possible.

A supporting bracket 21 for the conveyer and driving means therefor is sustained in the position shown in Fig. 1, by means of lower supporting members 22 attached, as at 23, to said bracket and at 24 to the grain elevator. A second supporting means 25 is attached, as at 26, to the grain elevator, and is fastened securely, as at the points 27, to the upper end of the supporting bracket 21. The lower end of this bracket 21 is bifurcated, as at 28, to provide bearing supports for the horizontal drive shaft 29. Power is transmitted to the shaft 29 by a chain member 30 driven indirectly from the threshing machine. This chain 30 engages a sprocket wheel 31 securely pinned as at 32 to the projecting end of shaft 29.

A bevel gear 33 is also attached to the shaft 29 and engages a bevel gear 34, which is attached to the lower end of a vertically disposed drive shaft 35, for which the supporting bracket 21 also provides bearing supports. Upon the receiving end 36 of the conveyer 18 is mounted a bracket 37, from which extends downwardly a yoke 38. The connecting supporting means between the bracket 21 and the yoke 38 is provided in a second yoke 39, which has the pivotal connection 40 and 41 with the yoke 38. The base portion 42 of the yoke 39 surrounds the upper end of the vertical drive shaft 35 and is slidably supported in the upper end of the supporting bracket 21 in a manner perhaps best shown in Fig. 2.

It is apparent from the above that the conveyer has a pivotal mounting with reference to the supporting bracket 21 to permit vertical movement. Again, the rotatable connection between the base portion 42 of the yoke 39 with the upper end of the supporting bracket 21 permits swinging movement of the conveyer. A means is provided, however, for preventing swinging movement of the conveyer, unless desired. This means includes a clamp 43, which is attached to the supporting bracket 21 by means of bolt members 44 and wing nuts 45. The bolt members 44 project through ears 46 which extend outwardly from the sides of the supporting bracket 21, thereafter passing through the apertures in the outer ends of the clamp 43, and being secured by the wing nuts 45. The clamp prevents swinging movement of the base 42 in that the supporting bracket 21 is cut away in such manner that the clamp 43 presses directly against the base 42. This is shown in detail in Fig. 2.

A specially formed gear 47 is attached to the upper end of the vertical drive shaft 35, and this gear engages a second specially formed gear 48, which is rotatable about a projecting pin 49 keyed as at 50 to a portion of the before mentioned bracket 37 on the receiving end of the conveyer. The gear 48 in turn drives an ordinary bevel gear 51, which is pinned, as at 52, to the projecting end of the drive shaft 53 for the flight portion 54.

Referring specifically to the enlarged details of the specially formed gears 47 and 48, we find said gears formed in exactly the same manner, with their teeth portions having different pitch angles. The teeth on these gears are so formed that they allow the proper meshing, irrespective of any position of the conveyer. The inner toothed portion 55 has one pitch, while the outer toothed portion 56 has another pitch. The teeth in the portion 56 are substantially parallel to the axis of the gear, while the teeth on the portion 55 are inclined inwardly with respect to said axis. Again, with respect to Fig. 4, we find that the pivotal connection between the conveyer and stationary supporting means is located at the point where the pitch lines of the engaging gear teeth intersect.

It is obvious also from said drawings that irrespective of the position of the gear 48, which is movable with respect to the stationary gear 47, the pitch line of the teeth intersect at this pivotal point, whatever the position of said gears.

It has been applicants' aim to provide an efficient driving connection between the stationary gear 47 and the movable gear 48, irrespective of the position of said gears and of the vertical angle of adjustment within a certain degree, of the conveyer 18. By fashioning the gears 47 and 48 with different pitch angles, and placing the pivotal connection between the conveyer and supporting means at the point where the pitch angles intersect, applicants have been successful in driving their conveyer efficiently in any position of adjustment.

By a close inspection of the drawings and

detail figures, it is apparent that the engaging surfaces of the intermeshing teeth change as the conveyer is moved upwardly or downwardly. However, there is always the same proportion of teeth engaging surface, irrespective of the vertical adjustment, and the teeth are always in mesh in a manner to provide an efficient driving connection. This has been accomplished, of course, by changing the pitch angles in such manner that irrespective of the position of adjustment, the pitch lines of the two gears will intersect at the point of pivotal connection between the conveyer and stationary support.

Applicants have included in Figs. 5 and 6, gear mechanism for accomplishing exactly the same result, except that instead of three gears being provided in the transmission of power to the conveyer, only two gears are provided, which are fashioned exactly as are the gears 47 and 48. These gears are designated 57 and 58, the former being mounted exactly as was gear 47, but gear 58, instead of being an intermediate gear, is attached, as at 59, to the projecting end of the shaft 53 for the flight 54. This modification has been shown merely for the purpose of illustrating that the principle of applicants' device might be incorporated in a slightly different gear connection, although the essential features of same, namely, the pivotal connection upon the inner section of the pitch lines of the adjacent gears, must similarly be maintained.

With respect to the operation, it is thought from the above that said operation is obvious, and that there is an efficient driving connection between the stationary gear 47 and the movable gear on the conveyer, irrespective of the angle of vertical adjustment of the conveyer.

What we claim is:

1. In a device of the class described, a conveyer, means for supporting the conveyer for movement in vertical and horizontal planes, and means for transmitting the power to the conveyer in all positions of vertical and horizontal adjustment, the said means including a driving shaft having a fixed support, a gear on said shaft having on one portion thereof teeth arranged substantially parallel to the axis of the gear, and an adjoining portion on which the teeth are inclined inwardly toward said axis, and a similar gear connected to the conveyer and meshing with the first named gear.

2. A device of the class described comprising a conveying device, means for supporting the conveyer for movement in vertical and horizontal planes, and mechanism for driving the conveyer in all positions of adjustment, said mechanism including a drive shaft having a fixed support, a gear mounted upon said drive shaft, a gear mounted upon the conveyer drive shaft, an idler gear between said gears, the idler gear and the first mentioned gear being similarly formed and having the teeth in one portion thereof substantially parallel to the axis of the gears and the teeth in another portion inclined inwardly toward the axis of the gear.

3. A device of the character described, comprising a conveyer mounted for movement in vertical and horizontal planes, a conveyer shaft, a beveled gear on said shaft, an idler gear mounted on said conveyer and meshing with the first mentioned gear, said gears moving with the conveyer and in unchanging relation with respect to each other, a drive shaft, a gear on said drive shaft meshing with the idler gear, the gear on the drive shaft and the idler gear being fashioned to permit the movement of the conveyer to all its adjusted positions while maintaining an uninterrupted driving connection between said gears.

4. A device of the character described comprising a grain conveyer mounted for movement in vertical and horizontal planes, a conveyer shaft, and means for transmitting the power to the conveyer shaft in all positions of vertical and horizontal adjustment, said means including a driving shaft having a fixed support and intermeshing gears establishing a driving connection between said shafts, said gears having their contacting surfaces fashioned to permit vertical movement of the axis of one of said gears relative to the other upon movement of the conveyer in a vertical plane while maintaining an uninterrupted driving engagement.

In testimony whereof we have hereunto affixed our signatures.

ARTHUR J. HARTLEY.
ARTHUR C. VAN HOUWELING.