May 1, 1951 M. MAYRATH 2,551,147

MOBILE POWER-OPERATED CONVEYER

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Fig. 1

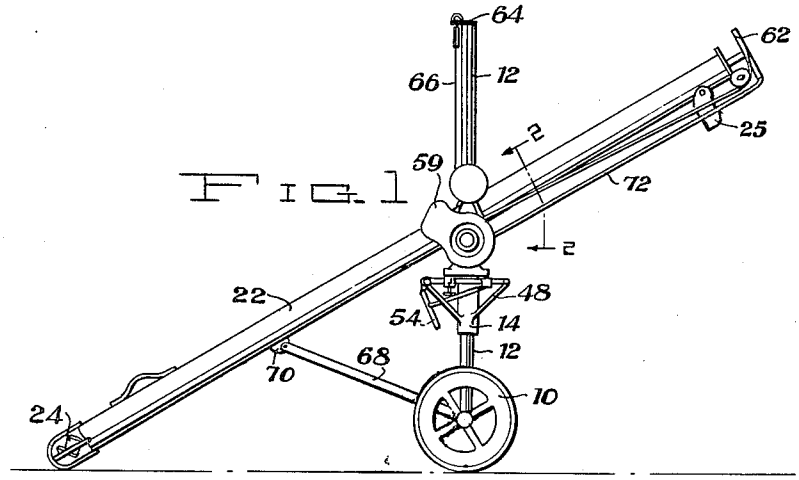


Fig. 2

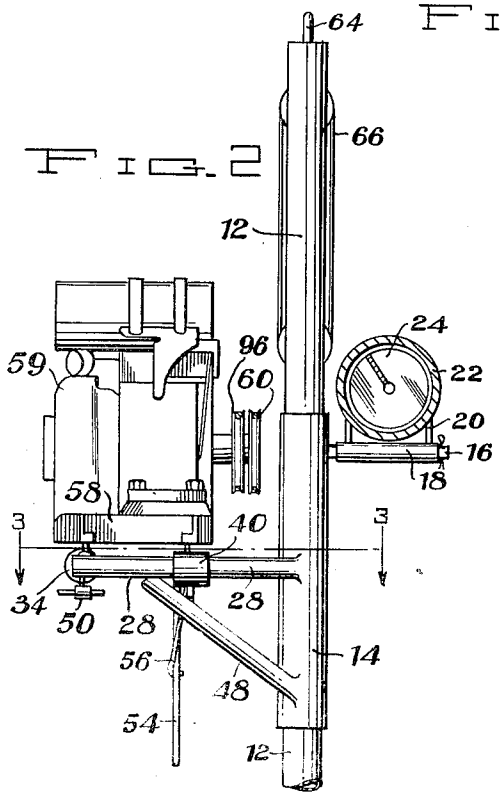


Fig. 3

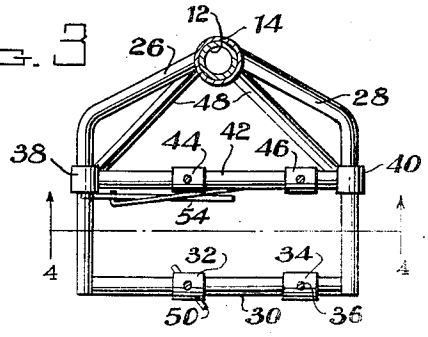
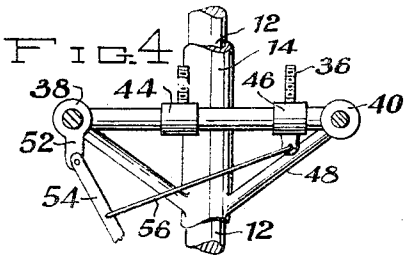


Fig. 4



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FIG. 5

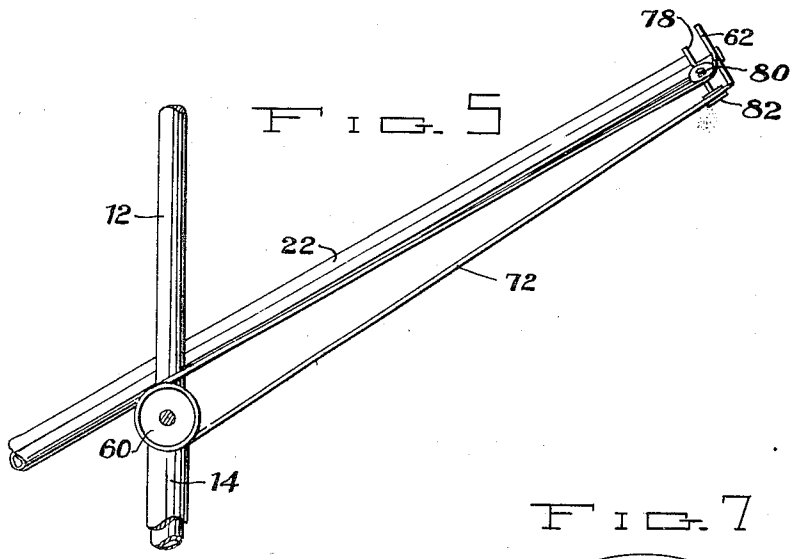


FIG. 7

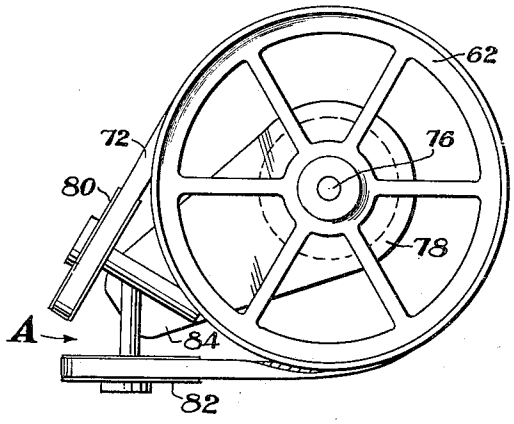
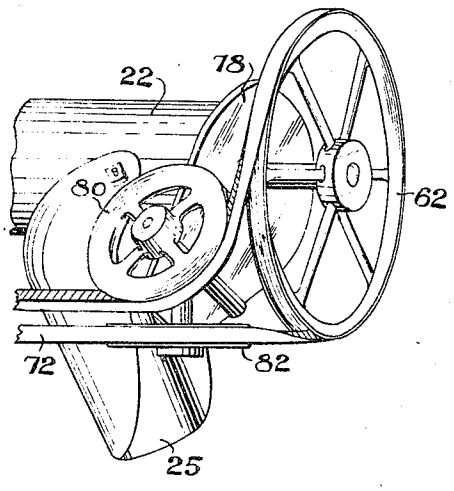


FIG. 6



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FIG. 8

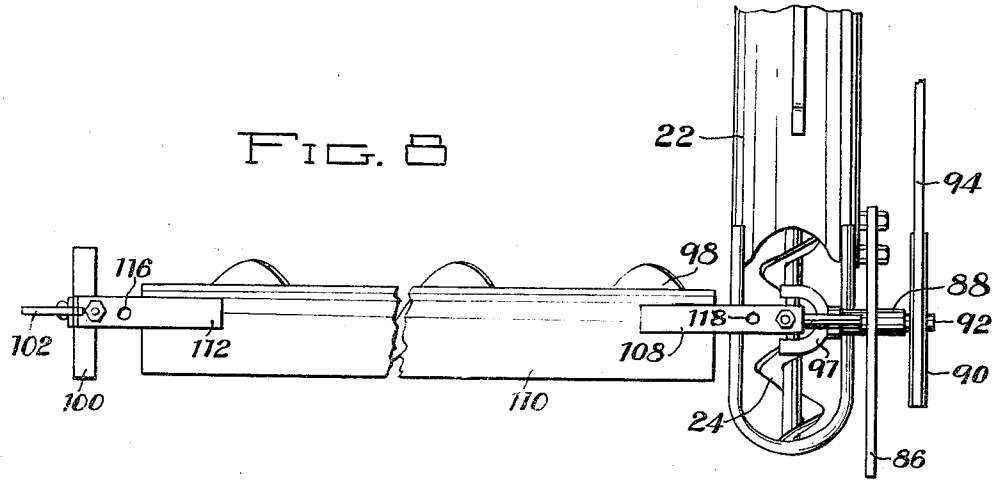


FIG. 9

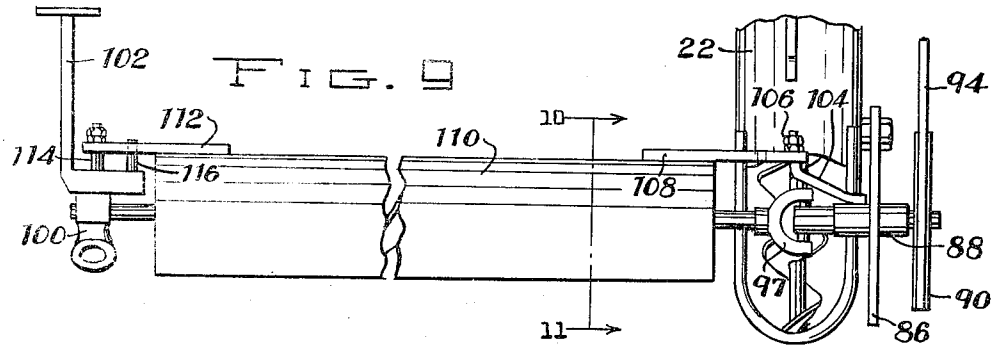


FIG. 10

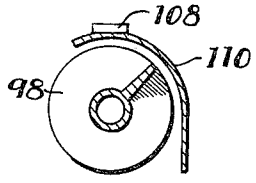
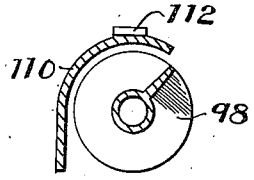


FIG. 11



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UNITED STATES PATENT OFFICE

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MOBILE POWER-OPERATED CONVEYER

Martin Mayrath, Dodge City, Kans.

Application October 1, 1947, Serial No. 777,182

4 Claims. (Cl. 198—233)

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This invention relates to power-operated conveyors, and particularly to a highly mobile, self-contained power conveyor adapted for the loading of grain or similar granular or more or less finely divided materials, of the general type disclosed in my earlier application Serial No. 701,771, filed October 7, 1946, and now Patent No. 2,483,290, granted September 27, 1949, of which this application is a continuation-in-part.

It is a principal object of the present invention to provide an apparatus of the general type above mentioned which is extremely flexible in operation, so that it may be used for many different types of loading, conveying and piling operations, yet which is so simple in application that it may easily be set up and operated by one man. An additional object is to provide such a device which is very simple in construction, considering the results accomplished, whereby the cost of manufacture, as well as the amount of maintenance required, are kept to a minimum.

In general, my invention utilizes as a power source a small gasoline or electric motor or the like which is mounted in such a way as not to interfere with the free adjustment of the main conveyor flight of the apparatus to different positions and angles as required by the particular job being performed. It will be understood that apparatus of this type finds its principal utility in connection with farming operations, and for this reason it is desirable to utilize for the power source, any of the small gasoline engines which are found in connection with farm equipment, so as to reduce the total cost of the conveyor as much as possible. To this end, I have designed my novel conveyor so that practically any gasoline engine of suitable size may readily and quickly be secured in operative position without the use of special tools or skills, and without permanently modifying the engine so as to render it unsuited to its other uses.

It is a further object of the invention to provide, in a machine of the class described, a motor or engine mounting which, while located near the vertical line through the center of gravity of the machine, may be given slight adjustments of the order of several inches to compensate for stretch or wear in the power transmitting belt driven thereby, or may be moved sufficiently to interrupt the transmission of power to said belt, thereby acting as a power clutch. Moreover, the design provides such a location of the motor or engine shaft with respect to the pivot axis of the swinging conveyor flight as to enable a moderate range of adjustment of the latter without interfering with the connections between engine and the members driven thereby.

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An additional object of the invention is to design a power transmission system (herein a belt drive) in which a reversal of the sense of rotation of the transmission may be accomplished with great ease and without any mechanical readjustment, so that the device can be used with engines turning either clockwise or counter-clockwise, or right- or left-hand auger type conveyor flights, without any mechanical changes or adjustments of the parts. More particularly, this is accomplished by a particular and novel arrangement of the driven pulley and a pair of idler or guiding pulleys adjacent thereto, such that the driving belt may be operated either straight or crossed without interfering with the proper running of the belt.

A further object of the invention is to provide a mobile mount for a conveyor of the class described, upon which the parts are nicely balanced for ease of transportation and adjustment, and in which the engine or other prime mover is always maintained automatically in a substantially upright position during operation, a feature of particular value where a gasoline engine is used as the prime power source.

Still another object of the invention is to provide, for use in connection with the conveyor, an auxiliary feeder conveyor adapted to move grain or other fluent material from a pile into the receiving portion of the main conveyor. While generally similar to the auxiliary conveyor described in the prior application mentioned above, the auxiliary conveyor of the present invention has certain advantageous features among which are the use of a reversible housing or shroud which renders the auxiliary much more flexible than the corresponding element of the prior application.

The above and other objects and advantages of my invention will best be understood from the following detailed specification of a particular referred embodiment thereof, taken in connection with the accompanying drawings forming a part hereof, and in which:

Fig. 1 is a side elevational view of an improved auger conveyor in accordance with the invention,

Fig. 2 is an enlarged fragmentary view, partly in section, looking in the direction of arrows 2—2 of Fig. 1,

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2,

Fig. 4 is a sectional view taken along line 4—4 of Fig. 3,

Fig. 5 is an enlarged diagrammatic view illustrating the relationship of the drive pulley of the engine to the driven pulley of the auger element,

Fig. 6 is a perspective view of the driven pulley and of the conveyor,

Fig. 7 is an end view of the same,

Fig. 8 is a fragmentary plan view of one end of a loader illustrating the use of an auxiliary feeder,

Fig. 9 is an elevation thereof, and

Figs. 10 and 11 are sectional views on line 10—11 of Fig 9, showing alternative arrangements of a shroud for the auxiliary feeder.

Referring now to Figs. 1 and 2 of the drawings, numeral 10 designates a wheeled carriage from which extends upwardly a rigid tubular or solid support column 12. preferably of circular cross-section, and upon which is arranged, in vertically slidable relationship, a tubular sleeve or support 14. A pivot or bearing element 16 extends laterally from one side of support 14 and pivotally carries a bearing collar 18 to which is rigidly connected, as by webs or plates 20, the main auger housing 22 within which is contained the rotatable auger conveyor element 24, adapted to elevate grain or the like and discharge the same through an opening in the under side of the upper end of housing 22 and onto a delivery spout 25, all as generally described in the earlier application referred to above.

Extending from that side of support 14 opposite to element 16 is a motor mounting frame preferably comprising a pair of angular side rails 26, 28 formed of rod stock or pipe and welded or otherwise fixedly secured about midway between top and bottom of support 14. The free ends of these rails are connected by an end rail 30, as by welding, which end rail has slidably mounted therearound a pair of collars 32, 34 each provided with an upstanding threaded stud or like fastening element 36. Slidable along each of the side rails 26 and 28 is a collar 38, 40, these collars being connected with one another by a rigid pipe or tube 42, which pipe or tube is hence carried upon the side rails for movements in a direction at right angles to, but always held in parallelism with, the end rail 30. Pipe, rod or tube 42, in turn, carries a pair of collars 44, 46 generally similar to collars 32 and 34 on end rail 30, each of these collars likewise mounting an upstanding threaded stud or the like 36.

Angular support or bracket arms 48 may be welded between the side rails 26 and 28 and the sliding support 14, and are connected to the side rails sufficiently far from support 14 as not to interfere with the desired range of lateral movement of cross-rail 42. It is obvious that the individual collars 32, 34, 44 and 46 are freely slidable along their respective rails, and that the set of collars 44, 46 on cross-rail 42 may be moved as a unit laterally with respect to the end rail 30. Hence, the base 58 of practically any engine or motor 59 can be secured to the engine mounting frame by passing the studs on said collars through the mounting holes on the engine base and securing suitable nuts to said studs. It is clear that the arrangement of the stud holes in the engine frame need not be rectangular (although this is usually the case), since all of the collars are free for independent motion relative to one another. Once the engine frame or base has been bolted to the collars, however, it serves to lock the collars together as an integral unit and to fix the distance between end rail 30 and

cross-rail 42. When so assembled, the collars 32, 34, 44 and 46 and the engine base may slide as a unit along said end and cross rails until locked in position as by tightening a screw clamp such as element 50 threadedly engaged in the under side of one of the collars and whose inner end is arranged to bear upon the rail carrying said collar.

As best shown in Fig. 4, one of the collars 38 or 40, herein specifically the collar 38, has a depending lug 52 to which is pivotally secured a lever 54 connected by a tie rod 56 with one of the collars slidable along the cross rail 42, such as collar 46. It is clear that pivotal movement of lever 54 will operate to slide all of the collars and the engine base 58 lengthwise of the mounting frame, and hence alter the distance between engine pulley 60 and the driven pulley 62 mounted at the upper end of auger housing 22. Thus, in order to compensate for slight variations in belt length, such as result from stretching or wear or the like, or to slacken the belt tension for use as a clutch, all that is necessary is to loosen clamp screw 50, operate lever 54 in the desired direction, whereupon, if desired, the clamp screw may be tightened to maintain the new position of the engine pulley.

I have found that the above described engine mounting not only provides a very convenient means for adjusting belt tension, but that it provides a mounting which is very flexible in application, in that it can accommodate practically any type of engine base without modification other than an adjustment with hand tools. This flexibility of application greatly reduces the number of different engine mounts which are required to be stocked by service agencies, and provides a simple and inexpensive combined belt tension adjustment and clutch mechanism.

In order to provide for adjustment of the height of the delivery end of the auger tube, the tubular sleeve 14 is preferably connected with a bracket 64 atop support column 12 by a chain hoist 66 or the like. It will be observed that, since both the auger housing 22 and the engine mounting frame are carried fixedly by support 14, this adjustment in height or slant of the auger housing is accomplished without in any way disturbing the effective concentricity of the engine drive pulley 60 and the auger housing pivot 16, and therefore the adjustment of the driving belt remains correct regardless of such height adjustments. If these two elements were to deviate a substantial amount from their concentric relationship, the swinging of the auger housing incident to adjustments of height would require a re-adjustment of belt tension, although, of course, a certain amount of eccentricity between the motor or engine pulley and auger housing pivot can be tolerated; for example, such an eccentricity as results from adjustments to correct for stretch or wear of the belt, or from limited sliding movements of the engine base in response to adjustments of lever 54. This arrangement is to be contrasted with prior art devices in which either the engine mount or the conveyor housing pivot is fixedly secured to the upright column 12.

As best shown in Fig. 1, a pair of radius rods such as 68 converge toward one another intermediate the lower end of the auger housing and its mid-point, and are there rotatably secured to the housing as by a pivot 70. The opposite ends of these rods are in turn pivotally secured to the axle or shaft connecting the vehicular wheels. I

have found that if the pivot point 70 is located approximately midway between the lower end of auger housing 22 and the auger housing pivot 16, then vertical adjustment of support 14 can be accomplished over a wide range without substantially altering the vertical direction of column 12. This is of course a very desirable and important feature, since it acts to maintain the engine 59 substantially level without the necessity of providing a swinging support or cradle arrangement therefor, as would be the case if the engine were carried directly by the auger housing, or if it were carried by column 12 or support 14 and the latter elements were not maintained substantially vertical.

Figs. 5, 6 and 7 illustrate the arrangement of the drive belt 72 between the engine pulley 60 and the main driven pulley 62 which is directly connected to auger 24 by an extension 76 of the auger shaft protruding above the upper auger bearing plate 78. Since the rotational axes of the engine shaft and the auger are perpendicular to one another, a pair of idler pulleys 80, 82 are arranged adjacent the driven pulley 62 to guide the belt 72 between the driving and driven pulleys. In accordance with my invention, these idlers 80 and 82 are preferably rotatably mounted upon stub shafts secured to a lateral extension 84 of the bearing plate 78. Idler pulleys 80 and 82 lie in respective planes which intersect both the pitch circumference tangent of the driven pulley 62, and the center of engine pulley 60.

As best shown in the end view of Fig. 7, the peripheries of idler pulleys 80 and 82 approach one another closely in the region denoted by arrow A, which is the region from which the belting leaves these pulleys in its travel to the driving pulley 60. This is an important feature of the present invention, since in this way it is ensured that belt 72 can be run either "straight" (as shown in the drawings), or crossed, between pulleys 60 and 62, without requiring any re-adjustment of the positions of the idler pulleys. This is because the distance between the points on the respective idlers to and from which the belt travels in its flight from and to the drive pulley 60 is very small as compared with the total distance between the latter pulley and the idlers. Hence, the difference in angle of approach of the belting, as between the two idlers, is negligible, and the belt will run equally well whether that section of the belt connecting the under side (for example) of the periphery of pulley 60 is directed to idler 80 or idler 82.

The importance of the above feature will be understood when it is considered that apparatus of this type is ordinarily powered by gasoline or electric engines having different directions of rotation, which makes it essential that provision be made for accommodating either right- or left-hand rotation of the prime mover without rebuilding the conveyor or altering the handedness of the auger flight. The arrangement described herein requires not even minor re-adjustments to accommodate motors or engines of both right and left hand rotation, which enables the device to be used with a prime mover which is usually already available to the purchaser of the conveyor. Thus the flexibility of application of the apparatus is enhanced, and the device is rendered more convenient and economical to set up for use than would be the case if a special engine were required, or if extensive operations were required to adapt it to an engine already on hand.

Figs. 8 and 9 illustrate, in plan and elevation respectively, an arrangement of an auxiliary or feeding conveyor adapted to transmit grain or other fluent materials in a horizontal direction to the receiving or lower end of the main conveyor. This device hence acts to increase the pick-up area of the combined unit, and greatly reduces the extent to which the main conveyor must be moved about in order that it be kept continuously supplied with grain or the like. It will be understood that in many circumstances it is desirable to keep the main conveyor in a preferred location, as near a bin or truck to be loaded; however, since the main conveyor will very soon pick up and convey away all of the fluent material near its entrance end, it would be necessary either to re-position the conveyor or to keep it supplied with material by manual labor. The use of a feeding auxiliary hence permits continuous operation without frequent moves or manual shovelling.

Referring now to Figs. 8 and 9 of the drawings, there is illustrated the lower end of a main conveyor or loader having housing 22 and auger element 24 as described above. Secured as by bolts to the lower end of such housing is a plate 86 which not only serves as a support for a shaft bearing 88 but as a baffle to prevent grain or other material fed by the auxiliary from reaching and interfering with the drive pulley 90 secured to stub shaft 92. A belt 94 connects pulley 90 with a driving pulley 96 (Fig. 2) on the shaft of the prime mover 59. On the opposite side of plate 86 from pulley 90, shaft 92 is connected by any desired form of universal joint 97 with the shaft of the auxiliary conveyor auger 98, the opposite end of the auger shaft being supported in a footed bearing 100 provided with an upstanding handle 102 which facilitates manual swinging movements of the auxiliary conveyor over a rather wide area in order to keep the main conveyor or loader continuously supplied with the material being handled or loaded.

Welded or otherwise securely fastened to the upper surface of a portion of fixed bearing 88 is a support bar 104 over whose outer threaded end passes a bracket 108 integral with a housing shell or shroud 110 partially surrounding the auger element 98. Bracket 108 is thus loosely held upon the bar 104 (as by nuts 106) to enable the shroud 110 to move in accordance with swinging movements of the auger element 98 in response to manual changes in the position of the auxiliary conveyor. The opposite or outer end of housing or shroud 110 carries a similar bracket 112 engaging a post 114 secured to the outer bearing support 100.

Since the alignment of the outer bearing member 100 with the axis of the auxiliary feeder must be maintained, a dowel or stud 116 on said bearing member is arranged to enter a second hole in bracket 112 and is rigidly retained therein when the nuts on post 114 are tightened. Bracket 108 at the other end is provided with a hole 118 adapted to receive the dowel 116 when the shroud 110 is reversed end for end, as described below.

In accordance with my invention, and as best shown in Fig. 10, housing or shroud 110 extends along the top of auger 98 and down one side thereof, with its lower edge extending to about the same level as the lowest point on the auger flight. Thus, the auger is rendered effective to move grain or other fluent material lying very close to

the ground, which would otherwise be merely agitated by the rotation of the auger. Moreover, since the support brackets 108 and 112 are welded or otherwise fastened near the top surface of the housing 110, and are substantial duplicates of one another, it is clear that the housing 110 can be reversed in position so as to pass down the opposite side of the auger (an arrangement illustrated in Fig. 11), which enables material lying on either side of the swingable feeder to be successfully reached and conveyed to the loader.

The peculiar shape of the shroud 110 as illustrated in Figs. 10 and 11 has an additional advantage in that, since the shroud is open downwardly, the auxiliary feed auger may be lowered vertically into a pile of material, whereupon it eats its way practically straight downward, the shape of the shroud allowing the material directly below, as well as to one side, to be fed away by the auger. In other words, shroud 110 lies closely adjacent the profile of auger 98 along approximately its upper quadrant and down along one side of the auger, and thence downwardly in a substantially vertical direction to approximately the level of the lowest point of the auger profile, leaving the bottom portion and opposite side portion of the auger exposed for effective action upon the fluent material.

It will be seen from the above that I have provided an auger type loader suitable for use with grain, coal, sand, water, fertilizer or other fluent materials, and satisfying all of the objects of my invention in a simple, efficient and practical manner, but it is to be understood that many changes and modifications of a mechanical nature may be made therein without departing from the scope of the invention as defined in the appended claims.

I claim:

1. A power driven conveyor mechanism comprising a support, a conveyor housing pivoted on said support intermediate its ends, a driven pulley at one end of said housing and connected to drive a conveyor element therein, an engine mount on said support comprising a pair of parallel rails, a slide mounted on said rails, an end bar fixedly secured to said rails at one end of each, and engine mounting collars slidable on said slide and on said end bar.

2. The invention in accordance with claim 1, and means for locking at least one of said collars in fixed position.

3. The invention in accordance with claim 2, and lever mechanism for adjusting the distance between one of said collars and one of said rails.

4. A power driven conveyor mechanism comprising a support, a conveyor housing pivoted on said support intermediate its ends, a driven pulley at one end of said housing and connected to drive a conveyor element therein, an engine mount on said support comprising a pair of parallel rails extending from said support, a pair of parallel bars extending between said rails, and engine mounting collars slidably mounted on said respective bars, at least one of said bars being slidably mounted at its ends upon said parallel rails.

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