June 7, 1955 J. H. FULPER 2,710,090

MULTIPLE DRIVE UNIT FOR CONVEYORS

Filed April 18, 1951 3 Sheets-Sheet 1

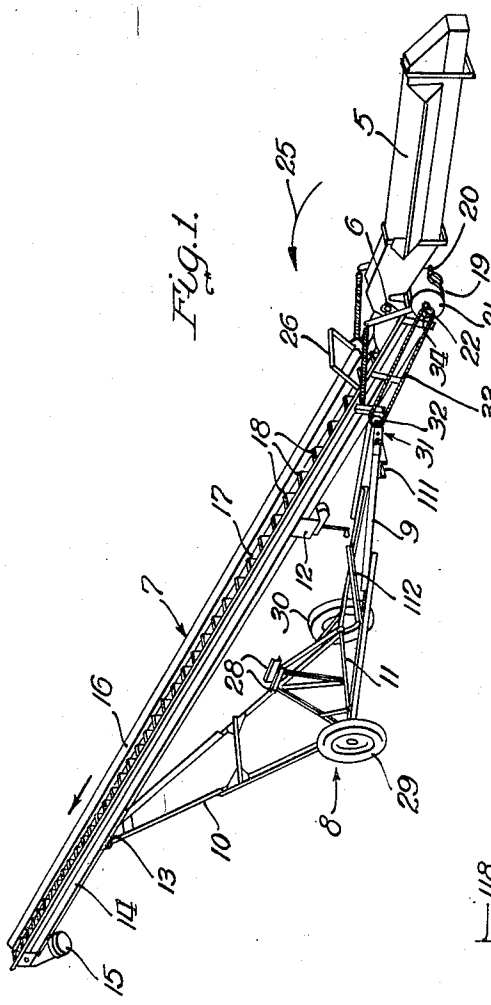


Fig. 1.

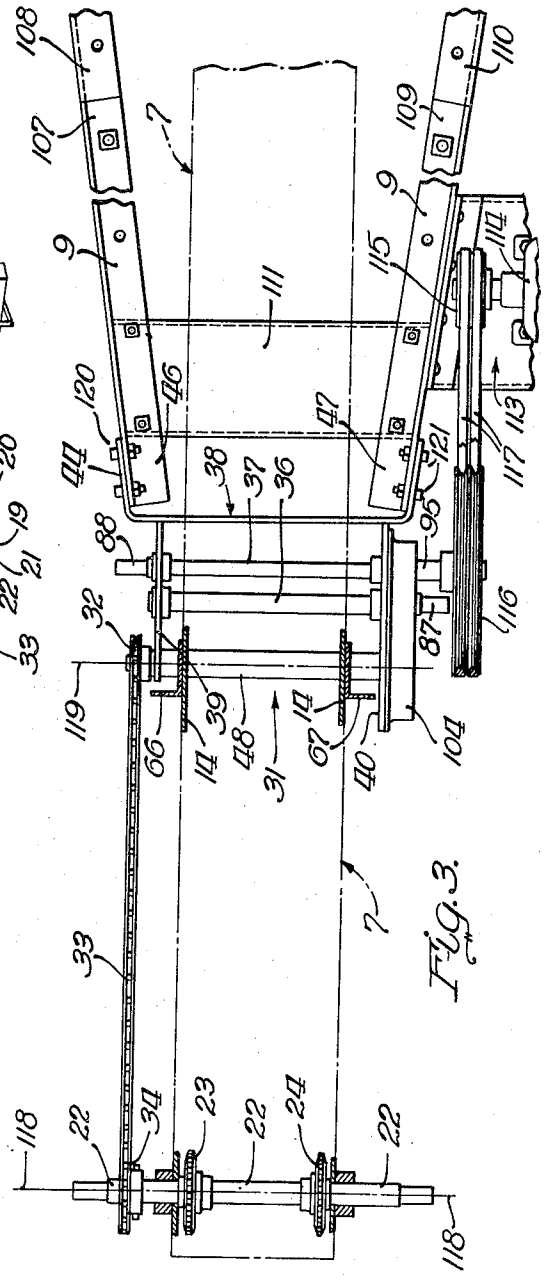


Fig. 3.

INVENTOR.
John H. Fulper
BY
Eberhard E. Wattley
Atty.

June 7, 1955 J. H. FULPER 2,710,090

MULTIPLE DRIVE UNIT FOR CONVEYORS

Filed April 18, 1951. 3 Sheets-Sheet 2

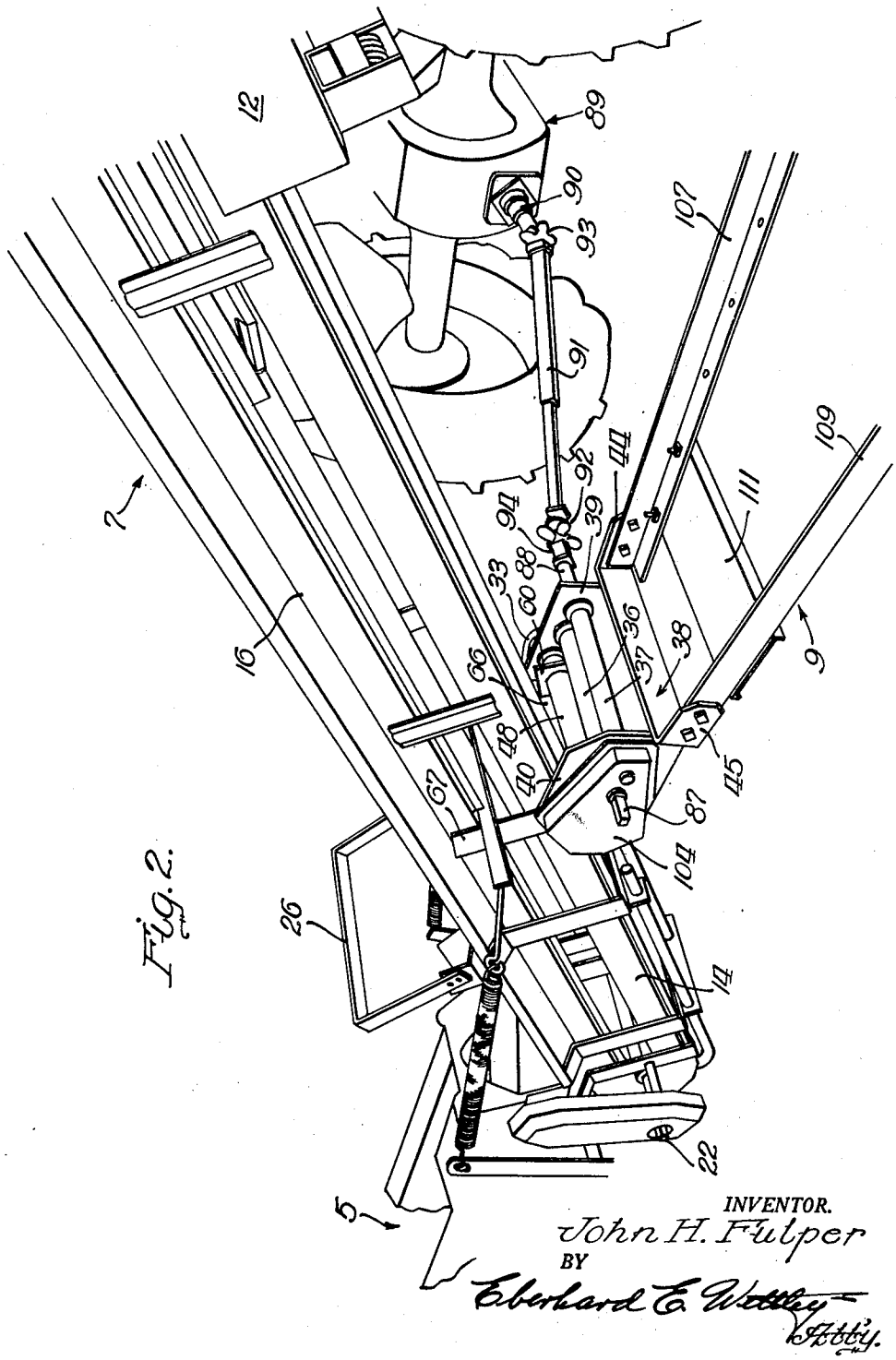


Fig. 2.

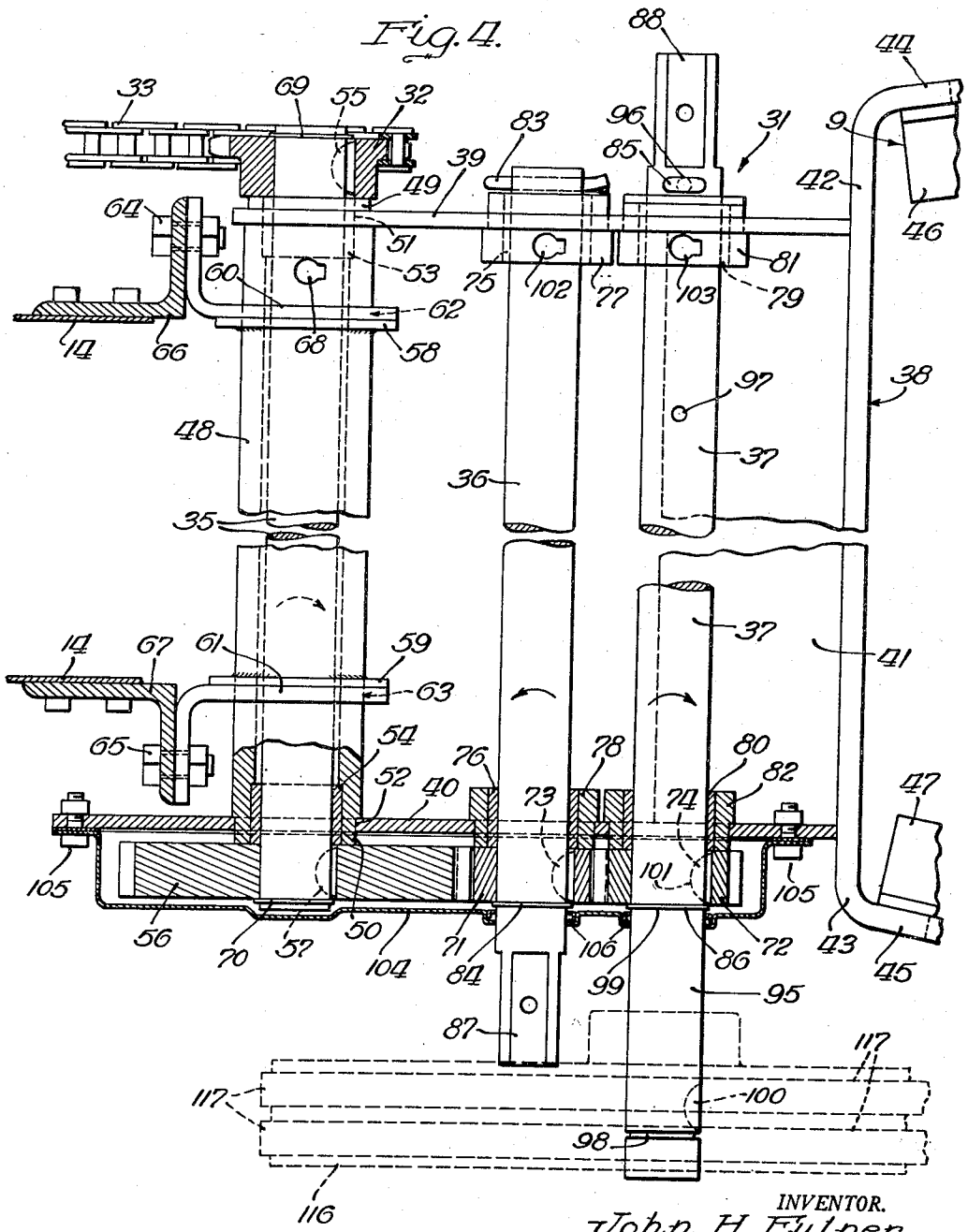
INVENTOR.
John H. Fulper
BY
Eberhard E. Wobbey
Wobbey.

June 7, 1955 J. H. FULPER 2,710,090

MULTIPLE DRIVE UNIT FOR CONVEYORS

Filed April 18, 1951 3 Sheets-Sheet 3

Fig. 4.



INVENTOR.
John H. Fulper
BY
Eberhard E. Wolley
Atty.

United States Patent Office 2,710,090 Patented June 7, 1955

2,710,090

MULTIPLE DRIVE UNIT FOR CONVEYORS

John H. Fulper, Kewanee, Ill., assignor to Kewanee Machinery & Conveyor Company, Kewanee, Ill., a corporation of Illinois

Application April 18, 1951, Serial No. 221,677

17 Claims. (Cl. 198—121)

This invention relates to a multiple drive mechanism for conveyors.

More specifically, this invention relates to a basic drive unit arranged for assembly with a portable farm elevator for the purpose of driving the conveyor chain thereof by means of various modern power sources such as, for example, a power take-off of a farm tractor or other power implement or vehicle, an internal combustion engine, or by means of an electric motor.

As one of the objects of the present invention the basic drive unit is designed for adaptation and use as an independent accessory for bodily installation and assembly into existing farm elevators as a conversion feature, or if desirable the drive unit may be directly built into a conveyor as an integral mechanism and offered with the conveyor as a part of the complete original assembly.

In the past, it has been the practice to employ numerous types of speed reducing mechanisms termed speed jacks which were placed on the ground adjacent the elevator for connection with the latter with universal jointed shafts known as tumbling rods. The speed jacks were then driven by a tractor, engine or motor through belts or the like. And the drive connection to the conveyor through the tumbling rods was made at the foot end of the elevating conveyor and adjacent the material receiving hopper of the conveyor.

Drive arrangements of this kind were cumbersome and unsatisfactory due to the multiplicity of speed jacks or interchangeable gears that were necessary to transmit power to the elevator to achieve a given rate of lineal speed for the conveyor chain when using any one of the various power units employed to drive the speed jacks.

Many other factors have proven devices now in use for driving conveyors impractical and normally in the way. The drive to the conveyor from one side cannot be used on the same foot shaft from the opposite side of the conveyor since the direction of rotation of the drive member must then be corrected leading to further inefficiency of operation and added cost for added equipment. Yet the conveyor should possess the facility of being operably driven from either side which is extremely important when clearances have to be considered between farm buildings and other fixed farm structures that might be near the necessary place of use of the elevator.

Another of the objects of the present invention is to provide a basic power transmission unit comprising a multiple drive mechanism that will overcome the various difficulties noted and which will supply the need of a universal power means that will drive a conveyor at the required speed while receiving its motive power from a modern power source.

Another object of the invention is to provide such a multiple drive mechanism that may be driven from either side of the conveyor or by a power device directly carried upon the conveyor.

Another object of the invention is to provide a multiple drive mechanism which becomes a part of the portable elevator or conveyor and one having the necessary speed

defining transmission connections always available for selective use without separate speed jacks or other gear assemblies or reverse gear changes to produce the proper driving speeds and in the proper directions, thus the complete unit is available for use without adjustment or re-assembly when re-setting the machine at a new work site after transporting.

A still further object of the present invention is to provide a basic power transmission unit that is carried upon the conveyor structure or frame at a point remote from the foot end thereof, thus moving the power connection point away from the conveyor feed hopper to greatly increase the clearance space adjacent the hopper and foot end of the conveyor or elevator for accommodating farm wagons or other vehicles that discharge their loads into the hopper.

Also, another object of this invention is to arrange the driving unit and its frame in a position wherein the elevator driving sprocket or power wheel of the basic power transmission is located upon a rotational axis disposed coincident with the pivotal axis of the connection of the elevator reach or push frame with the elevator trough or conveyor frame. In this manner, the drive chain from the drive sprocket of the basic drive unit to the connected sprocket on the foot shaft of the conveyor chain will never change in length under adjustments in the relative angularity between the reach frame and elevator trough structure. The drive chain will never tighten or loosen.

Other objects and advantages relating to the basic elevator drive unit of this invention shall hereinafter appear in the following detailed description thereof having reference to the accompanying drawings forming a part of this specification.

In the drawings:

Fig. 1 is a general perspective view of a farm elevator incorporating a multiple drive mechanism of the present invention;

Fig. 2 is a fragmentary perspective view of the farm elevator as viewed from the other side thereof adjacent the foot end and associated mechanisms to better illustrate the invention as applied to such an elevator and also illustrating a tractor drive for operating the elevator connected with the multiple drive mechanism;

Fig. 3 is a fragmentary plan view of the elevator embodying the invention to diagrammatically illustrate the relation of the various driving parts of the elevator; and

Fig. 4 is an enlarged plan view of the basic drive unit as the same appears interposed between the reach frame and the main frame of the conveyor, certain parts being broken away and in section to better illustrate the details of construction thereof.

Fig. 1 illustrates a typical farm elevator generally comprising a feed hopper **5** pivotally connected by suitable bearing means **6** to the main conveyor **7**, the latter being supported upon the wheel frame **8** having a push frame or reach frame **9** and a derrick **10** that is pivotally supported along the wheel axle **11** and can be angularly adjusted through a cable connected self-locking winch **12**. The derrick **10** has a wheel carriage **13** which runs along the lower trough **14** of the conveyor as the cable connected between the derrick **10** and the winch **12** is shortened or let out. In this manner, the elevation of the conveyor **7** may be adjusted for given heights to locate the discharge spout **15** as needed. The conveyor **7** also has an upper trough **16** and a conveyor chain **17** constructed with a plurality of flights **18** normally riding upwuardly along the upper trough **16** reversing over suitable sprockets at the discharge end of the conveyor and returning through the lower trough **14**. The foot end of the conveyor includes a pair of skids **19** terminating in a hitch **20** which encircles a housing **21** that contains the foot shaft **22** carrying sprockets **23** and **24** (see

Fig. 3) about which the chain 17 is looped adjacent the discharge end of the hopper 5. The latter also includes suitable conveyor means to bring the hopper material to the foot of the conveyor.

The illustration in Fig. 1 depicts the manner in which the elevator is set up for use. If the elevator is to be transported to another farm or another position, the hopper 5 can be swung upwardly and toward the conveyor frame proper as shown by the arrow 25 so as to rest upon bracket 26, and the derrick frame 10 can then be lowered by means of the winch 12 to bring the entire assembled trough conveyor 7 downwardly upon the rests 28 which are supported upon the axle 11 or reach frame 9. Then by hooking a tractor to the hitch 20, the entire unit may then be readily hauled away upon the supporting wheels 29 and 30 to any desired location.

The basic multiple drive unit of the present invention is indicated at 31 where this unit is interposed between the reach frame 9 and the main frame of the conveyor 7. The main drive sprocket 32 of the basic drive unit 31 is connected by a chain drive 33 to a sprocket 34 secured to the foot shaft 22 as best illustrated in Figs. 1 and 3.

Referring now to Fig. 4, the main drive unit 31 comprises in general three main shafts 35, 36 and 37 all mounted for rotation upon a rigid frame 38. The frame 38 comprises the parallel plates 39 and 40 which are connected as by welding to the cross angle 41 which has laterally extending wings 42 and 43 that terminate in angularly disposed ears 44 and 45 for connection with the side angles 46 and 47 of the reach frame 9. Side plates 39 and 40 are also rigidly joined through the tube 48 having reduced ends 49 and 50 tightly fitted into the respective openings 51 and 52 formed in the side plates. The tube 48 may be press fitted into these openings or tack welded or otherwise tightly fitted or secured to the plates, thereby presenting, together with the angle bracket 41, a very rigid framework defined by the lateral plates 39 and 40 in the width of the conveyor.

Tube 48 is provided with internal end bearing sleeves 53 and 54 in which is journalled the cross shaft 35 to which the sprocket 32 is keyed at 55 to rotate directly with the shaft 35. A gear 56 is keyed at 57 to the opposite end of the shaft 35, also for direct rotation with the shaft, and end play of the shaft and its connected gear and sprocket is counteracted by the ends of the tube 48.

A pair of annular rings 58 and 59 are welded to the exterior of tube 48 in spaced relation with respect to each other to form collars and spacing means for a pair of angle brackets 60 and 61. The latter brackets are apertured at 62 and 63 to receive portions of the tube 48 therethrough, and each of the brackets 60 and 61 are bolted as at 64 and 65 to vertical angles 66 and 67 that are firmly secured to the sides of the troughs 14 and 16 of the conveyor. Thus the brackets 60 and 61 by reason of their fixed connection with the conveyor proper and by their positioning relatively oppositely outwardly with respect to the collars 58 and 59 but engaging the same, act to position the entire basic drive unit 31 with respect to the conveyor and at the same time tube 48 and the entire frame 38 are pivotally supported by means of brackets 60 and 61 upon the conveyor 7.

The shaft 35 which is concentrically located with respect to the tube 48, is arranged with its axis coincident with the axis of pivoting of the tube 48 with respect to the brackets 60 and 61. This arrangement likewise disposes the rotative axes of the sprocket 32 and gear 56 upon the same pivotal axis as the tube 48.

The drive shaft 35 and its associated bearing parts within the tube 48 are lubricated through an oil cup 68 and the movable parts comprising shaft 35 and the sprocket 32 and gear 56 can be serviced and disassembled by removing either of the lock rings 69 or 70 to permit withdrawal of shaft 35 from the tubular housing 48, without changing the location of the frame itself with respect to the conveyor.

A pair of smaller gears 71 and 72 are keyed at 73 and 74 to the shafts 36 and 37 respectively, and gear 71 meshes with the larger gear 56 whereby the rotation of shaft 36 in one direction will actuate shaft 35 in the opposite direction, and gear 71 meshes with the gear 72 whereby rotation of shaft 37 in the opposite direction with respect to shaft 36 will drive gear 56 and shaft 35 in the same direction of rotation as shaft 37.

Each of the shafts 36 and 37 are carried in suitable bearings connected with the side plates 39 and 40. Shaft 36 rotates in bearing sleeves 75 and 76 that are carried by the bearings 77 and 78 which are tightly secured within openings located in the plates 39 and 40. Shaft 37 rotates in the bearing sleeves 79 and 80 that are carried by the bearings 81 and 82 that are also tightly anchored within openings in the side plates 39 and 40. End play of the shaft 36 is prevented by means of the cotter pin 83 and the removable locking ring 84, while end play in the shaft 37 is prevented by means of the cotter pin 85 and the lock ring 86. Shaft 36 terminates with a squared end 87 disposed to one side of the drive unit frame 38 while shaft 37 terminates with a squared end 88 disposed at the opposite side of the frame 38.

Either of the shafts 36 or 37 may be used to drive the conveyor through the gear train connected with shaft 35 and through sprocket 32 and chain 33. The power drive may be attached from either side of the conveyor, depending upon which of the squared ends 87 or 88 of shafts 36 or 37 may be selected for this purpose. In each case, gear 56 and the connected shaft 35 will be driven in the proper direction, and as illustrated in Fig. 2, a tractor 89 is shown with a unidirectional power take-off 90 connected by means of an extensible shaft 91 through universals 92 and 93 which hook on by means of a square socket 94 with the squared end 88 of shaft 37. It should also be noted in Fig. 2 that the shaft 37 has been moved endwise to the far side of the basic drive unit placing the squared end 88 in a position to freely accept and receive the power transmission means from the tractor 89.

In Fig. 4, however, the shaft 37 is shown as shifted endwise into another position wherein the end 95 is considerably extended for the reception of a pulley such as shown in Fig. 3 to thereby establish a driving connection from a power means carried upon the conveyor itself or from other supplemental drive means if desirable.

This endwise shifting of the shaft 37 is definitely controlled by a pair of positioning locking means that can readily be adjusted to change the position of shaft 37 according to the particular power set up that is employed for running the conveyor. As best seen in Fig. 4, shaft 37 is provided with a pair of transverse openings 96 and 97, either of which may receive the cotter pin 85 depending upon whether the shaft is located as shown in Fig. 4 or whether the opening 97 is brought to the location of the opening 96 to receive the cotter pin 85 as in Fig. 2. The other end of the shaft 95 is provided with an additional groove 98 supplementing the groove 99 so that the locking ring 86 may be removed from the position shown in Fig. 4 and shaft 37 can be slid endwise through the bearings to bring the groove 98 in the position formerly occupied by groove 99 for the reception of the split locking ring 86. This endwise actuation of the shaft 37 requires the removal of the key 74 from the position shown so that this key may be placed into the second key notch 100 which will occupy the same position as the notch 101 in the plane of the gear 72 when the shaft 37 has been moved endwise to accommodate a drive such as that shown in Fig. 2. Key notch 100 when used as shown in Figs. 3 and 4 can be adapted to receive a key for securing a drive wheel to shaft 37.

Suitable lubrication of the bearings of shafts 36 and 37 may be readily provided through the oil cups 102 and 103 illustrated in the upper portion of Fig. 4 and similar

cups are also provided for the bearings **78** and **82** at the other ends of the shafts **36** and **37**. The gears **56**, **71** and **72** may run in oil and a suitable housing **104** is bolted at **105** to the plate **40** to enclose the gears with oil retainers **106** encircling the shafts **36** and **37**. Housing **104** not only provides an oil retaining means, but it also acts as a guard to prevent injury to a conveyor operator and also to prevent damage to the gears enclosed within the housing.

Although not shown in the drawings, a similar housing may be employed to enclose and guard the sprocket 32, which housing would be open at the left hand end as seen in Fig. 4 for accommodating the chain **33**.

Referring now to Fig. 3, the reach frame **9** includes suitably adjustable connecting angle ends **107** and **108** at one side, and ends **109** and **110** at the other side, the respective parts of each portion of the frame being braced transversely by suitable channels and angles such as **111** and **112** as shown in Figs. 1 and 3. As further illustrated in Fig. 3, the reach frame **9** is provided with a sturdy lateral bracket or support **113** that is connected adjacent the basic driving unit **31** to rigidly mount a motor such as **114** with a drive pulley **115** in a predetermined position with respect to the pulley **116** that is secured to the end **95** of the shaft **37** with the drive being transmitted through appropriate belts **117** from the motor **114** to the drive unit **31**. Any form of power unit may be employed for mounting upon a platform or bracket such as **113** so that it is obvious that the motor **114** may be replaced by a suitable gasoline engine or by any other power means capable of driving shaft **37** in a given direction, and at the same time the pulleys **115** and **116** are of a predetermined diameter to rotate shaft **37** at a given speed which, when transmitted through the gear train to shaft **35**, will drive chain **33** at a given lineal speed to also drive the conveyor chain at a predetermined lineal rate of speed.

When the particular power drive of Fig. 3 is employed, the drive unit is adjusted to displace the shaft **37** endwise toward the pulley side of the basic drive **31** and according to specifications, the proper size of pulleys can be used with the power unit employed which may have one speed when an electric motor is used and another speed when a gasoline engine is employed. However, once the mode of driving the elevator is determined, and a setup is used as shown in Fig. 3, the basic drive unit is made to accommodate such an arrangement which then becomes a fixed organization of elements that will be used to drive the conveyor. If, however, this particular mode of operation is not desired by the operator, the mounting **113** and the power unit **114** may be omitted as well as the pulley drive to the end **95** of shaft **37**. In that particular arrangement, shaft **37** would normally be moved to project from the sprocket side of the basic drive unit **31** by the adjustment of the locking means of the shaft with respect to the frame of the drive unit and the drive parts of the latter will normally be arranged as illustrated in Fig. 2. In this case, the power unit may be driven by any suitable power takeoff means such as shown in Fig. 2 and the tractor such as **89** may be used as connected with the squared end **88** of shaft **37** at the side of the conveyor as illustrated. If clearances do not permit this particular setup, the tractor may be backed up to the conveyor on the near side as viewed in Fig. 2 so that the power transmission means comprising the power takeoff **90** may be connected with the squared end **87** of the shaft **36**. Obviously, the direction of rotation of the power takeoff **90** of the tractor and its connected shaft **91** will still be in the same direction, but by reason of the gears **71** and **72**, the drive gear **56** of shaft **35** will still rotate in the same direction regardless of from which side the drive of the tractor is connected to the conveyor.

The location of the basic drive unit **31** with respect to the foot end of the conveyor is best shown in Figs. 1, 2 and 3. As seen in Fig. 3, the basic drive unit **31** is considerably removed from the foot end of the conveyor and from the foot end drive shaft **22** to provide added clearances between the axis of shaft **22** as indicated at **118** and the axes of either of the shafts **36** and **37**. Furthermore, the frame **38** of the basic drive unit has been interposed between the adjacent end of the reach frame **9** and the brackets **66** and **67** of the conveyor **7** so that the pivotal action of the reach frame **9** with respect to the conveyor takes place about the axis **119** during the relative adjustments between the conveyor and the reach frame. Since axes **118** and **119** are always fixed due to this particular cooperative relationship of the movable elements, the chain **33** will at all times remain in the proper operative driving relationship with respect to the connected sprockets **32** and **34**. By reason of the rigid frame **38**, the driving shafts **36** and **37** will also maintain their predetermined relationships with respect to the shaft **35** so that all adjustments of the conveyor and reach frame will have no effect upon the efficient operative driving arrangement of the parts of the basic drive unit.

As has been shown in the drawings, the basic drive unit when assembled into the conveyor framework, actually becomes an integral part of the reach frame so that the frame **38** and the adjacent ends of the frame **9** are rigidly connected through bolts **120** and **121**, see Fig. 3. Farm elevators may be sold with this particular basic drive unit installed directly as shown when conditions require the same. However, in farm elevators that may be in the field, and which have been constructed similarly like the conveyor shown but which may not have the drive unit of the present invention, it will be an easy matter to take the drive unit bodily and to disconnect the usual bracket and bolt means to bring the reach frame **9** away from the brackets such as **66** and **67** and to insert the drive unit **31** which is readily installable in the space created between reach frame **9** and the conveyor **7**. The legs **107—108** and legs **109—110** permit this endwise adjustment of the reach frame so that the basic drive unit **31** may be readily accommodated by standard equipment of a farm elevator.

The description and the disclosure has been directed to a specific embodiment of the invention in a conveyor of the type illustrated. Other similar uses may also be available to a basic drive unit of this construction, and it is also contemplated that modifications and differences in the combination of parts may be made without departing from the fundamental concept of this invention. Such changes shall, however, be governed by the breadth and scope of the appended claims.

What I claim is:

1. A multiple drive unit for conveyors comprising a frame bodily attachable with the conveyor structure to dispose said frame in the general vertical plane of said conveyor, transverse shafts journalled in said frame and projecting to opposite side portions of said conveyor, one shaft having a drive sprocket thereon disposed laterally outwardly with respect to the adjacent side of the conveyor for chain connection with the side drive sprocket of the conveyor, two other shafts each having driving ends disposed beyond the opposite sides of said frame to establish a driving connection at either side of said frame and in positions arranged laterally outwardly with respect to the conveyor sides, and power transmitting means connecting said three shafts whereby said one shaft will be driven in the same direction by unidirectional power means connectible with either of the driving ends of said other two shafts respectively.

2. A multiple drive unit for conveyors comprising a rigid auxiliary frame attachable beneath the conveyor structure, a first shaft on said frame having a drive sprocket positioned laterally outwardly beyond one side of the conveyor for connection with a side drive sprocket of the conveyor chain, a second shaft carried by said frame and having a driving connection disposed to one side of the frame and beyond one lateral side of said conveyor, and

a third shaft carried by said frame and having a driver connection disposed beyond the other side of said frame and laterally outwardly of said conveyor, and gear means connecting said shafts whereby said first shaft will be driven in the same direction of rotation by a unidirectional power means when the latter is connected with the laterally outwardly disposed driving connections of either of the second or third shafts respectively.

3. A multiple drive unit for conveyors comprising a frame bodily attachable in the general vertical plane with a conveyor structure, transverse shafts journalled in said frame and extending laterally across said conveyor structure, one shaft having a drive sprocket thereon for chain connection with the drive sprocket of the conveyor, two other shafts each having driving ends disposed at opposite sides of said frame and beyond the sides of said conveyor structure to establish a driving connection at either side of said frame and conveyor, and power transmitting means connecting said three shafts whereby said one shaft will be driven in the same direction by unidirectional power means connectible with either of the driving ends of said other two shafts respectively, said power transmitting means comprising three meshed gears, one of said gears being of one diameter and connected with said one shaft, said other two gears being alike in diameters but of another diameter than said one gear and connected with said other two shafts respectively, said one gear being positioned to mesh with one of said other gears.

4. A multiple drive unit for attachment with the material moving structure of a conveyor and in the general vertical plane of said conveyor, said unit comprising a frame terminating with spaced side plates, bracket members to secure said frame to the conveyor with said side plates disposed at either side of the conveyor, cross shafts carried by said side plates and extending transversely with respect to the conveyor and beyond the lateral sides thereof, one of said shafts having a drive sprocket thereon arranged for chain connection with the conveyor driving sprocket, and a pair of other shafts carried by said side plates, said latter shafts each having a drive connection thereon terminating beyond the opposite lateral sides of the conveyor respectively, and gears connecting said shafts comprising a drive gear of one diameter connected to drive said sprocket shaft, and an equal pair of different diameter gears connected with said pair of shafts and with said drive gear to rotate the latter in the same direction and at the same speed when a unidirectional constant speed power means is connected with either drive connection of the pair of shafts respectively.

5. In a portable farm elevator, the combination of a conveyor frame, a reach frame, a conveyor drive member, and a self-contained conveyor drive unit consisting of a framework and a drive mechanism mounted thereon, said framework being interposed between adjacent portions of the aforesaid two frames and arranged to directly connect said frames, and said drive mechanism comprising a drive wheel connected to operate the conveyor drive member, and operable drive means arranged to drive said drive wheel, said drive means each having attachment members for connection with a power source, with one attachment disposed at one side of the conveyor frame and the other attachment disposed at the opposite side of said frame.

6. In a portable farm elevator, the combination of a conveyor, a wheeled frame, a conveyor drive element at the foot end of said conveyor, and a conveyor drive unit consisting of a framework with a drive mechanism mounted thereon, said framework directly connecting an adjacent portion of said wheeled frame with said conveyor at a point remote from the location of said conveyor drive element, said drive mechanism comprising a conveyor drive member operatively connected with said conveyor drive element, and at least two driving means connected with said conveyor drive member each having an attachment for connection with a power source, said attachments being arranged at opposite sides of the conveyor respectively.

7. In a portable farm elevator, the combination of a conveyor, an adjustable structure having one portion thereof connected with said conveyor to adjust the angular elevation of said conveyor with respect to the ground, a conveyor drive member carried by said conveyor, and a drive unit consisting of a frame and a multiple drive mechanism mounted on said frame, said frame being connected with another portion of said structure for connection with said conveyor, and said drive mechanism comprising a drive means operatively connected with said conveyor drive member, and a pair of driving units connected with said drive means, each of said units having an attachment for connection with a power source, said attachments being arranged for disposition at opposite sides of the conveyor respectively.

8. In a portable farm elevator, the combination of a conveyor, an adjustable structure connected with one portion of said conveyor to adjust the angular elevation of said conveyor with respect to the ground, said structure having another portion thereof disposed in spaced relation with another part of said conveyor, a conveyor drive member carried by said conveyor, and a multiple drive mechanism interposed between said other spaced portion of said structure and said other part of the conveyor, said drive mechanism comprising a frame, pivotal means on said frame to connect with said conveyor, said frame being rigidly connected with said adjustable structure, and conveyor driving elements carried by said frame, one of said elements being operatively connected to drive the conveyor drive member, said other elements comprising means to drive said one element, each of said means having attachment means for connection with a power source, and said one element being arranged for rotation about an axis arranged coincident with the operative axis of said pivotal means and at the pivotal juncture of said frame with the other part of said conveyor.

9. In a portable farm elevator, the combination of a conveyor, an adjustable structure connected with one portion of said conveyor to adjust the angular elevation of said conveyor with respect to the ground, said structure having another portion thereof disposed in spaced relation with another part of said conveyor, a conveyor drive member carried by said conveyor, and a multiple drive mechanism interposed between said other spaced portion of said structure and said other part of the conveyor, said drive mechanism comprising a frame, pivotal means on said frame to connect with said conveyor, said frame being rigidly connected with said adjustable structure, and conveyor driving shafts journalled upon said frame, one of said shafts having operative driving connection with said conveyor drive member, the other shafts having operative connection to drive said one shaft, said other shafts having attaching means for connection with a power source, and said one shaft being disposed in said conveyor attached frame to rotate about an axis arranged coincident with the axis about which said pivotal means operates.

10. In a portable farm elevator, the combination of a conveyor, an adjustable structure having one end thereof connected with one portion of said conveyor to adjust the angular elevation of said conveyor with respect to the ground, a conveyor drive member carried by said conveyor, and a multiple drive mechanism constructed and arranged as a bridge unit and interposed between the other end of said structure and another portion of said conveyor, said drive mechanism bridge unit comprising a frame, a tubular element carried by said frame, brackets connected with said conveyor and pivotally mounted upon said tubular element, and attaching means fixedly connecting said frame with said adjustable structure, a drive shaft mounted in said tubular element and operatively connected to drive said conveyor drive member, and op-

erative power transmission means carried by said frame to drive said shaft, said transmission means having attaching mechanism arranged for connection with a power source.

11. In a farm elevator, a conveyor, a reach frame, and a unitary multiple drive mechanism constructed and arranged for bodily insertion between one end of said reach frame and an adjacent portion of said conveyor to provide a rigid bridging unit between the reach frame and the conveyor, and to provide a drive means for said conveyor, said unitary multiple drive mechanism comprising side frames, transverse members rigidly connecting said side frames, one of said members consisting of a tube, brackets pivotally carried upon said tube and adapted for fixed connection with the conveyor, bracket means to rigidly connect said side plates with the reach frame of the farm elevator, and power transmission means carried by the side frames comprising a drive shaft having a sprocket arranged to operatively connect with the driving shaft of the conveyor, said drive shaft being mounted for rotation within said tube, and cooperative driving shafts carried by said side frames and connected to rotate said drive shaft, said cooperative driving shafts each having attachment means for connection with a power source.

12. In a farm elevator, a conveyor, a reach frame, and a unitary multiple drive mechanism constructed and arranged for bodily insertion between one end of said reach frame and an adjacent portion of said conveyor to provide a rigid bridging unit between the reach frame and the conveyor, and to provide a drive means for said conveyor, said unitary multiple drive mechanism comprising side frames, transverse members rigidly connecting said side frames, one of said members consisting of a tube, brackets pivotally carried upon said tube and adapted for fixed connection with the conveyor, bracket means to rigidly connect said side plates with the reach frame of the farm elevator, and power transmission means carried by the side frames comprising a drive shaft having a sprocket arranged to operatively connect with the driving shaft of the conveyor, said drive shaft being mounted for rotation within said tube, and cooperative driving shafts carried by said side frames and connected to rotate said drive shaft, said cooperative driving shafts each having attachment means for connection with a power source, and said attachment means each being positioned oppositely outwardly of said side frames and at opposite sides of the conveyor.

13. A multiple drive mechanism to drive the conveyor of a farm elevator including a reach frame, said mechanism comprising side frames, transverse members rigidly connecting said side frames, one of said members consisting of a tube, brackets pivotally carried upon said tube and adapted for fixed connection with the conveyor, bracket means to rigidly connect said side frames with the reach frame of the farm elevator, and power transmission means carried by the side frames comprising a drive shaft having a sprocket arranged to operatively connect with the driving shaft of the conveyor, said drive shaft being mounted for rotation within said tube, and cooperative driving shafts carried by said side frames and connected to rotate said drive shaft, said cooperative driving shafts each having attachment means for connection with a power source, said attachment means being positioned oppositely outwardly of said side frames and at opposite sides of the conveyor, and one of said cooperative driving shafts having the end opposite to its connected attachment means arranged for the reception of power drive means, said one shaft being endwise shiftable to dispose either end into an extended position beyond the adjacent side frame for power connection purposes.

14. A multiple drive mechanism to drive the conveyor of a farm elevator including a reach frame, said mechanism comprising side frames, transverse members rigidly connecting said side frames, one of said members consisting of a tube, brackets pivotally carried upon said tube and adapted for fixed connection with the conveyor, bracket means to rigidly connect said side plates with the reach frame of the farm elevator, and power transmission means carried by the side frames comprising a drive shaft having a sprocket arranged to operatively connect with the driving shaft of the conveyor, said drive shaft being mounted for rotation within said tube, and cooperative driving shafts carried by said side frames and connected to rotate said drive shaft, said cooperative driving shafts each having attachment means for connection with a power source, said attachment means being positioned oppositely outwardly of said side frames and at opposite sides of the conveyor, and one of said cooperative driving shafts having the end opposite to its connected attachment means arranged for the reception of power drive means, said one shaft being endwise shiftable to dispose either end into an extended position beyond the adjacent side frame for power connection purposes, and releasible locking means coacting between said shiftable shaft and said side frames to retain said shaft in either of its adjusted positions.

15. In a farm elevator, a conveyor, a reach structure to support said conveyor having one end thereof disposed in spaced relation with respect to an adjacent part of said conveyor, and a unitary self-contained drive mechanism to operate said conveyor bodily insertable between said one spaced end of said reach structure and the adjacent part of said conveyor comprising a rigid frame, bracket means at one end of said frame to secure said frame to the spaced reach structure of the elevator, pivotal means at the other end of said frame to pivotally connect the frame with the conveyor, and power transmission shafts carried by said frame comprising a first shaft disposed with its axis coincident with the axis about which said pivotal means functions, said first shaft having operative means connected therewith for driving the conveyor, and a pair of driving shafts each having attachment means for connection with a power source respectively, said pair of shafts being gear connected by equal size gears, and said first shaft having a different size gear meshing with one of the aforesaid gears of said pair of shafts.

16. A drive mechanism for a conveyor of a farm elevator comprising a rigid frame, bracket means at one end of said frame to secure said frame to the reach structure of the elevator, pivotal means at the other end of said frame to pivotally connect the latter with the conveyor, and power transmission shafts carried by said frame comprising a first shaft disposed with its axis coincident with the axes about which said pivotal means functions, said first shaft having operative means connected therewith for driving the conveyor, and a pair of driving shafts each having attachment means for connection with a power source respectively, said pair of shafts being gear connected by equal size gears, and said first shaft having a different size gear meshing with one of the aforesaid gears of said pair of shafts, said attachment means of said pair of driving shafts being disposed oppositely outwardly with respect to the rigid frame and at opposite sides of the conveyor, one of the shafts of said pair being endwise shiftable and having the end away from its attachment means also arranged for the reception of a power drive means, and coacting retaining means to hold said shiftable shaft in either of two positions to adequately project either shaft end beyond the rigid frame for the reception of a power connection.

17. In an elevator, a conveyor, a reach frame beneath said conveyor having one end thereof connected with one portion of said conveyor with the other end of the reach frame being adapted for disposition in spaced relation with another portion of said conveyor, and an auxiliary drive unit for said conveyor comprising a rigid bridging assembly to connect said spaced end of the reach frame with said other portion of said conveyor, said drive unit comprising operably connected shafts, one shaft having a conveyor drive means disposed laterally outwardly

beyond one side of said conveyor, and certain other shafts being transversely arranged to terminate with drive attachments for connection with external power means with said attachments terminating at opposite and laterally outward locations with respect to the sides of the conveyor, a power unit supported upon said reach frame in a position disposed laterally outwardly with respect to the conveyor, and power transmission means connecting said power unit and one of said certain other shafts in a location arranged laterally outwardly with respect to said drive unit and said conveyor.

References Cited in the file of this patent

UNITED STATES PATENTS

2,334,304	Arnett et al.	Nov. 16, 1943
2,343,133	Blank	Feb. 29, 1944
2,343,444	Coon	Mar. 7, 1944
2,446,660	Mulkey et al.	Aug. 10, 1948
2,557,612	Neighbour et al.	June 19, 1951