

April 22, 1952

C. MATTHEWS ET AL

2,593,470

CONVEYER DRIVE

Filed April 14, 1949

2 SHEETS—SHEET 1

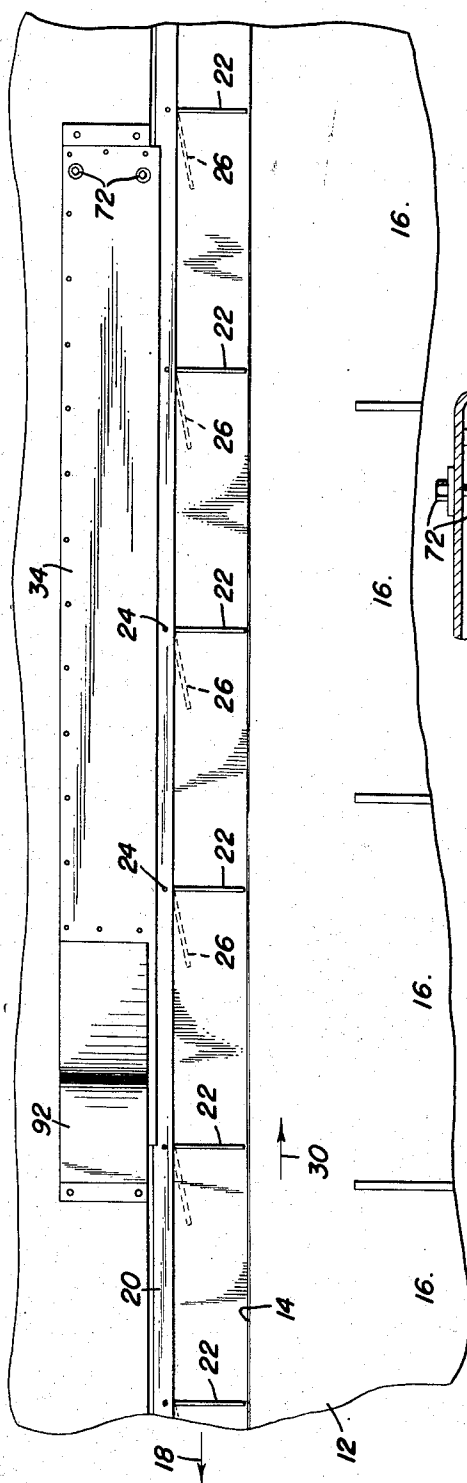


Fig. 1.

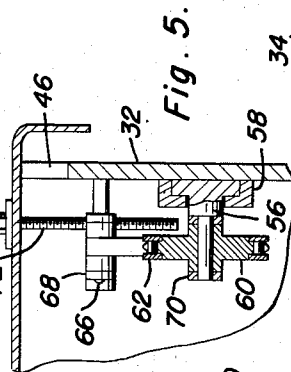


Fig. 5.

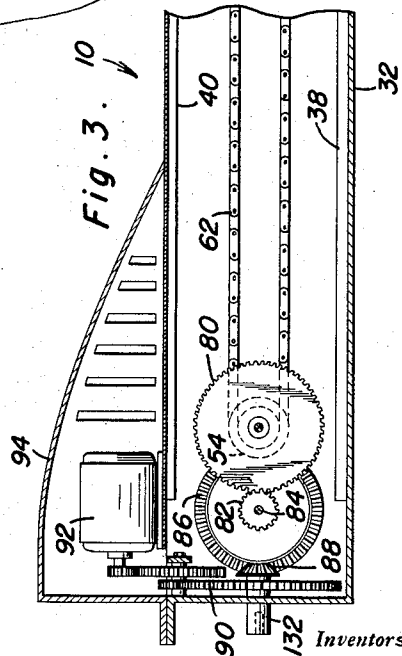


Fig. 3.

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2 SHEETS--SHEET 2

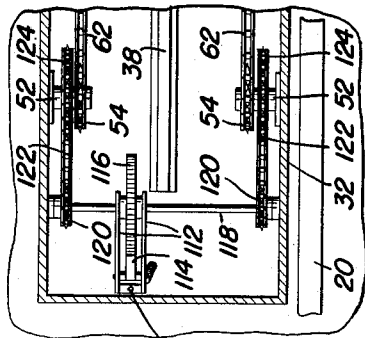


Fig. 8.

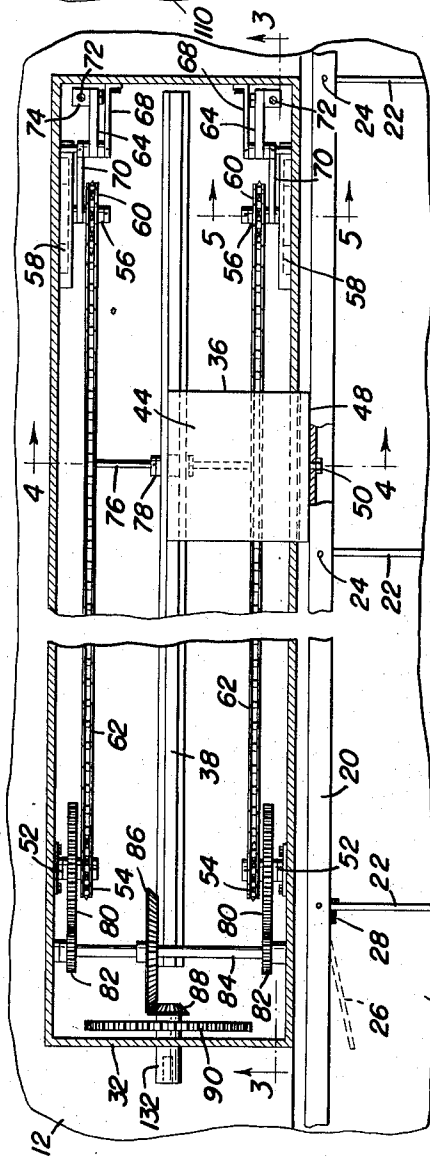


Fig. 2.

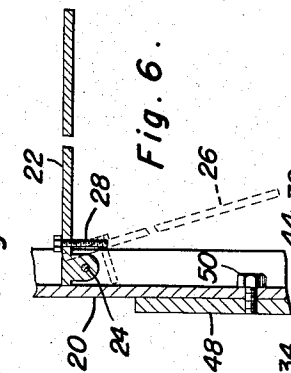


Fig. 6.

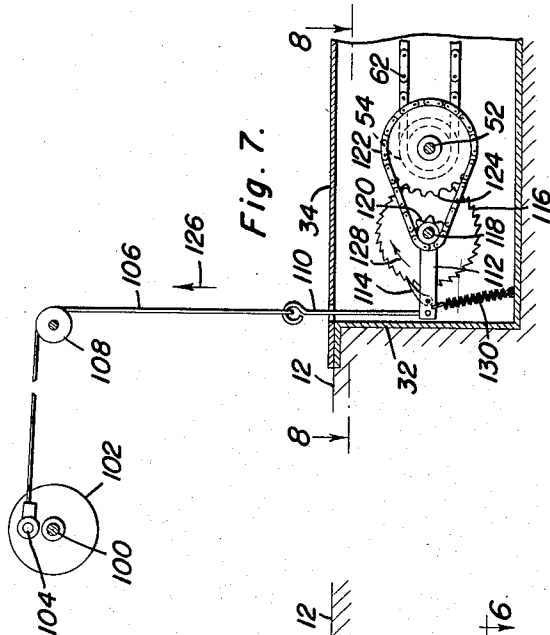
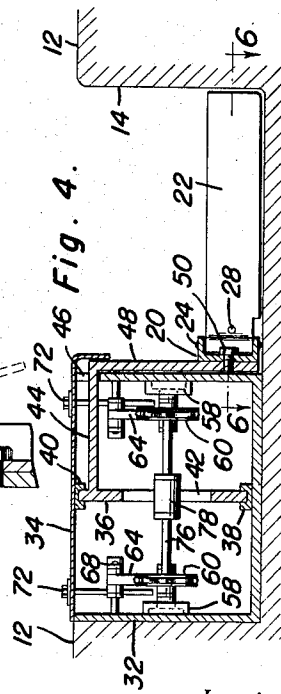


Fig. 7.



UNITED STATES PATENT OFFICE

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CONVEYER DRIVE

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1 Claim. (Cl. 74—37)

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This invention relates to new and useful improvements and structural refinements in apparatus for cleaning barns, and the principal object of the invention is to facilitate convenient, expeditious and effective manner for cleaning manure and other waste from a manure collecting channel with which barns are usually provided.

This object is achieved by the provision of a reciprocable member for actuating a plurality of oscillatory sweeping or cleaning elements in the manure collecting channel, so that the material accumulated in the channel is propelled by the cleaning or sweeping elements to a suitable outlet opening.

An important feature of the invention resides in the particular structural arrangement of the cleaning or sweeping elements and of the actuating member therefor, while another feature of the invention resides in the provision of power driven means for reciprocating said member.

Some of the advantages of the invention lie in its simplicity of construction, in its adaptability to economical manufacture, and in its adaptability to installation in barns of different sizes and types.

With the above more important objects and features in view, and such other objects and features as may become apparent as this specification proceeds, the invention consists essentially of the arrangement and construction of parts as illustrated in the accompanying drawings, in which:

Figure 1 is a top plan view of the invention installed in a barn;

Figure 2 is a top plan view thereof but with the cover of the actuating mechanism removed so as to reveal its construction;

Figure 3 is a cross-sectional view, taken substantially in the plane of the line 3—3 in Figure 2;

Figure 4 is a cross-sectional view, taken substantially in the plane of the line 4—4 in Figure 2;

Figure 5 is a fragmentary cross-sectional detail, taken substantially in the plane of the line 5—5 in Figure 2;

Figure 6 is a cross-sectional view, taken substantially in the plane of the line 6—6 in Figure 4;

Figure 7 is a fragmentary cross-sectional view showing a modified drive mechanism such as may be used in the invention, and

Figure 8 is a cross-sectional view, taken substantially in the plane of the line 8—8 of Figure 7.

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Like characters of reference are used to designate like parts in the specification and throughout the several views.

Referring now to the accompanying drawings, more particularly to Figures 1—6 thereof, the invention consists of a barn cleaning apparatus designated generally by the reference character 10, the same being intended for use in a barn having a floor 12 provided with a manure collecting channel 14 extending horizontally past the stalls 16 and terminating at one end thereof in an outlet opening located, for example, at 18, in Figure 1.

The apparatus 10 embodies in its construction a reciprocable, preferably channel-shaped member 20 which is slidable longitudinally in the channel 14, the member 20 preferably being disposed at one side of the channel and being provided with a plurality of swingable sweeping or cleaning elements 22. These elements simply assume the form of plates which are horizontally disposed and are pivotally attached at one end thereof to the member 20 by suitable pins 24, the elements 22 being engageable at one end edge thereof with the member 20 as is best shown in Figure 6, thus providing what may be referred to as a stop for supporting the elements in an operative position, substantially at right angles to the member 20.

However, the elements or plates 22 may be swung to a non-operative position which is more or less parallel to the member 20 as indicated at 26, and suitable stop screws 28 are provided on the plates 22, which stop screws, being engageable with the member 20, are used to adjust the extent of folding movement of the plates when the latter are swung to their non-operative position, as will be hereinafter more fully described.

As has been already stated, the member 20, together with the plates 22 is reciprocable in the channel 14, and it will be understood that when the member 20 is slid in the direction of the arrow 18 toward the outlet opening, the plates or elements 22, being disposed substantially at right angles to the member 20 and transversely of the channel 14, will sweep, so to speak, the bottom of the channel 14, thus propelling the manure and other waste therein toward the outlet opening. However, when the member 20 is slid in an opposite direction, that is, in the direction of the arrow 30 in Figure 1, the plates 22 will automatically assume a folded, inoperative position indicated at 26, so that the manure will remain substantially undisturbed until the member 20 is again slid in the direction of the outlet open-

ing as indicated at 18. In this manner, intermittent, unidirectional propelling movement will be imparted to the manure by the plates 22, so that the manure will be ultimately discharged through the outlet opening of the collecting channel 14.

The adjustment facilitated by the stop screws 28 prevents the plates 22 from assuming a true, parallel position relative to the member 20 when the plates 22 are folded, so as to assure that the plates 22 are automatically returned to their operative position at right angles to the member 20 when the latter is moved in the direction of the arrow 18.

The mechanism for reciprocating the member 20 is disposed in a suitable housing 32 provided in the floor 12 at one side of the channel 14, the housing 32 preferably being equipped with a removable cover plate 34 so that access to the interior of the housing may be had. The cover plate 34 is preferably flush with the surface of the floor 12 and if desired, the housing 32 may contain a quantity of oil to lubricate the mechanism therein.

The mechanism in the housing 32 assumes the form of a carriage 36 which is slidable in a pair of guides 38, 40 secured to the bottom of the housing and to the cover 34, respectively, the carriage 36 simply assuming the form of a vertically disposed plate provided with a substantially vertical slot or opening 42. It is to be noted that the guides 38, 40 are substantially parallel to the channel 14, and the carriage 36 is also provided with a lateral extension 44 which projects outwardly through a longitudinally extending slot 46 provided in one side of the housing 32 and is downwardly angulated as at 48 so that it may be secured to the aforementioned member 20 by means of a screw 50. As a result, reciprocating movement of the carriage 36 in the guides 38, 40 will be accompanied by a corresponding, reciprocating movement of the member 20 in the channel 14, as will be clearly understood.

A pair of trunnions 52 are secured in opposing relation to the sides of the housing 32 adjacent one end of the guides 38, 40, these trunnions carrying a pair of rotatable sprockets 54.

An additional pair of trunnions 56 are slidably mounted in suitable guides 58 provided in the housing 32 at the relatively opposite end of the guides 38, 40, the trunnions 56 accommodating a pair of rotatable sprockets 60, as is best shown in Figure 5. Endless chains 62 pass around the sprockets 54, 60, two of these chains being employed and each being disposed at one side of the guides 38, 40, and means are provided for adjusting the distance between the sprockets 54, 60 so that the chains 62 may be maintained in a taut condition. These means simply assume the form of a pair of sector plates 64 which are pivoted as at 66 to suitable brackets 68 provided in the housing 32, the sector plates 64 being operatively connected by suitable links 70 to the trunnions 56 whereby the trunnions, together with the sprockets 60 may be slid longitudinally in the guides 58 so as to increase or decrease the distance of the sprockets 60 relative to the sprockets 54.

A pair of adjusting screws 72, having their heads disposed above the cover plate 34 of the housing 32, operatively engage screw-threaded bosses 74 pivoted to the sector plates 64, so that by simply adjusting the screws 72 the chains 62 may be loosened or tightened as desired.

A pin or shaft 76 extends transversely between the chains 62 and is secured at the ends thereof

to the chains, the pin or shaft 76 carrying on an intermediate portion thereof a rotatable roller 78 which is vertically slidable in the aforementioned slot 42 of the carriage 36. Accordingly, when rotation is imparted to the sprockets 54, 60 and the chains 62 are motivated, the pin or shaft 76 will impart a reciprocating motion to the carriage 36 and to the aforementioned member 20 and the vertical movement of the pin 76, that is, from the bottom run to the top run of the chains 62 (and vice versa) will be simply absorbed in the slot 42 so that only horizontal reciprocating movement is imparted to the carriage and to the member 20.

The sprockets 54 are driven through the medium of suitable gears 80 which are rotatable on the trunnions 52 with the sprockets 54, the gears 80 meshing with pinions 82 secured to a shaft 84 which extends transversely of the housing 32 and carries a bevel gear 86 meshing with a bevel pinion 88. This pinion is, in turn, operatively connected by means of a gear drive 90 to the armature shaft of an electric motor 92 which is preferably disposed in a suitable enclosure 94 on the cover plate 34 of the housing 32.

A modified embodiment of the drive mechanism is illustrated in the accompanying Figures 7 and 8, this being intended to be operated by a remotely disposed power unit, such as for example, an internal combustion engine, the crankshaft of which is illustrated at 100.

This crankshaft carries a disk 102 to which is eccentrically connected as at 104 a flexible drive cable 106 which may be passed over suitable guide pulleys 108 and connected to an actuating rod 110 which projects outwardly through the cover plate 34 of the housing 32.

It will be apparent from the foregoing that rotary motion of the crankshaft 100 will result in a reciprocating movement of the rod 110, the latter being pivoted to a lever 112 which also carries a pawl 114.

The pawl 114 operatively engages a ratchet 116 secured to a shaft 118 which is rotatable in the housing 32 and also carries a sprocket 120, the latter being operatively connected by means of a chain drive 122 to a further sprocket 124 provided on each of the trunnions 52. In other words, the chain drives 122 are duplicated, two sprockets 120 being secured to the shaft 118, two chains 122 being employed and two sprockets 124 being utilized, each with one of the trunnions 52, as is best shown in Figure 8.

As will be readily understood, movement of the cable 106 in the direction of the arrow 126 will rotate the ratchet 116 and the sprockets 124 in the direction of the arrow 128. Conversely, a tension spring 130 which extends between the arm or link 112 and the bottom of the housing 32 will automatically return the link 112 to its starting position in readiness for the next actuation by the cable 106.

Finally, it may be explained that a socket 132 may be provided at one end of the housing 32 and arranged to rotate with the pinion 88, the socket 132 being available as a "power take-off" for actuating various machinery around the barn, such as for example, a conveyor (not shown) for delivering manure discharged from the channel 14 to a litter carrier or a manure spreader.

It is believed that the advantages and use of the invention will be clearly apparent from the foregoing disclosure and accordingly, further description thereof at this point is deemed unnecessary.

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While in the foregoing there has been shown and described the preferred embodiment of this invention it is to be understood that minor changes in the details of construction and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

Having described the invention, what is claimed as new is:

In a mechanism for converting rotary to 10 reciprocating motion, the combination of a horizontally elongated housing provided with a longitudinally extending recess, a pair of coaxially spaced transverse shafts rotatably mounted in each end portion of said housing, a pair of spaced 15 sprockets secured to the respective shafts in each pair, a set of endless chains extending between the pairs of shafts and engaging said sprockets, a pair of vertically spaced guides provided in said housing between the pairs of sprockets, a rotary 20 motor operatively connected to one pair of said shafts, a reciprocable carriage comprising a vertical plate having upper and lower edge portions thereof slidable in said guides and provided with a vertical slot, a transverse pin extending be- 25 tween and secured to said chains, said pin pass-

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ing through and being vertically movable in said slot, an antifriction roller rotatable on said pin and engaging edges of the slot, and a driven member provided rigidly on said carriage and projecting outwardly from said housing through said recess for connection to an element which is to be reciprocated.

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mark

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Witnesses to mark:

E. H. MILLER,

A. J. MILLER.

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