May 10, 1932. F. JOHNSON ET AL 1,857,550

LITTER REMOVER

Filed Aug. 24, 1929 3 Sheets-Sheet 1

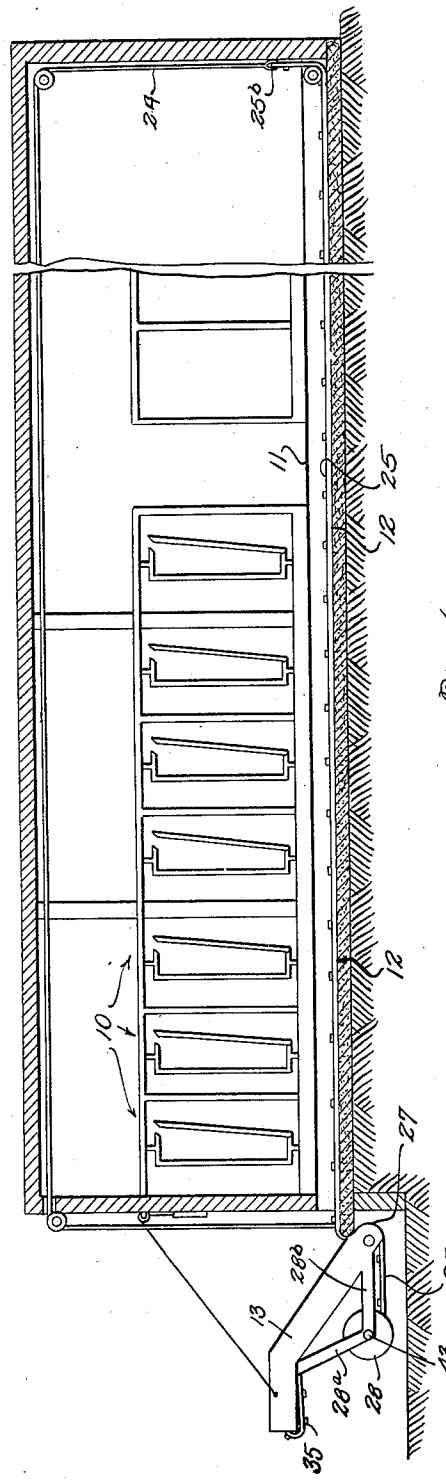

Fig. 1.

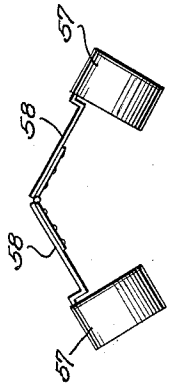

Fig. 7.

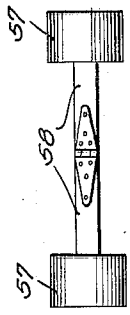

Fig. 8.

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LITTER REMOVER

Filed Aug. 24, 1929 3 Sheets-Sheet 2

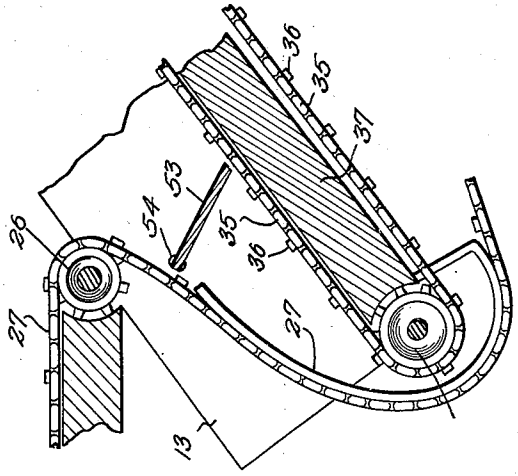

Fig. 3.

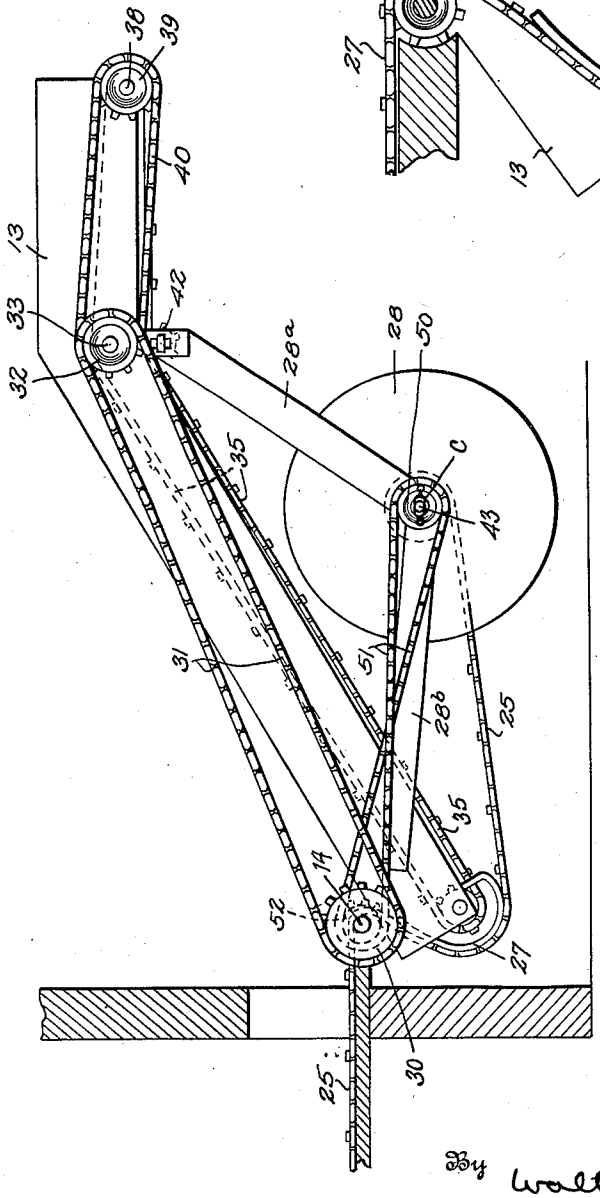

Fig. 2.

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LITTER REMOVER

Filed Aug. 24, 1929 3 Sheets-Sheet 3

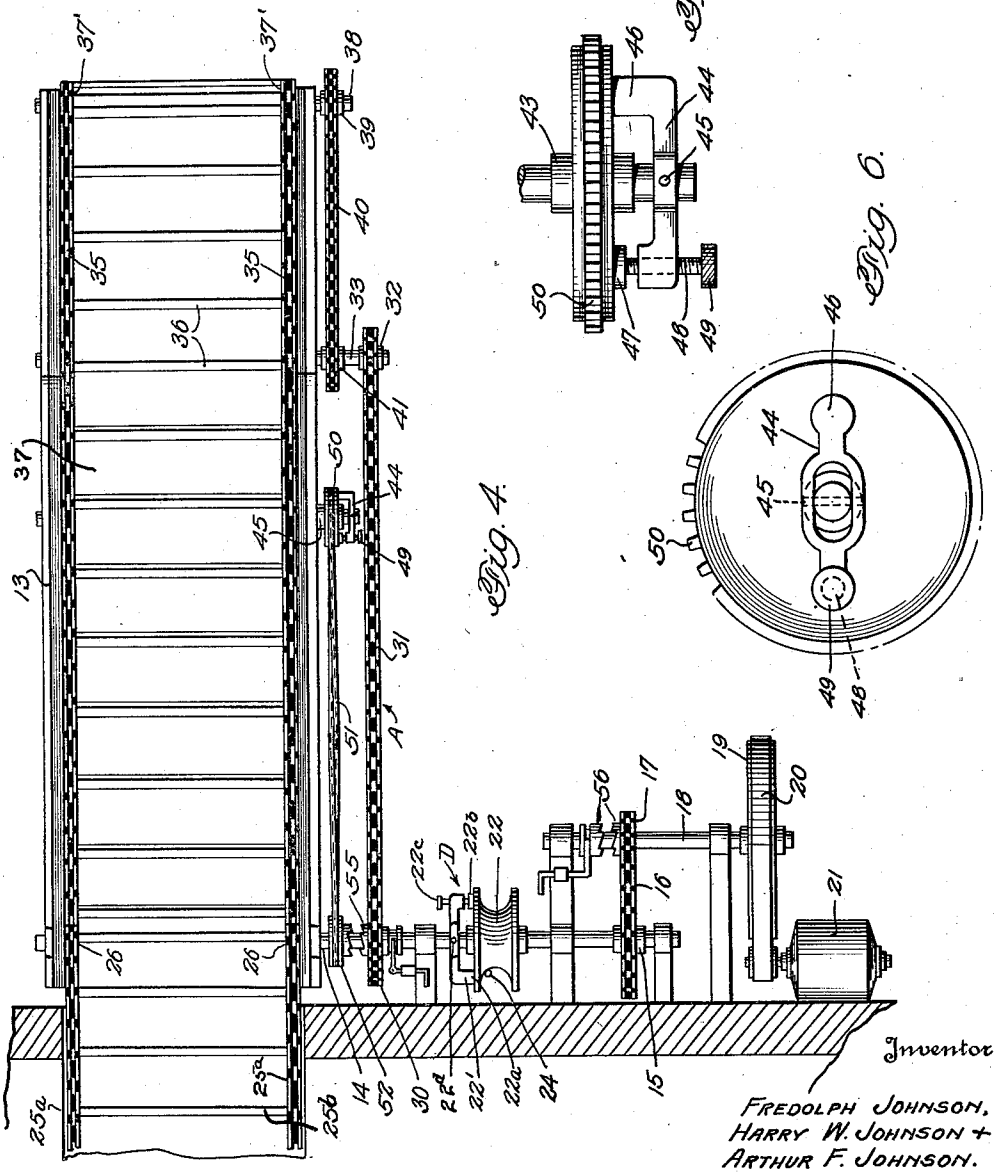

Fig. 4.

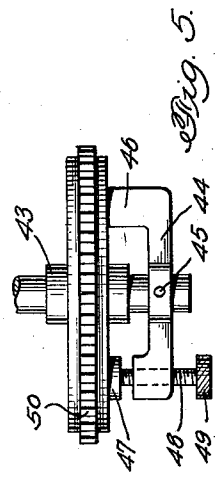

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE

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LITTER REMOVER

Application filed August 24, 1929. Serial No. 388,173.

This invention relates to stable litter cleaning devices and particularly to those devices wherein a conveyor member is mechanically operated in a trough at the rear of cattle stalls.

In the construction of litter cleaning devices, it has been found to be desirable to have such a construction that will permit of installation with very few changes in the construction of the barn.

As the space around a barn is always utilized to a full advantage, it has been found to be advantageous to have those parts outside of the barn walls, so constructed that they will occupy a minimum space.

The primary object of this invention is the provision of an improved litter cleaner for stables.

Another object of the invention is to provide an improved means for driving the conveyor.

Still another object of the invention is to provide an improved means of taking up the conveyor after it has delivered its material to the elevator.

A still further object of the invention is to provide an improved means for guiding the material from the conveyor onto the elevator.

A still further object of the invention is to provide an improved combination of elements wherein a drag conveyor is operated in combination with an elevator which may be swung into a vertical position.

Other and further objects of the invention will be apparent to those skilled in the art from a reading of the complete specification and claims.

Referring to the drawings wherein an embodiment of the invention is illustrated:—

Figure 1 is a detail cross-section of a barn showing my invention installed therein, certain of the details of the invention being omitted.

Figure 2 is a side view of my invention showing the working parts enlarged.

Figure 3 is an enlarged detail view showing the guide for the cleaning conveyor with the conveyor in contact therewith.

Figure 4 is a plan view of the invention.

Figures 5, 6, 7 and 8 are views of some of the details of construction.

The numeral 10 designates the spaces for the cattle stalls, 11 the floor line and 12 the bottom of the litter gutter in which the conveyor of our invention is installed.

In this invention, particular attention has been paid to the ease of installation in a barn already constructed.

In the drawings it will be noted that a conveyor frame 13 is pivoted about its axes on the shaft 14. This shaft 14 is driven through a sprocket 15 thereon, which sprocket is driven by a chain 16. The chain 16 is driven by a sprocket 17 mounted on a shaft 18 which is suitably driven by a pulley 19 from a belt connection 20 to the motor 21.

A pulley 22 is freely rotatable on the shaft 14. A clutch member 22′ is pivotally secured on the shaft 14 to revolve therewith and has bearing pads 22^a, 22^b which engage the side surface of the pulley. The thumb screw 22^c is provided and is threaded in the clutch member 22′ and carries the pad 22^b. When the threaded member 22^c is turned to push the pad 22^b inwardly, the clutch member 22′ being pivoted to the shaft 14 by a pin 22^a, perpendicular to its axis, the two pads 22^a, 22^b will be caused to exert an equal pressure on the surface of the pulley 22.

This pulley carries one end of a cable 24 which by suitable pulleys extends overhead to the far end of the gutter 12 and passes over suitable pulleys and is connected to the far end of the cleaning conveyor 25.

The cleaning conveyor comprises two chains 25^a and flights 25^b which connect the chains together. This chain 25 at the end opposite to that connected to the cable 24, passes over two sprocket wheels 26 which are keyed to the shaft 14.

After passing over the sprockets 26, the conveyor 25 passes over guides 27 which are secured to the elevator frame 13. These guides are curved in such a way as to receive the conveyor 25 without shock and lead the same around the lower end of the elevator to lead the conveyor to a take-up drum 28.

The take-up drum 28 is supported from the

elevator frame 13 by means of hangers 28[a], 28[b].

Mounted on the shaft 14 is a sprocket wheel 30. This sprocket wheel drives a chain 31 which in turn drives a sprocket wheel 32, mounted on the shaft 33. The elevator chains 35 have connecting flights 36 which move over the floor 37 of the elevator and carry the material to the upper portion thereof. The upper outer portion of the elevator 35 extends at an angle to the main portion, this angle being such as to be substantially level when the elevator is in position to discharge upon the manure spreader or wagon used to carry off the litter.

The chains 35 engage at the outer end of the elevator, the sprockets 37′ which are secured to the shaft 38, the shaft 38 is driven by the sprocket 39, which in turn, is driven by the chain 40 which is connected to a sprocket 41 on the shaft 33 already described.

Mounted as idlers below the shaft 33, are the sprockets 42. These sprockets 42 carry the lower reach of the elevated chains 35.

The take-up drum 28 is supported freely on the shaft 43. To this shaft 43 is secured a pivoted clutch member 44 as at 45. This clutch member 44 is so mounted on its pivot 45 that it may swing in a plane, passing through the axis of the shaft 43 and which is perpendicular to the axis 45. A clutch member 44 is in the shape of a double arm carrying a pad 46 and a pad 47. The pad 47 is mounted on a screw threaded shank 48 which is screw threaded in the end of the clutch arm 44 and is operated by the knurled knob 49. By the operation of the knob 49 to screw in or withdraw the pad 47, the pressure of the pad 47 and the pad 46 against the face of the sprocket wheel 50 may be absolutely controlled. The amount of pressure between the sprocket wheel 50 and the pads 46 and 47 will determine the amount of torque which will be necessary to apply to the shaft 43 without causing the pads 46 and 47 to slip. The sprocket wheel 50 is mounted to freely rotate upon the shaft 43 when the clutch pads 46 and 47 are not in engagement with its side wall. Rotary motion is therefore transmitted from the shaft 43 to the sprocket wheel 50 by means of the pads 46 and 47. The sprocket 50 is connected by a crossed chain 51 to a sprocket 52 which is mounted for rotation with the shaft 14.

We will now describe the operation: Assuming that the parts are in such a position that the litter carrying conveyor 25 extends the whole length of the gutter 12. The motor 21 is started. Motion is transmitted through the belt 20, the pulley 19, the shaft 18, the sprocket 17, the sprocket chains 16, the sprocket 15 and the shaft 14. The clutch 22′ is set so that it will not operate. This is brought about by unscrewing the screw 22[c] which carries the pad 22[b].

The turning of this shaft 14 turns the sprockets 26 in a close-wise direction as viewed in Figure 3. At the same time, the chain 51 is operated from the sprocket 52 which in turn operates the sprocket 50 mounted on the shaft 43. The clutch member 44 which has been described is turned by the sprocket 50.

This turning of the shaft 43 turns the drum 28 and takes up any slack in the conveyor 25 after the same has left the guide 27.

The turning of the sprockets 26 causes the conveyor chain 25 to be pulled through the gutter, carrying the litter therewith. This litter is dumped over the end of the gutter 12 and onto a material guide 53 which is pivoted at 54 in the elevator frame 13, its lower end being free to move upwardly and forwardly but being prevented from a downward and rearward movement by the chains 35 of the elevator.

The operation of the sprocket 30, the chain 31, the sprocket 32, the shaft 33, the sprocket 41, the chain 40, the sprocket 39, the sprockets 37′, and the shaft 38 move the elevator chains on the upper surface of the floor 37 of the elevator. This moves the material received from the conveyor to a point at the outer end of the elevator where it is dropped onto a wagon or into the box of the manure spreader.

The movement of the elevator and the conveyor is simultaneous with the operation of the take-up drum until that point where the sprockets 26 reach the end of the chain 25. It is then clear that substantially the whole length of the conveyor chain 25 will have been guided over the guide 27 or to the take-up drum 28. After the chain is no longer available to be fed by the sprockets 26, the clutch member 44 with its pads 46 and 47 will have a slipping action against the sprocket 50 of the movement of the conveyor and its related parts will cease. The elevator, however, continues to operate until it has discharged all of the material which has been delivered thereto.

In order to connect and disconnect, at will, the movement of the shaft 14 from the shaft 43, we provide a clutch 55 which may be used to disconnect the sprocket 52 from the shaft 14. In this connection it will be understood that the sprocket 52 is freely movable on the shafts 14 in a rotary direction and the sprocket 30 is slidably keyed to the shaft 14 in order that the shaft 43 may be disconnected, while the elevator is still continued in operation after the end of movement of the conveyor in its cleaning operation.

We have also provided a clutch 56 for disconnection of the sprocket 17 from the shaft 18 in order that the engine or motor 21 may be started without continuous operation of the shaft 14.

Having cleaned the gutter it is now neces-

sary to return the parts to their normal position in order to leave the parts in proper position for the next cleaning.

In this connection we have provided two curved sheet metal plates 57 which are connected together with hinged arms 58. These curved plates or covers are slipped over the gears 26 so that when the chains 25 are pulled back, the chains may slide over the surface of the curved plates without coming into contact with the sprockets 26.

With the cable 24 on the drum 22, the handle 22^c is operated to tighten the clutch member 22′ to drive the drum 22.

After the clutch 55 has been disconnected and the clutch 56 has been connected, the cable 24 will be wound upon the drum 22 from which it was unwound as the conveyor 25 permitted its operative function. This taking up on the cable 24 causes the conveyor 25 to return to its original position. The hinge members 58 are now grasped by the hand and the curved plates 57 are moved from the sprockets 26. The chain will now drop down on the sprockets 26 and be ready for another operation.

While the drawings and specification show and describe the invention in detail, it is to be understood that it is not intended to limit the invention to the details set forth and that modifications and changes may be made without departing from the spirit of the invention and within the scope of the appended claims.

Having described our invention what we claim and desire to secure by Letters Patent is:—

1. A litter cleaning device comprising a litter conveyor, an elevator frame adjacent the delivery end of the conveyor and having its lower end at a lower level than the delivery end of the conveyor, a take-up drum for receiving the conveyor and supported by the elevator frame and a guide for the conveyor for guiding the conveyor from its delivery end to the take-up drum.

2. A litter cleaning device comprising a litter conveyor, a pivoted elevator frame adjacent the delivery end of the conveyor and having its lower end at a lower level than the delivery end of the conveyor, a take-up drum for receiving the conveyor and supported by the elevator frame, a drive-shaft for the conveyor, located at and supporting and driving its delivery end, and a pivot for the elevator, located substantially about the axis of the conveyor drive shaft.

3. A litter cleaning device comprising a litter conveyor, a take-up drum for the conveyor, a shaft at and supporting the delivery end of the conveyor for positively driving the conveyor during operation, an elevator pivoted to swing about the axis of the shaft and carrying the take-up drum, rotary gripping means on the shaft for exerting a pulling action on the conveyor during its operation and a guide for receiving the conveyor from the gripping means, regardless of the pivoted position of the elevator.

4. A litter cleaning device comprising a litter conveyor, a positively driven shaft at and supporting the delivery end of the conveyor to positively drive the same during operation, and an elevator frame having its lower end adjacent the delivery end of the conveyor, a take-up drum to receive the conveyor after it has reached its delivery end, the take-up drum being supported on the elevator frame.

5. A litter cleaning device comprising a litter conveyor, a positively driven shaft at and supporting the delivery end of the conveyor to positively drive the same during operation, an elevator frame having its lower end adjacent the delivery end of the conveyor, a take-up drum to receive the conveyor after it has reached its delivery end, the take-up drum being supported on the elevator frame and a yielding drive means between the shaft and the take-up drum.

6. A litter cleaning device comprising a litter conveyor connected at one end to a take-up drum and at its other end to a pull-back cable, the pull-back cable being connected to a winding drum, the winding drum and take-up drums having yielding driving means, a swinging elevator frame, an elevator means on the frame to receive material from the conveyor, the take-up drum being carried by the elevator frame.

7. A litter cleaning device comprising a litter conveyor, a power shaft supporting and positively driving the delivery end of the conveyor, a pivoted frame, an elevator thereon and having its receiving end beneath the delivery end of the conveyor, a take-up drum carried by the elevator frame to receive the conveyor at a point beyond its delivery end, a conveyor guide on the elevator frame, a material guide pivoted on the elevator frame adjacent the delivery end of the conveyor and having its free end on the elevator.

In testimony whereof, we hereunto affix our signatures.

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HARRY W. JOHNSON.
ARTHUR F. JOHNSON.