Nov. 24, 1953 H. J. RADDATZ ET AL 2,660,263

DRIVING MECHANISM FOR MATERIAL CONVEYERS

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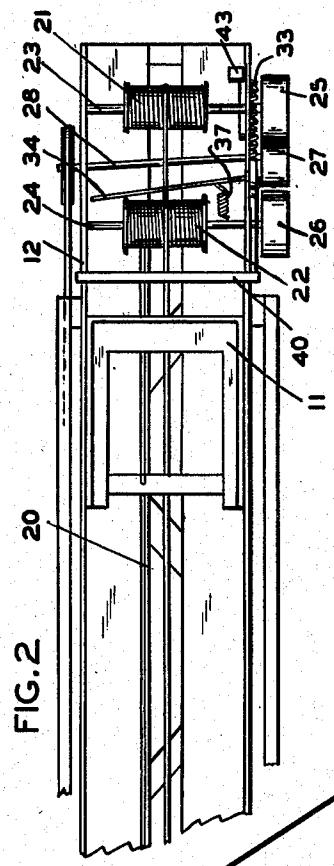


FIG. 2

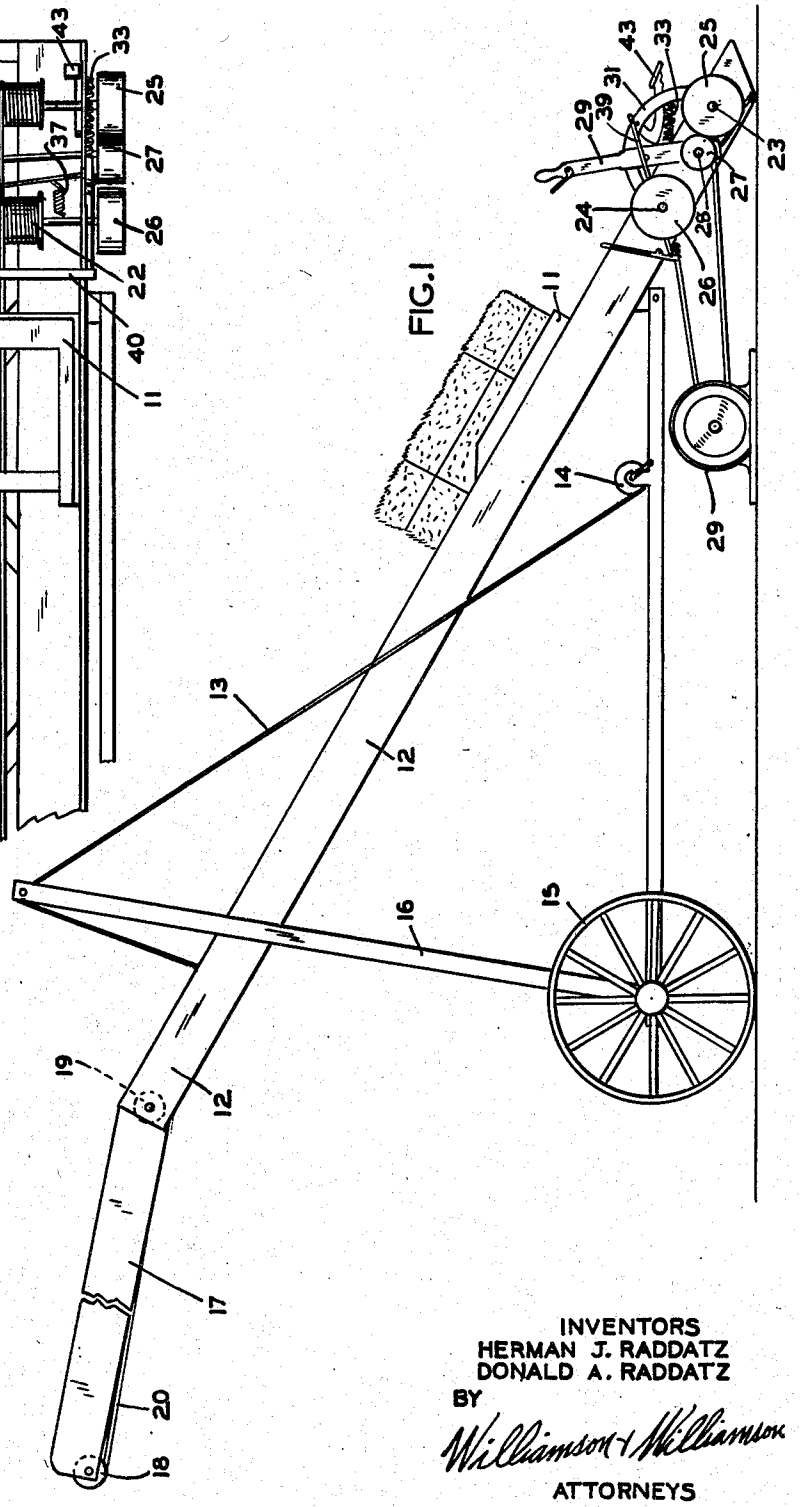


FIG. 1

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FIG. 10

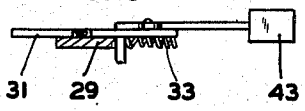


FIG. 6

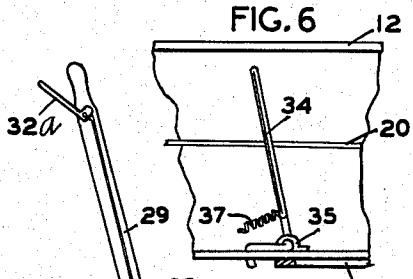


FIG. 3

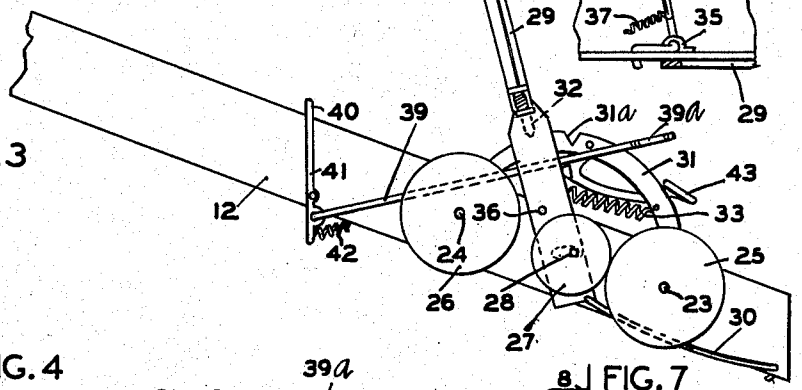
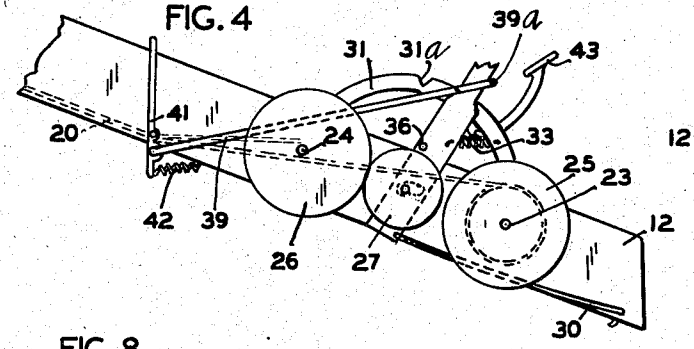


FIG. 4



8 FIG. 7

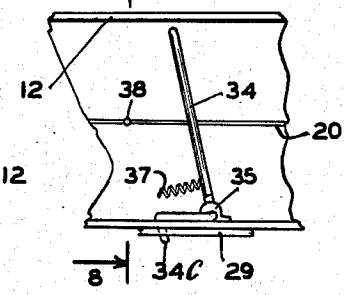


FIG. 8

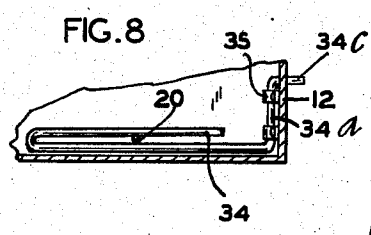
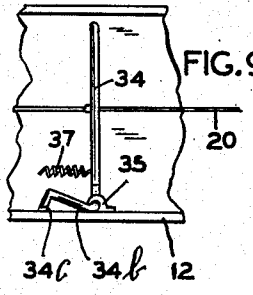


FIG. 9



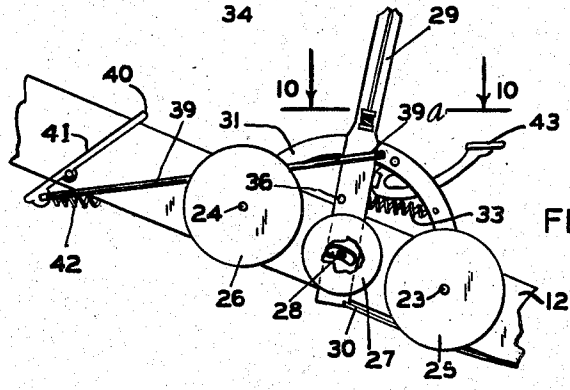


FIG. 5

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DRIVING MECHANISM FOR MATERIAL CONVEYERS

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6 Claims. (Cl. 187—10)

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This invention relates to a driving mechanism particularly adapted for use with a material elevator.

It is an object of our invention to provide a driving mechanism including a clutch mechanism and adapted to be connected to a source of constantly driven rotary power, and particularly adapted for use with a material elevator provided with a carriage member to initially raise the carriage a predetermined distance and thereafter automatically lower the carriage to normal position, and including mechanism for disengaging the clutch when the carriage reaches its normal loading position.

More specifically, it is an object to provide a driving mechanism particularly adapted for use with material elevators and having a pair of winding drums with the end portions of a carriage elevating line respectively wound thereon to selectively shift said line in both directions, said mechanism having a constantly driven member adapted to be shifted by automatically actuated mechanism from driving engagement with one winding drum to driving engagement with the other winding drum and thereafter shifted to neutral position, depending upon the position of the material carriage mechanism.

Still more specifically, it is an object to provide a pair of spaced substantially parallel winding drums with the end portions of a carriage elevating line respectively connected therewith for winding thereon, one run of said line being connected with a carriage member and an intermediate portion of said line being provided with an enlarged area to actuate a trip mechanism to automatically reverse the direction of movement of said line and thereby reverse the direction of movement of said carriage, said mechanism being provided with a second trip mechanism, said driving mechanism being responsive for actuation to engagement by the carriage member when in normal loading position to shift said driving mechanism into neutral position.

These and other objects and advantages of our invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views and in which;

Fig. 1 is a side elevational view showing my driving mechanism in elevating driving position as assembled in a bale elevator;

Fig. 2 is a top plan view of the driving mechanism shown in Fig. 1;

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Fig. 3 is a side elevational view showing the driven member in elevating driving position;

Fig. 4 is a side elevational view showing the driven member in carriage return position;

Fig. 5 is an elevational view showing the driving member in neutral position;

Fig. 6 is a top plan view of the latch mechanism for holding the operating lever and driving member in elevating position;

Fig. 7 shows the latch mechanism illustrated in Fig. 6 in bale elevating position;

Fig. 8 is a transverse vertical sectional view taken substantially along the line 8—8 of Fig. 7;

Fig. 9 shows the latch mechanism in released position to permit the operating lever and driving member to shift into reverse or neutral position; and

Fig. 10 is a fragmentary top plan view of the foot pedal actuating lever and its relation to the operating lever of the driving mechanism.

As illustrated in the accompanying drawings and best shown in Fig. 1, I provide a driving mechanism for a material elevator, such as the bale elevator illustrated. The bale elevator shown has an adjustable inclined chute 12 supported by the line or cable 13 having one end fixed to the upper portion of the chute and the other end wound on the hand operated winding drum 14 to permit adjustment of the elevation of the chute. A pair of wheels 15 support the upstanding A-frame 16 and permit easy shifting movement of the elevator. The upper portion of the chute 12 has a pivoted chute extension 17 pivotally mounted thereon, and a line-guiding sheave 18 is journaled at the outer free end of said pivoted chute extension and a double line-guiding sheave 19 is journaled on the pivotal axis of said chute. A carriage shifting line 20 is trained about sheaves 18 and 19, with the two runs thereof extending down the chute 12 and around a pair of spaced winding drums 21 and 22 respectively mounted at the bottom of said chute 12 and disposed in spaced substantially parallel relation to each other.

The winding drums 21 and 22 are respectively fixed to rotary shafts 23 and 24, which are journaled in the lower portion of said chute 12. A pair of spaced driven wheels 25 and 26 are respectively fixed to outwardly extending portions of the shafts 23 and 24 in opposed relation one to the other and a shiftable driving wheel 27 is interposed therebetween. The driving wheel 27 is of such a diameter that when it is in driving engagement with one driven wheel, it will be out of driving engagement with the other driven

wheel, and it may also be positioned between said driven wheels 25 and 26 in neutral relation out of driving engagement with both driven wheels. The driving wheel 27 is fixed to a rotary driving shaft 28, which is journaled in a conventional self-aligning bearing mounted in the far side of chute 12. Any conventional source of rotary power such as the motor 29 is connected with the shaft 28 as by the belt and pulley driving connection best shown in Fig. 1. A carriage 11 is slidably mounted in chute 12 and is fixed to the run of line 20, which is connected to winding drum 22.

The other end of shaft 28 is journaled in the lower portion of a lever 29 in slightly spaced relation above the lower extremity thereof. The lever 29 is pivoted for swinging movement on a pivot point disposed in spaced relation below shaft 28 to permit said shaft 28 to be shifted when the lever 29 is swung on said pivot point. In the form illustrated, the pivot is provided with a rod 30 pivotally connected at one end to the lower extremity of lever 29 and connected at the other end to the side of the chute 12. By using a rod 30 pivoted at both ends, the pivot point of the lever 29 is permitted to shift when said lever is shifted. An elongated guiding slot is provided in the side of chute 12 to produce positive axis positioning means for drive shaft 28 and driving wheel 27 and this combines with the pivot rod 30 to provide a double fulcrum action.

An arcuate segment 31 is fixed to the side of the chute 12 nearest the lever 29 and has a dog-receiving notch 31*a* formed therein. A cooperating spring pressed dog 32 is mounted on lever 29 and is adapted to be releasably received in the notch 31*a*. A releasing handle 32*a* is provided to remove the dog from the notch. Obviously the driving mechanism could be operated in the conventional manner of holding the lever 29 in driving position to engage the driving wheel 27 against one of the driven wheels 25 or 26, and this could obviously be done by spring pressure or manually applied pressure. A spring 33 is provided to normally urge said driving wheel 27 into engagement with return driven wheel 26. The driven wheel 26, in the arrangement shown in the accompanying drawings, rotates drum 22, the run of line 20 extending therefrom being connected directly to the carriage to return the same to the bottom of the chute. Thus, in the form shown, a latch mechanism must be provided for positively holding the lever in elevating, driving position to hold driving wheel 27 in engagement with elevating driven wheel 25, which is connected to drum 21 and serves to elevate the carriage.

This latch mechanism is illustrated in Figs. 6, 7 and 8, and consists in a transversely disposed bar 34 having an elongated line-receiving slot formed therethrough. The bar 34 has a substantially vertically disposed shaft element 34*a* fixed thereto at the inner end thereof, as best shown in Fig. 8, and this upstanding shaft is journaled for oscillation on a substantially vertical axis in suitable strap elements 35 fixed to the upstanding side flange of chute 12. A crank arm 34*b* extends along the upstanding side of chute 12 and has a dog 34*c* formed at substantially right angles thereto and extending outwardly through said upstanding chute side and a substantial distance therebeyond to be received in a cooperating aperture 36 provided in the operating lever 29. A spring 37 is provided to normally urge said latch dog into extended position by permitting retraction thereof by downward shifting movement of the bar 34. This downward shifting movement is produced by an enlarged portion, such as a knot 38 in the run of the line 20 extending through the aperture in said bar to the winding drum 21. Thus when the carriage reaches a predetermined distance from the normal rest position thereof, the latch bar 34 will be tripped by the knot 38 and the lever 29 released to be shifted by the spring 33 into carriage return position, as shown in Fig. 4, with the driving wheel 27 in driving engagement with the driven wheel 26. The spring 33 has sufficient tension therein to carry the lever 29 and spring pressed dog 32 beyond the notch 31*a* while the lever is moving but not so much tension that it will remove, against the weight of bucket 11, the stationary dog 32 on lever 29 from the notch when positioned therein by link 39 with hook element 39*a*.

In order to shift the driving wheel 27 into neutral position in spaced relation to both wheels 25 and 26, a shifting mechanism having a link 39 connected therewith, said link being provided with a hook element 39*a* on the upper free end thereof for engagement with an intermediate portion of the lever 29 and the lower side thereof by permitting unrestricted shifting movement of the lever toward the upper end of the chute. A trip member in the form of an inverted U-shaped bar 40 is pivoted on an axis disposed transversely of chute 12 and has a downwardly extending arm 41 to which the link 39 is pivotally connected. A resilient spring 42 normally urges said U-shaped trip bar 40 into upwardly shifted position to shift the link 39 into downwardly projected position and permit the lever 29 to be swung into carriage return position, as shown in Fig. 4. When the carriage returns to the normal rest position and engages the U-shaped trip member 40 to shift the same into the position shown in Fig. 5 against the force of spring 42, the hook 39*a* engages the operating lever 29 and shifts the same forwardly only at a sufficient distance to engage the dog 32 in the notch 31*a* to positively hold said handle and driving wheel 27 in normal rest position. A pedal 43 may be provided to shift the lever 29 forwardly into carriage raising position, as shown in Fig. 3, after the dog 32 has been released from the slot 31*a* to again elevate the carriage 11.

It will be seen that we have provided a highly efficient driving mechanism particularly adapted for use with material elevators such as the bale elevator illustrated. This mechanism permits the constant operation of the driving source and positively holds the driving wheel in neutral position until it is desired to elevate the material carriage 11. At that time the lever 29 is shifted forwardly and held in driving position by the latch mechanism and dog 34*c*. Upon the carriage reaching a predetermined elevation, the latch mechanism 34 is released by engagement with the knot 38 on the line 20 to permit the spring 33 to shift the driving wheel 27 into engagement with driven wheel 26 to actuate the return winding drum. This mechanism is entirely automatically operated, as is the mechanism for shifting the wheel 27 into the neutral position, shown in Fig. 5. We have thus provided a driving mechanism which will automatically shift from carriage elevating to carriage lowering position, and when the carriage has been returned to its normal position, will

automatically shift into neutral position and be retained there until loaded.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of our invention.

What we claim is:

1. A driving mechanism particularly adapted for selectively driving a material carrier in both directions, said mechanism comprising a pair of spaced rotary driven members adapted to selectively drive the carrier in both directions, a shiftable rotary driving member interposed between said spaced driven members and adapted to be driven by a source of constantly driven rotary power, resilient means for urging said driving member into driving engagement with one of said driven members, a latch mechanism for positively holding said driving member in driving engagement with the other driven member, and releasable means responsive for releasing said latch mechanism to a predetermined length of travel of the conveyor in one direction, thus permitting said resilient means to shift said driving member to reverse the direction of travel of the carrier.

2. A driving mechanism particularly adapted for driving a carrier selectively in both directions, said mechanism comprising a pair of spaced rotary driven members adapted to drive the conveyor selectively in both directions, a shiftable rotary driving member interposed between said spaced driven members and adapted to be driven by a source of constantly driven rotary power, means for selectively engaging said driving member with said driven members, and means responsive to a predetermined positioning of the carrier to shift and hold said driving member in neutral position out of engagement with both of said driven members.

3. The structure set forth in claim 2 and said last mentioned means comprising a lever mechanism responsive for actuation to a predetermined positioning of said carrier and cooperatively associated with the means for shifting said driving member to positively hold said driving member in neutral position.

4. A driving mechanism particularly adapted for selectively driving a material carrier in both directions, said mechanism comprising a pair of spaced rotary driven members adapted to selectively drive the carrier in both directions, a shiftable rotary driving member interposed between said spaced driven members and adapted to be driven by a source of constantly driven rotary power, a lever mechanism for shifting said rotary driving member to selectively engage said driven members, resilient means for urging said lever into one position to engage said driving member with one of said driven members, a latch mechanism for positively holding said driving member in driving engagement with the other driven member, releasable means responsive to a predetermined positioning of said carrier to release said latch mechanism and reverse the direction of travel of the carrier, and a second lever mechanism responsive for actuation to a second predetermined positioning of said carrier to shift said driving member into neutral position.

5. A material conveyor comprising guiding means, a carrier mounted for sliding movement in said guiding means, a flexible line connected to said carrier and doubled back upon itself, a pair of winding drums respectively connected to the ends of said line and adapted to controllably move said line in both directions, a pair of spaced rotary driven members respectively fixed to said drums for turning the same, a shiftable rotary driving member interposed between said driven members and adapted to be driven by a source of constantly driven rotary power, lever means for shifting said rotary driving member, resilient means for urging said driving member into driving engagement with one of said driven members, a latch mechanism for positively locking said driving member in driving engagement with the other driven member and means for releasing said latch mechanism to reverse the direction of travel of said carrier and responsive for actuation to a predetermined positioning of said carrier and said line.

6. The structure set forth in claim 5, and a lever mechanism responsive for actuation to a second predetermined positioning of said carrier and said line to shift said driving member into neutral position out of engagement with both of said driven members.

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