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A. McMILLAN

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MECHANISM FOR ACTUATING CLUTCHES AND THE LIKE

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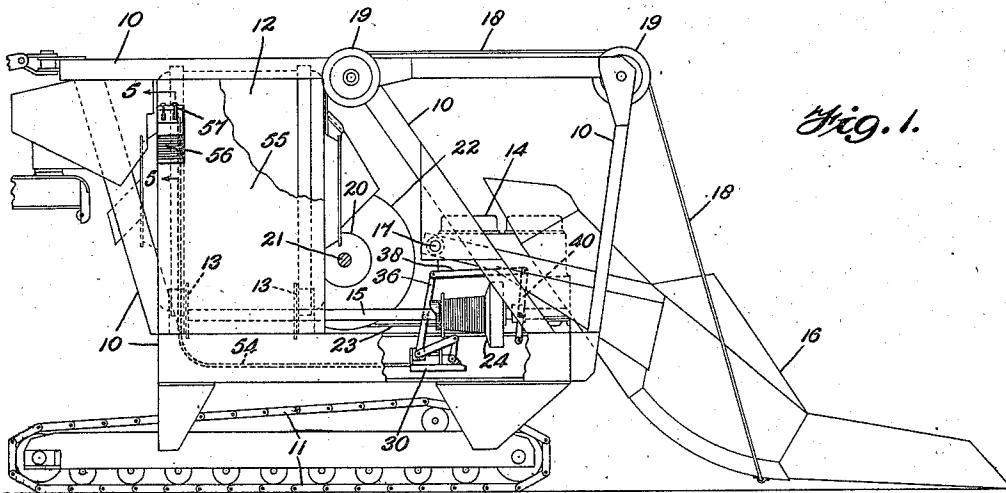


Fig. 1.

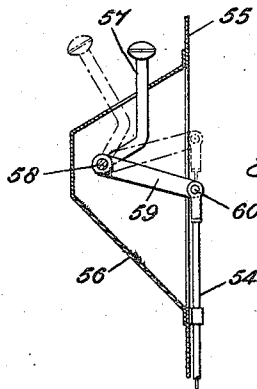


Fig. 5.

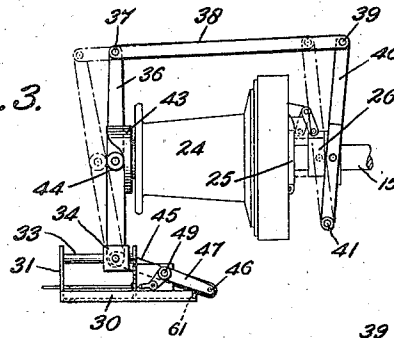


Fig. 3.

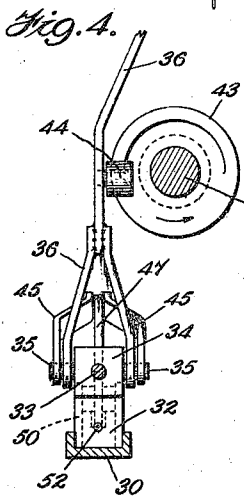


Fig. 4.

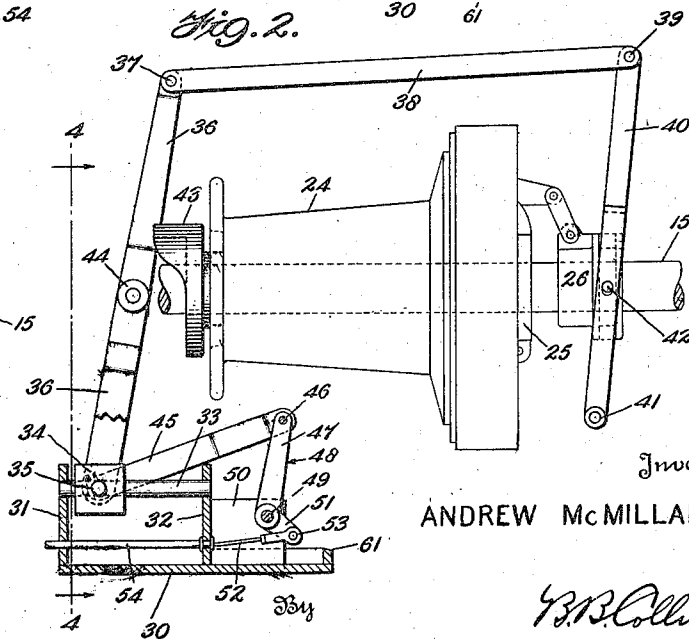


Fig. 2.

Inventor

ANDREW McMILLAN,

Y.B. Collins
Attorney

UNITED STATES PATENT OFFICE

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MECHANISM FOR ACTUATING CLUTCHES
AND THE LIKEAndrew McMillan, Milwaukee, Wis., assignor to
Chain Belt Company, Milwaukee, Wis., a corporation of Wisconsin

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3 Claims. (Cl. 192—93)

The invention relates to mechanism for actuating clutches and the like, and while it may find other applications, for purposes of disclosure it has been illustrated and will be described in the environment for which it has been primarily designed, viz., control of the "skip clutch" of a concrete mixing machine.

It is customary in such machines to elevate and lower the skip (by means of which batches of concrete making materials are charged into the mixing drum) by means of hoisting mechanism including cables and winding drums therefor, which drums are driven through appropriate mechanism from the mixer motor. Usually such motor drives a continuously rotating countershaft from which power may be taken at will through friction clutches to rotate the mixing drum and to drive various other instrumentalities of the machine, including the skip cable winding drum.

One of the objects of the present invention is to provide mechanism which, while under the manual control of the operator, will effect actual shifting of a clutch, such as that for the skip cable winding drum, by power supplied by the motor.

One form of the apparatus is disclosed in the accompanying drawing forming a part of this specification, in which like reference characters designate like parts in all the views, and in which:

Figure 1 is a more or less diagrammatic side elevational view of a portion of the elements of a concrete mixer of the paver type, with mechanism in accordance with the present invention applied thereto;

Fig. 2 is an enlarged side elevational view, partly broken away and in section, of the shifting mechanism and cable winding drum, the parts being shown in the positions they normally occupy, when the clutch is disengaged;

Fig. 3 is a similar view, on a smaller scale, illustrating two positions assumed by the parts in the course of performing their function of securing engagement of the clutch;

Fig. 4 is a sectional-elevational view, taken approximately on the plane indicated by the line 4—4 of Fig. 2, looking in the direction of the arrows; and

Fig. 5 is an enlarged sectional-elevational view, approximately on the plane indicated by the line 5—5 of Fig. 1, illustrating the manual control lever for the shifting mechanism, and its mounting and connections.

The concrete mixing machine shown in Fig. 1

comprises a framework 10, mounted for ground traverse upon crawler treads 11, and having a mixing drum 12 mounted within it for rotation upon rollers 13. A motor 14 is mounted upon the said framework 10 and, when operating, continuously rotates a countershaft 15 through a speed reducing drive, not shown. A skip 16, for charging materials into the drum 12, is pivotally mounted on the frame 10 at 17 and is adapted to be elevated to and lowered from drum-charging position by cables 18 passing over sheaves 19 and wound upon drums 20 carried by a transverse shaft 21. This shaft is adapted to be rotated by a bull wheel 22 upon which is wound a cable 23, which passes to and is also wound upon a winding drum 24, here shown as loosely mounted upon the countershaft 15 and adapted to be clutched thereto by a friction clutch 25 having a shifting collar 26 associated therewith.

The parts thus far referred to are all conventional in this type of machine, and are here more or less diagrammatically shown.

The mechanism for shifting the clutch 25 to couple the drum 24 to the shaft 15, whereby the skip 16 may be raised, comprises a supporting member or bracket 30, which may be suitably mounted on the machine frame 10 in juxtaposition to the said shaft, as illustrated in Fig. 1. The bracket member 30 includes a pair of spaced upstanding plates 31 and 32 which mount a horizontal rod 33 which serves as a support and guide for a block 34 which is slidably mounted thereon. This block is provided with a pair of trunnions 35 which constitute the fulcrum of an upwardly extending lever 36, which is connected at 37 to a link 38 which in turn is connected at 39 to a shifting yoke 40, pivoted as at 41 and engaging pins 42 carried by the clutch-shifting collar 26. A cam 43 is rigidly mounted on the shaft 15 adjacent the winding drum 24, and the lever 36 carries a follower roller 44 positioned for cooperation with the cam, as will appear more fully below.

The trunnions 35 of the block 34 also pivotally receive one end of a pair of links 45, the other ends of which are pivotally connected as at 46 to an arm 47 of a bell-crank lever 48, pivoted as at 49 between a pair of longitudinal ears 50 which may extend from the transverse plate 32. The other arm 51 of the bell-crank lever 48 has one end of a wire or cable 52 connected to it at 53, which wire or cable extends through a housing or sheath 54 upwardly to the operator's station, adjacent the forward end of the mixing

drum 12. The frame 10 frequently includes a protective panel 55 for shielding the drum and the wire or cable 52 may extend up behind this panel to a control box or housing 56 formed in or carried by the panel. In this housing a control lever 57 is mounted on a shaft 58 which also carries an arm 59 to which the upper end of the wire or cable 52 is connected as at 60.

The bracket 30 is provided with a stop member 61 so disposed as to be engaged by the arm 47 as it reaches the position shown in Fig. 3. In this position the pivot 46 has passed slightly below the dead-center line between pivots 35 and 49, and the said engagement between the arm 47 and stop 61 therefore serves to lock the block 34 in the Fig. 3 position whereby its trunnions 35 may serve as a fixed fulcrum for the lever 36. The roller 44 carried by the said lever may thus be retained in operative relation to the cam 43 without the necessity of the operator holding the control lever 57 in the broken line position of Fig. 5.

As above indicated, the normal position of the parts is that illustrated in Figs. 1 and 2. When it is desired to raise the skip 16, the operator merely moves the control lever 57 from the full line to the broken line position of Fig. 5 which, through arm 59, cable 52, bell-crank lever 48 and links 45, draws the block 34 along the guide rod 33 to the position illustrated in Fig. 3. During this movement the lever 36 pivots on the link connection 37 to assume the position illustrated in full lines in Fig. 3, and its roller 44 is moved into operative relation to the cam 43. The shaft 15 and cam 43 are continuously rotating at a relatively low speed, say 90 to 100 R. P. M., and as the high portion of the cam engages the roller, the latter together with the lever 36 will be forced to the broken line position of Fig. 3, which movement through link 38 and shifting yoke 40 will shift the clutch 25 to engaged position and couple the winding drum 24 to the shaft 15. The cable 23 will thus be wound upon the said drum, and unwound from the bull wheel 22, rotating the latter and with it the winding drums 20, winding the cables 18 thereon and elevating the skip. As is well known to those skilled in this art, mixing machines of this type are ordinarily provided with an automatic clutch knock-out (not here shown) actuated by the skip as it reaches its discharge station, and as the clutch is of a type which will remain engaged until such knock-out occurs, the operator may return the control lever 57 to its normal full line position as soon as the skip starts up. Such return will restore the block 34 to its Fig. 2 position, the lever 36 pivoting about the link connection 37 (in its broken line position of Fig. 3) and moving roller 44 out of operative relation to the cam 43. When the automatic clutch knock-out occurs, the parts will be fully restored to the Fig. 2 position, with roller 44 still out of operative relation to the cam.

While the control is manual, the actual shift-

ing of the clutch is performed mechanically by power derived from the motor 14, and since under present day paving practice it may be necessary to elevate the skip every 40 to 70 seconds, and since this is only a portion of the operator's duties, the present mechanism provides appreciable relief for him.

While one form of the invention has been illustrated and described, it will be obvious that those skilled in the art may vary the details of construction as well as the precise arrangement of parts without departing from the spirit of the invention, and therefore it is not wished to be limited to the above disclosure except as may be required by the claims.

What is claimed is:

1. In mechanism for actuating a clutch shifting element: a power-driven cam; a lever connected to said shifting element and provided with a follower for engagement with said cam; a bracket structure having a guide; a block slidably mounted on said guide, providing a shiftable fulcrum for said lever; a bell crank mounted on said bracket structure and connected to said block; and a manually operable control member connected to said bell crank for causing the latter to slide the block on the guide and move the lever and follower into operative relation to the cam whereby it may swing the lever on the fulcrum and actuate the clutch shifting element.

2. In mechanism for actuating a clutch shifting element; a power-driven cam; a lever connected to said shifting element and provided with a follower for engagement with said cam; a bracket structure having a guide; a block slidably mounted on said guide, providing a shiftable fulcrum for said lever; a bell crank mounted on said bracket structure; links connecting said block to one arm of said bell crank; a manually operable remotely located control member; and a cable connection between said control member and the other arm of said bell crank, whereby the latter may be caused to slide the fulcrum block and move the lever and follower into operative relation to the cam, where the latter may swing the lever on the fulcrum and actuate the clutch shifting element.

3. In mechanism for actuating a clutch shifting element, a power driven cam; a lever connected to said shifting element; a supporting member; means slidably mounted on said member providing a bodily shiftable fulcrum for said lever; a bell crank connected to said fulcrum means for shifting the latter upon said supporting member to move the lever into position to be engaged by the cam, whereby the latter may swing the lever upon the fulcrum and actuate the shifting element, a portion of the bell crank being engageable with the supporting member to provide a toggle lock for temporarily retaining the fulcrum in said shifted position; and manually operable means for actuating said bell crank.

ANDREW McMILLAN.