July 11, 1944. E. MOSS 2,353,487

CONCRETE BATCHING PLANT

Filed Aug. 19, 1943 2 Sheets-Sheet 1

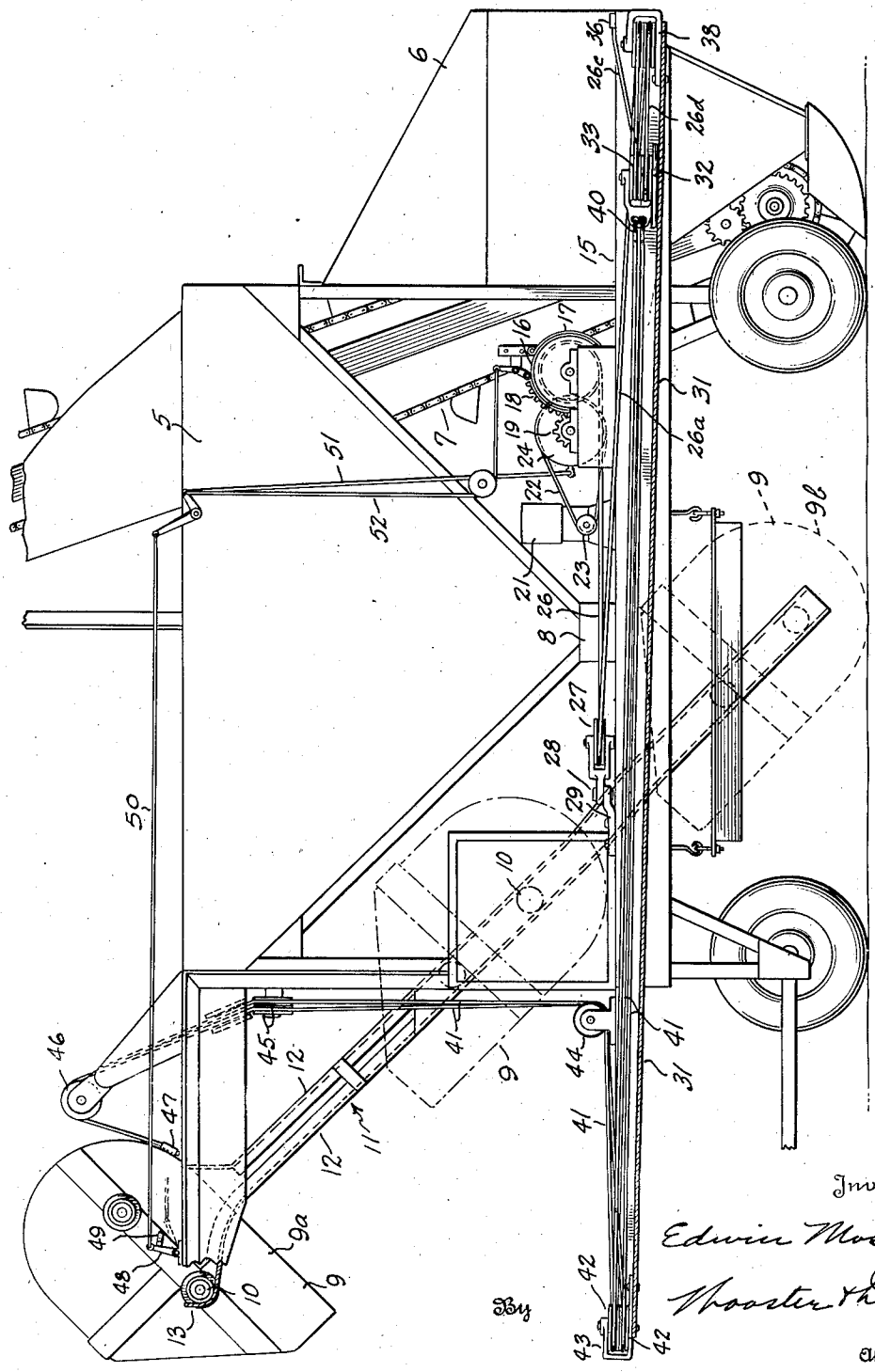


Fig. 1.

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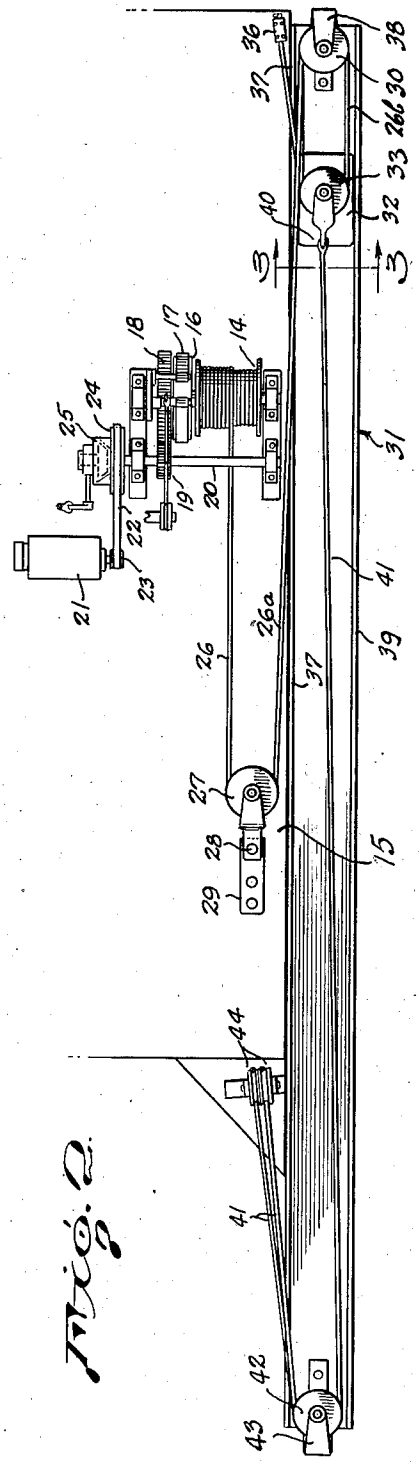


Fig. 2.

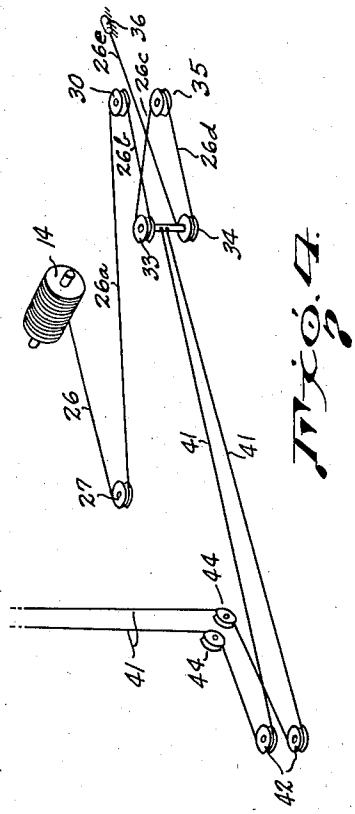


Fig. 4.

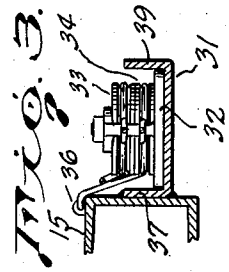


Fig. 3.

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Patented July 11, 1944

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UNITED STATES PATENT OFFICE

2,353,487

CONCRETE BATCHING PLANT

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Application August 19, 1943, Serial No. 499,245

7 Claims. (Cl. 214—103)

This invention relates to a concrete batching plant, particularly to an improved mechanism for shifting the batching bucket from a position under the supply hoppers containing the various ingredients to be mixed to a dumping position for discharging the materials into the mixing drum of a portable mixer, and has for an object to provide an improved and simplified construction for operating the bucket, which does not require hydraulic power means with its accompanying pumps, valves and similar mechanisms together with its reducing power drive because of the limited movement available.

Another object is to provide a construction in which any required amount of movement may be readily secured with a step-up power arrangement so that much less power is required to operate the bucket and still plenty of movement is secured to give the bucket the necessary travel without difficulty.

Another object is to provide a construction which is very simple, requiring a minimum number of parts and may be readily and quickly applied to a batching plant and connected with the motor available in such plant for operation thereby, and one in which liability of failure is reduced to a minimum so that it will operate indefinitely in an efficient and effective manner with a minimum loss of time for repairs.

With the foregoing and other objects in view I have devised the construction and arrangement illustrated in the accompanying drawings forming a part of this specification. It is, however, to be understood the invention is not limited to the specific construction and arrangement shown but may embody various changes and modifications within the scope of the invention.

In these drawings:

Fig. 1 is a side elevation showing somewhat diagrammatically a batching plant with my improved bucket operating means applied thereto, certain elements being shown in section to more clearly illustrate the invention;

Fig. 2 is a top plan view of the improved means for operating the bucket;

Fig. 3 is a detailed section substantially on the line 3—3 of Fig. 2, and

Fig. 4 is a perspective showing diagrammatically the arrangement of the cables and pulleys over which they run.

The batching plant illustrated comprises a hopper arrangement 5 in different compartments of which are placed the solid ingredients such as sand, gravel or broken stone and cement, the trucks carrying the sand and gravel being run onto a platform (not shown) at the outer end of the hoppers 6 and dumped into these receiving hoppers from which they are carried by conveyors 7 and deposited in the compartments of the hopper arrangement 5. Associated with these compartments are weighing or measuring devices (not shown) to weigh out the proper amount of sand, gravel and cement for one load of the mixer, which are discharged through control openings located at 8 at the bottoms of the hoppers through which they are discharged into the bucket 9 which at this time is located in the dotted position 9b under the hopper arrangement 5. This bucket is operated between this receiving or loading position and an upper or dumping position indicated at 9a in full lines for dumping its contents into a mixing drum (not shown) on a truck. The proper amount of water may be supplied to the bucket or to the drum for mixing with the aggregate or solid materials in transit to the job or place of use. The bucket is provided with supporting and guide wheels or rollers 10 at its opposite sides running in inclined guideways 11 which may be spaced angle irons 12 or a channel iron or other suitable guiding means. This guideway cooperates with the wheels to maintain the bucket in the upright position until it reaches the dumping position at which time it curves to a position to permit dumping of the bucket as indicated and may have upturned ends 13 to form a stop to limit forward movement of the bucket.

It has been common to use hydraulic means for shifting the bucket from the lower receiving or loading position to the upper or dumping position, but considerable difficulty has been experienced in operating such devices as they are complicated and as an operating piston is required the amount of travel is limited, and pumps and valve mechanism are required which are liable to leak and get out of order. Also as there is considerable travel required for the bucket a step-up connection is required between the piston and the bucket to give the necessary travel to the bucket from the limited travel of the piston, and as the load involves considerable weight this means considerable power is required of the piston and there is heavy strain on the connecting mechanism, which often breaks or fails involving a shut-down of the plant with a resultant loss of time and also the expense of repairs.

With the present operating mechanism this hydraulic drive is eliminated and any desired

travel is readily applied to the bucket with a step-down mechanism, requiring much less power to operate it with a greatly reduced liability of breakage or failure. This improved construction comprises a drum 14 mounted on the bed 15 including a brake drum 16 on which is a brake band 17, and which drum is driven by a gear 18 meshing with the pinion 19 on a shaft 20 driven from a gasoline motor 21 through a chain drive 22 running over the sprockets 23 and 24, the drive from the sprocket 24 to the shaft being controlled by a friction clutch 25. The motor 21 may be a separate motor or it could be the motor for driving the conveyors 7 and the measuring apparatus or other driven elements of the plant through controlled drives (not shown as they form no part of the present invention). Leading from the drum 14 is a cable 26 running over a pulley 27 swivelled at 28 to a support 29 mounted on the bed 15. From this pulley the cable leads at 26*a* to the upper pulley 30 mounted adjacent one end of a guide member, in this instance a channel iron 31. From the other side of this pulley 30 the cable runs forwardly at 26*b* to a pulley means on a movable block 32. In the specific arrangement shown there are a pair of pulleys mounted on the block 32 comprising upper and lower pulleys 33 and 34 respectively. The cable run 26*b* passes around the upper pulley 33 and then at 26*c* to a lower stationary pulley 35 below the pulley 30. From the pulley 35 the cable runs at 26*d* to the pulley 34 also on the block 32 and then at 26*e* to an anchor 36 on a stationary means, such as the bed 15, or a flange 37 of the angle member 31. Pulleys 30, 35 may be mounted on any suitable stationary support 38 secured adjacent the end of the channel member 31 and the block 32 which is movable is located between the side flanges 37 and 39 of the angle member 31 and is guided thereby so that the block slides along this channel member as a supporting and guide means. Leading from the block 32 and connected thereto by any suitable means such as the loops 40 are a pair of cables 41 running over stationary guide pulleys 42 mounted in a support 43 at the other end of the channel member 31 from which they run over guide pulleys 44 mounted on the bed 15, and run upwardly to pass over guide pulleys 45 and 46 from which they extend to the bucket 9 and to which they are secured at 47 adjacent opposite ends thereof so as to provide an even pull and prevent jamming of the bucket in the guide rails 11 and insure uniform movement thereof.

It will be understood that if the bucket is in the lower dotted position of Fig. 1 and if the drum 14 is operated from the motor 21 to wind the cable 26 on it, the cable will operate through the pulleys 27, 30, 33, 35, 34 to shift the block 32 carrying the pulleys 33 and 34 rearwardly or to the right along the channel member 31. This block will therefore draw the cables 41 through their guide pulleys and will shift the bucket 9 upwardly along the rails 11 to the dumping position 9*a*. With this arrangement any desired travel of the block 32 connected to the bucket may be readily secured, and through the double set of pulleys 30, 35 and 33, 34 a reduction of four to one is readily secured within the space available as the drum 14 will take any desired amount of cable. This greatly reduces the power required to operate the bucket and it can be readily operated from the same engine used to operate the conveyors 7 and other control devices for the solid material. A greater or less number of pulleys may be employed depending on the power increase or travel required or found desirable. Operation of the bucket is ordinarily controlled by hand through the clutch 25 and the brake 17, but as a safety feature a lever 48 is placed where it is hit by the bucket or a stop means 49 thereon as it approaches the dumping position and through the connections 50, 51 and 52 will release the clutch and set the brake if they have not already been released and set by the operator.

This device has proved very reliable and efficient in operation. The power required to drive it is greatly reduced over the old arrangements, and as the operating cable is wound on the drum there is no difficulty in securing the necessary movement of the operating means to give full travel to the bucket, and this full travel may be secured with a power step-up arrangement so that a relatively low powered driving motor may be used for operating buckets with relatively heavy loads. The device can also be readily applied to the batching plant and will function indefinitely without trouble. After the dumping of the bucket the weight of the bucket may be employed to return it to the loading position after the brake 17 is released or a weight may be connected to the bucket to assist in drawing it back to this position.

Having thus set forth the nature of my invention what I claim is:

1. In a device of the character described including a hopper adapted for holding solid ingredients for concrete, a controlled discharge means from the hopper, inclined guideways and a bucket movable on said guideways between a lower position to receive material from said discharge means and a dumping position at the upper part of said guideways, means for shifting said bucket between said positions comprising a guide member extending along one side of the hopper, a block slidable on said member and guided thereby, pulleys mounted on the block, stationary pulleys mounted adjacent the guide member, a drum, power means for operating the drum, a cable connected to the drum and running over said pulleys and anchored at its other end so that winding of the cable on the drum will shift the block along the guide member, and cable means connecting the block with the bucket so arranged that shifting of the block will shift the bucket.

2. In a device of the character described including a hopper adapted for holding solid ingredients for concrete, a controlled discharge means from the hopper, inclined guideways and a bucket movable on said guideways between a lower position to receive material from said discharge means and a dumping position at the upper part of said guideways, means for shifting said bucket between said positions comprising a movable block, pulley means carried by the block, stationary pulley means, a drum, power means for operating the drum, a cable connected to the drum and running over said pulleys and so arranged that winding of the cable on the drum will shift said block with a reduced relative motion, and a cable connection from the block to the bucket so arranged that the shifting of the block will shift the bucket to the dumping position.

3. In a device of the character described including a hopper adapted for holding solid ingredients for concrete, a controlled discharge means from the hopper, inclined guideways and a bucket movable on said guideways between a

lower position to receive material from said discharge means and a dumping position at the upper part of said guideways, means for shifting said bucket between said positions comprising a channel member extending substantially horizontally with its side flanges upright, a block slidable in said member between the flanges, pulley means mounted on the block, stationary pulley means adjacent one end of the said member, a drum, power means for operating the drum, a cable connected with the drum and running over said pulleys to shift the block along said member when the cable is wound onto the drum, and cable means connecting the block to the bucket arranged to shift the bucket from the loading to the discharge position by movement of the block.

4. In a device of the character described including a hopper adapted for holding solid ingredients for concrete, a controlled discharge means from the hopper, inclined guideways and a bucket movable on said guideways between a lower position to receive material from said discharge means and a dumping position at the upper part of said guideways, means for shifting said bucket between said positions comprising a movable block, a pair of pulleys carried by the block, a pair of stationary pulleys, a winding drum, power means for operating the drum, a cable connected to the drum and extending therefrom to one of the stationary pulleys, from this pulley to one of the pulleys on the block, from the latter pulley to the other stationary pulley, from this pulley to the other pulley on the block and then to an anchor adjacent the stationary pulleys, and a cable running from the block to the bucket and connected thereto and arranged to shift the bucket from the loading to the dumping position by shifting of the block as the first cable is wound on the drum.

5. In a device of the character described including a hopper adapted for holding solid ingredients for concrete, a controlled discharge means from the hopper, inclined guideways and a bucket movable on said guideways between a lower position to receive material from said discharge means and a dumping position at the upper part of said guideways, means for shifting said bucket between said positions comprising a substantially horizontal guide member including spaced upright side flanges, a block slidable between the flanges and guided thereby, a pair of pulleys on the block, a pair of stationary pulleys located adjacent one end of the guide member, a winding drum, power means for operating the drum, a cable adapted to be wound on the drum extending from the drum to one of the stationary pulleys, then to one of the pulleys on the block, to the second stationary pulley, then to the other pulley on the block and from this pulley to an anchor adjacent the stationary pulleys, other stationary pulleys adjacent the other end of the guide member and guide pulleys between these pulleys and the bucket, and one or more cables connected to the block and running over the latter pulleys to and connected with the bucket to shift the bucket from the loading to the dumping position by movement of the block as the first cable is wound on the drum.

6. In a device of the character described including a hopper adapted for holding solid ingredients for concrete, a controlled discharge means from the hopper, inclined guideways and a bucket movable on said guideways between a lower position to receive material from said discharge means and a dumping position at the upper part of said guideways, means for shifting said bucket between said positions comprising a substantially horizontal channel member arranged with its side flanges upright, a block mounted to slide in the channel member between said flanges, pulley means on the block, stationary pulley means adjacent one end of the said member, a winding drum, a cable adapted to be wound on the drum and running therefrom to and between the pulley means and so arranged as to shift the block along said member on winding of the cable on the drum, guide pulleys between said block and the bucket, a cable connected with the block and running therefrom over the guide pulleys to the bucket arranged to shift the bucket from the loading to the dumping position by movement of the block, power means for driving the drum to shift the block, and control means for the driving means.

7. In a device of the character described including a hopper adapted for holding solid ingredients for concrete, a controlled discharge means from the hopper, inclined guideways and a bucket movable on said guideways between a lower position to receive material from said discharge means and a dumping position at the upper part of said guideways, means for shifting said bucket between said positions comprising a substantially horizontal guide means, a block mounted to slide along said means and guided thereby, pulley means on the block, stationary pulley means, a winding drum, a cable adapted to be wound on the drum and running therefrom to and between said pulley means and so arranged as to shift the block along said guide means on winding of the cable on the drum, a cable connected with the block and the bucket arranged to shift the bucket from the loading to the dumping position by movement of the block, power means for driving the drum to shift the block, and control means for the driving means.

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