Nov. 4, 1930. F. L. DAKE 1,780,869

POWER CONTROL MECHANISM

Filed April 12, 1929 3 Sheets-Sheet 1

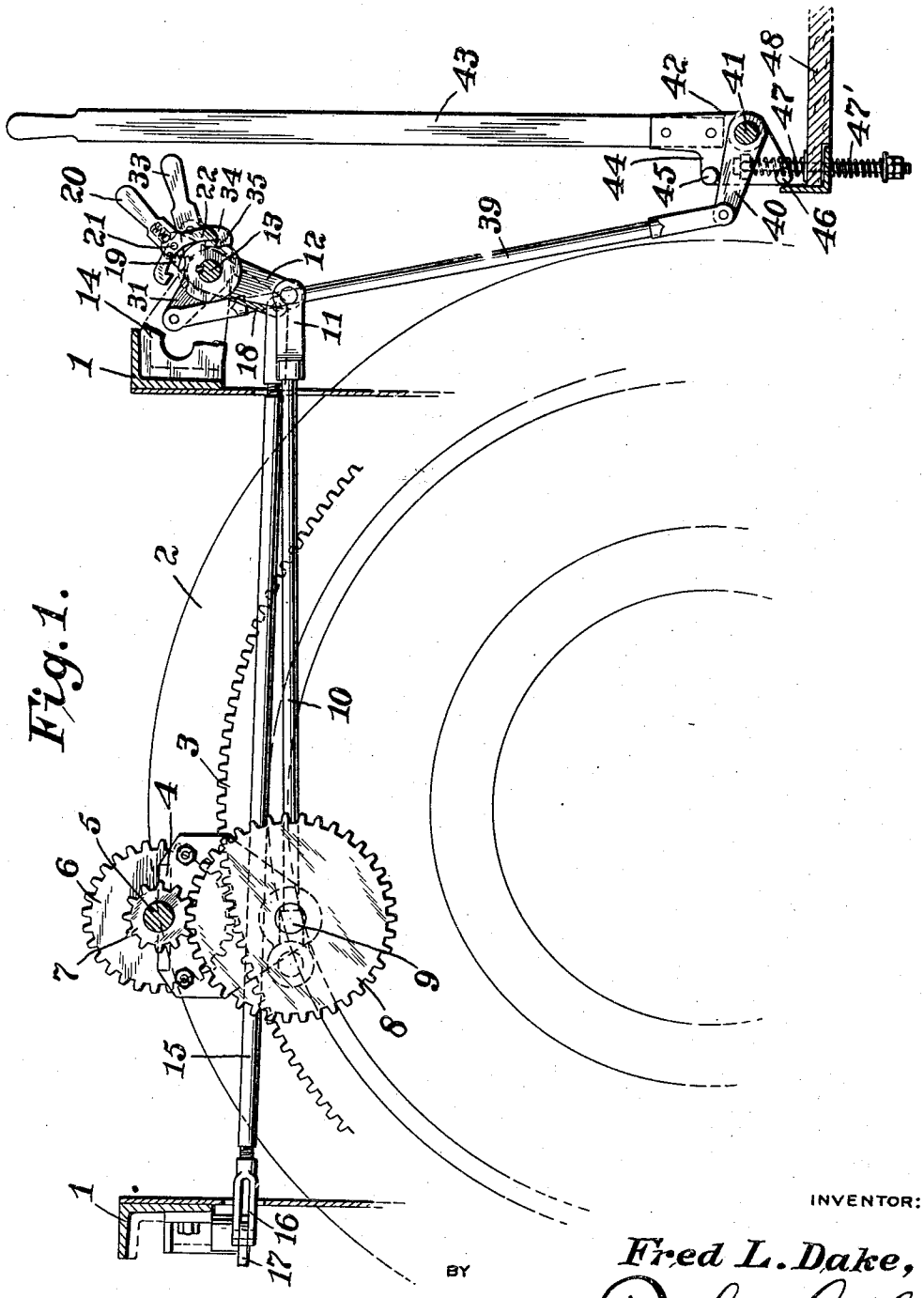


Fig. 1.

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POWER CONTROL MECHANISM

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Fig. 3.

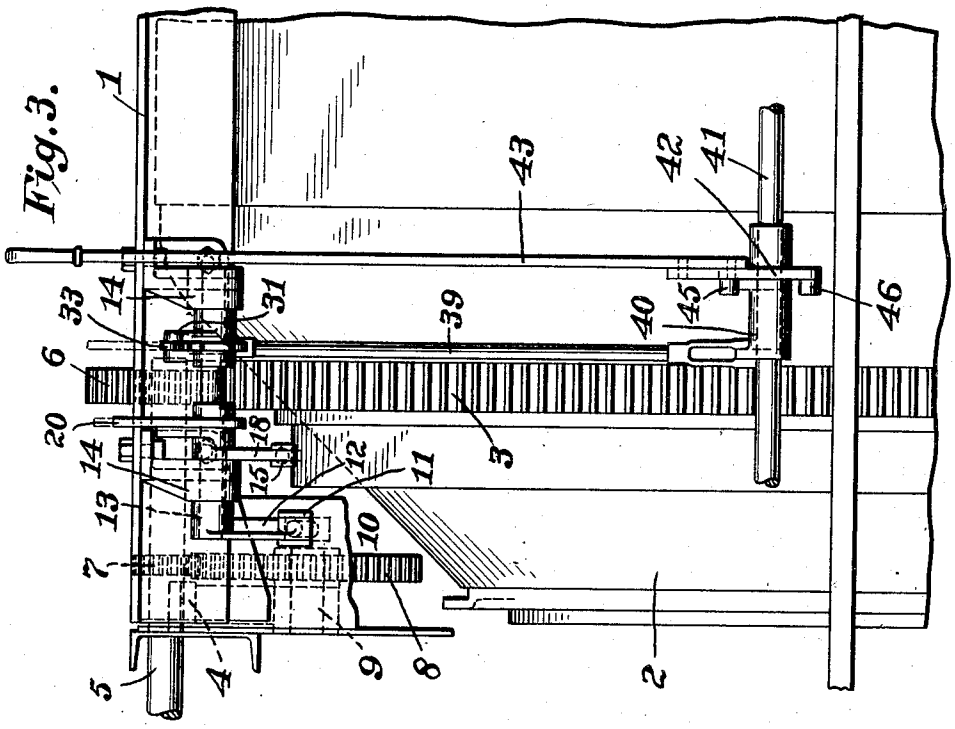
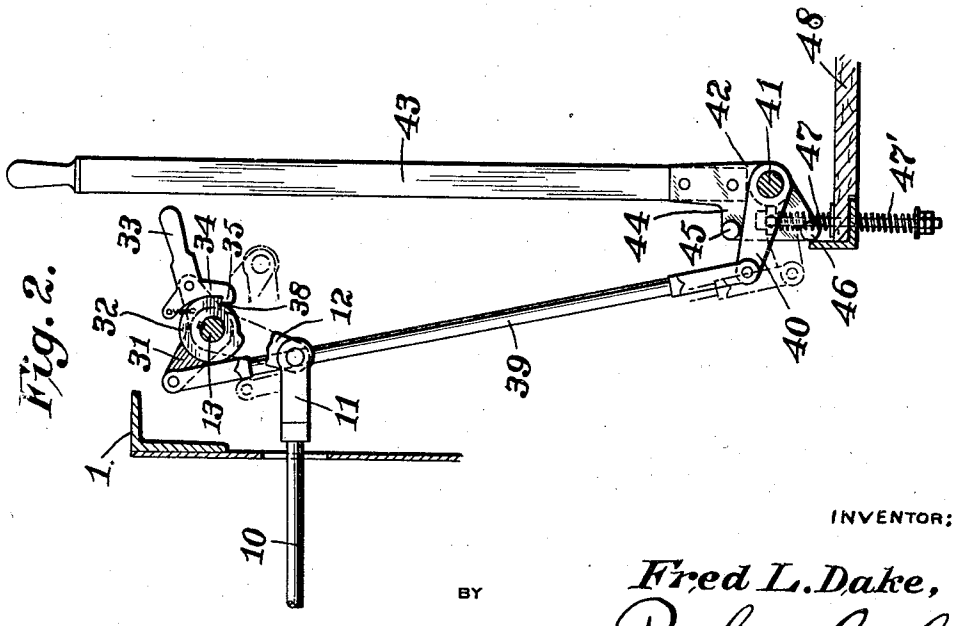


Fig. 2.



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Filed April 12, 1929 3 Sheets-Sheet 3

Fig. 4.

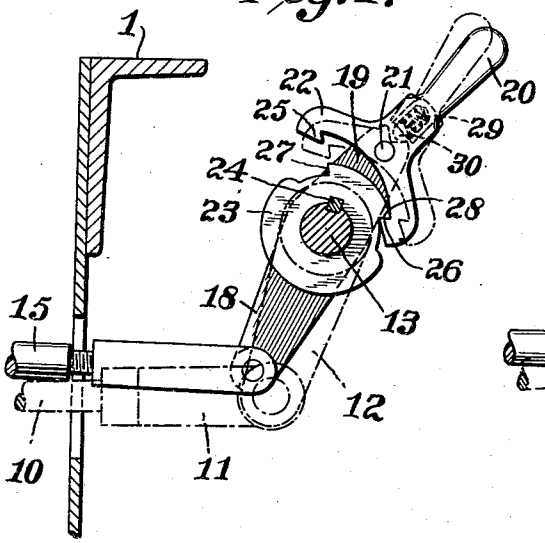


Fig. 5.

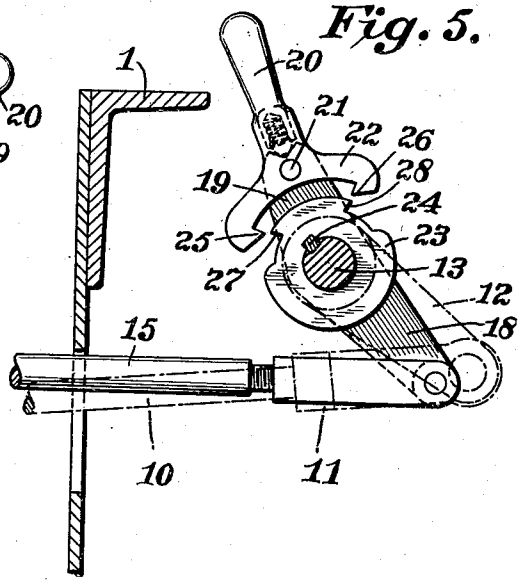


Fig. 6.

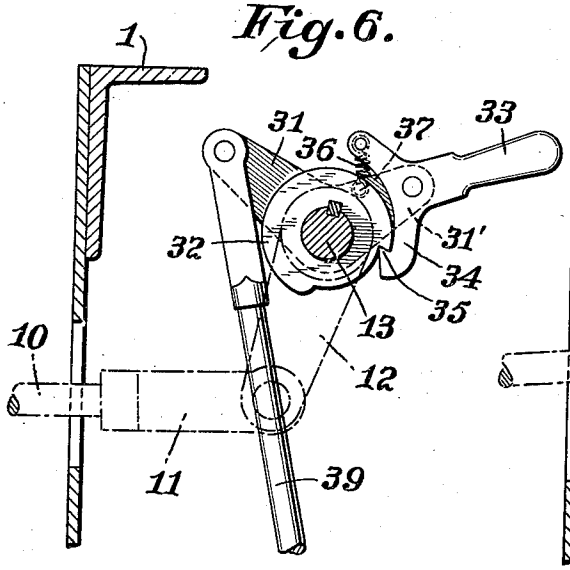


Fig. 7.

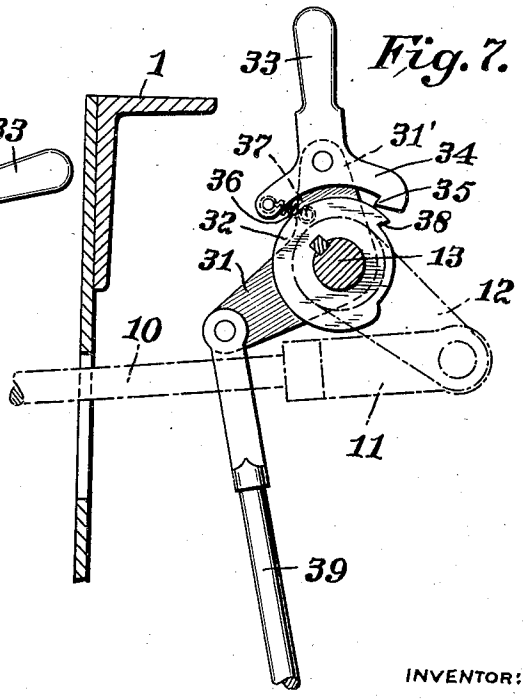
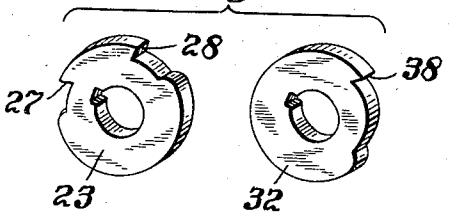


Fig. 8.



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Patented Nov. 4, 1930 1,780,869

UNITED STATES PATENT OFFICE

FRED L. DAKE, OF NUNDA, NEW YORK, ASSIGNOR TO THE FOOTE COMPANY, INC., OF NUNDA, NEW YORK, A CORPORATION OF DELAWARE

POWER-CONTROL MECHANISM

Application filed April 12, 1929. Serial No. 354,539.

My invention relates to new and useful improvements in controls, and more especially to controls that are power-operated, it being only necessary to throw a small handle into engagement with a cam on an oscillating shaft so that the oscillating shaft will mechanically operate the desired control to thereby in turn throw into or out of engagement the part to be operated.

One of the objects of the invention is to provide a means whereby the operator is relieved of the usual manual throwing of a control lever or levers and is accomplished by providing special forms of control levers, each of which is provided with a small pivotal handle, which, when tilted, will lock its lever to an oscillating shaft, so that the shaft will mechanically operate the control lever.

Still another object of the invention is to provide a power-operating control mechanism that is especially adapted to be used with a concrete paver, wherein one control may be used for the turning on and off of the water for the mixing drum; while another control may be used for throwing into engagement the power that operates the skip.

Another object of the invention is to provide a power-operating control mechanism wherein means are connected with the drum of a concrete paver to oscillate a control shaft on which the various controls are idly mounted and to provide simple interlocking handles, any one of which may be tilted to temporarily lock its control to the control shaft.

Still another object of the invention is to provide a power-control mechanism having an oscillatable shaft on which the various control levers are idly mounted, and to provide a shiftable handle on each of the controls, wherein any one of these handles may be shifted to temporarily lock its control with the shaft to thereby operate the control in the one direction or whereby the handle may be tilted in the opposite direction to lock the control to the shaft and cause the control lever to operate in the opposite direction.

Still another object of the invention is to provide a control mechanism which is of simple design and construction and comprises in the main an oscillatable shaft, together with means for causing the same to oscillate. Mounted on the oscillating shaft are as many control levers as desired, and these control levers are so arranged that any one of them may be quickly locked to the oscillating shaft to thereby cause the oscillating shaft to mechanically operate the predetermined control lever.

Still another object of the invention is to provide a power-control mechanism wherein the predetermined control lever may be temporarily locked to an oscillating shaft, and after the control lever is operated by the oscillating shaft, it will be again unlocked therefrom and the control lever remains in the position to which it has just been moved.

Still another object of the invention is to provide a power-operated control that may be particularly adaptable to the controlling of the water and skip of a concrete paver. Also, the power-operated control for the skip is interconnected with a lever for the manual control of the skip, making it possible to lower the skip manually which is desirable. Again, with the present invention, the power control of the skip being interconnected with the manual control makes it possible to entirely disengage the automatic control and permits the skip to be controlled in both its raising and lowering movements wholly by the manually operated control.

Still another object of the invention is to provide a power control mechanism which, although especially adaptable for use in conjunction with a concrete paver or mixer, might equally as well be used in conjunction with other power-operated machinery. As is well known, control levers when operated manually often take considerable strength, and the workmen or operator will soon tire. With the present invention, the strenuous manual labor is overcome as it is only necessary to shift a small handle, so that it in turn will lock its control lever with a power-operated shaft and mechanically perform the operation of throwing the control lever.

With these and other objects in view, the invention consists in certain new and novel arrangements and combination of parts, as

will be hereinafter more fully described and pointed out in the claims.

Referring now to the drawings showing a preferred embodiment of my invention.

Fig. 1 is a view partly in section and partly in elevation of my improved control mechanism, showing the manner in which the main control shaft is operated and showing manual control lever interconnected with one of the power-controlled levers.

Fig. 2 is a fragmentary view partly in section and partly in elevation, showing the power control lever and a manually operated lever for also controlling the power operated lever, this interconnected control being especially adapted for controlling the movements of the paver skip.

Fig. 3 is a fragmentary side elevation of a concrete paver, showing the improved power control mechanism; also showing the manually controlled operated lever interconnected with one of the power control levers for controlling the movement of the paver skip.

Fig. 4 is a fragmentary sectional view of a frame of a paver, showing in elevation one of the power-operated control levers mounted on the control shaft and illustrating the manner in which the control lever is to be locked and unlocked from the control shaft.

Fig. 5 is a view similar to Fig. 4 but showing the control shaft and control lever after being rocked to its opposite position; the control being of the double-toothed type for throwing the control into two different positions, and especially adapted for controlling the water for the mixing drum of the paver.

Fig. 6 is a fragmentary detail view showing a power control of the single toothed type and especially adapted for controlling the elevation of the skip, the control lever being shown as thrown to its operative position.

Fig. 7 is a view similar to Fig. 6 showing the control lever in its normal position, and

Fig. 8 is a perspective of both the single and double toothed cams.

Referring now more particularly to Figs. 1 and 3, there will be seen a fragmentary portion of the frame 1 of a concrete paver, there also being shown the mixing drum 2 with its ring gear 3 which is driven through a main drive shaft (not shown) from the gasoline engine that is used to drive the paver. There will also be seen in Fig. 1 a bearing 4 in which is mounted one end of a shaft 5 and also on the end of this shaft is the small spur pinion 6 designed to mesh with the ring gear 3 and be driven thereby.

Spaced over from the pinion 6 on the shaft 5 is a further pinion 7 designed to drive a gear wheel 8, which is mounted on the stub shaft 9 and eccentrically mounted on this gear wheel 8 is the connecting rod 10, which latter has secured at its outer end a small socket 11, to which is pivoted the lower end of the arm 12 which, in turn, is secured to one end of the main control or oscillatable shaft 13. This control shaft 13 is suitably mounted in the bearings 14 secured to the frame 1, as may be seen in Fig. 3.

Now whenever the mixing drum 2 is driven, it will, through the gears, pinions and arm just mentioned, oscillate or rock the shaft 13, as will be perfectly plain.

The rocking or oscillation of this control shaft is from the one limit, as shown in Fig. 4 to the other limit, as shown in Fig. 5. It is to this control shaft 13 that the various controls or levers are to be connected, and it will be understood that although, in the present instance, I have only shown two controls as operated by this rock shaft, any number could be used by lengthening the shaft 13.

Referring for the moment again to Fig. 1, there is shown a control or link rod 15 that extends across the front face of the drum and has the bifurcated end 16 connected to one arm of a bell crank 17 which, in turn, may be connected to the water measuring tank (not shown). This water measuring tank is shown in a pending application filed by Floyd W. Devinney on February 15, 1929, and bears Serial Number 340,179. Of course, the bell crank 17 may be connected to some other rod which, in turn, will be connected to a part to be operated, but the control mechanism, as described in this application, is one that is actually used on the Foote paver, and the controls here shown are actually connected to the mechanisms of the paver, as here described and illustrated.

Now the other end of the link rod 15 is connected to a lever 18 which is loosely mounted on the control shaft 13 and extends upwardly beyond the shaft 13, as may be seen more clearly in Figs. 4 and 5. At the upper end 19 of this lever 18 is the small control handle 20, which is pivotally mounted thereon, as indicated at 21, and provided with fixed lateral extensions in the form of a toothed dog or pawl 22, so that when the handle is moved about its pivotal point 21, one of these teeth will be thrown into engagement with a corresponding jaw on a cam member 23 which is splined, as at 24, to the shaft 13.

In the form of control shown in Figs. 4 and 5, the dog 22 is provided with the two teeth 25 and 26, while the cam member 23 has the two jaws 27 and 28 cut on its periphery for selective engagement by the teeth of the dog or pawl 22, that is, the tooth 25 may be thrown into engagement with the jaw 27 or the tooth 26 may be thrown into engagement with the jaw 28, as will be shortly described.

In Fig. 4, there will be seen a small self-centering arrangement for the handle 20, such as the spring 29 fitting up within the

handle that presses against the small ball 30, which ball, in turn, will rest in the notched upper end 19 of the lever 18, so that the little control handle 20 will normally hold the pawl out of engagement from the jaw 27 or the jaw 28. The operation of the above control mechanism will be set out and then reference will be made to a slightly different control mechanism that is especially adaptable to controlling the skip mechanism.

Supposing it is desired to push the link rod 15 toward the left, as seen from Fig. 1 to operate a water valve (not shown), the little handle 20 (see Fig. 5) on the lever 18 will be slightly tilted toward the operator, so that the tooth 26 of the pawl 22 will engage the jaw 28 of the cam 23. Now the connecting rod 10 is oscillating the shaft 13, through the ring gear and spur gear, and the tooth 26 will be engaged by the jaw 28 of the cam, as the handle has been tilted and causes the pawl to slip in the path of the jaw 28. An oscillation of the main control shaft 13, now locked by the pawl to the cam, will cause the lever 18 to rock with the control shaft and force the rod 15 to the left and thereby operate the bell crank, which is connected to the water tank (not shown). The small handle 20 will now be in the position shown in Figs. 1 and 4.

The handle 20 is then released by the operator, and the handle will right or normalize itself by the self-centering device, as described, and moves from the full line to the dotted line position (Fig. 4). On the return oscillation of the control shaft and its cam, the jaw 28 of the cam will ride away from the tooth 26 even if the handle has not had time to normalize itself or, if the handle 20 is in its normal position, it will clear the tooth 26 and will also prevent the jaw 27 engaging with the opposite tooth 25 of the pawl.

The link rod 15, therefore, and its lever 18 will now simply idle on the shaft 13 while the latter oscillates back and forth. Supposing it is desired to pull the rod 15 to the right, to operate the bell crank 17 in the other direction, the little handle 20 will be simply tilted forwardly (Fig. 4) by the operator until the tooth 25 engages the jaw 27 of the oscillating cam 23 and the moment the tooth 25 does engage with the jaw 27, the oscillation of the shaft 13 and its cam will rock the lever 18 to the position shown in Fig. 5 and thus pull the bell crank 17. The hand of the operator may be removed from the handle 20 as soon as the tooth 25 has engaged with the jaw 27 and the handle will center itself, so that it will again assume the position shown in Fig. 5.

Thus, it will be seen that instead of having a long manual lever connected to the link rod 15 and operating the same manually, with the arrangement shown it is simply necessary to rock or tilt the little handle 20 with its fixed frame, so that the same will engage the desired cam jaw while the oscillating or rocking of the control shaft 13 will mechanically move the rod 15 and, in turn, move the bell crank 17 connected to the water supply. It will be appreciated that other devices could be controlled by simply providing additional handles and cam units and suitable connections therefor.

The control just described, it will be noticed, is for operating a bell crank lever in either of two directions, but as it is sometimes desired to operate a control in one direction only and to provide a manual lever for reversing the operation, or doing both manually, I have shown another similar form of control, but with the power operated control acting in one direction only and a separate manually operated means for operating this control in the opposite direction, or the manually operated means controlling the action in both directions.

An arrangement of this kind is especially desirable when the control is used on a concrete paver because it is desirable to control by power the means for elevating the skip and, on the other hand, it is desirable to have a manually controlled brake for lowering the skip just as fast or as slowly as needed.

The present invention, therefore, contemplates a mechanical control for rocking a shaft in one direction (to elevate the skip), the control, in turn, being connected with a hand lever for throwing into or out of action the power control, and also for rocking the shaft in the other direction to apply a brake to the skip hoisting mechanism (not shown) to thus let the skip down as slowly as desired.

As far as the little handle and the cam are concerned, they are very similar to the control just mentioned but, as will be explained, the pawl is provided with only one tooth and the cam is provided with only one jaw. Going into the explanation more specifically of this form, reference is made to Figs. 1, 2, 6 and 7.

Mounted on the oscillatable control shaft 13 is the crank lever 31, which is also loosely mounted in the same manner as the lever 18, and there will be seen a small cam 32 which is splined to the shaft in the same manner as the formerly mentioned cam 23. At the outer end 31' of the lever is the small control handle 33 to which is fixedly mounted the small pawl 34, but this pawl has only the one jaw or tooth 35. At its opposite end, there is connected a small spring 36, which is also connected to the crank lever 31 at the point 37, so that normally the tooth 35 of the pawl will be raised and may not accidentally engage with the jaw 38 arranged on the peripheral edge of the cam 32, as may be seen in the several views.

It will be noticed that this small handle 33 has no self-centering mechanism, as shown in the handle 20, but does have the small spring 36, so that there is never the possibility of the tooth 35 accidentally coming into engagement with the jaw 38 of the cam, unless the small handle 33 is moved or rocked by the operator.

Connected to the outer end of the lever 31 is the link control rod 39, and referring to Figs. 1, 2 and 3, it will be seen that the lower end of the rod 39 is connected to the arm 40 mounted on a shaft 41, and this shaft 41 controls a cable drum (not shown) for raising and lowering a skip, and for applying a brake to the drum. For the purpose of understanding this invention, it is only necessary to say that when the shaft 41 is rocked by an upward movement of the arm 40, a skip (not shown) will be raised, and when the arm 40 is forced downwardly and the shaft 41 is rocked in the opposite direction, a brake (not shown) will be applied to the skip. The skip is not shown nor its elevating mechanism, as it is only necessary to understand that the control described is for rocking a shaft in two directions which might be connected to any desired mechanism.

Mounted loosely on the shaft 41 is the small casting 42 from which extends the manually operable lever 43. This casting widens out, as may be seen at 44, and is provided with an upper pin 45 and a lower pin 46 which extend outwardly to engage the arm 40 when the lever is forced to the left and right.

There may also be seen the two equalizing springs 47 and 47′ together with their rod or keeper, which latter is pivotally secured to the casting 42, so that the casting 42 and the lever 43 will be normally held in their position shown in Fig. 2 and thus not interfere with the power control.

It will be understood that when the link rod 39 is pulled upwardly, it will rock the shaft 41, which, in turn, it may be assumed causes a skip (not shown) to be elevated. It will also be understood that when the rod 39 is lowered, it will rock the shaft 41 in the opposite direction and let the skip down as slowly as desired, as it has already been mentioned that a rocking of the shaft in this direction will apply a brake to the skip mechanism.

Referring again to the control and the handle 33, and supposing it is desired to rock the shaft 41 upwardly to elevate the skip (not shown), the small handle 33 will be pulled downwardly until the tooth 35 of the pawl 34 is engaged by the tooth 38 of the cam, and as the cam and control shaft 13 are oscillated by the connecting rod 10, the arm 31 being now locked to the shaft 13 through the cam and the pawl, the rod 39 will be elevated and the shaft 41 rocked.

The small handle 33 will be released as soon as the pawl has been thrown out of engagement with the cam tooth, and as the shaft oscillates back and forth, the skip control 39 will remain over in its thrown position until moved by the hand lever 43. In other words, this small (skip) control handle is only to be operated in the one direction, as there is only one tooth on the pawl and only one tooth on the cam face, whereas on the control first described, it will be remembered that the control could be moved, so that it would be operated in either one of two directions.

In the drawings in Fig. 7, I have shown the (skip) control handle in its neutral position and I have also shown it in its operative position or pulled downwardly, as in Fig. 6.

When the control is used for regulating the action of the skip, it is always desirable to lower the skip by the manually operated lever 43 and when the same is forced to the left, the pin 45 will contact with the arm 40 and thus rock the shaft 41 which will apply a brake (not shown) to the skip controlling mechanism, so that the skip may be lowered as slowly as desired.

Also, by forcing the lever 43 to the left it will rock the shaft 41 and thus disengage the power operated control. This is desirable as it is sometimes necessary to throw out the skip clutch before the skip reaches its charging position.

By pulling the lever to the right, the shaft is rocked in the same manner as though it had been pulled upwardly by the rod 39, so that it will be seen the skip can be operated both in its raising and lowering by the hand lever 43, as desired. It is desirable that the hand lever should not operate during the power operation for raising the skip, but should be used in lowering the skip, so that its descent will be regulated.

From the foregoing, it will be seen that I have devised a very simple and efficient power control wherein the respective levers are thrown into and out of operation simply by the shifting of a small handle that will, in turn, lock its lever to an oscillating shaft whereby the lever is then operated mechanically. It will also be seen that I have devised a power control that may swing a connecting link, or any other form of connection with a desired mechanism, to the one side of a center and likewise to the other side of the center.

Again, I have shown a slightly different form of control mechanism where a connecting rod or link may be simply thrown to one side of a center and a manually operated lever may return it to the neutral position.

Also, it will be seen that the operator does not have to keep his hand on the small control handle, but simply has to throw or rock the same with its pawl into the path of a cam and may then immediately remove his hand from the handle. I have shown one way in which a manual control may cooper-

ate with the power control, so that a shifting of the manual control will automatically disengage the power control and the device may then be wholly manually controlled.

Lastly, the invention is one that may be very conveniently used on a concrete paver or mixer, as the control levers are ordinarily somewhat hard to manipulate. The present invention, however, does away with the strenuous efforts heretofore necessary.

The controls might easily be applied to other machinery just so there is a driving shaft, so that motion may be transmitted to the oscillating shaft from which all the controls are operated.

Many slight changes might be made without in any way departing from the spirit and scope of the invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A power operating control comprising a control shaft, means for oscillating said shaft, a control lever loosely mounted on said oscillating shaft, a handle on said control lever, means for locking said handle to said control shaft to thereby operate the control lever by an oscillation of the control shaft.

2. A power operating control comprising a control shaft, means for continuously oscillating said control shaft, a control lever loosely mounted on said oscillating shaft, means on said control lever for temporarily locking said control lever to said shaft to thereby operate the control lever by an oscillation of the control shaft.

3. A power operating control comprising a control shaft, means for continuously oscillating said control shaft, a control lever loosely mounted on said oscillating shaft, means on said control lever for temporarily locking said control lever to said shaft to thereby operate the control lever by an oscillation of the control shaft and the said means automatically unlocking from said control shaft after the control lever has been moved by an oscillation of the control shaft.

4. A power operating control comprising a control shaft, means for continuously oscillating said control shaft, a control lever loosely mounted on said oscillating shaft, a pivotal handle on the end of said control lever for locking said control lever to said shaft to thereby operate the control lever by an oscillation in one direction of the control shaft and the said pivotal handle also so arranged that the control lever and handle are unlocked from the control shaft on the return oscillation of said shaft to thereby leave the control lever in its thrown position.

5. A power operating control comprising a control shaft, means for continuously oscillating said control shaft, a control lever loosely mounted on said oscillating shaft, a cam locked on said shaft, a pivotal handle on the end of said control lever and means for locking the handle to said cam to thereby operate the control lever by an oscillation of said control shaft and the handle and cam arranged to unlock immediately the control lever has been thrown and thereby leave the control lever in its thrown position.

6. A power operating control comprising a control shaft, means for continuously oscillating said control shaft, a control lever loosely mounted on said control shaft, a cam locked on said shaft, a pivotal handle on the end of said control lever and means on the handle for locking the control lever to the cam to throw the control lever in either of the two desired directions and the said means arranged to automatically unlock the handle from the cam immediately after the control lever has been thrown to thereby leave the same in its thrown position.

7. A power operating control comprising an oscillatable control shaft and means for continuously oscillating the same, a control lever loosely mounted on said shaft, a cam provided with a tooth locked on said shaft adjacent said control lever, a small lockable handle mounted on the end of said lever and provided with a dog whereby when said handle is forced downwardly said dog will engage with said tooth to thereby rock the control lever to its thrown position and said tooth disengaging from said dog as the shaft oscillates in the opposite direction, thereby leaving the control lever in its thrown position.

8. A power operating control comprising an oscillatable control shaft and means for continuously oscillating the same, a control lever loosely mounted on said shaft, a cam rigidly locked on said shaft, a handle mounted on said control lever and provided with a dog, said handle adapted to be moved to throw the dog in the path of movement of the cam to thereby lock the control lever to the shaft and thus operate said lever and the cam unlocking from said dog on the return oscillation of said shaft to thereby leave the control lever in its thrown position.

9. A power control comprising a rockable shaft and means for rocking the same, a lever mounted on said shaft, a link connected to one end of the lever and a handle provided with a pawl pivoted to the other end of the lever, a cam locked on said shaft, and means on the handle for keeping the pawl normally disengaged from the cam, said handle when tilted locking the lever with said cam and rockable shaft to thereby operate the lever and link.

10. In a power operated control, a link to be operated, a rockable shaft, a lever on said rockable shaft, said lever connected to one end of the link, a pivotal handle connected to the other end of the lever, a cam secured to said rockable shaft, a pawl on said handle

and normally located above said cam, said handle when tilted locking the pawl with said cam to thereby operate the lever and link through a rocking of said shaft.

11. A power control comprising a rockable shaft and means for rocking the same back and forth, a lever, a link connected to said lever, said lever loosely mounted on said rockable shaft, a cam securely fastened to said rockable shaft, means mounted on the upper end of said lever for interlocking the same with said cam to thereby rock the lever when said shaft is rocked, and means for automatically pulling the tiltable handle to a normal position out of the cam path.

12. In a power control mechanism, a lever, a link connected to said lever, an oscillatable shaft, said lever loosely mounted on the shaft, a cam with oppositely arranged teeth rigidly mounted on said shaft, a double-toothed pawl pivoted directly above said cam, means for holding the pawl out of engagement with said cam, said pawl when tilted in one direction locking with one tooth of the cam to operate the lever in one direction and said pawl when tilted in the opposite direction engaging with the other tooth of said cam and operating the lever in the opposite direction.

13. A power control comprising an oscillatable shaft and means for continuously oscillating the same, a link to be operated, a lever, said lever connected to said link and said lever freely mounted on said oscillatable shaft, a pivotal handle connected to said lever and provided with a pawl, a cam rigidly locked on said shaft having two oppositely faced teeth, said pawl provided with two oppositely faced teeth so that tilting of the handle will throw one tooth of the pawl in engagement with one tooth of the cam to move said lever in one direction and said handle when tilted in the opposite direction causing the opposite tooth of the pawl to engage with the opposite tooth of the cam to thereby rock the lever in the opposite direction.

14. A power operated control for controlling a power shaft, a small oscillatable shaft and means for oscillating the same, a lever mounted on said oscillatable shaft, a cam locked to said shaft, a pawl pivoted on said lever, means for normally keeping the pawl out of engagement with the cam, a handle for rocking the pawl within the path of said cam to thereby rock the lever when said shaft oscillates, a link arm extending from the lever to a power shaft, a manually operated lever for cooperating with the link arm whereby a manual operation of said lever will disengage the power operated means and allow the power shaft to be controlled manually.

15. In a power control, a shaft to be controlled, an arm on said shaft, a lever connected to said shaft and said lever freely mounted on an oscillatable shaft, means for oscillating said oscillatable shaft, means for temporarily locking said lever to said oscillatable shaft to thereby rock the shaft to be controlled, a manually operable lever freely mounted on said shaft to be controlled and having means thereon for cooperating with said arm whereby said power control may be temporarily disengaged and said shaft controlled by the manually operated lever.

16. In a power control, a drive shaft to be controlled, an oscillating shaft, means for oscillating the shaft, a lever loosely mounted on said control shaft, means for temporarily locking the lever to the oscillating shaft, a link connected with said lever and with the shaft to be driven and manual means connected to the link for automatically throwing out the power control when said manual means is operated.

17. In a power control, a shaft to be controlled, an oscillating shaft, a lever loosely mounted on said oscillating shaft and means for temporarily locking it to said oscillating shaft, a small arm on the shaft to be controlled and a link connecting said arm and said lever, a manually operated lever loosely mounted on the shaft to be controlled and provided with means cooperating with the arm on said shaft to be controlled whereby an operation of the manually operated lever will automatically cut out the power control and permit the shaft to be controlled manually.

In testimony whereof I affix my signature.

FRED L. DAKE.