No. 827,144. PATENTED JULY 31, 1906.

L. W. CONNELL.

EXCAVATOR SHOVEL.

APPLICATION FILED MAY 9, 1906.

2 SHEETS—SHEET 1.

Fig. 1

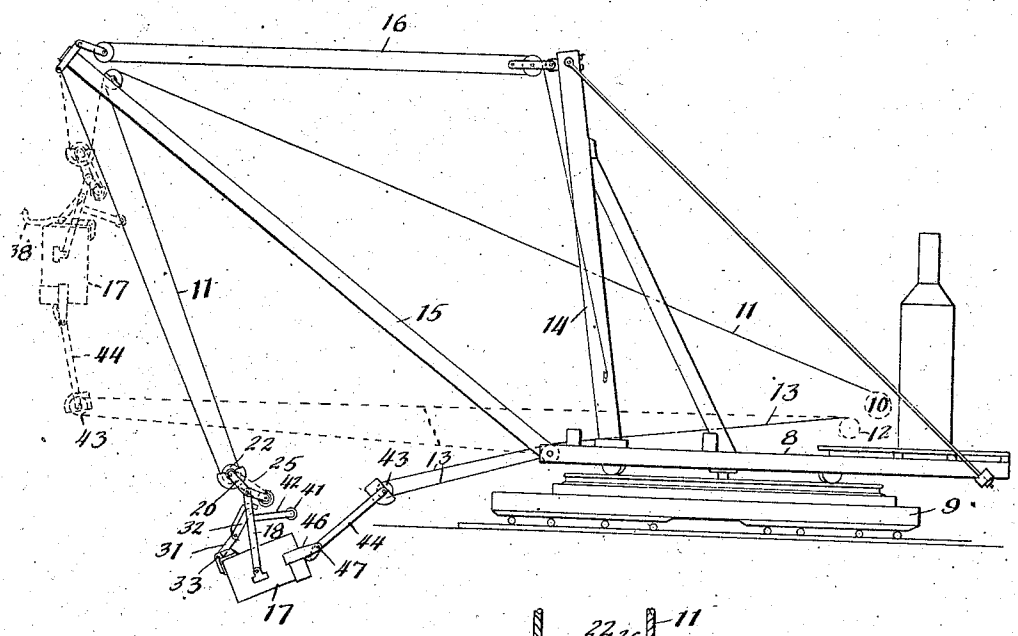


Fig. 2

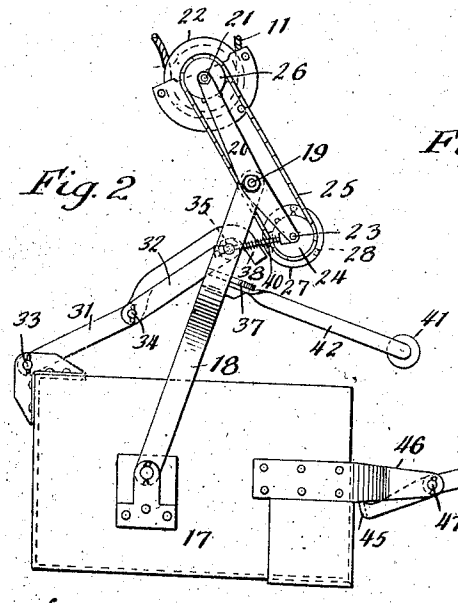
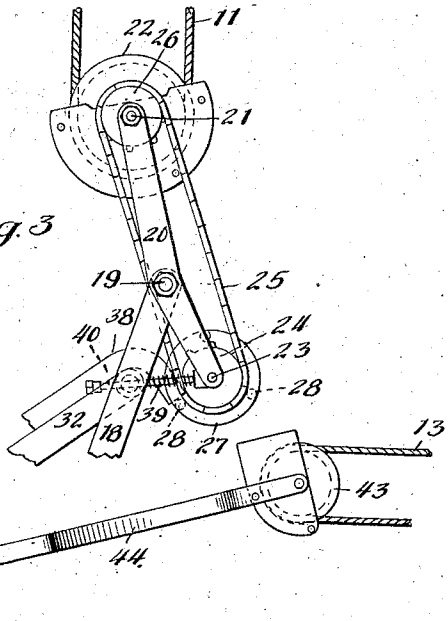


Fig. 3



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2 SHEETS—SHEET 2.

Fig. 5

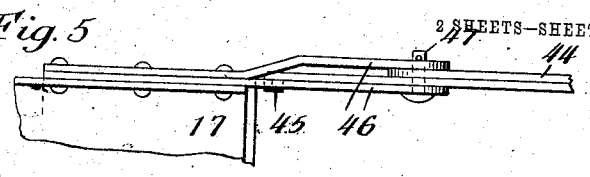


Fig. 4

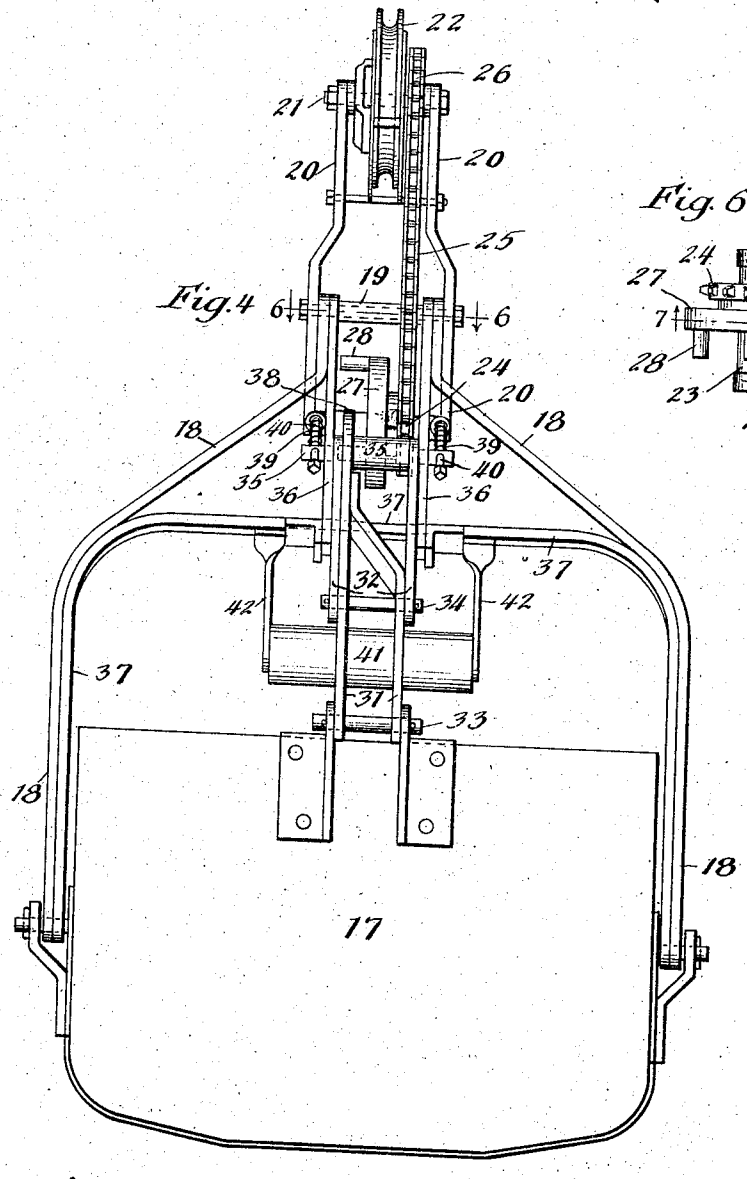


Fig. 6

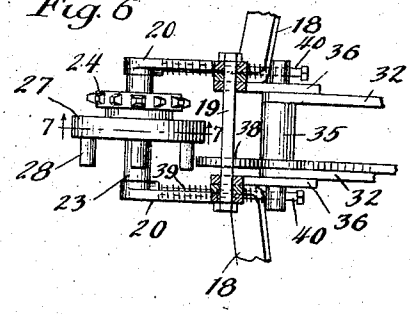
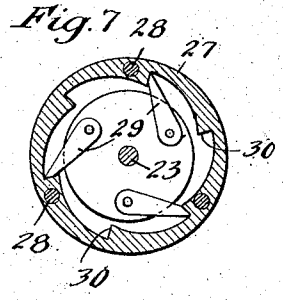


Fig. 7



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UNITED STATES PATENT OFFICE.

LEWIS W. CONNELL, OF JOLIET, ILLINOIS.

EXCAVATOR-SHOVEL.

No. 827,144. Specification of Letters Patent. Patented July 31, 1906.

Application filed May 9, 1906. Serial No. 315,902.

To all whom it may concern:

Be it known that I, LEWIS W. CONNELL, a citizen of the United States, residing in Joliet, in the county of Will and State of Illinois, have invented a new and useful Improvement in Excavator-Shovels, of which the following is a specification.

This invention is an improved construction of the mechanism for operating the shovels or buckets of excavators and dredges.

It is adapted to cause a quick dumping and is effective, simple, and easily controlled, and in these respects is an improvement on previous mechanisms used for the same purpose.

The nature of the improvement is fully disclosed in the description given below and is also illustrated in the accompanying drawings, forming a part of this specification, and showing, at Figure 1, an elevation of an excavator provided with my invention; at Fig. 2, an enlarged side elevation of the shovel; at Fig. 3, a side elevation of the controlling mechanism; at Fig. 4, a rear elevation of the shovel and controlling mechanism; at Fig. 5, a partial plan of the filling end of the shovel; at Fig. 6, a section on the line 6 6 of Fig. 4, and at Fig. 7 a section on the line 7 7 of Fig. 6.

In said drawings, 8 represents the platform of an excavator provided with a derrick-crane for operating the shovel; 9, the car upon which the excavator is mounted; 10, the winch of the lifting-rope 11; 12, the winch of the hauling-rope 13; 14, the mast of the derrick-crane; 15, the moving jib thereof, and 16 the rope extending from the mast, by which the jib is positioned and its radius of action changed.

The shovel is shown at 17 and is hinged to arms 18, the pivots connecting it to the arms being back of the center of gravity of the shovel. At their upper ends the arms 18 are united by a shaft or pivot 19, so that they, with said pivot, form a bail for the shovel. Upon the pivot 19 is mounted the side members 20 of a frame, supporting at their upper ends the shaft 21 of the sheave 22, under which the lifting-rope 11 passes. The members 20 are united by the pivot 19 and the shaft 21 and also at their lower ends by the shaft 23, upon which is mounted a sprocket-wheel 24. A chain 25 connects wheel 24 with another sprocket-wheel 26 on the shaft 21 and fast with the sheave 22, so that all the movements received by the sheave from the lifting-rope are communicated to the wheel 24. The frame members 20 are permitted to rock on pivot 19 for purposes presently to be explained, and the wheel 24 has a clutching connection to an adjacent pin-wheel 27, mounted on the same shaft therewith and having laterally-projecting pins 28. The clutch employed for actuating the pin-wheel should be adapted to drive the wheel in one direction, and a suitable construction thereof is illustrated at Fig. 7, the wheel 24 carrying a series of freely-pivoted pawls 29, which engage teeth or shoulders 30, formed interiorly of the rim of the pin-wheel on the side thereof adjacent to wheel 24.

The pin-wheel causes the tripping or unlatching of the shovel, as follows: The bail is connected to the rear of the shovel by a toggle composed of two frames 31 and 32. Of these, frame 31 is pivoted at its lower end on pivot 33, and at its upper end it is pivoted, by means of the pivot 34, to the lower end of the frame 32, and this frame is pivoted at its upper end upon the pivot 35, supported in two side pieces 36, the upper ends of which are stayed on the pivot 19, and the lower ends are fixedly secured to the cross-piece 37, which is preferably provided to connect the two sides of the bail above the back. Within the upper frame 32 is the hook 38, preferably formed in one piece with the frame 31, or at all events rigid with said frame 31. This hook naturally rests upon the pivot 35, as plainly seen at Figs. 2 and 3, or upon the sleeve inclosing said pivot 35 and attached to the toggle-frame 32, so that it is adapted to hold the shovel against tipping while the load is being gathered and while it is being swung to the place of discharge. The point of the hook 38 is so located that it will encounter the pins of the pin-wheel when the sheave-frame is swung upon pivot 19, as it is when the weight of the shovel comes upon the lifting-rope 11. In fact, the hook is normally in the path of the pins, so that when the rope 11 is slackened and the sheave 22 is operated the pins will approach the hook from below and lift it, so that it will be released and allow the superior weight at the forward end of the shovel to dump it, the toggle-frames 31 and 32 doubling up and permitting the dumping. The sheave-frame is normally pressed away from the hook by the springs 39, encircling rods 40, passing through the ends of the shaft 35 and bearing against the lower end of said

frame or against the shaft 23. These springs act to prevent the pins from engaging the hook after the dumping and during the relatching. At such times the strain of the rope keeps the pin-wheel forward of the hook, so that it cannot operate the latter even if it is rotated in the direction in which it is intended that it should release the hook. The bail is provided with a weight 41, supported by arms 42, attached to the cross member 37. This weight tends to maintain the bail in the inclined position shown at Fig. 2. For pulling the shovel forward when it is gathering a load the rope 13 is employed. It passes around a sheave 43 and is connected to the shovel by the forked frame 44. The ends of this forked frame are each provided with lateral hooks 45, adapted to set under the projecting ears 46, attached to the shovel and supporting pivots 47, upon which the ends of the forked frame are secured to said ears. The hooked ends of the frame extend rearwardly of said pivots, it will be seen, especially at Fig. 2, and said pivots are located in a plane above that of the hooks. With this construction it will be noted that when the shovel is being drawn forward to gather the load the tendency of the hooked ends is to tip the rear end of the shovel upward, so that its forward edge will enter the ground and gather its load quickly.

The operation of my invention is as follows: Supposing the shovel to have been loaded, the rope 11 is then drawn upon to lift the shovel preparatory to swinging it to the dumping-point. When the dumping-point is reached, the rope 11 is slackened, causing a reversal of the sprocket-wheel 24, by which the pin-wheel is operated, and the motion so given the pin-wheel carries one of the pins 28 under the point of the hook and raises it, so that the shovel is released and allowed to tip by the superior gravity of its forward end. When the shovel is drawn forward by the rope 13, that movement does not cause the tripping of the shovel, because the sheave-frame 20 is thereby swung to a position in which the pins 28 do not act upon the hook.

I claim—

1. The combination with the shovel of an excavator, of a lifting-rope, a latching device for controlling the dumping of the load, and mechanism operated by the lifting-rope and acting to operate said latching device by the slackening or paying out of the rope.

2. The combination with the shovel of an excavator, of a latching device controlling the dumping of the shovel, means for releasing said device, and a swinging frame carrying said releasing means and positioned by the lifting-rope.

3. The combination with the shovel of an excavator, of a latching device, controlling the dumping of the shovel, a rotating releasing-wheel at one end of a swinging frame, a rope-sheave at the other end of said frame, said frame and a lifting-rope passing around said sheave and swinging said frame.

4. The combination with the shovel and its latching device controlling the dumping, of the lifting-rope, the sheave operated by the rope, the swinging frame carrying said sheave, the releasing-wheel in said frame, the sprocket-wheels and their connecting-chain and a clutch connection between one of the sprocket-wheels and said releasing-wheel.

5. The combination with the shovel and its latching device controlling the dumping, of the lifting-rope, the rocking frame mounted on the bail of the shovel, the sheave in said frame around which the rope passes, a releasing-wheel for releasing the latch supported in said frame, and means operated by said sheave and having a clutch connection to and operating said releasing-wheel.

6. The excavator-shovel in combination with the rope 13 and the connection between said rope and the shovel, said connection being adapted when said rope is drawing the shovel to raise the rear end of the shovel.

7. The excavator-shovel in combination with a toggle for holding it against tipping while gathering its load and while moving to the place of discharge, a latch or hook attached to the toggle, and means for releasing the latch.

8. The excavator-shovel in combination with a toggle for holding it against tipping while gathering its load and while moving to the place of discharge, a latch or hook attached to the lower member of said toggle, and means for releasing the latch.

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Witnesses:
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