Feb. 21, 1950 F. L. WHITE ET AL 2,498,321

PORTABLE EXCAVATOR

Filed July 24, 1946 2 Sheets-Sheet 1

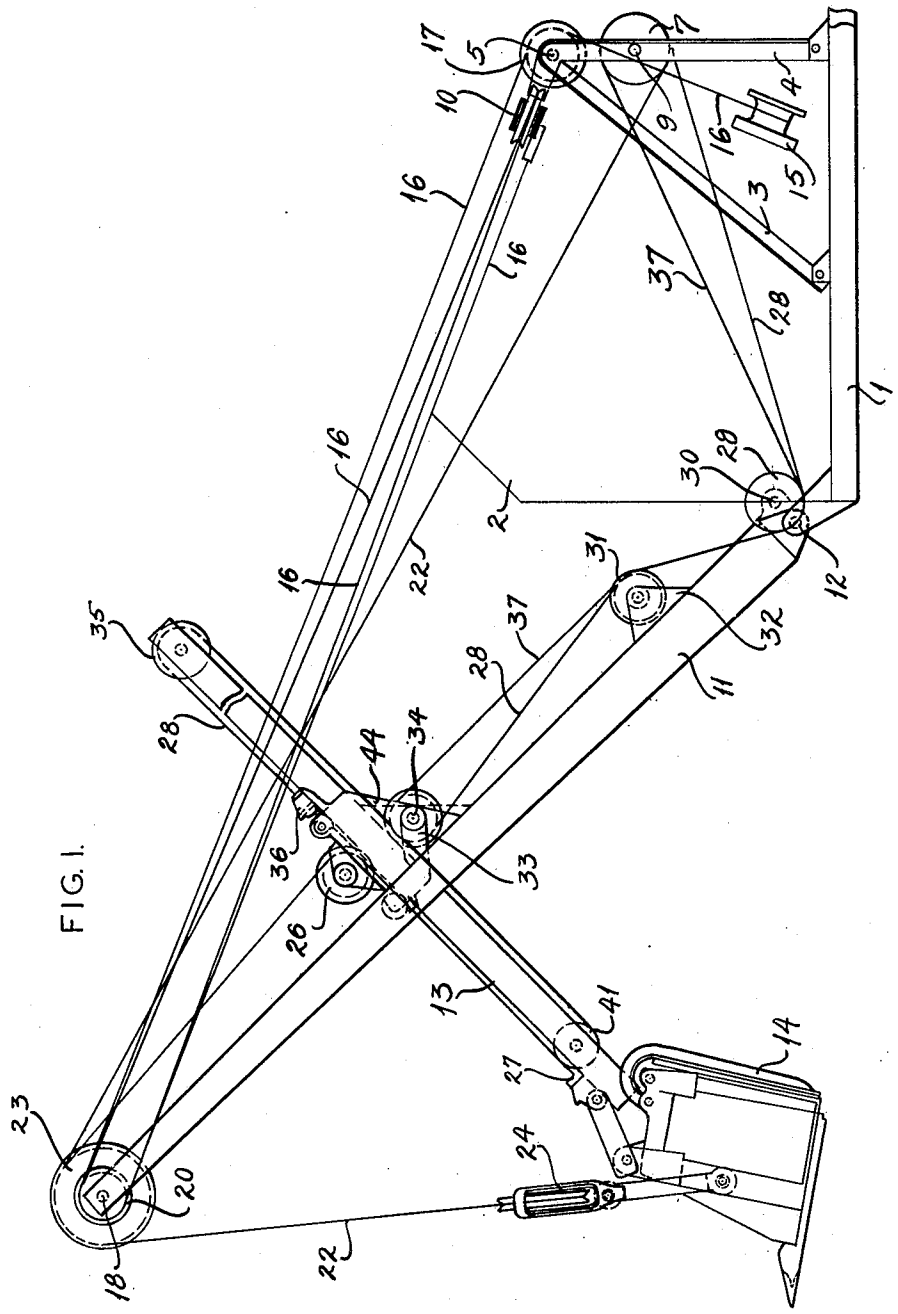


FIG. 1.

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Filed July 24, 1946 2 Sheets-Sheet 2

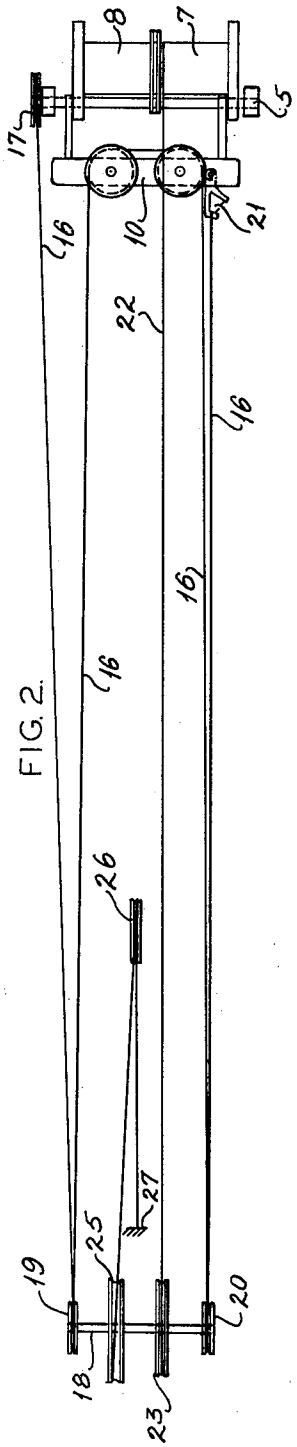


FIG. 2.

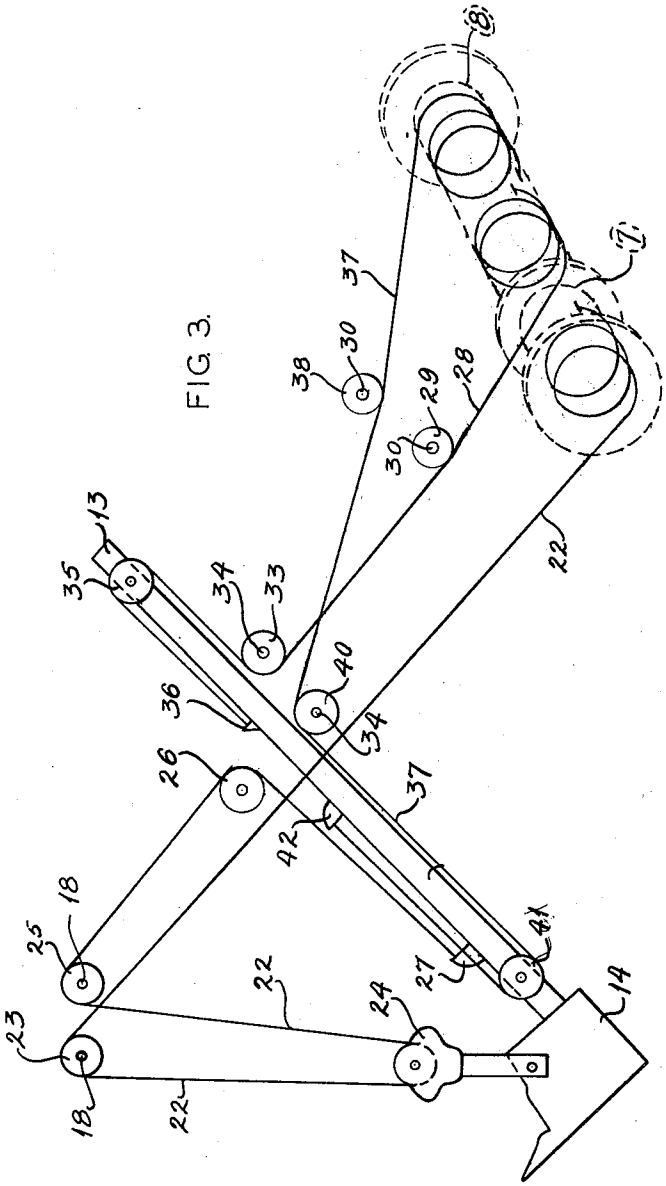


FIG. 3.

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Patented Feb. 21, 1950

2,498,321

UNITED STATES PATENT OFFICE

2,498,321

PORTABLE EXCAVATOR

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Application July 24, 1946, Serial No. 685,857

11 Claims. (Cl. 214—135)

1

This invention relates to excavators and in its more specific aspects is directed to a mechanism that will cause winding of the crowd cable when the dipper and associated handle mechanism is dropped by the action of gravity.

The object of this invention is to provide a device associated with the crowd mechanism of an excavator that will enable the crowd cable to be wound on the crowd drum when the dipper and its handle are dropped from an elevated position.

Another object of the invention is to provide a means associated with the crowd drum and the dipper and its handle to enable the crowd drum to rotate to wind up the crowd cable when the dipper and handle mechanism is dropped by gravitational action.

Other and further objects of the invention will occur to those skilled in the art to which it pertains as the description proceeds which taken in connection with the accompanying drawings sets forth a preferred embodiment thereof but such disclosure is not to be construed as a limitation of the invention which is limited only by the appended claims and any and all modifications, alterations and variations of structure coming within the spirit and scope thereof are deemed to be included herein.

In the drawings:

Fig. 1 shows a side elevational view of mechanism incorporating the invention.

Fig. 2 shows a plan view of the boom and dipper hoisting cables.

Fig. 3 shows a general lay out view partly in perspective of the cable connections for the dipper hoist, retract and crowd mechanism.

This invention is an improvement on the disclosure in previous application S. N. 598,304, filed June 11, 1945, now Patent No. 2,420,990, granted June 11, 1947, and entitled Portable excavator.

The objects and advantages outlined above are achieved in a structure set forth in the accompanying drawings in which 1 is a platform or deck structure on which a shelter 2 is mounted, only a portion of which is shown, all of which schematically illustrates the revolvable upper body of an excavator which is suitably supported on an appropriate chassis as is well known and understood in the art.

Supported on the platform 1 are gantry members 3 and 4 whose upper ends are connected to-

2

gether by a shaft 5 which may be mounted therein for rotation. A pair of winding drums 8 and 9 similar in construction to those illustrated in the above identified pending application are mounted on a shaft 9 rotatably supported in gantry member 4. The drums 8 and 9 are intended to be driven by a suitable prime mover (not shown) mounted on platform 1. An idler pulley support 10 having a pair of idler pulleys rotatably mounted therein is suspended from shaft 5.

A boom 11 is pivoted to platform 1 by means of a pin 12 and a handle 13 having a dipper 14 thereon is slidably mounted on the boom, the handle being received in a saddle block 44 secured to boom 11. The dipper 14 and its handle 13 is actuated in said saddle block by suitable means subsequently more specifically set forth.

A suitably driven hoisting means for boom 11 is schematically illustrated at 15, it being understood that it is appropriately mounted on platform 1 in a manner well known to the art. A cable 16 windable on the means 15 is led around sheave 17 secured to shaft 5 and is then led around sheave 19 rotatably supported on shaft 18 arranged in the upper or free end of the boom 11. The cable 16 is then led around both idler sheaves on idler mechanism 10, thence around sheave 20 mounted for rotation on shaft 18 and is thence returned to the idler mechanism 10 where it is anchored by means of mechanism 21.

The cable 22 for hoisting dipper 14 is wound on drum 7 and is then led around sheave 23 rotatably mounted on shaft 18, thence is led through padlock sheave 24, thence is led around sheave 25 rotatably mounted on shaft 18, thence around sheave 26 rotatably supported on saddle block 44 and is then anchored to handle 13 at 27 adjacent the dipper 14. It is apparent from the foregoing that upon actuation of the drum 7 to wind cable 22 thereon that dipper 14 is simultaneously hoisted and retracted.

The crowd cable 28 for the dipper 14 and handle 13 is secured to and wound on the drum 8 and is then led around sheave 29 rotatably mounted on a shaft 39 arranged in a suitable bracket mounted on the boom 11 adjacent the lower end thereof. It may be desirable under some circumstances to place the sheave 29 on the pin 12. The sheave 30 is arranged at the point designated to mini-

mize the effect of and to prevent the lowering and hoisting of the boom changing the tension in the crowd cable 28. Cable 28 is then passed over a sheave 31 rotatable in a bracket 32 secured to the boom 11 in order to prevent cable wear on the boom 11. The cable 28 is then led around sheave 33 rotatably mounted on shaft 34 arranged in saddle block 44, is then led around sheave 35 rotatably supported on the free end of handle 13 and is then anchored to the saddle block 44 at 36.

When the dipper 14 is dropped by gravitational action considerable slack may develop in the crowd cable 28 and because this may produce difficulty it is necessary that the cable be wound up as fast as the dipper and handle assembly is dropped. To achieve this result means must be provided to reversely operate the drum 8. A cable 37 is secured to drum 8 and wound thereon in a direction opposite to cable 28 such that the one will be wound while the other is unwound. The cable is then led around sheave 38 rotatably mounted on shaft 30, is then led over a sheave coaxially disposed with respect to sheave 31 and rotatably mounted on the shaft in bracket 32, is then led around a sheave 40 rotatably on shaft 34, is then led around sheave 41 rotatably mounted in handle 13 at a point adjacent the dipper 14 and is then anchored to the saddle block 44 at 42.

It is evident therefore the tension in cables 28 and 37 is substantially constant and that no slack will gather in the crowd cable 28 or in cable 37.

That which is regarded new, novel and useful and which is sought to be protected by Letters Patent of the United States is as follows:

1. A portable excavator comprising means to hoist and retract a dipper and handle assembly; means to crowd the dipper and handle assembly; and means associated with said last mentioned means to reversely operate said last mentioned means when the dipper and handle assembly is lowered by gravitational action.

2. A portable excavator comprising means to hoist and retract a dipper and handle assembly; means including a cable to crowd the dipper and handle assembly; and means associated with said last mentioned means to maintain said cable taut when the dipper and handle assembly is lowered by gravitational action.

3. A portable excavator comprising a tiltable boom; a dipper and handle assembly operatively associated with said boom; a double winding drum; a cable wound on one of said drums and operatively associated with said dipper and one end of said handle to hoist and retract said dipper; a cable wound on the other of said drums and operatively associated with the other end of said handle to crowd said dipper; and another cable wound on said last mentioned drum and operatively associated with said handle to maintain said crowd cable tensioned when said dipper and handle assembly is permitted to drop.

4. A portable excavator comprising a dipper and handle assembly operatively associated with a tiltable boom; a winding drum; a cable connected to and windable on said drum and operatively associated with the handle of said assembly to crowd the dipper; and another cable connected to and windable on said drum in a direction opposite said crowd cable and operatively associated with said handle to maintain said crowd cable tensioned when said assembly is lowered with respect to said boom.

5. A portable excavator comprising a tiltable boom; a dipper and handle assembly; a saddle block on said boom in which said assembly is slidably mounted; a winding drum; a cable wound on said drum and operatively associated with the free end of said handle and anchored to said saddle block to crowd the dipper; and a cable wound on said drum in a direction opposite to said crowd cable and operatively associated with the opposite end of said handle and anchored to said saddle block to wind said crowd cable on said drum when said assembly is moved by gravitational action relative to said boom.

6. A portable excavator comprising a dipper and handle assembly movable relative to a boom; means to crowd said dipper; and means associated with said last mentioned means to reversely actuate said means when said assembly is moved by gravitational action relative to the boom.

7. A portable excavator comprising a dipper and handle assembly movable relative to a boom; a saddle block in which said assembly is received for movement relative to the boom; a winding drum; a cable wound on said drum and anchored to said saddle block and operative on the free end of said handle to crowd the dipper; and another cable wound on said drum in a direction opposite said crowd cable and anchored to said saddle block and operative on the other end of said handle to reversely operate said drum to thereby wind said crowd cable when said assembly moves relative to said saddle block by gravitational action.

8. A portable excavator comprising a tiltable boom; a dipper and handle assembly; means on said boom in which said assembly is slidably received; a first winding drum; a cable wound on said drum and connected to the handle and operatively associated with the dipper to hoist and retract the dipper; a second winding drum; a cable wound on said second drum and anchored to said means and operatively associated with one end of said handle to crowd the dipper; another cable wound on said second drum in a direction opposite that of said crowd cable to reversely rotate said second drum to wind said crowd cable thereon when said assembly moves relative to said means; and a plurality of sheaves rotatably supported near the base of said boom over which the cables on said second drum pass to keep tension therein constant when said boom is tilted.

9. In a portable excavator comprising a dipper and handle assembly; a winding drum; a crowd cable windable on said drum and operative on one end of the handle to crowd said assembly; and another cable on said drum and operatively associated with the other end of the handle, said cables remaining under substantially constant tension regardless of the direction of axial movement of the handle of said assembly.

10. In a portable excavator comprising a dipper and handle assembly; a saddle block in which the handle of said assembly is received; a wind-drum; a crowd cable windable on said drum and anchored to said saddle block and operatively associated with one end of the handle to crowd the dipper of said assembly; and another cable windable on said drum and anchored to said saddle block and operatively associated with the other end of the handle; said cables operating on said drum so that one is unwound while the other is wound to thereby keep tension substantially constant in both cables when the handle is reversely moved in said saddle block.

11. In a portable excavator, a tiltable boom; a dipper and handle assembly operatively associated with said boom and adapted for hoisting, retracting and crowding operations by power operation or gravitational action; means to per-

form any two of the preceding operations simultaneously; means including a cable to perform the remaining operation individually in one direction by power and reversely by gravitational action; and means to maintain the cable taut when the last mentioned operation is being reversely performed.

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