June 24, 1930. LE ROY P. CLUTTER 1,765,905

EXCAVATOR

Filed Oct. 18, 1926 3 Sheets-Sheet 1

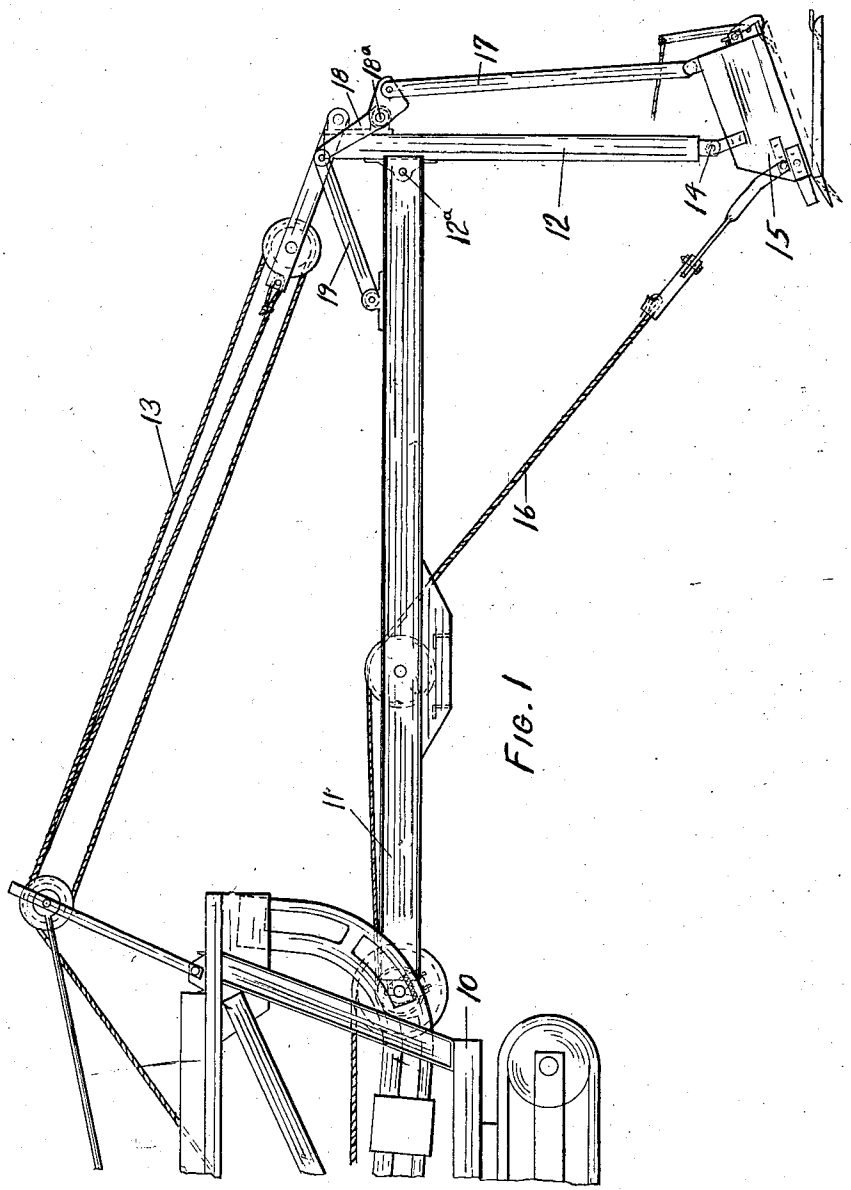


FIG. 1

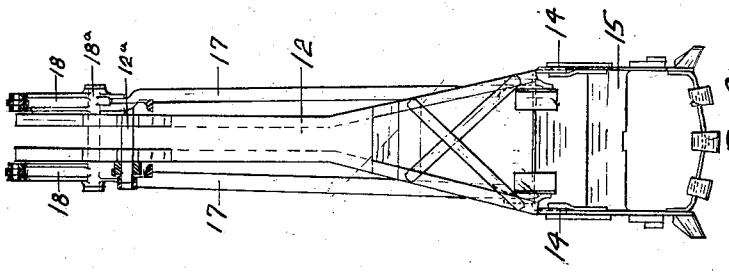


FIG. 2

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EXCAVATOR

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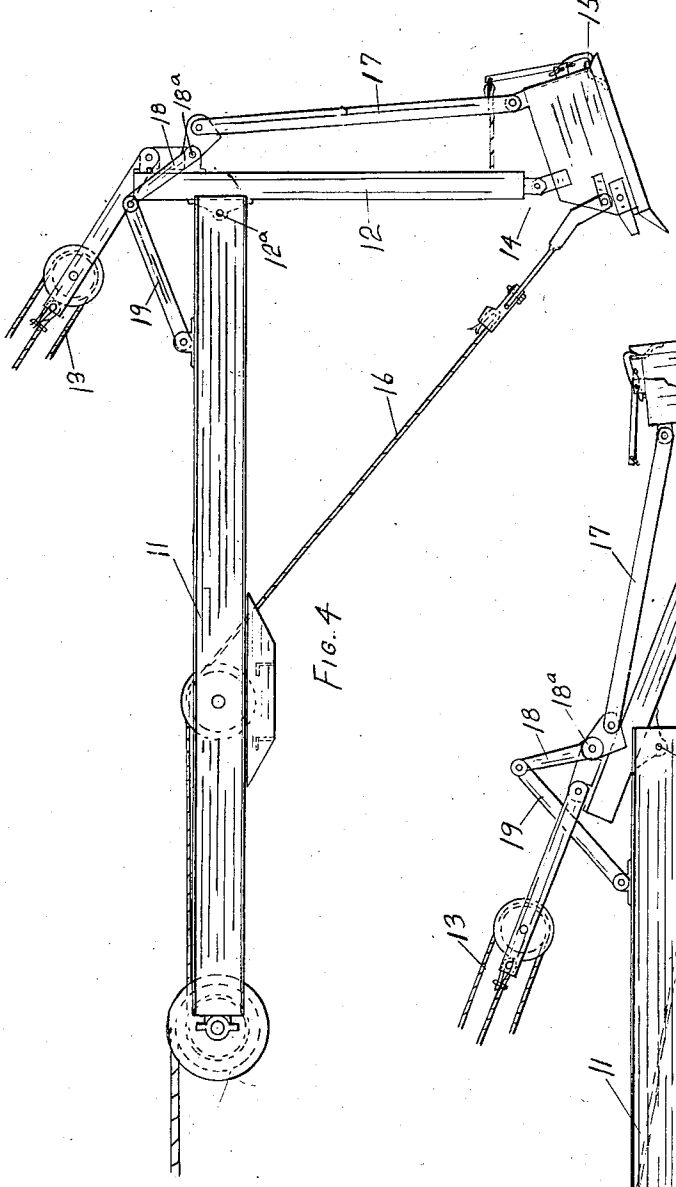


FIG. 4

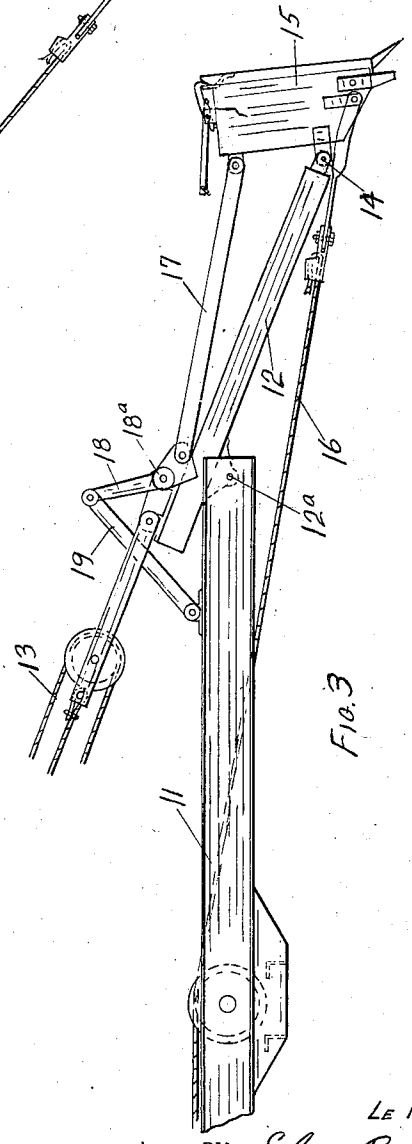


FIG. 3

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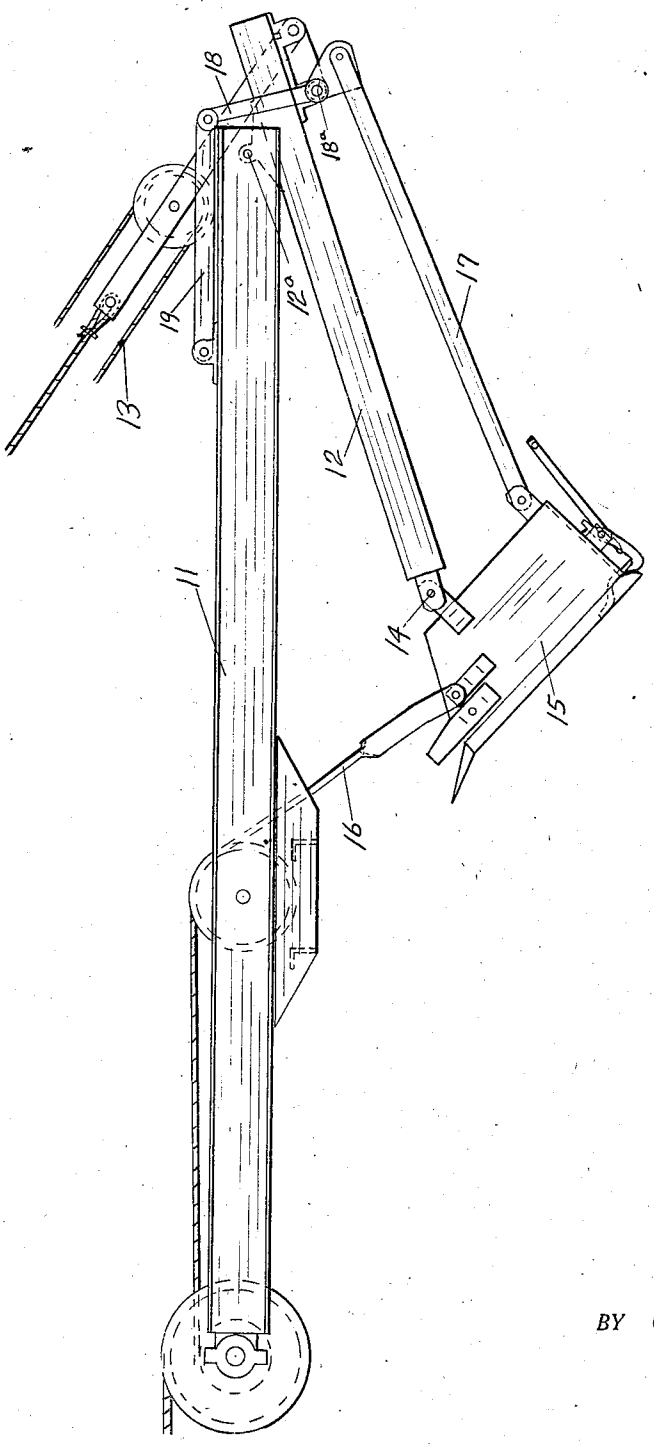


FIG. 5

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UNITED STATES PATENT OFFICE

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EXCAVATOR

Application filed October 18, 1926. Serial No. 142,183.

This invention relates to excavators, and particularly to that type known as ditchers used in digging trenches, cellars, etc.

The chief object of the invention is to provide in an excavator, means for swinging an excavator scoop along a path and means for shifting the scoop on the swinging means to maintain the scoop at an effective earth excavating inclination throughout the swinging movement thereof.

Another object of the invention is to provide the combination with an excavator, including a boom, and a dipper stick pivoted on the boom and carrying a scoop, of means operable by shifting of the dipper stick relative to the boom for shifting the scoop on the dipper stick so that it will be maintained at an earth excavating inclination in all positions of the dipper stick and boom. Thus the cutting angle can be maintained while operating the scoop along a path determined by movement of both the stick and the boom.

Particularly the invention has for its object the provision of means effective upon an excavator scoop mounted to swing upon a support to increase the cutting angle thereof at the extremes of its movement, whereby the scoop can cut approximately along the vertical at the start of its crowding movement into earth and also effective to prevent the heel of the scoop from scraping against the earth as it moves therethrough toward the finish of the crowding movement.

The foregoing and other objects are obtained by the apparatus illustrated in the accompanying drawings and described below. It is to be understood that the invention is not limited to the specific form thereof shown and described.

Of the accompanying drawings,

Figure 1 is a side elevation of apparatus embodying the invention;

Figure 2 is an end elevation, partly in section, of the dipper, scoop and operating means;

Figure 3 is a detail elevation showing the position of the apparatus at the start of an excavating operation;

Figure 4 is a similar view showing the apparatus in an intermediate position during an excavating operation; and

Figure 5 is a similar view showing the apparatus in its position at or near the completion of an excavating operation.

Referring to the drawings, the numeral 10 represents a suitable power shovel apparatus on which an apparatus embodying the invention may be pivoted. This apparatus includes a boom 11 pivoted on the platform of shovel apparatus 10 and having pivoted thereon, as at 12^a, on its free end a dipper stick 12, a portion of which projects slightly above boom 11 and has a hoist line 13 connected thereto and operable from apparatus 10, the lower end of dipper stick 12 having pivoted thereon at 14 a scoop shown at 15, the pivot being adjacent the forward end of the scoop, crowding of which is accomplished by means of a drag line 16 operable from the shovel apparatus 10 in any suitable manner.

For shifting scoop 15 during an excavating operation to maintain the scoop at an excavating angle throughout its movement, a link 17 connects scoop 15 adjacent its rear end to a lever 18 pivoted at 18^a on dipper stick 12 at a point outwardly and upwardly spaced from the pivot 12^a of dipper stick 12 when the latter is substantially at right angles to boom 11. Lever 18 is arranged to be operated by relative movement of the stick 12 and boom 11 by means of a link 19 connecting boom 11 and lever 18. Link 17 is of such length as to hold the scoop 15 at an excavating inclination throughout its crowding movement.

In operation, at the start of a ditching operation or in excavating cellars, the dipper stick 12 is moved to the initial position shown in Figure 3, this movement serving to actuate scoop 15 to an inclination adapted for a crowding action vertically into the earth. As the ditching operation proceeds, the dipper stick will be operated past the intermediate position shown in Figure 4 to the final position shown in Figure 5, from any of which positions the boom may be elevated to dump the scoop of earth in the usual manner.

It will be observed that the lever 18 is operated by link 19 by relative movement of the stick and boom to hold the heel of the scoop from dragging on the earth at any point in the path over which the scoop is operated. The scoop is actuated along any desired path by combined movements of the stick and the boom, i. e. as excavating operations proceed the scoop is actuated inwardly along a flattened arc by swinging the stick inwardly and lowering of the boom simultaneously with the swinging movement. The above device is thus capable of "nosing" the scoop into the earth so that it is at an effective angle at any point throughout the range of its movement due to combined action of the stick and boom.

Modifications of the invention may be resorted to without departing from the spirit thereof or the scope of the appended claims.

What is claimed is:

1. Excavating apparatus including a pivoted boom, a dipper stick pivoted on the boom, a scoop pivoted at its forward end on the dipper stick, means for raising and lowering the boom and for swinging the dipper stick thereon, a lever pivoted on the dipper stick at a point spaced from the pivot of the latter on the boom, a link connecting one end of the lever to the boom, and a link connecting the other end of the lever to the rear end of the scoop, whereby the scoop will be held at an excavating inclination to the path over which it is operated.

2. Excavating apparatus including a pivoted boom, a scoop carrier pivoted on the boom, means for raising and lowering the boom, means for swinging the scoop carrier on the boom to perform an excavating operation, a scoop pivoted adjacent its forward end on the scoop carrier, a lever pivoted on the scoop carrier, a link connecting one end of the lever to the boom, and another link connecting the other end of the lever to the scoop adjacent its rear end, whereby the scoop will be maintained at an excavating inclination to the path over which it travels under combined action of the stick and boom.

3. Excavating apparatus including a boom, a scoop carrier pivoted on the boom, means for swinging the scoop carrier on the boom to perform an excavating operation, a scoop pivoted adjacent its forward end on the scoop carrier, a lever pivoted on the scoop carrier, a link connecting the lever to the boom, and another link connecting the lever to the scoop adjacent its rear end, whereby the scoop will be maintained at an excavating inclination to the path over which it travels.

4. Excavating apparatus including a support, a scoop carrier pivoted on the support, means for swinging the scoop carrier on the support, a scoop pivoted on the carrier, and means between the support and scoop and actuated by relative arcuate movement of the scoop carrier and support for shifting the heel of the scoop on the carrier during swinging movement thereof, whereby the scoop heel will be drawn relatively toward the carrier pivot as the scoop is swung to the extremes of its movement.

5. In an excavating machine, a boom pivoted to swing in a vertical plane, a dipper stick pivoted on the boom to swing in said plane, a scoop pivoted upon the dipper stick, and means between the boom and scoop and operable by relative movement of the stick and boom for shifting the scoop on the stick to increase the cutting angle thereof at both the extremes of the swinging movement of said dipper stick.

6. In an excavating machine, a support, a scoop, means for pivotally suspending the scoop from the support, and means between the support and scoop and operable by relative arcuate movement of the suspending means and support for increasing the cutting angle of the scoop relative to the suspending means as the scoop is swung toward both extremes of its motion.

7. In an excavating machine, a support, a scoop, means for pivotally suspending the scoop from the support, and means between the support and scoop and operable by relative arcuate movement of the suspending means and the support for increasing the cutting angle of the scoop with respect to the suspending means to substantially a vertical cutting position at one extreme of its movement and also for increasing said cutting angle at the other extreme of movement of the scoop.

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