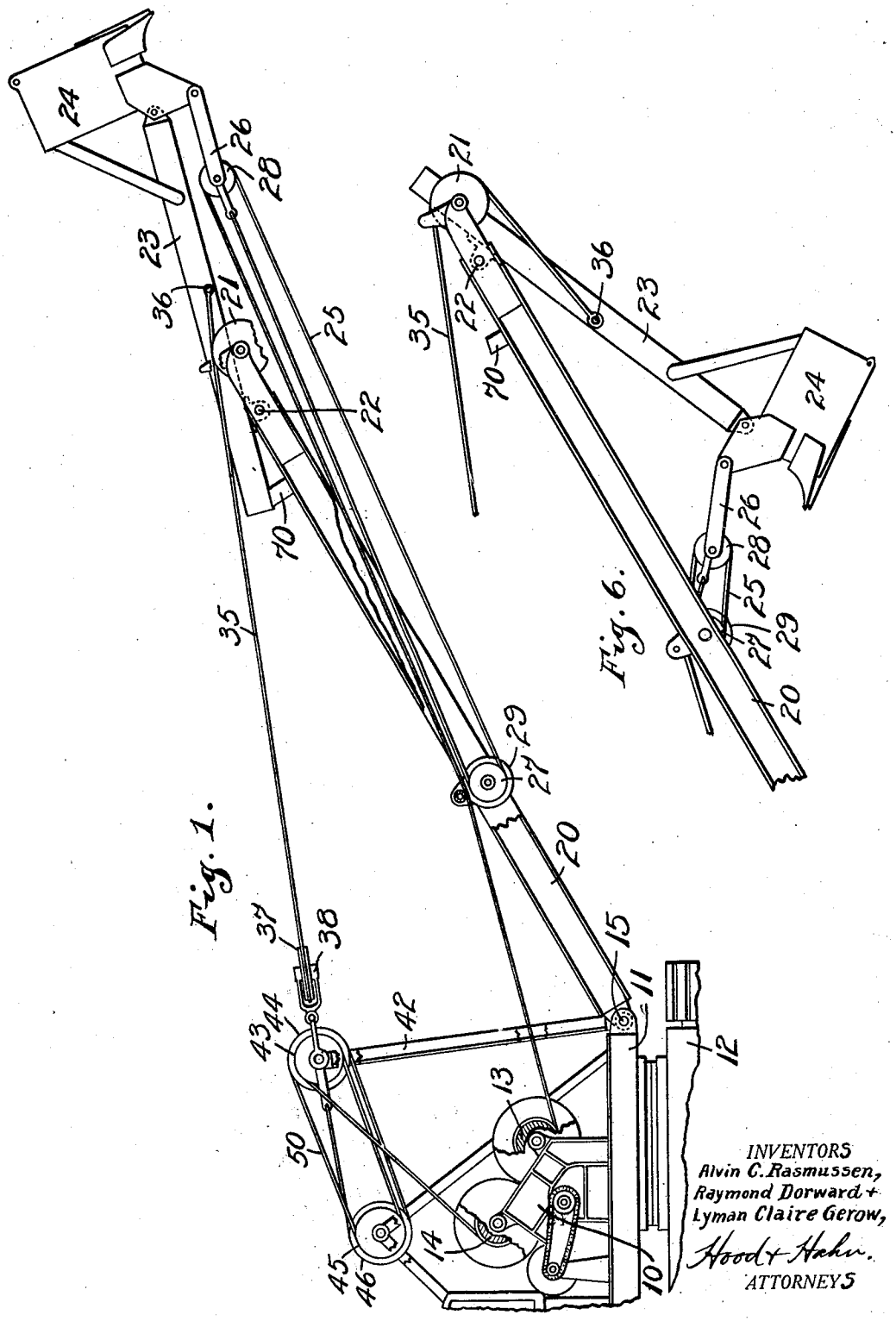
April 12, 1932. A. C. RASMUSSEN ET AL 1,854,151

DITCHER

Filed April 15, 1929 3 Sheets-Sheet 1



INVENTORS
Alvin C. Rasmussen,
Raymond Dorward +
Lyman Claire Gerow,
Hood + Hahn.
ATTORNEYS

April 12, 1932. A. C. RASMUSSEN ET AL 1,854,151

DITCHER

Filed April 15, 1929 3 Sheets-Sheet 2

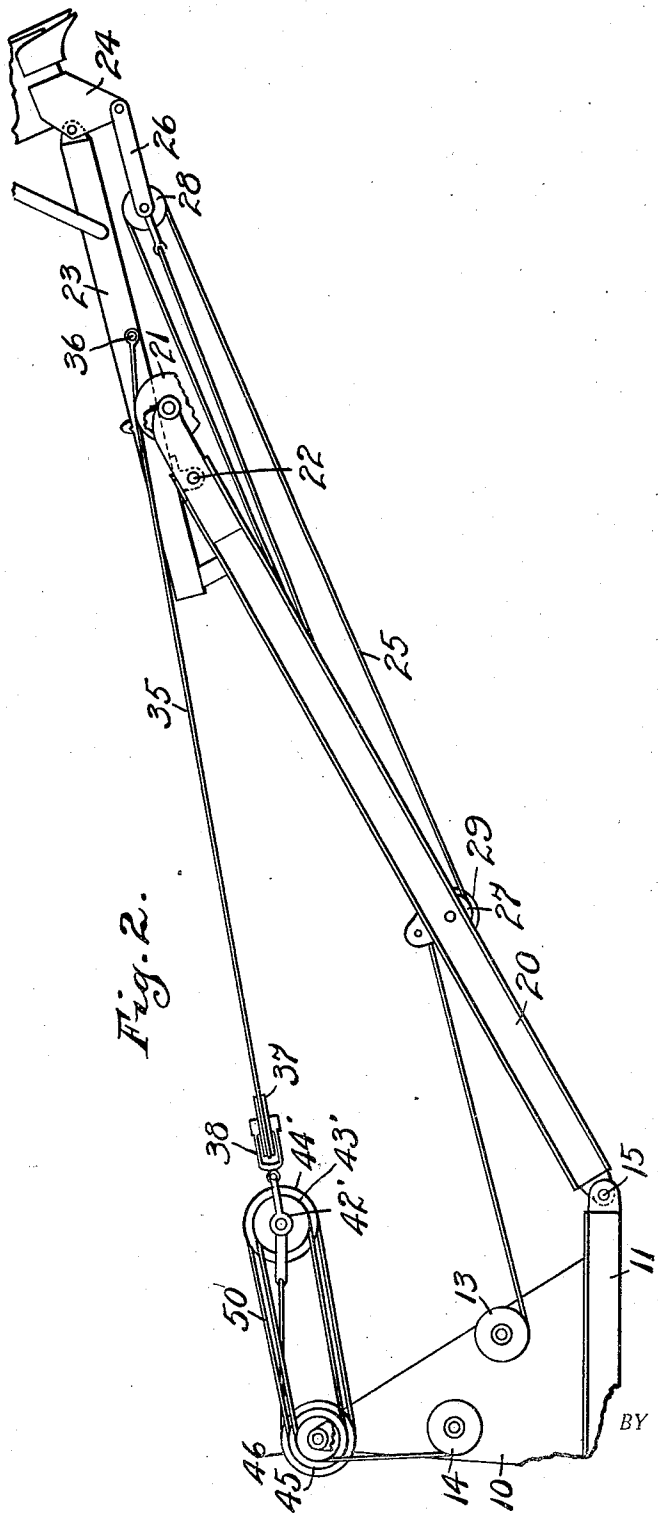


Fig. 2.

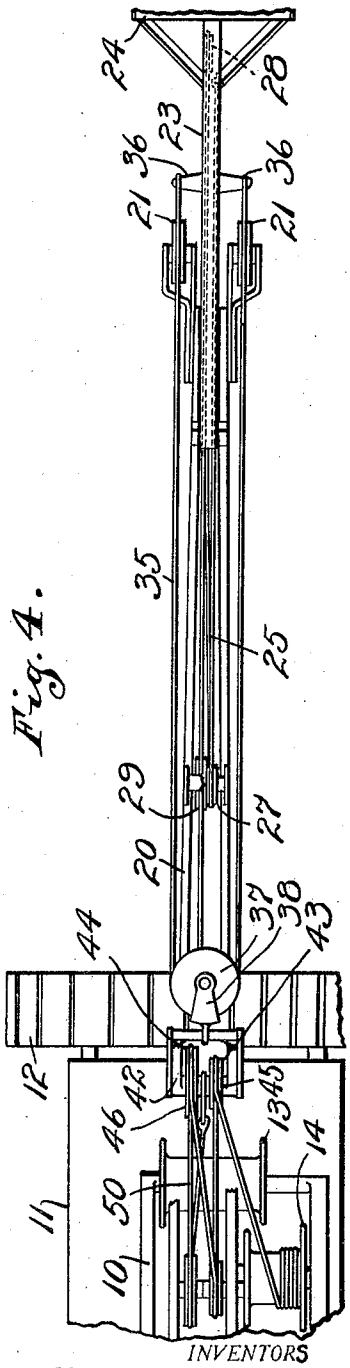


Fig. 4.

INVENTORS
Alvin C. Rasmussen,
Raymond Dorward &
Lyman Claire Gerow,
Hood & Hahn
ATTORNEYS

April 12, 1932. A. C. RASMUSSEN ET AL 1,854,151

DITCHER

Filed April 15, 1929 3 Sheets-Sheet 3

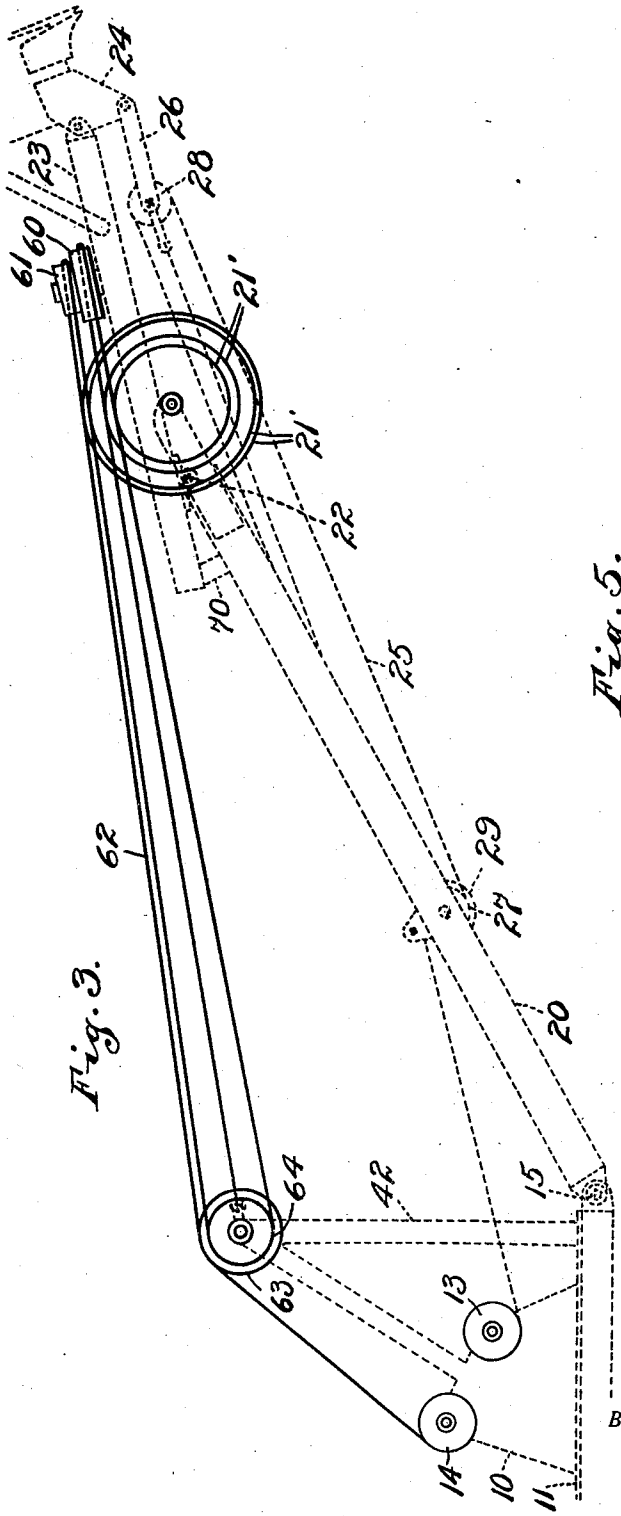


Fig. 3.

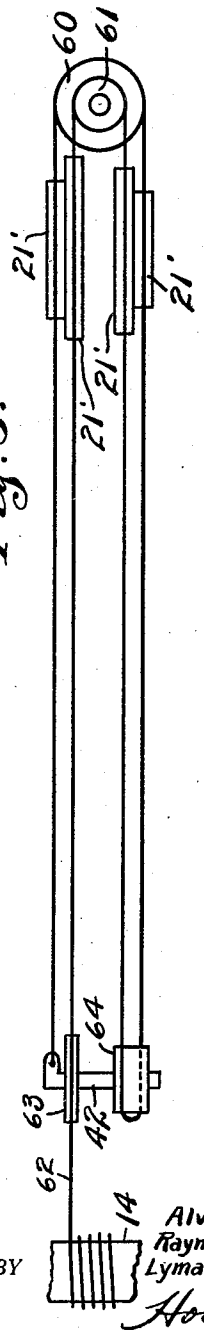


Fig. 5.

INVENTORS
Alvin C. Rasmussen,
Raymond Dorward +
Lyman Claire Gerow,
BY Hood & Hahn
ATTORNEYS

Patented Apr. 12, 1932 1,854,151

UNITED STATES PATENT OFFICE

ALVIN C. RASMUSSEN, RAYMOND DORWARD, AND LYMAN CLAIRE GEROW, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO INSLEY MANUFACTURING COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA

DITCHER

Application filed April 15, 1929. Serial No. 355,340.

The object of our invention is to produce a boom-type ditcher structure of such character that the necessary movements of the excavating bucket may be easily and accurately controlled.

The accompanying drawings illustrate our invention.

Fig. 1 is a side elevation of an embodiment of our invention;

Fig. 2 is a diagrammatic side elevation of another embodiment;

Fig. 3 is a diagrammatic side elevation of a third embodiment;

Fig. 4 is a plan of Figs. 1 and 2;

Fig. 5 is a diagrammatic plan of Fig. 3, and

Fig. 6 is a fragmentary elevation of the form shown in Fig. 1 with the bucket and stick at the inner extreme.

In the drawings 10 indicates a suitable power plant, carried by a turn table 11 mounted on a main body 12 conveniently of a tractor type, and comprising two winding drums 13 and 14 and means for independently driving and controlling the same.

Stepped on table 11, on a horizontal pivot 15 is a boom 20 which is bifurcated at its outer end to form supports for two axially-aligned sheaves 21, 21. Pivoted at an intermediate point on the boom near the base of the bifurcation, on a pivot pin 22, is a bucket stick 23 to the lower end of which is secured an excavator bucket 24 of desired type.

Connected to the lower end of the bucket stick, or to the bucket, is a pull line 25, which, in the drawings is anchored on the sheave block 26, passed thence around a sheave 27 on the boom, thence back to and around the sheave 28 of the block 26, thence back over a sheave 29 on the boom and thence to winding drum 13. It will be understood, however, that line 25 may be reeved in various ways depending upon the amount of pull desired. Line 25 will be called the lower pull line. In a ditcher of the hoe type this line is the digging line.

Thus far the various embodiments shown in the drawings are identical.

Referring now to Figs. 1, 2 and 4. The two ends of an upper pull line 35 are anchored at 36 upon the bucket-stick considerably below the pivot. The two leads of this line are passed over sheaves 21, 21 and the bight is passed around the sheave 37 of a block 38, sheave 37 thus acting as an equalizer for the upper pull line 35.

In the form shown in Fig. 1 the sheave-block 38 is anchored on the upper end of a jack frame 42 which is stepped at its lower end on table 11, conveniently on the pin 15 but independent of the boom. Frame 42 carries, at its upper end two sheaves 43, 44 (more or less as desired) and alined with these sheaves are two sheaves 45 and 46 (more or less as desired) journalled on a fixed support carried by the turn table and at about the height of the upper end of the jack frame.

A pull line 50, which is in effect a complement to the upper pull line 35, is anchored on the jack frame, reeved around sheaves 46, 44, 45 and 43 and passed thence to the winding drum 14.

In the form shown in Fig. 2 the jack frame is omitted and we provide a sheave block 42′, containing sheaves 43′ and 44′; and sheave block 38 is attached to block 42′.

In this form blocks 38—42′ are unsupported, except by the tension in the upper pull lines and therefore, when the boom is lowered to and below horizontal position the lifting effect of the upper line is materially diminished as compared with the arrangement including the jack frame as shown in Fig. 1.

In the form shown in Figs. 3 and 5 we show an arrangement in which a comparatively light and flexible upper pull line may be used without the use of the heavy line 35.

In this form we provide each finger of the

outer end of the boom with two sheaves 21′, 21′ and journal two sheaves 60, 61 on the lower end of the bucket stick. The upper pull line 62 is carried from the winding drum 14 over a sheave 63 on the mast, thence over one of the sheaves 21′ at one side of the boom, thence around sheave 61, thence back around one of the sheaves 21′ at the opposite side of the boom, thence back around a sheave 64 on the mast, thence back over one of the sheaves 21′, thence around sheave 60, thence back over the last sheave 21′, and thence to an anchorage on the mast. It will be readily understood that more or fewer passes of line 62 may be provided without departing from the spirit of the invention, the number of passes depending upon the size and strength of the pull line which is desired and the net force on the ditcher bucket to be exerted thereby.

It will also be readily understood that the number of passes of the pull line 35, and the number of sheaves carried by the block 38 may be more or less for the same reason.

The bucket stick is projected above its pivot so that, when the stick is fully extended the upper end of the stick will engage a buffer block 70 carried by the upper face of the boom 20.

We claim as our invention:

1. An excavator comprising a vertically swinging boom, a depending bucket stick pivotally supported on said boom, an excavator bucket carried by the lower end of the stick, pull line guiding means carried by the boom beyond the stick pivot, a sheave block arranged above the boom and independent thereof, a second sheave block anchored on the first sheave block, a pull line comprising two passes anchored to both the stick below its pivot, passed over the pull line guiding means carried by the boom and with its bight anchored on the second sheave block, a winding drum, a pull line connected to said winding drum and reeved through the first sheave block, a second winding drum, a pull line connected to said second winding drum and to the lower end of the stick to exert a pull upon the stick in opposition to the pull of the first-mentioned pull line, and means for independently controlling the two winding drums.

2. An excavator comprising a boom mounted to swing in vertical planes and bifurcated at its outer end, a bucket stick pivoted to said boom, a bucket carried at the free end of said stick, a pair of sheaves independently mounted on the furcations of said boom and spaced by a distance at least as great as the width of said stick, a cable having its ends secured to opposite sides of said stick at points below the pivot for said stick and passing over said sheaves, a winding drum, a pull line connected to said winding drum, means connecting said pull line to the bight of said cable, a second winding drum, a line connected to said second winding drum and to the lower end of said stick to exert a pull upon said stick in opposition to the pull of the cable, and means for independently controlling said two winding drums.

3. An excavator comprising a boom mounted to swing in vertical planes and bifurcated at its outer end, a bucket stick pivoted to said boom at a point removed from said bifurcated end, a winding drum, a pull line connected to said drum, a balance sheave secured to the free end of said pull line, a cable reeved through said sheave and having its ends anchored to opposite sides of said stick at points below the pivot of said stick on said boom, a sheave mounted on one of the furcations of said boom, one reach of said cable passing over said sheave, a second sheave mounted on the other furcation of said boom entirely independent of said first sheave, the other reach of said cable passing over said second sheave, said first and second sheaves being spaced to permit the passage therebetween of said stick, a second winding drum, a line connected to said second winding drum, and to the lower end of said stick to exert a pull upon said stick in opposition to the pull of the cable, and means for independently controlling said two winding drums.

4. An indigging ditcher of the dipper type comprising, a boom pivoted to swing about horizontal and vertical axes and bifurcated at its outer end, a dipper stick pivoted to said boom between its furcations, two pairs of sheaves journaled upon the boom, one pair at each side of the dipper stick, a pair of sheaves journaled upon the back of the dipper stick below its pivotal support and beyond the first-mentioned two pairs of sheaves, a winding drum, a pull line extending from said winding drum over said two pairs of sheaves carried by the boom and around said pair of sheaves carried by the dipper stick, an anchorage for the other end of said pull line, a second winding drum, and a second pull line extending from said second winding drum to the lower end of the dipper stick for inward-swing of the dipper stick and independent of the said sheaves carried by the boom.

5. An excavator comprising a boom mounted to swing in vertical planes and bifurcated at its outer end, a bucket stick pivoted to said boom, a bucket carried at the free end of said stick, a pair of sheaves independently mounted on the furcations of said boom, a cable having its ends secured to opposite sides of said stick at points below the pivot for said stick and passing over said sheaves, a winding drum, a pull line connected to said winding drum, means connecting said pull line to the bight of said cable, a second winding drum, a line connected to said

second winding drum and to the lower end of said stick to exert a pull upon said stick in opposition to the pull of the cable, and means for independently controlling said two winding drums.

In witness whereof, we have hereunto set our hands at Indianapolis, Indiana, this 11th day of April, A. D. one thousand nine hundred and twenty-nine.

ALVIN C. RASMUSSEN.
RAYMOND DORWARD.
LYMAN CLAIRE GEROW.