

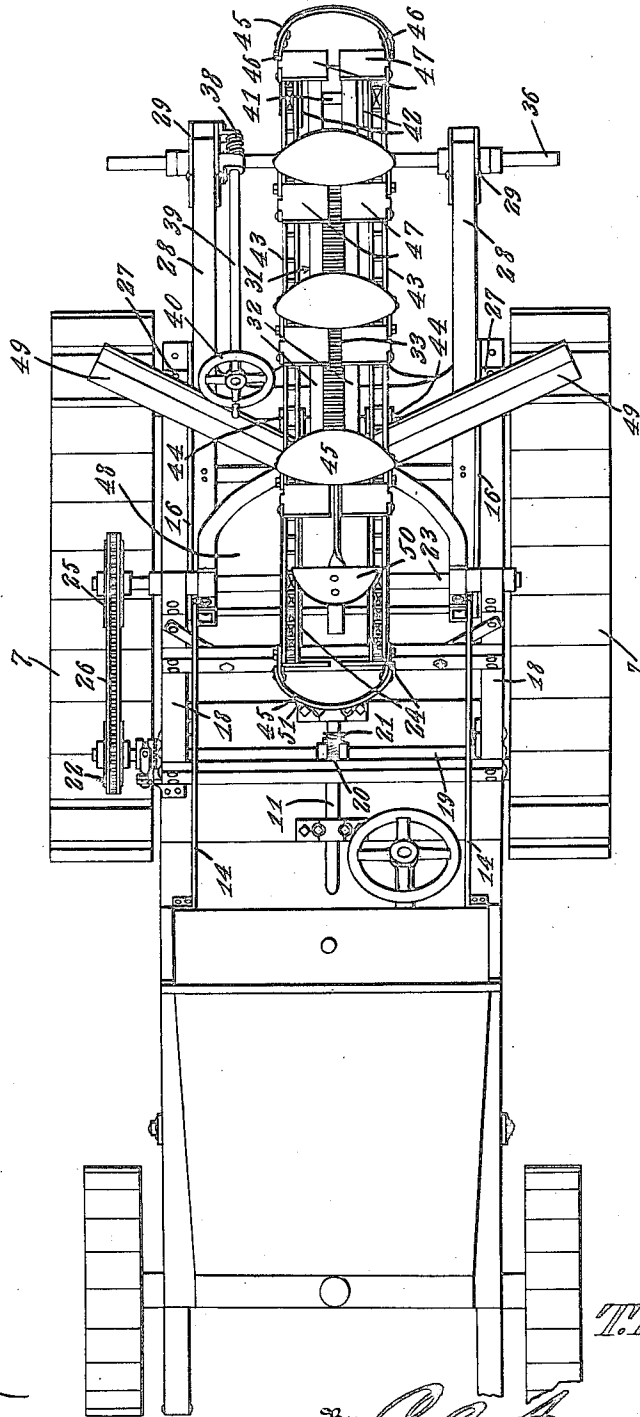
T. K. WHITE.
TRENCH FORMING MACHINE.
APPLICATION FILED MAR. 22, 1920.

1,419,480.

Patented June 13, 1922.

5 SHEETS—SHEET 1.

Fig. 1.



Witness

[Signature]

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5 SHEETS—SHEET 2.

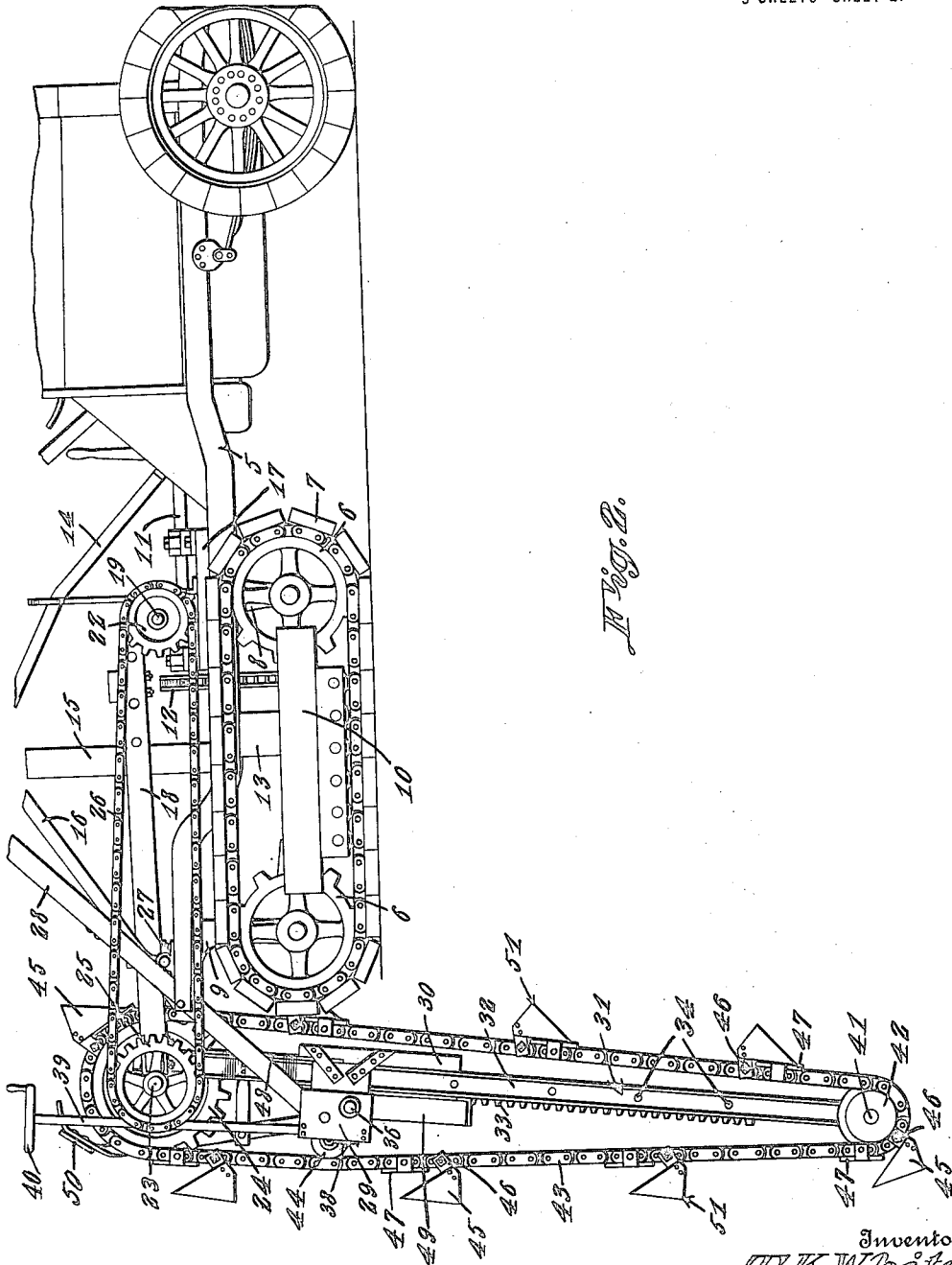


Fig. 2.

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5 SHEETS—SHEET 3.

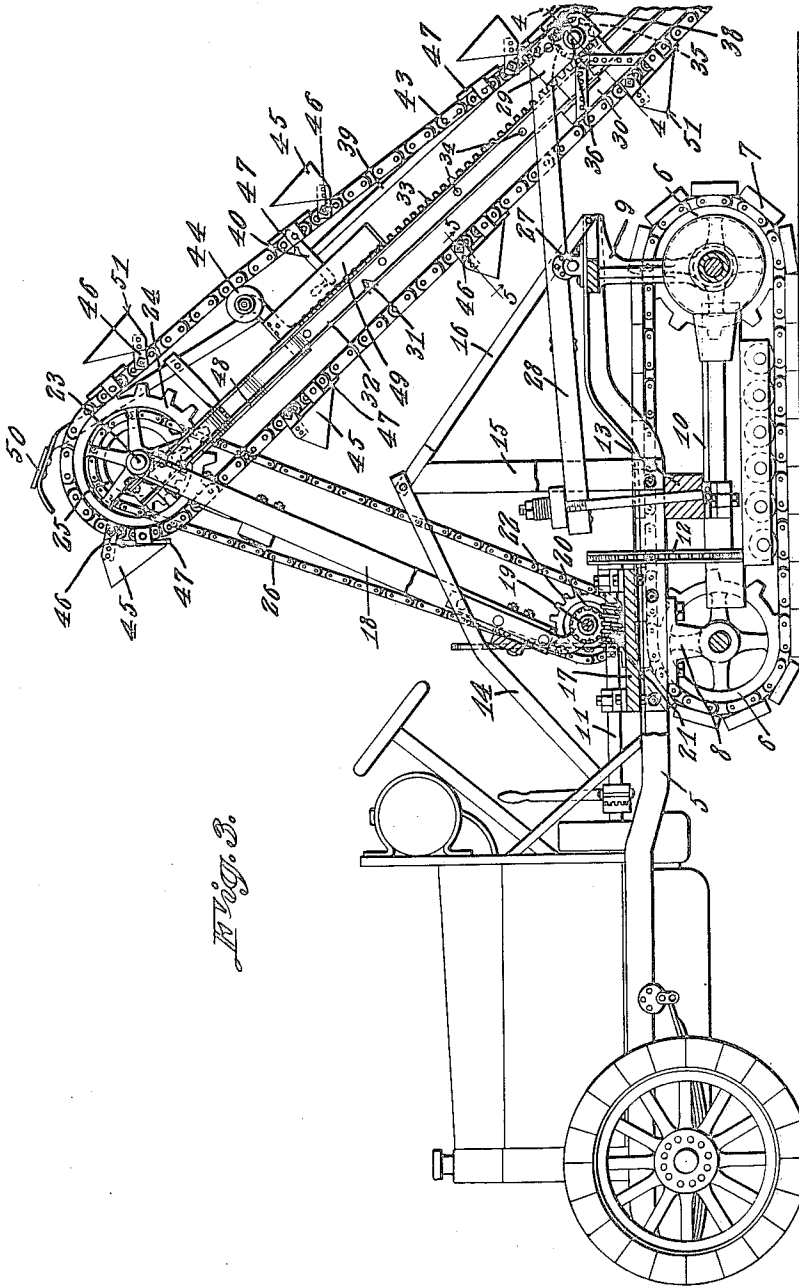


Fig. 3.

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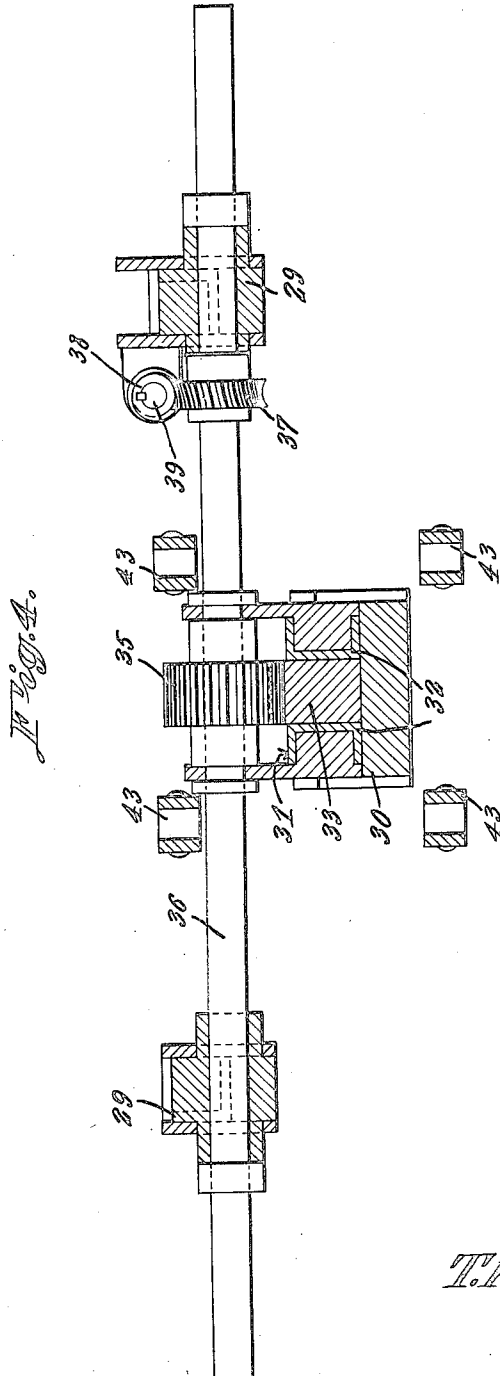
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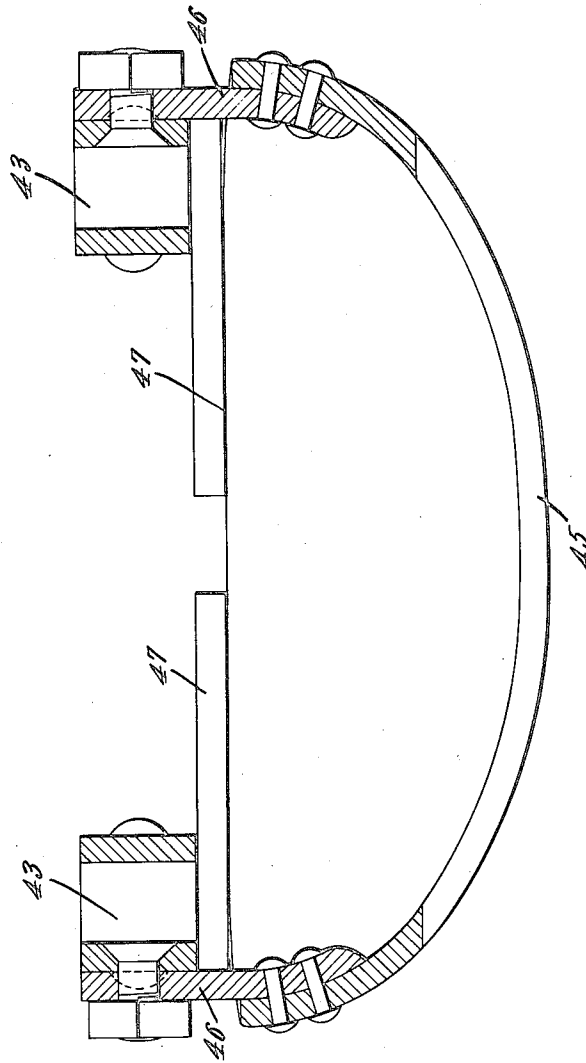
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5 SHEETS—SHEET 5.

Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS KENNEDY WHITE, OF SIOUX FALLS, SOUTH DAKOTA.

TRENCH-FORMING MACHINE.

1,419,480.

Specification of Letters Patent. Patented June 13, 1922.

Application filed March 22, 1920. Serial No. 367,979.

To all whom it may concern:

Be it known that I, THOMAS K. WHITE, a citizen of the United States, residing at Sioux Falls, in the county of Minnehaha and State of South Dakota, have invented a new and useful Trench-Forming Machine, of which the following is a specification.

This invention relates to excavating machines, and more particularly to machines especially adapted for forming trenches, ditches and the like.

The primary object of the invention is to provide a machine of this character having an adjustable boom, constructed in a manner to be moved to assume various angles, to facilitate the digging operation of the machine in the construction of trenches of various depths.

A further object of the invention is to provide an endless chain of scoops adapted to automatically dump the contents thereof, when the scoops have assumed a predetermined position.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter more fully described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed, without departing from the spirit of the invention.

Referring to the drawings:—

Figure 1 illustrates a plan view of a machine constructed in accordance with the present invention;

Figure 2 illustrates a side elevational view of the same, the boom being shown in a position to the limit of one of its adjustments;

Figure 3 illustrates a side elevational view of the machine, the boom being shown as in its inoperative position;

Figure 4 illustrates a sectional detail view of the boom, and its operating shaft; and

Figure 5 illustrates a plan view of one of the scoops, the same being shown partly in section.

Referring to the drawings in detail, the machine is shown as including the side bars 5 which are arranged in parallel relation with each other, and form a part of the frame of the machine for supporting the power generating means at the forward end thereof, which power generating means is

preferably in the form of an internal combustion engine controlled by the usual clutch mechanism, there being means provided whereby the engine may be connected with the mechanism of the machine for operating the endless chain of scoops, or may be clutched with the driving wheel 6, over which operate the caterpillar drive 7, for propelling the machine over the ground surface on which the device is to operate.

Depending bracket members 8 and 9 are secured to the side bars 5 and support the driving wheels 6, horizontal bars 10 being provided for supporting a shaft, which has connection with the drive shaft 11, through the chain 12.

The horizontal bars 10 are disposed in parallel relation with the bars 5 and bear the weight of the machine. Between the bars is supported the operating shaft which operates the drive wheels 6, through suitable differential mechanism, not shown.

Extending transversely of the machine, and connecting the side bars 5 is a brace beam 13, which is disposed in a position between the rear ends of the side bars 5 and the forward drive wheel 6, for the purpose of supporting the frame of the machine.

An auxiliary frame is provided on the side bars 5, and includes spaced bars 14 which have connection with the vertical bars 15, at the ends thereof, the opposite ends of the bars 14 having connection with the side bars 5, in a manner to brace the vertical bars 15, while the parallel bracing bars 16 also have connection with the vertical bars 15 adjacent the upper ends thereof, the lower ends of said bars 16 connect with the side bars 5 adjacent their rear ends.

A relatively small platform 17 connects the side bars 5 and provides a support for shaft 19, around which one end of the arms 18 are pivoted. This shaft 19 carries worm gear wheel 20 which may be slid on shaft 19, into or out of mesh with the worm on shaft 11, for transmitting motion from worm 21 to sprocket wheel 22 keyed to shaft 19, for causing the operation of the scoops.

The outer ends of the arms 18 are pivoted around shaft 23 on suitable brackets, which arms 18 hold the shaft 23 a predetermined distance from the shaft 19 and in parallel relation therewith, regardless of the position of the boom.

Pivotally supported within the bracket members 27, are the arms 28, the outer ex-

termities of which have connection with the supporting block 29, which has connection with guide blocks forming the guide-way 30, which guide-way supports the adjustable boom 31 in a manner to permit the same to be moved longitudinally of the guideway 30, to accomplish the adjustment of the boom.

The adjustable boom includes a pair of relatively long arms 32 and a rack bar 33 secured between the arms 32 by means of the bolts 34, and as shown, the teeth of this rack bar 33 are in engagement with the gear wheel 35 supported on the shaft 36, which is also supported by the guide-way 30, the shaft being provided with a pinion 37 in mesh with the worm 38 provided on the lower extremity of the operating rod 39, an operating wheel 40 being secured to one end of the rod 39 so that rotary movement of the wheel 40 causes a relative movement of the shaft 36 to cause the rack bar 33 to be moved through the guide-way 30.

The bars 28, as shown are of lengths so that the same contact with the transverse rod, thus holding the shaft 36 in a definite position with relation to the working elements of the machine, while in operation.

As shown, the upper extremity of the boom has connection with the shaft 23 so that the same may pivot on the shaft 23 to permit the arms 18 to be moved downwardly to assume a position in parallel relation with the arms 28, to permit the boom to be moved to a position at right angles to the body of the machine so that the scoops, to be hereinafter more fully described, may operate to remove earth to form a trench.

Provided at the free end of the boom, is a shaft 41, on which are supported the gear wheels 42, which gear wheels 42 accommodate the endless chains 43, which endless chains operate over the gear wheels 24 and gear wheels 42 in parallel relation with each other and in a manner to hold the chains rigid, at all times, however an idler 44 is provided for contacting with the inner surfaces of the chains 43, to prevent the chains from sagging under the weight of the material being lifted.

From the foregoing it will be seen that movement is transmitted to the endless chain 43 through the shaft 23 and sprocket wheels 24, which shaft receives motion through the chain 26 that operates over the sprocket wheel 25.

Pivoted scoops 45 are supported by the endless chains 43 and each of these scoops includes a curved body portion and spaced arms 46, which arms are connected to the respective scoops adjacent the cutting edge thereof, so that the scoops will closely engage the chains on the upward movements thereof, thus eliminating the possibility of material falling from the scoops before the

same have reached their depositing positions.

Carried by the endless chains 43, are the relatively wide plates 47, which plates 47 provide bottoms for the scoops, to prevent the material contained in the scoops from passing to the interior of the machine, between the endless chains 43.

A receiving platform 48 is also supported by the boom, in a position adjacent the upper end thereof, which platform is especially designed to receive the material excavated by the machine, and as shown, the chutes 49 extend laterally from the platform 48 to deliver the material to points remote from the machine.

Arranged adjacent the upper end of the boom is a scraper 50 which is of a size to properly fit within the scoops, and as shown this scraper 50 lies in a position to engage within the scoops when the same have been moved to their discharging positions, thereby insuring the emptying of the scoops, before the same are moved against their digging positions. It will also be seen that due to the angular construction of the rear walls of the scoops, the scraper 50 cams the rear portions of the scoops, outwardly and away from the endless chains which support the same, to further insure the dumping of the scoops.

In operation, the machine is moved to a proper position within the field in which the same is to form a trench, the wheel 40 is now operated to move the boom to the proper angle to form a trench of a predetermined depth. The clutch mechanism is moved to cause the operation of the chains 43 to the end that the cutting edges 51 of the scoops embed themselves in the soil under operation, and dislodge the soil, carrying the same upwardly and depositing the soil on the receiving platform.

It will of course be understood that the machine, while accomplishing the digging operation is moved at a predetermined speed over the ground surface to permit the scoops to accomplish the digging operation.

What is claimed as new is:—

1. In an excavating machine, a main frame, a boom supported by the frame, means for adjusting the boom with respect to the frame, to cause the same to operate at various angles, an endless chain of buckets operating over the boom, said buckets adapted to pivot with respect to the chain supporting the same, a scraping element adapted to pass through the buckets to remove material carried thereby, and means for operating the chain to cause the buckets to pick up material.

2. In an excavating machine, a main frame, a boom supported by the frame, said boom including a rack bar, a block, guide-ways carried by the block and adapted to

embrace opposite sides of the boom, means
for adjusting the block, a gear wheel sup-
ported by the block, said gear wheel be-
ing in mesh with the rack bar to move the
5 boom, and an endless chain of pivoted
buckets carried by the boom.

3. In an excavating machine, a frame, a
swinging boom supported by the frame, said
boom including a centrally disposed rack
10 bar, adjustable means supported by the rack
bar and carrying a gear, means for operat-

ing the gear, said gear being in mesh with
the rack bar to move the boom, and an end-
less chain of buckets carried by the boom.

In testimony that I claim the foregoing as 15
my own, I have hereto affixed my signature
in the presence of two witnesses.

THOMAS KENNEDY WHITE.

Witnesses:

FRANCES TORMEY,
ROSALIE MUNDT.