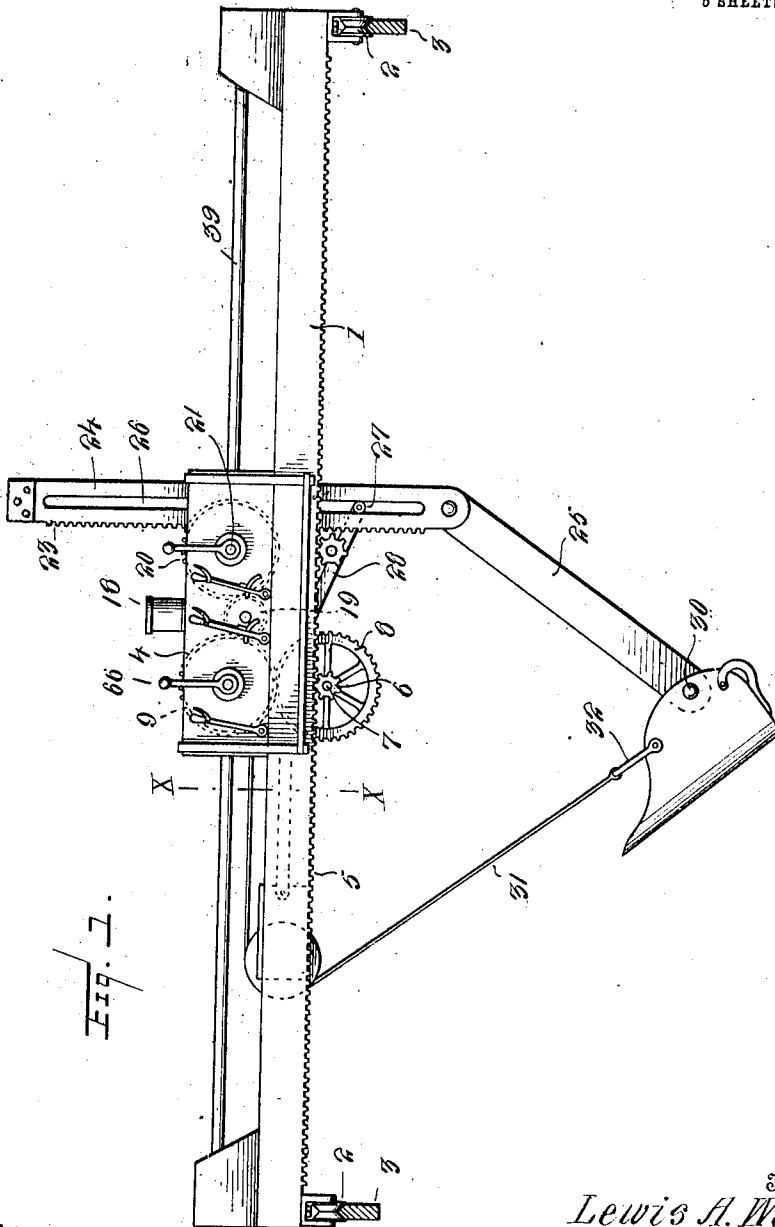


L. A. WARD.
EXCAVATING MACHINE.
APPLICATION FILED MAY 12, 1911.

1,048,244.

Patented Dec. 24, 1912.

5 SHEETS-SHEET 1.



Witnesses

E. B. Ruppert.
U. B. Hillyard

Inventor
Lewis A. Ward

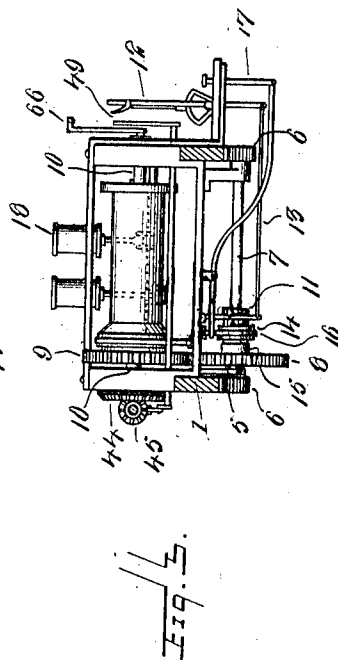
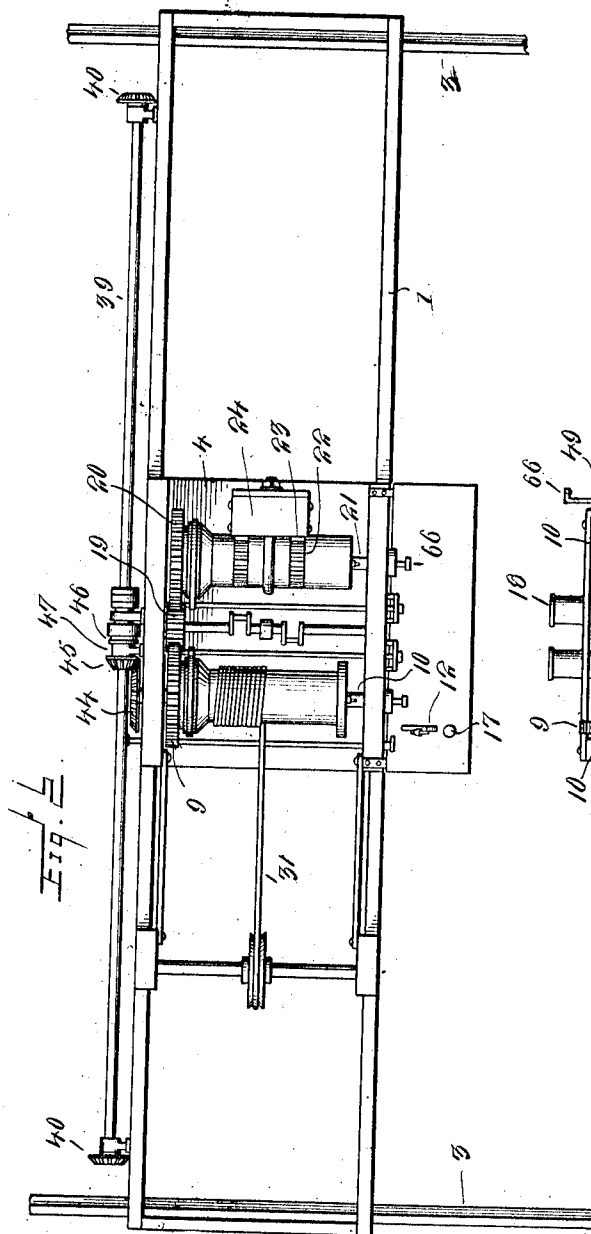
By Victor J. Evans
Attorney

L. A. WARD.
EXCAVATING MACHINE.
APPLICATION FILED MAY 12, 1911.

1,048,244.

Patented Dec. 24, 1912.

5 SHEETS-SHEET 2.



Inventor

Lewis A. Ward

By Victor J. Evans

Attorney

Witnesses
E. R. Ruppert
V. B. Tillyard.

L. A. WARD.
EXCAVATING MACHINE.
APPLICATION FILED MAY 12, 1911.

1,048,244.

Patented Dec. 24, 1912.

5 SHEETS-SHEET 3.

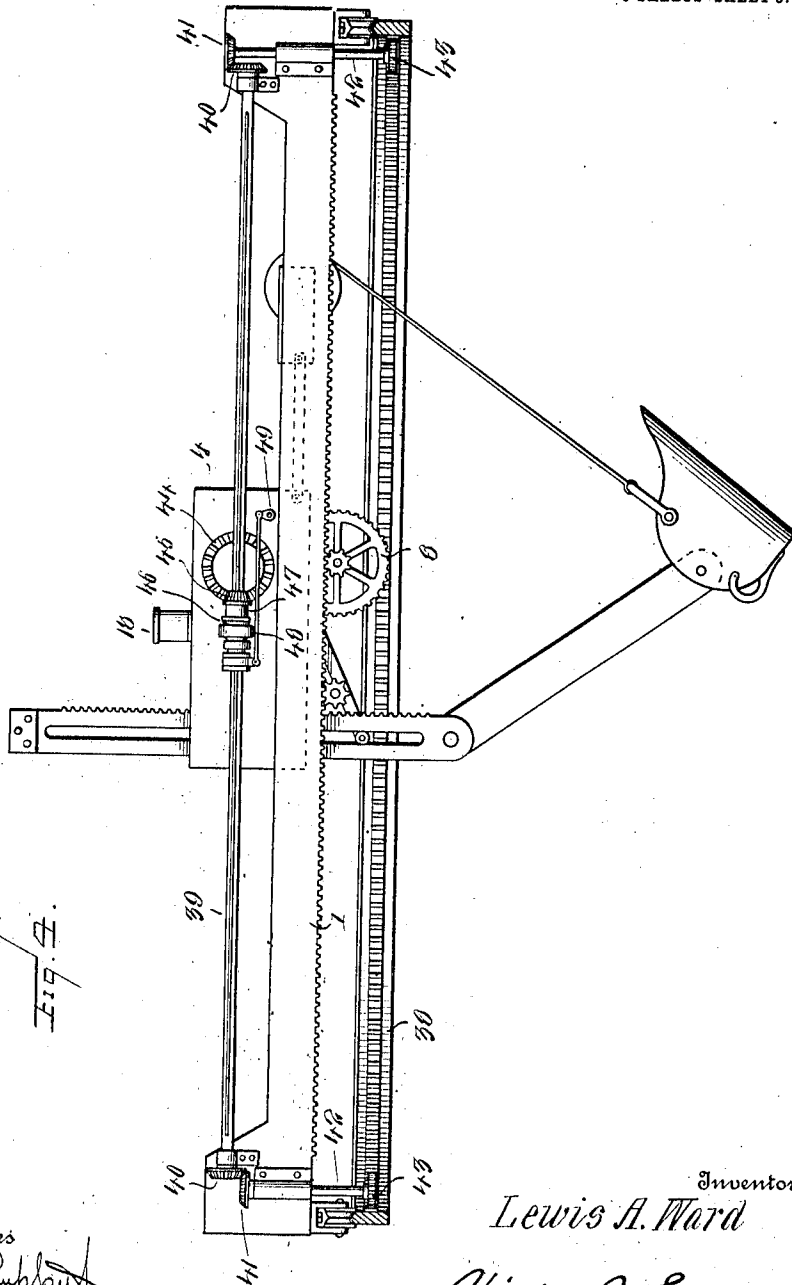


Fig. 3.

Witnesses
E. R. Ruffant
V. B. Willyard

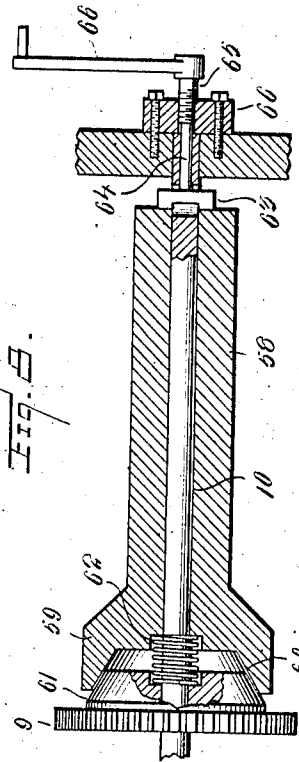
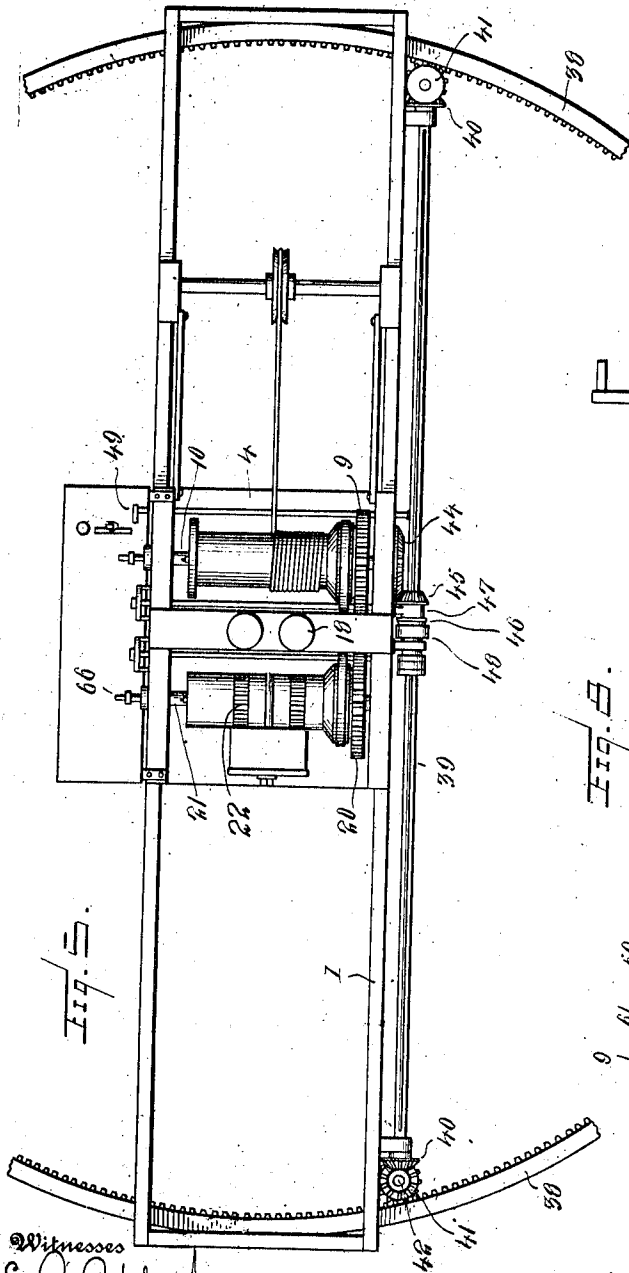
Inventor
Lewis A. Ward
By Victor J. Evans
Attorney

L. A. WARD.
EXCAVATING MACHINE.
APPLICATION FILED MAY 12, 1911.

1,048,244.

Patented Dec. 24, 1912

5 SHEETS-SHEET 4.



Witnesses
E. P. Ruppert
V. B. Willyard.

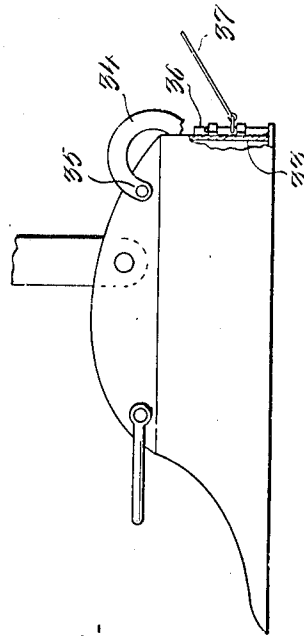
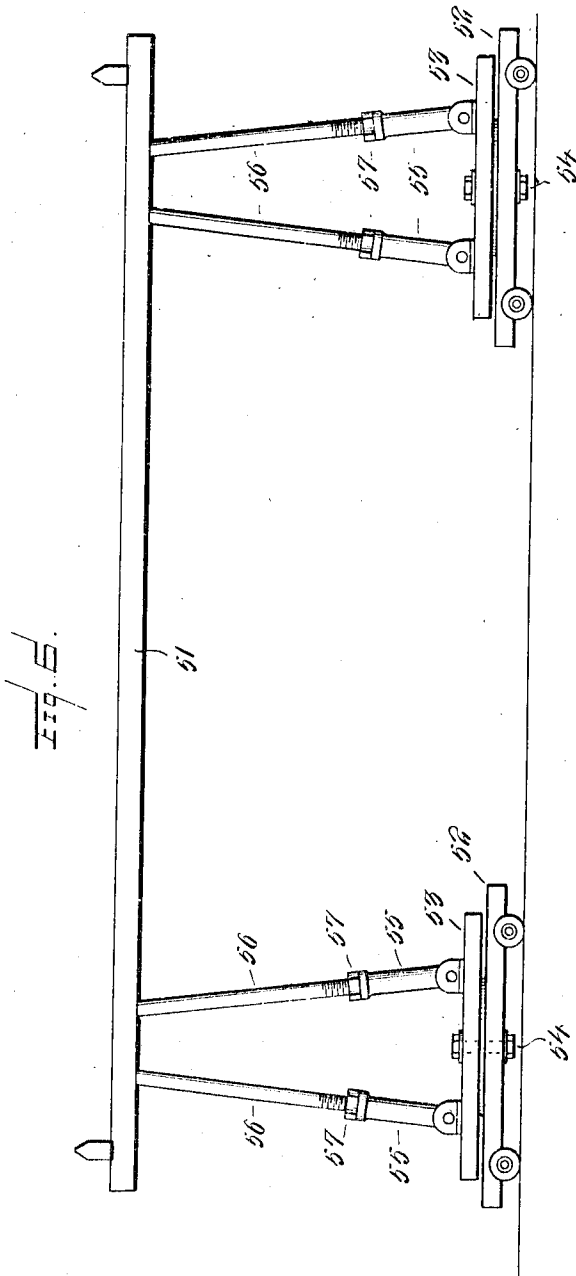
Inventor
Lewis A. Ward
By Victor J. Evans
Attorney

L. A. WARD.
EXCAVATING MACHINE.
APPLICATION FILED MAY 12, 1911.

1,048,244.

Patented Dec. 24, 1912.

5 SHEETS—SHEET 5.



Witnesses
E. R. Ruppert
V. B. Hillyard.

Inventor
Lewis H. Ward

By Victor J. Evans

Attorney

UNITED STATES PATENT OFFICE.

LEWIS A. WARD, OF TONAWANDA, NEW YORK.

EXCAVATING-MACHINE.

1,048,244.

Specification of Letters Patent.

Patented Dec. 24, 1912.

Application filed May 12, 1911. Serial No. 626,703.

To all whom it may concern:

Be it known that I, LEWIS A. WARD, a citizen of the United States, residing at Tonawanda, in the county of Erie and State of New York, have invented new and useful Improvements in Excavating-Machines, of which the following is a specification.

The purpose of this invention is the provision of a machine for digging or excavating which may be operated in a comparatively small space so that wells, cellars, and like excavations may be dug with the same facility as tunnels or other work allowing ample room.

The invention contemplates a machine which may be advantageously employed in bridge and pier building, since it admits of excavations for cofferdams, caisson and like work being effectively performed.

The invention further provides a machine which may be turned in a circle in its own length so as to sink a shaft or well or to make a short turn in tunnels, subways, or like under-ground work.

The machine embodies a track, a framework mounted upon the track, a carriage supported by the framework, and excavating and operating means mounted upon the carriage, the operating means serving to actuate the shovel and to move the carriage or framework as occasion may require so that the carriage may be caused to travel upon the framework and the latter in turn to move upon the track, whether the latter be circular or straight.

The invention consists of the novel features, details of construction and combination of parts, which hereinafter will be more particularly set forth, illustrated in the accompanying drawings, and pointed out in the appended claim.

Referring to the drawings, forming a part of the specification, Figure 1 is a side view of the machine adapted for excavating in straight lines. Fig. 2 is a top plan view of the machine in which the framework is mounted for lateral adjustment and having the carriage provided with the excavating and operating means mounted to reciprocate longitudinally on the framework. Fig. 3 is a transverse section on the line $x-x$ of Fig. 1. Fig. 4 is a side view of the machine adapted for turning in its own length for excavating cofferdams, cellars, wells, and like

work. Fig. 5 is a top plan view of the machine illustrated in Fig. 4. Fig. 6 is a detail view of a framework mounted upon trucks. Fig. 7 is a detail view of an excavator shovel. Fig. 8 is a detail view of the shaft 10 and the drum mounted thereon, showing more particularly the clutch mechanism and the means for moving the drum upon the shaft.

Corresponding and like parts are referred to in the following description, and indicated in all the views of the drawings, by the same reference characters.

The main frame is indicated at 1 and is mounted upon rolling supports 2, which are arranged to travel upon rails 3 forming a track. The rails 3 are preferably of triangular form in cross section and the supporting wheels 2 have V-grooves in their edges to fit the rails of the track. The framework is of substantial structure and the design will depend largely upon the particular work for which the machine is intended.

A carriage 4 is mounted upon the main frame to travel backward and forward thereon, said carriage receiving the excavating and operating means. Cog teeth 5 are formed upon side beams of the main frame 1 and cooperate with pinions 6 secured to the ends of a shaft 7, which is mounted in bearings attached to the carriage 4. A gear wheel 8 is loose upon the shaft 7 and is in mesh with a gear wheel 9 fastened to a shaft 10 mounted in bearings parallel with the shaft 7. A sleeve 11 is mounted upon the shaft 7 and is keyed thereon to rotate therewith and is adapted to be operated by means of a lever 12 and rod 13. A wheel 14 rotatable with the sleeve 11 constitutes both a clutch member and a brake member. As a clutch member the part 14 is adapted to engage frictionally with a clutch member 15 at one side of the gear wheel 8 so that when the clutch members are in engagement the gear wheel 8 rotates with the shaft 7 and causes the carriage 4 to travel upon the frame 1 either forwardly or rearwardly according to the direction of rotation of the gear wheel 9. A brake band 16 is adapted to cooperate with the part 14, one end of the brake band being attached to a part of the carriage and the other end having connection with a lever 17, which when operated will apply

the brake so as to check the speed of the carriage or the operating gearing. An engine 18 of any type is mounted upon the carriage.

5 When steam or compressed air is utilized as the medium for operating the engine the same will be supplied thereto through a hose pipe. A pinion 19 fastened to the crank shaft of the engine is in mesh
10 with the gear wheel 9 and with a gear wheel 20 loose upon a shaft 21 mounted in suitable bearings fitted to the carriage. The gear wheel 20 is adapted to be secured to the transverse shaft 21 by clutch means in
15 substantially the same manner as the gear wheel 8 and shaft 7 so that the gear wheel 20 may be thrown into or out of operation at will. Pinions 22 secured to the shaft 21 mesh with cog teeth 23 of a vertically ar-
20 ranged bar 24 to which the excavating shovel is connected by means of bars 25. Movement of the bar 24 up or down raises or lowers the excavating shovel. The bar 24 has a longitudinal slot 26 through which a pin or cross
25 piece 27 passes so as to direct the bar in its vertical movements, said cross piece being attached to a brace 28. The excavating shovel is raised or lowered by means of the cog gearing 22 and 23 and is advanced to
30 the work by the forward movement of the carriage 4 by means of the gearing 5, 6, 8 and 9. When the excavating is in parallel lines the framework is moved laterally at the end of each forward travel of the car-
35 riage 4.

The excavating shovel 29 is pivoted at 30 to the bar 25 and is adapted to be raised at its front end by means of a cable 31, which is attached to a bail 32 pivotally connected
40 to the upper forward portion of the shovel, the cable 31 being adapted to wind upon a drum of the operating mechanism. The gate 33 closes the rear end of the shovel and is attached to curved arms 34 which are piv-
45 oted at 35. In the normal position of the shovel it inclines to the horizontal with its front end inclining downwardly, but when it is required to dump the material from the shovel the cable 31 is wound upon the drum,
50 thereby raising the front end of the shovel and causing the same to incline upwardly and forwardly and upon releasing the gate 33 the same automatically swings open and discharges the load. A catch 36 holds the
55 gate closed and is adapted to be released by means of a cord 37. When the shovel assumes a normal position after dumping the load the gate automatically closes and is held by the catch 36.

60 In the construction shown in Figs. 4 and 5 the track is circular, thereby enabling the frame to be turned in a circle instead of moving laterally, this form of the invention being particularly adapted for sinking cof-
65 ferdams, wells, shafts and the like. The

circular track is indicated at 38, the frame-
work at 1 and the carriage at 4. A shaft 39 extends lengthwise of the framework 1 and is provided at its ends with bevel
70 gears 40, which are in mesh with bevel gears 41 fast to the upper ends of vertical shafts 42, said shafts having pinions 43 secured to their lower ends and in mesh with cog teeth forming part of the circular track 38. The
75 shaft 10 has a bevel gear 44 secured thereto and in mesh with a bevel pinion 45 loose upon the shaft 39. The bevel pinion 45 has a clutch member 46 connected therewith, both being mounted upon a sleeve 47, which is loose on the shaft 39 and mounted in a
80 bearing connected to the carriage 4. A clutch member 48 is mounted upon the shaft 39 so as to turn therewith and is free to move thereon with the carriage 4 and has an independent movement to admit of
85 throwing the clutch members 46 and 48 into and out of engagement, whereby the shaft 39 may be driven when required to positively turn the main frame upon the circular track. An operating lever 49 has con-
90 nection with the sleeve provided with the clutch member 48 so as to move the same into and out of engagement with the clutch member 46.

Fig. 6 shows a truck for supporting a
95 framework 51, upon which are mounted the rails forming a track to receive the main frame provided with the carriage and operating mechanism. Any number of trucks may be provided for supporting the frame-
100 work 51. The trucks are indicated at 52 and support platforms 53, which are connected thereto by means of king bolts 54. Tubes 55 are pivotally connected at their lower ends to the platforms 53 and receive
105 the lower threaded ends of legs 56 upon which are mounted hand nuts 57, the latter resting upon the upper ends of the tubes 55. The legs 56 are connected at their upper
110 ends to elements of the framework 51 and are strengthened by means of suitable braces. By proper adjustment of the hand nuts 57 the framework 51 may be raised or lowered to the proper elevation.

115 From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have
120 described the principle of operation of the invention, together with the device which I now consider to be the embodiment thereof, I desire to have it understood that the device shown is merely illustrative, and that
125 such changes may be made when desired as are within the scope of the claim appended hereto.

The drums mounted upon the shafts 10 and 21 are loose thereon to admit of throw-
130

ing them into or out of clutched engagement with the drive gears. Fig. 8 illustrates in detail the manner of mounting these drums and the clutch mechanism between them and the drive gears 9 and 20 loose thereon.

The numeral 58 designates the drum which is provided at one end with an enlarged portion 59 constituting a brake member. A recess 60 is formed in the enlarged portion 59 and constitutes a clutch member which co-operates with a clutch member 61 located upon the inner side of the gear wheel 9. A spring 62 mounted upon the shaft 10 is interposed between the parts 59 and 61 to normally hold them apart. A key 63 is fitted in a longitudinal slot formed in an end portion of the shaft 10, said key projecting and engaging the end of the drum 58 upon opposite sides of the shaft. A pin 64 fitting loosely within an opening formed in the end of the shaft 10 engages the key 63 at its inner end. A screw 65 threaded into a plate 66 is adapted to engage the pin 64 to move it inward, thereby bringing the clutch member 60 in engagement with the clutch member 61 when it is required to throw the drum into clutched engagement with the gear wheel. An operating crank 66 at the

outer end of the screw 65 enables said screw to be turned.

Having thus described the invention what is claimed as new, is:—

In an excavating machine, the combination of a supporting framework having cog gearing, a carriage mounted to travel upon the framework and provided with excavating and operating means, a shaft having pinions in mesh with the cog gearing, a gear wheel loose upon the shaft, a clutch for securing said gear wheel to the shaft, a second shaft having a gear wheel in mesh with the first mentioned gear wheel, a power driven shaft in mesh with the gear wheel of said second shaft, a third shaft having a gear wheel loose thereon and in mesh with a pinion of the crank shaft, a clutch for connecting the third shaft and the gear wheel mounted thereon, and gearing between said third shaft and excavating means for raising and lowering the latter.

In testimony whereof I affix my signature in presence of two witnesses.

LEWIS A. WARD.

Witnesses:

HUGO R. DORNFELD,
HERMAN B. SOMMER.