No. 642,048. Patented Jan. 23, 1900.

L. E. MILLER.

APPARATUS FOR EXCAVATING AND ELEVATING GRAVEL.

(Application filed June 15, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

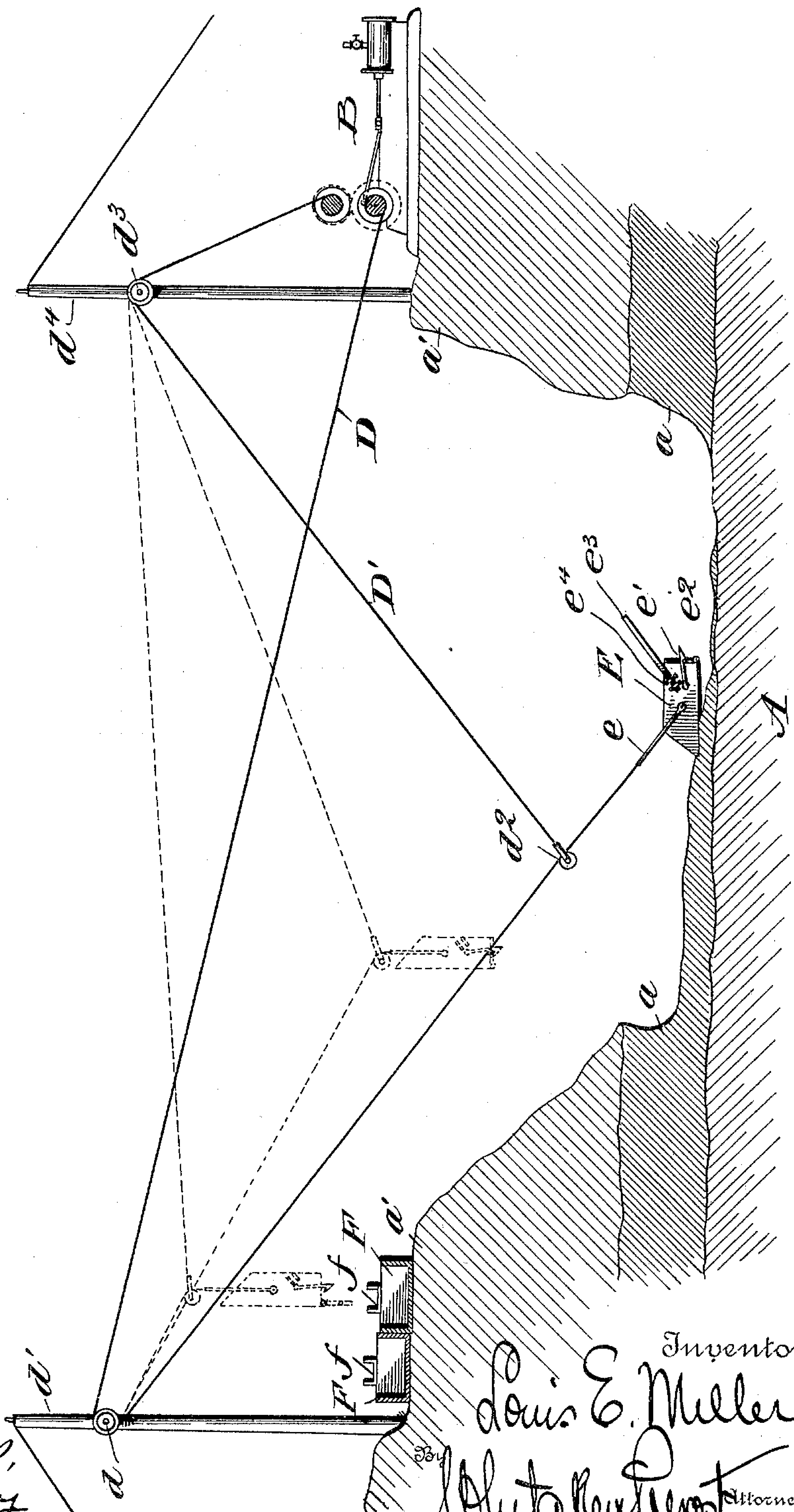

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Fig. 2.

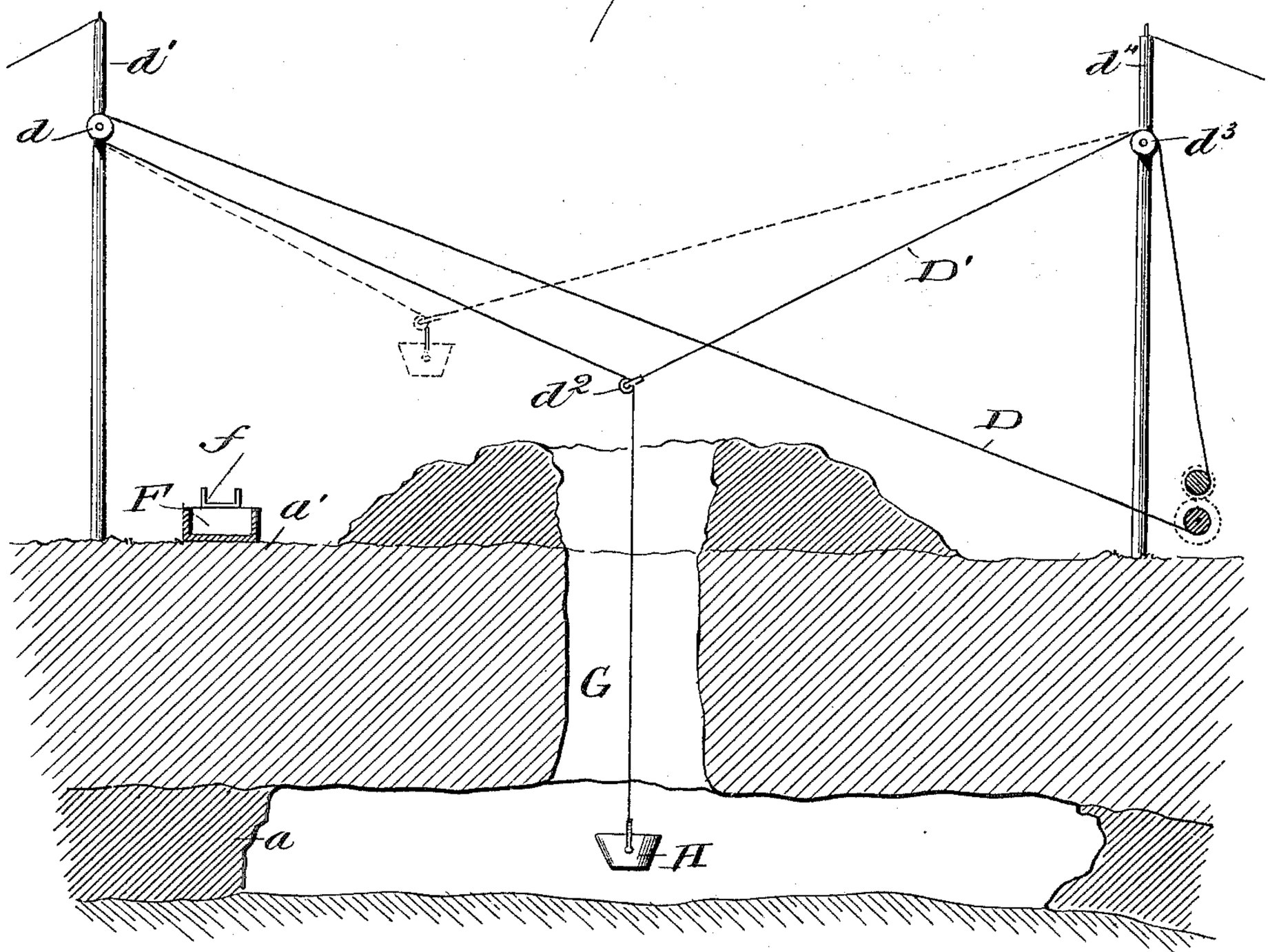


Fig. 4.

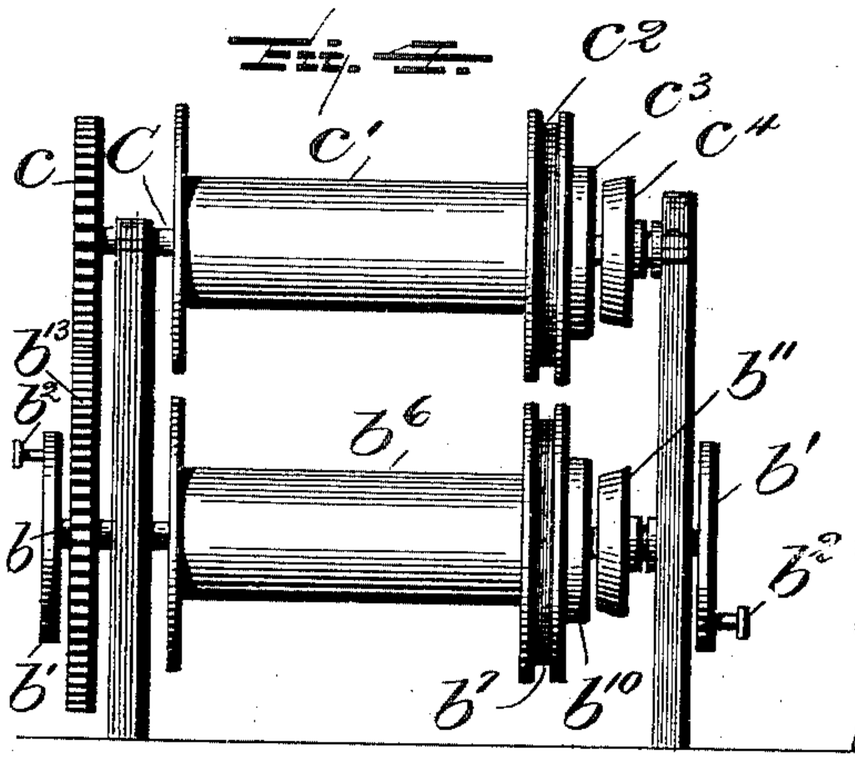
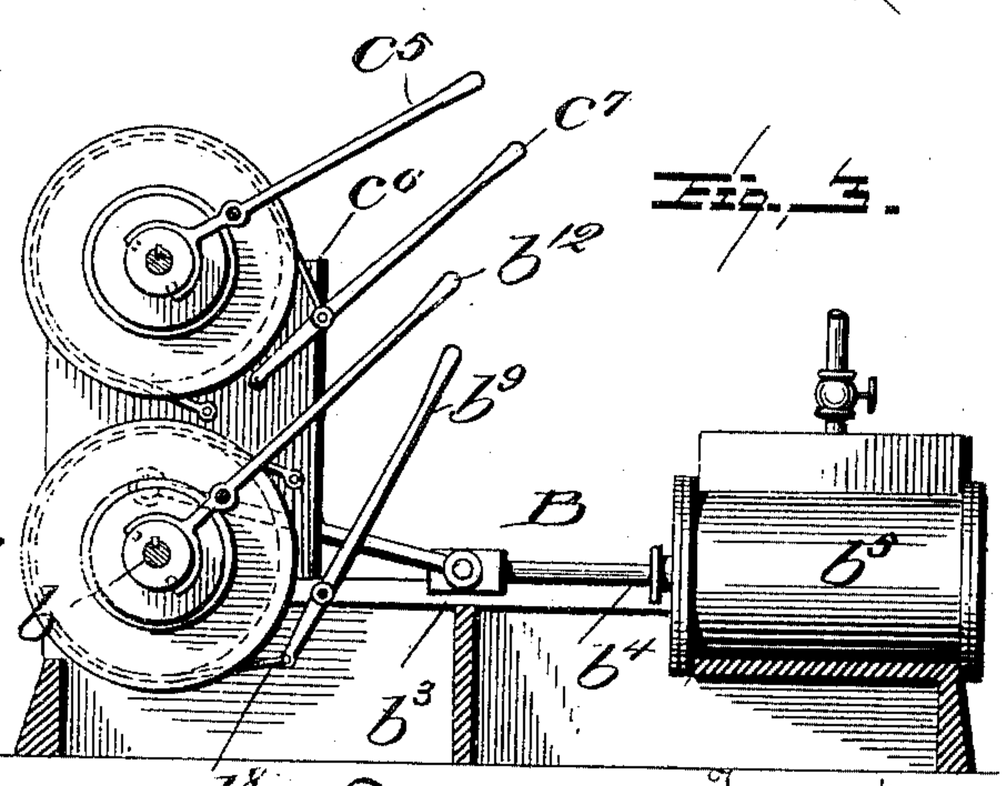


Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR EXCAVATING AND ELEVATING GRAVEL.

SPECIFICATION forming part of Letters Patent No. 642,048, dated January 23, 1900.

Application filed June 15, 1899. Serial No. 720,688. (No model.)

To all whom it may concern:

Be it known that I, LOUIS E. MILLER, a citizen of the United States, residing at Dawson, Canada, have invented certain new and useful Improvements in Apparatus for Excavating and Elevating Gravel; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is an improvement in apparatus for excavating and elevating gravel; and it consists in the novel features hereinafter described, reference being had to the accompanying drawings, which illustrate one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claims.

Referring to the drawings, Figure 1 represents a diagrammatic view of my apparatus arranged to excavate and elevate pay-gravel from a placer gold mine, showing it in connection with a scraper. Fig. 2 is a similar view showing the apparatus adapted for use in removing gravel from a mine having a vertical shaft. Fig. 3 is a vertical longitudinal sectional view of a form of hoisting-engine which I advantageously employ. Fig. 4 is an elevation of the hoisting-drums.

In Fig. 1 my apparatus is shown arranged for excavating from an open cut, as in placer-mining. In this figure, A represents the bed-rock, and a the pay streak or section of gravel bearing precious metals, which is located directly above the bed-rock in most cases, and a' a' represent the sides of the cut.

B represents a hoisting-engine provided with two independently-operated hoisting-drums. In Figs. 3 and 4 I have shown portions of a hoisting-engine which I prefer to employ in this connection.

b represents the crank-shaft of the engine, which is provided on each side with a crank-disk b', having a crank-pin b^2, to which the connecting-rod b^3 from one of the piston-rods b^4 is secured, the device being provided with a cylinder b^5 and piston at each side of the engine. Upon the crank-shaft is mounted the loose winding-drum b^6, which is provided with a flange at each end, one of said flanges being provided with a groove b^7 to receive a brake-strap b^8, connected to an operating-lever b^9. The drum b^6 is also provided with a friction-clutch member b^{10}, adapted to be engaged by a movable friction-cone b^{11}, splined on the shaft and controlled by a clutch-lever b^{12}.

C represents a counter-shaft, in this instance arranged above the crank-shaft and parallel thereto, said shafts being connected by a small gear-wheel c on shaft C meshing with a larger gear b^{13} on the crank-shaft b. I prefer to have the diameter of the driving-gear b^{13} about twice the diameter of the gear c, so that the shaft C will travel at double the speed of the crank-shaft. The shaft C is provided with a loose drum c', having a brake-groove c^2 and a clutch member c^3, similar to the one on the drum b^6, and the shaft C is provided with a friction-cone c^4, splined on the shaft and controlled by a clutch-lever c^5. A brake-strap c^6 engages the groove c^2 and is controlled by a brake-lever c^7. It will thus be seen that either of the drums can be thrown into operation independently of the other or held by their respective brakes or allowed to turn loosely upon their shafts at the will of the operator and that when the upper drum c' is in operation it will travel at double the speed of the crank-shaft.

Referring now to Fig. 1, the hoisting-engine B is preferably located on the bank at one side of the cut, as shown on the right in Fig. 1. The main hoisting-cable D is secured to the main drum b^6, passes across the cut and over an elevated pulley d, secured to a stationary support, (in this instance a properly-supported mast d',) and thence to the bail e of the hoisting device, (in this instance the scraper E.)

D′ represents the auxiliary hoisting-cable, which is provided at its end with a sheave d^2, engaging the main cable D between the scraper and the pulley d. From the sheave d^2 the auxiliary cable extends over a pulley d^3, fixed to a stationary support on the side of the cut opposite the pulley d, being secured in this instance to a properly-support-

ed mast d^4 adjacent to the hoisting-engine. From the pulley d^3 the auxiliary cable extends down to the auxiliary drum c', to which it is secured.

The scraper E may be of any usual construction which will enable it to fill itself when it is drawn along the surface of the ground and contain the gravel when hoisted, said scraper being provided with a hinged dumping door or gate e', normally held in place by a catch e^2, and the scraper is also provided with a pair of removable handles e^3, adapted to be slipped into cleats e^4 when the scraper is being filled and to be removed from the scraper when the latter is being hoisted, as will be readily understood.

On the side of the cut opposite the hoisting-engine I have shown a pair of washing-troughs or sluice-boxes, such as are used in placer-mining, said sluice-boxes being indicated at F F and each betng provided with a chute f for supplying water thereto for washing the gravel.

In the form of apparatus shown in Fig. 1 the operation will be as follows: The operator in the cut will attach the removable handles e^3 to the scraper, so as to be able to guide it as it is drawn along, the parts being in substantially the position shown in full lines in the figure. The hoisting-engine being in motion, the operator in charge will throw in the clutch connecting the main hoisting-drum to its shaft, thereby winding in the main cable D and drawing the scraper along the surface of the ground and filling the same. During this operation the auxiliary cable D' may be allowed to run free or may be held by applying the brake to the auxiliary drum c', according to the amount of slack in the same and the distance that the scraper has to travel in order to fill. Ordinarily the cable D' will be held by braking its drum. When the scraper has been filled, the operator in the cut will remove the handles therefrom and the operator at the hoisting-engine will apply the brake to the auxiliary drum and continue the operation of the main hoisting-drum to wind in the main cable. The sheave d^2 will allow the main cable to slip through it until the bail e strikes the sheave, when the sheave will move upward with the scraper in an arc on the axis of the pulley d^3 as a center. By continuing the operation of the main drum the angle formed at the sheave d^2, between the main and auxiliary cables, will gradually increase until the two cables are nearly in a straight line, when by partially releasing the brake on the auxiliary drum the auxiliary cable may be paid out and the scraper brought to the desired position over one or the other of the troughs or sluice-boxes F or carried to any other desired point. To return the scraper to the cut, the auxiliary drum is thrown into connection with its shaft by means of its clutch-lever and clutch, and the auxiliary cable is wound in very rapidly, as the shaft C rotates at double the speed of the crank-shaft, the main cable being paid out slowly until the scraper is about over the center of the cut, when the auxiliary drum will be held by its brake and the main cable paid out by releasing the main drum from its brake, when the scraper will sink into the cut until it rests upon the bottom in position to be refilled.

It will be noticed that the portion of the auxiliary cable between the sheave d^2 and the pulley d^3 operates very much as though it were a rigid arm pivoted at the axis of the pulley d^3. By the proper manipulation of the clutch and brake levers of the main and auxiliary drums the position of the scraper can be controlled with great precision, while my apparatus is exceedingly cheap and simple to construct and operate.

In Fig. 2 I have shown my apparatus applied to hoisting a bucket through a vertical shaft G of a mine and then moving it laterally to dump it into a sluice-box F, where it can be washed. In this instance the auxiliary cable D' is held by braking its drum in such a position that the sheave d^2 will be over the center of the shaft. The bucket H being at the bottom of the shaft and connected to the main hoisting-cable, the main drum will be thrown into operation to wind in the main cable, thereby elevating the bucket H vertically until its bail strikes the sheave d^2, when the sheave will move upward with it until the main and auxiliary cables are nearly in a straight line, when the auxiliary cable may be slackened to allow the bucket to be drawn laterally and dumped into the sluice-box F. To return the bucket to the shaft, the auxiliary drum will be operated to wind up the auxiliary cable until the sheave d^2 is nearly over the shaft G, when the main drum will be released and allowed to run free, thus lowering the bucket and sheave d^2 until the sheave is above the center of the shaft in substantially the position shown in full lines in Fig. 2, when the main cable will pay through the sheave and lower the bucket into the shaft.

I find it very advantageous to run the auxiliary drum at double the speed of the main drum or faster than the main drum, as it enables the scraper or bucket to be quickly returned, and the additional speed will not require additional power from the engine, as the bucket is empty when it is operated upon positively by the auxiliary drum.

What I claim, and desire to secure by Letters Patent, is—

1. In an excavating and elevating apparatus, the combination with two independent hoisting-drums, and means for operating and controlling the same, of a main cable, extending from a receptacle, over a pulley secured to a fixed support at a distance from said drums, and thence to one of said drums, and an auxiliary cable secured to the other drum,

and having a sliding engagement with the main cable between the receptacle and said pulley, substantially as described.

2. In an excavating and elevating apparatus, the combination with two independent hoisting-drums, and means for operating and controlling the same, of a receptacle, a main cable extending from one of said drums, over a pulley secured to a stationary support at a distance from the hoisting-drums, and thence to said receptacle, a sheave on said main cable between the receptacle and said pulley, and an auxiliary cable secured to said sheave and extending to the other of said hoisting-drums, substantially as described.

3. In an excavating and elevating apparatus, the combination with two independent hoisting-drums, and means for operating and controlling the same, of a receptacle, a stationary support at a distance from and entirely independent of said hoisting mechanism, a pulley carried by said support a main cable extending from one of said drums over said pulley, to said receptacle, a sheave on said cable between the receptacle and said pulley, an auxiliary cable connected to said sheave and extending to the other drum, and means for driving the drum for the auxiliary cable at greater speed than the drum for the main cable, substantially as described.

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

LOUIS E. MILLER.

Witnesses:
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C. M. BAIR.