

No. 639,004.

Patented Dec. 12, 1899.

J. & W. TITUS.
EXCAVATING APPARATUS.

(Application filed July 31, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 2.

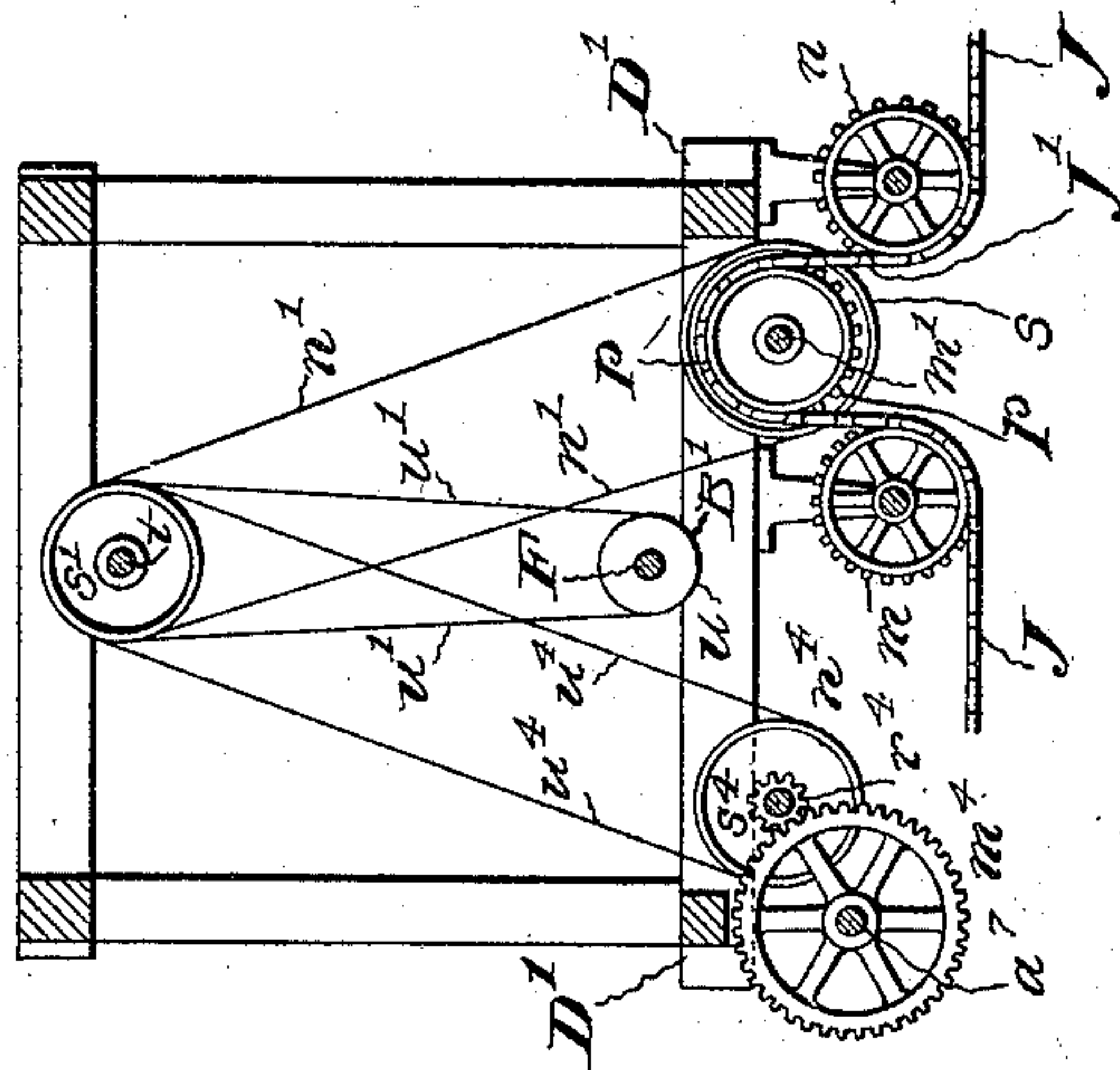
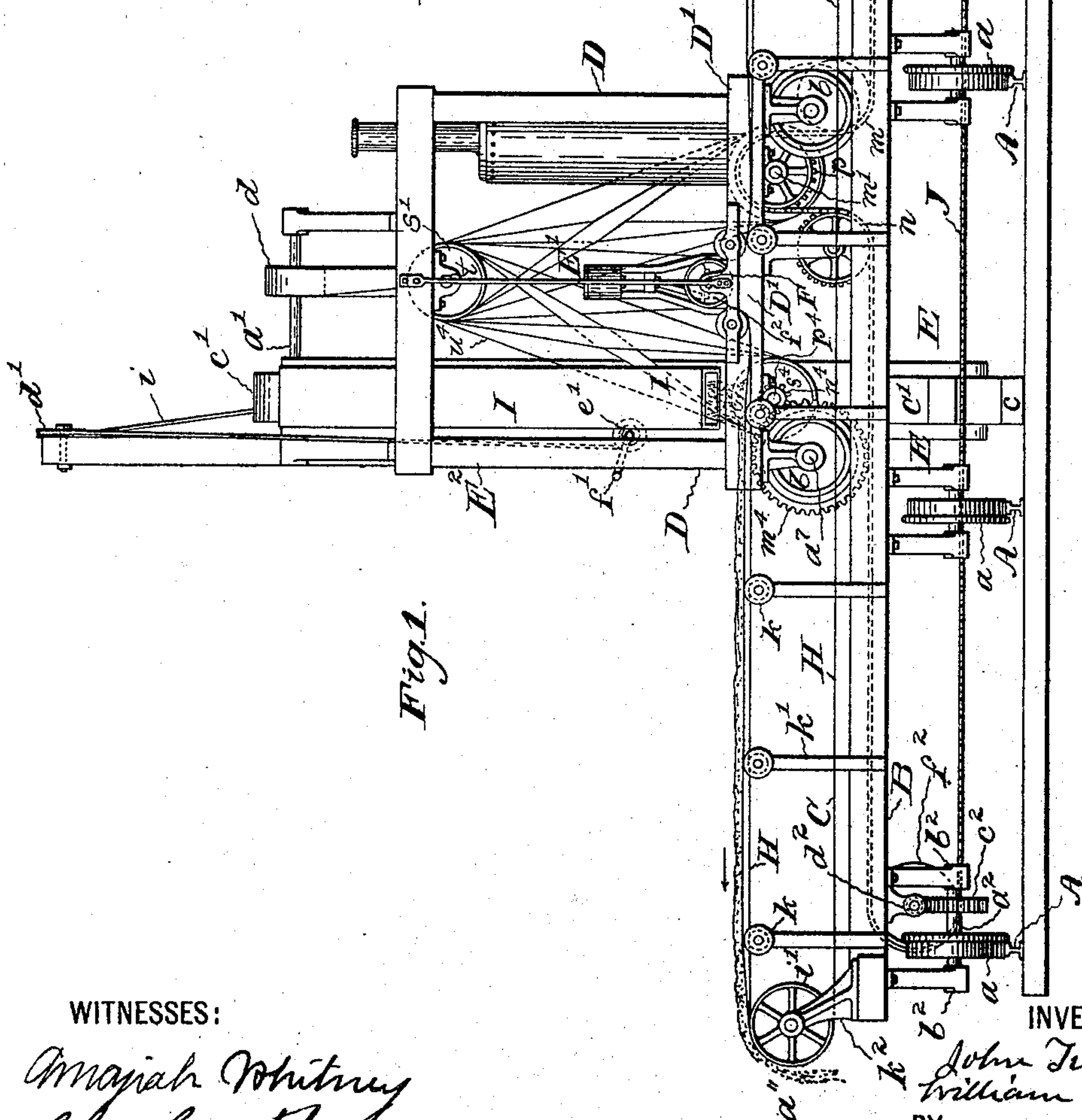


Fig. 1.



WITNESSES:

Marjah Whitney
Chas. C. C. C.

INVENTORS:

John Titus
William Titus

BY

James M. Whitney
ATTORNEY

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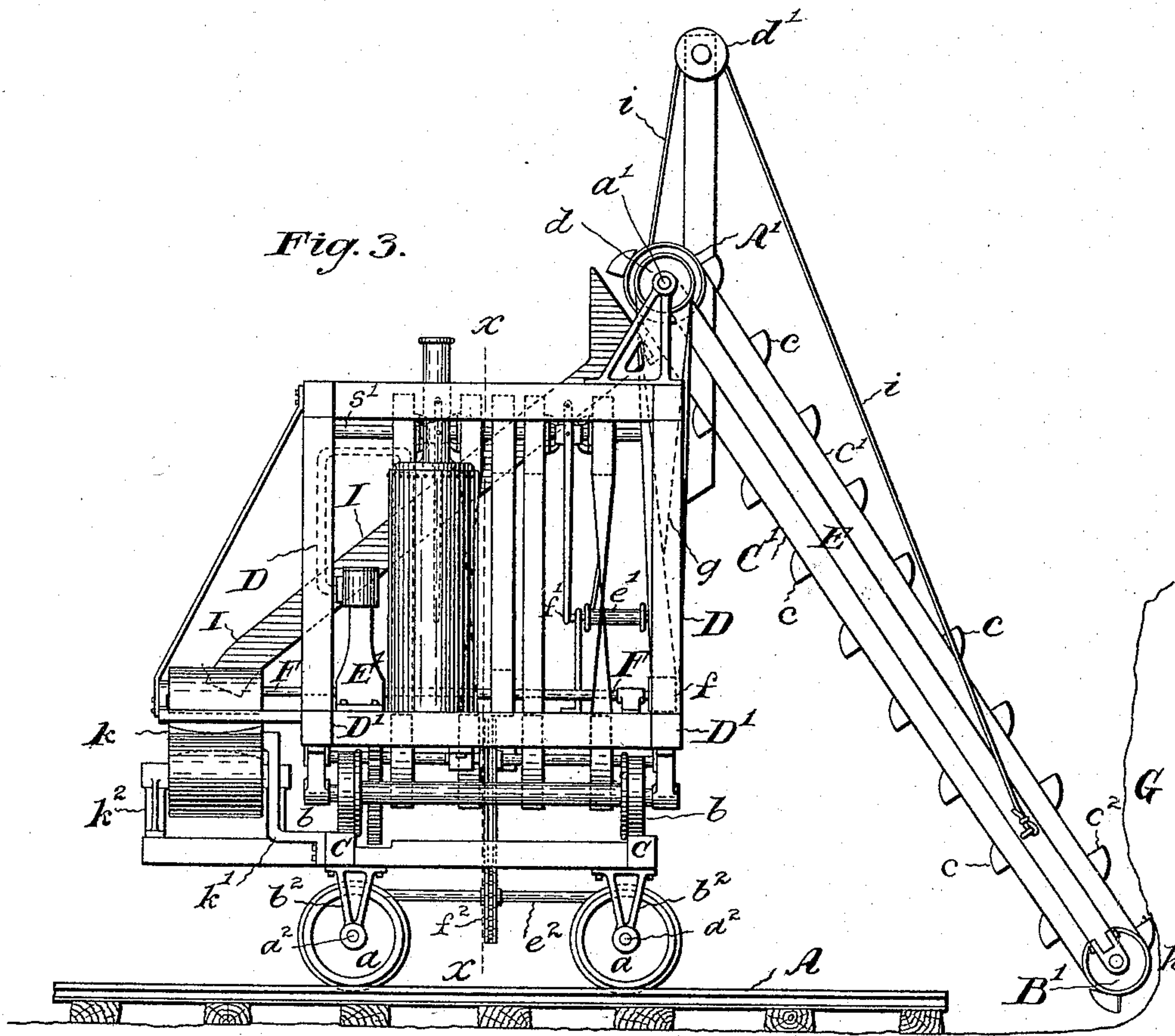
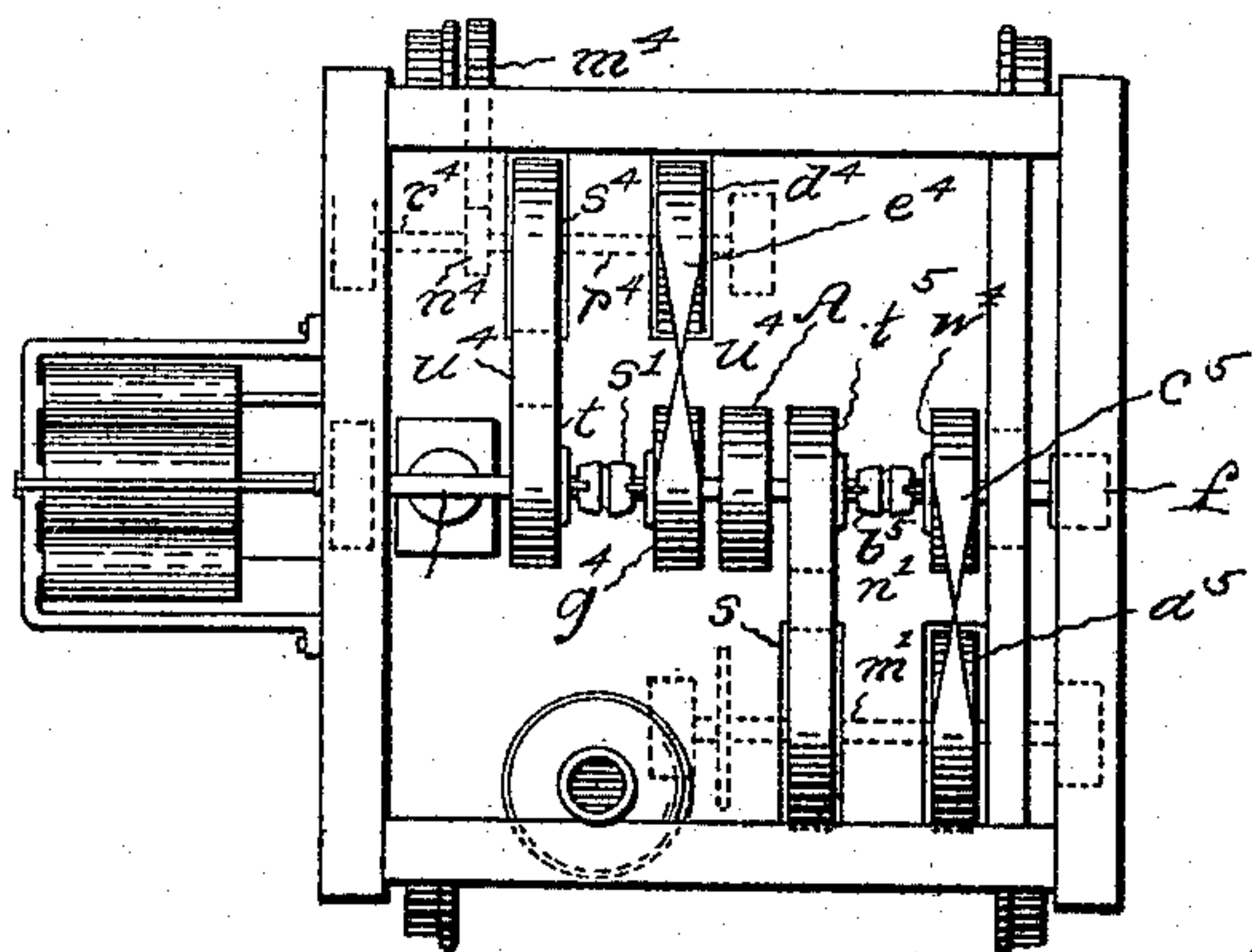


Fig. F.



WITNESSES:

Amariah Whitney
Chas Crystal

INVENTORS:

John Titus
William Titus
BY
James Whitney
ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN TITUS, OF OYSTER BAY, AND WILLIAM TITUS, OF NORTH HEMPSTEAD,
NEW YORK.

EXCAVATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 639,004, dated December 12, 1899.

Application filed July 31, 1899. Serial No. 725,594. (No model.)

To all whom it may concern:

Be it known that we, JOHN TITUS, a resident of Oyster Bay, and WILLIAM TITUS, a resident of Old Westbury, in the town of North Hempstead, in the county of Nassau and State of New York, citizens of the United States, have invented certain new and useful Improvements in Excavating Apparatus; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation of an apparatus made according to our invention. Fig. 2 is a vertical transverse sectional view of a part of the same, taken in the line xx of Fig. 3. Fig. 3 is an end elevation of the said apparatus. Fig. 4 is a detail plan view of a portion thereof.

This invention is more particularly intended for use in excavating and removing sand, earth, &c., from banks, bluffs, and like situations; and its object is to provide an apparatus for the purposes specified which is simple and strong in construction, easily operated, and capable of working along the face or front of a bank or bluff in lateral directions as well as in a forward direction, so that the whole or any part of said face may be worked off or excavated along greater widths than that of the excavator portion of the machine.

To these ends the invention comprises certain novel and useful combinations of parts hereinafter fully set forth and explained.

For the use of the apparatus a track composed of two or more rails A (four are shown in the drawings) is laid at right angles, or practically so, to the face of the bank or bluff from which the earth, sand, or like material is to be excavated and removed. On this track are placed the wheels a of a wheeled platform B . The effect of the track A is to enable the apparatus to be advanced toward the bank or bluff on which an excavation is to be made as the bank recedes by reason of the removal of material therefrom. Upon the platform B , in the direction of its length—that is to say, in a direction transverse to its line of travel on the track A —is a track C , upon which run the wheels b of a wheeled framework D , which carries the excavator or excavating mechanism

and also certain other parts of the apparatus.

The excavator, as shown more clearly in Fig. 2, comprises a frame E , which is pivoted, as at a' , to the upper part of the framework D and which has at top and bottom drums A' and B' , which carry an endless apron C' , which is provided in the usual or in any suitable manner with excavating and lifting buckets c . This system of buckets receives its motion by means of pulley d on the axle of its upper drum A' .

Carried upon the bed D' of the framework D is a motor of any suitable kind, or, for example, a steam-engine E' , the connecting-rod of which drives the crank of a driving-shaft F , on which is a pulley f . A crossed belt g (shown in dotted outline in Fig. 2) transmits motion from the motor-shaft F to the pulley d of the driving-drum A' , and thereby gives the requisite movement to the endless system of excavator-buckets in the operation of excavating, as from a bank G , as indicated at h in Fig. 1, the material excavated passing into buckets as the system revolves and being carried upward by the buckets as they pass in succession along the upper side of their supporting-frame E . To enable the lower end of the system of buckets to be lifted to any required height along the face of the bank G , there is provided a rope or line i , which passes around a pulley d' at the upper part of the framework D , and thence to a windlass e' , also carried by said framework. The windlass being provided with a crank f' or other suitable means for rotating it, the lower end of the system of excavating-buckets may be raised or lowered, as occasion demands.

At the front of the platform B and carried thereby are pulleys i and j , upon which is an endless conveyer-apron H , the upper part of this apron being supported by rolls k , the standards k' of which, like those k^2 of the pulleys i and j , are fast to the platform B . Leading from the upper or delivery end of the system of buckets c to a point over the conveyer-apron H is a chute I . As the buckets c turn over in passing the top of their supporting-frame E they deposit their contents in the upper end of the chute, which conducts the material to the conveyer-belt, which in

its revolutions throws off said material at its end a'' , either upon the surface below or into any suitable receptacle placed to receive it.

As shown in the drawings, the platform B is supported on four wheels, of which the two outmost are drums and are fast upon short axles a^2 , which work in suitable bearings b^2 , provided to the platform. On each of the axles a^2 is a worm-wheel c^2 , which gears with a worm d^2 on the adjacent end of a shaft e^2 , which is shown more fully in Fig. 3. This shaft has a hand-wheel f^2 , the position of which is shown in said figure, the shaft e^2 being carried by suitable bearings provided to the platform. On the traveling framework are two depressed sprocket-wheels m and n , which run as idlers. Above the space between them is a third sprocket-wheel p , on the shaft m' of which is a pulley s . A belt n' runs from the pulley s to a pulley on a shaft s' , and from a like pulley A on said shaft to a pulley B on the crank-shaft of the motor runs a belt n' . A sprocket chain or strap J passes over the two pulleys f^2 at the end of the platform and is looped upward between the idler sprocket-wheels m and n and over the sprocket-wheel p , as shown more fully in Fig. 2, and also in dotted lines in Fig. 1. The motion transmitted from the engine-shaft E to the sprocket-chain J is in time communicated by the latter through the pulleys f^2 , worms d^2 , and worm-wheels c^2 to the axle of the adjacent pair of platform-wheels A. As these wheels and their immediate driving mechanisms are duplicated at the opposite ends of the platform, the latter is moved along the track A toward the face of the bank to be excavated, as occasion may require. It will be observed that each of the outer wheels A is provided with a driving mechanism, such as described, the two wheels at each end of the platform being driven by the same shaft e^2 .

Upon the axle a^7 of one of the pairs of wheels b of the framework D, which run on the track C of the platform D', is a spur-wheel m^4 , with which gears a pinion n^4 on a shaft p^4 , which also carries a pulley s^4 , from which extends a belt u^4 to a pulley on the shaft t . The rotation of this pulley transmits motion through the belt u^4 , pulley s^4 , shaft p^4 , pinion n^4 , spur-wheel m^4 , and axle a^7 to the wheels b , and thereby causes the framework, with the mechanisms carried thereby, to traverse along the platform, so that the excavator as it operates is brought along the face of the bank to be excavated, thereby enabling the comparatively narrow excavator to operate along the front of a bank many times its own width—in other words, along a distance proportioned to the length of the platform. To enable the platform to be reversed or retired from the face of the bank when desired, the shaft s' , which carries the pulley t , carries two other pulleys t^5 and w^4 , correspondingly on the shaft m' , which has the pulleys, is a second pulley a^5 . The pulleys t^5 and w^4 are provided with a clutch mechanism, as at b^5 , by means of which the one or the other of said pulleys may be made fast or loose on their shaft, as occasion may require. From the pulley w^4 to the pulley a^5 runs a crossed belt c^5 . When the pulley t^5 is made fast to the shaft, the pulley w^4 runs loose, and vice versa. When the pulley w^4 is fast to the shaft, the belt c^5 being crossed of course reverses the direction of motion of the pulley a^5 , and consequently of the shaft m' and the parts driven thereby, and therefore up the platform B on its track A. In like manner there is provided to the shaft s' in due relation with the pulley t a second pulley g^4 . The pulleys t and g^4 are clutched to the shaft s' in such a manner that either of them may be made fast or run loose upon the shaft s' . Upon the shaft p^4 of the spur-pinion n^4 is a second pulley d^4 . From the pulley g^4 to the pulley d^4 runs a crossed belt e^4 , so that when the pulley d^4 is fast on the shaft, with the pulley n^4 running loose thereon, the crossed belt e^4 reverses the direction of rotation of the pinion n^4 , and consequently that of the movement of the framework and the excavator upon the platform and with reference to the front or face of the bank to be excavated. As the arrangement of crossed belts with pulleys and clutches for changing the direction of rotatory motion are drums, the construction of which is well known in mechanics, a more specific description thereof in this specification is deemed unnecessary.

What we claim as our invention is—

1. The combination with a wheeled platform having thereon a track in a direction at right angles or practically so to its line of travel on said wheels, and a wheeled framework adapted to run on said track, of a motor on the framework, an endless-chain excavator mounted on said framework, mechanism for transmitting power from the motor to the excavator, mechanism for transmitting motion from the framework to the platform to operate the wheels thereof, and mechanism for transmitting motion to the framework to move the same upon the platform, substantially as herein set forth.

2. The combination with a wheeled platform having thereon a track in a direction at right angles or practically so to that of the movement of the platform, a framework arranged to travel on said track, an endless-chain excavator carried by the framework, a motor carried by the latter for operating the excavator and pulleys provided to the platform, of an endless belt passed over said pulleys, mechanism for driving said belt from the motor, and mechanism for transmitting motion from the pulleys to the wheels of the platform, substantially as herein set forth.

3. The combination with a wheeled platform having a track thereon in a direction at right angles or practically so to that of the movement of the platform, a framework arranged to travel on said track, an endless-chain excavator carried by the framework, a

motor carried by the framework for operating the excavator, a sprocket-wheel and idlers carried by the framework, pulleys provided to the platform, mechanism for transmitting motion from said pulleys to the wheels of the platform, an endless belt upon the said pulleys looped over the sprocket-wheel between the idler-wheels and means for transmitting motion to the sprocket from the motor, whereby the excavator may be advanced to or withdrawn from its work, substantially as herein set forth.

4. The combination with a wheeled platform having a track thereon in a direction at right angles or practically so to that of the movement of the platform, a framework arranged to travel on said track, an endless-chain excavator mounted on said framework and a motor on the framework for operating the excavator, of a spur-wheel fast on an axle of the framework, a spur-pinion carried by the framework and gearing with the spur-wheel and means for transmitting motion to the pinion from the motor whereby the excavator may be carried laterally along the face of the bank to be excavated, substantially as herein set forth.

5. The combination with a wheeled platform having a track thereon in a direction at right angles or practically so to that of the movement of the platform, a framework arranged to travel on said track, an endless-chain excavator mounted on the framework, and a motor on the framework, for operating the excavator, of worm-wheels on the axles of the platform-wheels, worms for alternating the worm-wheels, pulleys for rotating the worm-shafts, a sprocket-wheel and idlers carried by the framework, an endless belt running on pulleys upon the work-shafts and

looped over the sprocket-wheel between the idlers, and means for transmitting motion from the motor to the shaft of the sprocket-wheels, substantially as and for the purpose herein set forth.

6. The combination with a wheeled platform having a track thereon in a direction at right angles or practically so to that of the movement of the platform, a framework arranged to travel on said track, an endless-chain excavator mounted on the framework, a motor on the framework for operating the excavator, of a spur-wheel fast on an axle of the framework, a spur-pinion carried by the framework and gearing with the spur-wheel, a pulley for rotating the pinion, a shaft, s' , a pulley on said shaft, a belt connecting said pulley with the pinion-pulley, worm-wheels on the axles of the platform-wheels, worms for actuating the worm-wheels, pulleys for rotating the worm-shafts, a sprocket-wheel and idlers carried by the framework, a pulley on the shaft of the sprocket-wheel, a pulley on the shaft, t , connected by a belt with the pulley of the sprocket-wheel, an endless belt running on pulleys upon the worm-shafts and looped over the sprocket-wheel between the idlers and a belt extended from the pulley of the sprocket-wheel to a pulley on the shaft, s' , the whole organized and arranged to provide for the movement of the excavator toward and from its work and also laterally along the face thereof, substantially as and for the purpose herein set forth.

JOHN TITUS.

WILLIAM TITUS.

Witnesses:

FLORENCE A. HAWXHURST,
WM. E. HAWXHURST.