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Patented Nov. 5, 1901.

J. & W. TITUS.
EXCAVATING MACHINERY.

(Application filed Feb. 18, 1901.)

(No Model.)

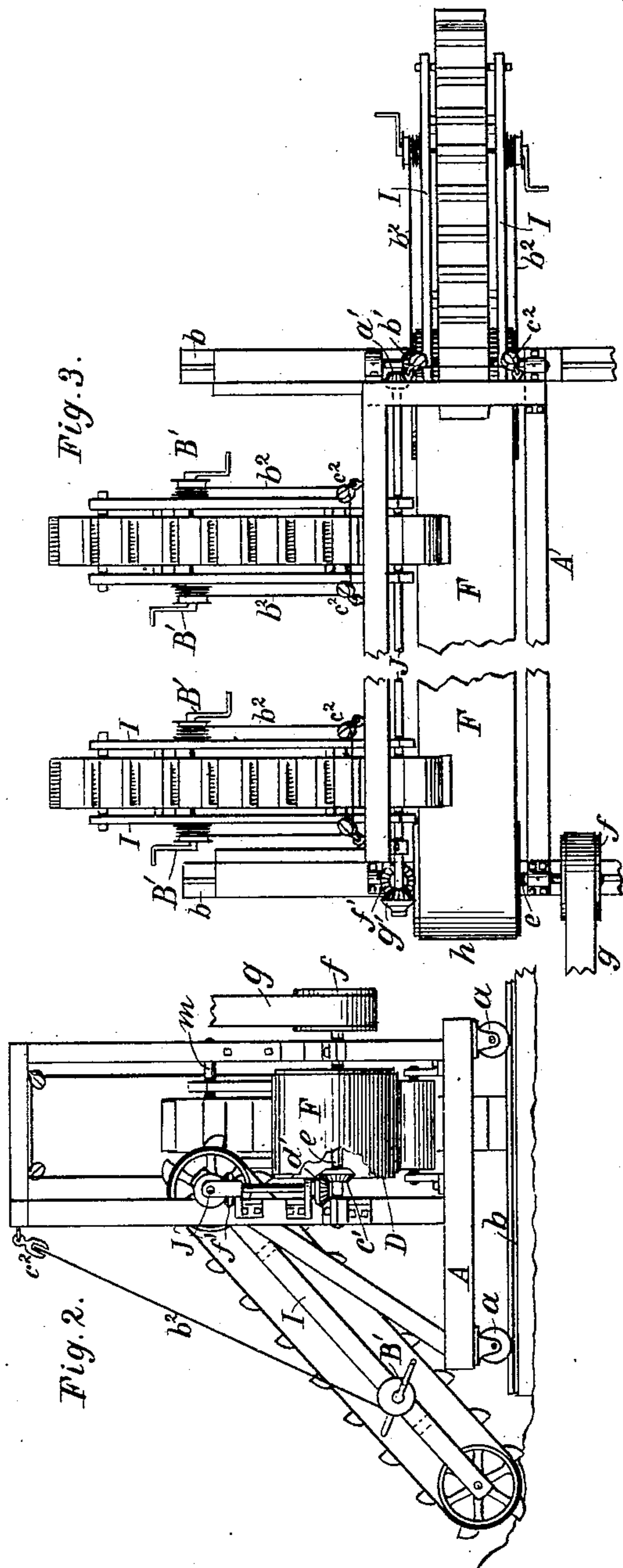
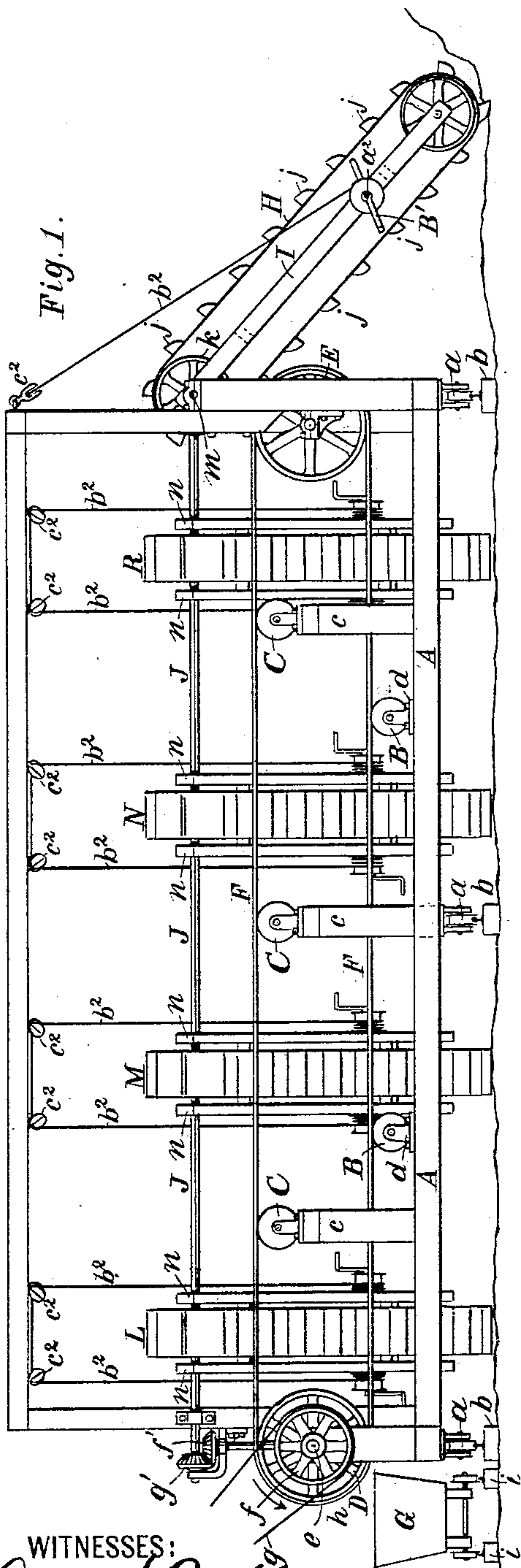
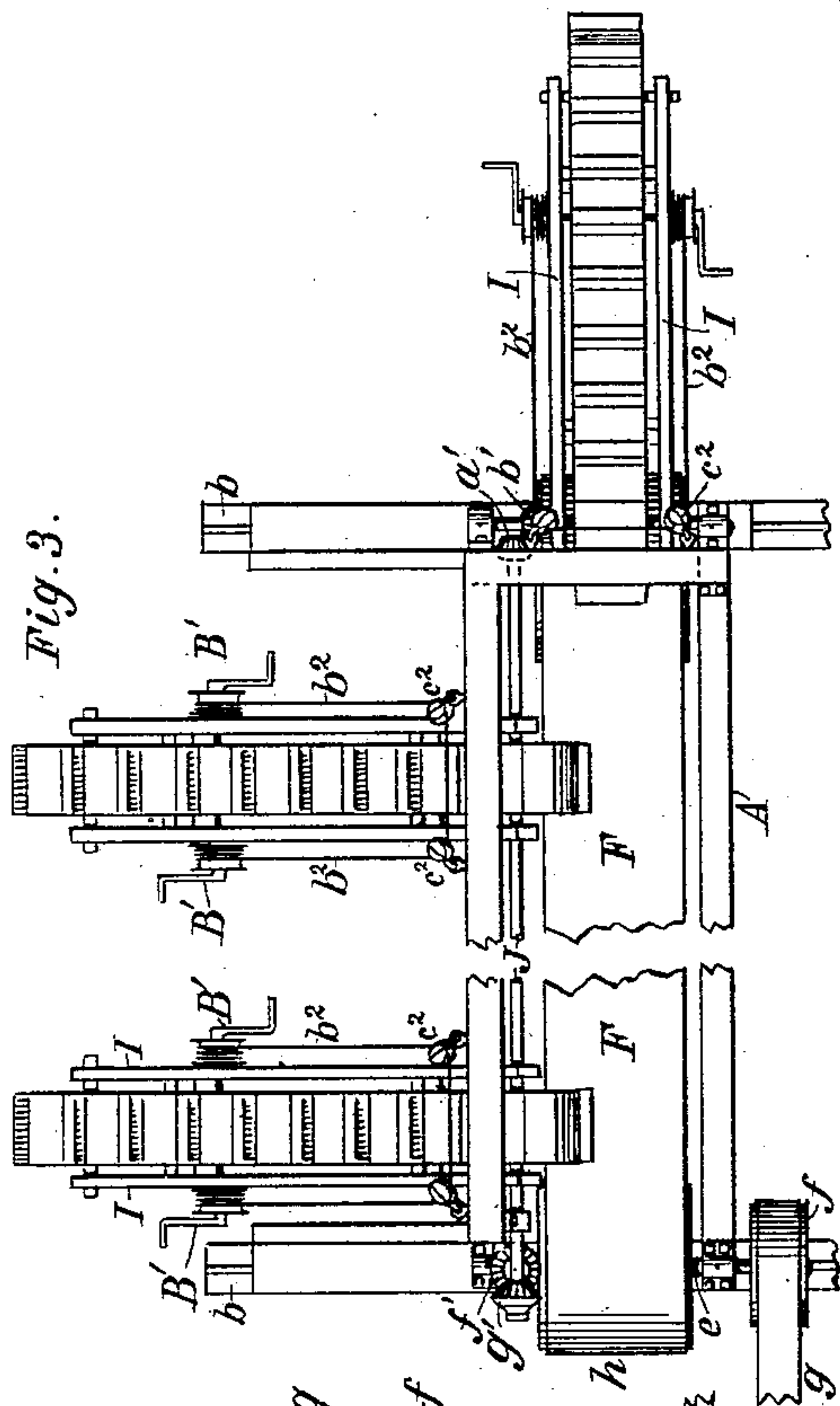


Fig. 3.



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EXCAVATING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 685,803, dated November 5, 1901.

Application filed February 18, 1901. Serial No. 47,774. (No model.)

To all whom it may concern:

Be it known that we, JOHN TITUS, residing at Oyster Bay, and WILLIAM TITUS, residing at 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 Machinery; 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 rear elevation of an apparatus made according to our invention. Fig. 2 is an end elevation of the same. Fig. 3 is a plan view of parts of said apparatus.

This invention relates to the excavation of sand, gravel, earth, &c.; and its object is to provide a simple, strong, and durable apparatus with great capacity for work, for excavating sand, gravel, earth, &c., and depositing such material in suitable receptacles or at suitable places for use or transportation.

To this end the said invention comprises certain new and useful combinations of parts, hereinafter fully set forth and explained.

A is a horizontal frame provided with wheels or rollers *a*, which in the use and operation of the apparatus run upon tracks *b*, which are laid at right angles to the face of the sand bank or like source of supply from which the material is to be taken and removed. Upon the bottom frame A are suitable standards *c* and *d*, upon which are journaled rolls B and C. Arranged in due relation with these rolls and at or near the ends of the apparatus are revoluble drums D and E. These drums carry an endless apron F, the upper part of which in the revolutions of the apron is supported along its length by the series of rolls C, while the lower part of the apron is in a similar manner supported by the series of rolls B. The shaft *e* of one of the drums—as shown in the drawings, the drum D—is provided with a driving-pulley *f*, which receives motion through a belt *g* from any suitable source of power, the direction of motion of the pulley, and consequently of the adjacent drum D, being indicated by the arrow in Fig. 1. Any material placed upon the

upper part of the endless apron is of course carried along by the motion of the apron until it is thrown off, as at *h*, by the movement of the belt around the drum D. Adjacent to the said drum is provided a trolley G to receive the material from the apron. This trolley is preferably arranged to run upon a track *i* to any suitable place of delivery of said material.

At that end of the apparatus opposite to that which carries the drum D is an endless chain H of buckets J, which at its upper end passes over a wheel or drum *k* and at its lower end over a wheel or drum *l*, the shafts of said wheels or drums *k* and *l* being supported in suitable bearings provided to a swinging frame I, which is pivotally connected at its upper end with suitable framework or supports, as at *m*, attached to the bottom frame A. To the frame I is secured a shaft *a*², which has at each end—that is to say, upon each side of the frame—a winch B'. A strap or rope *b*² is looped over two pulleys *c*² in the frame of the machine and has its ends attached to the two winches aforesaid, so that by operating the latter the frame I, or, in other words, the endless chain of excavating-buckets, may be swung upward or downward or adjusted as the exigencies of the work may require. This mechanism for raising, lowering, and adjusting, as just set forth, is the same for each of the endless-chain bucket mechanisms embraced in the structure of the apparatus, as presently herein set forth. Motion is communicated to the wheel or drum *k*, and consequently to the endless chain of buckets, by gears *a'* *b'*, as presently herein further set forth. By the operation of the endless system of buckets just described sand, earth, or gravel may be excavated at the above-indicated end of the apparatus and lifted to and deposited upon the adjacent part of the endless apron, which by its continued or revolving motion carries the same to the opposite end of the apparatus and deposits the same from the apron at *h* in the manner hereinbefore described.

Provided in suitable bearings, as upon vertical standards *n*, as shown in the drawings, and at a height greater than that of the upper part of the endless apron is a revoluble

shaft J, to which motion is transmitted from the shaft *e* of the driving-pulley by means of a bevel-pinion *c'* on said driving-shaft, which gears with a similar pinion *d'* on a vertical shaft *e'*, which latter has at its upper end a like pinion *f'*, which in its turn gears with a similar pinion *g'* on the shaft J. Upon this just-mentioned shaft J, at the opposite end of the apparatus, is the bevel-gear *a'*, which gears with the bevel-gear *b'* on the shaft *h'* of the upper drum K of the endless system of buckets H, hereinbefore set forth.

Fast upon the shaft J are pulleys or drums, each of which carries the upper end of an endless-chain system of excavating and elevator buckets, each of which may be of substantially the same structure and mode of operation as the system H shown at the right-hand end of Fig. 1 and hereinbefore described, except that instead of being arranged to excavate and deliver the earth, sand, or the like from the end of the apparatus they are arranged to excavate it at the rear side of the machine and to deliver it to the endless apron, over the rear edge thereof, and at various places along the length of said apron, the material thereby accumulated upon the apron as it revolves being carried along thereby until deposited therefrom at *h* by the movement of the apron over the drum D, as herein previously explained. Each of the backwardly-extended endless-chain bucket mechanisms ranged along the endless aprons, as described, is provided with a lifting and lowering mechanism which, as shown in the drawings, is the same in structure and operation as that provided to the endless-chain bucket mechanism at the end of the apparatus and hereinbefore explained in detail. As the endless-chain bucket mechanisms may be all of them substantially alike and so shown in the drawings, the several parts of each are indicated by the same reference-letters in all; but for convenience in reading the drawings each endless-chain bucket mechanism as an entity is indicated by a separate letter—thus, that at the end of the apparatus by the letter H, and the others, from right to left in Fig. 1 by the letters L M N R. Any desired number of rearwardly-extended systems of endless-chain buckets may be employed, according to the length and capacity of the endless apron and the character of the material to be excavated and moved.

In the operation of the apparatus it is gradually moved back toward the sand bank or other deposit of material to be excavated and lifted, and the excavating-buckets *j* as they revolve cut into the material and lift and deposit it upon the apron, the machine being fed back to its work as the excavation proceeds. By the means described the material to be moved may be rapidly conveyed in large quantities to the endless apron and with proportional speed conveyed to the place (*h*) of

deposit into the trolley G or otherwise. By looping the chain or rope of the winches over pulleys, as described, said chain or rope is allowed to run free over the pulleys whenever the motion of one winch exceeds that of the other, so that the rope becomes self-adjusting to prevent one side of the endless-chain system from being moved in advance of the other. The winches, it is to be noted, are operative independently of each other, so that if the one draws more rapidly upon the rope than the other the rope will slide upon the pulleys to equalize the strain, so that one side of the endless-chain bucket system shall not move faster than the other.

What we claim as our invention is—

1. The combination with a wheeled bottom frame, revoluble drums carried by said frame, an endless conveyer-apron carried by said drums, a system of rolls for supporting the upper or carrying part of the apron, a system of rolls for supporting the lower or slack part of the apron, a revoluble shaft placed higher than the apron, an endless-chain bucket mechanism arranged to deliver material upon the apron over the edge thereof, pulleys on said shaft to operate said bucket mechanism and mechanism for operating from one of the drums the shaft which is parallel with the apron, of winches provided at opposite sides of the endless chain of buckets, and a rope or chain looped over elevated pulleys and with its ends attached to the winches to lift, lower, or adjust the endless chain of buckets, substantially as described.

2. An organized machine comprising the combination with a wheeled bottom frame, revoluble drums carried on said frame, an endless conveyer-apron carried by said drums, a system of rolls for supporting the upper or carrying part of the apron, a system of rolls for supporting the lower or slack portion of the apron, a revoluble shaft placed higher than the apron and parallel therewith, an endless-chain bucket mechanism operated from said shaft and arranged to deliver material upon the apron over the edge thereof, a driving-pulley on the shaft of one of the drums, a bevel-pinion on said shaft, a like pinion on the shaft which is parallel with the apron, and a counter-shaft having bevel-pinions for transmitting motion from the pinion of the shaft of the drum to the shaft which is parallel with the apron, of independently-operating winches placed at opposite sides of the endless-chain bucket system, pulleys elevated above the winches, and a chain or rope which passes over the pulleys with its ends attached to the winches, all substantially as herein set forth.

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Witnesses:

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