

No. 652,911.

Patented July 3, 1900.

G. E. BOWERS.

PORTABLE CONVEYER AND ELEVATOR.

(Application filed Nov. 1, 1899.)

(No Model.)

2 Sheets—Sheet 1.

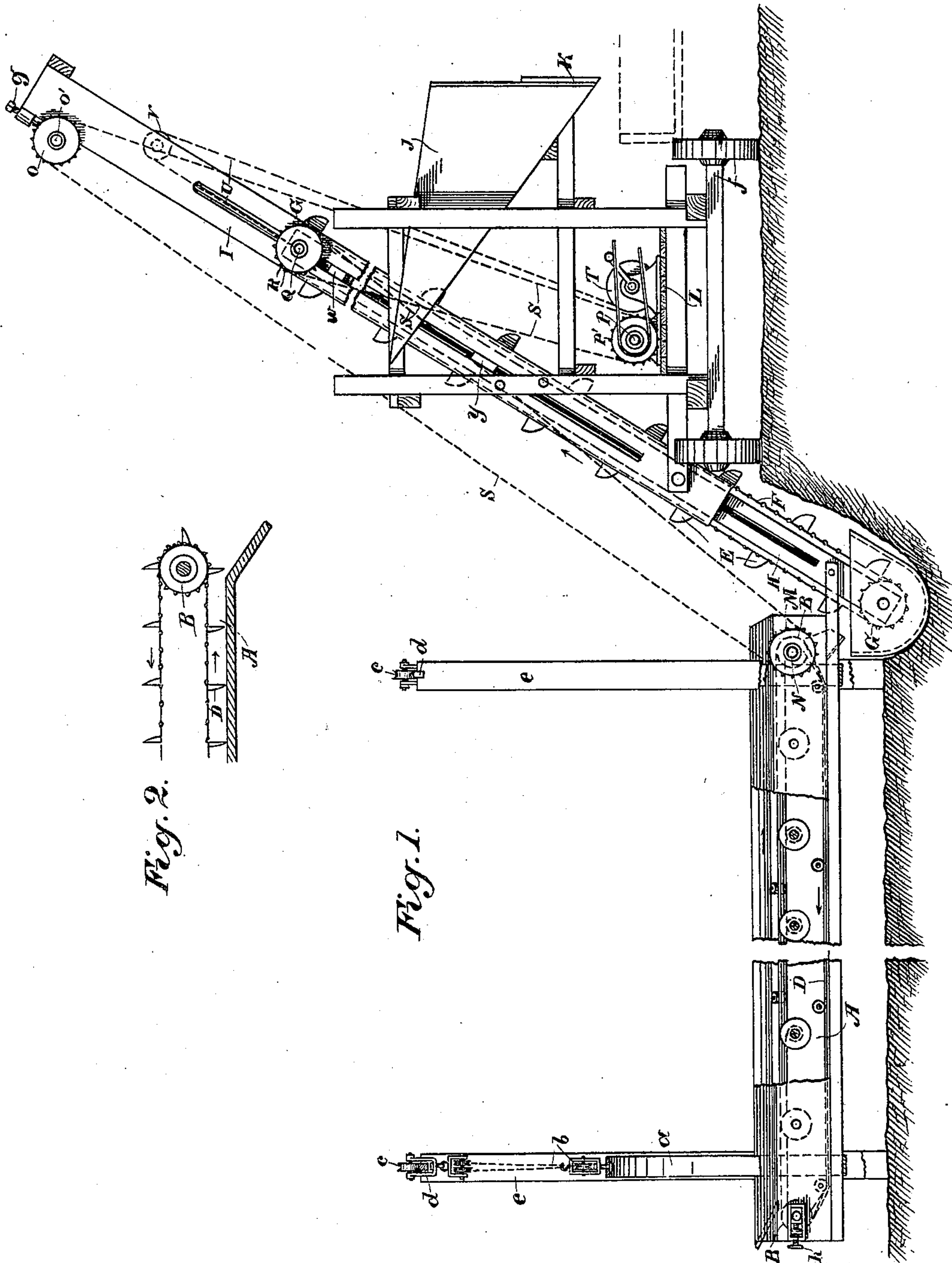


Fig. 2.

Fig. 7.

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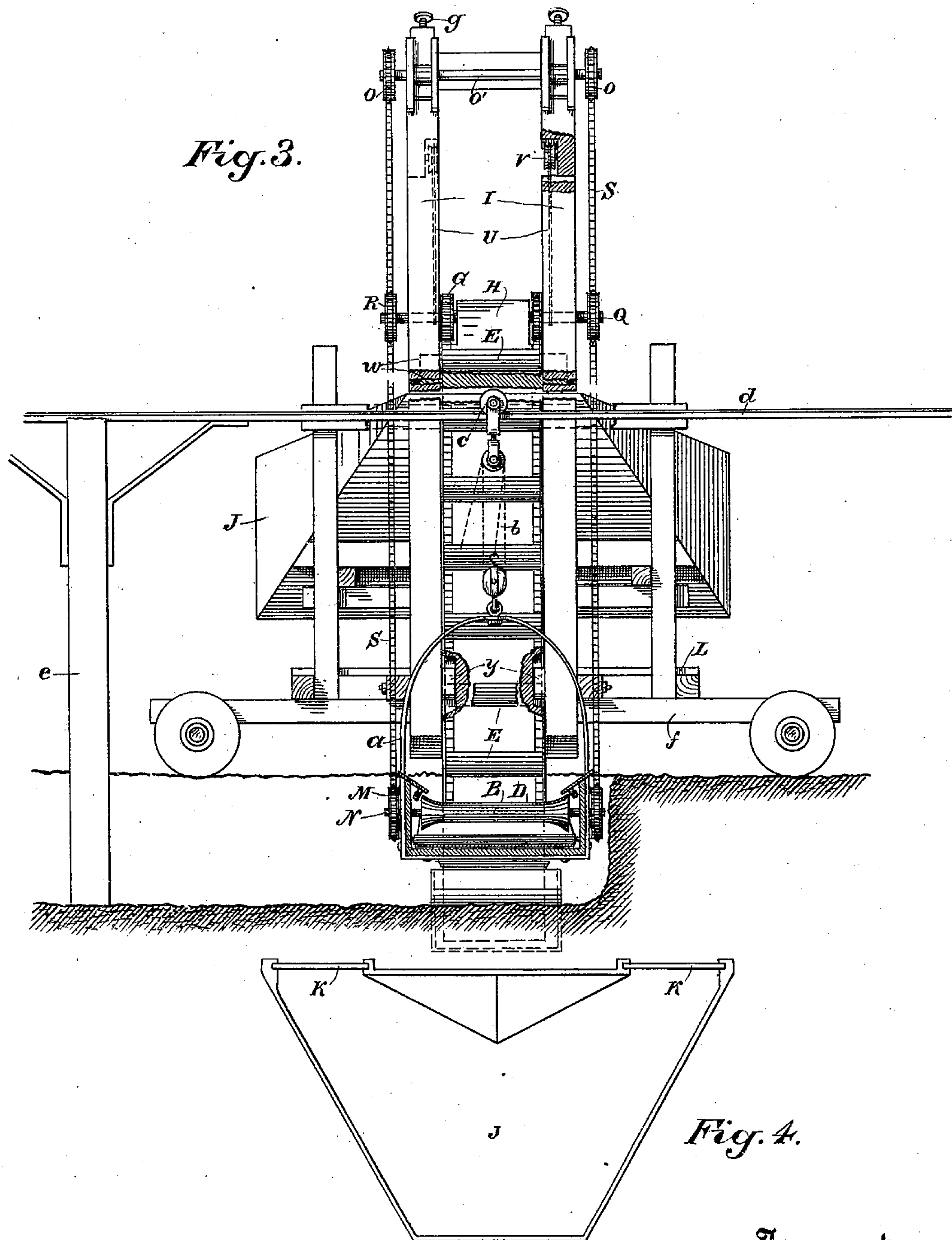
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UNITED STATES PATENT OFFICE.

GEORGE E. BOWERS, OF SAN FRANCISCO, CALIFORNIA.

PORTABLE CONVEYER AND ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 652,911, dated July 3, 1900.

Application filed November 1, 1899. Serial No. 735,454. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. BOWERS, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Portable Conveyers and Elevators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an apparatus for transporting and elevating earth and like materials.

The object of the invention is to provide a device which is designed for transporting and elevating earth from excavations or pits, such as are made for the construction of buildings, whereby the earth to be removed is conveyed from any point in the excavation to an elevator, by which it is raised to the level of the street or other point of deposit; and my invention consists in an arrangement of mechanism by which the transporting device or carrier may be shifted to any part of the excavation as the work proceeds and the elevator similarly moved in unison therewith. In conjunction with this is a receiving-hopper and means for delivering the excavated earth into carts or vehicles by which it is to be removed.

My invention also comprises details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation and partial section of my apparatus with belt carrier. Fig. 2 is a view of another form of carrier. Fig. 3 is a front view of the elevator with transverse section of the horizontal carrier. Fig. 4 is a view of the receiving-hopper.

A is a trough of such length as may be required for the purpose, having drums or like carrying-wheels B journaled near the ends and adapted to impel carriers D for the purpose of transporting excavated material from the point or points where it is received by the carrier to the point of delivery. As here shown, my carrier consists of an endless traveling belt passing around the terminal drums or rollers B and properly supported along the interval by intermediate rollers C; but it will be understood that endless-chain-impelled scrapers along the trough might be used or other equivalent device for moving the ma-

terial, and I desire the expression "carrier" as here used to cover any operative device for the purpose.

The device is so arranged that the carrier moves along the trough, so that when power is applied to drive the apparatus the carriers act to move the earth from one end of the trough toward the other, and passing around the drums or pulleys at that end they return to the point where they again enter the trough and advance toward the point of delivery. The framework and trough may be built in any suitable manner to suit the particular excavation which is being made. At the discharge end of the trough the material falls into elevator-buckets E, which are carried upon chain or like belts F, passing over drums or pulleys G at the upper and lower end of a frame H. This frame is slidable in guides I, so that it may be raised or depressed to suit the conditions of the excavation, the length being sufficient, so that the buckets will discharge from the upper end into a receiving-hopper J. This hopper may be made in any suitable manner. I have here shown it as diverging downwardly and outwardly from the receiving-point, and at the lower end it is provided with gates K, from which one or more carts or vehicles can be loaded by gravitation.

In order to drive the mechanisms here shown, sprocket-wheels M are arranged upon the ends of the shaft N of the horizontal carrier which is nearest the elevator and preferably upon both ends, so as to equalize the driving. Sprocket-wheels O are similarly fixed upon the shaft O' at the upper end of the frame, which carries the elevator-buckets.

Upon a support or framework L is journaled a shaft P, having fixed upon it sprockets P'. At the upper end of the guide-timbers, in which the elevator-carrying frame is slidable, is another shaft Q, carrying sprocket-wheels R.

S S are endless chains which pass around all of the sprocket-wheels M, O, P', and R, as shown in the drawings, so that when power is transmitted through the shaft and sprockets upon the platform the chains will be moved and caused to drive the horizontal carrier and the elevator in unison.

By reason of the sliding elevator-frame and

the arrangement of the various sprockets the horizontal carrier and the elevator may be adjusted to commence work at a given surface, and as the excavation proceeds the sliding elevator-frame may be moved downward in unison with a similar depression of the horizontal carrier, and the chains passing over the driving-sprockets, as heretofore described, will automatically lengthen and adjust themselves as the horizontal carrier and elevator are depressed to suit the conditions of the work.

T represents a winding-drum fixed upon the platform L to be operated by any suitable engine, and ropes or chains U, winding upon this drum, pass thence upwardly over guide-pulleys V and thence down to the slidable elevator-carrier, so that it can be raised or lowered to suit the conditions under which it is working. In order to properly guide this slidable elevator-carrier, I have shown plates fixed upon the side of the sliding frame having tongues *w*, which project into slots or channels in the guide-timbers, and other similar plates are fixed upon the guide-timbers having tongues *y*, projecting into corresponding slots or channels in the sides of the slidable frame. These two sets of oppositely-disposed plates and tongues serve to give a steady support for the slidable frame and to allow it to be adjusted up or down while holding it rigidly in position.

It is the design of this apparatus to commence at one side of the excavation to be made and to work across to the opposite side. For this purpose the trough or carrier A is suspended by suitable bales *a* with block and tackle, as shown at *b*, from hangers with pulleys *c*. These pulleys are adapted to travel upon horizontal supports *d* of any suitable or desired length transversely to the line of the carrier. These supports *d* rest upon posts *e*, which may be driven into the ground or otherwise so disposed as to support the ends of the bars *d* and at such a distance apart as to allow the carrier A to be moved transversely of the line of travel of the buckets as the work proceeds.

The elevator mechanism previously described and its platform L are supported upon a wheel-carriage, as shown at *f*, and this is so placed as to be moved in unison with the movements of a horizontal carrier. Thus if an excavation of any length is to be made to prepare for the foundations of a building the apparatus is set up with the horizontal carrier and elevator in line with one side of the proposed excavation. The material excavated by the workmen all along the line is thrown into the trough A, and the carrier and elevator being in motion the material will be continually transferred to the delivery-hopper. As the excavation proceeds the horizontal carrier may be lowered, and by the peculiar arrangement of the slidable elevator and the driving-chains these may be lowered in unison, while the chains maintain approximately

the required tension for driving purposes without other adjustment. When the desired depth of excavation has been reached, the excavation may then continue transversely of the line of travel of the carrier, and as it proceeds the carrier may be advanced across its line of travel by means of the trolleys *c*, traveling upon the supports *d*, and the carriage upon which the elevator portion is mounted will be advanced in unison therewith, so as to maintain all parts in line suitable for the work. In this manner the whole excavation can be completed to any desired depth without the necessity of driving the carts into it for the purpose of removing the material, the carts, remaining upon the street or other level where the receiving-hopper discharges, can be readily loaded by gravitation, and the work very expeditiously completed.

The journal-boxes at the upper end of the guide-timbers of the elevator are here shown as being slidable and provided with adjusting-screws or other equivalent adjusting devices *g*, so that any stretching or slack of the driving-chains may be taken up at will. The journal-boxes of the shaft at the receiving end of the horizontal carrier are similarly provided with adjusting devices, as shown at *h*, for the purpose of maintaining the proper tension of the horizontal carrier-chains.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a horizontal carrier, means whereby it may be raised and lowered, an elevator, and means whereby it may be raised and lowered in unison with the carrier.

2. A horizontal carrier, consisting of a trough, an endless conveyer, mechanism by which it may be raised or lowered, an elevator into the buckets of which the carrier discharges, and means for adjusting the elevator in unison with the adjustment of the carrier.

3. A conveyer consisting of an essentially horizontally disposed trough, an endless carrier adapted to move therethrough and transfer material from one end to the other, devices by which said trough may be raised or lowered and also moved transversely of the line of travel of the carrier, and an elevator with means for adjusting it in unison with the vertical movements of the carrier, and also with its transverse movements.

4. A conveyer consisting of a trough, an endless carrier adapted to move therethrough, bales connected with the trough, transversely-disposed rails supported above the trough, trolley-wheels adapted to travel upon the rails and means by which the trolley-wheel frames are connected with the suspending-bales of the trough.

5. A conveyer consisting of a trough, an endless carrier adapted to move therethrough and transfer material from end to end, means for raising and lowering said trough, and a chain of elevator-buckets into which the ma-

terial is delivered from the carrier, a frame upon which said chain of buckets is carried, guides in which said frame is slidable and means whereby said frame is raised and lowered in unison with the vertical adjustments of the horizontal carrier.

6. A conveyer consisting of a horizontal trough, an endless carrier movable there-through, means for raising and lowering the carrier, an elevator including a slidable frame and a chain of buckets mounted therein and adapted to receive the discharge of the carrier, guides between which the slidable frame is movable and means whereby said frame is raised and lowered in unison with the movements of the carrier, sprocket-wheels and supports therefor mounted upon the bed of the elevator, the upper portion of the guides, the slidable frame and the carrier, respectively, and endless chains passing around said sprocket-wheels whereby the carrier and elevator are driven in unison, and the tension of the chains maintained for any vertical adjustment of the parts.

7. A conveyer consisting of a horizontal trough, an endless carrier movable there-through, means for raising and lowering the conveyer, an elevator consisting of an endless chain of buckets into which the carrier discharges, a frame upon which the chain of buckets is mounted, guides in which said frame is slidable to raise and lower it in unison with the movements of the carrier, tongue-plates fixed upon the slidable frame and projecting into channels in the guides, corresponding plates fixed upon the guides and projecting into channels of the slidable frame, and means for raising and lowering the elevator-frame with relation to the guides.

8. A conveyer consisting of a trough, an endless carrier adapted to move through said trough, means for raising and lowering said carrier, means for moving it transversely to the line of travel of the buckets, an elevator consisting of a chain of buckets, a slidable frame upon which the buckets are mounted, guides and a mechanism by which said frame is raised and lowered in unison with the movements of the carrier and a carriage upon which the elevator is mounted, said carriage being capable of movement in unison with the transverse movement of the carrier.

9. A conveyer consisting of a trough, a carrier adapted to move therethrough, journal-boxes for the sprocket-wheel shafts about which the chains pass, and means for adjust-

ing said boxes to compensate for variations in the length of the chain, an elevator consisting of an endless chain of buckets, a slidable frame upon the upper and lower ends of which the sprocket-wheel shafts of the bucket-chains are journaled, guides in which said frame is slidable, and mechanism by which it is raised and lowered in unison with the movements of the carrier, endless chains passing around the sprocket on the carrier-driving shaft, sprockets on the carrier-shaft, sprockets on a shaft journaled in the upper end of the elevator-guide, sprockets upon the end of the shaft on the slidable elevator-frame and sprockets upon a main driving-shaft, said shafts and sprockets being so disposed that the length of the chains passing over them is automatically adjusted in unison with the movements of the elevator-carrying frame.

10. A conveyer consisting of a trough, a carrier adapted to move therethrough, means for raising and lowering the carrier, an elevator into which the carrier discharges, means for adjusting said elevator, sprocket-wheels and endless chains automatically adjustable for length in unison with the raising or lowering of the carrier and elevator, slidable boxes in which the shafts of the sprocket-wheels are journaled and devices by which the boxes may be adjusted independently of the automatic adjustment of the chains.

11. An apparatus consisting of a carrier, means for raising and lowering and moving it transversely with relation to the line of travel, an elevator, means for adjusting it in unison with the adjustments of the carrier, a hopper or receiver into which material delivered by the carrier to the elevating-buckets is discharged, and gates through which the material may be discharged from the hopper.

12. A conveyer consisting of a trough, a carrier movable therethrough, bales attached to the trough, horizontal tracks supported transversely of the line of travel of the carrier, trolleys journaled in frames and movable upon the transverse tracks, mechanism connecting the trolley-frames with the bales upon the trough whereby the trough may be raised or lowered and also moved transversely.

In witness whereof I have hereunto set my hand.

GEORGE E. BOWERS.

Witnesses:

S. H. NOURSE,
JESSIE C. BRODIE.