

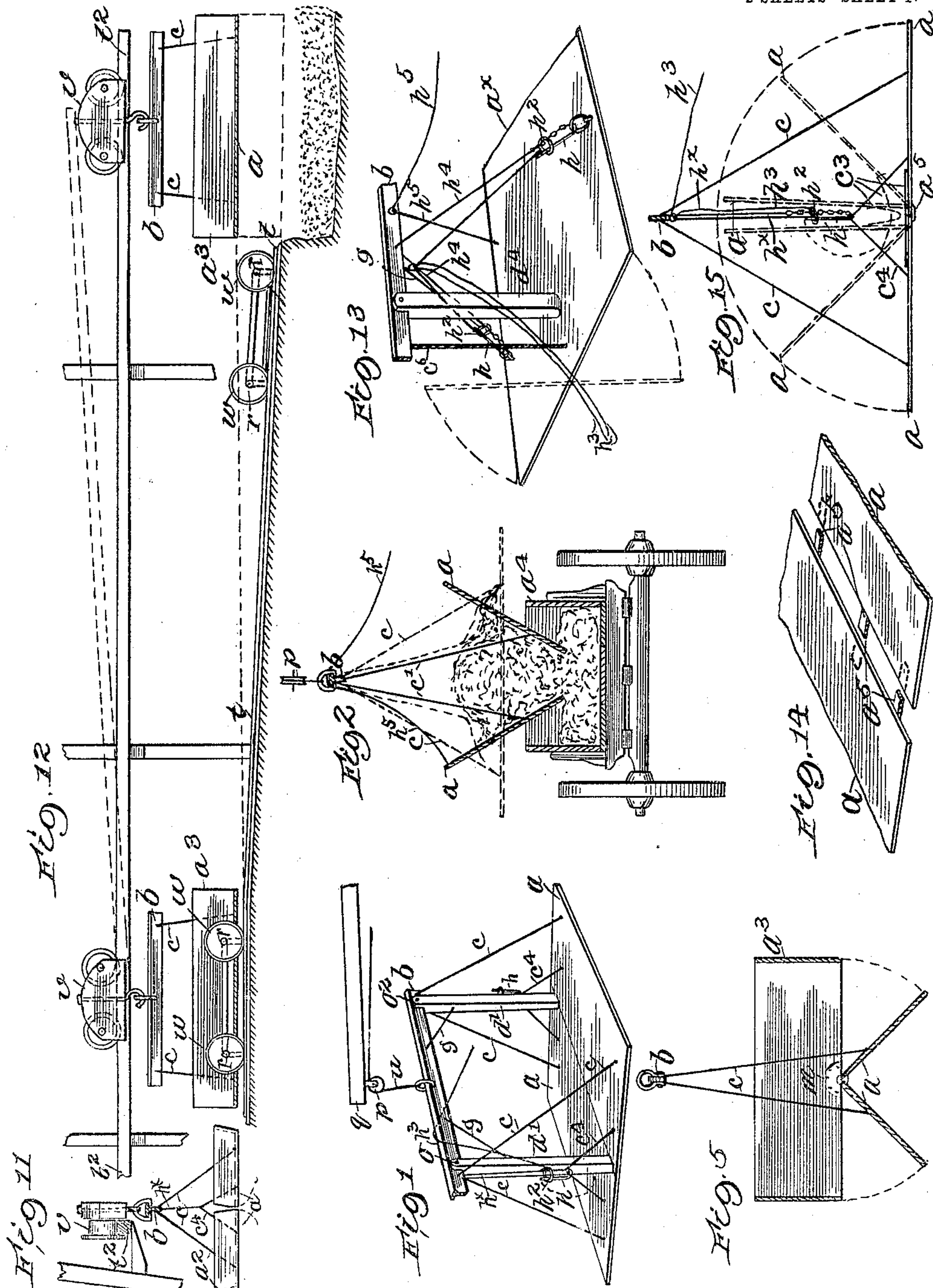
No. 822,419.

PATENTED JUNE 5, 1906.

W. ZIMMERMAN.
MECHANISM FOR TRANSPORTING EARTH.

APPLICATION FILED JULY 9, 1902.

2 SHEETS—SHEET 1.



Witnesses:
Harry B. White
Ray White.

Inventor
William Zimmerman.

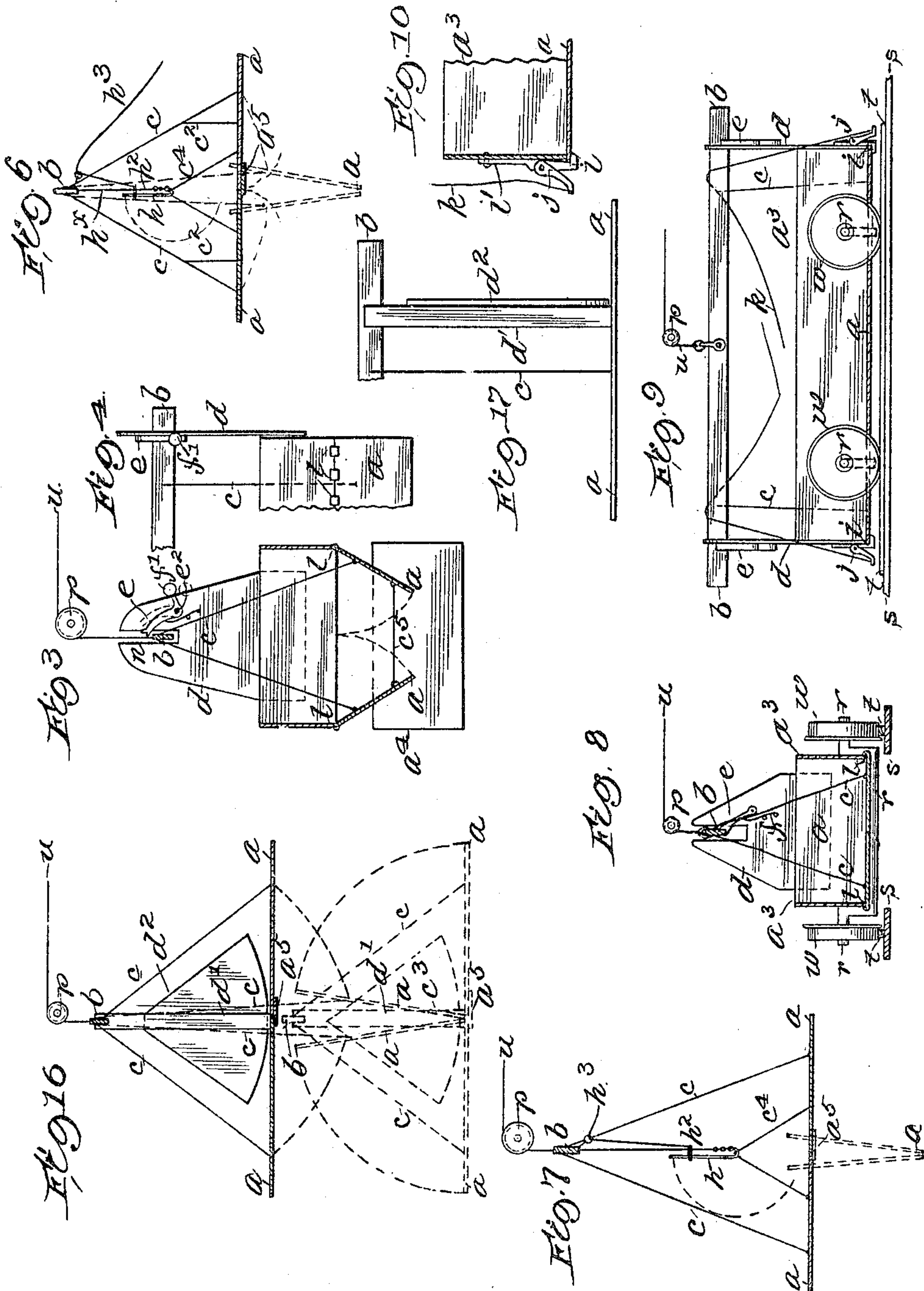
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UNITED STATES PATENT OFFICE.

WILLIAM ZIMMERMAN, OF CHICAGO, ILLINOIS.

MECHANISM FOR TRANSPORTING EARTH.

No. 822,419.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed July 9, 1902. Serial No. 114,889.

To all whom it may concern:

Be it known that I, WILLIAM ZIMMERMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mechanism for Transporting Earth, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part hereof, and in which—

Figure 1 shows in perspective one form of my said new device ready to load. Fig. 2 shows Fig. 1 in end view discharging a load of earth into a wagon-box, some of the details of rope gearing and other parts being omitted to leave the modified form of the attachment, which is shown in plainer form. Fig. 3 shows in sectional end view the loaded carrier or carrying-plates *a* of Figs. 1 and 2 hinged at 1 to a box or casing above them in the position they will be in at the time of having just discharged a load into a wagon-box, the latter being shown in outline. Fig. 4 shows a fragment of one end of Fig. 3 in side view without the wagon-box. Fig. 5 shows a sectional end view of my earth-carriers with a box to which the said carriers are hinged at their meeting edges. Fig. 6 shows an end view of a pair of carrying-plates and their carrying-bar above them and mechanism modified by the use of the parts *c*² for bringing them into and releasing them from a horizontal or loading into an unloading position, the latter indicated in broken outlines. Fig. 7 shows the mechanism shown in Fig. 6 for locking and releasing the plates *a a* into the loading and unloading position, the latter indicated in broken outlines. Fig. 8 shows a sectional end view of the box *a*³, its hinged bottom attached to its supporting and carrying mechanism below said box. Fig. 9 shows Fig. 8 in side elevation ready for work, its bottom being indicated in sectional form to distinguish it more readily. Fig. 10 shows a form of mechanism for locking the plates *a a* to the box. Fig. 11 shows an end view of an elevated or overhead railroad and truck, to which is attached a pair of plates with up-turned edges ready to load. Fig. 12 shows the elevated railroad of Fig. 11 in side elevation and the beam *b* of a car-box *a*³ hitched to the elevated car-truck *v* ready to separate said box from its carrier or truck-axles *r*, and at the other end of said railroad is shown the completed separation of said axles and box

and the latter discharged of its load, as shown by the broken outline of the bottom *a* of said box. There is also shown in said figure in broken outlines the opposite position of said railroad and grade or inclination of the track *t*, the latter being level and the track *t*² inclined, whereby with sufficient distance, according to inclination of track or tracks, the box and its axle may be separated, as shown. Fig. 13 shows in perspective a view of one end of a single plate supported at its longitudinal center and releasably supported at each side edge. Fig. 14 shows fragments of opposite carrying-plates provided with fingers *a*⁵ for holding the tangent edges of said plates in the same plane. Broken outlines indicate their locked position when the edges of the plates touch. Fig. 15 shows in end elevation a pair of plates ready to load and how they are moved into that position by the operation of the connecting-rope *c*³ and how they are held by the fingers *a*⁵. Fig. 16 shows an end elevation of my said new device, of which Fig. 17 is a side elevation showing the dirt-holder *d*² attached to the post *d*'. In the former figure is also shown in broken outline how the plates move and the position of the several parts as they move from the unloaded to the loading position.

Like reference-letters denote like parts in all the figures.

The object of my invention is to provide better means for transporting earth than has heretofore been known for railroad construction, mining, canal-work, excavating cellars, road-making, and wherever earth, rock, minerals, &c., are excavated and transported, and, finally, in said object to save, as far as possible, the manual labor now called forth in the use of the shovel in connection with ordinary wagons, carts, and the like.

To attain said desirable ends, I construct my said new mechanism in substantially the following manner, namely: I use plates *a*, preferably sheets of steel of suitable dimensions and strength, and connect them by wire ropes *c*, as herein shown, by lines or chains to a carrying-beam *b*, above the load, and to said plates. Preferably said plates will be so hung as to discharge by spreading apart and depositing on but one ridge-line, as shown in Figs. 1, 2, 3, 4, 6, 8, 9, and 15. Said plates may also be made to discharge on two ridges or lines, as when they turn on a longitudinal center line, as shown in Fig. 5 at

m. When there is but one line on which the discharge falls, the suspending-ropes *c* are placed nearer to the outer edges of the plates, while in the other case, where there are two lines of discharge, said ropes are placed at or near the longitudinal center, as for the single plate *a*^x on rope *c*⁶ under the posts *d*⁴, Fig. 13, or near the line of junction of two plates, as shown in Fig. 5. In Fig. 13 there is also shown a releasable support or bridle *h*⁴ on each longitudinal edge which is held by checking-hooks *h* in a check-ring, moved by a trip-cord *h*³, like corresponding parts shown in the other figures of this application, and there is also a trip-cord *h*⁵, secured to the outer edge of the plate *a*^x, passed over the beam *b* for the purpose of raising that edge and aiding the action of dumping the load. The posts *d*⁴ of Fig. 13 may be connected and braced to the beam *b*, as shown in Fig. 1. The said load-carrying plates *a* may also have their outer edges turned up, as shown at *a*², for greater strength and load capacity.

On the plain or flat sheets *a* (shown in Figs. 1, 2, 3, 5, 6, and 15) may also be placed a box *a*³. (Shown in Figs. 3, 4, 5, 8, and 9.) There is also a rope or bridle *c*⁴ with its ends fastened near the inner or abutting edges of the plates at each end of them, which serves to confine and release said plates to and from the horizontal or load-receiving position and which may also be of such length as will be suitable to confine the plates *a* when discharging to a fixed separating distance, as shown at *c*⁴ in Fig. 15, and a rope *c*⁵ in Fig. 3, but to which said plates and preferably is added a special rope *c*³, Fig. 15, as there indicated in both full and broken lines, to clearly show the operation of said rope and plates.

Branch ropes *c*² may also descend vertically to the plates *a* from the ropes *c*, on which as the plates *a* turn is cast the weight of their load, whereby the line of support is moved nearer to the center of gravity, and thereby is retarded the drop of the discharging load and its shock lessened.

Another modification of the construction of the suspending-ropes shown in Fig. 6 is shown in Fig. 2 and their action indicated in both full and broken lines. In said modification, Fig. 2, the branch ropes *c*¹ are the equivalents of said ropes *c*²; but in this case they are elongated and fastened to the beam *b*, and the bridle *c*⁴ is not shown merely for the purpose of avoiding confusion, though it or equivalent mechanism is necessary for holding and releasing the load. By means of said arrangement of the ropes the plates *a* will not only discharge well, but they will also more readily resume the original and normal horizontal position when released of their load. Manual assistance will be but slight and seldom required, even without said branch ropes, to bring said plates to their loading position, as their touching edges will

be quite close to each other when they touch the ground, and the posts *d*¹ or *d*² will separate them, so that they will fall from each other, after which by the weight of the plates the ropes *c*³ will bring them together, as clearly indicated by the positions of the plates *a* in Fig. 15, the rope *c*³ being of exact right length when taut to so unite the edges of the plates. To prevent the contact edges of the plates *a* from slipping one over the other, I attach fingers *a*⁵ under the plates *a* in alternate positions, as shown on an enlarged scale in Fig. 14 and indicated under the plates *a* in Figs. 6 and 15.

The bridle *c*⁴ is secured by a check bar or hook *h*, which may be hung on a chain or rope *h*^x, as shown in Figs. 7 and 15, which is hitched to the supporting-beam *b* or to the end supporting-posts, as *d*¹, *d*², or *d*⁴. When said posts are used, the hooks may be connected to them by a few chain-links to allow them to work more freely. A check-ring *h*² on a rope *h*^x is slipped over the end of the check-hook *h*, and it thus holds the bridle *c*⁴ in locked or raised position, from which it may be released by a trip-cord *h*³, which raises said ring above the free end of the check-bar. Large end plates *d*² may be used to hold the ends of the loose earth piled up in the longitudinal center of the load. Braces *g*, either flexible or rigid, serve to hold the beam *b* and posts *d*¹ *d*² to place, they having pivoted connections *o* and *o*² with the beam *b*.

When the loaded plates *a* are to be transported farther than is within the reach of a crane *q*, a wheeled conveyance, a truck on a track—a track-truck—is provided, which has a pair of axles *r*, bent twice at right angles between the wheels *w* to receive and hold said plates or plate with box *a*³ as near to the ground as possible. The flanged wheels *w* run on rails *t*, which are laid on plates *s*. Hooks *i*, attached to a spring *i*¹ and provided with levered eccentrics *j* and operating-cord *k* in the end of said lever, throw said hooks outward and away from the plates *a* to release the bottom of the box *a*³. Said hooks perform the same function as the bridles *c*⁴. End plates *d*, attached to the box *a*³, hold the supporting-beam *b* in slots *n*, and pawls *e* on the plates *d* hold and release said beam. When the box *a*³ is in loading position, the beam *b* is lifted and the pawls *e* are pushed under it, as shown in Fig. 8. When the load is lifted by the beam *b*, there is play enough to release said pawls and allow the springs *f* to throw them outward. A weight *f*¹, forming an integral part of the pawl *e*, which turns on a pivot *e*², also serves to throw the pawl into the open position, as indicated by its broken outlines.

The railroad *s* *t* is laid within the reach of the crane *q*, from whence the load is lifted by the rope *u* and pulley *p* and dumped into a wagon *a*⁴. The bar *b* may also be carried by

an elevated railroad t^2 on a truck v , through which the truck $r w$, Figs. 8 and 9, may be released by lifting said bar in any known and convenient manner high enough to free said lower truck and so that it may be taken from under said carrying-plates, and thereby permit the downward turning of the plates and the discharge of the load.

When the box a^3 is used and the carrying-plates a hinged at l or m and the ropes c set inward from the line of said hinges, said plates, owing to the position of said ropes, will assume the positions indicated in Figs. 3 and 5, whereby when their free edges touch the axles r they will be caused to rise and close up by their own weight and that of the superimposed attachments, and thus automatically close into the locking-hooks i .

Where the nature of the work renders it possible to lap the overhead or elevated railroad t^2 with the ground railroad t , their grades may be made to approach each other to a point where the truck v may be hitched to the carrying-beam b , from which point both trucks must move in unison until the load is raised far enough above the ground-truck to free and stop it, the load going onto the dump on the upper track. Where such lapping of the tracks is not practicable, lifting mechanism must raise the load to the elevated railroad truck.

When the load is dumped, the truck returns and brings the plates over the ground-truck by simply reversing the motions of the interchanging parts.

The inward pointing of the free edges of the discharged plates, owing to the manner in which they are hung to the carrying-ropes, tends to bring their meeting edges together in all cases, as shown in either Figs. 2, 6, 7, 15, or 16, when said free edges touch the ground, or, as shown in Figs. 3 or 5, when said free edges touch the axles r , the superimposed weight will cause said edges to slide on the axles, and to thus close up under the box a^3 . Said box is no part of the carrying mechanism; but it is carried by the carrying-plates and is by them reciprocated vertically in their discharge and return to normal position.

By placing the carrying mechanism or ropes c within the marginal edges of the plates a and connecting them to the supporting-beam b is attained the capacity to use the plates with or without a box a^3 and without or with a wheeled truck or carrying mechanism $r w$ and to load with shovels and to discharge the load and to return the plates into the horizontal position and to fasten them therein and to connect the entire loading mechanism through its supporting-beam b to a truck v on an elevated railroad.

Both railroads are also called "trucked carrying mechanism." Their trucks v and $r w$ are brought into a vertical line at a point

where the ends of the respective tracks s and t^2 overlap and end.

The load is piled on the plates a with shovels or any other mechanism as long as the material will hold. It is then lifted by means of a crane or other suitable mechanism, attached to the supporting-bar b and brought over the vehicle a^4 , which is to be loaded with it, and dumped therein. It is then brought back and lowered, and after touching the ground with its contact edges it will automatically bring itself into position for reloading, as already indicated, and only needs the checking up of the bridles to be fully ready for raising another load.

In this device the carrying ropes, chains, or like devices are connected directly to the supporting-bar b and the carrying-plates a .

The term "supporting mechanism" means the beam b or its equivalent and its legs d' d^2 . The equivalent of said legs is shown in the parts d , Figs. 8 and 9, and the tensional mechanism refers to the ropes or chains, bridles, and their equivalents. The trucks are the wheeled carrying mechanism.

What I claim is—

1. The combination with rotary carrying-plates and supporting mechanism to stand on said plates, of tensional and separable tensional carrying mechanism to said plates and to said supporting mechanism, substantially as specified.

2. The combination with rotary carrying-plates and supporting mechanism standing on, and reciprocating to and from said plates, of tensional carrying, and tensional carrying and discharging mechanism to said plates and supporting mechanism, substantially as specified.

3. The combination with rotary carrying-plates and severable wheeled carrying mechanism under said plates and supporting mechanism over said plates, of tensional carrying and discharging mechanism to connect said plates and supporting mechanism, substantially as specified.

4. The combination with rotary carrying-plates and wheeled mechanism under them and supporting mechanism over them, of tensional carrying and discharging mechanism connecting said plates and supporting mechanism and elevated wheeled mechanism and track therefor, substantially as specified.

5. The combination with rotary carrying-plates and wheeled mechanism under them and supporting mechanism over them, of tensional carrying and discharging mechanism connecting said plates and supporting mechanism and elevated wheeled mechanism and track therefor and means to transfer the load from one to another of said wheeled elements, substantially as specified.

6. The combination with rotary carrying-plates and supporting mechanism standing

on and reciprocable to and from said plates, of outer tensional carrying mechanism and separable tensional carrying mechanism, said separable tensional mechanism between said outer tensional mechanism and the meeting edges of said plates, substantially as specified.

7. The combination with rotary carrying-plates provided with fingered meeting edges, of tensional carrying mechanism to said plates intermediate their edges and tensionally-acting mechanism intermediate said tensional mechanism and said edges to contact said edges, substantially as specified.

8. The combination with carrying-plates, tensional carrying mechanism to said plates, supporting mechanism to the upper ends of said tensional mechanism, a surface railroad and an elevated railroad capable of variant grades between them, of trucks to said railroads and means to shift the load from one truck to the other, substantially as specified.

9. The combination with carrying-plates, tensional mechanism to said plates, supporting mechanism to said tensional mechanism, resting and freely movable on and to and from said plates, of an elevated railroad and truck thereto and means to connect said tensional mechanism and truck, substantially as specified.

10. The combination with rotary carrying-plates provided with fingered meeting edges, and supporting mechanism on said plates, freely movable in limited direction and range, of tensional carrying mechanism connecting said plates and supporting mechanism and means to contact said edges automatically, substantially as specified.

11. The combination with carrying-plates with fingered meeting edges, and supporting mechanism over said plates, of tensional carrying mechanism connecting said plates and supporting mechanism, and means to contact said edges automatically, and means to lock and release said plates, substantially as specified.

12. The combination with rotary carrying-plates, of tensional carrying mechanism, and separable tensional elements, said separable tensional elements, intermediate said carrying elements and the meeting edges of said plates, substantially as specified.

13. The combination with rotary carrying-plates and severable wheeled carrying mechanism under said plates, and supporting mechanism over said plates, of tensional carrying and discharging mechanism to connect said plates and supporting mechanism and means to sever said wheeled mechanism from said plates, substantially as specified.

14. The combination with carrying-plates, carrying tensional mechanism to said plates, supporting mechanism to the free ends of said tensional mechanism, and a surface railroad and an elevated railroad having relative vertical grades of any suitable angle, of trucks to

said railroads and means to shift the load from one truck to the other, substantially as specified.

15. The combination with rotary carrying-plates, fingered under their meeting edges, of tensional carrying mechanism and separable tensional carrying mechanism, intermediate said carrying mechanism and edges, to said plate, substantially as specified.

16. The combination with carrying-plates, tensional carrying mechanism to said plates, supporting mechanism to the free ends of said tensional mechanism, an elevated railroad capable of any vertical grade and horizontal direction, means to convey said plates, a truck to said railroad, and means to shift the load from one conveyance to the other, substantially as specified.

17. The combination with carrying-plates, tensional carrying mechanism to said plates, supporting mechanism to the free ends of said tensional mechanism, an elevated railroad capable of any vertical grade and horizontal direction, a truck to said railroad, and means to connect said tensional mechanism to said truck, substantially as specified.

18. The combination with carrying-plates, supporting mechanism to stand on said plates, tensional carrying mechanism, and separable tensional carrying mechanism to said plates, and to said supporting mechanism, of an elevated railroad, and truck thereto, and means to connect said tensional mechanism and truck, substantially as specified.

19. The combination with tensional elements, of rotatable load-carrying tangent elements to the lower ends of said tensional elements and separable tensional elements to said rotatable elements, intermediate said tensional elements, substantially as specified.

20. The combination with rotatable load-carrying and fingered tangent elements, of connected tensional elements to said rotatable elements, and separable tensional elements, intermediate said tensional elements, substantially as specified.

21. The combination with tensional elements, of rotatable load-carrying elements to said tensional elements, and separable tensional elements to said rotatable elements, intermediate said tensional elements, substantially as specified.

22. The combination with tensional elements connected to rotatable load-carrying elements and separable tensional elements, intermediate said tensional elements, to said rotatable elements, of an elevated railroad, a truck thereon, and means to connect said rotary elements to said truck, substantially as specified.

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Witnesses:

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