No. 854,920. PATENTED MAY 28, 1907.

F. E. ALLEN.

EXCAVATING AND ELEVATING APPARATUS.

APPLICATION FILED AUG. 4, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

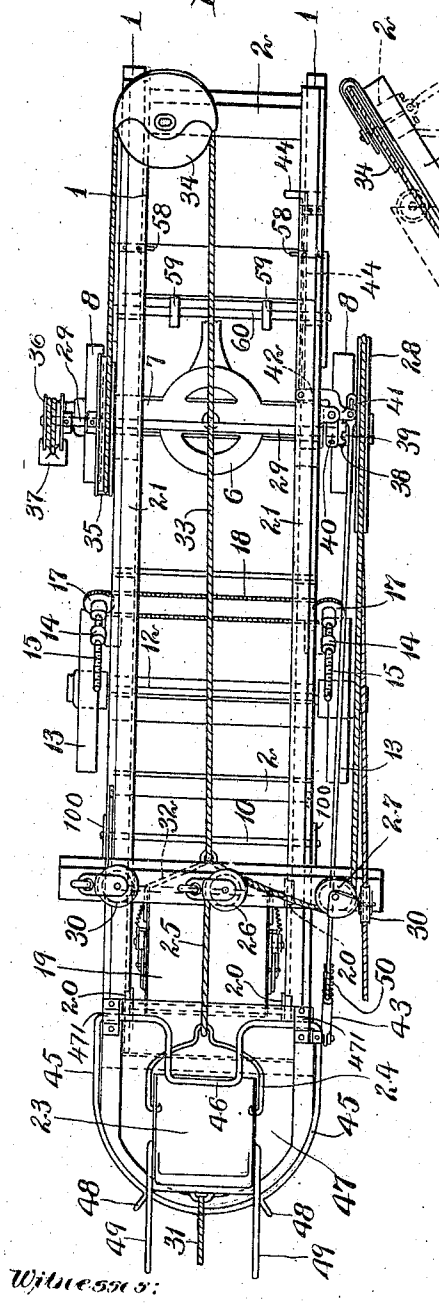
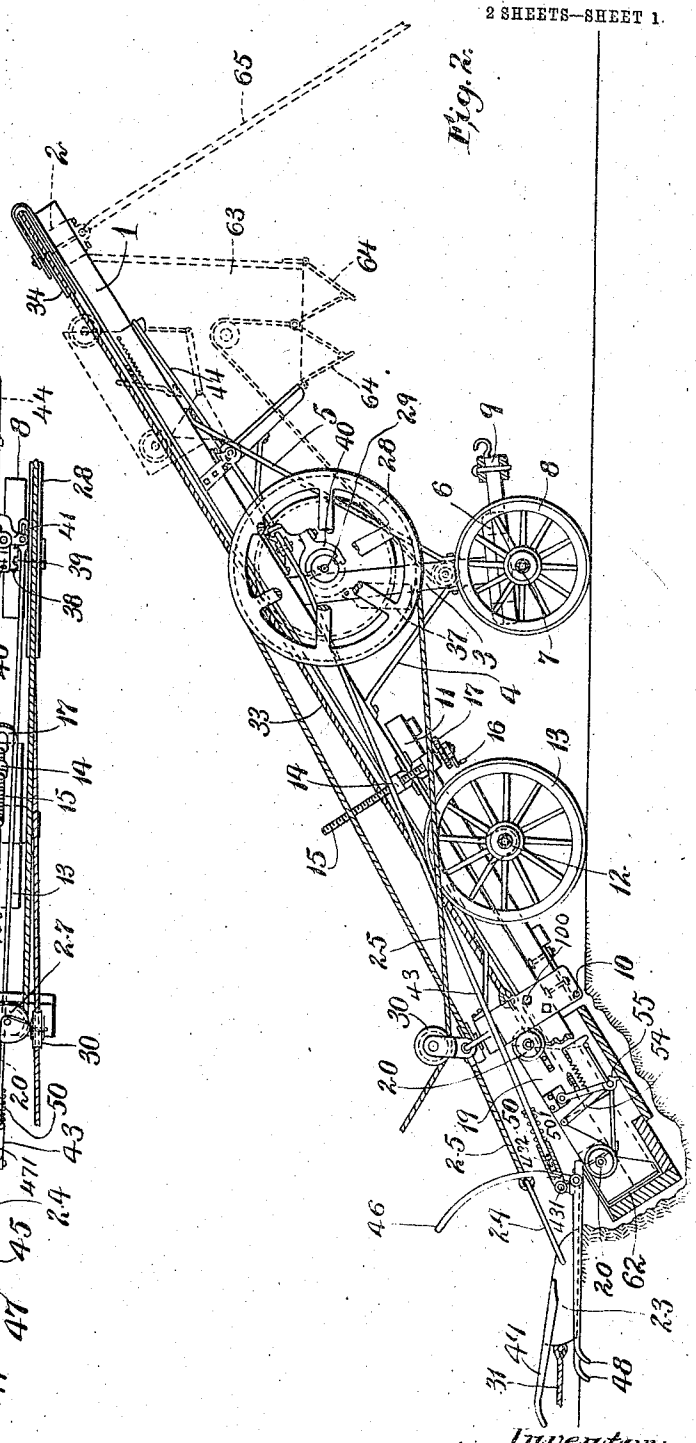


Fig. 2.



Witnesses:

Inventor:
F. E. Allen
by Wright Brown Quinby & Mac
Attorneys

No. 854,920. PATENTED MAY 28, 1907.

F. E. ALLEN.

EXCAVATING AND ELEVATING APPARATUS.

APPLICATION FILED AUG. 4, 1906.

2 SHEETS—SHEET 2.

Fig. 3.

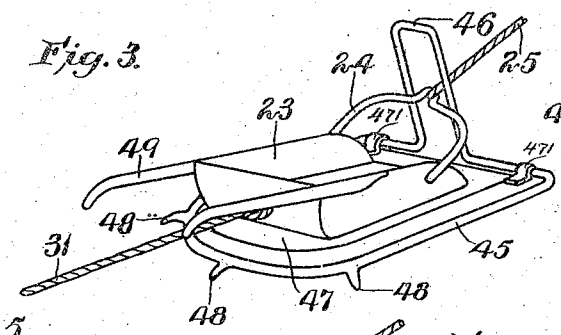


Fig. 4.

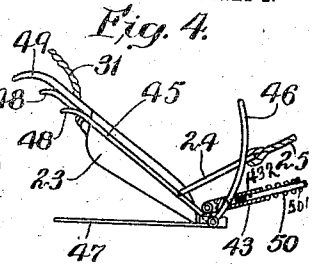


Fig. 5.

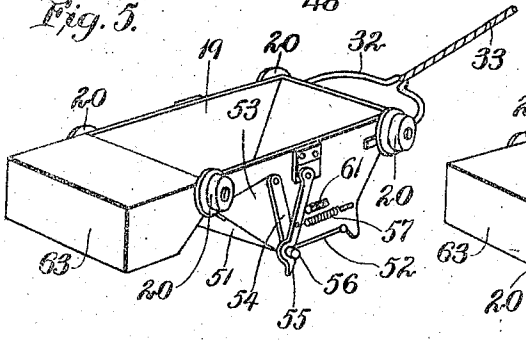


Fig. 6.

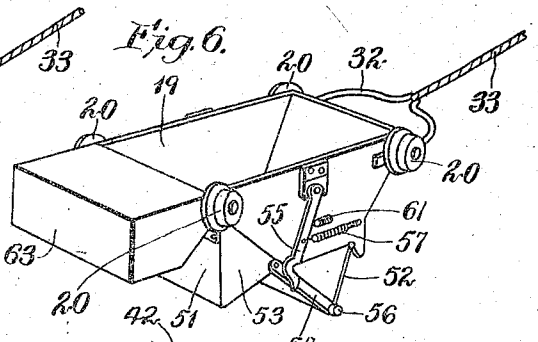


Fig. 8.

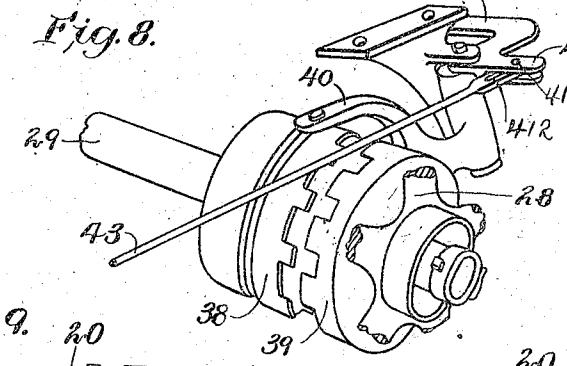


Fig. 7.

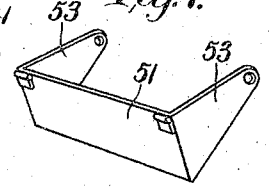
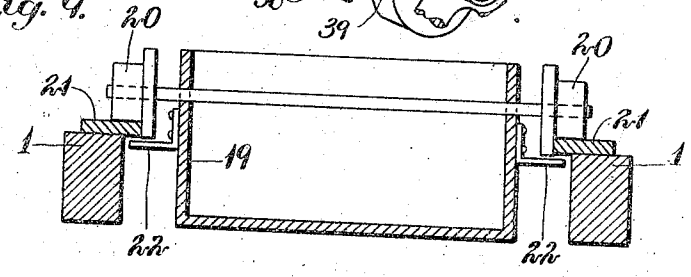


Fig. 9.



Witnesses:

W. M. Mattison

E. Batchelder

Inventor:
F. E. Allen
by Wright Brown Quinby & May
Attorneys.

UNITED STATES PATENT OFFICE.

FREDERICK E. ALLEN, OF SAN LEANDRO, CALIFORNIA.

EXCAVATING AND ELEVATING APPARATUS.

No. 854,920. Specification of Letters Patent. Patented May 28, 1907.

Application filed August 4, 1906. Serial No. 329,192.

To all whom it may concern:

Be it known that I, FREDERICK E. ALLEN, of San Leandro, in the county of Alameda and State of California, have invented certain new and useful Improvements in Excavating and Elevating Apparatus, of which the following is a specification.

This invention relates to portable devices adapted to be moved and located at any spot wherein excavation is to be made, and its object is to provide an improved device of this sort by which the earth to be excavated may be dug by a scraper capable of moving in every direction, and in which the material accumulated by the scraper may be hoisted to a sufficient elevation for dumping into a cart.

Another object of the invention is to furnish a drive for the moving parts of the apparatus whereby the device may be operated by horses or by a hoisting engine.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which,—

Figure 1 represents a plan view of the apparatus. Fig. 2 represents a side elevation of the upper part, and a longitudinal section of the lower part, of the apparatus. Fig. 3 represents a perspective view of the universally movable scraper. Fig. 4 represents an elevation, showing the scraper tilted up to dump its contents. Fig. 5 represents a perspective view of the conveyer or carriage by which the material is elevated. Fig. 6 represents a similar view, showing the drawers forming the bottom of the receptacle in their open position. Fig. 7 represents a perspective view of one of the drawers. Fig. 8 represents a perspective view of a clutch forming part of the elevator-drive mechanism. Fig. 9 represents a cross-section of the carrier, showing its manner of support on its guideway.

The same reference characters indicate the same parts in all the figures.

The apparatus comprises as its base a frame or body portion having two longitudinal side members 1 which occupy an inclined position when the device is in use, as shown in Fig. 2. These longitudinal side members or bars are tied together by transverse braces 2. The main frame or body is supported upon the column or standard 3, and stayed by braces 4 5 which are fastened to the standard. The latter has a swivel connection at 6 with an axle 7 on which are mounted road wheels 8 and to which is connected a drawbar 9 for moving the apparatus. The lower part of the main frame or body is connected by a pintle 10 with the second or auxiliary frame 11 secured to the rear axle 12 which has the wheels 13, the pintle being held by the auxiliary frame and its ends passing through plates 100 secured to the outer sides of the main frame, said plates embracing and confining the auxiliary frame. On each side of the body are pivoted nuts 14 into which are threaded screws 15 pivoted to the auxiliary frame 11. One of the screws has a crank 16 for turning it, and the two screws are connected by sprockets 17 and chain 18 so that they will turn in unison, the two screws being located at corresponding points on opposite side members of the two frames. Rotation of the screws causes the non-connected portions of the frames 1 and 11 to be pushed apart or drawn together, and thereby the pivot 10 is raised or lowered respectively, so as to elevate or depress the rear end of the inclined body. When the parts are in the position shown in Fig. 1, the body has its greatest inclination, and such inclination is diminished and the lower end raised by separating the frames 1 and 11, as will be readily understood.

The lower end of the inclined body may be made to rest directly on the ground near the place to be excavated, or, if desired, a small pit may be dug to receive it, as shown in Fig. 2, in order that the elevating conveyer or carrier 19 may descend to the level of the ground. This conveyer is a box-like carriage, shown in detail in Figs. 5 and 6, having supporting wheels 20 which run on metal rails 21 of the main frame longitudinals 1. As shown in Fig. 9, the conveyer has on its sides flanges 22 which extend under the rails and so prevent possibility of the carriage jumping off the track.

The conveyer normally resides in the position shown in full lines in Fig. 2, wherein it may receive loads of earth brought to it by the excavating scraper 23. This latter has a bail 24 to which is fastened the operating rope 25. The latter passes around guide pulleys 26 and 27, thence over a pulley 28 loose on the shaft 29, and finally away from the apparatus under one of the two guide pulleys 30 on either side of the machine. The rope may be hitched to a draft animal or it may also be connected with a hoisting engine, and it may be led away from either side

of the apparatus, as may be most convenient. 31 is a rope connected to the rear end of the scraper by which the latter may be drawn back. It will be seen that the scraper is not constrained to travel in any specified path, but may be placed in any position and drawn directly toward the elevating apparatus by the drive described.

The elevating carriage 19 has a bail 32 to which is connected a rope 33 passing over a guide pulley 34 at the top of the inclined body, and thence around a drum 35 to which it is secured and which is itself fastened to the shaft 29. A pulley 36 is also fastened to the shaft 29, and receives a rope to which is connected a counter-weight 37 which partially balances the weight of the carrier 19 when empty.

A movable clutch member 38 is splined to shaft 29 and connects with a complemental clutch member 39 on the loose pulley 28. A forked clutch shipper 40 engages a groove in the clutch member 38 and has two arms 41 and 42 connected with trip rods 43 and 44.

Pivotally mounted adjacent the lower end of the inclined body is a dumping device for the scraper, said device consisting of a continuous frame having a lateral hoop-shaped portion 45 and a transverse portion formed with an upwardly-projecting loop 46, the latter forming an upstanding arm. This device is pivoted to a flat plate or apron 47, passing through straps or loops 471 secured to the sides of the apron, which is fastened to the lower end of the inclined body and extends over the ground adjacent the latter, and the lateral portion 45 of the device has radial downwardly-curved fingers 48 which will work into the earth and guide the scraper so that it will ride over the dumping device as it is pulled toward the elevator.

After the scraper has been drawn over the lateral portion 45, its bail 24 strikes the upstanding arm 46 and tilts the dumping device so that the lateral portion thereof rises, as shown in Fig. 4, and engages the rear part of handles 49 of the scraper. This tips up the latter and causes it to discharge its contents into the carrier 19. At the same time the clutch trip 43 which is pivoted at 431 to a lug fastened on the dumping device is moved upward, and swings the clutch shipper about its pivot so as to connect the loose pulley 28 with the shaft 29 and drum 35. The trip rod 43 has a telescopic connection with the pivot 431 through the sleeve 432, into which it plays, and it also has a lost-motion connection with the clutch shipper 40, such connection consisting of a pin 411 on the shipper arm 41 passing through a slot 412 in the widened end of the trip rod. The spring 50 surrounds the rod 43 bearing against the sleeve 432 and the collar 501, keeping the telescopic members of the rod in their extended position. The spring 50 allows the dumping device to continue to rise after the end of slot 412 has engaged pin 411 and the clutch members have been connected, thus insuring a connection of the clutch under all conditions, while the slot 412 allows the dumping device to fall back without disconnecting the clutch.

The clutch being connected in the manner described, when the scraper is next retracted, a pull is given upon the drive rope 25, which, being communicated to the drum 35 through pulley 28, clutch 38, and shaft 29, pulls upon the rope 33 and raises the conveyer carriage up to the position shown in dotted lines in Fig. 2. When the conveyer reaches this position, however, its forward end engages the bent projection of the trip 44 and moves it so as to swing the clutch shipper in the clutch-disconnecting direction. Thereupon the hoisting drive for the carriage is disconnected and the latter is free to return by gravity. Before this return happens, however, the contents of the carriage are dumped by the following means:

Referring to Figs. 5, 6 and 7, it will be seen that the bottom of the carrier 19 is composed of two doors 51 52 which are hinged near opposite ends of the carriage so as to open downwardly, and when closed, to cover the entire bottom of the carrier. The door 51 has arms 53 at its ends which are connected by links 54 with the swinging edge of the other door so as to cause both to open or close simultaneously. When the doors are closed, latches 55 take over projections on the door 52, and thereby hold the latter door shut, door 51 being held by the links 54 and arms 53. Springs 57 tend to hold the latches in engaging position. When the carriage is raised to its most elevated position, pins 58 on the inclined frame engage the latches 55 and hold them back, thereby disengaging them from the projections 56 and allowing the doors to open. Thereupon the material is discharged. On return of the carriage, the down-hanging door 51 engages rollers 59 on a transverse shaft 60, and is raised thereby into closed position. In so rising, door 51 also closes door 52, and so lifts it above the rollers 59. Upon being closed the doors are immediately caught by the spring latches which were held against stops 61 on the sides of the carriage. As the latches have inclined faces on their lower ends, they are displaced by the projections 56 when the doors close.

In order to bring the carriage yieldingly to rest at the end of its descent, I construct the lower end of the inclined body with a pocket or chamber 62 into which fits a plunger projection 63 on the end of the carriage. Thus an air cushion is formed which arrests the carriage without shock. Buffer springs may also be used.

In Fig. 2, I have shown by dotted lines a receptacle 63 at the top of the inclined body, into which the carriage may dump its con-

tents, and which is itself adapted to be emptied from time to time into a cart by opening the doors 64 at the bottom. This receptacle, however, is not an essential part of the apparatus.

65 represents a brace for holding elevated the forward end of the inclined body and holding its rear end depressed, and thus preventing tilting when the conveyer carriage is in its elevated position.

I claim:—

1. An apparatus of the character described comprising an inclined body, elevating means mounted to travel on said body, an excavating scraper having freedom of movement in all directions, and means leading from the body for drawing the scraper toward, and dumping its contents into, the elevating means.

2. An apparatus of the character described comprising an inclined body, elevating means mounted to travel on said body, a disconnectible driver for said elevating means, an excavating scraper, means for drawing the scraper toward, and dumping its contents into, the elevating means, and a trip operated by said scraper for connecting said driver to cause operation of the elevating means.

3. An apparatus of the character described comprising an inclined body, elevating means mounted to travel on said body, a disconnectible driver for said elevating means, an excavating scraper, means for drawing the scraper toward, and dumping its contents into, the elevating means, and a trip operated by said scraper for connecting said driver to cause operation of the elevating means, said trip having lost-motion connections whereby to defer the operation of the elevating means until after the scraper has been dumped.

4. An apparatus of the character described comprising an inclined body, elevating means mounted to travel on said body, an excavating scraper, means for drawing the scraper toward the elevating means, and a tilting trip having an upward arm adjacent the elevating means and a lateral arm; the upward arm arranged to check, and be displaced by, the scraper, and the lateral arm to raise the rear portion of the scraper and dump the contents thereof.

5. An apparatus of the character described, comprising an inclined body, elevating means mounted to travel on said body, an excavating scraper, means for drawing the scraper toward the elevating means; and a tilting dumping device having a lateral portion lying on the ground so that the scraper may ride over it, and an upstanding arm adjacent the elevating means adapted to be struck and displaced by the scraper, whereby the lateral portion is raised and the scraper dumped.

6. An apparatus of the character described comprising an inclined body, elevating means mounted to travel on said body, an excavating scraper, means for drawing the scraper toward the elevating means; and a tilting frame pivoted adjacent the lower end of the inclined body and having a lateral portion adapted to lie on the ground, and an upstanding portion arranged to be struck by a part of the scraper after the same has been drawn over said lateral portion, whereby the frame is tilted, the rear end of the scraper raised, and the contents thereof dumped.

7. An apparatus of the character described comprising an inclined body, elevating means mounted to travel on said body, an excavating scraper, means for drawing the scraper toward the elevating means, an apron or plate resting on the ground extending from the body adapted to support the scraper when adjacent the latter, and a dumping device having a lateral portion lying beside the apron and an upstanding arm; the scraper in moving toward the elevating means arranged to strike said upstanding arm, tilt the same, and raise the lateral portion to tip up the scraper and discharge the contents thereof.

8. In an apparatus of the character described, an inclined guiding body, an elevating conveyer, means including a disconnectible clutch for raising the conveyer on the body, a trip for throwing in said clutch, and a trip operated by the conveyer at the limit of its upward travel for throwing out the clutch, whereby the conveyer is permitted to descend.

9. In an apparatus of the character described, an inclined guiding body, an elevating conveyer, means including a disconnectible clutch for raising the conveyer on the body, a trip for throwing in said clutch, a trip operated by the conveyer at the limit of its upward travel for throwing out the clutch, whereby the conveyer is permitted to descend, and a resilient cushion at the bottom of said body for yieldingly bringing the conveyer to rest.

10. In an apparatus of the character described, an inclined guiding body, an elevating conveyer, means including a disconnectible clutch for raising the conveyer on the body, a trip for throwing in said clutch, a trip operated by the conveyer at the limit of its upward travel for throwing out the clutch, whereby the conveyer is permitted to descend, and a partially inclosed chamber at the bottom of the body into which the conveyer is adapted to move, forming an air cushion for gradually bringing the conveyer to rest.

11. In an apparatus of the character described, an inclined guiding body, an elevating conveyer, means including a disconnectible clutch for raising the conveyer on the body, an excavating scraper for gathering material and dumping it into the conveyer,

a trip operated by the scraper as the contents thereof are dumped into the conveyer for throwing in said clutch, and a trip operated by the conveyer at the limit of its upward travel for throwing out the clutch, whereby the conveyer is permitted to descend.

12. In an apparatus of the character described, an inclined body having guides, a carrier adapted to ride on said guides, means for moving the carrier upward, a door pivoted to the carrier closing the bottom thereof, a latch holding the door closed, a trip on the upper portion of the body for engaging and tripping the latch as the carrier passes the same, whereby the door is released and allowed to open to discharge the contents of the conveyer, and means on the body for engaging and closing the open door on the descent of the carrier.

13. In an apparatus of the character described, an inclined body having guides, a carrier adapted to ride on said guides, means for moving the carrier upward, a door pivoted to the carrier closing the bottom thereof, a latch holding the door closed, a spring tending to retain said latch in holding position, a trip on the upper portion of the body for engaging and tripping the latch against the tension of said spring as the carrier passes the same, whereby the door is released and allowed to open to discharge the contents of the conveyer, and means on the body for engaging and closing the open door on the descent of the carrier, the spring thereupon moving the latch into holding position.

14. In an apparatus of the character described, an inclined body having guides, a carrier adapted to ride on said guides, means for moving the carrier upward, a door pivoted to the carrier closing the bottom thereof, a latch holding the door closed, a projection on the body in the path of the latch adapted to engage and displace the same as the carrier is moved past the projection, and thereby allow the door to open, and rollers mounted on the body adapted to engage the open door and raise it into closed position as the carrier descends, said rollers being located to permit passage of the carrier freely over them when the door is closed.

15. A conveyer for an apparatus of the character described, consisting of a receptacle having its bottom formed by two downwardly-swinging doors pivoted adjacent opposite ends of the receptacle, a latch engaging a projection on one of the doors to hold it closed, arms on the ends of one door, and links connected to said arms and the other door for retaining the latter also in closed position.

16. A conveyer for an apparatus of the character described, consisting of a receptacle having its bottom formed by two downwardly-swinging doors pivoted adjacent opposite ends of the receptacle, a latch engaging a projection on one of the doors to hold it closed, a spring acting on the latch to hold it in engagement with the projection, arms on the ends of said door, and links connected to said arms and the other door for retaining the latter also in closed position, the latch being displaceable to permit opening of the doors.

17. An apparatus of the character described comprising an inclined frame having guideways, a conveyer movable thereon, an axle having a standard to which said frame is secured, an adjusting frame pivoted to the first frame, an axle to which said adjusting frame is secured, and adjusting means for varying the distance between the non-pivoted portions of said frames for raising and lowering one end of the first frame.

18. An apparatus of the character described comprising an inclined frame having guideways, a conveyer movable thereon, an axle having a standard to which said frame is secured, an adjusting frame pivoted to the first frame, an axle to which said adjusting frame is secured, nuts pivoted to one, and screws pivoted to the other, of said frames meshing with said nuts for changing the distance between the non-pivoted portions of the frames, and thereby raising and lowering one end of the first frame.

19. An apparatus of the character described comprising an inclined frame having guides, a carrier mounted to run on said guides, a line connected to said carrier, a drum over which the line passes, a scraper, a pulley, a line connected to said scraper passing around said pulley for drawing the scraper toward the lower end of the frame, and a disconnectible coupling between the drum and pulley; the parts being arranged so that movement of the scraper away from the frame will draw the carrier upward on the guides.

In testimony whereof I have affixed my signature, in presence of two witnesses.

FREDERICK E. ALLEN.

Witnesses:

J. P. GORMAN,

F. S. DICKINSON.