March 2, 1943. V. G. ELLEN 2,312,806

MATERIAL HANDLING DEVICE

Filed Sept. 11, 1940 3 Sheets-Sheet 1

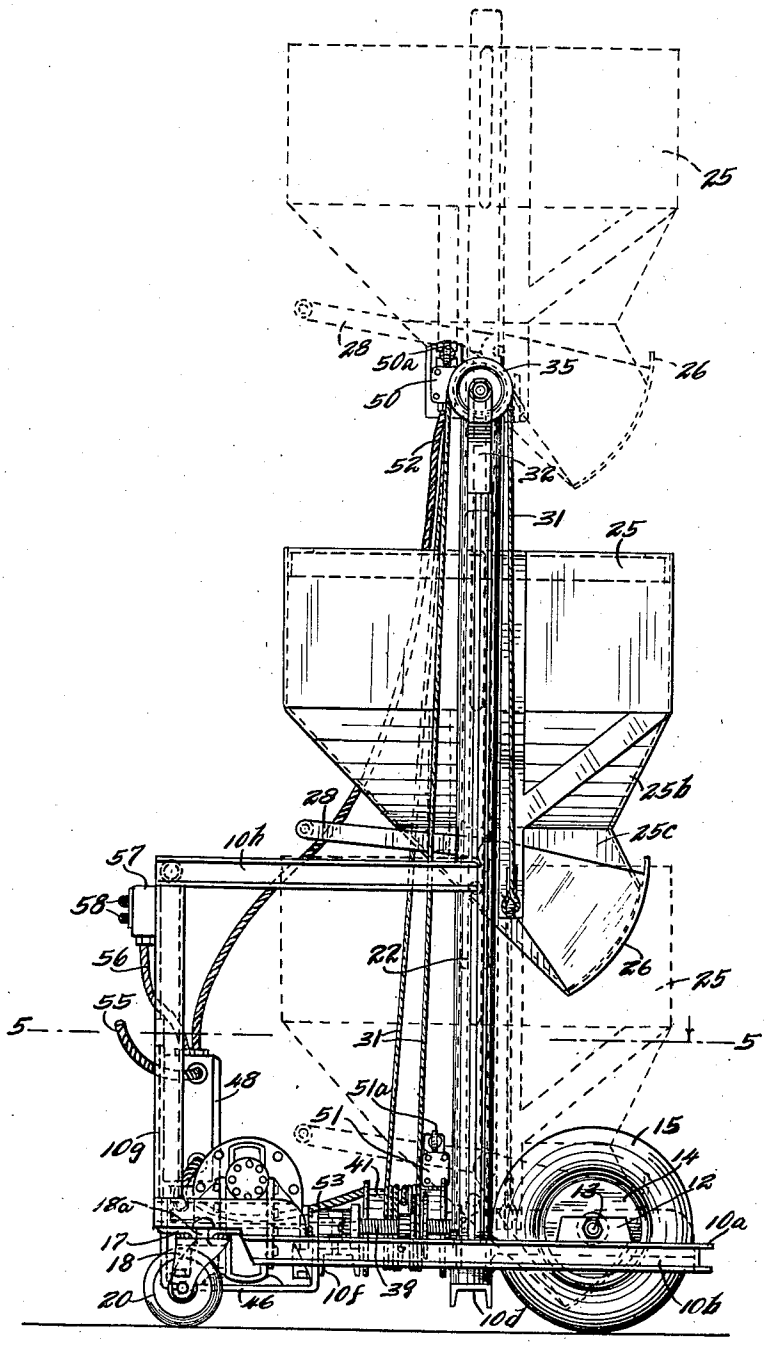


Fig. 1.

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Filed Sept. 11, 1940 3 Sheets-Sheet 2

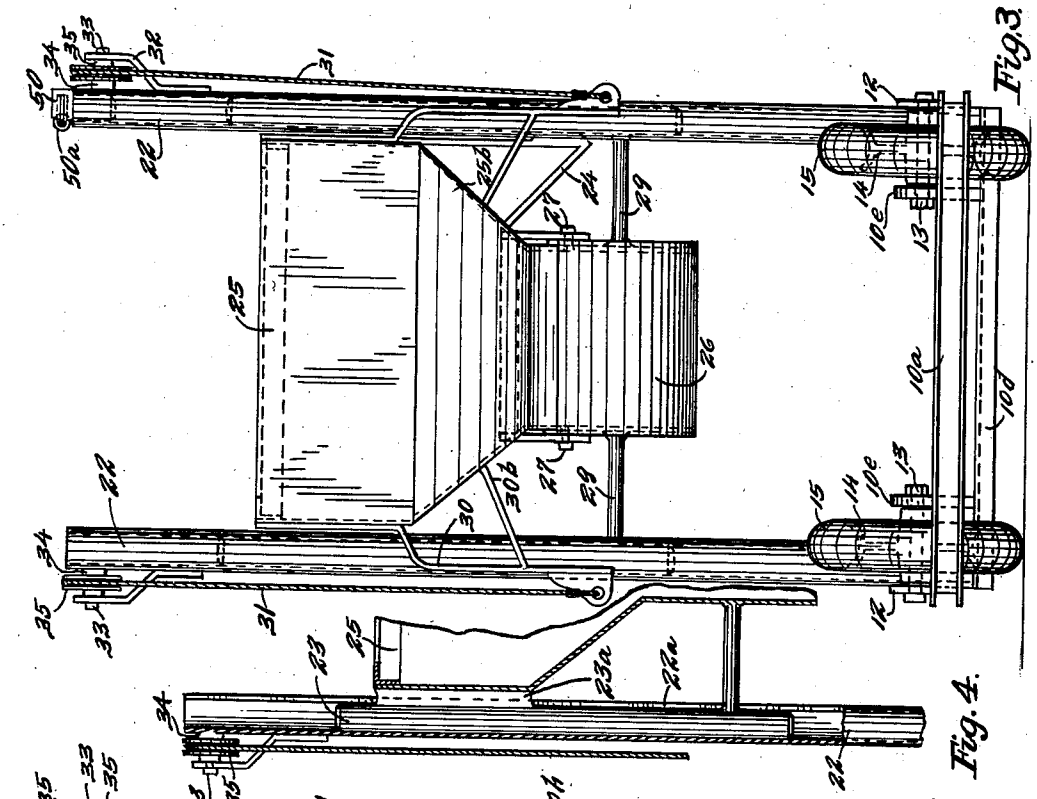


Fig. 3.

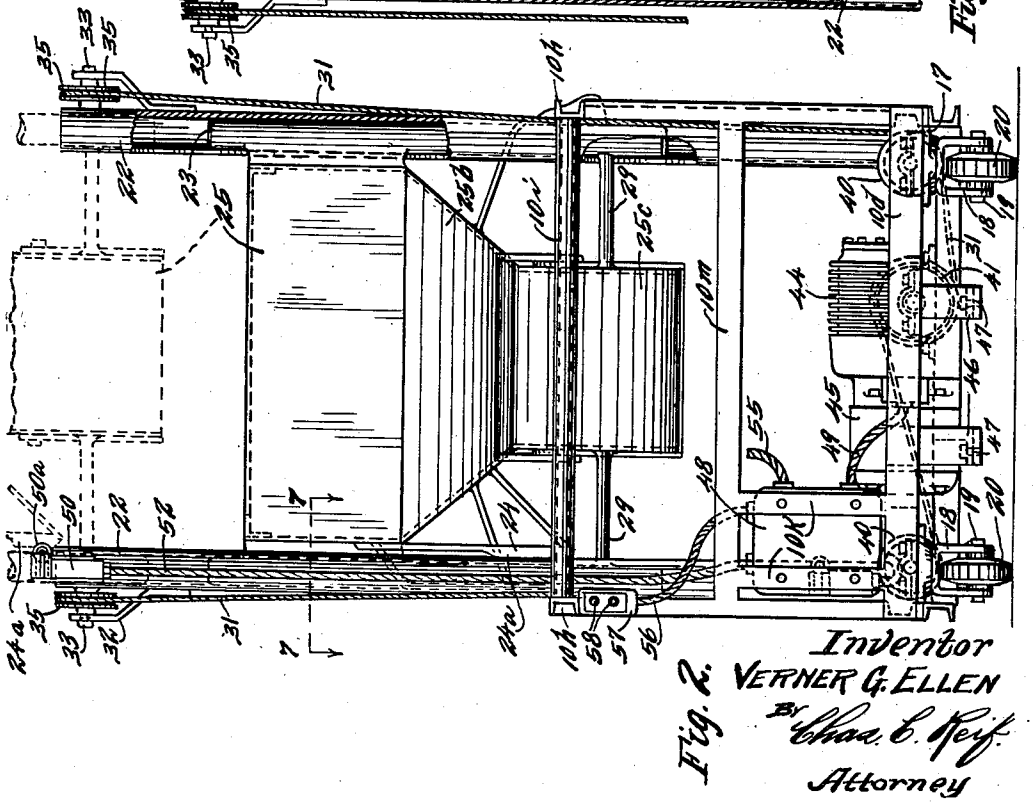


Fig. 4.

Fig. 2.

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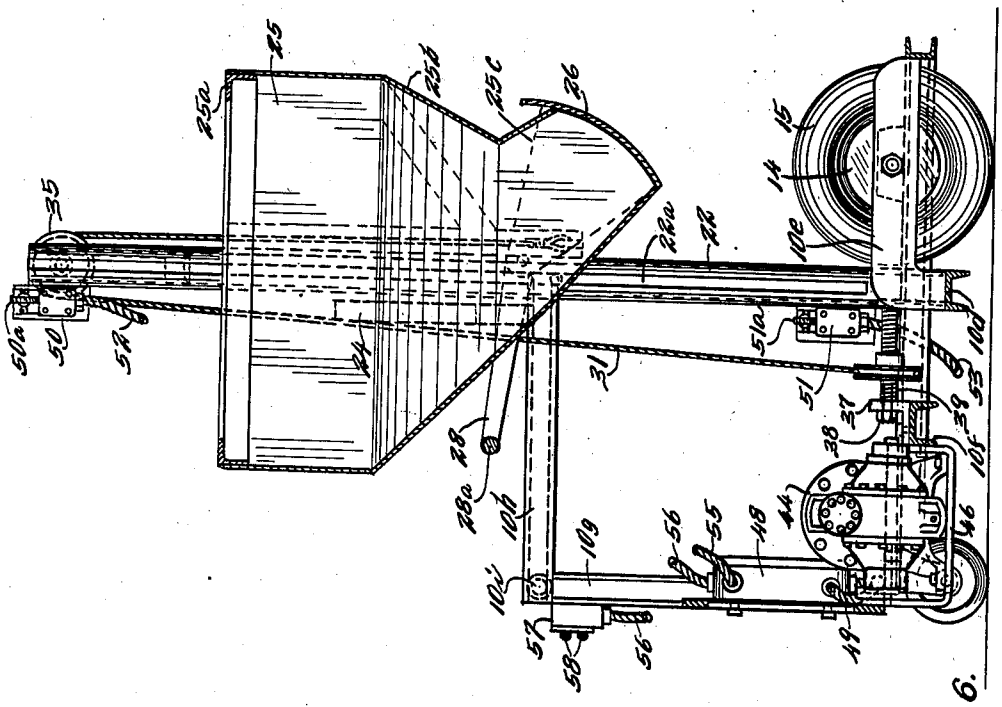


Fig. 6.

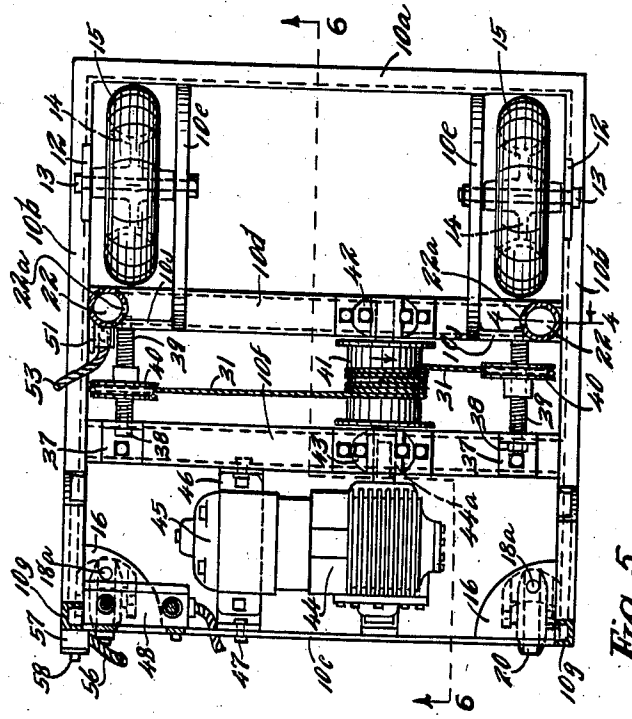


Fig. 5.

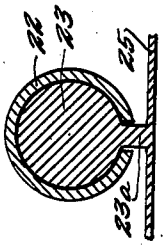


Fig. 7.

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UNITED STATES PATENT OFFICE

2,312,806

MATERIAL HANDLING DEVICE

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Application September 11, 1940, Serial No. 356,245

7 Claims. (Cl. 214—117)

This invention relates to a device for handling material and particularly to a device for receiving material at one location where a supply of the material is maintained and moving the material to another location where it is discharged for use. Such devices have great utility for transporting coal from a supply place in a yard or building to a furnace or furnace hopper.

It is an object of this invention to provide a simple and efficient device which is easily guided and moved on wheels and which carries a receptacle adapted to be lowered for conveniently receiving material and to be elevated so that the material can be conveniently discharged to a hopper or other member.

It is a further object of the invention to provide a device for handling material comprising a frame having supporting wheels at its front, one or more caster wheels at its rear portion, guide means on said frame, a receptacle adapted to be raised and lowered along said guide means with means on said frame for raising and lowering said receptacle.

It is another object of the invention to provide a device for handling material comprising an easily portable frame, spaced guide standards on said frame, a receptacle adapted to be loaded at its top and having a discharge outlet at its bottom guided by and disposed between said standards and means on said frame preferably motor-driven for raising and lowering said receptacle.

It is also an object of the invention to provide a device for handling material comprising a portable frame adapted to be easily pushed or propelled having vertical guide means thereon, a receptacle adapted to be raised and lowered between said guide means, a motor-driven means for raising and lowering said receptacle and means adjacent the top and bottom of said guide means for controlling said motor and limiting the raising and lowering movement of said receptacle.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a view in side elevation of the device, some parts being shown in different positions in dotted lines;

Fig. 2 is a view in rear elevation of said device, some parts being shown in dotted lines, some parts being broken away and others shown in vertical section;

Fig. 3 is a view in front elevation of said device;

Fig. 4 is a partial view in vertical section taken substantially on line 4—4 of Fig. 5 as indicated by the arrow;

Fig. 5 is a horizontal section taken substantially on line 5—5 of Fig. 1 as indicated by the arrow;

Fig. 6 is a vertical section taken substantially on line 6—6 of Fig. 5 as indicated by the arrows; and

Fig. 7 is a horizontal section taken on line 7—7 of Fig. 2 as indicated by the arrows:

Referring to the drawings a device is shown comprising a frame 10. While this frame might be variously constructed, in the embodiment of the invention illustrated it comprises a lower portion disposed substantially horizontally and in rather close proximity to the floor or supporting surface. Said portion is illustrated as formed by a channel having a front side 10*a* and side portions 10*b* extending at right angles to side 10*a*. A bar 10*c* extends between and connects the rear ends of portions 10*b*. A yoke-like member 10*d* extends between portions 10*b* somewhat adjacent the front ends thereof and in a plane somewhat below the plane of portions 10*b*, member 10*d* having arms 10*e* secured thereto which as shown in Fig. 6 extend upwardly and forwardly to the front side 10*a*. Another member 10*f* also illustrated as a channel having its flanges directed downwardly extends between and is secured to members 10*b* in the rear of member 10*d*. Frame 10 also has vertical portions 10*g* illustrated as made from channels having their flanges directed inwardly, members 10*g* being disposed at the rear ends of members 10*b* and thus at the rear corners of frame 10. Members 10*h* are secured to the tops of members 10*g* and extend forwardly therefrom parallel to portions 10*b*. A bar 10*i* shown as of tubular form extends horizontally between the rear ends of members 10*h*. A plate-like bracket 12 extends upwardly from each member 10*b* adjacent the front end thereof and is apertured to receive a headed and nutted bolt 13 which also passes through an aperture in member 10*e*. The members 13 form axles for wheels 14, which wheels are preferably equipped with pneumatic tires 15. Segmental plates or corner brackets 16 are secured in horizontal position at the rear inside corners of frame 10 extending between bar 10*c* and members 10*b*. Plates 16 have secured thereto

at their undersides by welding or other suitable means, plates 17. Plates 16 and 17 have extending therethrough pivot members 18a secured to yokes 18 which extend downwardly from plates 17. Yokes 18 are apertured at their lower ends to receive the headed and nutted bolts 19 which form axles for the caster wheels 20. Frame 10 is thus supported by the wheels 14 and 20.

A standard 22 illustrated as of tubular form is disposed at each side of frame 10 somewhat adjacent the front thereof and adjacent members 10b, said standards being secured at their lower ends to member 10d. Members 10h are secured at their forward ends to the standards 22 respectively. Each standard 22 is provided at its inner side with a slot 22a. Each standard 22 receives a member 23 slidable therein and shown as of cylindrical form, which member has projecting therefrom through slot 22a a portion 23a. A receptacle or bucket 25 extends between and is secured to and thus carried and supported by the members 23. While receptacle 25 might be variously made, in the embodiment of the invention illustrated it is shown as having a box-like top portion rectangular in horizontal cross section and reinforced at its top by an angle bar 25a having one flange secured to the inner side of said receptacle and its other flange extending horizontally inward. Receptacle 25 has a downwardly tapered portion 25b below its top box-like portion, which portion 25b merges into a discharge spout 25c. Discharge spout 25c is directed toward the front side of the device and is arranged to be opened and closed by a curved gate 26 having side portions 26a pivoted on pivots 27 mounted in the sides of spout 25c. Portions or plates 25e have secured thereto a yoke 28, the rear side of which is in the form of a cylindrical rod 28a which constitutes a handle for oscillating and operating gate 26. Brace rods 29 extend between the sides of spout 26c and guide members 23, being secured to said parts. A bracket 30 is secured to each side of receptacle 25, having an upper arm 30a extending along the upper portion of said receptacle and a lower arm 30b secured to portion 25b. Bracket 30 extends along the front of the guide member 22 and is apertured to have secured thereto the lower end of a cable 31. A bracket 32 is secured to each guide member 22 at the outer side thereof and adjacent the top thereof and supports a stud 33 also supported in a lug 34 secured to the outer side of guide standard 22. A pulley 35 is journaled on each stud 33 over which runs the cable 31. A bracket 37 of angle form is secured to each side of bar 10f having an upstanding flange through which passes a bolt 38. Bolt 38 extends into and is secured to a screw 39. Each screw 39 extends between its bracket 37 and a lug 10j on member 10e.

Supported upon each screw 39 is a sheave 40 having a hub threaded on said screw. The cables 31 pass downwardly from pulleys or sheaves 35 to and around the sheaves 40 and then extend inwardly to and are secured to a windlass drum 41. Drum 41 has a front trunnion journaled in a bracket 42 secured to bar 10d and has a rear trunnion journaled in a bracket 43 secured to bar 10f. Said rear trunnion is secured to a shaft 44a forming part of a reducing mechanism 44 driven by a motor 45 mounted upon brackets 46 extending between and having flanges secured respectively to bars 10c and 10f by bolts 47. Motor 45 is of a type having a magnetic clutch incorporated therein. This motor with the clutch and reducing mechanism is a standard article of commerce and per se forms no part of the present invention. A control box 48 is secured to spaced bars 10k which extend vertically between bar 10d and another bar 10m extending parallel and above the same and also extending between and secured to members 10g. A conductor cable 49 is shown as extending from control box 48 to motor 45.

Adjacent the top of one standard 22 is secured a switch 50 which has a contact member 50a projecting at one side thereof and adapted to be engaged by a projection 24a carried on a bracket 24, in turn secured to the side of receptacle 25. A similar switch 51 is mounted adjacent the lower end of one standard 22, the same having a roller stop or contact member 51a projecting therefrom also adapted to be engaged by portion 24a. Switches 50 and 51 are arranged to be secured in different positions on the guide members 22, a series of holes being provided for this purpose. Conductor cables 52 and 53 are shown extending respectively from switches 50 and 51 and these will extend to the control box 48. A conductor cable 55 extends from control box 48 to some suitable source of current. A conductor cable 56 is also shown extending from control box 48 to a switch casing 57 secured to one of the members 10g which contains a starting and stopping switch for motor 45 adapted to be operated by push buttons 58.

In operation if the device is to be used for transporting coal from a supply in one location to a stoker hopper at the furnace the operator will press the proper button 58 to have motor 45 run in the direction to rotate windlass drum 41 so that the cables 31 are unwound from said drum. This will move cables 31 so that receptacle 25 will be lowered to the position shown in dotted lines in Fig. 1. When the receptacle reaches its lowest position lug 24a engages stop member 51a operating switch 51 and stopping motor 45. The operator now pushes the device to the point of coal supply. The device is very easily moved rolling readily on the tire-equipped wheels 15. It can be easily guided as the caster wheels 20 will trail and oscillate to take the necessary position. The device will be disposed so that coal from the coal supply can discharge into receptacle 25 and fill the same. The device can then be again moved back to the stoker.

The operator will now press on the button 58 to operate motor 45 so that windlass drum 41 will be rotated to wind up the cables 31. This will move cables 31 so that receptacle 25 will be elevated thereby. The upward movement of said receptacle will continue until lug 24a engages the upper stop member 50a and this will operate switch 50 so that motor 45 will be stopped. The receptacle 25 is now in elevated position and it can be moved so that the discharge chute 25e will be disposed to discharge into the stoker hopper or other receptacle into which it is desired to discharge the coal.

The buttons 58 in one specific embodiment of the invention in practice were of the type which must be held in depressed position to keep the motor running. When released the motor stops and the receptacle or bucket 25 will be maintained in elevated position either by the clutch or due to the fact that the motor cannot be turned through the worm wheel which forms part of the reduction mechanism mentioned. Often the stoker hopper can be filled and receptacle 25 then moved thereover with the full

charge of coal. The operator will move handle 28 to swing gate 26 to open position. The coal can then discharge from receptacle 25 as permitted by the descent of coal in the stoker hopper. The coal is thus moved from the supply location to the stoker without any shovelling. Heretofore it has been the common practice to shovel the coal into some cart or other vehicle at the supply place and then to again shovel it into the stoker hopper. With the present device all of this shovelling is eliminated and coal can be fed by gravity into bucket 25 at the supply location and discharged by gravity from receptacle 25 at the stoker. The receptacle 25 is easily and quickly raised and lowered by operation of motor 45 and the receptacle is guided accurately by the long guides 23. The device is simple, the same can be made at comparatively small expense and is also made quite rugged for the use to which it is to be put.

From the above description it is seen that I have provided a simple and very efficient device for transporting and discharging coal or other material. The device can be used to handle various materials such as sand or flour and may be used with liquids. As above stated the device can be both loaded and emptied by gravity and hand shovelling of the material is eliminated. The device will have connected thereto a cable of suitable length which will in turn be connected to some current collector cooperating with a suitable trolley, rail or other current carrying member. In propelling the device the operator can conveniently take hold of member 10*i*. The device has been amply demonstrated in actual practice and found to be very successful and efficient.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. A device for handling material having in combination, a frame, a lower substantially horizontal portion adjacent the floor or supporting surface, wheels supporting said frame, spaced standards upstanding at the sides of said frame, members guided by said standards respectively, a receptacle secured to and disposed between said last mentioned members, said receptacle having a discharge outlet adjacent its bottom, a pulley adjacent the top of each standard, a cable running over each of said pulleys, the ends of said cables being secured to said receptacle, a windlass drum to which said cables are connected and about which they extend in opposite directions so as to be wound up or on said drum or unwound according to the rotation of said drum, a motor on said frame, means for driving said drum from said motor, a pulley disposed at each side of said drum substantially in horizontal alignment therewith, said cables running over said last mentioned pulleys respectively before passing to said drum and screws upon which said last mentioned pulleys are respectively mounted so that said pulleys will move lengthwise of said drum for guiding said cables thereto.

2. A device for handling material, receiving it at one location and discharging it at another having in combination, a frame, a pair of spaced brackets carried by said frame at each side thereof adjacent the front thereof, an axle carried in and rotatable in each of said pairs of brackets, a wheel mounted on each of said axles for supporting said frame, a caster wheel mounted at each side of said frame at the rear thereof and being swingable about a vertical axis, a tubular guide upstanding at each side of said frame, said guides having slots therein at their adjacent sides, cylindrical members movable in said tubular guides and having portions projecting through said slots respectively, a receptacle secured to and disposed between said portions, pulleys mounted at the top of each of said guides, a cable for each of said pulleys running over the same and having one end connected to said receptacle, pulleys mounted at the lower portion of said frame over which said cables respectively pass, a windlass drum to which said cables pass from said last mentioned pulleys and means on said frame for rotating said windlass drum and winding or unwinding said cables thereon to raise and lower said receptacle.

3. The structure set forth in claim 2, said receptacle having an open top through which it is adapted to be loaded and having a discharge portion at its bottom and a manually operated gate for closing and opening said discharge portion.

4. A device for handling material, receiving it at one place and discharging it at another, having in combination, a frame having a lower substantially rectangular portion, wheels carried by said portion for supporting said frame, vertical tubular standards at each side of said frame, said standards having slots at their adjacent sides, elongated guide members movable in said standards, a receptacle disposed substantially centrally of said standards and having brackets at the sides thereof secured to said guide members, said receptacle having a discharge spout at its bottom directed to one side of said standards, said receptacle being movable to a position above said standards and means for raising and lowering said receptacle.

5. A device for handling material, receiving it at one place and discharging it at another, having in combination, a frame having a substantially rectangular lower portion, wheels carried by said lower portion for supporting said frame, vertical standards extending from the sides of said lower portion, said frame having a vertical rear portion and a horizontal portion above said lower portion extending forwardly to said standards so that there is no frame portion above said lower portion forwardly of said standards, a receptacle substantially centrally disposed between said standards, brackets secured to the sides of said receptacle and secured to said guide members, said receptacle being movable by said guide members to a position above said standards, said receptacle having a closed periphery at its upper portion but having a forwardly directed spout at its lower portion and a movable closing member for said spout whereby said receptacle can discharge forwardly of said frame and means for raising and lowering said receptacle.

6. A device for moving material from one place to another, elevating and discharging the same having in combination, a frame having substantially horizontal side and end members, wheels supporting the forward end of said frame, caster wheels at the rear of said frame, an aux-

iliary frame extending above said frame at the rearward portion thereof, a pair of spaced standards extending from said first mentioned frame to a point above said auxiliary frame and at the front of the latter, said standards forming guide members, members movable along and guided by said guide members, a receptacle extending between and supported by said last mentioned members, said receptacle having a discharge outlet projecting at its forward side and disposed over the forward portion of said first mentioned frame and means on said frame for raising and lowering said receptacle at will whereby material can be loaded into said receptacle when it is in its lowered position, said receptacle then elevated and said material discharged over the front portion of said frame.

7. A device for moving material from one place to another, elevating and discharging the same having in combination, a frame having substantially horizontal side and end members, axles supported in said frame adjacent its forward end, spaced tire-equipped wheels carried on said axles disposed within said frame and rearwardly of the front side thereof, smaller caster wheels supporting said frame at the rear corners thereof, an auxiliary frame extending above said first mentioned frame at the rear portion thereof, tubular standards extending from said main frame to a point well above said auxiliary frame and at the forward portion of the latter, the same forming guide members, members movable in said standards and having portions extending through the adjacent sides thereof, a receptacle carried by said last mentioned members and extending between said standards, means on said frame under the control of the operator for elevating said members and receptacle to a point above the tops of said standards, said receptacle having a forwardly projecting discharge spout disposed above the front portion of said first mentioned frame, means for opening and closing said spout whereby material can be loaded into said receptacle when in its lowered position, said receptacle elevated above said standards and said material discharged over the forward portion of said first mentioned frame.

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