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## HAY AND MANURE LOADER

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2 SHEETS--SHEET 1

FIG. 1 is a perspective view of a portable machine, possibly a pump or sprayer. It features a large, rounded, ribbed container (17) mounted on a vertical frame (18). The container is supported by a series of curved ribs (61). A handle (14) is attached to the side of the container. The machine is mounted on a wheeled carriage (12) with large wheels (13). A motor or engine (16) is connected to the carriage via a drive shaft (15). Various mechanical components are labeled with numbers, including a pump mechanism (23, 24, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44) and a control lever (47).

FIG. 3 is a detailed view of a component, likely a pump or valve mechanism. It shows a vertical shaft (23) with a handle (14) and a control lever (47). The component is mounted on a base (18) and includes various internal parts (24, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44).

FIG. 2 is a cross-sectional view of the machine, showing the internal structure of the container (17) and the mounting frame (18). It illustrates the arrangement of the ribs (61) and the internal components (51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64).

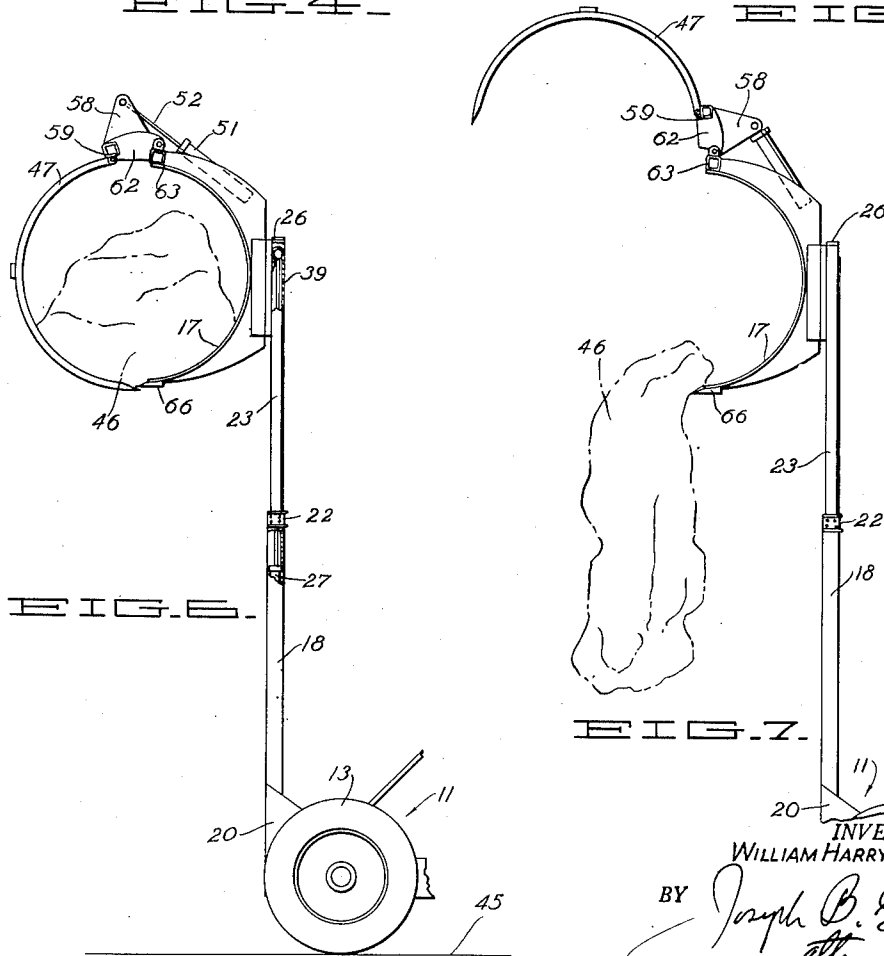
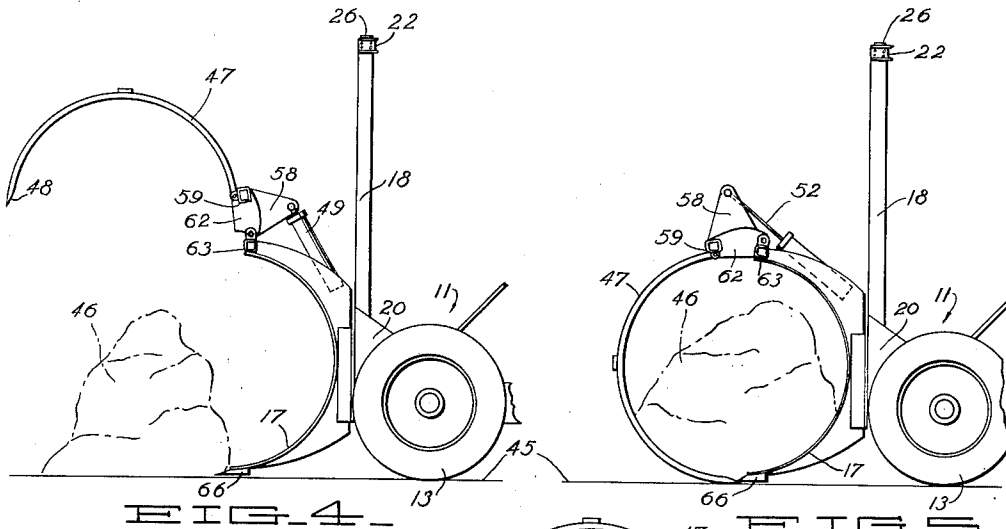
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2 SHEETS—SHEET 2



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## HAY AND MANURE LOADER

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This invention relates to loading mechanisms, and is more particularly directed to apparatus arranged to grasp and lift a quantity of hay, manure or like substances and move the same to a position remote from its original location.

Numerous devices of the aforesaid general variety have been heretofore manufactured, but because of inherent shortcomings in the design and construction, they have received far less than an enthusiastic acceptance by the trade. One of the principal difficulties encountered in the prior art machines has been their inability to readily load the material onto a scoop member and to retain it there during the lifting operation. The reason for this is primarily due to the practically impossible task of running a scoop under a load of material such as hay and manure, and having such material remain on the scoop while the latter is being raised, and still permit the material to be readily unloaded as the operator may desire. Machines have been suggested wherein the scoop member is capable of pivotal as well as vertical movement in order to eliminate the foregoing undesirable features, but the excessive cost of manufacture and maintenance prevents their widespread use, and it is also noted that in most operations there is no backing member, so that the hay and manure will tend to be pushed along the floor in front of the scoop rather than being loaded thereon.

It is therefore my desire to provide a loader which will overcome the foregoing difficulties and which will utilize a novel type of material gripper to more effectively grasp the material.

An object of the present invention is to provide a loading mechanism in which means are provided for urging the material to be loaded onto the scoop member and which will retain such material thereon during the subsequent lifting of the member.

A further object of my invention is to provide apparatus of the aforesaid character in which the material to be loaded will be effectively grasped by a pair of jaw members which may be selectively closed or opened so as to effect grasping or release of the material.

Another object of the invention is to provide loading mechanism of the type described wherein simplified means are utilized for raising and lowering the material and which is characterized by its economical construction and simplicity of maintenance.

A still further object of the invention is to provide a construction of the character hereinabove set forth in which the material may be

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readily dumped in any desired location without requiring costly or complicated scoop tilting mechanism.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawings:

Figure 1 is a perspective view of the apparatus of my invention attached to a tractor of standard design.

Figure 2 is a top plan view of a portion of the gripping mechanism.

Figure 3 is a perspective view of a portion of the scoop elevating mechanism.

Figure 4 is a side elevational view of the apparatus showing the gripping mechanism in open position.

Figure 5 is a view similar to Figure 3 showing the gripping mechanism in closed position with a load of material entrapped therein.

Figure 6 is a view similar to Figure 4 showing the gripping mechanism with the material in its uppermost position.

Figure 7 is a view similar to Figure 5 showing the gripping mechanism in its dumping or unloading position.

As is well known in the art, the floors of most stables or other closures for animals are generally covered with hay, and at daily or other periodic intervals, the hay and manure will be removed and fresh hay replaced on the floors. The task of removing the hay and manure is time consuming, and in the past has been done by not too satisfactory mechanical equipment. The apparatus of the present invention is designed to be mounted on a propelling vehicle, and in broad terms is arranged to grasp a quantity of hay and manure, raise the same to a level substantially higher than the ground, and finally dump the load in any desired location.

Apparatus to carry out the foregoing may assume a variety of forms, but I prefer to utilize the construction illustrated in the drawings which is not only simple to manufacture, but which will effectively perform in a manner to establish the previously set forth objects and features of my invention. The loading mechanism is arranged to be supported on and carried by a vehicle such as tractor 11 of conventional

design which includes a body portion 12, wheels 13, a steering wheel 14 and a motor housing 15 in which is arranged the motor for driving the tractor and also imparting the requisite movement to the loading mechanism as will be hereinafter explained. The loading mechanism includes a scoop member 17 of curvate cross-sectional form which is arranged to be mounted on the tractor for vertical movement relative thereto. It will be seen that the scoop 17 is substantially a semi-circle with the base thereof lying in a plane generally normal to the supporting surface of the ground, so that when the scoop is in its lowermost or ground engaging position, forward movement of the propelling vehicle will cause the material to enter the open mouth of the scoop, and as will be later explained, means are provided to retain the material therein during the subsequent lifting operation.

To mount scoop 17 on the tractor 11 I have provided a pair of spaced upright supports, which as here shown comprise channel members 18 having their open portions preferably facing each other, and the channels may be fixedly secured to the front portion of the tractor body 12 by welding or in any other suitable manner known in the art. Reinforcing members 19 may be secured to the channels at spaced points along the length thereof, brackets 20 furnishing lateral support at the bottom of the channels, and adjacent the upper ends of the channels and secured thereto as by rivets 21 is an anchor element 22. The reinforcing members and anchor elements are all positioned on the rearmost flanges of the channels so as to provide for an unimpeded passage between the open sides thereof. Telescopically mounted in channels 18 for axial movement relative thereto are channel members 23, and to reduce the friction occasioned by the relative sliding of these members, their confronting surfaces may be heavily greased or otherwise lubricated. It will be noted that the flanges of channel 18 are provided with inwardly extending lips 24 to prevent lateral displacement of the two channel members, and the upper ends of channel 23 are joined by a cover plate 26 extending therebetween.

Means are provided for effecting telescopic movement between the channel members, and for raising and lowering the scoop on such members. Such means include a vertically extending hydraulic cylinder 27 disposed between the open faces of channel 18 and terminating below anchor element 22, the lower end of the cylinder being secured to the tractor body by welding or the like. Mounted for axial movement in the cylinder is a piston 28 provided with a piston rod 29 which extends through the upper end of the cylinder. As will be seen, the cylinder is of the double acting type and the piston and rod may be moved in either direction by forcing hydraulic fluid to either side of the piston through conduits 31 or 32 which may be operatively connected to a suitable pump and selector valve mounted on the tractor 11. As such actuation mechanism is well known, they have not been shown in the drawing for purpose of simplicity. At the distal end of rod 29 is provided a journal 33 in which is mounted a laterally extending shaft 34, the ends of the shaft being fixed to the upper ends of channels 23 by brackets 35. Sprockets 37 are journaled to shaft 34 adjacent each end of the latter and the teeth 38 of the sprocket are engageable with a chain 39 having

one end thereof secured to anchor element 22 and the other end secured to a plate 41 which is mounted on the rear surface of scoop 17. To secure the chain ends to these members clips 40 may be utilized, and it will be seen that as piston rod 29 is raised or lowered, the chain being fixed at one end will cause the scoop member 17 and channels 23 to be correspondingly moved. As was previously stated, two sets of channel members are provided so as to limit the overall height of the apparatus when the scoop is in its lowermost position. To insure the simultaneous movement of upper channels 23 with the scoop 17 upon actuation of the piston, I provide a carriage comprising a shaft 42 and wheels 43, the carriage being mounted for rotation relative to plate 41 by means of suitable journals 44 secured to the plate. The wheels are mounted in the channels 23, and by this manner of construction, the scoop may be moved from its lower position as shown in Figures 4 and 5 to an upper position illustrated in Figures 6 and 7. In the former position, channels 23 will be entirely telescoped within channels 18 and the carriage will be disposed adjacent the lower ends of channels 23. In the raised position, channels 23 will be vertically extended, and the carriage will be disposed adjacent the upper ends of channels 23.

To pick up a load of material indicated by the numeral 46 in the drawings, the scoop 17 is lowered to a position wherein the bottom leading edge thereof rests on the floor surface 45. Although it is common practice to move a scoop laterally across the floor surface to pick up the material, it has been found that such action will not effectively load the material onto the scoop. Means are therefore provided to forcibly urge the material 46 onto the scoop 17 after the latter is positioned adjacent the material as shown in Figure 4. Such means include a jaw member 47 pivotally attached to scoop 17 adjacent the upper end of the latter and arranged to be selectively opened and closed relative thereto. Jaw 47 has a cross-sectional form substantially corresponding to that of the scoop member so that in a closed position, a generally cylindrical material engaging clamp is provided. It is noted that as the jaw is pivoted from its open to shut position, its leading edge 48 will engage the material and push the same into the scoop 17 and retain the same thereon until it is desired to unload the same. Numerous mechanisms could be utilized for effecting the aforesaid pivotal movement between the two jaws, that is, between the jaw 47 and scoop 17, but it is preferable to use hydraulic means, since a pump is already provided for moving the piston 28 in its cylinder. I therefore use a double acting cylinder 49 provided with a piston 51 which is connected to a piston rod 52. Conduits 53 and 54 are provided adjacent the ends of the cylinder 49, and as was previously stated, the pump and valve mechanism is not shown for purpose of simplifying the drawings. Cylinder 49 is pivotally attached to the scoop member by means of a pin 55 journaled in brackets 55 formed integrally with the scoop, and the distal end of piston rod 53 is similarly pivotally secured as by a pin 57 to a bracket 58 welded or otherwise fixed to a bar 59 which releasably holds the teeth 61 of jaw 17 in position. Also secured to bar 59 are a pair of reinforcing brackets 62, and these brackets together with bracket 58 are all pivotally attached to a member 63 of the scoop by suitable pins 64. In this way, the jaw will be pivotally mounted on the scoop

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member and upon actuation of the piston 51, opening and closing of the members will be readily effected.

From the foregoing description, it is believed that the operation of the apparatus will be evident. To pick up the load of material 46, the tractor 11 is moved into the position shown in Figure 3 of the drawing and the piston 28 is caused to descend to its bottom position in cylinder 27 whereby scoop 17 will be disposed immediately adjacent the surface on which the material is disposed. At this time, hydraulic fluid is forced through conduit 54 causing the piston rod 52 to move outwardly from cylinder 49 and effect pivotal movement of the jaw 47 to its closed position and urge the material onto the scoop 17. It will be noted that scoop 17 is preferably substantially solid in the lower portion thereof whereby the material will be retained thereon during the lifting operation, while the jaw 47 may consist of the previously described spaced teeth 61. It is also desirable to provide teeth 66 at the leading edge of the scoop to assist in the grasping of the material.

After the jaw has been moved to its closed position, hydraulic fluid may be introduced through conduit 32 so as to raise the piston and rod 29 with the associated raising of the scoop and jaw members. The tractor can then move to any desired location, for example, next to a truck, and by reversing the flow of hydraulic fluid into cylinder 49 the jaw 47 will swing open and the material in the scoop permitted to drop out. Materials such as mixed hay and manure will remain in the position indicated in Figures 5 and 6 of the drawing and the entire mass will easily drop out when the jaw is opened. However, if other materials of different consistencies are being loaded, it may be necessary to jerk the tractor in a rearward direction to cause all of the material to be removed from the scoop. Obviously, if desired, in place of the teeth on jaw 47, a substantially solid member could be provided so as to accommodate different types of materials.

I claim:

1. Material lifting apparatus arranged to be mounted on a propelling vehicle including a pair of fixed vertical support members carried by said vehicle, a scoop member mounted for reciprocal movement on said support members, said scoop member extending horizontally beyond the edges of said support members and being substantially semi-circular in cross-sectional form with the respective edges thereof being disposed in substantial vertical alignment, a jaw member having a form substantially corresponding to that of said scoop member and pivotally attached at the upper end thereof to the upper end of the scoop member, said scoop and jaw members cooperating in a closed position to provide a substantially cylindrical enclosure in which material may be retained, said pivotal connections being disposed substantially on the common diameter of said jaw and scoop members, means for selectively opening and closing said jaw member relative to said scoop member, and means for selectively raising and lowering said jaw and scoop members in unison relatively to said vertical support members.

2. Material lifting apparatus for tractors and the like comprising spaced vertical supports mounted on the tractor, a vertical hydraulic cylinder also mounted on the tractor between said supports, a piston having an axially extending

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piston rod operatively inserted in said cylinder for axial movement therein, a scoop member mounted for vertical movement on said supports and having a lower edge portion engageable with the ground, one end of said piston rod having a rotatable sprocket mounted thereon, a chain member engageable with said sprocket and having one end thereof fixed to said scoop member whereby on movement of said piston the scoop will be similarly raised or lowered, a jaw member pivotally attached at its upper portion to the upper portion of the scoop member, said scoop and jaw members cooperating in a closed position to provide a substantially open-ended cylindrical enclosure in which material may be retained, and means for selectively opening and closing said jaw member relative to the scoop member, said members in their open position thereof defining a pair of angularly related semi-cylindrical elements, said pivotal connection being spaced from and substantially diametrically opposite from said ground engaging portion.

3. Material lifting and loading apparatus arranged to be mounted on a propelling vehicle including a fixed vertical support member carried by said vehicle, a carriage mounted on said support member for vertical movement thereon, means for selectively raising and lowering said carriage, a scoop member rigidly mounted on said carriage and having a generally semi-cylindrical form with the respective edges thereof being disposed in substantial vertical alignment, a jaw member having a generally semi-cylindrical form, means pivotally securing said jaw member adjacent an edge thereof to the upper edge portion of said scoop member whereby said scoop and jaw members may cooperate in a closed position to provide a substantially cylindrical material enclosure, and means for selectively opening and closing said jaw member whereby said jaw member may be moved into an open position with the respective edges thereof disposed in substantial horizontal alignment.

4. Loading mechanism of the type described arranged to be mounted on a propelling vehicle including a pair of vertical spaced guide members carried by said vehicle, a carriage mounted for vertical movement on said guide members, means for selectively raising and lowering said carriage, a scoop member rigidly secured to said carriage for vertical movement therewith, said scoop member extending horizontally beyond the edges of said guide members and having a substantially semi-circular cross-sectional form with the lower edge portion thereof being movable into substantial engagement with the ground, a jaw member having a form substantially corresponding to that of said scoop member and pivotally attached adjacent the upper edge thereof to the upper edge portion of said scoop member, said scoop and jaw members cooperating in a closed position to provide a substantially cylindrically shaped enclosure in which material may be retained, and means for selectively opening and closing said jaw member relative to said scoop member.

5. Material lifting and loading apparatus arranged to be mounted on a propelling vehicle including a fixed vertical support member carried by said vehicle, a carriage mounted on said support member for vertical movement thereon, means for selectively raising and lowering said carriage, a scoop member rigidly mounted on said carriage and having a generally semi-cylindrical form with the respective edges thereof being disposed in substantial vertical alignment, a jaw

member having a generally semi-cylindrical form, means pivotally securing said jaw member adjacent an edge thereof to the upper edge portion of said scoop member whereby said scoop and jaw members may cooperate in a closed position to provide a substantially cylindrical material enclosure, and means for selectively opening and closing said jaw member whereby said jaw member may be moved into an open position with the respective edges thereof disposed in substantial horizontal alignment, said scoop member having a substantially solid arcuate body portion adjacent the lower edge thereof, and said jaw member comprising a plurality of parallel spaced substantially semi-circular tines.

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