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Gilfillan et al.

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[45] **June 11, 1974**

[54] **LOAD BODY WITH LOAD COMPACTING AND EJECTING BLADE**

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[52] **U.S. Cl.** **214/82**

[51] **Int. Cl.** **B60p 1/00**

[58] **Field of Search** 214/82, 83.3

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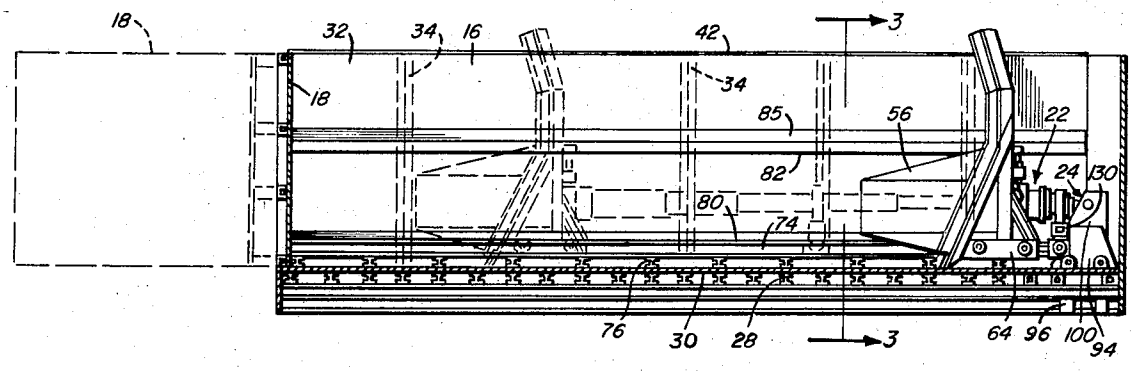
Primary Examiner—Robert J. Spar

Attorney, Agent, or Firm—Clarence A. O'Brien; Harvey B. Jacobson

[57] **ABSTRACT**

An upwardly opening load body including first and second ends and having an openable end gate at its first end and a load ejecting blade positioned within its second end for movement toward and away from the first end of the load bed. The blade may be utilized to eject a load from the load body or bed when the end gate is open and may also be utilized to compact a load within the body against the end gate when the latter is closed. The body includes upstanding side walls between which the ejecting and compacting blade is received and the side walls define corresponding longitudinal guideways in which followers carried by the corresponding sides of the ejector blade are guidingly received, the engagement of the blade supported followers in the side wall guideways insuring proper centering of the blade between the side walls and resisting spreading of the side walls due to compaction of a load therebetween.

9 Claims, 9 Drawing Figures



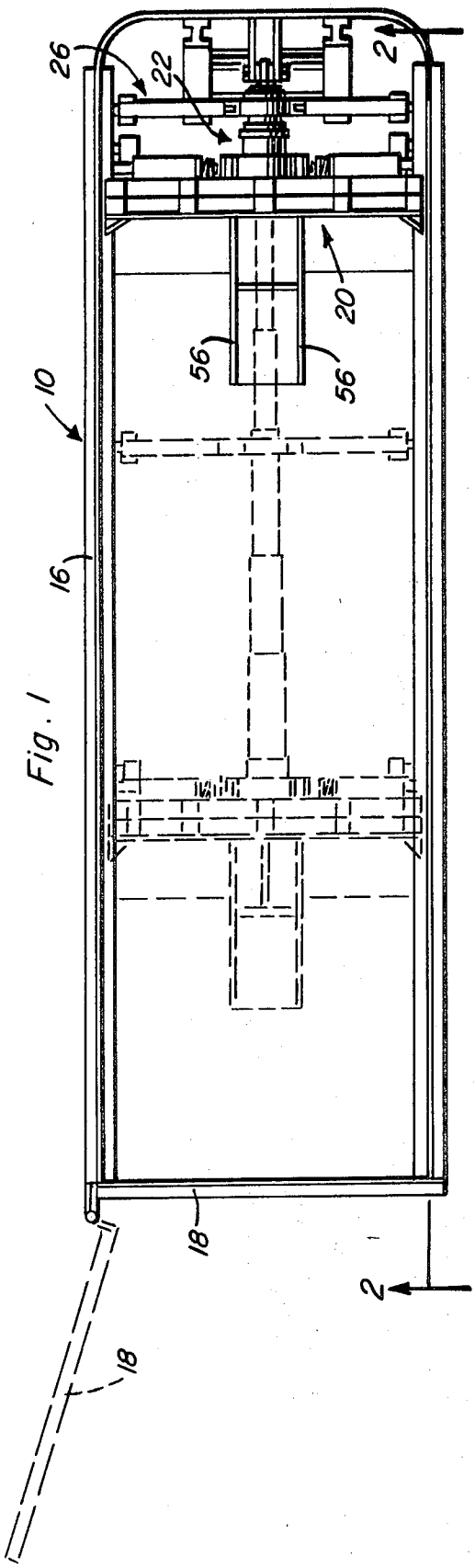

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Fig. 1

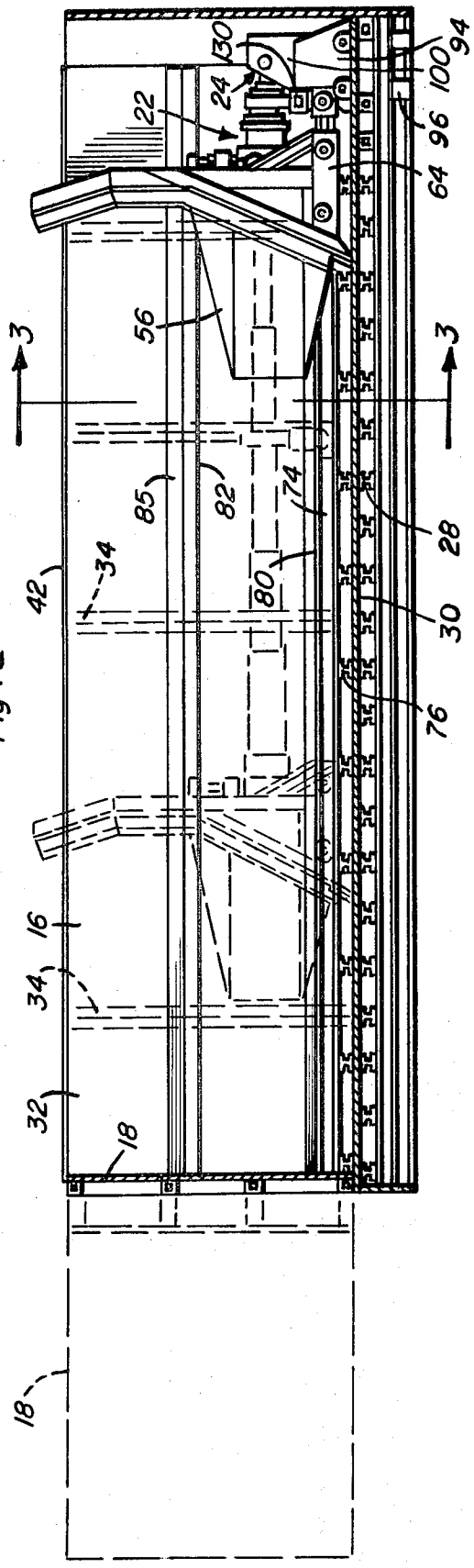

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Fig. 2

Fig. 3

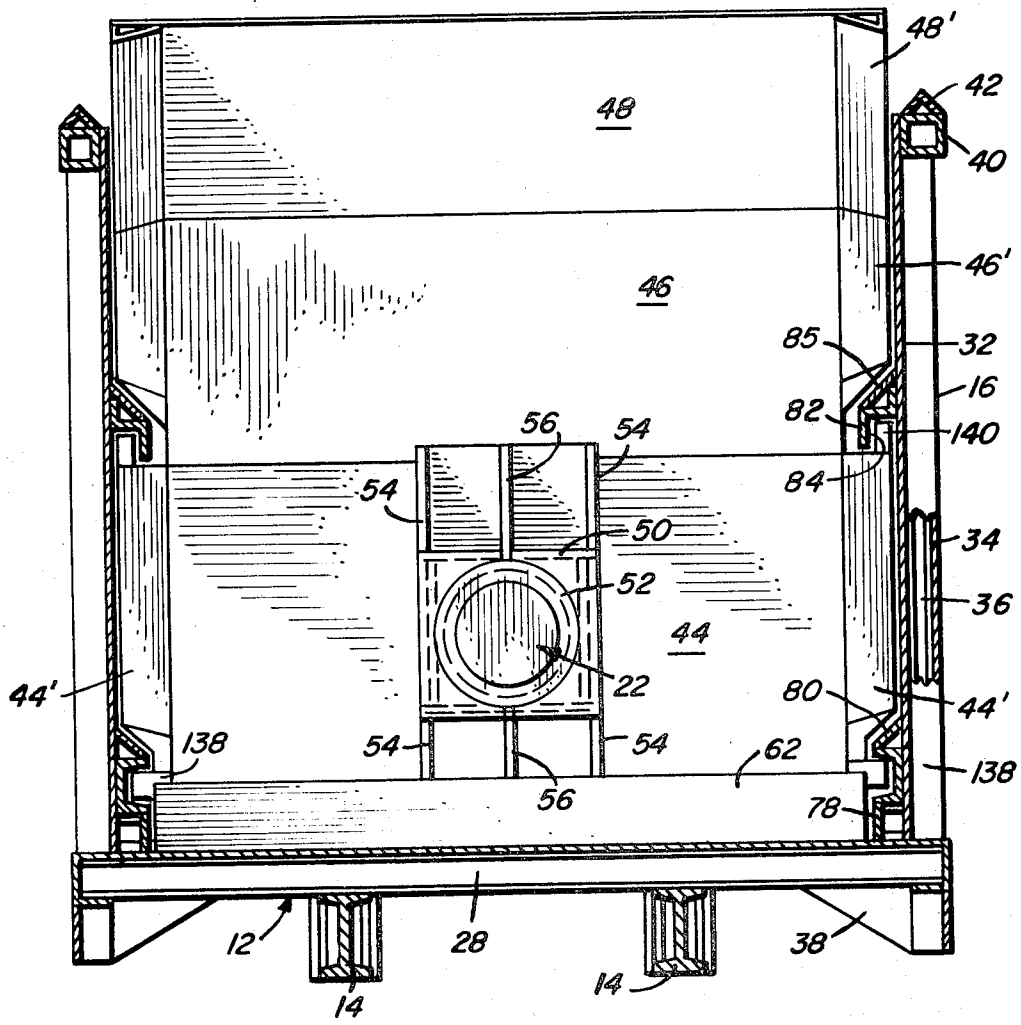


Fig. 9

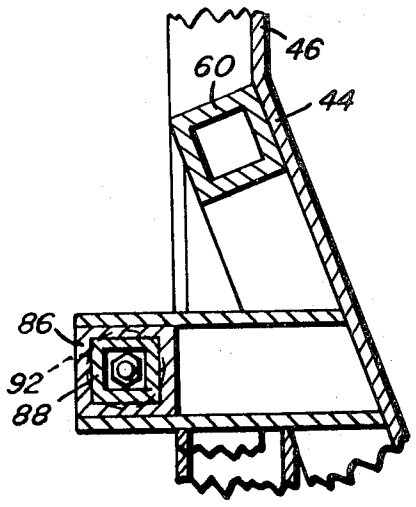


Fig. 7

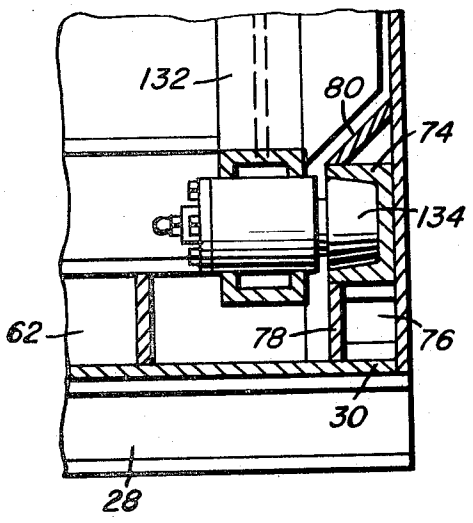


Fig. 4

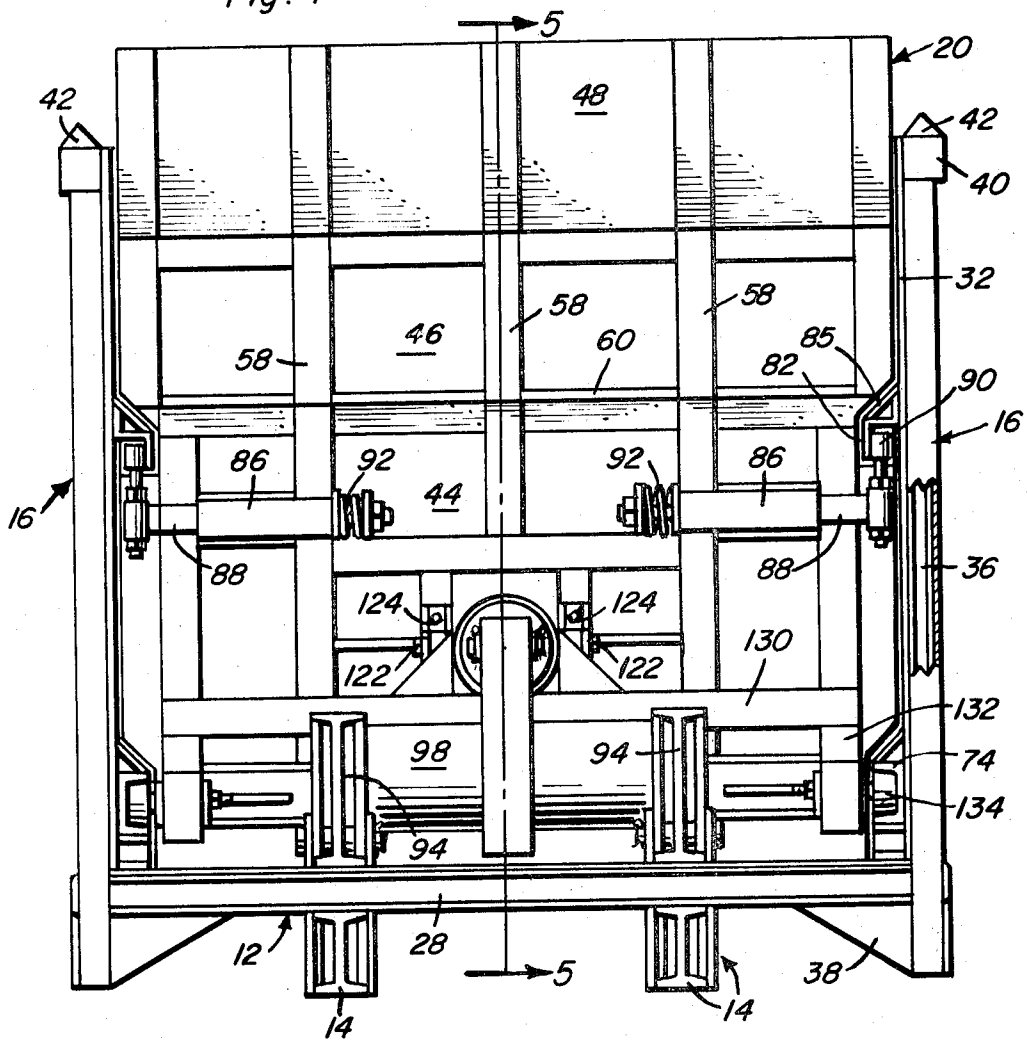

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Fig. 8

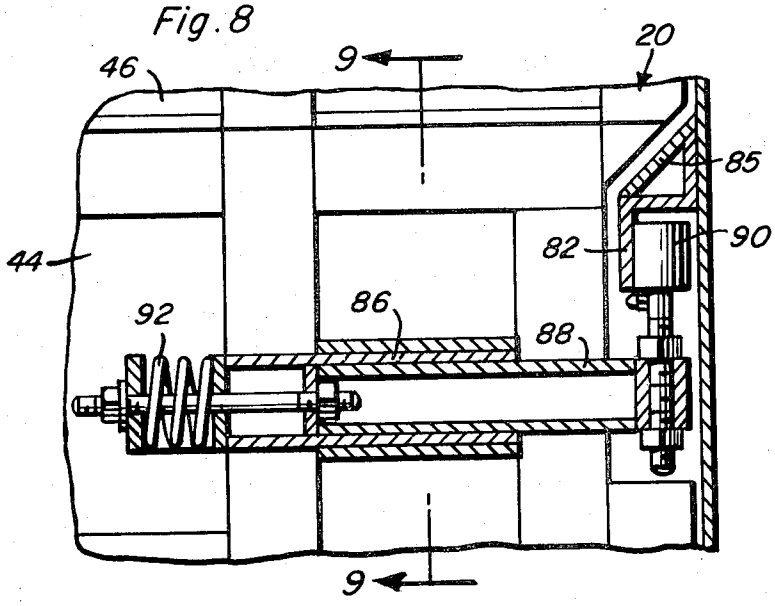

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Fig. 5

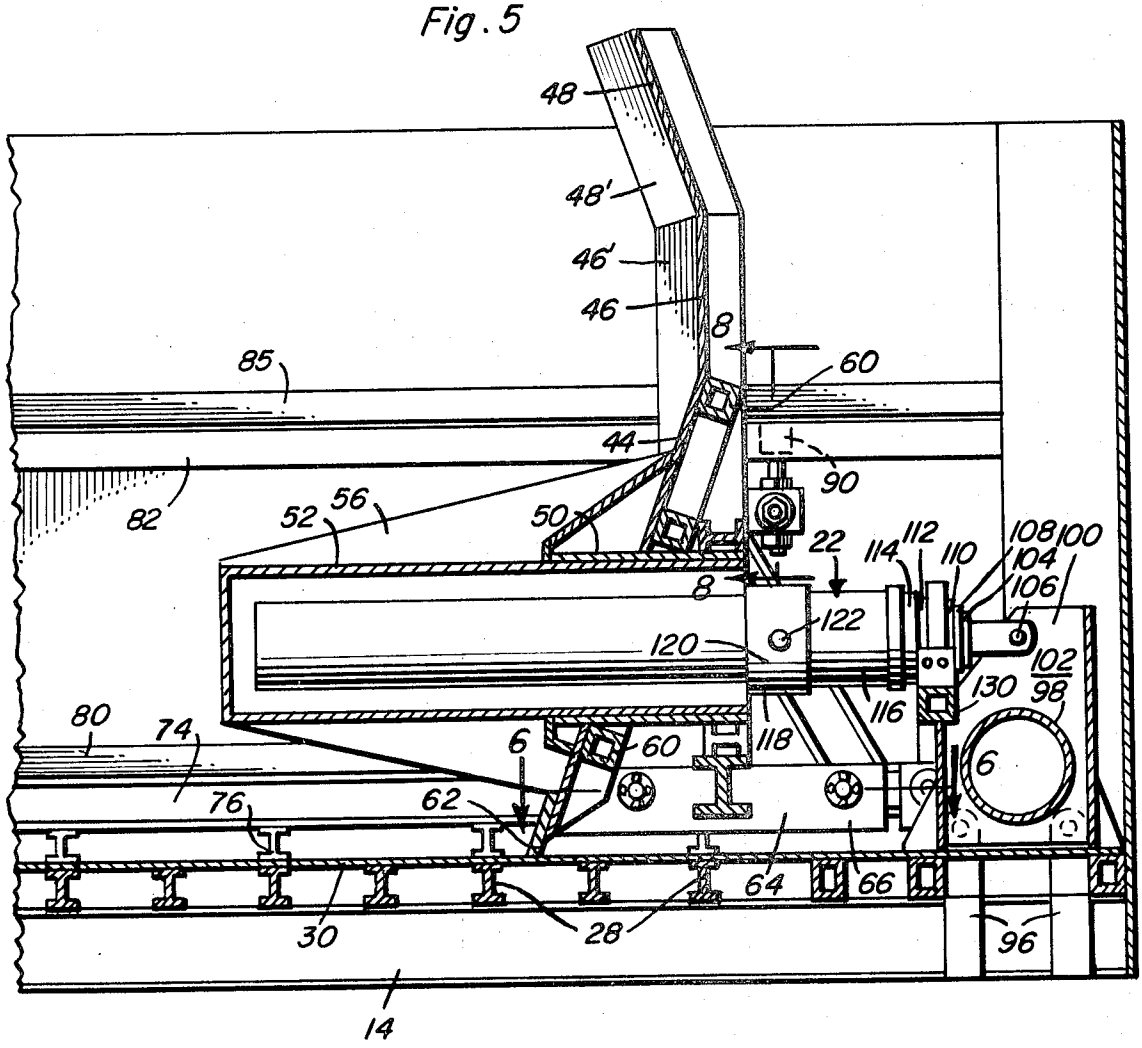
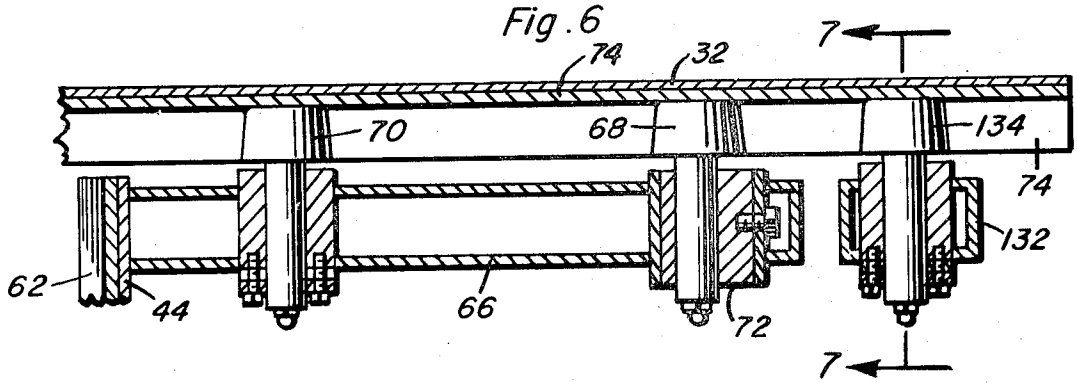

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Fig. 6


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LOAD BODY WITH LOAD COMPACTING AND EJECTING BLADE

The load compacting and ejecting body construction of the instant invention has been designed to provide an open top hauling body equipped with an internal front mounted blade connected directly to a double acting telescopic cylinder and guided from the side walls of the body for compacting a load against the end gate of the body when the end gate is closed and ejecting a load from the body when the end gate is open.

The various types of conventional load carrying vehicle bodies include dump bodies, such as are mounted on truck or trailer chassis and utilize hydraulic cylinders to raise the front of the dump body so that the load within the body may be dumped therefrom by gravity from the open rear of the body. This conventional type of load body cannot function to compact a load therein, requires considerable height to complete the dumping operation, is difficult to control the rate of dumping and creates an unstable condition when the body is long and/or the load is not uniform and/or when the grade on which the unit is supported is inclined.

Another type of load body presently in use if that which is referred to as an "Ejecto" body. This type of body is open at its top with a front mounted blade. The blade is powered by a cable which is in turn powered by means of sheaves, the center distance of which are lengthened and shortened by a double acting hydraulic cylinder. This type of load ejecting body has disadvantages including a system which is complicated and more difficult to maintain, the blade is supported on the outside of the body and the inside width and, therefore, the volume of the body is reduced in order to maintain the body within the maxim 96 inch width required, body size is limited becuase of limitations imposed by inherent physical characteristics of the cable actuated "Ejecto" body, and compaction forces of great magnitude cannot be developed.

A third type of conventional load body presently in use is that type including a closed top with a top opening for loading. This type of unit is provided with a front mounted blade which is directly coupled to a double acting hydraulic cylinder which may compact against the end gate when the end gate is closed and eject the load when the end is open. However, this type of unit includes disadvantages in that it must be loaded through the top opening, usually by means of a hopper, or through the rear end gate by means of a compactor blade. Also, this type of load body requires the utilization of the top in order to keep the side walls from spreading during the compacting operation and in this type of unit the blade is either supported by side rails on the floor of the load bed and/or sides or by a rail and rollers in the center of the body. In either instance, if the sides were stiffened and the roof removed, direct dumping by conventional means, such as loaders or cranes, would damage the blade supports.

The load body of the instant invention includes an open top and openable end gate as well as a hydraulic cylinder actuated compacting and ejecting blade disposed within the body. However, the sides of the body are stiffened to resist spreading and the ejecting and compacting blade is supported from the body in a manner requiring very little internal volume of the body and in a manner whereby the compacting and ejecting blade is connected to the side walls of the body by means of a movable connection so as to insure proper centering of the blade between the side walls and to also further resist spreading of the side walls.

The main object of this invention is to provide a load body with a load compacting and ejecting blade and constructed in a manner whereby maximum internal volume and ease in compacting and ejecting of the load within the body may be realized.

Another object of this invention is to provide a load body in accordance with the immediately preceding object which will enable direct dumping by conventional means, such as loaders and/or cranes, without damaging the structure by which the ejector blade is supported within the load body.

Still another object of this invention is to provide an ejector blade type of load body constructed in a manner whereby the clearance between the lower marginal edge portion of the ejector blade and the associated floor of the body may be adjusted.

Another object of this invention is to provide an ejector blade type of body powered by means of a multi-stage hydraulic cylinder and with the hydraulic cylinder having an intermediate portion thereof guidingly supported for movement longitudinally of the load body so as to prevent lateral deflection of the intermediate sections of the multi-stage cylinder when it is substantially fully extended.

Another important object of this invention is to provide a hydraulic cylinder powered ejector blade assembly constructed in a manner wherein a major portion of the length of the base section of the hydraulic cylinder is disposed forward of the load engaging face of the blade so that the blade may be moved to a position closely adjacent the forward end of the load bed.

A further object of this invention is to provide a movable connection between the ejector blade and the side walls of the associated load bed whereby the blade may be maintained centered between the side walls and spreading of the side walls may be resisted.

A final object of this invention to be specifically enumerated herein is to provide a load body with a load compacting and ejecting blade in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and dependable in operation so as to provide a device that will be economically feasible, long lasting and relatively trouble free.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a top plan view of the load bed body of the instant invention with a load ejecting position of the ejector blade and an open position of the end gate being illustrated in phantom lines;

FIG. 2 is a longitudinal, vertical, sectional view taken substantially upon the plane indicated by the section line 2—2 of FIG. 1;

FIG. 3 is an enlarged transverse, vertical, sectional view taken substantially upon the plane indicated by the section line 3—3 of FIG. 2;

FIG. 4 is an end elevational view of the load bed as seen from the front end thereof, with the front wall of the load body removed;

FIG. 5 is a fragmentary, longitudinal, vertical, sectional view taken substantially upon the plane indicated by the section line 5—5 of FIG. 4;

FIG. 6 is an enlarged fragmentary, horizontal, sectional view taken substantially upon the plane indicated by the section line 6—6 of FIG. 5;

FIG. 7 is a fragmentary vertical, sectional view taken substantially upon the plane indicated by the section line 7—7 of FIG. 6;

FIG. 8 is an enlarged fragmentary transverse, vertical, sectional view taken substantially upon the plane indicated by the section line 8—8 of FIG. 5; and

FIG. 9 is a fragmentary longitudinal, vertical, sectional view taken substantially upon the plane indicated by the section line 9—9 of FIG. 8.

Referring now more specifically to the drawings, the numeral **10** generally designates the load body of the instant invention. The body **10** includes a floor assembly referred to in general by the reference number **12** supported on a pair of right and left hand upstanding side wall assemblies referred to in general by the reference numeral **16.** The rear end of the body **10** includes an end gate **18** which is swingable between the closed solid line positions illustrated in FIGS. **1** and **2** of the drawings and the phantom line open position illustrated in FIGS. **1** and **2** of the drawings. In addition, the load body **10** includes an ejector blade assembly referred to in general by the reference numeral **20,** a hydraulic cylinder assembly **22** for shifting the ejector blade assembly **20,** an anchor assembly **24** for the hydraulic cylinders **22** and a support and guide carriage assembly **26** for an intermediate portion of the hydraulic cylinder assembly **22.**

The floor assembly **12** includes a plurality of longitudinally spaced transversely extending I-beams **28** secured across the boxed I-beams **14** and a flooring plate assembly **30** secured across the I-beams **28.** The side walls **16** each include an inner side wall plate assembly **32** and longitudinally spaced upstanding side wall posts **34** are secured to the outer surfaces of the side wall plate assemblies **32** on 2 foot centers and terminate downwardly at and are secured to the flooring plate assembly **30.** Under every third side wall post **34** is a 3 inch I-beam stiffener **36** welded to the side wall plate assembly **32** on 6 foot centers. The stiffeners **36** project through and below the flooring assembly **12** and are braced relative to the I-beams **28** by means of gusset plates **38.** The upper marginal edge portion of each side wall plate assembly **32** includes an outer tubular stiffener **40** extending longitudinally therealong and each stiffener **40** has an inverted V-shaped protector angle **42** secured to its upper surface.

The ejector blade assembly **20** includes a rearwardly and downwardly inclined lower body plate portion **44,** a substantially vertical intermediate body plate portion **46** and a rearwardly and upwardly inclined upper body plate portion **48.** The body plate portions are integral and the upstanding side marginal edge portions thereof include rearwardly angled marginal portions **44'**, **46'** and **48'**. The central portion of the lower plate portion **44** has a rectangular opening formed therethrough through which a rectangular sleeve **50** is secured. A longer protective pipe **52** extends through and is secured in the sleeve **50** and the rear end portions of the sleeve **50** and the pipe **52** are braced relative to the plate portion **44** by means of gusset plates **54** and **56.** As may be seen from a comparison of FIGS. **4** and **5** of the drawings, the plate portions **44, 46** and **48** include vertical bracing members **58** as well as horizontal bracing members **60** secured to their forward surfaces. The lower marginal edge portion of the plate portion **44** includes a scraper blade portion **62** which closely overlies the flooring panel assembly **30** and the entire ejection blade assembly **20** is carried by a carriage assembly referred to in general by the reference numeral **64.**

The carriage assembly **64** includes lower opposite side longitudinal members **66** from which front and rear tapered rollers **68** and **70** are journaled. The rollers **70** are fixed in position relative to the member **66.** However, the rollers **68** are mounted from eccentric supports **72** whereby the vertical positioning of the rollers **68** may be adjusted relative to the longitudinal members **66.** Thus, the scraper blade portion **62** may be adjusted in position relative to the flooring plate assembly **30** by raising and lowering the front rollers **68,** as desired.

The lower marginal portions of the side walls **16** include inwardly opening longitudinally extending channels **74** in which the rollers **68** and **70** are rollingly received and the channels **74** are spaced slightly above the flooring panel assembly **30** and supported from the latter by means of short longitudinally spaced transversely extending I-beams **76,** there being provided closure plates **78** secured across each set of inner ends of the I-beams **76.** Also, a pair of upwardly and outwardly inclined plates **80** are secured between the upper inner marginal edge portions of the channels **74** and the inner surfaces of the side wall plate assemblies **32** are disposed thereabove.

A heavy duty Z angle plate **82** is secured longitudinally along the inner surface of each side wall plate assembly **32** and each plate **80** defines a downwardly opening channel **84.** A pair of plates **85** corresponding to the plates **80** are secured between the upper innermost marginal portions of the angle plates **82** and portions of the side wall plate assemblies **32** disposed thereabove.

The ejector blade assembly **20** includes a pair of opposite side tubular mounts **86** in which a pair of tension arms **88** are slidingly telescoped. The arms **88** extend transversely of the load bed **10** and carry vertically adjustable upstanding rollers **90** on their outer ends disposed in the channels **84** and rollingly engaged with the angle plate **82.** The inner ends of the arms **88** are acted upon by heavy duty coil springs **92,** see FIG. **8,** and in this manner the ejector blade assembly **20** is maintained centered between the side walls **16.** Also, the spring urged arms **88** and the rollers **90** tend to prevent the side walls **16** from spreading.

The anchor assembly **24** comprises a pair of boxed I-beams **94** anchored in position on the floor assembly **12** by means of vertically extending opposite side anchor straps **96** secured to the boxed I-beams **94,** passing downwardly through the floor assembly **12** and secured to the boxed I-beams **14.** A cylindrical cross member **98** is secured and extends between the boxed I-beams **94** and it carries a center upstanding structure **100** between whose opposite side plates **102** the free end of the fifth extendable section **104** of the hydraulic cylinder assembly **22** is secured as at **106.** The hydraulic cylinder assembly also includes fourth, third, second and first extendable sections **108, 110, 112** and **114** as well as a main cylinder portion **116.** The main cylinder portion **116** is secured to the carriage assembly **64** by

means of a trunnion mount **118** secured to the framing carried by the front face of the ejector blade assembly **20.** The trunnion mount **118** includes a collar **120** carried by the cylinder **116** and including diametrically opposite trunnion pins **122** received through trunnion blocks **124** secured to the framework of the ejector blade assembly **20,** see FIGS. **4** and **5.**

The outer end of the third section **110** of the cylinder assembly **22** is supported from the support and guide carriage assembly **26.** The assembly **26** includes a horizontal transverse member **130** including opposite side depending legs **132** from the lower ends of which a pair of rollers **134** are journaled, the rollers **134** being also rollingly received within the channels **74.** Accordingly, when the hydraulic cylinder assembly **22** is in an extended position such as that illustrated in phantom lines in FIGS. **1** and **2** of the drawings, the outer end of the third extendable section **110** is supported against lateral deflection in any direction perpendicular to the center line of the hydraulic cylinder assembly **22.**

From FIG. **3** of the drawings it may be seen that the lower opposite side marginal portions of the plate portion **44** include tongues **138** which ride in the channel members **74** in advance of the rollers **70, 68** and **134** in order to maintain the channel members **74** clean as the ejector blade assembly **20** moves toward the rear of the load bed **10.** In addition, the upper opposite side marginal portions of the plate portion include additional tongues **140** which ride in the channels **84** in advance of the rollers **90** when the ejector blade assembly **20** is moving toward the rear of the load bed **10.**

In operation, the load bed **10** may be loaded through its open top with the end gate **18** secured in its closed position in any convenient manner (not shown). After a portion of a load has been placed in the load bed **10,** the load may be compacted by actuation of the hydraulic cylinder assembly **22** to force the ejector blade assembly **20** toward the end gate **18** and thereby compacting the load within the load body **10** against the closed end gate **18.** Then, the ejector blade assembly **20** may again be retracted to the front end of the load bed **10** after which additional loads may be placed within the load bed or body **10.** After repeated compacting of the load within the load body **10,** the latter may be transported to a point of discharge and the end gate **18** may be opened. Thereafter, the hydraulic cylinder assembly **22** may again be actuated to eject the load from the load body **10** in a controlled manner.

During the load compacting process, there is a tendency for the sides or side walls **16** to spread apart. However, this tendency is resisted by the I-beam stiffeners **36** and side wall posts **34** and the manner in which the posts and I-beam stiffeners are raised relative to the underside of the flooring assembly **12** by means of the bracing plates **38.** In addition, the coil springs **92** exert approximately a 1,000 pound thrust on each of the arms **88.** In this manner, the blade assembly **20** is maintained centered between the side walls **16** and each side wall **16** has a force of at least 1,000 pounds acting thereon adjacent the blade assembly **20** in opposition to spreading of the side walls **16.**

Although there has been no control assembly illustrated for controlling the operation of the hydraulic cylinder assembly **22,** it is to be noted that it is proposed that such a control system will include a pressure sensing reversing control whereby movement of the blade assembly **20** to its full limit stop position adjacent the end gate **18** will increase the actuating pressure for the cylinder assembly **22** and automatically reverse operation of the cylinder assembly **22** so as to contract the latter and return the blade assembly **20** to the front end of the load body **10.** In addition, this same pressure sensing control will automatically reverse the blade assembly **20** when a partial load is being compacted against the end gate **18** as the same maximum pressure is reached.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A load body defining an upwardly opening elongated receptacle having first and second ends and consisting of an elongated flooring assembly and a pair of opposite side upstanding side walls extending along and projecting upwardly from opposite side marginal edge portions of said flooring assembly, one end of said body including an openable end gate and the opposite end portion of said body having an upstanding transverse partition disposed therein between said side walls and guidingly engaged with the body for movement toward and away from said one end thereof, said body including motor means drivingly connected to said partition for selectively shifting the latter longitudinally of said body, said side walls including longitudinally extending guideway defining means spaced appreciably above said flooring assembly, said partition including followers guidingly engaged in said guideway defining means for movement therealong and against lateral inward movement relative to said guideway defining means, said followers being supported from said partition for limited movement horizontally along the partition transversely of said body, and force means operatively connected between said partition and said followers yieldingly biasing said followers inwardly toward each other.

2. The combination of claim **1** wherein said side walls include longitudinally spaced upstanding hollow reinforcing posts with internal stiffeners projecting downwardly below the corresponding side marginal portions of said flooring assembly, the lower end portions of said stiffeners projecting below said flooring assembly being braced relative to the adjacent underside portions of the corresponding side marginal portions of said flooring assembly.

3. The combination of claim **2** wherein the bracing between the lower end portions of said stiffeners and said flooring assembly side marginal portions includes transverse upstanding gusset plates secured to the underside surface portions of said flooring assembly and the inner side portions of the lower ends of said stiffeners projecting below said flooring assembly.

4. The combination of claim **3** wherein said stiffeners comprise I-beam members.

5. The combination of claim **1** wherein said flooring assembly includes a flooring plate assembly secured over a plurality of longitudinally spaced transverse beams, said side walls including longitudinally spaced upstanding hollow reinforcing posts with internal stiffeners projecting downwardly below the corresponding

side marginal portions of said flooring plate assembly and the adjacent ends of at least some of said transverse beams, and brace means secured between the lower end portions of said stiffeners and the underside portions of said some transverse beams of said flooring assembly, said brace means including transverse upstanding gusset plates secured to the underside surface portions of said transverse beams and the inner side portions of the lower ends of said stiffeners projecting below said transverse beams.

6. The combination of claim **1** wherein said motor means comprises a multi-stage hydraulic cylinder including a base end section secured longitudinally through and to a lower transverse center portion of said partition, a transverse horizontal anchor assembly supported in the other end of said body above said flooring assembly, the free extendable end of said cylinder being secured to said transverse horizontal anchor assembly, said multi-stage hydraulic cylinder including at least three relatively telescoped extendable sections, a guide carriage disposed between said partition and said anchor assembly, said guide carriage also including followers guidingly engaged in said guideway defining means, an intermediate section of said relatively telescoped extendable hydraulic cylinder sections being supported from said guide carriage against lateral deflection in all directions perpendicular to the centerline of said hydraulic cylinder.

7. A load body defining an upwardly opening elongated receptacle having first and second ends and consisting of an elongated flooring assembly and a pair of opposite side upstanding side walls extending along and projecting upwardly from opposite side marginal edge portions of said flooring assembly, one end of said body including an openable end gate and the opposite end portion of said body having an upstanding transverse partition disposed therein between said side walls and guidingly engaged with the body for movement toward and away from said one end thereof, said body including motor means drivingly connected to said partition for selectively shifting the latter longitudinally of said body, said flooring assembly including a flooring plate assembly secured over a plurality of longitudinally spaced transverse beams, said receptacle including a pair of transversely spaced longitudinal frame beams over which said transverse beams extend and to which the latter are secured, said motor means comprising a multi-stage hydraulic cylinder including a base section secured longitudinally through and to a lower transverse center portion of said partition, and a transverse horizontal anchor assembly supported in the other end of said body above the flooring assembly, and longitudinally spaced pairs of opposite side upstanding anchor members having their lower ends rigidly anchored to the opposite sides of each of said longitudinal frame beams below said flooring assembly, the upper ends of said anchor members projecting upwardly through said flooring assembly and rigidly anchored to said transverse horizontal anchor assembly, the free extendable end of said hydraulic cylinder being secured to said anchor assembly.

8. A load body defining an upwardly opening elongated receptacle having first and second ends and consisting of an elongated flooring assembly and a pair of opposite side upstanding side walls extending along and projecting upwardly from opposite side marginal edge portions of said flooring assembly, one end of said body including an openable end gate and the opposite end portion of said body having an upstanding transverse partition disposed therein between said side walls and guidingly engaged with the body for movement toward and away from said one end thereof, said body including motor means drivingly connected to said partition for selectively shifting the latter longitudinally of said body, said motor means comprising a multi-stage hydraulic cylinder including a base section secured longitudinally through and to a lower transverse center portion of said partition, and an anchor assembly supported from the other end of said body and to which the free extendable end of said hydraulic cylinder is secured, said side walls including longitudinally extending guideway defining means spaced appreciably above said flooring assembly, said partition including followers guidingly engaged in said guideway defining means for movement therealong and against lateral inward movement relative to said guideway defining means, said guideway defining means also including lower opposite side tracks carried by said side walls, said partition including a supporting carriage including front and rear pairs of opposite side rollers rollingly engaged in said tracks, one pair of said front and rear pairs of opposite side rollers being supported from said support carriage for adjustable vertical shifting relative thereto.

9. A load body defining an upwardly opening elongated receptacle having first and second ends and consisting of an elongated flooring assembly and a pair of opposite side upstanding side walls extending along and projecting upwardly from opposite side marginal edge portions of said flooring assembly, one end of said body including an openable end gate and the opposite end portion of said body having an upstanding transverse partition disposed therein between said side walls and guidingly engaged with the body for movement toward and away from said one end thereof, said body including motor means drivingly connected to said partition for selectively shifting the latter longitudinally of said body, said side walls including longitudinally extending guideway defining means spaced appreciably above said flooring assembly, said partition including followers guidingly engaged in said guideway defining means for movement therealong and against lateral inward movement relative to said guideway defining means, said guideway defining means also including lower opposite side tracks carried by said side walls, said partition including a supporting carriage having front and rear pairs of opposite side rollers rollingly engaged in said tracks, one pair of said front and rear pairs of opposite side rollers being supported from said support carriage for adjustable vertical shifting relative thereto.

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