United States Patent

Krause

[15] **3,682,333**

[45] **Aug. 8, 1972**

[54] **SELF-UNLOADING VEHICLE**

[72] Inventor: **Herbert K. Krause,** Route 1, Box 185 A, Blaine, Wash. 98230

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[52] **U.S. Cl.**.....**214/82,** 239/679

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

[58] **Field of Search**.....214/146, 82, 83.22, 83.3; 198/221; 239/679, 673

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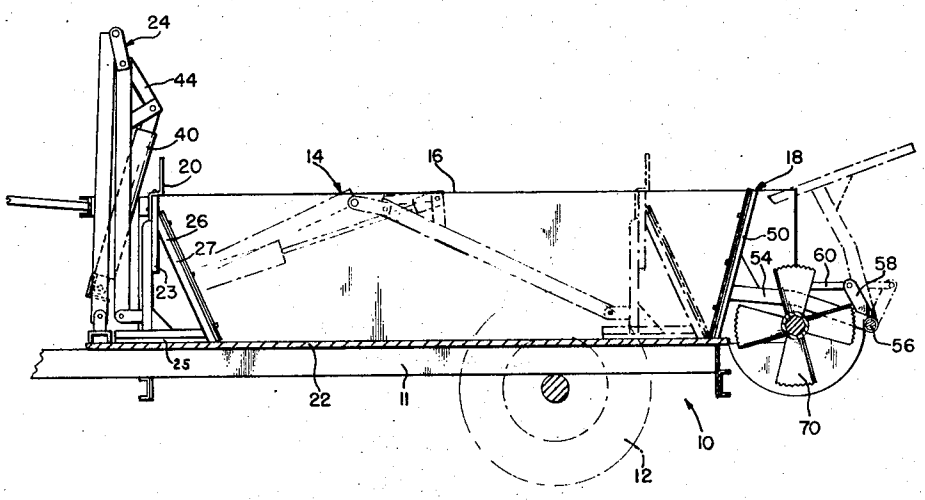
Primary Examiner—Robert J. Spar

Attorney—Seed, Berry & Dowrey

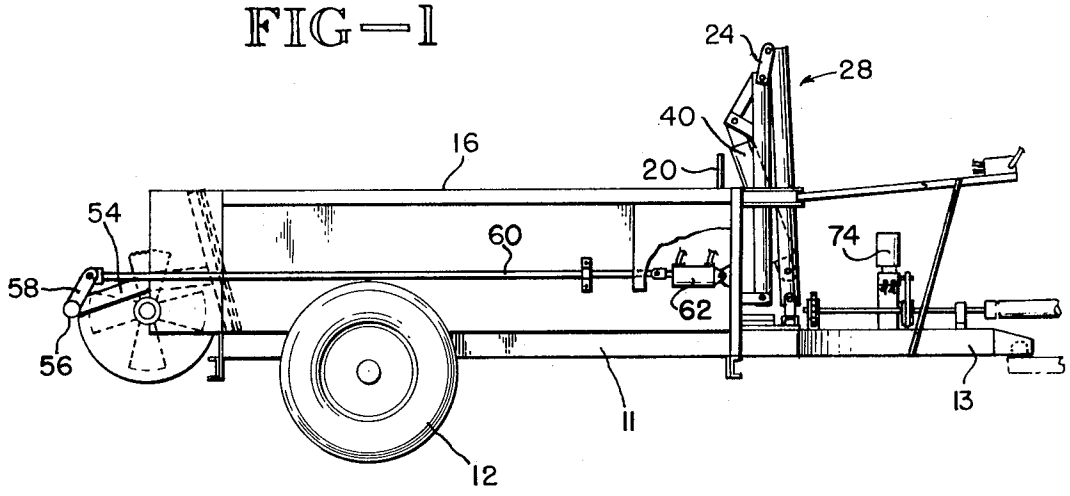
[57] **ABSTRACT**

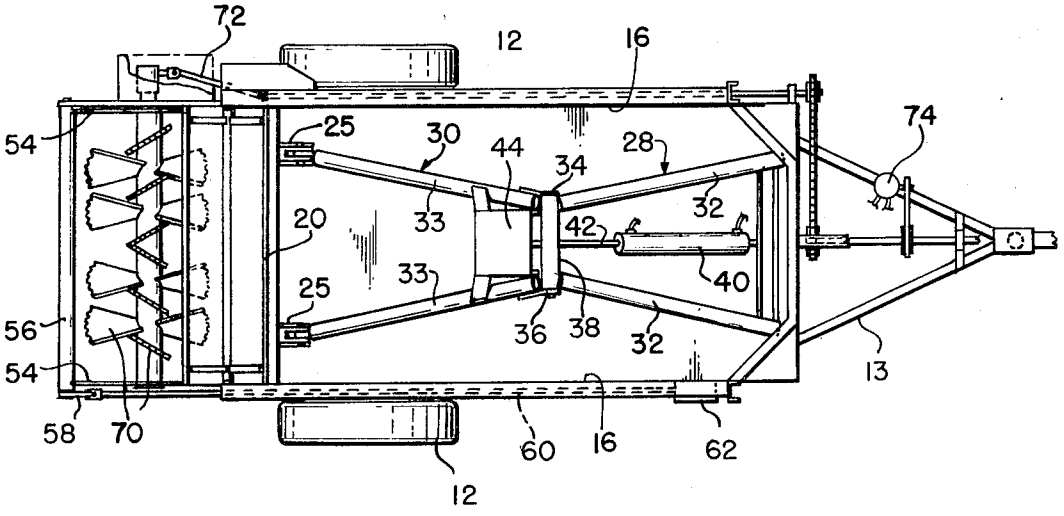
An unloading apparatus for a spreader or the like includes a caliper arm mechanism one end of which is secured to the box and the other end of which is secured to a slidable bulkboard. A hydraulic ram spreads the arms of the caliper mechanism to slide the bulkboard rearwardly. A tailgate is mounted for movement in an upward and rearward arcuate path to serve as a shield while material is being thrown from the spreader.

2 Claims, 5 Drawing Figures



FIG—1



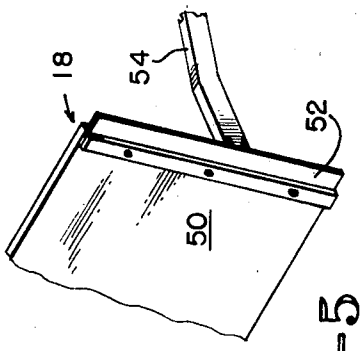


FIG—2

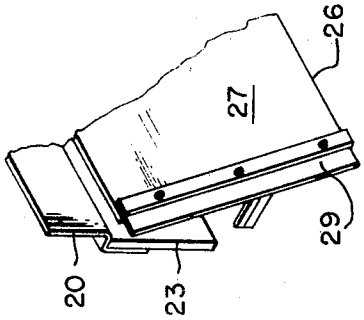
HERBERT K. KRAUSE
INVENTOR.

BY Sood, Berry & Tourney

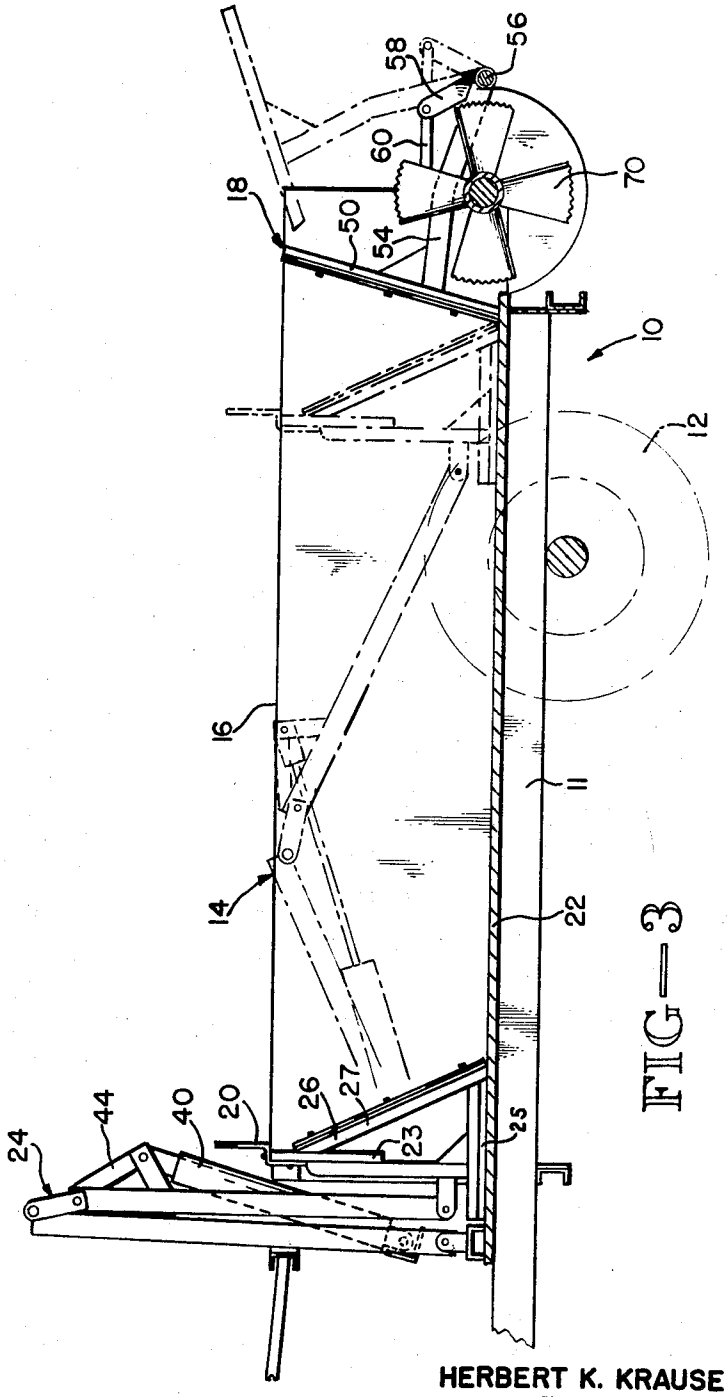
ATTORNEYS



FIG—5



FIG—4



FIG—3

HERBERT K. KRAUSE
INVENTOR.

BY

Fred, Berry & Deavers

ATTORNEYS

SELF-UNLOADING VEHICLE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention pertains to agricultural spreaders or the like.

2. Description of the Prior Art

Various types of unloading apparatus for spreaders have been known heretofore. One type employs a bulkboard which is drawn rearwardly in a box by ropes or cables sliding along the floor of the box. Another type employs a bulkboard which is slid rearwardly along a box by a multi-section telescopic ram, such as shown in the patent to Kelso, U.S. Pat. No. 3,273,728. The former device has proven unsatisfactory since the material being moved is commonly highly corrosive in nature and tends to attack the cables. In addition the bulkboard becomes askew and binds in the box. In the latter type of device a multi-stage ram is economically unfeasible since the initial cost of installation and the cost of maintaining the ram, particularly in a corrosive environment, is prohibitive. In addition, in the multi-stage ram shown in the Kelso patent, for example, the stages must be extendable for a great length causing alignment difficulties and heavy wear on the cylinders.

In prior art spreaders of the type having a beater or thrower on the rearward end, such as used for spreading manure in the agricultural field, the tailgate has heretofore been pivotally mounted between the side walls at the rearward end of the box serving primarily as a means to hold the material in the box until the spreading operation has begun.

SUMMARY OF THE INVENTION

It is an object of one feature of this invention to provide an unloading apparatus for a spreader which is inexpensive to build and maintain.

It is another object of this feature of the invention to provide an unloading apparatus which has a slidable bulkboard that is moved by a caliper arm mechanism and in which a ram is employed for spreading the arms.

It is an object of the second feature of this invention to provide a swingable tailgate which may serve also as a shield during the spreading operation.

It is another object of this feature of the invention to provide a tailgate which has a substantially planar body that is swung in an arc about a pivot disposed rearwardly of the thrower.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of the manure spreader illustrating the principles of the invention.

FIG. 2 is a plan view of the spreader shown in FIG. 1.

FIG. 3 is an enlarged vertical section of the spreader shown in FIG. 1 and illustrating in phantom lines the extended position of both the bulkboard and the tailgate of the invention.

FIG. 4 is a fragmentary isometric of a portion of a bulkboard illustrated in the drawings.

FIG. 5 is a fragmentary isometric of a portion of the tailgate illustrated in the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The trailer **10** such as a spreader or the like is provided with a frame **11** mounted on wheels **12** and having a conventional hitch connection **13** with a towing vehicle (not shown). The spreader, of course, may be self-propelled. Mounted on the frame **11** is a material holding box **14** having vertical side walls **16** and a tailgate **18**. An unloading apparatus includes a bulkboard **20** slidably mounted on a material supporting surface **22** of the box **14** and a caliper mechanism **24**. Although the unloading apparatus is best employed with a spreader it may also be advantageously in other areas in which material must be pushed through a box.

The bulkboard **20** includes a vertical frame **23** mounted on a pair of spaced runners **25**. The runners **25** are preferably made of wood to facilitate sliding on the material supporting surface **22**. The bulkboard also includes an inclined plate **26** having a material pushing surface **27**. The inclination of the pushing surface serves to hold the bulkboard down against the material supporting surface due to the weight of the material, such as manure, resting thereon. The plate **26** is provided with rubber strips **29** to assure a tight sliding seal between the vertical walls **16** and the pushing surface **27**.

The caliper mechanism **24** is best shown in FIG. **3** and includes a forward frame member **28** and a rearward frame member **30**. The forward frame member **28** includes a pair of laterally spaced arms **32** pivotally connected at their lower ends to the frame **11**. The rearward frame member **30** includes a pair of laterally spaced arms **33** pivotally mounted at their lower ends to the vertical members of the bulkboard **20**. The upper ends of the arms **33** are secured to collars **34** which pivotally mount a pivot rod **36**. The upper ends of the arms **32** are joined to a central collar **38** also pivotally secured to the pivot rod **36**. A conventional hydraulic ram **40** has its cylinder pivotally secured to the frame **11** and has a piston rod **42** pivotally secured to a bracket **44** mounted between the upper ends of the rearward arms **33**. As is readily apparent extension of the piston rod spreads the rearward and forward frame members **28** and **30** thus pushing the bulkboard **20** rearwardly in the box **14**.

Since the caliper arm mechanism achieves a great amplification in the stroke of the piston rod it can be readily seen that an inexpensive, single stage hydraulic ram may be used to spread the arms of the caliper mechanism. Another important feature of the invention is that the caliper mechanism **24** is self-guiding so that guide slots or the like are not needed in the material supporting surface **22**. The bulkboard, as mentioned earlier, is held against the material supporting surface as the piston rod **42** is extended due to the weight of the manure acting on the inclined pushing surface **27**. The accurate, self-guiding movement of the bulkboard assures that binding will not occur during the movement of the bulkboard and allows a tight fit between the rubber strips **29** and the vertical side walls **16**.

The tailgate of the invention is also best shown in FIGS. **2** and **3**. The tailgate **18** is provided with a substantially planar body **50** having rubber strips **52** on the lateral ends thereof. The rubber strips **52** provide a tight seal between the tailgate and the vertical side

walls **16** of the box **14**. A pair of laterally spaced arms **54** are secured to each end of the planar body **50** and are fixed to a pivot shaft **56** at their rearward ends. The pivot shaft is rotated by a bell crank **58** which is actuated by a link **60** connected to a hydraulic ram **62**. When the tailgate is in the lowered position the planar body fills the space between the vertical side walls and the material supporting surface **22**. As the planar body is raised the arms **54** are raised simultaneously so that no binding occurs and the body may be swung about an arcuate path into the phantom line position shown in FIG. **3**. In this position the tailgate advantageously serves as a shield to assist in guiding the material thrown from the rear of the box **14**. An hydraulic motor **74** powers the cylinders **62** and **40**.

The material is thrown or spread from the box **14** by a conventional thrower or beater **70** powered by a drive train **72** which is connected to the power takeoff at the towing vehicle.

In operation the bulkboard **20** is drawn to its forward most position and the box **14** filled with manure or other material to be distributed. With the tailgate in the lowermost position the vehicle may then be towed to the field where the manure is to be spread. The tailgate is then raised into its shielding position and the thrower **70** rotated as the vehicle is towed through the field. The bulkboard may then be slid rearwardly pushing the manure into the thrower.

While the preferred form of my invention has been illustrated and described it should be understood that variations will be apparent to one skilled in the art. Accordingly it is intended that the invention not be limited to the specific form illustrated but that the claims appended hereto be given the broadest interpretation possible.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A vehicle unloading apparatus for unloading sticky corrosive material such as manure comprising a frame, a box on said frame and having a generally smooth material supporting surface and vertical sidewalls, a bulkboard slidably disposed on said surface, said bulkboard having an inclined pushing surface engageable by material in the box for holding the bulkboard downward on the supporting surface, flexible seal means on said bulkboard for tightly engaging the sidewalls as the bulkboard is moved therealong, guide means for reciprocably moving said bulkboard including a forward movable rigid frame member pivotally mounted at its lower end to said box, a rearward movable rigid frame member pivotally mounted at its lower end to said bulkboard, each of said movable rigid frame members including a pair of laterally spaced arms, bracing means rigidly joining said spaced arms to rigidify the frames whereby both arms of a respective movable rigid frame move as an integral unit, and means joining said spaced arms at their upper ends to a substantially horizontal pivot shaft for allowing pivotal movement of said movable frame members but substantially restricting any lateral movement of the arms of the rearward movable frame member relative to the forward movable frame member thereby guiding the bulkboard in a straight movable frame member thereby guiding the bulkboard in a straight path in said box whereby the guided movement of the bulkboard is obtained substantially solely by said guide means, and hydraulic ram means for spreading said movable frame members for moving the bulkboard rearwardly in said box.

2. The apparatus of claim **1**, said sidewall engaging means including rubber strips secured to the laterally spaced ends of said pushing surface.

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