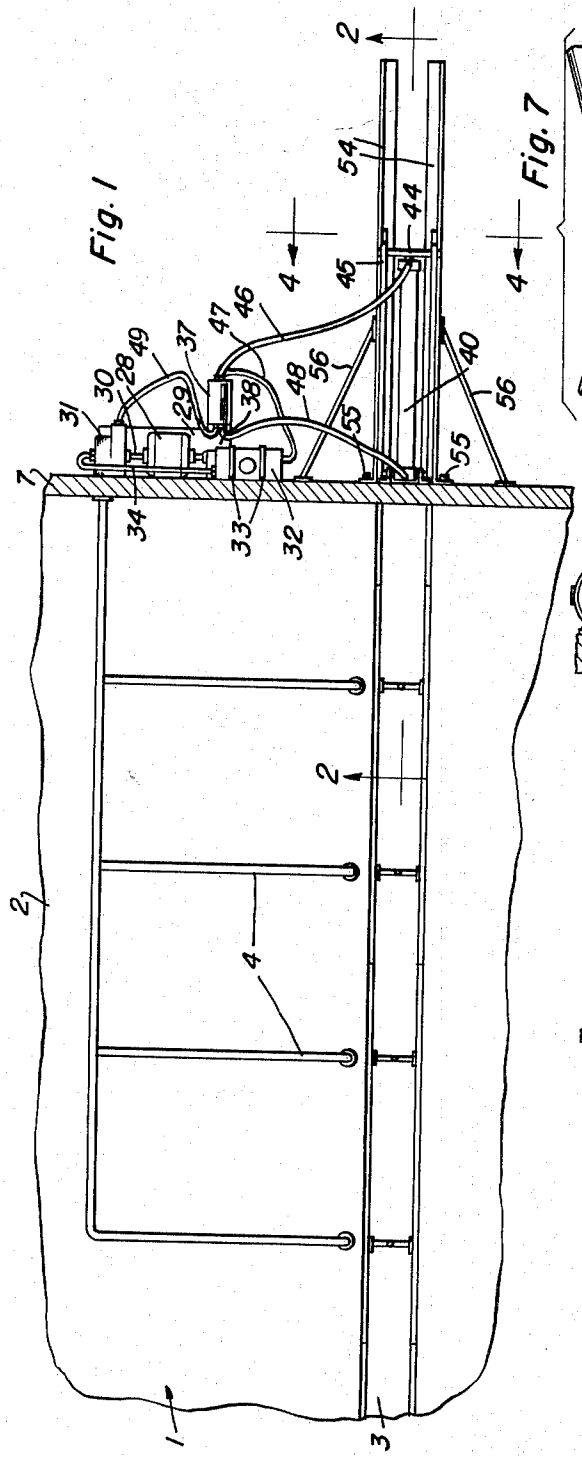
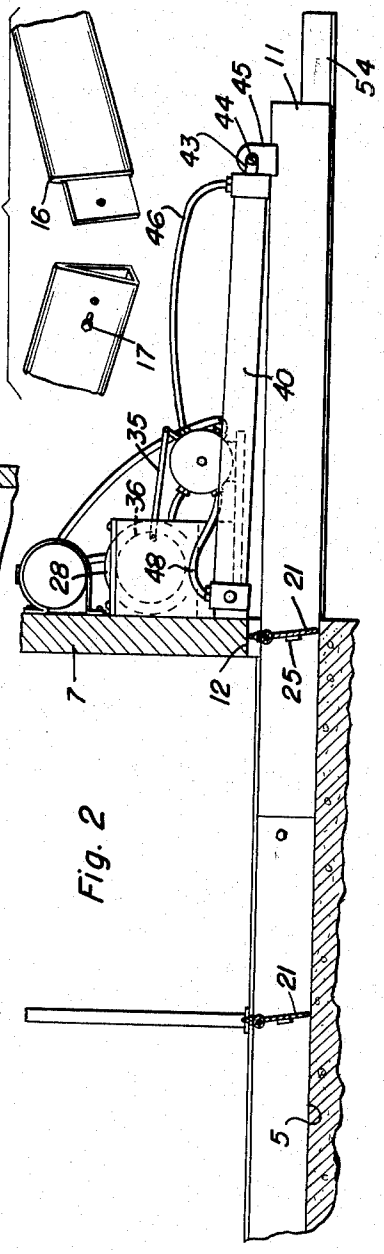
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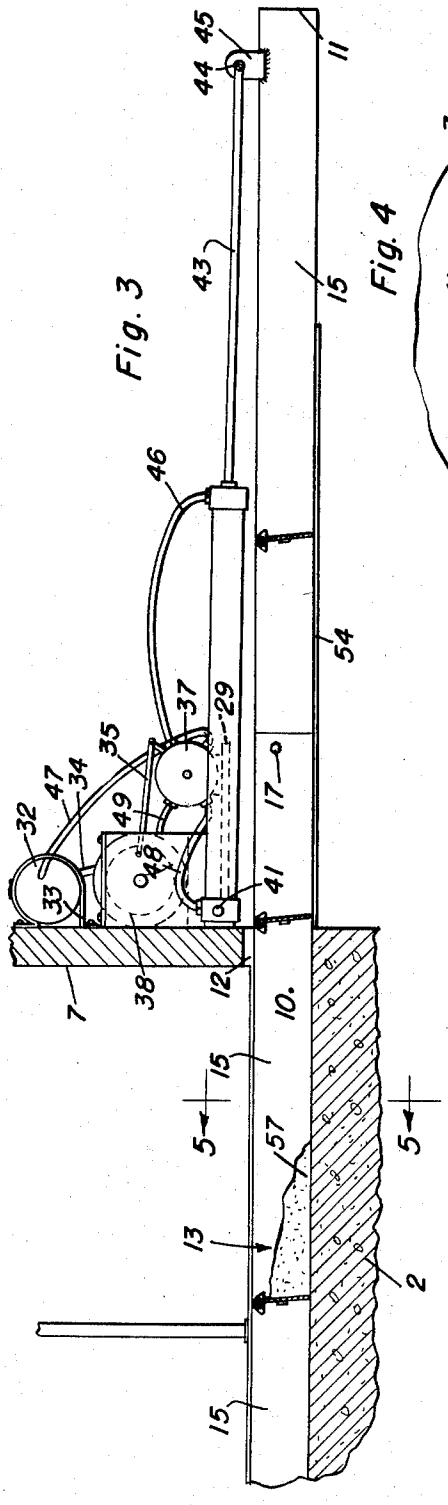
Velma L. Miller
INVENTOR.

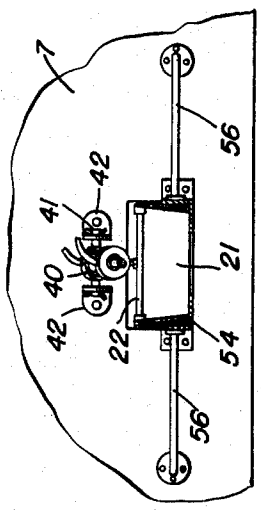
BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

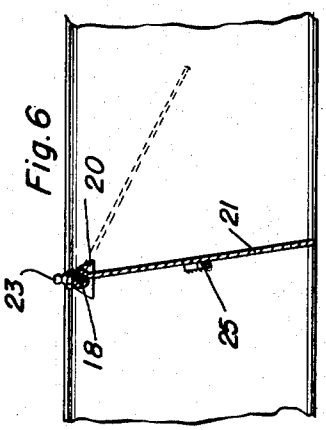
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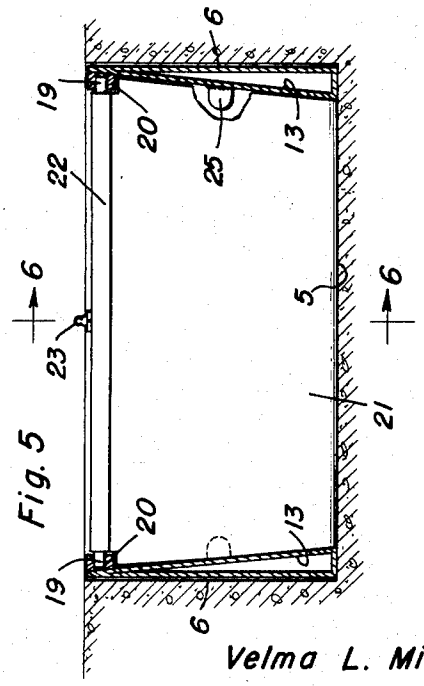
RECIPROCATING HOE TYPE MANURE CONVEYER

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Velma L. Miller
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

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RECIPROCATING HOE TYPE MANURE CONVEYER

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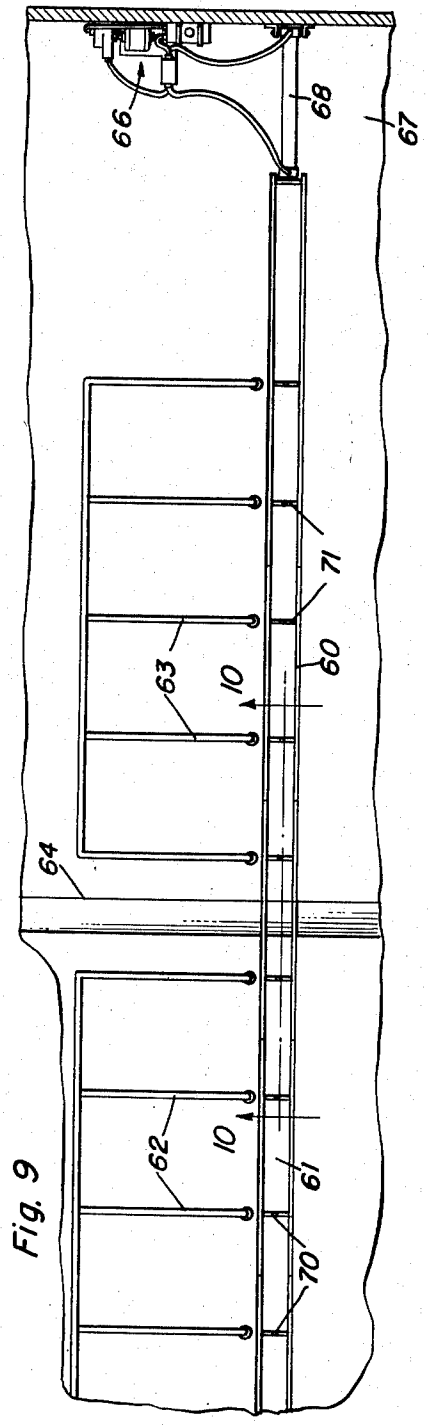


Fig. 9

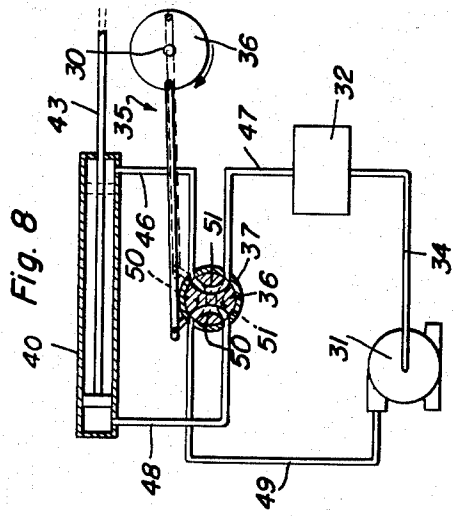


Fig. 8

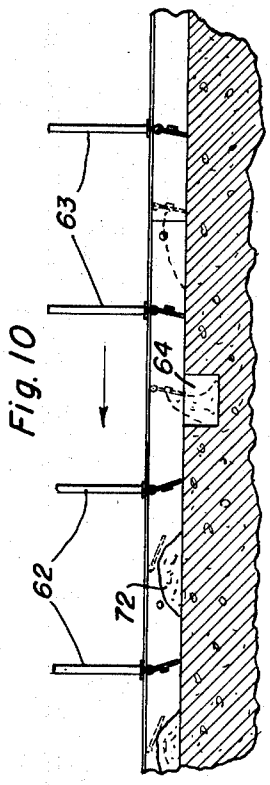


Fig. 10

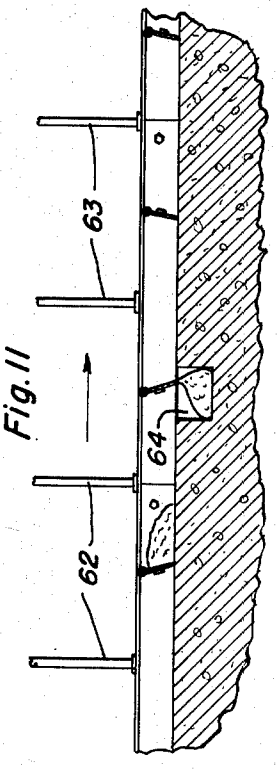


Fig. 11

Velma L. Miller
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

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RECIPROCATING HOE TYPE MANURE CONVEYER

Velma L. Miller, Whitefield, N. H.

Application May 14, 1951, Serial No. 226,233

5 Claims. (Cl. 198—224)

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My invention relates to improvements in reciprocating hoe type conveyors for evacuating manure from the manure gutters of cow barns and the like.

The primary object of my invention is to provide a simply constructed, hoe type conveyor for cleaning out such manure gutters and which is adapted to be slidably fitted in the gutter for efficient operation without requiring alteration in the gutter, or additional structure therein for slidably guiding the conveyor, and which is constructed and arranged for installation in the gutter by merely disposing the same therein, and requires no fastening means.

Another object is to provide a conveyor of the type and for the purpose above set forth equipped with an automatically controlled hydraulic pressure drive of simple, inexpensive construction which is easy to install.

Other and subordinate objects, within the purview of my invention, together with the precise nature of my improvements will be readily understood when the succeeding description and claims are read with reference to the drawings accompanying and forming part of this specification.

In said drawings:

Figure 1 is a fragmentary view partly in plan and partly in horizontal section illustrating my invention, in the preferred embodiment thereof;

Figure 2 is a fragmentary view in longitudinal vertical section taken on the line 2—2 of Figure 1 and drawn to a larger scale, the hoe unit being shown retracted;

Figure 3 is a similar view illustrating the hoe unit advanced;

Figure 4 is a fragmentary view in transverse section taken on the line 4—4 of Figure 1 and drawn to a larger scale;

Figure 5 is a view in transverse section taken on the line 5—5 of Figure 3 and drawn to a larger scale;

Figure 6 is a fragmentary view in vertical longitudinal section taken on the line 6—6 of Figure 5;

Figure 7 is a view in perspective illustrating the fastening means for the sections of the side bars of the hoe unit;

Figure 8 is a schematic view illustrating the power drive for the hoe unit;

Figure 9 is a fragmentary view partly in plan and partly in horizontal section of a modified embodiment of my invention;

Figure 10 is a fragmentary view in longitudinal vertical section taken on the line 10—10 of Figure 9 and illustrating how one of the series of hoe

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blades propels the manure into the disposal gutter; and

Figure 11 is a similar view illustrating how the other series of hoe blades propels the manure into the disposal gutter.

Referring by numerals to the embodiments of the invention illustrated in the drawings, and first to the preferred embodiment illustrated in Figures 1 to 8, the numeral 1 designates a cow barn, shown fragmentarily as sufficient for the present purposes, 2 the floor of the barn, 3 the usual manure gutter in the floor 2 in the rear of the cow stalls 4 and having a flat bottom 5 and perpendicular sides 6, and 7 one side of the barn 1.

The conveyor of my invention, in the preferred embodiment, comprises an elongated hoe unit 10 adapted to be reciprocated endwise in the gutter 3 for advance and retraction and which is sufficiently longer than the gutter 3 to extend at a front end 11 thereof, when retracted, out of an open end 12 of the gutter 3 at the side 7 of the barn 1.

The hoe unit 10 comprises a pair of opposite, laterally spaced, metal side bars 13 of the same width as the depth of the gutter 3 and preferably hollow with inner sides converging downwardly, relatively, for a purpose presently seen. The side bars 13 are spaced apart, by means presently described, to slidably engage flatly the sides 6 of the gutter 3 with the bottom longitudinal edges of said bars sliding on the bottom 5 of said gutter. Preferably, the side bars 13 are formed in sections 15 connected together by means of an end tongue 16 on each section fitting in the end of an adjoining section and fastened therein by a cross bolt 17.

Rock shafts 18 with reduced ends 19 journaled in upper edge bosses 20 on the side bars 19 space said side bars 13 apart. Hoe blades 21 depend from the rock shafts 18 transversely of the gutter 3 and are fixed to said rock shafts for swinging longitudinally of the gutter 3. Each hoe blade 21 is formed with a longitudinal upper edge sleeve 22 fitted on the rock shaft 18 and a set bolt 23 in the sleeve 22 engages the rock shaft 18 and provides for adjustably connecting the hoe blade 21 to its rock shaft 18. As best seen in Figure 1 the rock shafts 18 space the hoe blades 21 apart longitudinally of the gutter 3 the same distance as the width of the stalls 4, for a purpose presently seen. As best shown in Figures 2, 3 and 5, the hoe blades fit with a working clearance between the side bars 13 and incline downwardly from the rock shafts 18 into the gutter 3 for-

wardly of the unit 10, that is in the direction of advance movement of said unit. The lower edges of said blades 21 slidably engaging the bottom 5 of the gutter 3. Stop lugs 25 on the side bars 13 in the rear of the hoe blades 21 prevent rearward swinging of said blades out of the described inclined position. Preferably, the hoe blades 21 are inclined from the vertical approximately 10°.

A power drive for reciprocating the hoe unit 10 is provided which preferably comprises the following. An electric motor 28, adapted to be connected to any suitable source of power, not shown, is fixed on a shelf 29 on the side 7 of the barn 1 outside said barn. The armature shaft 30 of the motor 28 is operatively connected at one end to a suitable pump 31 on said shelf 29. A fluid supply tank 32 supported on the side 7 of the barn 1 by a bracket 33 is connected to the suction side of the pump 31 by a pipe line 34. A pitman 35 including a disk 36 fastened on the other side of the armature shaft 30 and enclosed in a housing 38 operatively connects said shaft to an oscillating core 36 of a valve 37 for controlling a fluid pressure circuit presently described. The valve 37 controls, in a manner presently described, admission and discharge of fluid pressure to opposite ends of a fluid pressure cylinder 40 extending longitudinally above the extending end 11 of the hoe unit 10 with one end pivoted, as at 41, between bearing brackets 42 on the side 7 of the barn 1 outside said barn, and so that said cylinder is vertically swingable for convenience in installing the same. A piston 43 extending out of the other end of said cylinder 40 is operatively connected to the front end 11 of the hoe unit 10 by a cross rod 44 on said piston rod pivoted in a pair of bearing ears 45 upstanding from the side bars 13.

Describing now the details of the fluid pressure circuit and the means whereby the valve 37 controls the same, a fluid pressure and return line 46 extends from one end of the cylinder 40 to one side of the valve 37, and a return line 47 from said side of the valve to the supply tank 32. A fluid pressure and return line 48 extends from the other end of said cylinder 40 to the other side of the valve 37 and a fluid pressure line 49 from the pressure side of the pump to said other side of said valve 37. The valve core 36 is provided with a pair of opposite, arcuate ports 50, 51 which, in opposite extreme positions of said core alternately connect the fluid pressure line 49 to the pressure and discharge lines 46, 48 while alternately connecting the pressure and discharge lines 46, 48 to return line 47, all as shown in full and dotted lines in Figure 8, and whereby, as will be seen, the piston 43 is reciprocated to advance and retract the hoe unit 10.

A pair of horizontal channel iron guides 54 support the bottom edges of the side bars 13, outside the side 7 of the barn 1 with inner ends bolted, as at 55, to said side 7. Diagonal brace rods 56 extend from the guides 54 to said side 7 of the barn to prevent said guides 54 from sagging.

Referring now to the operation of the preferred embodiment of my invention, in the fully retracted position of the hoe unit 10, as shown in Figure 1, the hoe blades 21 are disposed at opposite sides of the stalls 4 with said blades swung downwardly, under the influence of gravity, into propelling position in which the same engage the bottom 5 of the gutter 3. Upon reciprocation of the hoe unit 10, by the described drive, the hoe blades 21, upon advance of said unit 10, scrape and propel manure 57, by stages, forwardly in the gutter 3 into piles, whereas, upon retraction of said unit 10, the hoe blades 21 swing upwardly, forwardly, and wipe rearwardly over the piles to swing downwardly behind the same for repeat operation to scrape and propel forwardly. As will be seen, the stroke of the hoe unit 10 is greater than the distance between hoe blades 21 so that each blade 21 will propel a pile of manure forwardly during the forward stroke of the unit 10 for a preceding blade 21 to pick the pile up during the next forward stroke of said unit. Thus the manure will be propelled by stages out of the open end 12 of the gutter 3, outside the barn 1, to be disposed of, as desired, for instance by a conveyor, not shown.

In the modified embodiment illustrated in Figures 9 to 11, a hoe unit 60, like the unit 10, with exceptions presently noted, is provided to reciprocate in a manure gutter 61 extending behind two aligned rows 62, 63 of stalls, said unit 10 extending across a disposal gutter 64 between the rows 62, 63 of stalls and below the level of the gutter 61 for receiving the manure from the gutter 61 to be removed from the disposal gutter in any desired manner. The drive for reciprocating the hoe unit 60, and designated as a unit by the numeral 66, is the same as that previously described with the exception that said drive 66 is located inside the barn 67, the cylinder 68 thereof extending outwardly of one end of the hoe unit 60 and the channel iron guides 54 of the preferred embodiment, together with the brace rods 56, being eliminated. Also, in the modified embodiment, two series of hoe blades 70, 71 are provided, in the hoe unit 60, upon opposite sides of the disposal gutter 64 and which are pivotally mounted in the same manner as in the preferred embodiment but arranged to act oppositely, alternately, upon advance and retraction of the hoe unit 60 to scrape and propel manure in the gutter 61 into piles 72 and propel the piles into the disposal gutter 64 by stages. For this purpose, the series 70, 71 of hoe blades inclined downwardly into the gutter 61 oppositely in each series with respect to the other series, the series 70 inclining downwardly in the direction of retracting movement of the hoe unit 60, and the series 71 inclining downwardly in the direction of advancing movement of said unit.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention, without further explanation.

Manifestly, the invention, as described, is susceptible of modification, without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the appended claims.

Having described my invention, what I claim as new is:

1. A hoe unit for propelling manure along and out of a floor gutter in a barn, said gutter terminating at a manure discharge opening in one side of the barn, said unit comprising a pair of opposite laterally spaced side bars reciprocating on the bottom of the gutter with advancing and retracting movement in upright position and having corresponding ends extending out of said opening when said bars are retracted, hoe blades between said bars spaced in succession from said ends of said bars and inclining downwardly in the direction of advance of said bars into en-

gagement with the bottom of the gutter to maintain the same downwardly inclined for propelling the manure along the gutter to said opening during advance of said bars, one of said blades closing said opening where said bars are retracted, means pivotally connecting said blades to said bars to swing upwardly over the manure by wiping engagement therewith during retraction of said bars, a power drive for reciprocating said bars to move said one and the succeeding hoe blade outwardly of said opening, and means disposed outwardly of said opening and maintaining said one and succeeding hoe blades in said downwardly inclined position when the same are moved outwardly of said opening.

2. A hoe unit according to claim 1, said last named means comprising a pair of tracks outside said barn at the level of the bottom of the gutter and along which said one and succeeding hoe blades slide.

3. A hoe unit according to claim 1 wherein stops are provided on said bars for establishing the downwardly inclined position of said hoe blades.

4. A hoe unit according to claim 1 wherein said last named means supports said corresponding ends of said bars outside the barn during reciprocation of said bars.

5. A hoe unit according to claim 1 wherein said power drive includes a piston connected to both of said corresponding ends of said bars.

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