United States Patent

Hamilton

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[54] BOWL LIFT JACK MOUNTING FOR EARTHMOVING SCRAPER

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[73] Assignee: **Caterpillar Tractor Co.,** Peoria, Ill.

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[52] **U.S. Cl.** **37/129,** 308/22

[51] **Int. Cl.** **E02f 3/62**

[58] **Field of Search** 37/129, 126, 118, 124; 172/762, 763; 180/51, 52; 280/492

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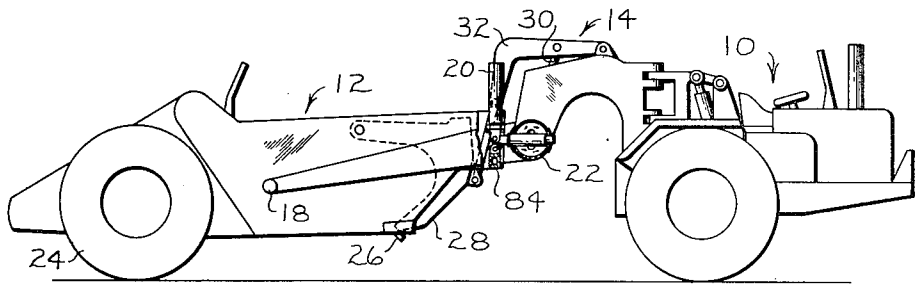
[57] **ABSTRACT**

A connection between the upper end of a bowl lift jack and tubular spreader of a bowl draft frame which connection is in the form of a gimbal having a spindle which extends through and is supported for rocking motion in one direction in the tubular spreader and has a bifurcated end or yoke outside of the spreader with journals thereon for supporting the jack for rocking motion in a direction normal to the first direction.

2 Claims, 4 Drawing Figures



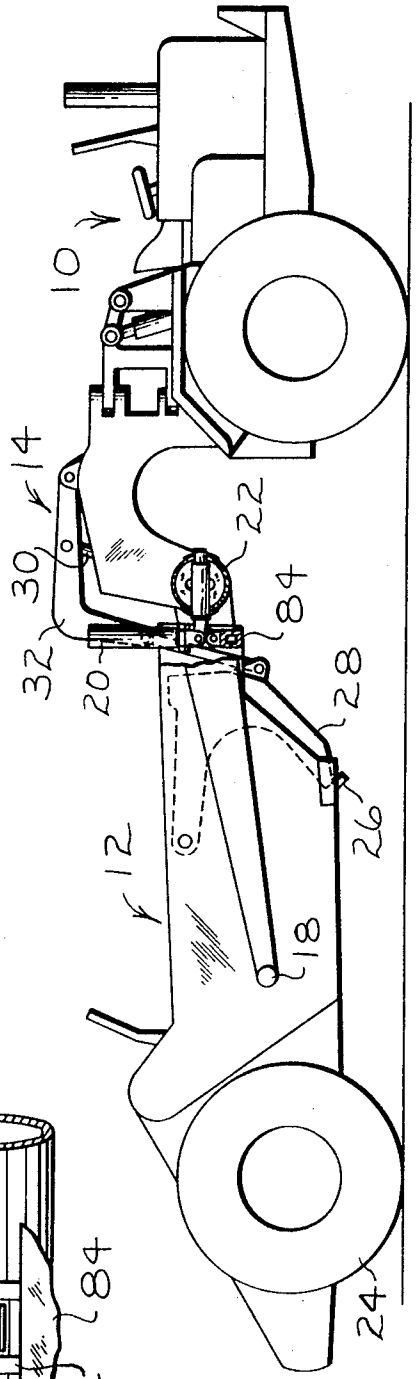


FIG. 1.

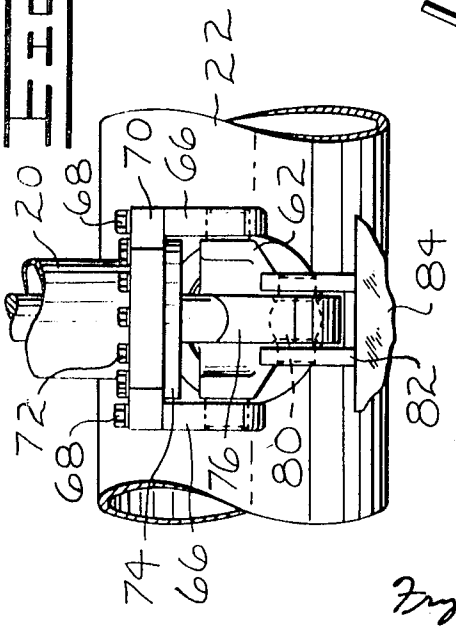


FIG. 4.

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Fig. 3.

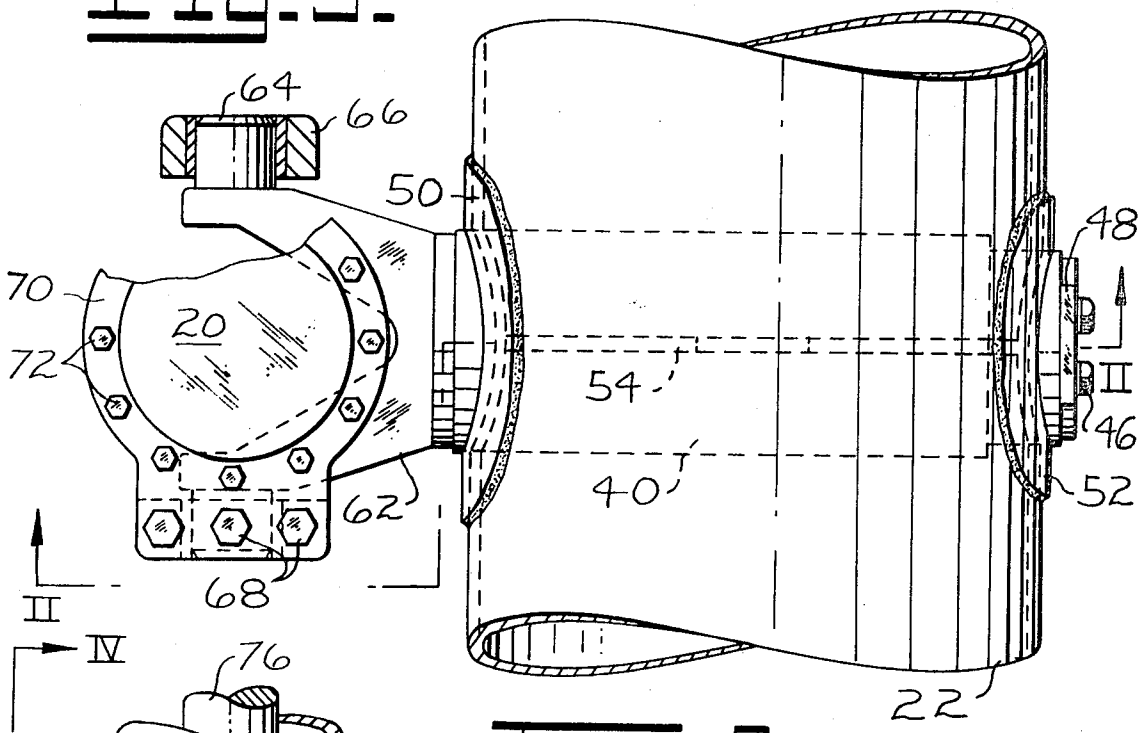
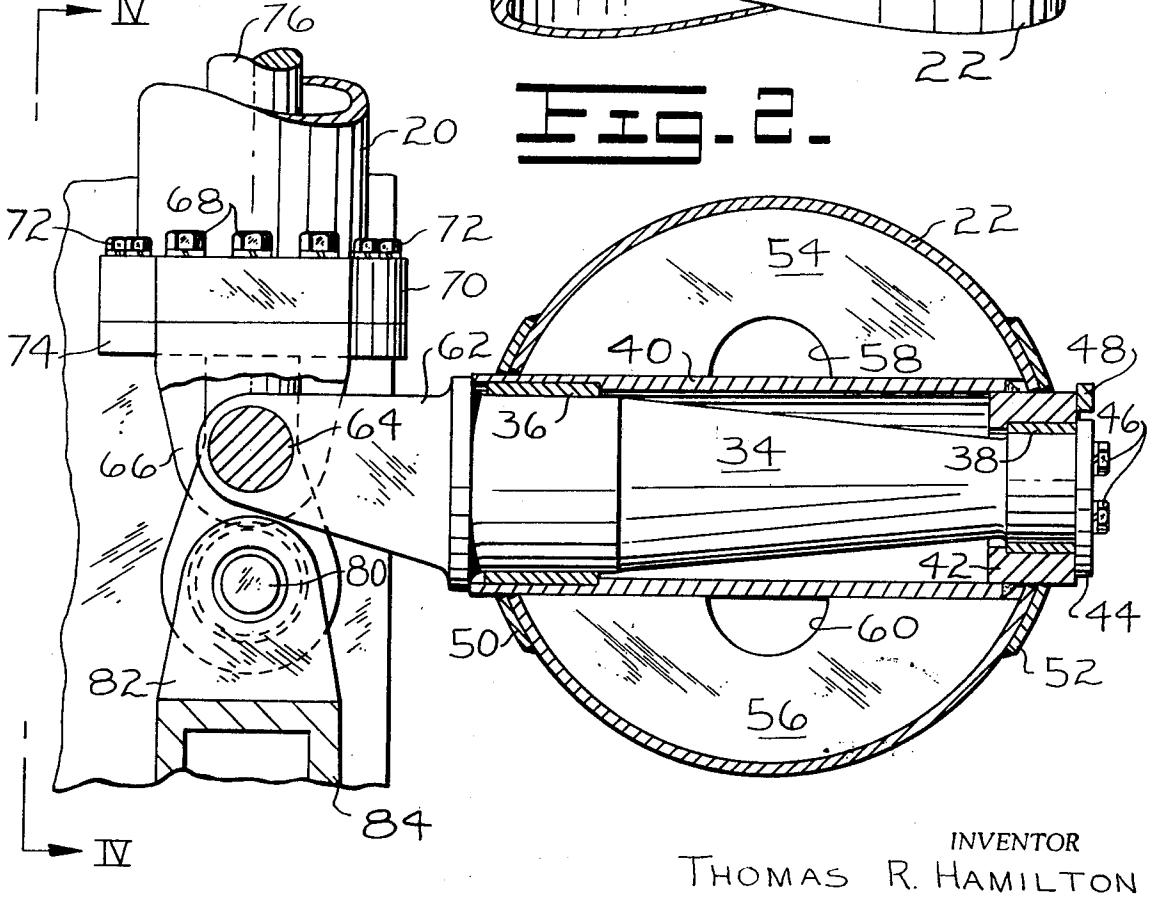


Fig. 2.



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BOWL LIFT JACK MOUNTING FOR EARTHMOVING SCRAPER

In many scrapers, a draft frame is pivoted to the scraper bowl and hydraulic motors or jacks connect the frame and the bowl to pivot the bowl about the axis of its ground-engaging wheels to raise and lower its forwardly disposed cutting edge with respect to the ground. Since loading and stresses are very high, unintended motions occur between the draft frame and the bowl and it becomes desirable to secure the jack to these parts by means permitting universal movement. Gimbals have been used to connect the jacks with the tubular spreader of the draft frame. In one known construction, the gimbals are supported on a heavy metal ring which embraces and is welded to the spreader. The rings are very large in some cases weighing several hundred pounds each and require a great deal of costly and time-consuming welding.

The present invention eliminates a great part of the weight of the known construction referred to and mounts the spindle portion of the gimbal within the tubular spreader. Since this lowers the position of the jack, a special fitting is provided to effect raising thereof to its proper position.

A more complete understanding of the invention will be had upon reading the following specification where it is described in detail by reference to the accompanying drawings.

IN THE DRAWINGS

FIG. 1 is a view in side elevation of a scraper fitted with bowl lift jacks embodying the present invention;

FIG. 2 is an enlarged sectional view showing the manner in which a jack is supported with respect to the tubular draft frame spreader and taken on the line II—II of FIG. 3;

FIG. 3 is a fragmentary view looking downwardly on the structure shown in FIG. 2; and

FIG. 4 is a fragmentary view in rear elevation of the assembly taken along the line IV—IV of FIG. 2.

In FIG. 1, a scraper of well-known design is shown as having a tractor portion generally indicated at **10**, a bowl **12** and a draft frame **14** connecting the tractor and bowl. The draft frame **14** is pivoted to the sides of the bowl as at **18** and the bowl is held in a raised or carry position by hydraulic jacks, one of which is shown at **20**, forming an adjustable connection between a tubular spreader shown at **22** which extends transversely of the draft frame and the bowl. Upon extension of the jack **20**, the bowl **12** is permitted to swing downwardly about the center of its supporting wheels **24** until its cutting edge shown at **26** engages earth to be loaded into the bowl. The usual apron **28** closes the forward end of the bowl when it is full and is manipulated by a jack partially shown at **30** and connected through a lever **32** and suitable linkage to the draft frame **14**. One of the jacks **20** is shown in FIG. **2** as connected to spreader **22** by a gimbal structure which has a spindle **34** supported for rotation on an axis parallel to the longitudinal center line of the tractor and scraper. The spindle is supported in bearing bushings, one of which is shown at **36** and the other at **38**. The bushing **36** fits within a large tube **40** extending all of the way through the spreader tube and the bushing **38** is carried in a smaller ring-shaped part **42** which extends through only the front wall of the spreader. The spindle is held against retraction by a plate **44** secured to its end as by cap screws **46**. The plate **44** is generally circular but has one flat side adjacent which a lug **48** is secured to the ring **42**. This prevents excessive rotation of the spindle which might occur during assembly or when the jack is partially disconnected. Reinforcing rings shown at **50** and **52** encircle the ends of the tube **40** and ring **42** and are welded to these parts and also to the spreader tube **22**. Further reinforcing is provided by semi-circular webs **54** and **56** welded in place above and below the tube **40** within the spreader **22**. Openings **58** and **60** are provided in the webs so that conduit and wiring for hydraulic and electrical components may be passed therethrough.

At its rear end, the spindle **34** carries a yoke **62** with outwardly extending journals **64** at its opposite sides as best shown in FIG. **3**. The journals extend into suitable bushings carried by bearing brackets **66** which, as shown in FIGS. **2** and **4**, are held in place by cap screws **68** extending through a flange **70** at the lower end of the jack cylinder. A circle of cap screws **72** also extends through this flange and secures a closure plate **74** to the end of the cylinder with a suitable opening therein through which a piston rod **76** extends. The lower end of the rod **76** is connected by a ball and socket joint indicated at **80** to brackets **82**, on a beam **84** (See also FIG. **1**) which extends transversely across the forward portion of the bowl between its sidewalls. This assembly permits full universal movement of the jack with respect to the bowl and the draft frame so that the jack structure is not subjected to excessive stresses.

In previous constructions where the spindle was mounted on top or a slight distance above the tubular spreader **22**, it was connected with the jack cylinder by trunnions intermediate its upper and lower ends. The jack was sufficiently high to enable it to raise the bowl to the proper carry position illustrated in FIG. **1**. In the present design in which the spindle is disposed at a lower position, the connection thereof to the jack below its lower end enables raising of the bowl to its proper carry position.

I claim:

1. In a tractor scraper combination which includes a tractor, a scraper with a wheel supported bowl and a draft frame connecting the tractor and bowl and including a spreader tube having a longitudinal axis between draft arms which are pivoted to the bowl, and at least two jack means extending between the spreader tube and the bowl for raising and lowering the forward end of the bowl about the axis of its wheels, the improvement which comprises a connection between the spreader tube and each jack means, each connection comprising a spindle extending through the longitudinal axis of the spreader tube, sleeve means extending entirely through the spreader tube, bearing bushings in the sleeve means receiving the spindle, and reinforcing webs extending between the exterior of the sleeve means and the interior of the spreader tube whereby the spindle is supported for rocking motion about an axis parallel to the longitudinal axis of the tractor and scraper, and a yoke extending rearwardly from the spindle including a pivotal connection between said yoke and the lower end of the jack means, said spindle including a generally circular plate having one flat side and said spreader tube including means to engage said plate to prevent excessive rotation of said spindle.

2. The combination of claim **1** in which the jack has a piston rod extending downwardly through said yoke, and a pivotal connection between the lower end of said rod and the scraper bowl.

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