618582

COMMONWEALTH OF AUSTRALIA

Form 1

Regulation 9 Patents Act 1952

APPLICATION FOR A STANDARD PATENT

WE **HARNISCHFEGER CORPORATION** of 13400 Bishops Lane, Brookfield, Wisconsin 53005, United States of America hereby apply for the grant of a standard patent for an invention entitled **SUPPORT ASSEMBLY FOR A DRAGLINE BUCKET** which is described in the accompanying complete specification.

The actual inventors of the said invention are: Paul Frederick MARTIN and Carl Dean SWICK

OUR address for service is SMITH SHELSTON BEADLE, 207 Riversdale Road (P.O. Box 410), Hawthorn, Victoria, 3122 (Attorney Code SA)

Details of basic application:-

Number of Basic Application:	162,146
Convention Country in which Basic Application was filed:	United States of America
Date of Basic Application:	29th February, 1988
ISO Code:	US

DATED THIS 27th DAY OF February, 1989.

M006950 27/02/89

SMITH SHELSTON BEADLE

Patent Attorneys for the Applicants

TO: The Commissioner of Patents

Our Ref: PS:WB:12harnisch.app

AUSTRALIA

Patents Act 1952

DECLARATION IN SUPPORT OF A CONVENTION OR NON-CONVENTION APPLICATION FOR A PATENT OR PATENT OF ADDITION

Name(s) of Applicant(s)

In support of the application made by HARNISCHFEGER CORPORATION

Title

for a patent for an invention entitled "Support Assembly for a Dragline Bucket"

Name(s) and address(es) of person(s) making declaration

I/~~we~~, George B. Knight
of 13400 Bishops Lane
Brookfield, WI. 53005
U.S.A.
do solemnly and sincerely declare as follows:-

1. I ~~am/we are the applicant(s) for the patent, or~~ am ~~are~~ authorised by the abovementioned applicant to make this declaration on its behalf.

2. The basic application~~(s)~~ as defined by Section 141 of the Act was~~/were~~ made in the following country or countries on the following date~~(s)~~ by the following applicant(s) namely:-

Country, filing date and name of Applicant(s) for the or each basic application

in U.S.A. on February 29 19 88
by Paul F. Martin and Carl D. Swick
in _____ on _____ 19 ____
by _____

3. The said basic application~~(s)~~ was~~/were~~ the first application~~(s)~~ made in a Convention country in respect of the invention the subject of the application.

Name(s) and address(es) of the or each actual inventor

4. The actual inventor(s) of the said invention ~~is/~~are Paul F. Martin and Carl D. Swick

See reverse side of this form for guidance in completing this part

5. The facts upon which the applicant(s) ~~is/~~are entitled to make this application are as follows:-
By virtue of Assignment between the inventors and the applicant

DECLARED at Milwaukee Wis this 16th day of January 1989

HARNISCHFEGER CORPORATION

By: X George B. Knight
George B. Knight, Assistant Secretary

This form may be completed and filed after the filing of a patent application but the form must not be signed until after it has been completely filled in as indicated by the marginal notes. The place and date of signing must be filled in. Company stamps or seals should not be used.

(12) PATENT ABRIDGMENT (11) Document No. AU-B-30782/89
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 618582

(54) Title
SUPPORT ASSEMBLY FOR A DRAGLINE BUCKET

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162146	**29.02.88**	**US UNITED STATES OF AMERICA**

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(71) Applicant(s)
HARNISCHFEGER CORPORATION

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(56) Prior Art Documents
US 2588657

(57) Claim

1. A support assembly for earth excavating bucket means controlled by the forces of lift line means and pull line means, said bucket means having a pair of opposite side walls with an open forward end, a carrying position, and a dumping position, comprising:

a pair of movable means secured to the opposite bucket side walls, the lift line means and the pull line means each being attached to the pair of movable means, for applying the forces of the lift and pull line means to the bucket means and moving the lift and pull line means between a first and a second position respectively corresponding to the carrying and the dumping position of the bucket means and at which positions said forces are applied to the bucket means; and

the bucket means is movable from the carrying position toward the dumping position in response to movement of the

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lift and pull line means toward their second position and the application of the force of the lift line means to the bucket means.

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COMPLETE SPECIFICATION

FOR OFFICE USE

Application Number: Class Int. Class
Lodged:

Complete Specification - Lodged:
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Published:

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Related Art:

TO BE COMPLETED BY APPLICANT

Name of Applicant: HARNISCHFEGER CORPORATION

Address of Applicant: 13400 Bishops Lane, Brookfield, Wisconsin 53005, United States of America

Actual Inventors: Paul Frederick MARTIN and Carl Dean SWICK

Address for Service: SMITH SHELSTON BEADLE
207 Riversdale Road (P.O. Box 410)
Hawthorn, Victoria, Australia

Complete Specification for the invention entitled:

SUPPORT ASSEMBLY FOR A DRAGLINE BUCKET

The following statement is a full description of this invention, including the best method of performing it known to us:

Our Ref: PS:WB:12harnisch.pl

The present invention relates to dragline buckets designed for excavating, digging, scraping, dragging, and the like, and more specifically to the support assembly for a dragline bucket.

Background of the Invention

Dragline buckets are used to move earth in, for example, strip mining operations. In such operations, buckets are suspended from cranes or the like by a lift line, and are manipulated by the lift lines and other control lines so as to dig earth from one location and then move the earth-filled bucket to another location where it is dumped. Because of the size and cost of the machinery involved, it is highly desirable to obtain maximum use of the machinery in order to achieve maximum cost efficiency.

Support for such buckets has conventionally been provided by mounting arrangements such as shown in U.S. Patent No. 3,247,606. Such mounting arrangements, or "hitches", use essentially three lines connected to the bucket: the lift line, the dump line, and the bridle chain.

Such conventional hitches are subjected to large stresses, requiring frequent replacement when the lines break. Replacement can be time consuming in view of the number of lines involved in the hitch, and thus replacement can hinder the cost effective use of the machinery.

The present invention is directed toward overcoming one or more of the problems set forth above.

Summary of the Invention

In one aspect of the present invention there is provided a support assembly for earth excavating bucket means controlled by the forces of lift line means and pull line means, said bucket means having a pair of opposite side walls with an open forward end, a carrying position, and a dumping position, comprising:

a pair of movable means secured to the opposite bucket side walls, the lift line means and the pull line means each being attached to the pair of movable means, for applying the forces of the lift and pull line means to the bucket means and moving the lift and pull line means between a first and a second position respectively corresponding to the carrying and the dumping position of the bucket means and at which positions said forces are applied to the bucket means; and

the bucket means is movable from the carrying position toward the dumping position in response to movement of the lift and pull line means toward their second position and the application of the force of the lift line means to the bucket means.

The support assembly of the present invention eliminates the need to have both a dump line and a bridle chain connected to the pull line. Elimination of the second line speeds the task of changing lines as is required due to wear, and thereby minimizes down time.

Brief Description of the Drawings

Fig. 1 is a side view of a bucket supported by the support assembly in its digging or earth moving position;

Fig. 2 is a cross-sectional view taken along line 2-2 of Fig. 1; and

Fig. 3 is a side view of the bucket of Fig. 1 but in its dumping position.

Description of the Preferred Embodiment

A dragline bucket 10 having a pair of side walls 12 and an open forward end 14 is shown in Figs. 1 and 2 supported by the present invention in its digging or earth moving position. Although the dragline bucket 10 shown in Figures 1 and 2 is of the archless type, it is understood that it may be of the arch-type (not shown) wherein an arch spans across the front end of the bucket for support.

The support assembly includes a pair of link plates 20 pivotably secured to opposite bucket side walls 12 by coaxial pivots 22 (note that the support assembly is identical on both sides of the bucket 10, and for ease of reference, matching pairs of components have herein been identified by the same reference numeral). Lift lines 26 and pull lines 28 are each secured to the link plates 20 by suitable coaxial mounts 32, 34, with the pull line mounts 32

being forward of the lift line mounts 34. Suitable pulleys or guides 36 are provided on the forward end of the bucket 10 to guide the pull lines 28.

Suitable stops 38,40 (such as, e.g., metal welded blocks) are secured to the bucket side walls 12 in order to limit pivoting of the link plates 20 to allow for control of the bucket 10 as will become apparent.

As shown in Fig. 2, the lift lines 26 are connected at their upper end to a bail 46 connected to a pair of cables 48 which in turn are connected to a lift cable 50. The pull lines 28 may be similarly secured to a pull cable (not shown). Both the lift and pull cables are controlled by a crane or the like.

In the preferred method of operation, the bucket 10 is dragged over the earth by the pull lines 28 until the interior of the bucket 10 is loaded with dug earth. The lift cable 50 and lift lines 26 are then used to lift the entire bucket 10 in order to clear it from obstacles as it is swung (by the supporting crane) to the location where the earth is to be dumped. The combination of the tension of the lift lines 26 and the pull lines 28, together with the weight of the loaded bucket 10, create a net moment force around the coaxial pivots 22 which keeps the link plates 20 against the stops 40 as shown in Fig. 1.

When the bucket 10 is to be dumped, the pull lines 28 are slacked, causing the opposing moment exerted on the link plates 20 by the lift lines 26 to be to be greater than the moment exerted by the pull lines 28. This causes the link plates 20 to pivot to the position shown in Fig. 3 against the other stops 38, which causes the bucket 10 to dump. (This change in net moment results not only from the different forces exerted by the lines 26, 28, but also from the change in orientation of the lines 26, 28 as the bucket 10 moves, which causes their forces to act through different moment arms relative to the coaxial mounts 22.)

When dumping is completed, the bucket 10 is moved back to the location where digging is being done, and is dropped for another cycle of digging.

As will be apparent to a skilled artisan with an understanding of the above, the above described support assembly will eliminate the third line found in conventional support assemblies thereby minimizing the cost of replacement as well as the down time required for such replacements.

Other aspects, objects, and advantages of the present invention can be obtained from a study of the specification, drawings and appended claims.

The claims form part of the disclosure of this specification.

The claims defining the invention are as follows:

1. A support assembly for earth excavating bucket means controlled by the forces of lift line means and pull line means, said bucket means having a pair of opposite side walls with an open forward end, a carrying position, and a dumping position, comprising:

a pair of movable means secured to the opposite bucket side walls, the lift line means and the pull line means each being attached to the pair of movable means, for applying the forces of the lift and pull line means to the bucket means and moving the lift and pull line means between a first and a second position respectively corresponding to the carrying and the dumping position of the bucket means and at which positions said forces are applied to the bucket means; and

the bucket means is movable from the carrying position toward the dumping position in response to movement of the lift and pull line means toward their second position and the application of the force of the lift line means to the bucket means.

2. The support assembly of claim 1 wherein the pull line means is attached to the pair of movable means for pulling the bucket means during loading of the bucket means and holding the bucket means in the carrying position during lifting of the bucket means.

3. The support assembly of claim 1 wherein the pair of movable means comprises a pair of coaxial pivots each

mounted on an opposite bucket side wall and a pair of link plates each secured to one of the pivots and each pivotable about said one of the pivots to move said lift and pull line means between said first and second positions.

4. The support assembly of claim 3 wherein the pull line means is attached to the pair of link plates for pulling the bucket means during loading of the bucket means and holding the bucket means in the carrying position during lifting of the bucket means.

5. The support assembly of claim 1 wherein:

the bucket means has a loaded condition including a loaded weight and a center of a gravity;

the weight of the loaded bucket means acts on the loaded bucket means in said carrying position at the center of gravity of the loaded bucket means;

the lift line means comprises a pair of lift lines and the pull line means comprises a pair of pull lines;

each one of the pair of movable means has a lift mount at which one of the lift lines is attached and a pull mount at which one of the pull mounts is attached, the pair of lift lines and the pair of pull lines moving the lift and pull mounts from first toward second positions at which the forces of the lift and pull lines are applied to the loaded bucket means; and

the lift mounts move toward their second position relative to the center of gravity of the loaded bucket.

6. The support assembly of claim 5 wherein the

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loaded bucket means is movable from the carrying position toward the dumping position in response to release of the force of the pull line on the loaded bucket means.

7. The support assembly of claim 5 further comprising:

first and second stops affixed to each bucket side wall; and wherein

the pair of movable means engage the first stops when the bucket means is in the carrying position and the pair of movable means engage the second stops when the bucket means is in the dumping position.

8. The support assembly of claim 7 wherein the lift mounts on the pair of movable means are coaxial with each other and the pull mounts on the pair of movable means are coaxial with each other.

9. The support assembly of claim 8 wherein the pair of movable means comprises a pair of coaxial pivots each mounted on an opposite bucket side wall and a pair of link plates each pivotally secured to one of the pivots to move the coaxial lift and pull mounts between their first and second positions.

10. The support assembly of claim 5 further comprising:

a securement location for each of the pair of movable means on an opposite bucket side wall;

the loaded bucket means has a weight moment arm acting at its center of gravity about said securement locations of

the pair of movable means;

the pair of lift lines have a moment arm between the lift mounts and the securement locations of the pair of movable means and acting about said securement locations;

the pair of movable means have a first position corresponding to the carrying position of the loaded bucket means and a second position corresponding to the dumping position of the loaded bucket means, the movable means being movable from it first to its second position with the loaded bucket means as the bucket means moves from its carrying to its dumping position; and

the lift mounts are movable with the pair of movable means from a first position corresponding to the first position of the pair of movable means toward a second position corresponding to the second position of the pair of movable means such that the lift lines moment arm is increased relative to the weight moment arm whereby movement of the bucket to its dumping position is initiated.

11. The support assembly of claim 10 wherein the movement of the lift mounts from their first position toward their second position is relative to the center of gravity of the bucket.

12. A support assembly for a drag bucket substantially as hereinbefore described with reference to the accompanying drawings.

DATED this 6 September 1991

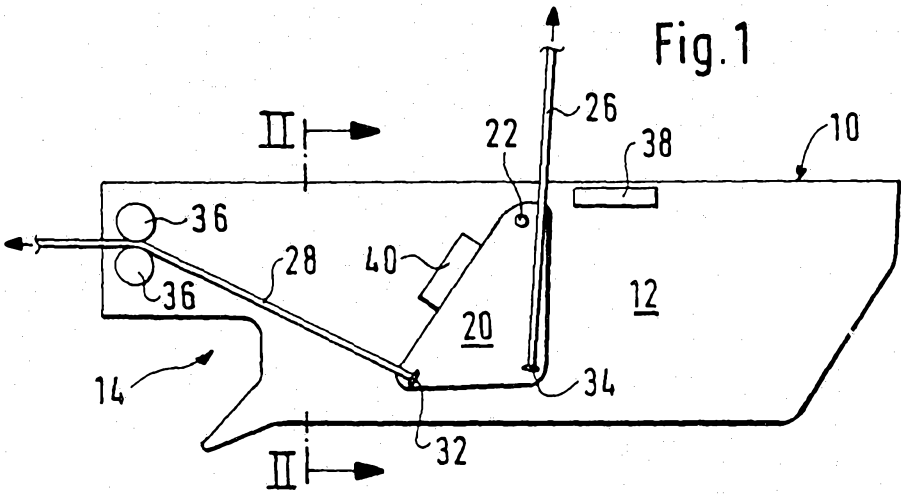
CARTER SMITH & BEADLE

Fellows Institute of Patent Attorneys of Australia

Patent Attorneys for the Applicant:

HARNISCHFEGER CORPORATION

Fig.1



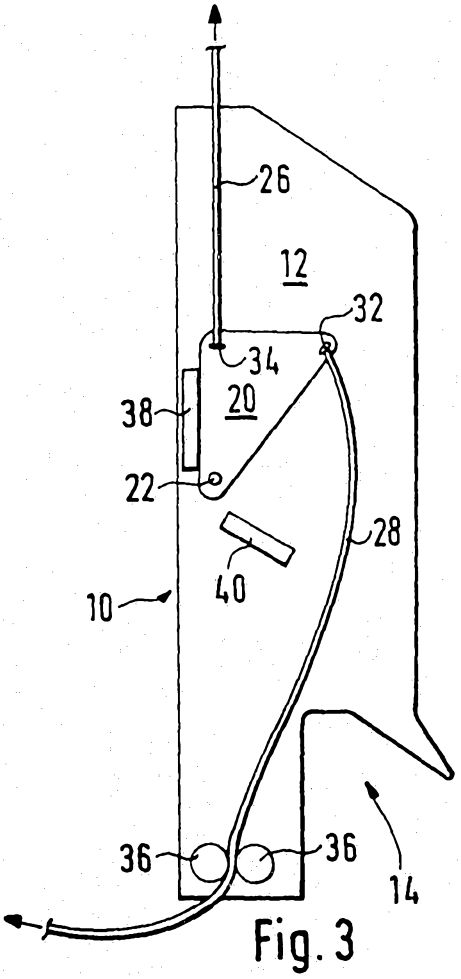


Fig.3

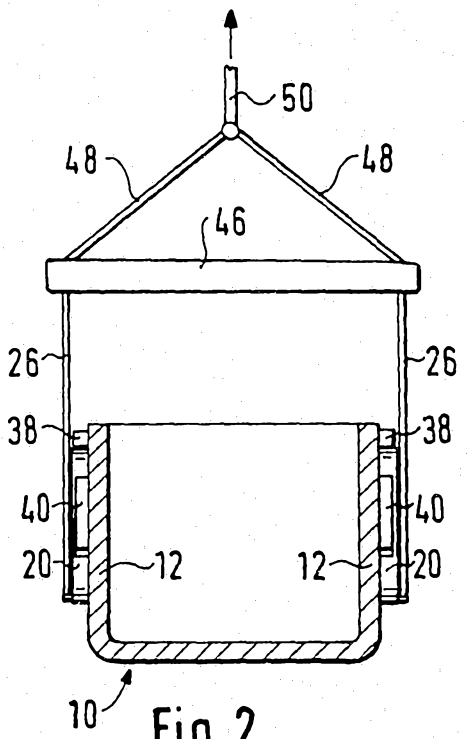


Fig.2