

12

**EUROPEAN PATENT SPECIFICATION**

45 Date of publication of patent specification: **12.07.89**

51 Int. Cl.<sup>4</sup>: **B 66 F 11/04**

21 Application number: **85103291.2**

22 Date of filing: **21.03.85**

54 **Hydraulic crane aerial platform attachment.**

30 Priority: **05.04.84 US 597010**

43 Date of publication of application:  
**30.10.85 Bulletin 85/44**

45 Publication of the grant of the patent:  
**12.07.89 Bulletin 89/28**

84 Designated Contracting States:  
**DE FR GB IT**

50 References cited:  
**DE-A-2 106 429**  
**DE-A-2 107 821**  
**DE-A-2 129 856**  
**DE-C-1 144 901**  
**GB-A-1 572 440**  
**US-A-3 605 941**  
**US-A-3 710 893**  
**US-A-4 427 121**

73 Proprietor: **FMC CORPORATION**  
**200 East Randolph Drive**  
**Chicago Illinois 60601 (US)**

72 Inventor: **McDaniel, Kenneth D., Jr.**  
**232 W. Higgins**  
**Midway Kentucky (US)**  
Inventor: **Endres, Douglas W.**  
**198 Timberlane Court**  
**Nicholasville Kentucky 40356 (US)**  
Inventor: **Griebel, Francis J.**  
**3543 Niagara Dr.**  
**Lexington Kentucky (US)**

74 Representative: **Bardehle, Heinz, Dipl.-Ing. et al**  
**Patent- und Rechtsanwälte Bardehle-**  
**Pagenberg-Dost-Altenburg & Partner**  
**Galileiplatz 1 Postfach 86 06 20**  
**D-8000 München 86 (DE)**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European patent convention).

**EP 0 159 543 B1**

## Description

This invention relates generally to aerial platform attachments and, more particularly, to such platform attachments which may be attached to and used with hydraulic cranes.

As will be clear from the accompanying Claim 1 the aerial attachment of the present invention is for use with cranes having a boom comprising relatively extendible and retractable boom sections; the aerial platform being pivotally mountable on the uppermost boom section, as considered with the boom extended upwardly, so as to be capable of being movable to an inactive storage position adjacent said boom. First storage means carried by the aerial platform is engageable with second storage retaining means carried by the lowermost section of the boom. These features of the present invention are already known from DE—A—2 129 856.

According to the present invention the aerial platform attachment includes means for swinging said platform against the boom while the boom sections are not wholly retracted; the aforesaid first and second storage retaining means being such that a final retracting telescoping movement of said boom sections causes said storage retaining means to engage each other to secure said platform in its inactive position; and an extending action of said boom sections whilst said platform is in said inactive position causes said storage means to release their engagement with each other to permit the platform to swing to its suspended operating position.

The present invention also provides an aerial platform attachment that includes a side plate for securement to a boom tip, said side plate having a pair of cross shafts extending therefrom; a bracket removably attached to said cross shafts; the aerial platform being pivotally attached to said bracket; and a hand-operated brake arranged to prevent relative movement between said bracket and said platform.

The pivotal suspension permits the platform to remain level as the crane boom is elevated, while the pinned connection to the cross-shafts allow the attachment to be readily removed and re-installed. The platform includes a basket and is positioned adjacent to the boom tip so that tools or other light materials may be exchanged between the ground and the basket by means of the whip line on the crane. A dash pot, preferably in the form of an automotive shock absorber, attached between the bracket and the platform controls the rate of movement and hence prevents any sudden rotational movement of the platform relative to the boom tip as the boom is elevated into a desired working position. The hand operated brake is provided to prevent rotation of the platform relative to the boom tip while the platform is occupied and in a working position.

It is of interest to note that an aerial platform attachment for a crane having relatively extendible and retractable boom sections is already

known from GB—A—1 572 440, said attachment comprising a side plate for securement to a boom tip, said side plate having a pair of cross shafts extending therefrom; and a bracket removably attached to said cross shafts, the aerial platform being pivotally attached to said bracket.

It is of further interest to note that US—A—3 710 893 discloses a power extendible crane boom having a work basket pivoted between yoke arms mounted on the end of the boom and provided with means for swinging said basket against the boom. Integral with each yoke arm is a plate having an arcuate slot, the centre of radius of which coincides with the pivot pins about which the basket swings. Wing nut-bolt-washer assemblies carried by the basket and extending through said arcuate slots enable the basket to be locked against swinging movement in any selected position.

Other attributes and advantages of the present invention will become more readily apparent from a perusal of the following description and the accompanying drawings wherein:

Figure 1 is a side elevational view of a hydraulic crane with the present invention attached thereto; Figure 2 is a detailed view of the attachment shown in Figure 1;

Figure 3 is a view taken on line 3—3 of Figure 2 with portions broken away and eliminated; and

Figure 4 is an expanded view of a preferred embodiment for the brake mechanism utilized in the present invention.

Referring to Figure 1, there is shown a hydraulic crane, indicated generally at 10, having a multi-section, extendable boom 12 pivotally mounted on the crane's upper 14. The upper is rotatable about a vertical axis on the lower 16. As illustrated in Figure 1, the entire crane 10 is supported for stability on outrigger jacks 18, which may be retracted to permit the wheels 20 on the lower 16 to engage the ground for transport in a conventional manner. Hydraulic cylinder means 22 is connected between the boom 12 and the upper 14. With both the boom and the cylinder means 22 fully retracted, the boom 12 is oriented as indicated by solid lines and when both the boom and the cylinder means are fully extended, the boom 12 is configured as indicated by dotted lines in Figure 1.

An aerial platform 23 is pivotally suspended from a boom tip 24 secured on the free end of the outer section of the boom 12. An auxiliary hoist 26 mounted on the upper 14 has a wire rope 28, commonly referred to as a whipline, wound thereon and trained over a sheave 30, as shown in Figure 2, rotatably carried on a cross-shaft between the side plates, one of which is shown at 32, of the boom tip 24 and an auxiliary sheave 34 on a shaft cantilevered from the tip 24 by means of arm 36. A hook 38 is attached to the free end of the wire rope 28. Since both the platform 23 and the auxiliary sheave 34 are suspended from the boom tip 24, the hook 38 will, as it approaches the boom tip as a result of the auxiliary hoist reeling in the wire rope 28, be in close proximity to the

platform 23 to enable a worker on the platform to remove or attach material from or to the hook.

Referring now to Figures 2 and 3, a pair of cross-shafts 40 and 42 project beyond the side plates 32. A bracket 44 has a pair of tubes 46 and 48 secured thereon, which tubes engage the ends of the cross-shafts 40 and 42 respectively. The tubes are cross-bored in alignment with bores provided in end fittings on the cross-shafts, one of which is shown at 50. A pair of pins, one of which is shown at 52 inserted through the tube 48 and the fitting 50, releasably secure the bracket 44 to the boom tip 24. The aerial platform 23 includes a basket 54, preferably constructed of an electrically non-conducting material, such as fiberglass, secured to a suspension link 56. The link 56 is pivotally connected to the bracket 44 by means of a pivot pin 58 attached to the link 56 and rotatably retained within a bushing 60 provided in the bracket 44.

A dash pot, which may be an automotive shock absorber 62, is pivotally attached at 64 to the bracket 44 and at 66 to an arm 68 secured to the link 56. Rotation of the link 56 clockwise, is viewed in Figure 2, will cause extension of the shock absorber 62, and rotation in the opposite direction will cause retraction. The shock absorber 62 will control the rate of such rotation, and hence will preclude any sudden rotational movement to the basket 54 while the boom is being elevated or lowered. Thus, the basket 54 will remain virtually vertical when moved to and from a working position. Movement of the occupant and the shifting of his or her center of gravity resulting therefrom will not cause an unsettling and unexpected sudden rotation of the basket.

A brake, indicated generally at 70, is provided to lock the link 56 relative to the bracket 44. When so locked by engagement of the brake 70, an occupant of the basket is provided with a stable platform from which work may be performed on elevated structures or lines. The brake 70 includes a rotor sector 72 secured to the bracket 44. Calipers 74 carried by an actuating member 76 secured to the link 56 are capable of engaging the rotor sector 72 to lock the link 56 to the bracket 44. An actuating lever 78 rotatably mounted on the member 76 has a central position, wherein the caliper 74 are out of engagement with sector 72 permitting pivoting of the link 56 relative to the bracket 44, and movement in either direction from its central position causes the caliper 74 to engage to sector 72 thereby locking the link 56 to the bracket 44. Movement of the actuating levers 78 is controlled by a one way control device 80, such as that made by Quadrastat Controls Corp. The control 80 has an input means 82 and output means 84. A hand lever 86 is affixed to the input means 82 and the link 88 is pivotally connected between the output means 84 and the actuating lever 78. The control permits rotation of the output means 84 when a force is applied to the lever 86, but precludes such movement when forces are applied to the output means 84. Consequently, the brake 70 can be released or

engaged only through manipulation of the lever 86, and unintentional release or engagement as a result of vibration or other forces applied to the output means 84 will be precluded. The position of the hand lever 86 when the brake 70 is released is shown by solid lines in Figure 2 and movement of this lever to either of the dotted line positions will cause the brake to engage. Thus, should an occupant need to quickly apply the brake 70 he or she would not have to consider which direction to rotate the hand lever; the brake 70 will be engaged with movement in either direction.

In order to store the basket 56 along side the boom 12, a loop 90 is attached to the side of the basket 54 adjacent to the boom and along the basket's bottom edge. A stabber member 92 is formed on a bracket 94 attached to the boom 12. The stabber member 92 engages the loop 90 when the basket is held parallel to the bottom of the boom and the boom is then fully retracted. An inclined surface 96 on the stabber member 92 cams the basket 54 upward to facilitate full engagement of the loop 90 by the stabber member 92 should the basket 54 not be perfectly parallel to the bottom of the boom 12. In order to move and hold the basket in the proper position for engagement of the stabber member 92 with the loop 90, a rope 95 may be attached to a second loop 98 secured to the basket 54 and passed through a third loop 100 attached to bracket 94. Tension force applied to the rope 95 permits rotation of the basket 54 to its proper position for engagement of the stabber 92 with the loop 90 from a remote position. When the boom is then fully retracted, the stabber 92 will engage the loop 90.

While a preferred embodiment of the present invention has been described and illustrated, it is to be understood that changes and modifications may be made therein without departing from the spirit of the invention as defined by the scope of the appended claims.

What is claimed is:

#### Claims

1. A latchable aerial platform attachment for a crane having a boom comprising relatively extendible and retractable boom sections; the aerial platform (54) being pivotally mountable on the uppermost boom section, as considered with the boom extended upwardly, so as to be capable of being movable to an inactive storage position adjacent said boom; first storage retaining means (90) carried by said platform (54) for engagement with second storage retaining means (92) carried by the lowermost section of the boom; characterized by means (95) for swinging said platform (54) against the boom while the boom sections are not wholly retracted; the first and second storage retaining means (90, 92) being such that a final retracting telescoping movement of said boom sections causes said storage retaining means (90, 92) to engage each

other to secure said platform in its inactive position; and an extending action of said boom sections whilst the platform is in said inactive secured position causes said storage retaining means to release their engagement with each other to permit the platform to swing to its suspended operating position.

2. A latchable aerial platform attachment according to Claim 1 wherein said platform swinging means includes a flexible line (95) attached thereto, and means (100) guiding said line (95) proximate said second storage retaining means.

3. A latchable aerial platform attachment according to Claim 2 wherein said line guiding means (100) includes a loop through which said line (95) is trained.

4. A latchable aerial platform attachment according to Claim 1 wherein said storage retaining means (90, 92) comprise a loop and a projecting member.

5. A latchable aerial platform attachment according to any of Claims 1 to 4 wherein said platform (54) is a basket.

6. A latchable aerial platform attachment according to any one of Claims 1 to 5 including a side plate (32) for securement of a boom tip (24), said side plate having a pair of cross shafts (40, 42) extending therefrom; a bracket (44) removably attached to said cross shafts; the aerial platform (54) being pivotally attached to said bracket; and a hand operated brake (70) arranged to prevent relative movement between said bracket (44) and said platform (54).

7. The latchable aerial platform attachment according to Claim 6 and further comprising dash pot means (62) connected between said bracket and said platform to resist sudden movement of said platform relative to said bracket.

8. The latchable aerial platform attachment according to Claim 7 wherein said brake (70) comprises a rotor sector (72) affixed to said bracket; calipers (74) affixed to said platform and movable to engage said rotor sector; a lever means (78) arranged to move said calipers; a one-way control (80) carried by said platform and having an input means (82) and an output means (84); and a link (88) connected between said lever means and said output means.

9. The latchable aerial platform attachment according to Claim 8 wherein a hand lever (86) is attached to said input means and said lever means engages said brake when moved in either direction.

10. The latchable attachment according to Claim 9 wherein said dash pot means (62) is an automotive shock absorber.

#### Patentansprüche

1. Arbeitsplattformbefestigung für einen hydraulischen Kran, welcher einen Ausleger mit ausfahrbaren und zurückziehbaren Auslegerabschnitten aufweist, wobei die Arbeitsplattform (54) an dem obersten Auslegerabschnitt bei

aufwärts ausgefahrenem Ausleger schwenkbar angeordnet ist, so daß sie in eine Ruhelage neben dem Ausleger bewegbar ist, mit einer ersten Verankerungseinrichtung (90), die von der Arbeitsplattform (54) getragen und mit einer zweiten Verankerungseinrichtung (92) in Eingriff bringbar ist, die von dem untersten Abschnitt des Auslegers getragen ist, dadurch gekennzeichnet, daß die beiden Verankerungseinrichtungen (90, 92) durch ein abschließendes teleskopartiges Zurückziehen der Auslegerabschnitte miteinander in Eingriff stehen, um die Arbeitsplattform in ihrer Ruhelage festzulegen, und daß durch Ausfahren der Auslegerabschnitte, während sich die Arbeitsplattform in ihrer fixierten Ruhelage befindet, die beiden Verankerungseinrichtungen voneinander lösbar sind, so daß die Arbeitsplattform in ihre aufgehängte Arbeitsposition schwenken kann.

2. Arbeitsplattformbefestigung nach Anspruch 1, dadurch gekennzeichnet, daß die Plattform schwenkende Einrichtung einen an ihr befestigten flexiblen Strang (95) und eine Strangführungseinrichtung (100) umfaßt, welche den Strang (95) in der Nähe der zweiten Verankerungseinrichtung führt.

3. Arbeitsplattformbefestigung nach Anspruch 2, dadurch gekennzeichnet, daß die Strangführungseinrichtung (100) einen Bügel einschließt, durch welchen der Strang (95) geführt ist.

4. Arbeitsplattformbefestigung nach Anspruch 1, dadurch gekennzeichnet, daß die Verankerungseinrichtungen (90, 92) einen Bügel und ein abragendes Bauteil umfassen.

5. Arbeitsplattformbefestigung nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß die Arbeitsplattform (54) ein Korb ist.

6. Arbeitsplattformbefestigung nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß eine Seitenplatte (32) zur Befestigung des oberen Abschnittes (24) des Auslegers mit zwei davon sich quer erstreckenden Wellen (40, 42) vorgesehen ist, daß die Arbeitsplattform (54) an dem Träger (44) schwenkbar befestigt ist, und daß eine von Hand betätigbare Bremse (70) vorgesehen ist, welche eine Relativbewegung zwischen dem Träger (44) und der Arbeitsplattform (54) verhindert.

7. Arbeitsplattformbefestigung nach Anspruch 6, dadurch gekennzeichnet, daß eine zwischen dem Träger und der Arbeitsplattform verbundene Dämpfungsvorrichtung (62) vorgesehen ist, um einer plötzlichen Bewegung der Arbeitsplattform gegen den Träger zu widerstehen.

8. Arbeitsplattformbefestigung nach Anspruch 7, dadurch gekennzeichnet, daß die Bremse (70) einen Rotorsektor (72) umfaßt, der an dem Träger festgelegt ist, daß eine Tastvorrichtung (74) an der Arbeitsplattform befestigt und zwecks Eingriffes mit dem Rotorsektor bewegbar ist, daß zum Bewegen der Tastvorrichtung ein Hebel (78) vorgesehen ist, daß eine Einwegsteuerung (80) von der Arbeitsplattform getragen ist und eine Eingangseinrichtung (82) sowie eine Ausgangseinrichtung (84) aufweist, zwischen denen eine Lenkstange (88) vorgesehen ist.

9. Arbeitsplattformbefestigung nach Anspruch

8, dadurch gekennzeichnet, daß ein Handhebel (86) an der Eingangseinrichtung (82) befestigt ist und daß der Hebel die Bremse ergreift, wenn er in einer Richtung bewegt wird.

10. Arbeitsplattformbefestigung nach Anspruch 9, dadurch gekennzeichnet, daß die Dämpfungsvorrichtung (62) ein Stoßdämpfer ist.

### Revendications

1. Dispositif verrouillable de fixation d'une nacelle sur une grue comportant une flèche comprenant des parties relativement déployables et rétractables;

la nacelle (54) étant apte à être montée à pivotement sur la partie de flèche qui est la plus haute lorsque cette flèche est déployée vers le haut, de manière à pouvoir être amenée à une position inactive de rangement adjacente à ladite flèche;

des premiers moyens (90) de retenue en condition de rangement, portés par ladite nacelle (54), destinés à venir en condition d'engagement avec des deuxièmes moyens (92) de retenue en condition de rangement, portés par la partie la plus basse de la flèche;

caractérisé par

des moyens (95) pour faire pivoter ladite nacelle (54) contre la flèche lorsque les parties de la flèche ne sont pas complètement rétractées;

les premiers et deuxièmes moyens (90, 92) de retenue en condition de rangement étant tels qu'un mouvement final de rétraction télescopique desdites parties de la flèche a pour effet que lesdits moyens (90, 92) de retenue en condition de rangement viennent en condition d'engagement mutuel pour fixer ladite nacelle à sa position de non-utilisation; et une action d'extension desdites parties de la flèche, alors que la nacelle est à ladite position de fixation en condition de non-utilisation, a pour effet de libérer lesdits moyens de retenue en condition de rangement de leur engagement mutuel, pour permettre à la nacelle de pivoter à sa position suspendue pour utilisation.

2. Dispositif verrouillable de fixation d'une nacelle selon la revendication 1, dans lequel lesdits moyens pour faire pivoter la nacelle comportent un filin ou câble (95) qui lui est fixé, et les moyens (100) guidant ledit câble ou filin (95), à proximité desdits deuxièmes moyens de retenue en condition de rangement.

3. Dispositif verrouillable de fixation d'une nacelle selon revendication 2, dans lequel lesdits

moyens (100) de guidage de câble ou filin comprennent un anneau par lequel passe ledit câble ou filin (95).

4. Dispositif verrouillable de fixation d'une nacelle selon revendication 1, dans lequel lesdits moyens (90, 92) de retenue en position de rangement comprennent un anneau et un élément mâle.

5. Dispositif verrouillable de fixation d'une nacelle selon l'une quelconque des revendications 1 à 4, dans lequel ladite nacelle (54) est un panier.

6. Dispositif verrouillable de fixation d'une nacelle selon l'une quelconque des revendications 1 à 5, comportant une plaque latérale (32) pour fixation à un bout (24) de la flèche, ladite plaque latérale ayant une paire d'arbres transversaux (40, 42) qui sont en saillie sur elle; une patte de suspension (44) amoviblement attachée auxdits arbres transversaux; la nacelle (54) étant attachée, avec possibilité de pivotement, à ladite patte de suspension; et un frein (70) actionnable manuellement, aménagé pour empêcher le mouvement relatif entre ladite patte de suspension (44) et ladite nacelle (54).

7. Dispositif verrouillable de fixation d'une nacelle selon la revendication 6, comprenant en outre des moyens amortisseurs (62) fixés entre ladite patte de suspension et ladite nacelle, pour résister à un mouvement subit de ladite nacelle par rapport à ladite patte de suspension.

8. Dispositif verrouillable de fixation d'une nacelle selon revendication 7, dans lequel ledit frein (70) comprend un secteur tournant (72) fixé à ladite patte de suspension; des mâchoires d'étrier (74) fixées à ladite nacelle et mobiles de manière à venir en condition d'engagement avec ledit secteur tournant; des moyens du type levier (78) agencés pour déplacer lesdites mâchoires d'étrier; une commande unidirectionnelle (80) portée par ladite nacelle et munie d'un moyen d'entrée (82) et d'un moyen de sortie (84); et un élément de liaison (88) monté entre ledit moyen du genre levier et ledit moyen de sortie.

9. Dispositif verrouillable de fixation d'une nacelle selon revendication 8, dans lequel un levier actionnable manuellement (86) est fixé audit moyen d'entrée et ledit moyen du genre levier met ledit frein en condition d'engagement lorsqu'on le déplace dans un sens ou dans l'autre.

10. Dispositif verrouillable de fixation d'une nacelle selon revendication 9, dans lequel lesdits moyens amortisseurs (62) sont un amortisseur d'automobile.

5

10

15

20

25

30

35

40

45

50

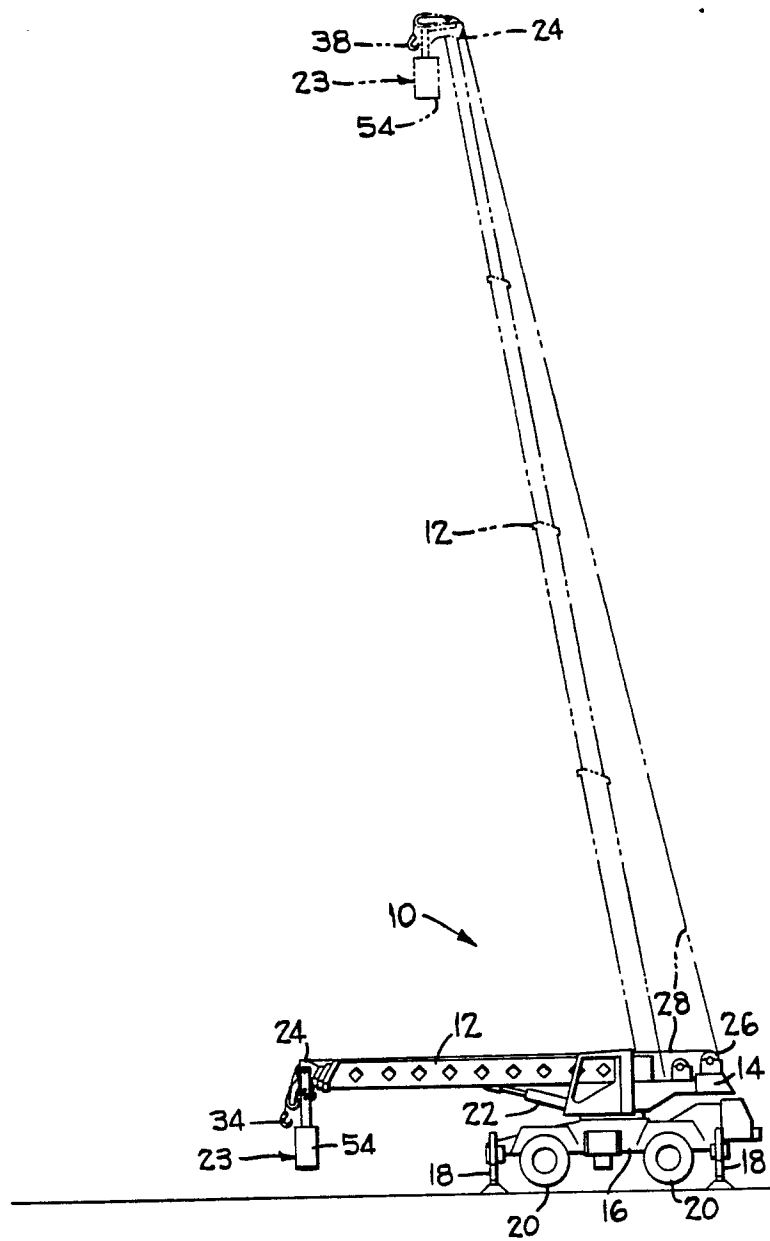
55

60

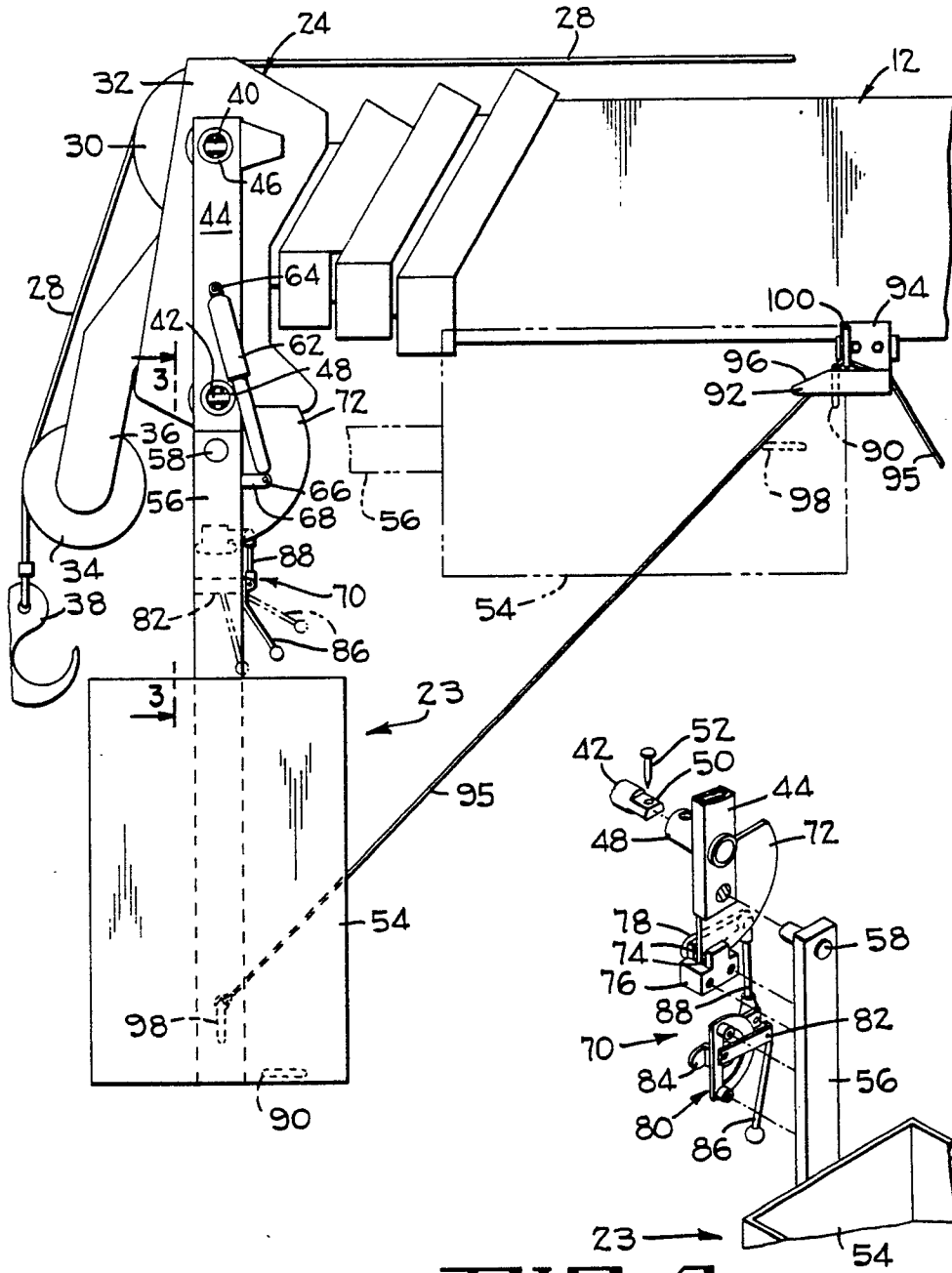
65

5

FIG 1



**FIG 2**



**FIG 4**

**FIG. 3**

