Nov. 12, 1968 R. W. FOSS ET AL 3,410,432

BOOM ATTACHMENT FOR A LIFT TRUCK

Filed Dec. 30, 1966 3 Sheets-Sheet 1

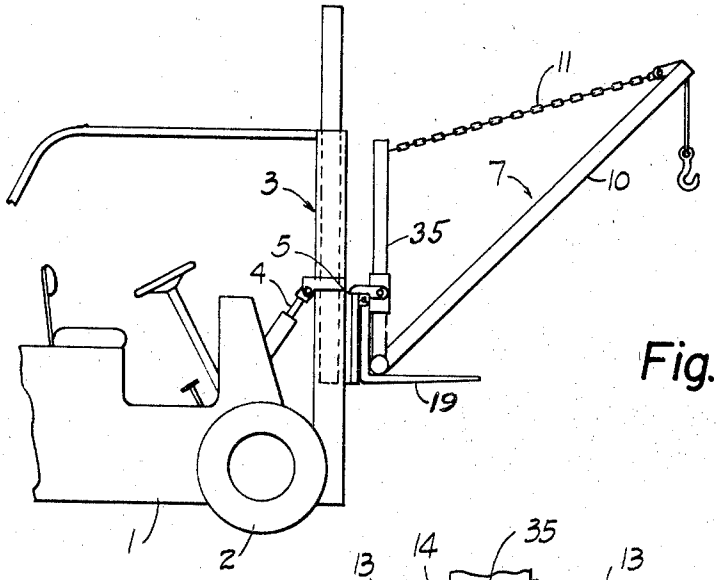


Fig. 1

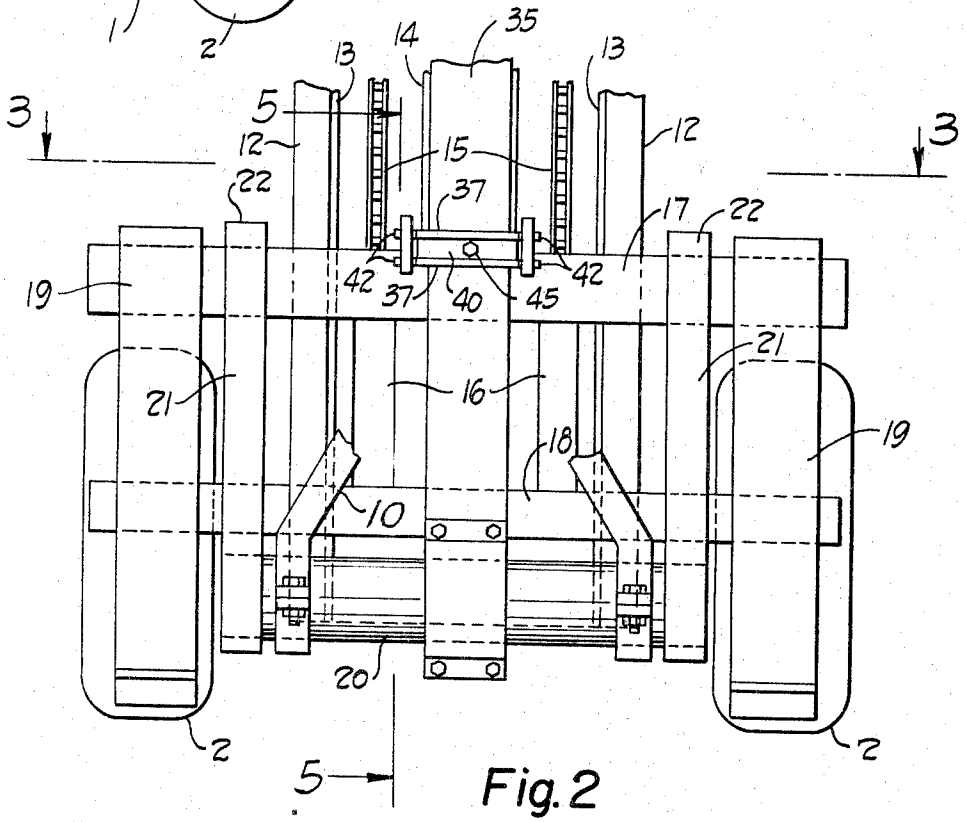


Fig. 2

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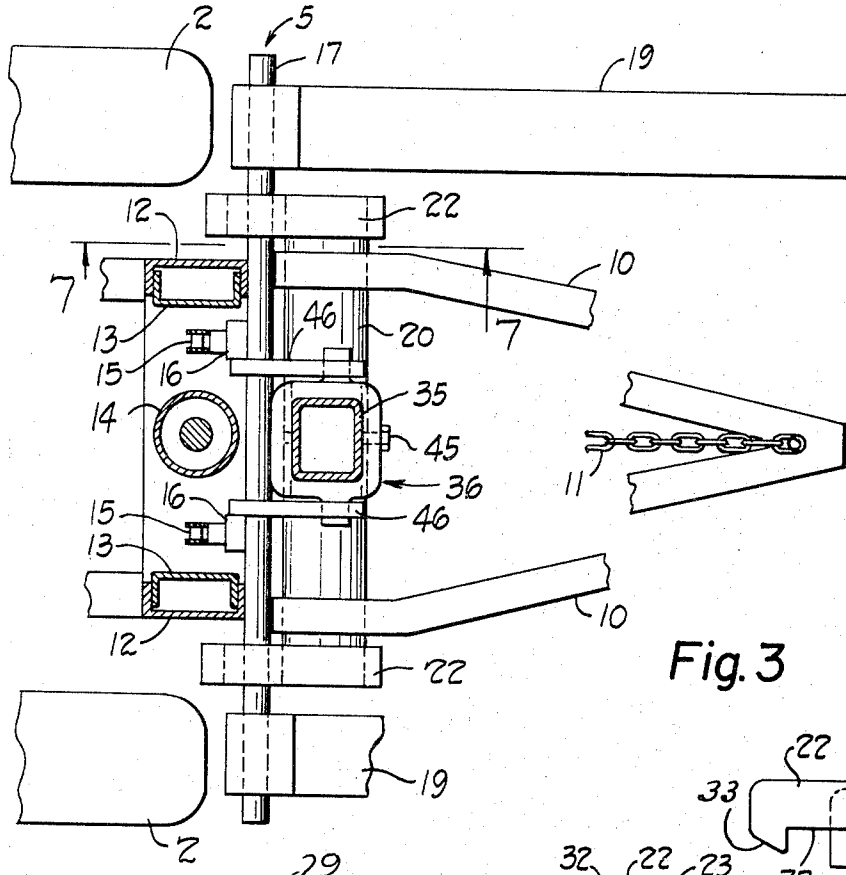


Fig. 3

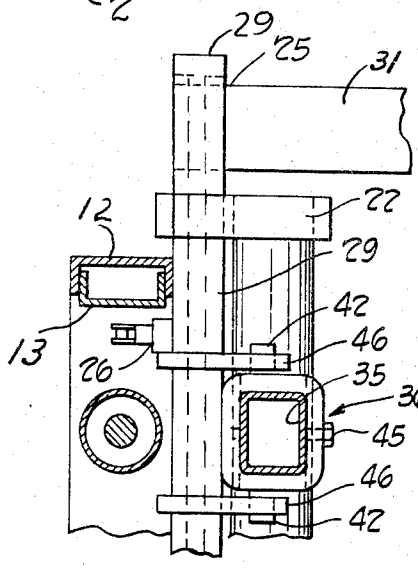


Fig. 4

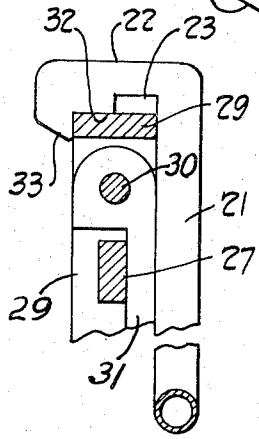


Fig. 11

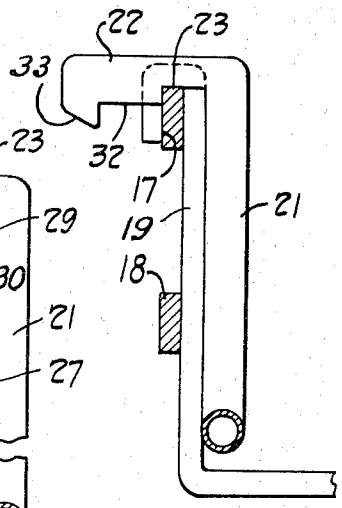


Fig. 10

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BOOM ATTACHMENT FOR A LIFT TRUCK

Filed Dec. 30, 1966 3 Sheets-Sheet 3

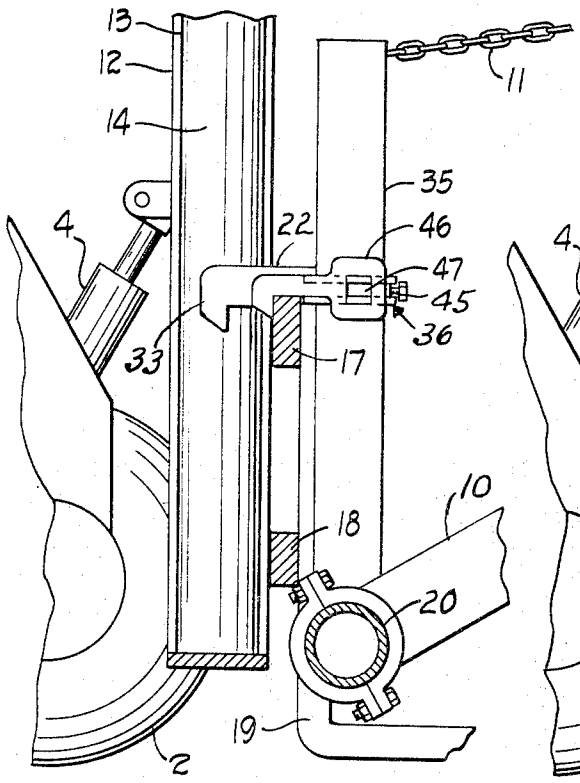


Fig. 5

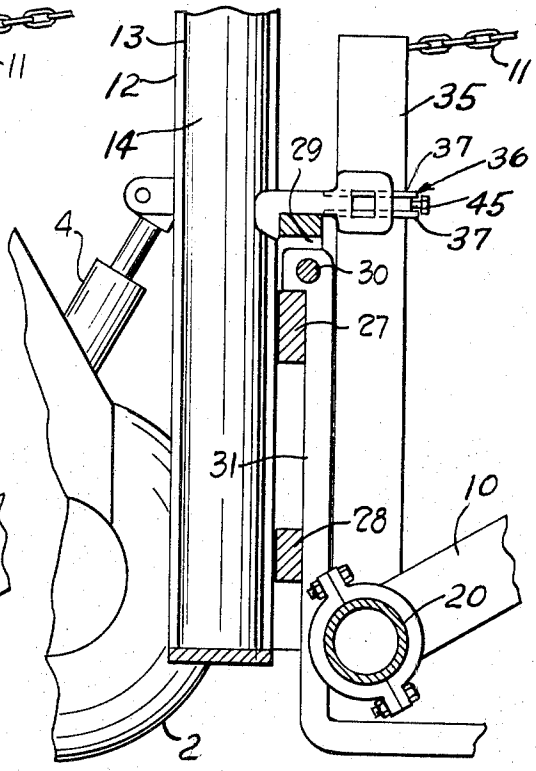


Fig. 6

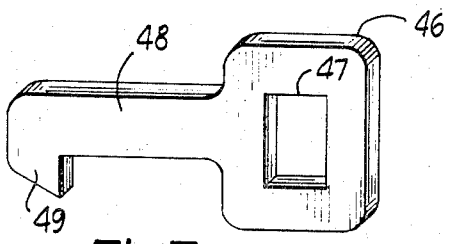


Fig. 7

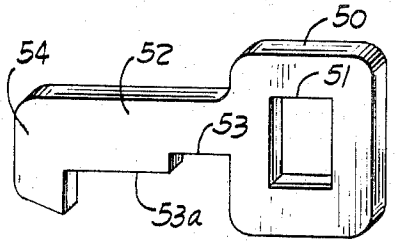


Fig. 8

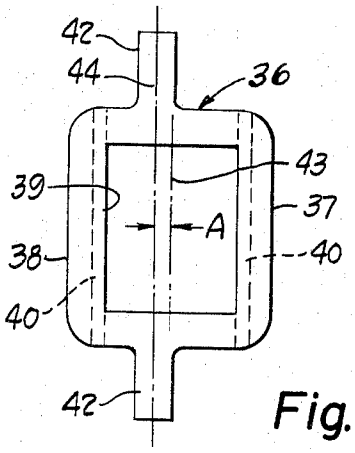


Fig. 9

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3,410,432

BOOM ATTACHMENT FOR A LIFT TRUCK

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6 Claims. (Cl. 214—620)

ABSTRACT OF THE DISCLOSURE

This invention discloses a universal boom attachment for lift trucks, which includes parts making the boom attachment easily attached to and removed from the lift frame of such trucks, which lift frame in certain trucks includes a frame member of one width and in a different lift truck, the comparable frame is of another width. The main purpose of the invention is to facilitate the attachment of the boom unit to any lift truck, irrespective of the width of the particular frame member to which the unit is attached. This is accomplished by using a reversible yoke together with hook members whose reach may be varied by reason of the construction thereof. By manipulating and reversing the position of the yoke and/or availing of the hooks whose reach variation is incorporated in the form thereof, substantially any lift truck may be availed of for support of the attachment thereon.

This invention relates to a universal boom attachment and particularly to such an attachment as may most suitably be connected to a fork lift truck and disconnected from the same and stored when use for the attachment is no longer present.

The basic concept of the attachment of the instant invention, resides in the ability to connect the same to lift trucks of varying construction, which lift trucks include fork lift carriages thereon which carriages are of different widths so to speak, both narrow and wide in the accepted sense and understood in the industry in relation thereto, the narrow type of construction being designated as the hook type and the wide type being designated as the bushing or tube type carriage.

One of the important problems involved in providing attachments for lift trucks is to make them universally applicable and in this particular instance, a boom is intended to be provided for a lift truck which will increase the scope of operation of the truck by availing of the various adjustable attributes of the truck itself at the same time providing a boom extension which may be used as a sort of crane-like attachment in all of the various conditions and positions which may be assumed by the mast and raise and lower the carriage upon which the attachment is supported.

With the foregoing in mind therefore, it is a primary object of this invention to provide a universally adaptable boom attachment for lift trucks which will fit either the hook type carriage or the tube or bushing type, and likewise may be useful in conjunction with the forks normally carried on such carriages or without the use of such forks under circumstances where the same would obstruct the manuevers through which the lift truck may be directed.

Another object of the invention is to provide a novel attachment which may be supported entirely upon the carriage without regard to the position of the forks normally carried thereon, and whether the carriage be of the usual hook type or of the tube or bushing type so-called.

Another object of the invention is to provide a novel connecting arrangement whereby the actual connection of the boom to the carriage, and in fact of a portion of the boom structure itself to the carriage may be effected irrespective of the width of a portion of the carriage to which the same is connected without any special manipulation of the various parts provided therefor.

Other and further objects of the invention will be understood from a consideration of the specification appended hereto and disclosed in the drawings wherein:

FIGURE 1 is a somewhat diagrammatic disclosure of a lift truck with a boom attachment disclosed as generally supported thereon and illustrating further some of the manueverability provided thereby.

FIGURE 2 is a fragmentary front view showing the boom attachment of this invention, as applied to a lift truck with certain of the attaching features disclosed.

FIGURE 3 is a fragmentary sectional view taken about on the line 3—3 of FIGURE 2 looking in the direction of the arrows.

FIGURE 4 is a comparable view to FIGURE 3 illustrating the same parts as applied to a lift truck of somewhat different construction and specifically to a tube or bushing type lift truck.

FIGURE 5 is a fragmentary sectional view taken about on the line 5—5 of FIGURE 2 looking in the direction of the arrows illustrating the application of the boom attachment to a hook type carriage provided on certain lift trucks.

FIGURE 6 is a comparable view to FIGURE 5 illustrating the same structure as applied to a tube or bushing type carriage provided on other lift trucks.

FIGURE 7 is a perspective view showing one form of hook member.

FIGURE 8 is a similar view to FIGURE 7 showing in perspective a different form of hook member.

FIGURE 9 is a plan view illustrating a yoke which is used for connection of the attachment to the carriage.

FIGURE 10 is a fragmentary view illustrating a support arm as the same is applied to a hook type carriage and FIGURE 11 is a view of similar nature showing a support arm as attaching the boom structure to a bushing or tube type carriage.

Referring now to FIGURE 1 initially, a lift truck is shown of generally conventional form as to the body and supporting means therefor denoted at **1** with the usual front wheels **2**, carrying adjacent the same a mast structure generally denoted **3** which is adjustable and pivotally arranged with respect to the truck, the adjustment being effected by the hydraulic piston and cylinder mechanism generally indicated at **4**.

A typical carriage such as **5** is generally noted, with the usual forks carried thereby, the carriage in this particular instance being a hook type as will be apparent to those skilled in the art.

The boom attachment of this invention, is indicated generally at **7** including a trunnion **8**, with a post extending upwardly therefrom, suitable boom arms **10** being provided and supported by means of a chain **11** connected to the upper end of the post and the extremities of said arms.

Referring now to FIGURES 2, 3 and 5, for more details of the structure herein generally previously mentioned, the mast structure **3** is provided by spaced pairs of telescopic mast members such as **12** and **13** pivotally supported at their lower ends on the lift truck **1**, and including centrally thereof the usual hydraulic piston and cylinder member **14**.

The hydraulic piston and cylinder member **14** is equipped with means at the upper end thereof including the chains **15** from said member to raise and lower the carriage generally denoted **5** and previously referred to.

In this instance the carriage **5** is a hook type carriage, comprising suitable vertical parts **16**, connected to the chains **15** in any suitable manner. The transverse fork

supporting framework forming part of the carriage, includes an upper member **17** and a lower member **18** arranged parallel thereto, these members being generally rectangular in section and extending across the front of the truck, usually carrying the forks such as **19** thereon, the forks **19** being provided with hook portions at the upper ends and offstanding arms at the lower end to raise loads which may be engaged thereby.

The boom attachment will now be specifically described and is shown as including a transverse trunnion **20** which may preferably be tubular in nature, having support arms such as **21** at opposite ends thereof, the support arms extending upwardly as indicated in FIGURES 10 and 11 for example, terminating at their upper ends in hook elements **22** adapted to engage the transverse supporting framework member **17** by means of a slot or notch portion in each denoted **23**, the hook element **22** extending rearwardly from the upright portion **21** as illustrated in said FIGURES 10 and 11.

Adverting momentarily to the boom structure as applied to a bushing or tube type carriage lift truck, as illustrated particularly in FIGURES 4 and 6, it will be seen that the carriage denoted **25** generally is similarly mounted on vertical members such as **26**, but in this instance includes not only the transverse members **27** and **28** corresponding to the members **17** and **18**, but additionally a further framework member designated **29**, as will be recognized by those skilled in the art, which extends downwardly along the outer sides and further supports a tube or rod **30** extending between said sides upon which the forks such as **31** are usually mounted. This particular structure is believed by certain manufacturers to offer better advantage and more strength than the hook type structure disclosed in FIGURES 3 and 5 for example.

In any event because of the existance of the two different carriages, namely the hook type and the bushing or tube type, it is necessary to provide means to accommodate the boom of this invention thereon and therefore the provision of the novel support arms for the boom attachment, including the hook elements **22** previously referred to on the upper ends of the arms **21**, and further in this instance the hook elements **22** are provided with wide portions **32** at the extremities having the hook ends **33** in each instance.

It will be observed from FIGURE 11, as contrasted to FIGURE 10, the wide portions **32** are adapted to rest upon the wide framework member **29** in the bushing or tube type construction and thus make the basic supporting parts of the boom attachment universally applicable to the two different types of carriages.

Referring now again to the hook type carriage and particularly FIGURES 2, 3 and 5, intermediate the support arms **21**, and mounted on the trunnion **20**, is a post **35** which extends in an upright position, its lower end being connected to the trunnion **20** as previously mentioned.

The post **35**, is preferably rectangular in cross section and adapted to have mounted thereon and slidingly engaged therewith, a yoke **36** of novel form, which yoke as suggested by FIGURE 2, is comprised of a pair of spaced members **37**, these members being identical, and including in each case a central body portion **38** in which an opening **39** is provided so slide over the post **35**, the members being maintained in spaced relation by longitudinal spacers **40** welded or otherwise secured to the respective central body portions **38**.

Extending in opposite directions and integral with the central body portion **38**, are the arms **42**, which arms are arranged in an offset manner with respect to the center line of the opening **39** in the central body portion **37**, the center line in the central body portion being indicated at **43**, the center line of the arms **42** being indicated at **44**, the offset being denoted A.

The spacers **40** being equipped with suitable set screws such as **45**, will enable the positioning of the entire yoke **36** vertically on the post **35** in any preferred position, in accordance with the desire to maintain the same upright and as will now be explained in conjunction with certain hooks which are provided, the hook **46** being illustrated further in FIGURE 7 as in turn comprising a body portion with a rectangular opening **47** therein, a hook element **48** integral with the body portion and a hook section **49** at the end of said hook in each instance.

By reason of the spacing of the members comprising the yoke **36**, a rectangular opening such as **47** in the hook is necessary, and as illustrated in FIGURE 5 provides for supporting the hooks **46** on said yoke.

In the example and disclosure of FIGURE 5, the hooks **46** extend rearwardly from their positions on the yoke **36**, so as to engage with the transverse fork supporting framework member **17** and thus maintain the post **35** in its vertical position so that the upper end of the post **35** may be connected by a chain **11** to the outer end of certain boom arms **10** to be more particularly described. The boom arms **10** are connected at their lower ends to the trunnion **20**.

By reason of the fact that the yoke **36** is formed with offset arms, it will be understood that if the upper and lower members of the yoke are reversed as to their relative vertical positions, that is the upper member is turned over so that it will occupy the position formerly occupied by the lower member, or the arms reversed end for end, the offset A may be reversed so that it will provide greater reach for the hook sections **49** of the hook elements **48**. Thus as indicated in FIGURES 4 and 6 the yoke hook elements **48** will engage the transverse framework member **29** to position the post **35** in its proper vertical or upright position when the unit is mounted on a bushing or tube type fork lift truck as suggested by the fragmentary views, offset A being of a predetermined amount to make this possible and as a matter of fact having been found in practice to require about an inch or an inch and a quarter of change in position to facilitate the connection as described. It will be understood that hooks such as illustrated in FIGURE 8 and denoted **50** may be mounted on the yoke **36** so as to obviate the necessity to reverse the yoke, such hooks **50** being provided with rectangular openings **51** therein the hook elements such as **52** extending therefrom, with slots or notches **53** to facilitate engagement with the hook type transverse framework member **17**. Wide portions **53***a* are provided and in conjunction with hook ends **54** accommodate connection of the yoke with the wide transverse framework member **29**.

It will be apparent that several combinations are thus provided by the structures herein set forth, it being noted further that the entire boom and associated structure may be suitably connected to either type of carriage without regard for the position of the forks such as **19** thereon or the forks in fact being removed if necessary since it may be desirable for certain types of operation where maneuverability would be hindered by permitting the forks to remain in place.

It is also clear that the support arms could be removed and the trunnion permitted to rest upon the forks if useful under other conditions.

We claim:

1. Universal boom structure for lift trucks, comprising in combination, a lift truck including a mast structure, a carriage connected to such structure for vertical raising and lowering movement, means for moving said carriage, said carriage having a transversely extending fork supporting framework member, like members on different lift trucks varying substantially in width, and a boom unit attachable to different framework mem-

bers of different lift trucks, such members having various widths, said unit having a transverse trunnion, means to support the trunnion from the framework member, a vertical post connected to the trunnion, a reversible yoke on the post having laterally extending arms mounted off the center line of the yoke whereby the said arms are positionable closer to and farther from the framework by reversing said yoke member, hooks on the yoke arms adapted to engage the framework member irrespective of the width thereof, said hooks together with the yoke reversibility permitting the bite of the hooks to be varied to thereby permit the boom structure to also be utilized with other lift trucks having a framework member of a different width, boom means connected to said trunnion, and means to maintain the attitude of the boom means by connection to the post aforesaid.

2. A boom structure as claimed in claim 1, wherein the trunnion is connected to support arms at its ends, the upper ends of said arms having hook elements thereon, said hook elements including slots to engage a relatively narrow framework member and wide portions to engage a wide framework member, hook ends being formed at the ends of said hook elements.

3. In lift means of the class described, in combination, a lift truck including a mast structure, a carriage connected to said structure for vertical raising and lowering movement, means for moving said carriage, said carriage having a transverse fork supporting framework member like members on different lift trucks varying substantially in width, and a boom unit detachably connected to said supporting framework, said unit having means to support a trunnion near the lower portion of the framework, a trunnion supported by said means, said support means being removably connected to the carrriage, an upright post connected at its lower end to the trunnion and extending upwardly along the carriage, reversible means on the post to detachably connect the same to a framework member of one width and having hooks thereon for detachable engagement with framework members of different lift trucks, which members are of different width, reversing of said means varying the bite of the hooks to engage such members to permit the boom structure to be used on the different lift trucks aforesaid, boom means connected to said trunnion, and means connected to the post and the boom means to maintain the attitude of the latter.

4. Lift means as claimed in claim 3, wherein the trunnion of the boom unit is connected to upwardly extending arms, hook elements are provided at the upper ends of said arms, the upright post is positioned between the arms aforesaid, said reversible means including a yoke slidably mounted on the post, and the hooks are connected to the yoke, said hooks and the elements referred to each including slots to engage relatively narrow framework members, and wide portions to engage wide framework members, hook ends being formed at the ends of said hook elements and hooks.

5. Lift means as claimed in claim 3, wherein the means on the post comprises a yoke having laterally extending arms positioned off the center line of the yoke whereby said arms are positionable closer to and farther from the framework member by reversing said yoke, and the hooks are mounted on the yoke arms to engage the framework member irrespective of the width of said member.

6. Lift means as claimed in claim 5, wherein the yoke is comprised of vertically spaced upper and lower members, each including a central body portion having an opening to receive the upright post, means connecting the members in spaced relation, relatively narrow arms extending oppositely from said portions, the center line of said arms being spaced from the center line of the opening whereby reversing the yoke to reverse the relative positions of the respective members will alternatively move the center line of said arms closer to and farther from the framework members, to thereby facilitate engagement of the wide and narrow framework members respectively of the different lift trucks by the hook members mounted on said arms.

References Cited

UNITED STATES PATENTS

2,584,870	2/1952	Hally	214—620
2,684,164	7/1954	Violette	214—620
3,207,347	9/1965	Ehrlich	214—620

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