Jan. 3, 1967 H. B. PETERSON 3,295,705

FOLDING AND SWINGING HYDRAULIC BOOM

Filed July 13, 1964 2 Sheets-Sheet 1

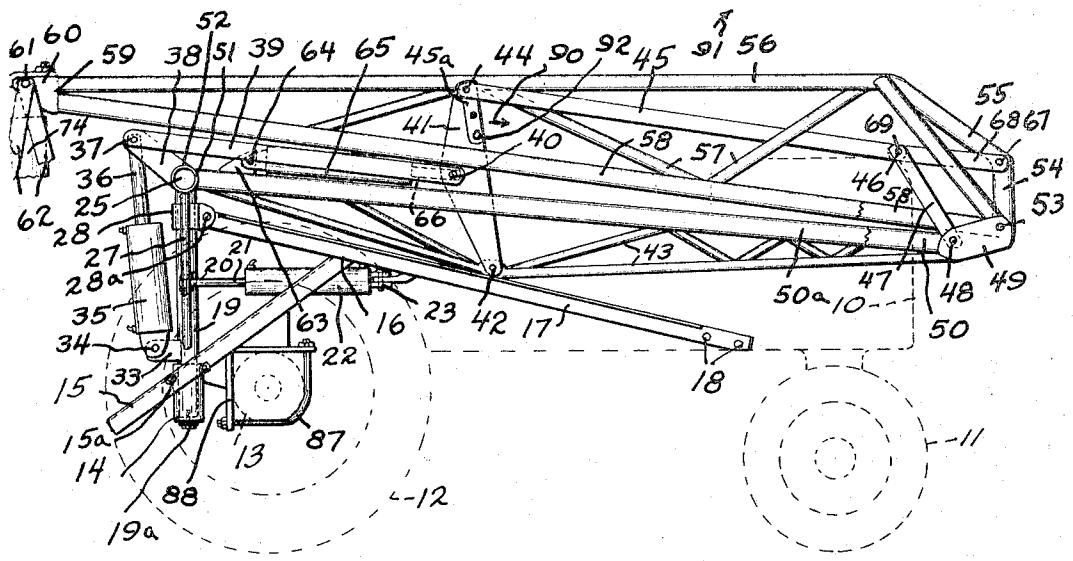


Fig. 1

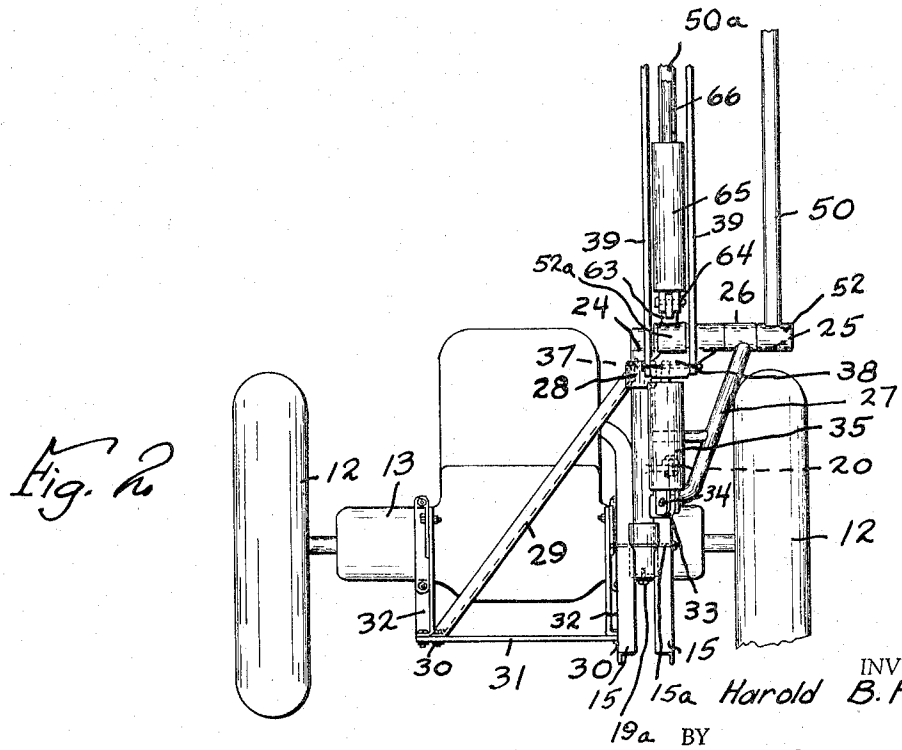


Fig. 2

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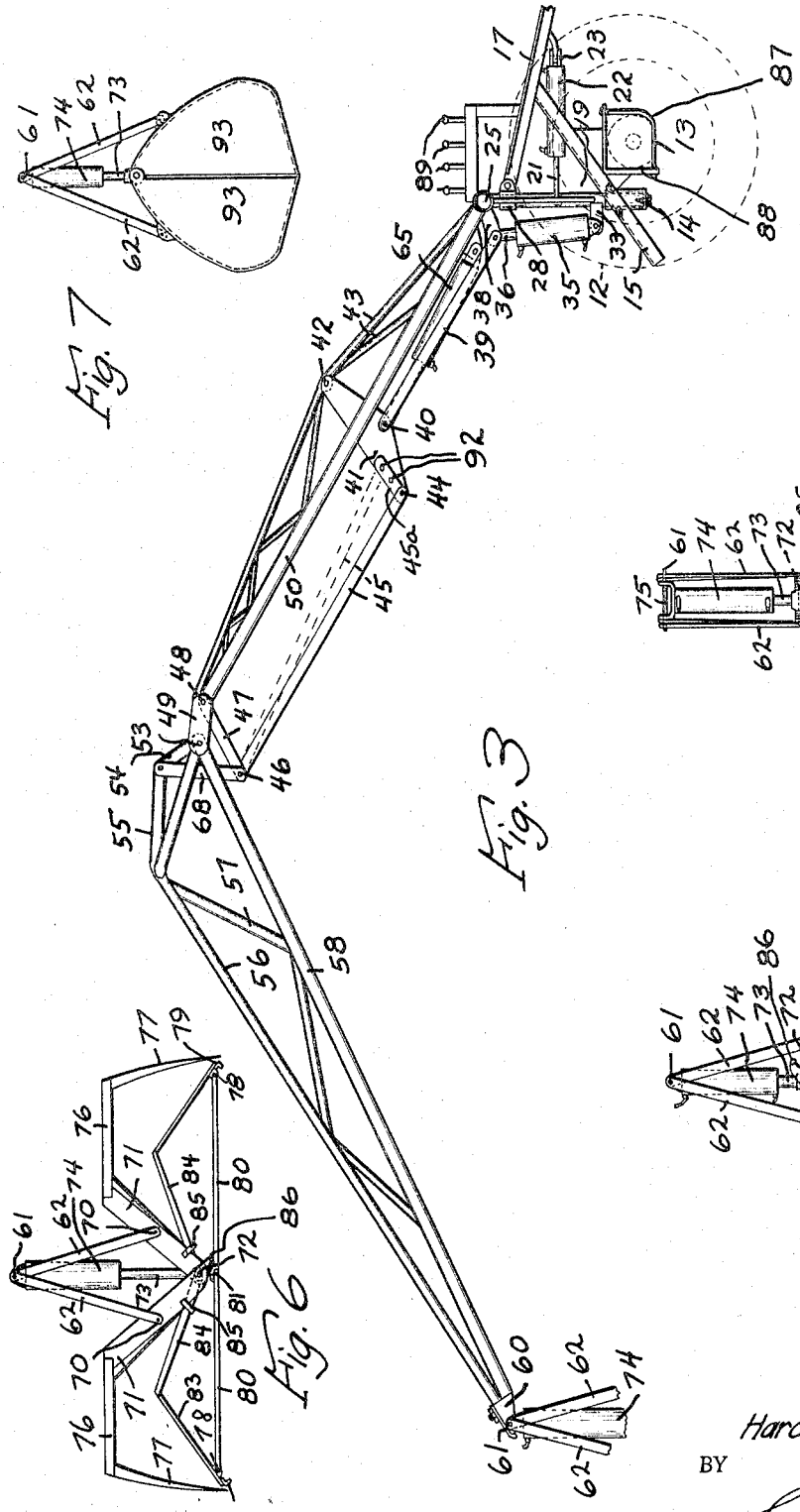


Fig. 3

Fig. 7

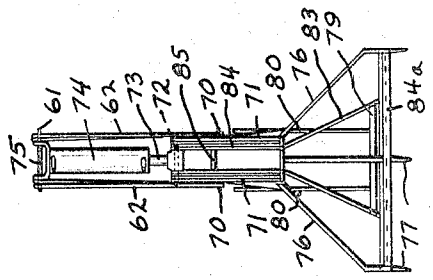


Fig. 5

Fig. 6

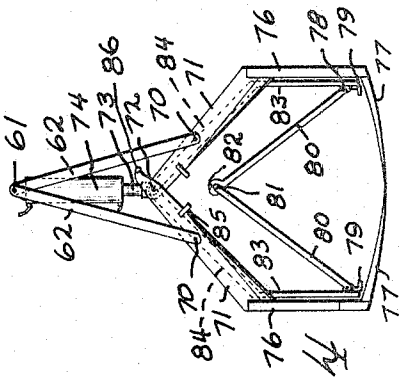


Fig. 4

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FOLDING AND SWINGING HYDRAULIC BOOM

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Filed July 13, 1964, Ser. No. 382,273
3 Claims. (Cl. 214—132)

My invention relates to a folding and swinging hydraulic boom.

An object of my invention is to provide a boom which can be readily controlled from a tractor, and which can be operated by means of the usual standard tractor hydraulic sources.

A further object of my invention is to provide means whereby the boom can be contracted to a minimum space, and can then be expanded to a relatively considerable distance.

A further object of my invention is to provide grapple members at the end of the boom, which grapple members can be controlled hydraulically.

A further object of my invention is to provide a clean-out device which will maintain the grapple in a clean condition.

A further object of my invention is to provide convenient hydraulic means for swinging the boom laterally.

With these and other objects in view, my invention consists in the construction, arrangement, and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

FIGURE 1 is a side elevation of the boom as attached to a tractor in its retracted position,

FIGURE 2 is a rear view of FIGURE 1 with a portion of the members however being in a partially raised position,

FIGURE 3 is a side elevation showing the boom in its expanded position,

FIGURE 4 is a side elevation of the grappling device,

FIGURE 5 is an end view of FIGURE 4,

FIGURE 6 is a further side elevation showing the grapple device in open position, and

FIGURE 7 is a modification showing the use of a clam-shell type of arrangement using the features of my grapple arrangement.

My invention contemplates the provision of an all purpose type of hydraulic boom which can be expanded to various positions for the purposes required and which can be swung laterally as required to thereby accommodate a variety of uses. The present application describes certain improvement on my Patent No. 3,094,228 issued June 18, 1963 on a Folding and Swinging Hydraulic Boom.

In describing my invention I shall refer at first to FIGURE 1 which shows the arrangement in its contracted or folded form and in this figure I have indicated the hood of the tractor by the character **10**, the front wheels by the character **11** and the rear wheels by the character **12**, the character **13** indicating the rear axle housing.

The character **14** indicates a socket member attached to the angle brackets **15** as at **15***a* which are attached as at **16** to the further bracing member **17**. The bracing member **17** is attached at **18** to the tractor framework, and received in the socket **14** is a vertical pipe or post **19**. Attached to the post **19** is an ear **20** which is pivotally attached to a piston rod **21** which is attached to a suitable piston within the hydraulic cylinder **22** which is pivotally secured at **23** to the bracing member **17**. This arrangement serves to rotate the post **19**, which post in turn is secured as at **24** (see FIGURE 2) to a transverse rod **25** which is received within a bearing **26** attached to the further bracket member **27** which is suitably attached to the post **19** for support. The character **28** indicates

a collar which receives the upper end of the rotatable pipe **19**, the character **29** indicating a further bracket or brace attached at **30** to the framework portion **31** of the tractor which in turn is supported by the framework portions **32** suitably attached. The collar **28** is attached at **28***a* to the member **17**. The character **19***a* indicates a washer and bolt arrangement for securing the member **19** in the socket **14**.

The character **33** indicates an ear attached to the post **19** and pivoted at **34** thereto is the hydraulic cylinder **35** which receives a suitable piston attached to the further piston rod **36** which is pivoted at **37** to a lever **38** and also to the rods or bars **39**, the bars **39** being pivoted at **40** to the member **41**, the member **41** being pivoted at **42** to the bracing members **43**, and also being pivoted at **44** to the further bars **45**. The character **45***a* indicates a re-inforcing strap.

The bars **45** are pivotally secured at **46** to the pair of links **47** which are pivotally attached at **48** to the members **49** which members **49** are securely welded to the further pipes or members **50** and **50***a* which are secured to the collars **52** and **52***a* which receive the transverse pipe or rod **25**. The members **49** are pivotally attached at **53** to the pipe member **54** which extends into the portions **55** and **56** to which are attached the bracing members **57**, which are attached to a pair of pipe members **58**, one of which is attached to the portion **54**, and the members **56** and **58** are secured at **59** to a holder **60** to which are pivotally attached at **61** the bars **62**. Attached to the member **50** is an ear **63** to which is pivotally attached at **64** a hydraulic cylinder **65** which operates the piston rod **66** which is also pivoted at **40** to the member **41**. Pivoted at **67** to the member **54** are the links **68** which are pivoted at **69** to the pivoting point **46**. The bars **62** are pivotally attached at **70** (see FIGURES 4 and 6) to the further bars **71** which are pivoted at **72**, and also pivoted at **72** is a further piston rod **73** which is operated by means of a suitable piston within the hydraulic cylinder **74** which is pivotally mounted as at **61** to the transverse rod **75**. Attached to the member **71** are the bars **76** which are secured to the tines **77**, and pivotally attached at **78** to the angle members **79** are the further bars or rods **80** which are mutually pivoted at **81**, the stop portion **82** restricting downward movement of the bars **80**.

Attached to the angles **79** are the further bars **83** which include the portions **84** which portions **84** are adapted to bear against the U-shaped members **85** at the position shown in FIGURE 6, and which pivot at **72**. The character **86** indicates a member attached to member **71** adapted to abut against the bars **80** to provide a secondary forcing action substantially at the position shown in FIGURE 6.

The character **87** indicates bolts partially passing about the axle housing **13** which together with the member **88** serves to support the arrangement. The character **89** indicates a series of levers which control the hydraulic pressure supply on the tractor, to provide oil under pressure to the various cylinders **22**, **35**, **65**, and **74** when required, and to release the pressure.

The device is operated in the following manner.

For expanding the arrangement to the position shown in FIGURE 3, the cylinder **65** is actuated whereby the rod **66** will force the member **41** in the direction of the arrow **90** (see FIGURE 1) which will correspondingly force the members **45** in the same direction so that the member **56** will rise in the direction of the arrow **91**. As the member **56** rises, due to the linkage at **47** and **68**, which helps to sustain the mechanical advantage, the tendency will be to also raise the members **50** towards a vertical position as well as the member **56**, and then when it is desired to swing the arrangement

still further, the cylinder **35** is actuated to force the piston rod **36** downwardly which will continue to force the entire arrangement over to the position shown in FIGURE 3. In this way, the distance of the device shown in FIGURE 4 can be varied at will with respect to the tractor so that in this manner when it is desired to grasp and raise hay or any other product, the arrangement can be selectively controlled for distance whenever desired. The hydraulic cylinder **74** can be actuated so that the piston rod **73** will be forced upwardly or downwardly, and when upwardly as shown in FIGURE 4, the arrangement can be used to gather the material, and when the rod **73** is forced downwardly as shown in FIGURE 6, the material will be released. During release of the material the various members **84**, in combination with the members **80**, will provide a clean-out device to completely clean the material out of the gathering arranegment and as shown in FIGURE 6. In this manner the material can be discharged at any desired height by use of the arrangement described. The character **84***a* designates further bracing members. The character **92** indicates additional pins, etc. in the members **41** and **45***a* for providing adjustable attachments with the bars **45**, if such is desired to be used when digging.

When it is desired to rotate the arrangement to any desired position with respect to the tractor, the cylinder **22** is actuated which will cause the post **19** to rotate, which post will then carry the entire arrangement to the desired angle.

FIGURE 7 illustrates a modification wherein identical characters will indicate identical parts, and wherein the cleanout arrangement, not shown in the figure, will be located inside of the clam-shell type of gathering buckets, which are indicated by the character **92**, and for digging purposes.

It will now be noted that I have provided the advantages mentioned in the objects of my invention with further advantages being apparent.

Some changes may be made in the construction and arrangement of the parts of my invention without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modifid forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. A folding and swinging boom comprising a boom structure including a boom member, a framework for supporting said boom member, said boom member being adapted to be pivotally moved upwardly, a further boom member pivoted to said boom member, means for extending said further boom member with respect to said boom member, means for rotatably securing said framework whereby said boom members can be rotated in a horizontal plane, said means for extending said further boom member with respect to said boom member including a lever pivoted to said boom member, means for hydraulically moving said lever, bars pivotally attached to said lever, links pivotally attached to said bars and to said boom member and said further boom member.

2. A folding and swinging boom comprising a boom structure including a boom member, a framework for supporting said boom member, said boom member being adapted to be pivotally moved upwardly, a further boom member pivoted to said boom member, means for extending said further boom member with respect to said boom member, means for rotatably securing said framework whereby said boom members can be rotated in a horizontal plane, said means for extending said further boom member with respect to said boom member including a lever pivoted to said boom member, means for hydraulically moving said lever, bars pivotally attached to said lever, links pivotally attached to said bars and to said boom member and said further boom member, said links being mutually pivoted to said bars, further hydraulic means for swinging said boom members in a vertical plane.

3. A folding and swinging boom comprising a boom structure including a boom member, a framework for supporting said boom member, said boom member being adapted to be pivotally moved upwardly, a further boom member pivoted to said boom member, means for extending said further boom member with respect to said boom member, means for rotatably securing said framework whereby said boom members can be rotated in a horizontal plane, said means for extending said further boom member with respect to said boom member including a lever pivoted to said boom member, means for hydraulically moving said lever, bars pivotally attached to said lever, links pivotally attached to said bars and to said boom member and said further boom member, said links being mutually pivoted to said bars, further hydraulic means for swinging said boom members in a vertical plane, a grapple member pivotally attached to said further boom member, said grapple member including a plurality of spaced arms including tines attached thereto, further spaced arms including further tines attached thereto pivoted to said spaced arms, means for spreading said arms, a clean-out member carried by said grapple member located interiorly of said arms, said clean-out member including opposed frame members, bars pivoted to said frame members, further bars pivoted to said frame members, said bars and said further bars being mutually pivoted, movement of said arms being adapted to change the angularity of said bars to thereby force material out of said grapple member.

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