May 12, 1959 J. B. CODLIN 2,886,194

TRACTOR MOUNTED TONG LOADER

Filed July 15, 1957

Fig. 1

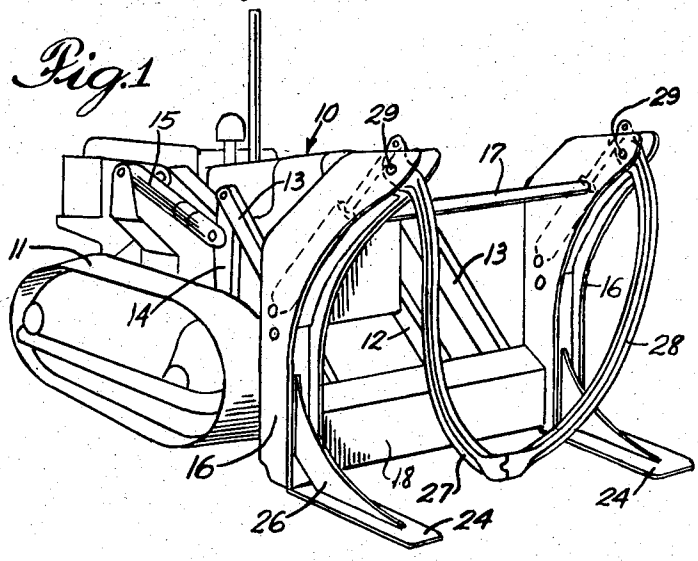


Fig. 3

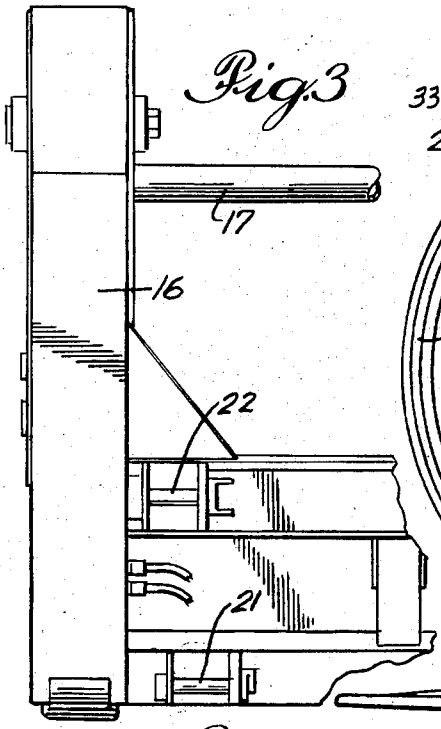


Fig. 2

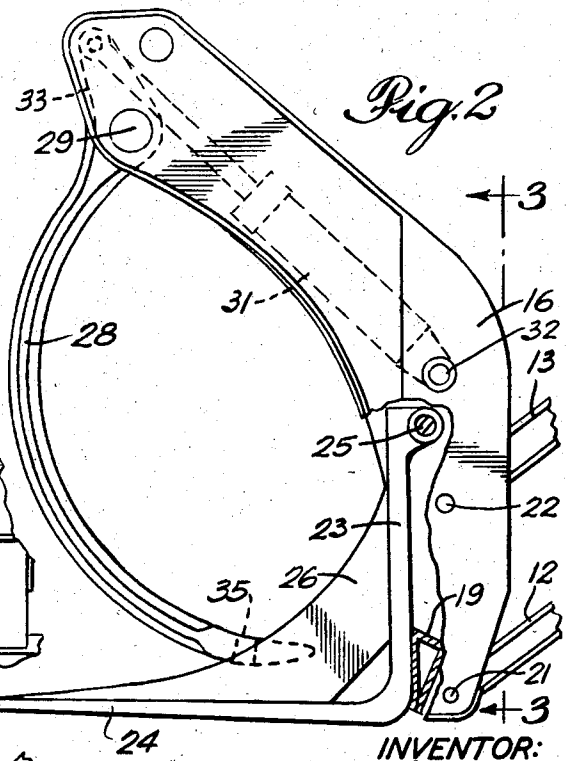
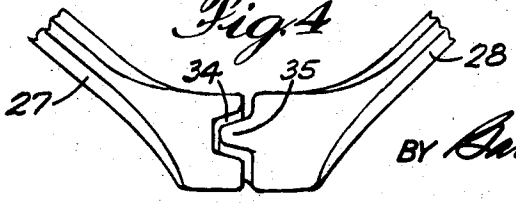


Fig. 4



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United States Patent Office 2,886,194 Patented May 12, 1959

2,886,194

TRACTOR MOUNTED TONG LOADER

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Application July 15, 1957, Serial No. 672,000

5 Claims. (Cl. 214—147)

This invention relates to a tractor mounted tong loader and more particularly to a loader for handling logs and the like.

Tong loaders for logs have heretofore been proposed in which fork arms are provided for receiving a load of logs and pivoted tong arms are mounted to swing toward and away from the fork arms for gripping the logs. In one type of construction a single tong arm has been provided in the form of a U-shaped member pivoted on its ends to the loader frame with its center portion swingable toward the fork arms to grip the load. If the load is uneven, as is common with logs due to the taper thereof, the logs may be gripped only at one side which results in a very unsafe condition or if sufficient pressure is applied to grip the load at both sides the tong arms will be twisted and will eventually fatigue and break.

It has also been proposed to utilize two independently movable tong arms to grip the logs at spaced points. Loaders of this type are generally satisfactory, but in picking up relatively small logs from a pile, as in handling pulp wood, it has been found that occasionally one tong will engage one log and the other tong will engage a different log. When the load is raised the logs cross and swing around in the loader or may fly loose again resulting in a dangerous condition.

It is one of the objects of the present invention to provide a tractor mounted tong loader in which independently movable tong arms are connected through lost motion means to limit relative movement thereof so that they normally function together, but can have a limited amount of relative movement to grip an uneven load uniformly.

Another object is to provide a loader in which the tong arms curve toward each other and are connected at their free ends for limited relative swinging movement.

According to a feature of the invention, one of the tong arms is formed with a notch at an angle to a radius from its pivotal axis and the other arm is formed with a tongue fitting loosely in the notch to limit relative movement between the arms.

A further object is to provide a loader in which the forks are pivotally connected to the supporting frame and engage the frame to limit pivotal movement thereof in one direction while remaining free to pivot in the other direction.

The above and other objects and features of the invention will be more readily apparent from the following description when read in connection with the accompanying drawing, in which:

Figure 1 is a perspective view of a tractor mounted tong loader embodying the invention;

Figure 2 is a side elevation of the loader;

Figure 3 is a partial rear elevation in the plane 3—3 of Figure 2; and

Figure 4 is a partial perspective view of the ends of the tong arms looking from the front in Figure 1.

The loader of the present invention is adapted to be mounted on a tractor of any desired type, as shown generally at 10, which is movable on tracks 11 or on wheels

to different places to pick up and discharge a load of logs, or the like. For mounting the loader the tractor has pivotally mounted thereon forwardly extending booms 12 and a control linkage for controlling tilting of the loader. The control linkage, as shown, comprises links 13 generally parallel to the booms 12 and pivotally connected at their upper ends to vertically extending cross links 14 which are pivoted at their lower ends to the booms 12. The cross links are connected through expansible hydraulic motors 15 to fixed pivot points on the tractor frame so that when the motors 15 are expanded or contracted a supporting frame carried by the linkage will be tilted about a horzontal axis. The precise linkage as shown does not, per se, form a part of the present invention and is illustrated as constructed in accordance with the patent to Dobeus, No. 2,685,973.

The loader is adapted to be secured to the linkage to be elevated thereby as the linkage is swung in a vertical plane and to be tilted about a horizontal axis for loading and unloading operations. The supporting frame, as shown, comprises a pair of side members 16 which may be of generally channel section and which extend vertically upward for substantially one-half their length and then angle forwardly as shown. The side members 16 are connected by an upper cross bar 17 and a lower cross framework 18 which, as shown in Figure 2, includes a cross beam 19 extending across the lower part of the framework and close to the forward edge portion of the side members 16. The framework is mounted on the linkage by pivotally connecting the booms 12 to the lower part thereof at opposite sides on pivotal axes 21 and by connecting the upper control links to the side members 16 above the bottoms thereof on pivotal axes 22. With this connection, when the booms are raised by the usual mechanisms provided on the tractor the supporting frame will be elevated without substantial tilting movement and when the hydraulic motors 15 are expanded the frame will be tilted forwardly for unloading, as described hereinafter.

The frame carries a pair of spaced forwardly extending fork members which are formed by angular beam elements 23 with the lower arms 24 thereof extending approximately horizontally forward from the lower part of the frame. The upper ends of the upper arms of the fork elements are pivoted to the side members 16 on pivotal axes 25 and extend downwardly therefrom to engage the cross beam 19 so that swinging of the fork members in a counter-clockwise direction, as seen in Figure 2, is limited while leaving the fork members free to swing in a clockwise direction. The horizontal and vertical arms of the fork members are connected with fillet plates 26 which strengthen the fork members and which provide a curved surface for the reception of the load of logs, or the like.

Logs received on the fork members are adapted to be gripped and held thereon by tong arms 27 and 28. The tong arms, as shown, are of complementary shape and are pivoted on coaxial pivots 29 at the upper ends of the vertical members 16, respectively. Below the pivots 29 the tong arms curve outwardly as seen in Figure 2 and simultaneously toward each other, as best seen in Figure 1, so that their free ends are close together. For moving the tong arms hydraulic motors 31 are provided in the supporting frame with one end of each motor being pivotally connected to one of the vertical members 16 on an axis 32 and with its opposite end being pivotally connected to an extension 33 projecting beyond the pivotal axis 29 of the tong arm. The motors 31 may be supplied with operating fluid from a common source so that they will exert equal pressure on a load and so that they are capable of independent movement, as more particularly disclosed in the patent to Carlson, No. 2,776,768. With this construction, when the motors 31 are contracted the tong arms will

swing clockwise, as seen in Figure 2, to move away from the lower tong arms **24** for reception of a load of logs. When the motors are expanded, the arms will be swung counter-clockwise toward the fork arms **24** to grip the logs thereon. Preferably the tong arms are capable of swinging to substantially the maximum closed position shown in Figure 2 so that they will grip and hold a relatively small number of logs on the fork arms for handling a partial load.

According to the present invention, the free ends of the fork arms **27** and **28** are connected through lost motion connection means for a limited amount of swinging movement relative to each other. For this purpose, as best seen in Figure 4, the tong arm **27** is formed with an enlarged end provided with a notch **34** and the tong arm **28** is provided with a tongue **35** fitting loosely in the notch **34** when the arms are assembled on the supporting framework. As shown by the dotted lines in Figure 2, the groove **34** and tongue **35** lie at an acute angle to a radius therethrough from the pivotal axis **29** so that after a limited amount of relative movement of the arms the tongue **35** will engage one side or the other of the notch or groove **34** to limit relative swinging of the tong arms.

In use, the tong arms may be raised away from the lower fork arms **24** so that longs may enter freely over the ends of the fork arms to be supported thereby. In this operation the fork arms are normally lowered onto the ground or onto the side of a pile of logs and the tractor is advanced toward the logs so that the fork arms will slide under them. The pivotal mounting of the fork arms on the supporting frame enables them to move independently of each other during this operation to accommodate irregularities in the ground or in the surface over which they are moved so that the frame or the supporting linkage will not be strained or bent. When the fork arms have been moved under a load of logs the tong arms are swung downwardly by operation of the hydraulic motors **31** to grip the logs so that they may be picked up and transported.

Normally the fork arms move together as a single unit so that there is no possibility of the different fork arms engaging different logs. As the fork arms move into gripping position and in the event the load is thicker at one side of the unit than at the other, the fork arms may move independently to each other to a limited extent so that each fork arm will securely grip the load at opposite sides thereof. Normally a relatively small amount of movement between the fork arms will be sufficient to insure uniform gripping and the lost motion connection provided by the groove **34** and tongue **35** may be made sufficient to accommodate all of the conditions normally encountered.

With the logs gripped, the frame may be tipped back if desired by contracting the hydraulic motors **15** to bring the center of gravity of the load closer to the tractor and may then be raised to a carrying position above the ground. For unloading on a truck, or the like, the supporting frame may be raised to a sufficient elevation to clear the sides of the truck and any previous load thereon and the hydraulic motors **15** may be expanded to tilt the supporting frame forward. When the tong arms **27** and **28** are elevated the logs carried on the fork arms **24** will roll from the forward end thereof to the desired loaded location.

While one embodiment of the invention has been shown and described herein, it will be understood that it is illustrative only and not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A tractor mounted tong loader comprising a frame, means to mount the frame on a tractor for bodily swinging in a vertical plane and for tilting about a horizontal axis, spaced forks carried by the frame and projecting outward therefrom at the lower part thereof to receive a load of logs or the like, a pair of tong arms separately pivoted on a horizontal axis on the upper part of the frame at horizontally spaced points and curving toward each other, lost motion means connecting the free ends of the tong arms to limit relative pivotal movement thereof about said axis to a predetermined amount, and a pair of motor means connected to the frame and the tong arms respectively to swing the tong arms about the horizontal axis.

2. The loader of claim 1 in which the motor means comprises a pair of fluid motors connected to the tong arms respectively.

3. A tractor mounted tong loader comprising a frame, means to mount the frame on a tractor for bodily swinging in a vertical plane and for tilting about a horizontal axis, spaced forks carried by the frame and projecting outward therefrom at the lower part thereof to receive a load of logs or the like, a pair of tong arms pivoted on a horizontal axis on the upper part of the frame at horizontally spaced points and curving toward each other, the free ends of the tong arms being formed respectively with a notch at an angle to a radius from the pivotal axis of the arms and a tongue fitting loosely in the notch to limit relative movement of the tong arms, and means to swing the tong arms about their pivotal axis.

4. The loader of claim 3 in which the last named means comprises a pair of fluid motors connected to the tong arms respectively.

5. A tractor mounted tong loader comprising a vertically elongated frame, means mounting the frame on a tractor for bodily swinging in a vertical plane and for tilting about a horizontal axis, a pair of angular fork arms pivotally mounted at opposite sides of the frame on a horizontal axis above the bottom of the frame, the fork arms extending downward and engaging the frame below their pivotal axis to limit pivotal movement thereof in one direction and projecting outward from the frame at the lower part thereof to receive a load, a pair of tong arms pivoted on a horizontal axis on the upper part of the frame on a horizontal axis at horizontally spaced points and curving toward each other, the free ends of the tong arms being formed respectively with a notch at an angle to a radius from the pivotal axis of the arms and a tongue fitting loosely in the notch, and a pair of fluid motors connected to the tong arms respectively to swing them about their pivotal axis.

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