



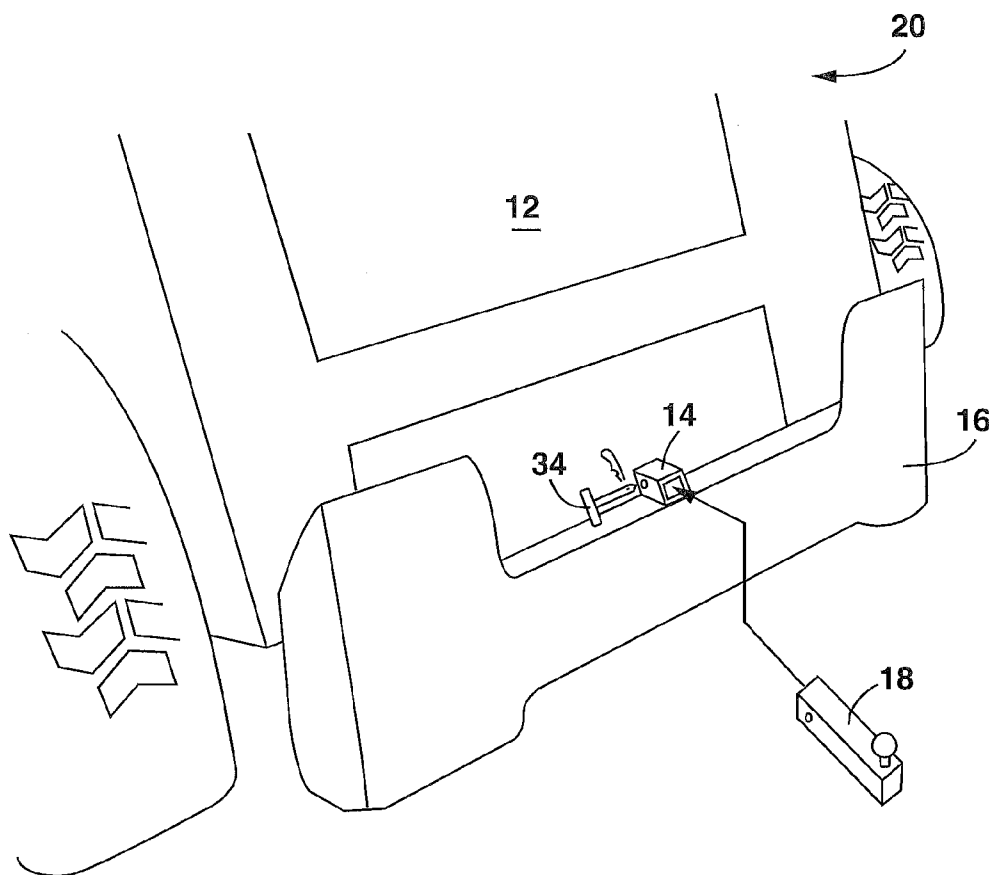
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(19) **United States**(12) **Patent Application Publication**
Murray(10) **Pub. No.: US 2012/0198734 A1**(43) **Pub. Date: Aug. 9, 2012**(54) **INTEGRATED HITCH SYSTEM FOR OFF
ROAD EQUIPMENT****Publication Classification**(76) Inventor: **Andrew Murray**, Columbia, SD
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E02F 9/00 (2006.01)
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(52) **U.S. Cl.** **37/403**(57) **ABSTRACT**

A integrated hitch system for off road equipment is provided that includes various styles of non receiver stile hitches (30) (32), combinations of a receiver hitch (14), plate (24), opening (28) and tool (18) attached to the front (20) or rear (22) of an off road machine (12) making a positive and secure connection between a trailer and off road machine (12) for towing purposes.

Related U.S. Application Data

(60) Provisional application No. 61/440,059, filed on Feb. 7, 2011.



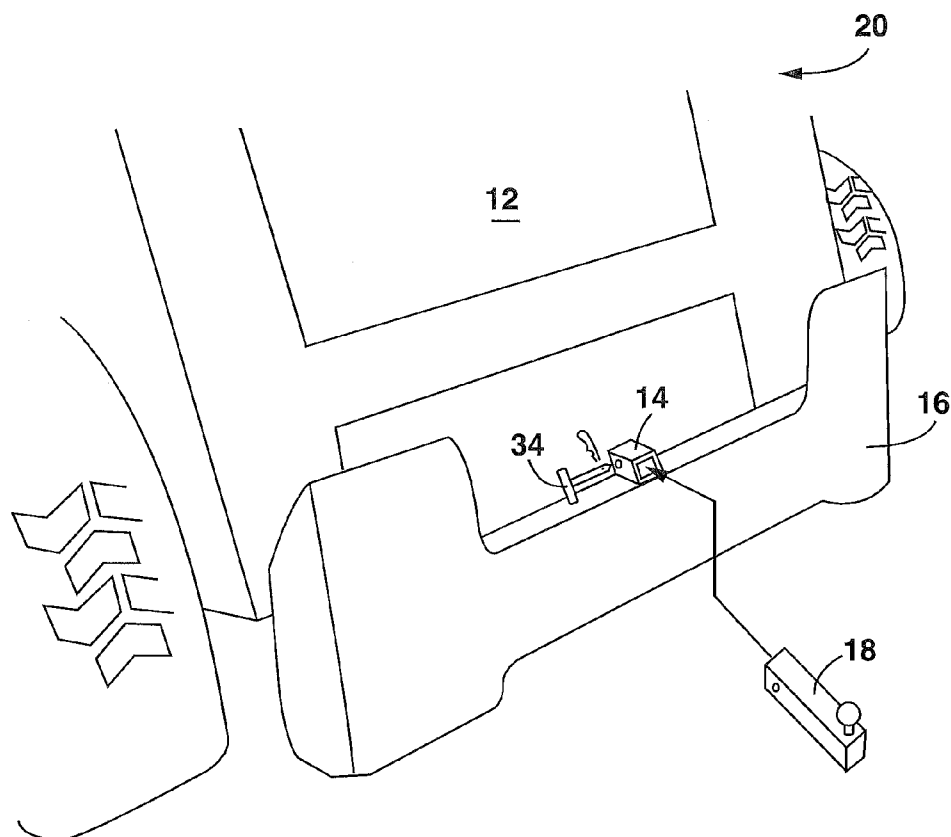
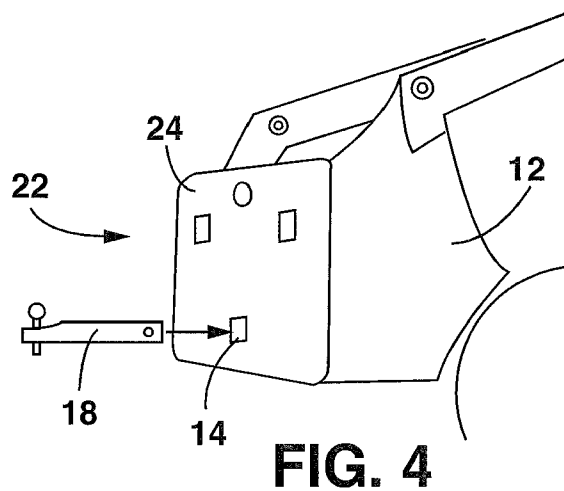
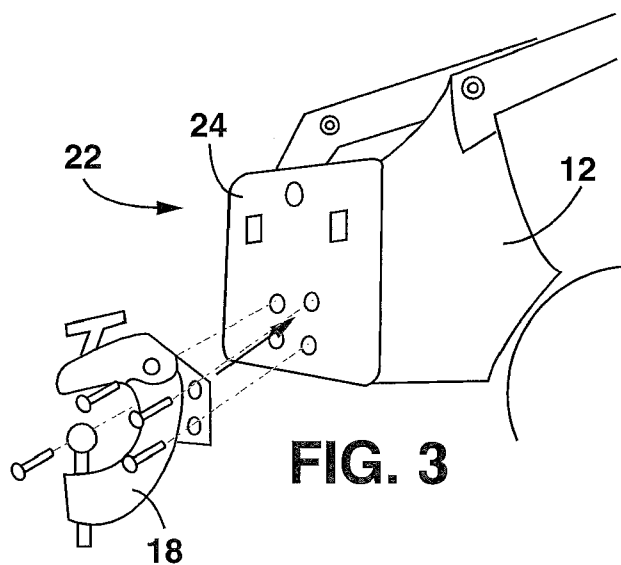
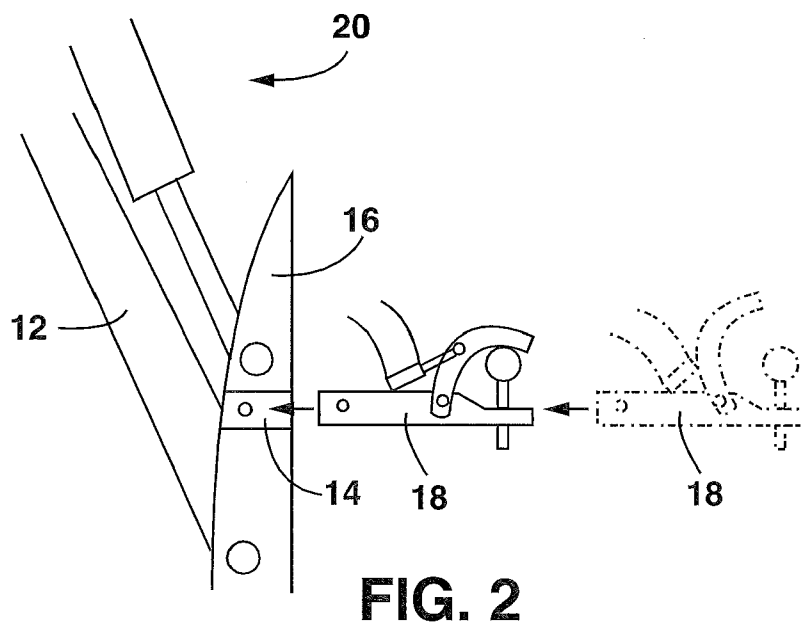


FIG. 1



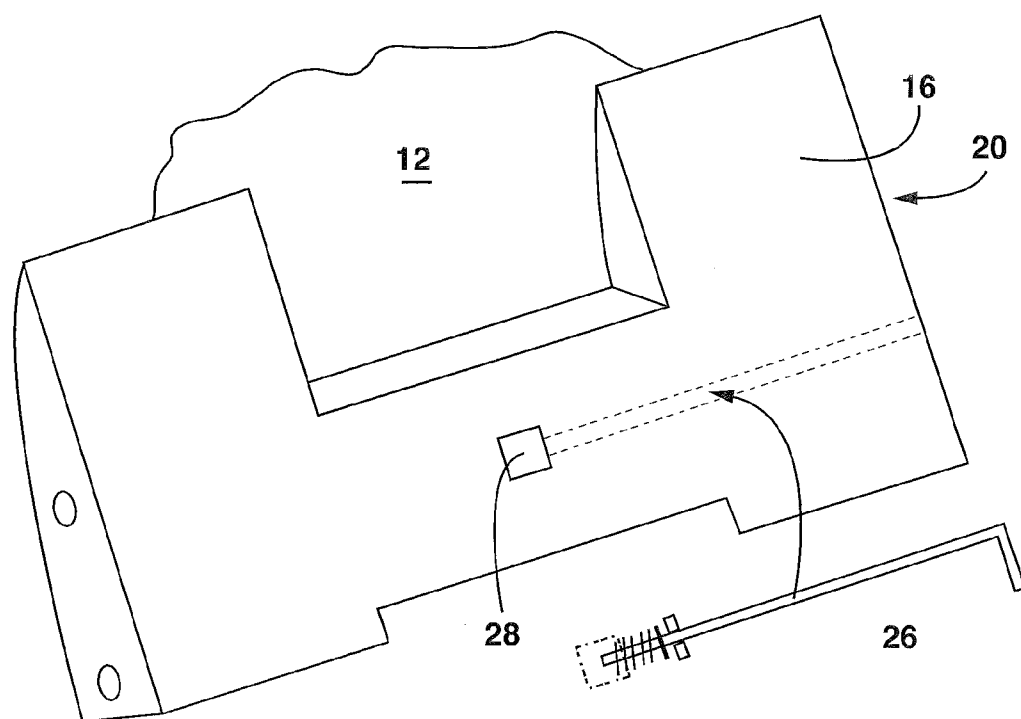


FIG. 5

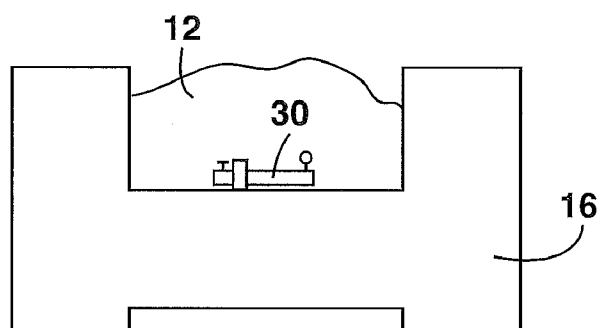


FIG. 6

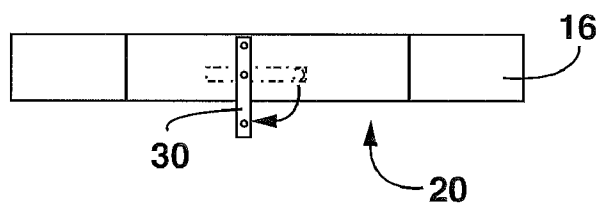


FIG. 7

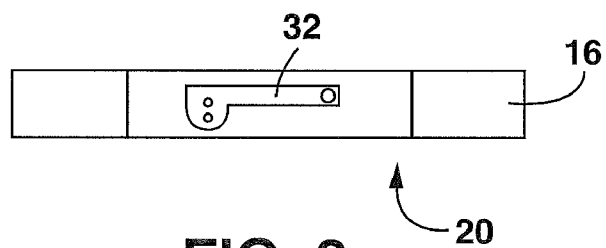


FIG. 8

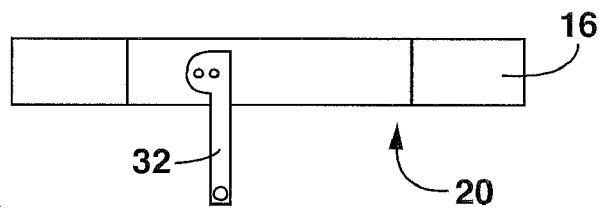


FIG. 9

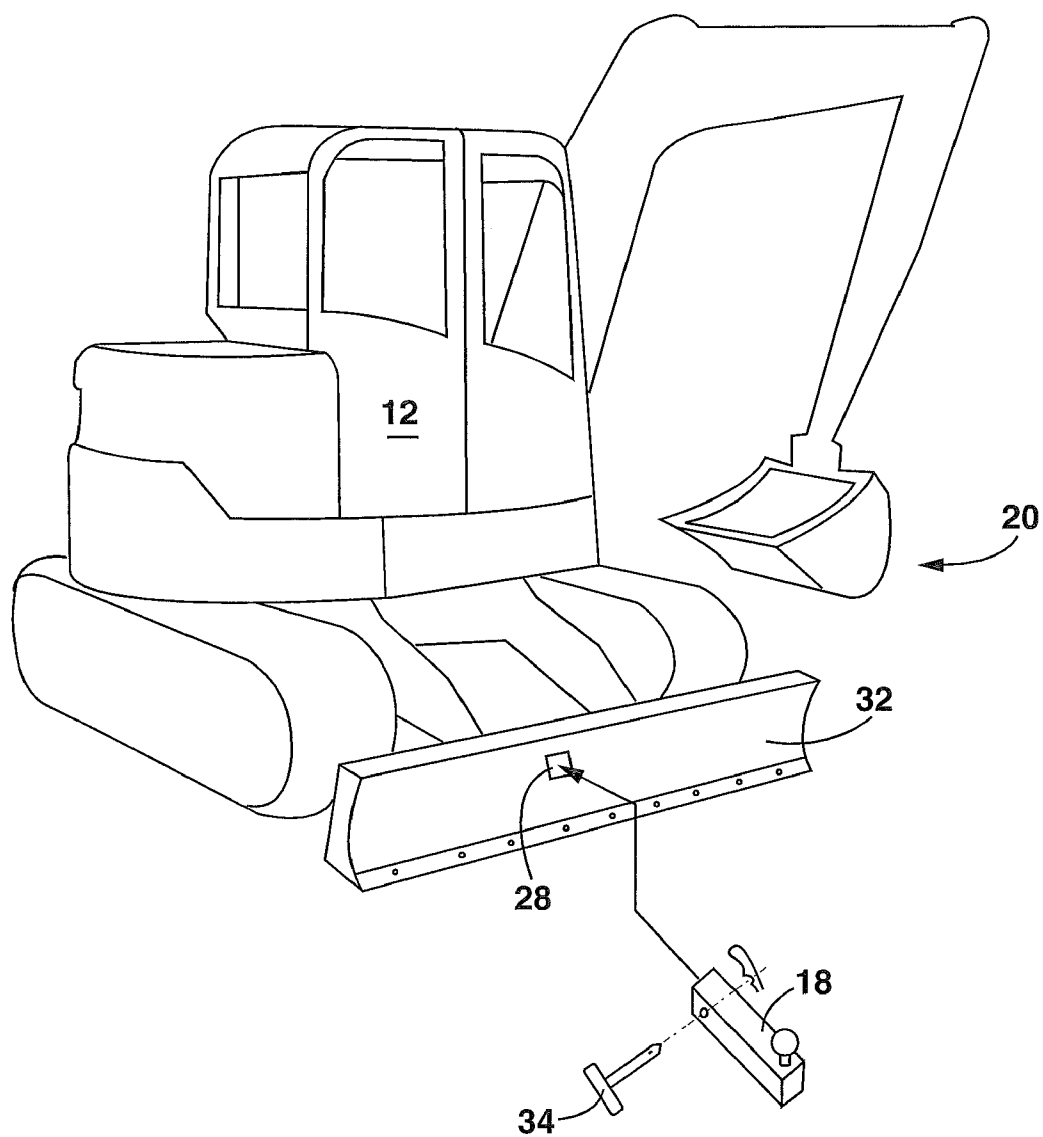


FIG. 10

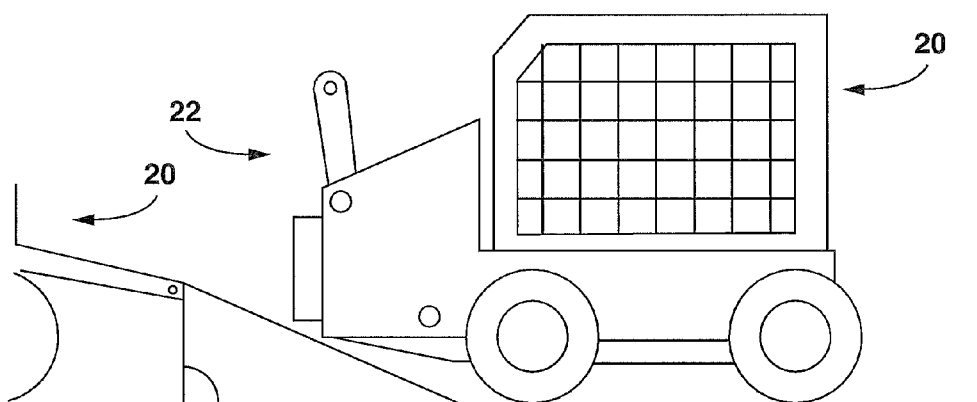


FIG. 11

INTEGRATED HITCH SYSTEM FOR OFF ROAD EQUIPMENT

RELATED APPLICATION

[0001] This application claims priority to U.S. Provisional Application No. 61/440059 filed Feb. 7, 2011, which is hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to an apparatus and method for integrating a hitch system for off road equipment, especially, an apparatus and method suitable for off road equipment that generally does not achieve highway speeds.

[0003] Trailers are used today for many purposes such as construction, agriculture and recreation. Trailers can be part of the form of portable machines, buildings and other portable devices. Trailer hitches are commonly configured for use on trucks and other vehicles that achieve highway speeds. Vehicles that achieve highway speeds are typically not used and underperform when they are used in off road situations.

[0004] Often trailers used and stored on off road sites have to be moved. On construction and agriculture sites this happens quite frequently. Usually on these sites, off road equipment is immediately available and better suited to navigate the off road terrain and lack of space for maneuvering a truck or automobile.

[0005] The problem with off road equipment is that it is not entirely effective in moving a trailer. There is not a positive connection point to accomplish this purpose on off road equipment such as skid loaders, graders and excavators.

[0006] As such, there is a need for an integrated hitch system for off road equipment that makes a positive and secure connection between a trailer and off road equipment.

SUMMARY OF THE INVENTION

[0007] In one aspect, an integrated hitch system for off road equipment is provided that includes an off road machine with at least one tool holder, the tool holder configured to interchangeably attach thereto at least a first of a plurality of tools; and a hitch attachment tool attached to the tool holder.

[0008] In one embodiment, the first tool includes one of a fork, a blade, and a bucket.

[0009] In one embodiment, the hitch attachment tool comprises a hitch receiver and a corresponding trailer hitch.

[0010] In one embodiment, the off road machine is one of a skid loader, an excavator, and a utility tractor.

[0011] In one embodiment, the hitch attachment tool is integral with the first tool.

[0012] In one embodiment, the off road machine is one of a skid loader, an excavator, and a utility tractor, and the first tool is one of a fork, a blade, and a bucket, and the hitch attachment tool is integral with the first tool.

[0013] In one embodiment, the machine includes controls for operating the first tool and the hitch attachment tool is integral with the first tool such that an operator of the machine may lower and raise the hitch attachment tool using the controls.

[0014] In one embodiment, the hitch attachment tool is pivotally attached to the tool holder, allowing the hitch attachment tool to pivot between an open and retracted position.

[0015] In one embodiment, the hitch attachment tool comprises a pivoting member that pivots between an open and closed position, wherein in the open position the pivoting

member allows a trailer to be attached to a trailer ball and in the closed position the pivoting member secures the trailer to the trailer ball.

[0016] In one embodiment, the pivoting member is operable by a user with a controller associated with the machine.

[0017] In one aspect, an integrated hitch system for off road equipment is provided that includes an off road machine with at least one tool holder, the tool holder configured to interchangeably attach thereto at least a first of a plurality of tools; and a hitch attachment tool attached to the tool holder, wherein the off road machine is one of a skid loader, an excavator, and a utility tractor, and the first tool is one of a fork, a blade, and a bucket, and the hitch attachment tool is attached directly to the first tool, wherein the machine comprises controls for operating the first tool and wherein hitch attachment tool is integral with the first tool such that an operator of the machine may lower and raise the hitch attachment tool using the controls, and wherein the hitch attachment tool comprises a pivoting member that pivots controllable between an open and closed position, wherein in the open position the pivoting member allows a trailer to be attached to a trailer ball and in the closed position the pivoting member secures the trailer to the trailer ball.

[0018] Additional aspects of the present invention will be apparent in view of the description which follows.

BRIEF DESCRIPTION OF THE FIGURES

[0019] FIG. 1 is a perspective view one embodiment of the integrated hitch system for off road equipment.

[0020] FIG. 2 is a side view of another embodiment of the integrated hitch system.

[0021] FIG. 3 is a perspective view of another embodiment of the integrated hitch system.

[0022] FIG. 4 is a perspective view of another embodiment of the integrated hitch system.

[0023] FIG. 5 is a perspective view of another embodiment of the integrated hitch system.

[0024] FIG. 6 is a front view of another embodiment of the integrated hitch system.

[0025] FIG. 7 is a top view of FIG. 6.

[0026] FIG. 8 is a top view of another embodiment of the integrated hitch system.

[0027] FIG. 9 is a top view like FIG. 8.

[0028] FIG. 10 is a perspective view of, yet, another embodiment of the integrated hitch system.

[0029] FIG. 11 is an elevation view of a skid loader.

DETAILED DESCRIPTION OF THE INVENTION

[0030] In order that the invention or inventions disclosed herein may be clearly understood and readily carried into effect, preferred embodiments of the invention(s) will now be described, by way of example only, with reference to the accompanying drawings.

[0031] Generally, the device of the present application is a permanently housed integrated hitch system that does not interfere with an interchangeable tool holder 16 or other part of a machine 12 thus increasing an off road machine's 12 productivity. The device can be positioned on the front or rear of a machine 12 in many various locations to haul trailers.

[0032] The off road machine may be a skid loader, excavator, small utility tractor loader or similar lifting type apparatus, but not limited to being actually attached to the lifting part of a machine.

[0033] Interchangeable tool holders 16 are a common component of many off road machines 12. The purpose of the interchangeable tool holder 16 is to make it more convenient for the operator to change tools such as forks, buckets and blades that interchangeably attach to tool holder 16. The integrated hitch system makes use of interchangeable tool holder 16 to create a positive and secure connection between a trailer and an off road machine 12.

[0034] The purpose of one embodiment of the invention is to utilize the visibility and versatility of a machine 12, like a skid loader and the available assortment of attachment tools 18 already on the market. One installs a tool 18 when needed and conveniently remove the tool 18 when not needed. Additionally, a multitude of currently available trailers or implements, of all sorts, can be moved by an off road machine 12 utilizing this integrated hitch system.

[0035] Referring to FIG. 1 the system according to at least one embodiment consists of a receiver hitch 14 attached directly and/or permanently by welding or other means onto an interchangeable tool holder 16 on the front 20 of the machine 12. A hitch attachment tool 18 slides into the receiver hitch 14 when needed and is removed when not needed.

[0036] Referring to FIG. 2 the system according to at least one embodiment consists of a receiver hitch 14 attached directly and/or permanently by welding or other means into an interchangeable tool holder 16 on the front 20 of the machine 22. A hitch attachment tool 18 slides into the receiver hitch 14 when needed and is removed when not needed. In this instance, the tool holder 16 is movable about a pivot point or points with a hydraulic ram power by the machine, as shown. The tool 18 may further include a pivoting member that pivots between an open position, e.g., allowing for a trailer to be attached to the trailer ball, and a closed position, e.g., securing the trailer to the trailer ball, as shown. The pivoting member may operate/be driven between the open and closed positions with a mechanical or hydraulic controller operated by a user of the machine 12.

[0037] Referring to FIG. 3 the system according to at least one embodiment consists of a receiver plate 24 attached directly and/or permanently by welding or other means on the rear 22 of the machine 12. A hitch attachment tool 18 bolts onto a receiver plate 24 when needed and is removed when not needed.

[0038] Referring to FIG. 4 the system according to at least one embodiment consists of a receiver plate 14 attached directly and/or permanently by welding or other means on the rear 22 of the machine 12. A hitch attachment tool 18 slides into the receiver plate 14 when needed and is removed when not needed.

[0039] Referring to FIG. 5 the system according to at least one embodiment consists of a receiver opening 28 permanently inserted into an interchangeable tool holder 16 on the front 20 of the machine 12. Interchangeable tool holder 16 is fitted with a spring loaded hitch pin 26 that interlocks with a corresponding hole or other engagement means in the hitch attachment tool 18. A hitch attachment tool 18 slides into the receiver opening 28 when needed and is removed when not needed.

[0040] Referring to FIG. 6 the system according to at least one embodiment consists of a non receiver style hitch 30 attached directly and/or permanently by welding or other means onto an interchangeable tool holder 16 on the front 20 of the machine 12.

[0041] Referring to FIG. 7, a top view of FIG. 6. A non receiver style hitch 30 is disclosed in the open position and shown in broken lines in the retracted position. In this instance, the receiver style hitch 30 pivots on the tool holder 16 between the open and retracted positions.

[0042] Referring to FIG. 8 the system according to at least one embodiment consists of a non receiver style hitch 32 attached directly and/or permanently by welding or other means onto an interchangeable tool holder 16 on the front 20 of the machine 12. The hitch 32 is disclosed in the retracted position.

[0043] Referring to FIG. 9 the system according to at least one embodiment consists of a non receiver style hitch 32 attached directly and/or permanently by welding or other means onto an interchangeable tool holder 16 on the front 20 of the machine 12. The hitch 32 is disclosed in the operating position.

[0044] Referring to FIG. 10 the system according to at least one embodiment consists of a receiver opening 28 permanently inserted into a push blade 32 on the front 20 of the machine 12. Push blade 32 is fitted with a keyed pushpin 34 or other means for removably attaching the tool 18 to the blade 32 or other hydraulically operated member of the machine 12. A hitch attachment tool 18 slides into the receiver opening 28 when needed and is removed when not needed. As can be appreciated, the operator of the machine 12 may hydraulically lower and raise the tool 18 into position from within the machine 12 using the existing hydraulic or other controls.

[0045] Referring to FIG. 11 this view discloses the angle of approach for the rear of a skid loader machine 12 where the obvious choice is to mount a hitch under the rear of the machine 12. The concept disclosed is that a hitch mounted under the rear of machine 12 would hinder machine 12 and would also cause extra drag or a point at which the machine 12 would get high centered. Thus an integrated hitch system for off road equipment of the above mentioned embodiments are of far superior design to the obvious choice of mounting a hitch under the rear of a on road or off road machine 12 to haul trailers.

[0046] There are many materials and configurations that can be used in constructing the devices disclosed herein by those skilled in the art including various materials, positions on the machine 12 and dimensions. In addition, it is clear that an almost infinite number of minor variations to the form and function of the disclosed invention could be made and also still be within the scope of the invention.

[0047] While the foregoing invention has been described in some detail for purposes of clarity and understanding, it will be appreciated by one skilled in the art, from a reading of the disclosure, that various changes in form and detail can be made without departing from the true scope of the invention.

What is claimed is:

1. An integrated hitch system for off road equipment comprising:

an off road machine with at least one tool holder, the tool holder configured to interchangeably attach thereto at least a first of a plurality of tools; and

a hitch attachment tool attached to the tool holder.

2. The system of claim 1, wherein the first tool includes a fork.

3. The system of claim 1, wherein the first tool includes a blade.

4. The system of claim 1, wherein the first tool includes a bucket.

5. The system of claim 1, wherein the hitch attachment tool comprises a hitch receiver and a corresponding trailer hitch.

6. The system of claim 1, wherein the off road machine is one of a skid loader, an excavator, and a utility tractor.

7. The system of claim 1, wherein the hitch attachment tool is integral with the first tool.

8. The system of claim 1, wherein the off road machine is one of a skid loader, an excavator, and a utility tractor, and the first tool is one of a fork, a blade, and a bucket, and the hitch attachment tool is integral with the first tool.

9. The system of claim 8, wherein the machine comprises controls for operating the first tool and wherein hitch attachment tool is integral with the first tool such that an operator of the machine may lower and raise the hitch attachment tool using the controls.

10. The system of claim 1, wherein the hitch attachment tool is pivotally attached to the tool holder, allowing the hitch attachment tool to pivot between an open and retracted position.

11. The system of claim 1, wherein the hitch attachment tool comprises a pivoting member that pivots between an open and closed position, wherein in the open position the pivoting member allows a trailer to be attached to a trailer ball and in the closed position the pivoting member secures the trailer to the trailer ball.

12. The system of claim 11, wherein the pivoting member is operable by a user with a controller associated with the machine.

13. An integrated hitch system for off road equipment comprising:

an off road machine with at least one tool holder, the tool holder configured to interchangeably attach thereto at least a first of a plurality of tools; and

a hitch attachment tool attached to the tool holder, wherein the off road machine is one of a skid loader, an excavator, and a utility tractor, and the first tool is one of a fork, a blade, and a bucket, and the hitch attachment tool is attached directly to the first tool, wherein the machine comprises controls for operating the first tool and wherein hitch attachment tool is integral with the first tool such that an operator of the machine may lower and raise the hitch attachment tool using the controls, and wherein the hitch attachment tool comprises a pivoting member that pivots controllable between an open and closed position, wherein in the open position the pivoting member allows a trailer to be attached to a trailer ball and in the closed position the pivoting member secures the trailer to the trailer ball.

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