ABSTRACT

The field of the present invention provides for a large automobile that has already been adapted for snow plowing, but having the snow plow removed is then has a folding backhoe apparatus attached to the snow plow attachment points. In a preferred aspect an adapter plate is used and the end of the backhoe can either have a forward or reverse position backhoe shovel (or bucket) attached or have an adapter apparatus that can accept different utility tips such as a post digger drill, a jack hammer or a rake. In a further aspect, snow plow attachment points are attached to an adapter mechanism that can be attached to either a single arm backhoe or a double arm backhoe apparatus.

Examples of related patents and applications are included in the Figures and Specifications. These related patents and applications are hereby incorporated by reference for the purposes of this application.

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BACKHOE ATTACHMENTS, BACKHOE APPARATUS ATTACHED TO AN SNOWPLOW ADAPTED AUTOMOBILE, AND METHOD OF USE THEREFOR

CLAIM TO PROVISIONAL APPLICATION

The application claims priority to U.S. Provisional Application 611/034,297 filed 6 Mar. 2008, the entire disclosure of which is incorporated by reference.

FIELD OF THE INVENTION

The field of the present invention relates generally to a large automobile adapted for snow plowing having the snow plow removed and having a folding backhoe apparatus attached to the snow plow attachment points. In a preferred aspect an adapter plate is used and the end of the backhoe can either have a forward or reverse position backhoe shovel (or bucket) attached or have an adapter apparatus that can accept different utility tips such as a post digger drill, a jack hammer or a rake. In a further embodiment, the snow plow attachment points are attached to an adapter mechanism that can be attached to either a single arm backhoe or a double arm backhoe apparatus.

BACKGROUND OF THE INVENTION

Traditionally, large snow plows are owned and used by the state or by private show plowing operators during the winter season and the plows are removed during the warmer months. Many states have their trucks parked and not used for a number of months. In order to make equipment interchangeable as it wears out, snow plow attachments and snow plows are often standard for large trucks that are owned by states and local municipalities, are only of a few types, or are readily adapted to different trucks types that are utilized for snow plowing.

When a backhoe apparatus or other similar equipment are needed for digging, drilling, jack-hammering and the like, a truck for carrying the heavy equipment and the equipment must be transported and reloaded at the transportation site. This requires the storage and maintenance of multiple types of equipment, depending upon the job and the time of year.

Farmers have long been required to accomplish different tasks on their farms in the most economical manner and often try to avoid having multiple tractors or trucks where each requires separate maintenance. Therefore, tractor equipment for different tasks is made for their specific model of tractor and can be removable attached. For example, backhoe apparatus are designed to attach to the back of the vehicle mountings, along with other equipment such as drills for posthole digging, shovels, plows and mowing equipment. For example, U.S. Pat. No. 3,844,423 to Bailey describes a quick release backhoe attachment for a tractor, U.S. Pat. No. 4,948,328 to Busch describes a quick release bucket for a backhoe, and U.S. Pat. No. 6,931,770 to Belside describes a number of pieces of front mounted equipment for small four wheeler recreational vehicles that may substitute for more expensive tractors.

Accordingly, there is a need for more economical use of existing equipment by municipalities and state governments to be able to utilize existing equipment for multiple purposes by adapting the existing equipment rather than by purchasing and maintaining specific purpose equipment.

In addition, private contractors can also benefit from such multipurpose equipment adaptations. Particularly, needed are equipment and attachments that can be coupled with large snow plow equipment and be easily transported to job sites to avoid the need for additional specific purpose equipment. Different attachments are needed for different purposes where each may be attached to the existing snow plow attachment points, either directly or through an intermediate coupling device.

SUMMARY OF THE INVENTION

An object of the present invention is to provide methods and apparatus for adapting large snow plow equipment and providing multiple purpose equipment that be can substituted for other single purpose equipment and avoid the need and expense for certain single purpose equipment, wherein the multiple purpose equipment capabilities are provided by attachment of apparatus to existing snow plow points of attachment and thereby provide a member selected from the group consisting of backhoe equipment, drill, jack hammer, rake, pavement roller, soil tamper and the like that can be easily transported by a snow plow truck to various locations instead of transporting and using single purpose equipment.

A preferred object of the present invention is to provide methods and apparatus for adapting large snow plow equipment into a backhoe apparatus wherein the bucket at the tip of the backhoe apparatus can be replaced by other style equipment such as a drill, jack hammer, rake, pavement roller, soil tamper and the like. The arms for the backhoe may be folded at the front of the truck in order to make it permissible to drive the snow plow truck on the open highway with the apparatus attached. The bucket at the end of the backhoe may be either a single bucket or a dual jaws bucket type.

Another object is to provide a backhoe apparatus having a single arm that may be attached direct to the existing snow plow attachment points on a snow plow truck, or to provide an adapter apparatus for attaching to the existing snow plow attachment points, and further attaching the adapter apparatus to a dual arm backhoe apparatus that can receive and operate a larger bucket tip that can be used for lifting snow or other solids upon a pile or stack.

A further object is to provide some embodiments wherein the backhoe apparatus may be transported within the rear of the truck and a winch may be utilized to remove equipment at or near the job site for mounting upon the front of the snow plow truck.

DETAILED DESCRIPTION OF THE DRAWING

FIG. 1 is a side view showing of an embodiment of the snow plow automotive vehicle (vehicle not shown) with snow plowing mounting apparatus 9 attached to a backhoe apparatus 20 according to the invention wherein 1 is a set of two swivel plates 8 that are separated by a bushing or thrust bearing 2 (not shown here, see FIG. 2) and sandwich a stationary plate 10 of the snow plow mounting apparatus, wherein the pair of swivel plates 8 have the ability to rotate and allow the backhoe apparatus 20 to be moved from the transport or horizontal position into the operating or vertical position. The shorter first extension arm 3 of backhoe apparatus 20 allows the backhoe apparatus 20 to be centered upon the snow plow vehicle (not shown) in the transport or horizontal position without extending beyond the fender of the
vehicle. First extension arm 3 is the portion of the backhoe apparatus 20 located closest to the attachment points of the vehicle. The nesting second extension arm 7 is a telescoping portion shaped so that the shorter first extension arm 3 nests inside so that in the horizontal position during transportation less of the backhoe apparatus 20 protrudes beyond the sides of the snow plow vehicle. The longer third extension arm 4 is the most distant arm portion of the backhoe apparatus 20 from the attachment points to the vehicle and attaches to second extension arm 7 on one end and on a second end provides an attachment portion for buckets or other useful apparatus to the backhoe apparatus 20. The top connection tube 5 is a tubular metal device that covers a connection from a standard snow plow mount bracket for securely mounting to the snow plow vehicle and is secured by the top connection pin 6 that is a locking pin to lock the top connection tube 5 to a standard snow plow upper mount bracket (not shown). The lower snow plow connection bracket 9 is shown.

0012 FIG. 2 is a front view showing further details of the mounting apparatus with the backhoe apparatus 20 secured in a vertical (working) position with locking pin 2, which is a device that goes through the swivel plates 8 and the stationary plate 10 to allow the attachment to be locked into one of two positions: the horizontal transport position (see FIG. 3) and the vertical working or operating position.

0013 FIG. 3 is a rotated landscape printing front view showing further details of the mounting apparatus with the backhoe apparatus 20 secured in a horizontal (transportation) position with locking pin 2 (as described in FIG. 2) going through the swivel plates 8 and the stationary plate 10 to allow the attachment to be locked into the horizontal transport position and the second extension arm 7 telescoping arm has first extension arm 3 (not shown) retracted and with third extension arm 4 (not shown) folded upon extension arm 7 in the horizontal transportation position.

DETAILED DESCRIPTION OF THE INVENTION

0014 The present invention provides methods and apparatus for adapting large snow plow truck equipment and providing multiple purpose equipment that can be substituted for other single purpose equipment and avoid the need and expense for certain single purpose equipment, wherein the multiple purpose equipment capabilities are provided by attachment of apparatus to existing snow plow points of attachment and thereby provide a member selected from the group consisting of backhoe equipment, drill, jack hammer, rake, pavement roller, soil tamper and the like that can be easily transported by a snow plow truck to various locations instead of transporting and using single purpose equipment.

0015 Heavy snow plow trucks are best adapted for such addition purpose apparatus and may even utilize off-road tractor-like tires that can optionally replace the ordinary tires for the trip to a job site or at the site. Mechanical attachments for hydraulic, electric, or a combination thereof, piston portions of a backhoe apparatus according to the invention whose purpose is to lift and lower the backhoe framework or to manipulate the bucket at one end of the backhoe apparatus can be be attached directly to existing attachment points on a snow plow truck or may be attached to intermediate adapter apparatus, which are attached to existing mounting points. The hydraulic fluid system can be attached to the existing hydraulic system of the snow plow truck, or have a separate system. Preferably, quick release mechanical, electrical, or hydraulic attachments to the snow plow truck are utilized to expedite equipment changes.

0016 Control of multipurpose equipment attached to a snow plow truck may have their own controls or may plug into a harness that communicates with the cab portion of the snow plow truck. Likewise the cab of the snow plow truck may be adapted to provide a harness or plug for certain controls, which may be interchangeable or swapped out depending upon the type of equipment in use with the snow plow truck.

0017 A preferred embodiment of the invention provides methods and apparatus for adapting large snow plow equipment into a backhoe apparatus wherein the bucket at the tip of the backhoe apparatus can interchangeably attach to style equipment apparatus located at one end of the backhoe arms, such as a drill, jack hammer, rake, pavement roller, soil tamper and the like. In a more preferred embodiment, the one or more arms of the backhoe apparatus portion of the equipment can be folded down and collapsed at the front of the truck in order to make it easier to operate the snow plow truck on the open highway with apparatus attached.

0018 According to the invention embodiment, the bucket at the end of the backhoe may be either a single bucket or a dual jaws bucket type. Also, the bucket at one end of the backhoe apparatus may narrow or wide and shallow or deep, depending upon whether one or two arm backhoe apparatus are attached to it and the desired use for the bucket.

0019 One embodiment of the invention provides a backhoe apparatus having a single arm that may be attached direct to the existing snow plow attachment points on a snow plow truck, or the apparatus may be attached to an intermediate adapter apparatus that is attached to the existing snow plow attachment points. In particular, an intermediate adapter apparatus may be utilized when a dual arm backhoe apparatus or when additional hydraulic, electrical, or winching equipment are attached to operate a larger bucket tip that can be used for lifting snow or other solids upon a pile or stack, or to operate larger equipment attached to one end of the backhoe arms apparatus.

0020 In some embodiments, the backhoe apparatus may be transported within the rear of the truck and a winch may be utilized to remove equipment at or near the job site for mounting upon the front of the snow plow truck.

0021 In a preferred embodiment the apparatus are mounted to an “A” frame mounting bracket that connects to a standard multiple snow plow mounts on a motor vehicle. In such an embodiment, the “A” frame mounting bracket connects to the attachment points located underneath the front of the vehicle and the third point is located at the front top of the vehicle. This “A” frame mounting bracket is attached to the three snow plow mounting points and supports the attached back hoe via a triangular frame. Attaching the backhoe apparatus to the intermediate frame is a rotating mount system that allows the piece of equipment to be locked in the upright, working position and the horizontal or transport position via a locking pin. Manual rotation is permitted by two circular plates sandwiching a plate mounted to the “A” frame which is attached to the mounts on the vehicle. The backhoe attachment is mounted on the outermost of the circular plates allowing a rigid secure mount to the frame mounting bracket and thus the vehicle. The hydraulic pump and ancillary equipment are attached to the triangular frame-mounting bracket and are operated by the connected controls for the back hoe. A power connection is made to the vehicle electrical system. The back hoe, in the vertical or working position, is able to
have all functions of a standard back hoe. In a further preferred embodiment, the back hoe (in the horizontal or transport position) is folded and locked to the triangular mounting frame.

[0022] Herein, some attachment points, the shape of equipment and the types of mechanical, electrical and hydraulic features are not depicted specifically by drawings. These are within the skill of a mechanic to provide after reading the adaptations described in the present text and reviewing the drawings provided.

[0023] The present invention may be embodied in specific forms other than those particularly described above or illustrated by the above examples. Upon viewing the present application preferred embodiments and other descriptions herein of the present invention, variations and other implementations that do not depart from the spirit and scope of the present invention will be apparent to one of routine skill in this field. Such variations and other implementations are considered part of the present invention and within the scope of the appended claims. Accordingly, reference should be made to the appended claims, rather than to the foregoing specification and examples, as indicating the scope of the present invention.

1 claim:

1. An apparatus for adapting snow plow truck equipment to provide multiple purpose equipment that be can substituted for other single purpose equipment, wherein the multiple purpose equipment capabilities are provided by directly or indirectly attaching equipment apparatus portions to existing snow plow points of attachment and thereby providing a multipurpose equipment member selected from the group consisting of backhoe equipment, drill, jack hammer, rake, pavement roller, soil tamper and the like that can be easily transported by a snow plow truck to various locations instead of transporting and using single purpose equipment.

2. The apparatus according to claim 1, wherein heavy snow plow trucks are adapted for such addition purpose apparatus.

3. The apparatus according to claim 2, wherein the heavy snow plow trucks can utilize off-road tractor-like tires that can replace ordinary tires for the trip to a job site, or may be attached to the vehicle at the job site as a replacement for ordinary tires.

4. The apparatus according to claim 3, wherein mechanical attachments for hydraulic, electric, or a combination thereof portions of a backhoe arms apparatus a backhoe apparatus according to the invention, which may include hydraulic pistons and levers whose purpose is to lift and lower the backhoe framework or to manipulate the bucket at one end of the backhoe apparatus are attached directly to existing attachment points on a snow plow truck or are indirectly attached through an intermediate adapter apparatus that are attached to existing mounting points.

5. The apparatus according to claim 4, wherein the hydraulic fluid system is attached to the existing hydraulic system of the snow plow truck, or has a separate system.

6. The apparatus of claim 1, wherein quick release mechanical, electrical, or hydraulic attachments are utilized to attach apparatus to the snow plow truck and thereby expedite equipment changes.

7. The apparatus of claim 1, wherein control of multipurpose equipment attached to a snow plow truck is actuated by an equipment operator from inside or outside of the snow plow truck, and wherein such multipurpose equipment apparatus either has its own controls or may plug into a harness that communicates with a cab portion of the snow plow truck.

8. The apparatus of claim 7, wherein the cab interior of the snow plow truck is adapted to provide a harness or plug for certain controls, which may be interchangeable or swapped out depending upon the type of equipment that is attached and in use with the snow plow truck.

9. The apparatus of claim 1, wherein a large snow plow truck is adapted into a backhoe apparatus having one or more arms with a removable bucket at one end of the backhoe arms apparatus, and wherein the bucket can be replaced with other shaped buckets or may be replaced with interchangeable apparatus that can provide other functional equipment at one end of the backhoe arms that are selected from the group comprising a drill, jack hammer, rake, pavement roller, soil tamper and bucket style jaws.

10. The apparatus of claim 9, wherein the one or more arms of the backhoe apparatus portion of the equipment can be folded down and collapsed at the front of the truck in order to make it easier to operate the snow plow truck on the open highway with apparatus attached and can be locked in position during transportation.

11. The apparatus of claim 9, wherein the bucket at the end of the backhoe arms may be either a single bucket or a dual jaws bucket type, and the bucket may be narrow or wide and shallow or deep, depending upon whether one or two arm backhoe apparatus are attached to it and desired use for the bucket.

12. A method for adapting snow plow truck equipment to provide multiple purpose equipment that be can substituted for other single purpose equipment, wherein the multiple purpose equipment capabilities are provided by directly or indirectly attaching equipment apparatus portions to existing snow plow points of attachment and thereby providing a multipurpose equipment member selected from the group consisting of backhoe equipment, drill, jack hammer, rake, pavement roller, soil tamper and the like that can be easily transported by a snow plow truck to various locations instead of transporting and using single purpose equipment.

13. The method according to claim 12, wherein heavy snow plow trucks are adapted for such addition purpose apparatus and heavy snow plow trucks can utilize off-road tractor-like tires that can replace ordinary tires for the trip to a job site, or may be attached to the vehicle at the job site as a replacement for ordinary tires.

14. The method according to claim 13, wherein mechanical attachments for hydraulic, electric, or a combination thereof portions of a backhoe arms apparatus a backhoe apparatus according to the invention, which may include hydraulic pistons and levers whose purpose is to lift and lower the backhoe framework or to manipulate the bucket at one end of the backhoe apparatus are attached directly to existing attachment points on a snow plow truck or are indirectly attached through an intermediate adapter apparatus that are attached to existing mounting points.

15. The method according to claim 14, wherein the hydraulic fluid system is attached to the existing hydraulic system of the snow plow truck, or has a separate system, and wherein quick release mechanical, electrical, or hydraulic attachments are utilized to attach apparatus to the snow plow truck and thereby expedite equipment changes.

16. The method according to claim 14, wherein control of multipurpose equipment attached to a snow plow truck is actuated by an equipment operator from inside or outside of the snow plow truck.
the snow plow truck, and wherein such multipurpose equipment apparatus either has its own controls or may plug into a harness that communicates with a cab portion of the snow plow truck.

17. The method according to claim 16, wherein the cab interior of the snow plow truck is adapted to provide a harness or plug for certain controls, which may be interchangeable or swapped out depending upon the type of equipment that is attached and in use with the snow plow truck.

18. The method according to claim 12, wherein a large snow plow truck is adapted into a backhoe apparatus having one or more arms with a removable bucket at one end of the backhoe arms apparatus, and wherein the bucket can be replaced with other shaped buckets or may be replaced with interchangeable apparatus that can provide other functional equipment at one end of the backhoe arms that are selected from the group comprising a drill, jack hammer, rake, pavement roller, soil tamper and bucket style jaws.

19. The method according to claim 18, wherein the one or more arms of the backhoe apparatus portion of the equipment can be folded down and collapsed at the front of the truck in order to make it easier to operate the snow plow truck on the open highway with apparatus attached, and wherein the bucket at the end of the backhoe arms may be either a single bucket or a dual jaws bucket type, and the bucket may be narrow or wide and shallow or deep, depending upon whether one or two arm backhoe apparatus are attached to it and desired use for the bucket.

20. The method according to claim 12, wherein the backhoe apparatus may be transported within the rear of the truck and a winch may be utilized to remove equipment at or near the job site for mounting upon the front of the snow plow truck.

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