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(54) **SNOW BIKE**

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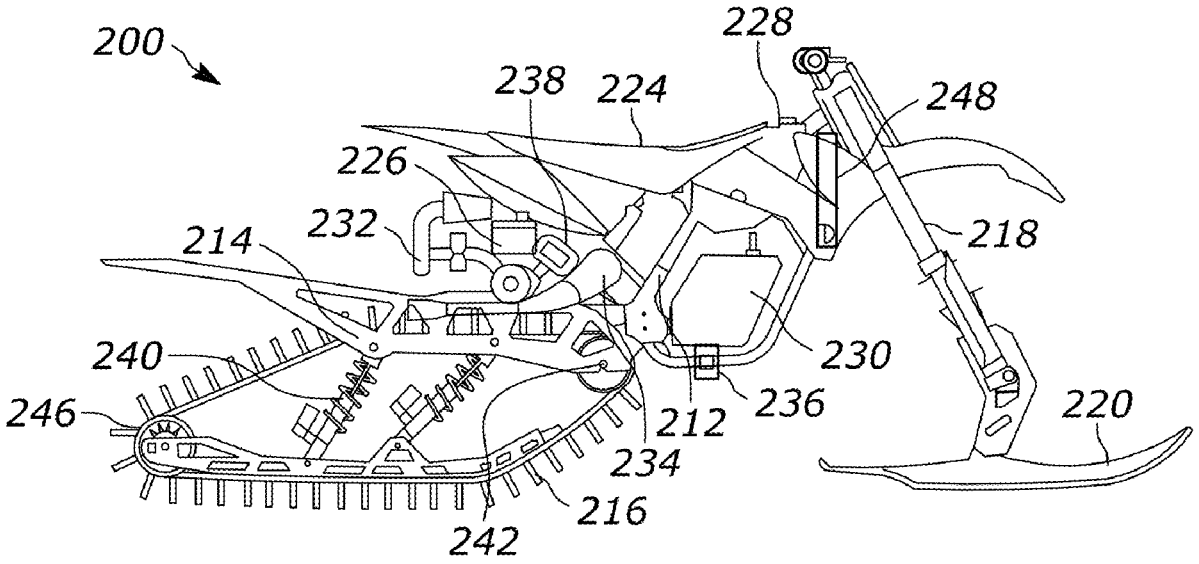
CPC ***B62M 27/02*** (2013.01); *B62M 2027/021* (2013.01); *B62M 2027/023* (2013.01); *B62M 2027/027* (2013.01)

(57) **ABSTRACT**

One embodiment of the improved snow bike described herein includes a frame. A track may be mounted at least partially rearward of the frame and a power source may be mounted above at least a substantial portion of the track. A centrifugal clutch may be mounted at least partially to the side of the power source and may extend laterally outward from the power source.



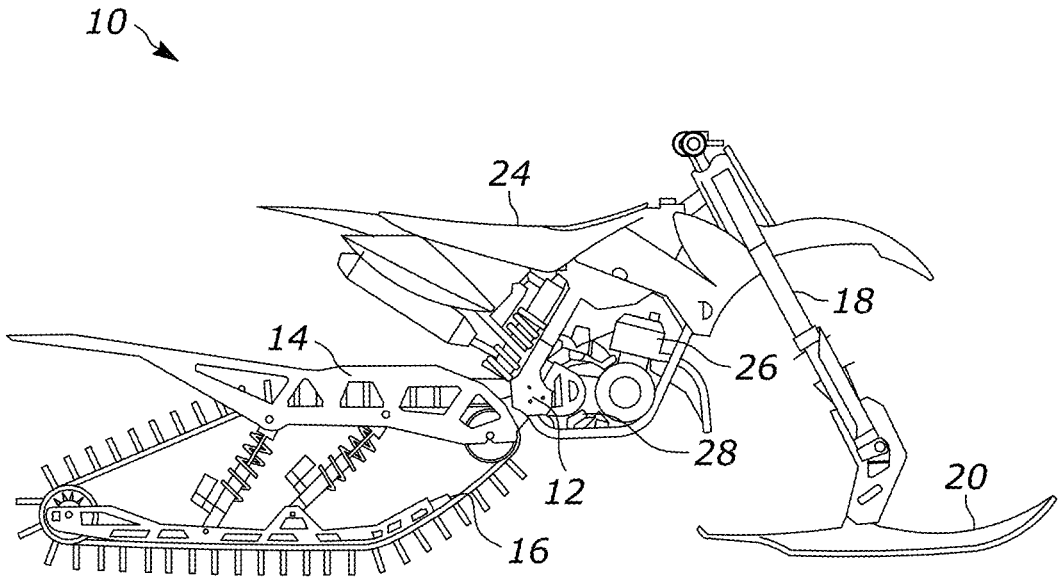


FIG. 1
(Prior Art)

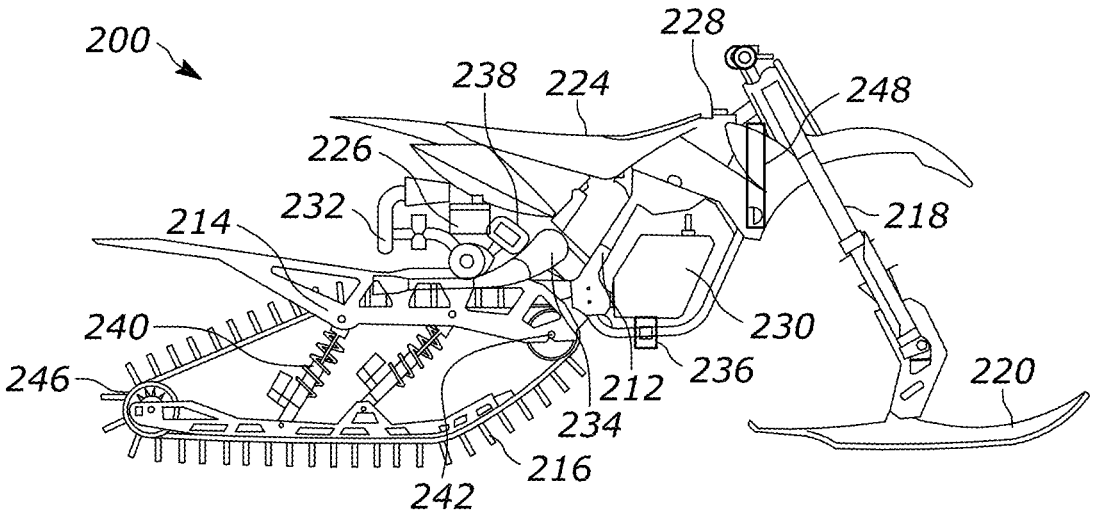

200
228
238
224
248
226
232
214
218
240
230
246
236
220
212
234
216
242

FIG. 2

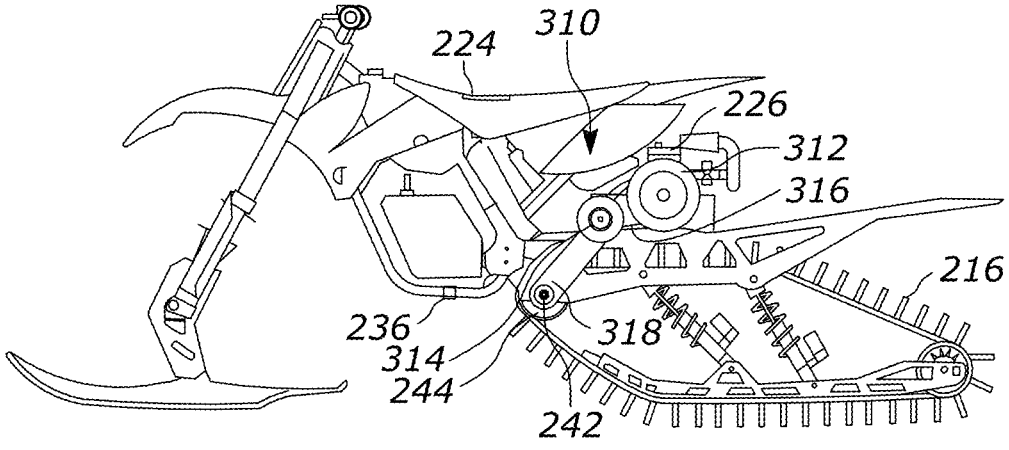

224
310
226
312
316
216
236
318
314
244
242

FIG. 3

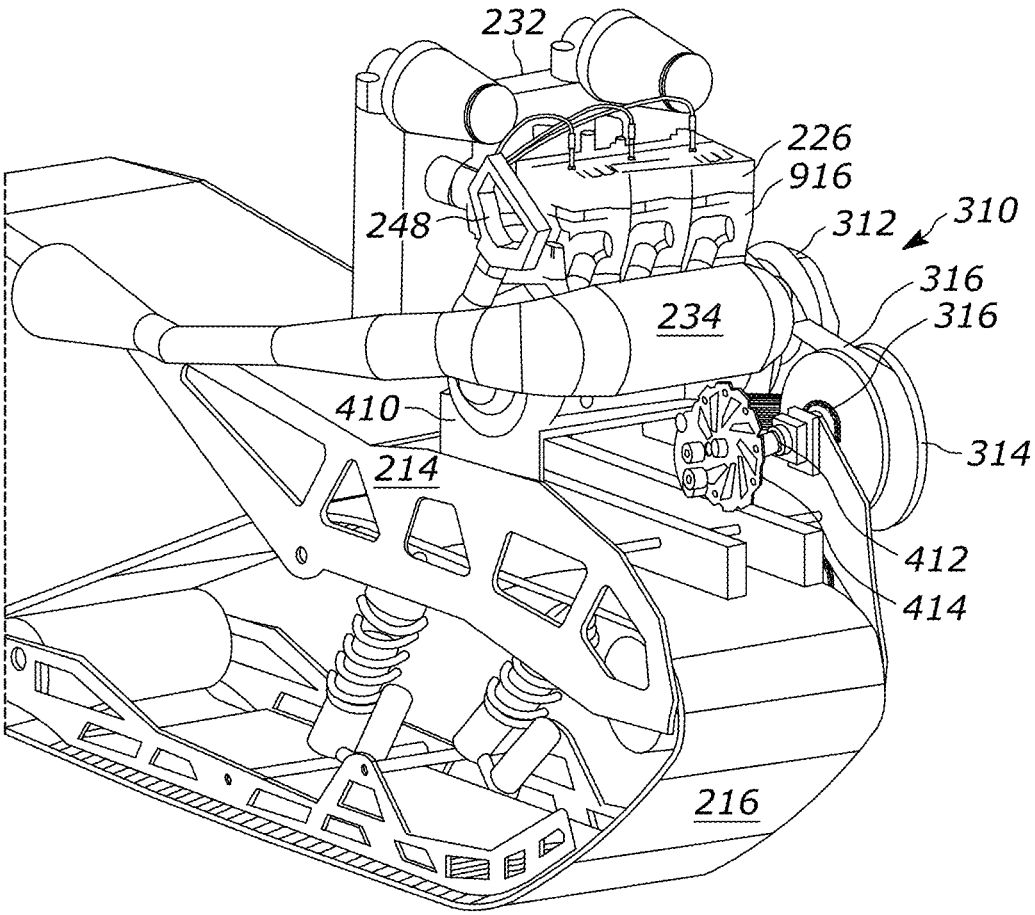


FIG. 4

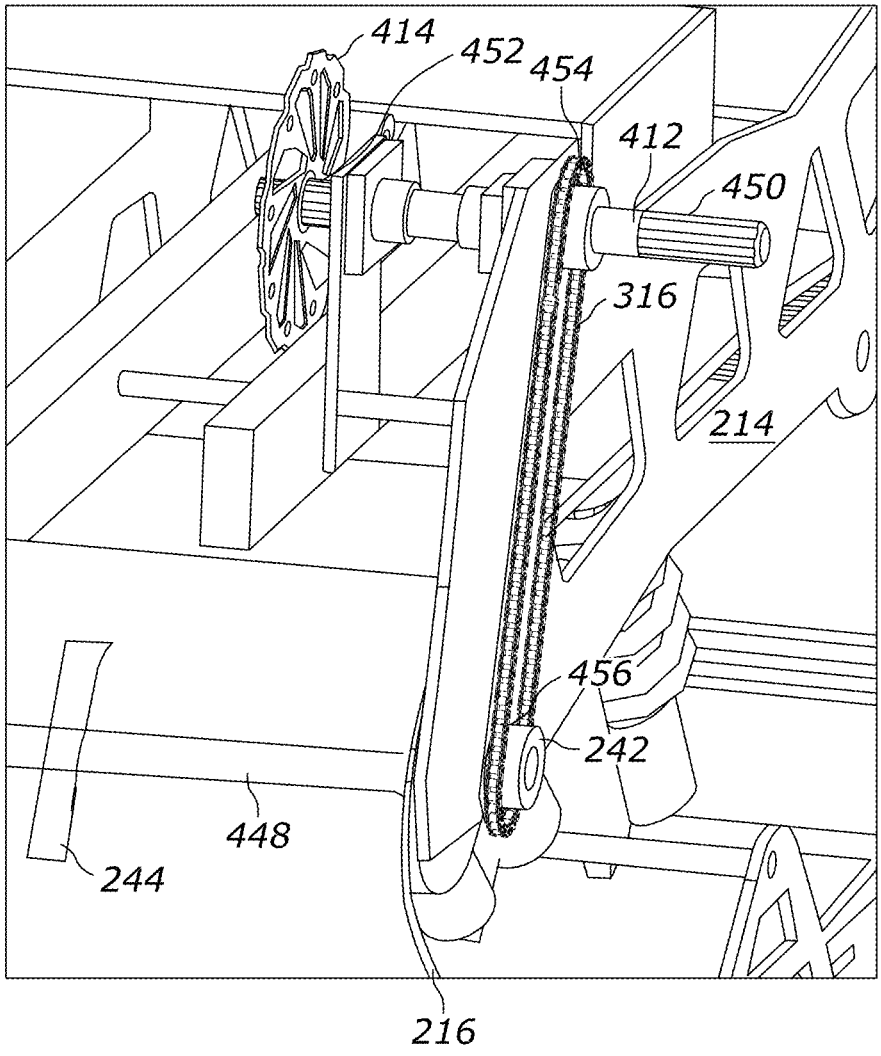


FIG. 5

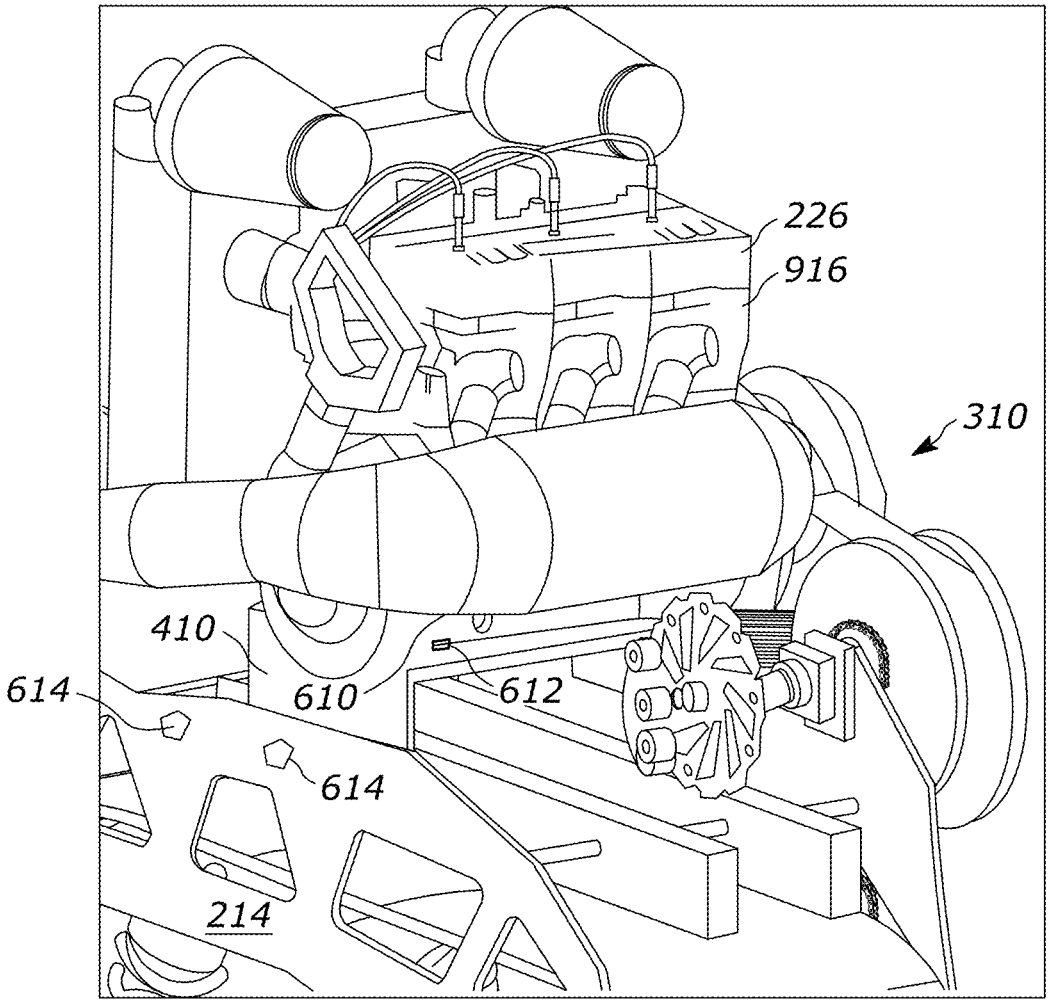


FIG. 6

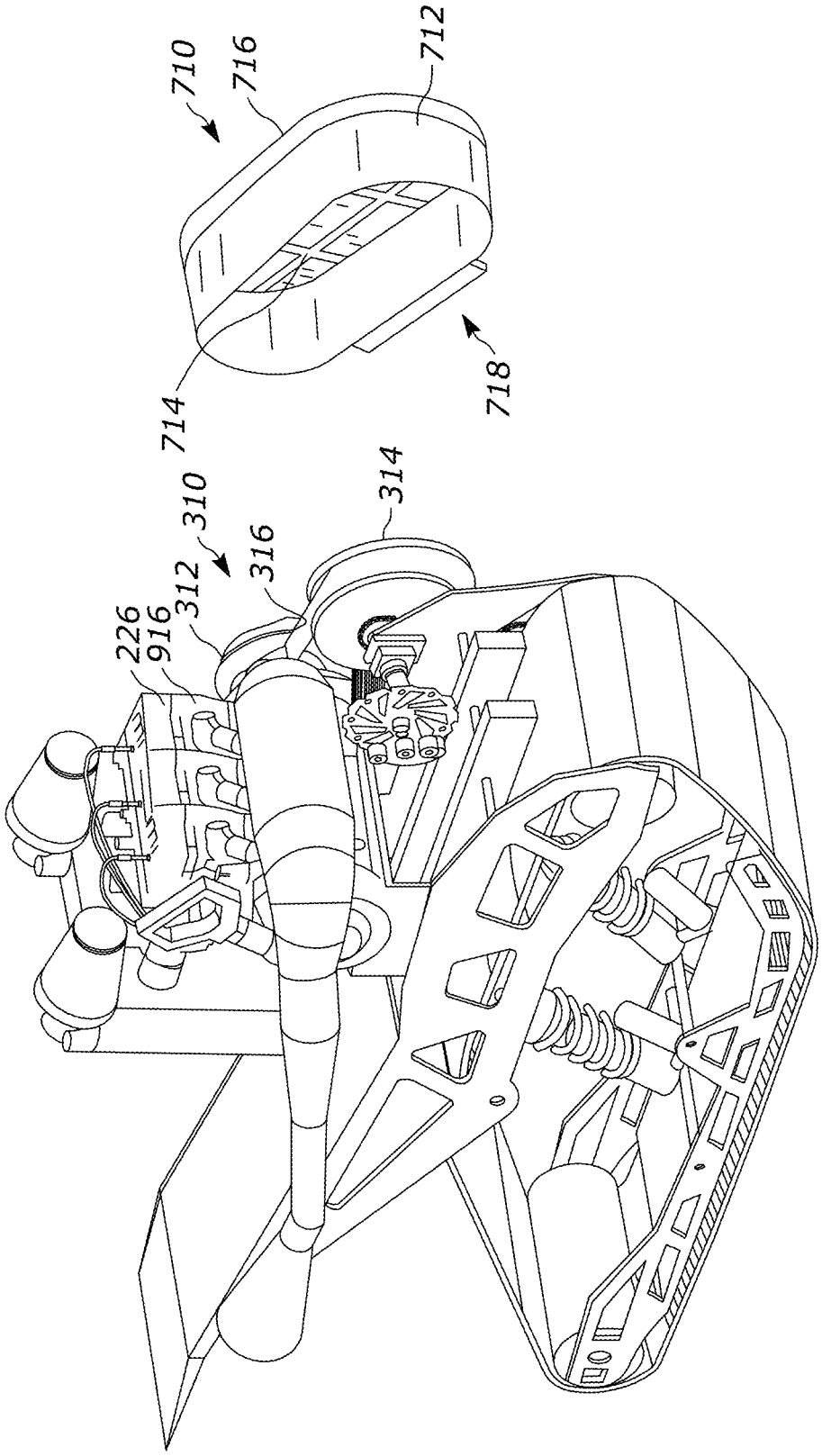


FIG. 7

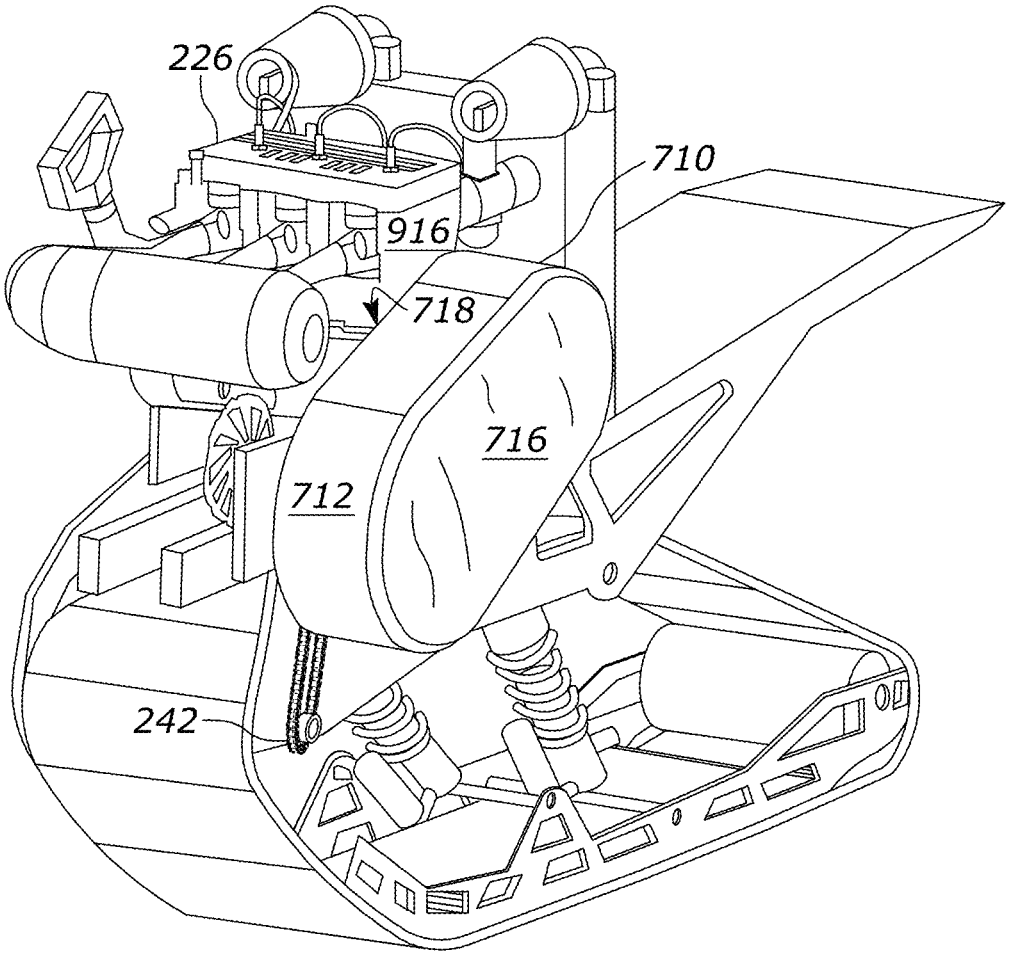


FIG. 8

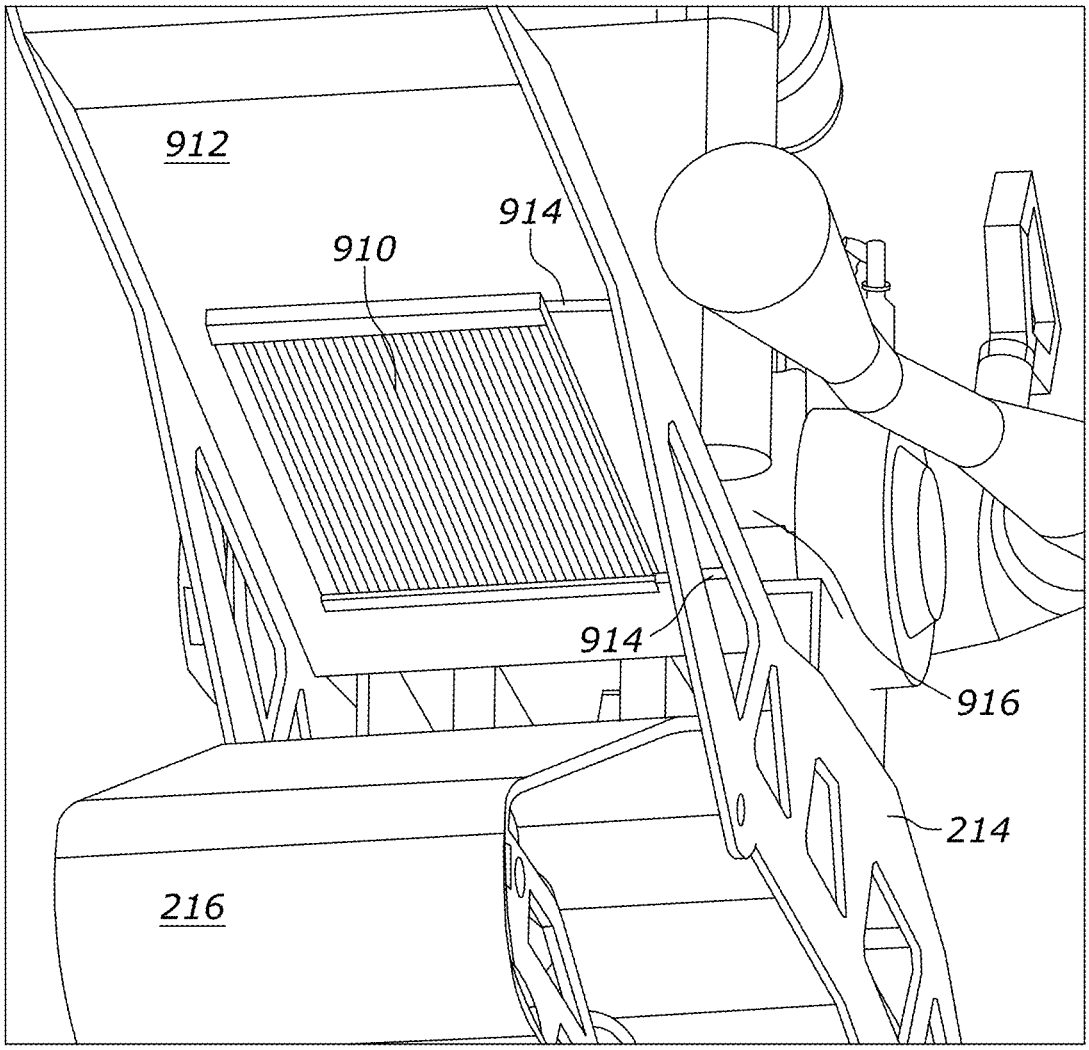


FIG. 9

SNOW BIKE

BACKGROUND

[0001] Reference throughout this specification to "one embodiment," "an embodiment," or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. Thus, appearances of the phrases "in one embodiment," "in an embodiment," and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment, but mean "one or more but not all embodiments" unless expressly specified otherwise. The terms "including," "comprising," "having," and variations thereof mean "including but not limited to" unless expressly specified otherwise. An enumerated listing of items does not imply that any or all of the items are mutually exclusive and/or mutually inclusive, unless expressly specified otherwise. The terms "a," "an," and "the" also refer to "one or more" unless expressly specified otherwise.

[0002] Furthermore, the described features, structures, or characteristics of the invention may be combined in any suitable manner in one or more embodiments. In the following description, numerous specific details are provided, such as examples of programming, software modules, user selections, network transactions, database queries, database structures, hardware modules, hardware circuits, hardware chips, etc., to provide a thorough understanding of embodiments of the invention. One skilled in the relevant art will recognize, however, that the invention may be practiced without one or more of the specific details, or with other methods, components, materials, and so forth. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of the invention.

[0003] FIG. **1** depicts a snow bike **10** representative of snow bikes of the prior art. The snow bike **10** is provided with a frame **12** and a track assembly **14** attached rearward of the frame **12** and containing a track **16**. A fork **18** is attached to the front of the frame **12**, a ski **20** is attached to the bottom of the fork **18**, a seat **24** is attached at the top of the frame **12**, and an engine **26** is attached within the frame **12** and toward the front bottom of the frame **12** as is customary with modern motorcycles.

[0004] The depicted snow bike **10** utilizes a frame **12** taken from a motorcycle. The track assembly **14** is generally a kit provided by snow bike manufacturers and is mounted to the rear of the frame **12** in lieu of a swing arm and a rear tire (not shown.) The ski **20** is attached to the fork **18** in lieu of a front tire (not shown). Most snow bikes of the prior art are made using a standard motorcycle that is usually a high powered dirt bike, removing the wheels and swingarm and attaching the track assembly **14** and the ski **20**. The engine **26** is typically the stock engine from the motorcycle the snow bike **10** is made from.

[0005] The engine **26** drives a sprocket and chain as in a typical dirt bike. The chain is connected with a jack shaft, which typically contains a braking mechanism. Another chain extends from the jack shaft to a drive shaft and turns the drive shaft. The drive shaft has teeth that engage and turn the track. The snow bikes **10** of the prior art typically use a transmission **28** that is provided with the original motorcycle and is a standard transmission using a plurality of gears.

[0006] One problem with using the stock engine is that the engines from light weight motorcycles such as dirt bikes are limited in horse power and often have third of the power that a snowmobile might have. Turning a track through the snow is demanding on horse power, and many feel that current snow bikes lack speed and power compared to modern snowmobiles. Modifications can be made to the engines **26**, but current engine modifications are limited in the horsepower that is added and are generally considered to be of limited reliability.

SUMMARY

[0007] One embodiment of the improved snow bike described herein includes a frame. A track may be mounted at least partially rearward of the frame and a power source may be mounted above at least a substantial portion of the track. A centrifugal clutch may be mounted at least partially to the side of the power source and may extend laterally outward from the power source.

[0008] A clutch guard may protect the centrifugal clutch and may have a hardened outer wall at least partially surrounding a periphery of the centrifugal clutch. The clutch guard may have an open side directed toward the frame in order to provide simultaneous protection to a rider and cooling of the centrifugal clutch.

[0009] A stock fuel tank may be mounted forward of the seat, and a second fuel tank may be mounted below the stock fuel tank in the frame in a recess originally adapted to a power source. In certain embodiments, the stock fuel tank and the lower mounted fuel tank are in fluid communication with each other to provide continuous fuel to the power source. A jack shaft may be in rotational connection to the power source for turning a track and may be provided with a centrally located sprocket for receiving a chain extending to a drive shaft that drives the track. A brake component may be disposed at one end of the jack shaft, and a secondary drive clutch of a centrifugal clutch system may be disposed at a second end of the jack shaft.

[0010] The power source may be a snowmobile engine or an electric motor mounted above the track with an engine mounting plate, and the track may be carried by a track assembly. The engine mounting plate may connect the track assembly with stock mounting surfaces of the snowmobile engine without requiring modification of the mounting surfaces, including stock apertures on the engine for receiving mounting bolts.

[0011] A cooling system for cooling the power source may be provided and may include a radiator and a heat exchanger in fluid communication with the radiator. A water jacket on the power source may be in fluid communication with the radiator such that fluid is pumped from the heat exchanger to the radiator and then to the water jacket in order to cool the power source. The snowmobile engine may be in gaseous communication with an exhaust pipe that is mounted forward of the snowmobile engine and rearward of the fuel tank. In this embodiment, the carburetor or fuel injectors are mounted rearward of the engine.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] In order that the advantages of the invention will be readily understood, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments that are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and are not

therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings, in which:

[0013] FIG. **1** is a right side view illustrating one embodiment of a snowbike of the prior art;

[0014] FIG. **2** is a right side view illustrating one embodiment of a snowbike of the present invention;

[0015] FIG. **3** is a left side view further illustrating embodiments of the snowbike of the present invention;

[0016] FIG. **4** is a perspective view showing an embodiment of a rear portion of the snowbike of the present invention;

[0017] FIG. **5** is a perspective view showing an embodiment of a drive system of the snowbike of the present invention.

[0018] FIG. **6** is a perspective view showing an embodiment of the engine, drive system, exhaust pipe, and track of the snowbike of the present invention.

[0019] FIG. **7** is a partially exploded perspective view of the rear portion of the snowbike of FIG. **4**.

[0020] FIG. **8** is a right side perspective view of the rear portion of the snowbike of FIG. **7**.

[0021] FIG. **9** is a perspective view showing a heat exchanger attached to a track assembly of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0022] In order to overcome some or all of the limitations of the prior art, embodiments of the snow bike **200** are shown in FIG. **2**. Depicted therein is a snow bike **200** having a frame **212**. The frame **212** may be any frame capable of carrying a seat **224** and other components of the snow bike **200**. In the depicted embodiment, the frame **212** is taken from an existing motorcycle. A radiator **248** is mounted to the front of the frame **212**. A track assembly **214** is mounted to the rear of the frame **212** in lieu of a swing arm and a rear tire (not shown.) A ski **220** is attached to a fork **218** in lieu of a front tire (not shown). While the snow bike **200** may all be made in a common production process, in the depicted embodiment, the snow bike **200** is made using a standard dirt bike motorcycle, removing the wheels and swingarm, and attaching the track assembly **214** and the ski **220**.

[0023] A fuel tank **228** is shown located in a standard position for a dirt bike and may be mounted to the frame **212**. In the depicted embodiment, a second tank **230** is also shown located below the fuel tank **228** within a location of the frame **212** that in prior art snow bikes normally contains an engine. The snow bike **200** may be provided with one or both of the fuel tanks **228**, **230**.

[0024] An engine **226** is mounted substantially outside of the frame **212** and to the rear of the frame. Of course, portions of the engine **226** may remain within the frame **226**. The engine **226** is shown mounted to the top of the track assembly **214**. The engine **226** is in the depicted embodiment a snowmobile engine with a centrifugal clutch **310** (shown in FIG. **3**). The engine **226** is one type of power source that may be used with embodiments herein. The engine **226** may be, for example, a single or multiple cylinder two or four stroke engine. In the depicted embodiment, the engine **226** is a Yamaha **700** SX snowmobile engine with a centrifugal clutch **310**.

[0025] The power source may also be an electric motor (not shown) and may utilize batteries that may be stored within the frame **212** in the location where the fuel tank **228** is shown.

[0026] The engine **226** is shown mounted centrally above the track assembly **214** and is shown with the intake **232** of the engine to the rear of the engine **226** and the exhaust **234** toward the front of the engine **226**. Of course, the engine **226** could be reversed in direction and could also be mounted sidewise with the intake **232** and exhaust **234** each located to one side of the snow bike **200**.

[0027] Also shown in FIG. **2** are a set of footpegs **236** located to the bottom of the frame. The footpegs **236** in the depicted embodiment are located below the seat and take the weight of the rider when the rider's feet are placed upon the footpegs **236**. A rider normally occupies a riding area by sitting on the seat **224** with the rider's legs extending downward to the footpegs **236**. The rider's legs typically remain in the riding area between the seat **224** and the foot pegs **236**. The engine **226** is, in the depicted embodiment, located substantially behind the area between the seat **224** and footpegs **236** where the riders legs will be located. In this manner, the engine **226** does not interfere with the riding area.

[0028] The engine **226** may be started manually or with a battery. In the depicted embodiment, a pull rope with a handle **238** is used to start the engine **226**. The pull rope and handle **238** are shown to the right side of the engine **226**, but could be located in other locations on the engine **226**.

[0029] Also shown in FIG. **2** are the suspension **240**, a front drive sprocket **244**, and a rear drive coaster **246**. In the depicted embodiment, the track assembly **214** is provided by a snow bike kit manufacturer. The track assembly **214** in the embodiment shown is a Timbersled Arro manufactured by Timbersled Products, Inc. of Sandpoint Idaho. The track assembly **214** is attached fixedly to the swingarm and shock mount (not shown) in a manner that is well known in the art. The track assembly **214** contains its own suspension **240** and does not utilize the suspension that comes stock on a motorcycle, though in some embodiments, one or more shocks are mounted between the swingarm assembly **214** and the frame **212** in a manner well known in the art. The ski **220** is also in this embodiment manufactured by Timbersled Products, Inc.

[0030] Referring now to FIG. **3**, shown therein is the centrifugal clutch **310** that is mounted to the left side of the engine **226**. The centrifugal clutch **310** is shown with a drive (or primary) clutch **312** and a driven (or secondary) clutch **314**. The drive clutch **312** is powered by the engine **226** and turns a belt **316** that turns the driven clutch **314**. The centrifugal clutch **310** protrudes outward from the engine **226** and is in one embodiment located entirely in an area that is behind the footpegs **236** and while partially under the seat **224**, generally to the rear of the seat **224**. Thus, while the centrifugal clutch **310** protrudes outward from the snow bike **200**, it does not substantially protrude into the riding area that is in use occupied by the leg of a rider.

[0031] The driven clutch **314** is connected with and turns a chain **316** (of FIGS. **4** and **5**) and is shown located under a chain case **318**. The chain **316** drives the drive wheels **242** which engage with and turn the track **216**.

[0032] FIG. **4** is a partially exploded view showing the track assembly **214** with the engine **226** mounted at the top thereof. The track assembly **214** is shown disconnected from

the frame **12** of the snow bike **200** in order to more clearly show the components of the engine **226** and the centrifugal clutch **310**. The engine **226** is shown with the intake **232** to the rear and the exhaust **234** to the front. The pull rope and handle **238** are shown to the right side of the engine **226**.

[0033] A motor mount plate **410** is shown disposed between the track assembly **214** and the engine **226**. The motor mount plate **410** is in one embodiment provided with holes, brackets, or other mechanisms to attach both to the track assembly **214** and the engine **226**. In one embodiment, the motor mount plate **410** is configured with mounting mechanisms **610** (shown in FIG. **6**) that bolt to the stock engine mounting points **612** of the engine **226**. Thus, a stock engine may be mounted directly to the snow bike **200** without requiring modifications to the engine **226** or the engine mounting points **612**.

[0034] Also shown in FIG. **4** is a jack shaft **412**, that typically contains a braking mechanism **414**. Another chain extends from the jack shaft **412** and extends to and turns a drive shaft **448** (of FIG. **5**). The drive shaft **448** has a sprocket **244** with extending protrusions or "teeth" that engage and turn the track **216**.

[0035] FIG. **5** shows this arrangement in greater detail. The jack shaft **412** is mounted to the track assembly **214** and has an interior end with splines **452** that receive a braking component shown as a disk **414** of the braking system. In a central portion of the jack shaft **412** is shown a sprocket **454** that drives the chain **316**. To the exterior of the jack shaft **412** and shown on the left side of the track assembly **214** are splines **450** for receiving the driven clutch **314** (shown in FIG. **4**). The chain **316** drives a sprocket **456** of a drive shaft **448** which turns the drive sprocket **244** which turns the track **216**.

[0036] FIG. **6** is a zoomed in view of FIG. **4** and shows the engine mounting points **612** connected with the mounting mechanisms **610** of the motor mount plate **410**. Also shown are bolts **614** passing through the track assembly **214** and the motor mount plate **410**, securing the motor mount plate **410** to the track assembly **214**. Of course, other mechanisms could be used to mount the power source to the track assembly, and the power source need not necessarily be mounted to the track assembly **214**, and could instead be mounted entirely or partially to the frame **212**.

[0037] FIG. **7** is the partially exploded view of FIG. **4** also showing a clutch cover **710**. FIG. **8** shows the clutch cover **710** from the opposite side. In the depicted embodiment, the clutch cover **710** partially covers the clutch assembly **310** and protects the rider's leg from any debris that may projected from the clutch, such as, for example, in instances where the belt **316** wears and loses integrity.

[0038] The clutch cover **710** is shown provided with a hardened wall **712** circumnavigating both the drive clutch **312** and the driven clutch **314**. The hardened wall **712** may be made of any protective material, but in one embodiment is made of steel or aluminum. Carbon fiber is a further suitable material, given by way of example. A framework **714** may be provided in the external side of the clutch cover **710** and in the depicted embodiment supports a sheet **716** of breathable material that allows air to pass but prevents the passage of snow. The interior side **718** of the clutch cover **710** is left open in the depicted embodiment in order to allow greater passage of air in order to keep the centrifugal clutch **310** cool. In this manner, the centrifugal clutch **310** may be located at an exterior of the snow bike **200** and to the rear of the rider's leg, while simultaneously protecting the rider's leg and allowing cooling air to circulate around the centrifugal clutch **310**.

[0039] FIG. **9** shows a heat exchanger **910** mounted to an underside of a tunnel **912** of the track assembly **214**. The heat exchanger **910** is fluidly coupled with the radiator **248** and the water jacket **916** (also shown in FIGS. **4**, **6**, **7**, and **8**). The heat exchanger **910** is preferably located in a location such as the tunnel **912** in order for snow kicked up by the track **216** to be thrown onto the heat exchanger **910** thereby cooling the coolant being pumped through the heat exchanger **910**. In one embodiment, the heat exchanger **910** precools coolant that passes from the water jacket **916** of the engine **226** prior to passing through the radiator **248**. The order of cooling components could be reversed with the coolant flowing from the water jacket **916** to the radiator **248** and then to the heat exchanger **910** prior to returning to the water jacket **916**.

[0040] The snow bike **200** in certain embodiments overcomes a problem of the prior art of snow bikes needing more power by accommodating a higher horse power snowmobile engine **226**. The engine **226** may be driven by a centrifugal clutch **310**, allowing the rider to not have to shift and providing a smoother transfer of power between the power source and the track **216**. Locating the engine **226** (or other power source) behind the frame lightens the front end of the snow bike **200** and allows the track assembly in certain embodiments to carry the engine **226**, thus allowing a larger engine **226** to be used without interfering with a riding area of the rider.

[0041] The problem of the location of the centrifugal clutch **316** is solved by locating the engine behind the rider with the primary and secondary clutches **312**, **314** protruding outward. The clutch cover **710** simultaneously protects the rider's leg while allowing air to cool the centrifugal clutch **316**.

[0042] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:

1. An apparatus comprising:

a frame;

a track mounted at least partially rearward of the frame;

a power source mounted above at least a substantial portion of the track; and

a centrifugal clutch mounted at least partially to the side of the power source and extending laterally outward from the engine.

2. The apparatus of claim **1**, further comprising a clutch guard having a hardened outer wall at least partially surrounding a periphery of the centrifugal clutch, the clutch guard having an open side directed toward the frame in order to provide simultaneous protection to a rider and cooling of the centrifugal clutch.

3. The apparatus of claim **1**, wherein the power source is a snowmobile engine and further comprising an engine mounting plate and wherein the track is carried by a track assembly, the engine mounting plate connecting the track

assembly with stock mounting surfaces of the snowmobile engine without requiring modification of the mounting surfaces.

4. The apparatus of claim **1**, further comprising a fuel tank mounted in the frame in a recess originally adapted to a power source.

5. The apparatus of claim **4**, further comprising a stock fuel tank mounted to the tank, and wherein the stock fuel tank and the fuel tank are in fluid communication to provide continuous fuel to the power source.

6. The apparatus of claim **1**, further comprising a jack shaft, the jack shaft comprising:

a. a centrally located sprocket for receiving a chain extending to a drive shaft that drives the track;

b. a brake component disposed at one end of the jack shaft; and

c. a secondary drive clutch of a centrifugal clutch system disposed at a second end of the jack shaft.

7. The apparatus of claim **1** further comprising a cooling system for cooling the power source, the cooling system comprising:

a. A radiator;

b. A heat exchanger in fluid communication with the radiator;

c. A water jacket on the power source in fluid communication with the radiator; and

d. Wherein fluid is pumped from the heat exchanger to the radiator and then to the water jacket in order to cool the power source.

8. The apparatus of claim **1** wherein the power source is a snowmobile engine.

9. The apparatus of claim **1** wherein the power source is an electric motor.

10. The apparatus of claim **1**, wherein the power source is a snowmobile engine taken from a snowmobile, the frame is taken from a dirt bike, and the track and front ski are taken from a commercially available kit.

11. An apparatus comprising:

a frame;

a track mounted at least partially rearward of the frame;

an engine mounting plate mounted above at least a substantial portion of the track;

an engine mounted to the engine mounting plate using stock mounting surfaces of the engine, including multiple apertures for receiving stock bolts.

12. The apparatus of claim **11**, further comprising a clutch guard having a hardened outer wall at least partially surrounding a periphery of the centrifugal clutch, the clutch guard having an open side directed toward the frame in order to provide simultaneous protection to a rider and cooling of the centrifugal clutch.

13. The apparatus of claim **11**, wherein the power source is a snowmobile engine and further comprising an engine mounting plate and wherein the track is carried by a track assembly, the engine mounting plate connecting the track assembly with stock mounting surfaces of the snowmobile engine without requiring modification of the mounting surfaces.

14. The apparatus of claim **11**, further comprising a fuel tank mounted in the frame in a recess originally adapted to a power source.

15. The apparatus of claim **14**, further comprising a stock fuel tank mounted to the tank, and wherein the stock fuel tank and the fuel tank are in fluid communication to provide continuous fuel to the power source.

16. The apparatus of claim **11**, further comprising a jack shaft, the jack shaft comprising:

a. a centrally located sprocket for receiving a chain extending to a drive shaft that drives the track;

b. a brake component disposed at one end of the jack shaft; and

c. a secondary drive clutch of a centrifugal clutch system disposed at a second end of the jack shaft.

17. The apparatus of claim **11** further comprising a cooling system for cooling the power source, the cooling system comprising:

a. A radiator;

b. A heat exchanger in fluid communication with the radiator;

c. A water jacket on the power source in fluid communication with the radiator; and

d. Wherein fluid is pumped from the heat exchanger to the radiator and then to the water jacket in order to cool the power source.

18. The apparatus of claim **11** wherein the power source is a snowmobile engine.

19. An apparatus comprising:

a frame;

a track mounted at least partially rearward of the frame;

a power source mounted above at least a substantial portion of the track;

a centrifugal clutch mounted at least partially to the side of the power source and extending laterally outward from the engine;

a clutch guard having a hardened outer wall at least partially surrounding a periphery of the centrifugal clutch, the clutch guard having an open side directed toward the frame in order to provide simultaneous protection to a rider and cooling of the centrifugal clutch;

a stock fuel tank mounted forward of the seat;

a fuel tank mounted in the frame in a recess originally adapted to a power source, the stock fuel tank and the fuel tank in fluid communication with each other;

a jack shaft, the jack shaft comprising:

a centrally located sprocket for receiving a chain extending to a drive shaft that drives the track;

a brake component disposed at one end of the jack shaft; and

a secondary drive clutch of a centrifugal clutch system disposed at a second end of the jack shaft;

a snowmobile engine;

an engine mounting plate, wherein the track is carried by a track assembly, the engine mounting plate connecting the track assembly with stock mounting surfaces of the snowmobile engine without requiring modification of the mounting surfaces;

a cooling system for cooling the power source, the cooling system comprising:

a radiator;

a heat exchanger in fluid communication with the radiator;

a water jacket on the power source in fluid communication with the radiator; and wherein fluid is pumped from the heat exchanger to the radiator and then to the water jacket in order to cool the power source.

20. The apparatus of claim **19** wherein the snowmobile engine is in gaseous communication with an exhaust pipe, and wherein the exhaust pipe is mounted forward of the snowmobile engine and rearward of the fuel tank.

* * * * *