sates for heave and that can also be actively driven for further heave compensation).

Various examples of hoisting systems having both active and passive heave compensation are generally depicted in figures 14-18 in accordance with certain embodiments. In each of these examples, the hoisting system includes a drawworks **22** with active heave compensation applied by rotating the drawworks drum, such as described above. The drum **26** of the drawworks **22** can be driven in any suitable manner, such as by electric or hydraulic motors. In those hoisting systems depicted in figures 14-17, passive heave compensation is provided by hydraulic cylinders that are used to move sheaves in the hoisting system to counter heaving motion of the floating vessel **12**. But hydraulic motors or other devices could also or instead be used for passive heave compensation. Additionally, the passive heave compensation devices in some instances include an active component as well, such as a hydraulic cylinder that passively compensates for heave but can also be selectively driven by equipment on the vessel **12** to actively compensate for heave. In figure 18, a hoisting system is shown as having passive heave compensation that rotates the drawworks drum **26** along with the active heave compensation. While a single hoisting line **20** is depicted in each of figures 14-18, it is noted that the hoisting systems represented in these figures could use multiple hoisting lines **20**, and that additional elements (e.g., hydraulic cylinders for passive heave compensation) can be added for use with the additional hoisting lines **20**.

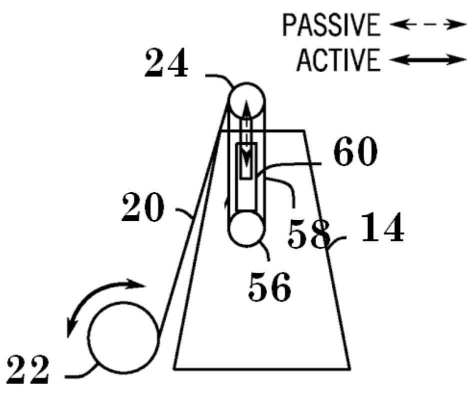

Figure 17: Fourth example of a hoisting system.

One approach to increasing hoisting capacity of a hoisting system is to increase the number and size of the hoisting lines. The hoisting lines can also be reeved between additional sheaves in the crown block and the traveling block to increase the number of parts in the lines that run between the crown block and the traveling block to increase the mechanical advantage. But a drawback to this approach is that it adds friction to the system and reduces the traveling speed of the hoisted load relative to the rotational speed of a drawworks drum. The added friction is amplified in an active heave compensating drawworks, negatively affecting the goal of achieving a constant weight-on-bit during heaving motion of a drilling vessel. By way of example, typical 1000-ton or 1250-ton hoisting systems can have multi-part hoisting lines with sixteen parts in a block-and-tackle reeving and sixteen or seventeen sheaves, and use a two-inch diameter wire rope. Such systems can have losses of approximately 15% or 20% due to the reeving efficiencies alone. Further accounting for the inertia effects of the rotating sys-

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