

Claims

1. An apparatus for applying negative pressure to a wound, comprising:
a negative pressure source configured to provide, via a fluid flow path comprising at least one lumen, negative pressure under a dressing placed over a wound; and
a controller configured to:
detect whether a canister is positioned in the fluid flow path between the negative pressure source and the dressing, the canister being configured to store fluid removed from the wound, in response to detecting that the canister is positioned in the fluid flow path, set a value of a parameter to a first value indicating that the canister is positioned in the fluid flow path, and in response to detecting that the canister is not positioned in the fluid flow path, set the value of the parameter to a second value indicating that the canister is not positioned in the fluid flow path; and
wherein the controller is configured to operate the negative pressure source to provide negative pressure under the dressing such that the negative pressure source can operate in a canisterless mode of operation or in a canister mode of operation.
2. The apparatus of claim 1 wherein the controller is configured to control one or more operations of the negative pressure source and wherein said controller is configured to control one or more operations of the negative pressure source differently when the negative pressure source operates in a canisterless mode of operation.
3. The apparatus of claim 2 wherein the apparatus further comprises one or more indicators to indicate one or more operating or failure conditions of the negative pressure source and wherein the controller is configured to vary one or more parameters controlling the delivery of negative pressure supplied to the wound dressing and vary one or more conditions for activating the one or more indicators based at least on whether the negative pressure source operates in the canister mode of operation or the canisterless mode of operation.
4. The apparatus of any preceding claim, wherein the controller is configured to detect whether the canister is positioned in the fluid flow path based at least on a level of activity of the negative pressure source and a first change in negative pressure provided by the negative pressure source to the dressing.
5. The apparatus of claim 4, wherein the controller is configured to detect whether the canister is positioned in the fluid flow path while the negative pressure source is maintaining negative pressure under the dressing within a negative pressure range.

4. The apparatus of claim 5, wherein the first change in negative pressure comprises one of

- (i) an average change in negative pressure between a maximum overshoot pressure and an upper hysteresis point pressure over a first time period while the negative pressure source is maintaining negative pressure under the dressing within the negative pressure range or
- (ii) an average change in negative pressure between the upper hysteresis point pressure and a lower hysteresis point pressure over a second time period while the negative pressure source is maintaining negative pressure under the dressing within the negative pressure range and wherein:

the lower hysteresis point comprises pressure measured at a time when the negative pressure source is activated to restore pressure under the dressing to be within the negative pressure range,

the upper hysteresis point pressure comprises pressure measured at a time when the negative pressure source is deactivated after pressure under the dressing is restored to be within the negative pressure range, and

the maximum overshoot pressure comprises a maximum negative pressure measured after the negative pressure source is deactivated and before the negative pressure source is reactivated.

5. The apparatus of claim 4, wherein the controller is further configured to detect whether the canister is positioned in the fluid flow path based at least on a second change in negative pressure provided by the negative pressure source to the dressing, the second change in negative pressure being different from the first change in negative pressure.

6. The apparatus of claim 4, wherein the controller is further configured to determine the level of activity of the negative pressure source based at least on a duty cycle of the negative pressure source.

7. The apparatus of claim 4, wherein the controller is further configured to determine the first change in negative pressure from a pressure measured at a pump head of the negative pressure source.

8. The apparatus of claim 2, wherein the controller is configured to detect whether the canister is positioned in the fluid flow path without determining a pressure under the dressing and a flow rate of fluid in the fluid flow path or wherein the controller is configured to detect

whether the canister is positioned in the fluid flow path without using a direct measurement of an operating speed of the negative pressure source.

9. The apparatus of claim 4, wherein the controller is further configured to: when the value of the parameter is set to the first value, activate an alarm based at least on a comparison between the level of activity of the negative pressure source and a first activity threshold, and when the value of the parameter is set to the second value, activate the alarm based at least on a comparison between the level of activity of the negative pressure source and a second activity threshold different from the first activity threshold.

10. The apparatus of claim 9, wherein the alarm is indicative of a blockage in the fluid flow path or wherein the alarm is indicative of a leak in the fluid flow path and when the alarm is indicative of a leak in the flow path, the controller is further configured to: when the value of the parameter is set to the first value, clear the alarm based at least on a comparison between the level of activity of the negative pressure source and a third activity threshold, and when the value of the parameter is set to the second value, clear the alarm based at least on a comparison between the level of activity of the negative pressure source and a fourth activity threshold different from the third activity threshold.

11. The apparatus of claim 1, wherein the controller is further configured to: detect that the canister is not positioned in the fluid flow path in response to determining that a plurality of conditions are satisfied, and

detect that the canister is positioned in the fluid flow path in response to determining that at least one of the plurality of conditions is not satisfied.

12. The apparatus of claim 11, wherein the plurality of conditions comprises a first condition indicating whether a level of activity of the negative pressure source meets an activity threshold while the negative pressure source is maintaining negative pressure under the dressing within a negative pressure range; and

wherein the plurality of conditions comprises a second condition indicating whether a first change in negative pressure provided by the negative pressure source to the dressing meets a first pressure threshold while the negative pressure source is maintaining negative pressure under the dressing within the negative pressure range; and

wherein the plurality of conditions comprises a third condition indicating whether a second change in negative pressure provided by the negative pressure source to the dressing does not meet a second pressure threshold while the negative pressure source is maintaining negative pressure under the dressing within the negative pressure range.

13. The apparatus of claim 12, wherein the first change in negative pressure comprises an average change in negative pressure between a maximum overshoot pressure and an upper hysteresis point pressure over a first time period while the negative pressure source is maintaining negative pressure under the dressing within the negative pressure range, and the second change in negative pressure comprises an average change in negative pressure between the upper hysteresis point pressure and a lower hysteresis point pressure over a second time period while the negative pressure source is maintaining negative pressure under the dressing within the negative pressure range; and wherein:

the lower hysteresis point comprises pressure measured at a time when the negative pressure source is activated to restore pressure under the dressing to be within the negative pressure range. the upper hysteresis point pressure comprises pressure measured at a time when the negative pressure source is deactivated after pressure under the dressing is restored to be within the negative pressure range, and

the maximum overshoot pressure comprises a maximum negative pressure measured after the negative pressure source is deactivated and before the negative pressure source is reactivated.

14. The apparatus of claim 1, further comprising a switch configured to toggle according to a user input, the controller being configured to detect whether the canister is positioned in the fluid flow path based at least on a position of the switch.

15. The apparatus of claim 1, further comprising a sensor configured to output an indication of whether the canister is positioned in the fluid flow path, the controller being configured to detect whether the canister is positioned in the fluid flow path based at least on the indication.

16. The apparatus of claim 15, wherein the sensor comprises a proximity sensor or wherein the sensor comprises a pressure sensor.

17. The apparatus of claim 16 wherein the sensor comprises a pressure sensor and wherein the pressure sensor is configured to output the indication when tabs used to secure the canister to a housing are engaged, the negative pressure source being disposed in the housing.

18. The apparatus of claim 1, further comprising the dressing.

19. A negative pressure wound therapy system, comprising a negative pressure source coupled to a dressing placed over a wound via a first fluid flow path or a second fluid flow path, the first fluid flow path comprising at least one lumen and not comprising a canister configured to store fluid removed from the wound, the second fluid flow path comprising at least one lumen and a canister,

wherein the system is configured to

detect whether the negative pressure source is coupled via the first or second fluid flow path to the dressing,

wherein, in response to detecting that the negative pressure source is coupled via the first fluid flow path, the system is further configured to select a first mode of operation and provide negative pressure with the negative pressure source via the first fluid flow path to the dressing in accordance with the first mode of operation; and

in response to detecting that the negative pressure source is coupled via the second fluid flow path, the system is further configured to select a second mode of operation different from the first mode of operation and provide negative pressure with the negative pressure source via the second fluid flow path to the dressing in accordance with the second mode of operation.

20. The negative pressure wound therapy system of claim 19, wherein the system comprises the apparatus of any of claims 1 to 18.

21. A method for operating a negative pressure wound therapy apparatus, the method comprising:

providing an apparatus comprising a negative pressure source and configured to provide negative pressure, via a fluid flow path comprising at least one lumen, under a dressing placed over a wound;

detecting whether a canister is positioned in the fluid flow path between the negative pressure source and the dressing, the canister being configured to store fluid removed from the wound;

in response to detecting that the canister is positioned in the fluid flow path, setting a value of a parameter to a first value indicating that the canister is positioned in the fluid flow path;

in response to detecting that the canister is not positioned in the fluid flow path, setting the value of the parameter to a second value indicating that the canister is not positioned in the fluid flow path; and

modifying operation of the negative pressure wound therapy apparatus based at least on whether the value of the parameter is the first value or the second value.

22. A method of operating a negative pressure wound therapy system, the method comprising:

detecting whether a negative pressure source is coupled via a first or second fluid flow path to a dressing placed over a wound, the first fluid flow path comprising at least one lumen and not comprising a canister configured to store fluid removed from the wound, the second fluid flow path comprising at least one lumen and the canister;

in response to detecting that the negative pressure source is coupled via the first fluid flow path, selecting a first mode of operation wherein the system is configured to provide negative pressure with the negative pressure source via the first fluid flow path to the dressing in accordance with the first mode of operation; and

in response to detecting that the negative pressure source is coupled via the second fluid flow path, selecting a second mode of operation different from the first mode of operation wherein the system is configured to provide negative pressure with the negative pressure source via the second fluid flow path to the dressing in accordance with the second mode of operation.