MACHINE CONTROL FOR DYNABRAID MACHINE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of provisional application Serial No. 63/345,627 filed May 25, 2022.

BACKGROUND

[0002] The present disclosure is directed to grinding machines and particularly to safety features for abrasive belt grinding machines.

[0003] A grinding machine employs an abrasive belt that is coated with an abrasive material or that has an abrasive material thereon. To perform a grinding operation, the abrasive belt is generally caused to rotate via a motor. Once the abrasive belt is rotating at a desired rate, the abrasive belt contacts a workpiece to perform a grinding operation. Typical abrasive belt machines include a latch style on/off switch that allows for the machine to remain in operation even while being unattended by an operator. Moreover, subsequent a power outage, an abrasive belt machine can have the switch remain in the on position, and upon reenergizing, the machine can spontaneously operate, creating a hazard. Grinding machines create substantial quantities of fine airborne particulate during operation. However, grinding machines are optionally equipped with exhaust vacuum particulate removal devices. These exhaust vacuum devices are optionally operated during the grinding operation.

SUMMARY

[0004] In accordance with the present disclosure, there is provided an abrasive belt machine comprising a support housing having a pivoting arm that supports an abrasive belt rotatably coupled to a drive motor; a safety controller operatively coupled with the drive motor; an E-stop operatively coupled to the safety controller; a foot pedal switch operatively coupled to the drive motor; and a 480 volt alternating current 3 phase electrical power supply electrically coupled to the drive motor.

[0005] A further embodiment of any of the foregoing embodiments may additionally and/or alternatively include the safety controller is electronically coupled to the E-stop, a guard door sensor, a vacuum pressure/air flow sensor and the like.

[0006] A further embodiment of any of the foregoing embodiments may additionally and/or alternatively include the safety controller is configured to prevent operation of the drive motor responsive to predetermined conditions.

[0007] In accordance with the present disclosure, there is provided an abrasive belt machine comprising a support housing having a pivoting arm that supports an abrasive belt rotatably coupled to a drive motor; a guard door coupled to the support housing proximate the abrasive belt, the guard door including a guard door sensor; an exhaust vacuum coupled to the support housing proximate the abrasive belt, the exhaust vacuum including a vacuum/air flow sensor; a safety controller operatively coupled with the drive motor; an E-stop operatively coupled to the safety controller; a foot pedal switch operatively coupled to the drive motor; and a 480 volt alternating current 3

phase electrical power supply electrically coupled to the drive motor.

[0008] A further embodiment of any of the foregoing embodiments may additionally and/or alternatively include the safety controller is electronically coupled to the E-stop, the guard door sensor, the vacuum pressure/air flow sensor and the like.

[0009] A further embodiment of any of the foregoing embodiments may additionally and/or alternatively include the safety controller is configured to detect electrical faults, short circuits, welded contacts and the like.

[0010] A further embodiment of any of the foregoing embodiments may additionally and/or alternatively includethe abrasive belt machine further comprising a fault light on a panel, wherein the safety controller is configured to provide a signal to the fault light on the panel.

[0011] In accordance with the present disclosure, there is provided a process for configuring an abrasive belt machine for safety comprising a support housing having a pivoting arm that supports an abrasive belt rotatably coupled to a drive motor; coupling a guard door to the support housing proximate the abrasive belt, the guard door including a guard door sensor; coupling an exhaust vacuum to the support housing proximate the abrasive belt, the exhaust vacuum including a vacuum/air flow sensor; coupling a safety controller with the drive motor; coupling an E-stop to the safety controller; coupling a foot pedal switch to the drive motor; and supplying a 480 volt alternating current 3 phase electrical power supply to the drive motor.

[0012] A further embodiment of any of the foregoing embodiments may additionally and/or alternatively include

the process further comprising electronically coupling the safety controller to the E-stop, a guard door sensor, a vacuum pressure/air flow sensor and the like.

[0013] A further embodiment of any of the foregoing embodiments may additionally and/or alternatively include the process further comprising configuring the safety controller to prevent operation of the drive motor responsive to predetermined conditions.

[0014] Other details of the abrasive belt machine are set forth in the following detailed description and the accompanying drawings wherein like reference numerals depict like elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Fig. 1 is a schematic representation of an exemplary abrasive belt grinding machine.

[0016] Fig. 2 is an electrical schematic representation of the exemplary abrasive belt grinding machine and accessories.

DETAILED DESCRIPTION

[0017] Referring now to Fig. 1 and Fig. 2, there is illustrated at Fig. 1 an exemplary abrasive belt grinding machine 10. The abrasive belt grinding machine 10 includes a support housing 12. The support housing 12 supports a pivoting arm 14 that supports an abrasive belt 16. The abrasive belt 16 can be driven by a drive motor 18 coupled to various pulleys 20 and tensioners/tracking devices 22 that maintain proper tension and alignment of the abrasive belt 16.

[0018] An E-stop 28 is operatively coupled to a safety controller 30. The E-stop 28 can be actuated by an

operator (not shown) in order to shut down the abrasive belt grinding machine 10. The E-stop 28 can be a dual channel device. The safety controller 30 is electronically coupled to the E-stop 28, a guard door sensor 32, a vacuum pressure/air flow sensor 34 and the like. The safety controller 30 prevents operation of the motor 18 responsive to predetermined conditions. For example, if the safety controller 30 receives a signal from the guard door sensor 32 that the guard door 36 is not positioned properly, then the safety controller 30 will not allow actuation of the drive motor 18. In another example, if the safety controller 30 receives a signal from the vacuum/air flow sensor 34 that the exhaust vacuum 38 is not in operation, then the safety controller 30 will not allow actuation of the drive motor 18.

[0019] A foot pedal switch 40 is operatively coupled to the drive motor 18. An operator provides foot pressure on the foot pedal switch 40 to provide for drive motor 18 operation.

[0020] The safety controller 30 can detect electrical faults, such as short circuits, welded contacts and the like. The safety controller 30 can provide a signal to a fault light 42 on a panel 44.

[0021] A 480 volt AC 3 phase electrical power supply 46 is electrically coupled to the drive motor 18.

[0022] Redundant safety relays 50, 52 can be electrically coupled with the safety controller 30 and power supply 46.

[0023] A technical advantage of the abrasive belt machine disclosed includes redundant safety features that prevent operator injury.

[0024] Another technical advantage of the abrasive belt machine disclosed includes programmable motor controller for speed optimization.

[0025] Another technical advantage of the abrasive belt machine disclosed includes multiple sensors that ensure safety devices are active before operation of the abrasive belt machine.

[0026] There has been provided an abrasive belt machine. While the abrasive belt machine has been described in the context of specific embodiments thereof, other unforeseen alternatives, modifications, and variations may become apparent to those skilled in the art having read the foregoing description. Accordingly, it is intended to embrace those alternatives, modifications, and variations which fall within the broad scope of the appended claims.

WHAT IS CLAIMED IS:

1. An abrasive belt machine comprising:

a support housing having a pivoting arm that supports an abrasive belt rotatably coupled to a drive motor;

a safety controller operatively coupled with the drive motor;

an E-stop operatively coupled to the safety controller;

a foot pedal switch operatively coupled to the drive motor; and

a 480 volt alternating current 3 phase electrical power supply electrically coupled to the drive motor.

2. The abrasive belt machine according to claim 1, wherein the safety controller is electronically coupled to the E-stop, a guard door sensor, a vacuum pressure/air flow sensor and the like.

3. The abrasive belt machine according to claim 1, wherein the safety controller is configured to prevent operation of the drive motor responsive to predetermined conditions.

4. An abrasive belt machine comprising:

a support housing having a pivoting arm that supports an abrasive belt rotatably coupled to a drive motor;

a guard door coupled to the support housing proximate the abrasive belt, the guard door including a guard door sensor;

an exhaust vacuum coupled to the support housing proximate the abrasive belt, the exhaust vacuum including a vacuum/air flow sensor;

a safety controller operatively coupled with the drive motor;

an E-stop operatively coupled to the safety controller;

a foot pedal switch operatively coupled to the drive motor; and

a 480 volt alternating current 3 phase electrical power supply electrically coupled to the drive motor.

5. The abrasive belt machine according to claim 4, wherein the safety controller is electronically coupled to the E-stop, the guard door sensor, the vacuum pressure/air flow sensor and the like.

6. The abrasive belt machine according to claim 4, wherein the safety controller is configured to detect electrical faults, short circuits, welded contacts and the like.

7. The abrasive belt machine according to claim 4, further comprising:

a fault light on a panel, wherein the safety controller is configured to provide a signal to the fault light on the panel.

8. A process for configuring an abrasive belt machine for safety comprising:

a support housing having a pivoting arm that supports an abrasive belt rotatably coupled to a drive motor;

coupling a guard door to the support housing proximate the abrasive belt, the guard door including a guard door sensor;

coupling an exhaust vacuum to the support housing proximate the abrasive belt, the exhaust vacuum including a vacuum/air flow sensor;

coupling a safety controller with the drive motor;

coupling an E-stop to the safety controller;

coupling a foot pedal switch to the drive motor; and

supplying a 480 volt alternating current 3 phase electrical power supply to the drive motor.

9. The process of claim 8, further comprising:

electronically coupling the safety controller to the E-stop, a guard door sensor, a vacuum pressure/air flow sensor and the like.

10. The process of claim 8, further comprising:

configuring the safety controller to prevent operation of the drive motor responsive to predetermined conditions.