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WELDING SYSTEMS WITH A ROLLING SUPPORT BASE HAVING A BRAKE

Abstract

A welding sled, comprising a support base comprising one or more attachment points for attachment of a wire supply support and attachment of a wire drive assembly; a plurality of rollers coupled to a bottom of the support base; and a brake configured to selectively brake the welding sled.

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Background/Summary

FIELD OF THE DISCLOSURE
[0001] This disclosure relates generally to welding systems and, more particularly, to welding systems with a rolling support base having a brake.
BACKGROUND
[0002] MIG welding, formerly known as Gas Metal Arc Welding (GMAW), combines the techniques and advantages of TIG welding's inert gas shielding with a continuous, consumable wire electrode. An electrical arc is created between the continuous, consumable wire electrode and a workpiece. As such, the consumable wire functions as the electrode in the weld circuit as well as the source of filler metal. MIG welding is a relatively simple process that allows an operator to concentrate on arc control.
[0003] A wire feeder is operationally connected to the power source and is designed to deliver consumable wire to a weld. Often times, it is desirable that a welding system, including any wire feeder, be portable to support various welding operations outside of a shop or plant setting. The system may be required to undergo movement from multiple locations in any given day. In general, some welding feeders have been supplied with a fixed base plate or an accessory option of being placed on a cart with a power source. The systems may have a relatively great mass which, combined with their configuration, present difficulties to operators while transporting the system around a job site, as they are often difficult to move. Improved systems are desirable.
SUMMARY
[0004] Welding systems with a rolling support base having a brake are disclosed, substantially as illustrated by and described in connection with at least one of the figures, as set forth more completely in the claims.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0005] FIG. **1** is a side elevation view of an example welding system having a rolling support base with a levered brake, in accordance with aspects of the present disclosure.
[0006] FIG. **2** is a cutaway side elevation of the example welding system of FIG. **1**.
[0007] FIG. **3** is a perspective view of the example welding system of FIG. **1**.
[0008] FIG. **4** is a side elevation view of another example welding system having a rolling support base with a levered brake in an unbraked position, in accordance with aspects of the present disclosure.
[0009] FIG. **5** is a side elevation view of the example welding system of FIG. **5** with the levered brake in a braked position.
[0010] FIG. **6** is a side elevation view of the example welding system of FIG. **5** with the levered brake in the unbraked position.
[0011] FIG. **7** is a side elevation view of the example welding system of FIG. **5** with the levered brake in the braked position.
[0012] FIG. **8** is a side elevation view of an example welding system having a rolling support base with a levered brake having a biasing element, in accordance with aspects of this disclosure.
[0013] FIG. **9** is a cutaway side elevation view of another example welding system having a rolling support base with a levered brake having a wedge-shaped contact pad, in accordance with aspects of this disclosure.
[0014] The figures are not necessarily to scale. Where appropriate, similar or identical reference numbers are used to refer to similar or identical components.

DETAILED DESCRIPTION

[0015] For the purpose of promoting an understanding of the principles of the claimed technology and presenting its currently understood, best mode of operation, reference will be now made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the claimed technology is thereby intended, with such alterations and further modifications in the illustrated device and such further applications of the principles of the claimed technology as illustrated therein being contemplated as would typically occur to one skilled in the art to which the claimed technology relates.

[0016] Welding-type power, as used herein, refers to power suitable for welding, plasma cutting, induction heating, electrode preheating, CAC-A and/or hot wire welding/preheating (including laser welding and laser cladding).

[0017] The present disclosure will be described with respect to a welding system with a dolly including a wire feeder of a MIG welding system. However, the present disclosure is applicable to power sources and various welding systems, for example, power sources for TIG, stick, flux cored, and the like welding systems. Moreover, the present disclosure is also applicable to supports for non-welding, high power systems such as plasma cutters and induction heaters, and other mechanical systems and components (including non-welding related systems) that may be positioned on a support structure such as a cart or sled.

[0018] Disclosed example welding sleds include: a support base comprising one or more attachment points for attachment of a wire supply support and attachment of a wire drive assembly; a plurality of rollers coupled to a bottom of the support base; and a brake configured to selectively brake the welding sled.

[0019] In some example welding sleds, the brake includes: a contact pad configured to selectively extend through the support base to contact one or more of the rollers; and an actuator accessible from a top or a side of the support base and configured to: actuate the contact pad to contact the one or more of the rollers to apply a braking force to the one or more of the rollers; and actuate the contact pad to move out of contact with the one or more of the rollers.

[0020] In some examples, the contact pad is a flat pad configured to apply pressure against the one or more of the rollers. In some examples, the contact pad is a wedge configured to apply pressure to two rollers of the plurality of rollers between the two rollers. In some examples, the contact pad is configured to extend through a top surface of the support base. In some examples, the contact pad is configured to extend through a side surface of the support base.

[0021] In some example welding sleds, the plurality of rollers includes at least one roller that is not braked by the contact pad. In some examples, the plurality of rollers includes at least five rollers. In some example welding sleds, the actuator includes a lever configured to actuate the contact pad to contact the one or more of the rollers when a handle of the lever is pushed in a first direction to an engaged position. In some examples, the lever is configured to actuate the contact pad to move out of contact with the one or more of the rollers when the handle of the lever is pushed in a second direction to a released position.

[0022] In some example welding sleds, the brake further includes: a biasing element configured to bias the contact pad to apply the braking force to the one or more rollers; and a lever configured to disengage the contact pad from the one or more rollers when a handle of the lever is pushed in a first direction, and to allow the biasing element to move the contact pad into contact with the one or more rollers when the level is released. In some example welding sleds, the brake includes an contact pad and an arm rotatably coupled to the support base, and configured to rotate between a braked position in which the arm holds the contact pad in contact with a support surface on which the support base is located, and a released position in which the arm holds the contact pad out of contact with the support surface.

[0023] Disclosed example welding systems include: a support base having one or more attachment points for attachment of a wire supply and attachment of a wire drive assembly; a wire drive

assembly attached to the support base; a wire supply support attached to the support base and configured to support a wire supply spool; a plurality of rollers coupled to a bottom of the support base; and a brake configured to selectively brake the welding system.

[0024] In some example welding systems, the brake includes: a contact pad configured to selectively extend through the support base to contact one or more of the rollers; and an actuator accessible from a top or a side of the support base and configured to: actuate the contact pad to contact the one or more of the rollers to apply a braking force to the one or more of the rollers; and actuate the contact pad to move out of contact with the one or more of the rollers.

[0025] In some example welding systems, the contact pad is at least one of a flat pad configured to apply pressure against the one or more of the rollers, or a wedge configured to apply pressure to two rollers of the plurality of rollers between the two rollers. In some example welding systems, the contact pad is configured to extend through a top surface of the support base. In some example welding systems, the contact pad is configured to extend through a side surface of the support base.

[0026] In some example welding systems, the actuator includes a lever configured to actuate the contact pad to contact the one or more of the rollers when a handle of the lever is pushed in a first direction to an engaged position. In some example welding systems, the lever is configured to actuate the contact pad to move out of contact with the one or more of the rollers when the handle of the lever is pushed in a second direction to a released position. In some example welding systems, the brake further includes: a biasing element configured to bias the contact pad to apply the braking force to the one or more rollers; and a lever configured to disengage the contact pad from the one or more rollers when a handle of the lever is pushed in a first direction, and to allow the biasing element to move the contact pad into contact with the one or more rollers when the level is released.

[0027] In some example welding systems, the brake includes an contact pad and an arm rotatably coupled to the support base, and configured to rotate between a braked position in which the arm holds the contact pad in contact with a support surface on which the support base is located, and a released position in which the arm holds the contact pad out of contact with the support surface.

[0028] FIG. **1** is a side elevation view of an example welding system **100** having a rolling support base **108** with a levered brake **160**. FIG. **2** is a cutaway side elevation of the example welding system **100** of FIG. **1**. FIG. **3** is a perspective view of the example welding system **100** of FIG. **1**.

[0029] The example welding system **100** of FIGS. **1-3** includes a wire feeder **102** with a drive assembly **104** and a wire supply support **106**, and a support base **108**. The drive assembly **104** of the wire feeder **102** includes rollers or gears (not shown) to advance consumable welding wire from a wire reel mounted to the wire supply support **106** to a welding torch or gun. In the illustrated example, the drive assembly **104** is protected by a housing **112**. In other examples, additional components of the wire feeder **102** may be positioned in the housing **112**. For example, the wire supply support **106** may be positioned in the housing **112** with the drive assembly **104** (e.g., a briefcase wire feeder).

[0030] Power is supplied to the wire feeder **102** by a welding power source (not shown) through a weld cable (not shown). The power source is designed to run in various modes, such as voltage-controlled, or current-controlled, and is further configured to power other welding systems and to provide auxiliary power to various accessories. The power source is designed to condition raw power supplied from a utility line or engine driven power supply and output power usable by the welding process. The output of the power source is generally controlled by a controller and associated operational circuitry that regulates the secondary or output side of the power conditioning components. A gas supply line (not shown) connects the wire feeder to a gas source or cylinder to provide shield gas for welding operations.

[0031] A welding gun or torch (not shown) connects to the wire feeder **102** via a wire guide line. The welding torch is configured to supply consumable welding wire to a workpiece. Control signals are transmitted between the torch and the wire feeder **102** via a control line (not shown).

The welding torch may be equipped with a trigger or other input device that, when manipulated, causes a transceiver of a controller (not shown) in the housing **112** of the wire feeder **102** to transmit control signals to the power source through weld cable or separate communications cable.
[0032] The wire supply support **106** in the example of FIG. **1** includes a reel or a hub **130** that rotatably supports a spool **132** of welding wire (welding wire not shown). Wire is drawn from the spool **132** by the drive assembly **104**. The spool **132** rotates to allow additional wire to be unwound from the spool as the wire is drawn through the drive assembly **104**. While a spool of wire is depicted, other sources of wire may be utilized by wire feeder **102**, for example, a free spool, a container or box with spooled wire, or any other desirable source of welding wire usable by a drive assembly. Additionally or alternatively, the hub **130** and the spool **132** may have a different orientation with respect to the plate **140**, and/or the orientation and/or position of the hub **130** and the spool **132** may be adjustable.
[0033] The drive assembly **104** and wire supply support **106** are supported by a sled or support base **108**. The support base **108** rigidly connects the drive assembly and the wire supply support together to ensure proper orientation to perform a welding operation, and to allow the feeder to be transported. In the embodiment depicted, the drive assembly **104** and the wire supply support **106** are supported on a support plate **140** of the support base **108**. The drive assembly **104** and the wire supply in the embodiment shown are mounted to the plate, for example, bolted to the plate, welded to the plate, or the like.
[0034] The example welding system **100** may include one or more handles, attachment points, and/or any other structures to allow an operator to grasp and manipulate the welding system **100**.
[0035] The support base **108** includes a set of rollers **150** which enable the welding system **100** to be easily pulled or pushed along a support surface **101** (e.g., via a handle). The example rollers **150** may be low-friction rollers. The rollers **150** are coupled the support base **108** via support rails and/or other support structures on a bottom of the support base **108**. In contrast with wheels or casters, the rollers **150** are relatively low friction and have a length that is substantially longer than the radius. Rollers **150** generally have lower rolling friction than wheels or casters having the same radius, and/or may enable a larger distribution of load than wheels or casters of the same radius. In disclosed examples, the welding system **100** includes at least five of the rollers **150** to provide stability and load distribution.
[0036] Because the rollers **150** are a relatively low friction, the rollers **150** may allow the welding system **100** to roll at unintended times in the presence of a graded support surface. Such unintended rolling may be problematic for an unsuspecting operator who is performing a weld or is otherwise not attending to the welding system **100**. To resist or prevent unintended movement of the welding system **100** via the rollers **150**, the example welding system **100** further includes a brake **160** to selectively increase rolling friction.
[0037] The example brake **160** of FIGS. **1-3** includes a contact pad **162** and an actuator **164**. The contact pad **162** extends through the support base **108** (e.g., through a hole **166** in a top of the support plate **140**, through a hole or aperture in a side of the support base **108**, etc.). When pressure is applied between the contact pad **162** and one or more of the rollers **150**, the contact pad **162** applies a braking force to the contacted ones of the rollers **150**.
[0038] The example contact pad **162** of FIGS. **1-3** is a rubber foot arranged to apply pressure to one of the rollers **150**. However, other implementations of the contact pad **162** may include a tapered or wedge shape to fit between two rollers **150**, a flat plate shape to contact one, two, three, or more rollers, and/or any other effective geometry for applying braking force to one or more of the rollers **150**.
[0039] The example actuator **164** of FIGS. **1-3** is a lever **168**, which actuates the contact pad **162** to contact one or more of the rollers **150** when a handle **170** of the lever **168** is pushed or pulled in a first designated direction **172**. To actuate the contact pad **162**, the example lever **168** includes an upper pivot pin **176** and a lower pivot pin **178**. As the handle **170** is moved in the first direction

172, the upper pivot pin **176** moves directly over (or slightly past) the lower pivot pin **178** and locks the contact pad **162** in contact with the rollers **150**. The lever **168** also actuates the contact pad **162** to move out of contact with the one or more rollers **150** when the handle **170** is moved in a second designated direction **174** (e.g., opposite the first designated direction **172**). As the handle **170** is moved in the second direction **174**, the upper pivot pin **176** is moved out of the vertical position with respect to the lower pivot pin **178**, and the contact pad **162** is released from contact with the rollers **150** and is moved out of contact with the rollers **150** via the connection between the handle **170** and the contact pad **162**. In the example of FIGS. **1-3**, the handle **170** is arranged such that it can be easily manipulated in either direction **172**, **174** by a hand and/or foot of the operator.
[0040] The contact pad **162** may be adjustable with respect to the actuator **164**, such as to adjust the pressure applied by the contact pad **162** to the roller(s) **150** when the actuator is in a braking position. For example, the contact pad **162** may be attached to a bolt or threaded stud, which is adjustable with respect to the lever **168** by adjusting the extension of the contact pad **162** from the lever **168** via the bolt or threaded stud (e.g., using nuts to secure the bolt or threaded stud, or having threads in the lever **168**).
[0041] FIG. **4** is a side elevation view of another example welding system **400** having a rolling support base with a levered brake in an unbraked position. FIG. **5** is a side elevation view of the example welding system **400** of FIG. **5** with the levered brake in a braked position. FIG. **6** is a perspective view of the example welding system **400** of FIG. **4** with the levered brake in the unbraked position. FIG. **7** is a perspective view of the example welding system **400** of FIG. **4** with the levered brake in the braked position.
[0042] The example welding system **400** is similar to the welding system **100** of FIGS. **1-3** disclosed above, and includes the wire feeder **102**, the drive assembly **104**, the wire supply support **106**, the support base **108**, the housing **112**, the hub **130**, the plate **140**, and the rollers **150**.
[0043] In addition, the example welding system **400** includes a brake **402** attached to a side of the support base **108**. Instead of contacting and applying braking force to the rollers **150**, the example brake **402** contacts the support surface **101** to apply a braking force using the weight of the welding system **400** to resist movement of the welding system **400**.
[0044] The brake **402** of FIGS. **4-7** includes a contact pad **404** (e.g., a rubber or plastic foot, a durable and high-friction contact surface), which is attached to the support base **108** via a rotating leg **406** coupled to a mounting bracket **408**. The mounting bracket **408** allows rotation of the leg **406** and the contact pad **404** between an unbraked position (e.g., FIGS. **4** and **6**) and a braked position (FIGS. **5** and **7**). In the braked position, the contact pad **404** is applying a braking force to the support surface **101**. The operator may rotate the leg **406** from the braked position to the unbraked position to more easily move the welding system **400** on the rollers **150**, and rotate the leg **406** to the braked position at the desired location to reduce the likelihood of undesired movement of the welding system **400**.
[0045] In some examples, the length of the leg **406** and, therefore, the weight placed on the contact pad **404** and resulting braking force, are adjustable. For example, by increasing the length of the leg **406**, the weight on the contact pad **404** is increased. As a result, the brake **402** has a higher resistance to movement of the welding system **400**, but may require more force to overcome the braking position and move the brake **402** to the unbraked position. Conversely, the leg **406** may be shortened to decrease the weight on the contact pad **404**, and reduce the braking force and force to move the brake **402** to the unbraked position.
[0046] In some examples, the bracket **408** and/or the leg **406** include detents or other features to improve stability of the leg **406** in the braked position without substantially increasing the weight on the contact pad **404**, and/or to retain the leg **406** in the unbraked position to resist or prevent unintentional rotation of the leg **406** to the braked position while the welding system **400** is being moved.
[0047] While the example brake **402** is shown in a particular position on the support base **108**, in

other examples the brake **402** may be positioned at any effective location on the perimeter of the support base **108**, and/or any other location on the support base **108** which allows the brake **402** to be positioned in the braked and unbraked positions. Additionally or alternatively, the contact pad **404**, the leg **406**, and/or the bracket **408** may have any other desired shape to contact the support surface **101** from the location at which the brake **402** is attached to the support base **108**. For example, the brake **402** may be implemented using the example actuator **164**, lever **168**, and/or handle **170** such that the lever **168** and contact pad **162** are configured to contact the support surface **101** (e.g., in addition to or instead of contacting the rollers **150**) to apply the braking force to the support surface **101** in the braked position illustrated in FIGS. **1-3**.

[0048] FIG. **8** is a side elevation view of an example welding system **800** having a rolling support base **108** with a levered brake **802** having a biasing element **804**. The example welding system **400** is similar to the welding system **100** of FIGS. **1-3** disclosed above, and includes the wire feeder **102**, the drive assembly **104**, the wire supply support **106**, the support base **108**, the housing **112**, the hub **130**, the plate **140**, and the rollers **150**.

[0049] The example levered brake **802** is similar or identical to the example brake **160** of FIGS. **1-3**, including the contact pad **162**, actuator **164**, lever **168**, and handle **170**. The example levered brake **802** further includes the biasing element **804**, which biases the contact pad **162** to apply the braking force to the one or more rollers **150**. The example biasing element **804** may be a spring or other biasing element which applies a force urging the contact pad **162** toward engagement or contact with the roller **150**. As a result, instead of the actuator **164** rotating in the first direction **172** to apply the braking force, the actuator **164** requires a force in the second direction **174** to overcome the biasing force from the biasing element **804** to set the brake **802** to the unbraked position. The handle **170** may then be released from the unbraked position to allow the biasing element to push the contact pad **162** into contact with the roller(s) **150** and apply the braking force to the welding system **800**. In this manner, if the actuator **164** becomes broken, the contact pad **162** is pushed to the braked position by default.

[0050] FIG. **9** is a cutaway side elevation view of another example welding system **900** having a rolling support base **180** with a levered brake **902** having a wedge-shaped contact pad **902**. The example welding system **900** is similar to the welding system **100** of FIGS. **1-3** disclosed above, and includes the wire feeder **102**, the drive assembly **104**, the wire supply support **106**, the support base **108**, the housing **112**, the hub **130**, the plate **140**, and the rollers **150**. The example levered brake **902** is similar or identical to the example brake **160** of FIGS. **1-3**, including the actuator **164**, lever **168**, and handle **170**. In contrast with the contact pad **162**, the contact pad **904** of the example welding system **900** has a wedged or tapered surface, and abuts two adjacent rollers **150** from a position between the contacted rollers **150**.

[0051] While an example wedge shape is illustrated in FIG. **9**, the wedge shaped contact pad **904** may have a larger or smaller angle, and a larger or smaller width.

[0052] As utilized herein, “and/or” means any one or more of the items in the list joined by “and/or”. As an example, “x and/or y” means any element of the three-element set {(x), (y), (x, y)}. In other words, “x and/or y” means “one or both of x and y”. As another example, “x, y, and/or z” means any element of the seven-element set {(x), (y), (z), (x, y), (x, z), (y, z), (x, y, z)}. In other words, “x, y and/or z” means “one or more of x, y and z”. As utilized herein, the term “exemplary” means serving as a non-limiting example, instance, or illustration. As utilized herein, the terms “e.g.,” and “for example” set off lists of one or more non-limiting examples, instances, or illustrations.

[0053] While the present method and/or system has been described with reference to certain implementations, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted without departing from the scope of the present disclosure. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the present disclosure without departing from its scope. For example, systems, blocks,

and/or other components of disclosed examples may be combined, divided, re-arranged, and/or otherwise modified. Therefore, the present method and/or system are not limited to the particular implementations disclosed. Instead, the present method and/or system will include all implementations falling within the scope of the appended claims, both literally and under the doctrine of equivalents.

Claims

1. A welding sled, comprising: a support base comprising one or more attachment points for attachment of a wire supply support and attachment of a wire drive assembly; a plurality of rollers coupled to a bottom of the support base, each of the rollers having an axial length longer than a radius of the roller; and a brake configured to selectively brake the welding sled, wherein the brake comprises: a contact pad configured to selectively extend from first position on a first side of the support base through the support base to apply a braking force in a second position on a second side of the support base; and an actuator accessible from a top or a side of the support base and configured to: actuate the contact pad from the first position to the second position to apply the braking force; and actuate the contact pad from the second position to the first position.
2. The welding sled as defined in claim 1, wherein the contact pad is configured to apply the braking force to one or more of the rollers.
3. The welding sled as defined in claim 2, wherein the contact pad is a flat pad configured to apply pressure against the one or more of the rollers.
4. The welding sled as defined in claim 2, wherein the contact pad is a wedge configured to apply pressure to two rollers of the plurality of rollers between the two rollers.
5. The welding sled as defined in claim 2, wherein the contact pad is configured to extend through at least one of a top surface of the support base or a side surface of the support base.
6. The welding sled as defined in claim 2, wherein the plurality of rollers comprises at least five rollers.
7. The welding sled as defined in claim 2, wherein the plurality of rollers comprises at least one roller that is not braked by the contact pad.
8. The welding sled as defined in claim 2, wherein the actuator comprises a lever configured to actuate the contact pad to contact the one or more of the rollers when a handle of the lever is pushed in a first direction to an engaged position.
9. The welding sled as defined in claim 8, wherein the lever is configured to actuate the contact pad to move out of contact with the one or more of the rollers when the handle of the lever is pushed in a second direction to a released position.
10. The welding sled as defined in claim 2, wherein the brake further comprises: a biasing element configured to bias the contact pad to apply the braking force to the one or more rollers; and a lever configured to disengage the contact pad from the one or more rollers when a handle of the lever is pushed in a first direction, and to allow the biasing element to move the contact pad into contact with the one or more rollers when the level is released.
11. The welding sled as defined in claim 1, wherein the brake is configured to apply the braking force to a support surface on which the support base is located.
12. The welding sled as defined in claim 11, wherein the brake comprises an contact pad and an arm rotatably coupled to the support base, and configured to rotate between a braked position in which the arm holds the contact pad in contact with a support surface on which the support base is located, and a released position in which the arm holds the contact pad out of contact with the support surface.
13. The welding sled as defined in claim 1, further comprising a wire drive assembly attached to the support base via one or more of the attachment points.
14. The welding sled as defined in claim 13, further comprising a wire supply support attached to

the support base via one or more of the attachment points and configured to support a wire supply spool.