QUICK SHUNT LOCKING MEANS
Inventors: John C. West, St. Paul; Gary N. Gunderson, Bloomington, both of Minn.
Assignee: Century Mfg. Co., Minneapolis, Minn.
Filed: Jan. 10, 1975
Appl. No.: 540,427

U.S. Cl. .......................... 336/133
Int. Cl. .......................... H01F 21/06
Field of Search .................. 336/130, 132, 133

REFERENCES CITED
UNITED STATES PATENTS

Primary Examiner—Thomas J. Kozma
Attorney, Agent, or Firm—Leo Gregory

ABSTRACT
A quick shunt locking device in connection with a sliding shunt type of welder including a pair of opposed channel members having a shunt therebetween, said shunt and channel members being disposed within the windows of the core of said welder, a yoke member overlying one side of said core in spaced relation thereto supported by a stud extending from said core, said member engaging one of said channel members, a pair of ramp like members carried at the outer side of said yoke member, said ramp members being in vertically spaced reverse relationship to one another with the respective lower and upper ends of said ramps being in diagonally opposed relation, a lever rotatably mounted on said stud engaging said ramp members moving said yoke member axially of said stud into engagement with said one of said channel members to move the same to lock said shunt between itself and the other of said channel members.

8 Claims, 7 Drawing Figures
QUICK SHUNT LOCKING MEANS

BACKGROUND AND SUMMARY OF THE INVENTION

In a movable shunt type of welder there is a strong vibratory motion of the shunt resulting from lateral forces when the welder is in operation. Hence, a secure locking means for the shunt is required.

A hand wheel on a screw rod operating a shunt locking or clamping member represents a common type of shunt locking device. The rotation of the hand wheel for both releasing and securing the shunt is time consuming.

It is desirable and an object of this invention to have a very quickly operable means to release and secure a shunt.

It is another object of this invention to provide a shunt locking device requiring but a single motion for its operation.

It is a more specific object of this invention to provide in connection with a movable shunt type of welder, a yoke member carried at one side of the core of said welder, a stud extending from said core supporting said yoke member, a pair of spaced ramp members on the outer side of said yoke member, said ramp members having their respective elevated and lower ends in diagonally opposed relation, a lever rotatably mounted on said stud having portions respectively riding on said ramps to move said yoke member axially of said stud, said yoke member engaging the adjacent one of a pair of members within said core, said shunt being between said members, and thereby locking said shunt therebetween in operating position, said lever being operated by a single manual motion.

It is also an object of this invention to provide a relatively low cost and simply constructed lever operated shunt locking device.

These and other objects and advantages of the invention will be set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

FIG. 1 is a view in front elevation;
FIG. 2 is an enlarged view in vertical section taken on line 2—2 of FIG. 1;
FIG. 3 is a view in horizontal section taken on line 3—3 of FIG. 2;
FIG. 4 is a broken view in elevation showing a detail of structure;
FIG. 5 is a view in horizontal section taken on line 5—5 of FIG. 4;
FIG. 6 is a view in front elevation showing a modification; and
FIG. 7 is a view in vertical section taken on line 7—7 of FIG. 6.

DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is made to U.S. Pat. No. 3,514,732, issued May 26, 1970, to R. H. Jackman, which patent is under the ownership of the assignee herein. The invention herein represents a substantial improvement over the shunt locking structure as disclosed in said patent. The general description of portions of the structure described in said patent are incorporated herein by reference as will be indicated although like reference numerals for like parts are not herein used.

Referring to FIGS. 1-5, an electric movable shunt type of welding apparatus or welder 10 is shown comprising a housing 11 having a top wall 12, side walls 13 and 14, a front wall 15, a rear wall 16 and a bottom wall 17 supported by foot members 18. The particular design of the housing is not essential to the invention herein.

Mounted within said housing and secured by brackets 20 and 21 is a welding core 23. The invention herein is applicable to various configurations of welding cores and shown here is an upright E type of core formed as a laminated structure comprising outer legs 25 and 26 and a central leg 27, said legs bounding windows 29 and 30.

Conventional primary and secondary coils 32 and 33 are mounted in spaced relation onto said center leg 27.

Disposed between each of said coils and respectively extending transversely through said windows of said core in parallel relationship are shunt members 35 and 36.

Said shunt member 35 as more fully described in said Patent comprises a frame 38 of spaced elongated members 39 and 40 having a shunt 42 disposed therebetween adjacent one end thereof.

Shunt member 36 carrying a shunt 46 between frame members 47 and 48 has a construction identical to that of said shunt member 35.

A cross bar 37 connects one pair of adjacent ends of said shunt members as shown in FIG. 4. Linkage 41 connects said cross bar to a crank 43 rigid with a cylindrical shaft or sleeve 44 extending outwardly of said front wall 16 of said housing to carry an operating knob 45. Said sleeve is carried on a shaft 44a welded to said core. This structure is not essential to the invention herein and may vary as to detail and the same is here described in general terms.

Disposed within said windows 29 and 30 forwardly of said shunt members 35 and 36 as shown in FIG. 3 and adapted to be secured therein are U-channel members 50 and 51 forming shunt member holding members and said holding members have their web portions 50a and 51a as shown in FIG. 4 project above and below said core. Said channel members conform to said windows.

The leg portions 53, 54 and 55, 56 respectively of said channel members extend for engagement with the adjacent edge portions of said shunt members 35 and 36 as shown.

Disposed at the opposite or rearward side of said shunt members 35 and 36 are channel members 60 and 61 identical to and in opposed relation to said channel members 50 and 51 having leg portions 62, 63 and 64, 65 for engagement with the adjacent edge portions of said shunt members 35 and 36.

As indicated at A in FIG. 4, there will be sufficient clearance within the windows 29 and 30 for movement of the channel members 50 and 51 in the direction of the channel members 60 and 61 to lock or clamp said shunt members therebetween.

It will be noted that as here illustrated, the respective engaging or mating edge portions of said legs of said channel members and the respective adjacent edge portions of said shunt members are beveled whereby said shunt members are made to be self-centering in locked position. This represents a preferred embodiment of structure as described in said U.S. Pat. No. 3,514,732 and is here shown as such for purpose of illustration.
The structure comprising the invention herein will now be described.

Overlying the end portion 66 of said core 23 as indicated in FIGS. 2 and 4 is a yoke member 67 comprising a web or back portion 68 having upper and lower side wall portions 69 and 70 which respectively have extending spaced leg portions 72, 73 and 74, 75. Said wall members extend to overlite the adjacent upper and lower wall portions of said core as illustrated in FIGS. 3-5. Said leg portions respectively have right angled flange portions 76, 77 and 78, 79. Said flange portions respectively engage the adjacent projecting portions of said channel members 50 and 51 as indicated at 50a and 51a.

Extending outwardly centrally of said end portion 66 of said core is a stud member 81 which extends through an opening 83 of said yoke member 67 to thus support said yoke member and a coil spring 85 is carried on said stud between said yoke member and said core to normally urge said yoke member in a direction away from said core and the same will be further described. Said stud is secured to said core as by welding.

Mounted in spaced relation on said web portion of said yoke member at the top and bottom thereof are ramp members 90 and 91 and the same are respectively secured to said web as by screws 93.

Said ramp member 90 has a ramp or elevating portion 95 and an upper level portion 96. Said ramp member 91 has a ramp or elevating portion 97 and an upper level portion 98. Said ramp members 90 and 91 as shown are disposed in reverse relation with respect to one another having their ramp and level portions in diagonally opposite relation as shown in FIGS. 3 and 4.

Mounted on said stud member 81 for rotation thereon is a lever 100 comprising a ramp engaging member which for purpose of illustrating one embodiment thereof is here shown in the form of a U-channel member having a cage 101 formed at each end thereof and journaled within each of said cages in a conventional manner is a small wheel or caster 102. Said casters will run or ride on said ramp members.

A link 104 as here shown has an end portion 105 recessed into said member 100 at right angles thereto and centrally thereof for rigid locking engagement therewith, said end portion being apertured to have said stud member 81 extend therethrough. Pivoted as by a rivet to the other end portion 106 of said link 104 is one end portion 108 of a link 109.

Also carried on said stud in rigid engagement therewith is a small strap member 112. A nut 113 is threaded onto the free end of said stud member to secure in rigid engagement with said member 100 said strap member 112 and said link 104.

Said strap member has an extended loop portion 116 as shown in FIGS. 2 and 4.

An elongated operating rod 118 is provided having a lower end portion 119 slidably disposed through said loop portion 116, an intermediate portion 120 thereof has pivoted thereto as by a rivet the other or free end portion 110 of said link 109. Said operating rod extends outwardly of the front wall 15 of the housing 11 through a slot 122 and for operating convenience has a knob 121 formed at its outer end portion as shown in FIG. 2.

MODIFICATION

With reference to FIGS. 6 and 7, a modification of the above structure is shown with like structure being indicated by like reference numerals and the modified structure being herein described.

Secured to said channel member 100 at right angles thereto as by being recessed therein is an elongated flat rod member 125 forming an operating rod which has its free end 126 extending through a slot 127 in the front wall 128 which wall differs in form from said front wall 15 but such difference is not material to the invention herein. This is a simplified form of the operating rod 118 and its attendant linkage.

OPERATION

The essential purpose of the invention herein is to permit a very rapid change of the energy output of an electric shunt type of welder by the operator being enabled very quickly to release the shunt members for movement to adjust the energy output and to quickly secure said shunt members in locked position against the effects of vibration, each operation requiring but a single manual motion.

With reference to the embodiment first above described, the casters 102 are positioned, as shown in FIG. 2, at the lowest portions of the ramp members 90 and 91 releasing the yoke member 67 from exerting any pressure against said channel members 50 and 51. The spring 85 normally urges said yoke member 67 away from any pressurized engagement with said channel members 50 and 51.

With the channel members 50 and 51 free of any pressure, the shunt members are readily movable for change as to position by the operator by the operation of the knob 45 in a known manner. This portion of the operation of the welder is not a part of the invention herein but is fully described in said Patent herein previously mentioned.

To lock said shunt members in their new position, the operating knob 121 is grasped and with a quick thrust the extended portion of said operating rod is moved inwardly of said slot 122. This movement as indicated in FIG. 4 moves the links 109 and 104 downwardly and the ramp engaging member 100 is rotated counterclockwise to move the casters 102 upwardly of the respective ramp members 90 and 91 pressing said channel member 67 against the tension of the spring 85 to engage the channel members 50 and 51 and move them and the shunt members 35 and 36 engaged by them against the adjacent extended leg portions of the channel members 60 and 61. The ramp member 100 is in locked position and locks the shunt members in operating position within casters 102 right upwardly onto the level ramp portions 96 and 97 into what is an overcenter position with respect to said member 100. The rod 118 slides readily through the loop portion 116 which acts as a guide.

Thus the shunt members 35 and 36 are securely locked against vibration by a simple thrust of the operating rod 118. Said shunt members are just as readily released by an outward pull of said operating member 118.

The modified structure of FIGS. 6 and 7 shows a straight operating rod 125 in lieu of the rod 118. The rod 125 is simply moved upwardly and downwardly within the slot 127 to operate the channel member 100 in the same manner that it is otherwise operated by the operating rod 118.
It will be appreciated that in the use of a welding apparatus a varying amount of energy output may be required for different kinds of welding jobs and to attain the most efficient use of the welding apparatus it is desirable for the operator to be able to adjust the output with a minimum of effort. The invention herein thus provides for such efficient use and operation of a welding apparatus and has been very successful in practice.

It will of course be understood that various changes may be made in form, details, arrangement and proportions of the parts without departing from the scope of the invention herein which, generally stated, consists in an apparatus capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. A quick shunt locking means for a welding apparatus having a movable shunt, having in combination a core,
a shunt member movably disposed in said core,
a pair of shunt member holding members carried in said core engaging said shunt member at opposed sides thereof,
a shunt locking means comprising
a yoke member carried at one side of said core engaging one of said pair of shunt holding members,
a stud carried by said core supporting said yoke member,
and
means carried by said stud, engaging ramp means on said yoke and moving said yoke member into engagement with said one of said pair of shunt holding members, locking said shunt member between said pair of shunt holding members.

2. The structure set forth in claim 1, including resilient means disposed between said core and said yoke member urging said yoke member out of engagement with said one of said pair of shunt holding members.

3. The structure set forth in claim 1, including a coil spring carried on said stud urging said yoke member out of engagement with said one of said pair of shunt holding members.

4. The structure set forth in claim 1, wherein said yoke member comprises a channel member, the sides of said yoke member overlying the adjacent upper and lower side walls of said core and engage said one of said pair of shunt holding members.

5. The structure set forth in claim 1, wherein said yoke member has a pair of spaced outward projections thereon forming ramp portions, said ramp portions being in reversely disposed relation with respect to one another, said means carried by said stud comprises

a bar forming a lever rotatably mounted on said stud in a fixed axial position with respect to said stud, and
means moving said lever upwardly of said respective ramp portions moving said yoke member axially of said stud into pressurized engagement with said one of said pair of shunt holding members.

6. A quick shunt locking means for a welding apparatus having a movable shunt, having in combination
a core,
a shunt member movably disposed in said core,
a pair of shunt holding members carried in said core engaging said shunt member at opposite sides thereof,
a shunt locking means comprising
a yoke member carried at one side of said core engaging one of said pair of shunt holding members, a stud carried by said core supporting said yoke member,
said yoke member having a pair of spaced reversely disposed ramp portions thereon, and
means rotatably carried on said stud in fixed axial relationship therewith engaging said ramp portions moving said yoke member axially of said stud into pressurized engagement with said one of said pair of shunt holding members locking said shunt member between said pair of shunt holding members.

7. A quick shunt locking means for a welding apparatus having a movable shunt, having in combination
a core,
a shunt member movably disposed in said core, a pair of shunt holding members disposed in said core having said shunt member therebetween, a shunt locking means comprising
a yoke member carried at one side of said core engaging one of said pair of shunt holding members, a stud projecting from said core supporting said yoke member, a lever rotatably disposed on said stud, a pair of spaced ramp portions carried by said yoke member forming projections in the direction of said lever, means operating said lever to ride up said ramp portions moving said yoke member into pressurized engagement with said one of said pair of shunt holding members moving the same to lock said shunt member between said pair of shunt holding members.

8. The structure set forth in claim 7, including a coil spring mounted on said stud urging said yoke member in a direction away from engagement with said one of said pair of shunt holding members.

* * * * *