ABRASIVE BELT HANDLING DEVICE
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The present invention relates in general to an abrasive belt handling device and more specifically to a device for facilitating the handling, moving and/or loading onto an abrating machine of a coated abrasive belt.

Heretofore, coated abrasive belts have been loaded on abrasive belt abrating equipment by hand operation. While this is generally fast and easy when the belt is relatively small, the increasing use of very large coated abrasive belts has made the problem of belt installation and belt changing a serious one. Wide belts up to 84 inches in width or even more and ranging in length up to 126 inches or more have come into popular use on coated abrasive machinery. Such massive belts are difficult to handle, requiring from two to six men to place the belt in position on a machine. In addition, manual handling carries with it risks of injury both to the belt itself and to those handling such belt. Since in many installations a belt may be used a number of times interchangably with other belts of different grit size the same belt may be installed and removed from a machine many times before its useful life is terminated. These large belts are expensive and since multiple handling increases the danger of creasing or tearing which would result in the belt being discarded.

Accordingly, is an object of the present invention to provide a device for facilitating the handling of coated abrasive belts.

Another object of the invention is to provide a device especially adapted for handling wide coated abrasive belts.

A further object of this invention is to provide a device which will eliminate manual loading or mounting of a belt on coated abrasive machine and the attendant risks of injury to the belt and/or those normally engaged in handling such belt.

Additional objects, if not specifically set forth herein, will be readily apparent to one skilled in the art from the following detailed description of the invention.

In the drawings:

FIGURE 1 is a side elevation, partly in section, of the device of the present invention showing it in operative position relative to loading on a coated abrasive belt from a storage rack.

FIGURE 2 is an end view of the device of FIGURE 1 showing the device in position to position the coated abrasive belt on the rolls of a conventional belt abrating machine.

Generally, the present invention comprises a belt handling device or fixture adapted to perform the following functions with respect to a wide coated abrasive belt.

(a) Pick up the belt from a holder or rack therefor.

(b) Position the belt in a fixed relationship to the surfaces of the belt handling device with which it is in contact and stretch the belt to its normal operating configuration.

(c) Transport the belt while in such fixed relationship to the machine upon which it is to be mounted.

(d) Orient the belt with respect to the machine upon which it is to be mounted.

(e) Feed the edges of the belt over the contact and idler rolls of the machine upon which it is to be mounted in a manner to minimize edge tearing or creasing of the belt.

(f) Release the fixed relationship between the belt and the belt handling device to permit the belt to be slid onto the machine rolls.

(g) Reverse the process when it is desired to remove the belt from the abrating machine.

(h) Perform these steps with only one operator required and with a minimum of physical contact between the operator and the belt per se regardless of the size of the belt.

More specifically, the device of the present invention is a belt handling fixture which will permit picking up a wide belt from a storage rack, orienting the belt at any desired angle to match its orientation when on the grinding unit with which it is to be used and depositing the belt in operating position upon the mounting rolls of such machine—all with a minimum of operator effort.

Referring now to FIGURES 1 and 2 of the drawings, 30 represents the device of the present invention and as shown in FIGURE 1, the relationship of such device 30 to a coated abrasive belt 11 which is to be picked up from a wall rack 12. The belt 11 is disposed on wall rack 12 in a loosely supported relationship but in generally extended condition as shown. The belt handling device 10, as is most clearly shown in FIGURE 1, comprises a pair of belt contacting members 13 and 13'. These may be formed in several ways, but in all instances possess an external surface of semicircular cross-section. The diameter of the cross-section is determined by the diameter of the contact and idler rolls of the machine with which the device is constructed to be used. While either member 13 or 13' may be designed to cooperate with either the contact or idler roll of the abrating machine (and these may be of different diameter in many machines) for ease of discussion the top member 13 herein described shall be referred to as the idler member while the bottom member 13' shall be referred to as the contact member, thus indicating that member 13 is designed with an internal diameter just large enough to fit over the idler roll of the abrating unit and member 13' similarly designed with respect to the contact roll of such abrating unit.

As shown, members 13 and 13' are long hollow shells but equivalent structures formed of a plurality of spaced rods, etc., could be used if desired. Idler member 13 is pivotally secured to a main frame member 14 by a pin 15 adjacent one end thereof. The other end 16 of idler member 13 is movably about pin 15 and such movement is effected through a pair of links 17 and 18 connected to frame 14 and the member 13 respectively. Control of such movement takes place through link 20 connected to piston 21 which is in turn actuated by a feed screw 22. Feed screw 22 is contained within a hollow member or shaft 23 which is secured to frame 14 and which, together with feed screw 22, passes rotatably through a frame support member 24. The hollow shaft 23 can be rotated, thus rotating frame 14 with respect to frame 24, by means of a hand wheel 25 fixedly secured to the side of shaft 23 as it protrudes from frame support member 24. The feed screw 22 is fixed against axial movement and operated by a hand wheel 26 mounted at the end thereof adjacent wheel 25.

Contact member 13' is fixedly secured to frame 14, preferably by a pair of vertically adjustable take-up bearings 32 as shown. These are affixed at the ends 33 of frame 14 and connected to member 13' by pins 34. These take-up bearings permit adjustment to some degree of the distance between members 13 and 13' to provide for slight variations in belt lengths.

The movable or outboard end 16 of member 13 and the corresponding end 19 of member 13' are preferably formed with a taper from the surface inwardly toward the opposite member as shown. This provides an essentially scoop-nosed end for each member, the purpose of
which will be apparent from the description of the use of the device given below.

Support frame 24 extends above the idler member 13 and carries a hanger consisting of a thrust bearing 29 and an associated roller means 30 adapted to engage and movably support the device 10 from an overhead rail 31. Obviously, the device could be constructed with support frame 24 extending downwardly and terminating in a wheeled support platform if so desired.

Movement of the outboard end 16 through the described linkage towards fixed end 19 of member 13 is necessary to permit slipping members 13 and 13' into contact with the inner surface of belt 11 and then by movement of end 16 away from end 19 the belt can be stretched to its normal operating length and retained in fixed relationship to members 13 and 13'.

The entire assembly of frame 14 and members 13 and 13' can be swung through a 360° arc about the axis of hollow member 23 through rotation of wheel 25. Usually two fixed positions are required in the device—one for loading the belt from the rack, illustrated in FIGURE 1 and the other for aligning the belt on the abrading machine (shown in FIGURE 2). A spring-loaded detent 27 on wheel 25 and associated angularly spaced holes 28 on frame support member or an extension thereof are therefore provided.

In operation, the unit 10 will be lined up with the belt rack 12 as shown in FIGURE 1. Wheel 26 will be operated to depress the end 16 of member 13 through such portion of its degree of movement A as shown, in FIGURE 1 as may be necessary to permit members 13 and 13' to slide between rack 12 and the inner surface of belt 11. The belt is then manually slid onto members 13 and 13' into the position shown by the broken lines in FIGURE 1. Member 13 is then moved away from 13' to tighten the belt in position. The unit 10 is then moved along track 31 into position alongside the machine (not shown) upon which the belt is to be mounted.

Referring now to FIGURE 2, it will be seen that the member 14 has now been rotated with respect to support frame member 24. This is accomplished as described above through hand wheel 25 and shaft 23.

The need for and degree of this movement is dictated by the particular orientation of the contact roll and the idler roll of the machine upon which the belt is to be mounted. Sometimes these will be vertically aligned as was the belt rack illustrated in FIGURE 1 and no adjustment of frame 14 will be needed. However, for any horizontal abrading machine such adjustment would be required. As illustrated, the unit is adjusted to place the belt on a horizontal machine having the idler roll disposed at a higher elevation than the contact roll. Since this equipment is conventional and illustration is not required to clarify the use of the present invention, the actual showing of the machine itself has been dispensed with herein. As was stated above, each belt handling unit is designed for use with a specific abrading machine and, hence, stop 28 is positioned to engage detent 27 at the proper point to hold frame 14 in correct alignment.

In operation, the tapered ends 16 and 19 of members 13 and 13' are brought into overlapping position with respect to the idler and contact roll of the machine respectively and the unit 10 moved in far enough to insure smooth transition from the members 13 and 13' to such idler and contact roll. In all conventional abrading machines, means are provided for moving the contact or idler roll towards the other roll to release tension on the belt or to permit mounting of a new belt. The unit of this invention, of course, functions when the tension on the abrading machine has been relaxed to permit the distance between the contact and idler roll to be less than it is when the belt is supported in taut position thereon. Once the members 13 and 13' are in position over the idler and contact rolls, the belt can be easily and smoothly slid from members 13 and 13' over the idler and contact roll of the machine. Unit 10 is then retracted from the machine, and the tension is applied to the idler or contact roll in conventional manner to stretch the belt upon the machine. The process is reversed to remove or replace belts.

Obviously, many variations and modifications can be made without departing from the spirit and scope of the invention disclosed herein and, therefore, only such limitations should be imposed as are contained in the appended claims.

What is claimed is:

1. An abrasive belt handling device comprising a movable frame member; a pair of belt contact members pivotally mounted on said frame member and disposed in adjustably spaced relationship one from the other; means mounted on said frame to adjust the spaced relationship of said belt contact members with respect to each other; means mounted on said frame to pivot said belt contact members to any desired angle to said frame; and means to lock said belt contact members at said desired angle to said frame.

2. An abrasive belt handling device as in claim 1 wherein said belt contact members are in the form of hollow shells having a semi-circular cross-section.

3. An abrasive belt handling device as in claim 2 wherein the diameter of the cross-section of one belt contact member is different from the diameter of the cross-section of the other belt contact member.

4. An abrasive belt handling device as in claim 1 wherein the means to adjust the spaced relationship of the belt contact members includes means to move at least one of the ends of said belt contact members further from said frame to change its spaced relationship to the corresponding end of the other belt contact member.

5. An abrasive belt handling device as in claim 1 wherein the means to pivot said belt contact members includes a shaft rotatably mounted within the frame and having means at one end connected to each of said belt contact members whereby rotation of the shaft moves the belt contact members relative to said frame.

6. An abrasive belt handling device as in claim 1 wherein the movable frame member is suspended from an overhead track.

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