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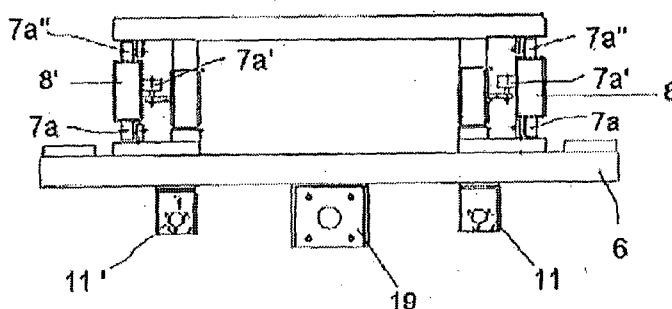


Figure-3

(57) Abstract: A bale plucking machine for plucking fibers from bales arranged on both sides of the machine comprising a carriage (2); at least two beams (8, 8') mounted on platform (9) of the carriage (2); swing structure (6) for sliding in vertical direction against the beams (8, 8'); a plucking head (5) mounted on said swing structure (6) by means of connecting elements (19) and locking elements (11, 11'); wherein rolling members (7a, 7a', 7a'') are provided for sliding.

AN IMPROVED HOLDING ARRANGEMENT FOR PLUCKING HEAD

FIELD OF THE INVENTION

The present invention relates to a textile bale plucking machine for plucking fibers from the bales arranged on both sides of the machine.

BACKGROUND OF THE INVENTION

In textile processing for opening and cleaning of fibers, a fiber plucking machine is used to pluck the fibers from the bales that are arranged on both sides of the machine. The carriage moves forward and backward along the bale laid down. Thus bales arranged in rows are processed. Two vertical beams are mounted on the platform of the carriage. The plucking head is attached to a swing structure commonly known as plucking head assembly which slides against the beams in vertical direction up and down in order to pluck the fibers from top to bottom layers of the bale. The plucking head is free to rotate 180 degrees for plucking the fibers on both sides of the machine. The plucking head comprises at least a plucking roller which is used to pluck the fibers from the bales. The fibers plucked by the plucking head are fed to a suction duct through a flexible hose for further processing.

In the known machines, to pluck the fibers on both sides of the machine the plucking head is made to rotate. The swing structure (which does not rotate) along with the plucking head (which rotates) is vertically moved up and down in order to pluck the fibers from top to bottom layers of the bale. The plucking head assembly is supported by means of sliding member which is slidably connected against the vertical beams. The plucking head assembly slides against the sides of the vertical beams. The plucking head is made to slide over three sides of vertical pillars using non metallic sliding member. Since this sliding member does not have a rigid support, the plucking head tilts and the up and down movement is blocked. Due to this the working of the machine is affected.

The fabrication variations of the beams and the welded structures also lead to improper contact between the sliding member and the vertical beams, which affects the sliding

movement. If we go for precision machining, the manufacturing cost will increase. The non metallic sliding member will wear out quickly. The present invention provides a bale plucking machine that mitigates the above mentioned drawbacks.

OBJECTS OF THE INVENTION

The object of the present invention is to provide an improved cam type rolling sliding member which supports the plucking head assembly to slide in vertical direction against the beams of the bale plucking machine.

Yet another object of the present invention is to provide a rigid support to the plucking head assembly which slides against the beams of the bale plucking machine.

Yet another object of the present invention is to achieve a smooth rolling sliding movement to the plucking head assembly against the beams of the bale plucking machine.

Yet another object of the present invention is to minimise the manufacturing cost of the bale plucking machine.

SUMMARY OF THE INVENTION

In order to withstand the inherent and working loads, the sliding member should provide a rigid support for the plucking head assembly. Thus the object of the present invention is achieved by incorporating cam rollers as a rolling sliding member for the plucking head to slide in a vertical direction against the beams of a bale plucking machine. Cam rollers are slidably connected against the beams. The cam rollers are fitted to the plucking head assembly i.e. swing structure by means of connecting elements. Cam rollers provide a rigid support to the plucking head assembly. This will prevent the plucking head to tilt and thereby gives a smooth sliding movement.

The cam rollers with eccentric mounting are provided to accommodate the variations in

the sliding arrangement. This arrangement will be very effective for adjusting the sliding alignment of plucking head against the beams. The cam rollers will support the plucking head assembly in 3 directions per side. Hence irrespective of any position of plucking head, the head will be positioned perpendicular to vertical columns.

A detachable strip can also be mounted in the vertical beams over which the cam rollers can slide. This will prevent the wear of beams.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

Figure 1 shows isometric view of a bale plucking machine.

Figure 2 shows the top view of a bale plucking machine according to prior art.

Figure 3 shows the top view of a bale plucking machine according to an embodiment of the present invention.

Figure 4 shows an isometric view of the swing structure without plucking head according to another embodiment of the present invention.

Figure 5 shows the exploded view of cam roller arrangement used in the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The detailed description set forth below in connection with the appended drawing is intended as a description of various embodiments of the present invention and is not intended to represent the only embodiments in which the present invention may be practiced. Each embodiment described in this disclosure is provided merely as an example or illustration of the present invention, and should not necessarily be construed as preferred or advantageous over other embodiments. The detailed description includes specific details for the purpose of providing a thorough understanding of the present invention. However, it will be apparent to those skilled in the art that the present invention may be practiced without these specific details.

Figure 1 is an isometric view of bale plucking machine wherein, the carriage motor (1) is

actuated to drive the carriage (2) directly in horizontal direction between two rows of bales (3). Suction duct (4) is provided in between the carriage (2). The plucking head (5) is mounted on the swing structure (6) by means of connecting elements (19). Swing structure (6) is attached to the sliding member (7) (refer figure 2 and figure 3) slidably connected against the beams (8, 8'). The swing structure (6) slides against the two beams (8 and 8') mounted on the platform (9) of the carriage (2). A rotating element (10) is attached on top of the swing structure (6) to rotate the plucking head 180 degree on two rows of the machine. The locking elements (11 and 11') are provided on the swing structure (6) for holding the plucking head (5) firmly in any one row during bale plucking. The swing structure (6) is lifted and lowered in a vertical direction by a pair of endless toothed belt (12) which is attached to the beams (8 and 8') by means of connecting elements (not illustrated). The toothed belt (12) is directly actuated by motor shaft (13). After each completion of movement of carriage (2) over entire row of bales on each side for plucking, the plucking head is lowered. Thus the fibers are plucked from top to bottom layers of the bales (3). The control panel is indicated by reference numeral (14). The fibers plucked by the plucking head (5) are fed to a suction duct (4) through a flexible pipe (15).

Figure 2 shows the top view of the sliding arrangement considering the prior art. The non metallic sliding members (7, 7', and 7'') are attached to the swing structure (6) by means of connecting elements. The sliding members are slidably connected against the beams (8 and 8'). The plucking head (5) is mounted on swing structure (6) by means of connecting element (19). The locking elements (11 and 11') are provided on the both sides of swing structure (6) for holding the plucking head (5) firmly. The endless tooth belt (12) is provided for lifting and lowering of swing structure (6) at both sides through suitable connecting elements. The plucking head is made to slide over three sides of vertical pillars using non metallic sliding member. Since this sliding member do not have a rigid support, the plucking head tilts and the up and down movement is blocked. Due to this the working of the machine is affected.

Figure 3 shows the top view of the sliding arrangement according to the invention. The cam roller sliding members (7a, 7a', and 7a'') are attached to the swing structure (6) by means of connecting elements. The sliding members (7a, 7a' and 7a'') are slidably connected against the beams (8) and (8'). The sliding members (7a, 7a' and 7a'') slides against the beams (8 and 8'). To accommodate the variations in the sliding arrangement, the cam rollers (7a, 7a' and 7a'') are eccentrically mounted against the swing structure (6). This arrangement will be very effective for adjusting and confirming the position of swing structure (6) sliding on the beams (8 and 8'). Hence smooth sliding movement is achieved. The plucking head (5) is mounted on swing structure (6) by means of connecting element (19). The locking elements (11 and 11') are provided on the both sides of swing structure (6) for holding the plucking head (5) firmly. The endless tooth belt (12) is provided for lifting and lowering of swing structure (6) at both sides through suitable connecting elements.

As shown in Figure 4, the swing structure (6) comprises horizontal beams which are interconnected by cross structures. The cam roller (7a, 7a', 7a'') are mounted on the swing structure (6) by means of bracket (18). Three cam rollers at top and three cam rollers at bottom as shown in the figure 4 are used in the swing structure per side. In total twelve cam rollers are used on both sides. The swing structure along with cam rollers is made to slide over the beams (8, 8'). The cam rollers limit the movement of the swing structure in X and Z directions and allows the movement in Y direction only. The swing structure (6) is lifted and lowered in the vertical direction by a pair of endless toothed belt (12). The plucking head (5) is mounted on the swing structure (6) using connecting element (19, 19') and locking pin (not shown). During movement, Plucking head assembly is supported by the cam rollers (7a, 7a', 7a'') on three sides of each beam (8, 8').

Replaceable strips (17) can also be used on beams (8) between the beam (8) and cam roller (7a) to avoid wear and tear of beam (8).

Referring to figure 5, the cam roller arrangement comprises a cam roller (7a) mounted on an eccentric bush (16). The eccentric bush (16) has eccentric hole to receive the cam roller with its stud. By rotating the eccentric bush (16), the position of the cam roller center can be varied, ie. the distance between the cam roller outer surface and the beam (8, 8') surface can be varied for example 2.3 mm.

The cam roller with eccentric mounting sliding arrangement rigidly supports the plucking head assembly against the beams of the bale plucking machine. The rigid support to the plucking head assembly will ensure the head standing in perpendicular position with respect to the beams. Hence plucking head is intact during working condition. The cam rollers will support the plucking head in three directions. Hence irrespective of any position of plucking head, the head will be standing perpendicular. Thus the invention with simple construction overcomes the problems faced in the existing arts.

Since other modifications and changes to fit particular requirements and environments will be apparent to those skilled in the art, the invention is not considered limited as described by the present preferred embodiments which have been chosen for purposes of disclosure, and covers all changes and modifications which do not constitute departure from the spirit and scope of this invention.

Claims

1. A bale plucking machine for plucking fibers from bales arranged on both sides of the machine comprising a carriage (2); at least two beams (8, 8') mounted on platform (9) of the carriage (2); swing structure (6) for sliding in vertical direction against the beams (8, 8'); a plucking head (5) mounted on said swing structure (6) by means of connecting elements (19) and locking elements (11, 11'); wherein rolling members (7a, 7a', 7a'') are provided for sliding.
2. The bale plucking machine as claimed in claim 1 wherein the said rolling members (7a, 7a', 7a'') are cam rollers.
3. The bale plucking machine as claimed in claim 2 wherein the said cam rollers (7a, 7a', 7a'') slide against the beams (8, 8').
4. A bale plucking machine as claimed in any of the preceding claims wherein the cam rollers (7a, 7a', 7a'') are eccentrically mounted against the swing structure (6) by means of eccentric bush (16).
5. The bale plucking machine as claimed in any of the preceding claims wherein the cam rollers are mounted on the swing structure (6) by means of bracket (18).
6. The bale plucking machine as claimed in any of the preceding claims wherein the beams (8, 8') have plurality of replaceable strips (17).
7. The bale plucking machine as claimed in any of the preceding claims wherein an endless tooth belt (12) lifts and lowers the swing structure (6) on both sides.
8. The bale plucking machine as claimed in any of the preceding claims wherein atleast three cam rollers (7a, 7a', 7a'') at top of the swing structure (6) and atleast three cam rollers at bottom of the swing structure (6) are slidably connected to each beam (8, 8').

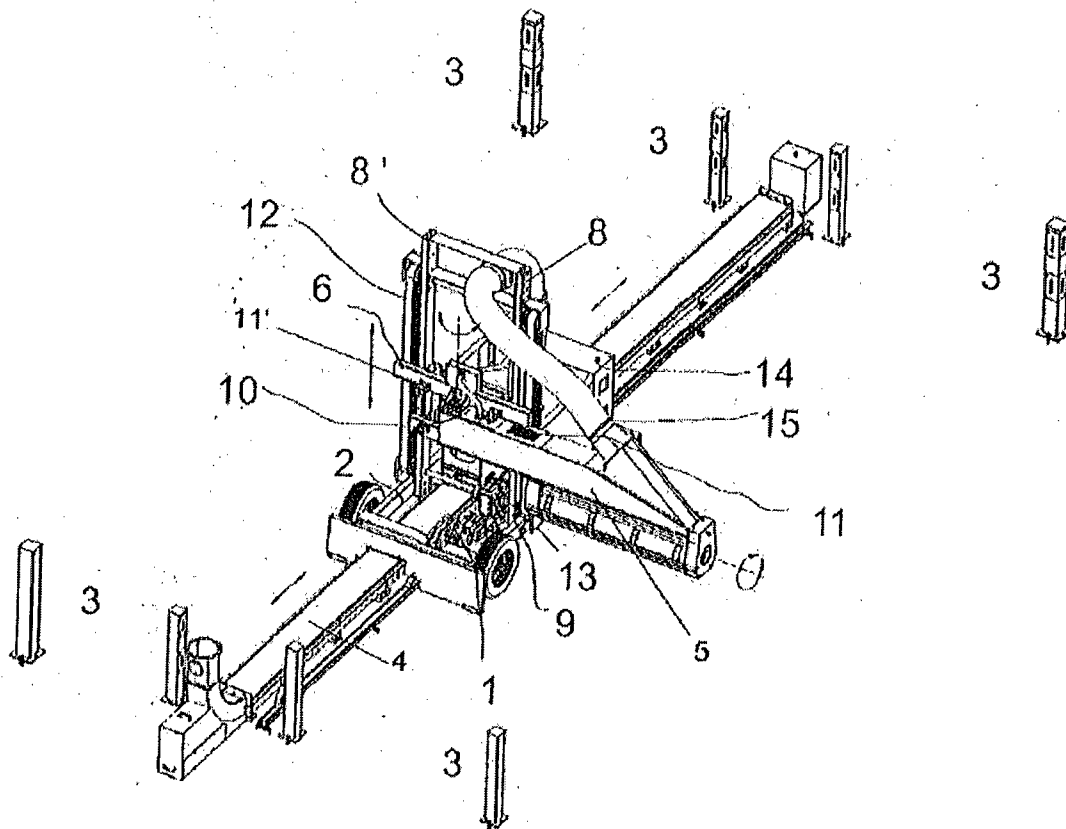


Figure - 1

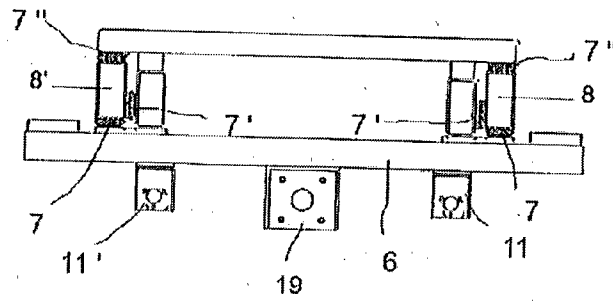


Figure-2

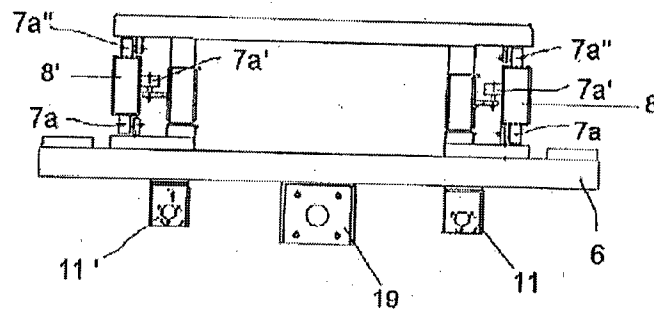


Figure-3

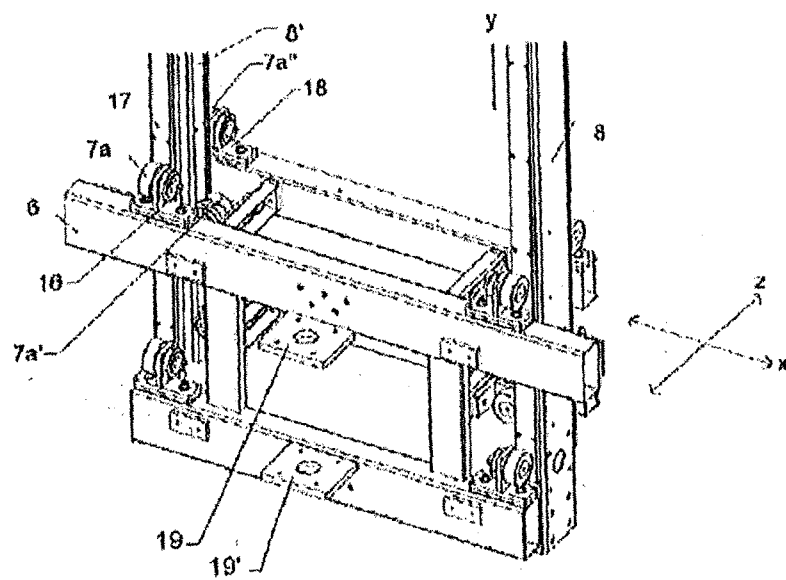


Figure 4

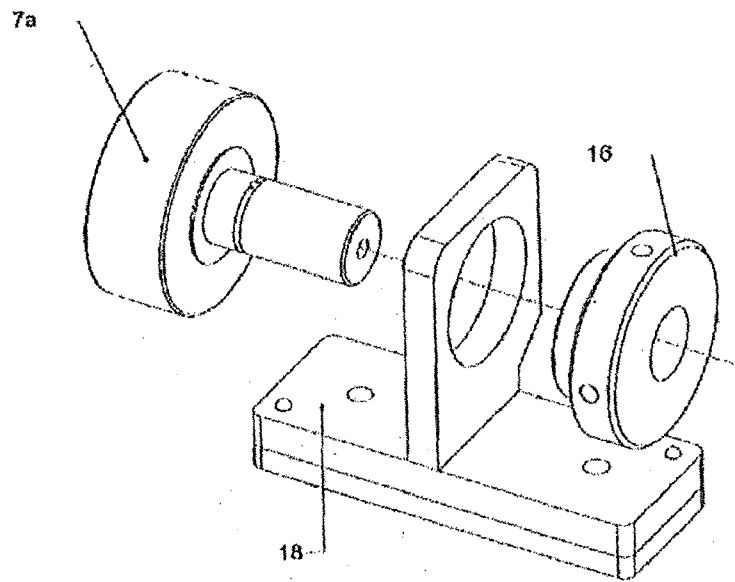


Figure - 5