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(54) DEVICE FOR FIXING JOINING CLAMPS ON A CONVEYOR BAND, BELT OR THE LIKE

(71) We, SOCIÉTÉ GORO, a Société Anonyme organised and existing under the Laws of France, of Avenue de Sylvie, Chelles, Seine-et-Marne, France, do hereby declare this invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be described in and by the following statement:

The present invention relates to the fixing of joining clamps on the ends of conveyor bands, belts or the like. More specifically, it concerns the fixing of U-section joining clamps which are designed to be fixed straddling the edge of the end of such a band or belt by means of metal staples inserted through holes provided opposite each other in the two legs of these clamps.

To facilitate the fitting of the latter, one leg is initially in a splayed position in relation to its normal position. In these circumstances, after having placed the other leg against one of the faces of the end of a band or the like, it is therefore necessary to press in the first leg against the opposite face of this band or the like. However, to fix the clamps in position, it is also necessary to position and insert the fixing staples through the band. For this purpose, these are engaged in the holes in one of the legs of the clamps and are inserted through the band until their tips emerge from the holes in the opposite leg of the same clamp.

However, in order to achieve a fixing strong enough to stand the stresses to which such joining clamps are subjected, it is necessary for the tips of the fixing staples to be bent back and pressed hard against the outer face of the corresponding leg of such clamps. It is also necessary that the holes in the two legs of the clamps, for insertion of the staples, be roughly identical in section to the latter, to avoid unwanted play which would be harmful. This second condition makes it essential that the staples be perfectly orientated when they are inserted.

Now, the devices at present used for fixing such clamps do not make it possible fully to meet these conditions. Moreover, they do not allow fixing staples to be properly inserted into thick conveyor bands comprising a metal reinforcement.

The present invention has for its object to provide an apparatus making it possible to carry out the fixing of such clamps under optimum conditions by using a device designed in such a way as to guide the fixing staples accurately when they are inserted, this device moreover making it possible to exert high pressure on the latter.

According to the present invention there is provided an apparatus for fixing a U-sectioned junction clamp straddling the edge of a conveyor belt, band or the like, by means of a U-shaped bent metal staple being driven through holes provided in the two arms of said clamp to a position where the head of the staple is received by a first arm of the clamp and the free ends of the legs of the staple are received by the second arm of the clamp, the apparatus comprising:

a) means for positioning a conveyor belt, band or the like with a U-sectioned junction clamp straddling the edge thereof and a staple having the free ends of its legs partially inserted in holes in said first arm of the clamp;

b) a driving punch positioned adjacent the head of the staple to be driven;

c) an anvil positioned to engage the second arm of the clamp;

d) means for moving the driving punch and the anvil towards each other in a direction perpendicular to the main axis of the conveyor belt to cause the driving punch to engage the head of the staple and drive the legs of the staple through the conveyor;

e) a bearing element positiond adjacent the first arm of the clamp to support one leg of the staple before driving same;

f) a movable bearing member positioned,

in its operative position, adjacent the first arm of the clamp to support the other leg of the staple and guide the staple during the driving thereof; and

g) means for actuating and moving said movable bearing member to its operative position before the staple is engaged by the driving punch.

An embodiment of the invention is hereinafter particularly described with reference to the accompanying drawings wherein:-

Figure 1 is a vertical sectional view of an operating head of a device according to the invention;

Figure 2 is a diagrammatic perspective view illustrating the method of fixing some of the components of the operating head.

An embodiment of the invention is hereinafter particularly described with reference to the accompanying drawings, wherein:-

Figure 1 is a vertical sectional view of an operating head of a device according to the invention;

Figure 2 is a diagrammatic perspective view illustrating the method of fixing some of the components of the operating head.

Figures 1 and 2 show an embodiment of the operating head of the device, according to the invention.

The operating head comprises a movable bearing member 25 capable both of providing correct initial positioning of the staples to be inserted and of guiding these during their insertion. This member is placed opposite the site where the staples 19 of a clamp are positioned before their insertion. On its face turned to face the staples, this movable bearing member comprises two vertical grooves 26 capable of partly encasing the neighbouring side legs of said staples in order thus to position these correctly before their insertion. However, the face in question of movable bearing member 25 could comprise any other kind of part capable of positioning and guiding the staples 19, for example a projecting spur designed to engage between the two staples to be guided.

On the opposite side there is a fixed bearing element in the form of a bar 27 against which the staples 19 are backed. This bar extends over the whole width of this device and it may advantageously comprise a series of vertical grooves 27*a* similar to the grooves 26 in the movable bearing member 25, and also suitable to take the corresponding side legs of staples 19 in order initially to put them in the correct position and then guide them during their insertion. Moreover, bar 27 carries the comb 23*b* designed to allow the initial putting into position of clamps 21 which are then held on this comb by means of an axle 24*b*.

The movable positioning and guiding bearing member 25 is carried by the bottom end of a rocking lever 28 articulated around a horizontal axle 29. The top end of this lever has a ramp 30 positioned in the trajectory of another ramp 31 forming a cam, which is carried by the inserting punch 15*b*.

The arrangement is such that as it descends in the direction of arrow F7, this punch rocks lever 28 in the direction of arrow F8 before itself acting on the head of staples 19 to be inserted. This therefore brings positioning movable bearing member 25 into contact with said staples, which provides for the possible adjustment of the position of these for their correct placing before insertion. The grooves 26 in this member are then able to guide staples 19 during their insertion, in cooperation with grooves 27*a* in bar 27. A return system (not shown) then returns the movable bearing member 25 to its "at rest" position.

A mobile anvil 14*b* is provided underneath the site of the clamps, designed to bend back the tips of the staples after they have been inserted through the two legs of a clamp and through the corresponding band T. This anvil is also intended previously to apply the bottom leg 21*a* of each clamp against the corresponding band by a raising movement in the direction of arrow F3.

For this purpose, anvil 14*b* is fixed on a mobile support 32 mounted to slide vertically between two vertical cheeks 33 constituting the frame of the operating head.

The control device comprises a rotating control axle 34 which carries an operating lever 34*a*. However, it could just as well be operated by a hydraulic, pneumatic or other device. The rotating axle 35 operates two control systems causing the movement of mobile anvil 14*b* and the movement of the inserting piston 15*b*, respectively.

The first of these two systems includes a rotating cam 36 integral with axle 35 and in contact with which there is a roller 37 carried by the top end of mobile support 32. Cam 36 has on its perimeter a boss causing the initial raising of support 32 and anvil 14*b* when lever 34 pivots in the direction of arrow F9.

The second control system operated by rotating axle 35 consists of a ball and socket mechanism including a connecting rod 38 on one end of which, at 39, an extension of the corresponding end of lever 34 is articulated. The opposite end of this connecting rod is articulated at 40 on the inserting punch 15*b*. Thus, the pivoting of lever 34*b* in the direction of arrow F9 is able to cause the lowering of this punch in the direction of arrow F7.

It should be noted that on its perimeter, cam 36 has a point 41 designed, at the end of

the operation, to press the mobile anvil 14*b* down harder in order to complete the bending back of the tips of staples 19. This point 41 on cam 36 is in such a position that it only comes into play at the end of the operation. The outline of the part of the cam which precedes this point is, for its part, of such a kind that this keeps mobile anvil 14*b* in the raised position during the whole time that the staples are pressed down.

In these circumstances, the operating phases are as follows:

1. Anvil 14*b* is raised to apply the bottom leg 21 of the clamp against the band.

2. The movable bearing element 25 operates, putting staples 19 into the right place before their insertion and guiding.

3. Insertion of staples 19 while mobile anvil 14*b* is held in the raised position.

4. Harder pressure from mobile anvil 14*b* at the end of the operation in order to complete the folding back of the tips of the staples.

The operating head is mounted so as to move transversally on a fixed vertical bar 11*b* extending between the two swan-necks 4 of the device. Thus, this operating head can be brought successively opposite each of the clamps whose fixing staples are to be inserted.

WHAT WE CLAIM IS:-

1. An apparatus for fixing a U-sectioned junction clamp straddling the edge of a conveyor belt, band or the like, by means of a U-shaped bent metal staple having a head and two legs depending therefrom, the staple being driven through holes provided in the two arms of said clamp to a position where the head of the staple is received by a first arm of the clamp and the free ends of the legs of the staple are received by the second arm of the clamp, the apparatus comprising:

a) means for positioning a conveyor belt, band or the like with a U-sectioned junction clamp straddling the edge thereof and a staple having the free ends of its legs partially inserted in holes in said first arm of the clamp;

b) a driving punch positioned adjacent the head of the staple to be driven;

c) an anvil positioned to engage the second arm of the clamp;

d) means for moving the driving punch and the anvil towards each other in a direction perpendicular to the main axis of the conveyor belt to cause the driving punch to engage the head of the staple and drive the legs of the staple through the conveyor;

e) a bearing element positioned adjacent the first arm of the clamp to support one leg of the staple before driving same;

f) a movable bearing member positioned, in its operative position, adjacent the first arm of the clamp to support the other leg of the staple and guide the staple during the driving thereof; and

g) means for activating and moving said movable bearing member to its operative position before the staple is engaged by the driving punch.

2. Apparatus, as claimed in claim 1, wherein the movement of said movable anvil and said driving punch are controlled by two separate assemblies of driving means driven from a single rotary shaft.

3. Apparatus, as claimed in claim 2, wherein said rotary shaft of the control device actuates said driving piston through a knee-action device comprising a pivoted link while acting upon said movable supporting member of said anvil through a rotary cam member.

4. Apparatus, as claimed in claim 1, wherein that face of the bearing element which supports said one leg of the staple and that face of the movable bearing member which supports the other leg of the staple comprise groove means capable of guiding the staple.

5. Apparatus, as claimed in claim 1, substantially as described herein with reference to the accompanying drawings.

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2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 1

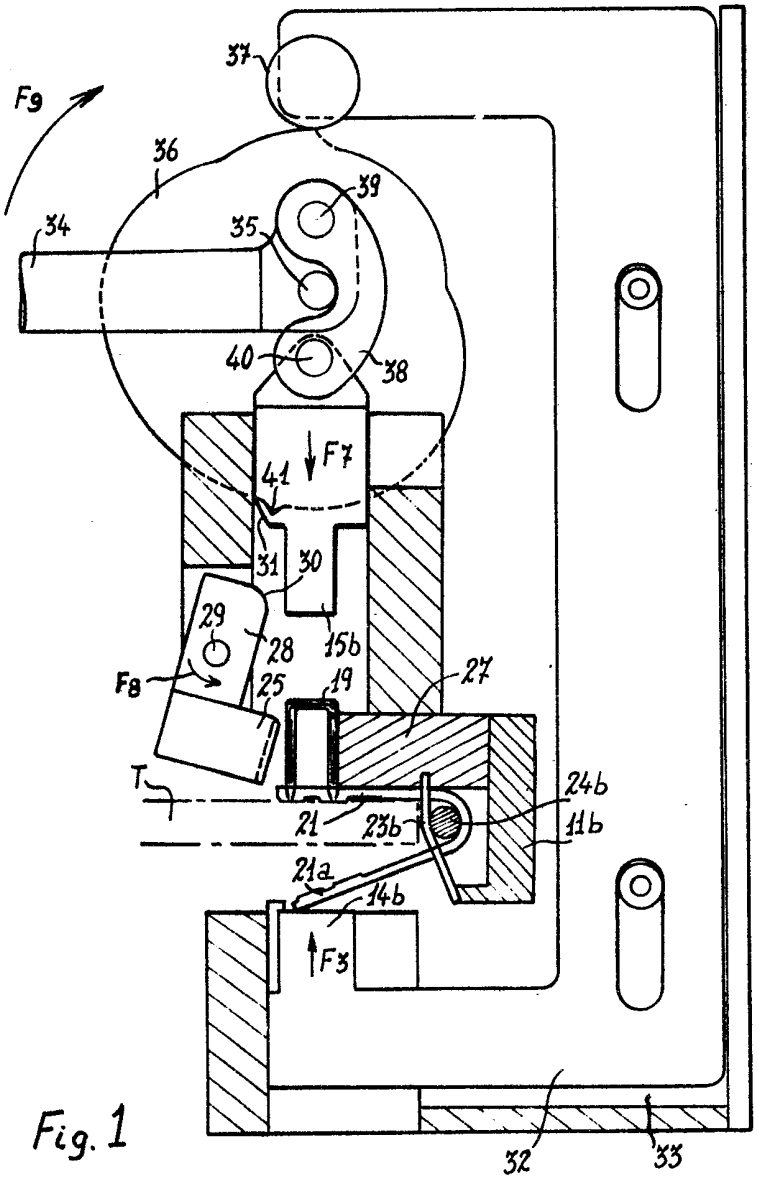

Fig. 1

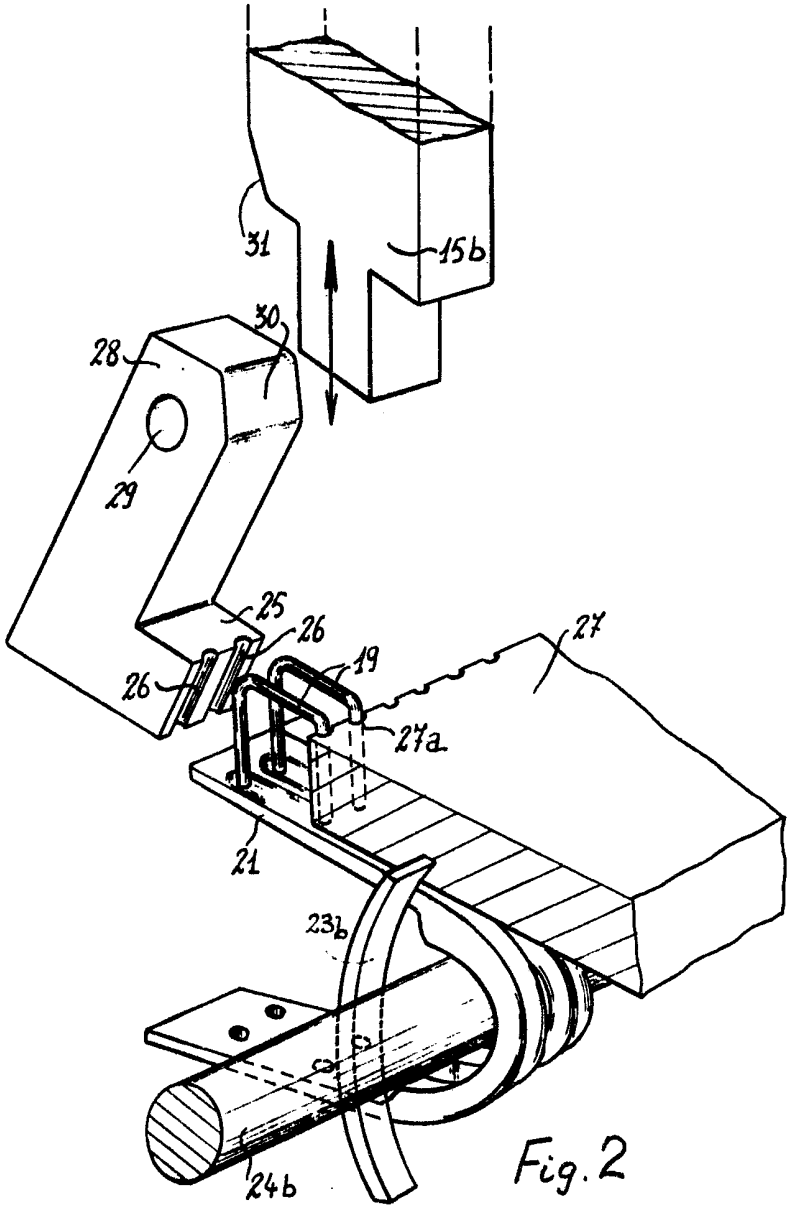

Fig. 2