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(71) Applicant: **FIELD GROUP PLC**
Old Amersham,
Buckinghamshire HP7 0DD (GB)

(72) Inventors:
- **Cuenin, Lionel**
  37100 Tours (FR)
- **Houziel, Alain**
  37390 La Membrolle (FR)

(74) Representative: **Leckey, David Herbert**
Frank B. Dehn & Co.,
179 Queen Victoria Street
London EV4V 4EL (GB)

(54) Support bars

(57) A support bar 14 for a blank processing machine comprises bearing means 18 provided on its upper and lower surfaces 20, 22 whereby blanks 6 received above and below the bar 14 may roll over its upper and lower surfaces 20, 22.

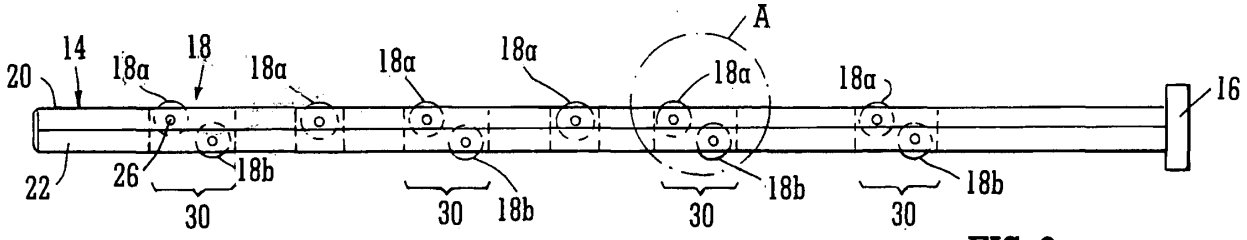


FIG. 2

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Description

[0001] The present invention relates to support bars and in particular to support bars for supporting a stack of blanks of cardboard, paperboard or other sheet material being fed into a processing machine.

[0002] It is common in the packaging industry to print, crease and cut paperboard blanks in a printing/creasing/cutting folding machine. Typically, a stack of blanks to be processed is placed in a magazine from which the blanks are fed into the machine. In a known arrangement, in order to allow for continuity of supply, the stack of blanks is lifted to the infeed of the machine on bar-like supports arranged under the stack. As the stack moves upwardly and becomes smaller, a new stack of blanks is introduced under the exhausting stack of blanks and supported on new supports. This stack of blanks is then lifted into contact with the exhausting stack of blanks. At some point the bars supporting the upper stack of blanks are withdrawn and used to support a new stack of blanks being positioned below.

[0003] A problem which arises with this arrangement is that as the bars are being withdrawn they may mark or even tear the blanks immediately above and below.

[0004] The present invention seeks to overcome this problem, and from a first aspect provides a support bar for a blank processing machine, said bar comprising bearing means projecting above its upper and lower surfaces whereby blanks received above and below the bar may roll over its upper and lower surfaces.

[0005] With such an arrangement, the frictional engagement between the bar and the blanks is significantly reduced, allowing the bar to be more easily withdrawn from between successively stacks of blanks. This means that the bars can be withdrawn without stopping the process. Moreover, it takes considerably less effort for an operative to withdraw the bar, and there is less waste due to marking of the blanks.

[0006] The bearing means may comprise one or more ball bearings, but preferably, it comprises one or more roller bearings. Roller bearings give a larger line of contact with a blank, leading to reduced marking of the blank.

[0007] In the case of roller bearings, the edges of the bearing may be bevelled to reduce the likelihood of marking the blank material.

[0008] The bearings may be made of any suitable material and will typically be of steel, but other materials such as rubber, plastics, composites, ceramics and so on may be used.

[0009] Preferably the bearings are arranged at spaced apart locations along the length of the bar. The bearings may be equispaced along the bar.

[0010] In some embodiments, the bearings may be arranged alternately on the upper and lower surfaces of the bar.

[0011] In a preferred embodiment, the bearings are arranged in pairs at spaced apart locations, with one bearing of each pair extending above the upper surface of the bar and the other bearing extending below the surface of the bar. The bearings of each pair may be aligned at the same axial position along the bar, but preferably they are offset axially to allow relatively large bearings to be received within the bar.

[0012] Additional bearings may be provided at positions intermediate the bearing pairs, most preferably arranged so as to extend above the upper surface of the bar.

[0013] The bar may be any shape in cross-section, for example rectangular, but preferably it is hexagonal in section.

[0014] A preferred embodiment of the invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 shows, schematically a feeding apparatus with which the support bar of the present invention may be used;
Figure 2 shows a side view of a support bar used in the apparatus of Figure 1;
Figure 3 is a top view of the bar shown in Figure 2;
Figure 4 is a cross-section through the bar of Figure 3 along the line IV-IV; and
Figure 5 is a view of detail A of Figure 2, showing hidden detail.

[0015] With reference to Figure 1, a machine 2 for processing paperboard blanks 6 has a feed inlet 4 for the blanks 6. The machine may print, crease, cut, fold or otherwise process the blanks 6. The blanks 6 are fed to the infeed of the machine 2 by a feed mechanism 8.

[0016] Schematically, the feeding mechanism 8 comprises a frame 10 which is provided with cross bars 12 which are moved up the frame on a chain system (not shown). The cross bars 12 are provided at both the rear frame members 10a and the front frame members 10b. This feeding arrangement is conventional in the art.

[0017] Extending between the bars 12 are a number of support bars 14. The support bars 14 support the a stack of blanks 6 such that as the cross bars 12 move upwardly the stacks of blanks 6 also move upwardly to allow the uppermost blank 6 to be fed into the machine 2..

[0018] The support bars 14 of the apparatus are shown in greater detail in Figures 2 to 5.

[0019] Each support bar 14 has a handle 16 at one end to enable it to be withdrawn from between adjacent stacks of blanks 6. The main body of the support bar 14 is hexagonal in section, as shown in Figure 4. The support bar 14 is provided with a series of rollers 18 at spaced apart locations along its length. These rollers include first rollers 18a which project from the upper surface 20 of the support bar 14 and second rollers 18b which project below the lower surface 22 of the support bar 14. Typically, for a bar 15mm deep, the rollers will be 12mm in diameter and will project about 1mm from the bar surfaces 20, 22.

[0020] The respective rollers 18 are mounted in slots

24 extending vertically through the support bar 14, the rollers 18 being supported by respective shafts 26 extending transversally through the support bar 14. It will be seen that the shafts 26 of the upper rollers 18a are arranged slightly above the centre line 28 of the support bar 14 and the shafts 26 of the lower rollers 18b slightly below that centre line 28.

[0021] There are four pairs 30 of upper and lower rollers 18a, 18b equally spaced along the length of the support bar 14, with two additional upper rollers 18a being equally spaced between two of those pairs 30. The rollers 18a, 18b of each pair 30 are offset axially from one another to allow them to be accommodated within the depth of the support bar 14.

[0022] In use, when the stack of blanks 6 is being moved upwardly in the feed mechanism 8 there comes a point at which the upper support bars 14 need to be withdrawn in order to support a further stack being introduced below the upper stack. By virtue of the rollers 18 the support bars 14 can be withdrawn with relatively little effort and without marking the surface of the blanks.

[0023] It will be appreciated that various modifications may be made to the specific embodiment described above without departing from the scope of the invention. For example, the support bar 14 may be of a different cross-sectional shape and the rollers need not be positioned in pairs as shown. Also, while the invention has been described primarily in the context of processing paperboard blanks, it can be used just as effectively in the processing of other blank materials such as cardboard, plastic sheet and even metal sheet,

Claims

1. A support bar for a blank processing machine comprising bearing means projecting above its upper and lower surfaces whereby blanks received above and below the bar may roll over its upper and lower surfaces.

2. A support bar as claimed in claim 1 wherein the bearing means comprises one or more ball bearings.

3. A support bar as claimed in claim 1 or 2 wherein the bearing means comprises one or more roller bearings.

4. A support bar as claimed in claim 3 wherein said roller bearings have a bevelled edge.

5. A support bar as claimed in any preceding claim wherein the bearings are arranged at spaced apart locations along the length of the bar.

6. A support bar as claimed in claim 5 wherein the bearings are equispaced along the bar.

7. A support bar as claimed in any preceding claim wherein the bearings are arranged alternately on the upper and lower surfaces of the bar.

8. A support bar as claimed in any preceding claim wherein bearings are arranged in pairs at spaced apart locations, with one bearing of each pair extending above the upper surface of the bar and the other bearing extending below the surface of the bar.

9. A support bar as claimed in claim 8 wherein the bearings of a pair are axially offset from one another.

10. A support bar as claimed in claim 8 or 9 comprising additional bearings provided at positions intermediate the bearing pairs.

11. A support bar as claimed in any preceding claim wherein the bar is hexagonal in section.

12. A feed mechanism for a blank processing machine comprising a support bar as claimed in any preceding claim.

13. A blank processing machine comprising a support bar as claimed in any of claims 1 to 11.

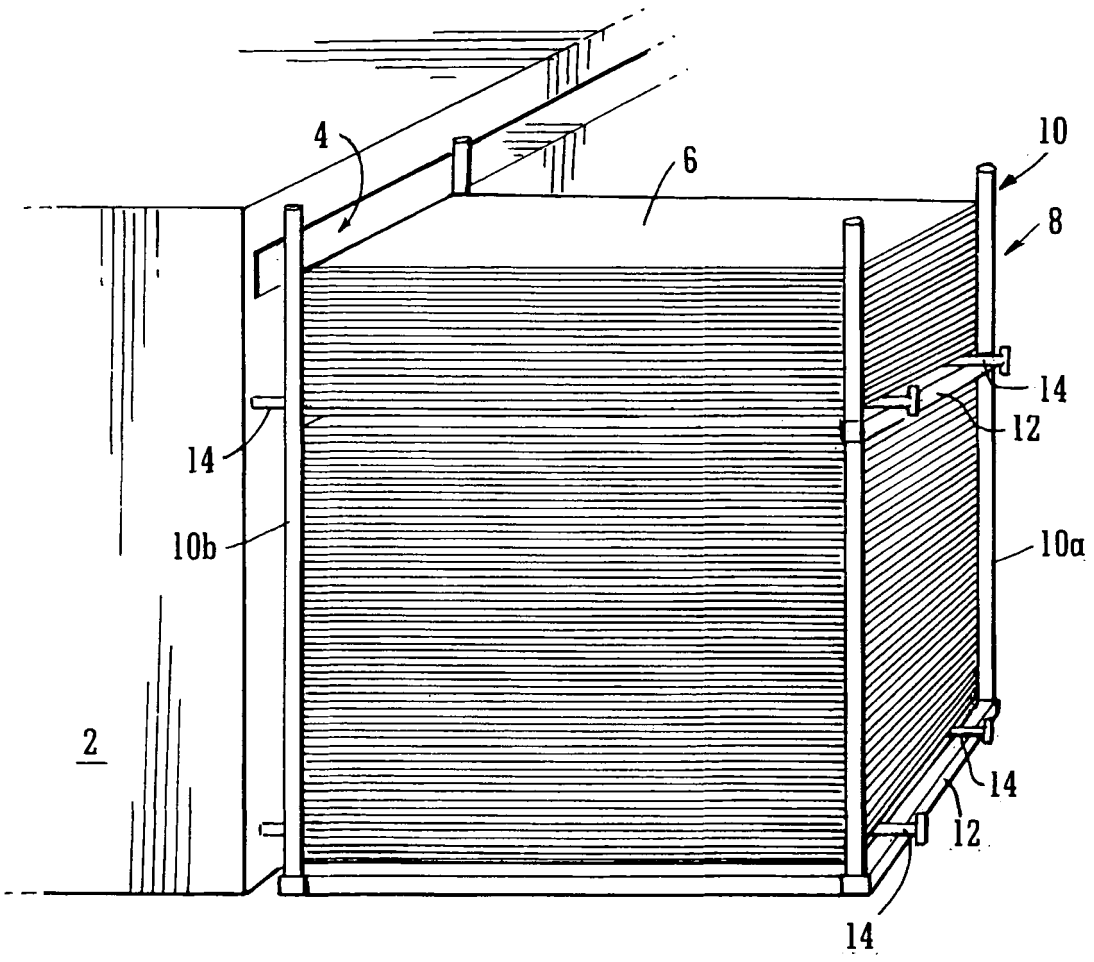


FIG. 1

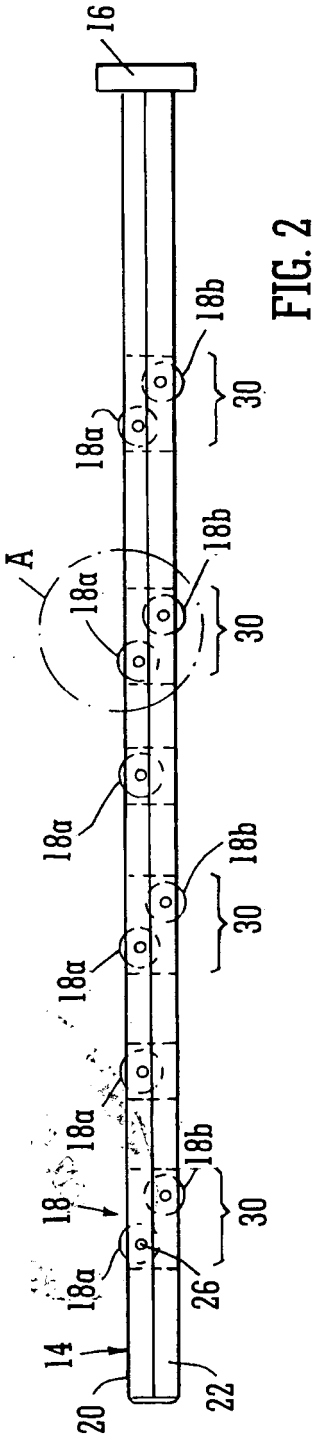


FIG. 2

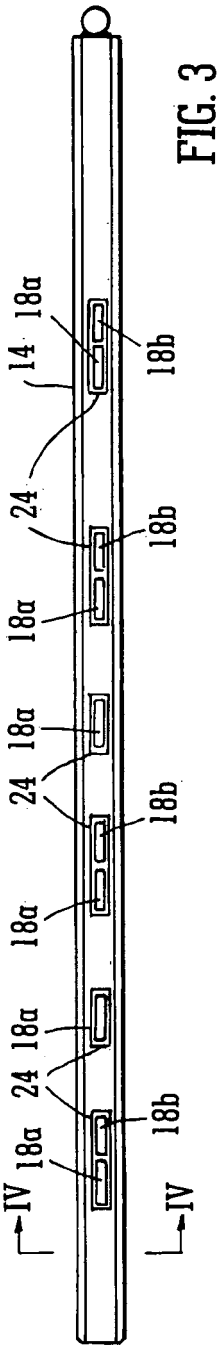


FIG. 3

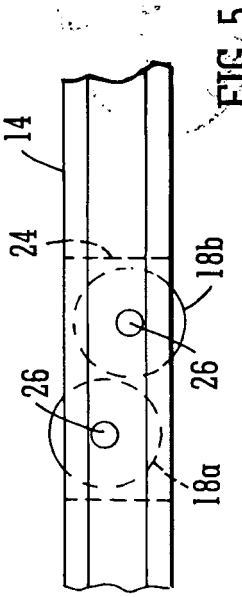


FIG. 5

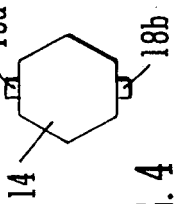


FIG. 4