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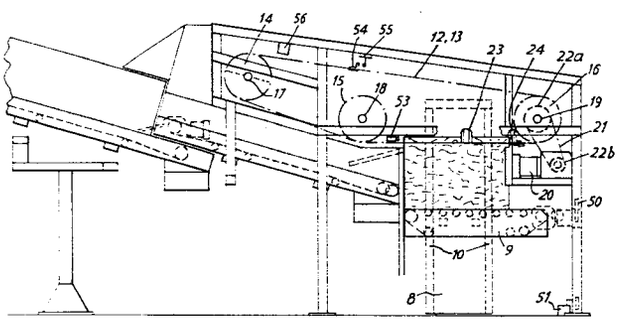
(54) Dry case tobacco slicing apparatus.

(57) An apparatus for opening a case of laminations of tobacco, comprises a vertical lift (9) for receiving a case of tobacco and for moving the latter to successive slicing positions; a pair of endless chains (12, 13) being mounted in parallel disposition; means (19-22) for driving said chains; and cutting means in the form of a wire (30) attached to and extending between said chains transversely of the movement thereof, said chains being so guided that said wire passes repeatedly over the lifting region of the vertical lifting to effect slicing.

Preferably further cutting means are provided in the form of blades (25, 26) attached to said chains at a position preceding the wire in the direction of movement thereof, said blades extending horizontally from the chains and serving to effect partial separation of a slice of laminations at marginal regions of the case.



TITLE: DRY CASE TOBACCO SLICING APPARATUS.

This invention relates to an apparatus for splitting cases of tobacco.

It is a requirement in the tobacco industry that compressed cases, bales or hogsheads of tobacco laminae have to undergo a preconditioning process before they can be handled. This process gives the laminae a temperature increase and a consequent condensation moisture gain. All known techniques for preconditioning embody temperature and moisture gain. The preconditioning process softens the tobacco, thus reducing degradation during subsequent handling in the process of tobacco. The next stage of processing generally is a consolidation of the moisture gain to a point where the laminae may be cut.

This initial conditioning is generally a batch process followed by line conditioning process, often in a rotating cylinder.

There are also several methods of opening cases of compressed tobacco laminae in which:-

1. The cases are driven onto rotating doffers as described for example in UK Patent Nos. 1,364,839, 1,136,439, 2,072,962A and 2,047,070A and the tobacco is conditioned.

2. Slices of laminae are removed with a jet knife as described in International Application No. WO.82/02324 in which the addition of moisture occurs simultaneously with the opening process.

3. Slices of tobacco are produced by dry slicing and fed directly into a conditioning cylinder.

4. In another process described in Japanese Patent Application No. 58-81773 dated May 17th 1983 the bulk tobacco is divided into approximately 4" (10 cm) thick slices by inserting wedge shaped blades between the natural strata and feeding the slices directly into the conditioning cylinder without recourse to pre-conditioning or auto feeds. Each case in turn is pushed into a support which tips the hogshead through approximately 75 degrees. The support comprises a conveyor wall and moving base which feed the hogsheads up the slope parallel with its axis to a slicing position where forks part off a slice. Two low level forks engage the hogshead first, followed by two wedge shaped forks from above which separate the slice and allow it to slide down to a conveyor.

A disadvantage of this process is that when the case is tilted, there is a tendancy for it to de-laminate of its own accord, particularly at the end of a case, so that the size of slice is

unpredictable. A further disadvantage is that the sliding of the slice on to the conveyor creates dust.

An object of the invention is to provide an improved apparatus for dry slicing the tobacco prior to conditioning.

According to the invention there is provided an apparatus for opening a case of laminations of tobacco, comprising a vertical lift for receiving a case of tobacco and for moving the latter to successive slicing positions, a pair of endless chains being mounted in parallel disposition, means for driving said chains and cutting means in the form of a wire attached to and extending between said chains transversely of the movement thereof, said chains being so guided that said wire passes repeatedly over the lifting region of the vertical lift to effect slicing.

Preferably further cutting means are provided in the form of blades attached to said chains at a position preceding the wire, said blades extending horizontally from the chains and serving to effect partial separation of a slice of laminations at marginal regions of the case.

The invention will now be described by way of example with reference to the accompanying drawings in

which:-

FIGURE 1 shows schematically a side elevation of the splitting apparatus with a case supported in an elevated position on a vertically movable lift with the laminations disposed horizontally;

FIGURE 2 shows a plan view of the apparatus of Figure 1;

FIGURE 3A shows an underplan view on a larger scale of the arrangement for the attachment of the wire to the chains;

FIGURE 3B shows an elevation of the arrangement (inverted) shown in Figure 3A, and

FIGURE 4 shows an end view of the attachment shown in Figures 3A and 3B.

The apparatus comprises a lift shown generally at 8 having a horizontally disposed platform 9 guided in the vertical direction by a frame 10. Lifting or lowering of the platform 9 is effected by a motor driven screw jack 11.

Arranged above the platform 9 are a pair of chains 12, 13 which travel in planes parallel to each other and which pass over chain wheels 14, 16, 14' - 16' mounted on shafts 17, 18, and 19 one of the latter being drivable by a motor 20 by means of a chain drive 21 and pulleys 22a, 22b. Between the chains 12,13 and attached to them there are two spaced apart transverse channel members 23, 24, which serve to support cutting

elements to be further described.

As seen from Figure 2, leading knives 25, 26 extend towards each other in a horizontal plane and are rearwardly inclined in relation to the direction of cutting. Each knife comprises a single flat blade pivotally mounted on brackets 27, 28 by torsion springs 29.

A wire 30 is tensioned between two pivot arms 31, 32 carried by the channel member 24. The arms are pivotted on rubber bushes 33, 34 (Figures 3A, 3B), mounted in blocks 35, 36, which bushes apply tension to the wire.

The wire, typically 18 swg (1.2 mm) piano wire, is attached to the arms 31, 32 by a fixed pulley 37 at one end and by a rotatable pulley 38 at the other end. The spindle of the pulley 38 passes through the arm 32 and is provided with a ratchet 40 controlled by a spring-loaded pawl 41 so that the wire can be tensioned. The wire is secured at each end to the pulleys by nipples 42, 43. The stretched wire 30 is arranged at the same height as the blades 25, 26. The torsional rubber bushes 33 allow the wire to deflect and follow the natural strata in the tobacco and also relieves some of the strain on the wire on initial contact of the latter with the tobacco.

The sequence of operations of the splitting apparatus is as follows:-

1. A safety gate 50 is opened and the case of tobacco T is placed on the lifting platform 9;

2. The gate is closed whereupon a microswitch 51 will enable the start switch (not shown).

3. The lifting platform lifts the case step by step to a position at each step to obscure a photoelectric cell 53 cell. The cell 53 stops the platform and starts up the drive to the chains thereby cutting a slice off the top of the case, which slice is pushed off on to a conveyor by means attached to the chains (not shown).

4. The chain drive motor runs continuously. When the cutting wire 30 strikes a feeler of a microswitch 56 a low speed lift motor (not shown) engages to lift the platform 9 a predetermined amount, i.e. a mechanical variable speed drive engaging electromagnetic clutch. Alternatively both low speed drive motor and chain drive motor could be started by a photoelectric cell and the electric clutch could engage drive when required.

5. A timer (not shown) controls the lifting time to ensure that the platform does not lift whilst the cutting wire is cutting.

6. The sequence of lift is controlled by the microswitch 56 and the timer. A second timer (not shown) is also operated by the microswitch 56. If the wire should break, the second timer will not be reset

by the wire before the end of a predetermined period. Accordingly the chain-drive will stop and a light will come on indicating that the wire is broken. A band inch button may be provided to stop the cutting head in a position suitable for changing the wire.

7. When the case has been cut, a microswitch 52 limits the travel of the lifting platform. This microswitch overrides the lifting timer and after the final cutting stroke of the cutting wire, causes the lifting platform to lower by means of the high speed motor which stops under the control of a lower microswitch 57.

The knives 25, 26 produce marginal separation of the tobacco laminations and the wire 30 completes the splitting of the slice over the width of the case. The separation at the corners of the case produced by the knives 25, 26 enables the following wire 30 to enter the case at the corners so that the wire is subjected to less strain then otherwise would occur.

The wire 30 may be followed by a full width flexible wiper 54 carried by the chains, which wiper pushes the resulting slice off the remainder of the case and onto a ramp 59 and a conveyor 60.

The apparatus may be arranged for:-

a) Continuous movement of both vertical lift and transverse members;

b) Incremental feed of vertical lift and

continuous movement of transverse members;

c) Continuous movement of vertical lift and incremental movement of transverse members.

The above alternatives provide for wide variations in overall processing rate and slice thicknesses.

CLAIMS:

1. An apparatus for opening a case of laminations of tobacco, comprising:

a) a vertical lift (9) for receiving a case of tobacco and for moving the latter to successive slicing positions;

b) a pair of endless chains (12, 13) being mounted in parallel disposition;

c) means (19-22) for driving said chains; and

d) cutting means in the form of a wire (30) attached to and extending between said chains transversely of the movement thereof, said chains being so guided that said wire passes repeatedly over the lifting region of the vertical lift to effect slicing.

2. An apparatus as claimed in Claim 1, characterised in that the wire is attached to the chains by means of a transverse member (24) extending between the chains (12, 13) and attached to them a pair of arms (31, 32) pivotally mounted on the transverse member, the distal ends of said arms having the wire secured thereto, and spring means (33, 35) for urging the arms in a direction to tension the wire.

3. An apparatus as claimed in Claim 2, characterised in that said spring means comprise torsion blocks

(35) containing rubber bushes (33).

4. An apparatus as claimed in Claim 2, characterised in that the wire (30) is secured to the arms by a pulley (37) fixed to one arm and a rotatable pulley (38) on the other arm, ratchet means (40, 41) being provided between said other arm (32) and said rotatable pulley (38) by which tensioning of the wire can be adjusted.

5. An apparatus as claimed in Claims 1 - 4, characterised in that further cutting means are provided in the form of blades (25, 26) attached to said chains at a position preceding the wire in the direction of movement thereof, said blades extending horizontally from the chains and serving to effect partial separation of a slice of laminations at marginal regions of the case.

6. An apparatus as claimed in Claim 5, characterised in that mounting means are provided for said blades comprise further torsion blocks (29) and a transverse member (23) extending between the chains and attached to them on which said further torsion blocks (29) are mounted.

7. An apparatus as claimed in Claims 1 - 6, characterised in that electric control means are provided which include a photoelectric cell (53) which terminates electric supply to the motor driving the lift when the latter moves the tobacco case to the next slicing position.

8. An apparatus as claimed in Claim 7, characterised in that the photoelectric cell (53) initiates start-up of the means driving said chains thereby causing the wire to cut a slice off the top of the case.

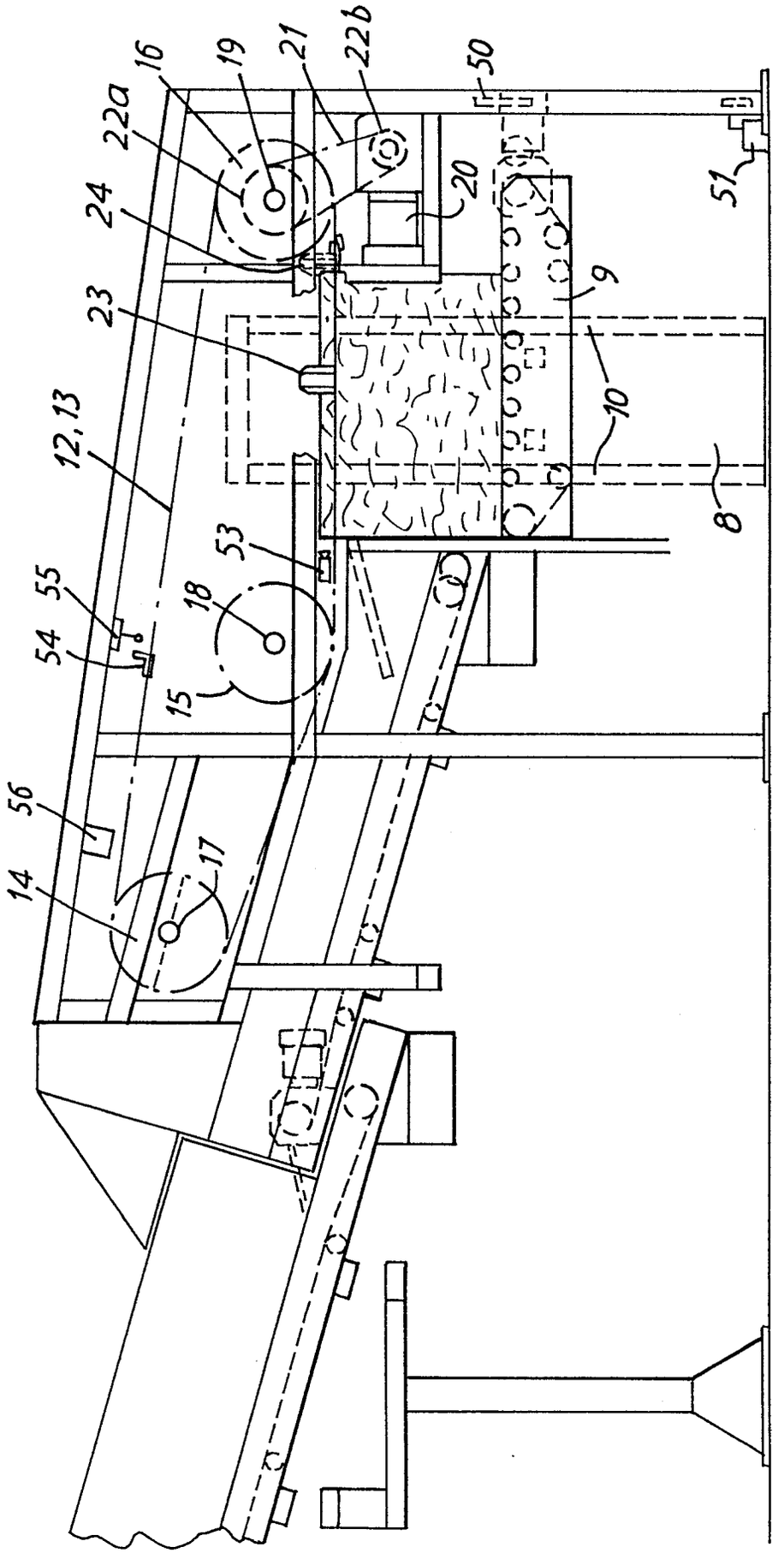


FIG. 1

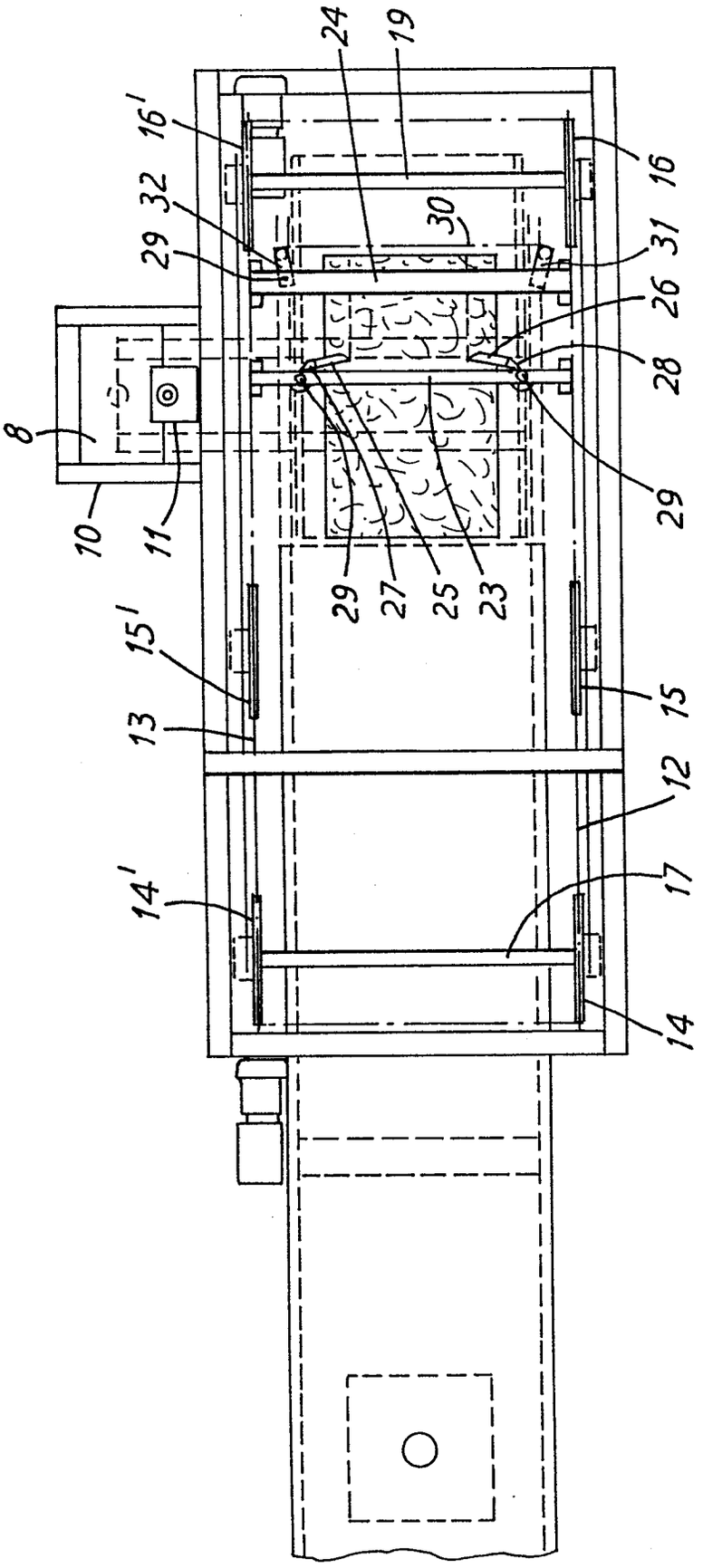


FIG.2

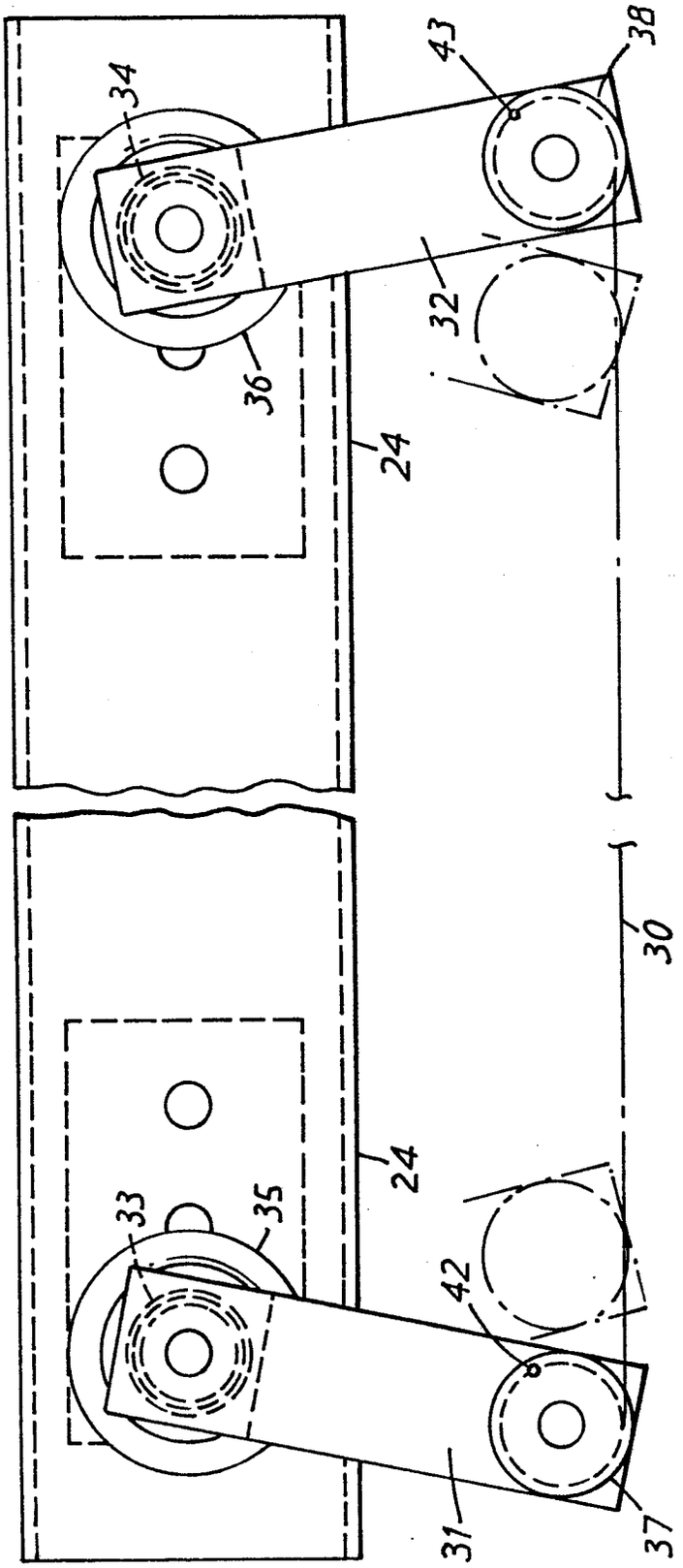


FIG.3A

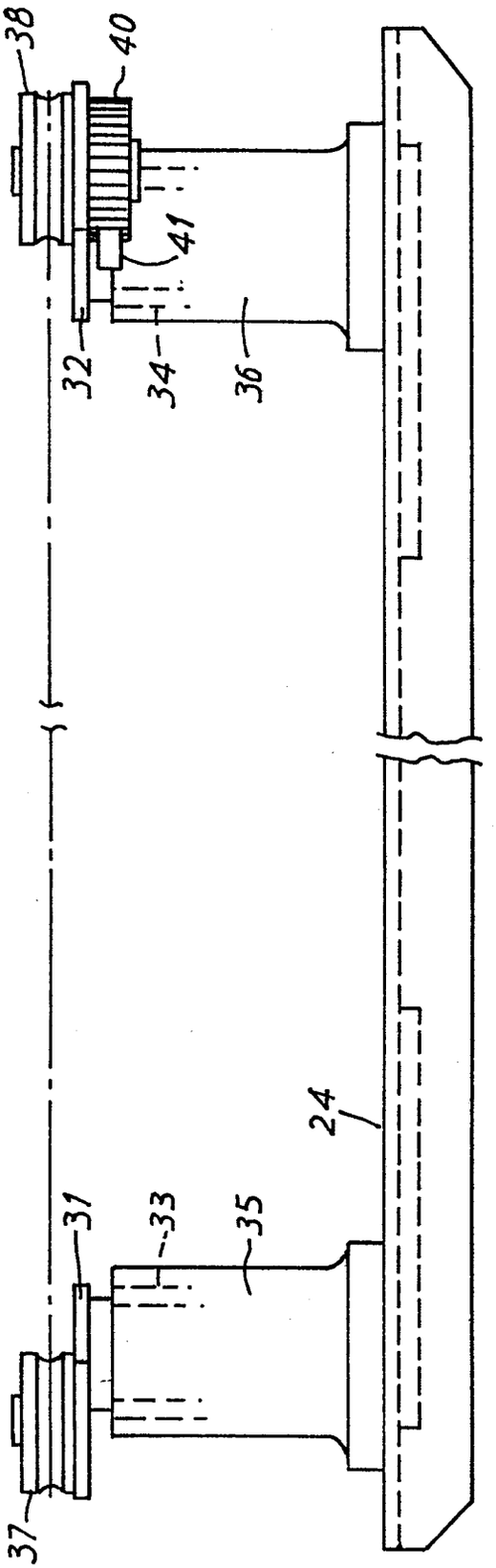


FIG.3B

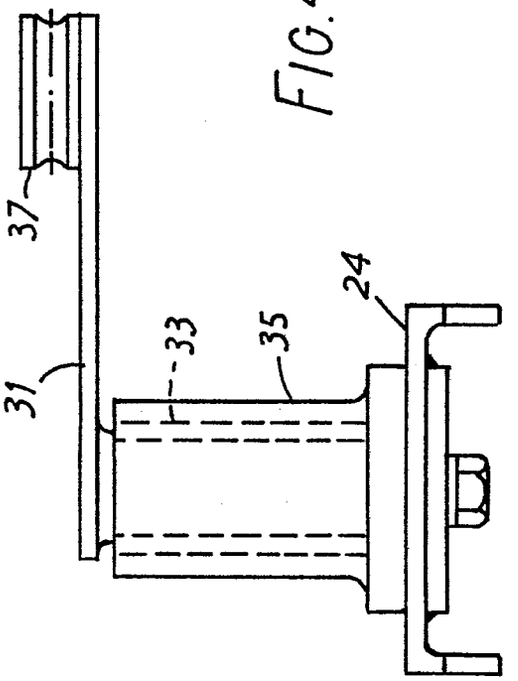


FIG.4

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EUROPEAN SEARCH REPORT

0143585
Application number

EP 84 30 7935

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A,D	WO-A-82 02 324 (AMF INCORP.) * Figure 1; abstract * ---	1	A 24 B 3/06
A	DE-B-1 130 345 (H. REEMTSMA) * The whole document * ---	1	
A	SU-A- 173 646 * Abstract; figures 1-2 * ---	1	
A	DE-B-1 139 419 (H. REEMTSMA) * The whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4) A 24 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15-02-1985	RIEGEL R.

CATEGORY OF CITED DOCUMENTS

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