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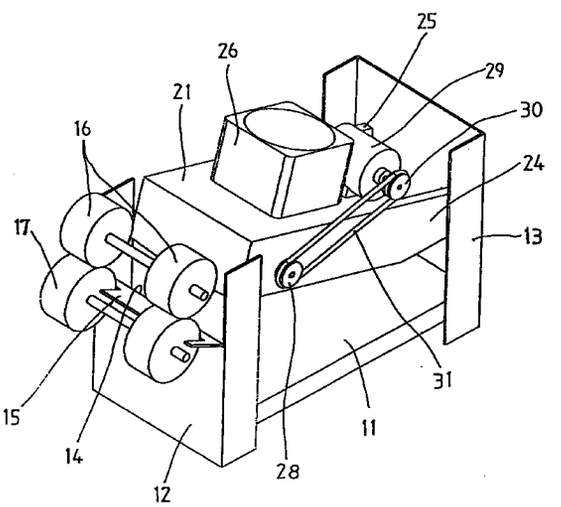
(54) Apparatus for paying out a sheet body

(57) This invention provides an apparatus which is able to payout surly and speedily sheet bodies one by one, is small-size and has a simple structure, namely an apparatus for paying out a sheet body which comprises at least suction means (21) which has an opening (22) to absorb a sheet body (S), and sending out means (27) to send out said sheet body (S) which is absorbed on this suction means (21), resisting to the absorption.

Fig.[1]



EP 0 812 790 A1

Description

This invention is relates to an apparatus for paying out a sheet body, in particular a sheet body which consists of paper or synthetic resin an so on. This invention ist especially concerned with a sheet body payout apparatus for paying surly a bill with the shett body which is paper money.

This invention is concretely concerned with an apparatus for paying out a sheet body which is suitable for fields which bills are used, such as vending machine which contains ticket sale machines and so on, money change machines, money changing machines which are used for registers in the retail industry and so on.

Further, the sheet body in case of this invention is typically bills which are folded freely.

However, the sheet body which contains card bodies such as telephone cards, commutation ticket cards which are bent freely is of course.

For example, an apparatus for paying out the bill which is a conventional sheet body payout apparatus includes an apparatus for feeding the paper leaf of the kind which is disclosed in the specification of Japanese Patent Publication 7-237764.

This feeder relates to an apparatus to supply paper leaves such as the bills which are stored in the hopper to the desired place, separating each paper leaf.

Concretely, in front of a hopper bottom wall on which bills are piled, a guidance plate for a bill is provided in a setting-up condition and, on a single roller rotating axis, a separation roller and a carrying-out roller for a bill are provided respectively and so on, so that the apparatus is disclosed in the specification has a complicated mechanism.

Also, a card sending-out apparatus for a card vending machine is disclosed in the specification of Japanese Patent Application 4-283398 (Japanese Laid-Open Publication 6-96349) of this case applicant.

As for this card sending-out apparatus, within the upper portion of two outside plates that are separated in parallel, a cards layer body is held and, a complicated mechanism apparatus which constituted to send out a card with a paying-out roller and a sending-out roller for the card is disclosed.

This invention was developed for the purpose to provide a sheet body payout apparatus with a small and simple structure which doesn't need a complicated mechanism apparatus as it is mentioned above.

When saying in other words, this invention was developed to provide apparatus which is able to payout surly and speedily sheet bodies one by one, and has a small-size and a simplified structure.

This object ist achieved by an apparatus according to claim 1.

Further developments of the invention are given in the subclaims.

This invention is explained below, referring to attached drawings of the embodiment according to the invention, of which:

Fig. 1 is a perspective view which shows the subject portion of the one embodiment by this invention, being summarized,

Fig. 2 is a front view of Fig. 1 and Fig. 3 is a plan view of Fig. 1.

Fig. 4 shows the subject portion of Fig. 1 and (A) of Fig. 4 is a side view and (B) is a base view.

Fig. 5 and Fig. 6 are drawings to explain the operation at Fig. 1 and (A), (B), (C), (D) thereof are schematic views respectively.

The big rectangular plate which is shown in the lower portion of Fig. 1 is an elevator 11 to pile the sheet bodies such as the bills and to upwardly carry the layered sheet bodies.

For example, this elevator 11 is equipped to rise when the weight thereof becomes light with a spring (illustration omitted) and so on which is sensitive to the weight.

Two standing guide frames 12, 13 which surround each end part of the elevator 11 are, for instance, plate bodies which are formed to be bent in the U-shaped form. In the upper portion of guide frame 12 on the left side of Fig. 1, an outlet 14 to pay out a sheet body (illustration omitted) is formed and, at the lower edge of this outlet 14, a guide fragment 15 is formed outwardly, being desirably.

Near the upper outside portion of the outlet 14, two pairs of rubber rollers 16, 17 to sandwich and draw out the sheet body are disposed. Incidentally, as for the mounting of these rollers 16, 17, the fact that a case (illustration omitted) of box form which covers the whole apparatus and so on is used is of course.

The slightly big box form at the center of Fig. 1 is a sheet body suction apparatus 21.

As for this suction apparatus 21, as shown in Fig. 2 and Fig. 4, a lower portion thereof is mainly done formed surrounding an opening 22 and the upper part is done formed smaller surrounding an opening 23.

The suction apparatus 21 is fixed by welding or the like the inside of the guide frame 13 on the left side of the drawing, being intervened by one pair of protruded arms 24, 25.

Suction apparatus 21 is, as shown in Fig. 2, formed at a slightly raised and diagonal posture relative to the elevator 11.

At the center on the suction apparatus 21, a small fan apparatus 26 is disposed.

Further, in the drawing, the fan apparatus 26 is illustrated, being summarized.

When the fan apparatus 26 is driven, as shown at the arrow in Fig. 2, air flows to a small opening 23 from a big opening 22.

Therefore, alternativly it is of course possible to insert a tube (illustration omitted) into the small opening 23 instead of the fan apparatus 26 and to mount it airtightly such that a sucking of air is permitted.

In the big opening 22 of suction apparatus 21 at nearly the outlet 14, a small rubber tire 27 is rotatably

disposed.

A pulley 28 is fixed at the outer end of the rotating axis of tire 27.

This tire 27 is the one to send out a sheet body (illustration omitted) which was absorbed at the opening 22 of suction apparatus 21 to the direction of outlet 14 by the frictional power.

29 on the suction apparatus 21 is a motor and this motor 29 is fixing a pulley 30 on the axis.

31 is a rubber belt, and it is expanded over the pulleys 28, 30 which become one pair.

In operation of this embodiment which has the above-mentioned constitution, firstly as shown in (A) of Fig. 5, a plurality of sheet bodies S are piled on the elevator 11 as a layer.

Further, when the sheet body S is a bill, a gap G between the first sheet body S1 on the sheet bodies S and the edge most below in the opening 22 is desirable about 5 mm.

However, the size of gap G is changed on the basis of the size, the thickness, the weight and so on of the sheet body S which contains a card.

Therefore, of course a gap is possible which is not limited to above-mentioned numerical value.

Next, when the suction apparatus 26 is driven, in (B) of Fig.5, the air is blown upwardly and the negative pressure occurs in the opening 22. The sheet body S1 of most top is as the result absorbed at the opening 22 like the drawing.

In this case, the underside of suction apparatus 21, i.e. the edge surface on the opening 22 has an angle K (refer to Fig. 5(A)) to the horizontal plane.

Therefore, the sheet body S1 is, as shown in Fig. 5(B), bent at 1/3 of the right margin of the body S1.

As the result, in case of sheet bodies S being new bills, or in case of sheet bodies S being so-called new tickets, by this bend, the top new bill is totally separated from the new bill below. Therefore, two-sheets pass away does not occur totally.

In case of cards which can not be bend and so on, the fact that the angle K is not necessary is a needless to say.

Moreover, the underside of the box-shaped suction apparatus 21, when saying in other words, at Fig. 2, the opening edges 32, 33 on either side are curved slightly and projecting to the lower direction, as shown in (A) of Fig. 4.

In case of a bill in which a curl is left with the sheet body S rounded, the bill is curved to the direction of the width with the curve of opening edges 32, 33 when the bill is absorbed. Therefore, the curl in the long direction is missed and the bill becomes flat.

Still, it is permitted of course the opening edges 32, 33 on either side are curved and depressed to the upper direction being contrary to Fig. 4 (A).

Also, in case of the sheet body S which doesn't have a curl and so on, the curves of the concave or convex opening edges 32, 33 are not necessary of course.

Next, in the condition of (B) of Fig. 5, when the motor 29 is operated, the tire 27 is rotated through the pulley 30, the belt 31, the pulley 28.

As the result, as shown in (C) of Fig. 6, the sheet body S1 which is absorbed on the opening 22 is sent out to the direction of outlet 14 by the friction power of the tire 27.

When the about 1/4 portion on the left side of sheet body S1 is sent out, the tip part of this sheet body S1 is sandwiched between rollers 16 and 17 which are paired.

As soon as sandwiched, it is quickly dragged by the rollers 16, 17 which turn faster than the tire 27 and, as shown in (D) of Fig. 6, it begins to be paid out to the outside direction.

When moving from the condition of (C) at Fig. 6 to the condition of (D) at Fig. 6, the tip part of the first sheet body S1 is put between a pair of rollers 16 and 17, and 2/3 portion on the left side of sheet body S1 is send out from the suction apparatus 21.

At this time, the illustration is omitted and, the about right half portion of opening 22 is released, and the center of the following second sheet body S2 is sucked and risen up.

Moreover, when the whole opening 22 is released, the following sheet body S2 is, as shown in (D) at Fig. 6, absorbed at the opening 22 of the suction apparatus 21.

Further, in the operation description at the above mentioned Fig.5 and Fig. 6, the suction apparatus 21 is continuously driven and the tire 27 is rotated according to the necessity.

However, it ist of course permited that the tire 27 is continuously rotated too and/or the number of sheet bodies S to be paid out is calculated with another apparatus (illustration omitted).

In this case, it is possible to do the payout of sheet bodies S surely and moreover at higher speed.

Also, in this embodiment, the tire is disposed within the opening 22 of the suction apparatus.

However, depending on the size, the hardness and so on of sheet body S, it is of course possible that the opening 22 is made small and the tire 27 is disposed the outside of opening 22.

In this case, the tire 27 touches a part of the sheet body S which is outside the suction apparatus 21 or a part of the card body and, the sheet or card body is sent out by the frictional power.

Also, in the description so far, a sending out apparatus in which the elevator 11 is arranged below is illustrated.

However, being based on the size, the thickness of the sheet or the card body and so on, the apparatus of which the elevator 11 is arranged diagonally or perpendicularly or above is permitted of course.

Saying in other words, depending on the size, the thickness of the sheet or the card body and so on, even if the sending out apparatus illustrated is mounted in a setting-up condition or in a upside-down condition or in a tumble condition, a similar operation is gotten of course.

According to this present invention above mentioned, by the combination with simple constitution, a big effect that a sheet body payout apparatus with the small and simple structure can be provided is gotten. That is, by combining a suction means as the fan or the like and a sending out means as the tire or the like according to this present invention, a sheet body payout apparatus with a small and simple structure is gotten.

In addition, according to this present invention, a big advantage that sheet bodies one by one can be sent surly and at high speed is gotten.

Brief Explanation of the reference signs:

S, S1, S2: sheet bodies, 16, 17: rollers (drawer means), 21: suction apparatus (suction means)
22: opening (suction means), 26: fan apparatus (suction means), 27: tire (sending out means),
28, 30: pulley (sending out means), 29: motor (sending out means),
31: belt (sending out means).

Claims

1. Apparatus for paying out a sheet body comprising at least:

   suction means (21) which has an opening (22) to absorb a sheet body (S, S1, S2); and
   sending out means (27) to send out said sheet body (S, S1, S2) which is absorbed on this suction means (21), resisting to the absorption.

2. Apparatus as described in claim 1, wherein the said sending out means (27) is within the opening (22) of the said suction means (21).

3. Apparatus as described in claim 1 or 2, wherein drawer means (16, 17) is provided with to put in and to draw out the said sheet body (S, S1, S2) which was sent out by the said sending out means (27).

4. Apparatus as described in any one of claims 1 to 3, wherein the said suction means comprises a fan apparatus (26).

5. Apparatus as described in any one of claims 1 to 4, wherein the said sending out means is a small tire (27).

6. Apparatus as described in any one of claims 1 to 5, wherein the said drawer means is a plurality of rollers (16, 17).

Fig.[1]

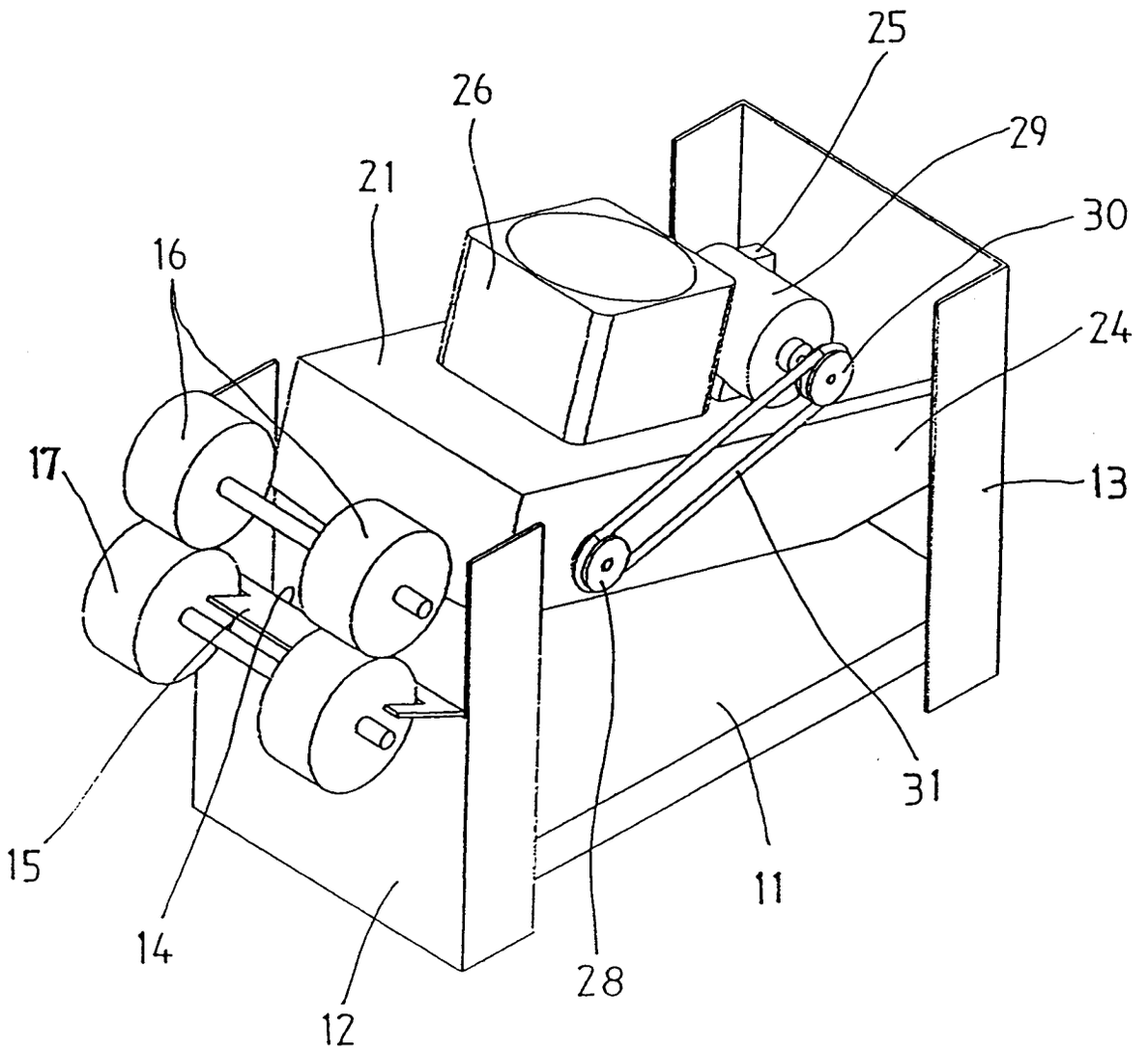


Fig.[2]

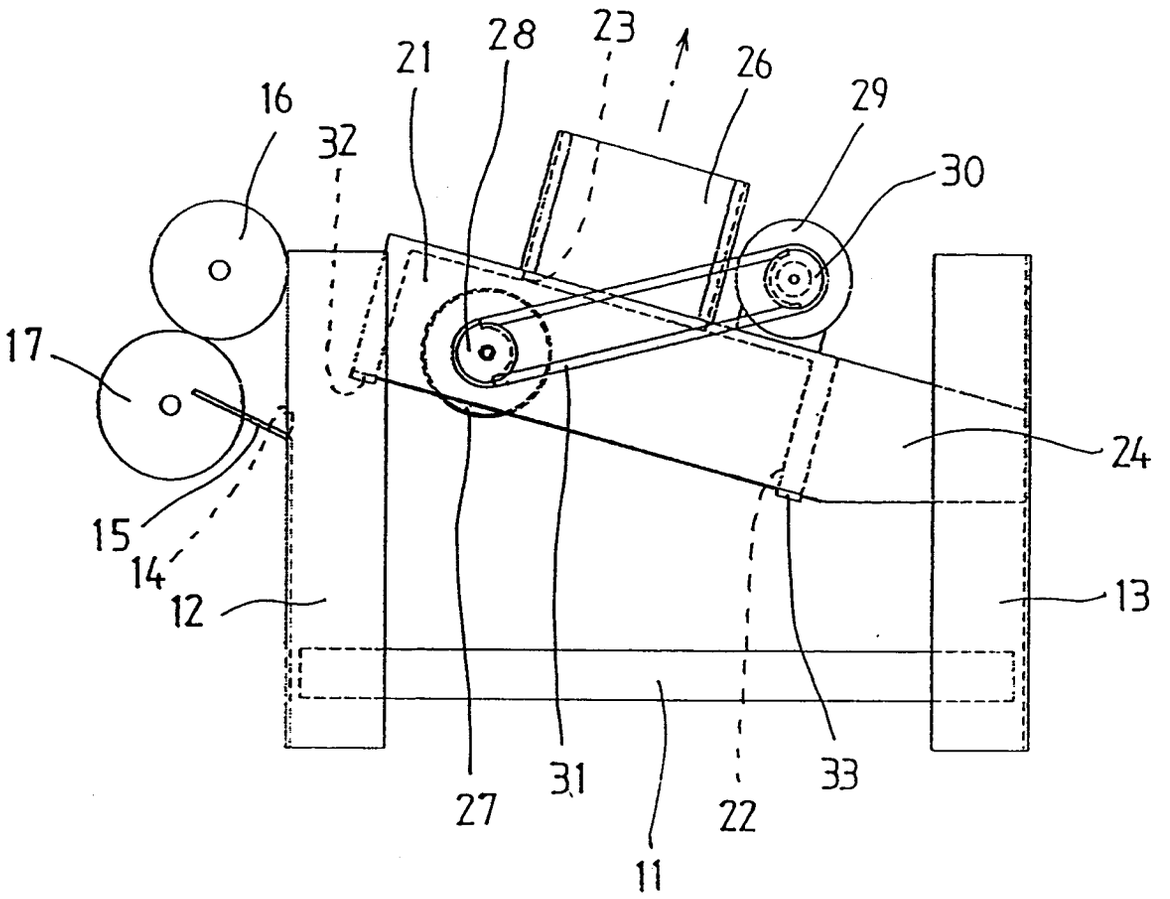


Fig. [3]

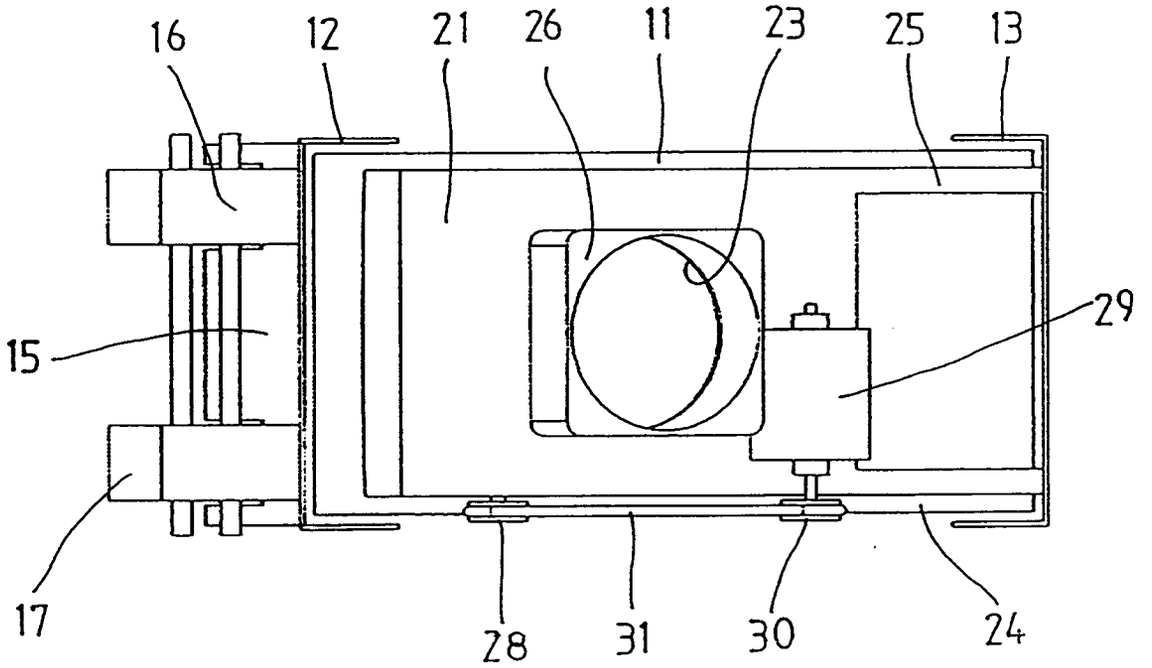


Fig. [4]

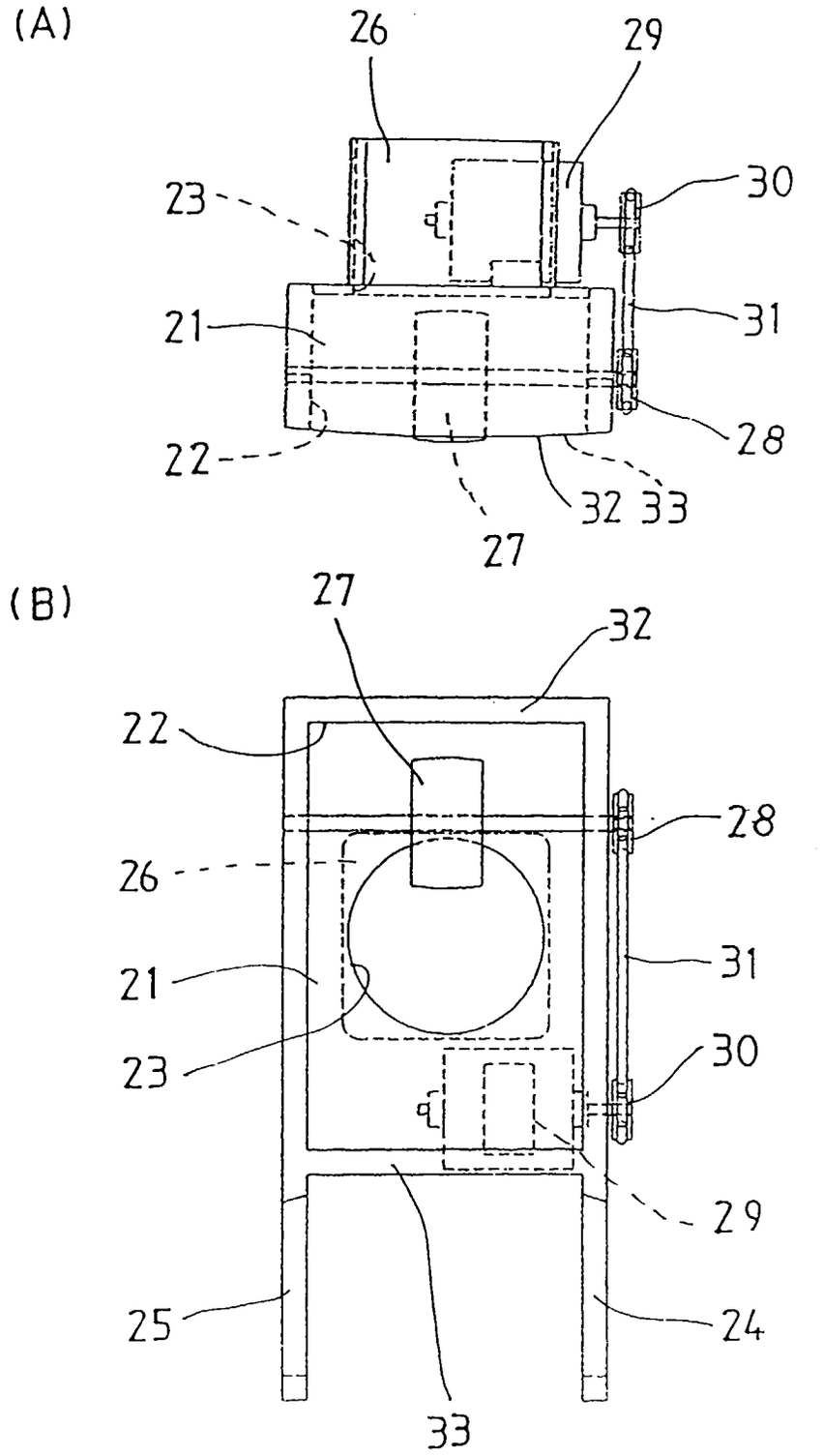

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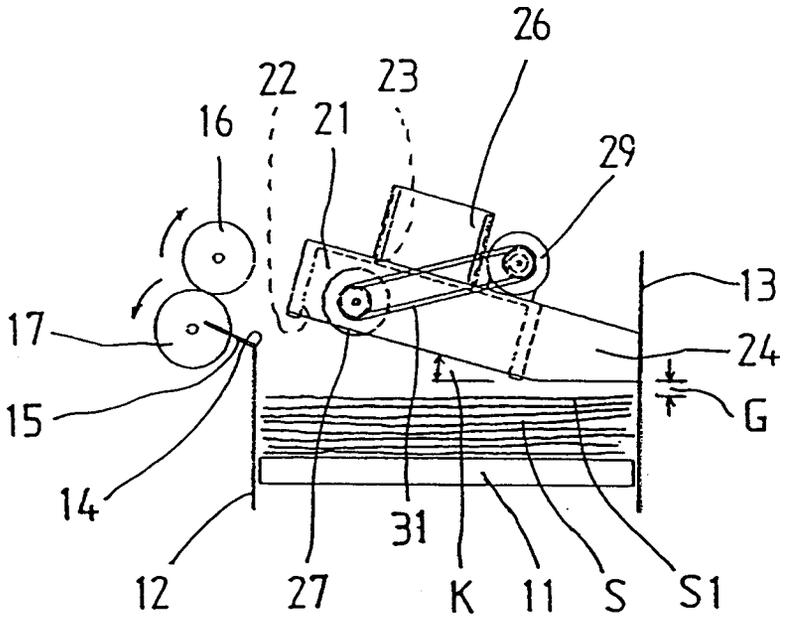
Fig. [5]

(A)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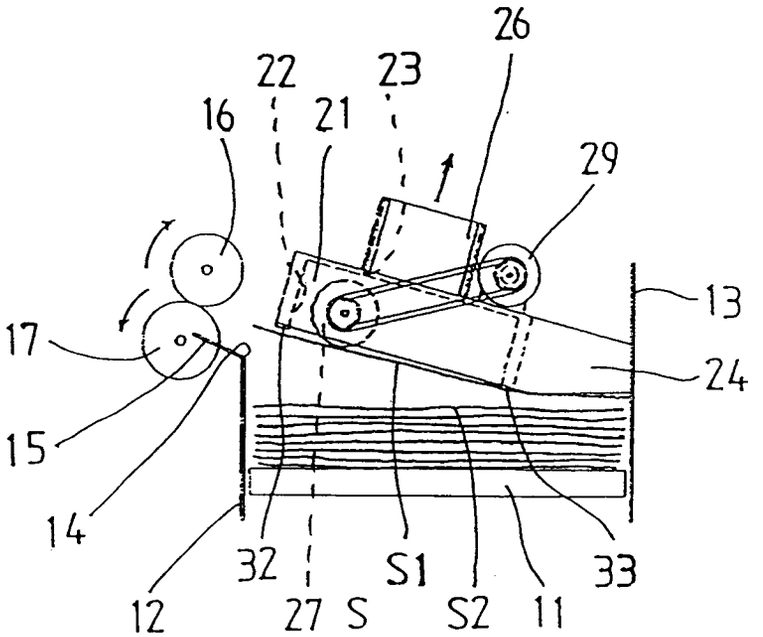
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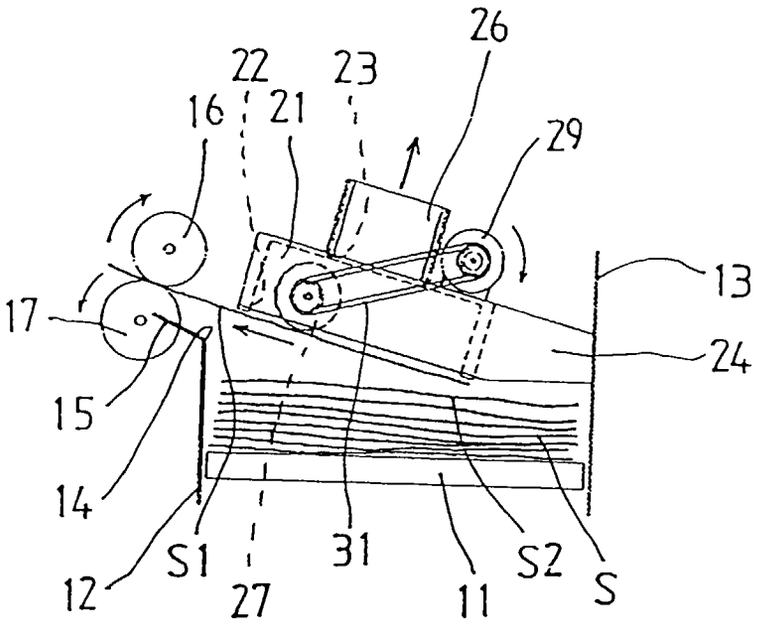
Fig.[6]

(C)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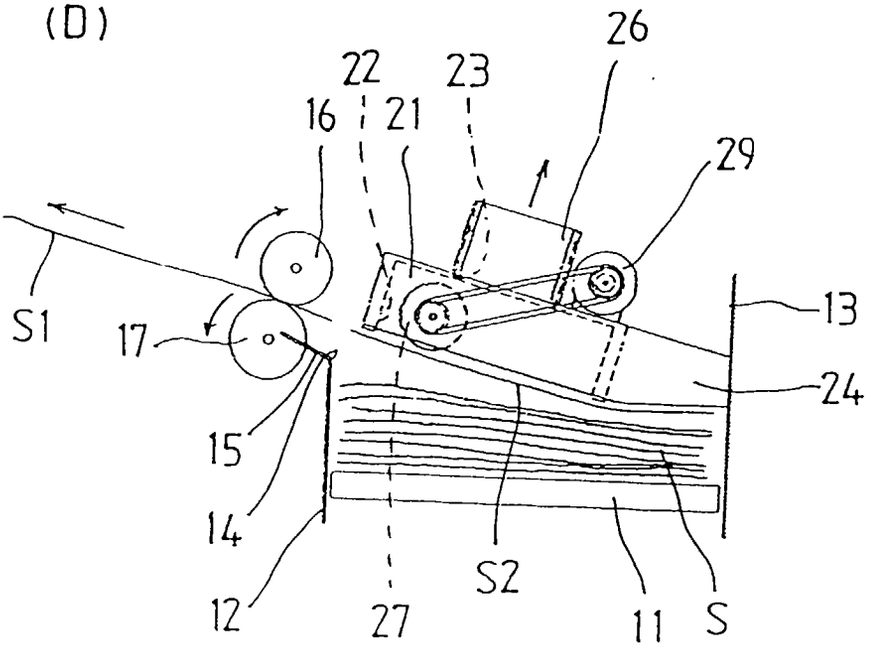
(D)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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 10 8905

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.6)
X Y	DE 24 37 082 A (PHILIPS PATENTVERWALTUNG) * page 3, line 23 - page 5, line 10; figures * ---	1-4,6 5	B65H3/08
Y	PATENT ABSTRACTS OF JAPAN vol. 096, no. 001, 31 January 1996 & JP 07 237764 A (NIPPON KINSEN KIKAI KK), 12 September 1995, * abstract * -----	5	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 September 1997	Neville, D

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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