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DEVICE FOR REMOVING SHEETS OR PLATES FROM A PILE ONE BY ONE

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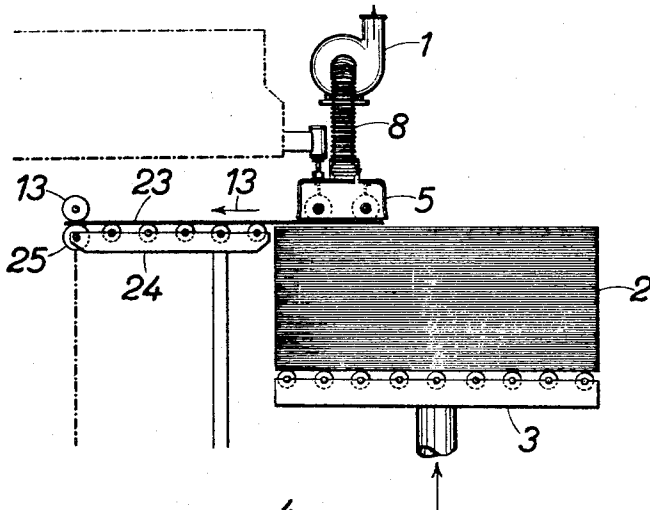


Fig. 1

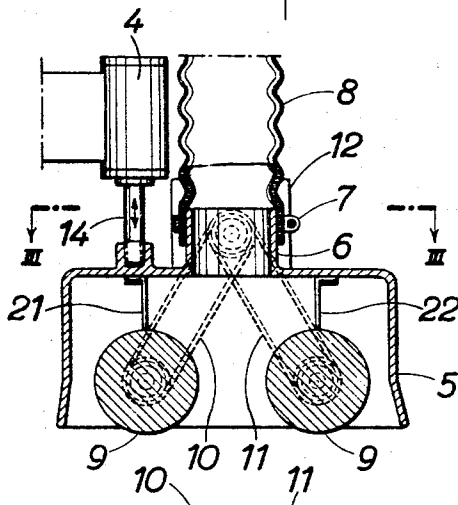


Fig. 2

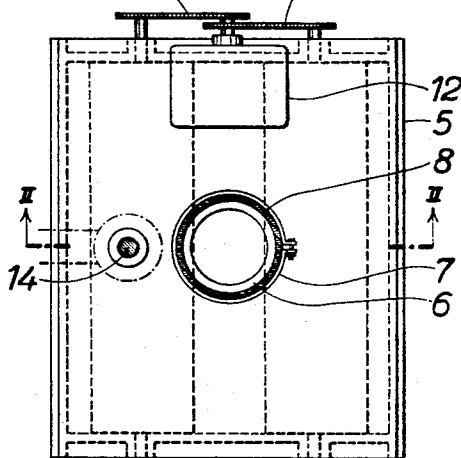


Fig. 3

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DEVICE FOR REMOVING SHEETS OR PLATES FROM A PILE ONE BY ONE

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ABSTRACT OF THE DISCLOSURE

The sheet separator comprises a suction box having powered rollers protruding from the bottom, open face of the box. Vacuum is applied to the box between the rollers and packing means extend from each roller to the box so as to confine the suction between the rollers.

This invention refers to a device for removing sheets or plates from a pile one by one. The device includes a suction box, arranged by means of vacuum to catch the uppermost sheet or plate.

Such a device is used when sheets, as paper, cardboard, carton or similar sheets or plates, as veneer, plywood, metal, chip, wallboard, plastic or other similar plates are fed into a working machine, for example into a printing, grinding or punching machine.

Feeding devices, operating by means of friction wheel, are known. They, however, tend to feed, besides the uppermost sheet, also underlying sheets, which causes disorder in the work process.

The use of hooks which fasten on the back edge of the uppermost sheet in the pile, is known, too. The use of this expedient is only suited for rather thick plates and may damage these.

Suction cups are also known, which catch the uppermost sheet, lift the same upward, move sideways together with the sheet, and drop the sheet, for example on a conveying table, which brings the sheet into the working machine. Thereafter the suction cup or suction cups move horizontally back to the original position and catch a new sheet. Devices, operating by means of suction cups, are very slow, because of both vertical and horizontal movements. When the sheet is moved horizontally, this causes a torsional strain in the suction cup, on account of which the suction cup gets broken. This risk increases with increasing speed of the operation.

In the device according to the present invention, suction, caused by a vacuum, is also made use of, but in a different way, so that the above-described disadvantages inherent in the use of the suction cup do not appear. The invention is characterized in that a suction box is provided with one or more rotatable wheels against which the sheet or plate presses and which moves the sheet or plate sideways from the pile.

An embodiment of the invention is illustrated in the drawing, in which

FIG. 1 shows a side view of the device in operation.

FIG. 2 shows the same device in a larger scale, as a section from FIGURE 3 along the line II-II,

FIG. 3 shows a section, taken from the FIG. 2 along the line III-III.

The device according to the invention consists of a suction box 5, comprising a pipe 6 in the upper part of the box, to which pipe an elastic suction pipe 8 is fastened by means of a clamping band 7. Two rubber wheels 9, the lower parts of which extend beneath the lower edge of the suction box, are fastened with bearings to the suction box. The wheels are operated by chains 10 and 11 driven by motor 12, placed on the suction box 5. The wheels 9 are packed in relation to the suction box 5 with packings 21, 22, dragging along the surface of the wheels, so that the

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suction effect takes place through the space between the wheels.

The device according to FIGURES 1-3 operates in the following way. When the suction box 5 is subjected to the influence of suction and situated at a distance from the pile of plates 2, it sucks the uppermost plate 23 against its lower surface. The rotating wheels 9 move the plate in the direction of the arrow 13 onto the feeding wheels 13 and 25 of the working machine (not illustrated) as shown in the FIGURE 1. Thereafter the valve, (not illustrated), situated between the suction apparatus 1 and suction box 5, is closed, whereupon the suction box returns to normal pressure. When plate 23 has been completely transported to feeding table 24, the suction box 5 is again subjected to suction, whereupon the suction box catches the next plate and moves it to the feeding table 24. The table 3, on which the pile 2 of plates is situated, is continuously lifted up while the plates are fed away from the pile so that the uppermost plate is always situated approximately at the same level as the feeding table 24.

In case the plates in the pile 2 are so heavy that the suction box 5 is not able to suck them against its lower side, the suction box is lowered to the uppermost plate 25 by means of a pressure cylinder 4, the piston rod 14 of which is fastened to the suction box. When the suction box 5 is now subjected to suction, it sucks the uppermost plate towards the suction box and partly reduces the weight of this plate. The friction between the uppermost plate and the underlying plate is reduced so much that the wheels 9 are able to move the uppermost plate onto the feeding table 24. For this purpose the surface of the wheels 9 is made of rubber or other material with high friction. The invention is, of course, not confined to the embodiment illustrated by the drawing. For example, there can be only one wheel 9 or there can be more than two wheels.

Subjecting the suction box 5 alternately to suction and providing it with a normal pressure, and the gradual lifting of the table 3 can be arranged to take place automatically, in accordance with a desired program.

I claim:

1. A device for transporting a single sheet from a pile of sheets, said device comprising a suction box adapted for being positioned above a pile of sheets, two rotatable wheels supported within the suction box in spaced relation and extending in part below the suction box, said rotatable wheels having an external surface of relatively high frictional coefficient, packing means in said box in contact with the wheels and the box to define therewith an enclosed space which is open between said wheels, means for creating a vacuum in said space to cause the uppermost sheet in said pile to be lifted from the pile and held against the rotatable wheels and means for rotating the wheels to displace the sheet held by the wheels laterally away from the pile.

2. A device as claimed in claim 1 wherein the suction box has an inner surface and the packing means includes a member for each wheel, said member having opposite ends, one of which is secured to the inner surface of the suction box and the other of which rests on the associated wheel within the suction box.

3. A device as claimed in claim 1 comprising means for releasing the vacuum in the space after the sheet has been laterally displaced away from the pile.

4. A device as claimed in claim 3 wherein said means for creating a vacuum in said space comprises suction producing means and means connecting the suction producing means and the suction box.

5. A device as claimed in claim 4 wherein the means for releasing the vacuum comprises a valve in the means

connecting the suction producing means and the suction box.

6. A device as claimed in claim 1 comprising means for raising and lowering the suction box to adjust the level of said suction box relative to the uppermost sheet on the pile.

7. A device as claimed in claim 6 wherein the means for raising and lowering the suction box comprises a cylinder adapted for receiving a pressure fluid, and a piston slidably mounted in the cylinder and secured to the suction box for displacing the suction box when the cylinder is pressurized.

8. A device as claimed in claim 1 wherein the rotatable wheels are rubber wheels.

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