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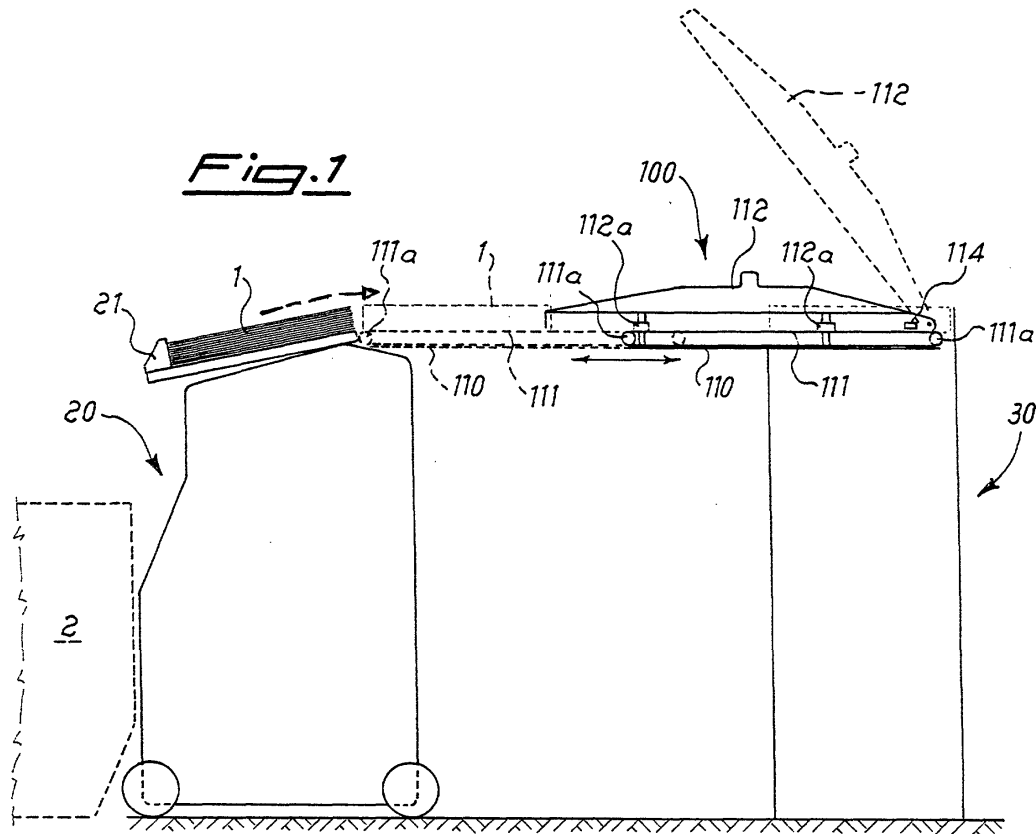
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(54) **Apparatus for transporting sheets leaving punching/pressing machine**

(57) Apparatus for transporting sheets (1) from a storage unit (20) to a stacker (30), which comprises a support surface (11) provided with means (111) for transporting said sheets (1), which surface is movable

translationwise from a position close to the storage device (20), where the sheets (1) are picked up, to a position close to the stacker (30), where the sheets are unloaded.



## Description

**[0001]** The present invention relates to an apparatus for transporting sheets from a storage unit to a stacker in particular for punching/pressing machines.

**[0002]** It is known in the technical sector relating to cutting, incision and/or hot-pressing of sheets of paper, cardboard and the like by means of so-called punching/platen machines and/or pressing machines that there exists a need to unload automatically the individual sheets leaving the said machines.

**[0003]** It is also known that, for this purpose, devices for removing the sheets from the machines and for depositing them on auxiliary storage surfaces outside the machine have been designed.

**[0004]** After storage of the sheets, it is also necessary to transfer automatically the pack of sheets formed on said storage surface to a stacker from where it is possible to unload easily the packs without interfering with operation of the machine.

**[0005]** The technical problem which is posed, therefore, is that of providing an apparatus for transporting sheets/packs of sheets from an auxiliary storage surface of a punching/pressing machine to a unit for stacking said sheets/packs.

**[0006]** Within the context of this problem a further requirement is that said apparatus allows sheets/packs to be deposited on the stacker at zero relative speed.

**[0007]** These technical problems are solved according to the present invention by an apparatus for transporting sheets from a storage unit to a stacker, which comprises a support surface provided with means for transporting said sheets, which surface is movable translationwise from a position close to the storage device, where the sheets are picked up, to a position close to the stacker, where the said sheets are unloaded.

**[0008]** Further details may be obtained from the following description of a non-limiting example of embodiment of the invention, provided with reference to the accompanying plates of drawings in which:

- Figure 1 shows a schematic cross-section along a vertical plane of the transportation apparatus according to the present invention.

**[0009]** As shown the transportation apparatus according to the invention is composed of an assembly 100 for connecting a device 20 for storing sheets 1 leaving a punching/pressing machine 2 and a stacker 30.

**[0010]** Said machine 2, storage device 20 and stacker 30 are conventional per se and therefore not described in detail.

**[0011]** In greater detail, the apparatus according to the invention is composed of a surface 110 having, arranged inside it, belts 111 which are endlessly wound on associated pulleys 111a, some of which are idle and others made to rotate by associated actuating means (not shown) which are controlled.

**[0012]** The said surface 110 is supported by lateral guides 112, one end of which is rotationally fastened to the stacker 30 with respect to which it is able to rotate, upon actuation of respective means, such as cylinders or the like, from a position rotated upwards (broken line in Fig. 1) to a substantially horizontal, lowered, position for connection to the storage device 20.

**[0013]** Said guides 112 have sliders 112a supporting the surface 110 which is therefore movable from a position inside the guides 112, close to the stacker 30, to a position outside the guides, close to the storage device 20.

**[0014]** Said translational actuation of the surface 110 is in turn controlled by associated devices which are per se conventional and not shown.

**[0015]** It is envisaged moreover that the relative displacements of the various movable parts and the transported sheets are detected by sensors able to emit corresponding signals for the control devices.

**[0016]** The operating principle of the apparatus is as follows:

- during installation of the apparatus the guides 112 are rotated upwards and the stacker 30 is brought into the vicinity of the storage device 20;
- by lowering the surface 110, the apparatus is connected to the device 20 for storage of the sheets 1 leaving the machine 2;
- when a predefined pack of sheets has formed on the storage device 20, as detected by conventional means, the transportation sequence commences as follows:
  - the surface 110 moves out from the guides 112 and assumes a position close to the storage device 20;
  - the transportation belts 111 are actuated;
  - a thruster 21 is actuated so as to push the pack of sheets onto the said belts which, rotating, pick up the pack;
  - rotation of the belts (111) is stopped and
  - the translational return travel of the surface 110 inside the guides 112 is started so as to bring the surface itself into the vicinity of the stacker 30;
  - end-of-travel sensors 114 detect whether the pack of sheets has reached the end of the surface close to the stacker and, if this is so, emit a corresponding signal which:
    - starts a new outward travel movement of the surface 110 towards the storage device 20, resulting in unloading of the pack of sheets 1, which are still pushed by the action of the belts 111, onto the stacker 30.

**[0017]** It must be underlined that, at the moment of unloading of the sheet/pack from the surface 110 onto

the stacker 30, the relative speed of the two machine parts is zero owing to control of the two speeds, i.e. speed of rotation of the belts 111a and speed of translation of the surface 110 towards the storage device 20, resulting in a highly reliable apparatus. 5

sition close to the storage device (20), where the sheets (1) are picked up, to a position close to the stacker (30), where the sheets are unloaded.

### Claims

1. Apparatus for transporting sheets (1) from a storage unit (20) to a stacker (30), **characterized in that** it comprises a support surface (11) provided with means (111) for transporting said sheets (1), which surface is movable translationwise from a position close to the storage device (20), where the sheets (1) are picked up, to a position close to the stacker (30), where the sheets are unloaded. 10  
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2. Apparatus according to Claim 1, **characterized in that** at the moment when the sheets (1) are deposited on the stacker (30) the relative speed is zero. 20
3. Apparatus according to Claim 1, **characterized in that** it comprises a pair of guides (112) inside which sliders (112a) supporting said surface (110) are movable. 25
4. Apparatus according to Claim 3, **characterized in that** said guides are movable rotationally with respect to the stacker (30) from a disengaged raised position to a lowered position for connection to the storage device. 30
5. Apparatus according to Claim 1, **characterized in that** said sheet transportation means consist of belts (111) which are endlessly wound on respective pulleys at least some of which are motorized. 35
6. Apparatus according to Claim 1, **characterized in that** means for actuating and controlling the speed of said means (111) for transporting the sheets (1) and the translational movement of the surface (110) are envisaged. 40
7. Apparatus according to Claim 1, **characterized in that** it envisages means (114) for detecting the end-of-travel position of the sheets (1) on the surface (110). 45
8. Machine for punching/pressing sheets (1) of paper and the like, provided with an auxiliary device (20) for storing the sheets (1) leaving the said machine and an apparatus (100) for transporting the sheets (1) from said storage unit (20) to a stacker (30), **characterized in that** said transportation apparatus (100) comprises a support surface (110) provided with means (111) for transporting said sheets (1), which surface is movable translationwise from a po- 50  
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