Sept. 27, 1955 K. E. STEEN ET AL 2,718,958

MEANS FOR REMOVING SHEET-SHAPED ARTICLES FROM A SUPPORT

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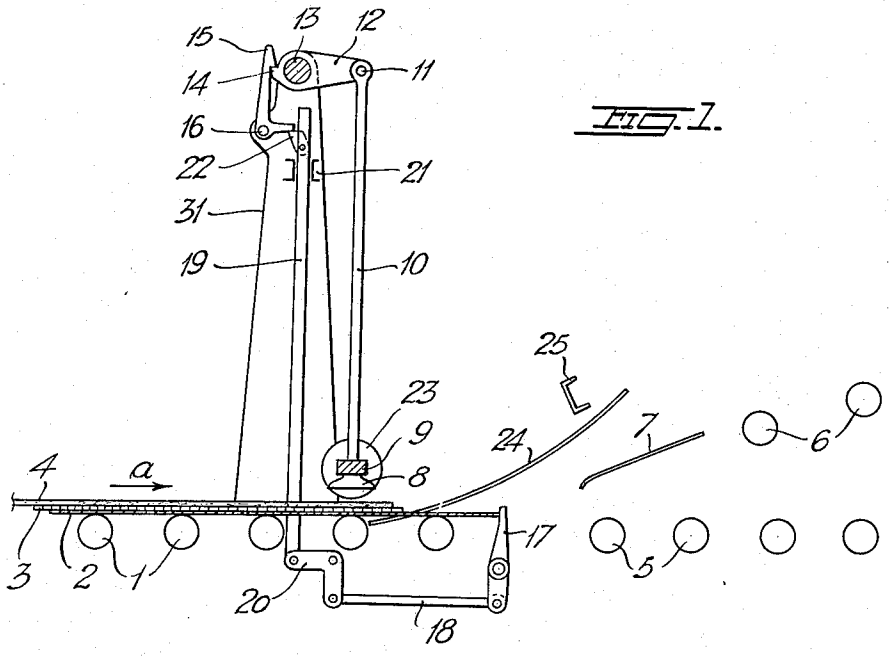


FIG. 1.

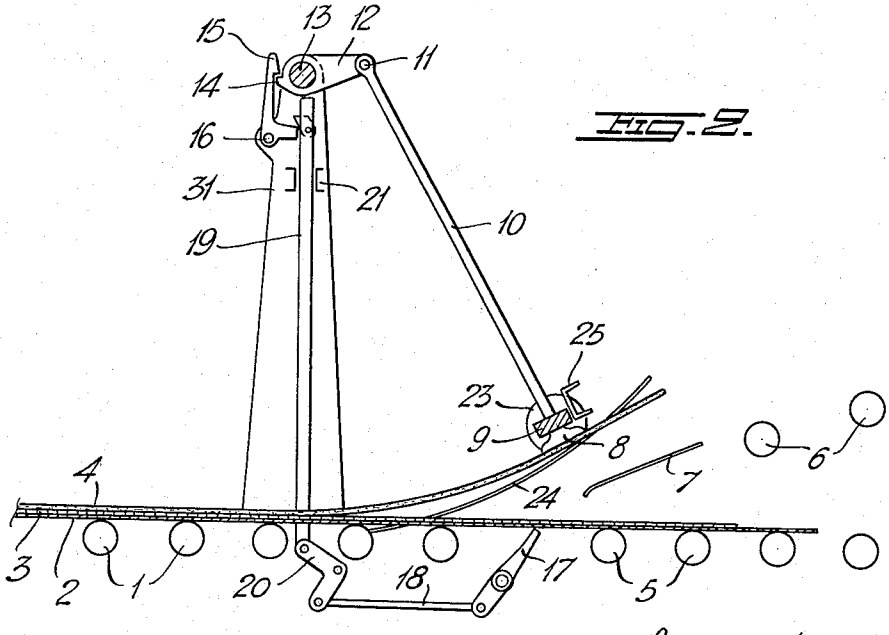


FIG. 2.

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FIG. 3.

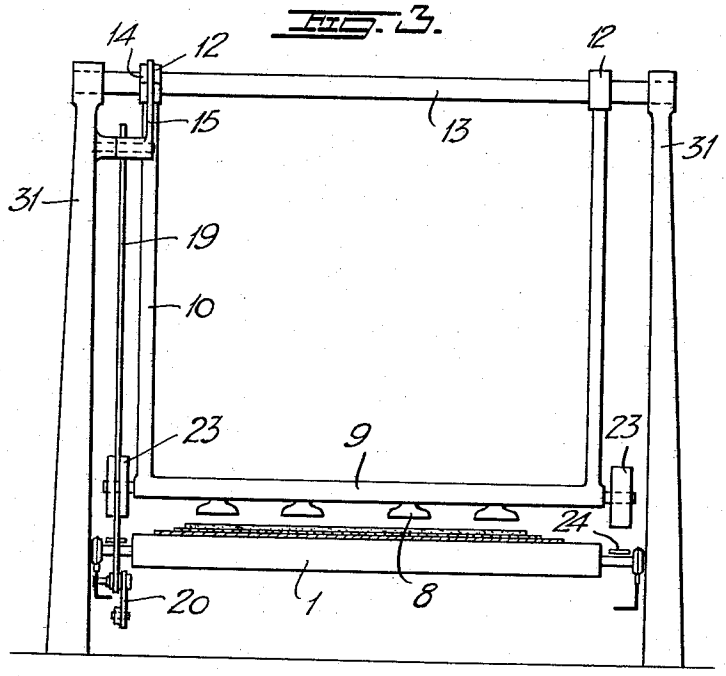
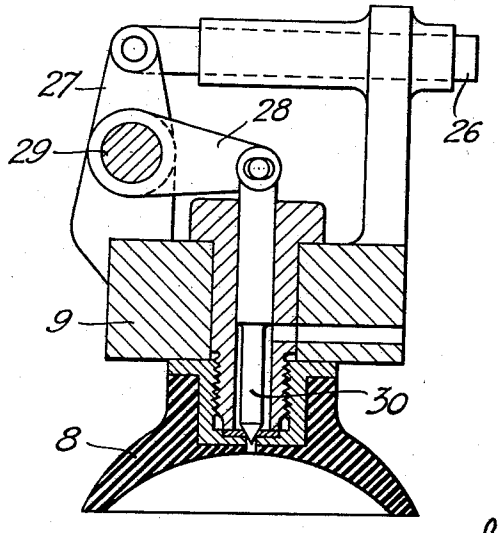


FIG. 4.



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MEANS FOR REMOVING SHEET-SHAPED ARTICLES FROM A SUPPORT

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Claims priority, application Sweden June 6, 1950

3 Claims. (Cl. 198—35)

This invention relates to a method and means for removing sheet-shaped articles, as wallboard, veneer, cardboard or the like in pieces from a support, for instance a conveying path and transferring said sheets on to another support, for instance a second conveying road.

In factories for manufacturing of wallboard, veneer, plywood or the like the transport of the sheets immediately after the pressing is accomplished on wire cloth and plates, on which the sheets are pressed. The following step of the treatment is to separate each sheet from the underlying wire cloth and plates. This is often made by hand in that the front end of the sheets is raised and transferred from the first conveying road carrying said plates on to the second conveying path. The mechanical means sometimes used for this purpose, as knives or the like, do not work satisfactorily, since the edges of the sheet are in some instances depressed into the support and flow together therewith.

One object of the invention is to provide an improved method securing a reliable and automatical removing of sheet-shaped articles from a conveying support.

Another object of the invention is to provide suction means for engaging the sheets to be removed from the support, as for instance, a conveying path said suction means adhere to the sheets by pressing against the sheet in order to raise the same from the support and transfer said sheet on to a second support or conveying path.

One embodiment of the invention for removing pressed wallboard sheets from their pressing support formed by wirecloth and press plates is shown in the accompanying drawing, wherein

Fig. 1 is a longitudinal sectional view of the arrangement immediately before the suction cups have engaged one sheet;

Fig. 2 is a similar view showing one end of the sheet in engagement with the suction cups after having been raised and transferred on to the second conveying road;

Fig. 3 is an end elevation, showing the arrangement as viewed in the direction of movement;

Fig. 4 is a longitudinal sectional view of a suction cup, showing a valve for making the suction cup ineffective.

The arrangement in Figs. 1 to 3 includes a roller conveyor **1**, on which press-plates **2** with wirecloth **3** and a wallboard sheet **4** is fed from the press, not shown. A roller conveyor **5** forms an extension of the conveyor **1** and on said conveyor **5** the plates **2** and wirecloth **3** are carried away. An oblique plate **7** is provided transversely over the path of the conveyor **5** in order to support the wallboard sheet when lifted from the wirecloth and the plate as described in the following and guide it to another roller conveyor **6** extending longitudinal with respect to said conveyors **1** and **5** at a higher level than the latter. During this operation the removed wallboard sheet **4** is positively fed forward by the trailing end portion of the sheet **4** still engaging the wirecloth **3** moved forward together with its plate **2** by the first conveyor **1** until the leading end portion of the sheet **4** is engaged by said higher conveyor **6** succeeding the movement of said removed sheet **4**, which is easily understood from Fig. 2.

According to our invention a number of suction cups **8** of rubber or the like is arranged for transferring the sheet from the conveyor **1** to the conveyor **6**, said suction cups being attached to a transverse beam **9**, said beam being fixed or linked to suspension rods **10**. In this case said connection is considered fixed. The rods **10** by means of pivots **11** are linked to levers **12** in turn fastened to a common shaft **13**, said shaft being pivotally mounted in two side frames **31** at both sides of the roller conveyor.

One of the levers **12** has a stop **14** for cooperation with a pawl **15** in order to hold the levers **12** in such a position as to keep the suction cups **8** pending freely above the conveyor **1** without touching the layer thereon.

The pawl **15** by means of the pivot **16** is rotatably mounted in the side frames **31** and is formed like a bell crank lever, which is released when the press plate **2** during its movement on the conveyor **1** abuts against a latch **17**, said latch controlling the pawl **15** through rods **18** and **19** linked together by a bell crank lever **20**. The rod **19** is slidably mounted in a member **21** of the side frame.

When the latch **17** is depressed by the press plate **2** moved in the direction *a*, the rod **19** is moved upwards bringing a dog **22** into engagement with the lower arm of the pawl **15** so as to release the levers **12**. The pawl **15** immediately returns to engaging position as soon as the dog **22** has passed said lower arm of the pawl. When the levers **12** are released the beam **9** with the suction cups **8** will fall down by its own weight causing the cups to adhere to the wallboard sheet **4** lying on the wire cloth **3** and the plate **2**. Consequently, as the sheet **4** is moved towards on the conveyor **1** the beam **9** will follow therewith, this being possible since the rods **10** are linked to the levers **12**.

The beam **9** at each end is provided with rollers **23**, Fig. 3. At the movement of the beam the rollers are guided by rails **24** bent upwards, causing an upward movement of the beam **9**. The front end of the sheet **9** pending in the suction cups will, therefore, be raised and brought forward over the plate **7**, until the beam **9** reaches a fixed abutment **25** at which time the cups are wrenched off from the sheet, said sheet falling down on the plate **7** in proceeding its movement onto the roller conveyor **6** positively fed by its trailing edge still engaging the wirecloth **3** as shown in Fig. 2.

Owing to the fact that the beam **9** is moved upwards by the rails **24** the levers **12** are also raised so high that the pawl **15** can engage the stop **14** when the beam **9** on account of its own weight is returned to its initial position after the suction cups have been disengaged from the wallboard sheet. In order to reduce wearing of the cups by the wrenching off from the wallboard sheet each cup can be provided with a release valve. In Fig. 4 the release valve comprises a needle valve **30** cooperating with a central opening in the cups **8**. The valve rod is linked to a piston **26** through a lever system **28, 27** arranged on the shaft **29** mounted on a projecting part of the beam **9**, said piston **26** being slidably mounted in another projecting part of the beam **9**. The piston is so arranged as to contact the abutment **25** on moving the beam **9**.

Thus, when the piston **26** engages the abutment **25**, said piston is moved to the left in Fig. 4. The movement is transmitted by the levers **27, 28** and the shaft **29** to all valve rods **30**, said rods being raised and permitting air to enter into the suction cups in order to release the same from the wallboard sheet. Some of or all suction cups can be provided with similar valves.

While this invention has been shown in but one form

it is obvious that it is not so limited but is susceptible of various changes and modifications without departing from the spirit and scope of the invention claimed.

Thus, the arrangement does not need to be selfacting but can be provided with suction members by which the suction action is attained by means of a vacuum pump. The vertical movement of the suction cups can also be brought out by means of separate raising members, such as magnets or the like instead of said ascending guide rails 24 in the foregoing example.

We claim:

1. A device for removing relatively rigid sheets positively moved on a conveying path and as a result of the proceeding sheet feeding movement lifting and guiding the same onto another support comprising freely oscillating arms suspended above the conveying path, suction cups on the lowermost ends of said arms, means permitting vertical movement of said arms and suction cups into engagement with the surface of the sheet to be removed and means for connecting the inner of the suction cups with the atmosphere at a given deflexion of the arms, thereby releasing the sheet.

2. A device for removing relatively rigid sheets positively moved on a conveying path and as a result of the proceeding sheet feeding movement lifting and guiding the same onto another support comprising a freely oscillating frame suspended above the conveying path, means for guiding the ascending movement of said

frame, suction cups on the lowermost cross beams of said frame, means permitting vertical movement of said frame and the suction cups into engagement with the surface of the sheet to be removed and means for connecting the inner of the suction cups with the atmosphere at a given deflexion of the frame.

3. A device for removing relatively rigid sheets especially wall board sheets from a press plate positively moved forward on a first conveying path and owing to the sheet feeding movement lifting and guiding the front end of the wall board sheet onto a second conveying road comprising a freely oscillating frame suspended above the first conveying path, suction cups on the lower cross beam of said frame, means for guiding the lower end of said frame, means actuated by the press plate for permitting a lowering of the frame and suction cups into engagement with the front margin surface of the sheet to be removed and means for connecting the inner of the suction cups with the atmosphere at a given deflexion of the frame.

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