The invention relates to sheet separating machines of the kind in which the sheets (e.g. of paper, card or metal or the like) are separated and removed one by one from the top of a pile being placed on the board at a loading station and the pile of sheets supported on a pile-board, the pile and board being elevated, as the sheets are removed, to maintain the top of the pile at a constant or approximately constant height. The sheets may be separated and removed by various mechanisms, for example, as disclosed in U.S. Patents Nos. 3,108,702 and 2,215,458 and British specification No. 489,405. In such machines it is necessary to build the pile of sheets on the board either between successive operations of the machine or, during the elevation of one board and pile, a second pile may be built on a second board beneath the first as described in British specification No. 606,524. The present invention is more particularly, but not exclusively, concerned with machines of the latter form. To assist in the building of a correctly formed and positioned pile it is necessary to provide front and side gauges against which the front and side edges of the sheets may be located during the building of the pile and the invention has for its object the provision in a sheet separating machine of the above kind of improved stacking gauges for this purpose.

The gauges are required to register the front edge and at least one side edge of the sheets and many forms of gauges have been constructed for this purpose. For example in one construction the side gauges are in the form of pillars in uncreased adjacent to the board. In another construction the side gauges are in the form of vertical bars adjusted to the board. A third construction has the front and side gauges made in the form of angle-section upright bars or the equivalent, such as a bar being provided at one and usually both front corners of the pile to receive and locate the corners of the sheets within the angle. It is necessary both that the side gauge or gauges shall be adjustable across the width of the pile (i.e., toward and away from one another when there are two side gauges) and that they shall not interfere with the elevation of the board. For the latter purpose the front corners of the board may be cut away (for example as shown in the drawings of British specifications Nos. 606,524 and 615,135) with the consequential disadvantage that except when sheets of the minimum size are being handled the front corners of the sheets are unsupported or special adjustable supporting means must be provided.

In all of these known arrangements the side gauges extend the full height of the pile to be constructed with the disadvantage that it is inconvenient or impossible to employ the gauges until the previously built pile has been elevated nearly to the limit of its travel.

The invention consists in a pile elevating mechanism for use in a sheet separating machine of the kind described and having at least one front gauge and at least one side gauge of which the side gauge is adjustable for different widths of sheets characterized in that the side gauge is arranged to seat on top of the pile board and is arranged automatically to move out of the path of the board as the board is elevated.

Preferably the side gauge is supported by means permitting vertical movement of the gauge so that the gauge may rest on the board when the latter is in any position within a range of the vertical movement of the board.

It is also preferred that the height to which the side gauge extends may be adjusted upwardly during the building of a pile whereby building may proceed during the elevation of a preceding pile without interference between the side gauge and the board of that pile.

It is further preferred that there are two side gauges allocated to the side edges of the sheets respectively and that each has the characteristic feature of the invention. Further, although a single front gauge of sufficient width to locate the front edge of the pile may be used, it is more convenient to use two front gauges adjacent to the sides of the sheets respectively and adjustable across the width of the sheets with the side gauges.

One specific example of a sheet separating machine according to the invention will now be described with reference to the drawings, in which:

Figure 1 is a perspective diagrammatic view of the machine;
Figure 2 is a plan of the machine;
Figure 3 is a view looking towards the rear of the machine;
Figure 4 is a perspective view to an enlarged scale of one of the front and side stacking gauges, and,
Figure 5 is a side view of the stacking gauge showing the side gauge in a different position.

The present example illustrates the invention as applied to the machine described and illustrated in British specification No. 606,524 and it is thought unnecessary to repeat here the description of the machine as given in that specification.
According to the present example of the invention front and side stacking gauges are incorporated in the machine in the manner about to be described.

The side gauges, in this example, are supported from the front gauges 2. The side gauges 4 are in the form of plates 1 having two slots 3 which are cut to extend upwardly and forwardly and which fit over vertically separated headed studs 4 on the side edges of the front gauges 2. There are three studs on the front gauges 2 at the pitch of the slots 3 and the arrangement is that the plates 1 may be fitted over either of the adjacent pairs of studs 4 and accordingly may be elevated as building of the pile proceeds. The slots 3 have upwardly directed extensions 6, 6 at their upper and lower ends, the extensions at the upper ends being of substantial length. The upper extensions 6 permit the plates 1 to move downwardly on the studs 4 and to rest on the pile board 7 with some latitude in the vertical position of the board 7 when the latter is, as shown, at the loading station, and the arrangement of sloping slots enables the board 7 to be elevated with the plates 1 resting thereon and in so doing to cause the plates 1, as they ride up on the studs 4, to move backwardly clear of the board, i.e. to the position shown in chain lines in Figure 4. The upward extension 6 at the lower ends of the slots 3 permit the plates 1, when moved clear of the board 7 to drop down on the studs 4 and to be retained in that position (see Figure 5).

The heads 4A of the studs, which normally rest the plates 1 in position on the studs, are shaped to co-operate with the extension 6 at the lower end of the slots 3 to permit removal of the plates 1 when the studs 4 are at the position in the slots shown in Figure 5. For this purpose the head of each stud 4 is of triangular form permitting removal of the plate 1 only when the stud 4 is in the angle between the sloping portion of the slot 3 and the lower upward extension 4 thereof.

It will be appreciated that when the pile, indicated at 8 in Figure 4, has been built up to or nearly to the level of the top of the plate 1, the plate 1 may be removed and replaced on the upper pair of studs 4 thereby permitting building of the pile 8 to continue. It will further be appreciated that the plate 1 may be placed in position on the lower studs 4 and pile building begun as soon as the preceding pile has been elevated sufficiently far to clear the top of the plate 1. Also the shape of the slots 3 ensures that the plate 1 will not interfere with the elevation of the lower pile-board and is unnecessary to shape the board 7 to clear the side gauges.

There may be more than three studs for a plate with two slots and further there may be more than two slots in each plate with an appropriate number of studs to permit adjustment of the plate. The invention includes the converse of the above arrangement, in which the studs are provided on the plate and are received within slots on or behind the front gauge.

I claim:

1. In a pile elevating mechanism for use in elevating a pile of sheets to a sheet separating machine having means for removing the sheets from the top of the pile, which mechanism includes a pile-board for supporting the pile of sheets and means for elevating the pile-board with a pile of sheets thereon through a vertical path upwardly from a pile-loading station; an upwardly extending side gauge for locating the side edges of the sheets on the pile-board, said side stacking gauge seating on the pile-board when the board is at the loading station, a fixed support outside the path of the pile-board, and means attaching the side gauge to the support and holding the side gauge in its upright attitude, which means permit upward movement of the side gauge with the pile-board and constrains the side gauge during such upward movement bodily to move laterally out of the path of the pile-board.

2. A pile elevating mechanism as claimed in claim 1 in which the means attaching the side gauge to the support comprise cooperating studs and slots on the gauge and the support, the slots sloping upwardly and laterally of the path of the pile-board and fitting over the studs to provide guide means constraining the gauge to move upwardly and laterally out of the path of the pile-board as aforesaid.

3. A pile elevating mechanism as claimed in claim 1 in which the fixed support aforesaid also constitutes a front stacking gauge adjacent the front edge of the pile-board for locating the front edges of the sheets on the board.

4. A pile elevating mechanism as claimed in claim 1 in which the fixed support aforesaid also constitutes a vertical degree of initial upward movement of the side gauge in the path of the pile-board without lateral movement.

5. A pile elevating mechanism as claimed in claim 1 in which the means attaching the side gauge to the fixed support provide an adjustment by which the side gauge may be adjusted upwardly with respect to the pile-board during the building of the pile.

6. In a pile elevating mechanism for use in elevating a pile of sheets to a sheet separating machine, which mechanism includes a pile-board and means for elevating it with a pile of sheets thereon; an upwardly extending front stacking gauge for locating the front edges of the sheets on the pile-board, a vertically extending plate arranged to seat at its lower edge on the pile-board and constitute a side gauge for locating the side edges of the sheets on the pile-board, and at least two studs on the side of the front gauge received within slots in the plate, the slots extending upwardly and forwardly thereby to constitute supporting and guide means which permit the plate to move upwardly with the pile-board as the board is raised and also constrain the plate to move forwardly out of the path of the board.

7. A pile elevating mechanism as claimed in claim 6 in which the plates have portions at their lower ends which extend vertically.

8. A pile elevating mechanism as claimed in claim 6 in which the plate may be elevated with respect to the front gauge by changing the particular slots and studs in engagement whereby the plate may be elevated independently of the pile-board.

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