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 [33] **Germany**
 [31] **P 17 61 468.5**

[56]

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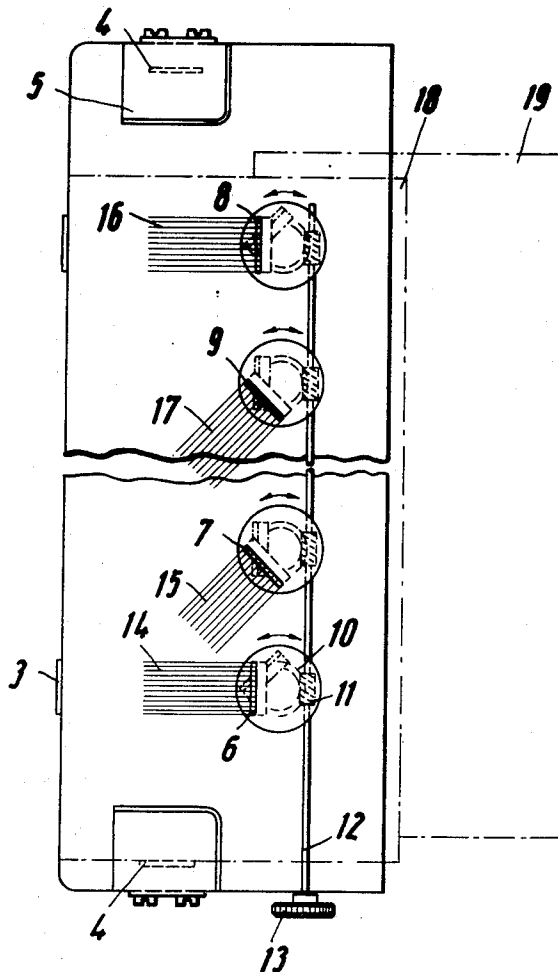
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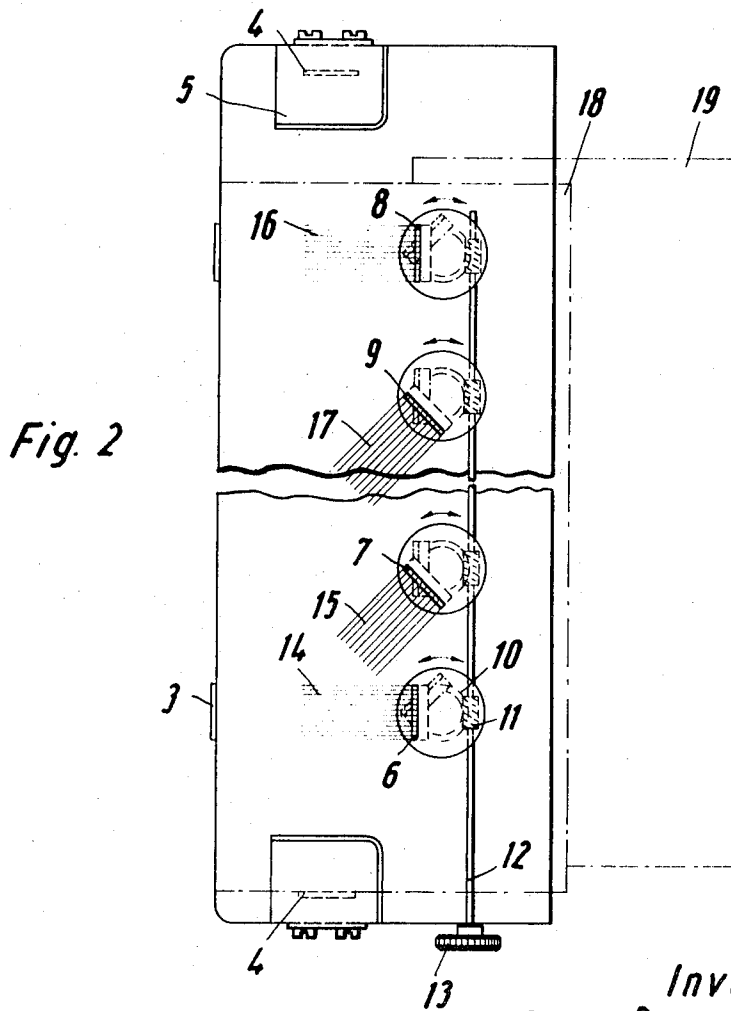
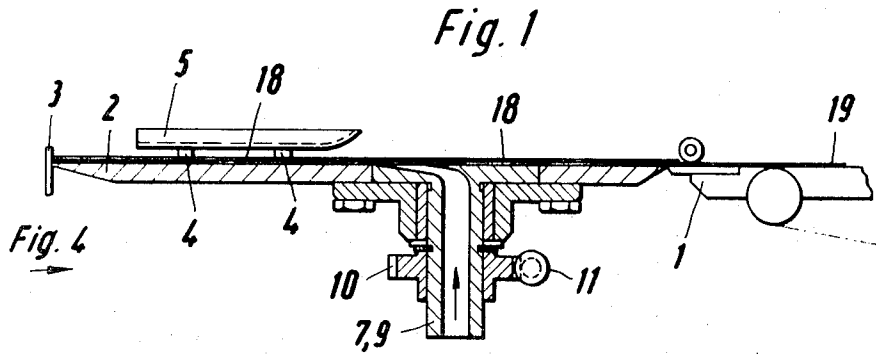
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[54] **SHEET-CONVEYING DEVICE**
4 Claims, 4 Drawing Figs.

[52] U.S. Cl. 271/74,
 271/48, 271/58
 [51] Int. Cl. B65h 29/24
 [50] Field of Search. 271/48, 49,
 50, 58-60, 74

ABSTRACT: A conveying device for conveying sheets of cardboard, paper, or synthetic plastic foil upon a table of a sheet processing machine and into abutment with front and/or side stops on the table effects correct location of the sheets with respect to the stops by airflows directed upon the sheets from below. These airflows constitute moving air cushions supporting and conveying the sheets toward the stops and retaining the sheets in abutment therewith.





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Fig. 3

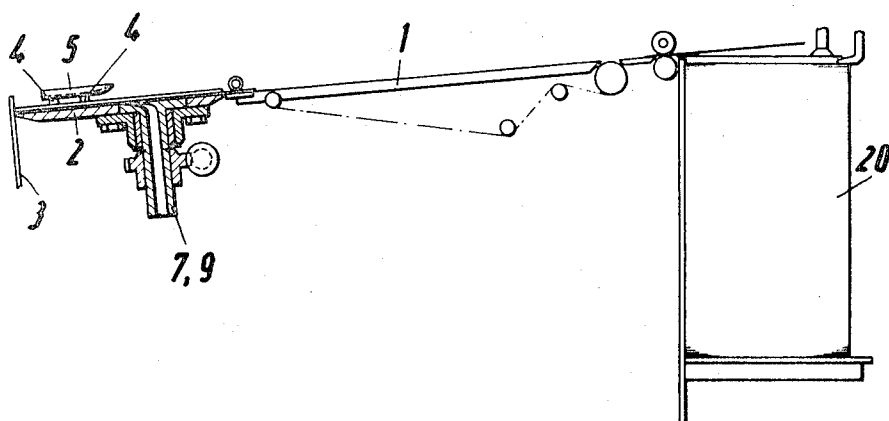
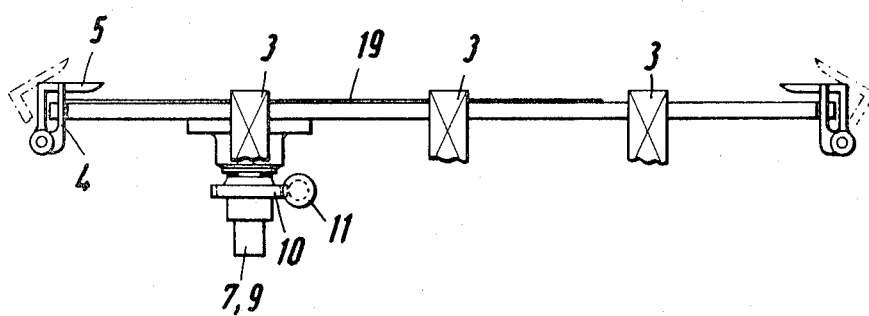


Fig. 4



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SHEET-CONVEYING DEVICE

The invention relates to a conveying device for sheets made of cardboard, paper, synthetic plastic foils, etc., for moving said sheets either following each other or in overlapped or shingled arrangement, and more particularly, to a conveying device for moving the sheets into abutment with stops on a table of a sheet-processing machine.

BACKGROUND

There are known sheet-conveying means of the general kind above referred to in which the sheets are moved by conveyor bands, rollers or grippers, or by means of pneumatic bands and suction means toward and into engagement with front stops on the table and are pushed or pulled by means of rails, rollers, grippers or other mechanical means toward the side stops on the table and located in registry therewith.

To obtain clean and fully acceptable prints it is essential that the sheets are not only placed exactly in registry with both the front stops and the side stops, but that they also remain correctly located until transferred to the printing press proper.

The very high operational speed of modern printing presses and the resulting reduction in size of all the cylinders of the press entails that only a very short period of time can be allocated for the required sheet-locating operations. It has been attempted to overcome the resulting problem by reducing the initially high speed of the sheet movement by special delay means just before the sheets reach the stops so that they engage the stops with a comparatively soft impact. However, it has been found that in spite of a reduction of the speed of the final sheet movement, there is a tendency of the sheets to bounce back from the stops.

The problem of correctly locating the sheets is not only present at the front stops which are engaged by the leading edge of the sheets, that is, by head-on collision, but also at the side stops due to the tremendously high operational speeds of modern printing presses. Obviously, a high operational speed of the press is desirable as it produces a correspondingly increased output per unit of time.

Another disadvantage of special sheet-retarding means is that such means substantially increase the overall costs of the installation. They also require additional servicing and difficult assembly. The overall costs are further increased when special retarding means must be provided for the side stops also.

THE INVENTION

It is a broad object of the invention to provide a novel and improved sheet-conveying device of the general kind above referred to which conveys the sheets gently into engagement with the front and/or side stops and retains the sheets in such engagement until they are transferred to the printing press proper.

SUMMARY OF THE INVENTION

The aforepointed out object, feature and advantage, and other objects, features and advantages which will be pointed out hereinafter, are obtained by directing flows of pressure air upon the sheets from below during the last part of the movement of the sheets toward the stops. These airflows constitute in effect air cushions upon which the sheets float toward the stops without harsh impact therewith. The airflows also retain the sheets in position as the moving action thereof is continuing.

The invention also provides that the direction of the airflow with respect to the locations of the stops is adjustable by means of varying the angular positions of the nozzles from which the airflows emanate, either singly or jointly.

DESCRIPTION OF A PREFERRED EMBODIMENT

In the accompanying drawing, a preferred embodiment of the invention is shown by way of illustration and not by way of limitation.

In the drawing:

FIG. 1 is an elevational diagrammatic sectional view of a sheet-conveying device according to the invention;

FIG. 2 is a plan view of FIG. 1;

FIG. 3 is a diagrammatic elevational view, partly in section showing movements of sheets from a stack of sheets to the conveying device; and

FIG. 4 is an edge view seen in the direction of an arrow in FIG. 1.

Referring now to the figures more in detail, FIG. 3 shows a sheet stack table assembly 20, which should be visualized as being equipped with conventional means for lifting and lowering the stack, and also with a suction head for supplying sheets 18, 19 to a sheet table 1 in a conventional fashion. This sheet table coacts with the sheet-conveying device according to the invention which comprises a table 2 on which front stops 3 and side stops 4 are mounted, either rigidly or movably. Side stops 4 are preferably provided with a guide such as a guide 5 made of sheet metal to assure that sheets such as sheet 19 are guided toward the front stops.

Table 2 has fitted therein two or more nozzle assemblies, four nozzle assemblies 6, 7, 8 and 9 being shown by way of example. The airflows emanating from the nozzle assemblies are directed toward front stops 3 and if desired also toward side stops 4.

The nozzle assemblies should be visualized as being of conventional design and connected to suitable pressure air conduits (not shown). They are preferably rotatably mounted within the table so that the angular positions of the nozzle assemblies can be adjusted. Adjustment can be effected for each nozzle assembly individually, or all or some of the nozzle assemblies can be ganged for joint adjustment.

Suitable adjustment means can be readily visualized. There is shown by way of example a common shaft 12 which via a gear 10 and a worm 11 is coupled to each of the four nozzle assemblies. A hand wheel 13 serves to turn the shaft and thus the nozzle assemblies as desired. The hand wheel is advantageously so placed that the nozzle assemblies can be adjusted when and while they are in operation.

The exits of the nozzle assemblies are preferably so arranged that air emanates from each nozzle assembly in the manner of an air sheet, as it is indicated at 14, 15, 16 and 17. As is evident, the nozzle assemblies may be disposed in one or more rows and such rows may be parallel to each other.

The operation of the conveying device as hereinbefore described is as follows:

Sheets are conveyed either one after the other or in overlapping or shingled arrangement by suitable and conventional conveying means toward front stops 3. As a sheet such as sheet 18 comes within the range of airflows 14, 15, 16 and 17, it is carried by these airflows in the manner of moving air cushions toward the front stops 3 and also toward abutment with side stops 4. The continuing moving action of the airflows maintains the sheets in abutment with the stops until the sheets are gripped by gripping means of the printing press.

What is claimed is:

1. A conveying device for sheets of cardboard, paper or synthetic plastic foils for moving sheets into abutment with sheet stops on a table of a printing press, and said device comprising in combination:

a table having stationarily mounted thereon front stops and side stops for respectively lengthwise and sidewise locating sheets fed upon the top surface of the table and conveyed thereon toward the stops;

nozzle means rotatably mounted in said table substantially flush with the top surface thereof and disposed anteriorly of said stops as seen in the direction of conveyance of the sheets, said nozzle means being oriented to direct airflows substantially parallel to the plane of the table surface and toward the front stops and the side stops for floatingly conveying sheets along the table surface into engagement with said front stops and side stops and retaining the sheets in said engagement;

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setting means including rotating drive means for selectively rotating said nozzle means to vary the directional orientation of the nozzle means and thus of airflows emanating therefrom relative to the stops; and

actuating means disposed spaced apart from said table and including linkage means coupled with said drive means for operating the latter when and while sheets are being conveyed without interference with the conveyance of the sheets.

2. The conveying device according to claim 1, wherein said nozzle means include a plurality of nozzle exits included in the

table surface and aligned for producing sheetlike airflows substantially parallel to the plane of sheets on sheet-like table.

3. The conveying device according to claim 1, wherein said nozzle means comprise a plurality of spaced-apart nozzles disposed crosswise of the width of the table surface.

4. The conveying device according to claim 3, wherein at least some of said nozzles are ganged, and wherein said setting means are operatively connected to said ganged nozzles for jointly turning the same.

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