Sept. 16, 1969 G. MEYER-JAGENBERG 3,466,983

METHOD OF AND APPARATUS FOR INSERTING MARKING STRIPS INTO STACKS OF SHEETS

Filed Sept. 8, 1965

Fig. 1

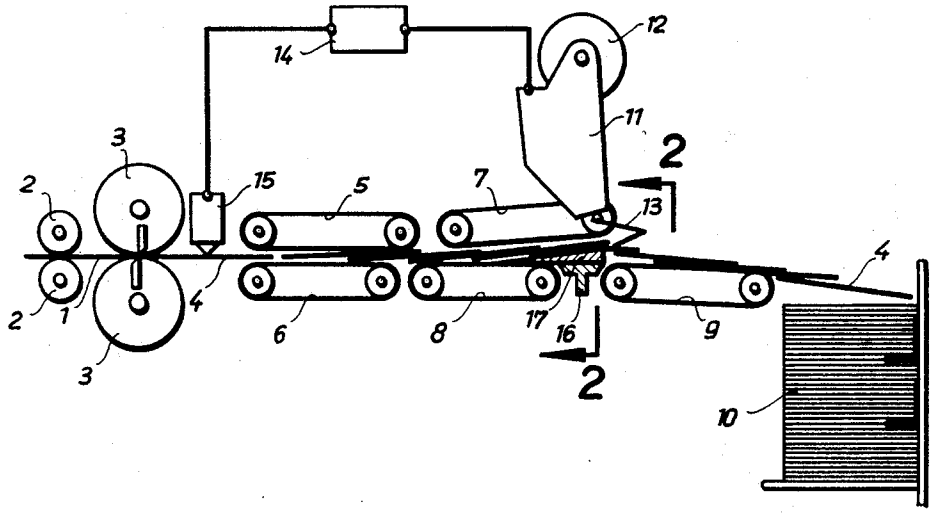


Fig. 2

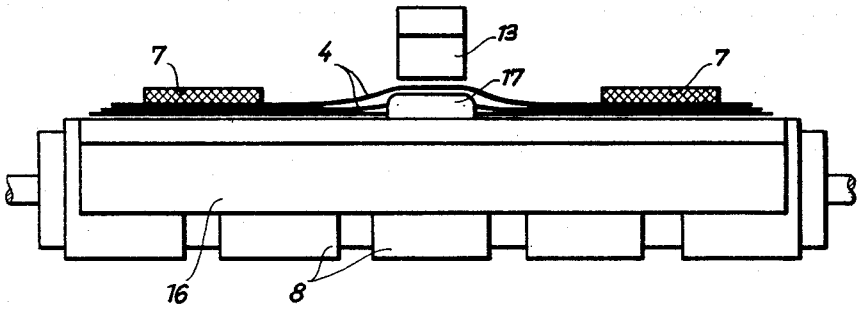


Fig. 3

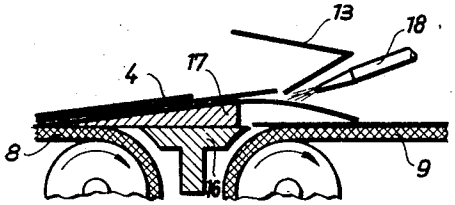
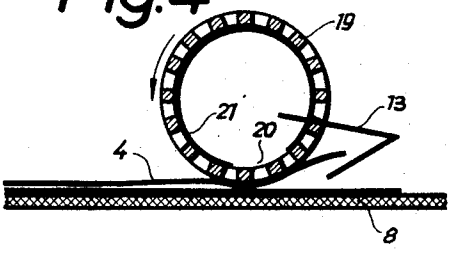


Fig. 4



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METHOD OF AND APPARATUS FOR INSERTING MARKING STRIPS INTO STACKS OF SHEETS

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Int. Cl. B65h 33/00, 5/08, 29/24
U.S. Cl. 93—93 8 Claims

ABSTRACT OF THE DISCLOSURE

The invention relates to a method and apparatus for inserting marking strips into sheets or packets of sheets coming from paper or sheet cutting machines and includes the conveying of the cut sheets in overlapped condition along a path of movement, during such conveying momentarily deflecting and lifting the leading edge of a selected sheet out of its path of movement, while so deflected inserting from above a V-shaped marking strip with its free edges facing the line of movement so that the lifted leading edge enters the gap between such free edges, engages the marking strip and carries the same along in continued movement of the strip and after insertion restoring the conveyed cut sheets to their original path of movement. The deflection and upward lifting of the leading edge of a selected sheet is effected at the central region of such sheet while the balance of the sheet is constrained to follow the original line of movement and may be effected by use of a tapered guide, a jet of compressed air directed toward the oncoming sheets, the combination of both of these measures or by using two laterally spaced suction rolls which lift up the central portion of a leading edge to provide a gap to receive a marking strip.

This invention relates to a method of and apparatus for inserting marking strips into stacks of sheets delivered from transverse cutters and similar paper processing machines ejecting sheets.

In this particular field it is known in the case of transverse cutters to insert marking strips in the area of the advance movement of the sheets toward the stack to be produced in such a fashion that following the stacking of the sheets an end portion of the marking strip projects or extends beyond an edge of the stack. The marking strips are inserted automatically following a run of a predetermined number of sheets whereby the complete stack is sub-divided or separated in a readily discernable manner such as by reams. It has been ascertained that the insertion of flat marking strips into stacks is not entirely satisfactory since there is the possibility of such strips shifting their position so that the strips are not visible.

For the above mentioned reason it has become the practice to employ V-shaped marking strips which are grasped by the forward edge of the sheet to be marked while the same is moving forward in the direction of the stack and thereby moved along with the sheet. Such a configuration of the marking strip ensures the proper positioning of the strip and, as a consequence, gives a definite and apparent marking of the number of sheets in the stack. However, by virtue of the high operating speeds employed in such machinery, there is the danger that thin and delicate paper sheets may be damaged by the grasping and carrying along of the V-shaped marking strips.

The deposition of the sheets on the stack at such high operating speeds also presents problems and it has been customary to retard the sheet movement by an increasing overlapping of the same viewed in the direction of the stack thereby assuring a substantially trouble-free deposition of the sheets. To avoid the above referred to damage to the forward edge of the sheet by the V-shaped strip, it has oeen found desirable to move the marking strips into the sheet run when the forward speed thereof has been reduced substantially in proximity to the stack of sheets. In connection with such an operating procedure, it is a prerequisite that means be provided for the angled end of the V-shaped strip to engage properly the forward edge of the overlapped moving sheet which is to be marked.

To overcome these difficulties is a salient object of the present invention and generally comprises the concept of "fanning" or displacing the forwardly moving overlapped sheets or packs of sheets momentarily upwardly from their normal straight line movement and following the insertion of the marking strip returning the sheets to their initial direction of movement.

By reason of the invention, at the lowered forward speed of the sheets, the marking strip is grasped in the zone of the upward "fanning" or displacement by the forward edge of the sheet to be marked and after the sheet has been returned to its initial travel path, the strip is held firmly by its angled end by two superimposed sheets. The upward "fanning" or displacement of the sheets is achieved by the end of the sheet facing the direction of movement being raised from the upper face of the preceding sheet only for a portion of the extent of its width so that merely an area of the sheet sufficient for the insertion of a marking strip is elevated with the remaining and much larger area of the forward end of the sheet remaining in its initial direction of movement.

In order to effect the momentary upward "fanning" or displacement of the sheets there is provided in the zone of the conveying means moving the overlapped sheets or packs of sheets at least one deflecting device which may be mechanical and/or pneumatic. It has been found advantageous to locate a deflecting device between two conveyor belts or equivalent means which hold down the edges of the sheets or packs of sheets and the deflecting device which is located substantially in the middle of the path of movement of the sheets is defined by at least one guide shoe, preferably wedge-shaped, which extends into the path of movement of the sheets. Moreover, the "fanning" or displacement in an upward direction of the sheets may be effected by one or more compressed air nozzles located above the path of movement of the sheets and, in the case of certain types of papers which have a tendency to cling or adhere together, it may be advisable to allow a mechanical deflecting means constituted by a guide to cooperate with a compressed air nozzle.

It is further possible to realize the desired deflection of the sheets from their normal path of movement by the utilization of one or more suction type rollers mounted a short distance above the path of movement of the sheets with the roller or rollers being driven in dependence upon the speed of movement of the sheets.

Additional objects and advantages of the invention will become more readily apparent to those skilled in the art from the following detailed description and annexed drawings, in which drawings:

FIGURE 1 is a diagrammatic view illustrating a preferred embodiment of the invention,

FIGURE 2 is a view taken along the line 2—2 of FIGURE 1, the view looking in the direction of the arrows and being on an enlarged scale,

FIGURE 3 is a fragmentary view partly in elevation and partly in cross section on an enlarged scale illus-

trating the manner in which the sheet is "fanned" or displaced upwardly respecting the initial path of movement in the zone of the means for inserting the marking strip, and

FIGURE 4 is a fragmentary view on an enlarged scale of a further embodiment for "fanning" or displacing the sheet upwardly.

As shown in FIGURE 1, a paper web **1** originating from a supply roll (not shown) is fed or moved forwardly by upper and lower feed rollers **2** to a transverse cutting mechanism **3** which sub-divides the web into individual sheets **4**. The sheets **4** are overlapped and their speed of movement is retarded in a known manner by means of the coaction of upper and lower endless conveyor belts **5** and **6** and **7** and **8**, respectively. After the overlapped sheets leave the conveyor belts **7** and **8** they are moved by an additional conveyor belt **9** to a stack holder **10**.

A marking strip inserting means **11** is located above the path of movement of the sheets at a point between the conveyor belts **7** and **8** and the conveyor **9** and the marking strip to be inserted emanates from a supply roll **12** with the inserting means **11** being such as to cut off the requisite length of strip and fold the same into a substantially V-shape and move the V-shaped strip into proper position. The actuation of the aforementioned inserting operation is effected by means of a counter mechanism **14** which is operably connected to a scanning head **15** and to the inserting means **11**. The scanning head **15** is disposed above the path of movement of the sheets **4** intermediate the transverse cutting mechanism **3** and the endless belts **5** and **6**. The actuation of the strip inserting means is achieved by the counter **14** which, following a specified number of input impulses of the scanning head **15**, initiates an output impulse for the operation of the inserting means **11**.

As shown in FIGURES 1 and 2, there is provided in the area of the inserting means **11** between the lower conveyor belts **8** and the conveyor **9** an intermediate member **16** which extends transversely of the belts and which is approximately T-shaped in cross section. The member **16** supports a guide shoe **17** and, as best illustrated in FIGURE 2, the shoe **17** is located in substantially the middle of the path of movement of the sheets **4**. The shoe **17** is wedge-shaped and the forward or tapered portion thereof extends over the upper flight of each of the belts **8** and the shoe functions to deflect momentarily the overlapped forwardly moving sheets **4** from their direction of movement upwardly in such a fashion that the forward edge of the sheet is elevated away from the upper face of the preceding sheet. It will be seen that there is thus produced a gap into which is inserted the angled end portion of a marking strip **13** supplied by the inserting means **11** and such strip is grasped or engaged by the front edge of the sheet to be marked and carried along by such sheet.

By virtue of the fact that the shoe **17** is located at the middle of the path of movement of the sheets the upward displacement of the sheet is effected solely in the middle area thereof with the side edges of the sheet being held down by the endless belts **7**, as is clearly disclosed in FIGURE 2. By virtue of the aforementioned arrangement, an unnecessary wide upward displacement of the sheet **4** is avoided and a quick removal or closing of the gap produced by such upward displacement is accomplished thus providing the secure positioning of the strip **13**.

In the event that thin papers which have a tendency to cling together are being processed, it may be necessary to support the "fanning" or upward displacement by means of compressed air and such an arrangement is shown in FIGURE 3. More specifically, a compressed air nozzle **18** is located substantially opposite the path of movement of the sheets **4** and the nozzle is located above the path of the sheets immediately to the rear of the guide shoe **17**.

FIGURE 4 illustrates still a further embodiment of the invention in which the deflection upwardly of a sheet is achieved by two suction rollers **19** mounted a short distance above the path of movement of the sheets and between which the feeding and inserting of the marking strips **13** is effected. The suction rollers **19** which rotate at the feeding speed of the sheets **4** are provided with a perforated wall which encloses a fixed or stationary ring **21** having a slot **20** therein. The width and location of the slot **20** are so selected that the pressure existing within the rollers **19** only becomes effective in the area or zone of deflection.

The invention is not to be confined to any strict conformity to the showings in the drawings but changes or modifications may be made therein so long as such changes or modifications mark no material departure from the spirit and scope of the appended claims.

What is claimed is:

1. A method for inserting marking strips into stacks of sheets delivered from high speed transverse cutters and other machines ejecting sheets to avoid damaging the leading edges of the sheets, comprising the steps of feeding sheets to form a flow-line of overlapped sheets, moving such overlapped sheets forwardly in a substantially straight line, momentarily fanning and lifting the leading edges of the sheets upwardly from the initial direction of movement, positioning a V-shaped marking strip forwardly of the upwardly fanned and lifted edge of a selected sheet whereby such edge of such sheet grasps the V-shaped marking strip, and thereafter restoring the sheets including such sheet together with the V-shaped marking strip into the initial straight line of movement.

2. The method for inserting marking strips into stacks of sheets as claimed in claim **1** in which the leading edges of the sheets are momentarily fanned upwardly only in the middle portion thereof.

3. The method for inserting marking strips into stacks of sheets as claimed in claim **1** including the step of directing compressed air in a direction opposite to the direction of feed and below the forward edge of such selected sheet while it is momentarily fanned upwardly.

4. An apparatus for inserting marking strips into stacks of sheets emanating from high speed transverse cutters and other machines ejecting sheets to avoid damaging the leading edges of the sheets, comprising means for overlapping moving overlapped sheets along a substantially straight line, means for selectively positioning a V-shaped marking strip into the line of movement of the sheets with the free edges facing such line of movement, means forwardly of the so positioned marking strip for momentarily deflecting sheets in an upward direction from their straight line movement whereby the forward edge of a selected and deflected sheet enters the gap between the free edges of the V-shaped marking strip and carries such strip along with such sheet upon further movement of the sheets.

5. An apparatus for inserting marking strips into stacks of sheets emanating from high speed cross cutters and other machines ejecting sheets to avoid damaging the leading edges of the sheets, comprising endless belts for associating and moving the sheets in overlapped condition, a deflecting means located between the endless belts for displacing sheets upwardly from the line of movement of the sheets, means for selectively positioning a V-shaped marking strip in advance of the deflecting means whereby the forward edge of an upwardly deflected and selected sheet engages the marking strip and carries the strip along therewith upon further movement of such sheet, and said deflecting means being located at a position to deflect substantially the mid portion of the sheets so that only such mid portion of the sheets is deflected upwardly with the endless belts holding down the side edges of the sheets.

6. The apparatus as claimed in claim 5 in which said deflecting means comprises a wedge-shaped shoe located to deflect the mid portion of the fed sheets.

7. The apparatus as claimed in claim 5 in which said deflecting means includes at least one compressed air nozzle directed against the line of movement of such sheets.

8. An apparatus for inserting marking strips into stacks of sheets emanating from cross cutters and other machines ejecting sheets, comprising endless belt means for associating and moving the sheets in overlapped condition, a deflecting means located between the endless belts for displacing sheets upwardly from the line of movement of the sheets, means for selectively positioning a V-shaped marking strip in advance of the deflecting means with the free edges of such strip facing the oncoming sheets whereby the forward edge of an upwardly deflected and selected sheet engages the marking strip and carries the strip along therewith upon further movement of such sheet, said deflecting means being located at a position to deflect substantially the mid portion of the sheets so that only such mid portion of at least a selected sheet is deflected upwardly with the endless belt means holding down the side edges of the sheets and said deflecting means comprising at least one suction roller driven in correspondence to the speed of movement of the sheets.

References Cited

UNITED STATES PATENTS

2,261,972	11/1941	Matthews	271—74
3,025,052	3/1962	Gutteling	271—12 X
3,203,326	8/1965	Obenshain	93—93.3
3,205,739	9/1965	Jagenberg	93—93.1
3,205,794	9/1965	Califano	93—93.3
2,127,736	8/1938	Jirousek	271—31
2,973,697	3/1961	Lerner.	
1,867,038	7/1932	Upham	156—510

FOREIGN PATENTS

907,653	3/1954	Germany.
697,537	9/1953	Great Britain.

OTHER REFERENCES

Auyang, R. P.: IBM Technical Disclosure Bulletin, vol. 3, No. 12, p. 6, May 1961.

WAYNE A. MORSE, JR., Primary Examiner

U.S. Cl. X.R.

271—12, 74