Oct. 11, 1966 R. ECKL 3,278,178

MEANS FOR DEPOSITING CONTINUOUS SETS OF FORMS

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Fig. 1

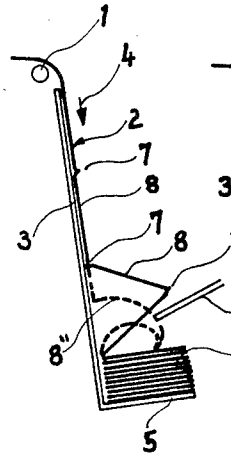


Fig. 2

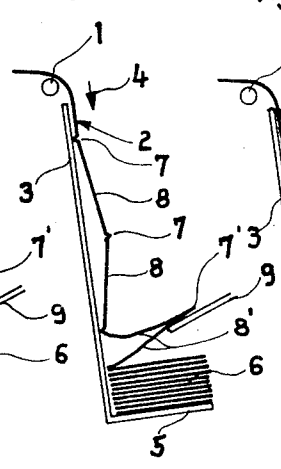


Fig. 3

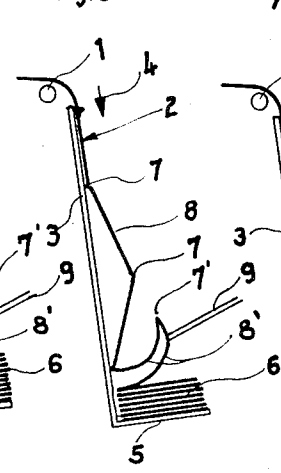
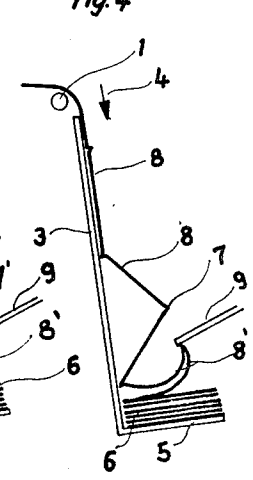


Fig. 4



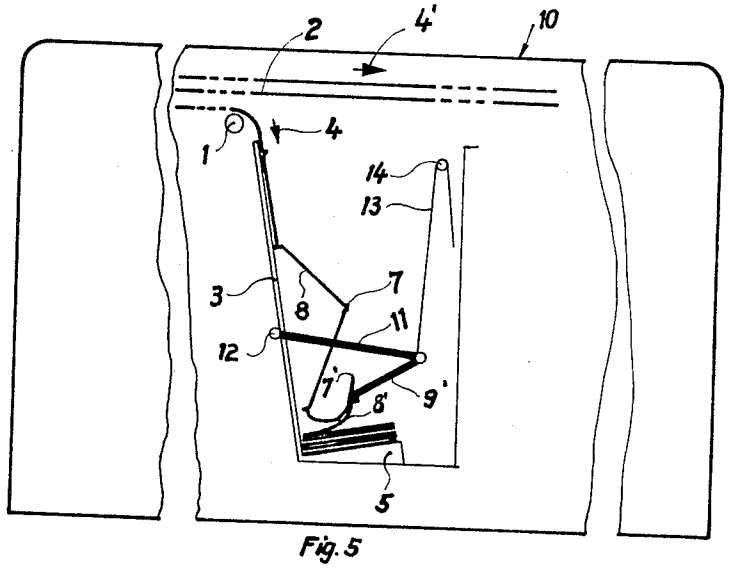


Fig. 5

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MEANS FOR DEPOSITING CONTINUOUS SETS OF FORMS

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5 Claims. (Cl. 270—61)

The invention relates to means for depositing one or more strips of paper or the like in the form of a zig-zag pile by reason of their impressed folded edges, the means comprising conveying means for feeding the strip, and a support on which the pile is deposited. Means of this kind are used particularly in apparatus for separating continuous sets of forms, in which the individual strips of forms fed downwardly are deposited in known manner in zig-zag form corresponding to the folding edges.

In one known device of this kind, the continuous strip arriving in the downward direction is guided between two guide forks or chains to the pile resting on the support. In one alternate known device, the strip is led along a guide wall extending at a small angle to the perpendicular and followed at its lower end by a plate or similar support for the pile.

The known devices of this kind have, however, a number of disadvantages, the chief disadvantage being that they are unable to produce a uniform, straight zig-zag pile in the case of thin or soft paper being used, as is the case with sets of forms comprising a substantial number of carbon copies. In this case, the part near the edges of the strip section changing from the vertical position to the horizontal position to be deposited on the pile, moves down more quickly than does the middle of the sheet when the strip is finally folded laterally at a position above the support. The descending sections of the strip arch upwardly in the middle and roll inwards. The folding edges of the upwardly arched portion are thus pressed down on to the top of the pile and discontinue moving or, by reason of the friction of the paper, fail to move outwards in the direction of the edge of the pile at a sufficient speed with simultaneous removal of the convexity. The formation of a uniform, straight pile thus becomes absolutely impossible. Such undesirable phenomena occur both in dependence upon the thickness of the paper and at specific speeds.

It is, however, equally impossible to effect delivery in the form of zig-zag piles simply at the particular speeds at which it can be carried out, without too much difficulty. The speed of delivery has to be highly variable for the reason that the operating speed, particularly in known separating apparatus, depends largely upon the output of other units coupled to the machine, and particularly upon the output of the subsequent cutting machine, and generally varies to a substantial extent, since moreover different kinds of paper have different properties with respect to their delivery, which propertes moveover change with changing speeds.

It is therefore an object of the invention to remove the disadvantages hereinbefore referred to, and to provide a simple and cheap device by which paper of widely varying kinds may be deposited smoothly at any speeds desired.

The invention consists essentially in the provision of at least one stop which, at a position above the pile, projects from one side in the direction of the middle of the pile into the gone of the folding edges which are finally folded laterally. One folded side of the sections of the endless strip lowered on to the pile is thus already intercepted above the pile. Instead of arching upwardly, the sections sag downwardly and, with their folding edge sliding along the stop, roll off on to the pile. Surprisingly, it has been found that by the simple means provided in accordance with the invention, it is ensured that even very soft paper s delivered efficiently, smoothly and uniformly to produce a zig-zag pile at both low and high speeds.

The construction of the stop according to the invention is advantageously such as to enable it to be moved from one side in the direction of the middle of the pile, so that it is suitable for strip sections of various lengths. Where sections of a given length are folded, the transverse adjustment of the stop is not critical. It is sufficient for the stop to project from one side into the zone of the folding edges folded finally on one side, and to be contacted thereby as they drop on to the pile.

In accordance with the invention furthermore, the changing height of the pile during the period of delivery is allowed for by providing the stop of a vertically adjustable construction. The end of the stop contacted by the strip of paper may advantageously be bevelled or rounded, so that the strip sections dropping on to it may readily slide off In accordance with the invention, moreover, the upper side of the stop may be inclined at an angle inwardly in the direction of the middle of the pile, so that sagging of the paper sections intercepted by the stop is facilitated, and the reliability of the device is increased. In one advantageous construction according to the invention, the stop may be formed by a plate extending at an angle inwardly which at the end adjacent the strip of paper may be bevelled or rounded. The stop may, however, also be provided in the form of a rod which extends parallel to the edge of the pile.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:

FIGURES 1 to 4 show four moments in the depositing operation following each other in quick succession, in the device according to the invention, and

FIGURE 5 shows by way of example the application of the invention in separating apparatus.

As illustrated in FIGURES 1 to 4, a continuous strip **2** of paper or the like is fed by a guide pulley **1** along a guide wall **3** in the direction of the arrow **4** downwards to a support **5** on which a pile **6** is deposited. The guide wall **3** is slightly inclined to the perpendicular in order to facilitate contact between the strip **2** and the guide wall **3**. The support **5** may also be inclined at a corresponding angle, so that the wall **3** may serve at the same time as a support for one side of the pile. In the case of paper of an adequate stiffness, and in the case of an adequate speed being used, a zig-zag pile **6** is produced by folding of the folding edges **7'**, as the strip which is sub-divided into individual strip sections **8** by the folding edges **7**, moves downwards. Where however thin or soft paper is used, the strip sections **8''** lowered on to the zig-zag pile **6**, arch upwardly and roll inwardly as indicated by the dotted lines in FIGURE 1.

The descending folding edges **7'** are intercepted by a stop **9** which projects into the zone of the folding edges **7'** which are finally being folded laterally. The strip sections **8'** adjoining the folding edges **8'** thus sag downwards (FIGURES 2 and 3) and finally, sliding along the stop **9**, roll off on to the pile **6**.

FIGURE 5 shows a section of separating apparatus **10** to which a series of continuous strips **2** of forms are fed, one of the strips, in the illustrated construction, being guided downwardly by a guide pulley **1** in the direction of the arrow **4** to the supporting device **5**. In this construction, the stop **9** illustrated in FIGURES 1 to 4 is replaced by a metal plate **9'** which extends at an angle from the edge to the middle of the pile **6** in the manner hereinbefore described. The sides of the deflecting plate **9'** are linked by stays **11** to the wall **3** at the position **12**, it

being possible for the level of the deflecting plate 9' above the pile to be adjusted by means of a rope 13 which runs over a guide pulley 14.

It will be understood that the basic idea of the invention, namely that of providing a stop by which the strip sections lowered on to the pile are intercepted in the zone of their folding edges, and thus deposited in an orderly way on the pile without the undesirable upward arching previously experienced, is not limited to the illustrated construction. Thus, for example, in apparatus not provided with the guide wall shown in the drawings, in which apparatus the strip is fed downwards either unsupported or between forks and chains, a corresponding stop may be provided above the pile on the opposite side thereof which in the illustrated constructions bears against the wall 3.

What is claimed:

1. In a device for depositing a continuous strip of flexible material preformed with fold lines at spaced locations along the strip in a stack of zigzag arrangement, the improvement which comprises a receiving platform for said stack, an upright guide along one side of said platform for directing said strip toward said platform and onto the previously formed portions of the stack while said strip folds from side to side in zigzag configuration along said fold lines to produce alternate fold edges lying along said guide means and remote from said guide means respectively, and stop means above said platform and projecting into the path of the fold edges of the strip remote from said guide means for deflecting them upwardly as the folds are deposited on said stack.

2. The improvement defined in claim 1 wherein said stop means is a member supported out of the path of the folds opposite said guide means and has a rounded surface in said path of said fold edges remote from said guide means, said stop means further comprising adjusting means for shifting the rounded surface of said member in vertical direction with respect to said platform.

3. The improvement defined in claim 2 wherein said adjusting means is so constructed and arranged as to permit displacement of the rounded surface of said member toward and away from said guide means.

4. The improvement defined in claim 3 wherein said member is a rod and said adjusting means includes a pair of articulated arms secured to said rod at opposite ends thereof.

5. The improvement defined in claim 1 wherein said stop means includes a plate inclined downwardly and inwardly toward said platform in the direction of stacking of the folds.

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