

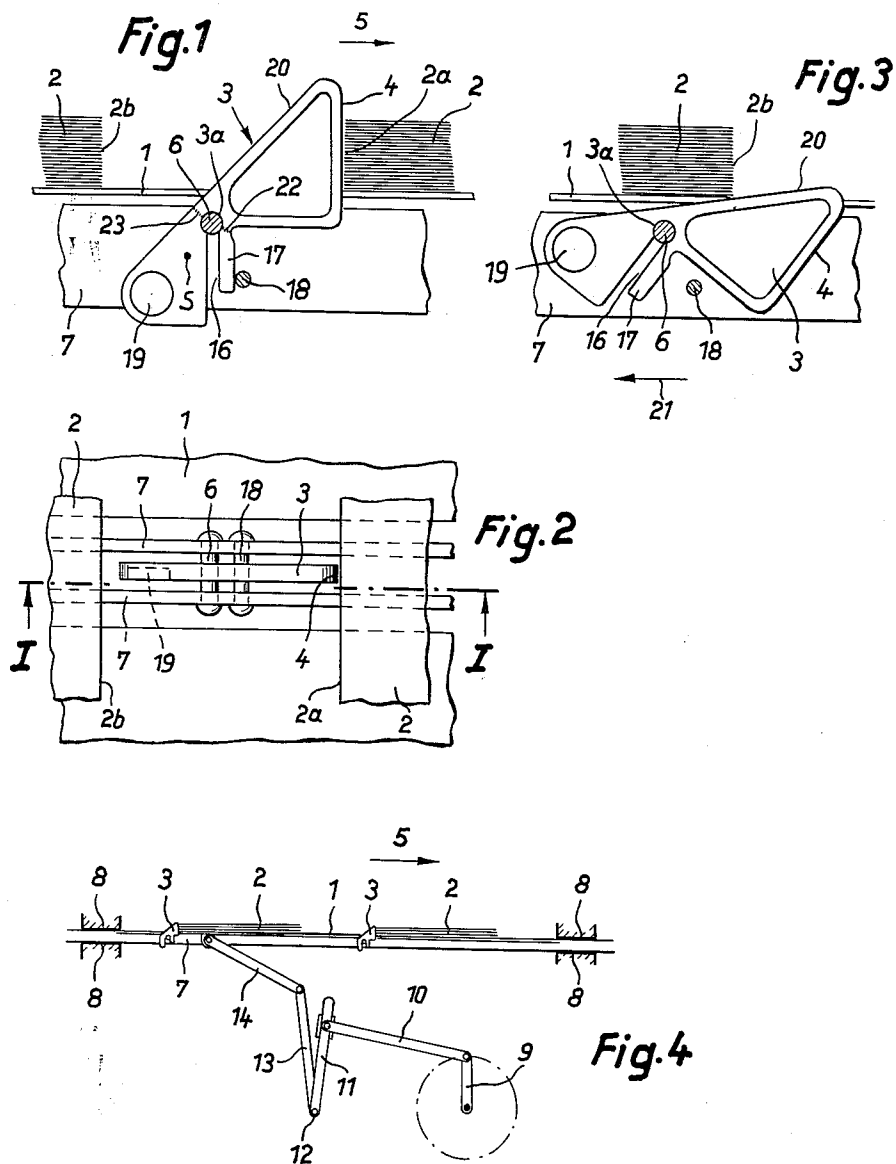
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CONVEYING MECHANISM AND FEED MEMBER THEREFOR

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CONVEYING MECHANISM AND FEED MEMBER THEREFOR

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The present invention relates to a conveying mechanism, and more particularly to a conveyor for feeding stacks of sheets of paper or the like on paper processing machines, for example, for printing, cutting, stapling, or gluing of paper pads, notebooks, pamphlets, books, and the like. In machines of this type, stacks of sheets are intermittently fed along a plate, for example, by reciprocating levers which are driven by means of a crank or cam device.

It is an object of the present invention to provide a conveying mechanism of the above-mentioned type and, more particularly, a feed member for such a conveying mechanism which may be very inexpensively produced and may be easily installed and replaced, and which is designed so as to operate very reliably and also to interrupt the conveying operation in the event of an irregularity in the operation of the machine and thereby to safeguard the machine and prevent it from being damaged.

An essential feature of the invention consists in providing a feed member which by means of a slot therein may be easily fitted upon a pin or shaft which is reciprocated in a direction transverse to its axis underneath a slotted plate supporting the stacks of paper or the like. This feed member is designed so as to be pivotable on this pin or shaft about an axis which is disposed in a spaced relation to the center of gravity of the feed member in such a manner that, due to its gravity, the feed member will during its conveying movement automatically pivot within the slot in the plate supporting the stacks of sheets to a feeding position by engaging with a stop member which reciprocates with the pin or shaft. In this position, the feeding surface of the feed member will engage with the rear side of a stack of paper and thus move the same forwardly, while during the reverse movement of the pin or shaft, the rear side of the feed member which extends at an angle to the front or feeding surface thereof will engage with the front side of the next following stack of paper and will thereby be pivoted to a horizontal position so as to slide rearwardly underneath that stack without shifting the same until it has cleared that stack and will then by gravity pivot back to its feeding position ready for the next forward conveying movement by the pin or shaft.

These and additional objects, features, and advantages of the present invention will become further apparent from the following detailed description, thereof, particularly when the same is read with reference to the accompanying drawings, in which—

FIGURE 1 shows a feed member according to the present invention in the feeding position together with some of the associated elements of the conveying mechanism, as seen in a cross section taken along line I—I in FIGURE 2;

FIGURE 2 shows a top plan view of FIGURE 1;

FIGURE 3 shows a view similar to FIGURE 1 but with the feed member in a position during the reverse movement thereof; while

FIGURE 4 shows a diagrammatic illustration of the entire conveying mechanism.

Referring to the drawings, the different stacks of sheets 2 lying on a slotted plate 1 are advanced intermittently

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in the direction shown by the arrow 5 by one or more, preferably two feed members 3, the feeding surface 4 of which is adapted to engage with the rear side 2a of a stack of sheets 2. The feeding movement of each feed member 3 is produced by a pin or shaft 6 which is secured underneath plate 1 in two adjacent rails 7. Rails 7 which are guided in their longitudinal direction by guide members 8, as indicated in FIGURE 4, are reciprocated to an extent depending upon the desired stroke length, for example, by means of a crank 9 or by an eccentric or cam. Crank 9 is connected by an arm 10 to a lever 11 which is pivotable about a shaft 12 on the machine frame, not shown. Shaft 12 also pivotably supports a further lever 13 which is connected to rails 7 by means of an arm 14. For adjusting the end position and the stroke length of rails 7, it is possible, for example, to adjust the position of arm 10 on lever 11 and also the angle between levers 11 and 13.

As shown in FIGURE 2, plate 1 is provided above feed members 3 and rails 7 with a longitudinal slot through which the feeding part of each feed member 3 may pass upwardly and which also permits the feed members 3 to be easily inserted and exchanged, if necessary.

Each feed member 3 is provided with a slot 16 which permits it to be fitted from above upon shaft 6 between the two rails 7. It is prevented from being accidentally removed from shaft 6 by the fact that slot 16 is slightly narrower than the thickness of shaft 6 and that the finger 17 adjacent to and formed by slot 16 is resilient, permitting the slot to expand when the feed member is pushed downwardly over shaft 6, so that finger 17 will snap back to its original position when shaft 6 is located in the bearing aperture at the end of slot 16. In this position feed member 3 is easily rotatable on shaft 6.

This bearing aperture 3a of feed member 3 is disposed at a point spaced from the center of gravity of the feed member so that, due to its gravity, it will tend to pivot to a position in which finger 17 engages with a stop pin 18 which extends between rails 7 and is secured thereto. In this position, the feeding surface 4 of feed member 3 will be in the feeding position and extend vertically to plate 1.

The other arm of feed member 3 opposite to the arm having the feeding surface 4 thereon is provided with a weight 19 of lead or other heavy material.

Feed member 3 is preferably made of a plastic, for example, polyamide, into which the weight 19 is cast in.

During the reverse movement of rails 7 and shaft 6 thereon in the direction of arrow 21, as shown in FIGURE 3 the rear surface 20 of feed member 3 which is inclined relative to the front surface will engage against the front side 2b of the stack of sheets 2 behind it, and it will thereby be pivoted in the clockwise direction, as shown in an intermediate position in FIGURE 3 so that it can then slide rearwardly underneath this stack of sheets without affecting the position thereof.

In order to effect the mentioned movements of feed member 3 in a simple manner, the feeding surface 4 and the rear surface 20 of feed member 3 are disposed forwardly of shaft 6, as seen in the feeding direction.

In order to prevent any damage to the machine or to the material worked upon in the event of any irregularity in the operation of the machine, the narrow portion 22 between finger 17 and the front part of feed member 3 and extending substantially radially from the bearing 3a for shaft 6 is made of a reduced solidity so that, if the feeding surface 2a encounters an excessive resistance, finger 17 will break off. For the same purpose, the narrow portion 23 at the opposite side of feed member 3 between the bearing 3a for shaft 6 and the outer side

may also be made of a reduced solidity so as to break under an excessive force. The broken pieces of feed member 3 may then drop downwardly through the space between rails 7 and will not interfere with the movement thereof. After the cause of the disorder of the machine has been removed, a new feed member which according to the invention is made of a very inexpensive material and structure, may be fitted very easily and quickly upon shaft 6.

Aside from the mentioned advantages of the feed member according to the invention, especially those of a simple and inexpensive production thereof, the safety of its operation and of also insuring the safe operation of the machine itself, and of being easily installed and replaced, it has the further advantage that it does not require any lubrication or other servicing. Although the feed member according to the invention has been described with particular reference to paper processing machines, it will be evident that it may also be applied in the same or a similar form to other kinds of machines to carry out conveying operations.

Although our invention has been illustrated and described with reference to the preferred embodiments thereof, we wish it understood that it is in no way limited to the details of such embodiments, but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed our invention, what we claim is:

1. In a conveying mechanism for feeding objects intermittently along a surface and having reciprocating means extending underneath said surface, at least one pivot secured to said reciprocating means and having an axis extending transversely to the direction of movement of said means, at least one feed member having a bore and two arms perpendicular to and on opposite sides of said bore, one of said arms having a feeding surface, a slot formed in said other arm and extending from the outer edge of the lower side of said other arm to said bore in a direction such as to permit said feed member to be fitted in a downward direction for mounting said feed member with said bore over said pivot, a stop member fixed to and movable with said reciprocating means and extending outwardly therefrom, said feed member being adapted to engage said stop member when said feed member is in said feeding position, said stop member then being adapted to prevent said feed member from pivoting under the influence of pressure exerted by said objects to be fed upon said feed member, and a weight carried by the other arm of said feed member greater than the weight of said first arm with the feeding surface thereon, said weight tending to turn said feed member into engagement with said stop member so as normally to maintain said feed member in said feeding position.

2. A conveying mechanism as defined in claim 1, in which said feed member is made of plastic and said weight consists of a member made of a material having

a greater specific gravity than said plastic, said member being embedded within said other arm.

3. A conveying mechanism as defined in claim 1, in which said feed member has a portion of a lower solidity than the other parts of said member, said portion extending from said feed member so as to permit said bore to break at the area around said bore and to fall down from said pivot if said feed member encounters an excessive resistance during its conveying movement.

4. In a conveying mechanism for feeding objects intermittently along a surface and having reciprocating means extending underneath said surface, at least one pivot secured to said reciprocating means and having an axis extending transversely to the direction of movement of said means, at least one feed member having a bore and two arms perpendicular to and on opposite sides of said bore, one of said arms having a feeding surface, a slot formed in said other arm and extending from the outer edge of the lower side of said other arm to said bore in a direction such as to permit said feed member to be fitted in a downward direction for mounting said feed member with said bore over said pivot, the part of said other arm on one side of said slot forming a finger, said slot having a width normally slightly smaller than the diameter of said pivot and said bore, said finger being resilient only to such a degree as to permit said slot to be widened by said pivot when said slot is placed over said pivot and said feed member is pushed downwardly to insert said pivot into said bore.

5. A conveying mechanism as defined in claim 4, in which a part of the material of said feed member is of a lower degree of solidity than the other parts at least along a line extending substantially radially from the wall of said bearing aperture through said finger so as to permit said finger to break off and thereby to release said feed member from said pivot if said feed member encounters an excessive resistance during its conveying movement.

6. A conveying mechanism as defined in claim 5, in which the wall of said bearing aperture opposite to said finger is also of a lower degree of solidity than the other parts of said feed member, so that said feed member will break completely apart and off said pivot if it encounters said excessive resistance.

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