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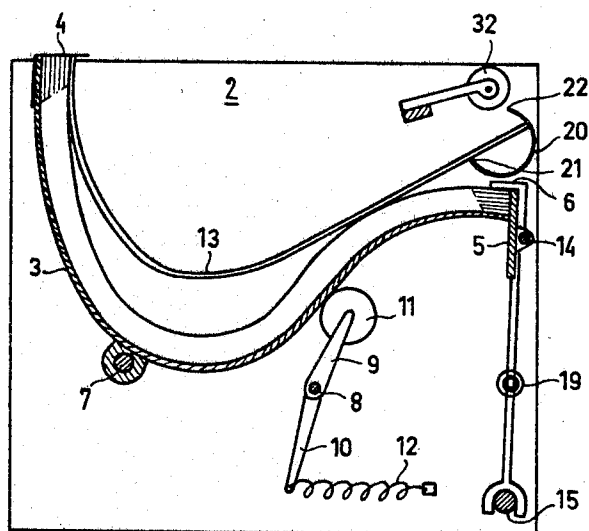
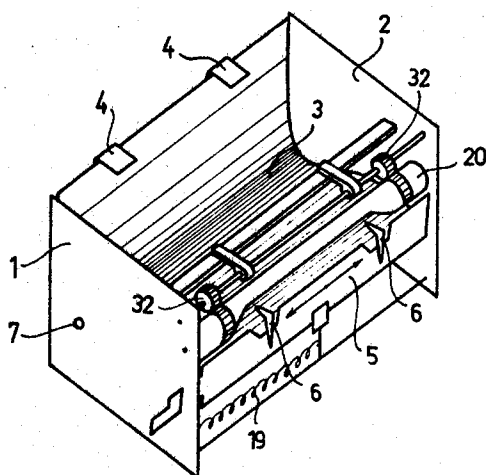
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3,511,496

DEVICE FOR REMOVING INDIVIDUAL SHEETS FROM A STACK

Filed May 23, 1968

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

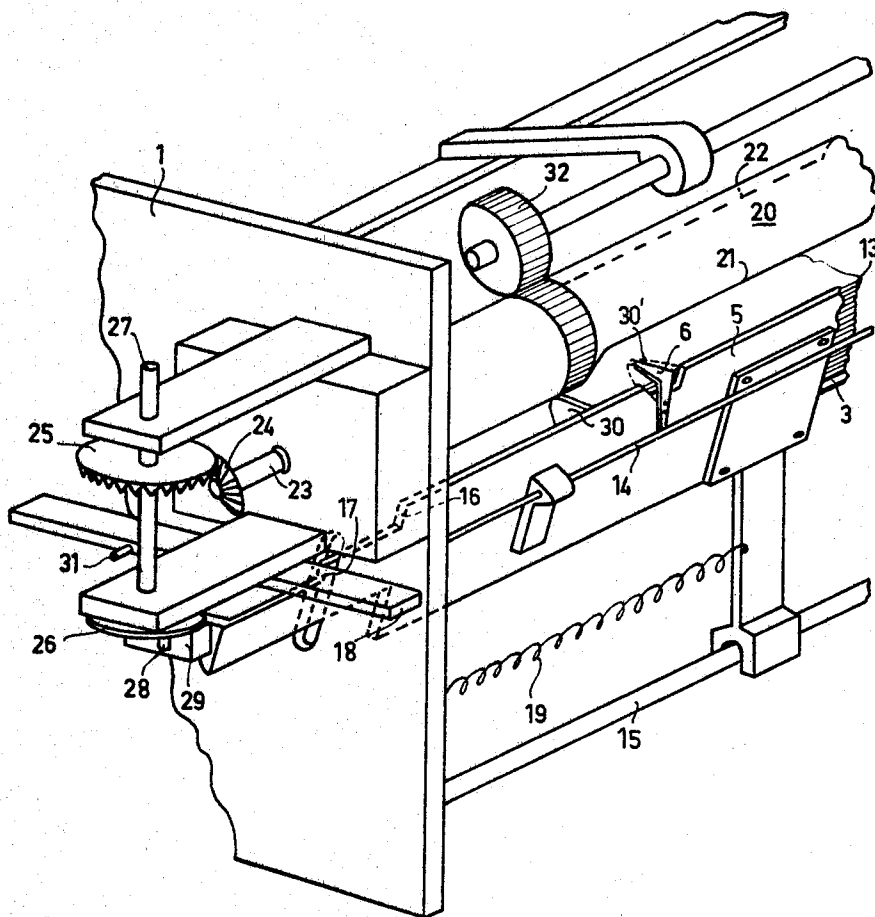


Fig. 3

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3,511,496 DEVICE FOR REMOVING INDIVIDUAL SHEETS FROM A STACK

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3 Claims 10

ABSTRACT OF THE DISCLOSURE

A device for removing individual relatively stiff sheets from a supply of sheets, stacked in a box whose bottom is convex in one direction. Hooked fingers overlapping the upper sheet of the stack are provided at the discharge end of the box and are reciprocally movable along the sheet edge. The fingers cooperate with perforations in the sheet edges which, for successive sheets, are laterally displaced with respect to each other so that only one sheet at a time is released by the fingers. A revolving hollow cylinder with a longitudinal slot is placed over the discharge end to pick up the lifted sheet edge.

The invention relates to a device for removing individual sheets from a stack, comprising a supply box with a bottom curved in one direction which carries the stack of sheets, and means for separating the uppermost sheet from the stack so far as to present an edge of this sheet to a system of transport rollers.

Prior art devices of this type generally comprise a rubber roller which is arranged for reciprocal movement on the uppermost sheet. During the forward movement the roller is blocked so as to remove this uppermost sheet by friction. During the return stroke the roller is free to rotate.

A drawback of this device, when used for sensitive sheet material such as photographic films, is that the surfaces of these sheets may suffer from excessive friction between the successive sheets. Another drawback may arise when the sheets are sticking together so strongly that they are not readily separated by the movement of the rubber roller. In that case two or more sheets may be removed from the stack at a time and presented together to the transport rollers, where no means are available to separate such sheets.

It is an object of the invention to avoid these drawbacks of the prior art devices. For that purpose the device according to the invention has at least one finger overlapping the edge of the uppermost sheet at the discharge end of the supply box and pressing the stack against the bottom of this box which is convex. The finger is reciprocally movable along the sheet edge so as to be brought into registry with a perforation of the edge. Perforations of the successive sheets of the stack are laterally displaced with respect to each other, so that only the uppermost sheet, by its inherent stiffness, is permitted to lift its edge from the stack when the finger reaches the perforation thereof, whereas the remainder of the stack is held pressed by the finger against the convex bottom of the supply box. By thus taking advantage of the inherent stiffness of the sheets it is made certain that only one sheet at a time is released from the stack and no intensive friction between the successive sheets is created.

According to the invention the released sheet may be further removed from the stack by a revolving hollow cylinder with a longitudinal slot, which cylinder is so positioned over the discharge end of the supply box, that

the edge of the released sheet is forced to slip into the longitudinal slot as it passes by. Thereafter the sheet edge is further lifted by one edge of this longitudinal slot and picked up by counter rollers cooperating with the hollow cylinder to be finally removed from the box. In order to prevent the released sheet edge from slipping out of the longitudinal slot before it reaches the counter rollers, the curved bottom of the supply box may by preference be convex only in the region near the discharge end of the device, but concave for the remaining part. This results in a further stretching of the released uppermost sheet while it is being lifted by the slot, thus forcing the sheet edge deeper into the hollow cylinder.

The invention will be described in greater detail with reference to the drawing, in which:

FIG. 1 is a perspective view of a device according to the invention;

FIG. 2 is a cross-sectional view of the device;

FIG. 3 is a perspective view of a part of the device, seen from the same direction as FIG. 1.

FIG. 1 shows a supply box having sidewalls 1 and 2 and a curved bottom 3. Bent strips 4 project from the rear edge of that bottom while at the discharge end of the box an elongated panel 5 carrying a pair of hooked fingers 6 is reciprocally movable, as indicated in the drawing by arrows. A stack of sheets which have to be removed individually is firmly held between the strips 4 and the fingers 6 so as to conform to the partly convex and partly concave curvature of the bottom 3. This bottom is hinged on a shaft 7.

As seen in FIG. 2 a shaft 8 bearing in the sidewalls 1 and 2, is provided with fixed arms 9 and 10. Arm 9 carries a roller 11 which is urging the discharge end of the bottom 3 upwards under the action of a drawing spring 12, connected to the arm 10. Thus, the bottom 3 at the discharge end is raised slightly each time a sheet 13 is removed from the stack in the supply box, thus pressing this stack against the fingers 6 once more.

As seen in FIG. 3, the sheet edges at the discharge end of the box are provided with V-shaped perforations. In the described embodiment every sheet has two such perforations of which the left ones only are visible in FIG. 3. The perforations of the uppermost sheet and of the next sheet are designated 30 and 30', respectively. They are laterally displaced a small distance with respect to each other, and so are the perforations in each successive pair of sheets which alternately correspond in position to perforations 30 and 30'. The elongated panel 5 is reciprocally movable along the guiding rods 14 and 15 and has two shoulders 16 and 17. In the non-operative state of the device a lever 18 rests against the shoulder 17 keeping the panel 5 in the position shown against the action of the drawing spring 19. A hollow rotatable cylinder 20 positioned just over the discharge end of the stack has a longitudinal slot with edges 21 and 22. This cylinder, which may be driven by any conventional means (not shown), is secured to a shaft 23 which also carries a bevel gear wheel 24. The rotation of the cylinder 20 is transferred through a bevel gear wheel 25 on a shaft 27 to a disc 26. An eccentric pin 28 on the disc 26 cooperates with a block 29 secured to the bent end of panel 5. As long as the device is in rest the pin 28 engages the block 29 only during a small fraction of each revolution, viz each time the pin comes at the shortest distance to the sidewall 1. The lever 18 has a fixed pivot 31. When sheets have to be removed, this lever is slightly lifted counter-clockwise. Shoulder 17 is set free thereby and the panel 5 is pulled to the left by the drawing spring 19 until it is stopped by the shoulder 16 engaging the lever 18. At this moment the fingers 6 are in registry with the perforations of the uppermost sheet 13 of the stack. The uppermost sheet is no longer held by the

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fingers and the forward end of that sheet is urged against the hollow cylinder 20 which is rotating clockwise. When the leading edge 22 of the longitudinal slot in this cylinder has passed along the edge of sheet 13, the latter slips into the cylinder after which it is lifted by the trailing edge 21 of the slot. Simultaneously with this lifting action the concave portion of the released sheet 13 will also stretch to some extent. As a result of this the sheet edge slips deeper into the cylinder thus preventing the sheet edge from slipping out. When the cylinder 20 revolves on, the sheet 13 touches the counter rollers 32 which, in cooperation with the cylinder 20, remove the sheet from the supply box. It will be noted that the trailing edge 21 of the slot has a recessed portion between the counter rollers 32. This is to ensure that a released sheet 13 which might have a somewhat corrugated edge enters with certainty into the longitudinal slot.

In the meantime the pin 28 has pushed the panel 5 back to the right against the action of the drawing spring 19. At the end of this movement the fingers 6 are in registry with the perforations 30' of the next sheet. The edge of this sheet is released and will be lifted by the edge 21 of the longitudinal slot as explained herebefore. The removal of the individual sheets will automatically be continued in this way until lever 18 is brought back to the inoperative position shown in FIG. 3. Of course, lever 18 can only return to that position when panel 5 is in the extreme right-hand position, enabling the lever to fall behind the shoulder 17.

What I claim is:

1. A device for removing individual sheets from a stack of sheets, comprising a supply box with a bottom curved in one direction which carries the stack of sheets, and means for separating the uppermost sheet from the stack so far as to present an edge of that sheet to a system of transport rollers, characterized in that it comprises at

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least one finger overlapping the edge of the uppermost sheet on the discharge side of the supply box and pressing the stack against the bottom of that box, which is convex, said finger being reciprocally movable along said sheet edge so as to be brought into registry with a perforation of said sheet edge, perforations of successive sheets of the stack being laterally displaced with respect to each other, whereby the uppermost sheet is permitted to lift said sheet edge from the stack by its inherent stiffness when said finger reaches the perforation thereof, and the remainder of said stack is held pressed by said finger against said convex bottom.

2. The device of claim 1 further comprising a revolving hollow cylinder with a longitudinal slot, the cylinder being so positioned over the discharge end of the supply box that the lifted edge of the uppermost sheet is forced to slip into the slot as it passes by and is further lifted by an edge of the slot, at least one counter roller being provided which cooperates with the hollow cylinder to pick up the sheet edge and remove the sheet from the box.

3. The device according to claim 2, wherein the curved bottom of the supply box is convex only in the region near the discharge end and concave for the remaining part.

References Cited

UNITED STATES PATENTS

2,088,856 8/1937 Heiland ----- 221—89

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U.S. Cl. X.R.

271—42, 61