

[54] CARTRIDGE FOR SHEET-FEEDING ARRANGEMENTS

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[58] **Field of Search**.....271/61, 39; 206/57

[56]

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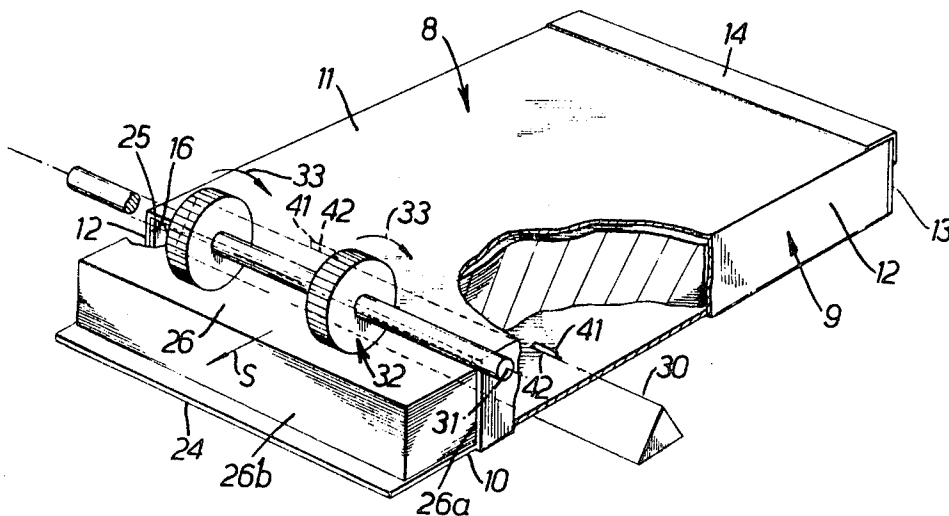
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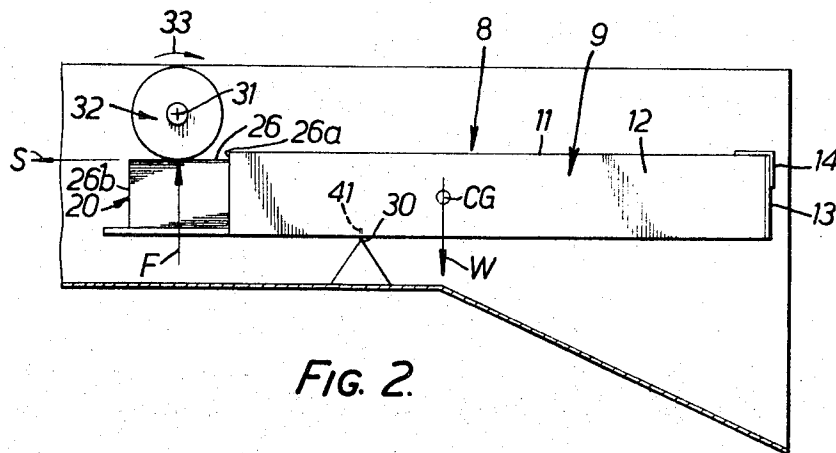
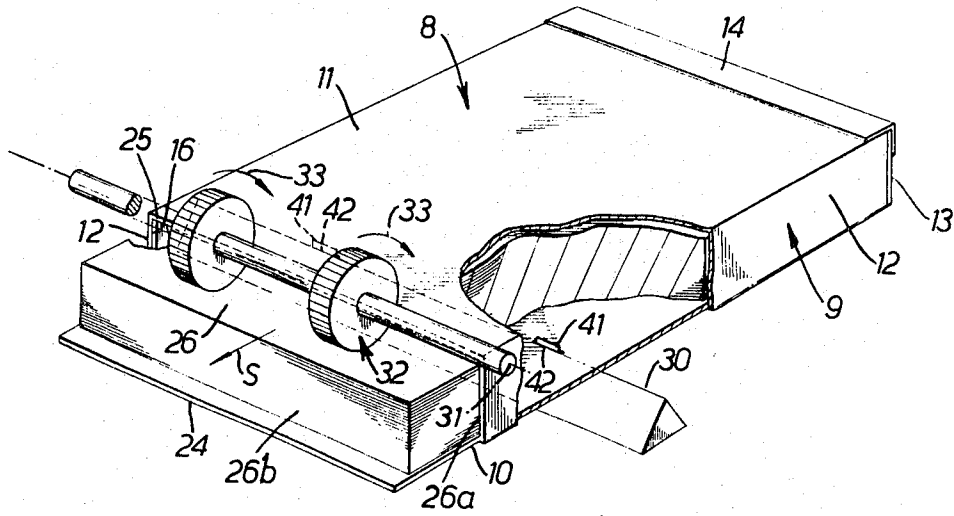
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ABSTRACT

For feeding sheets from a stack a cartridge presents a platform supporting the stack and is removably pivoted on a fulcrum edge so that the weight of the stack urges the top sheet against a sheet feed means positioned above the stack towards one end. The stack is permanently housed in the cartridge, thus facilitating handling of the stack.

3 Claims, 2 Drawing Figures





CARTRIDGE FOR SHEET-FEEDING ARRANGEMENTS

This application is divided from our copending application Ser. No. 713,806 now U.S. Pat. No. 3,533,617 filed Mar. 18, 1968.

This invention comprises improvements in sheet-feeding arrangements for feeding sheets from a stack thereof. Such an arrangement is required, for example, for feeding a sheet of copy paper from a stack of such paper sheets in a copying machine.

In copying machines, it is often desired to change the size of paper on which copies are to be made.

An object of this invention is to facilitate the handling of the paper stack from which copy paper is fed, in the machine, whereby a stack may be readily inserted in, and withdrawn from, the machine.

Our copending application No. 713,806 (now U.S. Pat. No. 3,533,617) is concerned with a sheet from a stack of sheets comprising:

a. an interchangeable cartridge comprising a container and a stack of sheets contained in the container, the container having a bottom wall presenting a platform surface and a top wall which is adapted to overlie a portion of the stack while leaving a portion thereof exposed for feeding the top sheet thereof;

b. means removably pivoting the platform surface on a pivot axis transverse to the direction of feed, the stack being positioned on the surface with the center of gravity of the stack to one side of said pivot axis, and interengaging means being provided on the bottom wall of the container and on the pivoting means to locate the container against translational movement relative to the pivoting means, and

c. a sheet-feed means positioned on the side of the pivot axis remote from the center of gravity of the stack, the weight of the stack being arranged to urge the exposed surface of the top sheet of the stack into frictional engagement with said sheet feed means. Such an arrangement is referred to as the center of gravity of the stack lies to one side of said pivot axis whereby the weight of the stack urges the exposed surface of the top sheet of the stack into engagement with a sheet-feed means, and the sheet-feed means is operated to feed the top sheet from the stack. Such a method is referred to hereinafter as a sheet-feeding arrangement as defined herein.

According to this invention, there is provided an interchangeable cartridge for use in a sheet-feeding arrangement as defined herein comprising: a container for containing a stack of sheets therein, said container having a bottom wall including a platform surface and a top wall which is adapted to overlie only a portion of said stack while leaving a portion of said stack exposed for feeding the top sheet thereof, said bottom wall having pivoting means adapted to cooperate with said sheet-feeding arrangement to positively locate said container against translational movement thereof relative to said sheet-feeding arrangement, said pivoting means being located on that side of the center of gravity of the stack of sheets remote from the transverse end wall of the cartridge.

A specific sheet-feeding arrangement employing a cartridge embodying this invention will now be described by way of example, with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of a sheet-feeding arrangement including a cartridge embodying this invention and,

FIG. 2 is a side view of the arrangement shown in FIG. 1.

Referring to the drawings, the cartridge generally indicated at 8, comprises a container 9 having a bottom wall 10, a top wall 11 parallel with the bottom wall 10, an opposite pair of parallel sidewalls 12 joining the top and bottom walls 10 and 11, and an end wall 13.

The end wall 13 is formed integrally with the bottom wall 10 and attached to the corresponding edge of the top wall 11 with a strip of adhesive tape 14 uniting the adjacent edges of the top and end walls respectively. The adjacent edges of the side and end walls may also be united in similar fashion if desired. Alternatively, any known or convenient arrangement of flaps on the end of the container may be provided to compose the end wall 13, the flaps being adapted to interlock with one

another to hold the container in its fully erected condition as illustrated in the drawings.

The container being described is constructed from a one-piece blank of stout cardboard, having a glue flap 16 along one edge which is glued to the inside of a sidewall panel 12 along its opposite edge in order to hold the container erect. The blank is creased along the intended fold lines of the blank to facilitate the erection of the blank into a substantially rigid rectangular sided and sectioned boxlike structure having one open end opposite the wall 13. The container holds a stack 20 of sheets of copy paper. The sheets of the stack 20 are a loose fit between the sidewall 12 of the container, the sidewalls 12 transversely locating the sheets in the container.

Similarly, the stack of sheets is a loose fit between the top and bottom walls 10 and 11 of the container.

The sheets of paper composing the stack 20 are of a length between the sidewalls 12, such that they may locate in one longitudinal direction on the end wall 13 of the container and extend nearly to the edge 24 of the bottom wall 10 remote from the end wall 13, as shown in the drawings. The corresponding edge 25 of the top wall 11 of the container is set back relative to the edge 24 to expose the upper surface of the top sheet 26 of paper in the stack.

It will be noted that the container provides an opening 26a defined in part by the edge 25 and which exposes an end face 26b of the stack 20.

In the use of the cartridge 8 in a copying machine by a sheet-feeding method as defined herein, the cartridge is placed in the copying machine with the container bottom wall 10 resting on a fulcrum edge 30 extending transversely of the container and of the intended direction of feed indicated by the arrow S in the drawings, such that the center of gravity (CG) of the paper stack 20 is disposed to the side of the fulcrum edge 30 remote from the exposed portion of the top sheet 26 of the stack. The weight W of paper in the paper stack then urges the top surface of the top sheet 26 upwardly into frictional engagement with a sheet-feed means 32 in the form of a pair of rollers having a common axis 31 parallel with the fulcrum edge 30, the means 32 being positioned above the paper stack on the side of the fulcrum edge 30 remote from the CG of the paper stack. The sheet-feed means 32 is then operated i.e., rotated in the direction of arrows 33 to feed the top sheet of paper from off the paper stack and to the left as seen in FIG. 2 into the copier section of the copying machine.

Tongue-and-slot means is provided to locate the cartridge 8 against translational movement relative to the fulcrum edge 30. Thus tongue means in the form of a pair of spaced-apart tongues 41 is provided upstanding from the fulcrum edge and these tongues engage in slot means in the form of a pair of elongated slots 42 in the bottom wall 10 of the container, the slot 42 extending parallel with the end wall 13 of the container on that side of the center of gravity CG of the paper stack remote from the wall 13.

With the paper-feed arrangement described, the cartridge 8 may be readily interchanged with a cartridge having a larger or smaller size of paper since it is resting freely in position in the machine between the sheet-feed means 32 and the fulcrum edge 30. The paper stack 20 is readily handled and stored when not in use, since it is not removed from its container 9. This is of particular advantage when using a specially coated paper, coated in accordance with the requirements of the copying process.

The paper may be sold in its container, the container being wrapped in an outer wrapping which may be suited to the needs of the copy paper to preserve it in proper condition.

It will be appreciated that the feed arrangement described utilizes the bottom wall 10 of the container as a platform or feed board. Insofar as the paper stack is positioned in the container before the container is pivoted on the fulcrum edge, the method comprises positioning the stack of sheets on the platform and then removably pivoting the platform on a pivot axis. The platform or feed board is pivoted to support the paper stack on a pivot axis represented by the fulcrum edge 30. The

platform formed by the bottom wall 10 has to be substantially rigid to ensure that the paper stack is unable to bend about the fulcrum edge but instead is operated as a first order lever under the action of its own weight.

The necessary rigidity may be imparted to the bottom wall 10 of the container in any convenient way. If the container is constructed of sufficiently stout cardboard, however, the bottom wall 10 may be sufficiently rigid regardless of the additional support afforded to it by the sidewalls 12 of the container.

The sidewalls 12 may be extended to form triangular bracket portions between the edges 24 and 25 of the bottom and top walls respectively of the container to give extra support to the cantilevered portion of the bottom wall 10. Alternatively, the bottom wall could be reinforced with additional strips of material, for example, glued to its underside so as to extend longitudinally of the container from the edge 24 and the slots 42 could be formed in such strips. Alternatively, the sidewalls 12 of the container could be additionally reinforced to act as webs lending substantial rigidity to the bottom wall 10 of the container.

The container could be provided with a reclosable flap or flaps for protecting the exposed end portion of the paper stack when the cartridge is not in use. Alternatively, the container may have a tear-off portion to expose the end portion of the paper stack to be engaged by the sheet feed means.

The container is not necessarily made of cardboard but may be constructed of any convenient material or materials.

A light-sensitive paper, since it remains in the container, is substantially protected against light.

Instead of a container having a tear-off portion or a reclosable flap or flaps, the container may be open-ended and supplied in a throwaway envelope e.g., of black synthetic resin film which prevents access of light and moisture to the paper stack during storage.

The position of the slots 42 in the container bottom wall is critical insofar as the force F is in direct proportion to the weight W which decreases as the paper is used up. On the other hand, when the container is full of paper the force F

must not be too great and yet must be great enough that it remains sufficient to feed the last sheet from the container when the weight W is at its lowest. The position of the slots 42 must be determined empirically in each particular case.

The stack of sheets should be a loose fit between the top and bottom walls such that a clearance is maintained between the inner surface of the top wall 11 and the top surface of the top sheet 26 even when the container is full. If the top wall 11 sags onto the top sheet, proper feeding of the top sheet out of the container by the feed means may be prevented. To this end it is of advantage if the top wall is stiff and does not sag noticeably so as to maintain a substantially uniform clearance with the top sheet.

I claim:

1. An interchangeable cartridge for use in a sheet-feeding arrangement as defined herein comprising:

a container for containing a stack of sheets therein, said container having a bottom wall including a platform surface, a transverse end wall adapted to locate the sheets of said stack in a longitudinal direction of said sheets, and a top wall which is adapted to overlie only a portion of said stack while leaving a portion of said stack exposed for feeding the top sheet thereof, said bottom wall having pivoting means adapted to cooperate with said sheet-feeding arrangement to positively locate said container against translational movement thereof relative to said sheet-feeding arrangement, said pivoting means being located on that side of the center of gravity of the stack of sheets remote from said transverse end wall.

2. A cartridge according to claim 1 wherein said pivoting means is adapted to cooperate with a tongue means on said sheet-feeding arrangement and wherein said pivoting means includes slot means formed on the bottom wall of said container for engagement with said tongue means, said slot means extending parallel with said transverse end wall of said container.

3. A cartridge as claimed in claim 1 wherein the sheets comprise copy paper.

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