Sept. 15, 1959 J. RABINOW 2,904,335

STACKER FOR MAIL SORTERS AND THE LIKE

Filed March 4, 1958

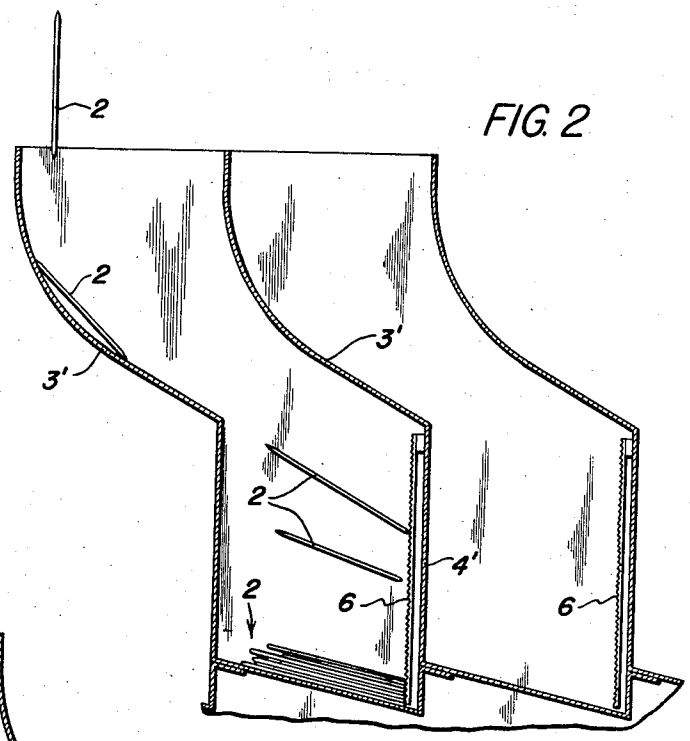


FIG. 2

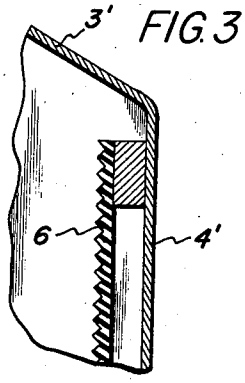


FIG. 3

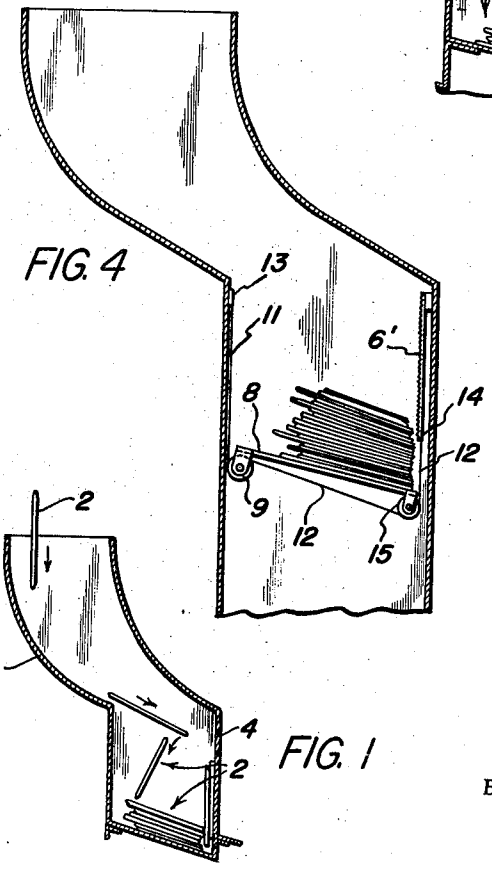


FIG. 4

FIG. 1

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STACKER FOR MAIL SORTERS AND THE LIKE

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2 Claims. (Cl. 271—88)

This invention relates to a receptacle into which letters or similar flat objects can be dropped from a sorting machine or similar device in such a manner that the letters keep their "facing," that is, the letters end up in a stack with the orientation of the stamp and address being preserved.

In letter sorters and other sheet handling devices, it is important that after the letters have once been faced (i.e., all the addresses arranged in the same relative position on the envelopes) the mail be handled in such a manner that the facing is maintained in subsequent operations. This is necessary whether the letters go through a cancelling machine, a sorting device, a reading device, or any other handling device, since it both costs more money and reduces the speed of operation if the lettters need to be re-faced. The present invention relates to a simple means for dropping letters into a stack and controlling their fall in such a way that the letters remain faced.

The present invention is particularly suited to the handling of letter mail, but it is useful for other flat objects where a similar problem exists; however, for convenience, the objects will hereinafter be termed "letters."

The problem which this invention solves typically occurs when letters or similar objects, having previously been faced, are automatically conveyed in sequence for various operations such as sorting, stamping, cancelling, reading, etc., and then must be re-stacked for subsequent use or handling. The problem is relatively easy when the objects are identical in size and weight, such as in the case of punch cards; but where the objects are of varied size, weight and configuration as in the case of letter mail, it has proved very difficult to discharge such objects successively into a receptacle so as to maintain their orientation. Typically, a certain percentage of the letters flip over, or else land endwise and jam up the following pieces.

It is a primary object of the invention to provide a receptacle which will accept faced letters from a discharge device such as a chute or a drop and stack them up in faced relation without disturbing their relative orientation. Although the invention will work with any source of oriented letters, it is particularly useful for handling letters conveyed thereto by a mail sorting machine such as is shown in my copending application Serial No. 644,017, for Mechanical Coding and Sorting Device, filed March 5, 1957.

The specific nature of my invention, as well as other objects and advantages thereof, will clearly appear from a description of a preferred embodiment as shown in the accompanying drawing, in which:

Fig. 1 is a schematic drawing showing the difficulties encountered with ordinary receptacles;

Fig. 2 is a schematic sectional view showing a series of receptacles according to the invention;

Fig. 3 is an enlarged detail view of the flexible corrugated element shown in Fig. 2; and

Fig. 4 is a schematic diagram of a modified form of the invention.

Referring to Figs. 1 and 2, the letters 2 are dropped vertically as shown in Figs. 1 and 2, from various machines. One of these may be of the type shown in my copending application previously referred to. The letter is dropped with its short dimension vertical and impinges upon the curved surface 3 or 3'. The successive positions are shown in the same figures. It was found that when an attempt to drop envelopes like this was made, the letters would hit the surface 4 of the receptacle, bounce back violently, or slide past the stack, as shown in Fig. 1. This problem was solved by providing a corrugated or otherwise roughened surface 6 so as to prevent the letters from sliding down ahead of the stack as shown in Fig. 1. Various surfaces were tested and while corrugated or otherwise roughened metal surfaces are quite satisfactory, surfaces that absorb much of the energy of the envelope and stop it with a minimum bounce proved to be superior. Sheet 6 having a face of corrugated soft material, such as rubber, spaced from the rear wall 4' by means of a supporting spacer 7, to which the upper end of the sheet 6 is attached, as by cementing, was found to be very satisfactory. The sheet is generally flexible, and the corrugations or ridges are preferably in the order of a quarter of an inch wide. It is preferable to suspend the rubber sheet loosely, slightly away from the back surface 4' of the stacker; in this way, as the letter impacts against the rubber it has a small amount of bounce, drops flat onto the envelope below it, and because of the tilt of the bottom surface, the stack slides forward and provides a stable base for the next envelope.

When a much taller stack is necessary, one that is greater than that roughly equivalent to the width of one envelope, a moving bottom is desired so that as the letter stack is formed, the weight of the stack forces the bottom down and permits a very large stack of mail to be assembled as shown in Fig. 4. It is necessary in doing this to provide a parallel motion of the bottom 8 and to move it down in compliance with the weight of the envelopes. It was found that the average weight does not vary much per inch of stacked thickness, so that an approximation of the correct motion can be obtained with simple springs. It is not necessary to maintain the top of the stack at a very exact level. A variation of two or three inches is acceptable, and since a stack of not more than 18 inches is satisfactory for most practical uses, a three-inch variation is easily maintained. In order to provide a compact and self-levelling arrangement for the moving bottom, and also in order not to have the springs extend far below the stack, as is done in punchcard sorting machines commonly used today, a novel roller type mechanism is provided which serves the purpose. It provides a spring force for the bottom and surfaces against which the envelopes lie.

Details of the mechanism are shown in Fig. 4. A window-shade type of roller 9, with the usual internal torsion spring, is mounted as shown, under the inclined bottom plate 8 of the stacker. This roller is exactly the same as the ordinary window-shade roller in common use, except that the centrifugal catch is removed so that it will not latch, but will always tend to roll up the attached cloth around the roller stick. Two sheets 11 and 12 of cloth or plastic are wrapped around the roller and are played out as shown in Fig. 4. Sheet 12 is passed under an idler roller 15, mounted on the underside of bottom plate 8, so as to support plate 8. The top edges of the two sheets are attached to the machine frame at points 13 and 14 respectively. The constant of the roller spring is so chosen that the weight of the envelopes moves the bottom down, keeping the top of the stack level at approximately the same point. The fact that the two sheets of cloth play out at the same time insures that the bottom plate 8 maintains parallelism with itself at all

times. The corrugated rubber stopping surface 6' is used as before and is preferably attached to sheet 12 as shown at 14.

Side doors on the stackers for removing the stacked letters are used when necessary but are not shown in this disclosure for the sake of clearness, and have no particular significance in this invention, as the side of the stacker may be either open or closed by a door, as desired.

The device shown is a simple receptacle for receiving envelopes. This receptacle works with a minimum of moving parts and in the case of the sort stacker, has no separate moving mechanism.

It will be apparent that the embodiments shown are only exemplary and that various modifications can be made in construction and arrangement within the scope of my invention as defined in the appended claims.

I claim:

1. A letter-receiving receptacle for stacking vertically-oriented letters dropped from above, said receptacle having a substantially horizontal aperture for receiving letters dropped from above, a letter guiding surface extending downward from said aperture into the path of letters dropped through the aperture and sloped so as to deflect a dropped vertical letter into a generally horizontal orientation inclined slightly downward in the direction of its motion, a stacking receptacle mounted below said guiding surface for receiving letters leaving said curved surface, said receptacle having a roughened shock absorbing vertical wall surface opposite said guiding surface to receive the impact of the forward edge of a letter leaving said surface, and having also a bottom surface inclined in the same general direction as the bottom portion of said guiding surface so as to support received letters in a slightly inclined position, said roughened surface being a surface of a sheet of limp flexible material hanging vertically in place from its top edge without rigid backing so as to absorb the energy of the letter hitting it.

2. A letter-receiving receptacle for stacking vertically oriented letters dropped from above, said receptacle having a substantially horizontal aperture for receiving letters dropped from above, a letter guiding surface extending downward from said aperture and sloped so as to deflect a dropped vertical letter into a generally horizontal orientation inclined slightly downward in the direction of its motion, a stacking receptacle mounted below said guiding surface for receiving letters leaving said guiding surface, said receptacle having a roughened, shock absorbing vertical wall surface opposite said guiding surface to receive the impact of the forward edge of a letter leaving said surface, and having also a bottom surface inclined in the same general direction as the bottom portion of said guiding surface so as to support received letters in a slightly inclined position, said bottom surface being movable and supported by spring means, said spring means comprising a roller containing a torsion spring and attached to said bottom, and two flexible sheets wrapped around said roller and attached at their far ends to stationary points so as to form the two sides of said receptacle and thus maintain the parallelism of the bottom.

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