Dec. 11, 1945. R. A. DOHL ET AL 2,390,573

ENVELOPE HOPPER FOR MAIL TREATING MACHINES

Filed April 22, 1943 2 Sheets-Sheet 1

Fig. 1.

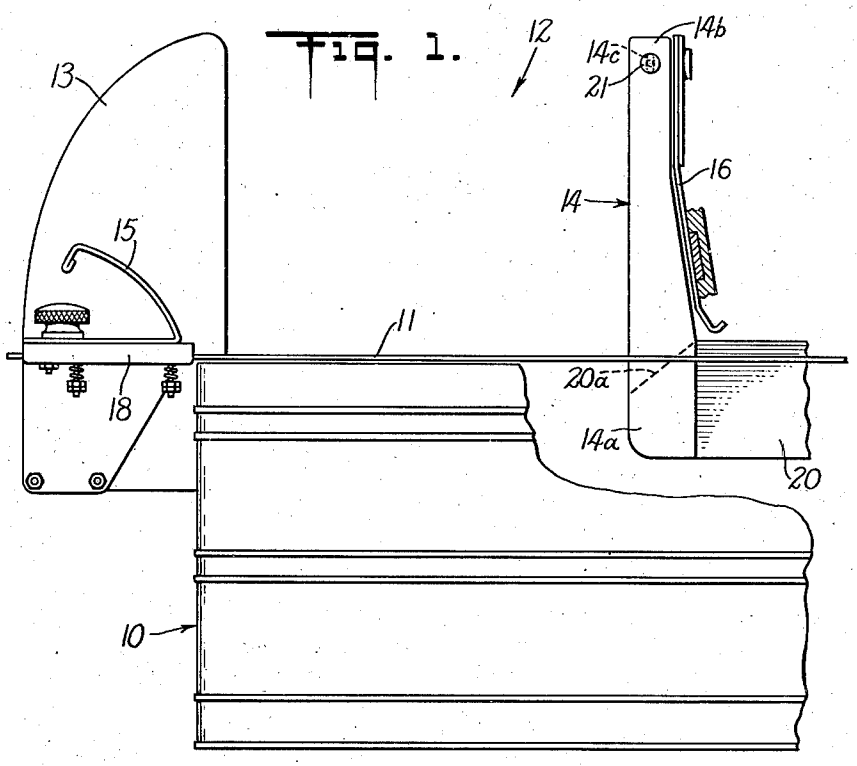
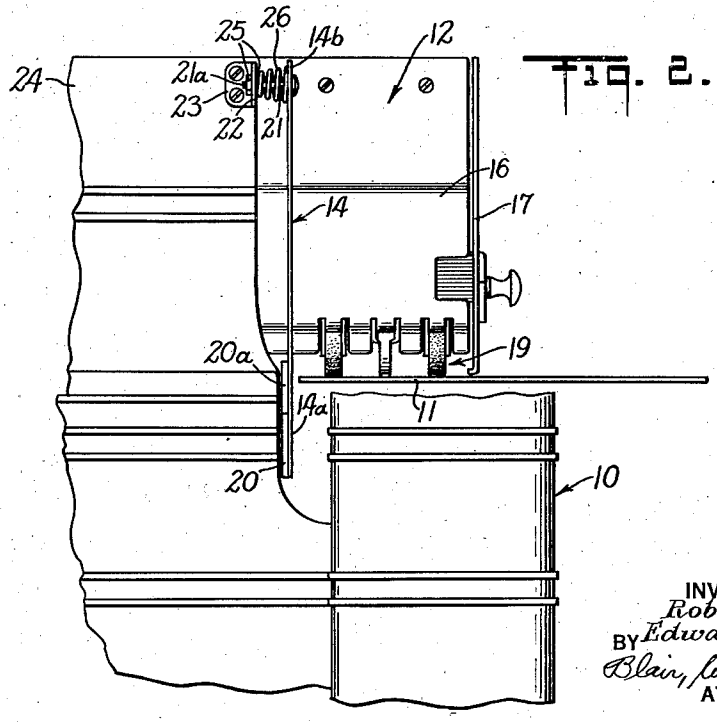


Fig. 2.



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Fig. 3.

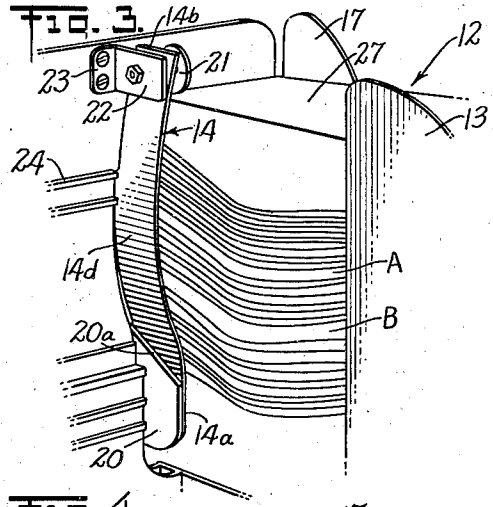


Fig. 4.

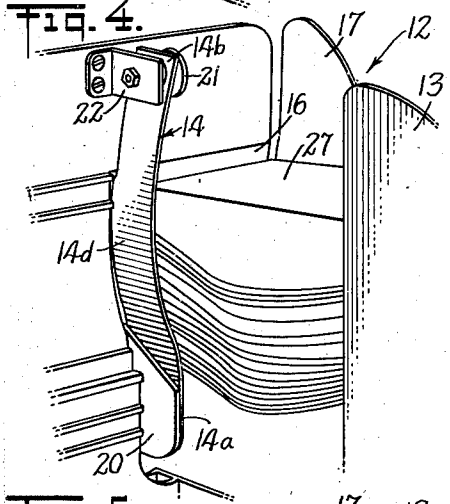


Fig. 5.

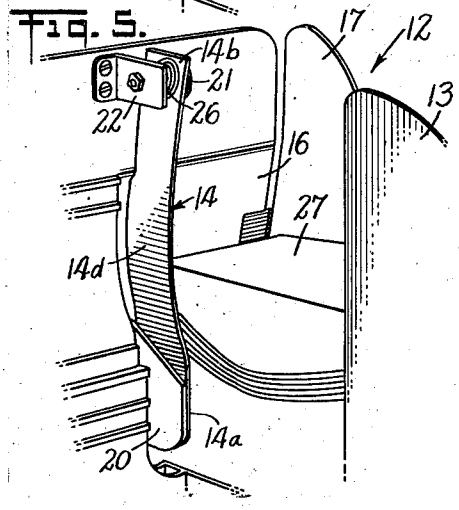


Fig. 6.

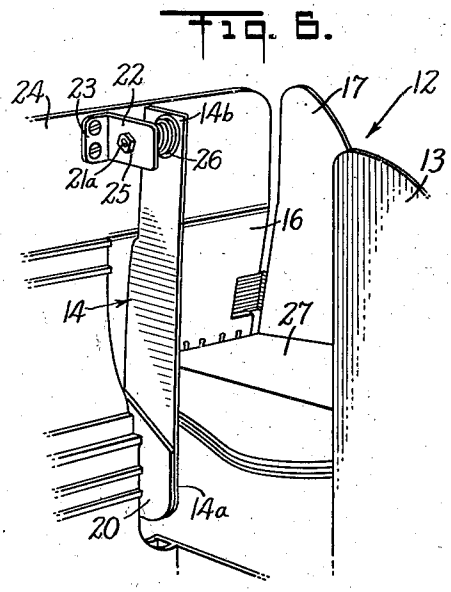
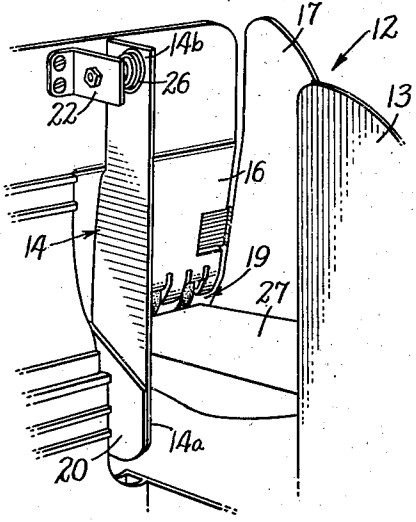


Fig. 7.



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ENVELOPE HOPPER FOR MAIL TREATING MACHINES

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Application April 22, 1943, Serial No. 484,042

7 Claims. (Cl. 271—61)

This invention relates to a mail matter hopper for a mail treating machine, and more particularly to an envelope hopper from which nested envelopes may be fed for sealing or stamping thereof, or both.

Modern high capacity power operated mail treating machines usually have envelope hoppers or magazines in which a substantial number of sealed or unsealed envelopes, envelopes with their flaps in extended nested relation, and cards or similar sheet material may be stacked, and from the bottom of which the envelopes or cards are automatically and successively withdrawn and fed into and through the machine for sealing or stamping, or both. In order that the potential high treating capacity of the machine be utilized, it is important that the envelopes or cards be steadily withdrawn from the hopper without interruption, regardless of the amount of envelopes or cards disposed in the hopper up to its capacity. There is little difficulty in attaining this uninterrupted successive feed where the envelope flaps are either sealed to the body of the envelope, are tucked within the envelope, or merely lie loose against the back thereof, or where the sealed or unsealed envelopes are stuffed to uniform thickness, or where a series of flat cards or the like are run through the machine. The feeding problem is more difficult, however, where a stack of unsealed envelopes with their flaps in extended nested relation are piled in the hopper for the sealing operation, and where the stuffing of the envelopes is such that they are not of uniform thickness. Under these conditions, the normal inclined attitude of a stack of uniformly thick envelopes with their flaps nested does not exist, but rather the stack of envelopes assumes various attitudes throughout its height, and the envelope flaps do not lie in regular nested relationship.

In a number of instances, attempts have been made to devise an envelope hopper amenable to the peculiar conditions occurring where a number of envelopes are stacked with their flaps extended and nested. For example, Ogden et al. 1,737,670 resorts to a rigid inclined plate against which the envelope flaps rest, and along which they slide as the stack is diminished. Northrup 1,624,899 and Eskholme 1,632,281 attain this plate inclination through a pivotal arrangement which permits the flap-guiding plate to pivot to an inclined position when the envelopes are stacked in the hopper. While these and similar arrangements have attained a certain measure of success where the envelopes are of uniform thickness, they do not operate as successfully where the envelopes vary substantially in thickness throughout the stack, as under these conditions the envelope flaps project at varying angles from the envelope body in such a manner that they interfere with one another as they progress downwardly through the hopper in such a manner that very often the feeding thereof is interrupted, necessitating a manual rearrangement or readjustment thereof in the hopper.

It is accordingly among the objects of this invention to provide an envelope hopper for a mail treating machine which is simple, durable and inexpensive in construction, and capable of obviating the above difficulties in addition to others.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the drawings, wherein we have shown one form of our invention,

Figure 1 is a fragmentary front view, partially in section, of our envelope hopper;

Figure 2 is a fragmentary side elevation of the envelope hopper looking in the direction of envelope travel through the mail treating machine;

Figures 3–7 are fragmentary perspective views of the rear of the hopper showing the different attitudes of the back or flap-engaging plate for different amounts of envelopes in the hopper.

Similar reference characters refer to similar parts throughout the various views of the drawings.

As shown in Figure 1, the left-hand end of the base of a mail treating machine is generally indicated at 10, and this base supports a table 11 which forms the bottom of our envelope hopper, which is generally indicated at 12. Hopper 12 also includes a flat rear plate 13, another rear or flap-engaging plate generally indicated at 14, a side or elevating plate 15, a side plate 16, and an adjustable front plate 17 (Figure 2). Side plate 15 (Figure 1) is fastened to a carriage 18 which may be adjusted along table 11 and fastened in adjusted position in any suitable manner. Thus by the adjusting of side plate 15 and front plate 17 (Figure 2) the length and width of hopper 12 may be varied in accordance with the length and width of the envelopes to be stacked therein. In general, hopper 12, with the exception of flap-engaging plate 14, is similar to that disclosed in the copending application of

Ryan and Drake, Serial No. 413,122, filed October 1, 1941.

Envelopes are successively fed from hopper 12 by feeding apparatus (not shown) housed under table 11 in base 10, and through a stripping device, generally indicated at 19 (Figure 2) which allows but one envelope to pass into the main treating machine at a time. Also, side plate 16 (Figure 1) is provided with the inclination shown, so that when a pile of envelopes is disposed in hopper 12, it will assume an inclination to the left, as viewed in this figure, which facilitates the successive feeding of the bottommost envelope. Furthermore, the trailing ends of the envelopes are supported on side plate 15, which inclines the bottommost envelope relative to the plane of table 11, thus to reduce the frictional engagement between the bottommost envelope and the table to expedite the feeding of the envelope.

The rear or flap-engaging plate 14 (Figure 2) is formed of a fine gauge highly flexible material, such as phosphor bronze, and its bottom portion 14*a* is fastened in any suitable manner, as by welding or brazing, to a plate 20. The top 14*b* (Figure 2) of flexible plate 14 is provided with a vertical slot 14*c* (Figure 1) through which a headed stud 21 extends, the unheaded end of which is threaded and extends through the flange 22 (Figure 2) of a bracket 23 screwed to a plate 24 which forms a wall of the nail treating machine. This threaded end 21*a* of stud 21 is secured in properly adjusted position in bracket flange 22 by a pair of lock nuts 25, and between the bracket flange and top 14*b* of plate 14 is disposed a coil spring 26, the bias of which presses the top of plate 14 against the head of stud 21. Thus, the flap-engaging plate 14, when hopper 12 is empty or almost empty, lies in a vertical plane from which it deviates only when there are more than a few envelopes with their flaps nested in the hopper. Accordingly it follows that when cards or sealed envelopes are stacked in hopper 12, there is no deviation of plate 14 from the vertical, and accordingly any tendency of the pile of cards or sealed invelopes to depart from the vertical, i. e. their best feeding position, is resisted by plate 14, thus reducing to a minimum friction between the cards or sealed envelopes and plate 14, which might tend to interfere with proper feeding. Furthermore, because of the resiliency of plate 14 and the displaceability to the left of its upper end 14*b*, as viewed in Figure 2, such pile of cards or sealed envelopes may readily be placed within hopper 12. Also, front plate 17 may be correctly set by holding an envelope against stud 21 and then moving plate 17 to a point adjacent or in engagement with the envelope edge, as desired.

In the normal course of use of a mail treating machine in a large business establishment, a large percentage of the mail matter to be fed through the machine constitutes unsealed envelopes variously stuffed, so that the thickness thereof is anything but uniform. Where an envelope is stuffed, for example, with a single sheet of paper, its unsealed flap, after the stuffing operation, will normally extend from the body of the envelope at right angles. Where, however, the envelope is heavily stuffed, its sides at the open edge of the envelope are spread apart, causing the ends at this edge to be drawn toward one another, this in turn curling the ends of the envelope flap, causing the flap to project from the address side of the envelope in substantially the same plane. Accordingly, it will appear that where such lightly and heavily stuffed envelopes are placed together on top of one another with their flaps nested, the successive flaps will engage one another with varying degrees of pressure, resulting in a frictional relationship between adjacent flaps that is not only not uniform, but which also varies the natural inclination which a stack of uniformly stuffed envelopes would normally assume. As noted hereinabove, this creates a condition in the envelope hopper which complicates the feeding problem.

In Figures 3–7, we have illustrated this condition of a stack of differently stuffed envelopes and accordingly of non-uniform thickness. Thus in Figure 3, hopper 12 is shown loaded almost to capacity with a stack of envelopes 27. It will be noted that some of the envelope flaps are regularly spaced from one another, indicating envelopes of uniform thickness, whereas other flaps as, for example, at points A and B, are farther apart, indicating that in the stack there are one or more envelopes of greater thickness than those above and below. Where there are one or more heavier or thicker envelopes in the stack, as at point A, the stack of envelopes above this point varies from its normal inclination because of the fact that the flaps of the heavier envelopes tend to lie in, or more nearly in the general plane of the envelope, thus causing the flaps of the lighter stuffed envelopes above toward a similar disposition. If, accordingly, there were several heavily stuffed envelopes in the stack and but a few lighter stuffed envelopes above, the flaps of the lighter stuffed envelopes would tend to approach the horizontal were there no restraining factor. Our flexible plate 14 effectively prevents this condition and holds the flaps not only of the heavily stuffed, but also of the lightly stuffed envelopes in a depending position (as shown in Figure 3) which is necessary for the proper feed of the envelopes down through the hopper. Thus, as is shown in Figure 3, the center portion 14*d* of plate 14 is bowed to the left, and its contour is generally that of the contour of the flaps against which it is pressing. It will also be noted that although the upper end 14*b* of the plate has been somewhat displaced to the left, it nevertheless curves reentrantly of the hopper and accordingly engages over the flaps of the uppermost envelopes holding these flaps in proper feeding position within the hopper.

In Figure 4 this condition still pertains, although the stack of envelopes in the hopper has somewhat decreased. Here again the center portion of plate 14 is also contoured in accordance with the contour of the envelope flaps, while the upper end of the plate is still more reentrant in character than in the Figure 3 position. It should be noted that without this reentrant curvature of the upper end 14*b* of plate 14, the tendency of the uppermost envelope flaps would be to open out, particularly where there is lying under them one or more heavily stuffed envelopes, with the result that the sharp edge of the envelope flaps would scratch along the plate were the rigid end not inclined, resulting in a tendency for these top envelopes to become displaced from their proper feeding position within the hopper.

In Figure 5 we have shown the envelope stack substantially depleted, but even in this condition flexible plate 14 is still slightly bowed so as to effect the proper nested relationship of the envelope flaps without undue binding or frictional engagement therebetween as would preclude uninterrupted feeding. In Figure 6, the stack of enve-

lopes is shown almost completely depleted so that plate 14 has almost assumed its normal vertical plane position, and in Figure 7 the hopper is shown empty but for one envelope, and plate 14 is back to vertical. Thus it will appear that as the stack of enevelopes in the hopper lessens in height, from the Figure 3 condition to that shown in Figure 7, the upper end 14b of plate 14 gradually moves from bracket flange 22 to the head of stud 21 under the bias of spring 26, and the curvature of the center portion 14d of plate 14 is maintained in a lessening degree, with the result that the plate 14 always properly engages the envelope flaps regardless of the number of envelopes in the hopper in proper fashion to maintain the envelopes in their most advantageous position for uninterrupted feeding. It will further appear that by reason of the flexibility of plate 14, the envelope flaps are not pressed against one another into such tight frictional engagement as to cause any interruption in the downward progress of the envelopes through the hopper or the successive feeding thereof from the bottom of the hopper.

As noted hereinabove, the natural tendency of a stack of envelopes with their flaps shingled is to incline in the direction of their flap edges. In our hopper, however, the resilient plate 14 counteracts this tendency to a certain degree so that the stack of envelopes maintains a more or less vertical attitude in the hopper. This is advantageous in that it is not necessary for the contacting faces of adjacent envelopes to slide relatively as the stack diminishes, and accordingly substantially precludes the possibility of adjacent envelopes snagging for one reason or another. Also, by reason of the flexibility of plate 14, the envelope flaps are allowed to assume a natural position without undue frictional engagement between adjacent flaps.

Thus we have provided an envelope hopper for a mail treating machine which attains the several objects set forth hereinabove in a thoroughly practical and efficient manner.

As many possible embodiments may be made of the above invention, and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

We claim:

1. An envelope hopper for a mail treating machine or the like, in combination, front and side plates forming three sides of the hopper, means forming a bottom for the hopper, and a resilient member forming the fourth side of said hopper and against which the flap edges of the envelopes rest and adapted to bow between its ends to accommodate the nested flaps of a stack of envelopes in said hopper.

2. An envelope hopper for a mail treating machine or the like, in combination, means forming opposed side plates and a bottom for said hopper, a back plate for said hopper, said back plate being resiliently pliable and having its lower end anchored and its upper end capable of limited movement toward and away from a stack of envelopes in the hopper, and means biasing the upper end of said back plate toward the hopper.

3. An envelope hopper for a mail treating machine or the like, in combination, means forming opposed side plates and a bottom for said hopper, a rear plate for said hopper, means anchoring the lower end of said rear plate, and means movably supporting the upper end of said rear plate for limited movement toward and away from said hopper and up and down relative thereto.

4. An envelope hopper for a mail treating machine or the like, in combination, means forming opposed side plates and a bottom for said hopper, a rear plate for said hopper, means anchoring the lower end of said rear plate, means movably supporting the upper end of said rear plate for limited movement toward and away from said hopper and up and down relative thereto, and spring means biasing the upper end of said rear plate toward said hopper.

5. An envelope hopper for a mail treating machine comprising, in combination, means forming opposed side plates and a bottom for the hopper, a flexible member forming the back of said hopper, means anchoring the bottom of said flexible member against movement, means extending through the upper end of said flexible member to support said upper end for limited movement toward and away from said hopper, and means for biasing the upper end of said flexible member toward said hopper.

6. An envelope hopper for a mail treating machine or the like, in combination, front and side plates forming three sides of the hopper, means forming a bottom for the hopper, and flexible means secured at the top and bottom and forming the fourth side of said hopper and lying in a substantially vertical plane when the hopper is empty and adapted to bow outwardly of the hopper when the hopper is full so as to conform with the contents of the hopper.

7. An envelope hopper for a mail treating machine or the like, in combination, front and side plates forming three sides of the hopper, means mounting said front plate for adjustable movement, adjustable means forming the fourth side of said hopper opposite said front side, and a stud extending through the top of said adjustable means to provide an upper support therefor, said stud also constituting a locating means relative to which the front side of said hopper may be adjusted.

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