C. P. WINTER.

PACKAGE OF FOLDED PAPER SHEETS.

APPLICATION FILED JULY 13, 1915.

1,177,466. Patented Mar. 28, 1916.

FIG. 1.

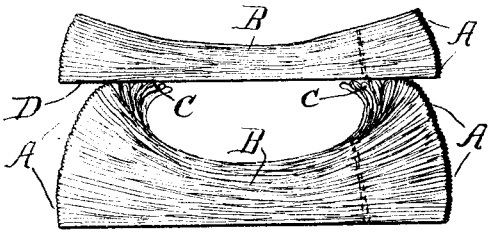


FIG. 2.

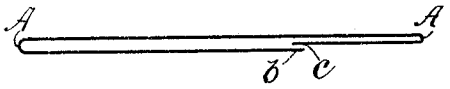


FIG. 3.

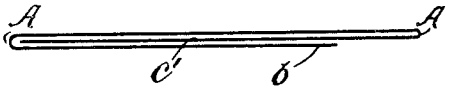


FIG. 4.

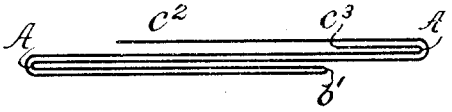


FIG. 5.

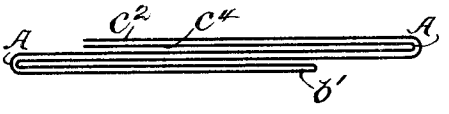


FIG. 6.

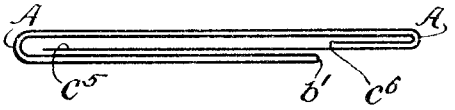
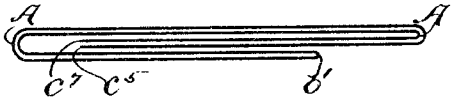


FIG. 7.



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PACKAGE OF FOLDED PAPER SHEETS.

1,177,466. Specification of Letters Patent. Patented Mar. 28, 1916.

Application filed July 13, 1915. Serial No. 39,646.

To all whom it may concern:

Be it known that I, COURTNEY P. WINTER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Packages of Folded Paper Sheets, of which the following is a specification.

This invention relates to separate sheets of paper folded to reduce their dimensions and grouped together in a stack or package for convenience in handling and dispensing, as for instance through means of a suitable cabinet provided for the purpose.

It has long been proposed, as for instance in expired Letters Patent No. 404,622, granted June 4, 1889, and No. 441,162, granted November 25, 1890, both to O. H. Hicks, to provide a paper package made up of separate superposed and non-interlocking sheets variously folded to provide a withdrawing flap in position for convenient grasping as each sheet reaches the delivery position. It has also been proposed to dispose the flap-forming folds, upon the main body of the sheet, in various positions, dictated by the desire to render the thickness of the package more or less uniform throughout its area, or, where there were a plurality of flaps, to render the package reversible in position so that either flap would be in proper position for prehension in delivery, as for instance in expired Letters Patent No. 550,280, granted November 26, 1895 to Lorenz; and it has also been proposed in the aforesaid patent of Hicks, No. 404,622, to have the withdrawing flaps on one side only of the main body of each sheet, so that there is no interference between the flaps. But none of these constructions produces a package which is of substantially uniform thickness throughout its area, for the reason that wherever there are edge folds, the sides of the package build up more rapidly than intermediate portions, and where the sheets terminate at the edges and the flaps or folds are produced at intermediate portions of their areas, the package is thin at the edges and thick in the middle. Particularly is this unsatisfactory building effect, or lack of uniformity in thickness, incident to packages made of non-interlocking sheets where folds on the same sheet or on adjacent sheets are brought in the same plane, either for causing a bottom-most sheet to engage with and extract the flap of an ensuing sheet, as where the flaps of a given sheet are located on opposite sides thereof, or for the purpose of rendering the package reversible in position, as where both flaps are located on the under side of a sheet. In all such constructions, there is no adequate compensation in the intermediate portions of the sheet for the building effect of the folds located at the edges of the sheets; moreover, the packages are unsatisfactory for other reasons.

The object of the present invention is to provide a package of separate, non-interlocked, superposed sheets having withdrawing flaps presented successively at the delivery position (for instance, the discharge opening of a cabinet); said delivery flaps being unrestricted in width by any definite relationship to other flaps on the same or an adjacent sheet, but, on the contrary, being of ample width to insure complete separation of adjacent sheets; each sheet being folded at (preferably both) its edges to bring a comparatively large area (when unfolded) into proportions convenient for packaging and dispensing, and each folded sheet having, over a suitable portion of its intermediate area, an overlapping or doubling of its flaps in a manner to build up the intermediate portion of the sheet commensurately with the building effect of the more or less rounding folds at the edges thereof. In those embodiments where the sheet is first folded to produce two or more ply, each sheet will embody the additional feature of having its flap with free ends proportioned to bring the outer ply, at least, and both plies, if desired, beneath an adjacent flap with folded edge, for the dual purpose of the aforesaid building effect, and preventing disarrangement of the separable plies on one sheet, by the act of withdrawing the sheet in advance thereof.

In my application for Letters Patent relating to dispensing cabinets for paper sheets and method of folding sheets for use therein, filed June 2, 1914, Serial No. 842,403, I have disclosed paper packages made up of individual sheets folded so as to provide a main portion and flaps extending inwardly from opposite edges thereon; and I have illustrated therein various methods of folding the individual sheets from which such a package is to be made. Some

of said methods, notably those disclosed in Figs. 9 and 13, involve the idea of having the combined width of the two flaps greater than that of the main portion of the sheet, so that said flaps overlap and aggregate their thickness with that of the main portion of the sheet to build up the intermediate area equally with the edges where the folds occur, and at the same time leaving one of the flaps in position to fall away from the rest of the sheet and present itself in convenient position for grasping in the act of withdrawing a sheet from the pack. These two methods of folding the sheet, broadly and specifically, form part of the subject matter of this application, which is to this extent a division of my application, Serial No. 842,403; but other methods are likewise disclosed and claimed herein.

The invention will be fully understood upon reference to the accompanying drawing, in which—

Figure 1 is a sectional view illustrating the objectionable effects of troughing or curling that occur in developing layers of improperly folded sheets for packaging (as for instance by the reeling process); Figs. 2 to 7 inclusive, are end views, showing sheets folded in accordance with a number of different methods illustrative of the principles involved in the present invention.

Referring to Fig. 1 when a paper sheet is folded, particularly if the material be of soft texture, such for instance as so-called crape paper used for hand towels, the fold develops thickness at A varying according to the pressure put upon it, but generally greater than the intermediate portion B, so that the building effect of a number of superposed folded sheets, especially in the reeling process, develops more rapidly at the edges than in the intermediate portions, and thus causes the accumulating layers to gradually develop a trough-like form, until an ensuing layer overlies the inturned edges and presses them down as at C and starts to build anew as at D, thus causing considerable inconvenience when the built-up layers are cut up in lengths for packaging. Moreover, such unevenness in the thickness of different portions of the piled sheets makes an undesirable package.

The present invention overcomes these objections by multiplying the paper plies intermediate of the edges, in proportion to the increased thickness developed by the folds at the edges, so as to approximately equalize the thickness of the pack both at its edges and through its intermediate portion, and render it more nearly uniform, not only when completed, but during the process of building up layers of the folded material; this multiplication of the plies intermediate of the edges being attained by overlaying folds of the sheet either on the same side or opposite sides of the sheet, and restricting the overlapping areas to the intermediate portions. Thus, there may be, as in Fig. 2, a fold A at one or each of the edges of the sheet, and at some stage in the building or banding of the packs, pressure is applied sufficient to reduce the rounded edges so that they are about one and a half times the thickness of the main portion of the folded sheet. But if the flaps b and c in Fig. 2, at an intermediate portion of the sheet, be overlapped as shown, they will compensate for the increased thickness at the edges. Or the flap b may be underlapped to a greater extent, by the flap c^1, as shown in Fig. 3, with even a better compensating effect.

If the paper sheet be originally folded intermediately to provide a double ply sheet, that is to be folded to provide oppositely extending two-ply flaps, as shown in Figs. 4 to 7, for instance, the folding of the double thickness at the sides will aggravate the excessive building effect. This may be overcome either by greater creasing of the folds with the extension of one of the free edge plies c^2 to the overlapping position as in Fig. 4, or the free edge ply c^3 to the underlapping position of Fig. 6; or it may be compensated for by extending both the plies c^2 and c^4 to the overlapping position as shown in Fig. 5, or underlapping position as illustrated by the flaps c^3, c^4, in Fig. 7. In each of the Figs. 4 to 7, the folded edge flap b^1 is shown on the under side and will preferably be put in that position in order to make it the flap that drops down in position for prehension in withdrawing the sheet from the pack or from a dispensing cabinet. However, in each of the forms shown in Figs. 4 and 5, the overlapping free edge flap is substantially symmetrical with the folded edge flap b^1, so that if the package were reversed, the outer ply c^2, Fig. 4, or both the free edge plies c^2, c^4, Fig. 5, would present themselves in position for withdrawal.

In each of the forms shown in Figs. 4 and 5, the outer ply of the free edge flap overlies the inner ply in a manner to protect it, while in Figs. 6 and 7, the free edge flap is protected by the folded edge flap, and in all the forms, the flaps are of sufficient length to prevent interference or disarrangement by the flap of an adjacent sheet (when the flaps are on opposite sides of the main fold), or by the main portion of the adjacent sheet when the flaps are both on one side.

From the foregoing, it will be seen that each of the forms illustrated involves the conditions of a pair of flaps extending inwardly from opposite edges of the folded sheet, a distance that makes the combined width of the flaps greater than the main part of the sheet, but terminate short of the folded edges with the distinct advantages

of preventing interference between or disarrangement of the flaps in withdrawing the sheets; of building a more solid and symmetrical package of paper; and overcoming the inconvenience heretofore experienced in reeling the paper.

In the forms shown in Figs. 2, 3, 6 and 7, the underlapping of a free edge flap, with the opposite flap, additionally secures the underlapped flap against disarrangement when presented toward the sheet beneath it, and when the latter is being withdrawn.

I claim:

1. A package of folded sheets made up of a series of separate sheets, each folded to produce a main portion and oppositely extending flaps overlying said main portion; the combined width of which is greater than that of the main body of the sheet, but which flaps terminate short of the folded edges of the sheet.

2. A package of folded sheets made up of a series of separate sheets, each folded to produce a main portion and oppositely extending flaps overlying said main portion; the combined width of which is greater than that of the main body of the sheet, but which flaps terminate short of the folded edges of the sheet; said flaps being substantially equal in width.

3. A package of folded sheets made up of a series of separate sheets, each folded to produce a main portion and oppositely extending flaps overlying said main portion; the combined width of which is greater than that of the main body of the sheet, but which flaps terminate short of the folded edges of the sheet; said sheet being two-ply and having one of its flaps terminating in a folded edge and its other flap terminating in two free edges.

4. A package of folded sheets made up of a series of separate sheets, each folded to produce a main portion and oppositely extending flaps overlying said main portion; the combined width of which is greater than that of the main body of the sheet, but which flaps terminate short of the folded edges of the sheet; said sheet being two-ply and having one of its flaps terminating in a folded edge and its other flap terminating in two free edges; the inner ply of the free edge flap terminating short of and being inclosed by the outer ply.

5. A package of folded sheets made up of a series of separate sheets, each folded to produce a main portion and oppositely extending flaps overlying said main portion; the combined width of which is greater than that of the main body of the sheet, but which flaps terminate short of the folded edges of the sheet; said sheet being two-ply and having one of its flaps terminating in a folded edge and its other flap terminating in two free edges; both flaps being upon the same side of the main portion of the folded sheet.

6. A package of folded sheets made up of a series of separate sheets, each folded to produce a main portion and oppositely extending flaps overlying said main portion; the combined width of which is greater than that of the main body of the sheet, but which flaps terminate short of the folded edges of the sheet; said sheet being two-ply and having one of its flaps terminating in a folded edge and its other flap terminating in two free edges; both flaps being upon the same side of the main portion of the folded sheet, and the free edge flap being lapped under the folded edge flap.

7. A package of folded sheets made up of a series of separate sheets, each folded to produce a main portion and oppositely extending flaps overlying said main portion; the combined width of which is greater than that of the main body of the sheet, but which flaps terminate short of the folded edges of the sheet; said sheet being two-ply and having one of its flaps terminating in a folded edge and its other flap terminating in two free edges; both flaps being upon the same side of the main portion of the folded sheet; the outer ply of the free edge flap extending beyond the inner ply thereof and being upon the same side of the main portion of the sheet with the folded edge flap and underlying said folded edge flap.

The foregoing specification signed at Washington, District of Columbia, this 26th day of April, 1915.

COURTNEY P. WINTER.