# United States Patent [19]

**Henig**

[11] **3,754,646**

[45] **Aug. 28, 1973**


[54] **RECEPTACLE FOR SORTING AND HANDLING FLAT ARTICLES SUCH AS LETTERS**


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[73] Assignee: **John I. Thompson & Company**, Rockville, Md.



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[52] **U.S. Cl.**..... **206/73**, 211/50, 206/45.11, 220/4 E

[51] **Int. Cl.** ... **B65d 1/36**, B65d 11/10, A47b 63/00

[58] **Field of Search**..... 206/73, 72, 45.11; 211/10, 11, 50; 220/4 E



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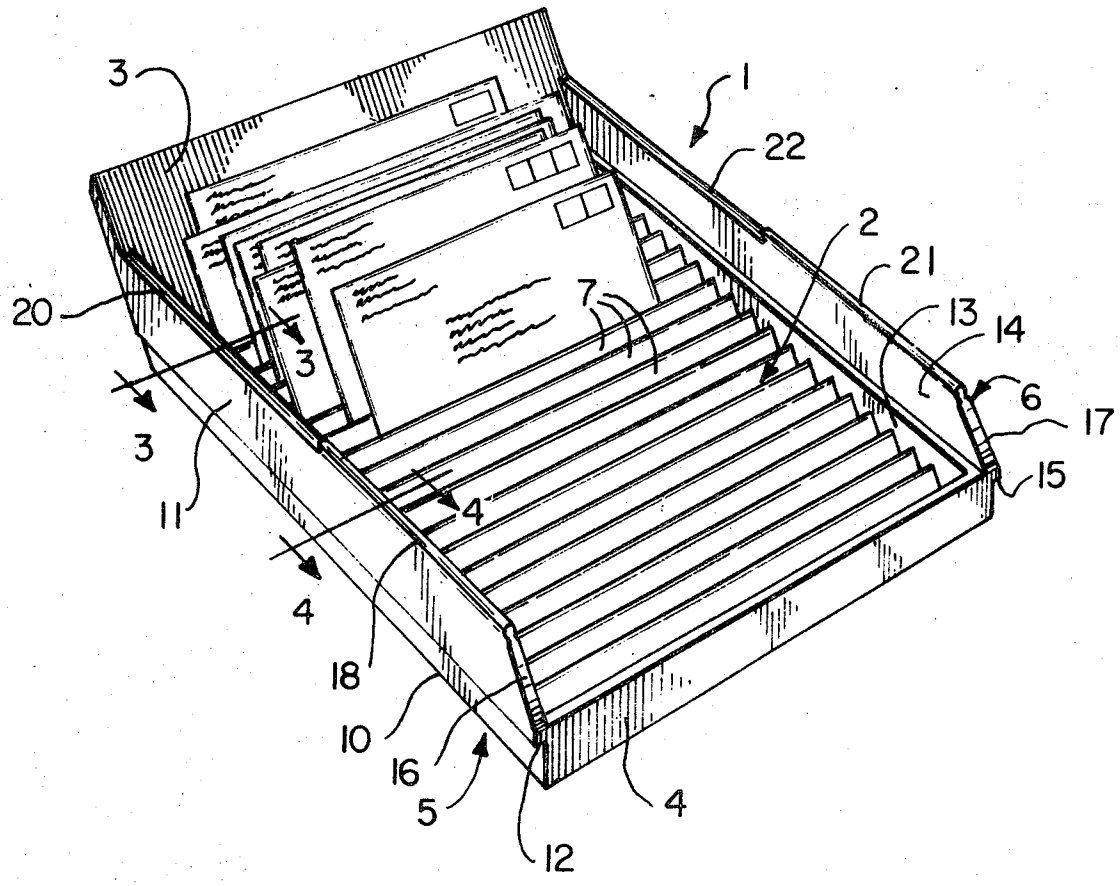
*Primary Examiner*—Leonard Summer
*Attorney*—Roylance, Abrams, Berdo and Kaul



[57] **ABSTRACT**

A receptacle which can be employed as a tray for collecting groups of thin generally flat articles, typically letters, during sorting and which can be combined with an identical but inverted receptacle to provide a complete container in which the collected group of articles can be transported. Constructed to be advanced by a conveyor beneath a series of article retaining stations, with the articles dropped one by one into the receptacle, the receptacle has an upwardly and rearwardly inclined trailing end wall, to support the first article dropped into the receptacle, and a series of upwardly opening transverse notches respectively arranged to receive the lower edges of the first and subsequent other articles dropped into the receptacle, the configuration and disposition of the notches being such that the dropped articles collect in the receptacle as an orderly group with all of the articles oriented in the same fashion, e.g., addresses of envelopes all facing the same way.


**9 Claims, 15 Drawing Figures**



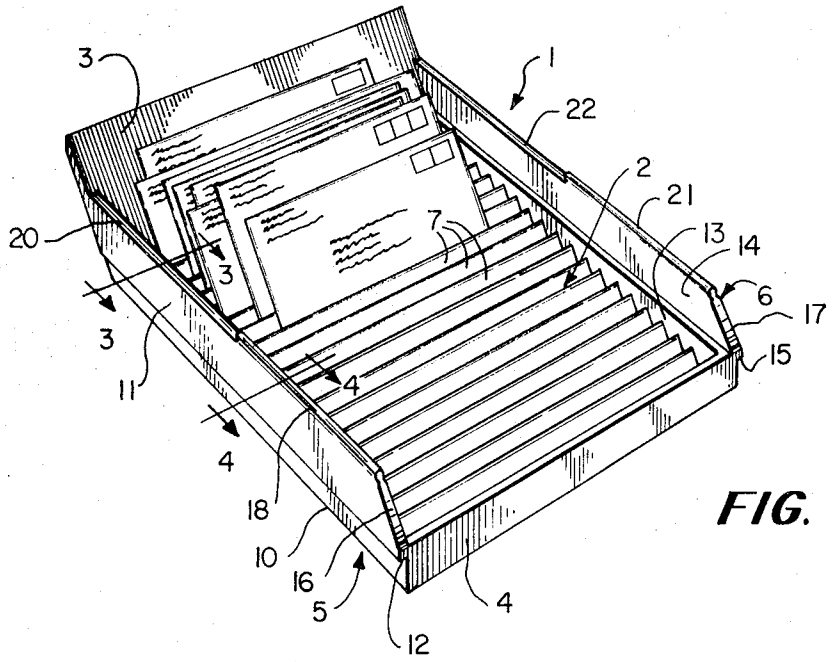



FIG. 1

FIG. 2

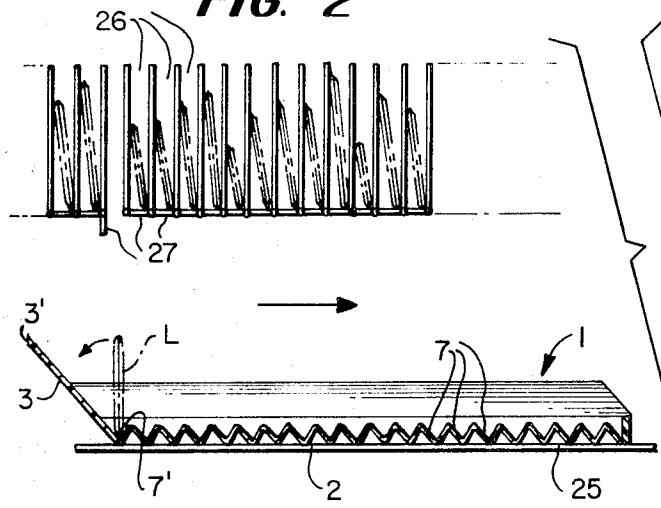
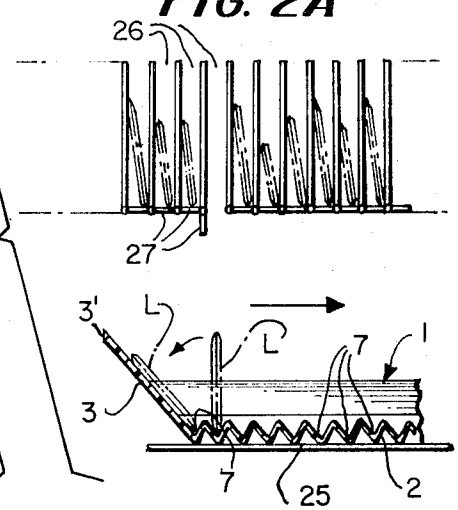



FIG. 2A



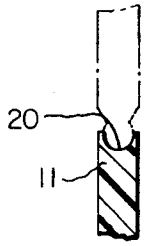




FIG. 3

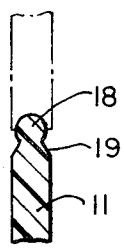



FIG. 4

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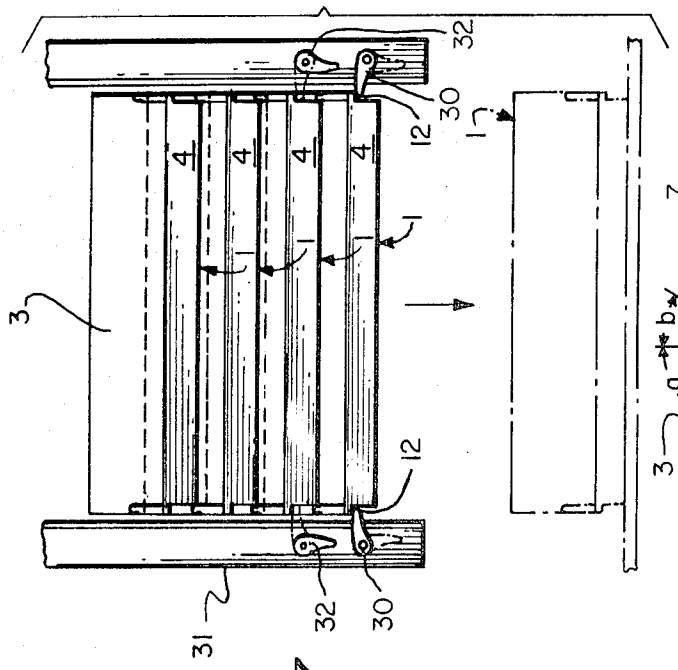



FIG. 7

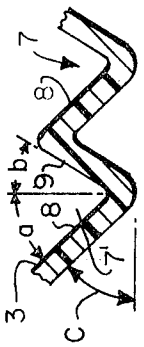



FIG 5

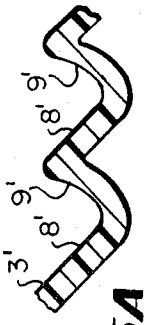



FIG 5A

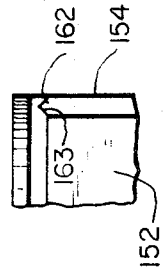



FIG. 13

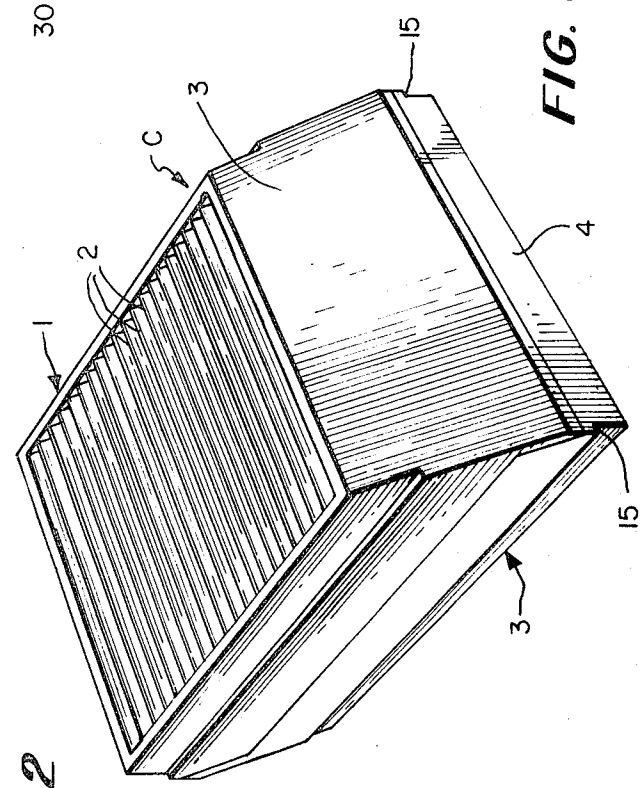



FIG. 6

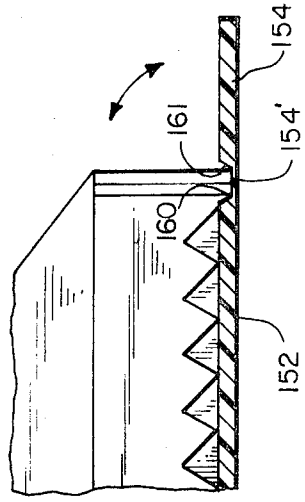



FIG. 12

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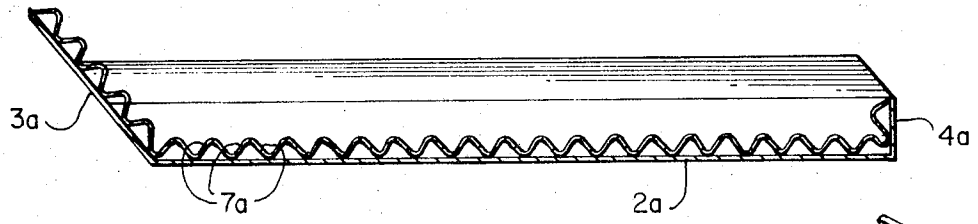



FIG. 11

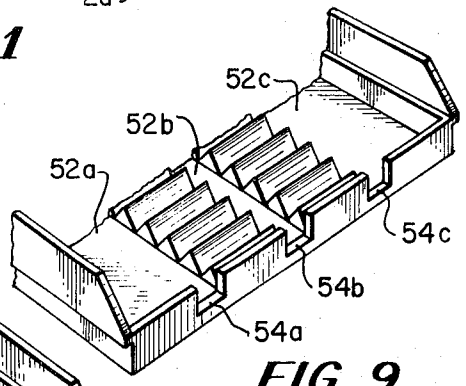



FIG. 9




FIG. 8

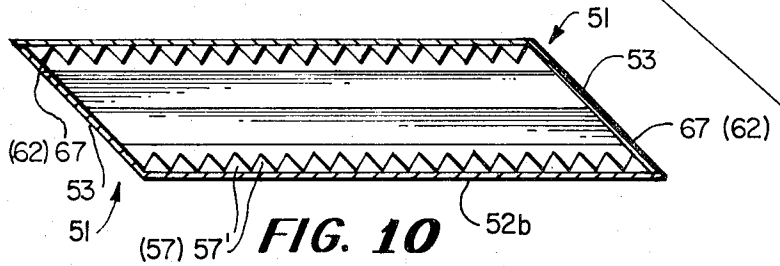



FIG. 10

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# RECEPTACLE FOR SORTING AND HANDLING FLAT ARTICLES SUCH AS LETTERS

## BACKGROUND OF THE INVENTION

It is frequently necessary to sort flat articles into groups of like articles and to handle and transport the resulting groups of articles. Thus, as described in my U. S. Pat. No. 3,300,066, issued Jan. 24, 1967, letters can be sorted automatically by delivering each letter into one of a horizontally extending series of upright storage slots, and dropping the letters selectively onto a conveyor arranged beneath the storage slots, the operation being such that letters of like characteristic, e.g., addresses are deposited in overlapping relation to form a group supported by the conveyor.

Sorting procedures of this general type are highly advantageous but involve a number of subsidiary problems. Thus, it is difficult to achieve the desired neatness and preciseness of grouping by simply dropping the letters or other articles edgewise onto a flat support such as a conveyor belt. Further, groups of letters so produced retain their integrity as a group only because of the support afforded by, e.g., the conveyor belt, and handling and transport of the groups requires that they be secured in some fashion, as by a band or by tying with string. And, so long as the groups have not been secured in some fashion, they cannot easily be manipulated, e.g., diverted for later addition of more articles.

Attempts to solve such problems in the prior art have not been truly satisfactory, particularly in the context of highly automated article sorting and handling. Though the groups can be secured adequately, as by banding, for transport, securing them in that fashion is allowable only after all sorting operations are complete, and it has thus been thought to be necessary to accumulate the articles in loose groups and retain the groups in that form until sorting has been completed. The usual portable receptacles employed in sorting of articles such as letters (e.g., mail bags, relatively large baskets, etc.) offer little if any advantage in automated systems. Accordingly, there has been a continuing need for some portable handling means capable of at least retaining the groups in proper form during sorting and handling.

## OBJECTS OF THE INVENTION

A general object of the invention is to devise a receptacle which serves both to orient flat articles in a predetermined fashion as they are dropped therein and thereafter to maintain the articles in their oriented relation.

Another object is to provide such a receptacle which is hermaphroditic in the sense that two identical receptacles can be combined to form a closed container which will preserve the oriented relation of a group of articles, one of the receptacles forming the bottom of the container and the other the top.

A further object is to provide a receptacle capable of being used to receive, arrange and retain letters or like flat articles dropped individually in succession from a series of retaining stations as the receptacle is advanced along a path below the series.

## SUMMARY OF THE INVENTION

Receptacles according to the invention comprise a bottom wall which is wider than the maximum length of the flat articles to be handled and has a length which is great in comparison to the thickness of the articles. At one end (the trailing end when the receptacle is moved beneath a series of article receptacles), the receptacle has an inclined end wall which slants upwardly and away from the bottom wall. The upper surface of the bottom wall presents a plurality of upwardly opening notches extending transversely of the receptacle and arranged in a side-by-side series progressing lengthwise of the receptacle, the effective width of the notches being larger than the thickness of the lower edges of the articles to be collected in the receptacle. The series of notches includes a first notch extending generally along the lower edge of the inclined end wall. When used for sorting letters, the receptacle is advanced along a path below a series of letter receptacles and a first letter is dropped into the receptacle when the first notch is located to receive the same. The relationship between the first notch and the inclined end wall is such that, when the first letter has been dropped, continued advance of the receptacle causes that letter to pivot rearwardly, coming to rest on the inclined end wall while the lower edge of the letter remains engaged in the notch. A second letter can be dropped in the next notch, will likewise pivot rearwardly, and will come to rest on the first letter. The procedure can be continued until the receptacle is full, or until the desired group of letters has been accumulated. Gravitational coaction of the letters with the notched bottom wall and the inclined end wall causes the letters to remain in a letter facing retained group, i.e., a group in which the letters are in address face-to-rear face contact with all address faces facing in the same direction, even though the receptacle is moved, stored, and again moved, so long as the receptacle remains in upright position.

In advantageous embodiments, the receptacle has upright side and front end walls and is so constructed that two of the receptacles can be joined to form a closed container with the group of letters or other articles housed therein for transport.

In order that the manner in which the foregoing and other objects are achieved according to the invention can be understood in detail, advantageous embodiments thereof will be described with reference to the accompanying drawings, which form a part of the original disclosure of this application, and wherein:

FIG. 1 is a perspective view of a receptacle according to one embodiment;

FIGS. 2 and 2A are semidiagrammatic views in which the receptacle of FIG. 1 is shown in longitudinal vertical cross section at two successive letter-receiving stations;

FIGS. 3 and 4 are fragmentary transverse sectional views, enlarged relative to FIG. 1, taken respectively on lines 3—3 and 4—4, FIG. 1, and showing the manner in which a second receptacle is applied as a cover to the receptacle of FIG. 1;

FIG. 5 is a fragmentary longitudinal sectional view taken at the juncture of the bottom and trailing end walls of the receptacle of FIG. 1;

FIG. 5A is a view similar to FIG. 5 but showing a modified form of the receptacle;

FIG. 6 is a perspective view of a closed container formed by two of the receptacles of FIG. 1;

FIG. 7 is a front elevational view of a plurality of the containers of FIG. 1 assembled in a nested stack and releasably retained by a supporting rack;

FIG. 8 is a perspective view of a receptacle according to another embodiment of the invention and also illustrates a hand tool useful therewith;

FIG. 9 is a fragmentary perspective view showing the receptacle of FIG. 8 in modified form;

FIG. 10 is a longitudinal sectional view of a closed container formed by two receptacles according to a further embodiment of the invention;

FIG. 11 is a longitudinal sectional view of a receptacle according to yet another embodiment;

FIG. 12 is a fragmentary longitudinal sectional view of a still further modified form of the receptacle of FIG. 8; and

FIG. 13 is a fragmentary top plan view of the receptacle of FIG. 12, showing the front end wall in closed position.

## THE EMBODIMENT OF FIGS. 1–7

In the embodiment of FIGS. 1–7, the receptacle 1 comprises a bottom wall 2, an upwardly and rearwardly inclined trailing end wall 3, and upright front end wall 4, and upright side walls 5 and 6. The receptacle is advantageously molded as an integral piece from a suitable polymeric material. Bottom wall 2 is of transversely corrugated configuration, presenting a plurality of straight, elongated, upwardly opening notches 7 which extend transversely of the receptacle so as to be parallel to end walls 3 and 4. As best seen in FIG. 5, each notch 7 is of triangular cross section, being defined by a flat rear surface 8 and a flat front surface 9. Bottom wall 2 is continuous, notches 7 extending from side wall 5 to side wall 6.

Notches 7 can be considered as arranged side-by-side in a series which progresses from end wall 3 to end wall 4, with the first notch 7′ of the series extending along the bottom edge of the trailing end wall 3 in such fashion that the front face of end wall 3 constitutes an extension of surface 8 of notch 7′.

Rear end wall 3 has a slant height which approximates three-quarters of the maximum width of the letters or other flat articles to be collected in the receptacle. Front end wall 4 extends upwardly at right angles to the plane of bottom wall 2 for a distance approximately one-third the projected height of wall 3 and terminates in a straight upper edge. Side wall 5 includes flat lower portion 10 and a flat upper portion 11, the two portions 10, 11 lying in vertical planes with the plane of portion 11 displaced outwardly from that of portion 10 and the two portions being integrally joined in such fashion that the lower edge of portion 11 is defined by a downwardly facing outer shoulder 12. Similarly, side wall 6 includes lower portion 13, upper portion 14, and a downwardly facing shoulder 15 along the lower edge of portion 14. The transverse dimensions of the receptacle are such that the space between the opposing faces of portions 11 and 14 is very slightly greater than the distance between the outer face of portion 10 and the outer face of portion 13. At the front end of the receptacle, the front edges 16, 17 of upper portions 11 and 14, respectively, slant upwardly and rearwardly at the same angle of inclination as rear end wall 3, edges 16, 17 being straight and commencing at the upper edge of front wall 4.

The upper edges of side wall portions 11 and 14 are straight and parallel to the bottom wall. The upper edge of portion 11 includes a front half 18, FIGS. 1 and 4, in the form of a straight elongated bead of circular transverse cross section such that the edge portion 18 presents a right cylindrical surface extending for substantially more than 180°, that surface joining inclined shoulders 19, FIG. 4. The upper edge of portion 11 also includes a rear half 20 in the nature of a groove having a curved transverse cross section which extends for more than 180° and has a radius of curvature substantially equal to that of the bead constituted by upper edge portion 18. The upper edge of upper portion 14 of side wall 6 is identical with that of portion 11 of side wall 5 and includes a front half in the form of a bead 21 and a rear half in the form of a groove 22.

The receptacle of FIGS. 1–8 is particularly useful for collecting groups of letters during sorting of mail in accordance with my U. S. Pat. No. 3,300,066, and the manner of such use is illustrated in FIGS. 2 and 2A. The receptacle 1 is placed on the upper run of an endless horizontal conveyor belt 25 arranged to advance the receptacle along a horizontal path below a horizontally extending series of letter-retaining stations 26. Each station 26 defines an upright slot closed at the bottom by a pivoted door 27. Letters previously identified as to category, e.g., address, are delivered individually to the retaining station in the manner described in my patent No. 3,300,066 and can be released selectively by opening of the respective door 27. Receptacle 1 is advanced by conveyor belt 25 until the first notch 7′ is in a predetermined position below the first station 26 containing a letter of the category to be collected. Door 27 of that station is opened and the letter L drops by gravity toward receptacle 1, opening of the door 27 being timed, relative to the speed of advance of receptacle 1 and the time required for the letter to traverse the space between the station 26 and receptacle 1, so that the notch 7′ is located directly below the station 26 when the lower edge of letter L reaches the bottom of receptacle 1. Accordingly, the lower edge of the letter enters notch 7′ and is guided into the bottom of that notch by the respective surfaces 8 and 9. With receptacle 1 continuing to advance, and with the lower edge of letter L now retained by notch 7′, the letter pivots rearwardly, coming to rest on the front face of the inclined trailing end wall 3. When receptacle 1 advances to the proper position below the next station 26 containing a letter L′ of the category to be collected, door 26 of that station is opened and letter L′ drops, with its lower edge entering the notch 7 immediately adjacent the preceding letter resting in notch 7′. With receptacle 1 still continuing to advance, letter L′ pivots rearwardly (relative to the receptacle) to come to rest on letter L. This procedure continues either until an adequate number of letters is collected during one pass beneath the series of stations 26, or until the receptacle has passed all of the stations 26 and, having collected less than a predetermined number of letters, is diverted to storage for subsequent recycle to receive additional letters.

As will be apparent from FIGS. 1–2A, letters collected in the receptacle 1 are arranged automatically in consistent orientation so as to be removable as a group or stack ready for banding or tying. With the letters delivered into stations 26 with the addressed surfaces facing to the right, as viewed in FIGS. 2 and 2A, all of the letters collected in receptacle 1 will have their addressed surfaces facing in the same direction, and the group of letters, when removed and tied, will accord-

ingly be ready for further handling, manually or by automated equipment, in usual fashion.

When the collected group of letters is to be transported for a substantial distance, as from city to city, the receptacle **1** in which the letters have been collected can be combined with another identical receptacle to form the closed container C, FIG. **6**, in which the group of letters is completely closed and retained in the same relation in which they were collected. Considering FIGS. **1–2A**, it will be noted that the height of side wall portions **11, 14** above the upper edge of front end wall **4** is equal to the projected height of that portion of wall **3** which extends above the upper edges of portions **11, 14.** Accordingly, a second receptacle **1**, containing no letters, can be inverted and applied as a cover to the first receptacle, with the beads **18, 21** being snapped into the grooves **20, 22,** respectively, to lock the two receptacles together. In the container C thus assembled, the end wall **3** of each receptacle **1** extends over the edges **16, 17** of the other receptacle **1** and has its free edge engaged with the upper edge of end wall **4** of the other receptacle. In this connection, the rear surface of trailing end wall **3** can be chamfered, as at **3'**, at the free edge in such fashion as to provide a surface which lies in the same plane as the front face of wall **4** of the other receptacle, in the assembled container C.

Since the combined heights of trailing end wall **3** and front end wall **4** determine the interior space between the bottom walls **2** of the two receptacles making up the closed container C, FIG. **6**, and since the slant height of wall **3** plus the effective slant height afforded by wall **4** is approximately equal to the maximum width of the letters or other articles to be collected, the articles contained within container C are on the one hand prevented from pivoting excessively and on the other hand retained and enclosed without being bent or deformed.

The distance between end walls **3** and **4**, and the number of notches **7**, are so selected that the receptacle can accommodate a predetermined number of letters and, in normal mail sorting use, that number will be collected before the receptacle is transported to another location. Accordingly when the container C is assembled with such a group of letters in place, the integrity of the group is maintained even though, during transport, the container may be, e.g., completely inverted.

Since the distance between the outer faces of lower side wall portions **10** and **13** is slightly less than the distance between the inner faces of the upper side wall portions **11** and **14**, a plurality of the receptacles **1** can be arranged as a nested stack in the manner seen in FIG. **7.** With the receptacles thus arranged, retaining dogs **30** of stack support **31** can be engaged respectively beneath shoulders **12** and **15** of the lowermost receptacle **1** to support the stack of receptacles. A second set of retaining dogs **32** is provided which can be brought into and out of engagement beneath the shoulders **12** and **15**, respectively, of the next higher receptacle **1** in the stack. Accordingly, with dogs **32** engaged, dogs **30** can be actuated to release the lowermost receptacle, and the dogs **32** can then be disengaged to allow the stack to descend until the dogs **30**, having been returned to their original positions, engage and support the newly arrived receptacle **1.**

The effective mouth width of notches **7** is made large enough so that each notch **7** can accommodate an article of the maximum thickness contemplated for the articles to be collected in the receptacle. The effective mouth width of the notches should approximate the maximum thickness of the articles to be handled and, advantageously, is made slightly greater than that thickness. Typically, when the receptacle is intended for handling letters, the mouth width of notches **7** is on the order of five-sixteenth inch, taking one-fourth inch as the maximum thickness of the letters. The angle between surfaces **8** and **9** of the notches should be less than 90° and, advantageously, is 75°–85°, with angle *a* being larger than angle *b*. The included acute angle *c* between trailing end wall **3** and the horizontal is, advantageously, in the range of 45°–70°.

## ALTERNATIVE EMBODIMENTS

In the embodiment of FIG. **8**, the receptacle **51** is generally like that of FIGS. **1–7**, save that the bottom wall **52** thereof is provided with two identical rows of notches **57** and **57'**, the notches of the two rows being mutually aligned transversely of the receptacle and the two rows of notches extending longitudinally of the receptacle and being parallel to each other. The two rows of notches are spaced apart and each row is spaced inwardly from the adjacent side wall of the receptacle. Bottom wall **52** includes a flat portion **52*a***, located between the row of notches **57** and side wall **55**, a flat portion **52*b***, located between the two rows of notches, and a flat portion **52*c***, located between the row of notches **57'** and side wall **56.**

Each transversely aligned pair of notches **57, 57'** is operative to receive and retain a flat article to be collected, such as one of the letters illustrated in FIG. **8**, in the same manner described with reference to notches **7** in the embodiment of FIGS. **1–7.**

A hand fork **40**, with three flat parallel fingers **41** spaced apart so as to be respectively alignable with the flat portions **52*a***, **52*b*** and **52*c***, can be used to remove the collected letters as a group from the receptacle.

As seen in FIG. **9**, the receptacle of FIG. **8** can be modified by providing the front wall **54** with upwardly opening rectangular notches **54*a***, **54*b*** and **54*c***, so that the fingers of a hand tool or an automated unloader can be inserted longitudinally into the receptacle with the fingers each entering via a different one of the notches **54*a*–54*c***. This modified form of receptacle has the advantage that the fingers of the unloading device can simply slide along the upper surfaces of flat bottom wall portions **52*a*–52*c*** without first being inclined to pass over the front wall of the receptacle, as is the case with the embodiment of FIG. **8.**

In both the receptacle of FIG. **8** and that of FIG. **9**, the wall portions defining notches **57, 57'** can be displaced upwardly out of the common plane of flat portions **52*a*–52*c*** in such fashion that the effective bottom of each notch is slightly above the upper surface of flat portions **52*a*–52*c***, providing free space between the bottom edges of the collected letters and the flat portions of the bottom wall to accommodate the fingers of the unloading tool.

FIG. **10** shows an embodiment employing receptacles identical with receptacle **51**, FIG. **8**, save that front wall **54** is eliminated entirely, inclined front side wall edges **62** and **67** are extended to the bottom of the receptacle, and rear wall **53** is extended so that when two of the re-

ceptacles are fitted together to form a closed container, the rear wall **53** of each will close the front of the other. The embodiment of FIG. **10**, like that of FIG. **9**, has the advantage that the fingers of the unloading tool can be inserted freely without interference by a front wall, and has the additional advantage that a complete container formed from two of the receptacles is fully closed despite the absence of a front wall in each receptacle.

While the receptacle is advantageously provided with notches **7, 57** of angular transverse cross section, it will be understood that the notches can be of other configurations capable of receiving and retaining an edge of a flat article such as a letter. Thus, as illustrated in FIG. **11**, the receptacle of FIGS. **1–7** can be constructed with bottom wall **2***a*, trailing end wall **3***a* and front end wall **4***a* formed of a single piece of single face corrugated box board, with the corrugations upwardly exposed as shown, the corrugations then defining the notches **7***a*.

In the embodiment of FIGS. **8** and **9**, the front end wall **54** is fixed in upright position, its end and bottom edges being integral with the respective side and bottom walls of the receptacle. In the embodiment of FIG. **10**, the front wall of the receptacle is eliminated. FIGS. **12** and **13** show an alternative embodiment in which the side, bottom and end walls are formed as an integral structure from a suitable polymeric material, the front wall **154** being connected to bottom wall **152** by an integral flexible hinge comprising a narrow markedly thinned area **154'** extending transversely of the receptacle completely along the juncture between the bottom wall and front wall. The material of thinned area **154'** lies adjacent the bottom face of the bottom wall so that, when the front wall **154** is pivoted to lie generally in the same plane as the bottom wall, the bottom face of the bottom wall and the corresponding face of the front wall lie in a common plane, as seen in FIG. **12.** Upwardly and outwardly diverging curved surfaces **160, 161**, FIG. **12**, extend between the edges of the thinned area **154'** and the upper face of the bottom wall and the corresponding face of the front end wall, respectively. The side edges of front end wall **154** are of generally triangular configuration, as indicated at **162**, FIG. **13**, and these edges snap resiliently into and out of engagement with mating grooves **163** which are of triangular transverse cross section so that, as seen in FIG. **13**, front end wall **154** can be retained positively in its upright positon.

In all embodiments, the notches provided in the bottom wall can be of a transverse cross section other than triangular. Thus, as shown in FIG. **5A**, surfaces **8'** of the notches can be flat and angularly disposed as hereinbefore described, and surfaces **9'** can advantageously be concave, as viewed from the opposite side of the notch, so that the lower edges of the letters or like articles deposited in the notches are positively retained against surface **9'** even though the angle of repose of the article, established by trailing end wall **3'**, is acute.

What is claimed is:

**1.** A receptacle for use in collecting relatively thin, flat articles such as letters comprising, in combination

a bottom wall having a width greater than the length of the articles to be collected and a length which is large in comparison with the average thickness of such articles;

an inclined first transverse end wall extending upwardly from one end of said bottom wall,

said first end wall slanting upwardly and away from said bottom wall;

the upper surface of said bottom wall presenting a plurality of substantially identical upwardly opening notches which are effectively elongated transversely of said bottom wall and arranged in a series which commences at the bottom of said first end wall and progresses lengthwise of said bottom wall toward the other end of said bottom wall,

said notches being in parallel side-by-side relation and having a width which is larger than the thickness of the lower edges of the articles to be collected, the series of said notches including a first notch so disposed that the bottom thereof extends generally along a line included in the plane of said first end wall whereby, when the receptacle is advanced lengthwise with said end wall at the trailing end of the receptacle, a flat thin article dropped in such fashion that its lower edge enters said first notch will pivot rearwardly, with forward movement of the receptacle, and come to rest on said first end wall, and a flat thin article similarly dropped into the next notch of the series will likewise pivot rearwardly to come to rest on the article dropped into said first notch;

two side walls extending lengthwise of the receptacle and each joined to a different end of said first end wall and to said bottomwall,

the height of said side walls being less than that of said first end wall;

wherein the upper edge of each of said side walls is provided with first and second different latch means,

said first latch means being of such configuration and size as to coact with a latch means of the configuration and size of said second latch means, whereby a second identical receptacle, when inverted and disposed over said receptacle in endwise reversed relation thereto, can be secured to said receptacle as a cover; and

a second transverse end wall secured to and projecting upwardly from said bottom wall,

the height of said side walls being greater than the height of said second end wall,

said side walls having inclined edge portions, at the ends thereof opposite said first end wall, which slant downwardly and toward said second end wall,

the dimensions of said first end wall said side walls, and said second end wall being such that, when said second receptacle is secured in place as a cover, said first end wall of said second receptacle will lie in flush engagement with said inclined edge portions of the receptacle being covered.

**2.** A receptacle according to claim **1**, wherein

said first end wall presents a substantially flat continuous surface, and

said bottom wall is relatively thin and of generally hill-and-valley configuration following the shape of said notches.

**3.** A receptacle according to claim **1**, wherein

said first end wall is integral with said bottom wall and constitutes a continuation of the corresponding wall of said first notch.

**4.** A receptacle according to claim **1**, wherein

the wall of each of said notches which slants upwardly and toward said first end wall is inclined at a greater angle from a plane at right angles to said

bottom wall than is the wall which slants upwardly and away from said end wall.

5. A receptacle according to claim 1, wherein said second end wall is pivotally connected to the end of said bottom wall opposite said inclined first end wall and is movable from an open position, in which said bottom and second end walls are generally coplanar, and a closed position, in which said second end wall bridges the space between the corresponding ends of said side walls, the receptacle further comprising means for releasably securing said second end wall in said closed position.

6. A receptacle according to claim 1, wherein said end wall is so disposed that the included acute angle defined by said first end wall and the plane of said bottom wall is in the range of from about 45° to about 70°.

7. A receptacle according to claim 6, wherein the included acute angle defined by said first end wall and the plane of said bottom wall is equal to the angle of the inclined edge portions relative to the plane of said bottom wall.

8. A receptacle according to claim 1, wherein the length of said notches is short in a direction transversely of said bottom wall and said notches are arranged in two parallel series, the notches of one series being aligned respectively with the notches of the other series, and said two series are spaced apart transversely of said bottom wall.

9. A receptacle according to claim 8 wherein said second transverse end wall is provided with an opening communicating with the space between said two series of notches.

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