March 5, 1957 D. A. WALLANCE 2,784,047

STORAGE BINS

Filed Jan. 15, 1953 2 Sheets-Sheet 1

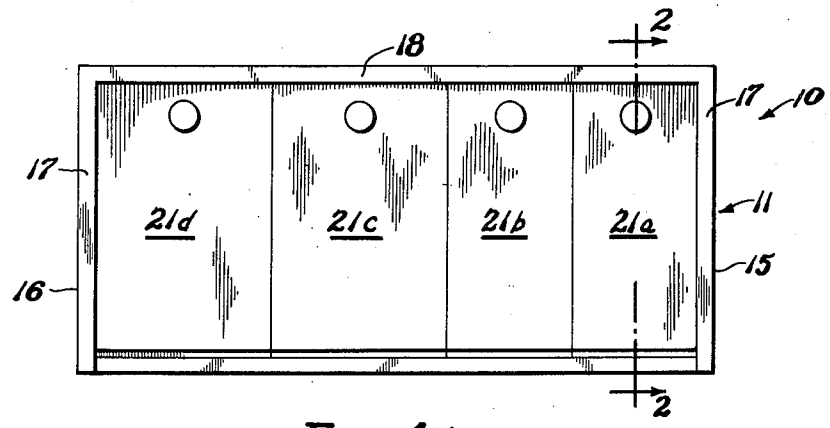


Fig. 1

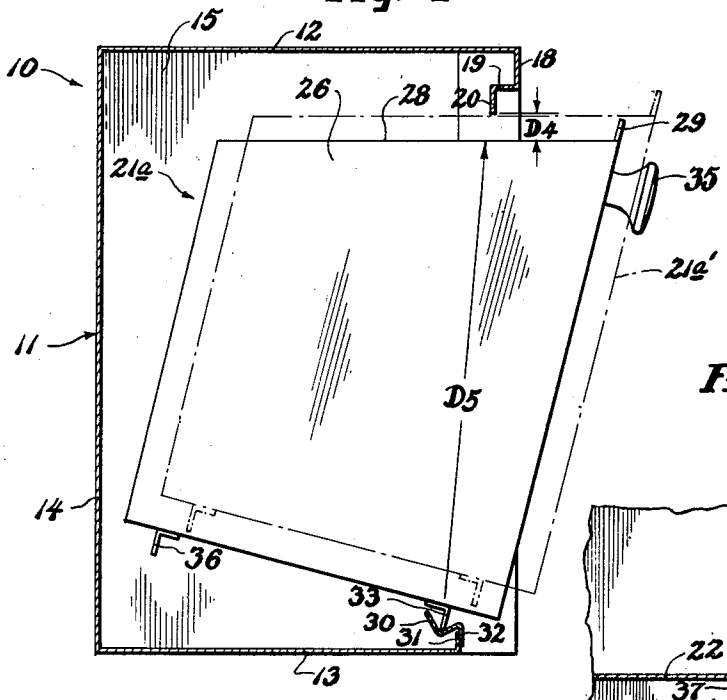


Fig. 4

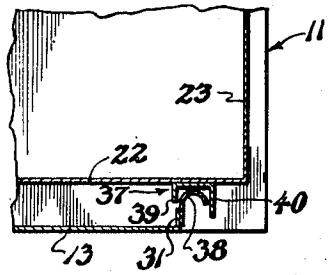


Fig. 6

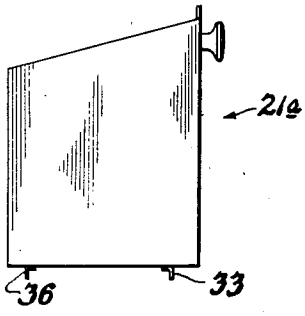


Fig. 5

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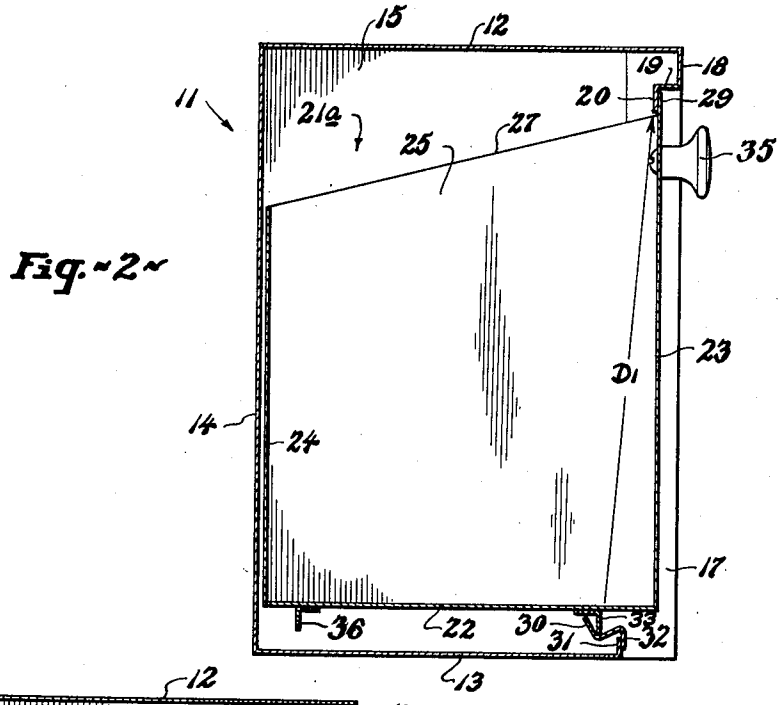


Fig. ~2~

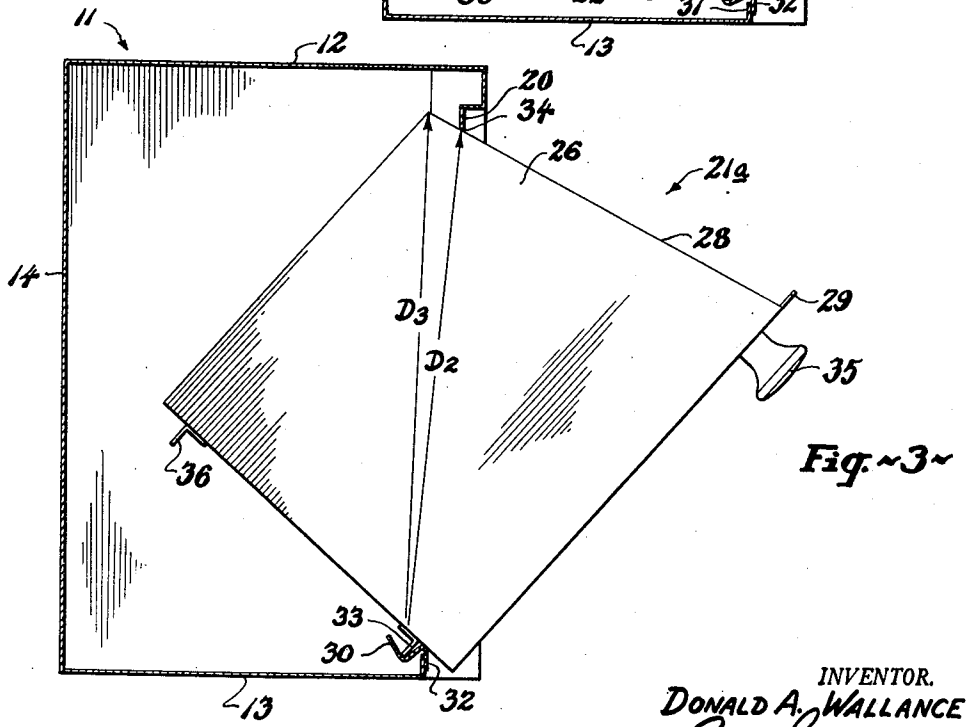


Fig. ~3~

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STORAGE BINS

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1 Claim. (Cl. 312—328)

The present invention relates generally to storage bins, and is particularly directed to an assembly of several storage bins for holding loose or comminuted articles, such as, for example, flour, sugar, rice, spices and the like, or small hardware items.

An object of the present invention is to provide an assembly of several storage bins which are mounted in a common housing for individual movement between a closed position and an open position, and wherein each bin is conveniently removable bodily from the housing independently of the other bins of the assembly.

Another object is to provide an assembly of the described character wherein the bins are rockably supported in the housing for swinging movement by manual actuation between the closed and open positions, and wherein the rocking axis of each bin is located so that the weight of the bin and its contents tends to maintain the bin in either its open or closed position.

Another object is to provide an assembly of the described character wherein the several bins and the common housing are formed to limit the swinging movement of each bin to the angular range between the open and closed positions thereof.

A further object is to provide an assembly of the described character wherein the several bins and the housing are formed to prevent bodily removal of the bins from the housing when the bins are in either their open or closed positions and to permit such bodily removal of each bin from the housing only when the bin is in an intermediate rocked position between the open and closed positions.

A still further object is to provide a housing and bin assembly having the foregoing advantages and features and which is capable of relatively low cost production without sacrificing durability or reliability of operation.

In accordance with the present invention the above mentioned objects, and other objects, features and advantages appearing hereinafter, are achieved by providing an assembly which includes a rectangular or box-like housing open at the front and several box-like bins open at the top and adapted to be received in side-by-side arrangement within the housing. The assembly is provided with means for rockably supporting the bins within the housing and such means includes a support element extending along the lower edge of the front opening of the housing and a cooperating element extending transversely across the bottom of each bin adjacent the front of the latter and rockably seated on the support element of the housing. The cooperating elements constituting the rockable supporting means for the bins are formed to be separable only when the bin and its element are raised bodily within the housing. The front walls of the bins project above the top edges of the side walls of the bins and engage against the front face of the housing above the front opening to limit the swinging movement of the bins in the direction enclosing the bins within the housing. The top edges of the side walls of each bin are straight and incline downwardly from the front to the back so that little clearance is provided between the top edges and the upper edge of the front opening when the bin is in its closed position or fully enclosed within the housing, and the rear portions of the top edges of the bin side walls contact the upper edge of the opening at the front of the housing when the bin has been rocked to an open position in which substantially the entire open top of the bin is exposed in front of the housing so that such contact limits the rocking of the bin in the direction toward the open position. Thus, the close proximity of the upper edge of the front housing opening and the top edges of the bin side walls in the open and closed positions of the bin prevents the raising of the latter and separation of the cooperating elements forming the rockable support when the bin is in its open or closed positions. However, when the bin is in an intermediate position, between its open and closed positions, a relatively large clearance is obtained between the top edges of the bin side walls and the upper edge of the front housing opening so that the bin can then be raised to separate the elements of the rockable support and withdrawn forwardly from the housing.

In order that the present invention may be fully understood, illustrative embodiments thereof are hereinafter described in detail and shown in the accompanying drawings forming a part hereof and wherein:

Fig. 1 is a front elevational view of a bin and housing assembly constructed in accordance with the present invention;

Fig. 2 is a vertical sectional view taken along the line 2—2 of Fig. 1 and on an enlarged scale;

Fig. 3 is a vertical sectional view similar to Fig. 2, but with the bin shown in its fully open position and in elevation;

Fig. 4 is a view similar to Fig. 3, but with the bin shown in an intermediate open position for removal from the housing;

Fig. 5 is a side elevational view of a bin removed from the housing and on the same scale as Fig. 1; and

Fig. 6 is a fragmentary sectional view corresponding to a portion of Fig. 2, but showing a rockable support for the bin constructed in accordance with another embodiment of the invention.

Referring to the drawings in detail, and initially to Figs. 1 to 5 thereof, a bin and housing assembly embodying the present invention is there illustrated and identified generally by the reference numeral **10**. The assembly **10** includes a housing **11** of generally rectangular configuration and formed of sheet metal or any other suitably rigid material. The housing **11** has a top wall **12**, a bottom wall **13**, a rear wall **14** and opposite end or side walls **15** and **16**, and is open at the front. The front edges of the end walls **15** and **16** are preferably bent inwardly toward each other and then reverted rearwardly to frame the sides of the front opening, as at **17** (Fig. 1). The front edge of the top wall **12** is bent downwardly, as at **18**, to frame the upper edge of the opening at the front of housing **11**, and a rearwardly directed flange **19** extends from the lower edge of the downwardly bent portion **18** and terminates in a depending flange **20** which forms a stop for defining the closed positions of bins in the manner hereinafter described in detail.

The assembly **10** includes several bins **21***a*, **21***b*, **21***c* and **21***d* which are of the same general construction, although the widths thereof may vary as shown, and are dimensioned to fit into the housing **11** in side-by-side relationship through the opening at the front of the housing. While the illustrated embodiment of the invention contains four bins, it is to be understood that the number of bins may be increased or decreased as

desired with the length of the housing being varied to accommodate the number of bins included in the assembly.

Each of the bins **21***a*, **21***b*, **21***c* and **21***d* includes a bottom wall **22**, a front wall **23**, a rear wall **24** and opposite side walls **25** and **26** which are joined together to provide a box-like container open at the top. The front wall **23** of each bin is greater in height than the rear wall **24** thereof, and the top edges **27** and **28** of the side walls **25** and **26**, respectively, of each bin are straight and incline downwardly from the front wall to the rear wall. The upper edge portion of the front wall **23** projects slightly above the top edges **27** and **28** of the side walls of the related bin, as at **29**, for engagement against the depending flange **20** framing the upper edge of the opening at the front of the housing (Fig. 2).

In order to rockably support the several bins within the housing **11**, each of the bins and the housing are provided with rockably engageable elements which are separable only by raising the bin within the housing. In the embodiment of the invention illustrated in Figs. 1 to 5, the rockable supporting elements include a substantially V-shaped channel **30** mounted above, and extending along, the front edge of the bottom wall **13** of the housing and framing the lower edge of the front opening of the housing. In order to support the V-shaped channel **30** above the front edge of bottom wall **13**, the latter is formed with an upstanding flange **31** to which is secured, by spot-welding or other suitable means, a flange **32** depending from the edge of the forward leg of the channel **30**. Each of the bins of the embodiment of Figs. 1 to 5 is provided with an angle member **33** extending transversely across, and secured to, the bottom wall **22** of the bin adjacent the front of the latter. Thus, the downwardly directed leg of the angle member **33** can seat upon the channel **30**, at the juncture of the converging legs of the latter, and the bin may be rocked about the axis defined by the lower edge of the downwardly directed leg of member **33** between a closed position (Fig. 2) enclosed within the housing **11**, and a fully open position (Fig. 3) in which substantially the entire open top of the bin is exposed in front of the housing.

As seen in Fig. 2, the various parts of the housing and bin are dimensioned so that, when the front wall **23** of the bin is substantially vertical, the projecting upper edge portion **29** of the front wall of the bin bears rearwardly against the flange **20** of the housing and the engagement of the portion **29** and flange **20** limits the swinging of the bin in the direction into the housing and establishes the closed position of the bin. Since the angle member **33** is located well forward of the center of bottom wall **22** of the bin, the center of gravity of the bin and its contents is disposed in back of the rocking axis of the bin when the latter is in its closed position (Fig. 2), and the weight of the bin and its contents tends to rock the bin in the direction into the housing to automatically maintain the bin in its closed position with the edge portion **29** bearing against the flange **20**.

As seen in Fig. 2, the bin side walls are dimensioned so that only a small clearance is provided between the lower edge of the flange **20** and the confronting portions of the top edges **27** and **28** of the bin side walls when the bin is in its closed position. That is, the radial distance D_2 (Fig. 3), from the rocking axis to the lower edge of flange **20** is only slightly greater than the radial distance D_1 (Fig. 2), from the rocking axis to the front end of each of the top edges **27** and **28** of the bin side walls. Thus, the close proximity of the lower edge of flange **20** and the confronting portions of the top edges **27** and **28** prevents raising of the bin when it is in its closed position within the housing (Fig. 2). Since the downwardly directed leg of the angle member **33** can be freed from the V-shaped channel **30** only when the bin has been raised sufficiently so that the lower edge of the member **33** is above the upper or front edge of the forward leg of the channel **30**, it is apparent that the bin cannot be removed bodily from the housing when the bin is in the closed position of Fig. 2.

Referring to Fig. 3 of the drawing, it will be seen that the radial distance D_3 from the rocking axis to the rear ends of the top edges **27** and **28** of the bin side walls is slightly greater than the radial distance D_2 so that, when the bin has been rocked forwardly or out of the housing to its open position (Fig. 3), the rear portions of the top edges **27** and **28** engage the lower edge of the flange **20**, as at **34**, to prevent further rocking of the bin in the direction out of the housing. Thus, the engagement of the top edges **27** and **28** of the bin side walls with the lower edge of the housing flange **20** establishes the fully open position of each bin and, in this open position, the open top of the bin is exposed to provide access to the contents of the bin. Further, while the angle member **33** is disposed adjacent to the front of the bin, it is to be noted that the member **33** is spaced a sufficient distance from the front edge of the bin bottom wall **22** so that, with the bin in its open position, the center of gravity of the bin and its contents will be disposed in front of the vertical plane extending through the rocking axis of the bin. Thus, the weight of the bin and its contents tends to maintain the bin in its open position (Fig. 3) after the bin has been manually rocked to the open position. Since the top edges **27** and **28** of the bin side walls engage the lower edge of the housing flange **20** when the bin is in its open position, it is apparent that the bin cannot then be raised to free the angle member **33** from the channel **30** and bodily removal of the bin from the housing is prevented.

In order to facilitate rocking of the bins between their open and closed positions, each bin is preferably provided with a knob **35** extending from the front wall **23** adjacent the top of the latter. Further, each bin has an angle member **36** extending transversely across, and secured to, the bottom wall **22** of the bin adjacent the rear edge of the latter, and the downwardly extending leg of the angle member **36** is preferably of the same height as the downwardly directed leg of the angle member **33** so that, when the bin is removed bodily from the housing **11**, it may be placed upon a support surface and is held level by the angle members **33** and **36**, as shown in Fig. 5.

In order to remove the bin from the housing **11**, the bin is rocked to an intermediate position between the open and closed positions, as shown in Fig. 4. In this intermediate position, the top edges **27** and **28** of the bin side walls are substantially horizontal, and a relatively large clearance D_4 is obtained between the top edges **27** and **28** and the lower edge of the housing flange **20**. The relatively large clearance D_4 results from the fact that the top edges **27** and **28** are straight and, therefore, the radial distances from the rocking axis of the bin to intermediate points on the top edges, for example, the distance D_5 (Fig. 4), are smaller than the distances D_1 and D_3 to the front and back ends, respectively, of the top edges. Thus, when intermediate points on the top edges **27** and **28** confront the lower edge of flange **20**, for example, when the bin is in the intermediate position of Fig. 4, the radial distance D_5 from the rocking axis to such points is substantially smaller than the radial distance D_2 (Fig. 3) from the rocking axis to the lower edge of flange **20**, and the relatively large clearance D_4 is obtained.

The parts of the assembly are dimensioned so that the clearance D_4, obtained with the bin in an intermediate rocked position (Fig. 4), is greater than the distance that the bin must be raised to free its angle member **33** from the channel **30**. That is, the distance D_4 is greater than the vertical elevation of the forward leg of the V-shaped channel **30**. Thus, the bin can be raised, as shown in broken lines and indicated by the refer-

ence character 21a' on Fig. 4, and then withdrawn from the housing with the lower edge of the downwardly directed leg of angle member 33 passing over the upper edge of the forward leg of channel 30. As seen in Figs. 2, 3 and 4, the rear leg of the channel 30 extends above the upper edge of the forward leg of that channel so that, when a bin is being inserted in the housing 11, the downwardly directed leg of the angle member 33 strikes against the higher rear leg of the channel 30 to ensure that the angle member 33 seats on the channel. In inserting a bin in the housing, the bin is disposed with the top edges 27 and 28 of the side walls extending substantially horizontally, and the bin is moved horizontally into the housing until the angle member 33 contacts the rear leg of the channel 30. Then, the bin is released or lowered so that the angle member 33 seats on the channel 30 and the bin is pivotally or rockably supported on the latter. Finally, the bin is rocked to its closed position (Fig. 2).

In Fig. 6, a modified construction for rockably supporting the bins is disclosed. This modified construction includes a downwardly opening or facing channel, generally identified by the reference numeral 37, extending transversely across and secured to the bottom wall 22 of each of the bins at a location adjacent the front of the latter, and an elongated member 38 secured to the upturned flange 31 at the front edge of the bottom wall 13 of the housing 11. The elongated member 38 is turned or rolled downwardly at its upper edge, and the channels 37 of the bins receive the rolled upper edge of the member 38 and are rockably supported on the latter. While Fig. 6 illustrates only the details of the modified rockable support construction, it is to be understood that the bins and housing using this modified construction are otherwise the same as the bins and housing described in connection with the embodiment of Figs. 1 to 5. It is apparent that the channels 37 can be freed or separated from the member 38 only when the related bin has been raised in the housing a distance greater than the height of the rear depending leg 39 of the channel 37, and that the bin can be raised for this purpose only when it is in an intermediate open position corresponding to the position shown in Fig. 4. Further, it will be seen that the front depending leg 40 of the channel 37 extends below the lower edge of the leg 39 so that, when the bin is being installed in the housing, the leg 39 can pass over the rolled upper edge of the member 38 and the leg 40 strikes against the rolled upper edge to ensure that the channel 37 seats upon the member 38.

From the foregoing, it is apparent that the bins of an assembly embodying the present invention can be individually rocked between open and closed positions, or removed bodily from the housing. Thus, the contents of the bins may be removed at the site of the housing, or the individual bins may be removed from the housing and transported to a more convenient location for either using or replenishing the contents. Further, the present invention provides the above advantages without undue complication of the housing or bin construction, and removal or installation of the bins is achieved merely by the described manipulation thereof and without requiring the loosening or securing of fastening members.

While I have described and shown certain illustrative embodiments of the invention, it is to be understood that the invention is not limited to these precise embodiments, and that various changes and modifications may be made therein without departing from the spirit or scope of the invention as defined in the appended claim.

What I claim is:

An assembly of the described character comprising a housing having a rectangular opening at the front thereof, a plurality of bins formed to fit into said housing in side-by-side relationship through said opening at the front of the housing, cooperating fulcrum means for rockably supporting the individual bins within said housing and including an upwardly opening channel member extending along the lower edge of said opening near the front of the housing and an angle member on the bottom of each bin near the front of the latter and having a downwardly directed leg bearing at its lower edge on said channel member, said bins being individually swingable between a closed position within said housing and an open position in which the top of the bin is exposed in front of the housing, each of said bins being open at the top so that in its open position access is provided to the interior of the bin, said channel member and angle members being separable by raising of the related bins within said housing, means on said housing and each of said bins operative to prevent raising of the bin when the latter is disposed in either of said open and closed positions thereof, said channel member having front and back legs converging downwardly, and means for preventing undesired bodily movement of the bins into the housing including an edge portion of said back leg of the channel member extending above said front leg of the latter to engage said downwardly directed leg of the angle member and prevent movement of the latter beyond sad channel member in a direction toward the rear of said housing, the radial distance between said fulcrum axis and the central portions of the top edges of the side walls being smaller than the radial distance between said fulcrum axis and the upper edge of the bin opening by an amount smaller than the vertical overlapping of said first and second fulcrum members at one side of the fulcrum axis and larger than the vertical overlapping of said first and second fulcrum members at the other side of the fulcrum axis.

References Cited in the file of this patent

UNITED STATES PATENTS

260,739	Bradish	July 11, 1882
550,900	Walker	Dec. 3, 1895
892,830	Hobbs	July 7, 1908
1,009,977	Kirkaldie	Nov. 28, 1911
1,447,360	Swan	Mar. 6, 1923