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BINS

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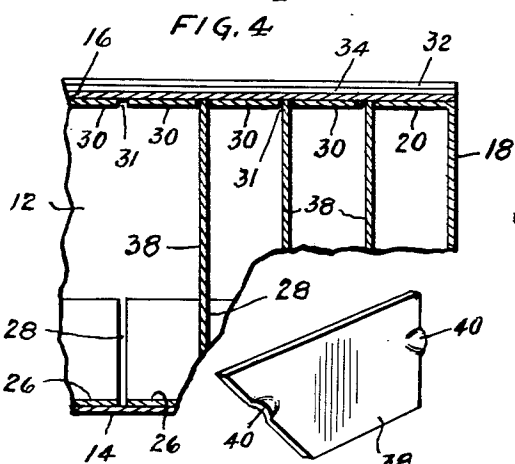
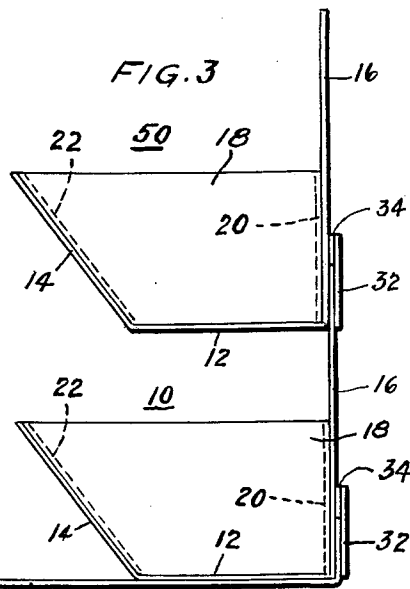
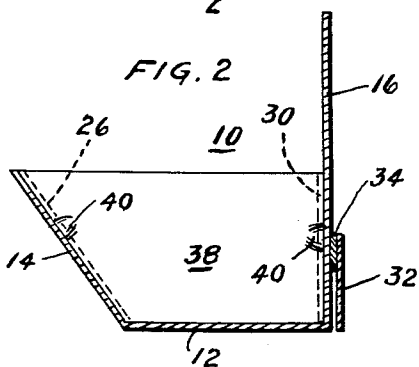
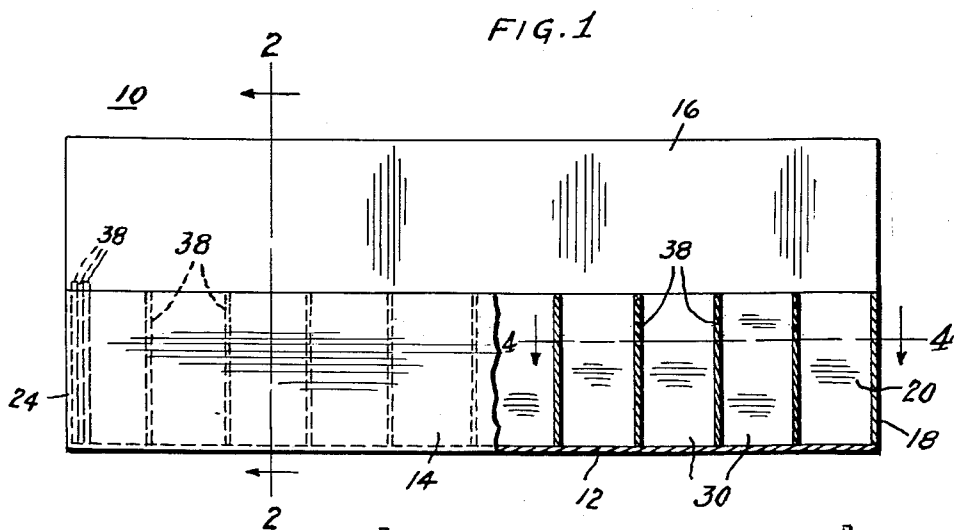
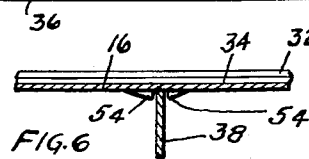


FIG. 5



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This invention relates to improvements in bins. More particularly, this invention relates to improvements in bins which can be used to hold a plurality of individually different parts.

It is therefore an object of the present invention to provide an improved bin that can be used to hold a plurality of individually different parts.

In many assembling operations it is essentially to have a supply of each of the various assemblable parts within easy reach of the assembler. The various parts must be kept readily available, and yet they should be kept separate from each other. As a result, it would be desirable to have a bin or bins that could be set within easy reach of the assembler and that would keep the individually different parts readily available while keeping those parts separate from each other. The present invention provides such a bin; and it is therefore an object of the present invention to provide a bin that can be set within easy reach of an assembler and that can keep the individually different parts readily available while keeping those parts separate from each other.

In some instances, the horizontal area that is available for the storage of the assemblable parts is quite limited; and it would, therefore, be desirable to have a bin that could be stacked in vertical array with other similar bins. Such a bin would coact with the other bins to provide the total storage area that is needed and yet would fit within the limited horizontal area that is available. The present invention provides such a bin; and it is therefore an object of the present invention to provide a bin that can be stacked in vertical array with other similar bins.

In some instances the bins can be solidly fixed in position adjacent the area where the assembling operation is performed, but in other instances the bins must be arranged so they can be shifted about relative to that area. As a result, it would be desirable to have a bin that is self-supporting and that can be stacked with other similar bins to provide a self-supporting stack of bins. The present invention provides such a bin; and it is therefore an object of the present invention to provide a bin that is self-supporting and that can be stacked with other similar bins to provide a self-supporting stack of bins.

The sizes of the various parts which are to be assembled in the assembling operation are not always the same; and hence it would be desirable to have a bin that can be made to accommodate parts of different size. The present invention provides such a bin by equipping that bin with a plurality of removable partitions. Where the parts to be assembled are quite small, all of the partitions will be set in position within the bin, and each pair of partitions will define a compartment in which all of the parts of one type and size can be kept. However, where one or more of the parts is larger, one or more of the partitions will be removed to define a larger compartment or larger compartments. It is therefore an object of the present invention to provide a bin which has a plurality of removable partitions.

Other and further objects and advantages of the present

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invention should become apparent from an examination of the drawing and accompanying description.

In the drawing and accompanying description a preferred embodiment of the present invention is shown and described but it is to be understood that the drawing and accompanying description are for the purpose of illustration only and do not limit the invention and that the invention will be defined by the appended claims.

In the drawing,

10 Fig. 1 is a partially broken-away, front elevational view of a bin that is made in accordance with the principles and teachings of the present invention,

15 Fig. 2 is a sectional view through the bin of Fig. 1, and it is taken along the plane indicated by the line 2—2 in Fig. 1,

Fig. 3 is an end view of the bin of Fig. 1 as it appears when assembled with another similar bin and with a supporting base,

Fig. 4 is a plan view of a part of the bins shown in Fig. 1,

Fig. 5 is a perspective view on a smaller scale, of one of the removable partitions for the bin of Fig. 1, and

Fig. 6 is a plan view of a part of a modified bin.

Referring to the drawing in detail, the numeral 10 generally denotes a bin that is made in accordance with the principles and teachings of the present invention. That bin has a flat, horizontally-directed bottom 12, an upwardly and forwardly inclined front wall 14, and a vertically-directed rear wall 16. While the bottom 12, the front wall 14 and the rear wall 16 could be made of separate pieces of metal that were suitably joined together, it is preferable to make that bottom, that front wall and that rear wall out of one piece of metal.

The numeral 18 denotes the right-hand end wall of the bin, and that end wall is provided with an inturned flange 20 at the rear thereof and with an inturned flange 22 at the front thereof. The inturned flange 20 and the end wall 18 subtend a right angle which has a vertically-directed apex; and the inturned flange 22 and the end wall 18 subtend a right angle which has its apex inclined forwardly and upwardly. The rear face of the inturned flange 20 will abut the right-hand portion of the front or inner face of the rear wall 16, and the front face of the inturned flange 22 will abut the right-hand portion of the rear or inner face of the front wall 14. The inturned flanges 20 and 22 will be suitably secured to the rear wall 16 and the front wall 14, respectively, as by spot welding or the like. The bottom of the end wall 18 will abut the upper face of the bottom 12.

The numeral 24 denotes the end wall for the left-hand end of the bin. That end wall is provided with inturned flanges which are the mirror images of the inturned flanges 20 and 22 of the end wall 18. Those inturned flanges will be suitably secured to the left-hand portions of the front or inner face of the rear wall 16 and to the left-hand portions of the rear or inner face of the front wall 14, as by spot welding or the like. The bottom of the end wall 24 will abut the upper face of the bottom 12.

The end walls 18 and 24 with their inturned flanges coact with the front wall 14 and the rear wall 16 to provide stiffness and rigidity for the bin. Also, they close the ends of the bin and prevent the accidental escape of parts from that bin.

A number of generally rectangular spacer plates 26 are fixedly secured to the inner face of the front wall 14 of the bin, as by spot welding or the like. Those spacer plates are spaced apart to form upwardly and forwardly inclined grooves 28 that define the front edges of horizontally-spaced, vertical planes. Spacer plates 30, which are identical in size and spacing to the spacer plates 26, are fixedly secured to the front face of the rear wall 16, as by spot welding or the like. The spacer plates 30 form up-

wardly-directed grooves 31; and those grooves define the rear edges of the horizontally-spaced vertical planes whose front edges are defined by the grooves 28. The grooves 28 and 31 are precisely in register with each other.

The numeral 32 denotes a vertically directed plate which is adjacent the lower part of the rear face of the rear wall 16; and that plate is held in fixedly spaced position rearwardly of that rear wall by a spacer 34. The spacer 34 is disposed a short distance above the bottom of the plate 32 and above the bottom of the rear wall 16; and it coacts with the rear wall 16 and the plate 32 to define a narrow, vertically-directed slot. That slot is dimensioned so it can accommodate the top edge of the rear wall 16 of another similar bin.

The rear wall 16 projects upwardly beyond the level of the top of the front wall 14; and, as a result, that rear wall will hold the bottom 12 of another similar bin 50 above the level of the front wall 14 when that other similar bin is assembled with the bin 10, as shown by Fig. 3. The front wall 14 will be inclined upwardly and forwardly from the horizontal at an angle of from about thirty five degrees to about fifty five degrees; and consequently that wall will coact with the front wall of the bin 50 to provide ready access to the contents of the bin 10. The bin 50 is identical to the bin 10; and the bin 10 could have been stacked atop the bin 50 instead of vice versa.

The numeral 36 denotes a supporting base which can be used to steady a number of bins that have been assembled in vertical array. That base has a horizontally-directed support-engaging portion and it has a vertically-directed slot-engaging portion. That slot-engaging portion is dimensioned to fit snugly within the slot defined by the rear wall 16 and the plate 32 of the bin 10, as shown by Fig. 3. The horizontally-directed portion of the base 36 extends forwardly beyond the front edge of the bottom 12 and even beyond the front edge of the front wall 14. As a result, the base 36 provides strong resistance to any tendency of the vertically-stacked bins 10 and 50 to tilt forwardly. Even where several bins are vertically-stacked, the base 36 can prevent forward tilting of those bins; and this, despite the fact that the centers of gravity of all of the various bins 10 will be disposed forwardly of the plane of the slot-engaging portion of that base.

When a bin is to be used individually, that bin can be assembled with the base 36 or can be rested upon its bottom 12. When two or more bins are to be stacked together, it will usually be advisable to steady them by using the base 36. The rear walls 16 and the plates 32 are made stiff enough so several of the bins can safely be stacked in vertical array.

The numeral 38 denotes the various partitions that can be disposed within the bin 10 to subdivide that bin into a number of compartments. Those partitions are trapezoidal in elevation, and the front and rear edges can telescope into the grooves 28 and 31 formed by the spacer plates 26 and 30, respectively. The front or rear edges, or both, of the partitions 38 are preferably provided with a slight offset or bend 40. The offsets or bends 40 make it necessary to bend the front or rear edges of the partitions 38 as those front or rear edges are set within the grooves 28 or 31, respectively. This is desirable because the resulting restorative forces generated within those partitions help hold those partitions solidly in position within the grooves 28 and 31. Consequently, there is no tendency for those partitions to become dislodged accidentally. However, whenever it is desired to remove the partitions 38 from the grooves 28 or 31, it is a simple matter to pull upwardly on those partitions and thereby remove them from those grooves.

Some of the partitions 38 will be removed from the grooves 28 and 31 whenever it is desirable to provide compartments within the bin 10 that are larger than the

widths of a spacer plate 26 or 30. When any of the partitions 38 are removed from the grooves 28 and 31, those partitions can be stacked neatly and compactly adjacent the inner face of the left-hand end wall 24 or adjacent the inner face of the right-hand end wall 18. Such stacking is made possible by the trapezoidal configuration of those partitions. Fig. 1 shows several of those partitions stacked adjacent the left-hand end wall 24; and, except for the fact that the top edges of those partitions extend a short distance above the top edges of the end walls 24, those partitions appear to be a part of that end wall. When those partitions are set close together they tend, because of the face-to-face engagement therebetween and because of the friction between the end faces thereof and the intumed flanges of the end walls to remain close together and close to the end walls of the bin.

Each of the bins can be used individually or in stacked vertical array. It is not necessary to alter or even empty a bin when it is to be stacked with another bin. All that need be done is lift that bin up and then telescope its slot down over the top edge of the rear wall of another bin.

The grooves which accommodate the partitions 38 are provided only in the front walls 14 and in the rear walls 16 of the bins. This is desirable because it leaves the upper face of the bottom of the bin perfectly smooth. As a result, the assembler experiences no sticking of the parts and experiences no discomfort as he or she runs his or her fingers along the bottom of the bin searching for parts in the various compartmented areas of the bin.

Referring to Fig. 6, the numeral 52 denotes the rear wall of a modified bin that is made in accordance with the principles and teachings of the present invention. That rear wall is similar to the rear wall 16, but it has protuberances 54 rather than the spacing plates 30 to define the vertically directed grooves. In all other respects, the wall 52 is identical to the wall 16; and it is equipped with a spacer 34 and a vertically directed plate 32.

The protuberances 54 can be punched from the rear wall 52, and they can be elongated vertically to provide full support for the rear edges of the partitions 38. However, if desired, the protuberances 54 can be made short in the vertical direction; and then two or more pairs of those protuberances can be aligned to define the partition-receiving grooves at the inner face of the rear wall 52. If desired, the grooves at the inner face of the front wall of the modified bin of Fig. 6 could also be defined by protuberances. Any such protuberances should have smooth and rounded upper and lower edges so the assemblers' fingers will ride smoothly over them.

Where they are made in small quantities, the bins provided by the present invention will preferably be made of fabricated metal. However, where those bins are made in large quantities, those bins will preferably be made of plastic or of die-cast metal.

Whereas the drawing and accompanying description have shown and described a preferred embodiment of the present invention it should be apparent to those skilled in the art that various changes may be made in the form of the invention without affecting the scope thereof.

What I claim is:

1. A storage bin for small parts that can be used by itself or that can be stacked with similar bins in vertical array and that has a generally flat, horizontally-directed bottom, a vertically-directed rear wall, a forwardly and upwardly inclined front wall, end walls closing the ends of said bin, said rear wall projecting upwardly above the level of said front wall, said front wall having a plurality of upwardly and forwardly inclined grooves at the inner face thereof, said rear wall having a plurality of upwardly directed grooves at the inner face thereof, said upwardly and forwardly inclined grooves at the inner

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face of said front wall being in register with the upwardly-directed grooves at the inner face of said rear wall, a plurality of partitions that have front and rear edges that are dimensioned to fit within said upwardly and forwardly inclined grooves at said inner face of said front wall and within said upwardly-directed grooves at said inner face of said rear wall, respectively, said partitions and said end walls having similar trapezoidal configurations, said partitions having offsets in the front or rear edges thereof that require bending of said edges as said edges are set within said upwardly and forwardly inclined grooves at the inner face of said front wall or within said upwardly directed grooves at the inner face of said rear wall, respectively, said partitions and said end walls having the bottoms thereof immediately adjacent said bottom of said bin and having the tops thereof at the level of the top of said front wall of said bin, said partitions being selectively disposable within said upwardly and forwardly inclined grooves and said upwardly-directed grooves at the inner face of said front wall and at the inner face of said rear wall, respectively, or being selectively disposable in abutting engagement within said bin adjacent one of said end walls, a spacer that is secured to the rear face of said rear wall adjacent the lower edge of said rear wall, a vertically-directed plate that is secured to said spacer and that depends downwardly from said spacer, said spacer holding said plate parallel to but spaced rearwardly from said rear wall to define a slot, said slot being dimensioned to telescope over and snugly fit the upper edge of the rear wall of a similar bin and thereby hold said bins stacked in vertical array, and a base that has a generally flat horizontally-directed portion that can underlie and project forwardly beyond said bottom of said bin and that has a vertically-directed slot-engaging portion that can telescope into said slot.

2. A storage bin for parts that has a generally flat, horizontally-directed bottom, an upstanding rear wall, an upstanding front wall, end walls closing the ends of said bin, a plurality of grooves at the inner face of said front wall, a plurality of grooves at the inner face of said rear wall, said grooves at the inner face of said front wall being in register with said grooves at the inner face of said rear wall and coacting with said grooves at the inner face of said rear wall to define a plurality of horizontally-spaced, vertically-directed planes, a plurality of partitions that have front and rear edges that are dimensioned to fit within said grooves at said inner face of said front wall and within said grooves at said inner face of said rear wall, respectively, said partitions and said end walls having similar configurations, said partitions having offsets in the front or rear edges thereof that require bending of said edges as said edges are set within said grooves at the inner face of said front wall or within said grooves at the inner face of said rear wall, respectively, said partitions being selectively disposable within said grooves at the inner face of said front wall and at the inner face of said rear wall, respectively.

3. A storage bin for parts that has a generally flat, horizontally-directed bottom, an upstanding rear wall, an upstanding front wall, end walls closing the ends of said bin, the outer face of said front wall defining an acute angle with the horizontal, a plurality of grooves at the inner face of said front wall, a plurality of grooves at the inner face of said rear wall, said grooves at the inner face of said front wall being in register with said grooves at the inner face of said rear wall and coacting with said grooves at the inner face of said rear wall to define a plurality of horizontally-spaced, vertically-directed planes, a plurality of partitions that have front and rear edges that are dimensioned to fit within said grooves at said inner face of said front wall and within said grooves at said inner face of said rear wall, respectively, said partitions and said end walls having similar configurations, said partitions being selectively disposable within said

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grooves at the inner face of said front wall and at the inner face of said rear wall, respectively or being selectively disposable in abutting engagement within said bin adjacent one of said end walls.

4. A storage bin for small parts that can be used by itself or that can be stacked with similar bins in vertical array and that has a generally flat, horizontally-directed bottom, a vertically-directed rear wall, a forwardly and upwardly inclined front wall, end walls closing the ends of said bin, said rear wall projecting upwardly above the level of said front wall whereby the top of said rear wall is disposed above the level of the top of said front wall, said front wall having a plurality of upwardly and forwardly inclined grooves at the inner face thereof, said rear wall having a plurality of upwardly-directed grooves at the inner face thereof, said upwardly and forwardly inclined grooves at the inner face of said front wall being in register with the upwardly-directed grooves at the inner face of said rear wall and coacting with said upwardly-directed grooves at the inner face of said rear wall to define a plurality of horizontally-spaced, vertically-directed planes, a plurality of partitions that have front and rear edges that are dimensioned to fit within said upwardly and forwardly inclined grooves at said inner face of said front wall and within said upwardly-directed grooves at said inner face of said rear wall, respectively, said partitions and said end walls having similar trapezoidal configurations, a spacer that is secured to the rear face of said rear wall adjacent the lower edge of said rear wall, a vertically-directed plate that is secured to said spacer and that depends downwardly from said spacer, said spacer holding said plate parallel to but spaced rearwardly from said rear wall to define a slot, said slot being dimensioned to telescope over and snugly fit the upper edge of the rear wall of a similar bin and thereby hold said bins stacked in vertical array.

5. A storage bin for small parts that can be used by itself or that can be stacked with similar bins in vertical array and that has a generally flat, horizontally-directed bottom, a vertically-directed rear wall, a forwardly and upwardly inclined front wall, end walls closing the ends of said bin, said front wall inclining upwardly from the horizontal at an angle in excess of forty degrees, said rear wall projecting upwardly above the level of said front wall whereby the top of said rear wall is disposed above the level of the top of said front wall, a plurality of upwardly and forwardly inclined grooves at the inner face of said front wall, a plurality of grooves at the inner face of said rear wall, a plurality of partitions that have front and rear edges that are dimensioned to fit within said upwardly and forwardly inclined grooves at said inner face of said front wall and within said upwardly-directed grooves at said inner face of said rear wall, respectively, a spacer that is secured to the rear face of said rear wall adjacent the lower edge of said rear wall, a vertically-directed plate that is secured to said spacer and that depends downwardly from said spacer, said spacer holding said plate parallel to but spaced rearwardly from said rear wall to define a slot, said slot being dimensioned to telescope over and snugly fit the upper edge of the rear wall of a similar bin and thereby hold said bins stacked in vertical array.

6. A storage bin for small parts that can be used by itself or that can be stacked with similar bins in vertical array and that has a generally flat, horizontally-directed bottom, a vertically-directed rear wall, a forwardly and upwardly inclined front wall, end walls closing the ends of said bin, said rear wall projecting upwardly above the level of said front wall whereby the top of said rear wall is disposed above the level of the top of said front wall, a spacer that is secured to the rear face of said rear wall adjacent the lower edge of said rear wall, a vertically-directed plate that is secured to said spacer and that depends downwardly from said spacer, said spacer holding said plate parallel to but spaced rearwardly from said rear wall to define a slot, said slot being dimensioned to

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telescope over and snugly fit the upper edge of the rear wall of a similar bin and thereby hold said bins stacked in vertical array, and a base that has a generally flat horizontally-directed portion that can underlie and project forwardly beyond said bottom of said similar bin and that has a vertically-directed slot-engaging portion that can telescope into the slot of said similar bin, the rear wall of said similar bin being dimensioned to space the end walls of said bin above the end walls of said similar bin and thereby provide access to said similar bin above said end walls of said similar bin, said rear wall of said similar bin and said slot of said bin coacting to support said bin in cantilever fashion.

7. A storage bin for small parts that can be used by itself or that can be stacked with similar bins in vertical array and that has a generally flat, horizontally-directed bottom, a vertically-directed rear wall, a forwardly and upwardly inclined front wall, end walls closing the ends of said bin, said rear wall projecting upwardly above the level of said front wall whereby the top of said rear wall is disposed above the level of the top of said front wall, and a vertically-directed plate that is fixed against movement relative to but that is spaced rearwardly from said rear wall to define a slot, said slot being dimensioned to telescope over and snugly fit the upper edge of the rear wall of a similar bin and thereby hold said bins stacked in vertical array, the rear wall of said similar bin being taller than the end walls of said similar bin to space the end walls of said bin above the end walls of said similar bin and thereby provide access to said similar bin above said end walls of said similar bin, said rear wall of said similar bin and said slot of said bin coacting to support said bin in cantilever fashion.

8. A storage bin for small parts that can be used by itself or that can be stacked with similar bins in vertical array and that has a generally flat, horizontally-directed bottom, a vertically-directed rear wall, a forwardly and upwardly inclined front wall, end walls closing the ends of said bin, said front wall extending up to a level approximating the level of the tops of said end walls, said rear wall projecting upwardly above the level of said front wall whereby the top of said rear wall is disposed above the

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level of the top of said front wall, a plurality of partitions that sub-divide said bin into a number of compartments, a vertically-directed plate that is spaced from the rear face of said rear wall to define a slot, said slot being dimensioned to telescope over and snugly fit the upper edge of the rear wall of a similar bin and thereby hold said bins stacked in vertical array, and a base that has a generally flat horizontally-directed portion that can underlie and project forwardly beyond said bottom of said similar bin and that has a vertically-directed slot-engaging portion that can telescope into the slot of said similar bin, said rear wall of said similar bin and said slot of said bin coacting to provide cantilever support for said bin, said base holding said bin and said similar bin against tilting.

9. A storage bin for small parts that can be used by itself or that can be stacked with similar bins in vertical array and that has a generally flat, horizontally-directed bottom, a vertically-directed rear wall, a forwardly and upwardly inclined front wall, end walls closing the ends of said bin, said front wall inclining upwardly from the horizontal at an angle in excess of forty degrees, said front wall extending up to a level approximately the level of the tops of said end walls, said rear wall projecting upwardly above the level of said front wall whereby the top of said rear wall is disposed above the level of the top of said front wall, a plurality of partitions that subdivide said bin into a number of compartments, the upper surface of said bottom of said bin being smooth and uninterrupted except for said partitions, and a vertically-directed plate that is adjacent the lower edge of said rear wall, said vertically-directed plate and said rear wall being spaced apart to define a slot, said slot being dimensioned to telescope over and snugly fit the upper edge of the rear wall of a similar bin and thereby hold bins stacked in spaced vertical array.

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