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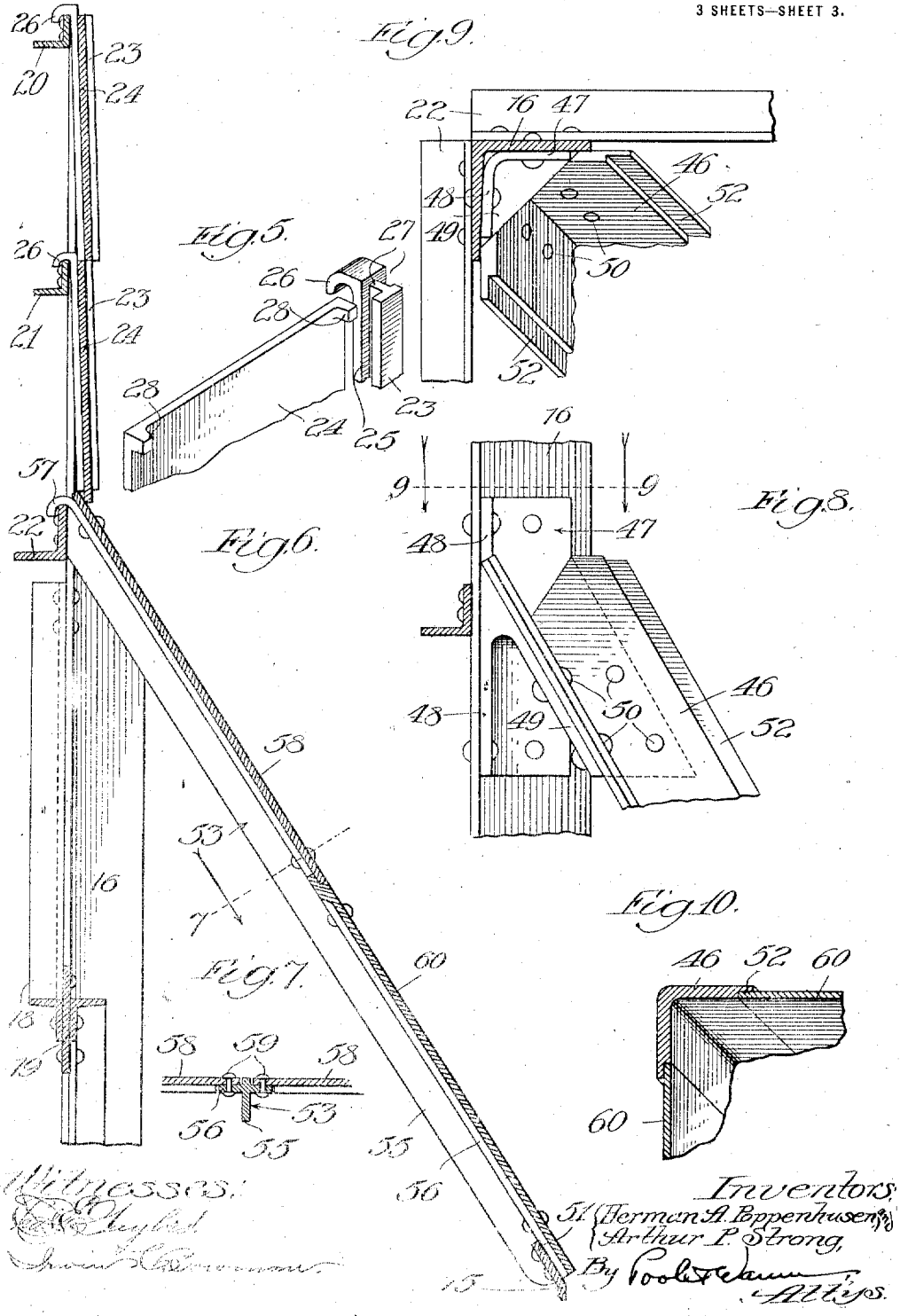
RECEPTACLE FOR ASHES AND THE LIKE.

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1,243,873.

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UNITED STATES PATENT OFFICE.

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RECEPTACLE FOR ASHES AND THE LIKE.

1,243,873. Specification of Letters Patent. Patented Oct. 23, 1917.

Application filed November 18, 1916. Serial No. 132,021.

To all whom it may concern:

Be it known that we, HERMAN A. POPPENHUSEN, a citizen of the United States, residing at Hammond, in the county of Lake and State of Indiana, and ARTHUR P. STRONG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Receptacles for Ashes and the like, of which the following is a specification.

This invention relates to improvements in the construction of receptacles, and particularly to receptacles or storage tanks suitable for the collection and disposal of ashes and the like.

Receptacles of the character described are ordinarily installed in connection with pneumatic ash conveying systems, such as are commonly used for the handling and removal of ashes in large boiler plants, the ashes being carried in closed conduits from the furnaces to an elevated receptacle or disposal tank, preferably situated exterior to the boiler house and in such place as to permit its contents to be readily emptied into cars or wagons for removal and ultimate disposal.

The receptacles ordinarily used for this purpose are of the well known wood or metal construction, supported above the ground upon a suitable frame structure, the whole being of a permanent and rigid construction, requiring the services of expert wood or structural workers in their erection. Receptacles of this character have been found to be objectionable for this particular use, not only because of the materials used, as will be presently pointed out, but also because of the excessive cost of transportation and erection. The disadvantages of the use of wood and steel are manifest, namely, that wood is inherently a material which is subject to rapid deterioration from exposure to the weather and the extreme liability to destruction by fire, and steel, on the other hand, has been found to be of comparatively short life, due to the corrosive action of certain destructive elements contained in or liberated from the ashes.

In order to eliminate the several disadvantages herein set forth and to provide a more suitable receptacle for the purpose mentioned, it is proposed to provide a construction for a receptacle embracing certain novel features, among which may be enumerated the following: First, a receptacle that is constructed of a number of comparatively small units or sections, permitting the shipment of the structure in "knock-down" form to the place of installation; secondly, the formation of the sections or units in a manner requiring the minimum amount of machine work and involving a simple mode of assembling the parts, so that ordinary laborers can erect the structure with little difficulty; thirdly, a receptacle wherein the sections are capable of removal, to permit worn or broken parts to be replaced, and, lastly, a receptacle wherein a suitable material, such as cast-iron, that will resist the corrosive action of the ashes may be used throughout portions of the receptacle where such action would occur.

The manner in which these results are accomplished will be more fully understood from the description which follows and in connection with the drawings, wherein—

Figure 1 is a view of a receptacle in side elevation, showing the general features of construction;

Fig. 2 is a top plan view of the receptacle;

Fig. 3 is an enlarged detail sectional view, taken on line 3—3 of Fig. 2;

Fig. 4 is an enlarged plan view in detail of a portion of the side wall of the receptacle, showing the corner construction;

Fig. 5 is a detail view, showing a plate with lugs engaging the supporting bars;

Fig. 6 is a detail view in vertical section, taken on line 6—6 of Fig. 1, and showing the method of constructing the lower portion of the receptacle;

Fig. 7 is a detail cross section taken on line 7—7 of Figs. 1 and 6;

Fig. 8 is a detail view in elevation, showing the manner of constructing the corner frame members of the lower portion of the receptacle;

Fig. 9 is a sectional view taken on line 9—9 of Fig. 8; and

Fig. 10 is a detail section showing the side wall members attached to the corner frame members of the lower portion of the receptacle.

Referring to Fig. 1, the general features

of construction embodied in the invention comprise a supporting frame 10, embracing and supporting the receptacle or tank 11, said tank being generally rectangular in shape and consisting of four side walls 12, a top wall 13, and a bottom wall or lower portion 14 having the shape of an inverted, truncated pyramid, the lower end or apex terminating in a discharge passage 15, through which the material is discharged from the receptacle.

The supporting frame or structure 10 is preferably of steel, being made up of members or structural forms known as angle-bars arranged in the following manner: At the corners of the frame are vertical posts or columns 16, mounted upon suitable foundations at their lower ends and extending upwardly a distance sufficient to permit the location of the receptacle at the desired elevation above the ground. The corner posts have the cross-sectional contour of the usual angle-iron or bar, the webs thereof being disposed at an angle of 90° to each other and coinciding with the sides of an imaginary rectangle indicating the outline of the frame. The upright columns or posts 16 are joined together by the following arrangement of cross-beams or struts. Throughout the lower portion of the frame a preferable arrangement comprises horizontal strut members 17, extending between each post, and immediately above the same, pairs of intersecting tension members 18, 18, joined together at their mid point by a plate 19, there being provided a similar arrangement on each side of the frame. Throughout the upper portion of the frame there is provided a distinctly different arrangement of members as follows: Surrounding the upper end of the frame is a plurality of horizontal angle-bars 20, which extend between and are connected to the web of each of the corner columns 16, said angle bars being arranged so that one web thereof abuts flatwise against the outer surface of the webs of the columns, and the other webs project outwardly and horizontally from the lower margin of the vertical web. Below the angle-bars 20 are a plurality of other angle-bars 21, somewhat smaller in size, but otherwise connected to the corner posts 16 in the same manner as the bars 20, the same being spaced apart vertically at equal distances and arranged in parallel relation to each other and to the angle-bars 20. As shown in Fig. 1, there are three series of the smaller angle-bars 21, which form in effect a series of bands, which surround the outer surface of the supporting structure. Spaced below the lowermost series of angle-bars 21 is another series of angle-bars 22, somewhat larger in size than the angle-bars 21 and substantially the same size as the angle-bars 20. said series of angle-bars 22 being arranged parallel to the bars 20 and 21 and connected to the frame structure 16 in identically the same manner as are the bars 20 and 21.

The parts thus described constitute the rigid and permanent structure which supports the receptacle proper, which will now be described in detail, referring first to the manner in which the side walls of the receptacle are formed, it being understood that the description of one side wall will suffice for all.

In general, the side walls may be said to comprise a plurality of wall sections or units, which are removably attached to the supporting frame, to wit, to the horizontal bars 20 and 21 thereof. These units or sections are of two varieties, namely, vertically depending bars 23, which are supported upon the supporting frame, and a plurality of plates 24 supported by said bars, said bars and plates being arranged in rows or tiers, one above the other and extending throughout the height of the side walls, each row or tier being supported upon one of the series of cross-bars 20 and 21, and having overlapping engagement with the row immediately below, as will hereinafter be described in detail.

The bars 23 are preferably of cast iron and comparatively narrow in width and of a length substantially equal to the distance between the horizontal frame members 20 and 21. Said bars 23 are provided along their opposed lateral surfaces with longitudinally extending grooves 25, 25, and at the upper end of each bar is provided a hooked extremity 26, projecting beyond the end of the bar and transversely thereof. These bars are attached to or suspended from the horizontal frame members 20 and 21 by means of the hooked extremities 26, which engage the vertical flanges of said members and hang downwardly therefrom and upon the inner side thereof, said bars being arranged in series, as before suggested, extending along each of said horizontal members in parallel and spaced relation and terminating adjacent to the upper end of the series or tier of like bars which are suspended from the cross-bars 21 immediately below, the bars of each series or tier being in vertical alinement with a corresponding bar of the series immediately below, so that all of the bars 23 present the appearance of vertical members extending throughout the height of the side walls of the receptacle. Referring to Fig. 6, the exact arrangement of the bars 23 is clearly shown: Each bar extends downwardly overlapping the upper end of the bar immediately below, the lower end of the uppermost bar engaging the end surface of the lowermost bar and resting in a recess formed by said end surface and the rear surface of the hooked extremity 26. Thus each bar is slightly inclined, it being

particularly noted that the lateral grooves 25 in each bar are closed at their lower end by a portion of the upper end surface of the under bar, immediately inwardly of the grooves thereof.

Between the bars of each tier or series extend the plates 24, which are ordinarily of cast-iron of suitable thickness, said plates being of any desired width and of a length substantially equal to that of the said bars, namely, of a length equal to the distance between the supporting cross-bars 20 or 21. The plates are supported by the bars through the medium of the grooves 25, which engage the lateral margins of said plates, the same being inserted between and into the grooves of two adjacent bars 23, preferably from the upper ends thereof, each plate or wall section thus closing the space between two adjacent bars 23 and between two adjacent cross-bars 21 or 20. Each row or tier of plates 24, thus formed, extends completely around the receptacle, each plate or row of plates terminating substantially flush with the plate or row of plates immediately below. Inasmuch as the grooves in the bars 23 extend throughout their length, it is desirable to provide means for limiting the downward movement of the plates with relation to the bars 23. This is preferably accomplished by providing at the upper end of each bar 23 a depression 27, located upon the inner edge of the bar and adjacent to the lateral groove 25 (Fig. 5). The plates are provided with inwardly projecting lugs 28 located along their upper margin and at the outer end, said lugs being adapted to enter the depressions and to prevent further downward movement of the plates, thus when the plate is inserted the same will extend the full length of the bar and at the same time have its upper margin flush with the end surface of the bar. It is to be also noted that, in inserting the plate, its lower margin will abut against and rest upon the upper end surface of the bar immediately below, as is clearly shown in Fig. 6, thus normally retaining the plate in position, although it is to be noted that, were several bars swung inwardly, the intermediate plates would be released and drop downwardly, hence the provision of additional plate-retaining means is desirable.

At the corners of the receptacle a slightly different construction of the wall section is employed, as is clearly shown in Figs. 2 and 4. At each corner is provided a member 30, which has the form of a plate or member 31, provided along its vertical margins with enlarged portions 32, 32, arranged at an angle to the web 30, said enlarged portions being provided with longitudinally extending grooves 33, similar in all respects to the grooves in the bars 23 located intermediate the corners. At the upper ends of the enlarged portions are provided hooked extremities 34, identical with the hooked members 26 of the bar members 23, said hooked members being arranged at an angle of 90° to each other and substantially at an angle of 45° to the web 31. The purpose of the corner members 30 is to provide a method for bridging the corner posts 16, and in reality they consist of two bars 23, which are connected together by an integral oblique web 31 extending between them, said web forming the corner wall portion of the receptacle immediately inside of the webs of the corner posts 16. In other respects the corner members 30 perform the same functions as the intermediate members 23 and, in addition, form the corner surfaces of the receptacle in place of removable plates such as are used intermediate the corners.

The construction thus described provides a side wall consisting of a multitude of small units in the form of supporting bars and plates or wall sections, which are capable of removal from the supporting frame and of being disconnected from each other, each plate or bar being a separate unit, which can be removed without materially disturbing the remaining units or sections.

Referring now to the manner in which the top wall 13 is formed, it is to be observed that the unit or sectional construction is adhered to in connection therewith. Briefly, the top wall consists of a plurality of triangularly shaped plates, arranged in series of similarly shaped plate members, each series forming a portion of the wall and being supported one upon the other in overlapping relation. The first series of plates 35 are triangular in shape and extend over the corner portions of the receptacle, their shorter margins resting upon the upper margins of the cross-bars 20, there being provided along said shorter margins a plurality of recesses or notches 36, which receive the hooked extremities 26 of the uppermost tier of grooved bars 23. The longer margins of the top plate or cover members 35 extend obliquely to the side walls at an angle of 45° and form the edge of a smaller aperture of rectangular shape, the margins thereof being disposed at an angle of 45° to the rectangular contour of the receptacle itself. This rectangular opening is, in turn, partially covered by means of still smaller triangular members 37, having the same shape as the members 35. These members are arranged obliquely of said members 35, their longer margins extending at an angle of 45° to the corresponding edges of said members 35, and form a rectangular opening still smaller in its dimensions. The shorter or lateral margins of the plates 37 overlap and rest upon the edges of the cover members 35, the latter being provided along their inner edges with upwardly projecting

ribs 38, 38, located a short distance inwardly from their margins, said ribs forming a shoulder surrounding the aperture formed by said margins and acting to retain the smaller plates 37 in position. As before, a smaller rectangular opening is formed by the margins of the triangular plate members 37, which is partially closed by still smaller triangular members 40, supported upon the margins of the triangular plate members 37 in the same manner as before described, said plate members 37 being also provided along their longer edges, forming the rectangular opening, with upwardly projecting ribs 41, which act, as before described in connection with the ribs 38 of the plate members 35, to retain the triangular members 40 in position. The rectangular opening formed by the inner margins of the triangular members 40 is again partially closed by means of still smaller plate members 42, which overlap the margins of the plates 40 and are held in position by ribs 43, extending along the margins of the plate members 40, said plate members 42 being formed to provide a circular opening having substantially the same diameter as the rectangular opening formed by said plates 40. The circular opening thus formed is preferably surrounded by a flange 44. Into this circular opening projects the end of a pipe 45, through which the ashes, or like material enters the receptacle from the conduits of the conveying system which the receptacle serves.

Referring now to the construction of the remaining part of the receptacle, namely the bottom wall or lower portion, the same comprises, in general, frame members rigidly connected to the supporting structure, other frame members removably attached to the frame structure, and removable wall sections attached to the permanent as well as the removable frame members. Referring more in detail to the arrangement of these members, which form the tapered or convergent lower portion of the receptacle, there is rigidly connected to each of the vertical column members 16 of the supporting structure a frame member 46, extending downwardly and inwardly and forming the corners of said lower portion, said members terminating at their lower ends in close proximity and there connected to the discharge passage 15. The frame members 46 consist of V-shaped angle members having webs arranged at angles of 90° to each other and preferably connected to the vertical column member 16 of the supporting frame in the following manner: Rigidly attached to the inner surface of each vertical column member 16 and adjacent to the lower portion of the side wall of the receptacle is a bracket 47 (Figs. 8 and 9), said bracket comprising a base portion 48 consisting of webs adapted to abut flatwise against the inner surface of the column member 16, and an inclined portion 49, integral with the base portion and projecting from a point substantially midway of the length thereof in a downwardly and inwardly inclined direction. The inclined portion is V-shaped in cross-section and forms a seat, in which rests the upper end of the frame members 46 of the lower portion or wall of the receptacle, said members 46 being preferably connected to said inclined portion 49 by means of rivets 50. As before suggested, the members 46 are connected to the discharge passage 15, the same being provided about its upper margin with an outwardly flaring flange 51, to which are attached the lower extremities of said inclined frame members 46 by means of rivets. Along the outer margins of the frame members 46 there are provided longitudinally extending grooves or rabbets 52 formed in the inner surface of the webs thereof, said grooves or rabbets being adapted to receive the margins of the sectional wall members, as will hereinafter be pointed out. Intermediate the rigidly connected frame members 46 are provided a plurality of removable frame members 53 and 54, said removable frame members being preferably arranged in a series of three each, each series being located on each of the four sides of the lower portion of the receptacle. These frame members consist of bars having the form shown in Fig. 7, namely, two intersecting webs 55 and 56 arranged at right angles to each other in a manner resembling a cross. At the upper end of each bar 53 and 54 is provided a hooked extremity 57 (Fig. 6), adapted to engage the vertical webs of the horizontal frame members 22 of the supporting structure. As shown in Figs. 1 and 6, one of the bars 53 is located midway between the frame members 46 and extends from the frame member 22 downwardly and inwardly to the upper edge of the discharge passage 15, where it is attached to the flange 51 of said discharge passage by means of bolts or rivets. On either side of the centermost bar 53 are located the bars 54, which are somewhat shorter in length and terminate in contact with the outer surfaces of the frame members 46 intermediate their length, and are attached thereto by means of rivets or other suitable devices.

The members of the lower portion of the receptacle thus far described form a frame or skeleton, to which are secured the wall sections, as will now be pointed out. The wall sections comprise flat plates, preferably of cast-iron, having a shape corresponding to the contour of the skeleton frame, and may be described as follows, it being understood that all sides of the lower portion of the receptacle are constructed in identically

the same manner. Extending horizontally between the centermost bar 53 and the bars 54 and from the lower edge of the side walls are two rectangular plates 58, 58, which terminate adjacent to the lower extremities of the bars 54, said plates 58 abutting against the inner surfaces of the transverse web 56 of said bars 53 and 54, and secured thereto by means of rivets or bolts 59, as shown in Fig. 7. Immediately below the plates 58 are triangularly shaped plates 60, connected to the center bar 53 in the same manner as are the plates 58 and to the frame members 46, along their inclined margins, in the manner shown in Fig. 10, namely, with their margins fitting within the grooves or rabbets 52 of said frame members 46 and in such manner that the inner surfaces of the webs of the members 46 and plate members 60 are flush. The plate members 58 and 60 are preferably connected at their adjacent margins by the provision of an offset flange 61, formed along the upper margins of the plate members 60, thereby forming end grooves or shoulders adapted to receive the lower margins of the plates 58, as shown in Fig. 7. In this manner the inner surface of the wall of this portion of the receptacle is maintained smooth throughout. The walls of the lower portion of the receptacle are completely closed by the provision of other triangularly shaped wall sections 62, 62, located outwardly beyond the shorter bar members 54 and adjacent to the upper portion of the frame members 46, said triangular plate members 62 being attached to the short vertical bar members 54 in the same manner as described in connection with the plates 58, and, further, resting within the rabbets 52 of the frame members 46 in the same manner as described in connection with the triangular plate members 60 and as illustrated in Fig. 10. Referring to Fig. 6, it will be seen how the walls of the lower or inclined portion of the receptacle are united or form a continuation of the side walls of the receptacle, namely, by extending the plates 58 and 62 a short distance above the upper margin of the horizontal frame members 22, thus permitting the lower tier of plates 24 of the side wall and their corresponding bars 23 to overlap the upper margins of said plates 58 and 62, thereby forming a continuous surface.

A receptacle constructed in the manner herein described comprises for the most part a comparatively large number of small sections or units, requiring little or no machine work in their production, and of such a size as to permit the same to be conveniently shipped and handled, thus enabling the manufacturer to transport a complete receptacle at a comparatively low cost. Furthermore, the parts or sections permit the receptacle to be erected with little trouble and expense, inasmuch as expert erectors are not required for this purpose. The advantage of the sectional walls is of further importance for the reason that it permits the removal and replacement of any part of the receptacle which may be broken or worn out, without tearing down the entire receptacle or a substantial part thereof, it being observed that, in order to replace say one plate of the side wall, it is only necessary to remove the plates and bars immediately above, thus permitting the desired plate to be withdrawn and a new one inserted. Furthermore, the sectional arrangement permits the use of cast-iron in the construction of the walls, in that plates of cast-iron of a size permitting of their convenient transportation and handling may be employed, whereas a tank constructed as a complete unit must necessarily employ sheet steel, which, as before indicated, is not a satisfactory material for the construction of receptacles for the purpose herein set forth.

Attention is called to the fact that tanks or receptacles of various shapes and sizes can be constructed in accordance with the features of the invention, and it is to be understood that it is not desired to limit the invention to the particular shape of receptacle or the particular method in forming the sections or units, except in so far as specifically pointed out in the claims.

We claim as our invention:

1. In a receptacle, the combination of a supporting structure, comprising connected together vertical and horizontal frame members, a plurality of detachable wall sections, and means for suspending said wall sections from said supporting structure.

2. In a receptacle, the combination of connected vertical and horizontal frame members, a plurality of detachable wall sections, and means for suspending said wall sections from said horizontal frame members and detachably connecting the same with each other.

3. In a receptacle, the combination of a supporting structure, comprising connected together vertical and horizontal frame members and a side wall comprising a plurality of wall sections and a plurality of supporting members suspended from said horizontal frame members and adapted to have detachable connection with said wall sections along the lateral margins thereof.

4. In a receptacle, the combination of a supporting structure comprising connected vertical and horizontal frame members, a plurality of horizontally spaced bars removably attached in vertical position to said supporting structure, and a series of wall sections extending between said bars and connected thereto along their lateral margins.

5. A receptacle comprising connected ver-

tical and horizontal frame members, a plurality of vertically arranged bars removably attached to said supporting structure in spaced relation, said bars being provided with longitudinally extending grooves, and a plurality of wall sections between said bars and removably retained within the grooves thereof.

6. In a receptacle, the combination of a supporting structure, comprising connected vertical and horizontal frame members, a plurality of bars provided with hooked extremities engaging said horizontal frame members of said supporting structure, and wall sections removably supported by said bars.

7. In a receptacle, the combination of a supporting structure, comprising vertical columns and a plurality of parallel and horizontal frame members, a plurality of bars suspended from said horizontal frame members, and a plurality of wall sections detachably connected to said bars and arranged in rows having overlapping engagement with each other.

8. In a receptacle, the combination of a supporting structure, comprising vertical column members and a plurality of horizontal frame members connected to said columns and arranged in parallel and vertically spaced relation, series of bars arranged in spaced relation along each of said horizontal frame members and extending downwardly to the adjacent horizontal frame member, the bars of each series being in vertical alinement and having overlapping engagement at their lower end with the corresponding bars of the series below, and a plurality of plates removably retained between the bars of each series thereof and arranged in horizontal rows overlapping the upper margins of the row immediately below.

9. In a receptacle having side and bottom walls, the combination of a supporting structure, comprising vertical column members and a plurality of horizontal frame members arranged in parallel and vertically spaced relation, said side wall comprising a series of horizontally spaced bars provided with hooked upper extremities and grooves in their lateral margins, each series of bars being suspended from a horizontal frame member and overlapping the corresponding bars of the series below, and a plurality of wall sections removably mounted between the bars of each series and engaging the lateral grooves thereof.

10. In a receptacle, the combination of a supporting structure, comprising connected vertical and horizontal frame members, the latter arranged in parallel and vertically spaced relation, a plurality of supporting bars suspended from and arranged in spaced relation along each of said frame members, each bar member terminating adjacent to a horizontal frame member below and in overlapping relation with a bar member suspended therefrom and provided with vertically extending grooves, and plates insertible between said supporting bars and engaging the grooves thereof, and means for limiting the relative downward movement of said plates in said grooves.

11. In a receptacle, the combination of connected vertical and horizontal frame members, the latter arranged in parallel and vertically spaced relation, said side wall comprising a plurality of supporting bars suspended from and arranged in spaced relation along each of said frame members, each bar terminating adjacent to the horizontal frame member below and in overlapping relation with a bar in vertical alinement therewith, said bars being provided with vertically extending grooves, and plates insertible between said supporting bars and engaging the grooves thereof, said plates being provided with a lug at the upper end thereof adapted to engage the upper ends of said supporting bars.

12. In a receptacle, the combination of a supporting structure, comprising connected vertical columns; horizontal frame members and downwardly and inwardly inclined frame members below said horizontal members, supporting members detachably connected to said horizontal frame members and forming with said inclined frame members a skeleton frame for the lower portion of said receptacle, and a plurality of wall sections connected along their margins with said frame and detachable supporting members.

13. In a receptacle, the combination of a supporting structure, comprising connected vertical horizontal and inclined frame members, the latter extending downwardly below said horizontal members, a plurality of bars provided with hooked extremities engaging said horizontal frame members and forming with said inclined frame members a skeleton frame for the lower portion of said receptacle, and a plurality of wall sections detachably connected to said frame and supporting members.

In testimony that we claim the foregoing as our invention, we affix our signatures in the presence of two witnesses, this 1st day of November, A. D. 1916.

HERMAN A. POPPENHUSEN.
ARTHUR P. STRONG.

Witnesses:
H. R. WILSON,
A. S. BRADY.