

June 6, 1967

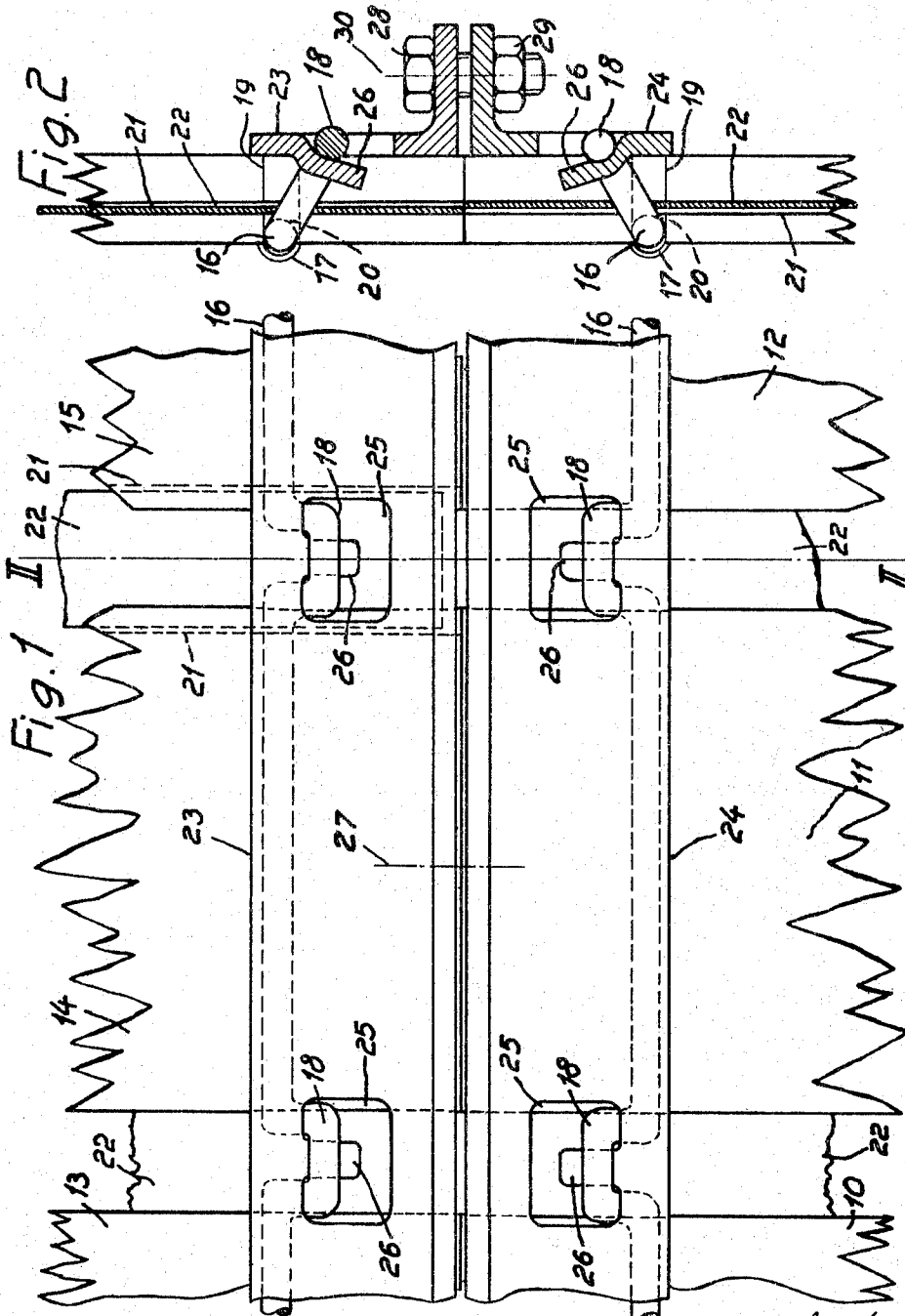
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3,323,265

CONTAINER WITH CONNECTING ELEMENTS FOR THE WALL PORTIONS

Filed July 20, 1964

5 Sheets-Sheet 1



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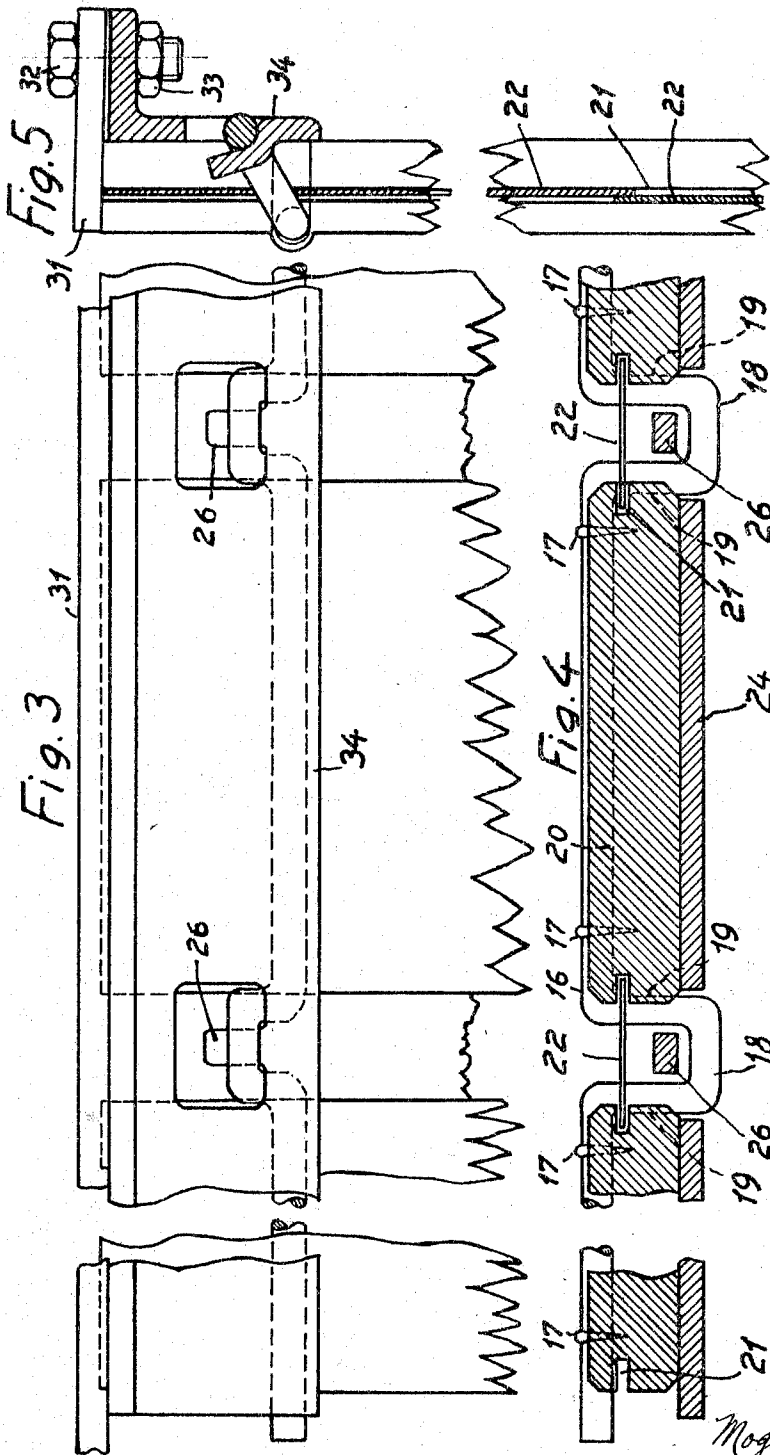
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5 Sheets-Sheet 2



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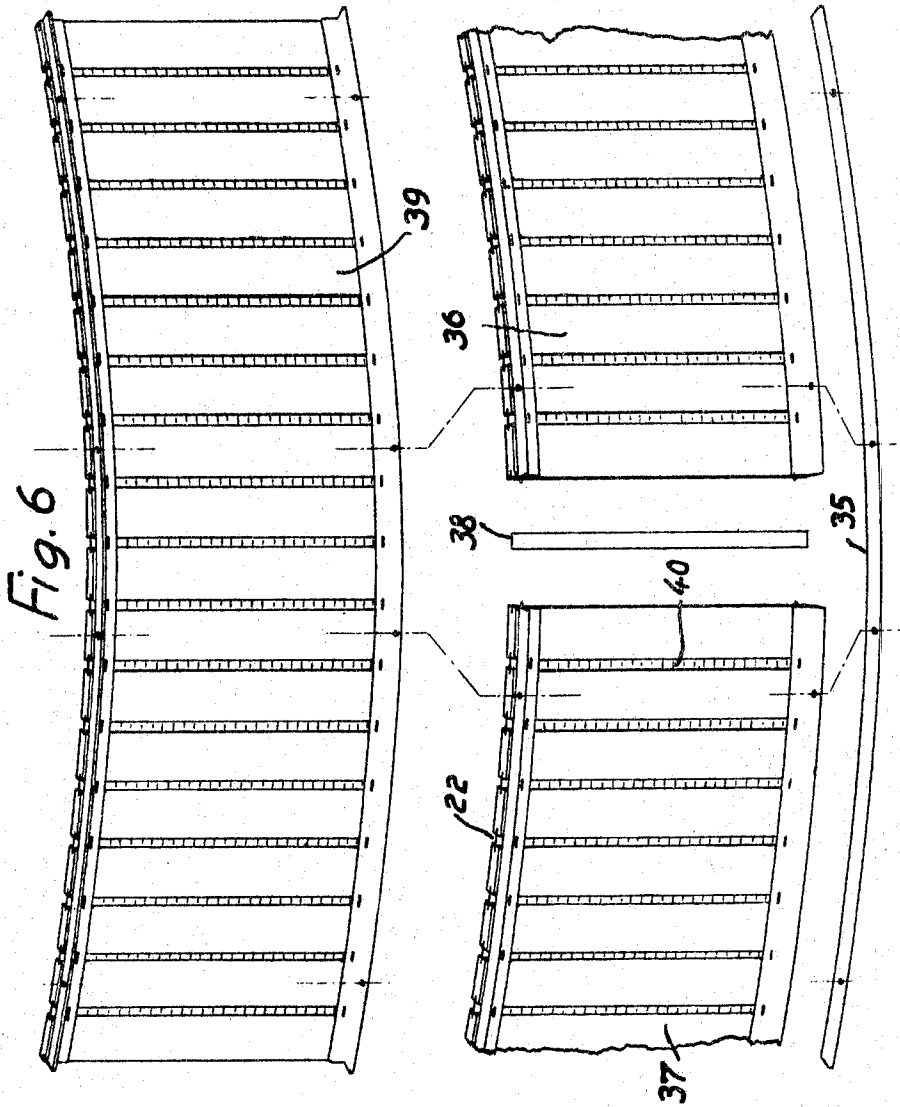
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5 Sheets-Sheet 3



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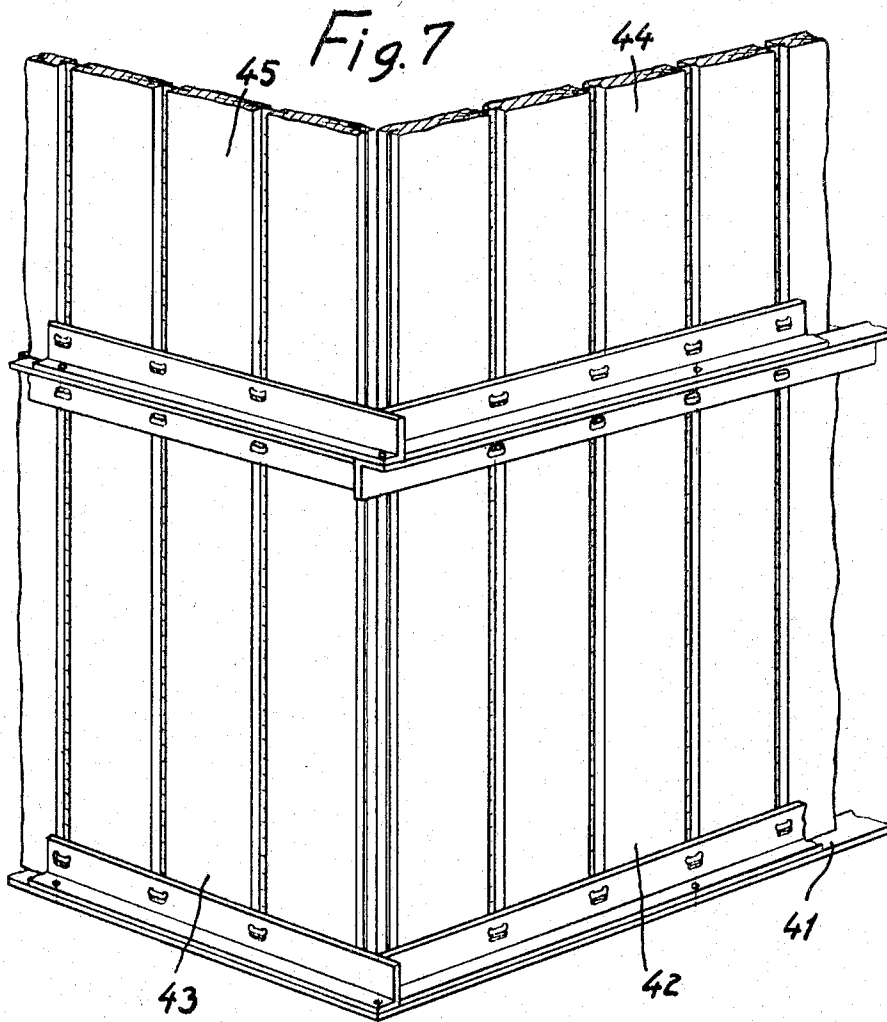
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5 Sheets-Sheet 4



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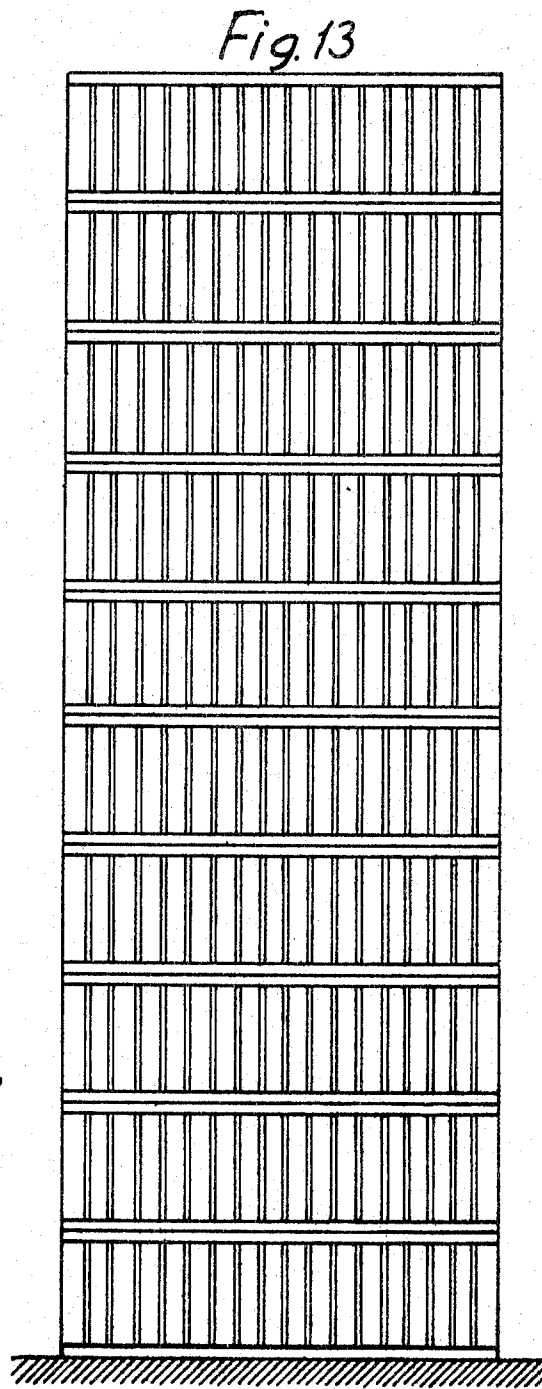
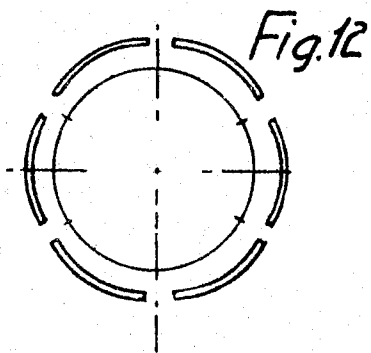
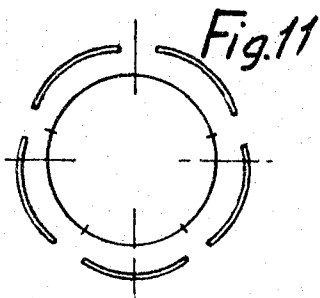
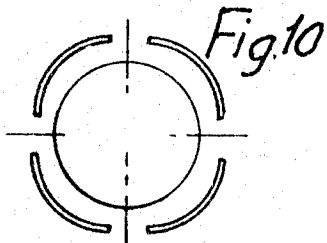
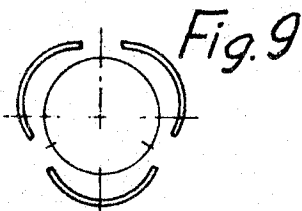
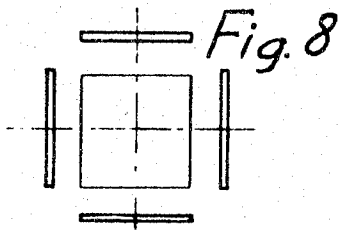
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CONTAINER WITH CONNECTING ELEMENTS FOR THE WALL PORTIONS

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5 Sheets-Sheet 5



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3,323,265

**CONTAINER WITH CONNECTING ELEMENTS  
FOR THE WALL PORTIONS**

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8 Claims. (Cl. 52—302)

The present invention relates to a container, particularly a silo, comprising large wall portions which again comprise small wall portions or boards, the large wall portions being held together by means of connecting members.

Such containers may be used for many purposes; thus they can be used as silos for agricultural purposes for storing of grain, and they may also be used for grain drying if the container wall is suitably perforated. The containers or silos are often cylindrical and consist of large wall portions which extend the full height of the container. Therefore it is necessary in prefabricating such wall portions to produce many sizes and forms of the wall portions in order to produce a container or a silo of the desired dimensions. Storing and transport of such wall portions may be rather inconvenient.

The wall portions may consist of vertical boards on horizontal ribs. The mounting of the boards may be carried out with nails but this is often not sufficient so the boards further have to be glued to the ribs, especially in the case of cylindrical containers. Nailing and gluing are both rather time-consuming.

If the wall portions are perforated, and consist of wood, they will often be obstructed by dust because the wood will be distorted.

A suitable material for the container or silo wall is wood with small yearly rings from slowly growing trees.

It is however difficult to provide such wooden materials in all the desired dimensions. In order to avoid waste of material it therefore may be necessary to glue wooden boards together and then cut them to the desired lengths. This gluing will increase the production costs.

The container or silo according to the invention is characterized in that the small wall portions comprise intermittently spaced mounted boards or smaller wall portions which by means of cross connecting members are connected to each other, and that in the intermittent spaces projecting parts on the connecting members of the large wall portions protrude, said projecting parts engaging the cross connecting members.

This container or silo has several advantages. The projecting parts on a connecting member can be inserted in the spaces between the boards to fix all the boards (the smaller wall portions), when the connecting members are connected to each other e.g. by means of screws or bolts, in order to connect the large wall portions to each other and transmit the tensions between them. The said connecting members have in this way several functions, and they may also be used to guide the large portions mutually. Besides the abovementioned three functions the connecting members may be effective in two additional respects which shall be explained hereafter.

The described form of the container or silo has however also the advantage that the small wall portions may be produced, stored and transported plane, even if they later, if desired, are to be used in the construction of a cylindrical container or silo, and it is possible to use the same wall parts both for cylindrical containers or silos with the different diameters and for containers or silos shaped in another way, e.g. with rectangular, square or polygonal cross section.

According to the invention the boards or the smaller wall portions may be connected by means of an iron bar which in the said interspaces is provided with a bent part. In this way the iron bar has the same effect as one thread in a sewing machine and the connecting member with the projecting parts has the effect as the other thread in a sewing machine. It will be understood that a very good fixing of the boards is obtained by these means.

According to the invention there may be inserted strips of metal, e.g. aluminum, or plastic material, in the spaces between the boards. These strips may seal the wall of the container completely but they may also be provided with perforations. This last mentioned form has the advantage that the container may be provided with many more ventilating perforations than a container which is made wholly of wood, and the perforations or openings may be carried out in such a way that they are not easily choked.

According to the invention the boards may be provided with grooves for the bent parts of the iron bars. In this way the bent parts when pulled upwardly or downwardly of the projecting parts on the connecting members will squeeze the boards firmly.

According to the invention there may be provided projecting parts or lugs on both sides of the connecting members. This is advantageous because it is possible to place two of the described containers concentrically with smooth walls facing each other. Such an arrangement may be used in grain drying.

The connecting members of the described container may according to the invention be formed as a profile iron with openings for screws or bolts in parts extending at approximately a right angle to the remotest parts of the lugs or the projecting parts. In this way they very easily may be pulled against the cross connection members (the iron bars).

In the accompanying drawings:

FIG. 1 shows a part of a container or a silo according to the invention seen from the side,

FIG. 2 is a vertical section through the wall in a form for such a container or silo,

FIG. 3 is a section of the upper edge of a form for the said container or silo seen from the side,

FIG. 4 is a horizontal section in the wall of a form of the said container or silo,

FIG. 5 is a vertical section through the upper edge of a form of the said container or silo,

FIG. 6 illustrates the building of such a container wall seen from the side,

FIG. 7 is a cornerpart of a rectangular or square form,

FIG. 8 shows schematically the building of a square container or silo according to the invention,

FIGS. 9 to 12 show in the same way the building of different containers or silos with circular cross section and different diameters and

FIG. 13 shows a container or silo according to the invention with a square basis, seen from the side.

In FIG. 1, 10, 11 and 12 designate three boards of which only the upper parts are seen, and 13, 14 and 15 are three boards of which only the lower parts are shown. The face of the boards 10 to 15 are provided with a groove in which is placed a cross connecting member in the form of an iron bar 16.

The iron bar 16 is connected to the boards 10 to 15 by means of staples 17, FIGS. 2 and 4, and is provided intermittently with bent portions formed as a crank 18. A number of boards connected by means of two iron bars 16 form a wall section of convenient size and weight, and the bent portion or crank 18 is situated in a plane at a

right angle to the boards, placed in another groove in the edges of the boards, said groove, FIGS. 2 and 4, designated by 19, and the aforementioned groove which extends at a right angle to the groove 19 and following the broad surface of the boards, is indicated by 20.

In the small sides of the boards are provided grooves 21, in which strips of plastic material or metal, e.g. aluminum, are inserted, indicated by 22. These strips 22 may be perforated or provided with slots which may be pressed outwardly so that the opening is upward.

Two profile irons 23 and 24 which may be L-shaped irons or irons with another profile, are provided with openings 25 for the cranks 18, and projecting parts or lugs 26.

In suitable places, e.g. intermediate between the openings 25, as indicated by a line 27, there may be provided means to pull the irons 23 and 24 against each other and fix them to each other.

These means may in their simplest form as shown in FIG. 2 which may be considered as a section along the line II—II in FIG. 1, be suitable openings in the irons 23 and 24 together with screws or bolts 28 with nuts 29. However other means may be used, e.g. a press construction or a construction with an eccentric body.

The profile irons 23 and 24 can by means of the lugs 26 engage the cranks 18 in the whole section at the same time. When the irons 23 and 24 then are pulled together along the line 30, FIG. 2, the cranks 18 will be forced out of the grooves 19 and take the positions shown in FIG. 2. In these ways the boards are squeezed from all four sides, and there is obtained a fixing of the boards which is far better than any which can be obtained by means of nails.

In the strips 22 are formed slots for the crank 18 so that a flap upon the insertion of the crank may be moved again to the former position. When the crank 18 turns during the tightening of the screws each crank 18 will pull in the corresponding strip 22, and the strips 22 therefore will be pressed against each other in the spaces between the wall sections so that they will seal the joints. In order to permit this movement it is preferred to use two strips instead of one strip, said two strips overlapping each other at the middle part of the board, as shown in lower portion of FIG. 5.

The upper part of the container may be formed as shown in FIGS. 3 and 5 with an edge part 31 which by means of screws 32 and nuts 33 is fixed to a profile iron 34, shaped similarly to the irons 23 and 24.

FIG. 6 illustrates the building of the said container. On to a profile iron 35 which is placed on a bottom or a floor are screwed sections 36 and 37. In the opening between these is inserted a strip 38 which may be of the same material as the strips 22 but may be somewhat thicker. On to the sections 36 and 37 is screwed a section 39, offset so that a bonded wall is formed. In this way using wall sections of the same dimensions containers of far different dimensions may be formed.

The strips 22 as indicated in FIG. 6 are provided with slots 40.

The container or silo illustrated in FIG. 6 is cylindrical but a container on a square or rectangular frame 41, FIG. 7, may be built using the same sections of sections 42, 43, 44 and 45. A square container or silo may be built as schematically shown in FIG. 8 and may in the full height have the appearance as shown in FIG. 13.

FIGS. 9 to 12 illustrate schematically the building of containers or silos with circular cross section and different diameters.

An important advantage in connection with the form of a wall section described in FIGS. 1 to 5 is that the cranks 18 involve that the neutral line in the wall section, when bent in different ways as shown in FIGS. 9 to 12, remains along the profile irons 23 and 24, FIGS. 1 and 2, or 35, FIG. 6. Therefore, the distance between the distance between the cranks of the iron bars always will correspond to the distance between the projecting part 26 of the profile irons.

The wall sections, when packed together, e.g. five or six sections together, will form a handy and rigid unit. This is due to the cranks 18 which extend somewhat from the surface of the wall sections and consequently transmit the powers of displacement between the sections. If the cranks 18 are extended sufficiently beyond the surface of the wall sections it will be understood that it is not necessary to bend the lugs 26 out of the plane of the openings 25. It is enough that the lugs 26 project into the openings 25. If the profile irons 23 and 24 are formed as U-shaped irons with projecting lugs 26 on both legs or flanges these irons may be used externally on a container wall as well as internally which as mentioned above may be advantageous.

What is claimed is:

1. A container, particularly a silo, comprising large wall portions made up of a plurality of small wall portions, said large portions fixed together by means of connecting members, the small wall portions including spaced boards which are connected to each other by means of cross connecting members, projecting parts on said connecting members of the large wall portions protruding into the spaces between said boards, said projecting parts engaging said cross connecting members, said cross connecting members being formed with a bent portion extending into the spaces and strips of metal located in the spaces.

2. A container according to claim 1 wherein the edges of said boards are provided with grooves for said bent portions.

3. A container according to claim 2 wherein said connecting members are provided with projecting parts on both sides thereof.

4. A container according to claim 3 wherein said connecting members are formed with openings for bolts in parts extending approximately at a right angle to the extreme part of the projecting parts.

5. A container according to claim 3 wherein said bent portions are in the form of cranks.

6. A container according to claim 5 wherein the face of said boards are provided with grooves for said cross connecting members and other grooves extending at right angles thereto for the insertion of said strips.

7. A container in accordance with claim 6 wherein said strips are provided with openings for said cross connecting members.

8. A container in accordance with claim 6 wherein said strips are provided with ventilation openings.

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