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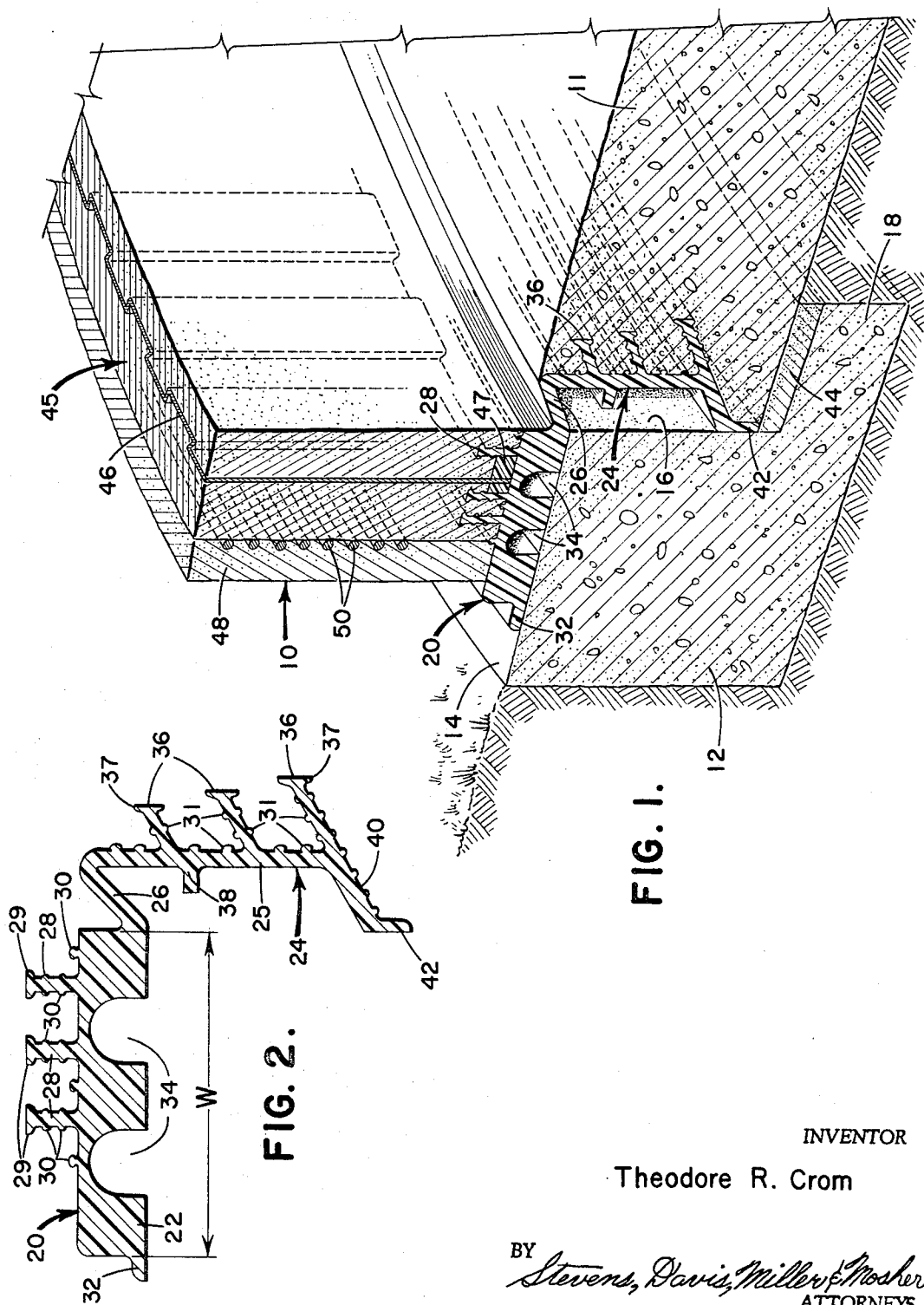


FIG. 1.

FIG. 2.

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## JOINT CONSTRUCTION AND WATERSTOP- BEARING PAD THEREFOR

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### ABSTRACT OF THE DISCLOSURE

A joint construction comprising a foundation having a top, an upstanding wall supported on the foundation top, and a floor, a waterstop-bearing pad having a wall support section positioned on the foundation top beneath the wall for supporting the wall, preventing liquid leakage from the bottom of said wall and providing a bearing action enabling horizontal movement of said wall relative to said foundation, said waterstop-bearing pad further comprising a floor engaging section embedded in said floor near the periphery thereof to prevent liquid leakage therefrom, the floor engaging section having a connecting portion connected to the inner part of said wall support section to provide flexibility between the wall support and floor-engaging sections and to isolate the foundation from any liquid contained by the wall and floor. The bottom of the wall support section rests upon the foundation and is free from integral connection therewith so that the waterstop-bearing pad need only be placed on the rectangular shoulder of the foundation during fabrication of the joint structure. The pad according to the invention therefore isolates the foundation contained by the floor and wall, and facilitates installation by providing a single unit that serves both as a waterstop and bearing pad.

The present invention relates to a novel waterstop-bearing pad and to structural joint constructions employing said pad, e.g. a joint between a foundation and an adjacent structural component. In one of its more specific aspects, the present invention relates to the construction of concrete liquid storage or treatment tanks and more particularly to an arrangement for joining the tank walls and floors to the foundations. Conventional tank designs require expensive formwork, and time consuming workmanship to place one or more waterstops and one or more bearing pads around the base of the tank which may vary in radius from about 20 feet to approaching 400 feet to date.

A conventional bearing pad is a continuous, resilient pad with a width substantially less than the thickness of the wall which it supports. The pad supports the wall on the foundation and permits the wall to move radially relative to the foundation so that excess bending does not occur when tank conditions change. This action decreases the chances of the tank wall developing horizontal cracks and leakage and also reduces the amount of vertical reinforcing steel required for the wall structure.

To prevent the wall portion which overlaps the bearing pad from engaging the foundation, another continuous pad may be positioned to support the balance of the wall during construction only. Usually, this additional pad is of a different material from the bearing pad.

In order to prevent leakage at the foundation, it is standard to embed in the wall and foundation opposite edges of a separate continuous member known in the art as a waterstop.

Yet another waterstop is placed between foundation and floor slab to prevent leakage at that point. A portion of the foundation itself is usually in direct contact with

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the contents of the tank. Sometimes the foundation also develops leakage due to radial cracks therein.

Not only is it inconvenient and time consuming to exactly place the three or four continuous members around the tank foundation, wall bottom, and floor, but this arrangement makes it difficult to assure complete and full separation of the wall and foundation for the entire thickness of the wall. Moreover, during the placement of both foundation material and the wall, extreme care is necessary to prevent inadvertent displacement of the various members.

The present invention avoids these problems by providing a single continuous member which is easily and quickly installed and which performs both the bearing and waterstop functions. Moreover, the member according to the invention is not embedded in the foundation and affords the added advantage of isolating the liquid contents in the tank from the foundation. With this arrangement, the tank foundation can be a relatively simple base which may crack without leaking.

Also, a new tank construction is provided which permits the floor to move relative to the foundation both radially and vertically without restraint while maintaining a liquid-tight connection to the wall.

It is therefore an object of the present invention to provide a new and improved waterstop-bearing pad which comprises a single, continuous, resilient member.

It is another object of the present invention to provide a waterstop-bearing pad having a wall supporting section which has a width generally equal to or greater than the thickness of the wall it supports.

Still another object of the present invention is to provide a novel foundation joint construction having a waterstop-bearing pad having a wall supporting section lying on the upper surface of said foundation and a floor engaging section dependently connected to the inner edge of said wall supporting section and being embedded in the peripheral edge of a floor.

It is still another object of the present invention to provide a foundation base with an inner lower shelf and a continuous waterstop-bearing pad which isolates the liquid contents of a tank from its foundation base and a compressible pad supported on said shelf which in turn eliminates the hydraulic loads from said base, unless anticipated settlements are exceeded.

One of the tank design problems is that the liquid load of the tank contents above the foundation are carried by the foundation, thereby reducing its effectiveness in carrying the wall loads. By using a compressible member between the floor and foundation, liquid loads are not transmitted to foundation until complete compression has occurred. If the thickness of the compression member is sufficient, this will not occur and a more suitable wall foundation results. However this feature should not be a condition of the patent, as bearing pad-waterstop stands on its own merits without this feature.

Other and further objects of the present invention will become apparent with the following detailed description when taken in view of the appended drawings in which:

FIGURE 1 is a perspective view, partially broken away, of a tank construction according to the present invention.

FIGURE 2 is a transverse vertical section illustrating one suitable cross section of the waterstop-bearing pad according to the present invention.

With reference to the drawings in detail, the tank construction 10 according to the present invention includes a continuous foundation 12 extending around the lower, outer periphery of the tank. Foundation 12 can be made of comparatively inexpensive material and poured with simple forms. Foundation 12 has a flat upper surface 14 with a vertical side 16 terminated at its lower edge

by an inward extending shelf 18. The inward shelf 18 is not essential, but is generally desirable particularly where significant floor settling is expected.

The waterstop-bearing pad 20 according to the present invention can be made of extruded rubber, PVC or any other suitable material and has a wall support section 22 resting flat on top 14 of foundation 12 and a floor engaging section 24 hanging vertically near side 16 of foundation 12. Sections 22 and 24 are continuously connected by a flexible connecting portion or hinge 26.

With reference to FIGURE 2, the wall supporting section 22 includes a rectangular body which has a lateral dimension W which may be slightly greater than, equal to, or less than the expected thickness of the wall which section 22 supports. In the illustrated embodiment the dimension W is slightly greater than the thickness of the wall. If the wall thickness is to be greater than W, a supplemental resilient pad (not shown) abutting the outer edge of pad 20 may be employed during formation of the wall. This supplemental pad may be wedge-shaped to facilitate removal. The abutting portion of the bottom of the wall will then be inclined downwardly. A small toe or flange 32 is formed at the lower outer edge of section 22. Three continuous, upstanding fins 28 with enlarged tops 29 are formed on the top of section 22 and are spaced from each other and from the inner and outer edges of section 22. Fins 28 provide for alignment of certain structural pieces of the wall and become permanently embedded in the concrete or gunite wall which is poured thereover. A plurality of continuous, spaced ribs 30 are formed at suitable locations on the body of section 22 as well as on the sides of fins 28. Tops 29 and ribs 30 enhance the engagement between section 22 and the wall which it supports.

The body of section 22 is further provided with a pair of parallel continuous channels 34 having rounded tops and openings through the bottom of section 22. Channels 34 remain empty or air-filled when the construction is assembled and serve to increase the resiliency and to enhance the bearing action of section 22.

It will be appreciated that section 22 of pad 20 provides sufficient column support to carry the wall load and sufficient bearing action to permit horizontal movement of wall 45 in response to the expansion and contraction thereof.

The floor engaging section 24 has a vertical piece 25 with three upward and inward extending fins 36 which are continuous and formed on the inside surface thereof. Fins 36, like fins 28, have enlarged free ends 37 and ribs 31 are provided on fins 36 and piece 25.

When assembled, the inside edge of body 22 is aligned with or positioned near vertical side 16 so that the connecting portion 26 extends upward and inward from side 16. Piece 25 has its upper end formed with the upper, inner end of portion 26 so that piece 25 hangs generally parallel to vertical side 16. In order to insure that piece 25 remains spaced from side 16 when the floor 11 is poured, an outward extending continuous rib 38 spaced below portion 26 is formed on the outside of piece 25.

Fins 36 slope upward and inward so that the floor material when poured is sure to flow between fins 36 and contact the inner side of vertical piece 25. If fins 36 extend horizontally inward, it may be more difficult for the floor material to flow therebetween and there would be a greater possibility of concrete shearing near the periphery of the floor.

A downward and outward extending foot section 40 is formed at the lower edge of piece 25 and has a vertical toe 42 extending downward from the outer edge thereof. The lengths of connecting portion 26 and foot 40 are such that toe section 42 engages wall 16 to vertically align piece 25 during assembly.

It will be appreciated that waterstop-bearing pad 20 is a continuous single piece unit which can be easily and quickly installed during assembly of the tank construction. If desired, nails can be driven through toe sections

32 and 42 at spaced locations to fix temporarily the position of the waterstop-bearing pad while the wall and floor are being formed.

Prior to pouring the tank floor, a continuous compressible mat which may be in the form of a sponge rubber cushion 44 is positioned on the top surface of shelf 18. Mat 44 may be of any suitable thickness and permits the floor to move vertically without putting eccentric loads on the foundation.

After the tank floor is poured, wall 45, preferably made of gunite, is formed on the upper surface of section 22 of waterstop-bearing pad 20. The wall in one preferred embodiment consists of a corrugated steel shell 46 which fits down between the two innermost fins and rests on the portion of section 22 therebetween. Prior to pouring the gunite wall sections, a suitable sealing material 47 is placed between the two innermost fins 28. The sealant bonds the bottom of steel shell 46 to the top of section 22. Thereafter, the gunite wall section is placed on both sides of shell 46 with the bottoms of the gunite wall sections completely encapsulating the upstanding fins 28. Lastly, an outer prestressed wall section 48, having spaced tensioned rods or wires 50 therein, is formed on section 22 flush with the next innermost wall section.

The operation of the invention is apparent from the above description. Waterstop bearing pad 20 not only provides the bearing and sealing functions for tank wall 45, but it also seals the floor periphery with can move vertically and radially by virtue of mat 44 on shelf 18 and the space between section 24 and foundation 16. Thus, foundation 12 remains free from eccentric loads. Connecting portion 26 of the pad not only permits relative movements, but it also isolates the liquid in the tank from foundation 12 so that leaks cannot result from cracks occurring therein.

Thus, there has been disclosed an improved foundation joint construction and waterstop-bearing pad which have advantages not heretofore known in the art. It should be understood that various modifications can be made to the herein disclosed embodiments without departing from the spirit and scope of the present invention.

What is claimed is:

1. A joint construction comprising a foundation having a top, an upstanding wall supported on the foundation top, and a floor, a waterstop-bearing pad having a wall support section positioned on the foundation top beneath the wall for supporting the wall, preventing liquid leakage from the bottom of said wall and providing a bearing action enabling horizontal movement of said wall relative to said foundation, said waterstop-bearing pad further comprising a floor engaging section embedded in said floor near the periphery thereof to prevent liquid leakage therefrom, the floor engaging section having a connecting portion connected to the inner part of said wall support section to provide flexibility between the wall support and floor-engaging sections and to isolate the foundation from any liquid contained by the wall and floor.

2. A joint construction as set forth in claim 1 wherein said floor engaging section comprises a piece hanging downwardly from the connecting portion and being spaced inward from an inner side of said foundation, a plurality of upward and inward extending fins formed on the inner side of said piece being embedded in said floor near its periphery.

3. A joint construction as set forth in claim 1 wherein said wall support section comprises a body having a plurality of upstanding spaced fins formed on the top thereof which are embedded in the bottom of said wall to seal the same.

4. A joint construction as set forth in claim 1 wherein said body has at least one hollow channel to enhance the resiliency and bearing action of the wall support section.

5. A joint construction as set forth in claim 1, wherein the inner side of said wall support section is generally vertically aligned with the upper part of a foundation in-

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ner side and said connecting portion extending inward from the inner side of said wall support section, said floor engaging section having a piece connected to and hanging from the inner edge of said connecting portion and being generally parallel to said foundation inner side, said piece having a lower outwardly extending foot to space the same from said foundation inner side, and said piece engaging part of the periphery of said floor and acting as a boundary therefor when the floor is poured.

6. A joint construction as set forth in claim 1 wherein said foundation, wall, floor and waterstop-bearing pad sections are continuous.

7. A joint construction as set forth in claim 1 wherein the bottom of the wall support section rests upon the foundation and is free from integral connection therewith.

8. A joint construction as set forth in claim 1 wherein said foundation includes an inward extending shelf, said floor having outer edge portions overlaying said shelf.

9. A joint construction as set forth in claim 8 further comprising a compressible mat positioned on said shelf and abutting the peripheral bottom of said floor so that said floor can move horizontally and vertically independent of said foundation.

10. A prestressed liquid storage tank construction comprising a circular foundation having a top and an inner side extending downward from said top, a floor, a continuous resilient waterstop-bearing pad having a wall support section positioned on said top and a floor engaging section spaced inward from and along said foundation side and an interconnecting portion connected from the inner edge of said wall support section to the top edge of said floor engaging section, said wall support section comprising a continuous body having an upper surface to support the bottom of the wall and a plurality of upstanding, continuous, spaced fins formed on the top thereof, each fin having an enlarged portion, a plurality of continuous ribs extending along the sides of said fins and the top of said body, an upstanding tank wall, said ribs and enlarged portions of said body being embedded in the tank wall, said body having its inner side generally

aligned with the top of said foundation side, an outward extending toe section connected to the bottom outer edge of said wall support section, said tank wall including a corrugated upstanding metal shell the bottom of which rests on the top of said body between two of said fins and a gunite wall section formed on each of the outer and inner sides of said shell and an additional wall section including prestressed reinforcing members formed on the outermost side of said wall, said floor engaging section comprising a continuous piece generally downwardly arranged and having an inner and outer surface, a plurality of inward extending continuous fins formed on the inner surfaces of said piece and being embedded in the periphery of said floor, said fins having enlarged portions, a further plurality of ribs extending along the sides of said fins and the inner surface of said piece, a spacing rib formed on the outer surface of said piece and spaced from the top and bottom thereof and extending outwardly to prevent said piece from contacting said foundation side when the floor is poured, and an outward and downward extending continuous foot formed on the bottom of said piece which engages the foundation side to space said piece from said side.

11. A tank construction as set forth in claim 10 wherein said body of said wall support section is provided with at least one hollow longitudinal channel to enhance the bearing action and resiliency of said wall support section.

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