April 19, 1966 J. C. WADE ETAL 3,246,582

ADJUSTABLE SQUARE DRAIN

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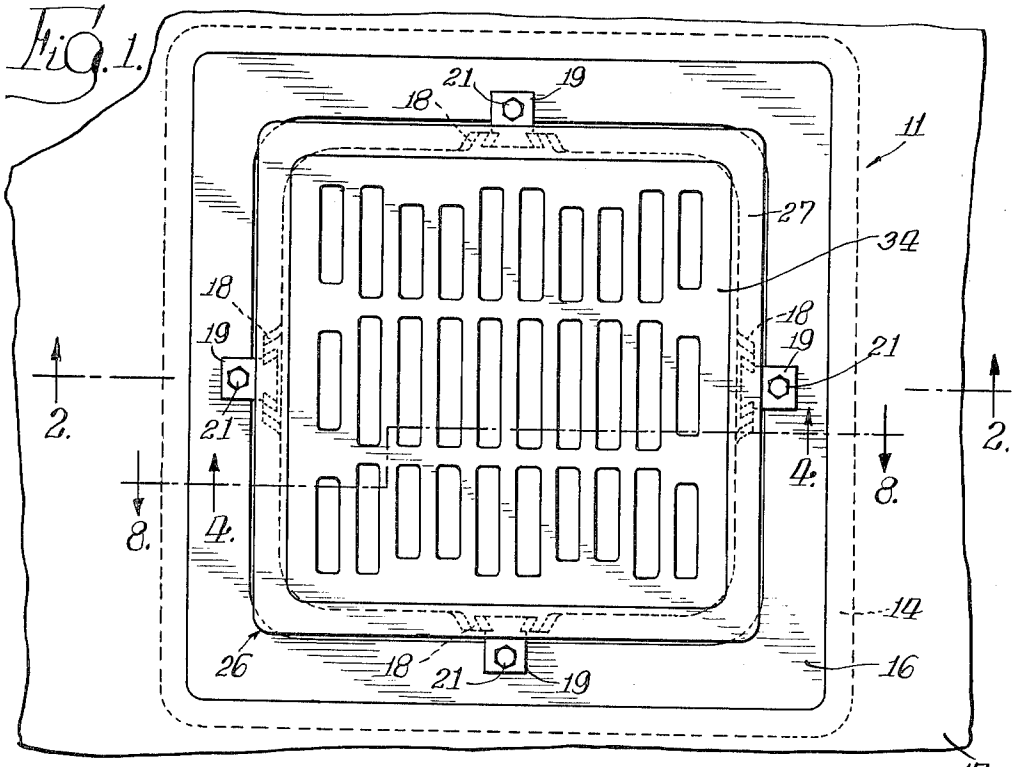
Fig. 1.



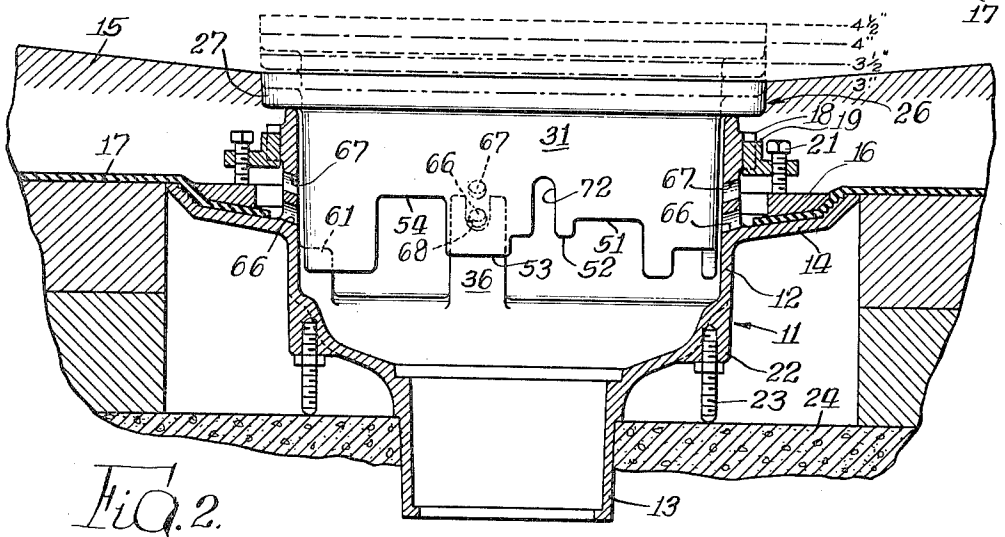


Fig. 2.

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Fig. 3.

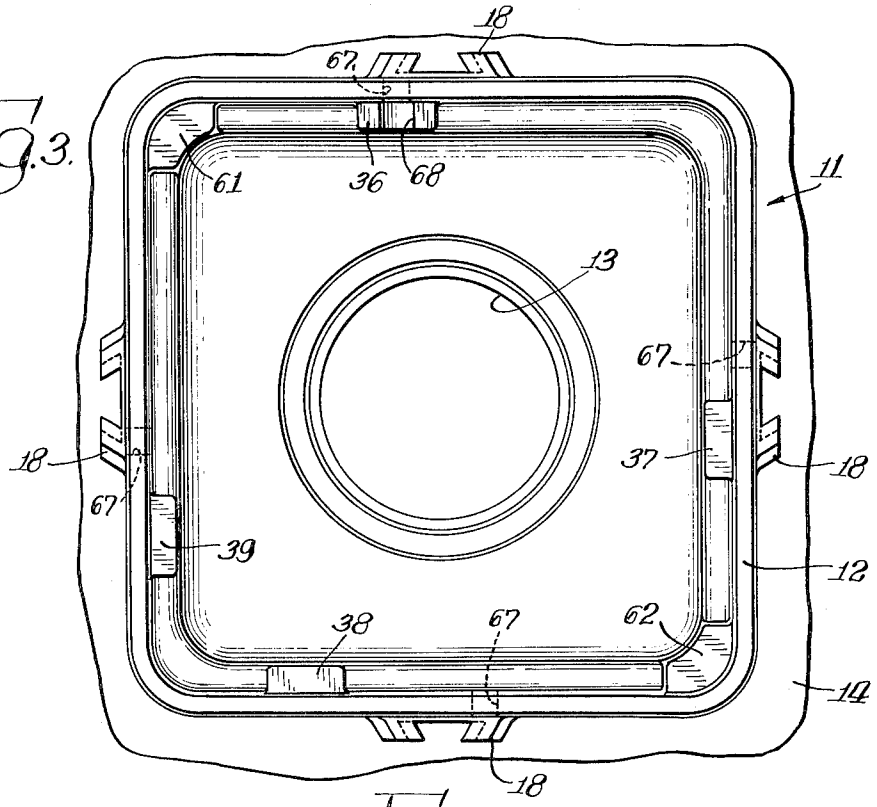

Fig. 4.

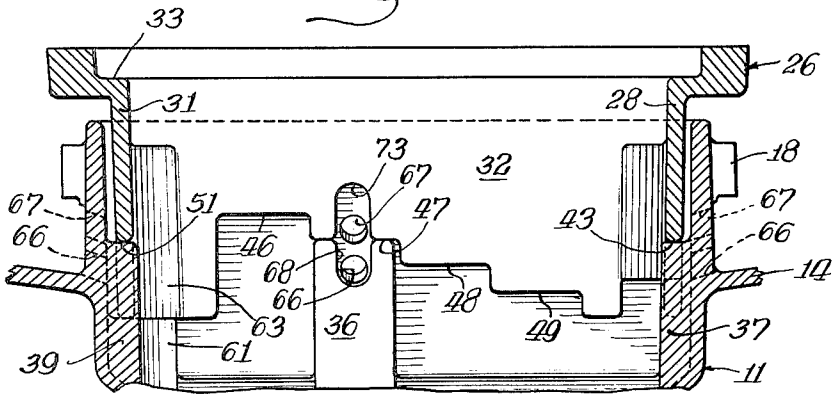

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Fig. 5.

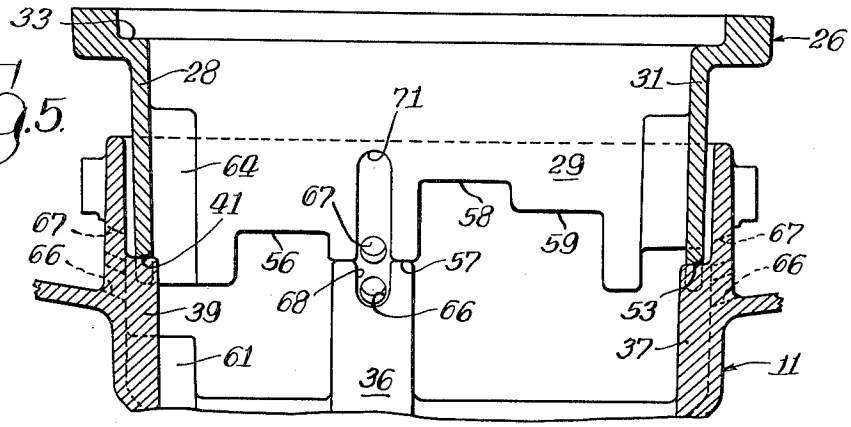


Fig. 6.

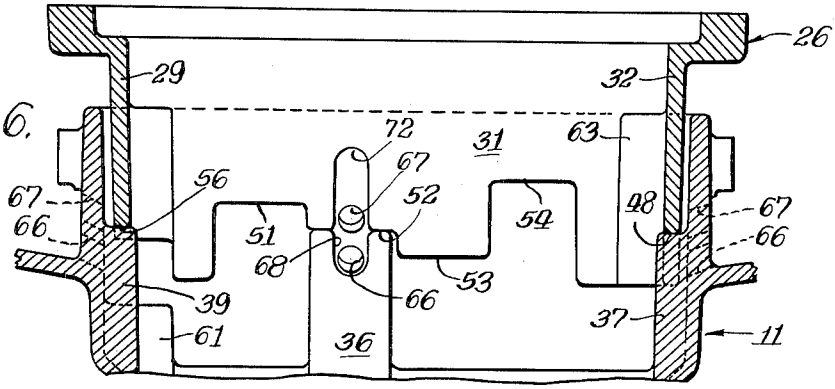


Fig. 7.

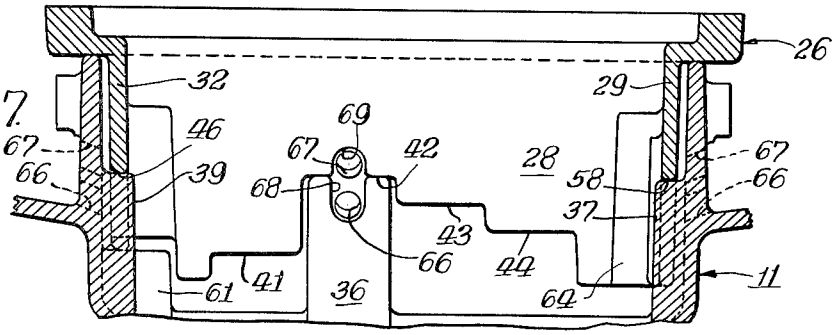
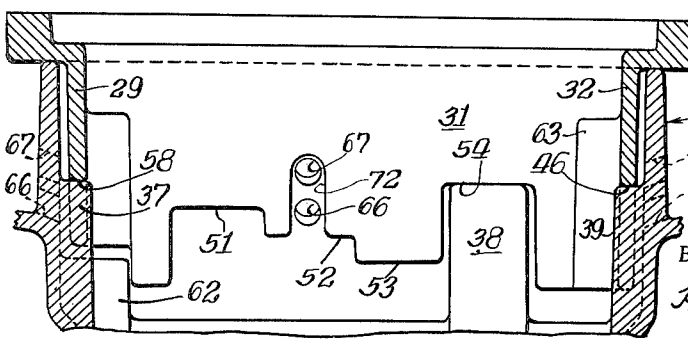


Fig. 8.



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ADJUSTABLE SQUARE DRAIN

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Filed Sept. 11, 1962, Ser. No. 222,911
6 Claims. (Cl. 94—33)

This invention relates to improvements in adjustable drains and more particularly to a novel adjustable floor drain having a square cross-sectional configuration.

It is known to provide an adjustable floor drain of round or circular configuration. Such adjustable drains are advantageous for accommodating varying vertical distances between the drain body and the floor level, thereby facilitating installation of the drain in a concrete floor or the like. The adjustability feature is particularly desirable in situations, such as in packing plant floors, where the floor thickness varies considerably dependent upon the area in which the drain is installed.

Various expedients have been used to provide the desired adjustability in the case of round or circular drains. For example, a screw thread connection may be provided between the drain body and an inner adjustable collar. Matching inclined plane or cam portions have also been employed. However, none of these arrangements are feasible in the case of a drain having a non-circular or square configuration. Nevertheless, there are certain applications which require a square drain. For example, in a tile floor it is desirable to be able to omit one or more tiles to provide a square opening for receiving the floor drain without special cutting operations.

Accordingly, a primary object of the invention is to provide novel adjustment means for a square floor drain or the like.

A further object of the invention is to provide a novel vertically adjustable square floor drain having a predetermined number of adjusted positions with adequate bearing support in each of said positions.

Another object of the invention is to provide a novel square floor drain construction having four positions of vertical adjustment of an inner collar relative to an outer drain body.

Still another object of the invention drain body and a square collar such that the collar has a plurality of bearing supports on the body in each adjusted position thereof.

An additional object of the invention is to provide a novel adjustable floor drain construction including a drain body with a square opening and a square collar fitted in said opening, whereby the collar has a bearing support at each of its four sides in all adjusted positions of the drain.

Other objects and advantages of the invention will be apparent from the subsequent detailed description taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a top plan view of an assembled and installed drain, comprising one specific embodiment of the invention, with the adjustable drain collar in its lowermost adjusted position;

FIG. 2 is a vertical sectional view taken along the line 2—2 of FIG. 1 with the adjustable collar of the drain shown in elevation;

FIG. 3 is a top plan view, similar to FIG. 1, but showing the drain body only;

FIG. 4 is a fragmentary enlarged sectional view taken along the line 4—4 of FIG. 1 but with the drain collar in an adjusted position just above its lowermost position;

FIG. 5 is a view similar to FIG. 4 but showing the drain collar in its uppermost adjusted position;

FIG. 6 is a view similar to FIG. 4 but showing the drain collar in an adjusted position just below its uppermost position;

FIG. 7 is a view similar to FIG. 4 but showing the drain collar in its lowermost adjusted position; and

FIG. 8 is a fragmentary sectional view taken along the line 8—8 of FIG. 1 and showing the drain collar in its lowermost adjusted position.

Referring particularly to FIGS. 1–3 of the drawings, the floor drain of the present invention comprises a drain body **11** having a cup-like upper end portion **12** of square cross-sectional configuration and a tubular outlet portion **13** at its lower end which is of conventional circular configuration. The lower end portion **13** comprises a soil pipe type drain outlet, but a threaded connection (not shown) may also be used.

In the illustrated embodiment the square portion **12** of the drain body **11** is provided with a laterally extending peripheral flange **14** extending around all sides of the drain body for catching seepage. A clamping or flashing ring **16**, also having a square configuration, is received in the flange **14** for clamping a waterproof membrane or sheathing **17** therebetween. However, it will be understood that in certain installations the clamping ring **16** and membrane **17** may be omitted. The membrane **17** when used may extend beneath the floor **15** and outwardly from the drain for conveying seepage in the usual manner. Each of the four sides of the drain body portion **12** is provided with a tapered groove structure **18** which receives a clamping lug **19** having a complementary wedge-shaped configuration. Adjusting screws **21** are mounted on the lugs **19** and engage the ring **16** so that upon tightening of the screws **21** the lugs **19** are urged upwardly into wedging relation in the groove structures **18** and the ring **16** is urged downwardly toward the flange **14** for clamping the membrane **17** therebetween. It is to be understood that the adjustability features of the invention hereinafter described are also applicable in the case of a drain body which does not have a flange, such as the flange **14**, and the associated clamping arrangement.

The drain body **11** may also be provided with corner bosses **22** carrying a plurality of adjustable leveling screws **23** which are adapted to coact with a concrete subsurface **24** or the like for insuring the desired vertical alignment of the drain.

An adjustable square collar **26** is provided which has a laterally extending rim **27** at its upper end and depending sides **28**, **29**, **31**, and **32** (FIGS. 4–7) having a loose telescoping sliding fit within the upper square end portion **12** of the drain body **11**. The rim **27** of the adjustable collar **26** is formed with an inner shoulder **33** (FIGS. 4–8) on which a removable slotted grate **34** (FIG. 1) is supported. For convenience of illustration, the grate **34** has been omitted from the sectional views in FIGS. 4–8. Although not shown in the drawings, it should be understood that a conventional bottom apertured sediment bucket may also be removably supported within the collar **26** if desired.

Because of the square configuration of the upper drain body portion **12** and the corresponding square configuration of the telescoping adjustable collar **26**, it will be appreciated that the collar **26** may be received within the drain body in any one of four different positions or orientations. Adjustment of the collar between the various positions is obtained by lifting the collar from the drain body, rotating the collar until the desired position is reached, and reinserting the collar in the drain body. As hereinafter described, the inner walls of the drain body portion **12** are provided with a plurality of bearing pads

or supports adapted to be engaged by the bottom edges of the sides of the collar **26** for supporting the collar in each of its differently oriented positions in the drain body. However, the four sides of the collar **26** are provided with cutouts or notches extending upwardly from the bottom edges of the collar and correlated with respect to the location of the bearing pads on the walls of the drain body **11** so that each of the four sides of the collar **26** is supported at a different elevation for each of its four oriented positions relative to the drain body. Although in the illustrated embodiment the bearing pads are provided on the drain body and the cutouts or notches are provided on the sides of the adjustable collar, it will be understood that the reverse arrangement could also be employed wherein bearing pads would be provided on the adjustable collar and cooperating grooves of different depths formed in the walls of the drain body.

Referring particularly to FIG. 3, the upright bearing pads projecting inwardly from the four sides of the drain body portion **12** are designated at **36, 37, 38** and **39**. As will be recognized, each of these bearing pads is located at a different relative lateral position non-centrally of its respective side of the drain body so that if the four sides of the drain body were aligned in parallel relation, there would be no lateral overlapping of the respective pads. Thus, the bearing pads **36** and **37** are disposed non-symmetrically and to one side of the center lines of their respective drain body side. Bearing pads **38** and **39** are located non-symmetrically approximately halfway between the centers of their respective drain body sides and a common corner junction therebetween. As will be evident from FIGS. 4–8, each of the bearing pads **36, 37, 38** and **39** has the same height so that the upper ledges or support surfaces thereof lie in substantially a common horizontal plane. Also, as best seen in FIG. 3, each bearing pad has the same width.

In order to provide the desired four different adjusted heights for the collar **26**, the bottom edge of each of the collar sides **28, 29, 31**, and **32** is notched or contoured in a predetermined configuration so as to provide four different horizontal bearing surfaces adapted to seat on selected ones of the pads **36, 37, 38**, and **39**, dependent upon the orientation of the collar **26** in the drain body **11**. These edge bearing surfaces on the four sides of the collar **26** may be arranged in any desired incremental sequence. For example, in the illustrated embodiment, the uniform heights of the pads **36, 37, 38** and **39** and the dimensions of the cut-outs are coordinated so that in the four different adjusted positions of the collar **26** the distance between the upper surface of the rim portion **27** and the uppermost edge of the flange **14** will be three, three and one-half, four, and four and one-half inches. Obviously, any desired range of elevations may be provided.

In FIG. 7, corresponding to the lowermost adjusted position of the collar **26**, the collar side **28** is notched at its lower edge to provide stepped bearing edges **41, 42, 43**, and **44**. In FIG. 4, corresponding to the next higher adjusted position of the collar **26**, the collar side **32** is notched at its lower edge to provide stepped bearing edges **46, 47, 48**, and **49**. In FIG. 6, corresponding to the next higher adjusted position of the collar **26**, the collar side **31** is notched at its lower edge to provide stepped bearing edges **51, 52, 53**, and **54**. In FIG. 5, corresponding to the uppermost adjusted positioned of the collar **26**, the collar side **29** is notched at its lower edge to provide stepped bearing edges **56, 57, 58**, and **59**.

Each bearing edge on any one of the collar sides **28, 29, 31**, and **32** has an equivalent bearing edge at the same elevation on each of the other three collar sides. Thus, the stepped bearing edges are arranged in sets of four lying in vertically spaced horizontal planes. For convenience,

the equivalent bearing edges having the same elevations above the bottom of the collar are tabulated as follows:

Collar Side	Uppermost Bearing Edge	Next Below Uppermost Bearing Edge	Next Above Lowermost Bearing Edge	Lowermost Bearing Edge
28	42	43	44	41
32	46	47	48	49
31	54	51	52	53
29	58	59	56	57

A comparison of FIGS. 4–7 will show that the respective bearing edges on the collar sides are arranged in end-to-end relation in a predetermined sequence which varies in a regular manner between adjacent sides of the collar. Thus, in FIG. 4 showing collar side **32**, the bearing edges **46, 47, 48** and **49** are arranged in stepwise descending sequence from left to right with the uppermost bearing edge **46** at the extreme left and the lowermost bearing edge **49** at the extreme right. The next adjacent collar side **31** is seen in FIG. 6 from which it will be apparent that the same left-to-right sequence has been maintained as in FIG. 4 except that the steps defined by the respective bearing edges have been shifted one position to the left laterally of the drain body. Thus, in FIG. 6 the bearing edges from left to right on collar side **31** are **51, 52, 53**, and **54** which correspond respectively to the equivalent bearing edges **47, 48, 49**, and **46** of collar side **32**. Progressing to the next adjacent collar side **29**, as shown in FIG. 5, the sequence has again been shifted one position to the left with the bearing edges from left to right being designated at **56, 57, 58**, and **59** and corresponding to the equivalent bearing edges **48, 49, 46**, and **47**, respectively, of collar side **32** and also corresponding to the equivalent bearing edges **52, 53, 54**, and **51**, respectively, of collar side **31**. Coming finally to the next adjacent collar side **28**, as shown in FIG. 7, the sequence has again been shifted one position to the left so that the bearing edges **41, 42, 43**, and **44** of side **28** correspond tot he equivalent bearing edges **49, 46, 47**, and **48**, respectively, of collar side **32** and to the equivalent bearing edges **53, 54, 51**, and **52**, respectively, of collar side **31** and also to the equivalent bearing edges **57, 58, 59**, and **56**, respectively, of collar side **29**. Returning to side **32** again, it will be seen that the bearing edge sequence again shifts one position to the left as above-described.

When the drain collar **26** is in its lowermost adjusted position (FIGS. 7 and 8), the collar is supported in stable position by engagement of the equivalent bearing edges **42, 58, 54**, and **46** on the four sides of the collar with the respective bearing pads **36, 37, 38** and **39** on the drain body. In addition, the outwardly projecting rim **27** of the collar **26** rests on the upper edge of the drain body portion **12**. In the illustrated embodiment, this position of the collar **26** may correspond to a distance of three inches between the upper surface of the rim **27** and the upper edge of the flange **14**.

When the collar **26** is in its next higher adjusted position (FIG. 4), which may correspond to a distance of three and one-half inches between the rim **27** and the flange **14**, the collar **26** is supported at each of its four sides by engagement of the equivalent bearing edges **47, 43, 59**, and **51** with the respective bearing pads **36, 37, 38**, and **39**. In this position additional support and stability for the collar **26** are provided by means of a pair of diagonally opposed corner pads **61** and **62** (FIG. 3) located adjacent the lower end of the drain body portion **12** and engaged by a pair of depending corner posts **63** and **64** on the collar **26**.

In the next higher position of the collar **26** corresponding, for example, to a distance of four inches between the rim **27** and the flange **14** (FIG. 6), the collar **26** has a stable four-point support by engagement of the equiva-

lent bearing edges **52**, **48**, **44**, and **56** with the respective bearing pads **36**, **37**, **38**, and **39**.

In the uppermost position of the collar **26** corresponding, for example, to a distance of four and one-half inches between the rim **27** and the flange **14** (FIG. 5), the equivalent bearing edges **57**, **53**, **49**, and **51** rest on the respective bearing pads **36**, **37**, **38**, and **39** to provide the desired stable four-point support.

Thus, it will be seen that, in all adjusted positions of the collar **26** relative to the drain body **11**, the collar has an effective stable support at each of its four sides by reason of the coordinated location of the bearing pads on the drain body relative to the notched bearing edges at the bottom of the collar **26**. In addition, by reason of the non-symmetrical and non-overlapping locations of the bearing pads at the four sides of the drain body, it will be seen that the collar is prevented from tilting or cocking in any of its adjusted positions. Moreover, in each adjusted position of the collar **26**, the four bearing pads of uniform height are engaged by a set of four bearing edges which are also of uniform elevation above the bottom of the collar **26**. For convenience, the above-described positions of engagement between the bearing pads and the bearing edges of the collar are summarized in the following table:

Position of Collar 26	Bearing Edge Supported On Pad 36	Bearing Edge Supported On Pad 37	Bearing Edge Supported On Pad 38	Bearing Edge Supported On Pad 39
Uppermost	57	53	49	41
Next below uppermost	52	48	44	56
Next above lowermost	47	43	59	51
Lowermost	42	58	54	46

Each of the four sides of the drain body portion **12** is provided with the customary pair of bi-level weep holes located one above the other just above the flange **14**. Thus, as seen particularly in FIG. 2, the lower weep holes are designated at **66** and the upper weep holes are designated at **67**. In this instance, the four sets of weep holes **66**, **67** are located symmetrically to one side of the centers of the respective sides of the drain body portion **12**. To avoid obstruction of the weep holes **66**, **67** at the side of the drain body having the pad **36**, a vertical groove or recess **68** extends downwardly from the upper edge of the pad **36** a sufficient distance to clear the lower weep hole **66**. In a generally similar manner, the four sides **28**, **29**, **31**, and **32** of the collar **26** are also provided with upwardly extending grooves or recesses **69**, **71**, **72**, and **73**, respectively, so that the upper weep holes **67** are always clear and unobstructed regardless of the adjusted position of the collar **26**. Thus, seepage collected by the membrane **17** will flow into the flange **14** and thence through the weep holes **66** or **67** and downwardly into the drain body **11**.

It will be appreciated that other geometric arrangements of bearing pads and notched collar edges may also be employed to achieve the desired four positions of adjustment of the collar **26** relative to the drain body **11**, but in any case each of the four sides of the collar must have a stable support on the corresponding side of the drain body for every adjusted position of the collar.

Although the invention has been described herein with particular reference to a specific structural embodiment, it is to be understood that various modifications and equivalent structures may be resorted to without departing from the scope of the invention as defined in the appended claims.

We claim:

1. An adjustable drain comprising a generally tubular drain body having a four-sided portion with a square opening therethrough, an upright support pad projecting inwardly from each of the four sides of said drain body

portion, said pads being of uniform height and each being located in a different relative lateral position on its respective side and non-centrally thereof, a peripheral flange extending outwardly from said drain body portion around all sides thereof and spaced below the upper end of said portion, a generally tubular four-sided collar with a square opening therethrough, said collar having a loose telescopic fit in said portion of said drain body, and a peripheral rim at the upper end of said collar overlying the upper end of said drain body portion and adapted to support a removable grate, the bottom edges of said collar at each side thereof being cut-out to provide at each side of said collar four bearing edges arranged in end-to-end relation at respectively different distances above the bottom of said collar and each of said bearing edges on any one side of said collar having an equivalent bearing edge at the same distance above the bottom of the collar on each of the other sides of the collar, said bearing edges being spaced in coordinated relation with the spacing of said pads so that said collar is adapted to be supported on said drain body in stable non-tiltable relation at four different elevated distances between said rim and said flange, dependent upon the orientation of said collar in said drain body portion, by selective engagement of one of said bearing edges on each side of said collar with one of said pads.

2. The structure of claim 1 further characterized in that the sides of said drain body portion are provided with weep holes above said flange, and said pads and said bearing edges are provided with recesses for clearing said weep holes in all adjusted positions of the collar whereby said weep holes are always free and unobstructed.

3. An adjustable drain comprising a drain body having a four-sided upper end portion defining a square opening, an adjustable drain collar having a four-sided square tubular portion loosely receivable in telescopic relation in said opening and adapted to be selectively fitted therein in any one of four differently oriented positions of said collar relative to said body, means on one of said portions defining four support surfaces lying in substantially a common plane and each located in a different relative lateral position on one of the sides of said one portion, and means on each of the four sides of the other of said portions defining a plurality of stepped bearing edges arranged so that each bearing edge lies in substantially a common plane with a bearing edge on each of the other sides of said other portion so as to provide a plurality of sets of four bearing edges lying in vertically spaced planes, the location of said bearing edges being coordinated with the location of said support surfaces so that the respective bearing edges of each of said sets are selectively engageable with said support surfaces in each of said differently oriented positions of said collar relative to said body, whereby said collar is adapted to have a stable four-point support at a plurality of different elevated distances relative to said body corresponding to said differently oriented positions.

4. The structure of claim 3 further characterized in that said stepped bearing edges are arranged in end-to-end relation in the same relative sequence at each side of said other portion except that the sequence is shifted one position as between adjacent sides.

5. The structure of claim 3 further characterized in that the sides of said body portion are provided with a plurality of pads projecting inwardly therefrom to define said support surfaces and the sides of said collar portion are provided at their bottom edges with upwardly extending cut-out portions to define said bearing edges.

6. In structure of claim 5 further characterized in that said body portion is provided with a peripheral flange extending outwardly therefrom and spaced below the upper end thereof, said collar is provided with a peripheral rim overlying the upper end of said body portion, the sides of said body portion are provided with weep holes above said flange, and said pads and said bearing edges are provided with recesses for clearing said weep holes in all

positions of said collar relative to said body whereby said weep holes are always free and unobstructed.

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