Nov. 19, 1946. J. STANITZ 2,411,301

METHOD OF MAKING PRESSED METAL WATER CLOSETS

Filed April 8, 1944 6 Sheets-Sheet 1

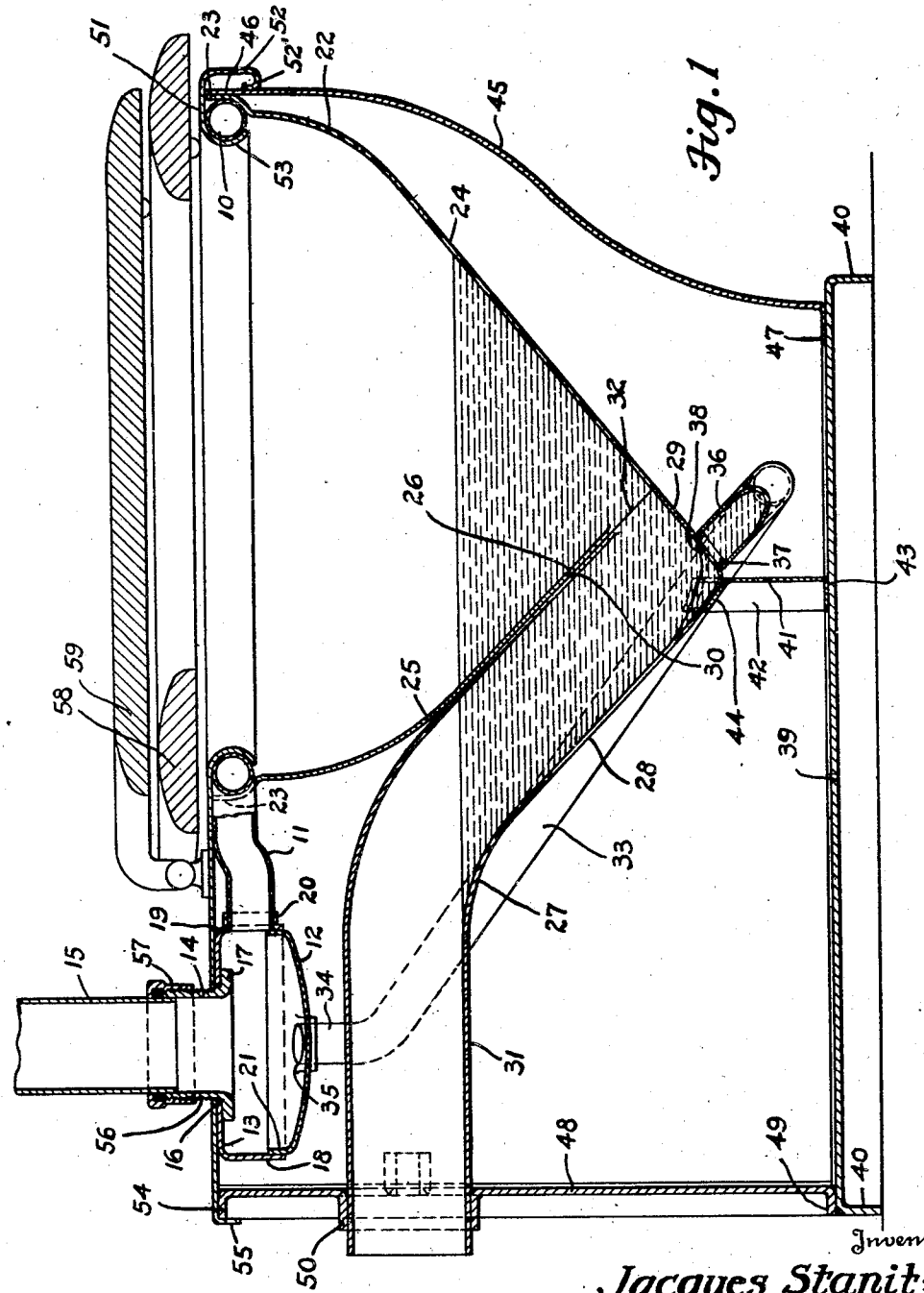


Fig. 1

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METHOD OF MAKING PRESSED METAL WATER CLOSETS

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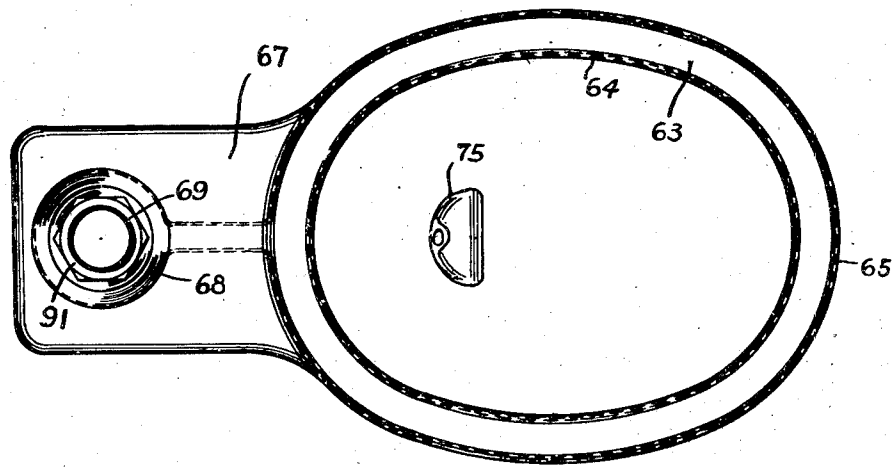


Fig. 4

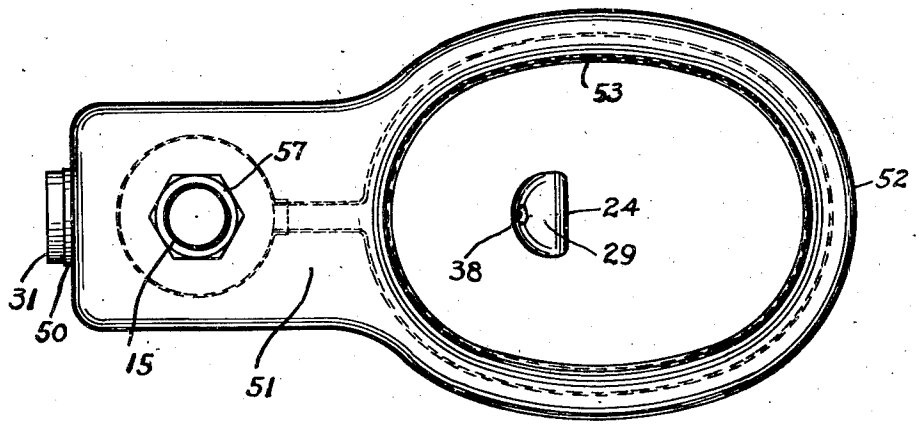


Fig. 2

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METHOD OF MAKING PRESSED METAL WATER CLOSETS

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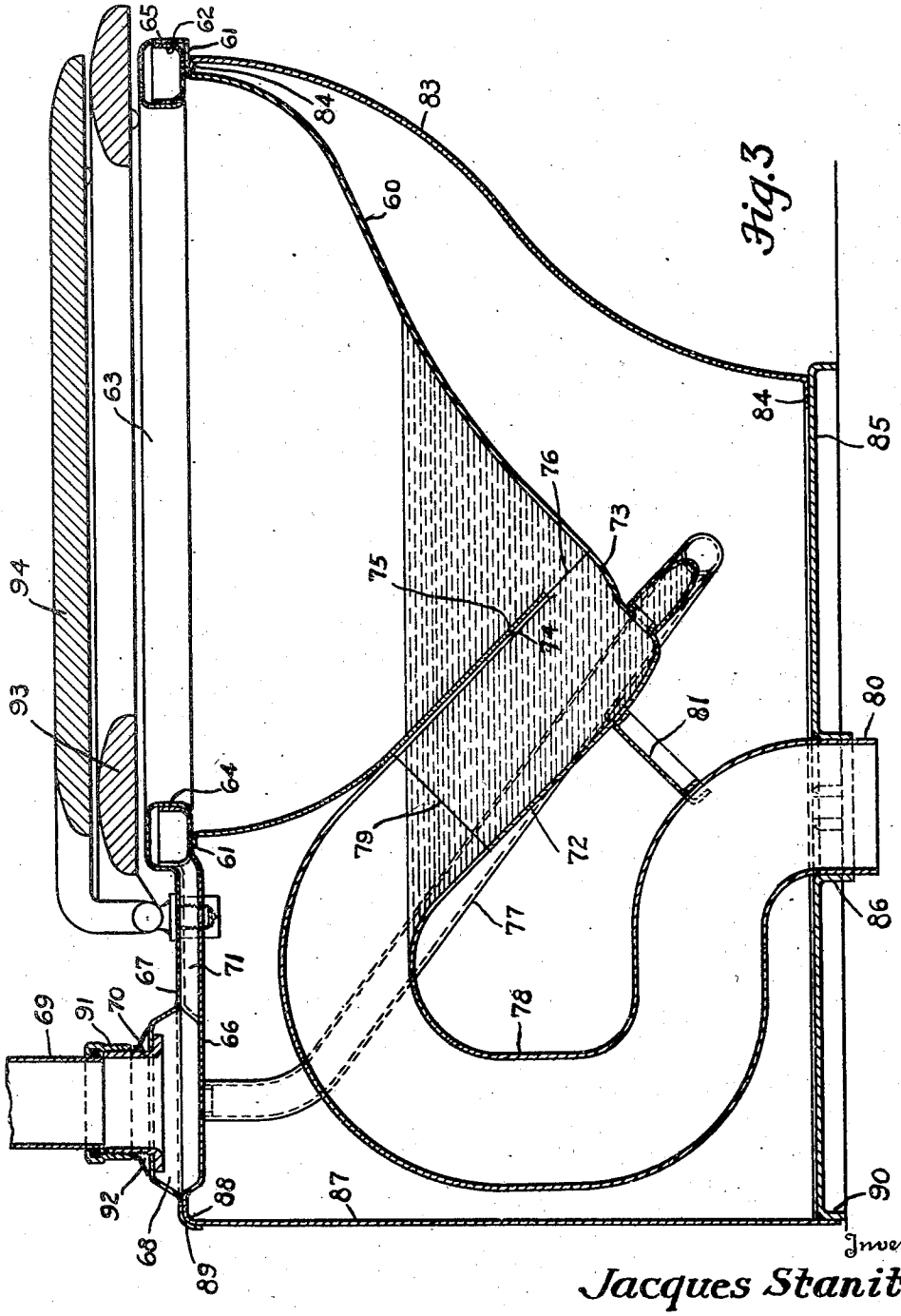


Fig. 3

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METHOD OF MAKING PRESSED METAL WATER CLOSETS

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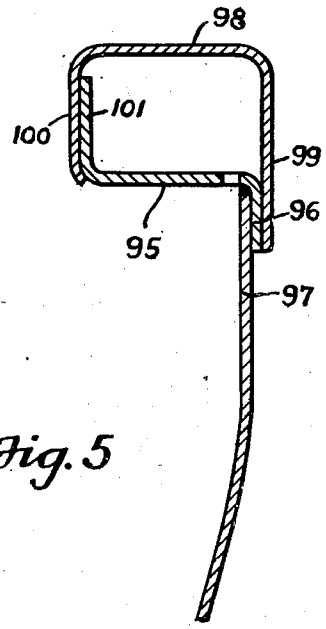


Fig. 5

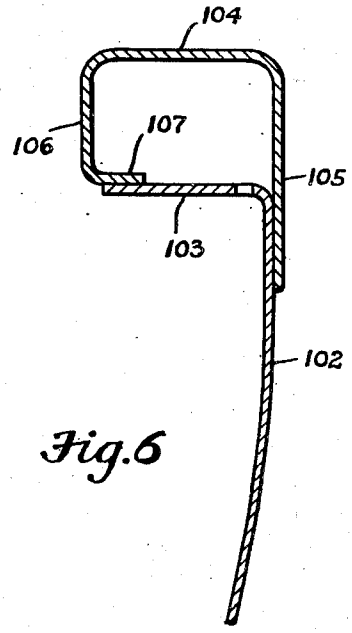


Fig. 6

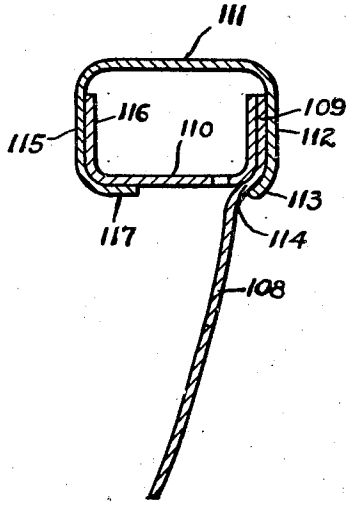


Fig. 7

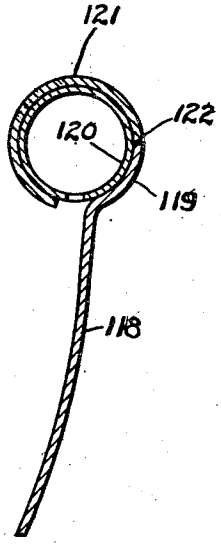


Fig. 8

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METHOD OF MAKING PRESSED METAL WATER CLOSETS

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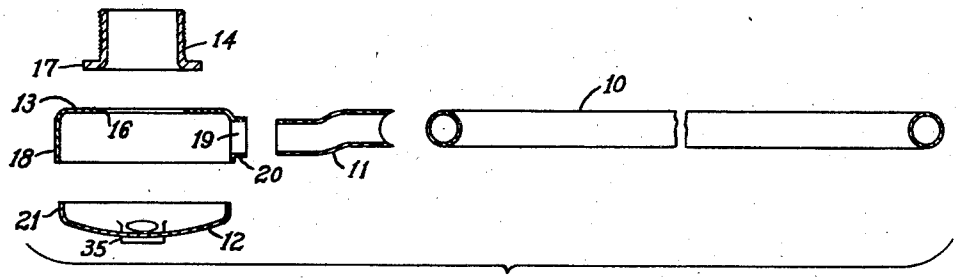


Fig. 9

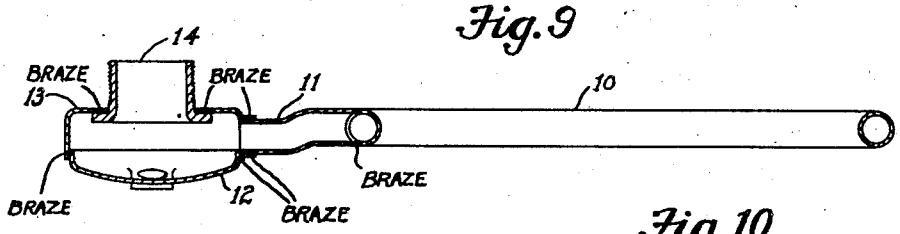


Fig. 10

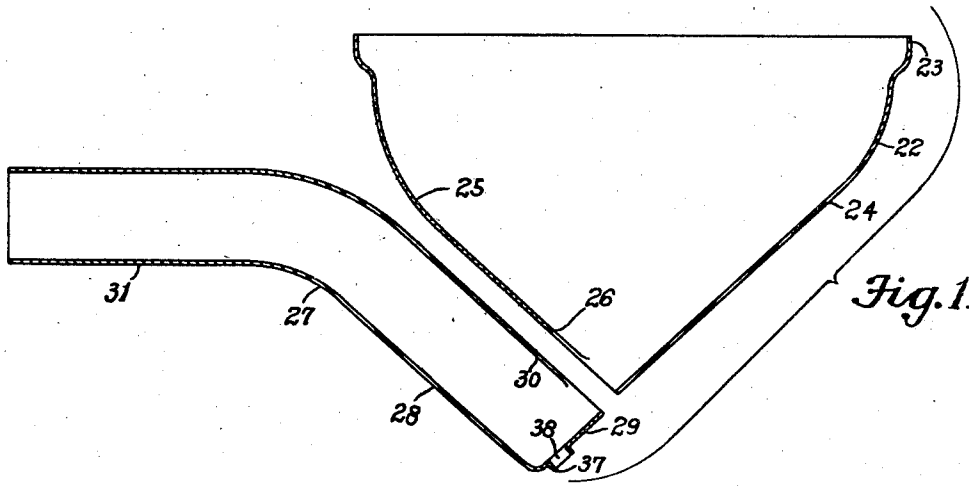


Fig. 11

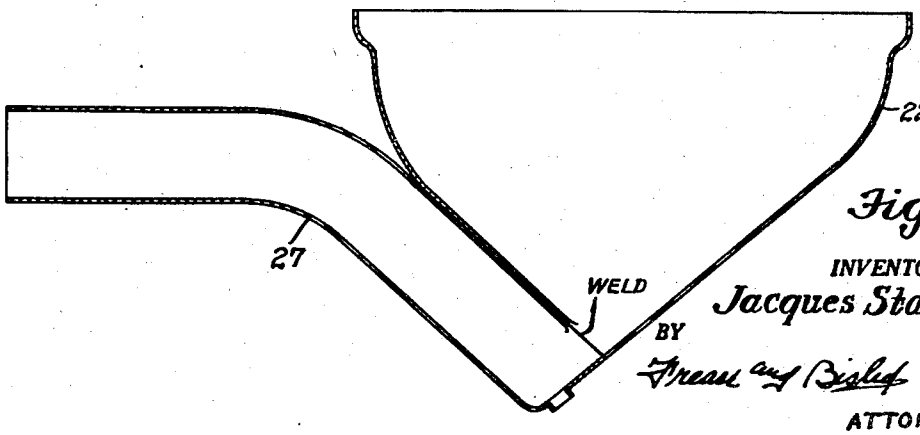


Fig. 12

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METHOD OF MAKING PRESSED METAL WATER CLOSETS

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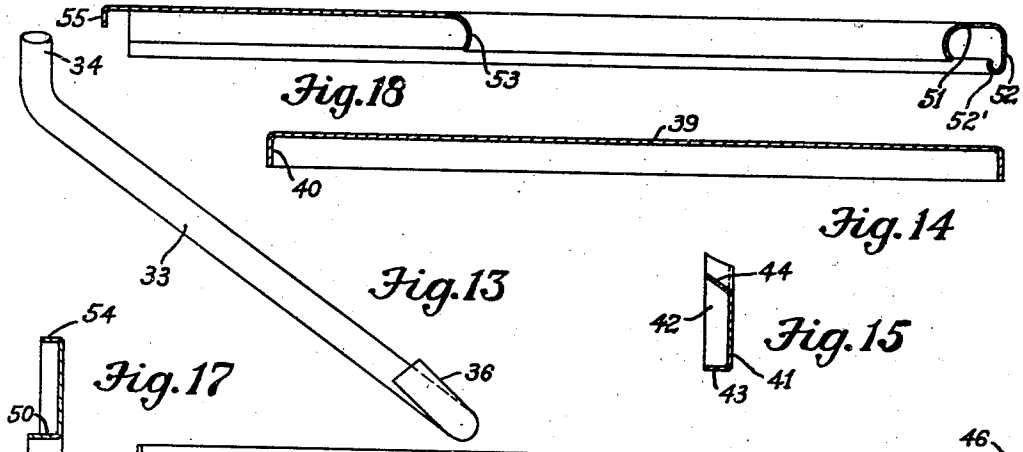


Fig. 18

Fig. 14

Fig. 13

Fig. 15

Fig. 17

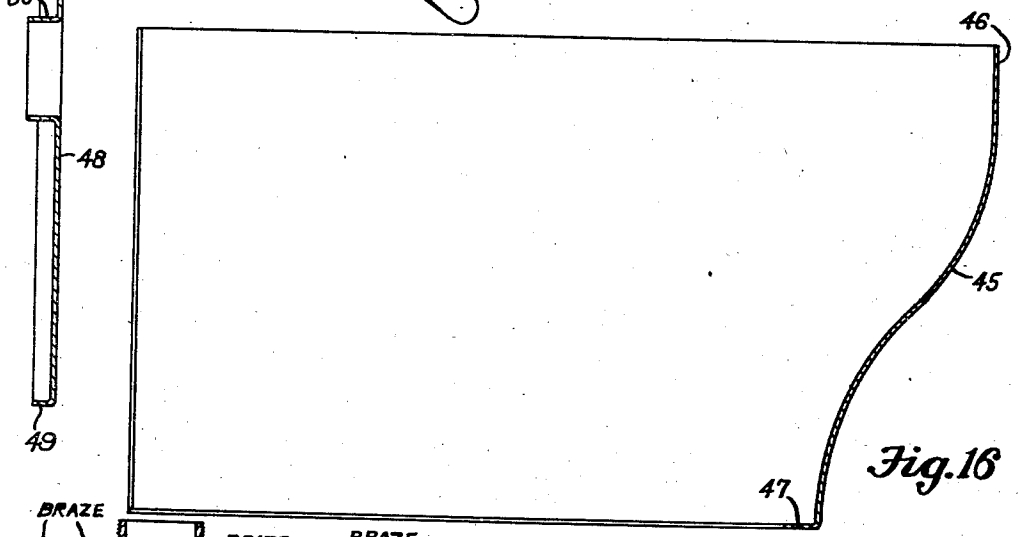


Fig. 16

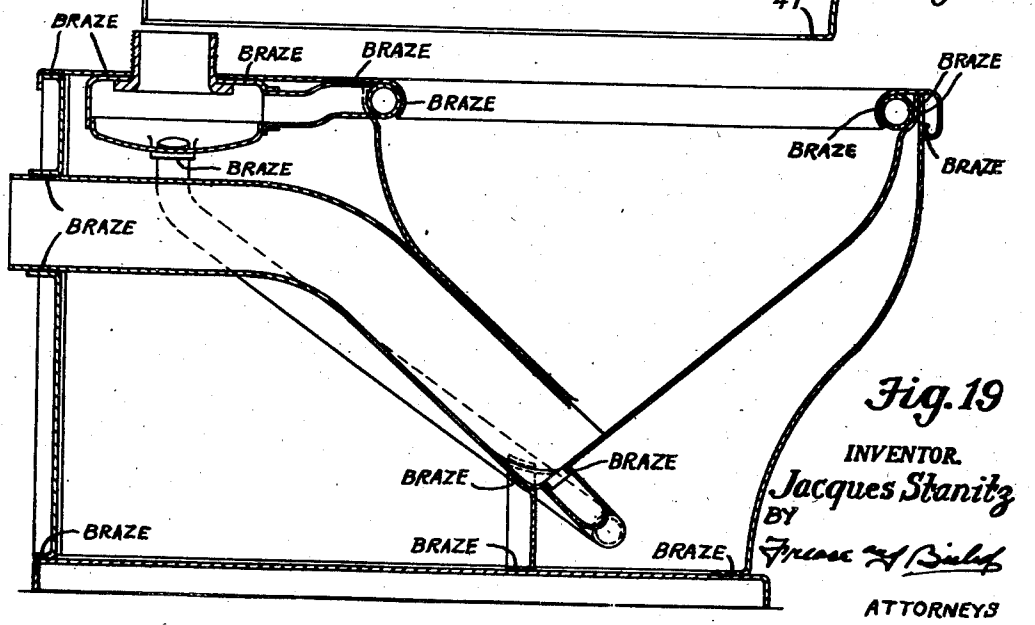


Fig. 19

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2,411,301

UNITED STATES PATENT OFFICE

2,411,301

METHOD OF MAKING PRESSED METAL WATER CLOSETS

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Application April 8, 1944, Serial No. 530,094

3 Claims. (Cl. 113—116)

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The invention relates to water closets and more particularly to the construction and manufacture of water closets from pressed metal parts, that is parts drawn, stamped, pressed or formed from sheet or plate metal which may be stainless steel, Monel metal or other corrosion resisting metal, or the pressed metal parts may be coated with a vitreous enamel such as porcelain.

Water closets for use in homes, hotels, office buildings and the like are of two general types, the wash-out jet type and the siphon jet type, both of which are commonly formed of china. Although the type of water closets used in railroad cars and similar places have been made largely of metal, and in some cases partly or entirely of sheet metal, it is not known that water closets of the washout or siphon jet type, suitable for use in homes and the like have ever been made of pressed metal.

The production of pressed metal water closets reduces the weight of such plumbing fixtures and also reduces the cost of manufacture and the cost of installation thereof, all of which renders them available for low cost housing units.

In the manufacture of pressed metal water closets there are a number of factors which must be considered, namely; uniformity in size of the water channel, a large water area at least equal to the seat opening to overcome soiling of the walls of the bowl, the jet channel or tube must be drainable to prevent bursting when drained for winter, a strong rim flush to thoroughly wash the walls of the bowl, provision to prevent back siphoning, a minimum depth of water seal, quiet and efficient operation, water control and vacuum brakes, an even distribution of water in flushing, and the jet should be concealed as the jet opening cannot be readily cleaned and would show a dark spot in the bowl if not concealed.

The manufacture of water closets from drawn, pressed or stamped sheet metal parts therefor presents a problem which is made more difficult if the advantages of mass production methods are to be attained because if a minimum of scrap loss is to result, each individual part must be as simple as possible in design and shape, and the assembly of the parts must be simple and accurate and the finished product must be leakproof, uniform as to size and shape and attractive in appearance.

It is therefore an object of the invention to provide a method of making a water closet made entirely of sheet metal stampings, which conforms to the above requirements, overcomes the problems mentioned, and realizes the advantages of mass production methods.

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A further object of the invention is to provide for the simplified manufacture of a water closet entirely of sheet metal stampings comprising a bowl, a wash-out connection or goose neck siphon tube, a jet tube, a perforated spray ring, a header, a base and suitable support and trim members which are welded and soldered together.

Another object is to provide a method of making a pressed metal water closet in which simple component stampings are so formed and assembled as to hold and maintain their assembled positions and provide leak-proof joints therebetween.

It is a still further object of the invention to provide an improved and simplified design of sheet metal water closet construction.

And a final object is the provision of an improved method of making a pressed metal water closet which is light in weight, inexpensive to manufacture, pleasing and attractive in appearance, rigid in construction, made of corrosion resisting material such as stainless steel or Monel metal without using excessive amounts of the same, or made from flat steel enameled with a vitreous enamel.

The above together with other objects and advantages which will be apparent to those skilled in the art from the drawings and following description, may be attained by constructing the improved water closet in the manner hereinafter described in detail and illustrated in the accompanying drawings, in which

Figure 1 is a vertical, longitudinal section of a washout jet type water closet embodying the invention;

Fig. 2 a top plan view of the same with the seat removed;

Fig. 3 is a vertical, longitudinal section of a siphon type water closet embodying the invention;

Fig. 4 is a top plan view of the same with the seat removed;

Figs. 5 to 8 inclusive are enlarged detail sections of modified forms of rim constructions;

Fig. 9 is an expanded view of the individual parts used in making the spray ring and header sub-assembly;

Fig. 10 is a diagrammatic view showing the spray ring and header sub-assembly formed from the parts shown in Fig. 9;

Fig. 11 is an expanded view showing the parts used to make the bowl sub-assembly;

Fig. 12 is a diagrammatic view showing the bowl sub-assembly formed from the parts of Fig. 11;

Fig. 13 is a view of the jet connection tube;

Fig. 14 is a sectional view of the base stamping;

Fig. 15 is a sectional view of the support stamping;

Fig. 16 is a sectional view of the support and trim plate stamping;

Fig. 17 is a sectional view of the back plate stamping;

Fig. 18 is a sectional view of the seat finishing top member stamping; and

Fig. 19 is a diagrammatic view illustrating the sub-assemblies of Figs. 10 and 12 and the parts of Figs. 13 through 18 assembled and brazed together to form the completed water closet illustrated in Figs. 1 and 2.

Similar numerals refer to similar parts throughout the drawings.

Referring first to the washout jet type shown in Figs. 1 and 2, the perforate spray ring **10** is formed of stainless steel, Monel metal or other corrosion resisting metal tubing as it is not possible to entirely coat the inner surface of this tube with vitreous enamel.

A tube connection **11** is provided for the spray ring and stampings **12**, **13** and **14** are provided forming a receiving header for connection to the water supply pipe **15**.

The stamping **13** is provided with an aperture **16** in its upper surface, which receives the pipe coupling stamping **14**, the peripheral flange **17** at the lower end of which is received against the under side of the top wall of the stamping **13** at a point surrounding the aperture **16**.

A depending flange **18** is formed upon the stamping **13**, and provided at its forward side with the opening **19** surrounded by the flanged connection **20** which receives the end of the tube connection **11**. The lower stamping **12** of the receiving header is provided with the upstanding peripheral flange **21** which fits within the depending flange **18** of the stamping **13**.

In the manufacture of the article, the above described parts **10**, **11**, **12**, **13** and **14** of the spray ring and header shown separately in Fig. 9 are press fitted together and silver solder or brazing metal is applied at or adjacent to the joints to be soldered or brazed and the parts are then passed through a hydrogen brazing furnace or the like where they are brazed together in a unit sub-assembly illustrated in Fig. 10, the silver soldered or brazed joints being indicated by the legend "braze."

The bowl, indicated generally at **22**, is formed of a sheet metal stamping shown in Fig. 11, having the offset rim flange **23** shaped to fit around the exterior of the perforated spray ring **10**, the front and rear walls **24** and **25** of the bowl being tapered downwardly as shown in Fig. 11 and an outlet opening **26** being formed at the lower end of the rear wall **25**.

The tubular washout connection **27**, also shown in Fig. 11, has the downwardly angled front end portion **28**, closed at its lower end as at **29** and provided with an opening **30** in its upper side coinciding with the outlet opening **26** of the bowl. The substantially horizontal rear portion **31** of the washout tube extends rearwardly from the bowl for some distance and is arranged to be connected to the usual waste pipe. The bowl **22** and tubular washout connection **27** are welded together as indicated in Fig. 12, finish ground and polished at the zone **32** (Fig. 1) to form the bowl sub-assembly illustrated in Fig. 12.

The jet connection comprises a tube **33** illustrated in Fig. 13, having the upturned upper end **34** for connection with the receiving header through the flanged opening **35** in the lower stamping **12** thereof. The tube **33** is upturned at its lower end at **36** for connection to the peripheral flange **37** surrounding the opening **38** in the lower front wall **29** of the washout tube **27**.

The base **39** shown in Fig. 14 is in the form of a stamping having the flat horizontal top portion of suitable shape and provided around its edges with the downturned flange **40**. A support stamping **41** shown in Fig. 15 is provided between the base and lower portion of the wash-out tube **27** having the flange **42** around its edges fitted upon the top of the base stamping as at **43** and shaped at its upper end to fit around the lower portion of the washout tube as at **44** (Fig. 1).

A support and trim plate **45** shown in Fig. 16 surrounds the forward portion of the bowl, the upturned end **46** fitting against the flange **23** of the bowl and the lower end having an inturned flange **47** fitting upon the top of the base.

The back plate **48** shown in Fig. 17 is in the form of a stamping having a flange **49** at its lower end seated upon the base and the flanged opening **50** which receives the rear end portion **31** of the washout tube.

The seat finishing top member shown in Fig. 18 is in the form of a stamping **51** having the depending flange **52** around its outer edges terminating in an inturned channel portion **52'** fitting around the upper end portion **46** of the trim plate **45** and having the inner downwardly curved flange **53** fitted around the inner side of the spray ring **10**, the rear end portion thereof resting upon the flange **54** at the upper end of the back plate **48** and having the downturned flange **55** fitting over the rear edge of the flange **54**.

The bowl and washout sub-assembly shown in Fig. 10 is then assembled with the jet connection tube **33** of Fig. 13, the support stamping **14** of Fig. 15, the trim plate **45** of Fig. 16, the back plate **48** of Fig. 17, the base **39** of Fig. 14, the seat finishing top piece **51** of Fig. 18, and the spray ring and receiving header sub-assembly of Fig. 10 and silver solder or brazing metal is applied to the joints and these assembled parts are again passed through a hydrogen brazing furnace for brazing all of the parts together as shown in Fig. 19 into a unitary structure. The brazed joints are again shown by the legend "braze" in Fig. 19 and in carrying out the second soldering or brazing operation a lower melting point soldering or brazing metal is used.

The base and the trim pieces and assembled parts may all be formed of stainless steel, Monel metal or other corrosion resisting metal or may be of enameling steel and porcelain enameled as all of the parts excepting the spray ring and tubular connection therefor may be enameled so as to obtain complete coverage on the inside which will avoid rusting. Therefore these parts, as above stated, should be made of stainless steel, Monel metal or other rust resisting metal.

The tubular stamping **14** may be screw threaded, as indicated at **56**, to receive the pipe coupling **57** by means of which the water supply pipe **15** is connected thereto. A seat **58** and lid **59** of any conventional design may be mounted upon the seat finishing top piece in usual and well known manner.

Referring now to Figs. 3 and 4, the invention is shown as applied to the siphon jet type in which the bowl stamping **60** is provided at its upper edge with the outturned flange **61** upon which the perforated spray channel stamping **62**

is mounted. This channel, together with the seat finishing top piece 63 forms a perforated spray ring at the top of the bowl. The downturned inner flange 64 of the seat finishing top piece fits around the inner side of the channel 62 and the downturned outer flange 65 thereof fits around the outer side of the channel.

The rear extensions 66 and 67 of the channel 62 and seat finishing top piece 64 are shaped to form a receiving header 68 for connection to the water supply pipe 69 by means of the tubular stamping 70 and form a tubular passage 71 between the receiving header and the spray ring. The members 62, 63 and 70 may be press fitted together, solder or braze metal is applied to the joints and the assembled parts are passed through a hydrogen brazing furnace where they are brazed together in a unit.

The tubular siphon connection includes the substantially straight tubular stamping 72 having the closed forward lower end 73 and the opening 74 coinciding with the opening 75 at the lower portion of the bowl and these parts may be welded together, finish ground and polished at the zone 76.

The tubular member 77 made of tubing and forming the jet connection is connected to the receiving header and to the tubular stamping 72 in the manner above described in Figs. 1 and 2.

The remainder of the siphon connection comprises the tubular goose neck member 78 connected to the upper end of the tube 72 as by welding at 79, the lower end 80 thereof being adapted to be connected to the usual waste pipe.

Since it would be substantially impossible to form a tubular piece into this goose neck and maintain the diameters and changes in diameters necessary for proper operation, this goose neck member is preferably formed of two half stampings which may be welded together.

The support stamping 81 is located between the tubular connection 72 and the lower portion of the goose neck member 78. The front supporting and trim plate 83 has the inturned flange 84 at its upper end received against the outturned flange 61 of the bowl and has the inturned flange 84 at its lower end mounted upon the base 85.

A flanged opening 86 is formed in the base to receive the lower end portion 80 of the goose neck member, and the back plate 87 has the inturned, curved flange 88 at its upper end received within the downturned flange 89 at the rear end of the receiving header 68, the lower end of the back plate being located against the downturned flange 90 of the base stamping. All of these parts may be assembled together in the condition shown in Fig. 3 and passed through a hydrogen brazing furnace so that they are brazed together in a unit in the manner above described.

The pipe coupling 91 may be mounted upon the threaded pipe 92 of the tubular stamping 70 to connect the water supply pipe 69 thereto and the seat 93 and cover 94 may be attached to the stamping 67 in conventional manner.

As above described in regard to the form shown in Figs. 1 and 2 the various stampings may be made of stainless steel, Monel metal or other corrosion resisting metal or may be coated with a vitreous enamel.

In Figs. 5 to 8 inclusive are shown various modified bowl rim constructions which may be substituted for those shown in Figs. 1 to 3. In Fig. 5 the angular perforate stamping 95 has the depending flange 96 which may be brazed to the upper edge portion of the bowl 97 and the seat

finishing top piece 98 has the depending outer flange 99 which may be brazed to the flange 96 and the depending inner flange 100 which may be brazed to the upturned flange 101 of the stamping 95.

In Fig. 6 the bowl stamping 102 has the perforate inturned horizontal flange 103 and this together with the seat finishing top piece 104 forms the perforated spray ring. The depending outer flange 105 of the seat finishing top piece may be brazed to the upper portion of the bowl and the downturned inner flange 106 of the seat finishing top piece terminates in the inturned horizontal flange 107 which may be brazed to the inner end portion of the flange 103.

In the form shown in Fig. 7 the bowl stamping 108 is provided at its upper end with the offset flange 109 to which the perforate channel 110 may be brazed. The seat finishing top piece 111 has the depending outer flange 112 which may be brazed to the bowl flange 109 and terminates in the inwardly curved portion 113 fitting within the offset 114 of the bowl. The downturned inner flange 115 of the top piece may be brazed to the adjacent flange 116 of the channel and then terminates in the inwardly curved end 117 fitting beneath and brazed to the channel 110.

In the form shown in Fig. 8 the bowl stamping 118 is provided at its upper edge with the outwardly and upwardly curved flange 119 within which is brazed the perforated spray ring 120. The seat finishing top piece 121 is curved to fit around the tube 120 being brazed thereto and to the upper edge of the bowl flange 119 as at 122.

In its broadest aspects, the invention which comprises the present improved method contemplates eliminating the use of high cost china bowl assemblies in the manufacture of water closets and using low cost, high production stampings made by mass production methods for forming the bowl assembly, top assembly and the base and support trims, and then brazing and welding the parts into an integral, assembled, unitary structure, thus saving a great deal of material without sacrificing strength.

Thus, the present invention provides an improved method and improved method steps for inexpensively making light weight, sheet metal water closets from drawn, stamped, pressed or formed sheet or plate metal parts which may be readily and accurately assembled into a rigid, integral unit. Also, the present invention provides an improved sheet metal water closet construction having strong thin sheet metal walls.

Accordingly, the present invention provides for overcoming difficulties and eliminating many of the expensive and complicated and wasteful operations involved in the prior practice of making water closets of the type described from china.

In the foregoing description, certain terms have been utilized for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefore beyond the requirements of the prior art, because such words are utilized for descriptive purposes herein and not for the purpose of limitation, and are intended to be broadly construed.

I claim:

1. The method of making a pressed metal water closet which comprises forming stainless steel stampings forming a perforated spray ring, a receiving header and a tube connection therefor, press fitting said stampings together brazing

them together in a unit, forming a sheet metal bowl stamping with an opening at its lower end and a sheet metal ejection tube, then welding the ejection tube to the bowl at said opening, forming a tubular jet connection for connecting the receiving header and the ejection tube, forming a supporting and trim plate stamping, a back plate stamping, a seat finishing top piece stamping, a base stamping and a support stamping, then assembling said spray ring and header unit at the upper edge of the bowl, placing said seat finishing top piece upon said spray ring and header unit, press fitting the ends of the tubular jet connection with the receiving header and the lower end of the ejection tube, assembling said supporting and trim plate and back plate to the seat finishing top piece and the base, assembling the support stamping to the ejection tube and base, and then brazing all of these parts together into a unitary structure using a lower melting point solder than in the first brazing operation.

2. The method of making a pressed metal water closet which comprises forming sheet metal stampings forming a perforated spray ring, a seat finishing top piece and a receiving header with a tubular connection to the spray ring, press fitting said stampings together and brazing them together in a unit, forming a sheet metal bowl stamping with an opening at its lower end and a sheet metal ejection tube, then welding the tube to the bowl at said opening, forming a tubular jet connection for connecting the receiving header and the ejection tube, forming a supporting and trim plate stamping, a back plate stamping and a base stamping, then assembling said spray ring and header unit at the upper edge of the bowl, press fitting the ends of the tubular jet connection with the receiving header and the lower end of the ejection tube, assembling said supporting and trim plate and said back plate to said upper assembled unit and to the base, and then brazing all of these parts together into a unitary structure using a lower melting point solder than in the first brazing operation.

3. The method of making a pressed metal water closet which comprises forming stainless steel stampings forming a perforated spray ring, a receiving header and a tube connection therefor, press fitting said stampings together and brazing them together in a unit, forming a sheet metal bowl stamping with an opening at its lower end and a sheet metal ejection tube, then welding the ejection tube to the bowl at said opening, forming a tubular jet connection for connecting the receiving header and the ejection tube, forming a supporting and trim plate stamping, a base stamping and a support stamping, then assembling said spray ring and header unit at the upper edge of the bowl, press fitting the ends of the tubular jet connection with the receiving header and the lower end of the ejection tube, assembling said supporting and trim plate to the bowl and the base, assembling the support stamping to support the ejection tube from the base, and then brazing all of these parts together into a unitary structure using a lower melting point solder than in the first brazing operation.

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