June 6, 1950 J. STANITZ 2,510,429

PRESSED METAL FAUCET MANUFACTURE AND CONSTRUCTION

Filed Oct. 23, 1943 3 Sheets-Sheet 1

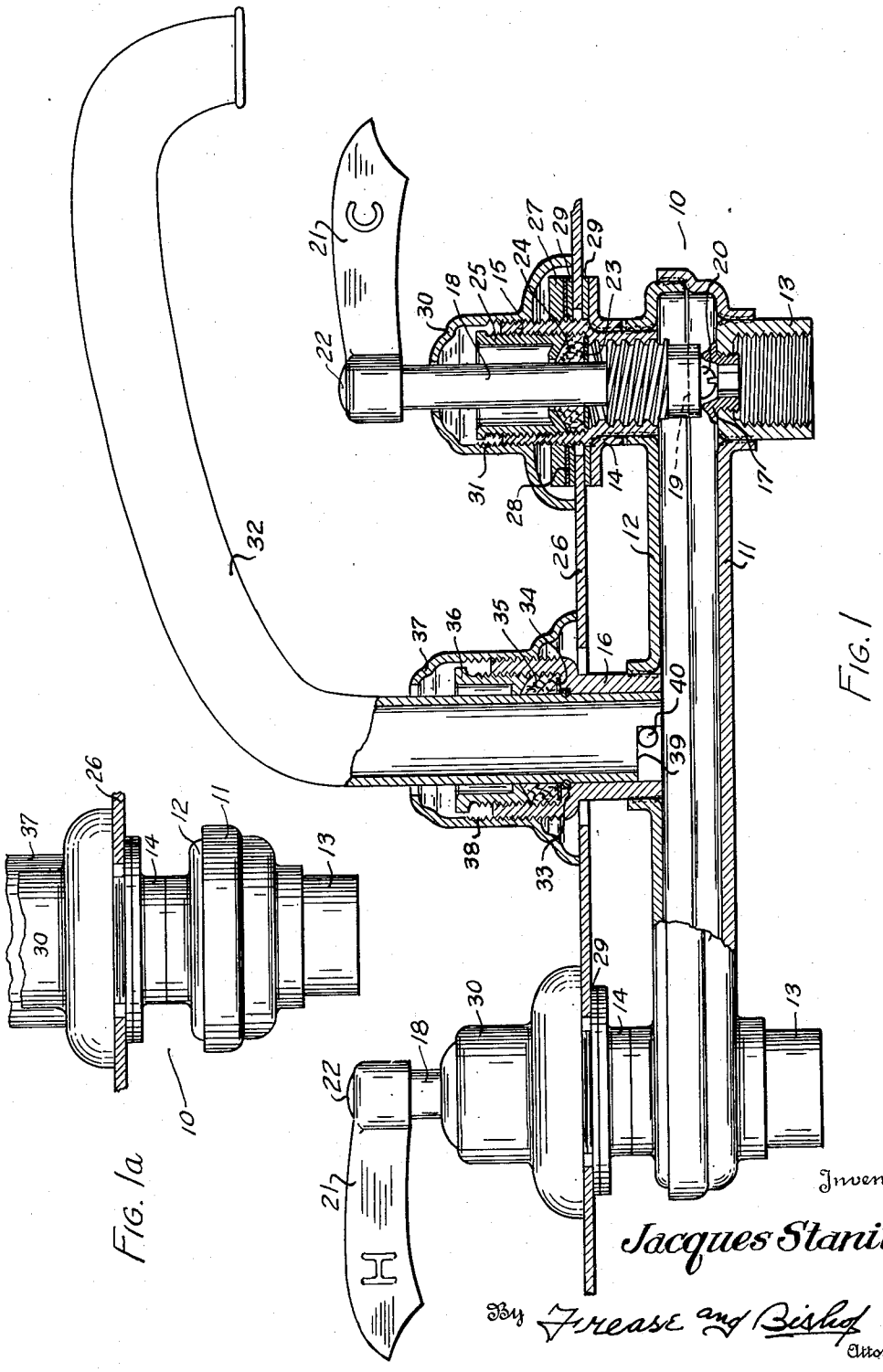


FIG. 1

FIG. 1a

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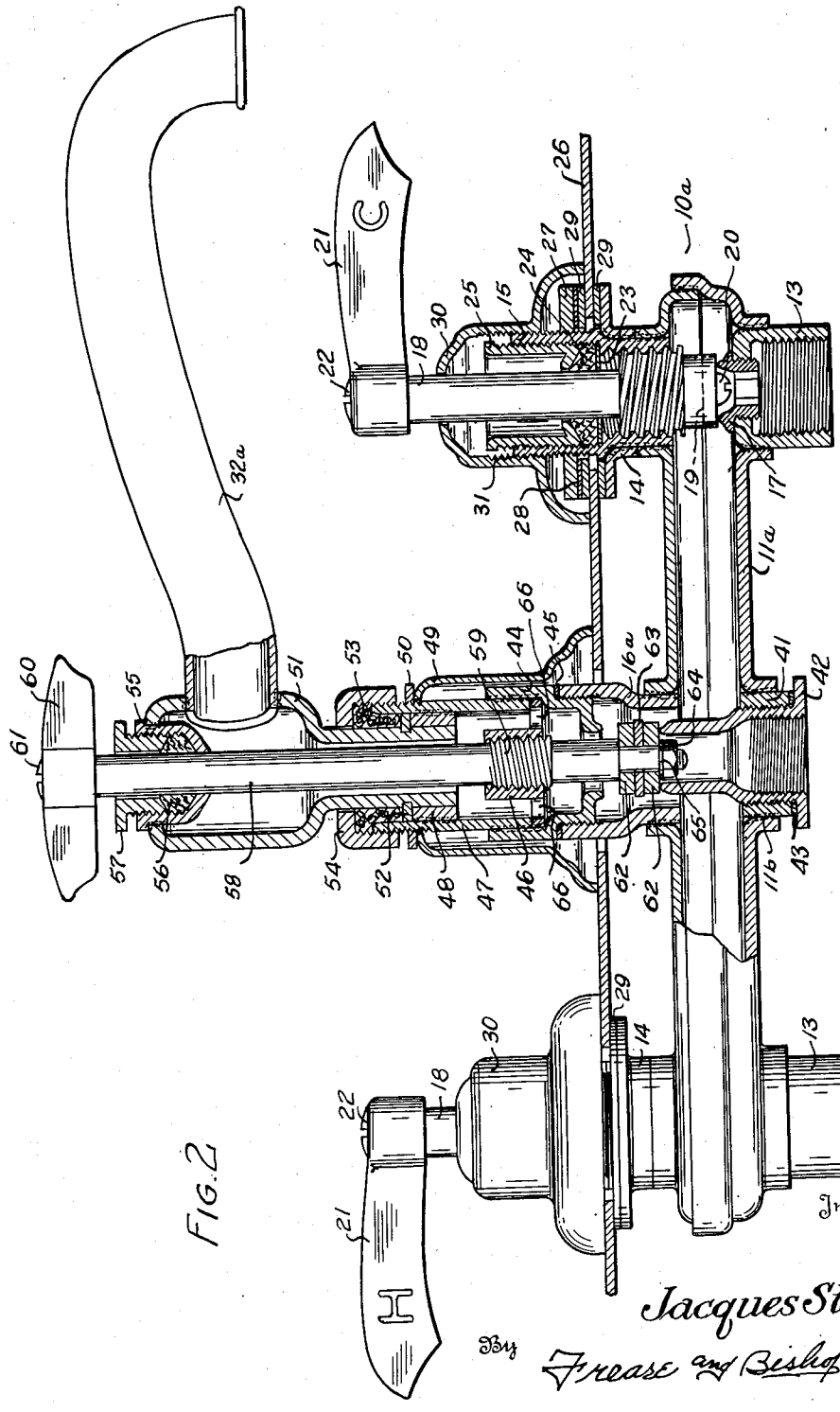


FIG. 2

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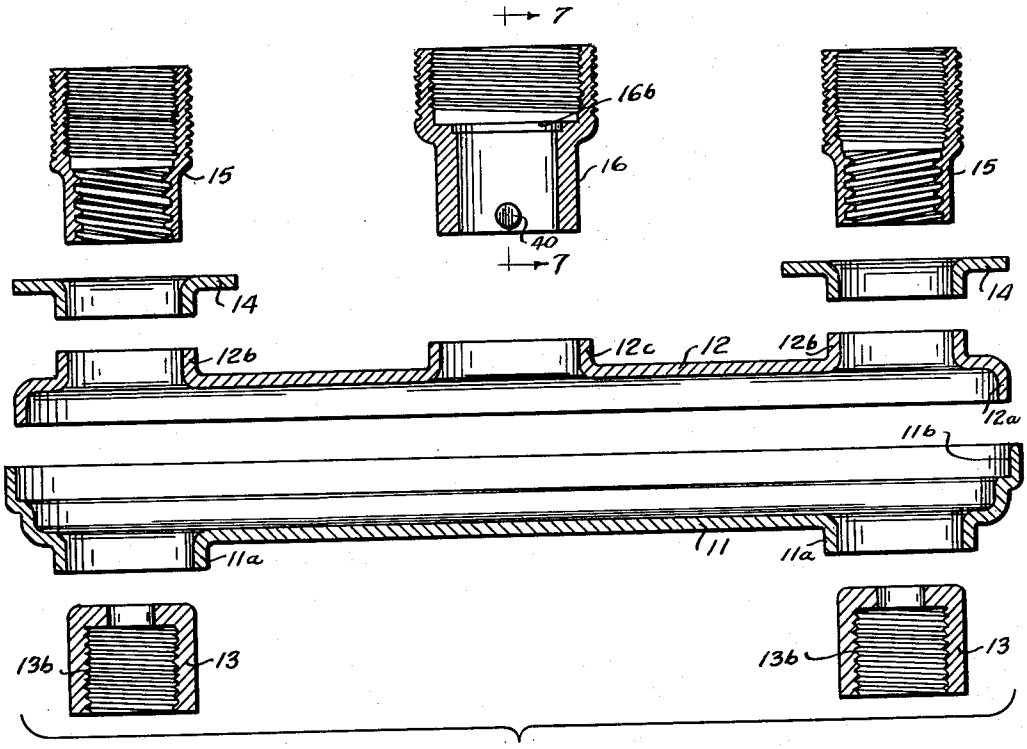


FIG. 3

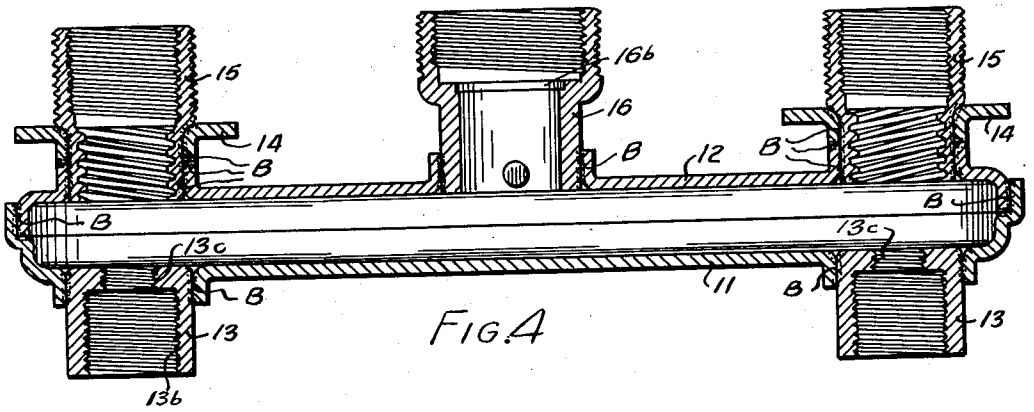


FIG. 4

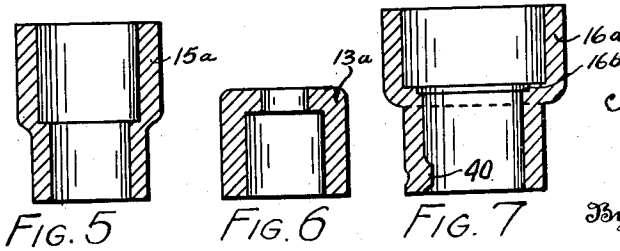


FIG. 5 FIG. 6 FIG. 7

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2,510,429

PRESSED METAL FAUCET MANUFACTURE AND CONSTRUCTION

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3 Claims. (Cl. 29—157.1)

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The invention relates to faucets and more particularly to the construction and manufacture of faucets from pressed metal parts, i. e. parts drawn, stamped, pressed or formed from sheet or plate metal such as stainless steel, Monel metal or brass or other ferrous or non-ferrous metal. Faucets for modern sinks and the like, usually include a casing; two water connections; two valves including threaded valve stems, gaskets and removable seats; escutcheon plates; and either a single movable, packed, outlet spout or a diverter valve with connections to a movable, packed, outlet spout and to a spray device.

Heretofore, almost all of the parts of such faucets except the packings and escutcheon plates have been made from sand brass castings which are machined and shaped to size, and the few remaining parts have been brass screw machine parts. Thus, the manufacture of the same is relatively expensive and slow using excessive amounts of relatively scarce metal, because of the thick wall sections incident to the manufacture of castings and the numerous machining operations.

The advent of pressed metal sinks, such as shown in the Stanitz Patent No. 2,270,774, has materially reduced the weight of such plumbing fixtures, and has reduced the cost of the same and the cost of installation thereof. This in turn has rendered more modern and less expensive plumbing facilities available for low cost modern housing units; has resulted in substantial savings in metal per unit; and has enabled mass production methods to be utilized in the manufacture of sinks.

It is equally important to reduce the cost, save metal and utilize mass production methods in the manufacture of faucets for sinks and the like so as to contribute further to the availability of the same for low cost modern housing units.

Pipe elbows have been made of stamped sections welded to cast flanges; pipe T's have been made from interfitting, expanded, brazed tubular sections; globe valves have been made of pressed metal parts secured and reinforced by welding; and faucets have been made of tubular and screw machine parts brazed together.

However, the manufacture of faucets for modern sinks having the functional relation and elements described, substantially entirely from

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drawn, stamped or pressed sheet metal presents a complex problem for which the prior art does not provide any solution.

Initially, the problem is complicated because of the very nature of the article and the fundamental functional elements and relationships thereof which cannot be changed. That is to say, the connections, mixing chamber, valves and outlets must be provided; they must be arranged to conform to building code and sanitary requirements; and they must be arranged for convenient and interchangeable connection with existing piping and sinks.

Furthermore, the problem is complicated because, if the advantages of mass production methods are to be realized and if little scrap loss is to result, each individual stamped, pressed or drawn part must be as simple as possible in design and shape.

Finally, the problem is complicated because, again, if the advantages of mass production methods are to be realized, the assembly of the parts must be simple and accurate and the finished faucet must be leak-proof and uniform as to size in every respect.

Accordingly, it is a principal object of the present invention to provide a method of making faucets substantially entirely of sheet metal stampings, which overcomes and solves the complicated or complex problems enumerated, and which reduces the cost, saves metal and realizes the advantages of mass production methods.

Furthermore, it is an object of the present invention to provide for the simplified manufacture of a sink faucet substantially entirely of sheet metal stampings, which faucet has a casing, inlets, valves, an outlet or diverted outlets, and attaching means and trim.

Furthermore, it is an object of the present invention to provide for the manufacture of sink faucets substantially entirely of sheet metal stampings and having either a single outlet or diverted outlets, and in which many of the same stampings are used irrespective of the valve outlet arrangement.

Also it is an object of the present invention to provide a method of making faucets substantially entirely of sheet metal stampings in which the component stamped, drawn or pressed parts are of simple design and shape, and in which

openings may be accurately formed and aligned.

Moreover, it is an object of the present invention to provide a method of making faucets substantially entirely of sheet metal stampings in which simple component stampings are so arranged and related to each other as to hold and maintain accurate alignment when assembled together and while providing leak-proof joints therebetween.

Also it is an object of the present invention to provide a method of making faucets substantially entirely of sheet metal stampings in which no substantial machining operations need be performed upon the stampings except threading.

In addition, it is an object of the present invention to provide an improved and simplified design of sheet metal faucet construction.

And finally, it is an object of the present invention to provide an improved faucet and method of manufacture of the same which attains the above objectives, and in which the faucet is very light in weight, inexpensive to manufacture, has a pleasing and attractive appearance, is very stiff, rigid and absolutely leak-proof, and may be made of corrosion-resistant material such as stainless steel, Monel metal, or brass or other ferrous or non-ferrous metal without using excessive amounts of the same and without material scrap losses.

These and other objects and advantages apparent to those skilled in the art from the following description and claims may be obtained by the pressed metal faucet construction and manufacture hereinafter described in detail and claimed, preferred embodiments of which are shown in the accompanying drawings.

The foregoing objects and advantages are also obtained by the methods, method steps and operations of making pressed metal faucets hereinafter set forth in detail and claimed, preferred steps of which are shown in the accompanying drawings, and which may be stated in general terms as including drawing, pressing, forming or stamping a plurality of sheet metal generally cup-form parts having wall portions and threading certain of said parts; assembling said parts by telescopically force fitting wall portions thereof one within another to accurately align and locate said parts with respect to one another and form a faucet body and water, valve and outlet connections; simultaneously brazing or silver soldering the joints between said telescopically force-fitted wall portions to form a unitary body; and assembling valves and packings in said faucet body.

In the drawings,

Figs. 1 and 1*a* are side and end elevations with certain parts in section of a single outlet faucet made in accordance with and embodying the improvements of the present invention;

Fig. 2 is a view similar to Fig. 1 of a modified form of diverter valve faucet;

Fig. 3 is a collective view of stamped parts about to be assembled together to form the body and connections of the faucet of Fig. 1;

Fig. 4 is a view similar to Fig. 3 of the parts in Fig. 3 assembled and brazed together to form a unitary structure; and

Figs. 5, 6 and 7 are views of certain of the parts shown in Figs. 3 and 4 as drawn and prior to being threaded; Fig. 7 being a section as on line 7—7, Fig. 3.

Similar numerals refer to similar parts throughout the various figures of the drawings.

Referring first to Fig. 1, an improved faucet

with a single outlet is generally indicated at **10** and includes a body formed by bottom body stamping **11**, top body stamping **12**, inlet bushings **13**, body flanges **14**, valve sleeves **15** and spout sleeve **16**. A valve seat **17** is threaded into each bushing **13**; and a valve stem **18** having a preferably rubber valve washer **19** retained by valve screw **20** is threaded into each valve sleeve **15**. Each valve stem **18** is provided with a handle **21** retained by screw **22**.

Each valve stem **18** is packed with a metal valve packing retainer washer **23**, valve packing material **24** and a valve packing nut **25** threaded into the valve sleeve **15**. The faucet may be secured to the sink ledge **26** and the like, with the body mixing chamber or casing formed by the stampings **11** and **12** concealed and the sleeves **15** and **16** projecting through openings in the sink ledge **26** by threading clamp nuts **27** on valve sleeves **15**. The nuts **27** preferably bear against fibre washers **28**, and rubber gasket clamp washers **29** are interposed between the flange **14**, the fibre washer **28** and the sink ledge **26**. Escutcheons **30**, internally threaded at **31** may be threaded onto the valve sleeves **15**.

A tubular hook-neck spout **32** is rotatably mounted within spout sleeve **16** and retained by a split lock ring **33**. The spout **32** is provided with a metal packing retainer washer **34**, spout packing material **35** and a packing nut **36** threaded into spout sleeve **16**. An escutcheon **37**, internally threaded at **38** may be threaded onto the spout sleeve **16**.

The sleeve end of the spout **32** is preferably notched at **39** so as to engage a projection **40** on the interior of the spout sleeve **16** and to limit rotatable movement of the spout **32** to about 180°.

Functionally, the faucet **10** has a usual and substantially standard arrangement so that hot and cold water may be connected to the inlet bushings **13**, flow of which is controlled by the hot and cold water valve stems **18** and handles **21**. The valve washers **19** and seats **17** may be repaired or renewed by removing the packings and stems.

The construction is, however, simplified by internally threading the escutcheons **30** and **37** and securing them directly upon the sleeves **15** and **16**. In prior constructions the valve body has been extended upward and a special escutcheon clamping nut provided thus requiring extra material and parts.

In accordance with the present invention, the body parts **11** and **12**, the bushings **13**, the flanges **14**, the sleeves **15** and **16**, the handles **21**, the packing nuts **25** and **36**, clamp nuts **27**, packing retainers **23** and **34**, and escutcheons **30** and **37** are each stampings or drawn or pressed sheet metal parts of simple form and design and none of these parts require machining except for threading. Also the valve seats **17** are preferably pressed or coined. Screws **20** and **22** of course are made in the usual way; while washers **19**, packings **24** and **35**, fibre washers **28** and rubber clamp washers **29** are made of material other than metal. Lock ring **33** is preferably made of wire and spout **32** is formed of tubing; so that each are analogous to sheet metal parts.

There only remains the valve stems **18** which may be formed as castings, screw machine parts or upset rods as desired.

By this construction many machining operations are eliminated and the amount of metal required for making the faucet is materially reduced.

The improved diverted outlet faucet **10***a* shown

in Fig. 2 is identical with the faucet 10 in all of its parts except for the diverter valve and outlets. For mounting the diverter valve and outlets, the bottom body stamping 11*a* is modified by providing the central flanged opening 11*b* in which the threaded outlet bushing 41 is secured. An outlet seat bushing 42 sealed by gasket 43 is threaded into bushing 41.

Spout body sleeve 16*a* is secured to top body stamping 12 and top valve seat 44 is threaded into sleeve 16*a* and sealed by gasket 45. Diverter screw bushing 46, body outlet 47 and spout guide 48 are integrally assembled with valve seat 44 in a manner to be described. Escutcheon 49 is clamped in place with nut 50 which threads onto body outlet 47. Spout swivel 51 in which spout 32*a* is secured, swivels in spout guide 48 and is retained by spout lock ring 52 against which spout packing 53 is clamped by packing nut 54. Spout swivel 51 is also provided with a diverter valve packing retainer 55 in which diverter valve packing 56 is clamped by packing nut 57 for packing diverter valve stem 58 which extends through swivel 51 and is threaded at 59 in diverting screw bushing 46.

A handle 60 is secured by screw 61 at the upper end of valve stem 58; and opposed valve washers 62 separated by washer container 63 are secured by valve nut 64 and lock washer 65 to the lower end of valve stem 58. Operation of valve stem 58 alternately seats washers 62 on either top valve seat 44 or bottom valve seat 42.

In accordance with the present invention, body bottom 11*a*, outlet bushing 41, outlet seat 42, sleeve 16*a*, top seat 44, bushing 46, body outlet 47, spout guide 48, escutcheon 49, nut 50, swivel 51, lock ring 52, nut 54, retainer 55, nut 57, handle 60, container 63 and washer 65 are each stampings or drawn or pressed sheet metal parts of simple form and design and none of the parts require machining except for threading, and the provision of the groove in swivel 51 for receiving lock ring 52, and punching holes 66 in bushing 46. The valve seats on parts 42 and 44 are coined. Screw 61 and nut 64 are made in the usual way; and gaskets 43 and 45, packings 53 and 56 and washers 62 are made of material other than metal. Spout 32*a* is made of tubing analogous to sheet metal.

There again only remains the diverter valve stem 58 which may be formed as a casting, screw machine part or upset rod as desired; and again the construction of the diverter valve and outlets described, eliminates many machining operations and reduces the amount of metal required.

Washers 62 may be replaced and valve seats 42 and 44 may be ground by unscrewing sleeve 44 from sleeve 16*a*. A spray device may be connected to outlet seat bushing 42.

Now referring particularly to Figs. 3 to 7, each of stampings 11, 12, 13*a*, 14, 15*a* and 16*a* are of simple generally cup-form with thin strong wall portions, and may be drawn, pressed, formed or stamped from sheet metal such as stainless steel, Monel metal, brass or other ferrous or non-ferrous metal or the like. Bushings 13*a* are then threaded at 13*b* as shown in Fig. 3 and sleeves 15 and 16 are also threaded. Each stamping 11, 12, 13*a*, 14, 15*a* and 16*a* is formed, as shown, with one or more tubular wall portions which may be telescoped within or around a tubular wall portion of one or more of the other stampings. Further, each sleeve stamping 15*a* and 16*a* is formed with a reduced end in providing the tubular wall portion thereof which is to be telescoped within a tubular wall portion of one or more of the other stampings.

These parts are then assembled as follows: The tubular wall portions of two bushings 13 are telescopically force-fitted, respectively, within the tubular walls of the two bottom body stamping outturned tubular inlet opening walls 11*a*. The peripheral tubular wall 12*a* at the rim of top body stamping 12 is telescopically force-fitted within the peripheral tubular wall 11*b* at the rim of bottom body stamping 11. The tubular walls of two body or sleeve flanges 14 are telescopically force-fitted, respectively, upon the tubular walls at the reduced ends of two sleeves 15. The tubular walls of the reduced ends of two sleeves 15 with sleeve flanges 14 assembled thereto are telescopically force-fitted, respectively, within the tubular walls of the two top body stamping outturned tubular valve opening walls 12*b* so that the ends of the tubular walls of the sleeve flanges 14 abut the ends of the valve opening tubular walls 12*b*. A tubular wall of sleeve 16 is telescopically force-fitted within the tubular wall of top body stamping outturned tubular spout opening wall 12*c*. Thus the parts are aligned and rigidly held by the telescoped tubular walls in accurate relation to each other as shown in Fig. 4. The assembly is then placed in a brazing or silver soldering furnace and the parts are simultaneously brazed or silver soldered together to form the brazed or silver soldered joints generally indicated at B; and meanwhile the rigid force fit assembling holds the parts in proper relation and alignment.

After brazing or silver soldering the valve seat openings in bushings 13 are preferably threaded at 13*c*. The integral, simultaneously brazed or silver soldered unitary faucet body may then have the valves, seats, packings, spout, etc., assembled therewith to form the faucet shown in Fig. 1.

As previously pointed out, the faucet body of the diverted outlet faucet of Fig. 2 contains many of the same parts as the faucet of Fig. 1. In the diverter valve and outlet, there are two additional brazed or silver soldered sub-assemblies. In one, the bushing 46 and outlet 47 have tubular walls telescopically force fitted in valve seat 44 after machining and guide 48 is similarly forced into outlet 47. These parts then hold their accurate aligned relation while being brazed or silver soldered to form a unitary integral structure. In the other, the spout 32*a* and retainer 55 are force-fitted into swivel 51 and similarly brazed or silver soldered. The various sub-assemblies and other parts are then assembled to form the completed faucet 10*a* shown in Fig. 2.

In its broadest aspects, the invention which comprises the present improved method contemplates eliminating the use of machined castings or forgings in the manufacture of faucets and using low cost, high production stampings made by mass production methods for forming the valve body; and then brazing or silver soldering the parts into an assembly in a brazing or other suitable furnace to form an integral assembled unit, 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 faucets 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 faucet 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 faucets of the type described from castings or forgings.

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

The words "sheet metal" are intended to include ferrous or non-ferrous sheet or plate metal of the desired or necessary gauge from which it may be desired to construct the faucets; the word "body" used in referring to certain parts of the faucet is intended to include the faucet casing, water connections, valve and outlet sleeves and connections, and related parts which are formed from a plurality of stampings and brazed or silver soldered into an integral, thin wall section, leak-proof unitary structure; the term "cup-form" used particularly in describing the stampings shown in Figs. 3, 4, 5, 6 and 7 and also with reference to the escutcheons, packing nuts and the diverter valve sub-assemblies, is intended to refer to stampings which are drawn from sheet metal by essentially cupping operations, although some of the finished stampings may have the bottom wall of the cup pierced or removed; and the term "brazing" is intended to refer to or include a brazing or silver soldering operation or step.

I claim:

1. In a method of making a sheet metal faucet body of thin wall section, the steps of drawing top and bottom mixing chamber body sheet metal cup members, forming a peripheral tubular wall at the top of the bottom body member, forming a plurality of outturned tubular inlet opening walls in the bottom of the bottom body member, forming a peripheral tubular wall at the bottom of the top body member, forming a plurality of outturned tubular valve opening walls in the top of the top body member, forming an outturned tubular spout opening wall in the top of the top body member, drawing a plurality of inlet bushing sheet metal cup members with tubular walls, forming a plurality of sheet metal sleeve flanges with tubular walls, drawing a plurality of valve and spout sleeve members with tubular walls, telescopically force-fitting the tubular wall of an inlet bushing within each outturned bottom body member tubular inlet opening wall, telescopically force-fitting the tubular wall of a sleeve flange upon the tubular wall of each valve sleeve, telescopically force-fitting a tubular wall of a valve sleeve with a sleeve flange assembled thereto within each outturned top body member tubular valve opening wall so that the ends of the body flange tubular walls abut the ends of the tubular valve opening walls, telescopically force-fitting the tubular wall of a spout sleeve within the outturned top body member tubular spout opening wall, telescopically force-fitting the peripheral top body member tubular wall within the peripheral bottom body member tubular wall, simultaneously brazing the telescoped force-fit tubular joints to form an integral leak-proof faucet body, and said force-fit joints holding the constituent members rigidly in accurate alignment while the brazing is being performed.

2. In a method of making a sheet metal faucet body of thin wall section, the steps of drawing top and bottom mixing chamber body sheet metal cup members, forming a peripheral tubular wall at the rim of each of the body members, forming a plurality of outturned tubular inlet opening walls in one of the body members, forming a plurality of outturned tubular valve opening walls in one of the body members, forming an outturned tubular spout opening wall in one of the body members, drawing a plurality of inlet bushing sheet metal cup members with tubular walls, forming a plurality of sheet metal sleeve flanges with tubular walls, drawing a plurality of valve and spout sleeve members with tubular walls, telescopically force-fitting the tubular wall of an inlet bushing within each outturned tubular inlet opening wall, telescopically force-fitting the tubular wall of a sleeve flange upon the tubular wall of each valve sleeve, telescopically force-fitting a tubular wall of a valve sleeve with a sleeve flange assembled thereto within each outturned tubular valve opening wall so that the ends of the body flange tubular walls abut the ends of the tubular valve opening walls, telescopically force-fitting the tubular wall of a spout sleeve within the outturned tubular spout opening wall, telescopically force-fitting the peripheral body member tubular walls one within the other, simultaneously brazing the telescoped force-fit tubular joints to form an integral leak-proof faucet body, and said force-fit joints holding the constituent members rigidly in accurate alignment while the brazing is being performed.

3. In a method of making a sheet metal faucet body of thin wall section, the steps of drawing top and bottom mixing chamber body sheet metal cup members, forming a peripheral tubular wall at the rim of each of the body members, forming a plurality of outturned tubular inlet opening walls in one of the body members, forming a plurality of outturned tubular valve opening walls in one of the body members, forming an outturned tubular spout opening wall in one of the body members, drawing a plurality of inlet bushing sheet metal cup members with tubular walls, forming a plurality of sheet metal sleeve flanges with tubular walls, drawing a plurality of valve and spout sleeve members with reduced end tubular walls, telescopically force-fitting the tubular wall of an inlet bushing within each outturned tubular inlet opening wall, telescopically force-fitting the tubular wall of a sleeve flange upon the reduced end tubular wall of each valve sleeve, telescopically force-fitting a reduced end tubular wall of a valve sleeve with a sleeve flange assembled thereto within each outturned tubular valve opening wall so that the ends of the body flange tubular walls abut the ends of the tubular valve opening walls, telescopically force-fitting the reduced end tubular wall of a spout sleeve within the outturned tubular spout opening wall, telescopically force-fitting the peripheral body member tubular walls one within the other, simultaneously brazing the telescoped force-fit tubular joints to form an integral leak-proof faucet body, and said force-fit joints holding the constituent members rigidly in accurate alignment while the brazing is being performed.

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