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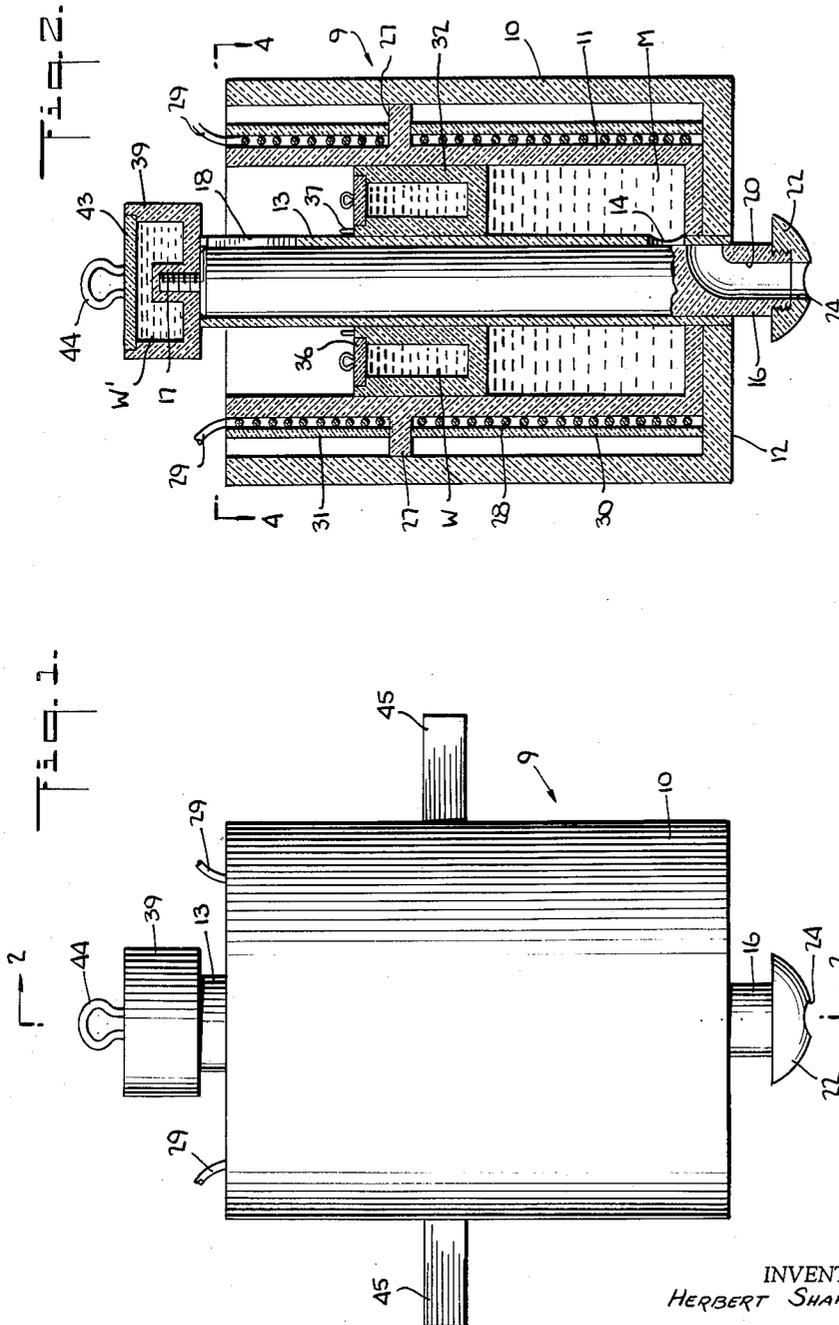
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APPARATUS FOR CASTING MOLTEN MATERIAL

Filed Dec. 30, 1958

3 Sheets-Sheet 1



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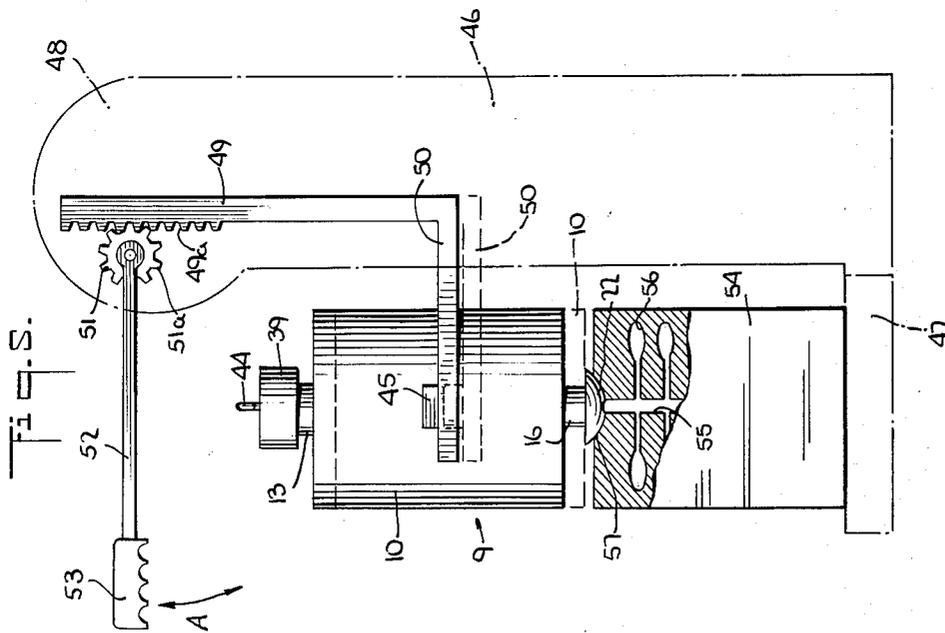
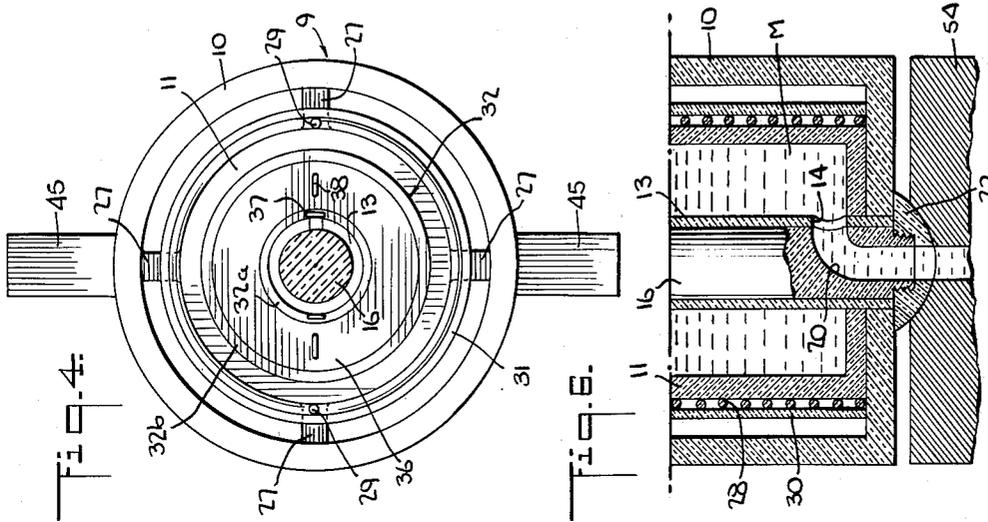
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APPARATUS FOR CASTING MOLTEN MATERIAL
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10 Claims. (Cl. 22—79)

This invention relates to apparatus for casting molten metal, and to a valved receptacle unit constituting a part of such apparatus in which the molten metal may be retained and from which it may be dispensed.

Although the present invention is fundamentally applicable to casting operations in general, regardless of the sizes of the castings to be produced, it will be described hereinafter with reference to the casting of small objects, such as items of jewelry and the like.

At the present time, jewelry casting is generally done by any one of a variety of casting processes. These processes, which are old and well known to those skilled in the art, are usually designated by the terms "centrifugal casting," "vacuum casting" (the molten metal is drawn by suction into the mold), and "gravity casting" (the molten metal is poured freely and usually by hand into the mold). The disadvantages inherent in these processes are readily recognizable; in the first two, for example, special and relatively complex apparatus is required, while in the third the operator must manipulate the metal-containing receptacle itself and simultaneously direct the flow of the molten metal into the mold. In any of these processes, moreover, it is difficult, if not impossible, to maintain the metal at the maximum desired temperature, and also to control this temperature, until the instant in which the metal enters the mold, which is a considerable disadvantage since a premature cooling of the metal may have serious adverse effects on the quality of the castings produced.

It is also well known that substantially all jewelry casting is carried out by the lost wax process in which each mold is used only once, since it must be destroyed when removing the finished castings. Nevertheless, although diecasting processes, which are characterized by the use of permanent molds composed of usually metallic, separable and reusable sections, are known, the use of such molds in (and thus the application of diecasting techniques to) jewelry manufacture has not become an accepted practice.

It is, therefore, one of the principal objects of the present invention to provide a casting apparatus which avoids the drawbacks and disadvantages of the known devices referred to above and which may be employed in making metal castings either by the lost wax process with disposable molds or by a diecasting operation with permanent molds.

It is also an important object of the present invention to provide casting apparatus including a container unit in which the metal may be retained in molten condition and at a predetermined temperature for any length of time and until the very instant in which it is dispensed into molds prepared therefor.

It is another object of the present invention to provide a receptacle unit constructed of glass refractory material and at least in part of a special crystalline glass ceramic material, and adapted to normally confine the molten metal in an enclosed and insulated space and to dispense the metal therefrom only in response to a predetermined relative motion between the receptacle and the mold.

Concurrently it is another object of the present invention to provide means in a receptacle unit of the aforesaid type for decreasing the volume of the metal-confining space in accordance with the dispensing of molten metal therefrom.

A related object of the present invention, therefore,

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is the provision of such a receptacle unit with a movable weight member adapted to float on the mass of molten metal so as to keep the volume of the confined space exactly equal to the volume of the molten metal still in the receptacle, and so as to apply a positive ejecting force to the metal for ensuring a rapid entry thereof into the mold.

A further object of the present invention is the provision of a self-contained unit for holding, melting and dispensing the casting metal, which unit is inexpensive to manufacture, requires a minimum of maintenance and repair expenditures, and is sufficiently rugged and sturdy to withstand the very high casting temperatures encountered.

The foregoing and other objects of the present invention will become more fully clear from the following detailed description thereof when the same is read with reference to the accompanying drawings, in which:

FIG. 1 is a front elevational view of the casting receptacle unit constructed in accordance with the present invention;

FIG. 2 is a sectional view taken along the line 2—2 in FIG. 1;

FIG. 3 is an exploded sectional view of the receptacle unit and illustrates the manner of its assembly;

FIG. 4 is a partly sectional top plan view of the receptacle unit, the view being taken along the line 4—4 in FIG. 2;

FIG. 5 is a partly sectional side elevational view of the complete casting apparatus according to the present invention and illustrates the receptacle in position ready for casting of the metal into a disposable mold; and

FIG. 6 is a sectional view of the lower part of the receptacle unit and illustrates the same in its metal dispensing position.

Referring now more particularly to FIGS. 1 to 4 of the drawings, it will be seen that the casting receptacle unit 9 according to the present invention essentially comprises an outer receptacle 10 and an inner receptacle 11. The outer receptacle 10 is open at its top and has a bottom 12 provided with an aperture 12a. A hollow guide sleeve 13 extends upwardly from the receptacle bottom 12, being fixedly connected thereto at its lower open end 13a. A short distance above its bottom end, the sleeve 13 is provided with an opening 14, and at one side adjacent its upper end the sleeve is provided with a vertical, elongated guide slot or keyway 15.

Slidably mounted within the sleeve 13 is a valve member 16 constructed in the form of a solid rod provided at its upper end with a threaded stud 17 and at one side adjacent said upper end with a key or guide member 18 adapted to be slidably received in the slot 15. The lower end of the rod 16 is somewhat reduced in size, as shown at 19, and a channel or passageway 20 extends from the base of the reduced rod portion 19 upwardly for a short distance through the rod and to one side thereof, the upper end of the channel 20 being adapted to be brought into registry with the opening 14 (see FIG. 6). The rod portion 19 is externally threaded, as shown at 21, so as to permit a valve head 22 having an internally threaded bore 23 to be screwed thereonto. The valve head 22 is provided with a central bore 24 coaxial with the bore 23 and adapted to register with the lowermost end of the channel 20 when the valve head is screwed onto the rod end 19.

The inner receptacle 11 is likewise open at its top and is provided with a bottom 25 having a central aperture 26 adapted to receive the sleeve 13 with a close sliding fit. The inner receptacle 11 is seated on the bottom or base 12 of the outer receptacle 10, the upper surface of the inner receptacle bottom 25 being located substantially tangentially to the lowermost point of the circum-

ference of the opening 14. Intermediate its upper and lower ends the receptacle 11 is provided with a plurality of laterally projecting guide lugs 27 which are so dimensioned as to slidably engage the inner surface of the outer receptacle 10 and ensure accurate vertical positioning and guiding of the inner receptacle 11 within the outer receptacle. Wound about the outer surface of the inner receptacle 11 is an electric wire heating element 28 which is designed to provide temperatures up to about 2300° F. and may be energized from any suitable power source (not shown) via leads 29. The heating wire 28 is surrounded by a pair of sleeves 30 and 31 of insulating material, preferably made of asbestos or the like, which prevent any of the generated heat from being lost to the outside or to the outer receptacle. Thus, the current flowing through the heating means 28, the strength of which current is adapted to be regulated by a rheostat or like device (not shown) connected to the power line 29—29, may be kept at a sufficiently high value to ensure continuous maintenance of the desired high temperature within the inner receptacle 11 without any danger to the operator. If desired, a ring or annular sheet of insulating material may also be placed between the inner receptacle bottom 25 and the outer receptacle bottom 12.

Slidably positioned within the inner receptacle 11 and surrounding the guide sleeve 13 is an annular hollow weight member 32 having an inner wall 32a and an outer wall 32b and the interior of which defines an annular weight receiving chamber 33 in which mercury, steel shot, or the like may be contained. The weight member or receptacle 32 is open at its top (see FIG. 3) and is provided with a pair of facing circular shoulders 34 and 35 at the upper ends of its walls 32a and 32b, respectively, on which an annular lid 36 is adapted to be seated. The weight member 32 is further provided on its inner wall 32a with a pair of oppositely located hooks or eyes 37, and the lid 36 is likewise provided on its upper surface with a pair of oppositely located hooks or eyes 38.

The valve rod 16 carries on its upper end a second hollow weight member or receptacle 39 which is provided in its bottom 40 with an internally threaded bore 41 by means of which the member 39 may be screwed onto the stud 17 at the upper end of the rod 16. The weight receptacle 39, which may also be filled with mercury, steel shot, or a like heavy substance, is provided at its upper open end with an inner shoulder 42 on which a lid 43 may be seated. The lid 43 is provided on its upper surface with a hook or eye 44.

Thus the smaller weight member 39, which when filled may weigh about five pounds, biases the valve rod 16 downwardly relative to the remainder of the receptacle unit 9. The extent of downward movement of the valve rod 16 is, of course, limited by engagement of the lower surface of the weight member 39 with the uppermost edge of the guide sleeve 13, while the extent of upward movement of the valve rod 16 relative to the remainder of the unit 9 (or alternatively the extent of downward movement of the inner and outer receptacles and the sleeve relative to the valve rod) is limited by engagement between the upper surface of the valve head 22 with the lower surface of the outer receptacle bottom 12. The larger weight member 32, which when filled may weigh anywhere from about 15 to 25 pounds, floats on the mass of molten metal M placed within the inner receptacle 11.

As indicated hereinabove, the casting unit 9 is particularly adapted for use in jewelry casting although not limited thereto. Consequently, it will generally be employed in the casting of non-ferrous metals such as aluminum, gold, silver, and the like, all of which melt at temperatures between about 1000° F. and about 2000° F. Thus, not only must the electric heating means 28 be capable of producing such temperatures but the various elements of the casting unit, such as the inner and outer

receptacles, the valve rod and guide sleeve therefor, and the weight member 32 must be capable of withstanding these very high temperatures.

In view of the fact that metals cannot be employed in making the various elements of the casting unit without considerably increasing the cost thereof, especially since this would necessitate the use of refractory linings, it is contemplated in accordance with the present invention to make these elements entirely out of refractory or ceramic materials particularly suited for use under normally encountered casting conditions. As will be readily understood, the inner receptacle 11, the guide sleeve 13, the larger weight member 32, the valve rod 16 and the valve head 22, being at some time or other in direct contact with the molten metal M, will be subjected to appreciably higher temperatures than the outer receptacle 10 and the smaller weight member 39. As a consequence, the present invention contemplates the use of two refractory or ceramic materials having different physical properties, and particularly different softening points and thermal conductivities.

More specifically, the material employed in making the outer receptacle 10 and the smaller weight member 39—43 may, for example, be a crystalline ceramic made from glass with the aid of special baking or heat treating techniques by Corning Glass Works and available commercially under the trademark "Pyroceram." This material is very hard and possessed of good mechanical strength characteristics and is capable of withstanding very high temperatures, its softening temperature being about 1250° C. or 2280° F. This material further has a relatively low thermal conductivity. The valve head 22 may also be made of this material, since the duration of its contact with the molten metal is fairly brief.

The inner receptacle 11, the valve rod 16, the sleeve 13 and the larger weight member 32 (and usually also the valve head 22) may be made from a clear high silica glass material made by Corning Glass Works and available commercially under the trademark "Vycor." This material, having mechanical characteristics similar to "Pyroceram," is capable of withstanding similar temperatures and has a better thermal conductivity than "Pyroceram."

In addition to their favorable thermal characteristics, as outlined above, both "Vycor" and "Pyroceram" can be easily cast, blown, drawn, pressed and rolled into a variety of forms or shapes and can be precision ground and polished to any desired dimensions with extremely close tolerances by standard finishing processes. This is of the utmost importance for the purposes of the present invention, as can be easily appreciated from FIG. 2, for example. The bottom aperture 26 of the inner receptacle 11 must be so precisely dimensioned as to permit the receptacle bottom 25 to slide over the sleeve 13 and yet be capable of preventing any flow of molten metal M out of the bottom of the inner receptacle other than through the opening 14. The weight member 32 must float on the molten metal and thus must be slidably disposed between the inner surface of the inner receptacle 11 and the outer surface of the sleeve 13, but at the same time the weight member 32 functions to close off the space within which the metal is confined, and thus the weight member 32 must prevent any upward capillary movement of the molten metal along these surfaces. The same holds true for the valve rod 16 and the inner surface of the sleeve 13.

The manner of assembling the receptacle unit and readying it for a casting operation may best be understood from a consideration of FIG. 3. The first step is, of course, to mount the sleeve 13, or rather the lower sleeve end 13a, in and fix the same to the bottom 12 of the outer receptacle 10. The inner receptacle 11, with the heating wire 28 wound thereabout and with the insulating sleeves 30 and 31 slipped over the lower and upper halves of the windings, respectively, is now inserted

into the outer receptacle 10, the sleeve 13 extending with a very close sliding fit through the aperture 26 in the inner receptacle bottom 25. The inner receptacle 11 is lowered until its bottom 25 rests on the bottom 12 of the outer receptacle 10. The valve rod 16 is then inserted into the sleeve 13 from the top of the latter until the key 18 is received in and rests on the lowermost edge of the guide slot or keyway 15. At this point, the lowermost portion of the valve rod 16 will project past the outer receptacle bottom 12 (see also FIG. 2) and the valve head 22 can be screwed onto the lower end 19 of the valve rod.

The metal to be cast, which is still in its solid form, of course, is now placed into the inner receptacle, which may be sized to have a maximum capacity of about 2500 pennyweights of gold, after which the weight member 32, filled with about 15 to 25 lbs. of mercury or steel shot W, is slipped over the sleeve 13 until it rests on the metal. The second weight member 39, filled with about 5 lbs. of mercury or steel shot W', is then screwed onto the stud 17 of the rod 16. The casting unit 9 is now ready for operation, and reference to FIG. 2 will show that communication between the opening 14 (and thus the interior of the inner receptacle 11) and the channel or passageway 20 and bore 24 can be established only by effecting a relative movement between the valve rod 16 and the remainder of the unit 9.

As previously stated, the present invention contemplates the provision of a composite casting apparatus which will eliminate any manual handling of the metal-containing receptacle or of the flow control means therefor. To this end, as shown in FIGS. 1, 4 and 5, the outer receptacle 10 is provided with a pair of oppositely located arms or lugs 45 by means of which it may be supported for vertical reciprocal movement. Merely by way of example, the supporting and moving means for the receptacle unit 9 may be of the type shown in FIG. 5 and comprising a frame or upright structure 46 having a base 47 and a head 48. Slidably guided in the head 48 is a mounting mechanism 49 provided at its upper end with teeth 49a defining a rack and at its lower end with a pair of spaced, substantially horizontal carrier arms 50 (only one of which is shown). A drive or actuating pinion or spur gear 51 having teeth 51a meshing with the rack teeth 49a is journaled in the frame head 48 and is adapted to be rotated or angularly moved in the direction of the double-headed arrow A by means of an operating arm 52 having a handle or gripping portion 53.

In operation, it is assumed first that the casting operation is to be performed by the lost wax process. The operator, therefore, places onto the base 47 of the frame 46 a conventional steel flask 54 in the interior of which are provided plaster-defined sprues 55 and mold cavities 56, in a manner well known to those skilled in the art. At its top the flask 54 is provided with a depression or "button" 57 defining the entry location for the molten metal (somewhat on the order of a funnel). It will be noted that the outer contour of the valve head 22 constructed in accordance with the present invention is such that it is mated with and fits snugly into the depression 57 (FIGS. 5 and 6). The heating coil means 28 is now connected to a source of electric power which will gradually cause the temperature in the inner receptacle 11 of the unit 9 to rise. Due to the presence of the insulating sleeves 30 and 31, all the heat is directed into the receptacle 11, whereby no heat is lost and the danger of the operator being burned by accidental contact with the outer receptacle 10 is substantially eliminated. As soon as the metal within the inner receptacle 11 has been completely melted, as indicated in FIG. 2 by M, the arm 52 is swung so as to cause the carrier mechanism 49 and its arms 50 to be lowered through the intermediary of the gearing 51—49.

The valve head 22, seated in the depression 57 on the

mold flask 54, will, of course, remain stationary, and thus, as the lowering of the arms 50 continues, the inner and outer receptacles 11 and 10 together with the sleeves 13 will be lowered along the rod 16 to the broken-line position illustrated in FIG. 5, until the opening 14 comes into registry with the uppermost end of the channel 20, as shown in FIG. 6. The molten metal M can now flow through the channel 20—24 into the sprues 55 of the flask 54 and thence into the mold cavities 56. The heavy weight member 32, which is at all times floating on the upper surface of the molten metal, not only prevents loss of heat upwardly and oxidation or other contamination of the metal M, but also aids considerably in the casting operation by adding its weight to the force of gravity exerted on the molten metal itself, thereby ensuring that the molten metal is practically injected into the cavities 56 so as to fill the same completely and secure thoroughly dense and fault-free castings.

When the mold flask 54 is completely filled, the handle 52 is swung so as to raise the arms 50 and therewith the outer receptacle 10 and inner receptacle 11 together with the sleeve 13 relative to the valve rod 16 until the opening 14 is again out of registry with the channel 20. The weight member 39 seated atop the valve rod 16 effectively biases the same downwardly and ensures that it will not be moved upwardly together with the receptacles 10 and 11. Only when the upper end edge of the sleeve 13 engages the lower surface of the weight member 39 can the valve rod be moved upwardly so as to remove the valve head 22 from the depression 57 of the flask 54 and permit removal of the latter from the frame base 47.

When the receptacle unit 9 is empty and in need of a refill, the power is cut off and the upper weight or biasing member 39 unscrewed from the rod 16, whereupon the weight 32 may be lifted out of the inner receptacle 11 by means of a pair of manipulating hooks or the like inserted thereinto and engaged with the hooks or eyes 37 affixed to the upper edge of the inner wall 32a of the weight member 32. It is not necessary to move any other part of the unit 9, and as soon as the new charge of metal has been placed into the receptacle 11, the weights are returned to their operating positions, as described hereinabove, and the power put on again. Should it be found desirable at any time to add weight to or remove weight from the member 32 without removing the same from the inner receptacle 11 (especially when the weight substance is steel shot or the like), the aforesaid manipulating hooks need merely be inserted into the receptacle 11, after unscrewing of the member 39, and engaged with the hooks or eyes 38 on the lid 36 to lift the latter off its seat 34—35 and out of the receptacle. Once the weight change has been effected, the lid is returned to its seat and the member 39 is again attached to the rod 16.

Assuming, for example, that the mold flask has a total liquid metal capacity of about 160 pennyweights, it is evident that each 2500 pennyweight filling of molten metal in the receptacle unit 9 will suffice for about 15 casting operations. Moreover, due to the presence of the injecting weight member 32 atop the surface of the molten metal M in the inner receptacle 11, each individual casting operation will proceed at a maximum speed. Consequently, since the only actions required of the operator are a lowering and raising of the handle means 52—53 with one hand and the placing of empty flasks on and removal of filled flasks from the frame base 47 with the other hand, the overall rate of production of the desired jewelry castings is considerably increased, thereby rendering the entire manufacturing operation substantially less expensive than has heretofore been possible.

If, by way of contradistinction with the foregoing, it is desired to eliminate the mold flask 54 and to employ in lieu thereof permanent multi-section molds for forming the desired castings, no changes in the apparatus according to the present invention are required. The molds may, for example, be mounted at circumferentially spaced 16-

cations on a turret or turntable (not shown) a part of which underlies the valve head 22 of the casting unit 9. Casting operations with such an arrangement are even more simplified than with the flasks 54, since the operator now no longer has to remove one flask and to replace it with another; rather, he merely is required to rotate the turntable through a predetermined angle so as to bring the next mold to a position beneath the valve head. It will also be appreciated that the use of permanent, reusable molds in this manner involves still less expenditures of time and money per unit casting produced, inasmuch as it is no longer necessary to invest many hours and a great deal of labor for forming the wax mold for each flask 54, encasing such wax mold in plaster or the like, and baking out or eliminating the wax from the flask.

Irrespective of the particular casting method chosen, of course, the encircling of the entire inner receptacle 11 by the heating wire means 28 ensures that the molten metal is maintained at a uniform temperature throughout, even when the casting operations are interrupted for any reason whatsoever. Moreover, due to the proximity of the opening 14 and channel 20 to the mold during a casting operation, the present invention ensures that the molten metal M suffers no appreciable temperature drop between the time it starts to flow out of the inner receptacle 11 and the time of its arrival in the mold cavity, whereby the production of faulty castings is minimized to a great extent, a result which is further enhanced by the additional pressure exerted on the metal by the weight member 32, which leads to the formation of dense, high quality castings.

It will also be understood that the individual dimensions of the inner and outer receptacles, as well as their spacing and relative dimensions, together with the construction of the remaining elements of the casting unit 9 will be determined as a function of the operating conditions to be met and of the physical and thermal characteristics of the particular refractory or ceramic materials employed in conjunction with the contemplated advantageous features of extreme light weight and portability of the apparatus. Thus, if desired, an annular lid or cover (not shown) may be additionally placed over the space between the upper edges of the outer and inner receptacles 10 and 11, whereby any possible loss of heat upwardly will also be prevented. Moreover, if found necessary, the inner receptacle 11 may be provided with more than four projections 27, and the bottom 25 of this receptacle need not rest directly on the bottom 12 of the outer receptacle, it being possible to provide at the outer surface of the aforesaid bottom 25 struts or projections substantially like the projections 27 formed on the sides of the inner receptacle.

Other variations of the structure according to and involving no departure from the present invention will readily suggest themselves to those skilled in the art. For example, the lower end of the sleeve 13 need not be coplanar with the bottom 12 of the outer receptacle, but may actually project therebelow. In certain cases, even the valve head 22 may be omitted if the mold 54 or the like is to be directly engaged by the lowermost end of the valve rod 16 so as to place the lowermost outlet end of the passageway 20 into communication with the interior of the mold. Effectively, of course, the valve head constitutes the means for limiting upward movement of the valve rod, and if the valve head as such is omitted it may be desirable to substitute some other type of motion-limiting means in its place. Concurrently, the biasing means constituted by the smaller weight member 39 may be replaced by other types of biasing means, while the mounting of such biasing means on the valve rod need not be of the screw connection type illustrated in the drawings.

The valve rod 16, with or without the valve head, will be seen to comprise flow gate means for controlling the flow of molten material from the inner receptacle into the mold. The arrangement is such that, with the flow gate

means 16 and the receptacle means 10—11—13 in a first relative position in which the outlet opening 14 and the inlet end of the passageway are out of register with one another, relative movement between the said means resulting from engagement between the flow gate means and the mold during relative movement between the mold and the receptacle means or the supporting means therefor will bring the flow gate means and the receptacle means to the second relative position thereof in which the outlet opening registers with the passageway inlet so as to permit flow of the molten material into the mold. The necessary relative movements may result either in the manner illustrated, with the mold and flow gate means stationary while the supporting means and the receptacle means move, or in an opposite manner, with the supporting means and the receptacle means stationary while the mold and the flow gate means move, or in a manner constituting a combination of these two.

I have described hereinabove preferred embodiments of my invention, but it is understood that this disclosure is for the purpose of illustration only, and that various omissions and changes in shape, proportion and arrangement of the parts, as well as the substitution of equivalent elements for the arrangements shown and described, may be made without departing from the scope of the invention as set forth in the appended claims.

Having thus particularly described the invention, what I claim and desire to protect by Letters Patent is:

1. A receptacle unit for casting molten material into a mold, comprising an outer receptacle, an inner material-receiving receptacle positioned within said outer receptacle, hollow sleeve means extending through the bottoms of both said inner and outer receptacles and upwardly from said bottoms interiorly of both said receptacles to a location remote from said bottoms to define an annular space between the inner surface of said inner receptacle and the outer surface of said sleeve means for receiving said material, heating means positioned in the space between said inner and outer receptacles and surrounding said inner receptacle, said sleeve means being provided at a location substantially immediately above the bottom of said inner receptacle with an outlet opening, a valve rod slidably arranged within said sleeve means and provided in its lowermost end region with a downwardly directed passageway the uppermost inlet end of which is out of register with said outlet opening in a first relative position of said rod and receptacles, and in register with said outlet opening in a second relative position of said rod and receptacles, the lowermost outlet end of said passageway being adapted to communicate with a mold, means operatively connected with said rod and biasing the same in such a direction as to normally maintain said rod and receptacles in said first relative position thereof, means limiting relative movement between said valve rod and said receptacles and sleeve means out of said first relative position thereof to an extent corresponding to location of said rod and receptacles in said second relative position thereof, and an annular pressure-applying member disposed in said annular space within said inner receptacle and about said outer surface of said sleeve means, said pressure-applying member being adapted to float on molten material received in said inner receptacle so as to press said molten material through said outlet opening and said passageway upon location of said rod and receptacles in said second relative position thereof.

2. A receptacle unit according to claim 1, said pressure-applying member comprising an annular container slidably engaging both said inner surface of said inner receptacle and said outer surface of said sleeve means with a close fit, and a predetermined amount of a heavy substance located within said container.

3. A receptacle unit for casting molten material into a mold, comprising an outer receptacle provided with a

bottom having a first opening therein, a hollow sleeve attached at its lowermost end to said bottom coaxially with said first opening and extending upwardly through said outer receptacle, an inner material-receiving receptacle provided with a bottom having a second opening therein, said inner receptacle being disposed within said outer receptacle and resting on said bottom of the latter with said sleeve extending through said second opening, heating means positioned in the space between said inner and outer receptacles and surrounding said inner receptacle, said sleeve being provided at a location substantially immediately above said bottom of said inner receptacle with an outlet opening, a valve rod slidably arranged within said sleeve and projecting beyond said uppermost end of the latter, said valve rod being provided in its lowermost end region with a downwardly directed passageway the lowermost outlet end of which is adapted to communicate with a mold, the uppermost inlet end of said passageway being out of register with said outlet opening in a first relative position of said rod and receptacles, and in register with said outlet opening in a second relative position of said rod and receptacles, a first weight member connected to the uppermost end of said rod and biasing the same downwardly, engagement of said first weight member with the uppermost end of said sleeve corresponding to location of said valve rod and receptacles in said first relative position thereof, means limiting relative movement between said valve rod and said receptacles and sleeve out of said first relative position thereof to an extent corresponding to location of said rod and receptacles in said second relative position thereof, and a second, annularly shaped weight member located coaxially within said inner receptacle in the space between the inner surface of the latter and the outer surface of said sleeve, said second weight member being adapted to float on said molten material and functioning to press said molten material through said outlet opening and passageway upon location of said rod and receptacles in said second relative position thereof.

4. A receptacle unit according to claim 3, said heating means comprising an electric heating wire element wound about said outer surface of said inner receptacle.

5. A receptacle unit according to claim 3, said inner and outer receptacles, said valve rod, said sleeve, and said first and second weight members all being made of refractory material.

6. A receptacle unit according to claim 4, further comprising insulating sleeve means carried by said inner receptacle and surrounding said heating wire element, whereby all generated heat is directed inwardly of said inner receptacle.

7. A receptacle unit according to claim 5, said inner receptacle being provided on its outer surface with a plurality of projections extending into engagement with the inner surface of said outer receptacle to ensure accurate positioning of said inner receptacle within said outer receptacle.

8. A receptacle unit according to claim 7, said first and second weight members being constructed as hollow containers and filled with liquid mercury, steel shot or a like heavy substance, the weight of said first weight member being about 5 lbs. and the weight of said second weight member being about 15 to 25 lbs.

9. A receptacle unit for casting molten metal into a mold, comprising an outer receptacle open at the top and provided with a bottom having a first opening therein, a hollow sleeve attached at its lowermost end to said bottom within said first opening and extending upwardly through said outer receptacle with its uppermost end disposed at a location above the plane of said top of the latter, an inner metal-receiving receptacle open at the top and provided with a bottom having a second opening therein, said inner receptacle being disposed within said outer receptacle and resting on said bottom of the latter

with said sleeve extending through said second opening and beyond the plane of the top of said inner receptacle, heating wire means positioned in the space between said inner and outer receptacles and wound about said inner receptacle, insulating means surrounding said heating wire means, said sleeve being provided at a location substantially immediately above said bottom of said inner receptacle with an outlet opening, a valve rod arranged non-rotatably and reciprocally slidably within said sleeve and projecting beyond said uppermost and lowermost ends of the latter, said valve rod being provided in its lowermost end region with a downwardly directed passageway the uppermost inlet end of which is out of register with said outlet opening in a first relative position of said rod and sleeve, and in register with said outlet opening in a second relative position of said rod and sleeve, a valve head connected to said rod at the lowermost end thereof and provided with a bore communicating with the lowermost outlet end of said passageway, a first weight member connected to the uppermost end of said rod and biasing the same downwardly so as to normally effect disengagement of said valve head from said bottom of said outer receptacle, engagement of said first weight member with said uppermost end of said sleeve corresponding to location of said valve rod in said first position thereof, engagement of said valve head with said bottom of said outer receptacle upon effectuation of relative movement between said rod and said sleeve and receptacles corresponding to location of said rod in said second position thereof, and a second weight member located within said inner receptacle and adapted to float on molten metal disposed in the latter, said second weight member being annular in shape and slidably engaging both the surrounding inner surface of said inner receptacle and the surrounded outer surface of said sleeve.

10. A dispensing unit for use with casting material, comprising receptacle means made of refractory material and adapted to contain said casting material, electric heating means carried by said receptacle means for melting said casting material and maintaining the same at a substantially uniform temperature, flow gate means made of said refractory material and carried by said receptacle means for engagement with a mold and controlling the flow of said molten material out of said receptacle means and into said mold, said flow gate means and said receptacle means being arranged for relative movement with respect to one another into first and second relative positions in which the flow of said molten material is cut off and permitted, respectively, by said flow gate means, first weight means located within said receptacle means and floating on said molten material for effecting an injection of the latter into said mold when said flow gate means and said receptacle means are in said second relative position thereof, and second weight means bearing on said flow gate means and normally retaining the same and said receptacle means in said first relative position thereof until they are moved into said second relative position thereof upon engagement of said flow gate means with said mold during relative movement between the latter and said receptacle means, said first and second weight means each comprising a hollow container made of refractory material and carrying a respective amount of mercury, steel shot or like heavy substance substantially immune to the heat generated by said heating means.

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