shale, which are used after comminution in customary manner with a mill to a fine powder, for example, of a particle diameter of 0.004 mm. to 1.00 mm. (20 mesh), and preferably 0.008 mm. to 0.50 (32 mesh). These may be in form of a calcined product. As convenient silicate mineral powders, mention can be made of the fine powders of quartz sand, silica, zeolite, toseki, feldspar and aplite. The silicate mineral powders are at times strictly classified further in the case of silica and quartz sand as silicic acid minerals and as silicate minerals. The silicate mineral powder and the silicate glass powder constitute the principal aggregates of the product, and either the silicate glass powder or the silicate mineral powder is mixed in an amount of 50 to 95 parts by weight, and preferably 60 to 90 parts by weight, per 100 parts by weight of the total components. When the silicate glass powder and the silicate mineral powder are to be used in combination, the ratio at which they are mixed is not so critical, and the silicate glass powder can be added in an amount of 20 to 400 parts by weight, and preferably 50 to 200 parts by weight, per 100 parts by weight of the silicate mineral powder. The ratio in which the two components are mixed can be suitably adjusted within the foregoing range in accordance with the properties desired in the foamed porcelain-like shaped article and the intended purpose or use of the product. When the silicate glass powder, e.g., the powder of soda-lime glass, barium glass or borosilicate glass, is used in a greater amount than the silicate mineral powder, e.g., the powder of quartz sand, silica, zeolite, toseki, feldspar or aplite, the degree of foaming tends to increase and there is also a tendency to form continuous cells. Further, the compressive strength and flexural strength of the shaped article tends to decline. Again, there is also a tendency of an increase in the rate of thermal expansion as well as a decline in the impact strength and heat resistance.

Water glass is admixed with the foregoing silicate glass powder and/or silicate mineral powder. A mixer equipped with an agitating apparatus is conveniently used for this purpose.

The water glass used in the invention process is either an alkali silicate or a concentrated aqueous solution which has as its principal component an alkali silicate. In this case the alkali used is either sodium or potassium. When the water glass used is sodium silicate, preferred compositions meet the following JIS standards.

Standards Table of Sodium Silicate in Accordance with JIS/K 1408

	Components (percent)		Molar ratio
	SiO_2	Na_2O	$Na_2O:SiO_2$
Number:			
1	36–38	17–18	1:2.1
2	34–36	14–15	1:2.4
3	28–30	9–10	1:3.05
4	23–25	6–7	1:3.7

The water glass is added in an amount of 5 to 40 parts by weight, and preferably 15 to 35 parts by weight, per 100 parts by weight of the total components. When the amount of the water glass added is less than 5 parts by weight, the binding by means of the water glass becomes inadequate, with the consequence that the molded shaped article from the foregoing mixture is friable and easily crumbles during its handling, making it unsuitable for large-scale production. On the other hand, when the water glass is added in a large amount in excess of 40 parts by weight, the mixture becomes too soft, with the consequence that it not only is easily deformed when it is being molded but also a strain is easily set up during the drying of the shaped article. Hence, the addition of the water glass in excess also makes the mixture unsuitable for large-scale production. When water glass is heated alone, it effloresces at 500° to 600° C. and results in a very minute quantity of powder. However, when water gloss is mixed with a silicate glass powder and/or a silicate mineral powder, it acts as a binding agent at room temperature to make it possible to compression mold the mixture. When it is heated to a still higher temperature in the range of 700° to 1200° C., the water glass starts to decompose and a porous structure is formed in the shaped article.

For example, when a temperature in the neighborhood of 700° C. is reached, the water glass used as a binding agent for the silicate glass powder and/or silicate mineral powder demonstrates a marked viscosity increase and, as a consequence, prevents the gas from escaping to the outside of the shaped article. In those cases where the hereinafter described inorganic alkali salts have been added, the gas that is generated by their heat decomposition and the gas that is generated as a result of the decomposition of a part of the water glass are captured inside the shaped article and prevented from escaping to the outside of the shaped article. Thus, a shaped article having a porous character and high bulk is produced as a result of the independent cells that are formed.

Then when a temperature in excess of 700° C. is reached, the silicate glass and/or silicate minerals attain a temperature at which they become meltable, with the consequence that upon initiation of their melting they attain a fluid state. However, this transition to a fluid state is checked by the water glass and, when the hereinafter described inorganic alkali salts are present, the formation of a porous structure made up of independent cells is fully accomplished by means of the gas that is generated by the heat decomposition of the inorganic alkali salts and the gas that is generated by the decomposition of a part of the water glass to thus make the formation of a high bulk article possible. Hence, although there is a movement of the silicate glass and/or silicate minerals as a result of their melting, the disintegration of the porous structure does not take place, and moreover a foamed porcelain-like shaped article having a smooth surface is obtained. Therefore, the water glass functions in the invention process as a binding agent, a blowing agent, a foam capturing agent, an independent cell formig agent and a bulking agent.

In the invention process, it is preferred to add to the silicate glass powder and/or silicate mineral powder, as a blowing agent component, an inorganic alkali salt, which generates a gas by substantially decomposing at the temperature at which the molded shaped article from the foregoing mixture is fired. On firing the shaped article within a temperature of 700° to 1200° C., the water glass generates a gas by decomposition and the alkali also generates a gas by being decomposed during the firing. As a consequence, the porous structure which results is formed more rapidly and in a more dense state to provide a shaped article of superior lightness. The inorganic alkali salts which form a gas by substantially decomposing at the firing temperature range include the inorganic sodium and potassium salts which form a gas by decomposing in the range of about 700° to 1200° C. Included as these alkali salts are the alkali salts of carbonic acid, such as $NaHCO_3$, Na_2CO_3, $KHCO_3$ and K_2CO_3; the alkali salts of sulfuric acid, such as $NaHSO_4$, Na_2SO_4, $KHSO_4$ and K_2SO_4; the alkali salts of sulfurous acid, such as $NaHSO_3$, Na_2SO_3, $KHSO_3$ and K_2SO_3; the alkali salts of thiosulfuric acid, such as $Na_2S_2O_3$ and $K_2S_2O_3$; the alkali salts of nitric acid, such as $NaNO_3$ and KNO_3; the alkali salts of nitrous acid, such as $NaNO_2$ and KNO_2; the alkali salts of phopshoric acid, such as NaH_2PO_4, Na_2HPO_4, Na_3PO_4, KH_2PO_4, K_2HPO_4 and K_3PO_4; and the alkali salts of chloric acid, such as $NaClO_3$ and $KClO_3$. The inorganic alkali salts which are particularly convenient include

$NaHCO_3$, Na_2CO_3, $NaHSO_4$, Na_2SO_4 and $Na_2S_2O_3$

These alkali salts decompose during the firing and generate in all cases a gas such as CO_2, SO_2, H_2, O_2 or NO_x