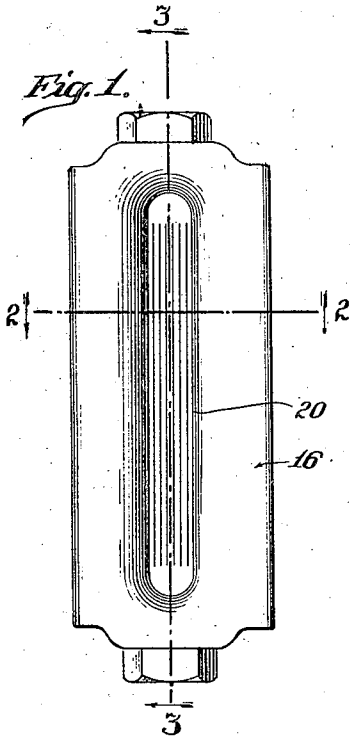
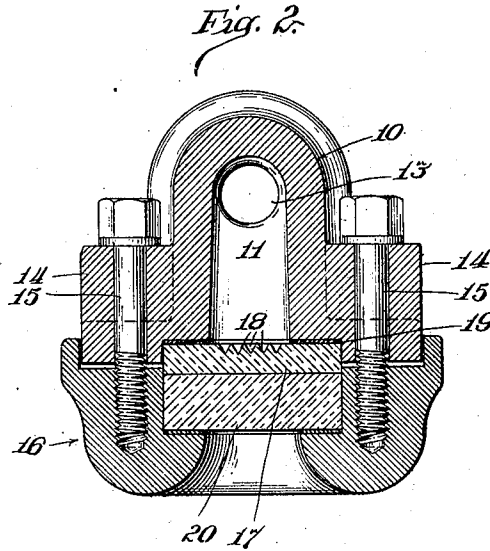
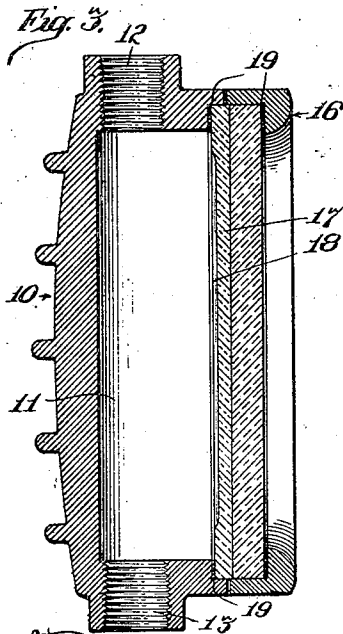
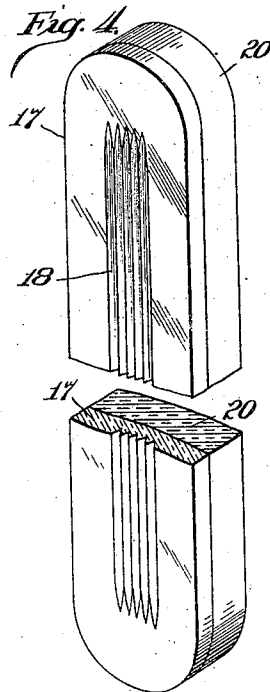
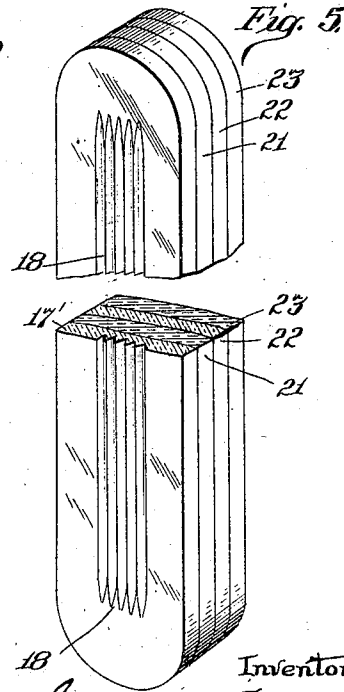


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WATER GAGE.
APPLICATION FILED APR. 12, 1920.

1,380,080.

Patented May 31, 1921.



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WATER-GAGE.

1,380,080.

Specification of Letters Patent.

Patented May 31, 1921.

Application filed April 12, 1920. Serial No. 373,359.

To all whom it may concern:

Be it known that I, GEORGE H. SARGENT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Water-Gages, of which the following is a description, reference being had to the accompanying drawing, which forms a part of my specification.

My invention relates more particularly to the glass panels used in water gages for boilers or steam generators and of the type wherein the metallic shell or casing is formed to provide a water-receiving chamber which has communication both at top and bottom with the boiler or steam generator, while one wall of the chamber in the gage must consist of transparent material or glass in order to discern the water-level within the gage; the glass being suitably clamped into place against the front or longitudinal sides of the metal casing, to extend throughout the length of the chamber in said casing and enable a correct reading and complete vision of the water level in the chamber.

Specifically stated, my invention relates to the type of gage wherein the glass panel is directly subjected to the strains and effects of the water and steam; and pertains especially to the type known as the reflex glass gage; that is the type wherein the glass wall or panel is provided with a series of facets or faces on the inner or water side of the glass to constitute reflecting surfaces whereby refraction and reflection of the light rays will be provided, varying with or depending upon the density of the contained media, and a defined line of demarcation provided, which will enable an easy reading or discernment of the water level in the gage.

The object of my invention is to provide a construction of greater strength, adapted to resist the internal pressure and which will therefore materially decrease the expense of upkeep, encountered with glasses as heretofore constructed, resulting from the deterioration of the glass on the water or steam side of the gage. The effect of the water and steam on the glass as heretofore constructed necessitates the frequent removal of the entire glass panel or wall of the gage when only a small portion or percentage of the panel or glass has become worn through the disintegrating effects of the water and steam on the inner surface of the glass or panel.

The objects and advantages of my invention will be more fully comprehended from the detailed description of the accompanying drawing, wherein:—

Figure 1 is a front elevation of the type of water gage to which my invention is adapted.

Fig. 2 is a cross-sectional view, taken on the line 2—2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is a longitudinal sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a perspective view of my improved glass as employed in the gage illustrated in the preceding figures.

Fig. 5 is a perspective view of a modified form of my invention.

In the particular exemplification of the invention as disclosed, the gage comprises a main body portion 10 of suitable metal, cast or formed so as to provide the water space or chamber 11 disposed lengthwise thereof and open at the front of the shell or casing 10; while opposite ends of the shell or casing 10 are shown provided with suitable tapped openings 12 and 13 adapted to receive suitable connecting tubes (not shown) whereby communication with the boiler or generator may be effected. The longitudinal sides of the main shell or casing 10, at suitable points, are provided with the laterally disposed lugs or ears 14, 14 adapted to receive suitable screw-bolts as at 15 whereby the glass-holding metallic frame 16 may be secured in place. The frame 16, as can be seen in Figs. 1 and 3, is provided with a longitudinal opening disposed full length of the chamber 11 of the gage and of equal or greater width, so as to enable proper discernment of the water level in the chamber 11 through the front glass panel or wall of the gage. The front face of the main shell or casing 10, as well as the inner face of the frame 15, at coincident or registering points, are suitably kerfed or recessed to receive the marginal edges of the glass panel or wall; the frame 16 being formed to extend entirely about the marginal edges of the glass wall or panel, as clearly disclosed in Figs. 2 and 3 so as to form water and steam-tight connection therewith.

The front or glass wall of my improved gage comprises a plurality of panels or sections arranged face to face in intimate relation; with the inner section or panel 17 provided with a suitable number of longitudinally disposed facets or reflecting sur-

faces, as at 18, produced by longitudinal grooves, preferably V-shaped in cross-section, which may be formed in any suitable manner, as by pressing, grinding, casting or otherwise. This panel or section 17, as stated, constitutes the inner surface of the transparent or front glass wall of the gage and therefore is the section which contacts with the hot water and steam and is subjected to the deteriorating and disintegrating effect of the steam and distilled water which pass into the gage from the boiler by means of the conduits connected to the ends of the gage. It has been found in practice that the action of the steam and hot water, in a comparatively short period of time, seriously affects the facets or faces on the inner side of the panel so as to materially reduce the refracting and reflecting function; while at the same time more particularly affecting the marginal surfaces or sides of the panel, especially where they are in overlapping or joint-forming relation with the metallic wall of the gage.

It is well known that where cylindrical vessels are subjected to internal fluid pressure, the greatest or maximum stress occurs or is imposed upon the internal surface or inside layers of the material, while the outer surface or layers of the material remote from the inside layers bear a minimum amount or much less strain, which condition maintains until the elasticity or yield of the inside layers causes the outer layers to bear a material amount of the strain. The thicker the walls of the cylinder, the greater or more pronounced is this inequality of stress. It is apparent, therefore, that where a single glass wall of comparative thickness is employed, this condition is very pronounced, and owing to the very low elastic nature of glass, such inequality in the stresses on the different surfaces or portions of the glass are apt to cause or set up fractures, which, in glass, are radiated or spread throughout the entire panel. The employment, therefore, of separate sections or independent layers of glass to constitute the glass panel or wall of the gage, as contemplated by my invention, practically tends to confine the stresses or strains to the single inner section.

The tensile and elastic nature of the metal portion of the gage will compensate for the excessive strains to which the internal portions thereof are subjected; while, on the other hand, in view of the low degree of elasticity in glass, it is apparent that the stresses will be transmitted throughout the entire glass section or panel, with the result that any faults or flaws will be radially transmitted throughout the glass section and frequently result in a complete shattering of the glass panel or section.

By employing a plurality of panels or

separate glass sections, however, the inner section is made to withstand the greater or major portion of the strains, without transmitting its faults to the entire glass wall or composite panel.

In addition to the dissipating effect, on the inner surface of the inner section or panel 17, due to the chemical action of the water and steam, it has been found that the marginal sides or edges of the panel,—which are usually seated on a comparatively thin gasket, as at 19,—become worn by erosion as a result of the passage of steam and hot water, at points where the gasket has become defective through the action of the elements, which therefore necessitates the removal of the entire panel and the substitution of a new panel, although the outer surface and main portion of the panel is still uninjured and intact, with the consequent result of great loss and expense.

With my invention, the inner section or panel need not be of great thickness and the disintegrating effects and strains will practically all be confined to the comparatively thin panel or section 17, so that the supplementary panel or panels need not be renewed when replacement of the inner panel or section becomes necessary. It is apparent that the inherent faults or strains of the inner panel 17 will not be communicated to the supplementary panel or sections and will not therefore be transmitted to the entire composite glass panel or wall of the gage. In the event of a fracture occurring in the inner section, such fracture will be confined to said section and therefore materially reduce the danger resulting from escaping hot water and steam, because of the additional panels or supplementary sections which are arranged in supporting relation with the outer surface of the inner section.

The composite glass panel may be composed of the inner and comparatively thin section 17 and a single and somewhat thicker panel or outer section 20 as shown in Figs. 2 to 4; or the composite glass panel may consist of a plurality of panels or sections as shown, for example, in Fig. 5, where the composite panel consists of the prismatic or inner section 17 and the supplementary sections 21, 22 and 23, which combinedly provide a glass panel or wall of desired thickness and strength. In constructing the composite panel or glass wall, the respective layers or sections are provided with smooth flat surfaces which are placed in intimate contacting relation with one another. As a result of this construction, it is evident that a glass panel or wall is provided possessing materially greater strength than that possessed by a single or unitary panel; while the transmission of fractures to the supplementary panel or sections will be obviated. Furthermore, in the event of wear,

due to the action of the water and steam, but one section or layer need be replaced or renewed, with the result that the cost or expense of maintenance is greatly reduced.

5 I have shown and described what I believe to be simplest and best exemplifications of my invention, which may be modified in certain details without, however, departing from the spirit of my invention.

10 What I claim is:—

1. In a water gage of the class described, a transparent section or sight-wall composed of a plurality of glass panels having flat surfaces arranged in intimate abutting relation.

15 2. In a water gage of the class described, a

transparent section or sight-wall composed of a plurality of flat glass panels of different thickness, arranged face to face in abutting relation. 20

3. In a water gage of the class described, a transparent section or sight-wall composed of a plurality of flat glass panels arranged face to face in abutting relation, with the inner face of the inner or water contacting panel provided with a plurality of light refracting facets. 25

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