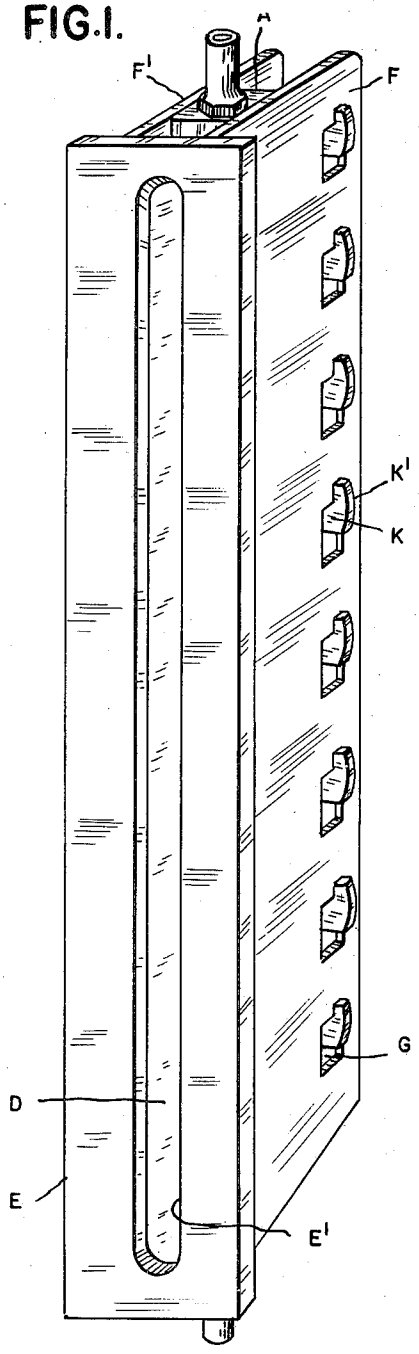
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LIQUID LEVEL GAUGE

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2 Sheets-Sheet 1

FIG.1.



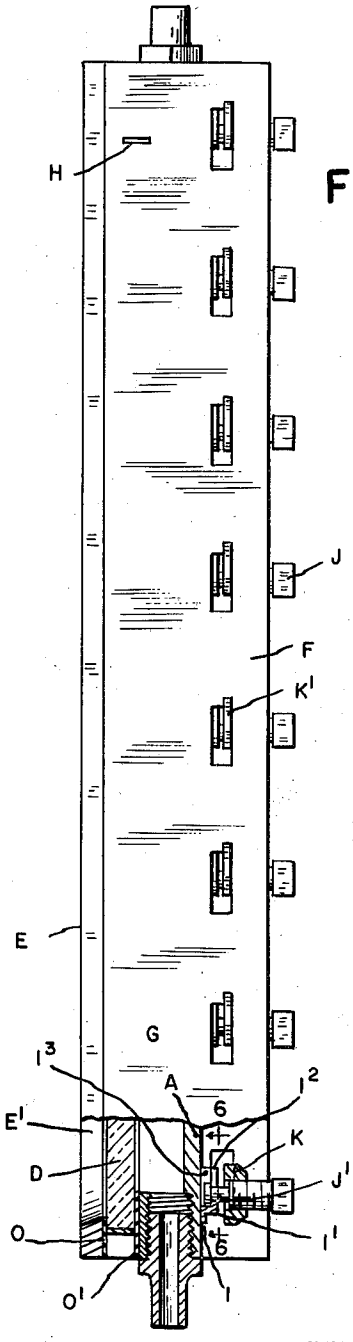


FIG.2.

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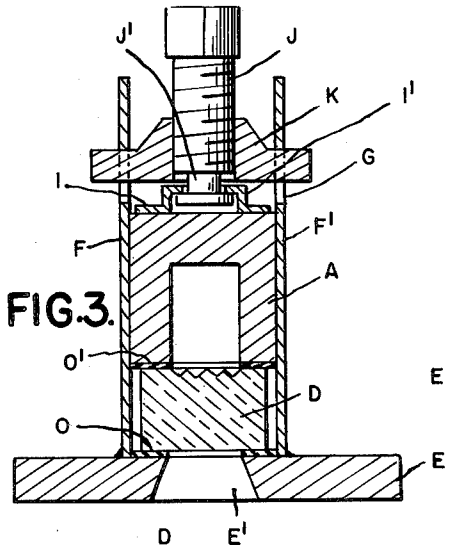


FIG.3.

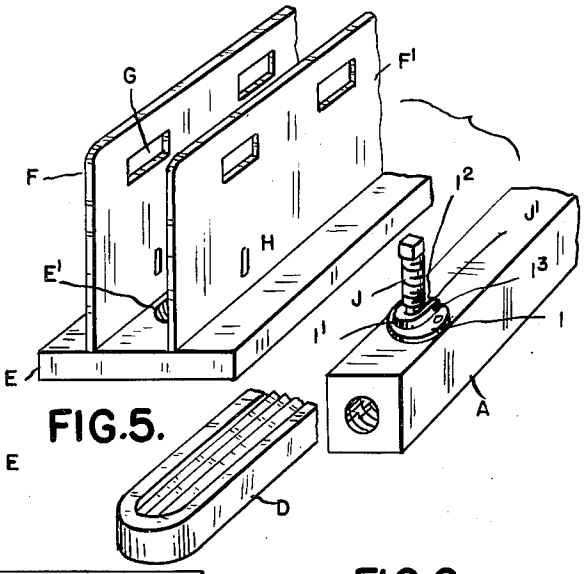


FIG.5.

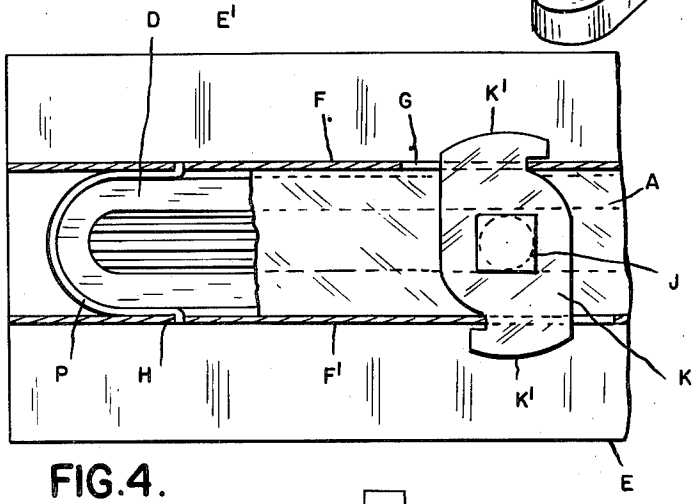
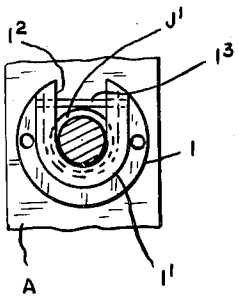


FIG.4.

FIG.6.



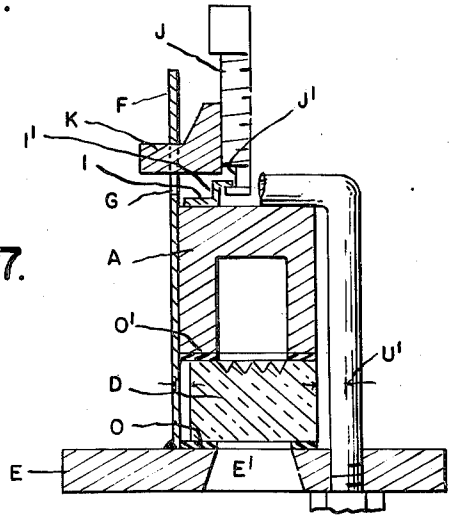


FIG.7.

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UNITED STATES PATENT OFFICE

2,480,070

LIQUID LEVEL GAUGE

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Application November 19, 1945, Serial No. 629,516

3 Claims. (Cl. 73—330)

1

The invention relates to liquid level gauges for indicating the level of a liquid in a boiler or other fluid container.

Extensive manufacturing experience in this art has pointed out weaknesses and improvements.

It has been found that the overhanging sides of the glass cover (or frame), whenever the bolts are tightened, are brought under heavy stress and the outer edges of the face tend to bend over under the pull and the face width dimension shows a tendency to spread, particularly at mid length position.

These effects, if carried far enough, can cause breakage of the glass.

To protect the glass from similar bending stresses the use of substantial and heavy metal sections is required.

To reduce weight while maintaining strength is an object of this invention.

To reduce machine shop labor by utilizing the smooth cold drawn surfaces is another object.

Another object is the use of cold drawn steel in an effort to secure material of higher strength inherent to its cold working.

To reduce eccentric loading, bending and deformation is an important object.

A further object is the integration of all the bolts into one of the major housing elements of the gauge so as to avoid the handling of many small parts, prelocate the locking members, save assembly time and eliminate the nuisance of dropping nuts or bolts while working on the gauge.

Another object is the elimination of special dies or molds through the fabrication of standard rolled steel shapes.

Another object is the thorough dispersal of stress concentrations by interposing the deep sides between bolts and glass.

In the drawings is shown a practical embodiment of the claims, although there is no intention of limitation to this precise form.

Fig. 1 is a front perspective elevation of the gauge;

Fig. 2 is a side elevation partly in vertical central section of the improved gauge;

Fig. 3 is a horizontal cross section therethrough;

Fig. 4 is a rear elevation of a portion of the gauge;

Fig. 5 is a perspective view of the several main members from which the gauge is formed detached from each other;

Fig. 6 is a section on line 6—6, Fig. 2, illustrating the means for securing the clamping screws;

Fig. 7 is a diagrammatic cross section showing on the left of the center my improved construction and on the right a U-belt securing means.

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The main elements of my improved gauge are formed from cold rolled bar stock and are fashioned with the minimum amount of machining operations. Thus, the member A containing the liquid column is preferably formed of a cold rolled bar. This bar is threaded at both ends for connection tailpipes and has a formed liquid chamber between the ends which is open at the front, and covered by the sight glass in the usual manner. To hold the glass D in place and to form a liquid-tight seal, I employ the following construction. E is a flat bar of cold rolled stock which constitutes the face of the gauge and which has stamped or otherwise formed therein a longitudinally extending central slot E'. F and F' are flat bars of cold rolled stock and of a lighter gauge than the bar E which are spaced from each other a distance equal to the width of the member A and are secured to the bar E by suitable means, such as by welding. The side bars F and F' have punched therein adjacent to the outer edges thereof a series of apertures G and have also adjacent to their inner edges and near the opposite ends thereof the punched apertures H. The member A has arranged on the side thereof opposite the channel a series of stampings I which are secured to the member by suitable means, such as by spot welding. Each of these stampings I provides a swivel connection to the end of a screw J, which latter threadedly engages a cross bar K adapted for insertion through the aligned apertures G in the sides F and F'. The swiveled engagement is formed by cutting a groove J' in the screw J and by forming the member I with a raised flange I' having an entrance slot I^2 therein of sufficient width to receive the groove portion of the screw. A pin I^3 is then inserted to hold the screw from detachment while permitting free rotation thereof. Thus, all of the screws J together with the cross bars K engaged therewith are secured to the member A but are free to be independently operated. To facilitate such operation the bar K has arcuate end portions K'. The member A may be placed in position by, first, turning the cross bars K so that they will pass inward between the sides F and F' and then turning each of these cross bars at right angles to engage the same with the aligned apertures G. The screws J may then be turned to force the cross bars K in an outward direction with the reaction that the member A is pressed against the glass bar D and gaskets O and O', so as to form a liquid-tight seal. The glass D is located in assembly by the clips P engaging in apertures H.

In the general statement of object it was mentioned that the overhanging sides of the glass cover tended to be bent over with the pull.

This tendency increases as the pull is exerted farther away from the supporting glass.

This stress is exerted in conventional gauges by round section bolts, hence the bolt center line is necessarily at some distance from the solid glass and gasket supporting edge (Fig. 7; U').

But if high strength steel is used, if a long narrow side section be substituted for bolt, if the narrow side be positioned parallel to the glass, it becomes possible to bring the center line of stress close in against the edge of glass.

Hence the fabricated cover secures the minimum overhang, least eccentric load, least distortion and, consequently, minimum glass breakage.

What I claim as my invention is:

1. In a liquid level gauge a member having apertures in the opposite ends thereof and a channel in one face thereof extending to connect with said apertures, a transparent plate covering said channel, a U-shaped frame member embracing said transparent plate and channel member, said frame including a slotted front plate and side plates extending in rear of the channel member and provided with series of apertures in the opposite sides of the rearwardly extending portion, a series of screws each swiveled to the rear face of said channel member, an oblong plate threadedly engaging each screw adapted when turned in one direction to pass between the sides of said frame and when turned transversely to engage opposite apertures in said sides and to transmit clamping stress from said screws to said frame.

2. A liquid level gauge comprising a member formed of cold rolled bar stock having threaded apertures formed in its opposite ends and a channel in one face thereof extended to connect with said apertures, a member including a front plate having a longitudinally extending slot therein and a pair of spaced parallel plates arranged on opposite sides of said slot and welded to said front plate to extend at right angles thereto and adapted to embrace said channel member, said parallel plates being provided with series of apertures therein adjacent to the outer edge portions thereof and all of said plates being formed of cold rolled stock requiring no machining of any of the surfaces thereof, a transparent panel extending between said parallel plates and said front plate and channel member to cover the channel of the latter, sealing means between said transparent panel and channel member, a plurality of clamping screws each having a swivel engagement with said bar member and arranged in registration

with aligned pairs of apertures in said parallel plates, and cross bars threadedly engaging said screws adapted when turned in one direction to pass between said parallel plates and when turned at right angles thereto to engage aligned pairs of apertures in said parallel plates.

3. A liquid level gauge comprising a member formed of cold rolled bar stock having threaded apertures formed in its opposite ends and a channel in one face thereof extended to connect with said apertures, a member including a front plate having a longitudinally extending slot therein and a pair of spaced parallel plates arranged on opposite sides of said slot and welded to said front plate to extend at right angles thereto and adapted to embrace said channel member, said parallel plates being provided with series of apertures therein adjacent to the outer edge portions thereof and all of said plates being formed of cold rolled stock requiring no machining of any of the surfaces thereof, a transparent panel extending between said parallel plates and said front plate and channel member to cover the channel of the latter, sealing means between said transparent panel and channel member, a plurality of clamping screws each having a groove near its inner end, a sheet metal stamping for each screw slotted to receive the groove portion thereof and welded to the rear face of said bar member, said stampings being located to register said screws respectively with aligned pairs of apertures in said parallel plates, and a cross bar threadedly engaging each screw adapted when turned in one direction to pass between said parallel plates, said cross bars having arcuate end portions permitting the turn of the same into engagement with aligned pairs of slots to form abutments for the clamping screws.

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