G. H. SARGENT & F. G. DUNBAR.

FLUID GAGE.

APPLICATION FILED NOV. 2, 1911.

1,113,490. Patented Oct. 13, 1914.

Fig. 1

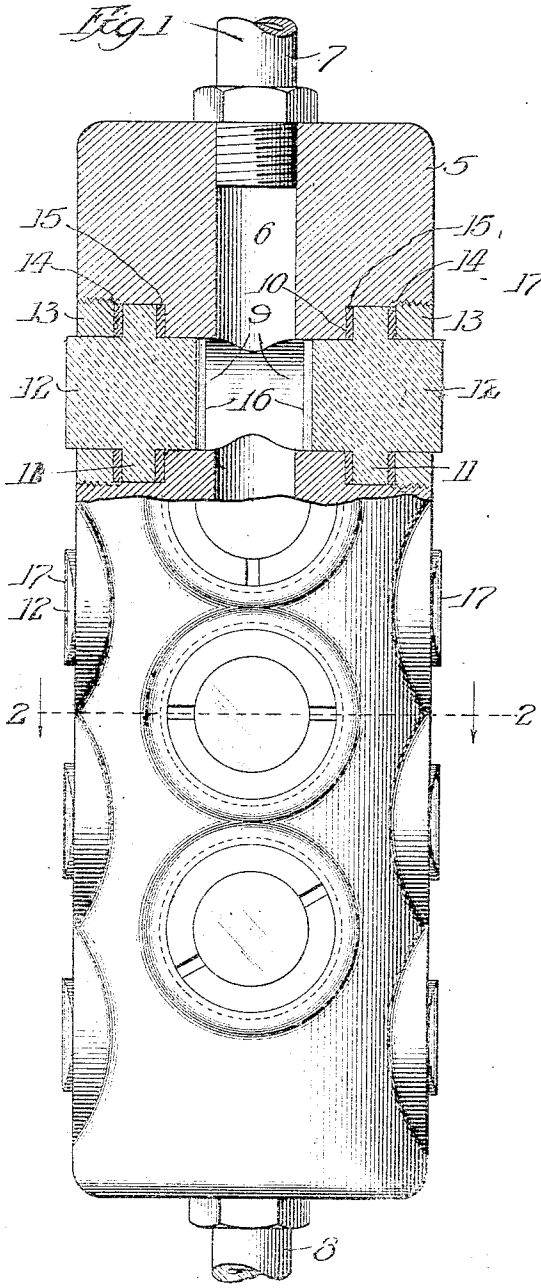


Fig. 2.

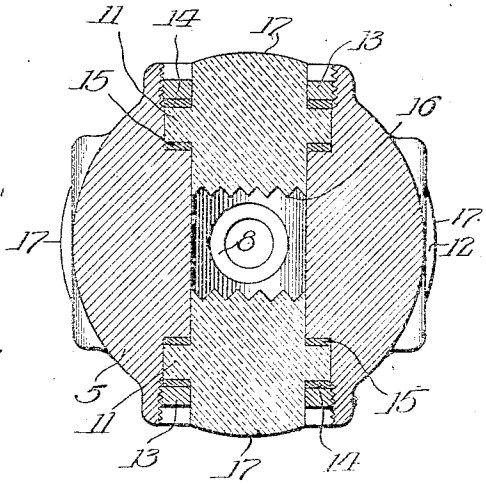


Fig. 3.

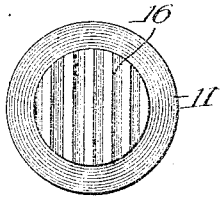
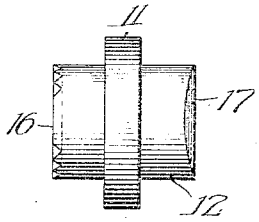


Fig. 4



Witnesses:

Geo. C. Davison

Ida J. Nelson

Inventors

George H. Sargent

Frank G. Dunbar

By Smith Hall & Fuller

Attys.

UNITED STATES PATENT OFFICE.

GEORGE H. SARGENT AND FRANK G. DUNBAR, OF CHICAGO, ILLINOIS, ASSIGNORS TO SARGENT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

FLUID-GAGE.

1,113,490. Specification of Letters Patent. Patented Oct. 13, 1914.

Application filed November 2, 1911. Serial No. 658,037.

To all whom it may concern:

Be it known that we, GEORGE H. SARGENT and FRANK G. DUNBAR, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fluid-Gages, of which the following is a specification.

This invention relates to fluid gages for use in connection with steam boilers and the like and aims to provide a gage of this general character which will be particularly adapted for use as a water gage or lubricator gage on high pressure locomotive boilers.

The ordinary tubular gages, because of their frangibility, have been to a large extent supplanted on locomotive boilers by metal gages having a heavy glass front through which the water is viewed. The principal objection to this type of gage, however, is, that the fluid in the gage can be viewed only from a position practically in front of the glass.

Our present invention provides a gage in which the water level or the lubricant feed can be observed from any point around the gage. To this end, the gage is set with a plurality of series of individual sight glasses, each series being disposed radially to the central bore of the gage so that the outer faces are presented in various directions. To further facilitate the observance of the water level the outer faces of the sight glasses are convexed to refract the light so that the glasses in two series can be observed simultaneously.

The invention will be best understood by reference to the following description when considered in connection with the accompanying drawings which illustrate the invention in one of its preferred forms.

Referring to the drawings—Figure 1 is a side elevation partially in section of a gage embodying our invention. Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1. Fig. 3 is a detail view of the inner face of one of our improved sight glasses; and Fig. 4 is a side elevation of the glass shown in Fig. 3.

On the drawings, 5 designates the body of our improved gage, said body being preferably cylindrical in form although it will be obvious that it may be of any preferred polygonal form in cross-section and, we therefore wish it to be understood that the word "cylindrical" as used hereafter is not intended as a limitation to a gage body having a circular periphery. The body is provided with a centrally disposed longitudinally extending bore 6 into the upper and lower ends of which are threaded the connecting pipes 7 and 8 by means of which the gage is connected with the boiler. Through the side walls of the gage body is formed a plurality of series of sight glass receiving sockets 9 communicating at their inner ends with the bore 6. In the present form of invention we have shown four series of these radially disposed sockets, each series extending longitudinally of the gage and the individual sockets in each series being disposed in staggered relation relatively to the adjacent series as shown. The sockets are provided with annular shoulders 10 forming abutments for the annular projections or shoulders 11 on the sight glasses 12 to prevent displacement of the glasses inwardly. The sight glasses are held in position in the sockets by holding rings 13 threaded into the mouths of the sockets and in order to insure a tight fit suitable packing rings 14 and 15 are disposed upon either side of the annular shoulders 11.

The inner face of each of the sight glasses is provided with facets or reflecting surfaces 16 which will reflect the light to give a silvery appearance when the medium back of the glasses is of low refracting power, such as is the case with air and steam, but will permit the passage of the light through a medium of higher refracting power such as water; the result of these facets being that the portion of the glass backed or covered by water appears black or very dark while that portion backed by air or steam presents a silvery appearance. A sharp and clear demarcation is thus produced between the level of water and steam which permits the water level to be readily discernible even from a considerable distance.

By arranging the sight glasses in radial relation to the circular body it will be apparent that the water level in the gage can be observed from any side of the gage. In order, however, that the exact water level may be perceived from any position around the gage we have convexed the outer surfaces of the sight glasses, as indicated at 17 so that the light passing from the denser to the rarer medium—*i. e.*, from the sight glasses

into the surrounding air—will be refracted away from the perpendicular to increase the angle within which any one glass is clearly visible. Since the gage is usually viewed from a position practically at the same height as the gage we have found it desirable to convex the outer faces of the glasses in one plane only to produce a cylindrical-convex surface. When the glasses are mounted in the gage body they are positioned so that the axis of curvature of the cylinder-convex surface extends in a vertical line. With all of the glasses positioned in this manner it will be obvious that the light from each series of glasses will be refracted toward the adjacent series so that the rays of light from adjacent series will cross at no great distance from the body of the gage. When the eye of the observer is positioned at any point beyond the point where the rays of light cross nearest the gage, two series of sight glasses are plainly visible and by reason of the law of refraction the water level in the bore 6 can be easily seen. The individual glasses in each series are set so that the upper edge of each glass will lie in a horizontal plane slightly above the lower edges of the glasses in adjacent series. From this arrangement it will be apparent that when the water level approaches the top of one sight glass it becomes visible at the bottom of the sight glasses of the adjacent series and, since two of the series are always visible the exact height of the water level is descernible at all times.

While we have shown and described a preferred embodiment of our invention it will be understood that the structural details of the gage may be varied within the limits and scope of the invention and we do not limit the invention to the details herein shown except in so far as said details may be made the subject of specific claims.

We claim:

1. A gage comprising a cylindrical body equipped with a plurality of oppositely disposed rows of sight glasses, the glasses of adjacent rows being arranged with their longitudinal axes at angles to each other, and the glasses of opposite rows being arranged with their longitudinal axes in a common plane.

2. A gage comprising a body provided with a cylindrical sight glass having a faceted inner end and a cylindrical convex outer end, the facets on the inner end being arranged parallel with the longitudinal axis of said body, and also parallel with the generatrix of said outer end.

3. A gage comprising a cylinder provided with a plurality of sight glasses having their longitudinal axes disposed radially of the cylinder, said glasses having faceted inner faces and cylindrical convex outer faces, the facets on the inner ends and the generatrices of the outer ends of the glasses being disposed parallel with the axis of said cylinder.

4. A sight glass for gages and the like of substantially cylindrical form, the inner end of said glass being provided with parallel facets and the outer end being of cylindrical convex form, the facets on the inner end being disposed parallel with the generatrix of the outer end of the glass.

5. A gage comprising a cylindrical body, and a plurality of series of cylindrical sight glasses set radially in said body, the glasses of each series being arranged in staggered relation relatively to the glasses of adjacent series, one series of glasses being disposed diametrically opposite another series in the cylinder and each glass having its inner end provided with facets disposed parallel with the longitudinal axis of the gage and its outer end of cylindrical convex form.

GEORGE H. SARGENT.
FRANK G. DUNBAR.

Witnesses:
IRA J. WILSON,
M. A. KIDDIE.