(No Model.)

G. WELLS.

REFLECTOR FOR WATER GAGES.

No. 538,989. Patented May 7, 1895.

Fig. 1.

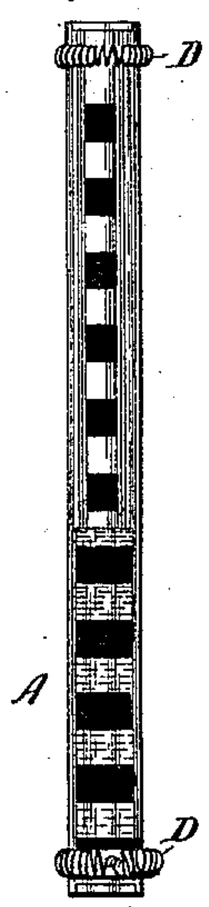

Fig. 2.

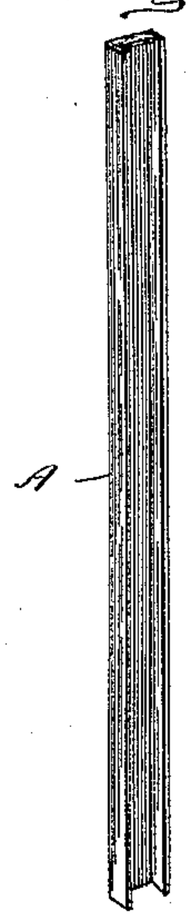

Fig. 3.

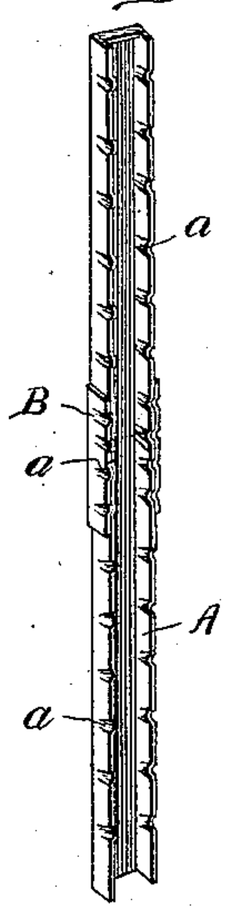

Fig. 4.

Fig. 5.

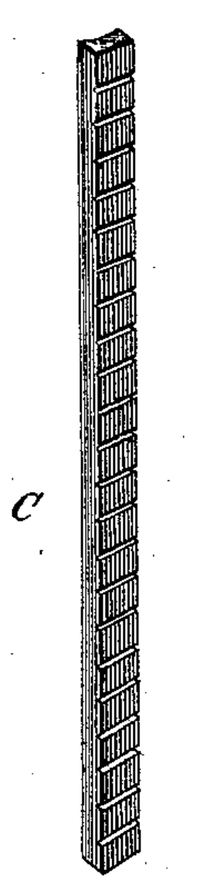

Fig. 6.

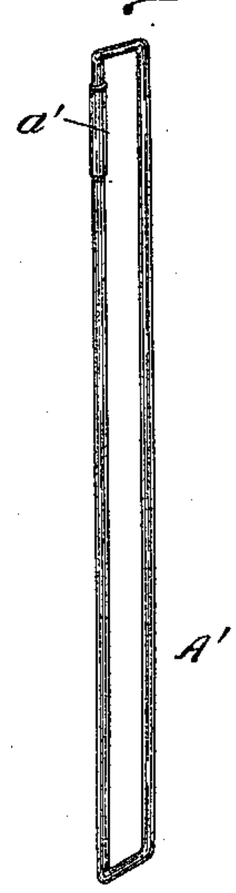

Fig. 7.

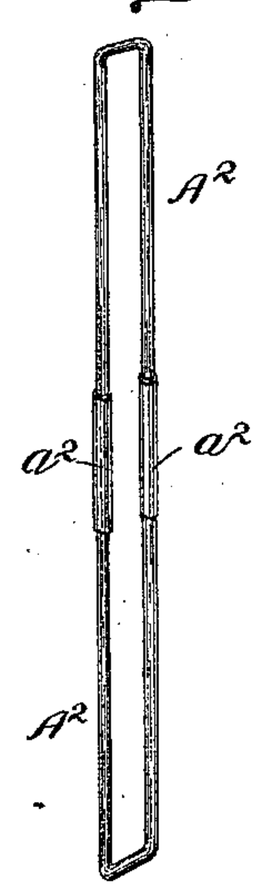

Fig. 8.

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UNITED STATES PATENT OFFICE.

GEORGE WELLS, OF SOUTH NORWALK, CONNECTICUT.

REFLECTOR FOR WATER-GAGES.

SPECIFICATION forming part of Letters Patent No. 538,989, dated May 7, 1895.

Application filed May 4, 1894. Serial No. 510,083. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WELLS, a citizen of the United States, residing at South Norwalk, Fairfield county, State of Connecticut, have invented certain new and useful Improvements in Reflectors for Water-Gages; and I do hereby declare that the following is a full, clear, and exact description of the invention, sufficient to enable others skilled in the art to which it appertains to understand and use the same.

My invention relates to reflectors for water gages of steam boilers, the purpose being to enable the height of the water therein to be accurately noted at a glance.

The invention comprehends the following features, viz: first, a frame adapted to receive and hold a reflector or reflecting surface, and to be applied to the glass tube of a water gage; second, an extensible frame adapted to receive and hold a reflector or reflecting surface and to be adjusted in length to correspond with gage tubes of different lengths; third, a reflector or reflecting surface adapted to be removably placed in, and sustained by, said frame; fourth, a reflector transversely divided into sections or short lengths to enable the length of the reflecting surface to be varied with the length of the sustaining frame by adding or removing sections, as may be required; fifth, the means hereinafter described for attaching the reflector, as a whole, to the glass tube of the gage.

In the accompanying drawings, which illustrate my invention and form a part of this specification, Figure 1 represents a front view of a water-gage with my reflector applied thereto. Fig. 2 represents a perspective view of a sheet-metal frame or frame-section. Fig. 3 is a similar view of an extensible frame made in two parts. Fig. 4 is a perspective view of a reflector-block as preferably made for single frames of short length. Fig. 5 is a view showing the reflector-block divided into sections. Fig. 6 represents a non-extensible, and Fig. 7 an extensible, wire-frame; and Fig. 8 a reflector-block adapted to the wire-frame.

Referring to the drawings, A designates a frame formed of a strip of sheet-metal by bending both of its edges to one side to form a trough or channel, the turned-up portions being bent past a right angle with the central portion to give the frame a dovetail shape in cross section, whereby it is adapted to receive and hold correspondingly shaped reflector blocks C which are inserted from the end, one or both ends being left open for that purpose.

Water gages vary greatly in length, and it is therefore desirable to have a reflector frame adjustable to all lengths, as otherwise frames would be required for every different length of gage. This I provide for by making the frame in two or more parts and coupling the same together, preferably by means of a telescopic coupling which permits the parts to be drawn apart or closed together within certain limits determined by the length of the coupling.

In Fig. 3, B designates the coupling which is made of the same shape as the frames A, and of any suitable or preferred length, according to the length to which the apparatus is designed to be extended. In cross section the interior of this coupling corresponds with the exterior of the frames A, so as to embrace and hold the latter tightly when inserted therein from opposite directions, as shown. When the parts fit together tightly, friction alone may be relied on to hold the frames in adjusted position in the couplings, but for the sake of greater security I indent the edges of the frames and couplings at regular intervals, as shown at *a*, the distances between said indentations corresponding with the length of the reflector blocks, the indentations in the coupling engaging those of the frames to hold the latter in adjusted position.

The frames A may be made out of any preferred kind or variety of metal, but I propose to make them of thin sheet brass, which is obtainable in the market in sheet form. The fiber of rolled or drawn metal extends in the direction in which it is rolled or drawn,—that is to say, in the direction of elongation, and the material therefore possesses greater

strength and tenacity when bent across the fiber than when bent in a longitudinal direction. Hence, in cutting out the blanks for the frames A I prefer to cut them so that the fiber shall extend in a transverse direction across the blanks; then when the edges are bent up in the operation of forming the frames the bend will be across the fiber, a stronger and more rigid frame being the result. The material above named from which I prefer to make the frames is obtainable in sheet form in varying widths, the price per pound varying and increasing with the width. By making the frames in two or more parts and coupling them together in the manner shown and described I am enabled to use narrower and lighter material, obtainable at the minimum price, and thus secure the advantages of rigidity extensibility and economy in the cost of production.

The reflector blocks C may be made of any suitable material, glass or porcelain being deemed preferable. They are made of a size and shape in cross section to fit snugly within the frames A, and preferably their inner faces are concaved to lie snugly against the glass tube of the gage. These blocks may be made in short lengths,—say from one-eighth to seven-eighths of an inch, and all of the same color, or of different colors alternating with each other. Preferably I make them of a length corresponding with that of the frames A and notch or nick them transversely across the back to adapt them to be readily broken into sections or lengths corresponding with the distances between the indentations of the frames and their couplings, whereby when the reflecting surface is to be extended extra sections may be broken from a reserve block to fill the extended frame.

Instead of making the frames of sheet metal as above described, they may be made of wire as shown in Figs. 6 and 7.

In Fig. 6 I show a nonextensible frame A′ formed of a single piece of wire bent into rectangular form, the frame so formed being of suitable width to receive and hold the reflector blocks C′ between the parallel side bars, the said blocks being notched or grooved in their sides to receive the frame bars. The frame may be left open at one end for convenience in inserting and removing the reflector blocks, or it may be closed by permanently uniting the adjoining ends, the blocks in this latter case being inserted and removed by springing the frame bars apart. In the drawings I show the ends coupled together by a sleeve a' into which the two ends project and in which they may be permanently or separably secured in any appropriate manner.

In Fig. 7 I show an extensible wire frame made by bending two pieces of wire into U-shape and joining the open ends together, each part constituting about one half of the complete frame. The two pieces A^2 A^2 are coupled together by means of tubular coupling or sleeves a^2 a^2 which receive and hold the open ends of the two half frames, the latter being thus adapted to be drawn apart and adjusted within the limits of the length of the couplings.

As in the case of the sheet metal frames above described friction between the couplings and frame sections may be relied on to hold the latter in adjusted position, but for greater security the sleeves a^2 may be indented at intervals and the ends of the frame sections notched at corresponding intervals, the indentations engaging the notches and holding the parts securely in adjusted position. The reflector thus constructed is laid against, and attached to the glass tube of the gage on the side opposite that from which it is to be observed, so that the reflecting surface is seen through the tube.

The glass tube, to the height of the water therein, acts as a convex lens and magnifies the reflecting surface behind it, while above the water there is no magnifying effect, but on the contrary the hollow tube acts as a reducer causing the surface behind it to appear narrower than it really is. There is thus presented to the eye a reflecting surface divided into two sections of apparently varying width, the line of division being at the water line, whereby the observer is enabled to note the height of water at a glance and from a greater distance than would otherwise be possible.

Any suitable clamping or holding device or devices may be employed to secure the reflector in place against the gage tube, but I prefer the spring retaining clip shown in Fig. 1, the same comprising a coil D of spring wire the ends of which are bent into hook form and adapted to be hooked together to form a band which is to be placed around the gage tube and reflector frame to hold the latter in place. Gage tubes vary in size from five-eighths of an inch to an inch in diameter, and it is therefore desirable to have a retaining device adapted to the different sizes, and I find that the coiled wire band if made of suitable spring material possesses the necessary resiliency to adapt it to this purpose, and also, by entirely encircling the parts possesses the advantage over the ordinary open clip in that it prevents the reflector from being accidentally displaced.

The details of construction above described may evidently be varied without departing from the essential features of the invention. For example, the coupling B may be dispensed with and the sections A, A, telescoped together; also, instead of indenting the edges of the frame sections A and of the couplings B, as shown and described, the indentations may be formed at the corners, or in the backs of the respective parts, the operation being the same in either case. I therefore desire to have it understood that my claims are in-

tended to cover all mere modifications falling within the scope of the invention as above described.

Having now described my invention, I claim—

1. A reflector for water gages embracing the combination of a longitudinally adjustable frame and a notched reflector body, substantially as described.

2. A reflector for water gages embracing the combination of reflector blocks having concaved face and notches across the back, and a nicked telescoping or adjustable frame substantially as shown and described.

In testimony whereof I hereunto affix my name this 13th day of April, A. D. 1894.

GEO. WELLS.

In presence of—

JACOB M. LAYTON,

JAMES PAUL.