

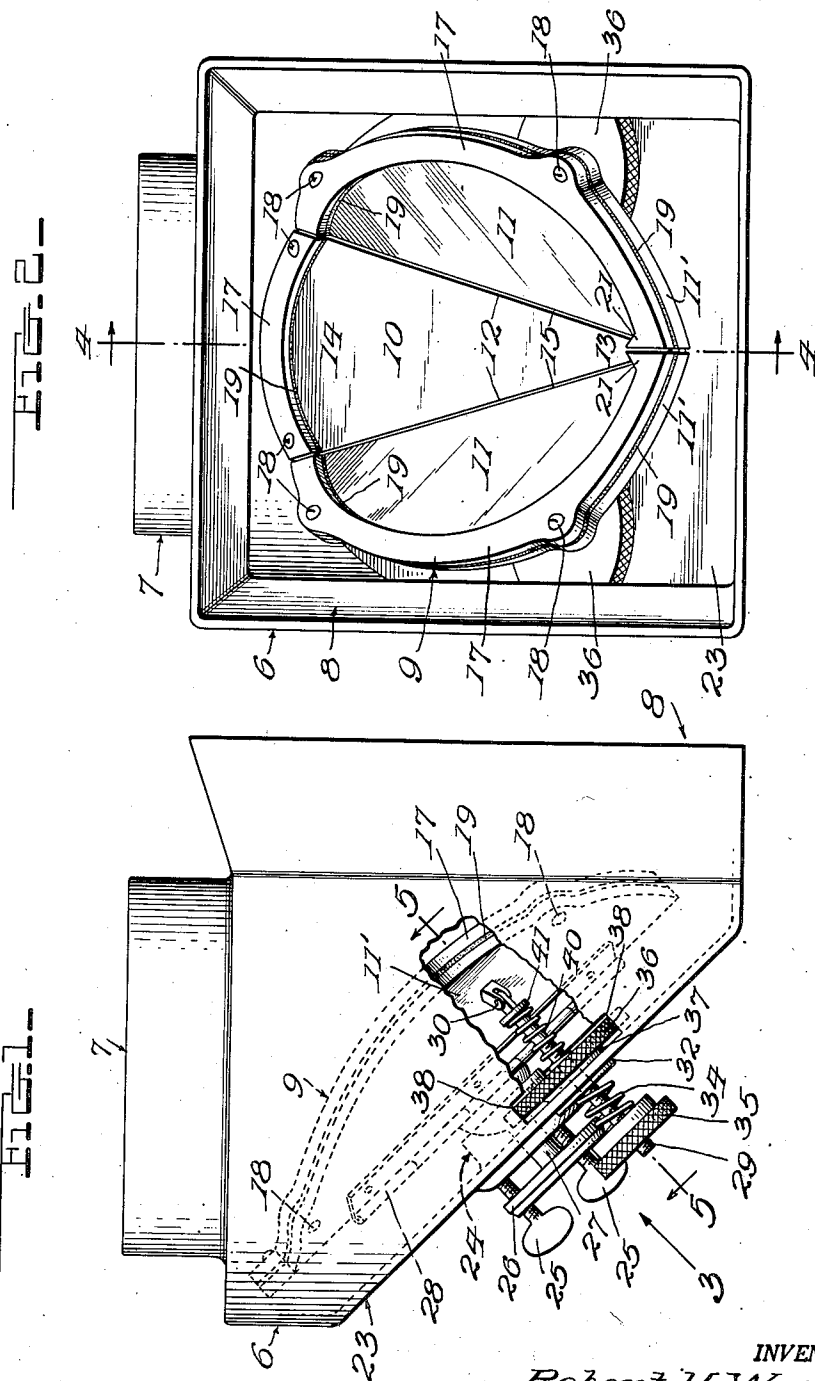
June 14, 1949.

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R. H. WAGER
ADJUSTABLE MIRROR OBSERVATION UNIT
FOR SMOKE INDICATORS

2,473,231

3 Sheets-Sheet 1



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Fig. 4--

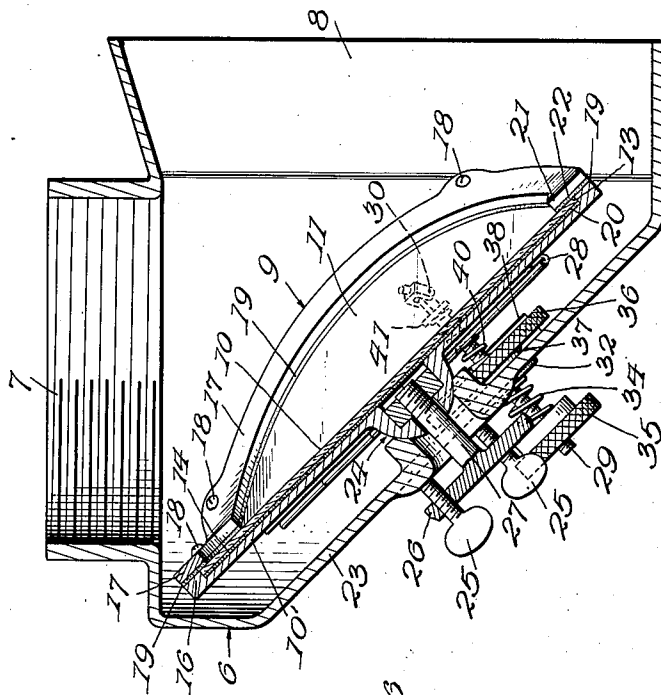
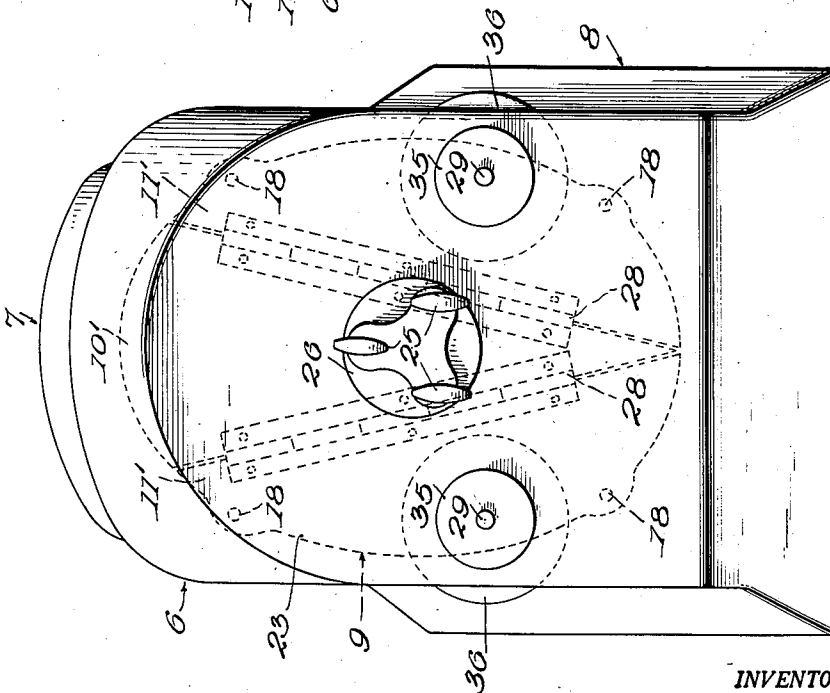


Fig. 3--



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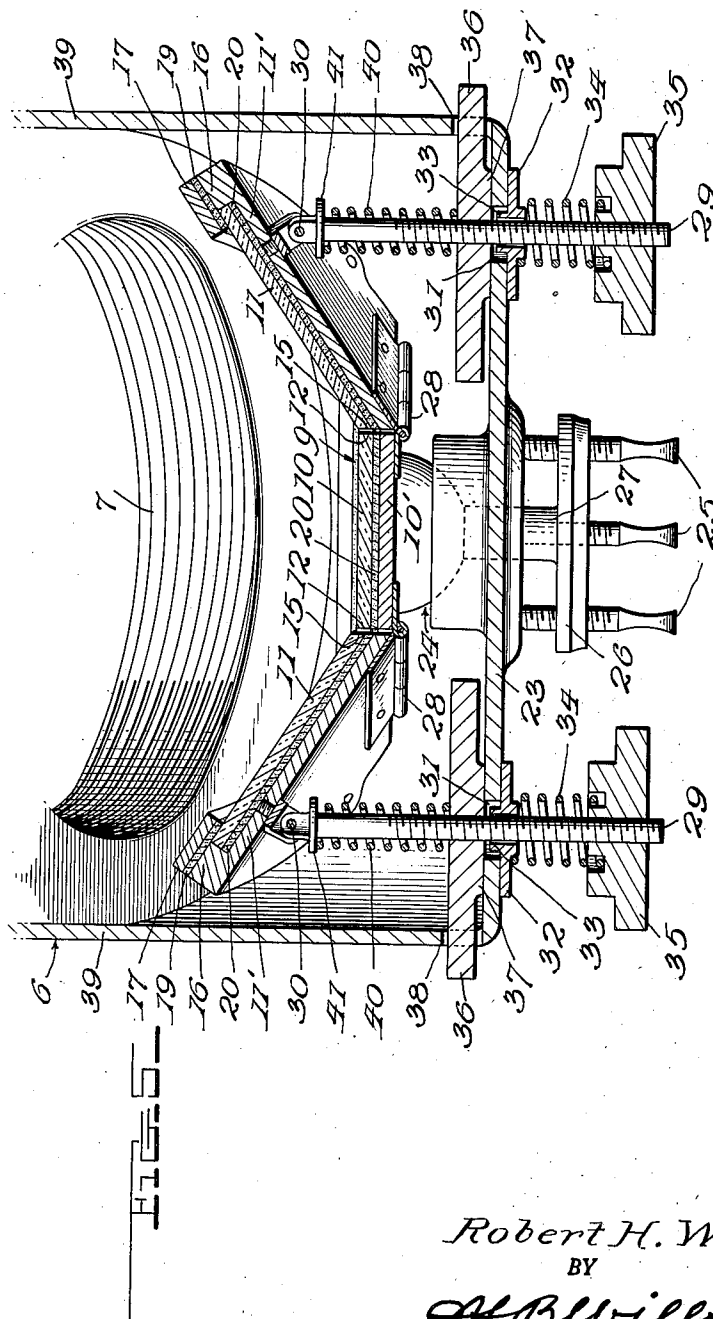
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UNITED STATES PATENT OFFICE

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ADJUSTABLE MIRROR OBSERVATION UNIT
FOR SMOKE INDICATORS

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6 Claims. (Cl. 38—74)

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This invention relates to smoke inspection devices of the general type disclosed in my U. S. Patents 1,708,987 of April 16, 1929, 2,118,716 of May 24, 1938, and 2,408,495, October 1, 1946.

In all of the above mentioned devices, an observation unit in a boiler room receives a beam of light reflected after projection through the smoke and reflects said beam forwardly to an observation point, and in said Patent 2,408,495, the reflecting means of said observation unit also obliquely reflects said beam on two forwardly diverging lines to other observation points to the right and left of the aforesaid point, permitting a fireman to observe the character of the smoke from any of three viewpoints and hence, often overcoming the necessity of leaving duties being performed to make smoke observations. While this has proven satisfactory in numerous installations, some have been encountered in which boilers or other equipment have prevented a person from viewing one or the other, or both, of the obliquely reflected light beams. It is the object of the present invention, however, to overcome this difficulty by making novel provision whereby the oblique beams may be reflected at any of various angles to clear obstructions.

Figure 1 of the accompanying drawings is a side elevation, partly broken away showing an observation unit constructed in accordance with the invention.

Fig. 2 is a front elevation.

Fig. 3 is a rear elevation viewed as indicated by the arrow 3 of Fig. 1.

Fig. 4 is a vertical longitudinal section on line 4—4 of Fig. 2.

Fig. 5 is a transverse section on line 5—5 of Fig. 1.

A preferred construction has been shown and will be rather specifically described, but attention is invited to the possibility of making variations within the scope of the invention as claimed.

A casing 6 is provided, in the form of an elbow, said casing having a light beam inlet 7 at its upper end, and a forwardly open lower end 8 constituting a light beam outlet. The inlet 7 is threaded or otherwise adapted for connection with tubing through which a beam of light is reflected after projection across a boiler uptake or other smoke conducting passage, and the beam entering the casing at 7 is reflected through the outlet 8, by means of reflecting means 9 in said casing. The beam is reflected straight forwardly from the casing and also obliquely on two forwardly diverging lines, and the angles of these

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lines may be varied as required, due to novel structural features hereinafter described.

The reflecting means 9 includes a central rearwardly inclined mirror section 10, and two lateral mirror sections 11, these sections 11 being inclined rearwardly and being also transversely inclined at obtuse angles to said central section 10. This central mirror section has two forwardly converging longitudinal edges 12 (Fig. 2) providing said mirror with a pointed lower end 13 and with a relatively wide upper end 14. The lateral mirror sections 11 have longitudinal inner edges 15 disposed at the edges 12, and the outer edges of these sections 11 are convexly curved. Individual backing plates 10' and 11' are provided for the mirror sections 10 and 11 and the shapes of said backing plates correspond to those of said mirror sections. The backing plates are provided with ribs 16 disposed at the periphery of the mirror assemblage (10 and 11) and marginal frame members 17 are secured upon these ribs by means of screws 18, said frame members overlapping the mirror sections 10 and 11. Pads 19 of felt or the like are disposed under the frame members 17, and other similar pads 20 are interposed between the mirror sections and the backing plates, protecting said mirror sections against breakage. The lower or front ends of the frame members 17 extending along the outer edge portions of the lateral mirror sections 11, substantially meet at the pointed end 13 of the section 10 and are here provided with lugs 21 overlying said pointed end 13 to hold it down. Portions 22 of the pads 19 are interposed between these lugs and the aforesaid pointed mirror end 13.

The central backing plate 10' is mounted on the inclined back wall 23 of the casing 6 by means of a ball and socket joint 24 such as that disclosed in the above mentioned patents, said joint having adjusting screws 25 extending through a head 26 on the outer end of a stud 27 which extends from the ball of the joint to the exterior of the casing 6, said screws contacting with the casing back wall 23. The lateral backing plates 11' are hinged at their inner longitudinal edges to the longitudinal edges of the central backing plate 10', by means of hinges 28 which allow said lateral backing plates and the mirror sections 11 mounted thereon to be pivotally adjusted, to reflect the light beam on any of various lines diverging forwardly with respect to the line on which the central mirror section 10 reflects said beam. The backing plate 10' and mirror section 10 may be adjusted to reflect the beam in the

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desired direction, by means of the screws 25. For adjusting the lateral backing plates 11' upon the hinges 28, the construction now to be described is provided.

Two adjusting screws 29 are pivoted at 30 to the backing plates 11', on pivotal axes parallel with the hinges 28, said screws extending downwardly and rearwardly through openings 31 (Fig. 5) in the casing back wall 23, said openings being of much greater diameter than said screws 29. Washers 32 surround the screws 29 and contact with the outer side of the back wall 23, said washers having bosses 33 loosely and shiftably received in the openings 31. Compression springs 34 surround the screws 29 below the washers 32 and abut these washers, and adjusting nuts 35 are threaded on the lower ends of said screws, said nuts abutting the lower ends of said springs 34. Hand wheels 36 are threaded on the screws 29 and are provided with bosses or hubs 37 resting upon the inner side of the casing back wall 23. Peripheral portions of these hand wheels 36 project accessibly through slots 38 in the casing side walls 39. Other compression springs 40 preferably surround the screws 29 and exert downward pressure on the hand wheels 36, said screws having shoulders 41 against which said springs 40 thrust upwardly.

By loosening the proper nut 35 and rotating the proper hand wheel 36, one screw 29 or the other may be vertically adjusted to change the transverse inclination of one or the other of the lateral mirror sections 11 as required. Tightening of the nut 35 will then compress the spring 34, exerting a downward force on the screw to frictionally bind the wheel 36 against the back wall 23, preventing accidental turning of said wheel. The upward thrusts on the screws 29 and the downward thrusts on the wheels 36, exerted by the springs 40, increase the friction between the threads of the screws and wheels and contribute toward frictionally holding said wheels against accidental turning. Upon pivotal adjustment of either lateral mirror section 11, the screw pivot 30 must move inwardly or outwardly to some extent upon an arc concentric with the hinge 28. When this occurs, the entire screw can laterally move a corresponding distance, due to the looseness of the washer boss 33 in the opening 31. If the screws 25 be adjusted to change the longitudinal inclination of the central mirror section 10, the screws 29 must change their angular relation with the casing back wall 23, but the construction will permit this without placing injurious strain on any parts.

From the foregoing, it will be seen that novel and advantageous provision has been made for attaining the desired end, and while preferences have been disclosed, attention is again invited to the possibility of making variations within the scope of the invention as claimed.

I claim:

1. In a device of the character set forth, a casing, reflecting means in said casing including a main mirror section mounted for limited angular adjustment and a lateral mirror section hingedly connected directly to one edge of said main section for angular adjustment with respect thereto, an adjusting screw connected to said lateral mirror section, one wall of said casing being formed with an opening through which said screw extends, said opening being of much greater diameter than said screw, a hand wheel threaded on said screw and contacting with the inner side of said one wall of said casing, an-

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other wall of said casing having a slot through which a peripheral portion of said hand wheel projects accessibly, a washer on said screw and contacting with the outer side of said one casing wall, said washer having a boss loosely received in said opening, a compression spring on said screw and abutting the outer side of said washer, and a nut threaded adjustably on the outer end of said screw and abutting the outer end of said spring.

2. A structure as specified in claim 1; together with an additional compression last mentioned spring on said screw, said spring exerting outward pressure on said hand wheel and inward pressure on said screw.

3. In a device of the character set forth, a casing, a plural-plane mirror in said casing consisting of a central section and two lateral sections hingedly connected directly to opposite edges of said central section, a ball and socket joint supporting said central section on one wall of said casing for limited universal angular adjustment, and independent adjusting means for each of said lateral sections for swinging them on their hinged connections with said central section, each of said independent adjusting means having a pivotal connection with one of said lateral sections and a laterally shiftable connection with said casing, said independent adjusting means including manually-actuated operating elements accessibly exposed at the exterior of the casing.

4. In an observation unit for a smoke indicator, a casing, a plural-plane mirror in said casing consisting of a central and two lateral sections hingedly supported from said central section, a ball and socket joint connection for supporting said central section on one wall of said casing, said connection including means on the exterior of said one wall for adjusting the joint for limited universal angular adjustment of said central section, an adjusting screw for each of said lateral sections for swinging them on their hinged connections with said central section, each of said screws having a pivotal connection with one of said lateral sections and a laterally shiftable connection with said casing to permit said limited universal adjustment of said central section, and a hand wheel threaded on each of said screws, said casing having slots through which peripheral portions of said hand wheels project to permit adjustment of said screws from the exterior of said casing.

5. The structure of claim 4 in which said shiftable connections of said screws with said casing includes openings in said casing of greater diameters than said screws and through which said screws project, together with spring means associated with each of said screws for frictionally holding said hand wheels against rotation and said screws against lateral movement.

6. In an observation unit for a smoke indicator, a casing having angularly disposed walls with an opening in one wall and a slot in the other wall adjacent said opening, a main mirror section mounted for limited universal angular adjustment on said one wall, a lateral mirror section hingedly connected directly to one edge of said central section, an adjusting screw for swinging said lateral section with respect to said main section, said screw extending through said opening and being of less diameter than said opening to permit lateral movement of said screw, a pivotal connection between the inner end of said screw and said lateral section, a hand wheel

threaded on said screw and having a peripheral portion disposed in said slot, said hand wheel being in slidable contact with the inner side of said one wall, and spring means associated with said screw for frictionally holding said hand wheel against rotation and said screw against lateral movement.

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