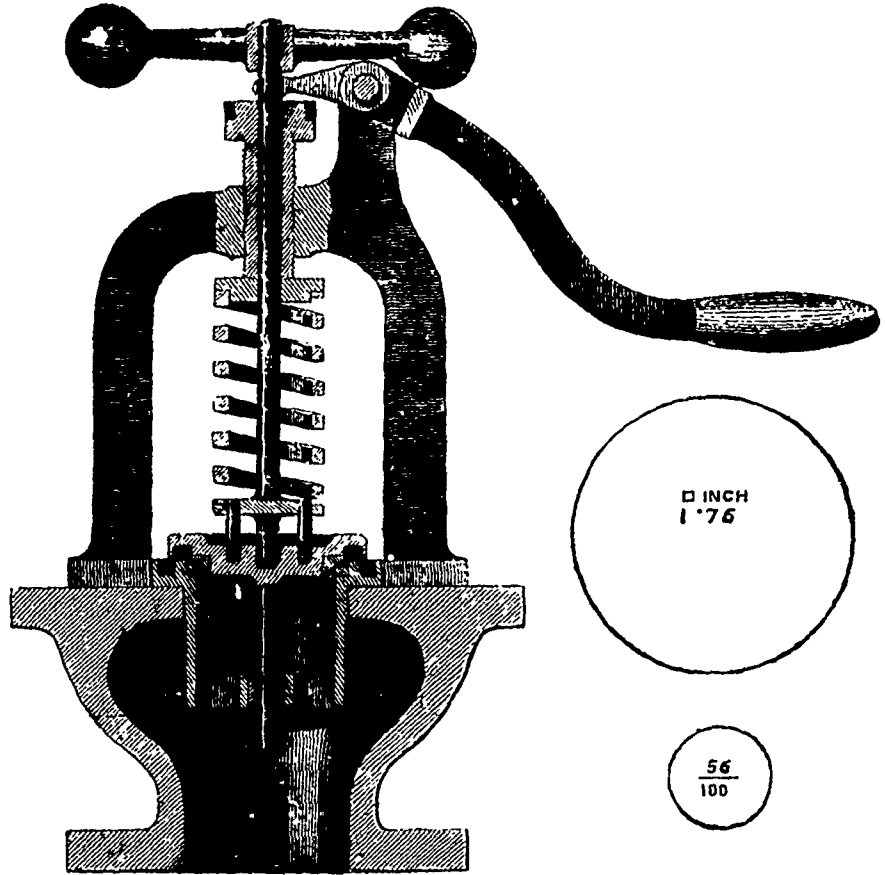


carbons were really useful, we cannot doubt but they would have been introduced before this into our light-houses.

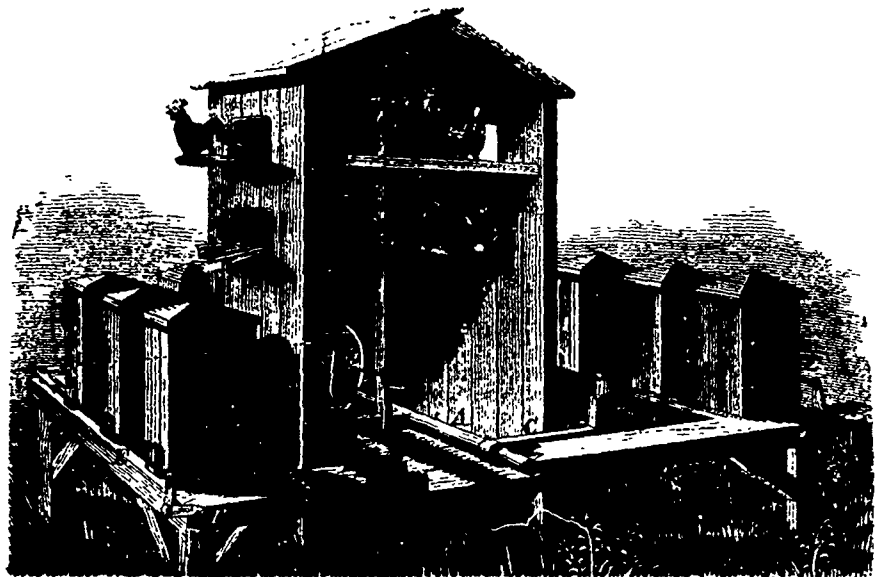
Fig. 2 also shows a vertical section of the holophotal apparatus used. The central piece is a polyzonal lens which refracts into parallelism the rays that impinge upon it at different degrees of obliquity. The upper and lower prismatic portions perform a very important economic office in intercepting and totally reflecting the rays which make large acute angles with the principal axis. The other rays are lost, as it has not been deemed necessary, for the present, to adopt the ingenious prismatic mirror system of Mr. Stevenson, by which those rays, after undergoing two reflections, are concentrated in the radiant point, again to be transmitted. The non-adoption of this appliance is owing, no doubt, to the temporary character of the arrangement on the clock tower, as such an optical aid must considerably increase the effect of the electric light.

#### ASHCROFT'S "POP" SAFETY VALVE.

This valve was designed by Mr. Ashcroft with the view of equalising the pressure on the valve to that of the boiler, so that the exact degree of pressure on the interior surface of the boiler is really indicated. In ordinary valves the pressure decreases as soon as the valve begins to open, the escaping steam rendering the pressure on the valve surface less than that exerted at the same moment on the plates of the boiler. In the "pop" valve this is not the case, the pressures being equalised. The above engraving is a section of the valve, in which it will be seen that the pressure is regulated by a spring, the valve spindle working in a bush screwed into the framing above. The valve seat and that part of the valve bearing upon it are of nickel bronze, which combines the hardness of steel with the freedom from oxidation which distinguishes gold, so that durability is insured and corrosion prevented. The valve seat is so formed as that when the steam has left the ground joint it enters the annular recess in the valve and is deflected into another annular recess



ASHCROFT'S "POP" SAFETY VALVE.



BEE PROTECTOR (See page 118.)