

(No Model.)

2 Sheets—Sheet 1.

C. A. SMITH

BALLOON FOR OBSERVING DISTANT OBJECTS.

No. 505,414.

Patented Sept. 19, 1893.

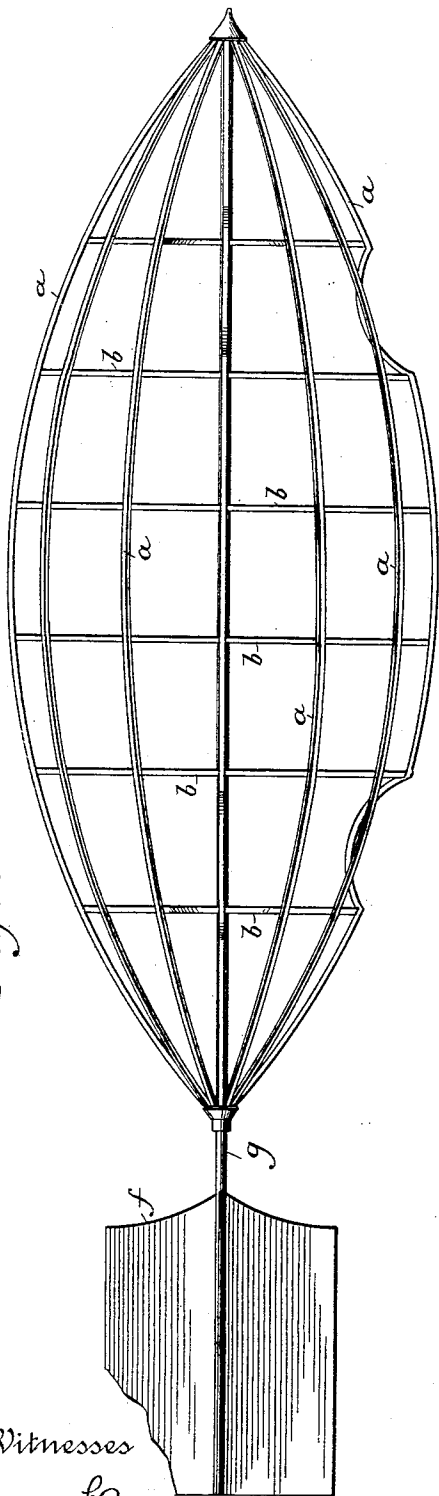


Fig. 1.

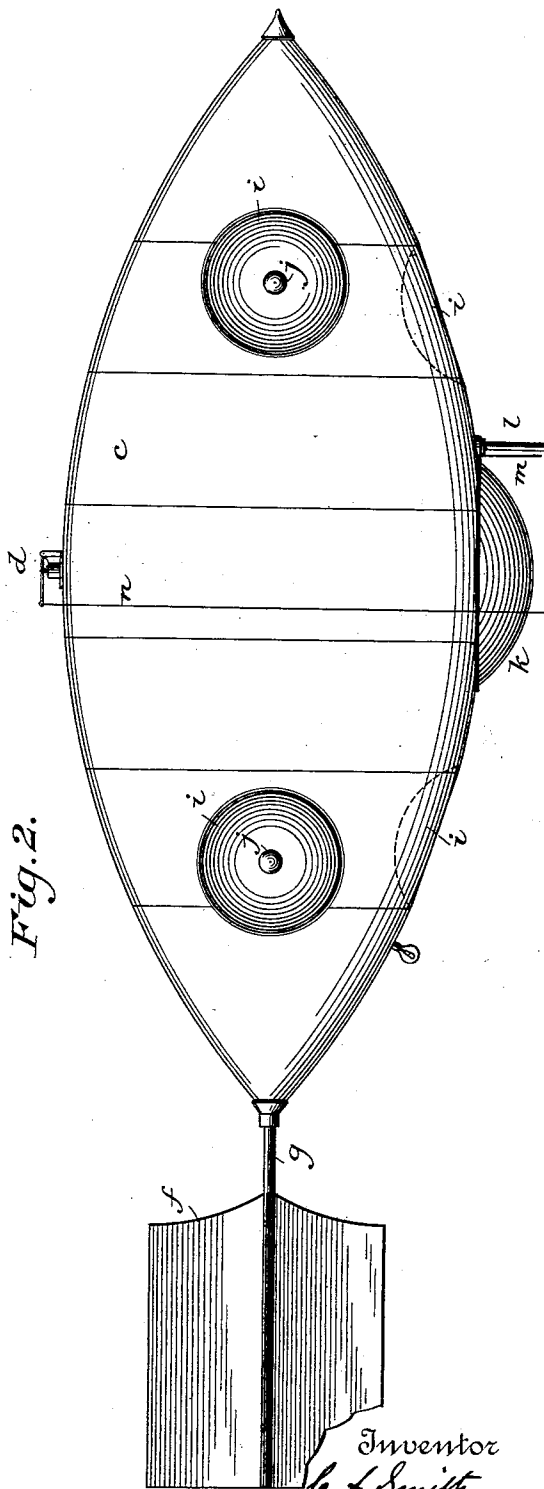


Fig. 2.

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(No Model.)

2 Sheets—Sheet 2.

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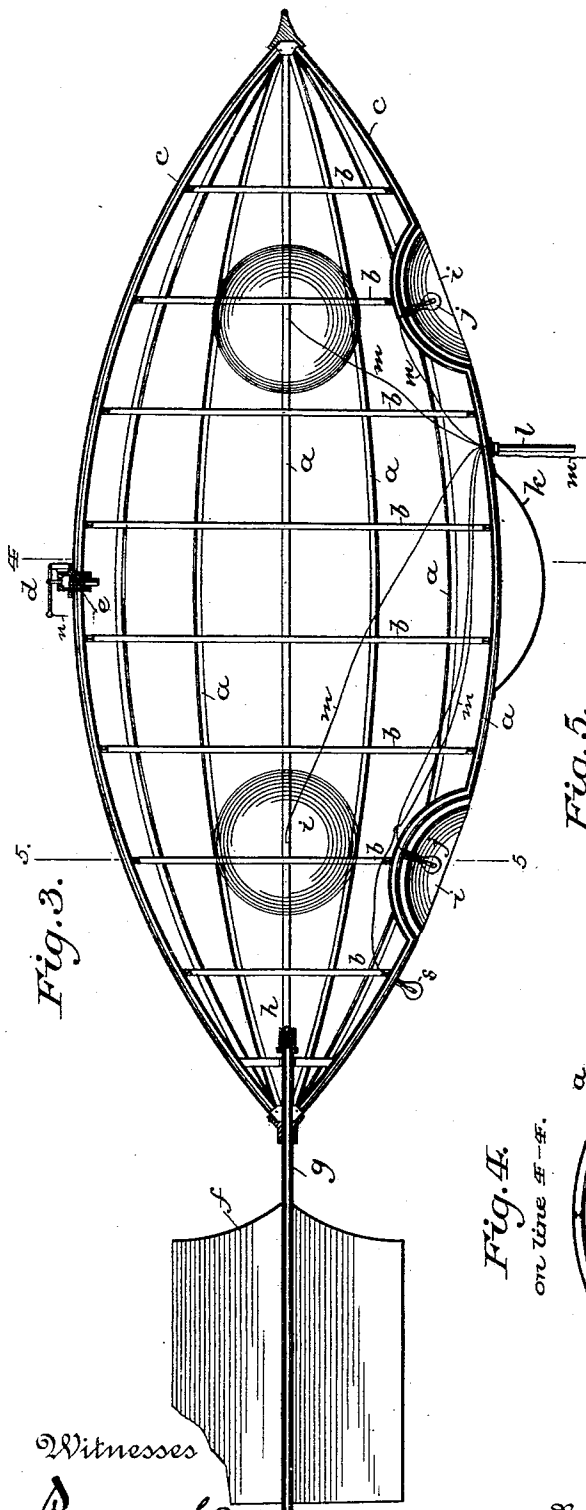


Fig. 3.

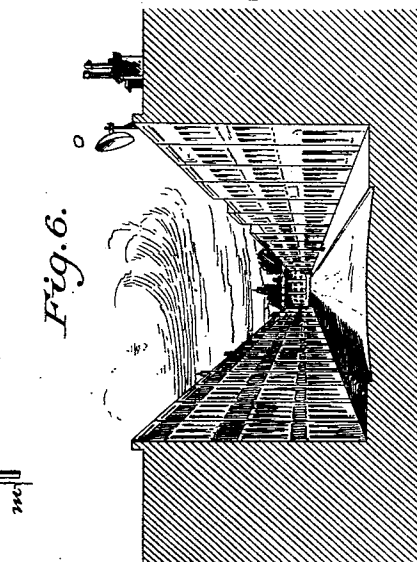


Fig. 6.

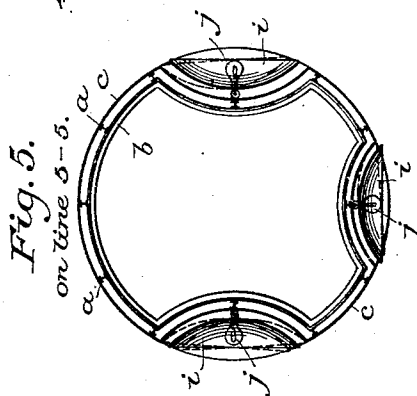


Fig. 5.
on line b-b.

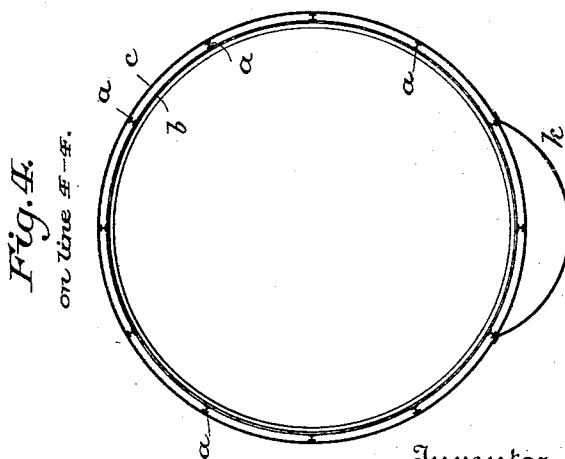


Fig. 4.
on line f-f.

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UNITED STATES PATENT OFFICE.

CHARLES ABBOTT SMITH, OF SAN FRANCISCO, CALIFORNIA.

BALLOON FOR OBSERVING DISTANT OBJECTS.

SPECIFICATION forming part of Letters Patent No. 505,414, dated September 19, 1893.

Application filed May 11, 1893. Serial No. 473,877. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ABBOTT SMITH, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Balloons for Observing and Reconnoitering Distant Objects and Places; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The objects of my invention are to provide means for lighting cities and towns, parks, harbors, &c., and to convey information as to the movements and disposition of persons or objects at a distance or out of the line of vision,—as for example,—bodies of men, cars, vessels, &c., and to reconnoiter distant or inaccessible places; and to these ends the invention comprises a body buoyant in air and provided with electric lamps, mirrors arranged with relation to said lamps to throw the light thereof down to the surface or upon the object or place to be reconnoitered to light up the same, and with one or more convex reflectors so arranged that the reflection of any place or object within the radius of reflection may be reflected to a distant point or points for the purpose of disclosing the condition or character of distant or inaccessible places, or the disposition or movements of objects at such place or places.

In the accompanying drawings which form a part of this specification and illustrate the means for carrying out my invention Figure 1 is a side view of the frame of a balloon adapted to my purpose. Fig. 2 is a side view of the completed balloon equipped with electric lamps and reflectors. Fig. 3 is a central longitudinal section in a vertical plane. Fig. 4 is a vertical cross-section on the line 4—4 of Fig. 2. Fig. 5 is a similar section on the line 5—5, and Fig. 6 is a diagrammatic view representing in vertical cross-section a street of a city or town.

In carrying out my invention I propose to construct a balloon of metal,—preferably of aluminum on account of its lightness—the

frame work of which is represented in Fig. 1. This frame work consists of a series of longitudinal ribs *a* circularly disposed and separated from each other at their mid-lengths and converging toward both ends, and a series of circular ribs or hoops *b* arranged at intervals within the longitudinal ribs to sustain the latter. The frame thus constructed is covered by, and sustains, a tight metal casing or shell *c*, which forms the body of the balloon, the said shell, as also the frame, being made as light as may be, due regard being had for the strength necessary to withstand the pressure to which it will be subjected in operation. The balloon will be rendered buoyant by filling it with hydrogen or other light gas.

d designates a safety or relief valve which is preferably located at or near the top, as shown, but it may be located at any other point. This valve opens outward, and is held to its seat by a spring *e*; the strength of the spring being proportioned to the outward pressure of the gas.

f designates the rudder which is composed of longitudinal blades intersecting each other at right angles and supported by a stem *g* which may extend longitudinally through the balloon as represented in Fig. 1, or may terminate at its inner end near the rear end, as shown in Fig. 3. This stem is made hollow, and is provided with a suitable valve or cock *h*. The balloon may be filled through the stem *g*, the valve or cock *h* being properly manipulated.

At suitable points below the horizontal center—preferably at the bottom and along each side of a longitudinal central line—I arrange concave mirrors or reflectors *i* (any desired number being provided) in front of each of which is arranged an electric lamp *j* in such relation thereto that the light will be concentrated and thrown to the ground or upon the locality or object to be lighted or reconnoitered. These reflectors may be attached in any suitable manner, but in order to preserve a smooth exterior I preferably seat them in concavities, or in openings, in the shell *c*. When seated in openings in the shell they form portions of the latter, in which case the joints must be tightly sealed: When seated in concavities in the shell they may

be so mounted as to be capable of being turned to some extent in different directions, and adjusted in different positions to throw the light of their respective lamps in any desired direction or upon any particular object or place. To provide means for effecting such movements and adjustments falls within the province of the skilled mechanic and I do not therefore deem it necessary to illustrate any means for this purpose.

In Figs. 3, 4, and 5 different adjustments are indicated by full and broken lines.

k designates a convex mirror or reflector arranged at the bottom of the balloon, with the convex surface downward. This mirror, by reason of its convexity receives the image of any object or place within the radius of its reflection and reflects the same to any and all points within the same radius, so that the reflection of distant objects or inaccessible places may be observed and studied at distant points. The convexity of the convex reflecting mirror may be greater or less, according to the purpose for which it is to be used, or the distance of the object or place to be observed or reconnoitered.

The observer will provide himself with a plane mirror which, when properly adjusted, will receive the reflection from the convex mirror *k* and present it for observation.

l designates the anchor rope by which the balloon is made fast and held stationary at any desired elevation; *m* is the electric wire for conveying the electric current to the lamps, and *n* is a rope or cord attached to the relief valve *d* to open the same, when desired, to destroy the buoyancy of the balloon.

o designates a concave reflector which is to be mounted on a suitable support in position to receive the reflected light of the lamps *j*, and throw it upon dark objects out of the line of the direct rays, as for example,—and as indicated in Fig. 6 of the drawings—to the dark side of a street or building. The concavity of this reflector will diffuse the light and scatter it over a considerable area.

For the purpose of conveying information by flash signals I provide the balloon at any suitable or preferred point with an electric lamp *s*, located in a separate circuit, extending to the observer or operator. By the use

of an ordinary key for opening and closing the circuit the lamp *s* may be flashed to give signals or convey messages to a distant observer by or through any predetermined code.

Changes and modifications will suggest themselves to skilled mechanics, and to others skilled in the art to which this invention relates, and I desire, therefore, to have it understood that I do not intend to limit or confine the invention to the exact details of construction herein shown and described, and that the claims are to be understood as covering and including all mere modifications falling within the scope of the invention and involving only mechanical skill.

Having thus described my invention, I claim—

1. A balloon constructed as shown and described with concavities or recesses in its surface, concave reflectors set in said concavities, and electric lamps mounted in front of said reflectors, the arrangement being such that the light of the lamps will be reflected downward.

2. The combination with the hollow balloon provided with lamps and reflectors as shown and described, of the tubular rudder stem and the rudder, the said stem being provided within the balloon with a valve opening inward, as and for the purpose described.

3. The combination with a body or balloon buoyant in air, of electric lamps, reflectors arranged with relation to said lamps to throw the light thereof to the ground or upon distant objects or places, and a convex reflector arranged at the bottom of the balloon with the convex surface downward.

4. The combination with a body or balloon buoyant in air, of a convex reflector below the same with the convex surface downward, electric lamps mounted on said body or balloon, and concave reflectors arranged with relation to said lamps to throw the light thereof within the radius or field of reflection of the convex reflector.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES ABBOTT SMITH.

Witnesses:

A. L. O'GRADY,
M. E. CALEY.