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Managing Windows for Air.

There is always a draught through key-holes and window crevices, because as the external air is colder than the air in the room we occupy, it rushes through the window crevices to supply the deficiency caused by the escape of warm air up the chimney. If you open the lower sash of a window, there is more draft than if you open the upper sash. The reason of this is because if the lower sash be open, cold air will rush into the room and cause a great draft inward; but if the upper sash be open the heated air of the room will rush out, and of course there will be less draft inward. A room is best ventilated by opening the upper sash, because the hot vitiated air, which always ascends towards the ceiling, can escape more easily. The wind dries damp linen, because dry wind, like a sponge, imbibes the particles of vapor from the surface of the linen as fast as they are formed. The hottest place in a church or chapel is the gallery, because the heated air of the building ascends, and all the cold air which can enter through the doors and windows keeps to the floor till it has become heated.

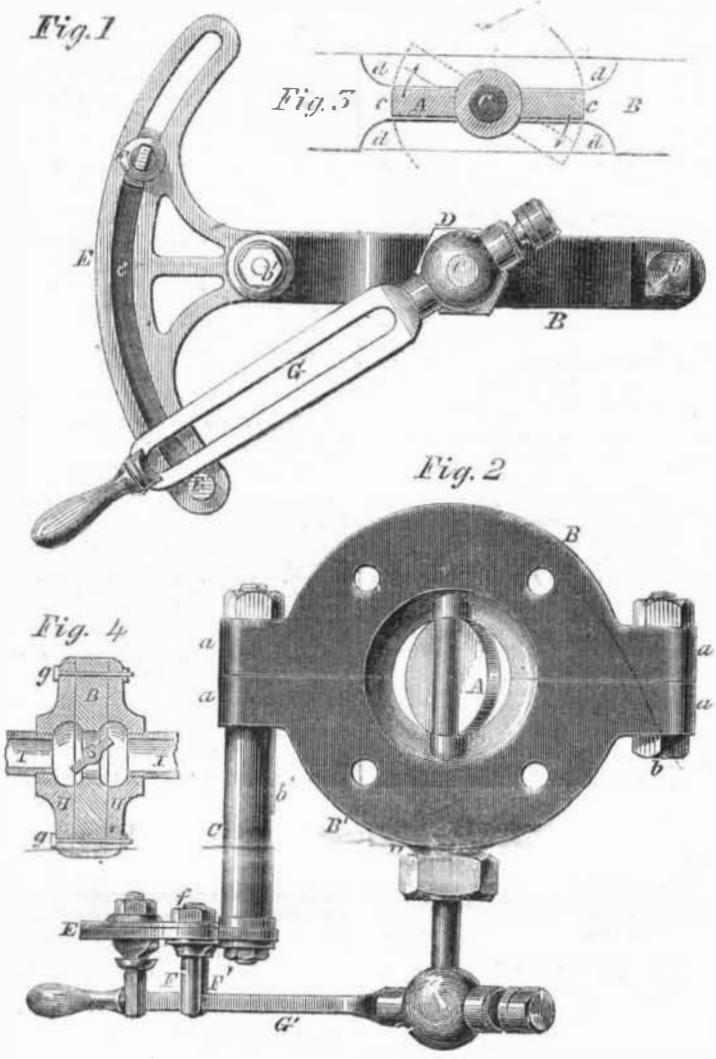
Special attention should be given to the ventilation of sleeping-rooms; for pure air and an abundance of it are, if possible, more necessary when we are asleep than when we are awake. Sleeping-rooms should be large, high, and airy, more especially in warm latitudes, and in situations where the windows have to be kept closed at night on account of malaria.

Ventilating Hats.

A great number of hard-shell hats are made with a small opening covered with gauze in the crown of each, and with this arrangement it is supposed they afford ventilation for the head, and tend to keep it cool during warm weather. This is a mistake, because ventilation can only be effected by a current of air, and as there are no means provided for the inlet of air, but only for its outlet, in such hats, of course they cannot afford ventilation. The true ventilating hat must have perforations at or near the band to secure the inward passage of air, and quite a number of such hats are now manufactured and worn. Felt hats, being somewhat porous in their texture, afford partial ventilation. Silk plush hats being saturated with lac-varnish are perfectly impervious to the atmosphere.

We hope our friends will make up their lists, and send in their subscriptions for the new volume with as little delay as possible. The first number of the new volume will be issued June 29. There is only one more number to be published before this volume will close.

COPE & HODGSON'S GOVERNOR VALVE.



The subject of our engraving is an improvement on what have long been known as "butterfly valves," and is for the purpose of enabling the engine to be controlled with greater accuracy. There is less friction and it is very simple. In our illustrations, Fig. 1 is a front view of the valve, and Fig. 2 is a top view of the valve and its box complete, and ready to be applied to a steam-engine regulator in connection with a governor. A is the valve, B B' the box, and C the valve spindle. The valve may be made of the usual form and about the usual thickness, with the exception that it has its periphery turned to represent a portion of a sphere concentric with C. The transverse section of the valve is seen in Fig. 3. The box, B B', has the seat, *c*, turned of a similar spherical form to the face of the valve to make a close but easy fit thereto. The fitting should be completed by grinding. To provide for the insertion of the valve in the seat the box has to be divided into the two parts, B and B', which have lugs, *a*, on them which receive bolts, *b b'*, that hold the parts together. The seat, *c*, need not not be any wider than the face of the valve, and may have an enlargement to correspond with the enlargement of the valve near the valve spindle. By providing the box with a cavity, *d d*, the valve, when open, has its openings increased or diminished in a greater degree by a given movement than an ordinary throttle valve, as the edges of the valve move directly away from the seat instead of parallel with it. The spindle, C, is shown fitted into a stuffing box in the part, B, of the valve box, but a stuffing box will be unnecessary if the spherical faces of the valve and seat be properly fitted, as in that case no steam could escape around the spindle. E is a slotted plate attached securely by the bolt, *b'*, to the valve box. The slot in this plate is an arc concentric to the spindle. F F' are two stops made adjustable in the slot and capable of being secured in any position therein by nuts, *f*, applied to screw-threads cut upon them. These stops are for the purpose of limiting the movement of the valve gear, G, which plays between them, one of them stopping the valve when closed and preventing it giving steam the wrong way, and the other stopping it when it has the greatest amount of opening. By shifting the lever, G, on the spindle, either with or without changing the position of the stops, the movement of the valve may be controlled in a similar manner, opening in the reverse direction, and hence the valve is applicable in connection with any arrangement of a governor. The spherical-faced butterfly valve may be used not only for a governor valve, but as a cut-off for steam-engines or for any purpose in which a close-fitting and perfectly balanced valve is required. Fig. 4 shows the method of attaching the valve to steampipes. The pipes, I, are screwed into suitable flanges, H H, which are secured to B' by bolts, *g*. These flanges are so cast as to give, when attached to B', suitable steam room to the valve, and making, as it were, a little chamber on each side.

These valves have been in use and are highly approved of by those who have tried them, as is testified by numerous certificates now before us. The inventors are Nathan Cope and William Hodgson, of Cincinnati, Ohio, and they will be happy to give any further information upon being addressed as above. The patent is dated May 10, 1859.

Gutta Percha and Ships' Compasses.

One of our cotemporaries states that the new steam frigate, *Lancaster*, which is at present lying at the Philadelphia navy yard (where she was built), "has two binnacles on the spar deck arranged with gutta-percha so as to cut off the effect of local attraction." Gutta-percha is an electric insulating material, but not a magnetic insulator. A magnet will attract a piece of metal with a piece of glass interposed between them, and yet glass is superior to gutta-percha as an insulator. The remedy for local attraction between the machinery of a steamship and the compasses is *distance*, not gutta-percha, as the attraction is inversely according to the square of the distance. A stratum of dry air is superior to either glass or gutta-percha as an insulating medium.

Fever and Ague.

There are some situations where fever and ague prevails every season, and this is the case in the vicinity of creeks and swamps in Long Island, not one mile from New York City. An acquaintance of ours, who has resided for several years on one of these creeks, never has had a single case of fever and ague in his family, while all his neighbors have been more or less affected with it every season. He attributes his immunity from this troublesome disease to the use of a good fire in his house every chilly and damp night in summer and Fall. When the Indians travel at night or early in the morning in swampy regions, they cover their nose and mouth with some part of their garments to warm the air which they inhale, and this they say prevents chills and fevers.

Pitch Phenomenon at Sea.

While the bark *Rolla*, of New York, was in the Gulf of Mexico, on May 4, it passed through a scum of smoking pitch which extended for several miles, and emitted a most nauseating odor. It was supposed by her captain (Mr. Rogers) to be thrown up by a submarine eruption from some part of the bottom of the ocean. This, we think, is the true explanation of the phenomenon. There are extensive formations of mineral pitch in Cuba, Trinidad, and other West India islands, and no doubt there are beds of this material under the waters of the gulf.

Sulphurous Acid.

As this acid is not to be obtained at the druggists, and as some of our readers may occasionally wish to use it in chemical experiments for bleaching &c., the following simple method of making it, taken from the London *Chemical Gazette*, will be found useful:—

Take 2 ounces of sulphur in fragments, and 25 ounces of sulphuric acid and place them in a glass flask furnished with a gas tube. After this heat it over a spirit lamp, when the sulphur will soon melt and an evolution of sulphurous acid will take place, which is conducted by the tube into the condensing vessel through cold water.

GLASS *vs.* METAL.—Practice has developed the fact that one-third more light is transmitted by glass than by metallic specula; hence the old catoptric or reflecting light-houses are disappearing and giving place to catoptric or glass systems.