vantageous for the reduction of this variety of ore, granular ores often requiring no other flux.

Mr. Barlow exhibited a model of Mr. Parker's system for banding pulleys, as used for driving a circular saw. In this arrangement the power is communicated to the belt by friction between pulleys, instead of friction over the driving pulley as usual. On the driving shaft a large pulley is keyed; near the centre of this shaft is pivotted a frame, carrying at the other end a second pulley, smaller than the first, which approaches that of the driver as it is moved in the direction in which the power is exerted; between the circumference of these two the belt is compressed, and passing back around about one-fourth the periphery of the larger wheel, returns over the saw pulley, whose axis is as near as possible to that of the driver. By this arrangement the belt is tightened as the power is increased, and the space required is much less than by the common method, since the belt may be shortened to one-fourth the circumference of the driving pulley.

Geo. W. Smith, Esq., presented two dioptric fixed light apparatus for ship's lanterns, each cast in one piece of flint glass, at the Brooklyn Flint Glass Works, Long Island, New York. They are very economical, compared with the ground glass dioptric lanterns, and intercept less light, and might be advantageously used for many purposes, viz: for piers, signal stations, street lamps, &c. Mr. Smith reminded the meeting that a few years ago he had suggested a modification of the form of lens for fixed lights, viz: the substitution of the meniscus or concavo-convex form in section, in lieu of the ordinary plano-convex lens. The advantages he proposed thereby were, first, the more direct incidence of the light from the lamp on the glass, and the less loss by reflection; second, the less diameter, both above and below, of the aperture of the drum, which enables it to intercept a larger portion of the emitted sphere of light. A less number of catadioptric rings would be required, and those of a smaller diameter than usual. The meniscal drums were made at the same works in Brooklyn, and all the curves calculated there by one of the employees of the Company. Mr. Smith believed that they were the first constructed on this plan which he had suggested. They were presented by the Company through Mr. Gilliland.

COMMITTEE ON SCIENCE AND THE ARTS.

Report on J. & J. Dilks' Improvement in a Gauge for indicating the height of Water in Steam Boilers.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania, for the promotion of the Mechanic Arts, to whom was referred for examination, an "Improvement in a Gauge for indicating the height of water in steam boilers," invented by Messrs. J. & J. Dilks, of Philadelphia, Pennsylvania.—REPORT:

That an instrument similar in principle to this was formerly presented to the Committee for examination, by Mr. Jos. Dilks, and was favorably reported on. As it was feared by many, however, that the form of instrument then shown would be unfavorably influenced by the pressure of the steam on its slides, the Messrs. Dilks have modified it, and offer it in its present form. As now constructed, the gauge consists of a plug of brass, which passes through the head of the boiler, to which it is attached by a

proper screw. The axis of the plug is hollow, and in it is fitted a cylindrical rod, which terminates exteriorly in an index hand, which traverses a dial, and is protected by a glass face, as may be seen by the drawing.

The inner end of the plug is ground flat and true, and is covered with a plate fixed upon the rod; this plate being carefully ground, acts as a slide to prevent the access of the steam to the hollow axis of the plug through which the rod passes. Beyond this circular slide, the rod carries a pinion, and beyond this its extremity rests in a bearing supported from the plug, against which a spiral spring wound around the rod also abuts, which by its pressure is intended to keep the slide always firmly against the surface of the plug. To the side of the plug, the arm of the float is attached by a pivot, and carries a toothed quadrant so placed that its teeth shall gear into the leaves of the pinion on the rod of the index. It will be easily seen that by this adjustment, when the water in the boiler, and consequently the float, sinks, the index hand, by means of its rod and pinion, and the toothed rack on the float arm, will be moved in one way; when the water rises, it will be moved in the opposite direction; and these changes are clearly indicated in the graduated dial. At one point of the circular slide, a deep notch is cut in its circumference, and this notch is so placed that when the water has sunk so far as to reach a dangerous level, the notch corresponds to a second orifice drilled through the plug, and terminating outside in a steam whistle. By this means the existence of danger will be notified to the engineer and all others whom it may concern.

The Committee regard the gauge of Messrs. Dilks as simple and efficient. Like the magnetic gauge of Mr. Faber, it indicates the level of the water by means of a float, and dispenses with the stuffing box, (which was the

former objection to this method of indicating,) and appeals at every moment to the eye of the engine man, without requiring any experiment, as with the gauge cock and the percussion gauge, to show the level of the water. It is easy of construction and cheap, and can be easily and speedily removed at any time, when the boiler is not in actual use, for examination, or repair if it should need it, although it does not seem liable to get out of order, since it may be placed at any desired height above the water level. It also possesses the advantage, that by a simple and obvious mechanism outside of the boiler, its indication of the water level may be transmitted to any place, and the manager of an establishment may thus have under his eye in his office the state of the water in all the boilers under his charge.

The recent improvement introduced by Messrs. Dilks in the application of their principle, will much diminish the liability to stick, if such existed in the original form, by diminishing the area of the surfaces in contact; and the Committee believe that the constant oscillations of the surface of the water in the boiler will obviate all danger of this occurring.

The Committee, therefore, regarding the invention as useful and ingenious, and believing it to be new, recommend the award of the Scott's Legacy Premium to the Messrs. Dilks for their water gauge.

By order of the Committee,

WM. HAMILTON, *Actuary.*

Philadelphia, February 10th, 1853.

Report on Mr. Richards' Improvement on the Stereoscope.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania, for the promotion of the Mechanic Arts, to whom was referred for examination, an "Improvement on the Stereoscope," invented by Mr. F. De B. Richards, of Philadelphia, Pennsylvania—REPORT:

That, as will be seen by the letter of Mr. Richards, appended hereto, he claims for his arrangement of the Stereoscope four advantages, viz:

First. "Leaving the box open for a short space at the back, so that the light can fall upon the picture properly, when the body is upright." This arrangement is undoubtedly advantageous, inasmuch as it not only relieves the body from a constrained position, but also allows more light to fall upon the picture than can frequently be gained in the usual construction. It is, however, not new, as a very favorite form of the instrument has been the skeleton stereoscope, in which the whole upper part and sides are open to the light.

Secondly. The "increase of the focal distance and power of the lenses, so as to take in much larger pictures than formerly, which pictures I have found by experience have to be taken at a different angle from those for smaller instruments." This enlargement of the capacity of the instrument is undoubtedly in many cases an advantage; but as it is obtained simply by increasing the focal distance and power of the lenses, cannot be considered as an invention, although it may be a very happy suggestion.

Thirdly. "The placing at the back of the instrument a screw, to lessen or increase the distance of the picture from the lenses, so as to suit any focus." The Committee consider this arrangement as constituting a