

IMPROVED CIRCULATING GENERATOR FOR STEAM BOILERS.

The principal advantages claimed for the invention here-with illustrated are a large saving of fuel, the rapid generation of steam, and increased durability of the boiler. The engraving shows the brick wall on one side of the setting broken away so as to give a clear view of the circulating apparatus and other parts underneath, and attached to, an ordinary horizontal boiler. D is a riveted steel drum placed on a brick bridge wall, which is lowered so as to allow the top of the drum to be of proper height in relation to the grate and opening for the products of combustion. Through pipe, N, the water passes from the bottom of the boiler into this drum, where it is converted into steam and superheated water to a temperature higher than that in the boiler, to which it returns with great velocity through pipe, H. A constant circulation is maintained and the formation of scale over the furnace thus prevented. Besides the gain in evaporation, which is a very important feature, there is also another advantage in having lime and other impurities in the water pass into the drum.

The peculiar arrangement of pipes, G and H, is such that impurities cannot return to the boiler, but can be blown out through pipe, F, or if necessary, altogether removed by means of the hand hole, E, which is placed at end or back of drum as may be necessary. In the rear of the drum, and extending to the back connection wall, is placed a coil of heavy lapwelded pipes, A A, which rests on bearers let into side walls; this coil is connected with the boiler at back end by pipe, P, and at the top by pipe, J; it is also connected with the feed pump by pipes, M O, and their branches. A deflecting wall resting on a heavy iron bearer is also built under and close to the boiler at the back end, as shown in the engraving. The combustion of gases ignited in the furnace is maintained the entire length of the boiler in the coil chamber. When the flame strikes the deflecting wall it passes through the openings between the coil pipes and returns backward through the tubes in the boiler. The feed water for the boiler enters this coil from the heater in use or in a cold state, by pipe, M, and in its passage to the boiler, which is very rapid, it becomes heated to a temperature ranging from 250° to 300°.

To preserve the coil from any liability to burn, as well as to secure circulation from the back of boiler, a connection is made by pipe, P, with a pipe leading to coil, and an ingeniously constructed swing check valve, invented by the patentee of this circulating generator, is attached to this pipe. This valve is partially open when the feed pump is operating, and the water from the boiler unites with the feed water, raising the temperature of the latter to nearly boiling point before it enters the coil. When the feed water is stopped the check valve opens wide, giving unobstructed passage of the water from boiler to coil, through which, by its increasing temperature, a rapid circulation to the boiler is maintained. By opening valve, K, the coil can be cleaned. (We are informed, however, that there is no liability to clog even where this precaution is neglected, so rapid and continuous is the circulation.)

The manufacturers state that the device causes a greatly increased power of boiler, "a gain of over fifty per cent being shown in some cases, due to the perfect consumption of fuel and the utilization of heat by which an evaporation of twelve pounds of water to one pound of coal is frequently attained." The circulation is claimed to be continuous, giving equalized temperature, even expansion, and contraction and freedom from scale deposit; also rapid loosening of scale if formed in a boiler previous to the generator being attached. It is further claimed that there is additional security against explosion, inasmuch as the feed water can never enter the boiler when fired, except at a temperature almost equal to that of the water already in the boiler. It has been found, we are told, that the temperature of the feed water sometimes exceeds that of the water in the boiler. Patented in 1876 and 1877. For further information address the Ironclad Manufacturing Company, of 52 Greenpoint avenue, Greenpoint, L. I.

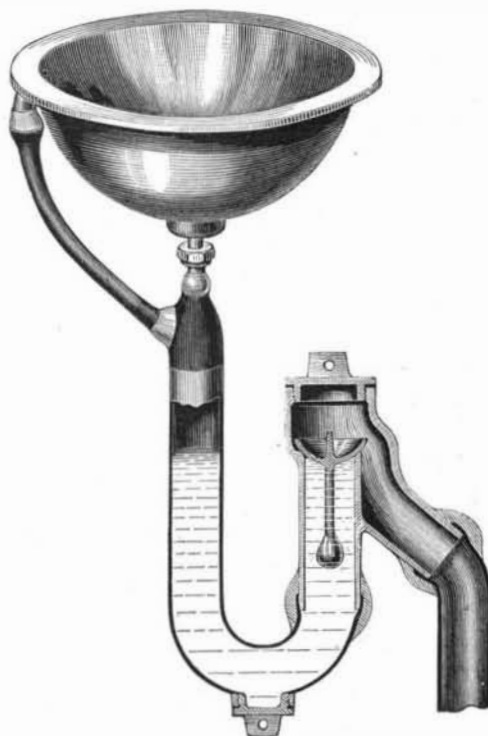
The Star Finder.

Under this name a handy astronomical chart, or planisphere, with a movable horizon, has been published by Van Nostrand, of New York city. It exhibits the stars of the first three magnitudes which are visible on the parallel of 40° north latitude, and shows the boundaries of the principal

constellations. The chart furnishes beginners with a means of approximately solving a number of problems without calculation, it being simply necessary to adjust the movable horizon according to the date and hour, to determine the right ascension, declination, rising, meridian passage, or setting of any of the principal stars. To locate the planets, their positions are found by reference to an almanac.

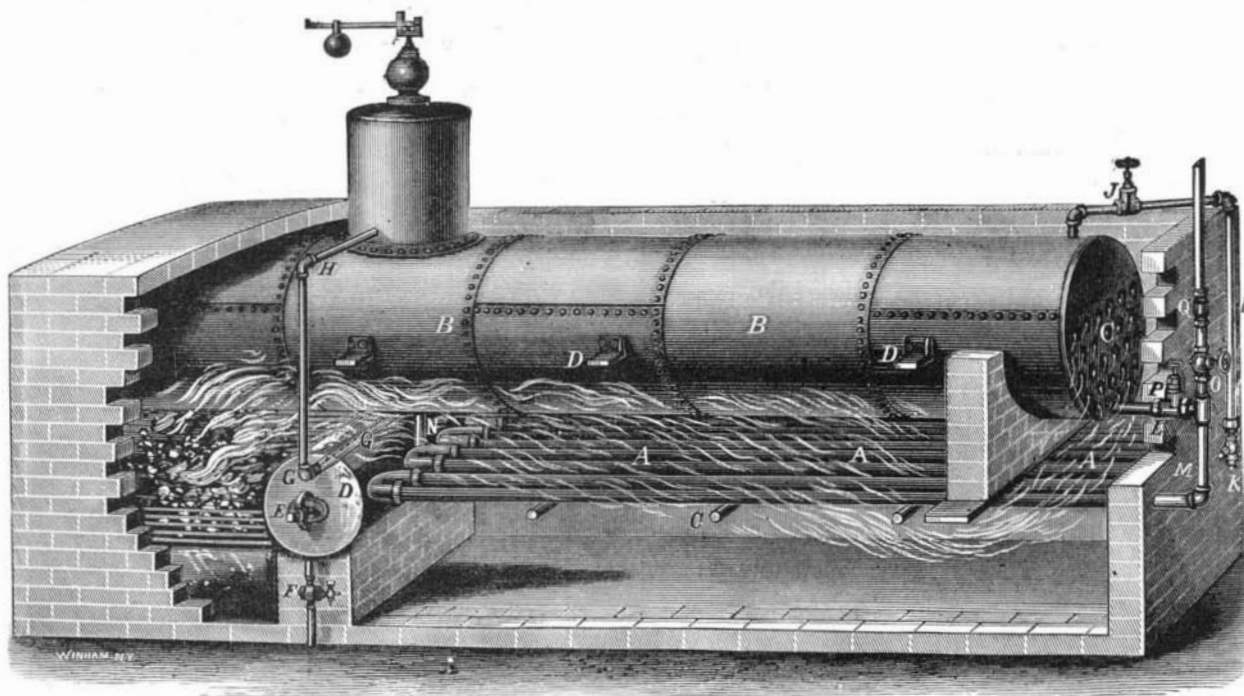
IMPROVED SEWER GAS CHECK VALVE FOR STATIONARY WASH BASINS, ETC.

Sanitary engineers seem to be recognizing a fact which is becoming more and more apparent, that very much of the ill health and disease prevalent in cities and towns is attri-



WARING'S SEWER GAS CHECK VALVE.

butable to defective drainage and imperfect sewerage. Physicians, also, testify now far more frequently than formerly that small pox, typhoid fever, and diphtheria are the consequences of uncleanness, breathing air rendered impure by the emanations of sewer gas, and the presence of effluvia from sinks, garbage, and decomposing refuse. There is no theory or mere imagination about such statements. The evil is at our very doors, in our homes, and all around us. No matter how many "modern improvements" are introduced or what attention is given to insuring warmth and comfort, in public buildings, business offices, and private residences, if provision is not made to prevent the admission of sewer gas, the air in that building is rendered impure and poisonous; it becomes injurious to health, and will steadily undermine the vitality and vigor of the strongest constitution. This evil, which is by far too common, can be remedied by property owners, landlords, and builders

**STEAD'S CIRCULATING GENERATOR FOR STEAM BOILERS.**

adopting sanitary measures, and availing themselves of suitable and reliable contrivances for its prevention. One of the most recent inventions, which is neither complicated nor costly, but effective and valuable, is that invented by Colonel George E. Waring, Jr., of Newport, R. I., sanitary engineer, and is manufactured at the Jennings Sanitary Depot, A. G. Myers, Manager, 94 Beekman street, New York. Of this we give a representation by the annexed engraving, on reference to which it will be seen that the contrivance is a perfect safeguard against pressure of sewer

gas, siphoning, the transmission of sewer gas through the water, and all obnoxiousness. The engraving shows a wash basin, with the ordinary outlet and overflow pipes. The valve and water seal are drawn in section. The valve is convex on its exterior seat, concave on the surface exposed to the gas that may issue from the waste pipe leading to the sewer. The interior area exposed to the back pressure of gas is larger than the area in contact with the water seal, therefore, the valve is kept well down to its seat and prevents all possibility of gas escaping through the water to the apartment. The bulb steadies the valve, tends to maintain it in a vertical position, and weights it down on its seat. By removing the cap directly over the valve, the latter can be examined at any moment with the least possible trouble. This invention makes it absolutely safe to have any and all basins, baths, etc., that may be desired in any part of a public or private building. The check valve is water tight and steam tight; always stands tight shut except when escaping water opens it. It would be a protection against the escape of foul air into an apartment even if there was no water in the pipes, and it may be very properly considered a self closing door of a soil pipe, opening as it does at the least touch to let out, and permanently and hermetically closing against all admission of, foul air and sewer gas. This excellent contrivance may be seen at the Jennings Sanitary Depot, the address of which is given above.

Elias Magnus Fries.

By the death of this eminent scientist has been extinguished one more bright star from the galaxy of botanists that have shed such a luster on Sweden.

Fries was born at Smaland, Sweden, August 15, 1794, and was consequently, at the time of his death, which occurred on the 8th ult., eighty-four years of age. His father, a clergyman, was an ardent and accomplished botanist. As there were no boys of his own age whom young Fries could make his companions, he became the constant companion of his father on his botanical excursions, and hence at an early age acquired a fondness for the study of botany, and soon made himself master of the diversified flora of his native place. At about the age of twelve he came across a large and exceedingly brilliant toadstool—a species of *Hydnum*—and was then first incited to the study of the *Agarics* and their allies, that abound in Sweden more than in any other region of Europe. Before he had left school at Wexio he knew, and had given temporary names to, nearly 400 species. Entering the University of Lund, in 1811, he had for his preceptors the celebrated botanists Schwartz and Agardh. In 1814 he was made Docent of Botany, and shortly after published his "*Novitia Florae Suecicae*," first part, the second following in 1823. The first important result of his researches in fungology appeared in 1815, under the title of "*Observationes Mycologicae*." Dissatisfied with the method of Persoon, he began, the following year, to construct a system of his own, which, developed in his great work—the "*Systema Mycologicum*," 1821–1829—has been universally adopted by cryptogamic botanists, and remains in use to the present day. His other great works on the fungi are "*Systema Orbis Vegetabilis*" (1825), and "*Epicrisis Systematis Mycologici*," which appeared in 1838, and was supplemented in 1874 by a second edition. In 1831 was issued his large work on

another order of cryptogams—the lichens. In 1834 he was made Professor of Practical Economy at Upsala; in 1847 he became a member of the Swedish Royal Academy, and in 1851 succeeded to the Chair of Botany at Upsala, which he resigned only a few years ago to his son.

The works of Fries are written, as all like works should be, in Latin, and are thus made available to students of every nationality. Fries displayed most wonderful tact in the discrimination of genera and species, and based all his descriptions on external characters. He displayed a singular prejudice against the use of the perfected microscope, and refused to avail himself of its use up to the time of

his death. Corda, Kunth, and other German fungologists, having, on this account, criticised some of his work, his annoyance manifested itself in a refusal to publish the manuscript of a "*Synopsis Ascomycetum*," in which he had included some 600 new species.

All the latter years of his life he lived at Upsala, in good health and in constant correspondence with botanists of this and other countries. It is a curious fact that his death occurred at the same place as, and but a few weeks beyond, the centennial anniversary of that of his great predecessor Linnaeus.