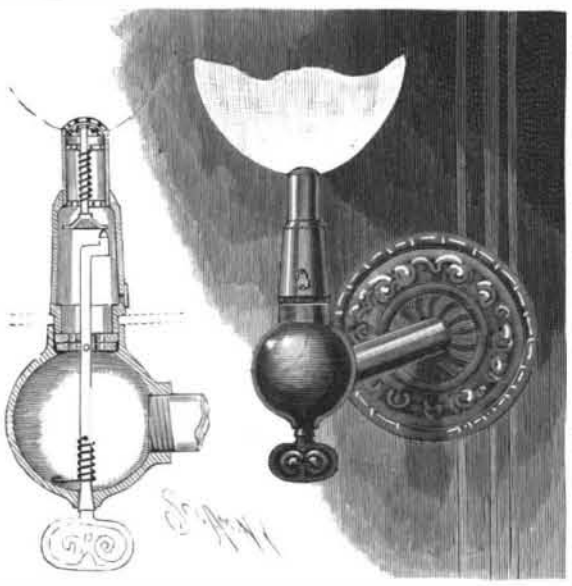
AN IMPROVED GAS BURNER.

The illustration represents a gas burner provided with an automatic gas stop or cut-off, whereby, should the light be accidentally extinguished or blown out, the cut-off will immediately stop the flow of gas. It is also provided with a controller to gage the size of the light, and means for locking the fixture so that it cannot be used for unauthorized purposes. The improvement has been patented by Horace W. Billington, of No. 565 Jersey Avenue, Jersey City, N. J. The base of the burner is spherical, on this portion being



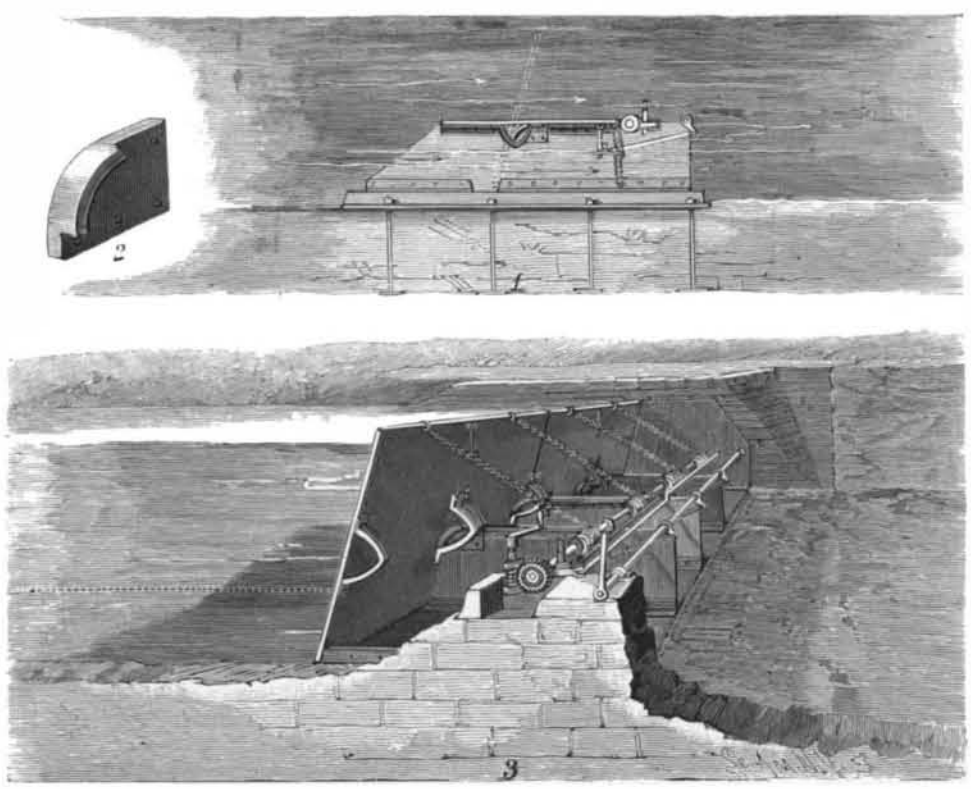
BILLINGTON'S GAS BURNER.

screwed a neck, with which the tip is removably connected, the hollow base where the gas first enters forming a receptacle to receive and hold all impurities, which may be cleaned out occasionally through an opening at the bottom. In the portion of the neck which joins the lower part of the burner is a fixed perforated disk, whose openings correspond with similar perforations on a lower revoluble disk on a rod or key, on whose lower end is a turning knob, while on the upper end of the rod is a crank whose upright member is finely pointed, and adapted to engage one of several apertures in a locking disk, as indicated in the sectional view. A spring attached to and coiled around the key rod is also attached by its other end to the inner surface of the hollow base. In the lower portion of the tip is secured a spider, through which and through an upper guide spider a hollow rectangular copper rod extends upward to the inner face of the burner tip, where it is connected with the apertured cap, a spring around the rod bearing against the two spiders, and the lower end of the rod being connected with the apertured locking disk, preferably made of steel. When the key is turned to bring the cut-off disks in registry and the gas is ignited, the copper rod is expanded, bringing the locking disk downward, so that the fine point of the crank arm of the key rod will enter one of the apertures of the disk, and the key will thus be held open, the locking disk thus also forming a controller to gage the flow of the gas. Should the flame be accidentally extinguished, the cooling of the copper rod and its consequent expansion, assisted by the spring within the tip, causes the lifting of the locking disk and the freeing of the key, when the cut-off disks move to non-registering positions, and prevent the further flow of gas. Provision is made to lock the fixture against unauthorized use, by means of a spring and a corresponding opening in the meeting faces of the cut-off disks, it being thus possible to turn the lower disk by means of the key to a locking engagement, such lock being released by passing a rod of the necessary shape through an opening in the neck portion of the burner to depress the spring.

AN IMPROVED AUTOMATIC WEIR.

The illustration represents a weir arranged to open and close automatically according to the amount of water passing down the waterway, to always retain the desired amount of water and permit a ready discharge of the surplus. Between suitable side abutments, and on top of a foundation in the bed of the waterway, are secured longitudinal I beams, the space between being filled in with cement or concrete, and on each of the beams a vertical rib is fastened by angle irons. A series of gates extend across between the abutments, rearwardly inclined and normally resting with their lower edges on the bottom of the weir, each gate having in its lower portion one or more slots adapted to straddle the vertical ribs. The gates are mounted to swing at the rear on a series of curved rider plates, one of which is shown in Fig. 2, these rider plates being bolted to opposite sides of each vertical rib, and there being also on top of the ribs horizontal angle irons, forming a rest for the gates when they curve from a vertical to a horizontal position. On the back of each gate is a reinforcing plate, adapted to ride on the rider plates, and the gates carry keepers, which inclose the rider plates, preventing the accidental displacement of them. If the height of the water to be retained is equal to the height of the gates, they press, with about one-third of their height from the bottom edges, against the rider plates, as shown in Fig. 3; and if the height of the water increases beyond the limit, the pressure on the upper portion of the gates causes them to turn on the rider plates, the gates opening proportionately to let one-half of the surplus water over the top edges of the gates and one-half under the bottom edges, as shown in Fig. 1. The gates change their resting point on the rider plates, moving upwardly and rearwardly, according to the pressure of the surplus water, and when this has been discharged and a normal pressure again prevails, the gates return to their first position.

To facilitate opening the gates when water is not desired, their upper ends are connected by chains with drums on a transverse shaft at the rear, the shaft having at one end a bevel gear with a worm on a vertical shaft to be turned by a handle. The several drums are locked to the shaft by clutches, which may be moved into and out of engagement with the drums by transversely sliding rods connected with a link under the control of a gateman on one of the abutments. When the gates move to a horizontal position, hooks on their upper ends engage pins on the vertical ribs, and the hooks may be disengaged by rods sliding on the ribs, and pivotally connected with arms on a shaft in brackets attached to a runway or gang plank, extending from one abutment to the other in the rear of the gates, one end of the shaft having a lever, by which the gateman may simultaneously throw the several hooks to unlock the gates and return them to the normal upright position. The main principle in the construction of this weir is that it is designed to retain the water to the full height of the gates when the pressure is in equilibrium, the weir commencing to discharge when the water rises above this point. The point of support of the gates changes according to the height of the water, and the gates come back again to their lowest resting point on the rider plates when the excess of water is discharged.

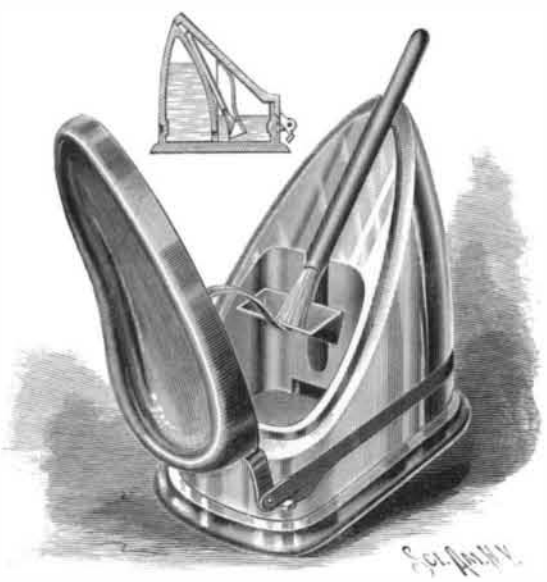


FUCHS' IMPROVED AUTOMATIC WEIR.

This improvement has been patented by Mr. G. Ludwig Fuchs, of Meiningen, Germany, and further information relative thereto may be obtained through Mr. Ernesto Fuchs, Ciudad Lerdo, Mexico. The construction of the weir is especially adapted for streams, rivers or creeks where water is to be retained to a certain level for hydraulic power or for irrigation purposes. It is also designed for use in rivers where large amounts of ice or floating obstructions may injure a weir, in which case it is provided in front of the ribs with a grate that allows the gates to perform their action without allowing any obstructions to go underneath the lower part of the gates, but forcing such obstacles to go over the weir without causing injury to its construction. Where sudden floods come, the gates work automatically to release the surplus water without the supervision of a gateman, and the practical working of the weir is designed to keep the river bed clean, as in floods all the sediment, which would accumulate before a dam made of mason work, is carried down.

A COVER FOR MUCILAGE RESERVOIRS.

The appliance shown herewith is especially designed for use with bottles having a vacuum reservoir within which the liquid is retained by air pressure, a fount or cup being connected with the reservoir by a passage at the bottom. The improvement has been patented by Truman S. Lewis, of Waterbury, Conn. (Box 823). The larger view shows the device with the cover thrown back, the small figure showing it in section with the cover closed. A connecting passage opens from the bottom of the reservoir into a well or cup in front, and the cover is pivoted to a band which surrounds the lower portion of the bottle, the lower portion of the cover having a projecting arm to engage the side of the bottle, and keep the cover from being thrown too far back. On the inside of the cover is an outwardly extending downwardly bent arm carrying a small bucket or cup, which is immersed in the mucilage when the cover is down, and on the inner side of the reservoir is a groove adapted to receive the handle of a brush placed in the cup. When the cover is thrown back, as shown in the main view, this cup then acts as a brush wiper, but when the cover is closed the brush is kept constantly immersed, with the cup, in the mucilage, so that the evaporation is not great, and the brush and



LEWIS' COVER FOR MUCILAGE RESERVOIRS.

its supporting cup are constantly kept moist, preventing the edges of the reservoir and brush from becoming gummed up.

The World's Production of Coal.

The following table has been compiled by Dr. E. W. Parker, of the United States Geological Survey, giving the coal output of the principal countries for the years nearest 1896 for which figures could be obtained. The table will appear in the Report of the Survey for 1896. The long ton is, of course, 2,240 pounds and the short ton 2,000 pounds.

Country.	Usual unit in producing country.
Great Britain (1896), long tons	195,361,260
United States (1896), long tons	171,416,390
Germany (1896), metric tons	112,437,741
France (1896), metric tons	29,310,832
Austria-Hungary (1895), metric tons	32,654,777
Belgium (1895), metric tons	21,213,000
Russia (1896), metric tons	9,079,138
Canada (1896), short tons	3,743,034
Japan (1893), short tons	3,400,000
India (1895), long tons	4,441,890
New South Wales (1895), long tons	3,737,536
Spain (1896), metric tons	1,878,399
New Zealand (1894), long tons	719,546
Sweden (1895), metric tons	223,652
Italy (1895), metric tons	305,321
Transvaal (1895), long tons	1,152,206
Queensland (1895), long tons	322,977
Victoria (1895), long tons	194,171
Natal (1895), long tons	153,951
Cape Colony (1895), long tons	87,985
Tasmania (1895), long tons	36,856
Other countries	2,000,000
Total in English tons	589,732,000
Percentage of Great Britain	33·1

The total under "other countries" includes China, Turkey, Servia, Portugal, United States of Colombia, Chile, Borneo and Labuan, Mexico, Peru, Greece, etc.