19-1

IMPROVED VALVE COCK.

The annexed figures represent an improved valve cock, for which a patent was granted to John Griffiths, of Philadelphia, on the 14th of last February. Figure 1 is a side view of a stop cock constructed on the principle of this invention, and figure 2 is a longitudinal section of the same through the center. Similar letters of reference indicate like parts.

The valve cock possesses advantages over the plug cock in its lightness, and the facility with which the valve is ground tight, but the

Figure 1.

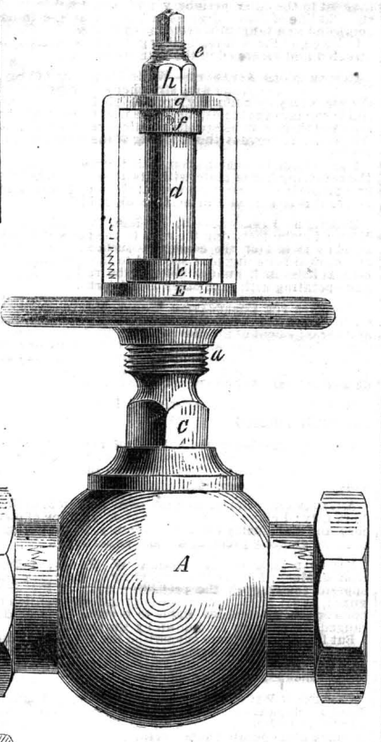

Figure 2.

valve cock as constructed is very imperfect. It is usual to make the screw by which the valve is opened and closed, on the valve stem, and unless every part is truly constructed, one side of the valve will be made to close or bear upon its seat, harder than the other parts, and the stem is thereby liable to be bent. This evil is increased by vulcanizing the bearing of the valve, hence it is customary to make it with a narrow seat. The object of this invention is to construct the cock in such a way that the valve will always close truly, and thus allow it to be made with a bearing of such width as will enable it to be kept as tight as the best plug cock. The valve is therefore made with a cylindrical stem passing through a hollow stem, which is attached rigidly to, or forms part of the body of the cock, and is furnished outside with a screw, to which is fitted a nut carrying a yoke, in which the valve stem is capable of turning freely, but not of moving longitudinally. By turning the nut the valve is raised and lowered—from and to its seat—in a right line, the valve being kept in such position that it will fall into and close tightly in its seat.

A is the body of the cock, and B is the valve seat, which do not differ materially from other valve cocks; C is the hollow fixed stem, which, in the cock shown, is secured into the body; it is furnished at its upper part with an external screw, *a*; it is provided with a stuffing box, *b*, and gland, *c*, for the purpose of packing the valve stem; D is the valve, and *d* its stem, which is furnished at its top with a screw, *e*, and a little below the screw with a collar, *f*; E is the nut by which the valve is opened and closed; it is fitted to the screw, *a*, on the hollow fixed stem, and is provided with a wheel or lever, by which it is turned; it is furnished above with a yoke, *g*, which fits easily to the valve stem above the collar, *f*, being confined to the stem by a nut, *h*, fitting to the screw, *e*; this nut fits down to a shoulder, so that it does not bite the yoke, but simply prevents the longitudinal motion of the valve stem and nut, independently of each other, not preventing the turning of the nut. The valve is raised and lowered by the turning of the nut. The valve stem is squared at the top to receive a wrench for grinding the valve. To grind the valve, the nut, *h*, should be taken off. The valve of a cock of large size, constructed in this way, may be ground in a few minutes; whereas a three-inch plug will commonly take five or six, and sometimes ten hours to grind in tight, whenever it leaks.

In cocks of large size, the body, A, may be made of cast iron, and the seat, B, and stem, C, of brass, which construction will reduce the expense. The invention is applicable to cocks of almost every description.

Mr. Griffiths informs us that he has disposed of upwards of five hundred of the cocks, and that they give perfect satisfaction to the purchaser. Leaky cocks are a sore trial to the patience of engineers; this valve is worthy their attention as a remedy for such an evil.

These valve cocks are manufactured by Mr. Griffith, at his brass fonndry, No. 15 North 7th street, Philadelphia. For more information about that which relates to business connected with it, we refer to an advertisement of the patentee on another column.

SCIENCE, ART AND DISCOVERY.

Ancient and Modern Water Works and Tunnels.

19-3

We are liable to forget the great works of the past, in our admiration of those of the present age; hence it is a good thing sometimes to recall what the old engineers have accomplished, as a healthful stimulant to excite our modern engineers to greater efforts.

The old Roman aqueducts for supplying that city with water, in the days of its glory, when compared with the greatest of modern works of this kind, dwarf them into insignificance. Rome had one aqueduct—Aqua Apia—ten miles long, all underground; another—Anio Vetus—forty-three miles, and nearly all underground also; another—Aqua Marcia—fifty miles long, and the Anio Nevus fifty-nine miles long, with arches 109 feet high. There were also four other aqueducts, amounting to nine altogether, for supplying Rome with water by gravitation, for there were no steam engines in those days to pump it up from the adjacent river Tiber for city use, as is now done at Philadelphia, Chicago, Cleveland, and others of our cities.

The noblest work of modern engineering for supplying any city with water is, undoubtedly, the Croton Water Works of New York. Its artificial tunnel is carried over valleys, through hills, and over rivers a distance of forty miles. The work is stupendous, to be sure, for it carries a condensed river from the mountains into the city, but compared to the old Roman water tunnels, it is not so much to boast of.

The city of Montreal has recently finished some great works of engineering for supplying itself with water in the same manner as the city of Philadelphia, by employing the water power of the river to pump itself up to an elevated reservoir. The water from the St. Lawrence immediately above the rapids, is conducted by a canal five miles long to a basin, where two large wheels, 36 feet in diameter, work force pumps, which drive the water through iron pipes for about three miles to a double reservoir situated on the mountain behind the city, at a height of 200 feet above the river level. These reservoirs contain 20,000,000 gallons, and were cut out of the solid rock. Thus from the elevation of 200 feet the water is conducted through the whole city. Next to the Croton Water Works, the Water Works of Montreal, we understand, are the greatest of the kind on our continent.

From present indications there are a number of cites in the United States which will yet surpass old Rome in extent and population, and which must be supplied with water from distant sources. As no city can be kept clean and healthy without a good supply of water, we tell them to look to old Rome for encouragement and an example.

Some great works of tunneling, or boring through mountains, have, within a few years, been executed in Europe and in our own country, for carrying railroads through them, and the tunnel now boring through the Green Mountains, three miles long, is considered to be the most expensive work of the kind ever attempted by our engineers; but we have only begun to execute works of this kind, and we require to be stimulated. The Alleghanies, the Rocky Mountains, and other mountains, have yet to be tunneled to make pathways through them for the "iron steed." Look at what the old Romans did. They cut a tunnel as part of a drain for Lake Fucinus, and it was bored one mile through a mountain of hard cornelian. It was in the form of an arch, nine feet wide and nineteen feet high. There was no gunpowder then to assist the miners in blasting; all the work of cutting was executed inch by inch by steady labor with the pick, wedge and chisel. Considering the amount of labor required for this work, our engineers have much to incite them.—*Scientific American.*

LOCAL AFFAIRS.

Spring Garden Gas Works.—These works, situate on Callowhill street, near Fairmount, are now complete and in successful operation. They consist of two retort houses, one 190 feet long and 30 feet wide, containing 21 ovens, with 3 retorts in each; the other, 164 feet long and 30 feet wide, containing 18 ovens, with the same number of retorts, making 117 in all. The buildings are constructed with a basement story 10 feet high, and have capacity for storing 3000 tons of coal. There are two purifying houses, each 54 feet long by 23 feet wide, and 18 feet high, with 4 purifying boxes 6 by 14 feet in the square and 3 cylinders 2 feet in diameter by 12 high. Two jets of water play in each of these to wash and separate the impure properties from the gas, and 2000 feet of ten inch pipe, through which the gas passes or is conducted between the washers and purifying boxes, which gives a sufficient condensing surface to make the gas cool by the time it comes in contact with the lime. The works are also supplied with 2 station metres and 2 governors, large enough to register and regulate 300,000 feet of gas per day, and 2 telescopic gas holders, capable of containing 590,000 cubic feet of gas. One of the holders is 60 feet high and 100 in diameter, and the other 40 feet high and 60 feet in diameter.

19-2

The street mains laid measure nearly 32½ miles, or 170,930 feet, as follows:—5,150 feet of twelve inch, 1600 feet of ten inch, 11,850 feet of eight inch, 9850 feet of six inch, 47,505 of four inch, 74,975 of three inch, and 2000 feet of small pipe to supply public lamps. In addition to the above there has been upwards of 74,600 feet or nearly 14 miles of service pipe laid.

The annexed table shows the number of meters set in each year, with the number of lights supplied:

	100	65	45	30	20	10	5	3	Total.
1846	0	0	0	0	1	4	50	22	77
1847	1	0	0	0	4	16	170	184	375
1848	0	0	0	0	0	6	240	154	400
1849	2	0	0	0	0	4	250	190	446
1850	1	0	0	1	2	14	328	297	643
1851	2	1	0	2	9	31	319	231	595
1852	0	0	1	1	8	12	299	386	707
1853	1	0	0	0	4	10	334	411	810
	7	1	1	4	28	97	2040	1875	4053

The total cost of the Works as given to the Committee on Gas, in Spring Garden, by the Superintendent, Mr. A. Myers, is $378,305 24, as follows:—Amount expended in 1846, $14,239 66; in 1847, $21,240 10; in 1848, $11,005 22; in 1849, $47,720 76; in 1850, $49,570 83; in 1851, $76,804 01; in 1852, $103,106 41; in 1853, $54,618 25.

The Spring Garden Gas Works will become the property of the City of Philadelphia, upon the organization of the new Councils.