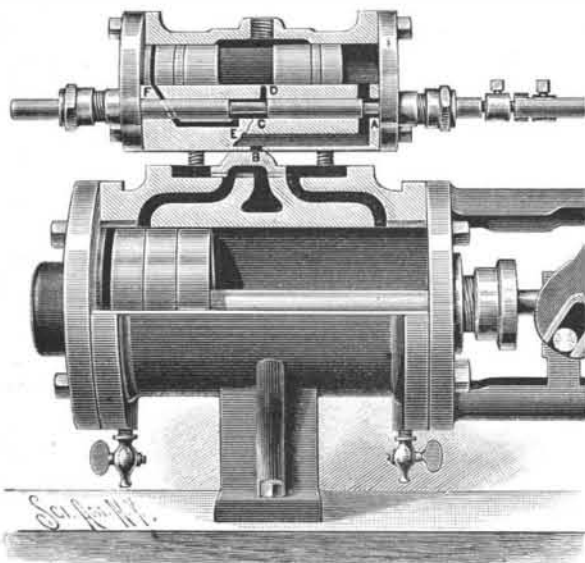


AN IMPROVED STEAM ACTUATED VALVE.

The valve shown in the illustration is more especially designed for use with steam pumps, and is of simple and durable construction, very effective in operation, and arranged to positively control the movement of the main piston valve. It has been patented by Mr. Joseph J. Kwis, of Findlay, Ohio. The pump has the usual steam cylinder, with the end inlet ports and central exhaust port, controlled by the usual slide

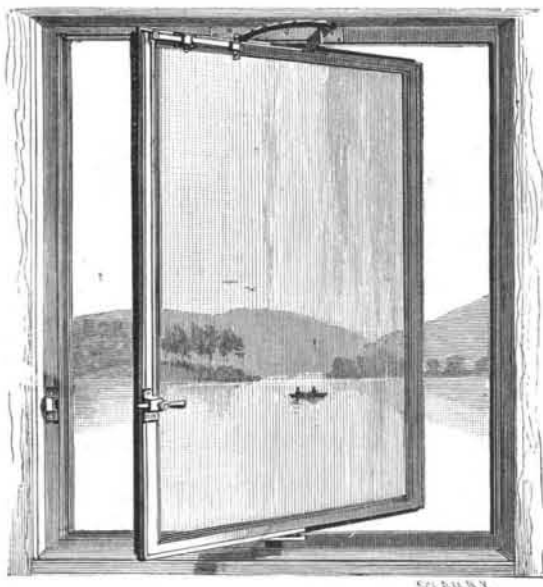
**KWIS'S STEAM ACTUATED VALVE.**

valve extending into the steam chest, within which also is an auxiliary piston valve adapted to be directly actuated from the piston in the steam cylinder, the steam chest having a main bore and an auxiliary bore. Steam inlet ports lead from the auxiliary bore to the ends of the main bore and exhaust ports independent of the inlet ports, and lead from the end of the main bore transversely through the auxiliary bore to the common exhaust passage. The auxiliary balanced piston valve sliding in the auxiliary bore has reduced portions controlling the steam inlet ports and the exhaust port, whereby the auxiliary piston valve is directly and positively actuated from the main piston rod, avoiding all undue friction, and positively shifting the main piston valve whenever the piston nears the end of its outward or inward stroke. In the illustration the exhaust is shown open at A, and enters main exhaust through the opening at B. The live steam which supplies the recess, C, is admitted through hole, D. The live steam port is shown open at E, and entering steam chest at F.

Further information relative to this improvement may be obtained of the Adams Brothers Company, the Findlay Machine and Boiler Works, Findlay, Ohio.

A WIDOW SASH FASTENER.

This is a device especially adapted for use in connection with window sashes pivoted at their centers at top

**KIRSCH'S WINDOW SASH FASTENER.**

and bottom, and is very simple, durable and inexpensive, and capable of quick and easy manipulation. It has been patented by Mr. Richard Kirsch, of Bay Ridge, L. I., N. Y. Near the upper central pivot of the sash an outwardly projecting rack is secured to the window frame, the rack being preferably of a quadrant form, and having a downwardly projecting flange which serves as a stop to prevent the sash from passing over a center line when opened. Extending across one side of the top rail of the sash, and passing adjustably through a block adapted to act as a pivot, is a locking lever, one end of which works in a bracket-like guide secured to the sash, there being at this end an adjustable locking pin adapted to engage one of the apertures of the rack. The locking lever is capable of lateral

adjustment in its pivot block, and in an outer end block by which it is connected with a vertical connecting rod extending down one side of the sash. This rod is held to slide in one or more guides, and has at its lower end a guided movement in a plate in which is pivoted a connected operating lever, which may be either an elbow, an angle or a crank lever, forming a suitable handle by means of which the locking pin may be made to engage any one of the apertures in the rack, according to the position in which it is desired to adjust and lock the sash.

Protection of Iron from Rusting.

Mr. W. Thomson, of Manchester, is continuing his researches into the oxidation and corrosion of iron and steel; and he recently published some further observations on the subject in the *Journal of the Society of Chemical Industry*. According to this statement, Mr. Thomson had a number of sample pieces of thin sheet iron, of uniform size, weighed and painted with one coat of each of the paints, and weighed again; then left for about a week exposed to the atmosphere, and again weighed. The difference between the two first weighings gave the weight of the wet paint employed, which was calculated out to the square yard of surface; while the first deducted from the third gave the weight of dry paint. The coatings thus tested upon the sample strips, which measured 4 inches by 1 3/4 inches, varied in weight from 3/4 ounce for linseed oil alone to 7 ounces for oxide of iron paint; tar weighed 1.56 ounces; solution of pitch, 1.24 ounces; red lead, 6.24 ounces; and so on.

Having tried in vain the effect of spraying the samples with a saline solution, Mr. Thomson proceeded to immerse the samples in a glass vessel containing sufficient saline solution to half cover each. He observed that, after two or three days, the clear solution began to grow turbid; and in a few days more it threw down a precipitate of the peroxide of iron. Some time later on it could be observed that the iron beneath some of the coatings of paint was undergoing oxidation to a much greater extent than others. It suggested itself to Mr. Thomson that if each plate of iron were placed in a separate glass beaker with the saline solution, the turbidity of the clear liquid would be some criterion of the progress of the rusting action. This was done in a case of a second series of experiments, which went to show that this observation is just; and Mr. Thomson was able to ascertain that oxide of iron paint, white lead, and the ordinary paints of commerce, have comparatively little protective influence on iron as contrasted with red lead, for the latter showed no signs of turbidity in the saline solution after all the others had become turbid, and deposited a considerable precipitate of ferric oxide. Mr. Thomson further lays stress on the electrolytic corrosion of iron; and he suggests that, for the protection of large iron structures from this effect, it might be advisable to place a large ball of zinc in wet ground in metallic contact with the iron of the structure by means of wires, which he believes would tend materially to prevent corrosion at comparatively small cost.

The Germ of Smallpox.

Professor Guamuri, of the University of Pisa, is of the same opinion as that published by him in 1892, in the *Archivi di Scienze Mediche*, viz., that the process of pustulation, both of cowpox and smallpox, is originated by a parasite which develops in the epithelial cells. He has studied both the morphology and biology of this organism. It is capable of amoebic movements, which can be seen on examination of lymph taken from the initial vesicle at the temperature of the human body. By this process Professor Guamuri has also verified the multiplication of the parasite under the microscope, and the fact of phagocytosis by polynucleated leucocytes. With a stain of gentian and methylene, the structure of this low organism may be studied. It consists of a roundish body with a clear outline. Professor Guamuri has succeeded in reproducing the parasite in the cornea of rabbits with inoculation of the same lymph, and he has verified the fact that no other source of irritation is capable of producing anything of the appearance of the same parasite in the cornea. Professor Guamuri believes that it is a zooparasite belonging to the class of rhizopode, and that it is the cause of both cowpox and smallpox.

A Home for Truants.

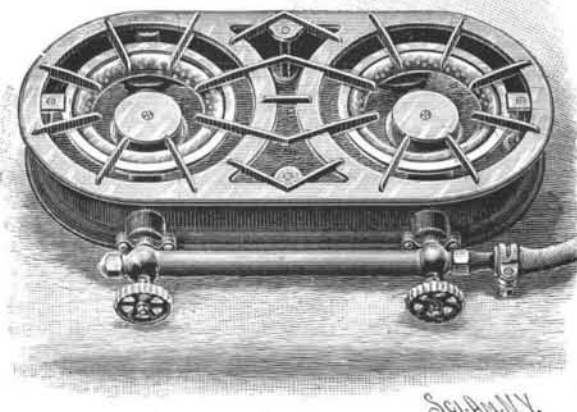
Boston is soon to have a home school for truants and troublesome boys. They are to be gathered into families of about twenty-five, under the care of a superintendent and his wife. A teacher of rare gifts of mind and heart is to be assigned to each group, and under his direction, three hours a day are to be devoted to study. The boys are to do all the household work and to cultivate the estate of thirty acres where the home is to be placed.

They are also to devote four hours a day to training for occupations to be had in the city.

The instruction on Sunday morning is to be moral and religious, and in the afternoon it is to be denominational.

AN EFFICIENT HEATING GAS BURNER.

As shown in detail in the *SCIENTIFIC AMERICAN* of April 7, the base of this burner, where it is attached to the gas supply tube, is supplied with apertures to admit air to mingle with the gas before it reaches the point of combustion, while the tube which surrounds the flame has air-receiving openings on its under surface and smaller air-discharging apertures in its upper surface, where the tube is impinged upon by the flame. The tube thus being raised to a high temperature, and correspondingly heating the air discharged therefrom to mingle with the burning gas, is designed to afford the most perfect combustion, with the attain-

**WILLIAMSON & BUZBY'S HEATING GAS BURNER**

ment of the highest possible degree of efficiency for the quantity of gas consumed. The illustration represents the practical construction followed in the application of the improvement recently patented by Messrs. John R. Williamson and Isaac W. Buzby, of Seattle, Washington.

A HIGH WINDMILL.

Among the windmills shown at the late World's Columbian Exposition, that of the Aermotor Co., of Chicago, represented in the accompanying illustration, was perhaps the most unique and striking. It was 55 feet from the ground to the turret of the old Dutch windmill, from which sprang a galvanized steel tower 87 feet high, surmounted by a 16 foot wheel, making a total height of 150 feet. This windmill towered above

**A HIGH WINDMILL.**