

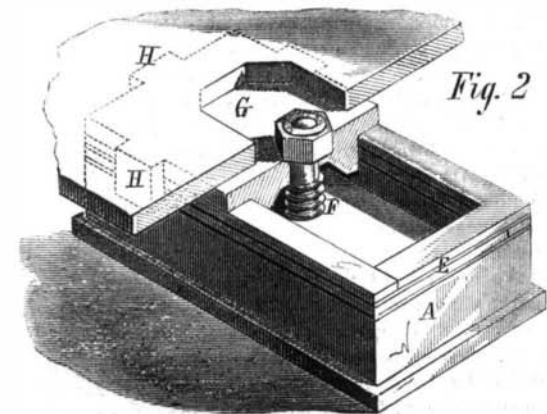
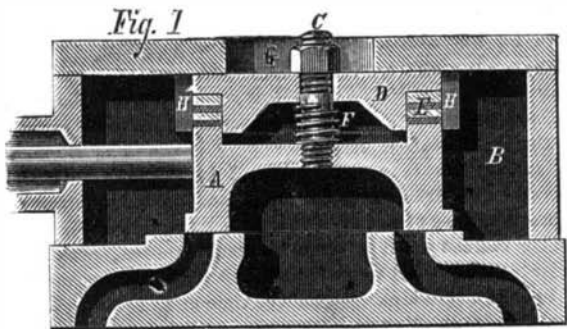
IMPROVED GAS REGULATOR.

We give herewith perspective and sectional views of a new gas regulator, patented through the Scientific American Patent Agency, May 5, 1874, by Mr. Joseph Adams. The pressure of the gas acts on a flexible diaphragm, which is connected with a valve, which opens or closes as the gas is turned on or off from the burner or as the pressure varies in the street mains. The devices arranged with the diaphragm, described below in detail, contribute, it is claimed, to render the regulator extremely sensitive to differences in the flow.

The exterior of the invention is represented in Fig. 1, and from Fig. 2 the interior arrangement will be readily understood. The circular casing of the regulator is of metal, and the parts are joined together through the flanges shown. The latter also fasten, with a gas-tight joint, the outer edge of a flexible annular diaphragm, A, the inner edge of which is riveted between the flanges of the thin metallic hemispheres which form the balloon, B. Upon the top of the latter is a rod, upon which are placed weights, C, to adapt the governor to the variation of pressure for different elevations. The lower hemisphere opens through a pipe, D, to the supply of gas from the meter below, said pipe terminating in a funnel shaped valve which plays in the valve seat, E. The latter is attached to the bottom of the case, and is adjustable, so as to be lowered to reduce the orifice around the valve, and by this means adapt the apparatus to a low pressure of gas. A movable plate, F, is screwed into the upper portion of the outer casing, and has in its center a small hole for the admission of air to counteract the pressure of gas upon the diaphragm. G is a conduit for the gas, and H the connection for the service pipe. In operation, the valve is adjusted to the particular elevation or pressure of the locality by means of the weights. As the valve, pipe, and diaphragm are in a state of suspension by reason of the buoyancy of the balloon, the pressure on the gas being neutralized by the atmospheric air on one side and by the weight on the other, the diaphragm becomes particularly sensitive to an increased or diminished flow. If the pressure be increased, the diaphragm, balloon, and valve are raised, and the valve orifices proportionally closed; if diminished, the same portions are depressed by the air pressure and weight, the orifice opened, and the flow augmented. For very low pressures, the weights may be entirely removed and the valve seat lowered, or both, as required. By this delicate arrangement, it is claimed, the flow of gas through the burners is made uniform and independent of the pressure from the main and also of the number of burners employed at a time. For further particulars address Joseph Adams, 1,025 Market street, Philadelphia, Pa.

YOUNGMAN'S IMPROVED SLIDE VALVE.

The invention herewith illustrated is an improvement on the ordinary D valve, which is designed to overcome the difficulties arising from the expansion of the metal when heated by steam. The valve fills up the whole of the space of the steam chest vertically, and, while highly elastic, is claimed to be as indestructible as the D valve under any speed or pressure. When the steam is shut off, the valve cannot cock in the yoke, as it takes no air in through the



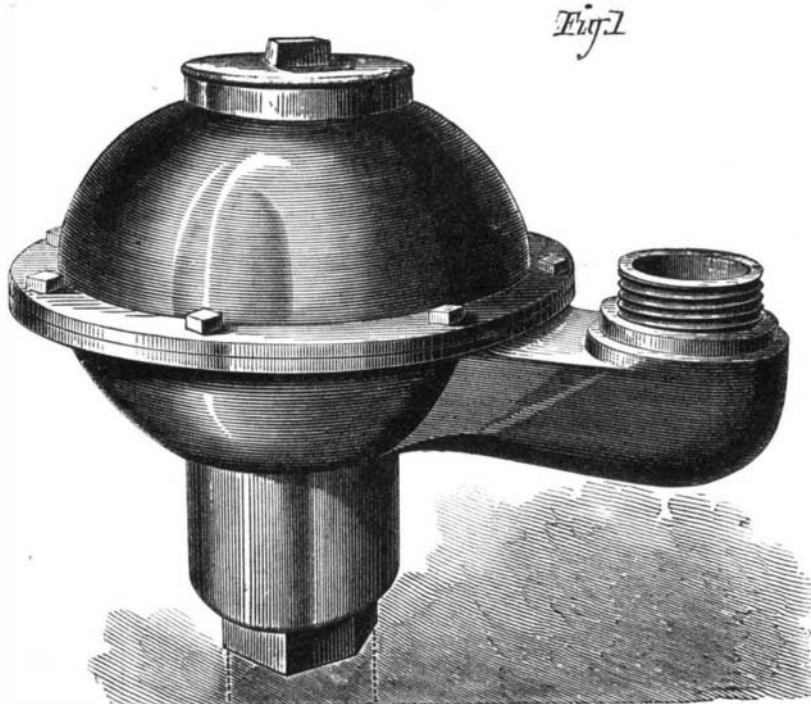
smoke stack, but through the opening in the chest head by the sinking of the cap. The oil is received at the same place.

Fig. 1 is a transverse vertical section of the valve, A, as located in the chest, B. Fig. 2 is a perspective view showing a portion of the steam chest above. Attached to the valve is a screw bolt, C, which passes through the adjustable cap, D, Fig. 1, and is secured by the nut shown. At E,

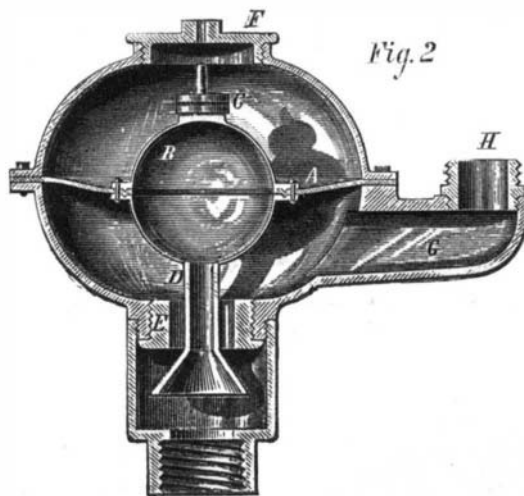
packing is placed, and at F, a spiral spring. An opening, G, Fig. 2, is made in the top of the steam chest in order to allow the nut to travel the full extent of the movement of the valve, and also to give access to the nut to use a wrench whenever necessary.

The packing is kept in place by lugs, H, depending from the cap. A gum gasket, we are informed, placed between the cap and valve, is all that is necessary on machinery where drifting cannot occur, consequently metallic packing can be dispensed with on steamboats.

The nut, in connection with the spring, regulates the cap, which forms a ground joint in connection with the inside



ADAMS' IMPROVED GAS REGULATOR.



surface of the steam chest head, elevating it and depressing it at will. All the upward force falls upon the nut, and not upon the chest head. Between the valve and the cap exists a space the full square of the valve, in which the packing is placed, consisting of four pieces of brass, three sixteenths of an inch in thickness and one half inch in width, shaped precisely like a carpenter's square. These are laid one on top of the other so as to break joint, and also so that, if expansion should take place and shove one out of position at the point of intersection, the other may take its place. Between each layer of metallic packing a gum gasket is placed. A space of about one eighth of an inch exists between the cap and the upper layer of packing. This forms a square of packing around the shoulder which occupies the chamber. The effect of this is that, when the steam is forced into the steam chest, it presses upon the packing inward and downward, inward against the shoulder and downward against the top of the valve. The packing is subject simply to pressure; there is no movement whatever connected with it. When the steam is off, and the engine is in motion, the cap sinks and rises according to the motion of the piston head and the operation of the spring, the shoulder sinking within the square of packing without any abrasion whatever. As the different parts of the packing are separated one sixteenth of an inch, and are brought instantly into place through the pressure of the steam, it never can become disordered.

The inventor claims the present device to be superior to a somewhat similar arrangement employed on board of the Great Eastern, and mentioned in a recent work by Mr. John Bourne. The English invention consists of two rings embedded in the chest head, between which is a gum gasket. This combination is subject to the operation of set screws, which keep the parts pressed closely upon the top of the valve, thus, we are informed, producing much more friction than the device above described.

The further claims regarding the present invention are, that it moves its weight only, is cheap, requires no alteration of machinery for its application, and may be very quickly substituted for the D valve. Using it, the engine can be reversed without shutting off steam, and it can be moved easily with one hand when surrounded by pressure. We are

also informed that the valve has been successfully tested for some time past. It will be placed in locomotives, steamers or land engines, and warranted for six months.

For further particulars, address Jacob Youngman or J. M. Bostian, Sunbury, Pa.

The Tay Bridge.

The firm of Hopkins, Gilkes & Co., of the Tees Side Iron Works, Middlesbrough, England, have entered into a contract with the North British Railway Company for the completion of the great engineering work known as the Tay Bridge, near Dundee. This, when finished, will be the longest bridge over a running stream in the whole world. The total length will be 10,321 feet, or nearly two miles, so that it is 1,127 longer than the Victoria Bridge, Montreal, which is 9,194 feet in length and has hitherto claimed the distinction that will henceforth be awarded to the Tay Bridge. There are, of course, bridges of considerably greater length than either, although none spanning a tidal river. There is, for example, the Tensas and Mobile Bridge, on the Mobile and Montgomery Railway, which is fifteen miles in length; but the greater part of this bridge is carried over great morasses, where the engineering and other difficulties to be surmounted were not at all comparable to those met with in this case; and even after our American cousins have got all due credit for the big things they have done in this direction, the fact will still remain that the Tay Bridge is, in its way, perhaps the most remarkable structure in the world.—*Newcastle Chronicle*.

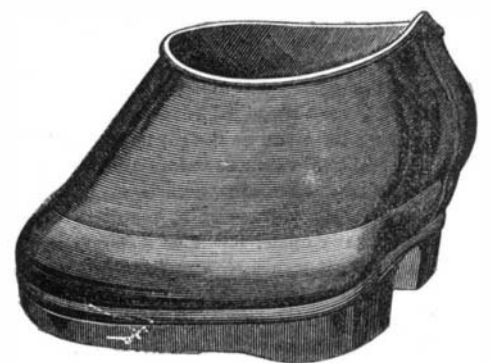
INDIA RUBBER SHOES FOR HORSES.

We can describe the invention illustrated in our engraving in no better or more concise terms than by stating that it is an india rubber overshoe for horses. It is made and lined in precisely similar manner to the articles of apparel worn by the human race, and, in fact, presents no points of difference save in its shape and its manufacture of the best quality of india rubber.

It is designed as a substitute for the iron shoe, and as a means of preventing the many maladies to which horses' feet are subject. The inventor informs us that horses suffering with cracked or contracted hoof, and similar painful hurts, are quickly cured by the substitution of the rubber covering for the unyielding metal shoe. The elasticity of the former allows the hoof to remain in its natural shape while protected from abrasion against pavements by the heavy rubber sole beneath.

The device is easily removed from or put on the hoof, and hence, while standing in the stall or turned out to pasture, the horse may be left barefooted. In winter time the covering serves as a protection against illness due to the common practice of mingling salt with the ice and snow in city streets, while the roughened surface of the rubber beneath serves to give the animal a foothold in slippery weather.

As compared with iron shoes, the cost of the rubber ones is about one third more, and their weight is some forty per cent less. Sixteen sizes are manufactured, so that accurate fits may be obtained. With reference to wear, the inventor states that the durability, owing to the fine quality of rub-



ber employed, is very great. The device has been successfully used for some time past, and, we understand, has received the endorsement of the New York Society for the Prevention of Cruelty to Animals.

For further particulars relative to sale of territory purchase of goods, address the inventor, Mr. Amzi J. No. 266 Nesbitt street, Newark, N. J. Patented through Scientific American Patent Agency, July 14, 1874