

will be described in connection with suction producer plants, but completer methods are adopted in the purifying of gas made in pressure producers. This is feasible since the gas in the pressure plants is under a greater pressure than in the suction plant, and for that reason the resistance of the washing and purifying apparatus to the passage of the gas is not of such great importance. The washing apparatus in different plants varies considerably but most frequently consists of a succession of contrivances in which the gas is washed either by causing it to bubble up through the water, by subjecting it to superficial friction against a sheet of water, or by systematically circulating it in a mass of continuously besprinkled inert material, such as coke.

The object of washing is to remove the dust from the gas. The physical purification is completed by passing the gas through a

should be provided by which, when the bell is full, the generation of gas is automatically diminished or stopped. The bell of the tank is usually provided with a flap valve, opening towards the inside, so that should the generation of gas be stopped for some reason and the engine continue to operate until the gas in the bell is exhausted, there will be no danger of the engine sucking water, since atmospheric pressure will, when the gas is exhausted, open this valve.

In fairly small units it is possible to use the same water in this tank as is used to cool the engine cylinders thus doing away with the necessity for extra reservoir equipment; but care must be taken in an arrangement such as this that there is a sufficient quantity of water to warrant that it will not become so hot as to unduly heat and expand the gas in the bell. This same water is not used in plants where the engine is larger than 50 h.p.

The volume of the bell of the gasholder should preferably be not less than three cubic feet per brake horse power of the engine to be supplied; in this case the bell acts as a pressure regulator, assuring a sufficiently homogeneous gas, and rendering it possible to supply the engine during the short intervals in which it is necessary to stop the blast to poke the fire. But if it is desired to supply the engine from the holder for intervals longer than these, when the blast is closed down, its capacity must be made much greater per horse power of the engine.

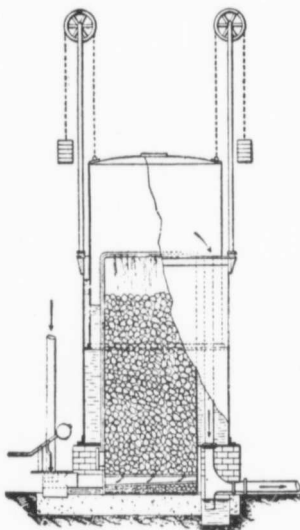


Fig. 7—Combined Gas Holder and Washer

filtering bed consisting of fibre, sawdust or moss, the latter being rather uncommon. If chemical purification is found necessary, it is usually affected by means of calcium hydrate, iron oxide, or, still better, by a mixture of lime and iron sulphate. The filtering material must necessarily be removed at intervals.

THE GAS HOLDER.

The gas holder belongs essentially to the pressure plant. It is constructed upon the same principal as the gas holders used in city or town coal gas plants. The holder consists chiefly of a tank and a bell, the bell being balanced with weights so that it may rise or lower according to the capacity required, and the amount of gas generated. The tank contains water which forms a water seal against the escape of the gas. Sometimes the gas holder includes washing or scrubbing apparatus as shown in Fig. 7.

This figure also shows the arrangement of the bell with regard to the tank. Mechanism

Duplex Steam Pump Troubles

By CHARLES E. BASCOM.

There is no accessory about the steam plant that receives the neglect that is bestowed upon the steam pump. You find it in some dark corner of the plant or in some pit half submerged in dirt and water. Sometimes it is oiled, and sometimes it is not—more often not. The only phenomenon about the pump is that it runs at all under the conditions in which it is placed. Even some of the builders seem to have a grudge against the pump, sending out any number of them with cast-iron rocker shafts and with stuffing boxes that will only hold 2-inch rings of packing. This is too often the case with the duplex pump.

If the cast-iron rocker shaft is not oiled properly, it will very soon wear so that the valves do not get their proper travel. When only two rings of packing can be put in a stuffing box, it has to be screwed up so, to keep it steam and water-tight, that the rods are soon worn in the middle and a shoulder formed at each end. In this condition the pump will not make its full stroke. With the valves properly set on a duplex pump, if the rod packing or the piston packing in the water end is too tight on one side, the stroke of the piston on that side will be too short, while on the other side it will be too long.

If the pump has been in use for several years and there is any doubt as to whether your predecessor has neglected the valve and cylinder lubrication, disconnect the exhaust pipe and let the pump run against a pressure. If the exhaust is short and sharp, it will be known that everything is all right, but if a continuous blow is heard between the

exhausts, it will be found that the valves and valve seats are worn so that steam is leaking past the side of the valves into the exhaust port. This is on the supposition that the pistons in the cylinder are tight.

Next take off the entire steam chest, put a scale on a steel straight edge on the valve, also on the valve seat. If they are found badly worn, as they doubtless will be, take a fine flat file and carefully file down both valves and valve seats until the straight edge will touch every part. Then scrape to a good fit, using a little red lead and oil on the valve face, and work the valve back and forth on the seat until both are fitted. Now loosen the packing, at the same time prying the rod toward the water end until the piston touches the cylinder head. Make a mark on the rod next to the packing gland, then pry it back toward the steam end until the piston touches the cylinder head. Make another mark on the rod next to the packing gland, as before, and then take a pair of dividers or a rule and locate a point half-way between the two marks, and make a third mark. Move the rod toward the water end until the mark last made comes up flush with the gland, and the piston will be exactly in the middle of the cylinder. Treat the opposite side in a similar manner, and both pistons will be at half stroke.

Now put on the steam chest and set the valves so that they will be in the middle of their travel. The valves should just cover the parts line and line. If the lost motion is not equal with the valves in this position, take out the pin connecting the valve rod with the valve stem and screw the valve stem in or out of the valve nut until the lost motion is equalized. Put on the steam-chest cover, tighten the glands and start the pump, which should have plenty of oil until the new faces on the valve and seat have attained their polish, when the amount of oil can be reduced. If the pistons have too much travel, reduce the lost motion in the valve gear and vice versa. If the rods are much worn, they should be taken out and turned up in a lathe. A larger packing will then be required.

With regard to the water end, do not try to pump hot water with soft-rubber valves, nor with a solid brass plunger pump unless it is outside packed. Use composition or hard-rubber valves for hot water, and examine them often if the plate between the valve and spring is too small, which is often the case. The valve should be turned over if it becomes convex on the under side. Old valves can be made nearly as good as new by bringing them to a face on a sheet of fine sand-paper. Lay the sand-paper, cutting side up, on a smooth board and draw the valve back and forth over it. See that there is no leak in the gasket between the cylinder head and the water end, and also see that there are no leaks in the gasket between the suction valves. Do not get the springs too tight on the suction valves, for in this event the pump will not take water. Watch for leaks in the suction pipe, and if the piston packing in the water end does not last as long as it ought, examine the sleeves, and if they are badly scored or rough, have new ones put in. Do not crowd the new piston packing in too tight, leave it a little chance to expand.—Power.