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THE MITCHELL SAFETY STEAM GENERATOR.

Among the many and varied forms of steam boilers which have appeared of late years, few, we think, will awaken more curiosity and interest among engineers and mechanics than the apparatus to the illustration and description of which we devote our initial page. It consists essentially of a rotating cylinder, disposed transversely over the fire, into which water is fed in a state of fine division, through a small pipe which runs through the axis, and through the length of the chamber. The revolution of the cylinder is effected by suitable mechanism in connection with the engine to which, with the other devices regulating water supply, etc., detailed reference is made below. Although the idea of generating steam in quantities by the direction of fine streams of water upon highly heated surfaces has been sought to be applied in various ways, experiments in that direction have met with little success, and certainly have not attained the practical results which the inventors of the present generator seem to secure by their system.

Referring to the engraving, the cylinder, A, which is constructed of ordinary boiler iron, riveted, rotates on friction rollers under the trunnions, P. Into this, water is injected by means of the steam pump, B, through the feed pipe, C. The latter passes through the axis of the cylinder, and is plugged at its extreme end where it rests upon the trunnion. At D a check valve is provided which prevents the return of the water to the pump. F is the pipe which conducts the steam to the pump, through the regulating valves, G and H, the latter of which is set to close at the required pressure of steam, and so stop the motion of the pump. The valve, G, serves a similar purpose whenever the steam is lowered twenty-five pounds below the desired pressure in the generator. The overflow valve, I, is set at the same pressure as the valve, H. The steam passes through the stationary steam pipe, K, in the packing box through pipes, L, L, and is discharged at M, to the engine or where required. Bolted to the flange of one trunnion is a worm gear, O, which rotates the cylinder by means of a belt from the engine on the pulley. A steam damper regulator is attached to the damper in the smoke pipe at Q, the weight on the lever of which is so set that the damper will close on a required pressure of steam being obtained. Before the fire is started, three or four inches of water are admitted into the generator by working the pump by hand. After steam is up, the pump is actuated by the pressure and is subsequently self-regulating.

No further description is, we think, necessary to insure a comprehension of the mechanism of the apparatus, as the parts are quite simple and their operation is fully apprehended from our illustration. It remains, therefore, to consider the merits and practical advantages which the inventors claim for their device.

We have already pointed out that the pressure of water entering the cylinder may be regulated at will. Let it be supposed that this is fixed at sixty pounds per square inch. It is clear that, as long as the pressure of steam within the generator is below this limit, the entering flow will continue, but the instant it arrives at or exceeds the same, then the supply must cease. The water seeking a vent will then re-

turn into a reservoir beneath the valve, until the steam pressure falls below sixty pounds, when it will again re-enter the cylinder. If, however, the full steam-producing capacity of the boiler is being used, the rapid withdrawal of steam will diminish the pressure to, say, thirty-five pounds; hence, again the water will continue flowing out at a pressure of twenty-five pounds—the difference between sixty and thirty-five—and feed in just sufficient quantity to maintain a steady supply. The inventors, therefore, claim that the generator is perfectly secure against explosion, because the supply of steam is constantly made equal to the demand, and because the pressure cannot exceed that of the limit set by adjusting the valve which admits the water; and this adjustment may be set at the highest pressure which it is safe for

dense, it is carried around by the rotation of the cylinder, and literally, before it has time to settle, is blown out of the trunnions by the force of the steam. The inventors inform us that new boilers clear themselves of dirt or chips left in them after manufacturing, and that the interior of a cylinder, after two years' continuous use, on examination, presented the appearance of perfectly new iron.

The saving of fuel effected is claimed to be one third. That a certain amount, whether greater or less than thus estimated, must be saved is evident, both from the non-formation of scale, and from the fact that there is no large body of water, or even a quantity of flues, etc., to heat to 212°, before a particle of useful steam is obtained. Only the iron itself has to be raised to a suitable temperature, and

steam will at once be produced, an operation occupying hardly a minute of time after the water is turned on, or barely twenty minutes after starting fires. Moreover, the water is kept in constant agitation, and thus the formation of steam is again expedited. In a word, the force is made as it is required, and not stored up in a reservoir—a point which seems to us to set forth more clearly the advantages of the system than any other we have adduced. The apparatus is easily managed, occupies about two thirds of the space of the ordinary tubular boiler, and weighs one quarter as much.

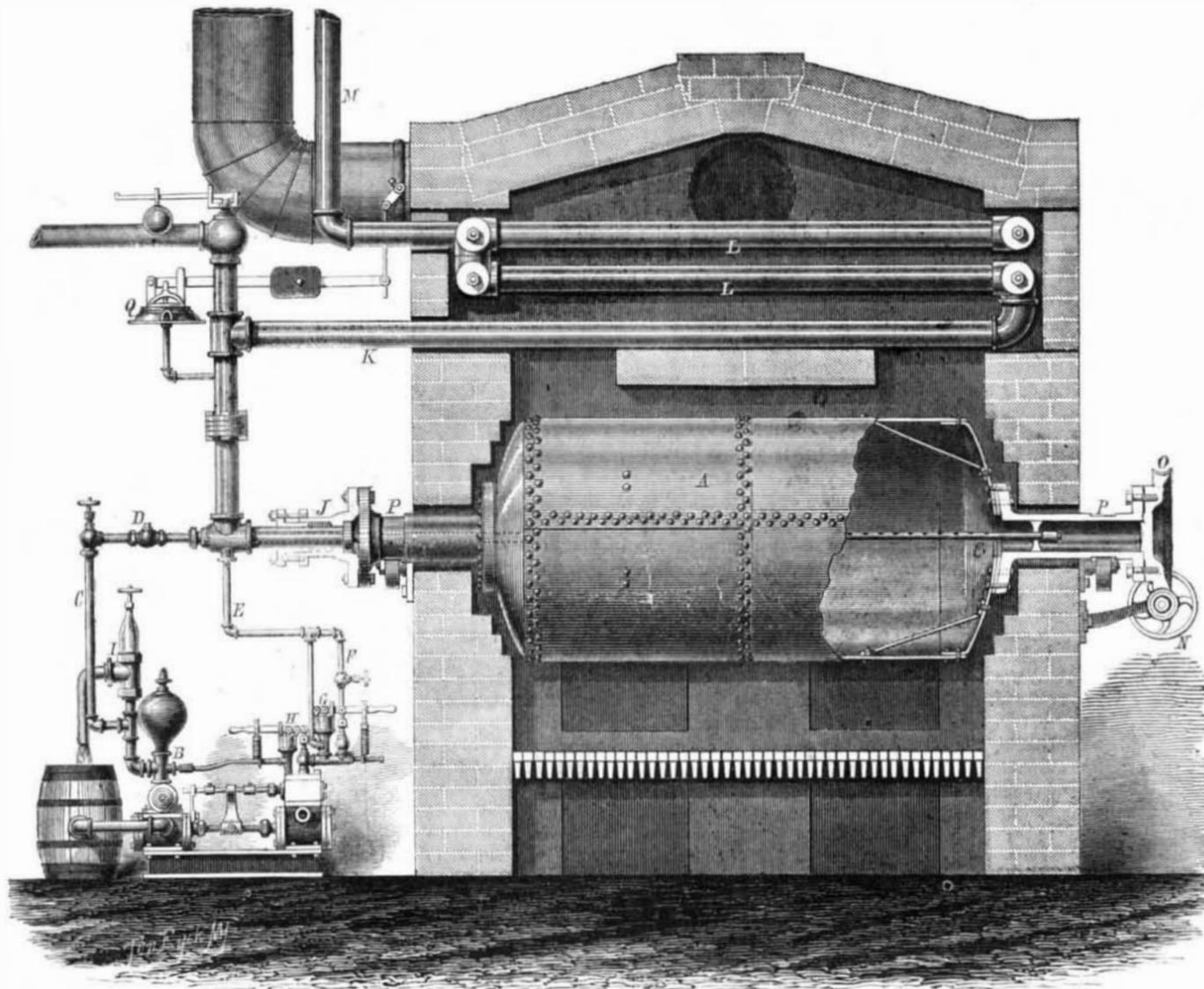
We recently had occasion to inspect one of these boilers in actual operation at the Empire Laundry, one of the largest establishments of its class in the world. The proprietors state that the generator, which is 6 feet 6 inches long by 3 feet 8 inches in diameter, has taken the place and does the work of two return flue boilers, each 27 feet long by 4 feet in diameter, having two 14 inch flues in each.

It has also effected a saving of thirty per cent of fuel, although the capacity of the drying closets in the laundry has been doubled. With the old boilers 65 pounds of steam were needed to keep up 116 revolutions of the engine. With the Mitchell generator, 45 pounds pressure to the square inch in the boilers is found to be sufficient. The engine used is rated at 50 horse power.

For rights of territory, further information, etc., address the inventors, Messrs. T. & T. H. Mitchell, No. 329 East 53d street, New York city.

If You "Go West," Young Man.

To both single and married men in the East who have decided to go West, we would whisper in their ears one thing which, if heeded, will be of value to them. It is this: Avoid a too common error, that of puffing yourselves up with the notion that you are going West to show the natives how to work; that out there you will be looked up to as somebody unusually smart in your line. The Western people estimate a man by what he really is as a mechanic, and do not give him credit for what he is not. True, if you are heralded as a workman of superior skill, they await your coming anxiously, and will lay nothing in the way when you have stripped off your coat and are one among them. But the moment it is discovered that you have been overestimated, all your pleadings about "how they do it East" will avail nothing. Hundreds of instances have come under our observation wherein workmen from the East have gone West inflated with conceit, and, when they were put to the test, were found almost worthless.—*Carriage Monthly.*



THE MITCHELL SAFETY STEAM GENERATOR.

the boiler to undergo. There are two results which the entering water can produce; first, if the cylinder be highly heated, steam will be made as fast as the water is supplied. But, as we have already stated, the moment the fixed pressure is exceeded, the overflow valve opens, and the supply is stopped until the steam is worked off sufficiently. The other result is the reverse of this, and consists in flooding the cylinder, when the same is not hot enough to make the steam. This necessarily cannot produce explosion, while, to obviate the difficulties which might be caused by the overplus, the valve is so set that the superior pressure of water above it, exceeding that of the steam below, brings it to its seat, thus stopping the water supply. The water in the pipe, C, it will be observed, is continually surrounded by steam, and is also heated by the exhaust, so that it is, the inventors assert, always kept at the boiling point.

The generating cylinder rotates over the fire at a speed of about two revolutions a minute; thus, it is claimed, heating the iron of which it is composed to an equal temperature throughout, so that even expansion and contraction necessarily follows. The crown sheet and other metal around the fire box of ordinary boilers, as is well known, usually first deteriorate, owing to their being subject to unequal contraction and expansion, due both to the excess of heat there applied over other portions of the generator, and to the shifting of the water line. The form of the present apparatus, it is claimed, necessarily precludes this defect, and hence its durability is largely increased. The generator, in fact, has no water line, and is all steam space, so that scale cannot form therein. When the foreign matter in the water becomes