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NEW SERIES.

## IMPROVED SINGLE BALANCE PUPPET VALVE.

The steam-engine has engaged almost every inventor's attention at some period of his or her (for there are lady inventors we are happy to say) life, but few, as all will readily acknowledge, leave their impress on the machine by such an improvement as is the subject of our engravings, which represent the invention of Charles Westland, who is at present residing at the Moss Hotel, No. 30 Bowery, New York.

Fig. 1 shows the improvement adapted to an oscillating engine in which the valve chests, A, are placed on the top of the cylinder, and the valves are elevated and allowed to drop by their own weight, by angle levers, B, moving on centers, a. These angle levers are operated by cams, C, which are braced to the framing of the engine and remain stationary while the cylinder oscillates, and as it carries the angle levers with it, it causes them to move against the cams and so receive their motion. An oscillating engine which had this valve attached (in fact, the one of which our engraving is a portrait) has been worked up to 400 revolutions a minute, and there does not seem to be any limit to the speed at which this puppet-

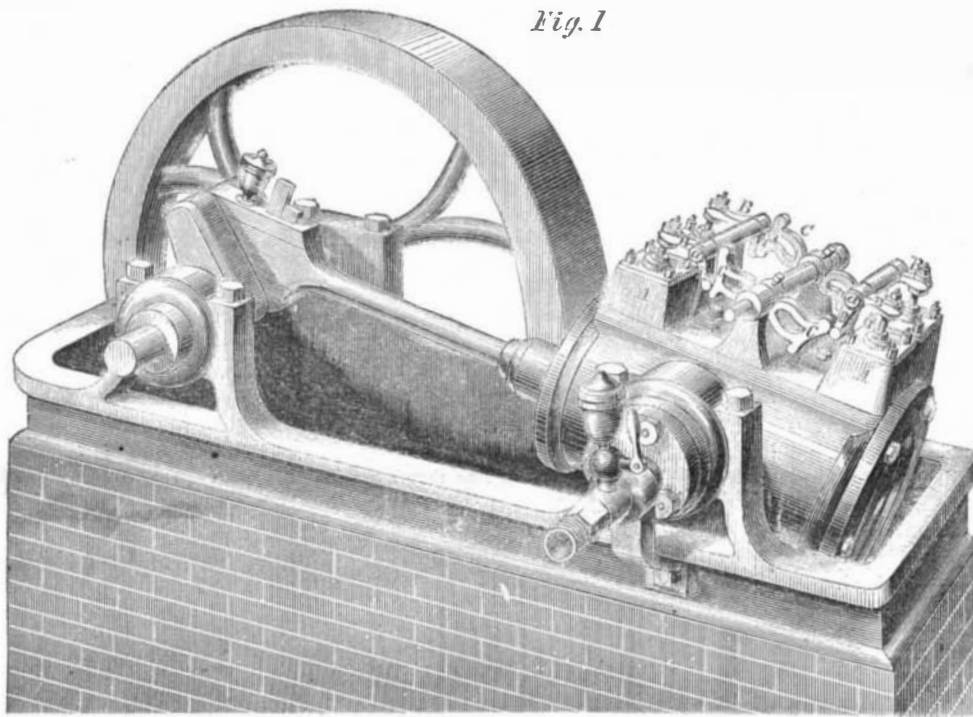
valve can be run. Fig. 2 is a vertical section across the valves at one end of the cylinder, D, and is taken from an engine now running at the works of the Atlantic White Lead Company, Brooklyn, L. I. A channel or steam passage, E, runs the whole length of the cylinder on each side, one of them having an induction passage, b, and the other an exhaust passage, c. On the top of the cylinder is the steam chest, F, which has the valve openings exactly corresponding to the hole in the channel, so that the communication is perfect. The steam valve, G, (represented closed, thereby preventing the admission of steam to the cylinder through the channel, E, and the opening, d, of the cylinder into the steam chest, F,) is mounted on a spindle, e, and is a cylinder of metal, f, just turned to fit its bearings steam-tight, the cylinder or valve, f, being connected with the spindle by arms. The spindle is guided in its up-and-down motion and prevented from shaking or jarring by its stuffing-box, g, on the top, and a bearing or guide, g', in a cross in the opening between the valve and the channel. The valve has two seats; one, h, at the bottom of the steam chest, and the other, h', at the top of the chest and about in the center of the space in which it works. This last seat forms a seat for the top of the valve when closed. Steam might be taken in through both seats; but as the area of the lower opening is always large enough, there is no necessity to take it in through more than the bottom seat. From this cause the motion of the valve need only be about one-fourth of the ordinary puppet valve, and by this means they are enabled to be opened and closed with more rapidity, and consequently, a greater advantage than usual can be taken

of the expansion of the steam. The exhaust valve, G', is precisely the same in construction as the steam valve just described. The method in which these valves are operated, D being a stationary cylinder, is shown in Fig. 3, which is a view of the cylinder taken to show the valves at both ends. D is the cylinder and A the valve

i, in position. The sliding toes are connected with the governor and so form a cut-off, if they are raised in their position on the stationary piece, I. The pins on the end of the jointed pieces, i, slide under them, and if they are lowered in their position the pins slide under them, so that the valve can be closed at any point of the stroke that may be regulated by the governor.

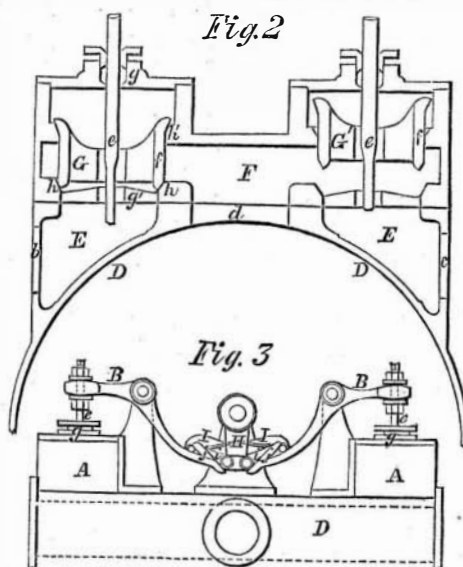
The company who own the engine from which these drawings are taken have written to the inventor stating that they have saved a considerable amount of coal by the use of this valve.

The inventor will be happy to furnish any further information upon being addressed as above. He is about to apply for a patent.



WESTLAND'S SINGLE BALANCE PUPPET VALVE.

chests. The spindles, e, project through the stuffing-boxes, g, and are moved by angle levers, B, which are elevated and allowed to fall by an oscillating arm, H,



which is moved by the eccentric. To this arm small pieces, i, are jointed, and they carry pins on their ends which, moving on the angle levers, depress them until they are above the level of a sliding toe, j, that is on the end of a piece, I, at the back of the arm, H, and when they pass over that the valves are allowed to drop by their own weight. A spring keeps the jointed piece,

your hands." He took them in his. "Hang it," he went on, "they are very dry for our experiment." "You think so?" "Certainly." "Then it is dangerous?" "It might be so." "In that case we will go," I said, turning to the door. "That would be a pity," my companion replied, holding me back: "stay, dip your hands in this bucket of water, dry them well, and they will be sufficiently damp."

I must mention that, to ensure the success of this marvelous experiment, no other condition is requisite than to have the hands slightly damp. I had scarce finished wiping my hands when the furnace was opened, and a jet of molten metal, about the thickness of my arm, burst forth. Sparks flew in every direction, as if it were a firework performance. "Wait a few minutes," M. Boutigny said, "till the metal is cleansed, for it would be dangerous to try our experiment at this moment."

Five minutes later the stream of liquid fire left off bubbling and emitting scoræ; it became, indeed, so limpid and brilliant, that it scorched our eyes at a few yards off. All at once my companion walked up to the furnace, and calmly began washing his hands in the metal as if it had been lukewarm water. I make no pretence to bravery. I confess at this moment my heart beat as if it would burst, and yet, when M. Boutigny ended his strange ebullitions, I walked forward in my turn with a determination that proved a certain strength of will. I imitated my professor's movements, and in my joy, I took a handful of the metal and threw it high in the air, and it fell back in a fire-shower on the ground.—Memoirs of Robert Houdin.