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IMPROVED SLIDE VALVE.

The valve of the steam engine has probably been the subject of more thought than any other piece of mechanism of equal size and simplicity. Several improvements in it have proved of great value to the inventors; and a firm in Providence, R. I., are just now accumulating a large fortune from an arrangement of valves which they patented a few years since. The invention here illustrated is of a novel character, and will attract the attention of engineers. It relates to the sliding D-valve, and its object is to relieve the valve from the downward pressure of the steam. The plan adopted is to make the back of the valve parallel with the face, and then to secure a smooth *stationary* plate in steam-tight contact with the back of the valve; the plate thus receiving the pressure, and allowing the valve to run freely under its lower surface.

In the annexed cuts, Fig. 1 is a longitudinal and Fig. 2 a cross section —both sections being vertical. The most darkly-shaded parts are the interior of the steam chest filled with live steam; A and B are the induction ports, and C, the eduction or exhaust; E is the valve; F, the balance plate; G, a sheet of copper; H, a circle of boiler iron; I, a screw to fasten the iron circle and sheet copper to the balance plate; J, a hole drilled through the screw, I; K, a circular cavity in the steam chest cover; L, a spring; M, set screws for the spring; N, preventive screws.

Fig. 1

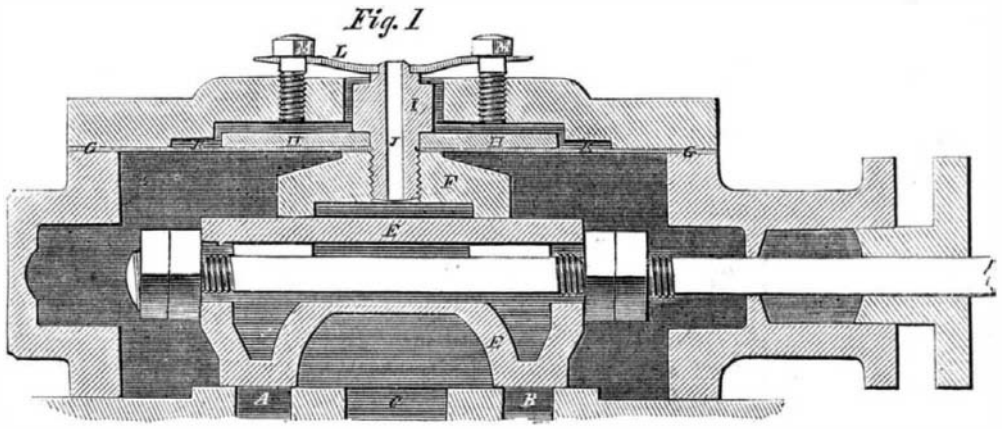
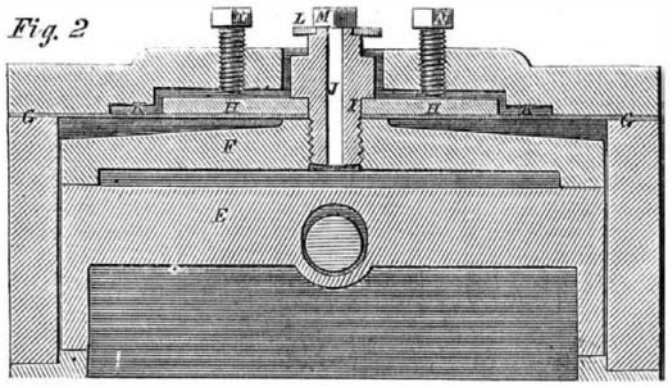


Fig. 2



STODDART'S IMPROVED SLIDE VALVE.

The iron circle stiffens the copper, and receives the upward pressure of steam inside the steam chest. Steam pressure keeps the copper in contact with the cover, except where the cavity, K, exists; hence, there is a certain upward pressure which is received by the screw, I, tending to lift the balance plate off the valve. Now, the area of the cavity, K, and of the circle, H, are so proportioned to the area of the balance plate, F, that the upward pressure on screw, I, is counterbalanced by the downward pressure of steam on the balance plate, and the spring, L, insures contact. The flexibility of the copper plate permits the balance plate to accommodate itself to the back of the valve under all circumstances. The area of the balance plate should not exceed the width of the valve by the distance between the steam ports and one-half the width of one steam port. Having determined the size of the balance plate, find the diameter of a circle of area equal thereto; and to this diameter add 1¼ inches, which will be the diameter of cavity, K. The diameter of circle, H, will be 2½ inches less than the diameter of cavity, K. These are appropriate dimensions for a valve of 10 to 15 square inches of steam port area. The balance plate should be placed truly over the center of the valve seat. The screws, N, are set within 1-16th of an inch of touching the circle, H; if the balance plate becomes unseated, the screws will receive the strain; they are simply preventives, and are also of service in first using a new valve, by screwing them home till the valve has worn a little. It may be thought that the hole through the screw, I, is unnecessary,; but it is not so, because if we drill through to the exhaust cavity in the valve, and thus draw off any leakage of the balance plate, it is plain that the sudden pressure when the engine exhausts would be felt by the balance plate and its equilibrium destroyed. Another reason for not drilling through to the exhaust is this: if the balancing arrangement becomes disordered, then, by simply shutting a small cock screwed in screw, I, the valve would continue to perform its function, precisely as a common unbalanced valve, without stopping the engine. And, further, the hole through screw, I, is a continual test of the condition of the balance plate, as, if any steam leaks between the balance plate and the valve, it will escape through the hole, I, and thus give notice of the leak.

This valve is in practical operation on a steamboat and in a flouring mill in California, and works satisfactorily.

Patents for this invention have been secured (through the Scientific American Patent Agency) both in this country and Great Britain (the United States patent bearing date August 16, 1859); and further information in relation to it may be obtained by addressing the inventor, David Stoddart, at San Francisco, Cal.

CLARIFYING SUGAR.—We recently gave an account of a new process practiced in Europe for clarifying sugar by means of lime and carbonic acid. Messrs. Meschelynck and Lionnet have communicated to the Academy of Sciences of Paris an improved mode of obtaining pure carbonic acid for this purpose. They heat chalk only to dull redness, and then let on to it a current of steam. The carbonic acid gas is collected in gasometers, and preserved for the sugar process.

WHAT WAS LEARNED BY THE OBSERVATIONS ON THE LATE ECLIPSE.

The solar eclipse of July 17, 1860 was more thoroughly observed than any other that ever occurred. In addition to the great number of trained observers who were scattered along the line of its path, from the State of Oregon to Egypt, the new art of astronomical photography leant its powerful aid towards obtaining a complete history of the phenomenon. In former total eclipses, when the sun was completely hidden by the moon, a bright halo or corona was observed surrounding the moon, while still brighter objects, appearing like protuberances on the edge of the moon, were seen extending into the corona. There had been much discussion among astronomers in regard to these appearances, some believing that they were produced by the action of the earth's atmosphere on the sun's light, others attributing them to the moon, and others still to the sun. Hopes had been for some time entertained that the eclipse of this year would afford observations which would settle these questions. These hopes have not been disappointed. The corona is a luminous atmosphere of the sun, brighter than the face of the moon, gradually becoming fainter as its distance from the sun increases, till it fades away in the sky without any defined limit, but visible at least 500,000 leagues from the body of the sun. The red protuberances are luminous clouds floating in this shining atmosphere, all of them pretty near the surface of the sun. It is a curious fact that some of these clouds impressed their image on the photographic paper, though they could not be seen through powerful telescopes. This fact is explained on the supposition that they may have emitted a deep violet light, mostly composed of chemical rays.

The application of photography to observations of the heavenly bodies was first made our by American astronomers, a fact admitted by the English and French.

COAL TAR AGAIN.—The gas-works in France have been obliged to employ additional clerks to attend to the sale of coal tar, in consequence of the new demand which has arisen for the article from its extensive use in the artificial preparation of fuel. Waste coal dust, sawdust, tan bark, &c., is mixed with coal tar and pressed in molds, when it is found to make an excellent fuel. The *Journal de L'Eclairage au Gaz*, published at Paris, has an illustrated description of a large apparatus which is used in this new manufacture.

THE FASTEST SAWING YET.—Lewis T. Hamilton, of Madison county, Ill., says that he sawed 31,270 feet of one-inch stuff, from 100 logs of white oak, hickory and elm in 12 hours, with a single 58-inch circular saw.