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THE K. M. I. STEAM ENGINE.

The principal feature of the novel form of steam engine illustrated here with, to which the attention of the reader is directed, is the valve, which is equally well adapted to either double or single machines. The double cylinder engine is constructed with cranks at right angles, has no dead point, and consequently requires no fly wheel, the leverage varying between one and one and a half cranks, nearly. The valve is actuated by bevel gearing communicating with similar mechanism on the main shaft, which may be in the center, or on the outside of the bed plate as represented in the perspective view, Fig. 1. To this portion of the apparatus, however, more particular reference will be made hereafter.

Fig. 2 is a section of the steam chest, A, valve, B, cut-off plate, C, and valve seat, D. The valve stem, it will be noticed, carries a bevel cog wheel above the steam chest, and is held in a suitable frame. The direction of the live steam is indicated by the bent arrow, at E, and the course of the exhaust by similar means at F. Proceeding to the consideration of the various portions in detail, we represent in Fig. 3 the bottom of the valve, B. G

is the dome which, as already indicated, opens into the live steam port, H, which is cut to one eighth of the circle; I is the exhaust aperture, cut to three eighths, whence the steam passes into the steam chest, as before noted, at F, Fig. 2. Around the dome, G, is formed a short cylindrical rim which passes down through the cut-off plate, C, and into the valve seat, so as to hold the valve in place. The arrow drawn beside Fig. 3 shows the direction of the rotation of the valve. In Fig. 4 is depicted the variable cut-off plate, C, which is a thin disk of metal; in it are four openings, which correspond with similar apertures, each equal to one eighth circle, in the valve seat, Fig. 5. These orifices embrace the stops, J, Fig. 5, which are pieces of metal secured to the valve seat and of the same thickness as the cut off plate. The object of these stops is to prevent the movement of the plate from affecting the points of admission of steam into the cylinders. The plate is controlled by the governor by means of suitable mechanism connecting with the cogged octant, formed at its circumference and fitting in a recess in the side of the steam chest. It is stated that the governor adjusts the cut-off, by moving the plate, with the greatest ease, the valve gliding over the latter with very slight friction.

The valve seat, as shown in Fig. 5, is pierced for a double cylinder engine. The openings, 1 and 3, connect with the right cylinder, and 2 and 4 with that on the left, the steam ways crossing, as indicated by the dotted lines. The valve moves over the seat in the direction of the arrow, Fig. 5, which, as before noted, is pierced for a fixed cut off at half stroke, since one eighth passing over one eighth gives one quarter revolution or one half stroke; while, as the exhaust port is cut three eighths of circumference, necessarily three eighths passing over one eighth gives one half revolution, or full stroke for exhaust.

According to the inventor, this valve is capable of these modifications as follows: First, the valve constitutes the steam chest, the steam taking the ordinary course, the live steam port connecting with the steam chest and the center dome connecting with the exhaust port, which

opens downward only, the joints being visible and showing any leak that may exist.

In the second, the course of the steam is reversed; the live steam port of the valve opens into the center dome. The exhaust port, opening upward, discharges the exhaust steam into the steam chest above the valve. This modification is already described and shown in Fig. 2.

In the third plan, a part of the top of the steam chest is attached to the valve stem, in surface slightly less than the bottom of the valve, producing a balanced valve, the top

works a similar wheel, L, upon the rod which connects with the valve gear. Between the wheels, K, and sliding loosely upon the shaft, is a sleeve forming a clutch which may be brought into action, as plainly indicated, with either. The sleeve, although moving freely along the shaft, is rigidly connected with it by a feather and slot, so as to partake of its rotary motion. It is evident, therefore, that the wheel, L, thus receives its motion from but one wheel, K, while the other is inoperative, and hence, as is evident from the arrangement of the gearing, may, by altering the position of the sleeve, be caused to rotate always in the same direction.

The claims of the inventor regarding the merits of his device, advantages which we learn secured for it much attention and favorable comment at the recent Louisville Exposition, may be briefly summed up as follows: That, in dispensing with the fly wheel and the eccentric, and in the free movement of the valve, there is a saving of a great part of the resistance arising from the moving parts of the engine itself. That the double engine costs no more, and the single engine less, than the common non-cut-off engine of the same power. That in econ-

omy of steam, and consequently of fuel, it accomplishes all that engines of the highest grade can accomplish, while it is remarkable for simplicity and cheapness of first cost. That it cannot get out of order except by breakage or wear of parts, and can be managed by an unskilled hand. The valve, it is also stated, can be attached at small expense to engines now running, giving them the fixed and automatic cut-off, with a saving of half the fuel for the same amount of work. The double engine, it is believed, has peculiar adaptation to road steamers, steam plows, etc.

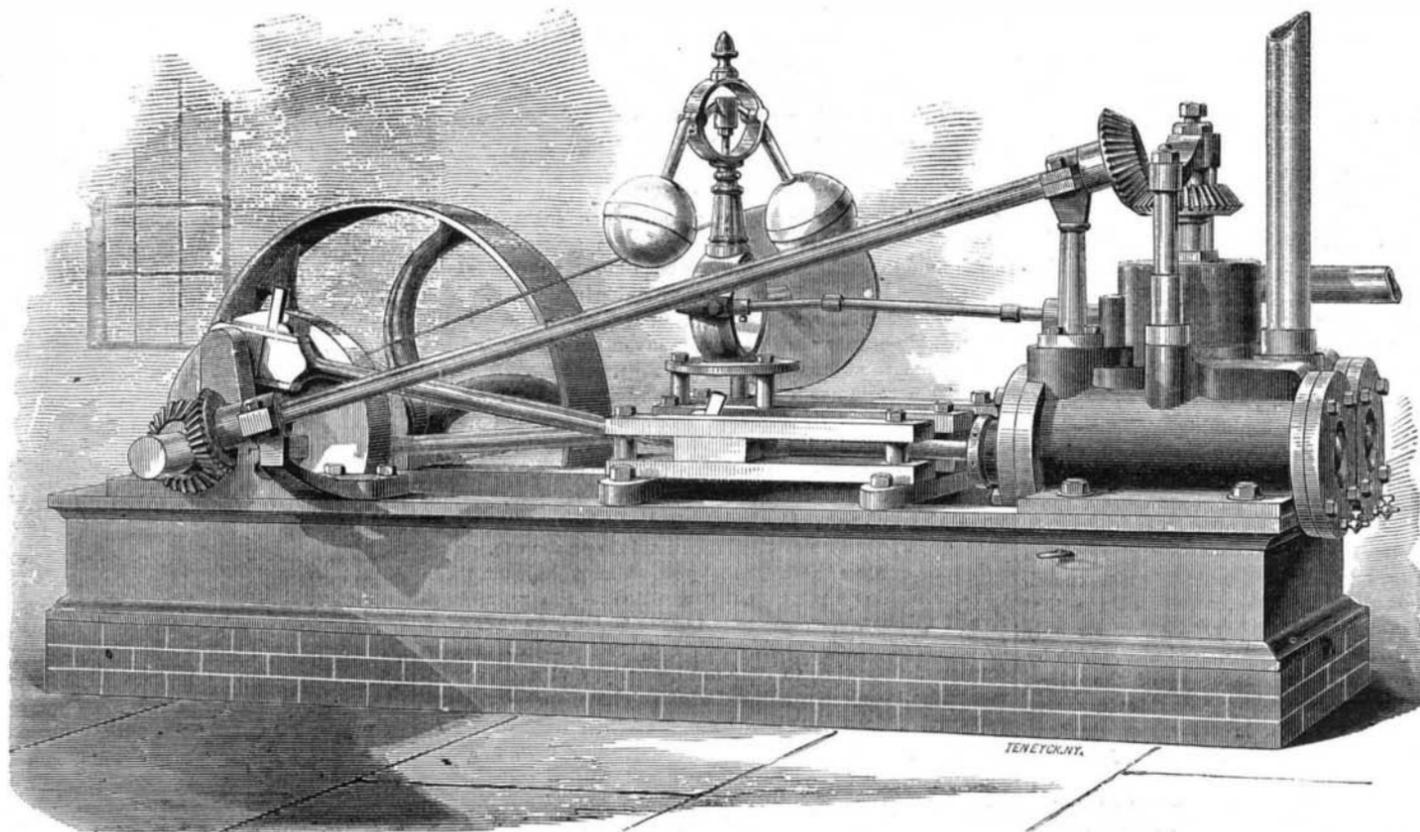
Our engraving is taken from a photograph of this form of the machine, as exhibited at the above mentioned exposition.

Patented September 9, 1873. For further information address the inventor, Colonel R. T. P. Allen, Superintendent Kentucky Military Institute, Farndale P. O., Franklin county, Ky.

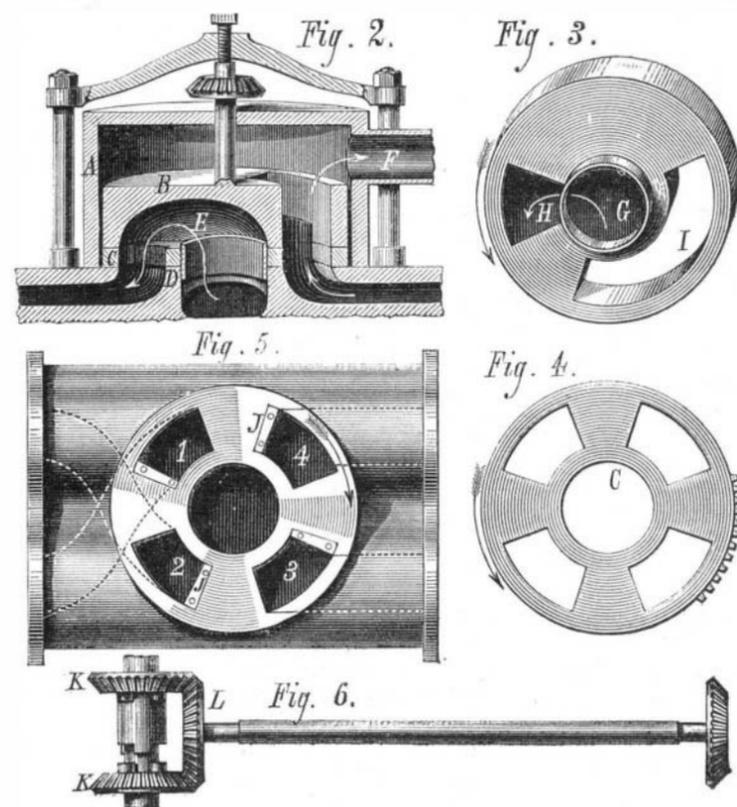
The Cotton Window in the Guildhall, London.

Mr. W. J. Cotton, a London merchant, and an alderman, has recently presented to the city a stained glass window, in commemoration of the troublous times of the scarcity of cotton during our late civil war, and the generosity of the Londoners in aiding the Lancashire operatives. Alderman Cotton was a zealous worker on behalf of the relief fund; and if, by accident, the memorial window perpetuates his own name, no one will grudge him the distinction.

The window illustrates the cotton plant, in the different stages from its growth to its final application to clothing, by twelve medallion pictures, showing sowing, growing, picking, packing in the field, loading at New Orleans, at sea in an American clipper, discharging in the London Docks, carting, in transit on the rail, the Manchester Piccadilly (the Cottonopolis), manufacture in cotton mill, and wearing, the last named being a family group. The color of the ground work is lavender; the borders are ruby, with an amber ribbon; the designs are filled in with ruby, amber, and lavender, the gothic scroll work being brownish white.



THE KENTUCKY MILITARY INSTITUTE STEAM ENGINE.



of the steam chest being reduced to a narrow outer rim. The steam, entering at the side of the chest, takes the ordinary course. Fig. 6 shows an ingenious device employed for connecting the cog wheel which actuates the valve with the main shaft, whereby the movement of the latter may be instantly reversed without altering the direction of rotation or the