

found to be the ultimate powers of resistance of sheet iron plates, when riveted together similar to those in boilers and other constructions.

Mr. Fairbairn then exhibited sketches and diagrams in illustration of boilers of the cylindrical form, showing the necessity for adherence to form, and all those elements in construction so essentially requisite for the attainment of uniformity in the strength of all the parts. For these objects, gussets, similar to those adopted for giving stiffness and rigidity to the Britannia and Conway tubes, were in this case recommended, as shown in engraving, for imparting strength and retaining the flat ends of cylindrical boilers in shape.

The gussets which are shown at A, would diverge or radiate from the centre of the boiler, and might be increased in number according to the pressure the boiler was calculated to sustain; or, rather, equal to the strength of the other parts of the structure. The author earnestly recommended this principle of construction, as infinitely superior to stay-rods as a means of security against sudden and unexpected pressure.

Steam Brake for Locomotive Engines. By G. MAUGHAM, C. E.*

The system of brake in question consists in fixing to the support or other convenient part of the boiler, a steam cylinder or valve *a*, from 6 to 8 inches in diameter; the piston or valve rod being connected with the ends of the levers *b b*, which act upon the blocks *c c*, constituting the brake. A connexion is formed with the boiler, by means of a small steam pipe *e*, having a shut off cock fixed within reach of the engine driver.

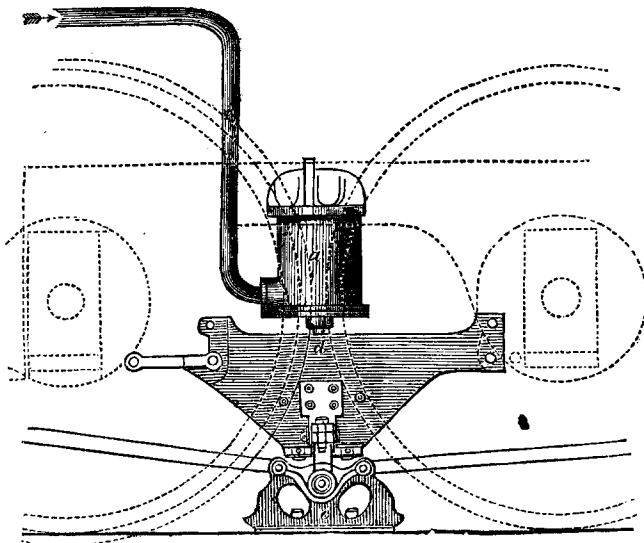


Fig. 1.—Side View.

The steam being admitted under the piston, raises the same, and consequently the two levers *b b*, and thus cause the brake-blocks *c c*, to

* From the London Architect for September, 1851.

descend upon the rails. The pressure of the steam gradually increases, until it has acquired the same force as that in the boiler. The pressure on the rails will then depend upon the force of steam per square inch in the cylinder or valve, multiplied by the leverage. The communication with the boiler being shut off, and the discharge cock opened, the brake-blocks will rise by means of the counterweight fixed on the levers. The effect of this break may be regulated at pleasure, by admitting more or less steam, as circumstances may require.

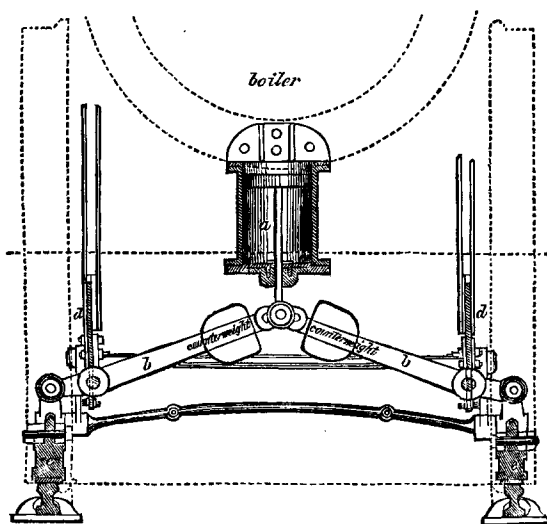


Fig. 2.—Transverse Section.

The above brake has been in use on the Namur and Liege Company's lines in Belgium during the last fifteen months, and daily experience proves its use to be highly advantageous and economical. The advantages arising from its application may be enumerated as follows:

1. In cases of immediate danger, the brake in question acts instantaneously, it being worked by the engine driver, who is in most cases the first to perceive the necessity of stopping the train.

2. The elasticity of the steam acting like a spring, allows the brake-blocks to rise over the inequalities of the line in passing over bad joints, switches, crossings, &c.; whence a great superiority over the brakes acted upon by a screw.

Lastly, its economy. By applying a steam-brake to locomotives, a brake carriage and its attendant may be dispensed with; thus decreasing the current expenses, viz: constant repairs to wheel tyres, guard's wages, to say nothing of the traction of the carriage.

The cost of a steam-brake (each) applied to a goods engine, is about 25*l.*; to keep the same in repair the cost is insignificant, the plates under the brake-blocks being the only pieces which require replacing from time to time.

Tender-wheels under the system usually adopted are very soon worn out, and require re-tyring; by affixing a steam-brake to the engine, no necessity exists in ordinary cases to allow the tender wheels to slide or skid upon the rails in stopping a train. In order to test the value of the above system, an experiment was made on the Mons and Manage Railway, on an incline of 1 in 100, its length being about $2\frac{1}{2}$ miles. To regulate the descent of a train of 42 loaded wagons, a single brake-carriage and the steam-brake were only made use of; whilst by the ordinary method, the same train required two brake-carriages and the tender brake. In the latter case, 14 wheels were exposed to rapid wear and tear, whilst in the former only 4 wheels were allowed to skid along the rails.

The above experiment fully bears out what has hitherto been stated, as far as regards the economy of the system. The utility of a brake of this description, in cases of extreme danger, cannot be questioned. Its extended application to locomotive engines would be a great safeguard to the public, and might probably be the means of preventing the recurrence of accidents similar to those which have recently taken place in England.

Mons, Belgium, July, 1851.

AMERICAN PATENTS.

List of American Patents which issued from October 14, to November 4, 1851, (inclusive), with Exemplifications by CHARLES M. KELLER, late Chief Examiner of Patents in the U. S. Patent Office.

16. For an *Improvement in Insulators for Telegraph Wires*; John M. Batchelder, Cambridge, Massachusetts, October 14.

"The object and design of this invention is, to afford a convenient and suitable holder or supporter for the wires of the electro-magnetic telegraph, and to secure a more perfect insulation of the wires, especially during rain-storms, than has heretofore been effected."

Claim.—"What I claim is, the re-entering angle at or near the base of the cup, as described, for the purpose of giving the wind a direction downwards, thereby preventing the rain that is driven by the wind, from entering the cavity of the cup.

"I also claim the annular disk, or washer, supported upon the centre shank, or rod, and so placed within or at the open or lower end of the inverted cup, as to prevent the free access of wind and rain to the inside of the cup.

"I do not claim the mode of imbedding the shank in glass, cast around it; but I do claim the application of the enamel, or glazing of porcelain, glass, or other vitrified non-conducting material, to a surface of metal, when the same is used for insulating the wires of the electric telegraph."

17. For an *Improvement in Insulators for Telegraph Wires*; Zenas C. Robbins, Washington, District of Columbia, October 14.

Claim.—"What I claim as my invention is, my improved insulating supporter for telegraph wires, composed of the supporting and protecting cover, the winged tube, the wire holder, and the insulating segments, arranged and combined with each other, substantially in the manner herein represented and described."

18. For an *Improvement in Imitating Marble*; Hiram Tucker, Cambridge, Massachusetts, October 14.

Claim.—"What I claim as my invention is, the process, substantially as described, of preparing and applying colors to glass, or other suitable transparent medium, so as to imitate the varied or colored appearance of polished marble or other mineral."