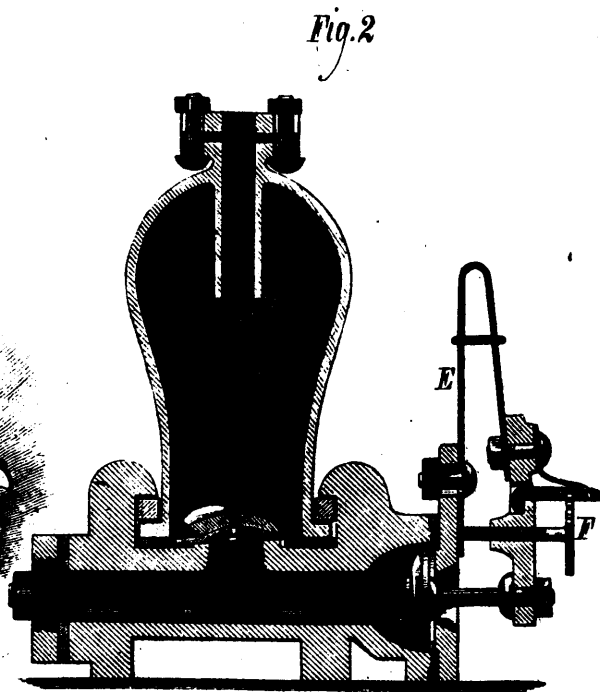




MORROW'S HYDRAULIC RAM.

IMPROVED HYDRAULIC RAM.

The hydraulic ram is one of the simplest and most desirable devices for raising water where a fall of a foot or more is available, providing its construction be such as to insure continuous and uniform action under equable conditions. A ram which seems to embody every essential feature without being unduly complicated is represented by the annexed engraving, in which Fig. 1 is a perspective view showing the exterior, and Fig. 2 is a vertical section showing the interior construction.

The base of the ram has a horizontal passage, A, with a discharge valve, B, at the top, and an overflow valve, C, at the end. Covering the discharge valve there is an air chamber, held in place by keys or wedges, and furnished with a discharge pipe at the top, which projects a short distance downward and serves the double purpose of a discharge for water and an escape for the surplus of air in the chamber. One of the greatest troubles with all rams, aside from this one, is the gradual increase of water in the air chamber until the chamber is filled and the ram stops. The ram shown in the engraving airs itself, and drives off with the water any surplus air when the quantity is more than sufficient to fill the space above the lower end of the tube, D.

The discharge valve, B, is attached to a flap formed on a disk of leather which also forms the packing of the lower end of the air chamber. The valve is concave to receive the head of the rivet or bolt which secures it to the leather, and the leather touches the valve seat a short distance from the edge of the valve opening. By means of this construction the valve is always kept free from ridges, and whether or not it always strikes exactly in the same place it is always tight.

The overflow valve, C, is hung upon a casting attached to the lower end of the spring, E, and its stroke is regulated by the screw, F, which bears against the body of the ram. The screw, F, carries a toothed head which may be secured in any desired

position by a stop or pawl. This construction admits of regulating the overflow valve to the 1-448 part of an inch, and effectually prevents it from jarring out of adjustment. The valve can be regulated to make from 30 to 300 strokes per minute, and the ram may be adjusted so delicately as to raise water 10 feet on a 9 inch fall, or it may raise water 200 feet with less than 4 feet fall. For irrigating lands, supplying dairies, farms, barnyards, dwellings, factories, engines, railroad stations, villages, etc., this ram is invaluable, as its extreme simplicity enables it to be set up or repaired by any one likely to use it.

This improved form of hydraulic ram is the invention of Mr. H. F. Morrow, of Chester, Pa., who has a patent for it and an application pending.—*Scientific American*.

A Beaumont compressed-air locomotive was tried on the Metropolitan Railway last week. The engine was not large enough to draw a complete train, the wheels being only 30 in. in diameter. The inventor, Colonel Beaumont, R.E., was present, together with Mr. Tomlinson, chief engineer of the line; Colonel Frank Bolton, Major Ardagh, of the War Office; and several other gentlemen. A start was made from the Chapel-street works of the railway company near the Edgware-road Station. The engine ran to Baker-street, where it was shunted on to the St. John's Wood line to pick up a carriage, then ran from Baker-street to Moorgate-street. On the return journey, after a halt at King's Cross, the engine ran without a stop to Edgware-road, the distance between the two stations—which is for the greater part an ascent of 1 in 100—being performed in eight minutes. The total distance run, including the shunting, was about eleven miles, and the weight moved, including the engine itself, was about 20 tons. The engine commenced with an initial pressure of 1,000 lb. on the square inch, and when the run was finished the gauge showed a remaining pressure of 300 lb. in the cylinders.