

The improvement in these treble beat hydraulic valves consists in making the outer beats as near as possible of one size, and allowing the water to act against the middle plate to lift the valve, which will give a third beat, and a third discharge of water, and consequently reduce the lift, prevent concussion, and increase the durability not only of the valve, but other parts of the machinery.—Registered 1851.

202 ASHBY, JONATHAN, *Croydon Common*—Inventor.
Screw friction clutch, for engaging and disengaging machinery, while the moving power is in motion.

204 LEES, T., *Stockport*—Inventor.
Water-gauge, alarm valve, &c.

205 NEWCOMB, THOMAS, *12 Norfolk Place, East Lane, Walsworth*—Inventor and Maker.
Brass model of machine, for rolling tanned hides. Its objects are, increased speed in drying hides, less power in working, and a finer finish in the leather. The pressure on the hides may be varied from 1 cwt. to 2 tons.
Brass model of patent furnace for marine or stationary steam engines; it supplies itself with fuel, consumes its own smoke, and burns small coal.

206 HASKETH, —, *Redruth*—Inventor.
A lubricator for machinery.

208 GADD & BIRD, *Manchester*—Inventors.
An expansive piston.

300 LLOYD, GEORGE, *70 St. Guildford Street, Southwark*—Inventor and Manufacturer.
Patent centrifugal disc blowing machine.
The centrifugal exhauster differs from the ordinary

blower in requiring no outside case; the air or gas is drawn through the pipes, and discharged through the opening in the periphery, into the atmosphere.

301 NAPIER, J. R., *Vulcan Foundry, Glasgow*—Inventor.
Portable rivet-heater, for iron ship builders or boiler makers.

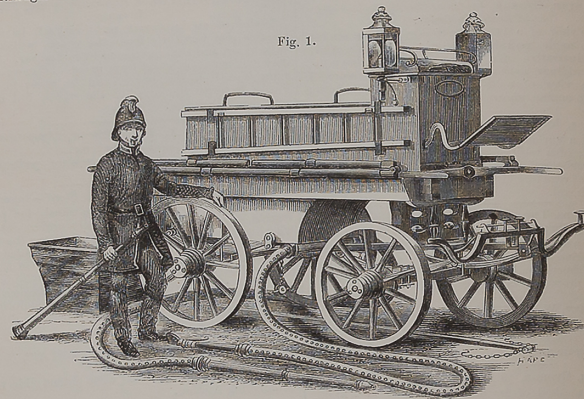
304 KENNEDY, M., *3 George Street, Camden Town*—Designer and Manufacturer.
Improved blast-fan, for blowing smiths' forges, and founders' furnaces, applicable also for ventilating and fumigating.

305 WHEELER, EDMUND, *2 North Buildings, Finsbury Circus*—Inventor and Patentee.
Equilibrium slide valves for steam engines, to relieve the valve from the pressure due to the elastic force of the steam.

400 DALY, JOHN, *Brass and Lead Works, Limerick, Ireland*—Manufacturer.

Bronze bell, mounted between two brass pillars, with the bust of Shakespeare on the top.
Improved brass pump, for supplying kitchens, water-closets, cisterns, stable-yards, &c.

401 MERRYWEATHER, MOSES, *63 Long Acre*—Manufacturer.
Carriage fire-engine to be drawn by two or four horses, London Fire Brigade pattern (Simpkins' patent) with 7-inch gun-metal cylinders, and spherical copper air-vessel; gun-metal pistons and valves in separate valve chambers; handles for 30 men, to fold up fore and aft; improved wrought-iron fire carriage, patent axles and springs; double delivery screws for attaching two lines of hose. Fully equipped with hose, suction-pipes, nose-pipes, jet-spreader, &c. Fig. 1 represents this engine, and the peculiar dress of the fire brigade.



Merryweather's Carriage Fire-engine.

Light carriage fire-engine, Simpkins' patent; country pattern for post-horses, with handles for 20 men. Equipped and furnished like the preceding.

Patent metallic fire-engine, for tropical countries, to be drawn by hand.

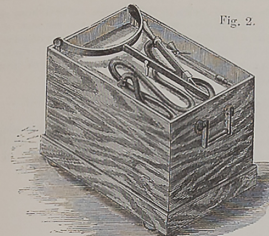
Ship fire-engine for six men; on the patent principle, with suction-pipes, delivery-hose, branch-pipe, &c.

Cabinet fire-engine (fig. 2, p. 227), for mansions, picture galleries, &c.

Two portable conservatory engines.

A coil of best leather-hose, copper-riveted, with gun-metal union screws—London Fire Brigade pattern.

A coil of patent seamless canvas hose, screw, &c., as before.



Merryweather's Cabinet Fire-engine.

An improved short branch-pipe and nozzle fitted with Baddeley's jet-spreader.—Registered 1842.

An improved metal breeching for connecting two separate lines of hose into one, or for dividing one line into two.—Invented by Lord Thurlow; registered 1844.

Improved preventor (or fire-hook), capable of being lengthened indefinitely.—W. Baddeley, inventor.
Six improved japanned leather helmets, and leather belts and axes, for firemen.

Leather and canvas fire-buckets.
Set of seven portable fire-escape ladders on hand carriage, with guide wheels, safety-belt and rope, as supplied to the City police, &c.

Domestic family fire-escape, simple and easily applied.
Fireman's leather morion, as made at the establishment of the exhibitor in the early part of the 18th century.
Old English leather black-jack, of the same period.
Old English leather plate-basket, of the same period.

402 SHALDERS, WILLIAM, JUN., *Bank Place, Norwich*—Designer and Manufacturer.

Patent fountain pumps, engines, and hydraulic working parts, in various metals, for beer, &c., and for house or garden cisterns.

The advantages claimed consist in their reciprocating and rolling action, which is effected without leakage, friction, or liability of choking from such particles as are not easily prevented from entering without blocking up the entrance to their suction-pipes, as small stones, shingle, &c., or from cargoes of grain, pepper, rice, beans, &c., the evolutions of the connector quickly expelling such matters, without receiving material injury, but which with the valve leathers are the only parts that suffer at all; they will pump up even from the bottom of deep wells, and drive up to a higher level any puddled soil or half sand and half water, and that more economically than by other means. Fountain pumps admit of more economical and simpler construction than the common piston and cylinder pumps, and by their admitting of either quick or slow motion without leakage or loss of power, they are easily applied to any motive force; they are cheap, simple, and durable, and, with common smiths' tools, the most complex are readily examined or repaired.

403 STOTHERT, RAYSON, & PITT, *Newark Foundry, Bath*—Improvers and Manufacturers.

Iron crane for a dock or wharf, with improvements in the gib, and in the general arrangement and proportion of the parts.

403A STOTHERT, H., *Bath*—Inventor.

Model of a plan for removing the sewage of London without disturbing the present arrangement of drains.

404 FOX, HENDERSON, & CO., *London Works, Birmingham*—Inventors.

Derrick crane and model. Proving press and patent pipes.

[This crane was put into actual service in lifting the heavy machinery around it into their present places, and is equally applicable for their removal at any future time. It was also employed in the construction of the building, and particularly in unloading and testing the cast-iron girders.]

405 BERRIDALE, LORD, *17 Hill Street, Berkeley Square*—Inventor.
Double-acting fire-engine, for private houses; exhibited for power and ease of working.

406 FOURDRINER, E. N., *38 Barclay Street, Sunderland*—Inventor.
Patent safety apparatus, for preventing loss of life and property when a rope or chain breaks in shafts of mines and collieries.

407 BEGG, W. G., *20 Market Street, Edinburgh*—Inventor and Manufacturer.
Safety cages, for mine shafts, to prevent the loss of life and destruction of property in mine shafts, when the rope or chain snaps.

408 EASTON & AMOS, *Grove, Southwark*—Part Inventors and Manufacturers.
Improved patent hydraulic ram, originally invented by Montgolfier, in France, and patented by him in 1797; the English patent has passed into the hands of the exhibitors.

[This machine, which is self-acting, is composed of an air vessel and three valves, two for the water, and one for keeping up the supply of air. Upon pressing down the valve in the conducting tube, which opens downwards, the water escapes from it, until its momentum is sufficient to overcome the weight, when the valve immediately rises and closes the aperture. The water having then no other outlet than the inner valve, rushes through it, by its generated force, compressing the air in the air vessel until equilibrium takes place, when the air reacts by its expansive force, closing the inner valve, which retains the water above it, and driving it up the ascending tube. By this reaction, the water is forced back along the conducting pipe, producing a partial vacuum beneath the outer valve, which immediately falls by its own weight. The water then escapes until it has acquired sufficient force to close this, when the action proceeds as before. It is best adapted for the raising of moderate quantities of water, as for household or farming purposes.]

409 BADDELEY, WILLIAM, *29 Alfred Street, Islington*—Inventor and Manufacturer.

A portable, and simple farmers' fire-engine. It is also applicable as an agricultural force-pump.
A portable fire-engine; two sizes.

410 SHAND & MASON (late TILLEY), *245 Blackfriars Road*—Manufacturers.

Improved brigade fire-engine, with complete set of tools and implements, worked by 28 men; is drawn by horses, and carries the firemen; has improvements in suction or inlet cock, air-vessel, and exit pipe; by means of the latter two, right angles are avoided in the passage of the water. This engine is represented in the accompanying Plate.

Mansion or factory fire-engine, for 20 men.
Metallic fire-engine, for 14 men, suitable for any climate.

Ship's fire-engine, for 6 men, mounted on wheels.
The above are each fitted with metallic valves, draw water through suction-pipe or from cistern, and are mounted on four wheels, with locking-carriage and drag-handle.