

FIFTY HORSE POWER ENGINE AND BOILER.

We illustrate from the *Engineer* a semi-fixed engine of unusually large size made by Messrs. Ruston & Proctor, of Lincoln, to the following specification:

Cylinders.—To be respectively 14 inches diameter for the high pressure and 23½ inches diameter for the low pressure, the steam passing from the first to the second, and thus expanding to the most economical extent; both to be 24 inches stroke. The working barrel of each to be cast separately of specially selected hard metal and forced into the main casting, the space between forming the steam jacket, which completely surrounds each cylinder. The slide valves of the same kind of iron scraped up fairly with the valve faces. The steam chests to be placed on each side and the stop valve chamber centrally in front, all the valves being at once accessible on the removal of their respective covers. The cylinders to be planed to receive the channel iron frame and strongly bolted to it; at the top to be secured by a flange to the boiler. The cylinder covers to be polished, the glands all brass of extra strong pattern, suitable drain and tallow cocks to be provided, and a special arrangement for draining the steam jackets. The barrels to be covered with felt and wood lagging, and finished with neat sheet iron casing fastened by screws.

Pistons.—Of improved pattern, with two metallic packing

branch from the exhaust pipe connected by a copper tube, furnished with brass cock, to the "return" pipe of the pump. The overflow water, thus highly heated by the exhaust steam condensing and uniting with it, passes down and raises the temperature of all the water in the feed tank to nearly boiling point.

Crank shaft.—Of steel bent from a single bar, and truly turned, to be long enough to carry a pulley at both ends.

Crank shaft carriages.—To be strongly attached to the frame, and very substantial, with extra long gun metal bearings adjustable both vertically and horizontally, and caps made to fit over projections on the horn blocks.

Flywheel.—10 feet diameter by 16 inches face, of heavy pattern, turned to carry belt; revolutions per minute, 90.

Bed plate.—To be formed of two strong channel iron bars firmly braced together at the ends by the cylinder and ashpan castings, and stayed between by the wrought iron plate carrying the guide stands.

Boiler.—Placed over the engine; to be of the loco-multi-tubular type, very strong, of ample capacity and extra heating surface, suitable for burning wood. The barrel plates to be of best Staffordshire quality; double riveted in longitudinal seams, and arch plate of same quality. The tube plate and other plates of flanging quality.

Fire box.—To have large grate area. All the plates—front

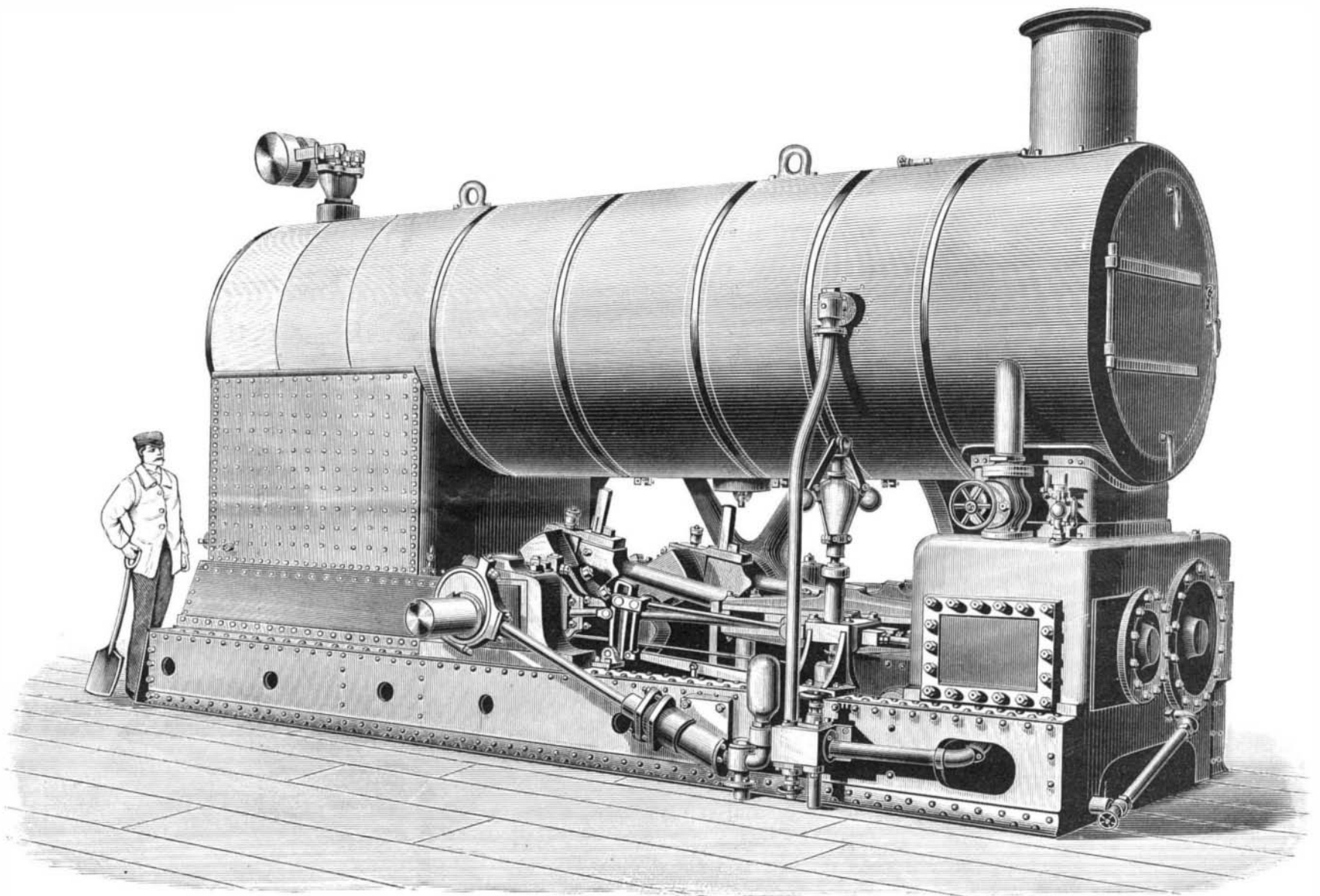
connected by a copper bend with an anti-priming pipe fixed inside the boiler. Combined spring balance lever safety valve, and improved lock-up spring safety valve. Steam pressure gauge and brass siphon, glass water gauge of strong pattern, two brass gauge cocks, and signal whistle. Steam jet pipe and cock for forcing the draught. Brass blow-off cock and water plug.

Sundries.—The boiler barrel to be felted, lagged with wood, and neatly covered with sheet iron. The engine to have good lubricators to all bearings; tool box and set of case-hardened spanners; firing tools and shovel; suction and return pipes; tube brush and rod; water funnel; oil tin and spare gauge glass; also suitable holding-down bolts.

Generally.—To be capable of working up to three times its nominal power, and to be tested under steam by a friction brake; to be made throughout of the very best material and workmanship, every part being finished accurately to gauge by the most modern appliances.

Coal Dust Fuel in France.

The United States Commercial Agent at Nantes says that the coal dust, which was formerly rejected as worthless, is now consumed in immense quantities in France in the form of "patent fuel," or coal bricks. The natural supply of dust from the yards of the coal merchants being entirely in-

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rings and internal spring ring, to be bored taper and secured by outs to steel piston rods.

Crossheads.—Of hammered scrap iron, forged solid, tool finished all over, and cotttered firmly to piston rods.

Slide bars.—To be quadruple, of rectangular section, bolted respectively to the cylinder covers and neat guide stands. Slide blocks of cast iron with large wearing surfaces. Gudgeons of steel, firmly keyed to crossheads.

Connecting rods.—Of best scrap iron finished bright, fitted at both ends with extra long gun metal bushes secured by straps and cotters.

Eccentric straps.—Of gun metal polished, with bright wrought iron rods and case-hardened joints and pins. Valve spindles of steel, to work in suitable brass guides.

Automatic gear.—The admission of steam to the high pressure cylinder to be automatically varied by the governor from 1 per cent up to 50 per cent of the stroke, according to the power required, by an improved arrangement of gear consisting of a double-ported expansion valve connected by a radius rod to a rocking slot link driven by a separate eccentric.

Governor.—Of improved cross-arm type, very sensitive in action, connected directly to the expansion gear, and furnished with an oil cylinder to steady it.

Feed pump.—Of ample size worked by separate eccentric, with gun metal plunger, valve box and valves and copper delivery pipe; to work continuously, water not required by the boiler being returned through a regulating cock to the feed tank.

Water heater.—Of improved construction, to consist of a

cover and tube plate—to be exclusively of Lowmoor or of Bowling iron, and to be well strengthened by deep girders and screw stays at top and sides respectively.

Tubes.—To be of best wrought iron lap welded, 2 inches extreme diameter, 144 in number; expanded by patent tool at smoke box ends, and secured in the fire box by steel ferules.

Manhole.—To be formed in a stout wrought iron plate, flanged and riveted round the opening, with a strong cover, crossbars, and bolts. Mudholes, suitably furnished, to be made at each corner of fire box, in the smoke box, and in a mud collector placed under the barrel.

Seatings.—Strong cast iron seatings, truly faced, to be riveted on the shell to carry the safety valves and check valve.

Workmanship.—The plate edges to be planed and fullered, rivet holes to be accurately punched fair with each other, and plates be riveted up by patent hydraulic machinery. The stayholes in the firebox to be drilled through both plates at once, so as to be perfectly true.

Pressure.—To be strongly stayed for a working pressure of 120 pounds per square inch, and tested by water to 200 pounds per square inch.

Mountings.—To be furnished as follows: Strong wrought iron smoke box, with door and fittings. Chimney base, and wrought iron chimney finished with bell top and damper plate. Fire door with baffle plate, set of fire bars, and cast iron ash pan with regulating damper. Brass safety plug screwed into crown of fire box. Balanced steam stop valve with starting handle, placed in the cylinder casting, and con-

sufficient for the needs of the brick works, the manufacturers, particularly in the Nantes district, import a large quantity of coal dust from Cardiff, Swansea, and Newport. The process of manufacture is very simple. The coal dust is mixed with pitch, and the mixture poured into cups attached to a belt, each cup containing just enough material for a brick of the size desired. The belt in its movement passes this material through a chamber where it is exposed to steam, which fuses the two substances into a homogeneous mass.

This is poured by the descent of the belt into moulds, where it is subjected to an enormous pressure by a hydraulic press or by machinery set in motion by a steam engine. The brick is square in form, its thickness being about one-third of its other dimensions, and it weighs five, ten, or fifteen pounds. Certain of the French railway companies refuse to accept fuel unless at least 10 per cent of pitch has been used for its agglomeration. It is stated that *briquettes* are preferable to ordinary coal for exportation to the colonies and to warm climates on account of their compact storage and freedom from small fragments and dust, also for use on locomotives, both on account of economy of space and because firemen can always determine the amount of fuel they are employing in a given time, the weight of each brick being exactly known. The manufacturers claim that the "patent fuel" is more healthy for domestic use than ordinary coal, citing in support of this theory the declaration of certain well known physicians. At the present day a large number of bricks are made for domestic use, of small size, and perforated with circular or longitudinal openings.