

IMPROVED TRACTION ENGINE AND CRANE.

At the recent Agricultural Show, Preston, England, Messrs. Aveling and Porter, of Rochester, had a large collection of engines, and among them an exceedingly handy crane engine, of which we give a perspective view, from *Engineering*. This engine, which is rated by the makers as a 6 horse, has done excellent work in getting exhibits into position, the crane with which it is fitted being capable of lifting loads of three tons, and both lifting and slewing by power. The arrangement of the gear is ingenious. The hoisting barrel is mounted on the crane jib, and is geared to a pinion running on the vertical shaft around which the jib slews, this pinion being fixed to a sleeve having a

and which is geared to the crankshaft so that it is always running while the engine is in motion. On this diagonal shaft are carried two bevel pinions, one giving the slewing motion to the right and the other to the left; by an arrangement of taper keys actuated by a clutch lever, either of these pinions can be driven as desired, and the load may be slewed in either direction, while the hoisting or lowering is going on. The whole arrangement is exceedingly neat and convenient, and the engine is capable of doing a vast amount of work. It is shown fitted with one of Priestman's diggers, which it is well adapted for working. With one of these diggers the engine has unloaded easily 70 tons of coal from a barge in a day of eight hours.

The Alacrity.

The Alacrity, twin screw steel dispatch vessel, 1,400 tons displacement, which recently arrived at Portsmouth from Jarrow-on-Tyne, where she was built by the Palmer Shipbuilding Company, has just completed her highly successful series of steam trials in the Solent. The trials were conducted by Mr. J. P. Hall, on behalf of the contractors, and among those present on the occasion were: Mr. Bakewell, from the Admiralty; Commander the Hon. F. R. Sandilands, in command of the ship; Mr. Alton, Chief Inspector of Machinery; Mr. Connor, of the steam department of the dockyard; and Mr. J. Smith, chief engineer of the ship.

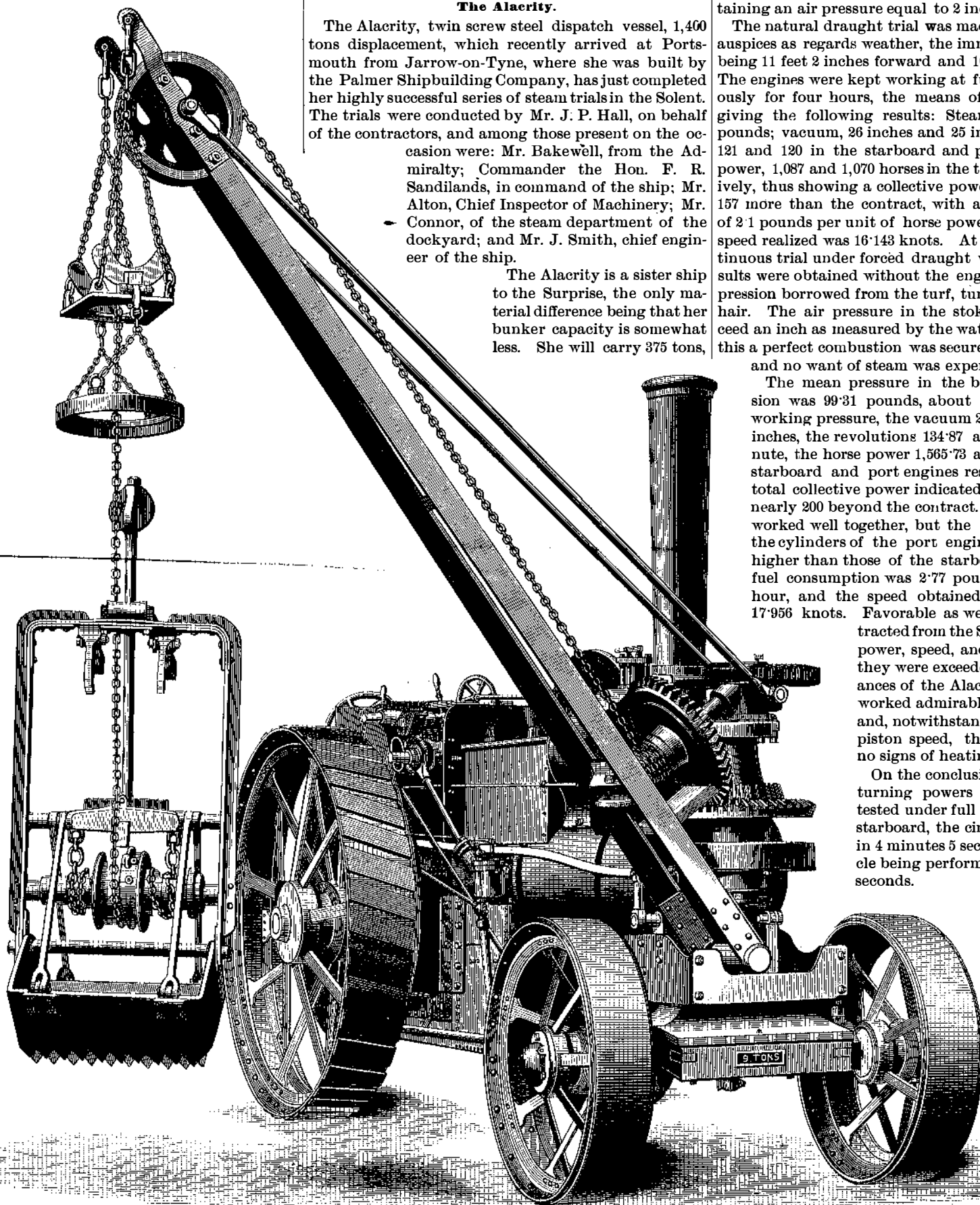
The Alacrity is a sister ship to the Surprise, the only material difference being that her bunker capacity is somewhat less. She will carry 375 tons,

the bilges, and are thus capable of dealing with a considerable leak. Four special engines are provided for feeding the boilers, while two others of similar design pump out the bilges, and can also be employed as fire engines. The main engines are fitted with steam reversing gear of simple construction, and can be handled very easily. The piston and other glands are packed with the new patent asbestos cloth packing. Steam is provided by four steel boilers, two being 9 feet 6 inches in diameter, and two 10 feet 4 inches, the length of all being 17 feet 6 inches. The working pressure is 100 pounds to the square inch. The stokeholes are fitted with arrangements for forced draught, the air being supplied by four centrifugal fans, 4½ feet in diameter, driven by an independent engine. These are capable of maintaining an air pressure equal to 2 inches of water.

The natural draught trial was made under favorable auspices as regards weather, the immersion of the ship being 11 feet 2 inches forward and 10 feet 6 inches aft. The engines were kept working at full power continuously for four hours, the means of the observations giving the following results: Steam in boilers, 92.63 pounds; vacuum, 26 inches and 25 inches; revolutions, 121 and 120 in the starboard and port engines; horse power, 1,087 and 1,070 horses in the two engines respectively, thus showing a collective power of 2,157, equal to 157 more than the contract, with a fuel consumption of 2.1 pounds per unit of horse power developed. Her speed realized was 16.143 knots. At the four hours' continuous trial under forced draught very gratifying results were obtained without the engines, to use an expression borrowed from the turf, turning so much as a hair. The air pressure in the stokeholes did not exceed an inch as measured by the water gauge, but with this a perfect combustion was secured in the furnaces, and no want of steam was experienced.

The mean pressure in the boilers on this occasion was 99.31 pounds, about equal to their full working pressure, the vacuum 25.1 inches and 24.5 inches, the revolutions 134.87 and 134.75 per minute, the horse power 1,565.73 and 1,807.34 in the starboard and port engines respectively, and the total collective power indicated 3,173.07 horses, or nearly 200 beyond the contract. The two engines worked well together, but the mean pressures in the cylinders of the port engine were somewhat higher than those of the starboard engine. The fuel consumption was 2.77 pounds per horse per hour, and the speed obtained on the mile was 17.956 knots. Favorable as were the results extracted from the Surprise, as regards power, speed, and economy of coal, they were exceeded by the performances of the Alacrity. The engines worked admirably from first to last, and, notwithstanding the enormous piston speed, the bearing showed no signs of heating.

On the conclusion of the run, the turning powers of the ship were tested under full speed. Circling to starboard, the circle was completed in 4 minutes 5 seconds, the port circle being performed in 4 minutes 24 seconds.



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disk cast on it as shown. This disk is situated between two other disks, that above it being made solid with the bevel wheel to which the hoisting motion is communicated from the engine, while the lower disk is fixed on the central spindle forming the crane post, this spindle carrying at its upper end a quadrant geared into by a worm as shown, this worm giving the slewing motion. To the central disk first mentioned is fixed a bracket forming the fulcrum of a pair of levers actuating friction clutch gear as shown, these levers when depressed causing the central and upper disks to be frictionally connected, and thus making the hoisting motion available, while if raised the levers frictionally connect the central and lower disks, so forming a brake by which the load is upheld. The hoisting and slewing motions are both driven from a diagonal shaft which extends to the rear of the engine,

as compared with the 400 tons of the Surprise; but even this reduced quantity will enable her, it is supposed, to steam 15 knots for about 14 days. The vessel is propelled by two sets of compound engines, each having a high-pressure cylinder, 26 inches in diameter, and one low-pressure cylinder, 50 inches in diameter, with a stroke of 34 inches. The main engines are horizontal, each pair being fitted with a horizontal air pump driven from the crank shafts. Her crank shafts are of Vickers steel, while the propeller shafting and the cylinder liners are made of Whitworth fluid compressed steel.

The propellers themselves are composed entirely of gun metal. There are two large horizontal condensers, formed also of gun metal, the water being circulated by two pairs of centrifugal pumps made by Allen. The fans and casings are likewise made wholly of gun metal. The pumps are fitted with large suctions from

The approximate diameters were 500 and 700 yards, or about from six to seven lengths of the ship. At the end of the trial the Alacrity returned into harbor, when she will be completed to replace the Enchantress as Admiralty yacht. As it is proposed, however, to arm her and her sister ship, the Surprise, with six 5-inch breech-loading guns and four 3-pounder quick-firing guns, she will not be ready for the use of their lordships on their forthcoming visits of inspection to the dockyards.—*London Times*.

JUDGE FIELD, of the Supreme Court of the United States, relates in his memoirs, just published, that in 1862 there occurred a mysterious epidemic, the origin and nature of which have never been explained. A mere touch with the end of the finger was sufficient to convey the infection.