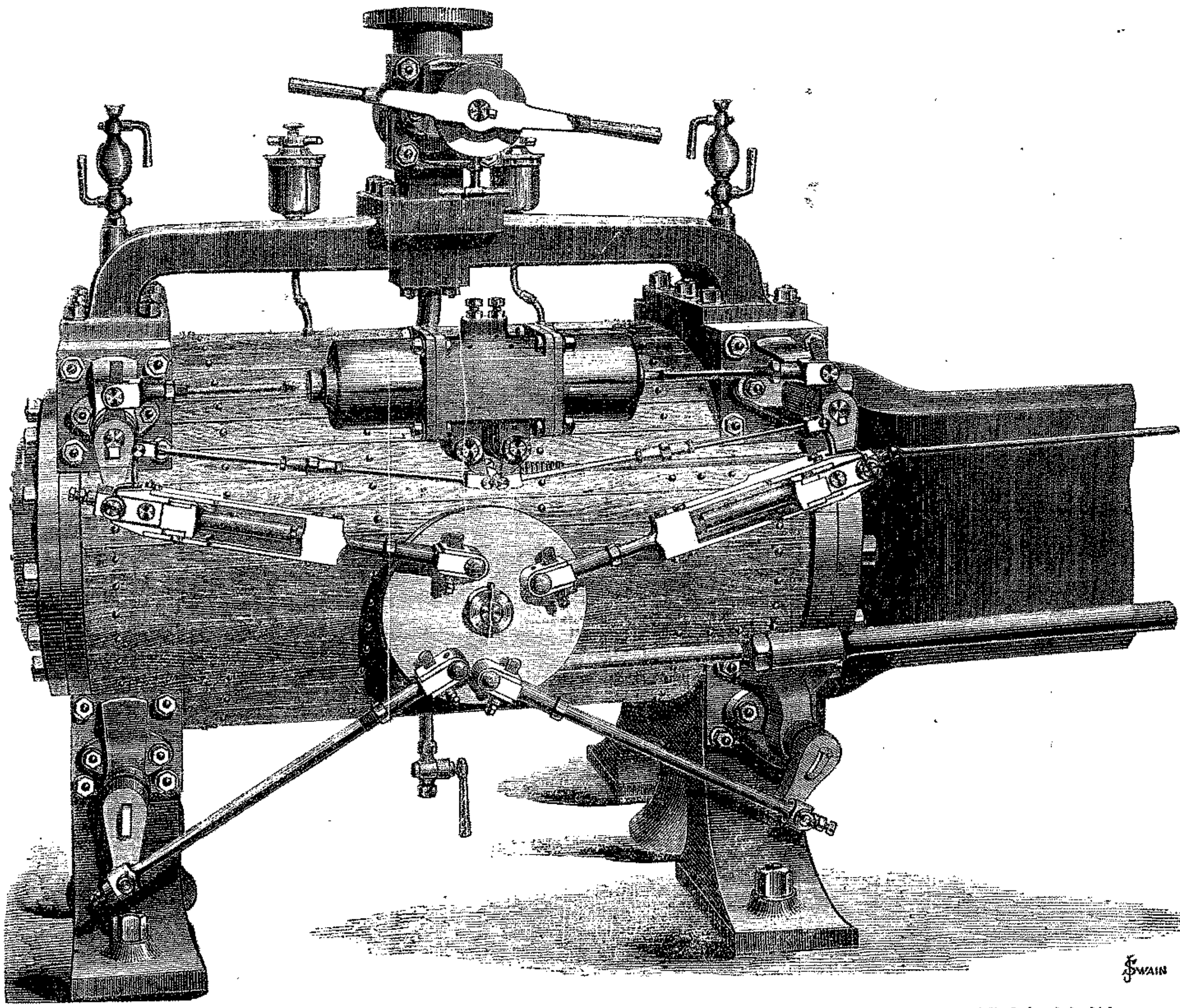
CORLISS ENGINE—WATERLOO FLOUR MILLS.

ELEVATION OF CYLINDER AND VALVE GEAR.



At the left-hand of Waterloo Bridge, and on the Surrey side, close to the edge of the river, a fine pile of buildings has recently been erected by Mr. Seth Taylor. These are the Waterloo Flour Mills, and as they contain every modern improvement, and have been fitted up almost regardless of expense, we have some pleasure in briefly describing and illustrating them for the benefit of our readers. We must first express our obligations to Mr. Taylor for the courtesy with which he acceded to our request for permission to visit and describe the mills.

The pile of buildings next the river constitutes a store, cut off from the mill proper by an open space crossed by iron bridges, and secured by iron doors. In the top floor, just under the roof, is a 6-horse horizontal engine, used for hoisting grain out of barges beneath to any required floor. Between the mill and the store is a corrugated iron roof, under which stand the two boilers which supply the motive power. The engine-room comes next. On the ground floor of the mill, and beyond the engine-room, is the burst room, and beyond that again, and farthest from the river, are the general offices. The total length of mill and store is 178ft.; the breadth is 48ft., and the height to the top of the roof is 69ft. The building is of a most substantial character, the roof in particular constituting a very fine example of timber work. All the floor beams are 12in. by 12in. The ground floor is 9ft. high, all the others 8ft. The rise of the roof, or attic floor, is 11ft. 6in.

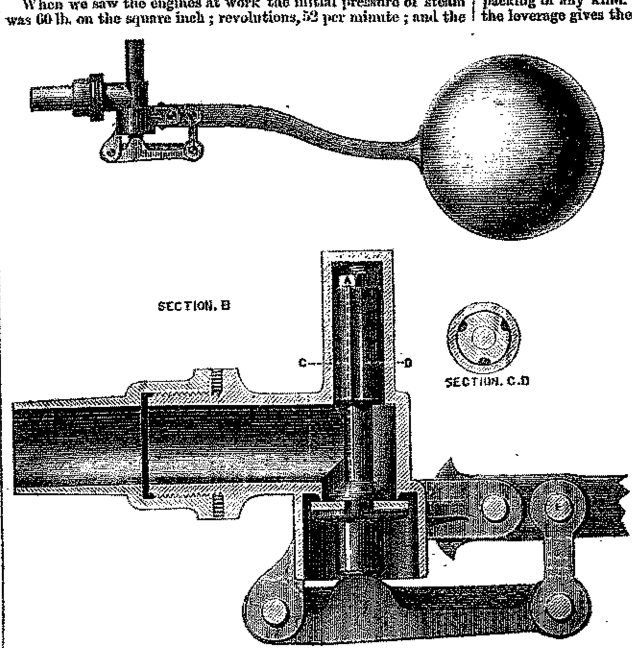
As regards the machinery, we shall begin by describing the motive power, returning to the mill in a subsequent impression. The boilers are of the Lancashire type, each with two flue tubes, 2ft. 6in. in diameter, and fitted with Galloway's tubes; and the shell is 6ft. 9in. in diameter, and 26ft. long. The flame passes through the tubes, splits at the back end, through the side flues, and finally under the shell to the chimney.

The engines are condensing direct-acting Corliss engines, as illustrated on page 24, in elevation and half plan, with enlarged section of the cylinder and details below. The diameter of the cylinder is 20in., and stroke of piston 4ft.; depth of piston, 5in.; diameter of piston-rod, 3in.; thickness of liner of cylinder, ⅞in.; space between liner and casing to form steam jacket, 1¼in.; thickness of casing, ⅞in.; length of connecting rod, 11ft.; diameter of crank and shaft, 9in.; distance between bearings, 5ft. 5in.; distance between centre of bearing and centre of crank pin, 15in.; diameter of connecting rod at crank and neck, 2⅜in.; diameter at centre, 4in.; and diameter at piston end neck, 3in. The condensers—injection—are situated below the air pumps, as shown in the sectional elevation; and the motion for each pump is derived from the engine connecting rod guide block pin by twin links, connecting rods, and lever motion, as shown in the plan.

The engine valves and gear next claim attention. An elevation of the gear is shown above; and the eccentric expansion gear is the straight slotted lever kind, as shown in the sectional elevation on page 24. The radius of the top or supply steam valves is 2¼in.; width of valve across chord, 3¼in.; width of steam port in cylinder, 1¼in.; length of port at cylinder's periphery, 16½in.; diameter of valve spindle, 1½in.

The proportion of the bottom, or exhaust valves, is: radius of valve, 2½in. section, half diameter; width of exhaust port in cylinder, 1¾in.; length as before.

When we saw the engines at work the initial pressure of steam was 60 lb. on the square inch; revolutions, 52 per minute; and the cut-off motion appeared perfect for a grade of one-fourth for expansion. The workmanship is extremely good, and reflects credit to the makers, Messrs. Hick, Hargreaves and Co., engineers, Bolton.



CHANDLER'S COMPOUND LEVER BALL VALVE.

We illustrate above a well designed ball valve, manufactured by Messrs. J. Chandler and Co., Grove Works, Mile End-road. It will be seen that it is specially designed for high pressure, and possesses the great advantage of being without cup leather or packing of any kind. The guide A keeps the valve steady, and the leverage gives the ball perfect command of the valve. It is quite up to a head of 1000ft. of water. Nothing less likely to get out of order.

The Ericsson Torpedo. — Captain Ericsson has designed a torpedo propelled by compressed air which is attracting some attention in the United States. Captain Ericsson has abolished the plan of storing up the compressed air within the torpedo. He supplies the air while the missile moves towards its destination. This is effected by means of a tubular cable connected with an air receiver on shore, or on board of some armoured screw vessel of low freeboard. The tubular cable is coiled round a reel turning on a hollow axle, the air from the receiver passing through the same into the tubular cable while the latter is being reeled off during the progress of the torpedo toward the enemy's vessel. The compressed air being supplied by steam power, it is evident that an amount of motive energy may be obtained sufficient to propel the submarine torpedo at any desirable speed, during an indefinite time. It merits particular notice that the position of the rudder of the torpedo is regulated by admitting more or less air into the tubular cable. The steering therefore is effected by simply changing the position of the handle of the stop valve which regulates the admission of air. A trial has just been conducted in the bay of New York, for the purpose of ascertaining practically what amount of motive energy is consumed in towing a tubular cable of adequate size to transmit the intended power. The result of this trial has established the important fact that a tubular cable half a mile in length, towed at a rate which will give a mean velocity of ten miles per hour to the submarine torpedo, consumes one-third of the motive power capable of being transmitted through the cable.

The following appointments were made on Monday at the Admiralty: — Charles Allsopp, engineer, to the Frolic; Henry M. G. Pellew, engineer to the Kestrel; William Walker (B), second-class assistant engineer, to the Frolic; and Benjamin J. Brown, acting second-class assistant engineer, to the Kestrel.