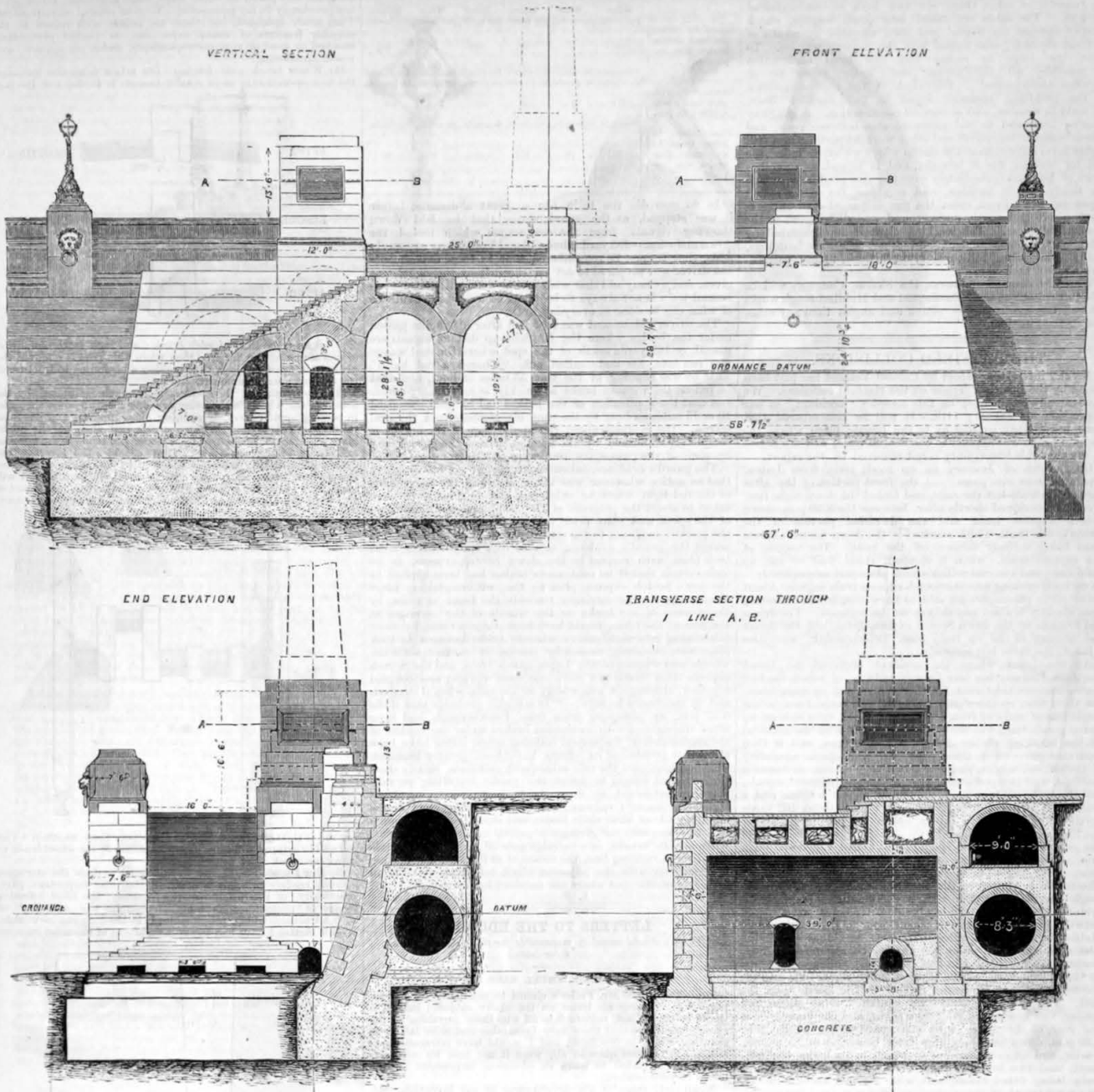


CLEOPATRA'S NEEDLE ON THE THAMES EMBANKMENT.



utmost durability of the valve; the reason being that the valves of the Collmann engine are closed by constant and unchangeable action of the gearing itself, the speed of closing being sufficiently great to prevent wire-drawing of the steam, while hammering is prevented. Variable frictional resistances are overcome in this new gear, by the pressure of a flat spring as shown, the amount of pressure caused by this spring being totally without any influence on the closing speed of the steam valves, and dash pots are entirely dispensed with; the exhaust valves are worked by cams, and no springs are made use of. (6) As all parts of the engine are purposely made very strong, so as to avoid vibration and excessive pressures on the wearing surfaces, all ratchets or parts that are liable to wear and tear, and must therefore be frequently replaced, are omitted, and the only buffer surfaces that would be liable to some wear are made so large—5in. in the present case—that, although they are covered with leather, they will wear for any length of time.

Whether the engine is really much superior to that made by Sulzer or Corliss is a matter on which opinions will differ. It is at least certain that Herr Collmann has produced gear which should be noiseless and is capable of giving a nearly perfect diagram. The gear is really not so complex as it looks, and all things considered, we are disposed to regard the engine as one with an important future before it.

CLEOPATRA'S NEEDLE ON THE THAMES EMBANKMENT.

We regret that, in defiance of good taste, it has been decided to erect the obelisk on the Thames Embankment. We have spoken so frequently and so strongly on the selection of a site, that we shall not further refer to the subject now.

It is well to know, however, that no objection can be urged on engineering grounds to the position selected on the Embankment; in other words, there is no fear that the monolith will tumble into the river, bringing a large section of the Embankment with it. We give above a section of the river wall at

the Adelphi Stairs, with the base of the Needle shown in dotted lines. From this it will be seen that a very large base is provided, and that the water stairs act as a buttress or relieving wall. The arched vaults are to be filled in solid with cement concrete. The only place where danger is to be apprehended is in the subway, the river haunch of the arch of which may be exposed to a considerable additional strain. The side pedestals are to be cut off at or about the lines A B.

THE BRITANNIA IRONWORKS, MIDDLESBROUGH.

THE Skerne Iron Company, of London and Darlington, we are glad to hear, have recently acquired the Britannia Works, and this fact is a proof of the confidence felt in the future of the Cleveland district, and the probable expansion of the iron and steel trade as soon as the present depression ceases. The Britannia Works are of great magnitude, and when in full work help to maintain the reputation of Cleveland as the largest iron-producing district in the world. They were erected in 1871, and probably never before in the history of the trade was the enormous number of 120 puddling furnaces built at one time under one complete design. The works are situated on the river Tees, between Newport and Middlesbrough, and about one mile from the latter town. They were originally intended for the manufacture of iron rails and accessories, but as these have now been superseded to a great extent by steel, the works have been idle for some time past, the Skerne Company intend them for an auxiliary to their Darlington establishment—which is of about the same magnitude—and will for the present devote them to the manufacture of ship-building iron, but we understand steel-producing plant will shortly be added. The existing Britannia plant is capable of turning out from 1500 tons to 2000 tons per week, and when in full operation employs about 1500 men.

We shall proceed to notice briefly the principal features of these works, which, it may be observed, have a most imposing appearance, and undoubtedly take rank as one of

the most interesting establishments in this remarkable district. As we have stated, they contain 120 puddling furnaces. There are two 22in. forge trains worked by separate direct-acting steam engines, by which the use of gearing is entirely dispensed with. The diameter of the cylinder is in both engines 36in., with 4ft. 6in. stroke, the weight of the fly-wheel being 37 tons. Six 6-ton single-acting steam hammers are erected, for which the anvil blocks weigh 42 tons each. In the centre of each forge train, scissor shears are fixed for cutting puddled bars as they come from the rolls. After the puddled bars are cut they are made into piles for rolling. These piles are afterwards heated in Siemens' patent furnaces, twelve of which are built for the purpose, this being the first application of this invention in the heating of piles. The blooming mill is White's patent, and consists of two pairs of horizontal and one vertical pair of rolls, the advantage of such an arrangement being that the pile only requires to go through the mill once. The rail mill is constructed in accordance with Brown's patent.

The train consists of a double set of 24in. rolls, which are so arranged that while the usual costly reversing gearing is abolished the same results are obtained as in a reversing mill. In other words, the rail is rolled alternately backwards and forwards, and never passed over the rolls. The engine for working this mill is similar in construction to the forge engines. Every endeavour has been made to render this mill as perfect and thoroughly self-acting as possible. After being rolled, the rail is traversed by self-acting gear to the saws, and on being sawn it is again traversed to the hot straightening plate. The rails are then finished in the usual way for transport, either by shipment—for which a special wharf is provided—or by rail. The entire plant is arranged on the most modern principles, comprehending all the improvements which experience has suggested.

All the fuel, pig iron, and fettling are brought to the ground on a high level railway, which, at an altitude of 10ft., traverses the whole line of the forge, the latter, we should observe, being arranged in the form of a parallelogram, with four lines of