HALL'S STONE BREAKER.

(See page 5.)

We give an engraving of a new form of stone breaker designed and patented by Mr. C. Hall, and now being constructed by the Saville-street Foundry and Engineering Company, Limited, of Sheffield. As will be seen from our illustration Mr. Hall's stone braker is similar in principle and mode of action to the Blake machine, but it includes some important modifications of detail. Thus in the first place the movable jaw, instead of being made in one piece the full width of the fixed jaw, is divided into two, each half that width. The two movable jaws J J, thus formed are driven by separate toggle levers and eccentrics, so that they make alternate strokes. One result of this arrangement, of course, is to greatly reduce the strain on the framing, &c., the width of jaw which is crushing at any one time being reduced one-half, while the eccentrics being placed opposite each other, they together with the connecting rod and toggle levers are balanced.

The alternate movement of the two jaws is also turned to account to draw back the jaws, the india-rubber spring which is used for this purpose in the Blake machine being dispensed with. Thus the drawback rods X are coupled to a cross lever Y mounted on a stout under framing at one end, the forward movement of one jaw thus drawing back the other and *vice-versâ*.

The machine is also fitted with an arrangement of cubing jaws invented by Mr. Hall. Referring to our engraving, it will be seen that the movable jaws have cast on them a transverse projection J1, this projection or rib being undercut on each side and chilled at the top. Against this rib abut the movable faces J4 and J5, these faces being help in place by wedge-headed bolts at the top and bottom respectively, so that they can be readily tightened if necessary. One object in this arrangement is to reduce the expense of replacing the working faces, it being found that the lower parts of the jaws wear much faster than the upper portions, and hence provision has been made for replacing these worn lower parts without interfering with the portions above.

The fixed jaw is also made two sets of faces, the upper set being of wider pitch than the lower, and being so arranged with respect to the movable jaw that the teeth of the latter work opposite a space in the fixed jaw. In the lower parts of the fixed jaw, on the other hand, the pitch is finer and the teeth are directly opposed to the teeth of the fixed jaw, as shown in figure 2. Between the two sets of faces of the fixed jaws is an enlarged throat or space P, this enlargement giving the stone a chance of turning over in its descent so that the blows are not received all on one side. Mr. Hall claims for this mode of constructing the jaws an improved cubing action, a reduction of waste, and the arrangement promises well.

The machine we illustrate is mounted on wheels, the fore axle being arranged so that it can be locked round without the fore wheels striking the flywheels. Altogether Mr. Hall's improvements have evidently been carefully thought out, and we shall probably have more to say of his stone breaker hereafter.

Engineering.

PROPOSED MONSTER BALLOON FOR THE PARIS EXHIBITION.—Amongst the propositions on which it is said the Commissioners have looked favourably, is that of M. Henry Giffard, an engineer of reputation, who has projected a huge captive balloon for 1878. It would be formed of silk and sheets of India-rubber covered with varnish, and painted white to reflect the rays of the sun. The balloon would be about 110 ft. in diameter; the car itself would form a gallery nearly 50 feet in circumference, and the balloon would be held to the earth by eight cables attached to iron rings secured in a wall of masonry, and it would take up forty or fifty persons each time. The cable by which it would be brought down is described as working round an iron axle more than 6 ft. in diameter, and 23 ft. long, worked by a steam-engine of 200-horse power. The length of the cable would be about 1,800 ft., and the balloon would ascend about 1,600 ft. from the earth. The quantity of iron filings and sulphuric acid needed to produce the gas required to fill the balloon is something enormous, and the process would have to be repeated about every forty-eight hours. To us the game is hardly worth the candle, —at any rate, such a very big candle. It is like Mr. Gamgee's very ingenious "Glaciarium," where two steam-engnes are kept going to enable a dozen porsons to do a little skating out of season.

TRADE MARKS IN GREAT BRITAIN.

The Commissioner of Patents of Great Britain has informed foreign Governments that by act of Parliament foreigners have been accorded the privilege of registering trade marks in that country on the same terms as British subjects. The United States Patent Office has recently declined to register trade marks for British subjects for the reason that no provision had been made by treaty or act of Parliament extending the reciprocal privilege to their citizens; but in view of the action of England now communicated, their Patent Office will hereafter register trade marks for them on the same terms and under the same regulations as those prescribed by it, in accordance with act of Congress for citizens of that country.

The London Patent Office call especial attention to the fact that prior registration in the country of which a foreign trade mark owner is subjected is not necessary before registration in Great Britain; but in case a trade mark has heen used before the date of enactment of the new law (which date is not, however, stated in this communication) it will be necessary in the application for registry that a description of the goods in respect of which it has been used, and the length of time during which it has been so used, be given.

THE CHANNEL TUNNEL.

This scheme, says the *Standard*, under Sir John Hawkshaw on the English side, and M. La Vallée on the French side, appeared, more than a year ago, to be making substantial progress, and we heard of three railway companies ready to furnish their contingents of £20,000 apiece, and an English company equally ready to collect the remaining portion of the £80,000 Sir John Hawkshaw requires for the trial works which it was at that date comtemplated proceeding with forthwith at St. Margaret's Bay, three or four miles to the east of Dover. What is the progress up to date? On the English side less than nothing—retrogression. Lord Richard Grosvenor and the English company, abiding by the advice of their engineers, Sir John Hawkshaw and Mr. Brunlees, have clung to the £80,000 trial works at Dover, involving a shaft of 19 feet in diameter, colossal pumping engines, and a driftway under the sea of 7 feet square. Sir Edward Watkin, with a vote £20,000 in his pocket on behalf of the South-Eastern Railway, very properly looks that the sum in his custody should be employed for the benefit of the shareholders whose property he represents, and is willing only to part with some few thousands at a time for smaller trial works to make a shaft of 7 or 8 feet diameter, less pumping power, and as moderate a driftway under the sea as can well be driven. Clearly this would realise knowledge with a minimum of expenditure; and there can be little doubt that such a shaft could be driven and a suitable driftway carried a third of a mile under the sea, and water pumped to the quantity of 500,000 gallons a day for £20,000. If, then, Sir Edward Watkin contributed £5000 on the part of the South-Eastern Railway, as it is understood he is willing to do, then the three other contributors doing the like would furnish the means for a trial of real value, and which would determine, as far as a first practical effort could accomplish, the probability of the engineering work of the Channel Tunnel being possible of accomplishment. If the magnitude of the expenditure were increased another £10,000, there could be almost certainly got for the £30,000 outlay an 8-feet staff and suitable pumping gear for a million gallons of water per day from a 6-feet driftway of half-a-mile under the sea. Possibly Sir John Hawkshaw may have been frightened by the volume of the springs he has encountered in the mile and a half of sewage-drains along the shore of Brighton; but the flow of water through the fissures of the white chalk there does not appear to us to be a criterion at all for the prospects in a non-water bearing stratum like the grey chalk—so unlike in every way to both the white chalks above it, and the water from which it holds up on its surface, and so throws off the waters of both by any available outlet rather than let them through its substance. Messrs. Rothschilds and the London, Chatham and Dover Railway would seem either to have withdrawn their influence or to hold aloof, and so the matter on the English side remains at a dead lock.

On the French side there has been quiet and steady onward movement on a small but useful scale. The dredgings of Sir John Hawkshaw on the French side were confirmed and enlarged by M. La Vallée and his staff some time ago, and a report made by him of considerable value in September last year. Since then, the English sea bottom of the Channel has been sounded, and