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REVIEW OF SPECIFICATIONS OF PATENTS,

PUBLISHED IN THE REPERTORY OF ARTS, MANUFACTURES, &c.

*During the Months of April, May, and June, 1811.*

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*Mr. WILLIAM MURDOCK's Patent for an Improved Method or Process for Boring and Forming Pipes, Cylinders, Columns, and Circular Disks, out of solid Blocks and Slabs of Stone, of any kind or description. Dated January, 1810.—Repertory of Arts, No. 108. Second Series.*

WHEN it is intended to form a pipe or hollow cylinder of stone by this method, instead of reducing the whole inside to powder, it is sawed out in the form of a core or solid cylinder, the diameter of which is about half an inch less than the diameter of the

inside tube. In like manner, when a solid column or cylinder is to be formed, the outside and superfluous parts of the stone are taken away by a similar process, and the core forms the column or cylinder required. When the stone is large enough to leave the outside parts of a proper thickness, they may be used as a pipe; or the cores cut out of large pipes used as columns, or formed into smaller pipes: so that in some cases, several may be cut out one within another. The method by which these are formed, is the following.

If a pipe or cylinder is to be formed, the block of stone is placed in a vertical position; but if a disk is to be cut from a flat stone or slab, it is placed with its upper surface horizontal. A plug of wood or metal is fixed in the block or slab, at the centre of the intended pipe, column, or disk. This plug or step has a hole in its centre, for receiving the pivot of a vertical spindle or axis, which is made longer than the pipe is required to be. This rod is of a uniform thickness, and either square, triangular, or of any other shape that will admit of sockets sliding freely up and down without turning round upon it. On the upper part of this spindle a socket is fitted, having on the middle part of its outside a pulley, or small toothed wheel and pinion, by which the axis or spindle may be turned round. The upper and lower extremities of this socket are cylindrical, and serve as gudgeons, upon which it turns in a frame. Near the lower end of the vertical axis, a wheel or cross with arms is fixed, having the circumference like a hoop two or three broad; and its diameter a little less than that of the diameter of the pipe to be bored, and fitted to the inside of a tube of metal, so that the latter may easily slide over it. The upper part of this spindle is perforated to a little below where the above-mentioned socket is fixed, where the perforation comes out obliquely. On this axis or spindle, and concentric with it, a thin tube of metal is fixed, of a diameter nearly equal to that of the pipe to be formed, and exceeding it in length by about two feet. This pipe is made as truly cylindrical as possible; and on its lower edge a rim of proper metal is fixed, which is so much thicker than the tube, that the groove it makes in the stone may admit the tube to move freely. This hoop, being intended to grind or saw the stone, has its lower edge either left smooth, or formed like the saws used by stone-cutters. Another wheel or cross is fixed on the vertical axis near its upper end, like that near its bottom, and to this the metallic tube is fastened; so that it can slide freely up and down without being suffered to turn round, and is always kept concentric with the axis. A small cord or chain is fastened to one of the arms of the upper wheel or cross, and passes upwards through the perforation in the upper part of the axis, and over a pulley fixed at a convenient distance above it, and serves to raise the tube on the axis when required. On the upper part of the tube weights are fixed, for the purpose of making it act more

forcibly upon the stone, if necessary. When the apparatus is to be put in motion by the force of men, the above-mentioned pulley, fixed on the socket near the upper part of the axis, is generally made about double the diameter of the pipe to be bored, and a rope passed round it at each end, over a vertical pulley fixed at a convenient distance on each side of it; by which means the ends of this rope turn downwards, and, having handles fixed to them, are pulled alternately by a man at each end, so as to cause the tube to make a reciprocating rotative motion about the axis or spindle. The apparatus may also be put in motion by any other power; only if the pulley and cord be retained, a spring or a sufficient weight acts at one end, while the power operates on the other by means of a crank, or some similar contrivance. Or, instead of the pulley, a toothed wheel or pinion is substituted, and acted upon by a reciprocating toothed wheel belonging to the mill, engine, &c. connected with the moving power, or by a reciprocating rack or sector, put in motion by the same power or machinery. A cistern is also placed at some convenient height above the tube, by means of which a mixture of water and sand is conveyed into the latter, and forces its way under the saw when in motion, and causes it to abrade or grind away the stone, and form in it a circular groove concentric with the axis. As the groove becomes deeper, the water accumulates in the tube, and forces the sand with it under the saw, and both are discharged over the outer edge of the tube in the form of mud or sludge, and the motion of the tube thus continued as long as the moving power is maintained. When any circumstance causes this to stop, the tube must be drawn up by means of the cord and pulley for that purpose, or the sand will set fast round the tube, and it will not be easily freed again.

It is the method of fitting the saw with the spindle passing through the axis, and the two crosses or wheels; the working it by a reciprocating motion instead of a rotative one; and the method of discharging the sand and sludge by means of a pillar of water, either over the edge, or in certain cases through holes in the sides of the pipe, that this patentee claims as his invention.

*Observations.*—A patent was obtained in March 1805, by Sir George Wright, for the same objects as this now granted to Mr. Murdock, and some parts of this machinery were very ingenious, but rather complex. See page 391 of our first volume. In the present instance, the machinery is not only different from, but much simpler than the former, and the method better calculated to save both time and labour; besides cutting several cylinders out of one block of stone, which could not be previously done. Upon these accounts, therefore, we do not hesitate to denominate this a *useful invention*; and we can add, that it has been put in practice with success.