

The United States of America.

To all to whom these Letters Patent shall come :

WHEREAS *Caleb Leach* _____ a citizen of the State of *Massachusetts*, in the United States, hath alleged that he has invented a new and useful improvement in *boring Pumps and conduits*, _____

which improvement has not been known or used before his application ; has *made oath*, that he does verily believe that he is the true inventor or discoverer of the said improvement ; has paid into the Treasury of the United States, the sum of thirty dollars, delivered a receipt for the same, and presented a petition to the Secretary of State, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose : THESE ARE THEREFORE to grant, according to law, to the said *Caleb Leach* _____ his heirs, administrators, or assigns, for the term of fourteen years, from the *eighteenth* _____ day of *February last past*, _____ the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said *Caleb Leach* _____ himself, in the schedule hereto annexed, and is made a part of these presents.

IN TESTIMONY WHEREOF, *I have caused these Letters to be made Patent, and the Seal of the United States to be hereunto affixed.*

GIVEN under my hand, at the City of *Philadelphia*, this *Thirteenth* day of *April*, in the Year of our Lord, one thousand seven hundred and ninety- *seven*, and of the Independence of the United States of America, the *Twenty-first*.

John Adams

By the President,

Timothy Pickens Secretary of State.

City of Philadelphia : TO WIT :

I DO HEREBY CERTIFY, That the foregoing Letters Patent, were delivered to me }
on the *thirteenth* day of *April* in the year of our Lord one thousand }
seven hundred and ninety- *seven* to be examined ; that I have examined the same, }
and find them conformable to law. And I do hereby return the same to the Secretary of }
State, within fifteen days from the date aforesaid, to wit : On this *thirteenth* }
day of *April* in the year aforesaid. *Charles Lee* }
Attorney General

The schedule referred to in these Letters-Patent and making part of the same, containing a description in the words of the said Caleb Leach himself, of an improvement in boring Pumps and Conduits.

Specification of the machinery invented by Caleb Leach, for boring and finishing wooden conduit pipes, and for which he solicits Letters-Patent: which machine differs from any other made use of for the same purpose, as it turns the Log while the augers remain fixed, by which several important points are gained, viz: First. We are enabled to use two augers at the same time entering each end of the log exactly central, and thereby making double dispatch. Second. In boring straight, which principle is already known in boring cannon, and is of the utmost consequence in this work. Third. In forming the ends to interlap each other, which is performed by holding certain tools to the two ends while the log turns, and thereby forming the joints with the utmost exactness. The machinery for turning the logs consists of two hollow iron cylinders, resembling the cylindrical part of a drum, one third of an inch thick, round the middle is a projection or hoop very thick and strong, for the support of four large screws which pierce it with its cylinders at right angles point the centre of said cylinder, on the points of the screws are fastened small pavins to prevent their piercing the log - these cylinders revolve on four thick planks cut in form to receive their semidiameters and placed or set edgewise, two to each cylinder, so that the hoop, screws &c may pass between them, one cylinder in addition to its other apparatus, is armed with cogs in order to be driven by any common cog-wheel or lantern-wheel, either vertical or horizontal, the log being inserted through these cylinders and fastened by the force of said screws. This work is supported on two long timbers or sills laid parallel and in a horizontal position, which also serve as a basis for the auger frames, the planks on which the caged cylinder turns are fixed, the ends resting on and being fastened to the said sills, the other two with their cylinder being connected are moveable on the sills like the puppet of a common turning lathe. The auger frames are raised on each end of the sills and must be considerably longer than the auger, they consist of a number of upright pieces framed into the said sills, to the inward sides are fastened long strips of plank horizontally, with a rabbit along the upper side for little trucks to roll in, which are put on to each end of the auger handle, which handle is no other than is commonly used by hand, but with the addition of these trucks. There is another horizontal strip of plank on one side of each frame, placed over the truck (just giving it room to play) to keep the auger from turning with the log; these frames must be of such height as to bring the auger shanks exactly in a line with the centre of motion in the two cylinders, the other end of said shank slides on a moveable piece, the ends of which rest in said rabbit; but to enter the augers and be sure of the centre of motion, a piece of plank is used standing edgewise on the sills, each end having a notch in the lower corner to fit the sills and keep it steady, on the upper edge is cut a small semicircle to exactly fit the bit of the auger, said bit being held firmly down with the hand and at the same time pushed forward enters the log with great ease and truth, the centre being obtained the auger appears perfectly steady, if not it performs a circuitous motion, which motion will increase as the auger proceeds, but must be remedied by starting the screws that sustain the log: any auger bit may be used, but the new one excels, the difference

ference of which from the common pod auger is altogether in its cutting part, which tapers suddenly from three inches to one, having a lip turned at the end like the common pod auger of one inch, but the tapering part being twisted throws the edge on the cutting side into a spiral line, by which means it cuts the softest wood extremely smooth and with so much ease as to admit of being used of almost any size. — The tool to ream or enlarge the bore of one end of the pipe for the reception of the next is a piece of hard wood turned partly conical and partly parallel or cylindrical, the conical part is hollow with an iron or cutter fixed one side running down in a moderate spiral under or within, which is a narrow avenue for the shavings to pass to the inside or hollow where it is discharged. The handles of this tool are made by cutting away the two ends of a piece of plank which has a hole cut through the middle of sufficient magnitude to receive the large end of the other part, and into which said part is driven and fastened with nails, in this plank is one end of the cutter fastened, the other running quite down to the cylindrical part or pin, and there is fastened with a screw as at the other end, this cylindrical part or pin exactly fits the bore of the log, and serves to keep the tool steady. I have contemplated making the turned part of this tool of cast iron, or some other metallic substance, with the pin to screw on so as to be shifted to fit different bores, or to be used without the pin in making crooked joints: the excellency of this tool consists partly in its spiral edge as in the above mentioned auger, and partly in its being sure of cutting a perfectly round hole, and is wholly novel. — The tool for forming the other end or point of the pipe is easily described by the common brass mortar piece of ordnance of six inches bore which the stock part nearly resembles in shape and size, the chamber being bored through and the barrel bell-muzzled with a plank socket and handles on the muzzle, like the tool last described, this bottomless chamber is a receptacle for a long wooden mandril one end of which runs quite through the mortar extending a little beyond its breech or bottom where a wooden key passes through to hold it in, the other end extending twelve or fifteen inches beyond the muzzle and of a diameter to fill the bore of the log into which when used it is introduced, and serves to steady and direct the tool, mandrils to fit different bores are used in the same tool, the iron or cutter in this tool is a thick narrow knife, bedded and fastened on the inside, beginning at the chamber of said mortar where it is fastened by a square headed iron pin passing through it to the outside of the mortar, on which end is a screw secured by a nut or burr, thence up the inside in a moderate spiral, till it arrives at the muzzle where it turns off, corresponding with the front side of the plank, in which that part is also bedded, by which crook it cuts its way forward, while the other or spiral part shapes the point of the pipe, the shavings pass off through a long opening cut in the plank and mortar connectively and corresponding with the crooked knife. A hollow tool in some degree related to this last described, has been attempted at Providence in Rhode-Island, without either the plank front piece or mandril, the handles being fixed across the breech and with a cutter like the joiners panel plane-iron, not being capable of cutting in front, or of forming a good point, for want of proper steadymment and support, having no center for its guide. — The aforementioned caged cylinder has a wooden rim or wheel for the support of the cogs, which are also wood, but to make cylinder and all of one piece of cast work of iron would be preferable; though perhaps more expensive.

Signed in the presence of
Wm Watson.
Joshua Thomas.

Caleb Leach.