(No Model.)

W. MACLEOD.

PROCESS OF CONSTRUCTING WATER TIGHT PITS OR VAULTS.

No. 530,646. Patented Dec. 11, 1894.

Fig. 1.

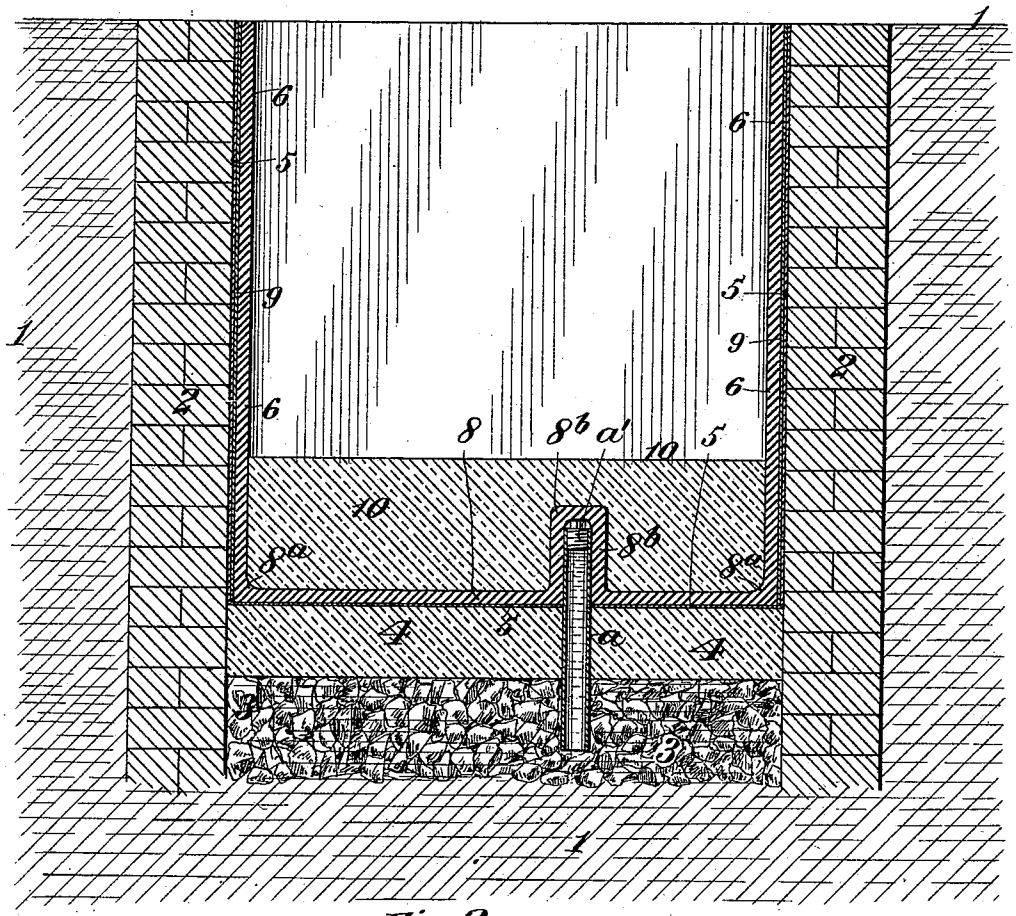
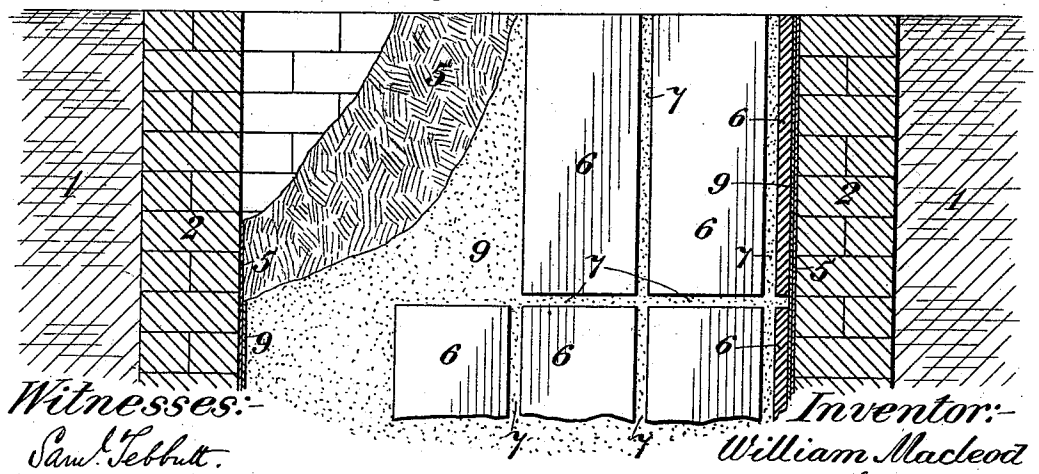


Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM MACLEOD, OF NEW YORK, N. Y.

PROCESS OF CONSTRUCTING WATER-TIGHT PITS OR VAULTS.

SPECIFICATION forming part of Letters Patent No. 530,646, dated December 11, 1894.

Application filed January 11, 1894. Serial No. 496,524. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MACLEOD, a subject of the Queen of Great Britain, and a resident of New York city, in the county and State of New York, have invented certain new and useful Improvements in Processes of Constructing Water-Tight Pits or Vaults, of which the following is a full, clear, and exact specification.

My invention consists in applying asphalt in slabs or plates to a wall surrounding a pit or vault which it is desired to render waterproof, by working Portland or other cement upon one side of the slab and upon the wall and pressing the slab upon the wall while the cement on both is still fresh; in covering the floor with asphalt and in forming a union between the floor and the slabs on the walls, and between each of the slabs by heating the edges thereof and working in hot asphalt between; and the object of my invention is to form a continuous lining of asphalt of even thickness in a pit or vault and also to secure the same firmly to the walls and floor thereof.

In the drawings, Figure 1 represents a vertical cross section of a water tight pit constructed according to my invention. Fig. 2 is a partial similar view of the same in course of construction.

Similar reference characters designate corresponding parts in both the figures.

1 designates the ground in which it is desired to construct a water-tight pit and which is saturated with moisture. A pit somewhat larger than the desired finished size having been dug, a wall 2 of suitable material, such as stone or brick or concrete, is built around the same, and may be continued downwardly to any desired extent in order to secure a good foundation. The bottom of the pit is filled in with broken stone 3, or the like, to a suitable depth to form a blind drain, and in this drain is placed a short piece of pipe or tubing *a*, the upper end thereof being allowed to project some little distance above the top surface of the drain. A suction pump may be connected with this tube and in this way the pit may be kept free from water while under process of construction.

Upon the material forming the blind drain, I construct a foundation of some such material as concrete, as at 4, which will cover entirely the bottom of the pit, with the exception of the space occupied by the pipe *a*. I now take about equal parts of cement and sand, and render or plaster the walls and floor with the same, as at 5, which gives throughout a uniform, but preferably rough surface. I then make a number of slabs or plates of asphalt of a convenient size in width and length for handling, and about one inch more or less in thickness. If the pit be not too deep, I prefer to make them of a length equal to the entire depth thereof; but if the same be too deep, the slabs of course, may be equal to one half or one third the depth thereof. These plates or slabs I make with a smooth and even finish on one side, namely: the side which will be exposed after the slab has been set in place, and the other side I preferably leave rough and uneven. I now take Portland or other cement mixing it rather thin and apply a light coating to the plastered surface of the walls of the pit as at 9 and also to the rough sides of the slabs. I then put the slabs in position against the walls leaving a space between each slab of about one to one and a half inches, as clearly illustrated in Fig. 2 of the drawings in which 6 designates the slabs and 7 the spaces between the same. The slabs I hold in their position until the cement has become sufficiently hardened by shoring with timbers or by other suitable means, and I may keep them spaced apart by wedges, if necessary, which may afterward be removed.

I have discovered that while the asphalt plates or slabs cannot be made readily to adhere to a surface of wet cement by merely pressing them against the same, by taking wet cement and working it against the roughened surface of the asphalt plate or slab, I cause it to adhere or "take" and that then by applying the asphalt plate or slab with the cement thereon still fresh, upon any surface which has been similarly treated, I obtain a very firm union.

In about twelve hours, more or less, after the cement has become sufficiently hardened and the slabs are all firmly in position, I remove the shoring timbers and proceed to put a layer of asphalt 8 upon the floor, covering same completely with the exception of the pipe *a*. This asphalt I may put down while hot, and I obtain a union between it and the

slabs forming the wall, by applying heat, conveniently by the use of a gasoline force torch, to the edges of the slabs with which the asphalt now being put down would come in contact. This will cause the two to run together and in cooling become one structure. I further preferably finish off the angle by working in a fillet, as at 8^a (Fig. 1) in order to insure a perfect joint. I next apply heat to the edges of the plates 6, which inclose the spaces 7, as just described for those opposite the asphalt upon the floor, and work in hot asphalt in all the said spaces, which, forming a perfect union between the slabs, causes the whole of the asphalt, on all the walls and the floor to be a complete lining in one continuous piece of work. The work as far as lining and rendering the pit waterproof, is now finished, and the suction pipe of the pump may be removed from the tube *a*. The tube *a* should then be sealed by screwing a plug *a'* therein, the tube having been suitably tapped before being inserted for this purpose. Asphalt is now used to cover up this tube *a*, as shown at 8^b, this being run together with the asphalt 8 upon the floor in the same manner as hereinbefore described. I lastly (as shown in Fig. 1) load the bottom of the asphalt lining with a suitable material such as concrete or the like; the quantity and weight requisite depending upon the depth to which the pit has been sunk, and hence upon the amount of water pressure. If the pit be very deep or from other causes the water pressure considerable, it might be well to load the bottom of the pit as above described before removing the suction pump, in which case a clear space would be left around the exposed end of the tube *a* until a sufficient weight of material were down, when the tube could be sealed, and covered with asphalt as before described and the floor then finished and leveled off. I may, if desirable, build a wall all around in front of the asphalt, completely inclosing it, which would protect same, as for instance from the heat, if the pit were used as a boiler pit.

Heretofore, it has been customary in lining pits with asphalt to inclose a space in front of the walls with planking or by a course of brickwork or the like, thus forming a mold into which the hot asphalt was poured, which method has proved very unsatisfactory for the following reasons: In the first place, asphalt chills very readily, and is not thin enough to pour well and it is exceedingly difficult to get it down in the space at all, especially if this space is at all shallow; secondly, if there is the slightest dampness when the hot asphalt is poured in, steam will be generated and blow-holes through the asphalt will be the result, which of course, would be fatal to water tight work. Moreover, air bubbles were very likely by the old process to be formed, which, in case planking were used, after the same had been removed, might not show on the surface but might honeycomb the back so that a slight additional pressure would burst through the thin or weakened portion of the asphalt. Furthermore by the old method, the work was always entirely out of sight until completely finished, so that irregularities would not be discovered in any case until after the planking had been removed, when it might be found, for instance, that the asphalt had not flowed to all the parts, necessitating the expense and loss of time in reconstruction; or in the case where the mold had been formed by a course of brickwork having been built in front, and afterward left as a protection the same remarks would apply with regard to the faulty work, but it would not be found out until everything had been supposedly finished and the water pressure being on same had leaked or poured through.

Not only this, as it is a well known fact in the art that asphalt will not readily adhere to a cold surface and never to a damp one, the same would generally have to depend upon something built in front of it to keep it in position. Again, by the former method, in removing the planking, it has often been found that the hot asphalt has adhered so firmly thereto, the same being probably warmer and drier than the wall, as partly to come away therewith. By my improved process, I overcome all these difficulties and am enabled to economically construct an absolutely water-tight pit or vault; and one also which will successfully withstand an immense pressure of water without the assistance of any wall of masonry in front thereof, though I may in some cases employ same, however, for a purpose such as suggested hereinbefore.

Although I have described my process as applicable to an open pit, I wish it to be understood that it would be equally efficacious in constructing a waterproof cellar, vault or tunnel which might be roofed over in the same manner, with the plates or slabs, as hereinbefore described for the walls.

I claim—

1. The process of constructing water tight pits or vaults consisting in inclosing same by a wall of masonry, preparing asphalt in slabs, interposing between said slabs and wall fresh cement in applying the slabs in position thereon, and in heating the edges of said slabs and causing a union between same by the introduction of hot asphalt, substantially as and for the purpose set forth.

2. The process of constructing water tight pits or vaults consisting in inclosing the same by a wall of masonry, plastering said wall to give a rough finish, making a series of asphalt slabs, treating one side thereof and the plastered wall with a thin coat of fresh cement, and applying said slabs to said wall while cement on both is still fresh or unset, leaving a space between the edges of each of the slabs and the ones in proximity thereto, in heating

the edges of the asphalt slabs after same are in place and causing a union between them by introducing hot asphalt, thus to form a continuous lining, as and for the purpose herein set forth.

3. The process of constructing water tight pits or vaults consisting in inclosing same by a wall of masonry, making a floor foundation of concrete or its equivalent, plastering or rendering the exposed surfaces of walls and floor, making slabs of asphalt and treating one side thereof with a thin coat of cement, treating the plastered wall with a similar coat, and applying the slabs thereto while the cement on both is fresh, in covering the floor with asphalt and forming a union between the asphalt on the floor and the slabs by heating the edges of the latter in proximity thereto, in forming a union between the edges of the slabs by heating the same and interposing hot asphalt all substantially as herein described and for the purpose set forth.

4. The herein described process of constructing water tight pits or vaults consisting in inclosing the sides of the same by a wall of masonry, filling in the bottom with broken stone to form a blind drain, superposing a floor foundation of concrete or its equivalent, and lining the whole throughout with a continuous lining of asphalt by applying the same on the wall in the form of slabs on the surface of which as on the surface of the wall has been placed some fresh cement such application being made while said cement is fresh or unhardened, in forming a union between said slabs and each other, and between said slabs and said floor by heating the edges thereof and introducing hot asphalt all substantially as and for the purpose set forth.

5. The process of constructing a water tight wall consisting in first plastering or rendering same and allowing it to dry, in then making a series of asphalt plates or slabs and treating same with a coat of cement, in treating the plastered walls in a similar manner, in applying the asphalt plates to the walls a small distance away from each other while the cement is still fresh or unset and allowing same to set or harden, and the slabs consequently to adhere, and lastly in heating the edges of the asphalt slabs and introducing in the spaces between same hot asphalt, causing said slabs to merge into one continuous sheet of asphalt, substantially as and for the purpose set forth.

6. The process of constructing water tight pits or vaults consisting in inclosing the sides of the same by a wall of masonry, filling in the bottom with loose material as broken stone to form a blind drain, superposing a floor foundation of concrete or the like but permitting a communication to the drain through such foundation, of lining the pit or vault throughout with asphalt and lastly of hermetically sealing the communication with the blind drain, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 7th day of December, 1893.

WILLIAM MACLEOD.

Witnesses:
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SAML. TEBBATT.