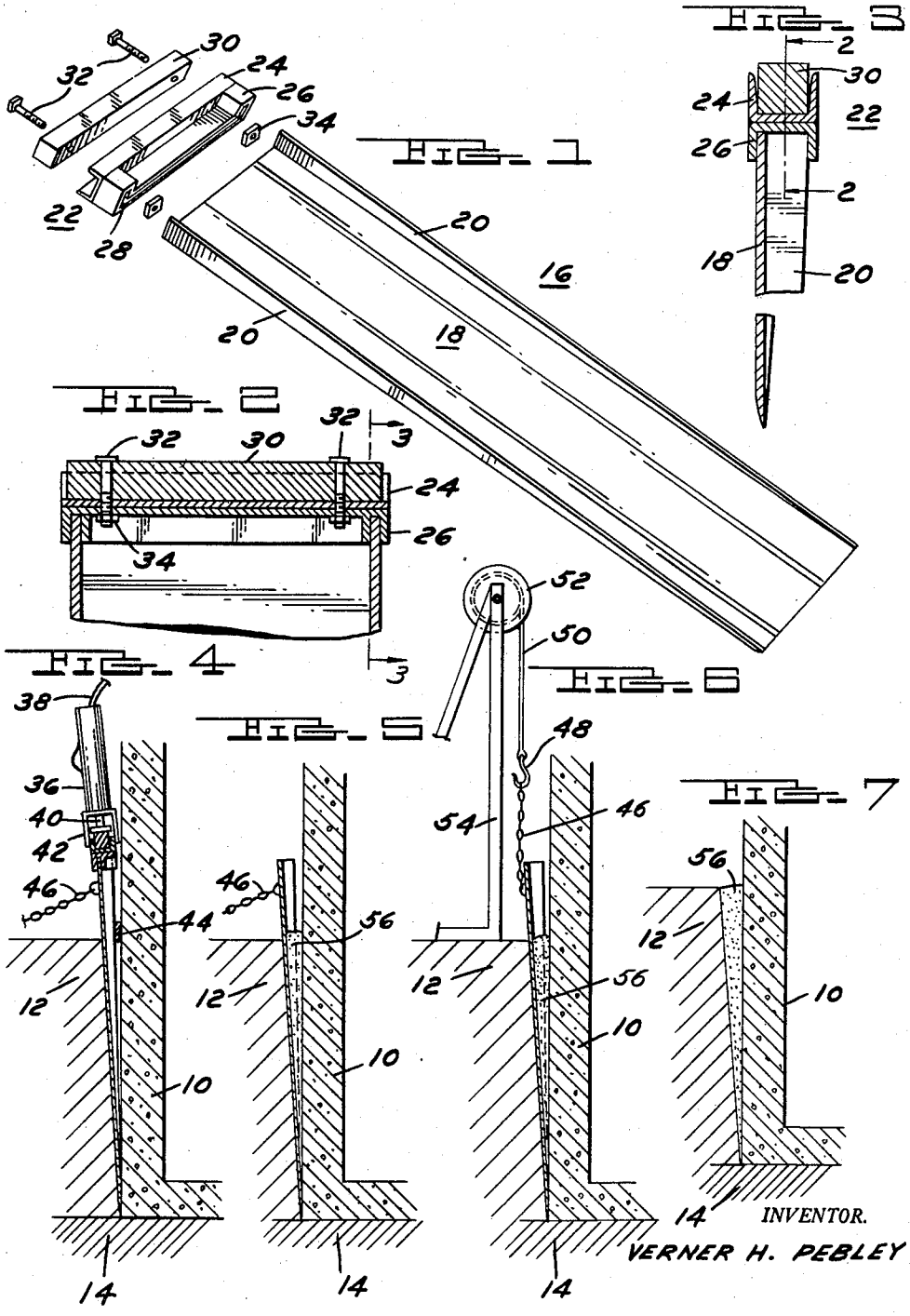
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METHOD OF REPAIRING A BASEMENT WALL

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METHOD OF REPAIRING A BASEMENT WALL

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4 Claims. (Cl. 72—126)

This invention relates to an improved process or method of repairing a leak, crack, or other opening in a basement wall or that portion of the foundation wall disposed below the ground level.

This application is a divisional application of which application Serial No. 570,090, filed March 7, 1956, is the parent case.

Heretofore it has been the usual practice to repair leaks, cracks, or the like in underground walls by excavating the earth from alongside the wall for a sufficient distance to enable a workman to enter the excavation and to apply a waterproofing compound or mastic composition coating over the cracked portion of the wall. Such excavation and plastering with mastic was a time-consuming and costly operation.

I have found that leaks within underground walls may be quickly and effectively sealed without excavating ground from alongside the wall sufficiently to permit a workman to enter the excavation and repair the leak by plastering or coating. I have found that such leaks may be repaired by depositing suitable leak-sealing material, which material possesses the capacity to swell and fill the leak and form a moisture-proof barrier thereover, and the process of this invention resides in carrying out such operation.

An object of this invention is the provision of a process or method whereby leaks in underground portions of foundation or basement walls or the like may be readily and easily repaired by relatively unskilled labor and in a small fraction of the time and at a small part of the cost heretofore required for the repairing of such leaks in the manner hereinabove described.

A meritorious feature of this improved process is that it involves the formation of a cavity within the ground alongside the wall overlying the leak, which cavity is merely of sufficient size to receive and contain a sufficient quantity of water-absorbent swellable bentonite or other similar material to form a seal over the cleaned portion of the wall and such bentonite picks up moisture from the ground after it has been deposited and forms a moisture-resistant barrier which is urged by the swelling of the bentonite against the cracked part of the wall.

A further meritorious feature of this improved process is that the cavity within which the swellable bentonite is deposited is preferably formed by employing a wedge-shaped tool or the like which is inserted within the ground alongside the portion of the wall having the leak and which urges the ground away from the wall by compacting the ground outwardly therefrom, thereby forming a cavity alongside the wall overlying the leak portion. The ground which has been compacted by being urged away from the wall to form the cavity tends to close the cavity and presses against the bentonite and augments the pressure exerted by the swelling of the bentonite and increases the seal formed over the cracked portion of the wall.

An important feature of depositing the bentonite in a cavity formed as described is that such method of forming a cavity facilitates the forming of cavities of relatively narrow width and of merely sufficient size to receive that amount of material necessary to seal the leak. Such method of forming a compacted rather than an excavated cavity is expeditious and may be employed alongside of the foundation wall of a house without disturbing the foundation shrubbery planting along side the wall. In addition there is no excavated earth which has to be removed. Further, such a cavity may be formed and filled very quickly and at little cost.

Other objects, advantages, and meritorious features will appear from the following specification, claims, and accompanying drawing, wherein:

Fig. 1 is a perspective of a wedge-shaped tool suitable for the formation of the cavity in the carrying out of the process;

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 3;

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional view through the underground portion of a foundation wall showing the first step in the carrying out of the improved process;

Fig. 5 is a sectional view taken on the same line as Fig. 4 showing the second step in the carrying out of the preferred form of the improved process;

Fig. 6 is a sectional view taken on the same line as Fig. 5 showing the third step in the preferred form of the process;

Fig. 7 is a sectional view taken on the same line as Figs. 4, 5, and 6 showing the final step in the carrying out of the process of this invention.

This particular invention comprehends the repair of cracks, leaks, or the like in foundation or basement walls below the level of the ground and comprises the depositing of suitable swellable moisture-absorbent sealing material alongside the outer surface of the cracked portion of the wall between the wall and the ground and in only sufficient quantity to accomplish the required sealing. The material deposited is of a character which absorbs moisture and swells and forms a gel-like mass which seals the crack in the wall and constitutes an effective and permanent barrier to the passage of moisture therethrough. Bentonite, which is a form of clay consisting largely of montmorillonite, and is of small-particle size, being finely divided, is a preferred composition to be used in carrying out the process. Bentonite possesses the capacity when it absorbs water to swell to a very substantial extent though it will not exert an undue pressure in such swelling. It forms a gel-like mass which is relatively impervious to the flow of water therethrough. When deposited as set forth hereinafter, it forms a moisture-resistant barrier adjacent to the foundation wall and filling in crack or opening therein.

In the drawing a foundation wall is indicated by the numeral **10**. Such may be a concrete wall or the like. The adjacent earth is indicated by the numeral **12**. Such wall would normally be disposed upon a footing. In the drawing the footing is indicated as **14**. I provide a cavity alongside that portion of the wall which has the crack therein and which cavity is merely of sufficient size to contain the required amount of bentonite to seal the crack. A preferred method of forming this cavity is by driving a wedge-shaped tool into the ground alongside of the cracked portion of the wall, urging the earth away from the wall and exposing the cracked portion. The driving of this wedge-shaped implement permits the formation of a cavity of limited size throughout the necessary height of the wall within a minimum amount of time and without requiring any other excavation.

In the drawing I have showed a preferred form of tool which is a trough-shaped element generally indicated by the numeral **16**. Such tool may be formed of any suitable material. Aluminum is satisfactory. This tool is channel-shaped in cross section having a bottom portion **18** and two side wall portions **20**. The side wall portions taper from the top to the bottom. At the bottom they are flush with the bottom wall as shown in Fig. 3. This implement may be in any desired length to fit the type of wall with which it is to be used. A length of six feet or thereabouts is average and the implement may have a width of a foot or more. The side wall portions might well taper from a flush condition at the bottom to a height of two or three inches adjacent to the top.

In carrying out the preferred process of the invention, such tool is driven into the ground and to facilitate driving, the upper end of the tool may be provided with a crown assembly indicated by the numeral **22**. This crown assembly comprises a channel-shaped portion **24** and a lower portion **26** which may be welded together as illustrated in Figs. 1 and 2. This lower portion **26** may be hollowed out as at **28** to be received over the upper end of the wedge member **16** seating thereover as shown in Figs. 2 and 3.

An impact member, which may be formed of brass, aluminum, or the like, is indicated as **30**. This is normally seated within the channel **24**. It is held therein by bolts **32** extending therethrough and provided with nuts **34**, all as shown in Figs. 1 and 2.

In carrying out the process of the invention according to the preferred method, such a wedge-shaped channel-shaped implement may be driven or inserted into the ground alongside of any selected portion of the foundation wall by suitable air hammer apparatus **36**. Fig. 38 indicates an air line leading to the cylinder and **40** indicates the hammer part per se. The cylinder here is shown as having a forked portion **42** adapted to be received over the cap or crown assembly and hammer blows are applied to the impact member **30** to drive the tool into the ground alongside the wall. It is desired to form the cavity in such a manner that the earth will be scraped cleanly away from the outer surface of the foundation wall over the cracked portion. This may be facilitated by inserting a spacer **44** between the implement and the wall as shown in Fig. 4 so that the lead end of the implement can be held closely against the wall as shown.

A chain **46** may be provided on the upper end of the implement. A hoist element indicated by the frame **54**, pulley wheel **52**, and cable **50** may be employed to engage the chain and lift the implement out of the ground after it has served its purpose.

The implement may be driven into the ground through the use of an air hammer as illustrated or manually with a sledge hammer until it reaches the position as shown in Fig. 4. When the implement has reached the position shown in Fig. 5, the interior of this channel wedged member may be filled with bentonite or a bentonitic composition **56** as illustrated in Fig. 5. This is a a very finely divided powdered material relatively dry and of low moisture content. When the interior of the implement has been filled as shown in Fig. 5, the implement may be withdrawn as illustrated in Fig. 6. This leaves the powdered bentonite within the ground cavity alongside the wall overlapping the cracked portion thereof. It has been found that bentonite, being highly absorbent of moisture, will normally absorb sufficient moisture from the ground to swell and form a gel-like mass. As it swells, it is urged against the foundation wall throughout the cracked area. It is so finely divided that it normally fills such crack. It possesses the inherent capacity of forming a barrier to the flow of water therethrough into the crack. Should it dry out completely, it will be found that as soon as the ground becomes saturated with moisture, it will again absorb moisture and swell and serve its barrier purpose. The swelling is insufficient to cause any rupture or fracture of the wall but it is sufficient to cause the bentonite to form a good seal throughout the cracked portion. Bentonite possesses the capacity of swelling to many times its original size and such causes it to completely fill the cavity and holds it against the foundation wall, forming an effective seal thereover.

Following deposit of the bentonite the tool is withdrawn and the operation is complete. If one desires, the tool may be withdrawn from the cavity before the bentonite is placed therein and the bentonite may be placed within the cavity following withdrawal of the tool. It has been found preferable, however, to leave the tool in place until the bentonite is deposited because this assures the flow of the bentonite throughout the provided cavity. Otherwise earth might enter the cavity and prevent the bentonite from completely filling the same.

What I claim is:

1. That process of sealing a leak within an underground portion of a wall which includes the steps of applying pressure to the earth adjacent the leak in the wall laterally outwarly away from the wall of sufficient force to compact and move the earth laterally outwardly away from the wall exposing the leak and forming a cavity in the earth extending from its surface to a point below the leak, continuing said pressure sufficient to maintain the cavity and simultaneously filling the cavity with dry bentonite from a point below the leak to a point thereabove, removing the pressure and allowing the earth to urge the bentonite toward the leak in the wall, and subjecting said bentonite to moisture to form a gel and swell in the cavity against the leak sealing the same.

2. That process of sealing a leak within an underground portion of a wall which includes the steps of applying pressure to the earth adjacent the leak in the wall laterally outwardly away from the wall of sufficient force to compact and move the earth laterally outwardly away from the wall exposing the leak and forming a cavity in the earth extending from its surface to a point below the leak, continuing said pressure sufficient to maintain the cavity and simultaneously filling the cavity with dry bentonite from a point below the leak to a point thereabove, removing the pressure and allowing the earth to urge the bentonite toward the leak in the wall, and allowing said bentonite to absorb moisture from the earth and form a gel and swell in the cavity against the leak sealing the same.

3. That process of sealing a leak within an underground portion of a wall which comprises the steps of interposing a barrier between that portion of the wall having the leak and the earth and urging the barrier laterally outwardly away from the wall against the earth compacting the earth and forming a cavity in the earth from its surface to a point below the leak and facing at one side on the leak in the wall, while holding the barrier spaced from the wall filling the cavity between the barrier and the wall with dry bentonite from a point below the leak to a point thereabove, removing the barrier from between said bentonite and the earth allowing the earth to urge the bentonite toward the leak and allowing the bentonite to absorb moisture from the earth and form a gel and swell against the leak sealing the same.

4. That process of sealing a leak within an underground portion of a wall comprising the steps of introducing the lower end of a barrier at the surface of the earth adjacent the wall and above the leak between the wall and the earth, urging the barrier downwardly over the leak in the wall and laterally outwardly away from the wall while keeping said lower end of the barrier in sliding contact with the wall to form a wedge-shaped cavity in the earth between the wall and the barrier with the upper end of the barrier at the surface of the earth being spaced laterally outwardly from the wall to form an open upper end for the cavity and with said cavity

extending downwardly along the leak in the wall, maintaining said barrier in the aforesaid position and filling the cavity through the open upper end with dry bentonite, withdrawing the barrier upward from the cavity allowing the earth to contact the bentonite and urge it toward the leak in the wall and allowing the bentonite to absorb moisture and form a gel and swell against the leak sealing the same.

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Volclay; Data No. 231–0; Copyright 1941 by American Colloid Co., Chicago, Illinois.