Sept. 1, 1953 O. C. STINE 2,650,477

CESSPOOL LINING MACHINE

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Fig. 1.

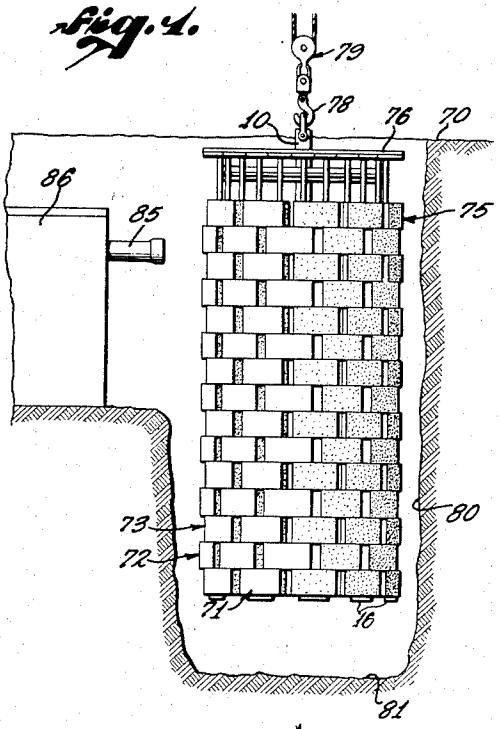


Fig. 2.

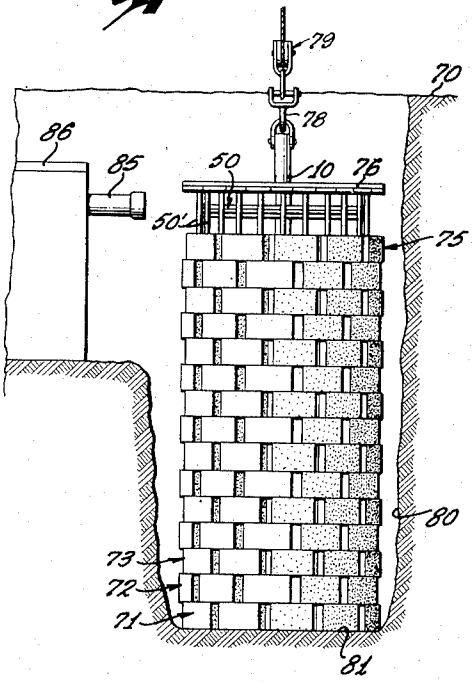


Fig. 3.

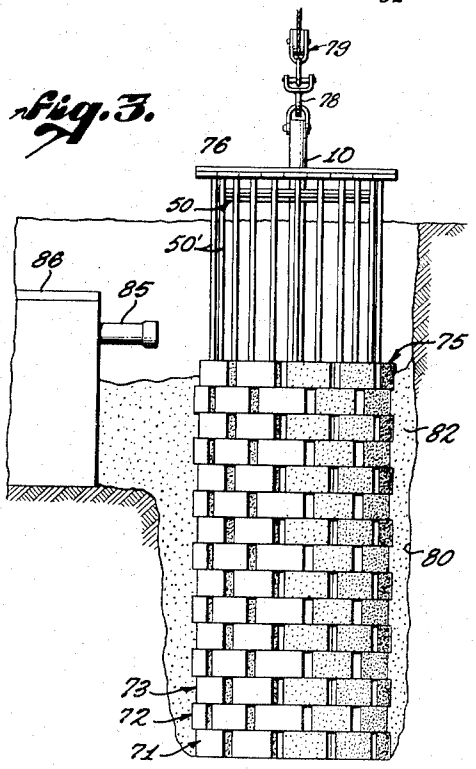
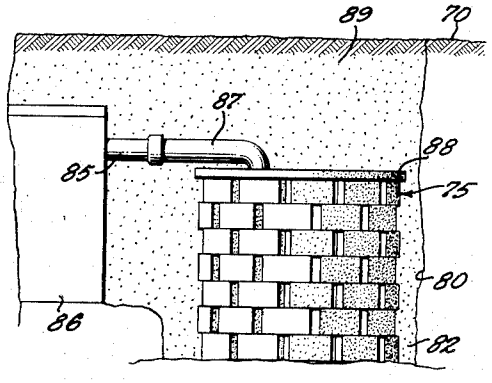


Fig. 4.



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CESSPOOL LINING MACHINE

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Fig. 5.

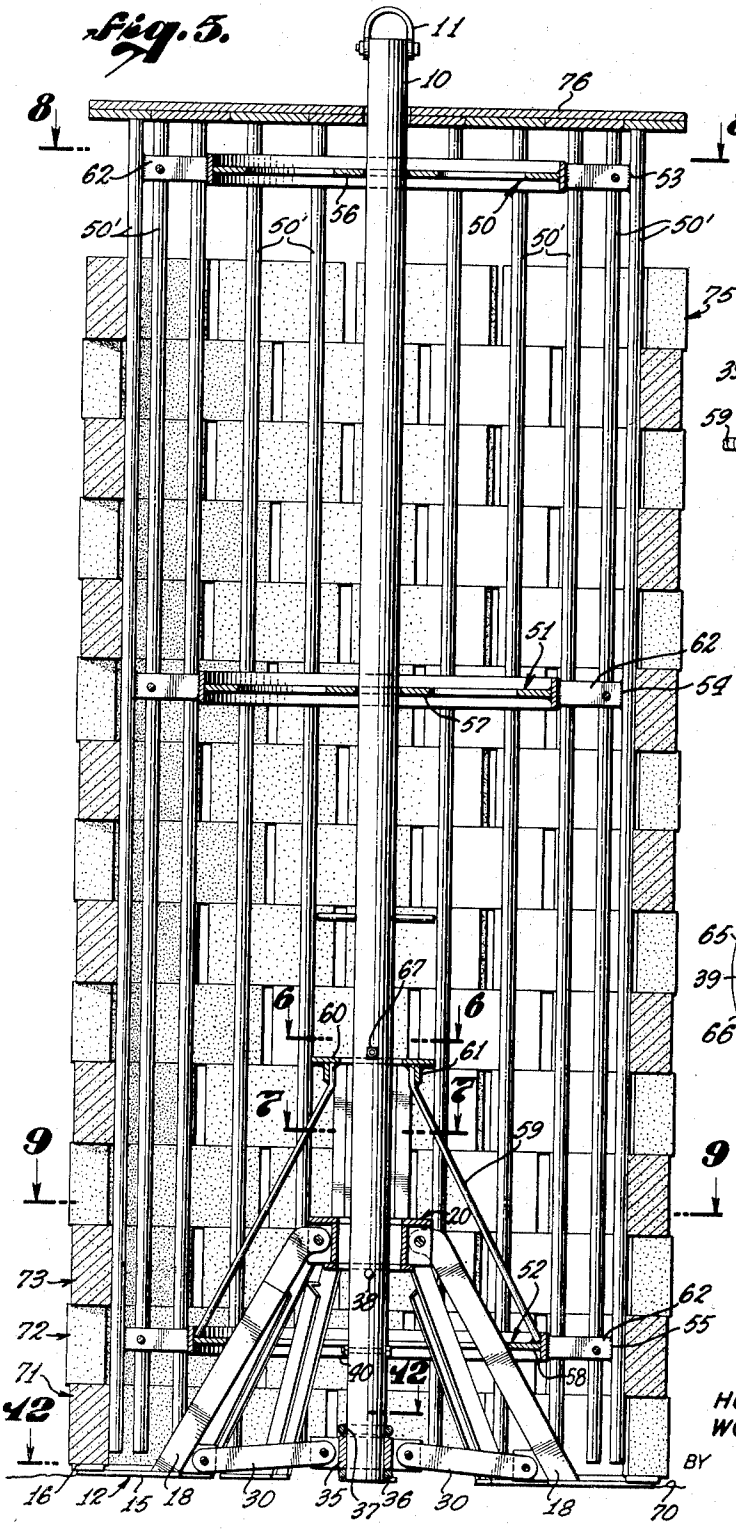


Fig. 6.

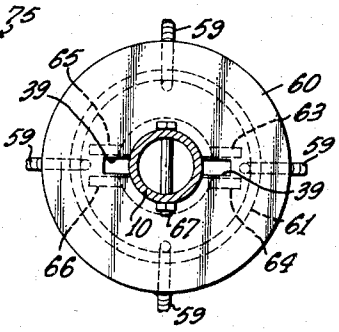
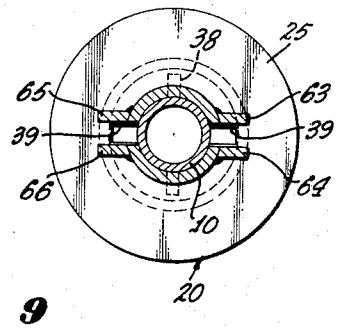


Fig. 7.



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CESSPOOL LINING MACHINE

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Fig. 8.

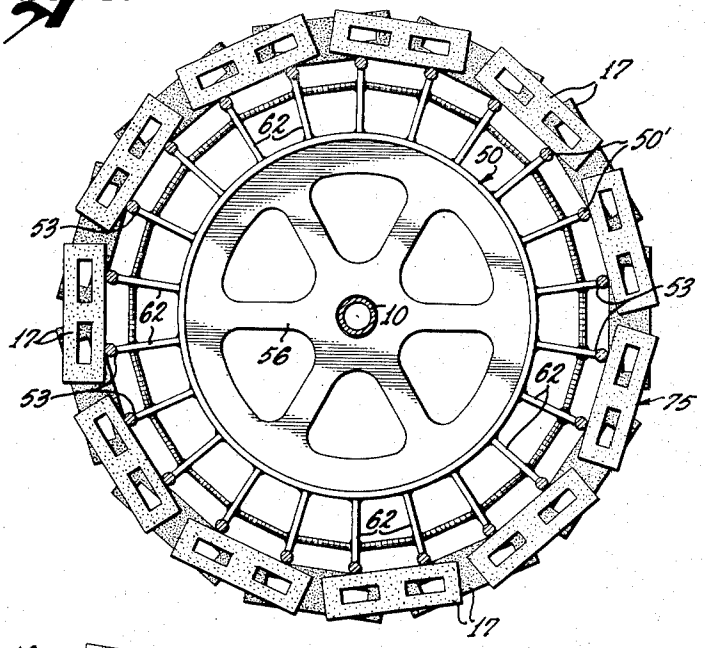
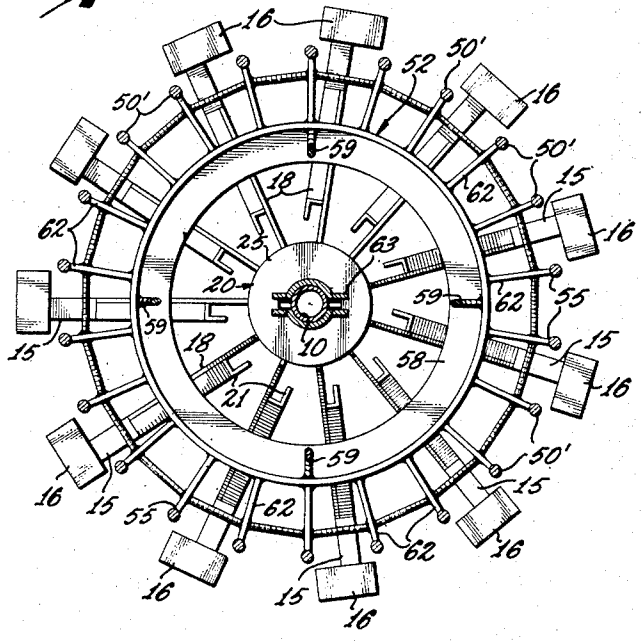


Fig. 9.



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Fig. 10.

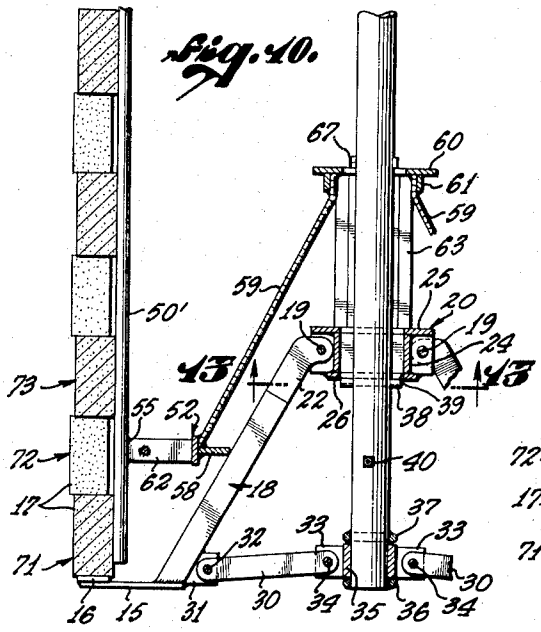


Fig. 11.

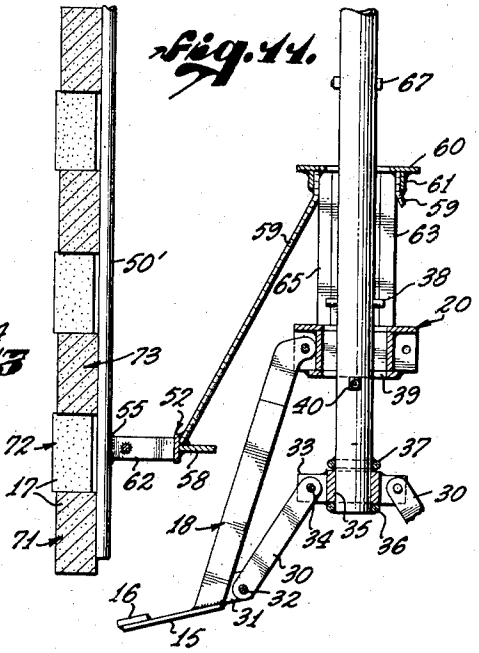


Fig. 12.

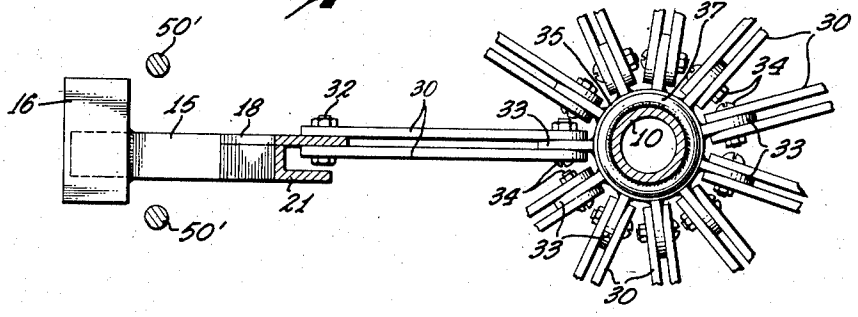
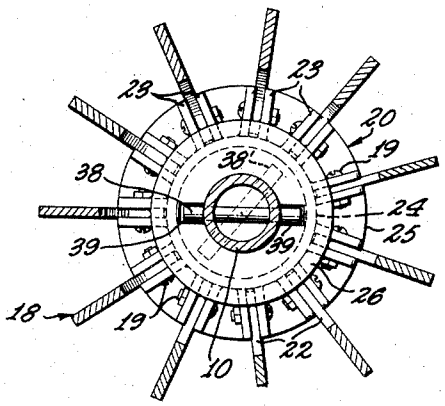


Fig. 13.



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2,650,477

UNITED STATES PATENT OFFICE

2,650,477

CESSPOOL LINING MACHINE

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Application October 16, 1952, Serial No. 315,035

5 Claims. (Cl. 61—63)

1

The invention relates to the art of constructing subsurface tanks and particularly those tanks which might advantageously be constructed of blocks. The invention more particularly relates to the construction of cesspools which may be used in connection with septic tanks, the cesspool being of such character that it is adapted to receive the flow of liquid and permit the liquid to be gradually dissipated from the tank into the surrounding earth.

The construction previously employed for subsurface tanks of this general character has been to excavate a relatively large hole sufficient to permit the accumulation of such liquid as may be admitted into the tank and to build in the excavation somewhat pervious walls of concrete block or other suitable construction so laid as to permit liquid to seep outwardly from the tank, while at the same time to permanently preserve the tank from infiltration of a sand backing or other earth which might be packed around the exterior. In the construction of such tanks the excavation must of necessity be large enough to permit workmen to work in the space allowed whether or not the space is larger than need be for any particular need. Under circumstances where the space might be small, considerable difficulties have been encountered in the past in laying up such walls at a satisfactory rate and in a sufficiently rugged fashion so that they will last as long as needed. The disadvantages in the construction of such tanks by conventional means lie not only in the necessity of building them in somewhat cramped space, but also the need for passing down all materials into the space as they are needed while the work progresses.

Among the objects of the invention is to provide a new and improved machine to facilitate the construction of lined pits in excavations wherein substantially all of the pit construction can be engaged in above ground and the structure thereafter lowered into the excavation.

Another object of the invention is to provide a new and improved device for constructing somewhat pervious pits of blocks or comparable material on the surface of the ground which makes the ultimate cost of construction and installation substantially inexpensive without in any way impairing the ruggedness and utility of the pit once it is installed below the surface.

Still another object of the invention is to provide a new and improved machine for the construction of a lining for a subsurface tank which permits quick and accurate laying of the walls of the tank outside of the excavation in a manner which also permits ready inspection prior to the lowering of the lining into the excavation and which furthermore makes it possible to lower the lining as a complete unit into the excavation, to hold it there until the excavation is filled, and thereafter make it possible to withdraw the machine without in any way disturbing the final placement of the walls.

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With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a vertical elevational view showing an early step in the lowering of the machine loaded with the wall of the pit, the excavation itself being shown in section.

Figure 2 is a view similar to Figure 1 after the machine has been rested on the bottom of the excavation.

Figure 3 is a view similar to Figure 1 after the fill has been placed around the lining inside of the excavation showing partial withdrawal of the machine.

Figure 4 is a fragmentary elevational view of the top of the lining showing the excavation completed and the connections made to the cesspool.

Figure 5 is a vertical sectional view of the machine with the blocks forming the lining in place thereon preparatory to lowering to the position shown in Figure 1.

Figure 6 is a cross sectional view taken on the line 6—6 of Figure 5.

Figure 7 is a cross sectional view taken on the line 7—7 of Figure 5.

Figure 8 is a cross sectional view taken on the line 8—8 of Figure 5.

Figure 9 is a cross sectional view taken on the line 9—9 of Figure 5.

Figure 10 is a fragmentary vertical view partially in section showing the lower part of the machine in the position occupied when the blocks are placed thereon preparatory to lowering into the excavation and also the same position as occupied when in the bottom of the excavation.

Figure 11 is a view similar to Figure 10 showing the bottom of the machine in withdrawn position preparatory to removal.

Figure 12 is a fragmentary cross sectional view taken on the line 12—12 of Figure 5.

Figure 13 is a cross sectional view taken on the line 13—13 of Figure 10.

The embodiment of the invention chosen for the purpose of illustration contemplates the provision of a machine which may be readily adapted to the construction of the wall or lining of a cesspool wherein the wall structure may be one constructed of individual blocks. It will be appreciated however that the blocks may be of any character suitable to the eventual use to which the tank may be put. To this end the machine itself may be said to be one capable of supporting virtually any type of wall which may be built upon and around the machine on the surface of the ground and thereafter lowered as a unit into a suitable excavation, whereupon the excavation may be filled in around the wall, if need be, and the machine pulled or withdrawn therefrom. The machine is capable of performing its function without the construction of a bottom for the tank prior to lowering the tank into the excavation, but upon withdrawal of the machine from the tank the way is left clear for the subsequent construction of a bottom in the tank should the particular use to which the tank might be put require a bottom of one sort or another. It will be noted as the description proceeds that the particular nature of the lining or wall built around the machine is not material to the operation of the machine itself, the wall herein shown being for the purpose of illustration only.

The construction of the machine as a whole may be readily observed in Figure 5 and the fragmentary views taken in connection with Figure 5.

As there shown there is provided a central suspending structure or column 10 which in the illustration chosen is tubular in form and is provided with a sling 11 at the top. As shown in the drawings the suspending structure or column is centrally disposed with relation to the remaining portions of the machine.

At the bottom of the column there is provided a bottom structure for the machine indicated generally by the reference character 12. The arrangement of structure comprising the bottom may also be readily seen by an examination of Figure 9 taken in connection with Figure 5. In the embodiment herein illustrated the bottom comprises eleven foot-piece assemblies. Details of these foot-piece assemblies may be readily distinguished in Figures 10 and 11. Each assembly is identical and consists of a foot plate which, in the position illustrated in Figures 5 and 10, is horizontal. The foot may be provided with a pad 16 upon which lining blocks 17 may be placed. To position the foot there is provided a diagonal brace 18 which is permanently set at an obtuse angle to the foot. At its top end the diagonal brace is secured by means of a pin 19 to a ring 20. To provide sufficient strength the mid-portion of the diagonal brace 18 may be made in a somewhat channel shape as indicated at 21 in Figure 12 and again in Figure 5. The construction of this portion is a structural detail and necessitates only a cross section and weight of member sufficient to provide proper strength. The diagonal brace 18 at its upper end 22 may be of single thickness sufficient to be pivoted to the ring 20 by the pin 19 in each case.

Details of the pinning are illustrated in Figure 13. As there shown the pin consists of a nut and bolt attached to lugs 23 which in turn extend outwardly from a ring 24 which, as more aptly shown in Figure 5, is located between an upper plate 25 and a lower plate 26. The same

structure is also readily observable in Figures 10 and 11.

The foot 15 is adapted to be held in outward position by a somewhat horizontal brace 30. This brace is most advantageously constructed of parallel elements, as illustrated in Figure 12, and the parallel elements are fastened to a lug 31 on the foot by means of a pin 32 and are fastened at the other end to a lug 33 by pins 34. The lug 33 extends outwardly from a ring or bushing 35 which surrounds the lower end of the suspending column 10. It will be noted that the braces 18 and 30 together with the lower portion of the column 10 form a triangle of support in the position illustrated in Figure 10 for the foot when it is located beneath the lower perimeter of the wall which is to be constructed.

It will be further noted that the ring or bushing 35 is secured by means of snap rings 36 and 37 on the suspending column so that the ring or bushing, although capable of rotating with respect to the suspending column, cannot be moved axially with respect thereto.

It will also be noted, and is particularly shown in Figure 11, that the ring 20 is adapted to move axially with respect to the suspending column 10. Two positions are shown respectively in Figures 10 and 11. In Figure 10, for example, the ring 20 is shown in the position it would have when resting upon the pin 38. The particular orientation of the suspending column in this figure, however, is one wherein the column has been rotated so that the pin does not support the ring.

So that the ring 20 may be moved axially upwardly from the position shown in Figure 10 to the position shown in Figure 11, the plate 26 is provided with a slot 39, as shown in Figure 13, slightly larger than the pin 38 so that the pin can pass through the slot 39. As shown in Figure 11 the suspending column 10 has been shifted upwardly so that the pin 38 occupies the new position there shown. This amount of movement likewise causes the bottom of the suspending column to be lifted a corresponding amount which in turn lifts the ring or bushing 35. As the column moves upwardly so that the pin 38 moves upwardly to the position shown in Figure 11, the feet as indicated by the foot 15 in Figure 11 tilt inwardly until a bolt 40 strikes against the bottom of the plate 26. After this adjustment is reached, the foot assembly will no longer shift in position but can be moved upwardly when in the position shown in Figure 11. It will be apparent that when the brace 30 is tilted upwardly to the position shown in Figure 11, the foot 15 will be drawn toward the axis of the column 10 and, inasmuch as the ring 20 will be free to move axially a limited distance, the rigidity of the triangular support for the foot 15 will be relaxed and permit the triangular support to close.

So that the blocks may be supported vertically after they are placed upon the feet 15 there are provided a series of vertical slide bars 50'. In the illustration chosen these are bars or rods circular in cross section and extending from a position slightly above the feet 15 to a position above the top of the lining which is to be built upon the feet.

The vertical slides may be advantageously mounted and spaced by wheels 50, 51 and 52. These wheels may be of any suitable construction but should have a circular perimeter sufficient so that the vertical slides may be welded thereto at points 53, 54, 55, etc., in order to position them equally spaced around the perimeter of the ma-

chine. In the illustration selected there are a sufficient number of vertical slides positioned such that two slides will support each block at the junction of that block along a vertical line with the block next above or below. By positioning the rods or slides in this fashion the blocks may be placed and pushed against the rods as each layer is built up, and the rods will automatically position the blocks in substantially a circular arrangement.

The wheel **50**, for example, is provided with a hub **56** loosely encircling the column **10**. The wheel **51** has a corresponding hub **57**. The wheel **52**, however, has a substantially larger hub **58** of a circumference sufficiently great to encircle the braces **18** when they are in the extended position shown in Figure 5.

For the wheel **58** there are provided diagonal supports **59** which extend upwardly from the wheel **52** to a transverse plate **60** having a depending cylindrical flange **61** to which the diagonal supports **59** are attached. It should be further noted that in the construction of the wheels **50**, **51** and **52** a series of spokes **62** are provided in each case extending radially outwardly from the rim of each respective wheel and that it is these spokes to which the vertical slides are welded. Use of the spoked arrangement referred to is helpful in lightening the weight of the machine.

Operation of the structure is further improved by the provision of vertical guides **63**, **64**, **65** and **66** which form channels on opposite sides of the column **10**. The vertical guides are anchored at the top to the transverse plate **60** and at the bottom to the ring **20**. The guides serve to align the pin **38** as it travels upwardly relative to the ring **20**, for example, in company with the column **10**.

The vertical guides also serve to space the plate **60** with respect to the ring **20**. When, therefore, a pin **67** moves downwardly with the column **10** to a position of engagement with the top of the plate **60**, further movement downward of the column **10** will be restricted which also means that the column **10** will move no further downward with respect to the ring **20**.

In the operation of the invention the machine is first placed in the adjustment shown in Figure 5 upon the surface **70** of the ground. In this position the column **10** is moved downwardly relative to the wheels **50**, **51** and **52** and also downwardly relative to the transverse plate **60** and the ring **20**. In the position shown in Figure 5, which is also accurately depicted in Figure 10, the foot assembly is moved outwardly so that the feet **15** rest flat upon the surface of the ground with the pads **16** defining the bottom perimeter of the wall which is to be built up of the blocks **17**. When in this position the column **10** is rotated and in rotation the pin **38** is moved from the position **10** to a position angularly disposed with respect thereto, namely, a position such as **38'** in Figure 13. Because of this positioning of the pin **38** beneath the plate **26**, when the column **10** is lifted, the feet **15** will be maintained in the horizontal position shown in Figures 5 and 10, for example, and thus be capable of lifting the weight of the blocks forming the wall.

When the feet are placed upon the surface of the ground as described, a first row **71** of blocks **17** is laid. In laying the first row the blocks are positioned so that each foot **15** carries a block. The blocks are pushed inwardly against the vertical slide bars **50'** which thus position the blocks in substantially a circular arrangement about the

machine. They define in this fashion the lower perimeter of the wall of the tank.

Following the laying of the first row **71**, a second row **72** of blocks **17** is laid upon the first row with the blocks of the second row breaking joints with the first row. The blocks of the second row are also pushed against the vertical slides **50'** which again serve to arrange the blocks in a circular fashion about the machine. It should be noted further that there is ample space between the ends of the blocks on each row to permit free seepage of the liquid contents of the tank outwardly.

Following the placing of the second row, a third row **73** is placed and so on until the topmost row **75** is placed. It is preferable to have the vertical slides somewhat higher than the full height of the tank so that the topmost row occupies an elevation slightly below the top of the machine.

Further improving the rigidity of the machine, but more particularly to keep fill-in dirt from filling in the tank, a cover plate **76** may be employed on the top overlying the tops of the vertical slides **50'** and overlying to a slight extent the tops of the blocks of the uppermost row **75**.

Upon completion of the laying of the blocks forming the walls of the tank, a hook **78** of a block and tackle **79** is engaged with the sling **11** and by suitably manipulating the block and tackle by means of a lifting device (not shown) the machine with its load of blocks is swung clear of the ground surface **70** and located above an excavation **80** in the ground. It can be noted from Figures 1 and 2 that the excavation need be but a slight amount larger than the perimeter of the tank formed by the blocks sufficient only to have the tank comfortably clear the walls of the excavation. The bottom **81** of the excavation should be level.

After the machine with its load of blocks has been centered above the excavation **80**, it is gradually lowered through the position shown in Figure 1 to the position shown in Figure 2. Should there need to be any aligning to place the tank in a precisely vertical position, it can be done at this juncture by leveling off one side or another of the bottom **81** of the excavation before the machine is released from its load of blocks. When the machine and the load of blocks comprising the tank has been properly centered in the excavation **80** and before withdrawal of the machine, the space between the exterior of the tank and the walls of the excavation may be filled with a sand fill **82**, as illustrated in Figure 3. After the sand fill has been properly placed to a level slightly below the top of the tank, the machine may be withdrawn.

Withdrawal is accomplished by first rotating the column **10** until the pin **38** is again in alignment with the slot **39**. After this has been done, the block and tackle **79** is elevated and the first elevational movement will raise the column **10** with respect to the ring **20**, but the column **10** will carry with it the ring **35**. This movement will cause the braces **30** to be pulled angularly upwardly to the positions shown in Figure 11 and will permit the braces **18** to shift angularly downwardly to the positions there shown. The result of this movement is to withdraw the feet **15** and pads **16** from their position beneath the blocks **17** of the lowermost row **71**. Meanwhile the slides **50'** are maintained in their position holding against the inside surfaces of the blocks.

As the column **10** is pulled upwardly the pin **40** finally strikes against the bottom of the plate

26 and thereafter no further movement of the braces 18 and 30 of the foot assembly takes place. The pressure of the pin 40 against the plate 26, however, is transferred to the transverse plate 60 and thereafter the slides are slid upwardly along the inside walls of the tank as suggested in Figure 3, the lifting being continued until the machine is lifted entirely clear of the tank and above the surface 70 of the ground.

At this point an outlet pipe 85 of a septic tank 86 may be joined by means of an elbow 87 so that the outlet pipe is directed downwardly into the top of the tank. A cover 88 is then applied and the remaining fill 89 placed over both the septic tank and the cesspool formed by the tank described as built from the blocks 17.

There has thus been described a simple and effective machine for facilitating the building of cesspools by means of which a tank for the cesspool may be quickly and accurately constructed above ground and thereafter lowered into an excavation and the excavation substantially filled in before removal of the machine.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an excavation lining machine for positioning, supporting and placing a wall in an excavation the combination of a central suspending column adapted to be slung on a cable, a cage around the column and spaced therefrom defining the inner surface of said wall, a limited axially sliding connection between the cage and the column, and a collapsible bottom attached to the column beneath the cage adapted to form a support for the wall, said bottom having a collapsible connection to the column, lock means adapted to hold said bottom in an extended position on the column, and means adapted to release said lock means for retraction of the bottom to a collapsed position removed from the wall.

2. In an excavation lining machine for placing blocks to form the wall of a pit the combination of a bottom, side wall supports and a suspending structure, said bottom comprising collapsible elements having extended positions defining the bottom perimeter of the wall and retracted positions withdrawn from the wall, articulating collapsible connections between the elements and the suspending structure and a locking means operatively associated with said elements and the suspending structure adapted to hold said elements in the extended positions, said side wall supports comprising a series of vertical slides attached to the suspending structure independently of the bottom and disposed circumferentially in positions defining the inside circumference of the wall, and a suspending sling on the suspending structure.

3. In an excavation lining machine for placing blocks to form the wall of a pit the combination of a bottom, side wall supports and a suspending

structure, said bottom comprising a series of radially disposed elements having extended positions defining the bottom perimeter of the wall and retracted positions withdrawn from the wall, articulating collapsible connections between each of the elements and the suspending structure and a locking means on the suspending structure operatively associated with said connections adapted to hold said elements in the extended positions, said side wall supports comprising vertical slides disposed in positions adjacent the outer ends of the radially disposed elements defining the inside circumference of the wall, braces between the slides and the suspending structure adapted to fix the positions of said slides, and a sling on the suspending structure.

4. An excavation lining machine for positioning, transporting and placing a wall forming a tank in an excavation the combination of a central suspending column, a collapsible bottom comprising radially extending foot mechanisms having block supporting feet defining when extended the bottom perimeter of the wall, each foot piece mechanism having a pair of collapsible triangular braces wherein the respective braces of each pair are radially arranged about the column in the form of a set, and a ring around the column joining each set of braces, one of said rings being axially slidable in the column and the other of said rings being fixed against axial movement on said column, and a stop on said column having in one position of rotation of the column a supporting relation to said one ring and in another position of rotation a released relation, and vertical block contacting slides defining the perimeter of the inside circumference of the wall of said pit, said slides including braces from the column to the slides adapted to hold said slides in place, said braces having a limited axially slidable relation to said column.

5. In an excavation lining machine for placing blocks to form the wall of a tank the combination of a central suspending column, a collapsible bottom comprising radially extending foot piece assemblies equal in number to the number of blocks forming the perimeter of the bottom of the wall, a block supporting foot on each foot piece assembly defining the bottom perimeter of the wall when in extended position, each foot piece assembly having an upper and lower collapsible triangular brace and a ring around the column joining the upper braces and a second ring around the column joining the lower braces, the ring joining the upper braces being axially slidable in the column and having a transverse slot therein and the other of said rings being restricted against axial movement on said column, and a pin on said column having in one position of rotation of the column a supporting relation beneath the first identified rings and in another position of rotation having a released relation in alignment with the slot therein, and a series of vertical block contacting slides defining the perimeter of the inside circumference of the wall of said tank including bracing means from the column to the slides adapted to hold said slides in place, said last bracing means being axially slidable relative to said column.

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No references cited.