Oct. 17, 1950 B. VAN EYCK 2,526,176

FOUNDATION MACHINE

Filed Feb. 25, 1946 2 Sheets-Sheet 1

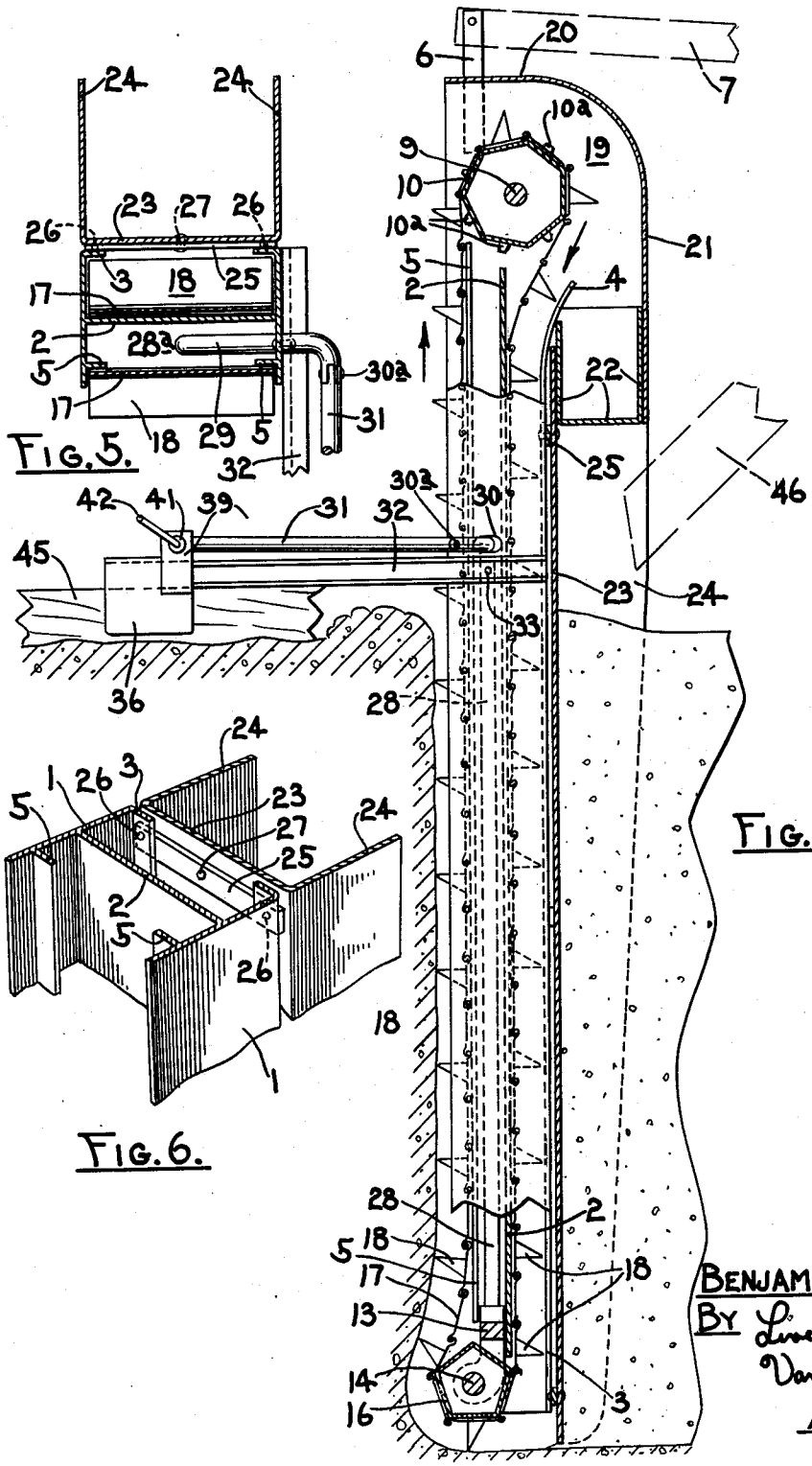


FIG. 5.

FIG. 1.

FIG. 6.

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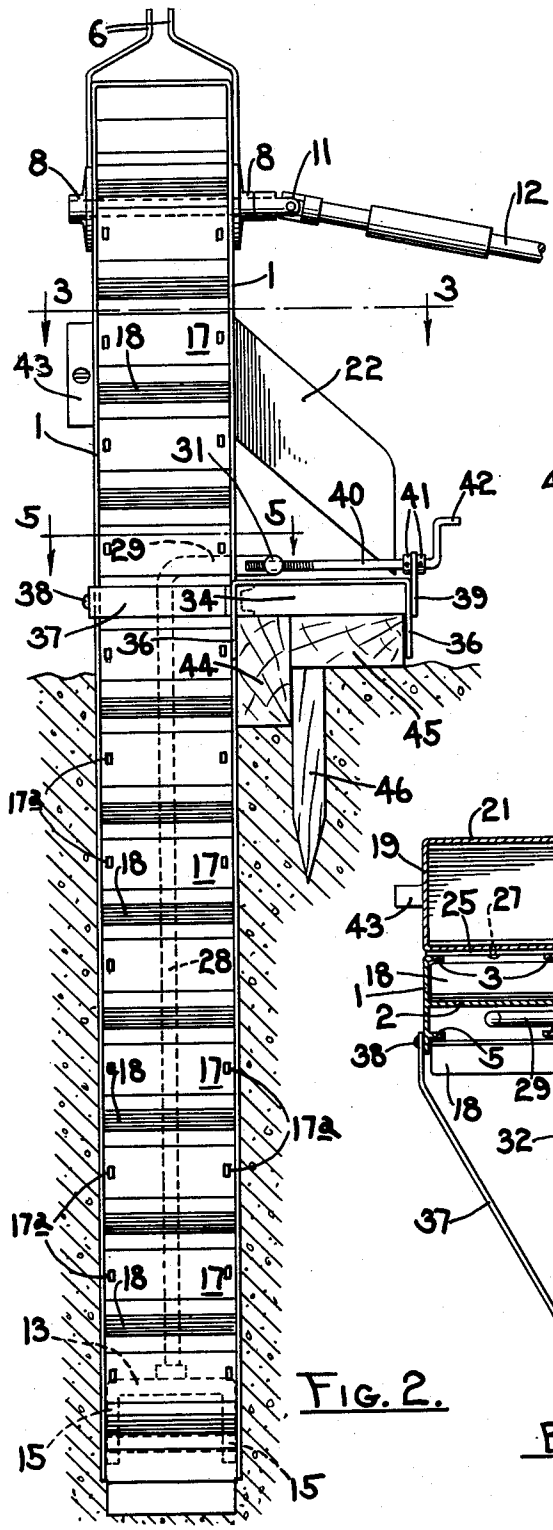


FIG. 2.

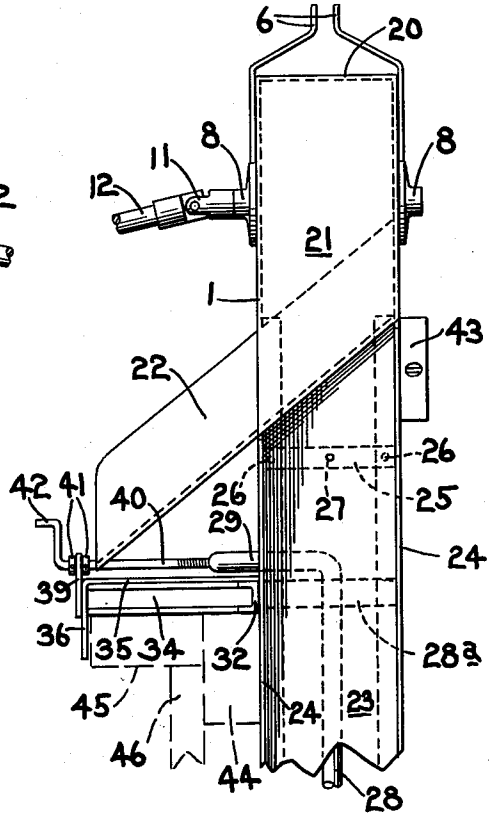


FIG. 4.

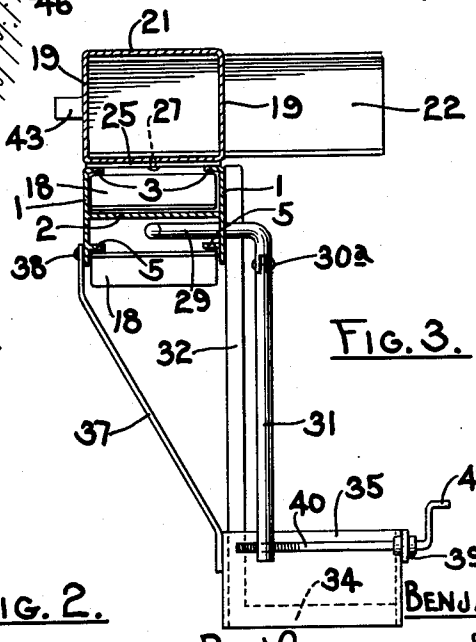


FIG. 3.

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FOUNDATION MACHINE

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Application February 25, 1946, Serial No. 649,883

3 Claims. (Cl. 61—63)

1

This invention relates to excavating machines and more particularly to a machine for digging and forming cement foundations.

The primary object of the present invention is to provide a machine which will dig a trench in the ground the desired width and depth of a foundation thus forming a mold into which cement or other foundation material is poured thus eliminating the usually necessary foundation forms and the resulting cost of labor, material and time of constructing these forms, and to provide means for subsurface constructions, vaults, shelters, culverts, tunnels and spillways.

Other objects of the present invention are; to provide means whereby the weight of the poured cement in the trench helps provide the motivating power for the forward movement of the excavating machine, to provide means whereby the machine is guided for the proper location and alinement of the resulting foundation, to provide means whereby the trench is dug with the proper vertical positioning of the resulting foundation with convenient means for maintaining the digger in vertical position; to provide means whereby the operator may observe how plumb or inclined the trench is being dug.

Other objects and advantages will become apparent with an understanding of the invention which may be had from the following description taken in connection with the accompanying drawings, in which,

Fig. 1 is a side elevational view of the foundation machine with the ground being excavated in vertical section.

Fig. 2 is a front elevational view of the machine being guided by a locating frame with the ground in vertical section.

Fig. 3 is a horizontal sectional view through the upper portion of the machine taken along line 3—3 in Fig. 2 looking in the direction of the arrows.

Fig. 4 is a fragmentary rear view of the upper end of the foundation machine.

Fig. 5 is a horizontal sectional view through the upper portion of the machine taken along line 5—5 in Fig. 2 looking in the direction of the arrows, and

Fig. 6 is a sectional perspective view showing the construction of the vertical support and guide members.

Referring in detail to the drawings in which like reference numerals refer to like parts throughout the several figures the foundation machine comprises vertical side supporting plate

2

members 1 held in spaced parallel relationship by the integral vertical cross member 2. The rear vertical edges of the side plates 1 terminate in the inturned flanges 3 which at their upper ends are bent rearwardly at 4, which act as guides for the digging members, and integral guide strips 5 extend inwardly from the plate 1 near their forward edges. A pair of hanger bars 6 are secured to the upper ends of the side members 1 and are bent inwardly to receive a supporting arm 7 attached to a tractor or the like whereby the machine may be supported.

Rotatably mounted in bearings 8 attached to side plates 1 is a shaft 9 having a polygonal shaped drum 10, with projections 10a acting as sprockets, secured thereto and universal joint 11 attached to shaft 9 driven by telescoping, splined shaft 12 attached to a suitable prime mover for rotation of shaft 9 and drum 10.

Yoke 13 is secured to the forward face of cross member 2 at its lower end and shaft 14 is mounted between ears 15 with a polygonal shaped drum 16 rotatably mounted thereon. An endless link belt 17, having opening 17a and digging members 18 extending outwardly therefrom is located around the polygonal drums 10 and 16, with projections 10a engaging openings 17a, and at its forward run is guided along its rear side by guide strips 5 and at its rearward run is guided by flanges 4 and between cross member 2 and flanges 3.

The upper ends of side plates 1 have rearwardly extending integral plate portions 19 and a top plate 20 and integral rear plate 21 partially enclosing this upper end. A chute 22 is attached to the inner side of plate 21 and in a position to receive the ground excavated by the diggers to remove the ground to one side of the machine.

Located to the rear of the main support is a cement chute into which cement is poured and comprises a front vertical cross member 23 with integral rearwardly extending guide plates 24 between which the cement is poured. This chute is supported against the rear side of the main support by a plurality of spaced horizontal bars 25 which are riveted at 26 or otherwise pivotally attached to the flanges 3 and at a central point are pivotally or loosely attached at 27 to the cross member 23. This form is loosely attached to the main support in the manner described whereby the whole structure may be twisted for the steering of the lower end thereof to maintain the machine plumb or at any desirable predetermined angle.

The mechanism for steering the lower end of the machine comprises a rod 28 attached to and extending upwardly from yoke 13 and rotatable received in bearing block 28a secured to the front face of cross member 2 near the ground line. This rod is then bent horizontally in the portion 29 which extends outwardly through a horizontal slot 30 in one of the side members 1 and terminates in the forwardly extending horizontal rod 31 pivotally connected at 30a for vertical movement.

A channel member 32 is pivotally connected as 33 to the outer side plate 1 for vertical pivotal motion and has an integral channel member 34 forming an L-shaped frame. A plate 35 is attached to the upper sides of channels 32 and 34 and has the downwardly extending guide plates 36. A strut 37 is pivotally attached at 38 near the forward edge of the inner side plate 1 and at its other end is secured to one of the guide plates 36 whereby the plate 35 is held horizontally rigid with the main support while allowing vertical pivotal movement thereof. A bearing plate 39 is attached to the outer guide plate 36 in which is rotatable mounted a crank rod 40 screw threaded at its inner end and received in a threaded opening at the outer end of rod 31. Crank rod 40 is provided with pinned collars 41 either side of bearing plate 30 and is formed into a crank 42 at its outer end. A spirit level 43 is attached to the outer face of the inner side plate 1 whereby the operator may observe the vertical condition of the machine.

Preparatory to forming a cement foundation the ground is built up along the foundation line near to the floor level and packed. Then a guide frame is located along where the finished foundation is to be formed and this frame, in this instance consists of guide rails 44, the inner faces of which are located in alinement with the outer face of the foundation to be formed. Other guide rails 45 are nailed with these edges against rails 44 and their upper faces flush with the upper edge of studs 44. A series of spaced stakes 46 to which the rails 44 and 45 are nailed are driven into the ground whereby the rails are held in position.

Before the trench and foundation are formed ground is added along where the foundation is to be formed and within the confines of the foundation where the floor is to be poured and packed to the elevation of the bottom of the finished floor line. Then the guide rails are staked in position with the inner face of rail 44 in line with the outer face of the resulting foundation and with the upper face of rail 45 level with the floor line. Guide rails may also be located for the formation of partition within the foundations.

With the foundation machine supported by a tractor or the like by means of arm 7 and supporting bars 6 and with the chain and digging members driven in the direction indicated by the arrows in Fig. 1, the machine is lowered against the ground digging itself downwardly to the position shown in Fig. 1 until channel 32 engages the top edge of rail 44 whereby the depth of the foundation is regulated. Then the tractor is moved ahead moving the machine lengthwise of the trench whereby the machine may dig a trench of short length. When this is done there will be a portion of the trench formed to the rear of the main support into which cement may be poured as from chute 46. The trench is filled up to the bottom of the finished floor line. The pressure of the fluid cement against cross member 23 of

the cement chute aided by the action of the conventional concrete vibrator, causes the machine to move ahead as the ground is removed from in front of the machine.

The digger members in their movement loosen and remove ground from the front side of the trench and lift it up over drum 10 and drop it into chute 22 whereby the ground is deposited to one side of the machine beyond the guide frames 44 and 45. The links 17, with the digging members 18, while loosening the ground, are guided over drum 16, against guide strips 5 and at other times are guided over drum 10 and between flanges 3 and 4 and cross member 2.

The operator occasionally observes the spirit level 46 and when the machine is not making a trench at the desired angle, may turn crank 42 to steer the lower end thereof to guide it back toward the angle. In turning crank 42 rod 31 is pivoted horizontally in bearing block 28 whereby, through vertical rod 28 and yoke 13 attached to cross member 2, the lower end of the main frame is twisted whereby on subsequent digging the lower end will be brought back to plumb on other predetermined angle.

During the movement of the machine along the rails the outer side plate 1 is held against the face of rail 44 with channel member 32 riding on the top edge thereof. The downwardly extending guide plates 36 engage the inner face of rail 44 and outer edge of rail 45 whereby the steering mechanism receives the proper twist to be effective.

The link connection between the main supporting structure and the cement chute as shown in Fig. 6 allows the supporting structure and chute to twist or flex along their vertical length to allow the lower end of the machine to be steered to maintain it plumb or other desired angle. If the connection between the main supporting structure and the cement chute were rigid it would resist twisting of the supporting structure. After the foundation has been formed by the machine and has set, the floor of the building or dwelling may be poured into the same frame 44 and 45 using the top thereof to level off the floor.

The excavating machine may be raised during its operation to provide for doorways, windows and openings for subsequent excavating of the basement within the foundation, these excavating openings to be closed independently after the excavating of the basement. After the basement is excavated, the interior of the foundation is cleaned and then either cement gunned or plastered for a finished surface. With a few simple alterations the machine may be used in pairs to form a double thickness wall or foundation. The machine may be made relatively narrow whereby a comparatively thin water-proof curtain of concrete or other material may be formed.

Having thus described my invention, the particular constructions which I claim as new are defined in the appended claims which are to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. An excavating machine comprising a vertically positioned elongated axially twistable supporting member, means on the supporting member for loosening and lifting ground from one end of a trench, a frame secured to the supporting member near its upper end extending a distance from the supporting member the outer end thereof adapted to be guided on guide means, steering

means rigidly attached to the lower end of the supporting member extending upwardly and outwardly to the outer end of the frame, and means at the outer end of the frame for moving the steering means whereby the lower end of supporting means is guided at a pre-determined angle.

2. An excavating machine comprising, a vertically positioned elongated axially twistable supporting member, means thereon for loosening and removing ground from one end of a trench, a horizontal steering frame rigidly secured to the supporting member and extending near its top a distance therefrom, means for guiding the steering frame adapted to traverse guide means on the ground, a steering rod rigidly secured to the supporting member at its lower end and rotatably mounted in a bearing in the supporting member near its upper end and extending outwardly along the steering frame, means on the steering frame for adjustably holding the steering rod in selected rotatable positions whereby the lower end of the supporting member is steered to be guided at the desired angle with the upper portion thereof.

3. A machine as described in claim 2 including a cement chute of U-shaped horizontal section extending substantially the length of the supporting member adjacent the rear side thereof and open toward the rear, and horizontally located vertically spaced bars loosely attached at the ends to the supporting member and loosely attached near a middle point to the cement chute.

BENJAMIN VAN EYCK.

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