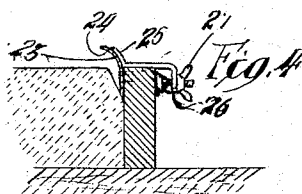
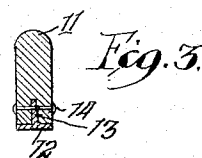
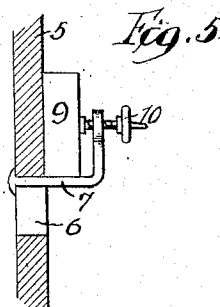
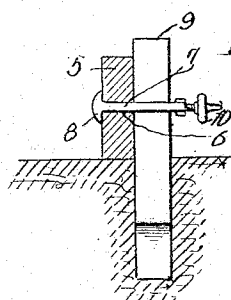
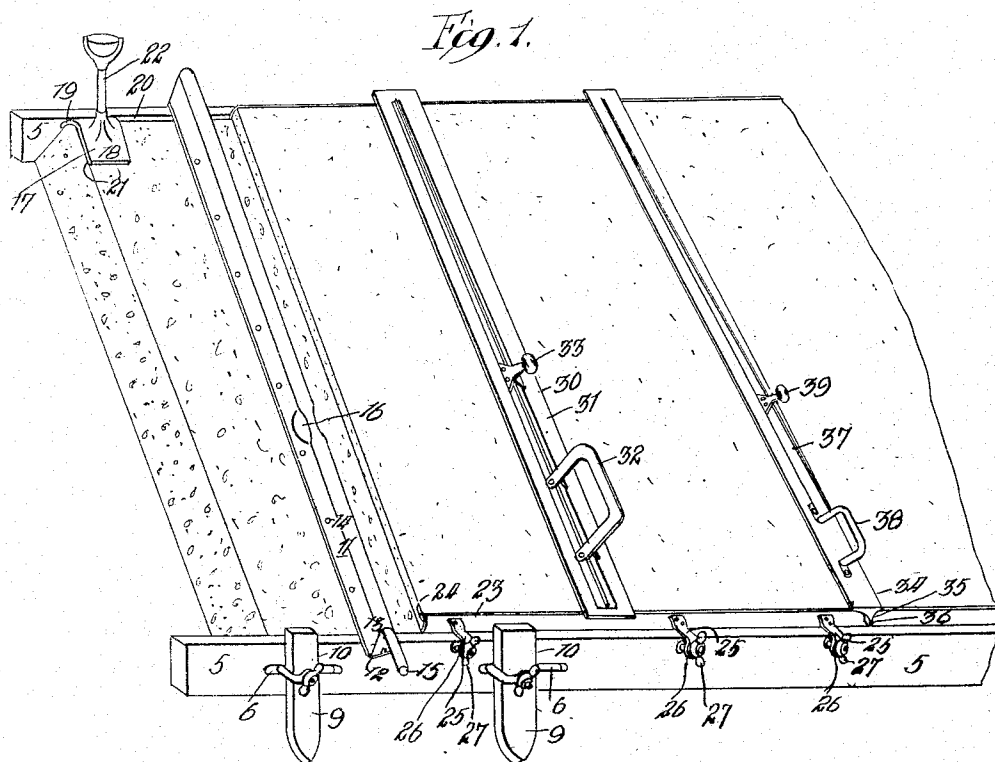


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 APPARATUS AND PROCESS OF LAYING CEMENT SIDEWALKS OR SIMILAR STRUCTURES.
 APPLICATION FILED FEB. 23, 1909.

939,071.

Patented Nov. 2, 1909.



Witnesses

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APPARATUS AND PROCESS OF LAYING CEMENT SIDEWALKS OR SIMILAR STRUCTURES.

939,071.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALEXANDER D. NEY, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Apparatus and Processes of Laying Cement Sidewalks or Similar Structures, of which the following is a specification.

In the ordinary method of laying cement sidewalks or similar cement structures, it is customary to first lay a foundation of relatively coarse material, which is tamped down by means of a tamping tool between the rails of a mold form which serves to hold it in position. In the use of a tamping tool, the common practice is to press the foundation material to the extent necessary to bring its surface below the level of the mold or form and thereafter fill in the remaining space with the surface layer of cement until the top of the surface layer is flush with the top of the form, smoothing down the surface with a straight edge and finishing it with a trowel. This method of laying sidewalks is objectionable, for the reason that it is impossible, even with great care, to secure an absolutely level surface for the foundation by means of a tamping tool, so that, when the surface layer is applied, it will be of a varying thickness, by reason of inequalities in the level of the foundation. This lack of uniformity in the thickness of the surface layer frequently causes the latter to crack and disintegrate when subjected to the expansion and contraction due to changes in temperature, thereby destroying the sidewalk. Furthermore, such a process requires considerable practice, skill and mental exertion even to produce fairly satisfactory results, and involves considerable expenditure of time and labor.

The object of the present invention is to provide means for securing perfect uniformity of thickness in the surface layer with the resulting attendant advantages, and at the same time permit the work to be performed more rapidly and with less labor and practice than has hitherto been required.

Further objects will appear from a detailed description of the invention, which

consists in the various steps and operations to be hereinafter described and claimed.

In the drawings, Figure 1 is a perspective view of a cement sidewalk in various stages of completion, illustrating the process of the present invention and the tools or devices therein employed; Fig. 2 a cross sectional view, taken through the form used in the present process; Fig. 3 a cross sectional view of the straight edge employed in leveling the foundation layer; Fig. 4 a cross sectional view, showing the method of clamping the upper form to the rails of the lower form; and Fig. 5 a plan view of the clamp of Fig. 4 in clamping position.

In the process of the present invention, after leveling the ground to the extent necessary to receive the sidewalk or other cement structure, a line of stakes 9 are driven into the ground, which serve as supports for the rails of a lower form, the upper edges of which rails are intended to lie flush with the top of the foundation layer of cement. These rails are provided with elongated slots 6 which are adapted to receive clamps 7, each of which is provided with a flattened T head adapted to be inserted through the adjacent slot in the rail and thereafter turned crosswise of the slot to prevent its retraction. The clamps are offset to embrace the stakes 9, and through the ends of the clamps are threaded adjusting screws adapted to be manipulated by the thumb and finger, which are adapted to be screwed down against the rails to the extent necessary to tightly clamp the parts together. This method of clamping the rails to the stakes permits a considerable degree of adjustment after the stakes have been driven, so that great exactness in driving the stakes is not required. After the rails have been laid, the foundation layer of cement concrete material, which is in a fluid condition rather than in the relatively stiff condition used where the tamping operation is performed, is poured into the space between the rails until its surface is substantially on a level or flush with the top edges of the rails, after which it is leveled down by means of a straight edge 11, which is of sufficient length to extend from side to side and rest upon the side rails. By reason of the fluid nature

of the cement concrete employed, gravity will act to bring the material to a substantially solid, coherent and homogeneous mass, so that no tamping will be necessary.

5 Where the material is relatively stiff, a tamping operation is necessary in order, not only to level down the mass, but also to pack down the material, so that interstices or spaces will not be left in the completed

10 foundation. In the present case, gravity serves to perform the packing function of a tamping operation and in a much more satisfactory manner. Furthermore, in forming the foundation layer by the present process,

15 it will not be necessary to provide a filling of cinders or other porous material in order to drain off the water when the material is tamped down, but the cement can be poured directly on the surface of the ground, since

20 an abundance of water is desirable in order to properly crystallize and set the cement concrete, which chemical action will be much more perfect where the material is left practically undisturbed after the pouring operation

25 than is the case where a tamping operation is performed and the natural operation of crystallization interfered with. The straight edge is preferably formed of wood with metal facing in the form of a T iron

30 strip 12, having its flange 13 embedded in the wood and held by means of cross bolts 14. The straight edge is provided, at one end, with a projecting handle 15, and is further provided, at a suitable distance from

35 the handle, with a hand-hole 16 which permits easy manipulation of the straight edge. After the foundation layer has been leveled down, it will be partially cut or divided into sections by means of a tool 17, the construction of which will be hereinafter referred to,

40 and which makes a separating joint. The relatively thin consistency of the foundation material permits it to be quickly and perfectly smoothed down by means of the

45 straight edge, so that its upper surface will be perfectly level and flush at all points with the side rails and in proper condition to receive the surface layer or coating. Before the latter is applied, the edges of the foundation layer are slightly rounded by means

50 of the tool 17, which comprises a plate 18 having its outer end 19 turned down to work the material slightly away from the form in order to provide a slot or channel 20 outside

55 of the edge of the foundation layer for the reception of the finer and smoother material which forms the surface layer. The inner end 21 of the tool is flat to bear upon the leveled surface of the foundation layer,

60 which facilitates the manipulation of the tool by means of a handle 22 similar in form to the handle of a spade. After the foundation layer has been thus treated, it is in condition to receive the surface layer. Before

the application of the latter, the mold is built up by inserting a top form comprising top metal strips 23, each of a length equal to the intended length of a section of sidewalk, which strips, along their upper edges

65 24, are inwardly bent or curved to furnish a circular formation to the upper corner of the finished sidewalk; and these upper metallic strips are inserted into the groove or channel formed by the tool 18 and are held in place by means of clamping brackets

70 25, each of which is of a length to bridge over the top of the side rail and is provided with a downturned end 26, which is adapted to have a clamping screw 27 threaded there-through, which screw is adapted to bear

80 against the outer faces of the lower rail and to be adjusted to tightly clamp the strips composing upper form into position.

The width of the groove or channel 20 is such that when the upper strips are clamped

85 tightly against the inner faces of the side rails a space will be afforded inside of the form for the reception of the cement intended to furnish a side finish for the sidewalk. The projection of the upper form

90 above the side rails will be equal to the intended thickness of the surface layer which is poured in between the metal form and fills down under the inwardly turned edges thereof and into the groove or channel

95 inside of the lower form, after which it can be leveled down by means of a straight edge like that previously described, or of any other suitable formation, which straight edge, being of sufficient length to rest upon

100 the upper metal form, will level the surface layer to a uniform thickness at all points. The straight edge will rest upon the thin inturned edges of the top metal strips 23, so that no surface will be afforded for the

105 lodgment of grit, pebbles or hard particles of cement on the edges of the metal strips in such manner as to cause irregularity of movement of the straight edge, which will move smoothly and evenly along the edges

110 of the strips in leveling down the surface layer. During this operation, the strips furnish a knife edge for cutting off the surplus cement. After the surface layer has been leveled down it is smoothed off and finished

115 by means of a surface finishing tool 30 which comprises a flat plate 31 having secured to its rear face a tapered bar of inverted T iron, to the flange of which, at one end, are secured handles 32 and 33, conveniently

120 located to permit manipulation of the tool. The tool is of sufficient length to rest upon and be guided by the top form, which greatly facilitates and expedites the finishing operation. By supporting the finishing tool

125 upon the top form, the finishing operation can be performed almost immediately after the top layer of cement has been poured in

place, since the surface of the cement will be relieved from the pressure of the tool, so that there is no necessity for allowing the cement to partially harden or crystallize before it is finished down. In the use of an ordinary trowel for finishing purposes, it is necessary to allow the cement to harden or thicken to a considerable degree before it will be in condition to bear the weight of a trowel, after which the troweling operation disturbs or impairs the natural crystallization of the material. The operation of the present process can be performed immediately, so that delay is avoided and a smoother and more coherent surface layer will be secured. After the section of the walk has been surfaced it will be divided up at the intended points by means of a cutter 34 in the form of a flat bar 35 having a V-shaped flange 35^a which serves as a blade, and is of sufficient length to enter the slots or spaces 36 between the ends of adjacent metal strips, thereby allowing the cutter to be worked back and forth until a cut of the desired depth is made, the edges of which cut will be on a circle, and the cut being made in register with the underlying cut in the foundation. The cutter is reinforced on its surface by means of a tapered rib 37, at one end of which is a handle 38, and near the center of which is a handle 39 which facilitates the manipulation of the cutter.

In laying a sidewalk in accordance with the steps and operations of the present invention, perfect uniformity as regards thickness of the top or surface layer will be secured, by reason of the employment of upper and lower forms adapted to be superimposed one on the other. The old method of employing but a single form necessitated either continued measurements to determine the level of the foundation at different points while being tamped, or resulted in a foundation which was largely a matter of guesswork. As a result of such imperfect methods, the surface layer would vary quite materially in thickness at different points, so that, under the influence of frost and changes in temperature, the cement would crack at the points of least thickness and strength, thereby causing the sidewalk to disintegrate in a short time. Furthermore, even with the most careful measurements under the old tamping process, much time was wasted and laborious operation was necessitated, all of which objections have been overcome by the process of the present invention. Each of the several operations, the leveling down, finishing, surfacing, and cutting of the sidewalk, in the process of the present invention is performed with exactness and uniformity, by reason of the fact that in all of these operations the tools employed are guided and supported by the forms, which indicate both

the length and thickness of the sections composing the sidewalk.

In the claims, when speaking of the foundation material as being relatively thin, it will be understood that such expression refers to a comparison with the material employed in laying a foundation layer by the tamping method; and, in referring to the laying of a cement sidewalk, it will be understood that it is intended to cover any other structure of a similar nature.

What I regard as new and desire to secure by Letters Patent is:

1. The process of laying a cement structure, which consists in securing lower rails in the desired position, pouring in a foundation layer of material between the rails and up to the level of the upper edges of the rails, leveling the surface of such material by means of a straight edge resting upon the lower rails, then securing to the lower rails upper strips having a projection above the lower rails equal to the intended thickness of the surface layer, and then pouring in a surface layer of cement and leveling such layer by means of an implement resting upon the upper strips, substantially as described.

2. The process of laying a cement structure, which consists in securing lower rails in the desired position, pouring in a foundation layer of fluid material between the rails and up to the level of the upper edges of the rails, leveling the surface of such material by means of a straight edge resting upon the lower rails, then securing to the lower rails upper strips having a projection above the lower rails equal to the intended thickness of the surface layer, then pouring in a surface layer of cement and leveling such layer by means of an implement resting upon the upper strips, and then surfacing the top surface of the upper layer by means of surface finishing tool of a length to rest upon both of the upper strips, substantially as described.

3. The process of laying a cement structure which consists in securing a lower form in the desired position, pouring in a foundation layer of material within the form and up to the level of the upper edges of the form, leveling the surface of such material by means of a straight edge resting upon the lower form, then securing to the lower form an upper form having a projection above the lower form equal to the intended thickness of the surface layer, then pouring in a surface layer of cement and leveling such layer by means of an implement resting upon the upper form, then leveling the top surface of the upper layer by means of a surface finishing tool of a length to rest upon the upper form, and then dividing the structure into sections by means of a cutter of a length to operate back and forth

within the spaces between the ends of adjacent upper forms, substantially as described.

4. The process of laying a cement structure, which consists in first securing a pair or lower rails in position, then pouring in the space up to the level of the lower rails a relatively thin foundation material, then leveling the surface of such material with a straight edge laid upon the rails, then forming channels along the upper side edges of the foundation layer and inside of the rails, then clamping upper strips to the lower rails in position to hold the lower edges of the upper strips within the channels, then pouring in the space intermediate the upper strips with a surface layer of cement, and then leveling down the surface of such upper layer by means of an implement resting upon the upper strips, substantially as described.

5. The process of laying a cement structure, which consists in first securing a pair of lower rails in position, then pouring in the space up to the level of the lower rails a relatively thin foundation material, then leveling the surface of such material with a straight edge laid upon the rails, then forming channels along the upper side edges of the foundation layer and inside of the rails, then clamping upper strips to the lower rails in position to hold the lower edges of the upper strips within the channels, then pouring in the space intermediate the upper strips a surface layer of cement, then leveling down the surface of such upper layer by means of an implement resting upon the upper strips; and then leveling the top surface of the upper layer by means of a surface finishing tool of a length to rest upon both of the upper strips, substantially as described.

6. The process of laying a cement structure, which consists in first securing a pair of lower rails in position, then pouring in the space up to the level of the lower rails a relatively thin foundation material, then leveling the surface of such material with a straight edge laid upon the rails, then forming channels along the upper side edges of the foundation layer and inside of the rails, then clamping upper strips to the lower rails in position to hold the lower edges of the upper strips within the channels; then filling in the space intermediate the upper strips with a surface layer of cement, then leveling down the surface of such upper layer by means of an implement resting upon the upper strips, then leveling the top surface of the upper layer by means of a surface finishing tool of a length to rest upon both of the upper strips, and then dividing the structure into sections by means of a cutter of a length to operate back and forth within the spaces

between the ends of adjacent upper strips, substantially as described.

7. The process of laying a cement structure, which consists in securing lower forms in the desired position, pouring in a cement concrete material in a sufficiently liquid condition to allow gravity to solidify the ingredients without tamping, then leveling down said material with a straight edge resting upon the lower rails, then securing the upper strips to the lower rails to constitute a form, then pouring on an upper layer of cement in a plastic condition to the intended thickness of the surface layer, then leveling such layer by means of an implement resting upon the upper edge of the form, then surfacing said material with a surfacing tool which spans the material and partially rests upon the form, the form being the guide for the shape of the upper face of the sidewalk, substantially as described.

8. In an apparatus for laying a cement sidewalk, the combination of a pair of lower rails, each having slots cut therethrough, a plurality of stakes adapted to hold the lower rails in position, a plurality of clamps, each comprising a shank having a T-head at its inner end and having its outer end offset to embrace a stake, the T-head being of a size to permit insertion through one of the slots in the rails, adapting the clamp to be thereafter turned to bring the T-head into transverse relation with respect to the slot and to bring the offset end of the clamp outside of the stake, and a screw entered through the offset end of the clamp and adapted to bear against the stake for clamping the rail to the stake, substantially as described.

9. In an apparatus for laying a cement sidewalk, the combination of a pair of lower rails, each having slots cut therethrough, a plurality of stakes adapted to hold the lower rails in position, a plurality of clamps, each comprising a shank having a T-head at its inner end and having its outer end offset to embrace a stake, the T-head being of a size to permit insertion through one of the slots in the rails, adapting the clamp to be thereafter turned to bring the T-head into transverse relation with respect to the slot and to bring the offset end of the clamp outside of the stake, a screw entered through the offset end of the clamp and adapted to bear against the stake for clamping the rail to the stake, the upper edges of the rails lying in the same plane and affording guides upon which to partially rest a leveling implement, as a straight edge, and upper strips, each provided with clamping brackets adapted to engage the lower rails, said strips having their edges intumed to round off the corners of the surface layer and afford guides upon which to rest a surfacing tool, substantially as described.

10. In an apparatus for laying a cement sidewalk, the combination of lower rails having their upper edges in the same plane and furnishing guides upon which to rest a leveling implement, as a straight edge, and upper strips adapted to be removably secured to the lower rails, said strips having their edges in the same plane to furnish guides upon which to rest a surfacing tool, the upper strips being inwardly rounded to round off the edges of the completed sidewalk, and spaces being left between the adjacent strips to permit the insertion of a cutting tool, substantially as described.

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Witnesses:

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