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METHOD OF CONSTRUCTION FOR STREETS AND THE LIKE

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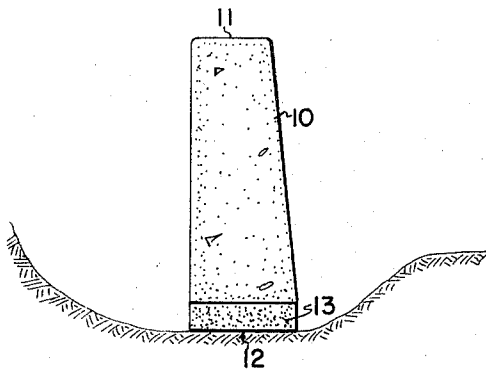


FIG. 1

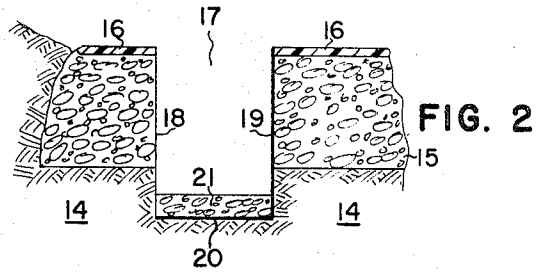


FIG. 2

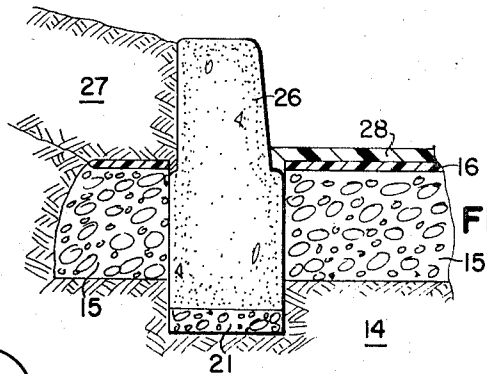


FIG. 4

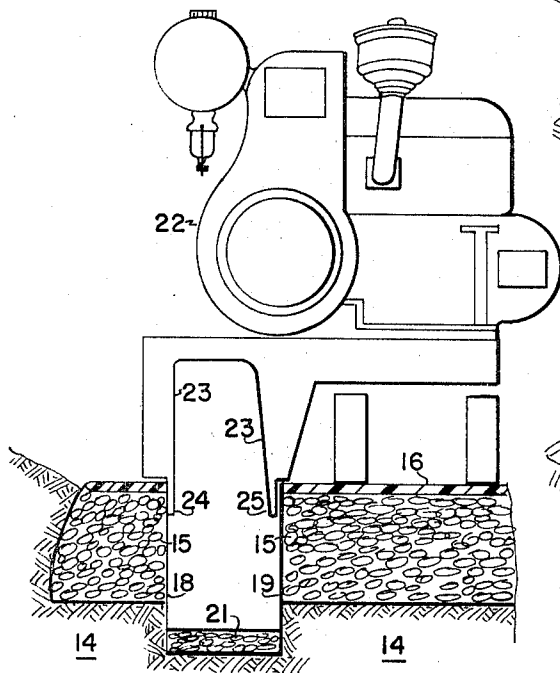


FIG. 3

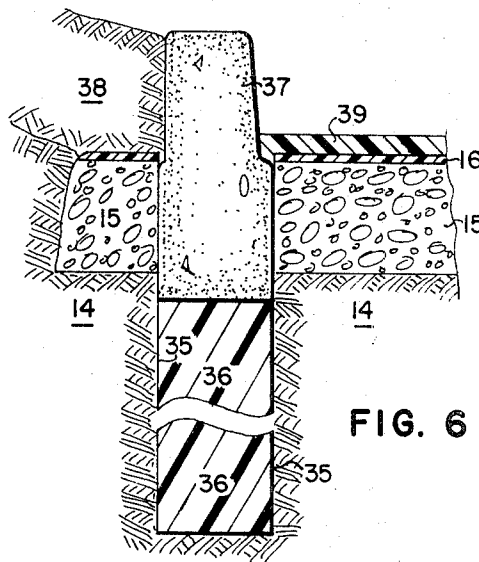


FIG. 6

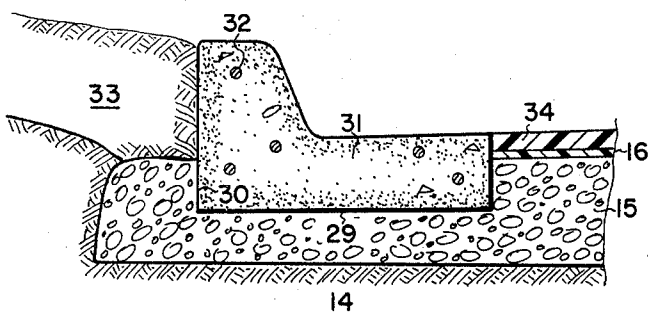


FIG. 5

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**METHOD OF CONSTRUCTION FOR STREETS  
 AND THE LIKE**

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5 Claims

**ABSTRACT OF THE DISCLOSURE**

A method of construction for streets and the like of any width wherein the subgrade and base courses are first prepared and a trench provided in at least one side of such prepared foundation, a concrete curb being extruded and embedded in said trench.

The present invention relates to a method of construction for streets and the like and more particularly to such a method wherein the curb is extruded into a trench in the prepared subgrade and base of the roadway.

Heretofore in the construction of flexible base streets it has been the general practice to excavate the roadbed to the desired depth after which the curbs are poured. After finishing the curbs, the subgrade is prepared and the base course deposited. Finally, a prime or tack coat is distributed on the surface of the base and the wearing surface laid thereon.

In such prior art method the excavated subgrade remains exposed to weathering for approximately ten days to two weeks or for such period of time required for the placement of the curb forms, pouring, removing the curb forms and finishing operations. Obviously the exposed surface of the excavation is subject to damage during this time and the natural moisture in the subgrade may either be lost or such subgrade saturated due to rain.

Furthermore, it is well known that the forming for such curbs must extend the full depth of the concrete and such forms must be braced so that the placing and tamping of the concrete therein will not bulge the forms. After the forms are removed, all exposed surfaces of the curbing must be floated and brushed.

Thereafter, during the working of the subgrade and base courses with heavy equipment, the face of the curbing is frequently defaced or the curbing is pushed out of alignment.

In the process of the subject invention, on the other hand, the subgrade may be worked immediately upon reaching the desired depth; after the base course is deposited and compacted, the prime or tack coat prevents damage to the foundation due to weathering. Obviously, the period of time that the foundation is exposed is minimal and the natural moisture is retained in the subgrade.

The trench provided in such foundation to receive the extruded curb not only eliminates the costly forming steps but such curb completely fills the trench and seals the foundation at each side of the roadbed. All finishing steps are eliminated as the curb mold provides the finish operations.

The principal object of the invention is the provision of a method of constructing a street of desired width wherein all costly concrete forming and finishing operations are eliminated.

Another object is to provide such a method wherein the compacted foundation courses extend rearwardly of the curb and provide additional support therefor.

Still another object is to provide an embedded curb

which is stronger than conventional curbing due to the low slump of the concrete used and compaction of such concrete by an extrusion process.

A still further object is to provide an improved process wherein the subgrade is exposed to weathering a minimum period of time.

A final object is to provide an improved method which is simple to practice, eliminates costly and time consuming hand operations, is capable of mass production techniques, and is universal in its adaptability.

Other objects and features of the invention will become apparent to those skilled in the art as the disclosure is made in the following detailed description of preferred embodiments of the invention as illustrated in the accompanying sheet of drawing in which:

FIG. 1 is a diagrammatic view showing the prior art method of forming a curb before preparing the foundation of a proposed roadbed.

FIG. 2 is a diagrammatic view illustrating the first steps of the subject process wherein the foundation is prepared and a tack coat distributed thereon after which a trench is provided along a desired line in such foundation.

FIG. 3 illustrates a curber in position preparatory to extruding a concrete curb into the trench of FIG. 2 of the drawings.

FIG. 4 illustrates a finished street with backfill rearwardly of the curb and asphalt laid on the foundation.

FIG. 5 illustrates a curb and gutter extruded into a trench in accordance with the principles of the subject invention; and

FIG. 6 illustrates a water-impenetrable material deposited beneath an extruded curb in accordance with a modification of the subject invention.

There is illustrated in FIG. 1 of the drawings the prior art method of constructing a street of the flexible base type which terminates laterally in a concrete curb 10 on at least one side thereof. In such method of construction, the line for the top of the curb, indicated by 11, and the width of the proposed street between opposite curbs is provided the contractor prior to the start of construction.

Heretofore it has been the general practice to first excavate to a depth of approximately sixteen inches below the plane of the proposed top line of the curb, dependent upon the thickness of the base course, or if necessary, provide fill material to such level, said cut or fill extending at least one foot beyond the rear surface of the proposed curb on each side of the roadbed. A depression, indicated generally by 12, is thereafter provided as by means of a maintainer or the like in proximity to each side of the proposed street whereby a cushion 13 of sand or gravel at least two inches in thickness may be provided under such curb. Curb forms are suitably placed in such depression and after the concrete has been poured and allowed to set for the required period of time, the curb forms are removed, the curb is finished, backfill placed rearwardly of such curb and loosely packed. The curb on the opposite side of the proposed street is constructed in like manner.

Thereafter the subgrade is prepared and the base course deposited thereon between the finished curbs and compacted, in a conventional manner; a tack or primer coat is applied to such base as by means of an asphalt distributor, followed by one or more courses of a wearing surface such as asphalt.

Referring now to FIGS. 2-6 of the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there are shown the several steps in the practice of preferred embodiments of the subject process. For purposes of convenience only,

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henceforth throughout the specification and claims the term street is used in a generic sense and includes but is not restricted solely to highways, minor streets, collector streets, marginal residential access streets, marginal commercial access streets, driveways and parking areas; also, although only a single curb and that portion of the subgrade, base and wearing surface, respectively, adjacent thereto are illustrated in the several views, it is to be understood that an extruded curb may also be formed upon the opposite side of the street in like manner and the principles of the invention hereinafter to be described in detail are applicable for the construction of a street of any desired width.

In the practice of the subject invention, as best seen in FIG. 2 of the drawings, the roadbed for the proposed street is generally excavated to a depth of sixteen inches below the top of the proposed curb, dependent upon the thickness of the base, said excavation preferably extends at least six inches beyond the rear surface of the proposed curb. Such excavation is shaped in conformity with the typical sections as shown on the plans and to the established lines and grades. The subgrade 14 is the foundation for the roadbed and normally consists of the material in the excavation or cut which is worked to a depth of six inches; however, the subgrade may range from zero to twenty-four inches in thickness. Soils classified as A-1 to A-4 as designated by the Bureau of Public Roads are suitable for use as subgrade materials. All unstable or otherwise objectionable material is removed from the subgrade and replaced with approved material; all holes, ruts and depressions are filled with approved material and, if required, the subgrade is thoroughly wetted with water and reshaped and rolled to place the subgrade in acceptable condition to receive the base material. Subgrade 14 thus formed is compacted from eighty to ninety-five percent density as determined by the modified Proctor test and the surface finished to line and grade as established and in conformity with the typical sections shown on the plans.

A flexible base, indicated generally by 15, composed of crushed rock, gravel, disintegrated granite, waterbound-Macadam or bituminous base is provided, in one or more courses, upon such subgrade. The base material is deposited, spread and shaped and, if required, sprinkled and then bladed, dragged and shaped to conform to typical sections shown on the plans. All segregated coarse or fine materials are removed and replaced with well graded materials. Although the base course is normally approximately eight inches, the base may range in thickness from four to twenty-four inches; the said base is compacted by conventional methods to a uniform density ranging from ninety to one hundred percent, as determined by the said modified Proctor test.

Thereafter the upper surface of the base is cleaned as by sweeping or the like and an asphalt prime coat 16 such as MC-0 or MC-1 in accordance with Asphalt Institute Specification P-1, or a tack coat such as conforms to the American Association of State Highway Officials designation M81-42 or M82-42 deposited thereon; preferably such coating should extend behind the rear surface of the proposed curb.

Still referring to FIG. 2 of the drawings, downwardly extending trench 17 consisting of outer and inner walls 18-19 and bottom 20 is provided in the roadbed thus formed; the most lateral or outer wall 18 of such trench is vertically aligned relative to the plane of the rear surface of the proposed curb. A trench eight inches in width and extending downwardly approximately eleven and one-half inches provides advantageous results. Under normal conditions such trench extends through the base course into the subgrade. During the trenching operation, base material normally falls onto bottom 20 of such trench forming a cushion 21; additional material may be deposited, if required, to form a cushion of approximately two inches. Alternatively, a trench approximately nine and

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one-half inches in depth may be provided and approximately two inches of the subgrade therebelow loosened to form a cushion. In either method, however, the material removed from trench 17 is subsequently to be used as backfill.

Referring now to FIG. 3 of the drawings, a curb forming machine 22 such as manufactured by Power Curber, Incorporated, of Salisbury, N.C., under U.S. Letters Patent Nos. 2,707,422 and 2,818,790, includes a curb mold 23 which terminates downwardly in sides 24-25 which extend into trench 17 approximately two inches. A relatively dry or "stiff" concrete mix is used and the curb is not only extruded into but also is embedded in such trench. During extrusion concrete first completely fills and conforms to the lower part of the trench, after which the concrete passes upwardly and outwardly of sides 24, 25 forming a shoulder between the rear surface of the curb and outer wall 18 of the trench and the front surface of the curb and inner wall 19 of the trench, respectively; such shoulders terminate upwardly in proximity to the upper surface of the base course, as illustrated in FIG. 4 of the drawings.

The exact concrete mix used to provide a "zero slump" is dependent upon the type of sand and coarse aggregate available, its moisture content and the specifications for the particular job. Preferably the aggregate used should be smaller than three-quarters inch. A desirable mix for one cubic yard of concrete consists of 1,950 lbs. sand SSD 4% moisture, 517 lbs. (5½ sacks) cement, 1,422 lbs. ¾" gravel SSD and 16 gallons of water.

As best seen in FIG. 4, approximately twenty-four hours after the curb forming machine 22 has extruded curb 26, backfill 27 is packed against the rear surface thereof. A wearing surface 28 such as asphalt is then applied to the prime or tack coat 16 in a conventional manner.

There is shown in FIG. 5 of the drawings a modification of the process of the subject invention wherein after the subgrade 14, base 15 and tack coat 16 are prepared in accordance with the principles heretofore described in detail, a trench 29 five and one-half inches in depth and twenty-one inches in width is provided in base 15 in a conventional manner. More specifically, the outer wall 30 of such trench 29 is vertically aligned with the rear surface of the proposed curb. A curb forming machine of the type heretofore described extrudes curb and gutter 31 into trench 29; if desired, reinforcing steel 32 may be placed in such extruded curb and gutter. Backfill 33 is provided rearwardly of the curb and a wearing surface 34 of asphalt or the like, approximately one and one-half inches in thickness, applied in a conventional manner on tack coat 16 to complete the street.

In the embodiment of FIG. 6 there is shown a still further modification of the process of the subject invention. More particularly, subgrade 14, base 15 and tack or primer coat 16 are prepared in accordance with the principles heretofore described in connection with FIG. 2 of the drawings. In such modification to the process, trench 35 is provided, in a conventional manner, to a depth ranging from twenty-two to thirty-four inches into the base, subgrade and underlying structure, respectively. A water-impenetrable material 36 is next deposited in the lower portion of trench 35 and compacted; such material consists of a mixture of one cubic yard of the base material with two sacks of portland cement, or other mixture which forms a four inch slump; the upper surface of such material extends to a height approximately ten inches below the tack or prime coat 16 and curb 37 is extruded into the upper portion of trench 35 in the manner heretofore described. Material 36 forms an impervious barrier which prevents water from percolating through or under the subgrade and/or base with resultant damage to the street. Backfill 38 is provided rearwardly of curb 37 and a wearing surface 39 laid on tack coat 16.

It should be understood, of course, that the foregoing disclosure relates to only preferred embodiments of the

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invention and that it is intended to cover all changes and modifications of the examples of the invention herein chosen for the purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. A method of construction for streets terminating laterally in a curb on at least one side thereof comprising the steps of

grading the proposed roadbed of such street to a predetermined elevation and at least six inches rearwardly of the proposed curb,

working the subgrade at least six inches rearwardly of the proposed curb and compacting said subgrade to 80-95% density,

depositing a base on said subgrade and compacting said base to 90-100% density,

shaping the upper surface of said base to predetermined lines and grades,

distributing a sealant on the upper surface of said base,

providing a trench in at least said base, the most lateral side of said trench vertically aligned with the rear surface of the proposed curb,

extruding a curb into said trench, and

laying a wearing surface on said sealant.

2. A method of construction for streets terminating laterally in a curb on at least one side thereof comprising the steps of

grading the proposed roadbed of such street to a predetermined elevation and at least six inches rearwardly of the proposed curb and compacting said subgrade to 80-95% density,

depositing a base on said subgrade, said base extending at least six inches rearwardly of the proposed curb, said base compacted to 90-100% density,

shaping the upper surface of said base to predetermined lines and grades,

distributing a sealant on the upper surface of said base,

providing a trench ranging from 9½-11½ inches in depth in at least said base, the most lateral side of said trench vertically aligned with the rear surface of the proposed curb,

extruding a concrete curb into said trench, and

laying a wearing surface on said sealant.

3. A method of construction for streets terminating laterally in a curb on at least one side thereof comprising the steps of

grading the proposed roadbed of such street to a predetermined elevation and extending at least six inches rearwardly of the proposed curb,

preparing the subgrade and compacting said subgrade to 80-95% density,

depositing a base selected from the group consisting of crushed rock, gravel, disintegrated granite, water-bound-Macadam and bituminous material on said

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subgrade and compacting said base to 90-100% density,

sealing the upper surface of said base, providing a trench ranging from 9½-11½ inches in depth along a predetermined line in at least said base to receive said curb,

extruding a curb into said trench, and

laying a wearing surface on said sealant.

4. A method of construction for streets terminating laterally in a curb on at least one side thereof comprising the steps of

grading the proposed roadbed of such street to a predetermined elevation and extending at least six inches rearwardly of the proposed curb,

preparing the subgrade and compacting said subgrade to 80-95% density,

depositing a base on said subgrade and compacting said base to 90-100% density,

sealing the upper surface of said base,

providing a downwardly extending trench along a predetermined line and extending at least into said base,

extruding a curb into said trench, and

laying a wearing surface on said sealant.

5. A method of construction for streets terminating laterally in a curb on at least one side thereof comprising the steps of

grading the proposed roadbed of such street to a predetermined elevation and extending at least six inches rearwardly of the proposed curb,

working the subgrade at least six inches rearwardly of the proposed curb and compacting said subgrade to 80-95% density,

depositing a base on said subgrade and compacting said base to 90-100% density,

sealing the upper surface of said base,

providing a trench ranging in depth from twenty-two to thirty-four inches, the most lateral side of said trench vertically aligned with the rear side of the proposed curb,

depositing a water-impenetrable material in the lower portion of said trench,

extruding a curb on top of said water-impenetrable material in said trench, and

laying a wearing surface on said sealant.

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JACOB L. NACKENOFF, Primary Examiner

U.S. Cl. X.R.