

[54] **CONCRETE FORMING APPARATUS AND PROCESS**

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[22] Filed: **Aug. 10, 1972**

[21] Appl. No.: **279,709**

[52] U.S. Cl. **404/72, 404/89, 404/124**

[51] Int. Cl. **E01c 7/35**

[58] Field of Search **404/84-124, 404/72, 75, 133, 83**

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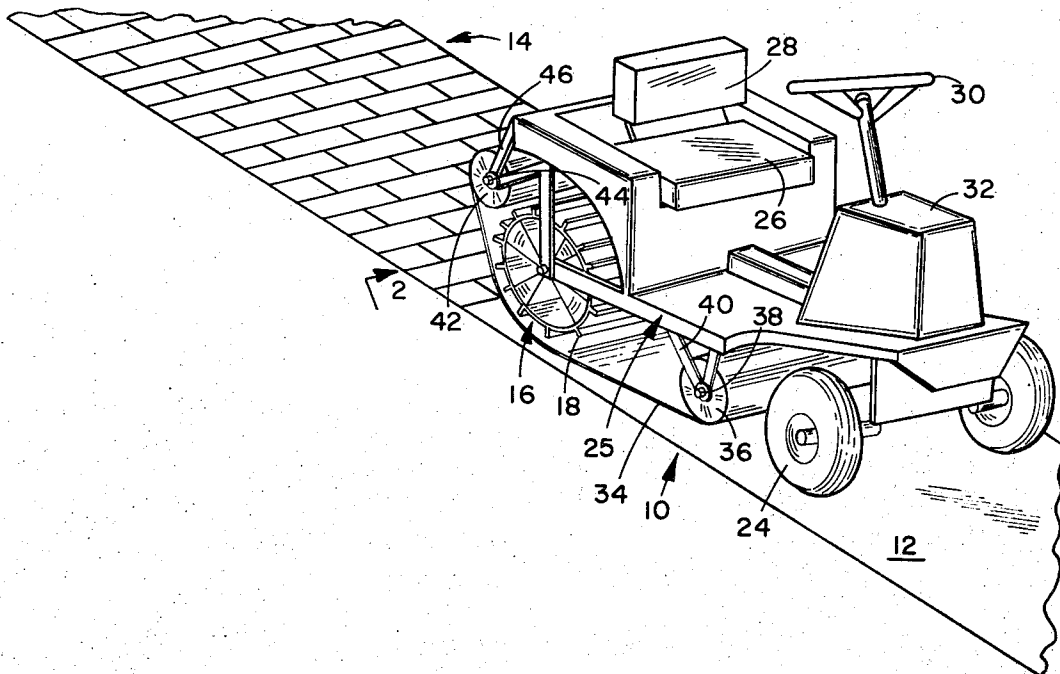
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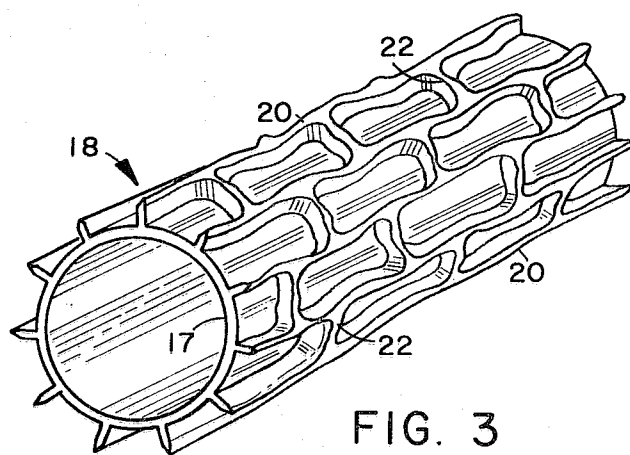
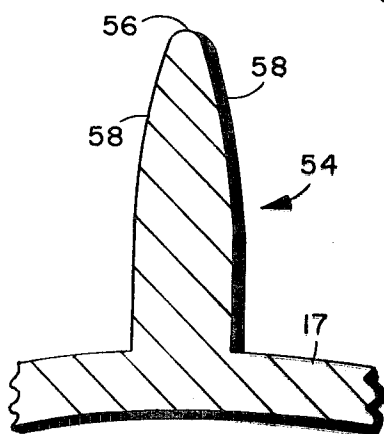
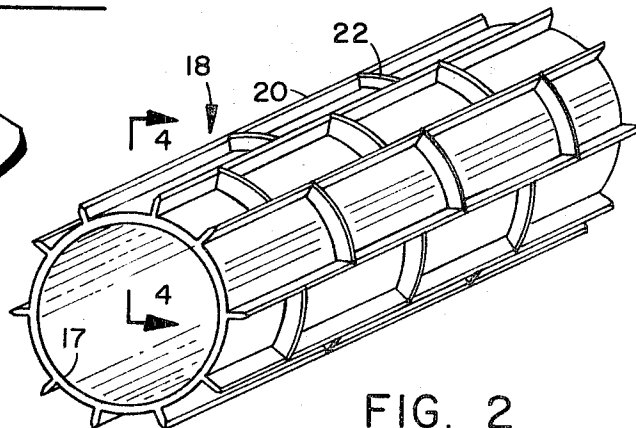
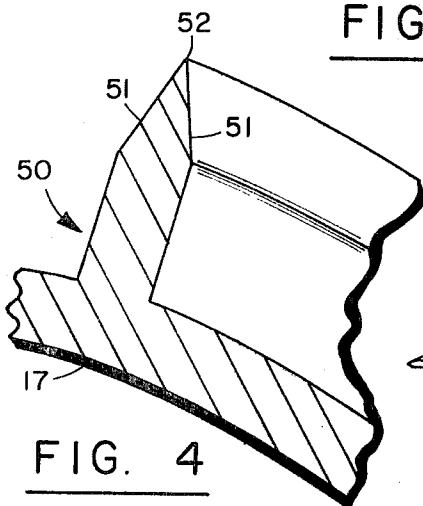
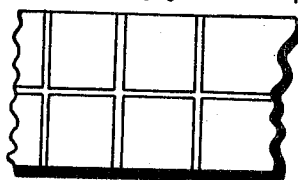
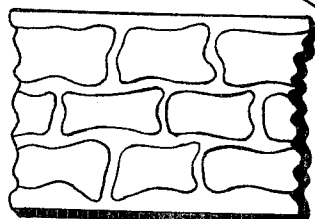
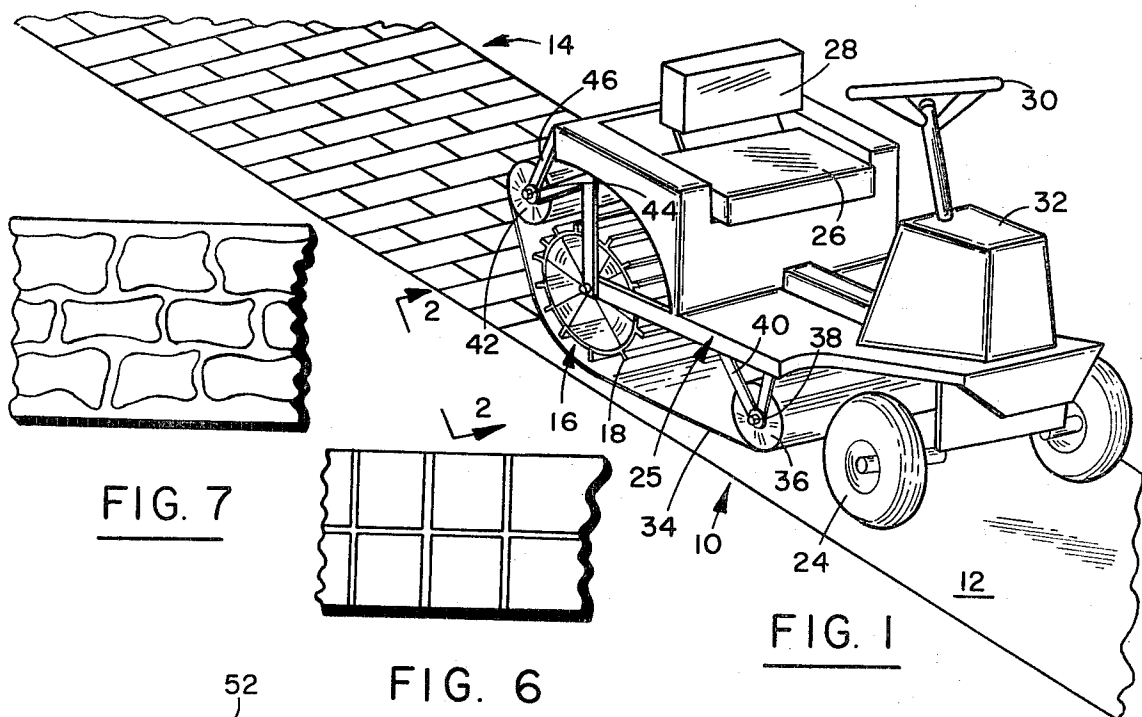
[57] **ABSTRACT**

A concrete or paving forming apparatus and process comprising laying a concrete or paving material and allowing it to cure into a substantially plastic condition and then imprinting it with a pattern impressed therein in a continuous process. A plastic film, or other suitable release agent permits the forming apparatus to be driven into the concrete in a manner whereby it will not remove the surface of the concrete when it is withdrawn.

The apparatus generally comprises a roller with a series of patterns formed by means of blades that conform to the pattern that is to be pressed into the concrete. The roller effectively rolls in the pattern while at the same time a sheet of plastic film is laid down on the concrete ahead of the roller. Thus, as the roller is impressed into the concrete and removed, it will not gouge the concrete. Other release agents such as the silicones or the tetrafluorethylenes can be sprayed on the roller blades or on the concrete to prevent binding and gouging of the pavement.

5 Claims, 7 Drawing Figures





CONCRETE FORMING APPARATUS AND PROCESS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The field of this invention lies within the concrete forming art.

2. The Prior Art

The prior art as it relates to concrete patterns and formation involves numerous concrete patterns that have been formed as molds for casting a concrete form in situ therein. In other words, different mold configurations and bodies for containing concrete to be cast in various forms have been utilized.

Recently, during paving operations it has been desirable to create different patterns in concrete as well as other paving materials. In some cases, it has been particularly desirable to create patterns which appear to be in the form of different blocks, bricks, cobblestones and the like. At times it is desirable for aesthetic purposes to provide an appearance of handlaid bricks, stones, or cobblestones.

The foregoing effect has been effectuated by means of certain hand tools utilized to strike a pattern into the concrete. Specifically, the grooves which are normally the struck pattern in concrete between bricks and other stones has been provided by a foot driven impressment tool.

Recent developments in the art have directed themselves to foot impressment tools, for "stamping concrete." The stamping process utilizes a series of V-shaped blades which penetrate the concrete when it is in a semi-plastic state so as to effectuate the creation of grooves analogous to struck portions between bricks and stones. As can be appreciated, any pattern can be effectuated to cause an appearance of bricks, stones, or other handlaid masonry. It is the aesthetic appearance of bricks, stones or other handlaid materials that is desired by the foregoing processes and apparatus of the prior art.

One of the drawbacks of the prior art with regard to "concrete stamping tools" has been the inability to turn out a continuous, inexpensive product. Specifically, the utilization of hand tools requires extensive labor and substantial effort upon the part of the concrete mason. As a consequence, the "hand stamping" of concrete has only been applied in limited applications. This invention substantially overcomes the deficiencies of the prior art by creating a continuous process and an apparatus for carrying out the continuous process. The apparatus utilizes an embossing roller and other attendant support apparatus.

Hand stamping tools have been increased in size to effectuate coverage of broad areas. However, the process is relatively time consuming because of the fact that a man can only impress a limited amount of concrete as to the square footage that is being impressed. This invention overcomes the limitations of hand stamping concrete by providing a continuously rolling impressment. This invention utilizes a means for preventing the disorientation of the concrete after it has been impressed by virtue of the fact that the shape of the blades do not pull the concrete from its original placement. Furthermore, the invention utilizes a superior method of providing a buffer between the blades and the concrete as they are impressed into the con-

crete. The foregoing allows the blades to effectuate a smooth and non-gouged look to the groove that has been struck or impressed by the invention.

The blades have a coefficient of friction with respect to the semi-plastic concrete to the extent that they normally tend to disturb the concrete as they are being moved. This is particularly true if the blades move laterally within the concrete upon removal from the concrete. Another consideration is that when the blades are on a rotating drum or other rotational means, such as a continuously moving roller, they disturb the concrete as they are being removed. This is not only due to the coefficient of friction between the blades and the concrete, but also because of the general character of the rotational movement of the blades creating lateral forces. However, the buffer of this invention provides a solution to the foregoing problem and tends to eliminate gouging of the concrete.

This invention provides a substantial advance over the prior art by creating a different process and apparatus for effectuating continuously impressed concrete. The blades of the continuous impressment process effectuate a striking of the concrete continuously so that substantial hand work need not be utilized in the process. Additionally, the impressment means creates a smooth surface which is superior to the prior art surfaces by utilization of the buffer means of this invention, such as the plastic sheet or release agents.

SUMMARY OF THE INVENTION

In summation, this invention is a continuous concrete impressment process and apparatus to provide concrete with a smooth and undisturbed patterned surface.

More specifically, this invention provides a process whereby concrete can be impressed in an easy and facile manner. The process incorporates a placement of concrete in a particular form with an attendant screeding and striking for leveling it off. The surface of the concrete can then be tamped, floated and trowled as in prior art processes. The process is then further effectuated by means of a buffer surface so that a continuous impressment and rolling of the concrete can take place.

The apparatus for effectuating the foregoing can comprise means for continuously rolling and pressing the concrete with blades which serve to outline a specific form that provides the grooves in the concrete. The use of the blades is enhanced by means of a plastic buffer or release agent to prevent the dislodgement or gouging of the concrete by the blades after it is in a semi-plastic state. In other words, a plastic sheet or release agent effectuates a protective surface between the blades of the impressment tool of this invention and the concrete so that continuity of impressment of the concrete can take place.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be more clearly understood by reference to the description below taken in connection with the accompanying drawings wherein:

FIG. 1 shows a form of apparatus in a perspective view for purposes of practicing the invention;

FIG. 2 shows a roller for purposes of practicing this invention as shown along lines 2—2 of FIG. 1;

FIG. 3 shows a roller having varying configurations similar to that of FIG. 2 but with a different series of impressment blades;

FIG. 4 shows a sectional view along lines 4—4 of FIG. 2 detailing the configuration of the blades of this invention;

FIG. 5 shows an alternative sectional embodiment of the blades of this invention;

FIG. 6 shows a plan view of the concrete which has been impressed with this invention; and,

FIG. 7 shows a plan view of concrete which has been impressed by this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The Apparatus

Looking more particularly at FIG. 1, a motorized tractor 10 is seen overlying a concrete surface 12 which has recently been poured. The concrete surface 12 has been impressed with a pattern seen generally in the area designated 14. The impressment has been effectuated by a roller 16 having a series of blades 18 that are shown with longitudinal portions 20 and lateral portions 22 thereof. A drum surface 17 is utilized to support the blades 18. The blades 20 and 22 effectuate an impressment of the concrete to provide the pattern generally shown at 14.

The tractor has been provided with tires 24, a frame 25 for support of the tractor and the rear roller 16. The tractor 24 is driven by an engine not shown, and has a seat 26 with a back 28 thereto. A steering wheel 30 is provided coupled into a steering block 32.

The foregoing configuration of the tractor can be in any form, as long as it provides suitable power and mobility for impressment of the blades 20 and 22 into the newly laid concrete 12 by means of the roller 16. As an alternative, the roller 16 can be provided with an attachment as will be described and hand pushed by means of a handle. Furthermore, the roller can be towed over the uniform concrete surface 12. A sheet of plastic 34 is provided to aid as a release agent for the blades 20 and 22. The sheet of plastic 34 is reeled outwardly from the roll of plastic 36 supported on a spindle 38 with frame members 40 holding the spindle 38. The sheet 34 is taken up on a second roller 42 supported on a spindle 44 by means of braces 46. The sheet or film 34 is caused to roll around the takeup roller 42. The film 34 can be paid out from the roller 36 in any suitable manner and taken up on the roller 42. An important consideration is that a film, buffering surface or release agent be laid between the concrete 12 and the roller 16.

In addition to the foregoing film laying apparatus and process, a roller 16 can be provided with a means for feeding out a film over its surface in a continuously driven manner. Also, a plastic polymer or silicone release agent can be sprayed onto the newly formed concrete surface 12 ahead of the roller, directly onto the roller. In this manner, the roller 16 can impress its blades 20 and 22 into the newly formed concrete and can be easily removed therefrom without gouging the concrete.

Although a specific film takeup means has been shown, oftentimes it is not necessary. In many cases the blades penetrate the film and leave a fragmented film impressed against the surface of the concrete. In such

cases, the film has been sacrificed in the process and its only value is scrap.

Other suitable means can be effectuated to provide a buffer between the blades 20 and 22 and the newly poured concrete 12 so as to eliminate displacement or gouging of the concrete. Aside from the foregoing film 34 that can be used as a buffer, various other materials can be used. For example, various silicone lubricants and release agents can be utilized. The release agents can be sprayed on the roller 16 or directly on the concrete. In addition to the release agents, the blades 20 and 22 can be coated with a fluorinated hydrocarbon such as tetrafluorethylene, commonly referred to as teflon. In this manner, the blades will pass into the concrete and not gouge the concrete upon removal.

Looking more specifically at FIGS. 4 and 5, a series of cross sectional showings of the blades are shown. The cross sectional showing in FIG. 4 shows a blade 50 having a pointed end 52. The pointed end tapers away from the edges of the blade 50 in chamfers 51 so as to provide a substantially sharp edge along the upper pointed edge 52. Of course, the drum surface 17 is utilized to support the blade 50.

Looking more particularly at FIG. 5, a drum surface 17 is shown with an upwardly projecting blade 54 therefrom. The blade has a rounded end 56 conforming to a generally curved arcuate configuration. The rounded end 56 flows from a pair of oppositely disposed arcuate surfaces 58 which extend from the upstanding portions of the blade 54.

Many specific configurations of the blades 20 and 22 can be utilized. However, an important consideration is that the blade not displace the concrete as it moves laterally within its rotational movement. In other words, as the blade moves laterally within its arc of movement as it is supported on the drum 17, it should effectuate a path whereby the blade will not substantially displace the concrete.

The Process

The process firstly comprises placement of concrete by means of any suitable pouring operation. For instance, the concrete can be poured and initially screeded or struck off to its approximate proper level at which the concrete is to assume its final form. After the concrete has been screeded and struck, the concrete is then tamped or vibrated to bring the fine portions thereof to the surface of the concrete and maintain the more coarse aggregate displaced below the level of the surface.

The surface can then be floated and trowled to allow for a substantially smooth and level upper texture of the concrete. The concrete can then be maintained in this substantially smooth configuration in which it will be finally impressed and formed with the apparatus and process of this invention.

The concrete in many instances is colored by means of a powdered pigment sprinkled across its surface. In other instances, the concrete can be integrally colored prior to the time it is poured so that the entire cross section of the concrete is formed as one integrally colored mass. In this manner, different blocks, brick colors and configurations can be utilized for aesthetic appeal providing a configuration and color which will suitably approximate the colors of cobblestones, bricks, and other blocks.

It should be appreciated that the placement of a powdered pigment should be made before the surface is

floated and trowled in the eventuality a powdered pigment is used. In this manner, the powdered pigment can then be trowled into the upper surface of the concrete.

In addition to the foregoing means for providing the concrete with coloration, the concrete can be provided with color by means of a continuous sprinkling operation in front of the impressment means of this invention. In other words, the front portion of the apparatus that passes over the concrete prior to the roller 16 or other impressment means can be utilized to sprinkle a pigment on the surface thereof. The sprinkling can take place with a rotary type of dispenser, or any other suitable uniform powder sprinkling means. Also, an automatic troweling of the concrete can be effectuated to drive the coloration into its surface.

After the concrete has been substantially prepared in the foregoing manner, it is then rolled by means of a roller 16. Prior to the rolling process, a polyethylene film or sheet 34 is laid down so as to effectuate a surface or buffer between the roller 16 and its blades 20 and 22. The buffer can be provided by any particular polymer as long as it provides a suitable buffer. The smooth buffer can be effectuated by means of other plastics in the sheet form as shown, or a plastic liquid can be sprayed on the roller so that a smooth lubricity or release capability is provided to the roller 16.

In addition to the foregoing plastic film or liquid, the lubricity or release agent can be provided by such compositions as silicone lubricants known in the art today which prevent adhesion of such things as elastomers to molds, along with other mold release lubricants. In addition to the use of the foregoing release agents, the blades 20 and 22 can have a coating of tetrafluorethylene (teflon) on its surface to enhance the release properties thereof.

It should be understood that the foregoing teachings of this invention can be broadly utilized to effectuate the capabilities of practicing this invention. Specifically, the invention can be broadly utilized with any continuous process for pavement impressment and utilization of a film over the surface thereof. Thus, this in-

vention is only to be read in light of the scope and spirit thereof as defined by the following claims.

I claim:

1. In a process for impressing concrete with blades conforming to a pre-established pattern, the process steps comprising:

pouring concrete;

leveling said concrete to the approximate surface level to which said concrete is to be cured;

providing a plastic material over said concrete to form a buffer; and,

impressing a tool with blades into said concrete for simulating separate masonry elements joined by mortar with said buffer between said blades and the concrete whereby the frictional engagement between said blades and said concrete is decreased so that as said blades are withdrawn they will not substantially disturb said concrete.

2. The process as claimed in claim 1 wherein said buffer comprises:

a plastic sheet.

3. The process as claimed in claim 2 further comprising:

continuously rotating a tool with blades about an axis of rotation for impressment thereof into said concrete; and,

paying off said plastic sheet from a roll in a continuous manner so as to allow said blades to strike said plastic sheet and impress themselves into said concrete by movement against said plastic sheet into said concrete.

4. The process as claimed in claim 2 further comprising:

applying a coloring pigment to the surface of said concrete before impressing said blades; and, trowling or causing said coloring agent to be impressed into said concrete.

5. The process as claimed in claim 1 further comprising:

spraying a release agent onto said blades prior to their impressment into said concrete.

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