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CURB FORMING MACHINE

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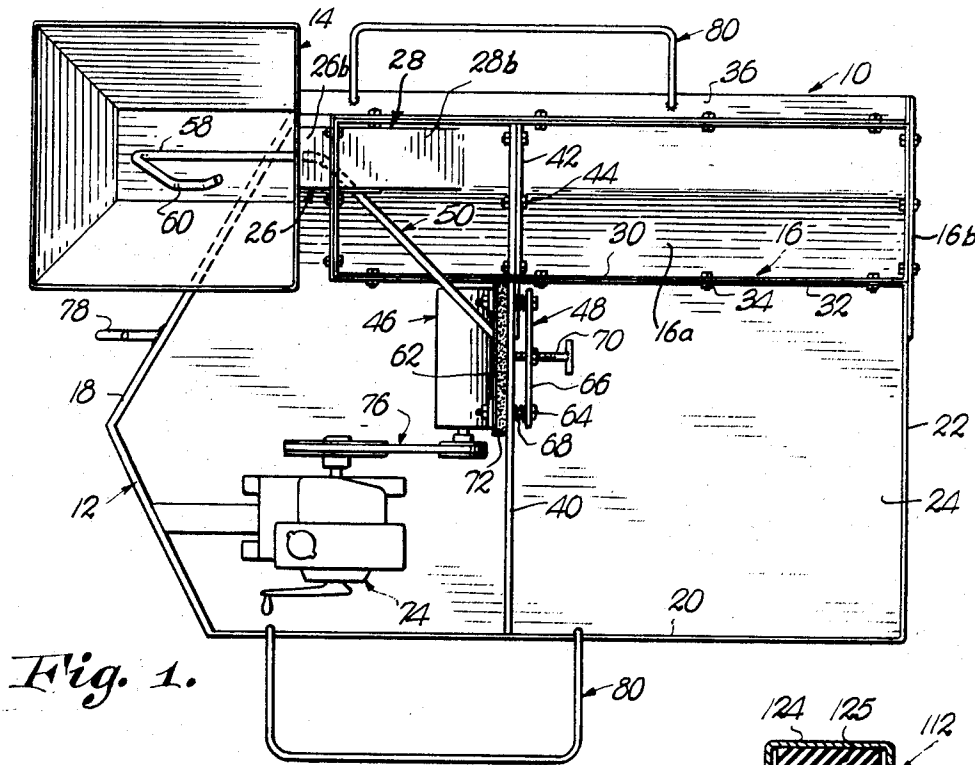


Fig. 1.

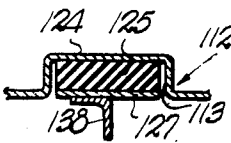


Fig. 4.

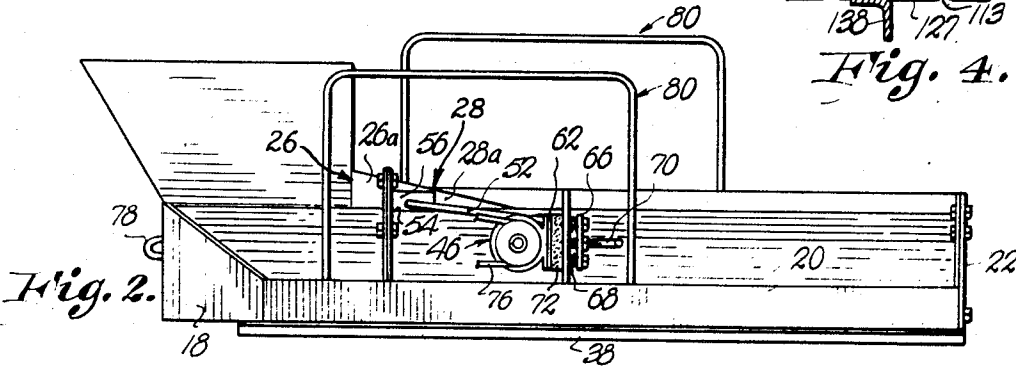


Fig. 2.

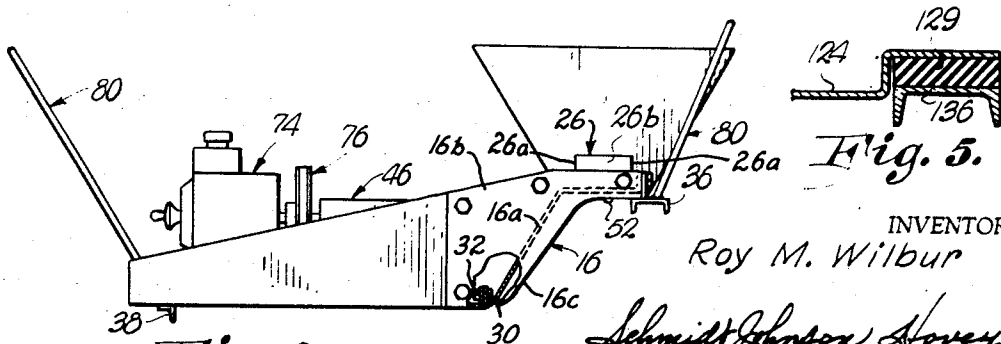


Fig. 3.

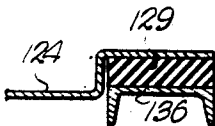


Fig. 5.

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CURB FORMING MACHINE
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6 Claims

ABSTRACT OF THE DISCLOSURE

A curb forming machine having a vibrator including an elongated, J-shaped rod extending through the trowel structure and into the material hopper. A clamp mount for the vibrator is adjustable to vary the compression of a pad of resilient material interposed between the vibrator and the machine frame to thereby vary the amplitude of the vibrations of the rod and the trowel means. In a modified form, pads of resilient material are interposed between support skids and the machine frame to isolate the construction forms from the vibrations of the machine.

This invention relates to paving equipment, and more particularly, to a machine for forming curbs for streets, highways and the like.

Machines for forming curbs from concrete, asphalt or similar material are well known and are in widespread use in the paving industry. These machines generally comprise a hopper and trowel structure mounted on a frame and adapted for towing along construction forms. Material put into the hopper gravitates through the trowel structure where it is shaped into the contour desired for the finished curb.

Although machines of the type described have been generally successful, problems have arisen concerning the composition and density of the material in curbs formed by these machines. Manifestly, it is desirable that the material of the curbs be free of bubbles, voids and the like. Further, the material will flow through the forming machine much better if the material is agitated so that the relatively coarse aggregate is moved toward the center of the mass to leave a relatively fluid, finer layer of material in sliding contact with the surfaces of the machine. Also, the curb will hold its shape better after the concrete has been compacted by vibration in the hopper.

Various vibrators have been employed to overcome the problems set forth above. These have included vibrators for the hopper and also devices for vibrating the trowel structure or machine frame. So far as is known, however, no machine has included a single vibrator capable of performing a variety of vibrating functions necessary for the curb forming operation.

Accordingly, it is the primary object of this invention to provide a curb forming machine having a single vibrator capable of vibrating the frame and also vibrating the material in the hopper.

Still another important object of the invention is to provide a machine of this type wherein means are included to adjustably divide the vibration output of the machine between the frame and an element extending into the hopper. This has the advantage of permitting vibration of the curb material only in the event a second pass or screeding is necessary during the curb building operation.

Yet a further object of the invention is to provide a novel vibrator rod which extends through the trowel throat and upwardly into the material hopper for agitating the material within the hopper and also for agitating the material while it flows therefrom and is shaped into the final configuration chosen for the curb.

It is also an object of this invention to provide a curb forming machine which is provided with means to isolate

the supporting forms from vibrations of the machine.

These and other important aims and objects of this invention will be further explained or will become apparent from the specification, claims and drawing.

In the drawing:

FIGURE 1 is a top plan view of a curb forming machine embodying the principles of this invention;

FIG. 2 is a fragmentary, side elevational view of the machine of FIG. 1, the engine having been removed for clarity;

FIG. 3 is a rear elevational view thereof, parts being broken away to reveal details of construction;

FIG. 4 is an enlarged, fragmentary, cross-sectional view through a machine frame illustrating a modified form of support skid; and

FIG. 5 is a view similar to FIG. 4 illustrating another modified form of support skid.

A machine embodying the principles of this invention is broadly designated by the numeral 10 and includes a frame 12 upon which are mounted a hopper 14 and troweling structure broadly designated 16. Frame 12 includes an elongated angled screed 18, a side member 20, a back 22 and a generally planar bottom 24. The leading side portion of bottom 24 immediately adjacent hopper 14 is configured to slope upwardly with integral side portions 26a and a stop 26b to present an inverted transversely U-shaped throat portion 26 which communicates with the bottom of hopper 14. Portion 26 slopes downwardly as the rear of machine 10 is approached and complementally embraces the leading edge of the elongated structure 16 as illustrated in the drawing. Structure 16 is accordingly provided with an inverted, transversely U-shaped extension 28 having side walls 28a and an integral top 28b, forming a continuation of portion 26 whereupon material emanating from hopper 14 as machine 10 is advanced to the left as shown in FIG. 1, is swaged or compressed downwardly beneath structure 16.

Referring especially to FIG. 3, it may be seen that structure 16 comprises an angled member 16a carrying a removable screed plate 16b having a lowermost edge 16c which is contoured to conform to the desired configuration of the finished curb. Structure 16 is provided with a peripheral upwardly extending flange 30 which embraces a flange 32 which extends around the periphery of the opening in bottom 24 which is adapted to receive structure 16. Bolt means 34 at spaced intervals around flanges 30 and 32 removably secure structure 16 in position for shaping the material emanating from hopper 14 as machine 10 is advanced.

The channel member 36 extending along the side of frame 12 adjacent structure 16 is adapted to ride upon the uppermost edge of a construction form (not shown) and a parallel angle member 38 extends the length of machine 10 beneath bottom 24. Member 38 is adapted to slide along the upper marginal edge of the adjacent form for guiding machine 10 along a rectilinear path of travel. Members 36 and 38 comprise skids which support machine 10 on the forms during the curb forming operation.

An intermediate elongated stiffener member or rib 40 extends from side member 20 across machine 10 and into engagement with a flange 42 carried by structure 16. Bolt means 44 releasably secures rib 40 to flange 42. The lowermost edge of rib 40 is rigidly secured by welding or the like to the uppermost surface of bottom 24.

A vibrator device 46 is mounted by means broadly designated 48 to the leading surface of rib 40 and an elongated, J-shaped arm or rod 50 has a first stretch 52 extending at an angle from device 46 through an opening 54 in the side of extension 28 of structure 16. A grommet 56 in opening 54 may be provided to permit stretch 52

entry into the throat defined by portion 24 and extension 28 while permitting vibratory movement of stretch 52.

A second stretch of rod 50 extends forwardly from the throat and above the bottom of hopper 14, terminating in an upwardly extending hook portion 60 in the hopper. The end of rod 50 proximal device 46 is rigidly secured as by welding or the like to a mounting plate 62 which is a part of device 46 and is in physical engagement with the housing of the latter. Plate 62 is generally rectangular in shape and is provided with spaced apart openings which receive mounting bolts 64 extending through mounting lugs on the vibrator device housing and openings in rib 40. Bolts 64 are also received through a generally rectangular plate 65 disposed on the side of rib 40 opposite device 46 as shown in the drawings. Springs 68 received over bolts 64 are interposed between plate 66 and rib 40 to urge plate 66 rearwardly of machine 10. A thumb screw 70 is threadably received in plate 66 and projects against rib 40 whereupon tightening of screw 70 shifts bolts 64 and therefore plate 62 and device 46 toward rib 40. This compresses a pad 72 of resilient material such as rubber or the like for a purpose to be hereinafter explained. Conversely, operation of screw 70 in the opposite direction permits plate 62 to shift forwardly to release the compression of pad 72.

A prime mover 74 mounted on frame 12 may take the form of a gasoline engine or the like and is operably coupled with vibrator 46 through a drive 76.

A tow hook 78 rigidly secured to screed 18 is adapted to be coupled to a towing vehicle for moving machine 10 forwardly and handles 80 at either side of machine 10 permit manual guiding or stabilizing of the machine during the curb forming operation. Further, handles 80 serve to permit manual shifting of machine 10 on and off the supporting forms.

Referring now to FIGS. 4 and 5, a modified frame 112 is provided with an elongated integral channel 113 which may be formed in bottom 124 and receives an elongated pad 125 of resilient material such as rubber or the like sandwiched between bottom 124 and an elongated plate 127. An angle 138 is secured to the lower-most surface of plate 127 and serves as a skid or guide for the curb forming machine.

The outermost edge of the modified bottom 124 is configured as illustrated in FIG. 5 and includes an elongated pad 129 of resilient material interposed between the longitudinal extending channel member 136 adapted to ride upon the upper edge of the form in sliding relationship thereto. Thus, plate 127 and angle 138 provides one supporting skid for the forming machine while the parallel extending member 136 provides the other supporting skid for the machine. The pads 125 and 129 serve to isolate the supporting forms from vibrations in the machine.

In operation of the machine 10 illustrated in FIGS. 1-3, skids 36 and 38 support the machine 10 as it is drawn along the parallel forms to the left as illustrated in FIGS. 1 and 2. The lowermost edge of screed 18 smooths the upper surface of concrete, asphalt or other material in the form to provide the upper surface of the lower portion of the curb. The angled front face of screed 18 causes surplus material to move toward the rear and outwardly from the leading edge of the screed.

Additional curb forming material is deposited in hopper 14 to form the upwardly extending structure of the curb. The operation of vibrator 46 by engine 74 produces vibrations in rod 50 which agitate the material thoroughly while the same is in hopper 14 and also while the material moves through the throat extending between structure 16 and hopper 14. It should be pointed out at this juncture that the vibrating of the material in this throat portion is extremely important to provide desired density and compaction of the material while the same is being compressed by the gradually restricting, tapered surface of extension 28 of structure 16. Manifestly, agitation of the material not only compacts the same but

also has a tendency to move the coarse aggregate toward the center of the mass, leaving a more fluidized material comprising a relatively high content of "fines" adjacent the surfaces of machine 10 which contact the material. This enhances the movement of machine 10 and also provides a better surface to the formed curb.

Vibrator 46 not only serves to vibrate rod 50 but also operates through a resilient mounting which includes pad 72 to cause a resultant vibrating of frame 12. The latter is rigidly secured to structure 16 so the entire frame, trowel structure and hopper is vibrated.

It will be recognized to those skilled in this art that the pad 72 may be utilized for either permitting vibration of rod 50 relatively independent of frame 12 or causing simultaneous vibration of rod 50 and frame 12. Thus, when pad 72 is compressed by operation of screw 70, a greater proportion of the vibrations of device 46 are imparted to frame 12 than is imparted to frame 12 when pad 72 is in a relatively non-compressed state. Further, the squeezing of pad 72 between plate 62 and rib 40 permits adjustment of the amplitude of the vibrations of rod 50.

The operator may thereby control the amplitude of the vibrations imparted to the material by rod 50 as the material passes through hopper 14 and through the throat leading to the troweling structure. He may also control the vibration imparted to the frame of machine 10, which vibrations affect the boundary between the surface of the material and the proximal surface of machine 10.

The modified skids 136 and 138 are isolated from the frame of the curb forming machine by the resilient pads 125 and 129. These skids permit maximum vibration of the forming machine with a minimizing of the vibrations which are transferred to the supporting construction forms.

Trowel structure 16 is releasably secured to frame 12 to permit removal of the structure for replacement by a similar structure. Machine 10 may thereby be utilized for constructing curbs of different configuration. All that is required to change machine 10 for constructing a curb having a different shape, is to remove bolts 34 and 44. Structure 16 configured as illustrated in these drawings may then be removed from the frame. Another trowel structure, identical to structure 16 except having a different contour for its troweling surface, is substituted in machine 10 and the latter is ready for forming curbs conforming to the shape of the new troweling surface.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a curb forming machine having a frame, a material hopper and trowel means carried by the frame and communicating with the hopper for shaping said material into a curb as the machine is advanced, said trowel means having a tapered throat adjacent the hopper, structure for vibrating said material comprising:

a vibrator;

an arm carried by the vibrator for vibrating responsive to operation of the latter, said arm including an elongated rod having a first stretch extending through said throat and into the hopper, and a second stretch extending upwardly from said first stretch whereby to vibrate substantially all of the material in the throat and in the hopper;

means mounting the vibrator to the frame, said mounting means including a pad of resilient material interposed between the vibrator and the frame in position to permit limited vibratory movement of the vibrator independent of the frame, and means for shifting said vibrator toward said frame to compress the pad therebetween; and

power means operably coupled with the vibrator for operating the latter.

2. The invention of claim 1, wherein said frame includes a plate, said means for shifting the vibrator including clamp means disposed to engage the plate and the vibrator for squeezing said pad therebetween.

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3. The invention of claim 1, wherein said rod is generally J-shaped.

4. The invention of claim 1, wherein is included support means for said machine comprising:

a skid carried by the frame and adapted to engage a material form in sliding relationship to the latter; and a pad of resilient material sandwiched between the skid and said frame for damping the vibrations of the frame with respect to the skid whereby to minimize the vibration of said form.

5. The invention of claim 4, said form including a pair of spaced apart rails, and wherein said support means includes a skid for each rail, there being a pad of resilient material for each skid respectively.

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6. The invention of claim 4, wherein said skid includes an elongated member, said pad extending the full length of said member.

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