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(54) PAVEMENT SEAL, INSTALLATION MACHINE AND METHOD OF INSTALLATION

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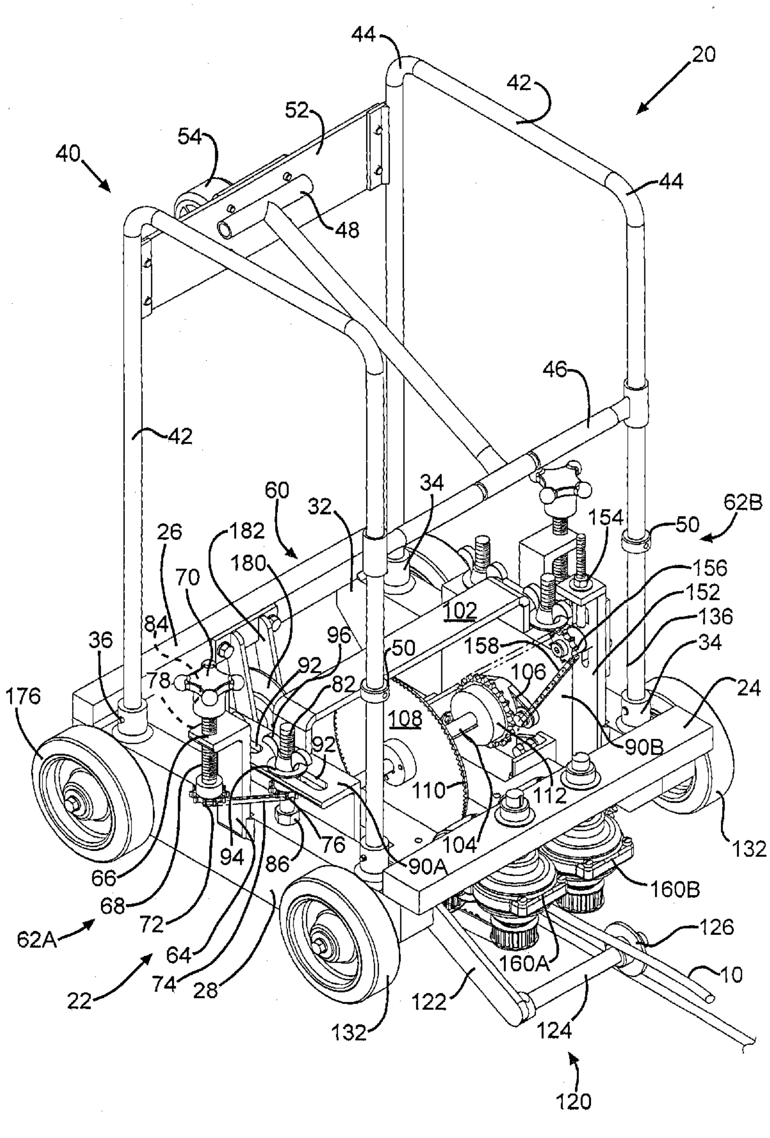
(57) **ABSTRACT**

The present invention provides a compressible seal for installation in joints in concrete pavement, the machine for installing the seal and the method of installation. The seal is a preformed, closed cell, elastomeric cylinder or rope. The seal defines a round cross section in its relaxed, i.e., uncompressed, state somewhat larger than the joint into which it will be installed. The installation machine is a wheeled, hand powered device having a first guide wheel which is received within the joint, an aligned installation wheel which installs the seal in the joint, a second guide wheel which ensures that the seal is at the proper depth in the joint and a pair of contra-circulating belts which feed the seal to the installation wheel.



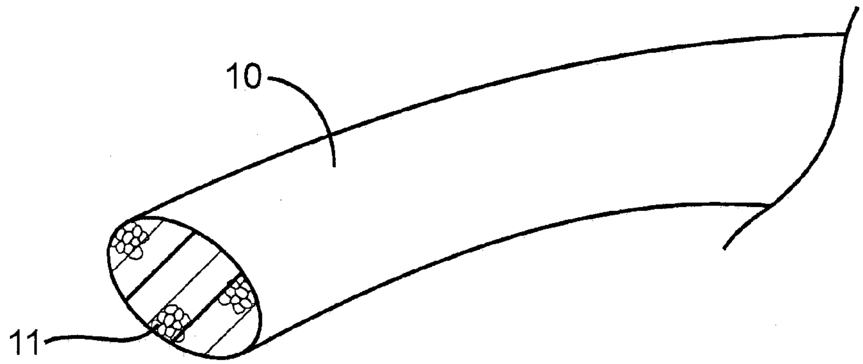


FIG. 1

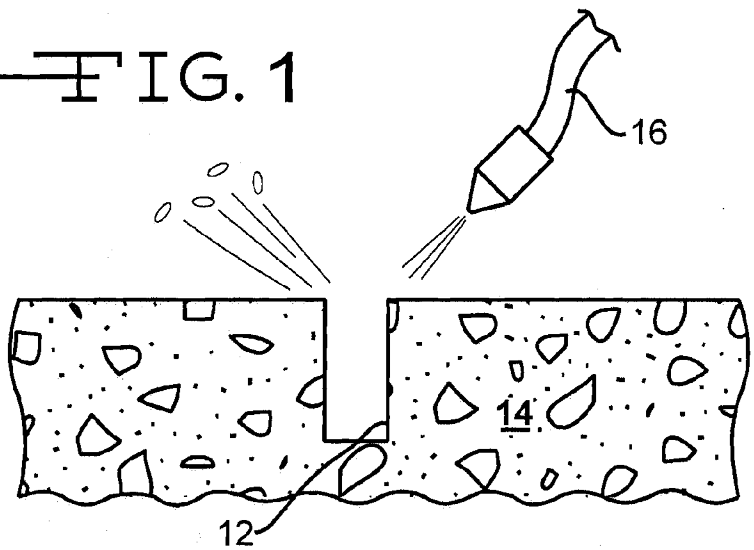


FIG. 2

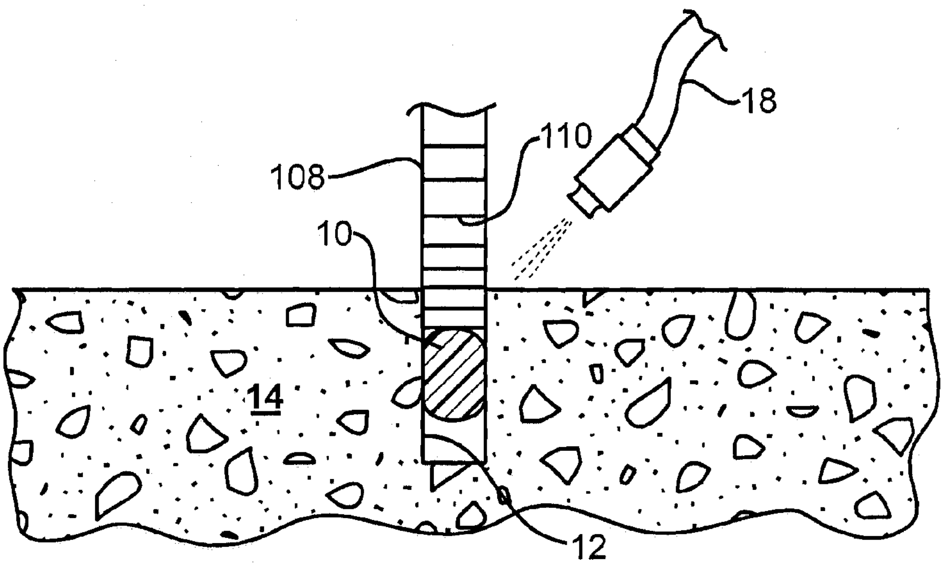
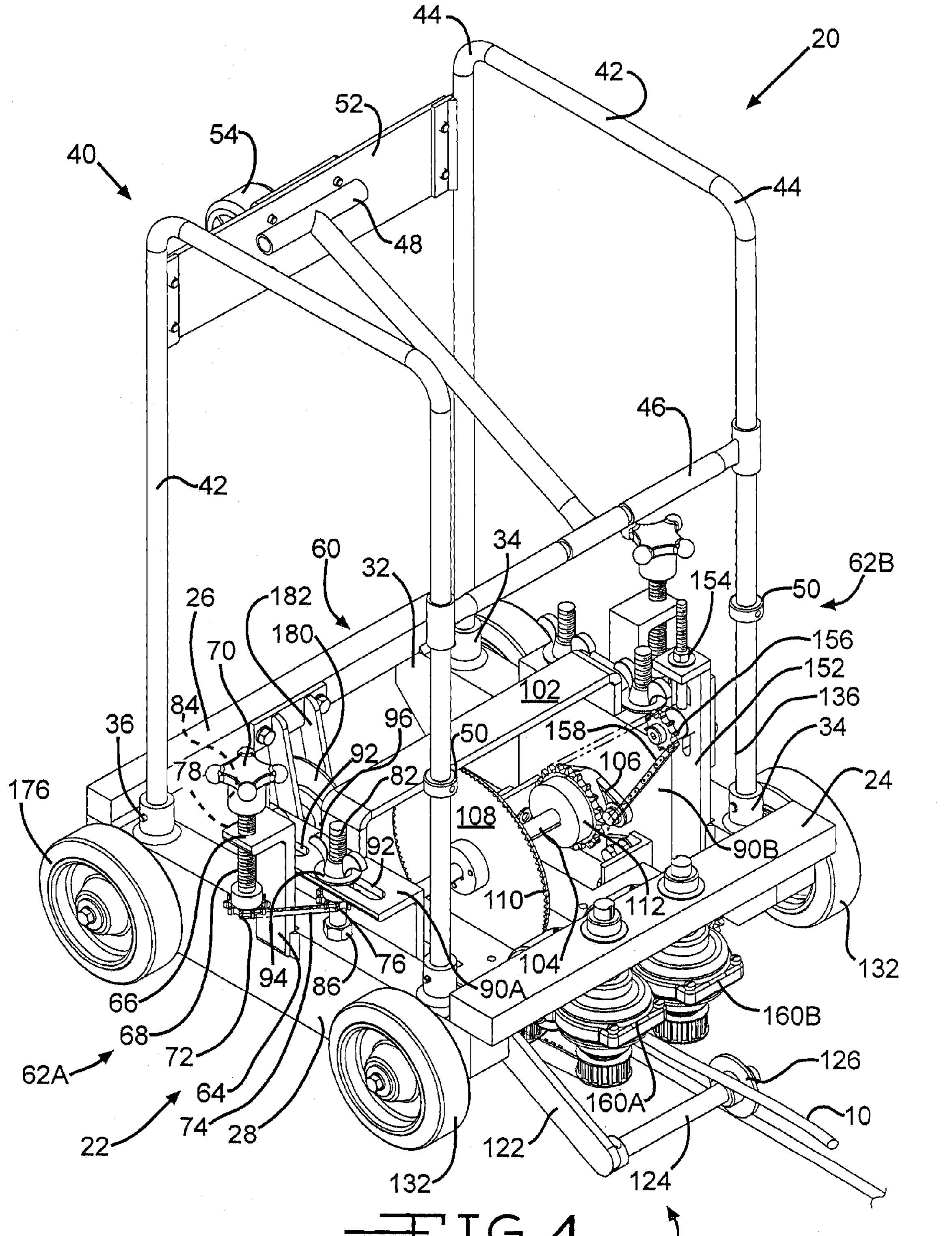


FIG. 3


20
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62B
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152
136
36
84
96
102
158
106
34
24
176
78
92
50
82
108
90B
92
110
112
132
66
68
72
64
74
94
86
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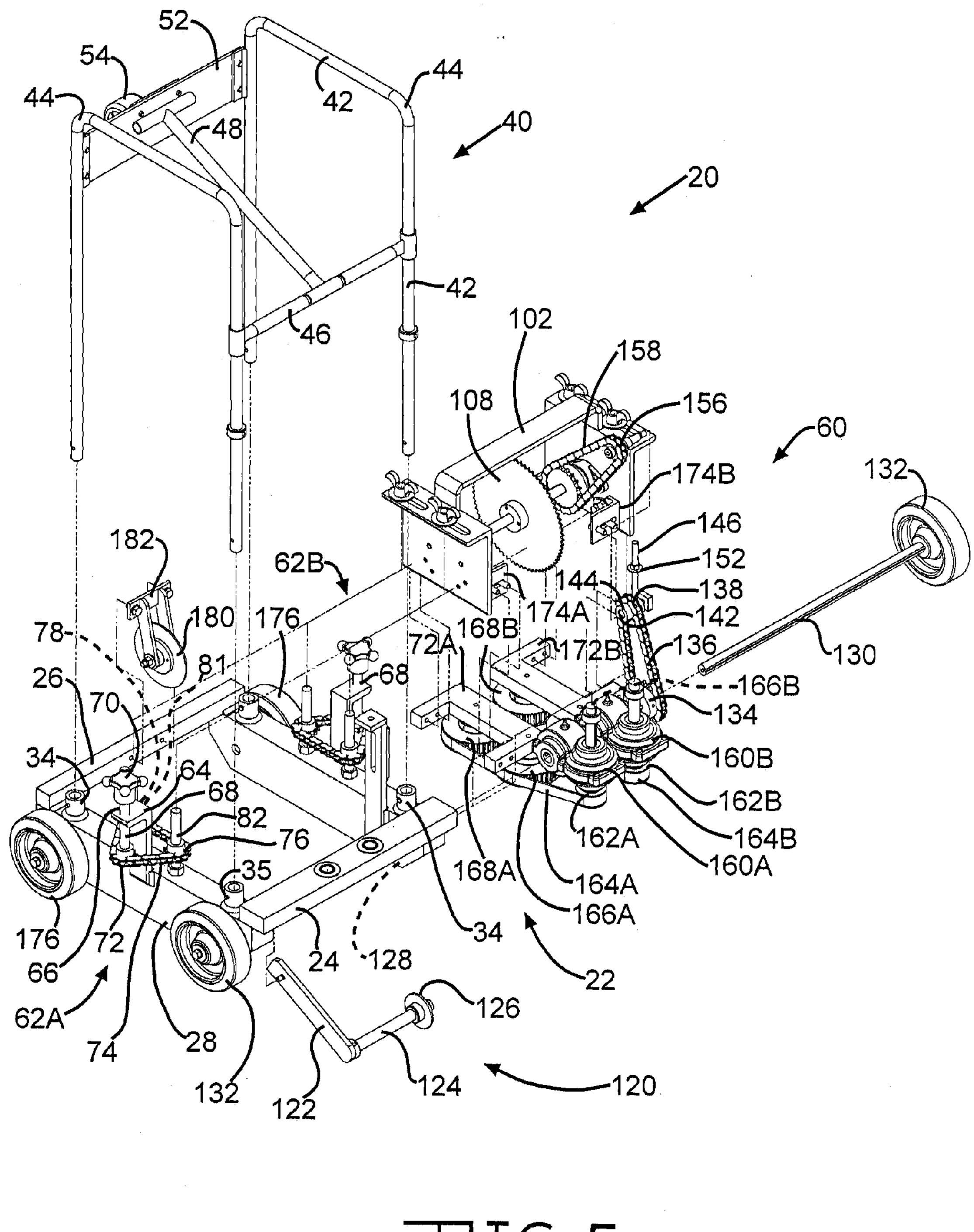
90A
104
160B
62A
22
28
160A
126
10
122
124
132
120

FIG. 4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102
158
108
156
60
174B
132
146
152
144
138
182
62B
174A
142
78
180
176
168B
172B
136
130
72A
166B
81
68
26
70
134
34
64
160B
68
162B
82
162A
164B
76
160A
35
168A
164A
176
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166A
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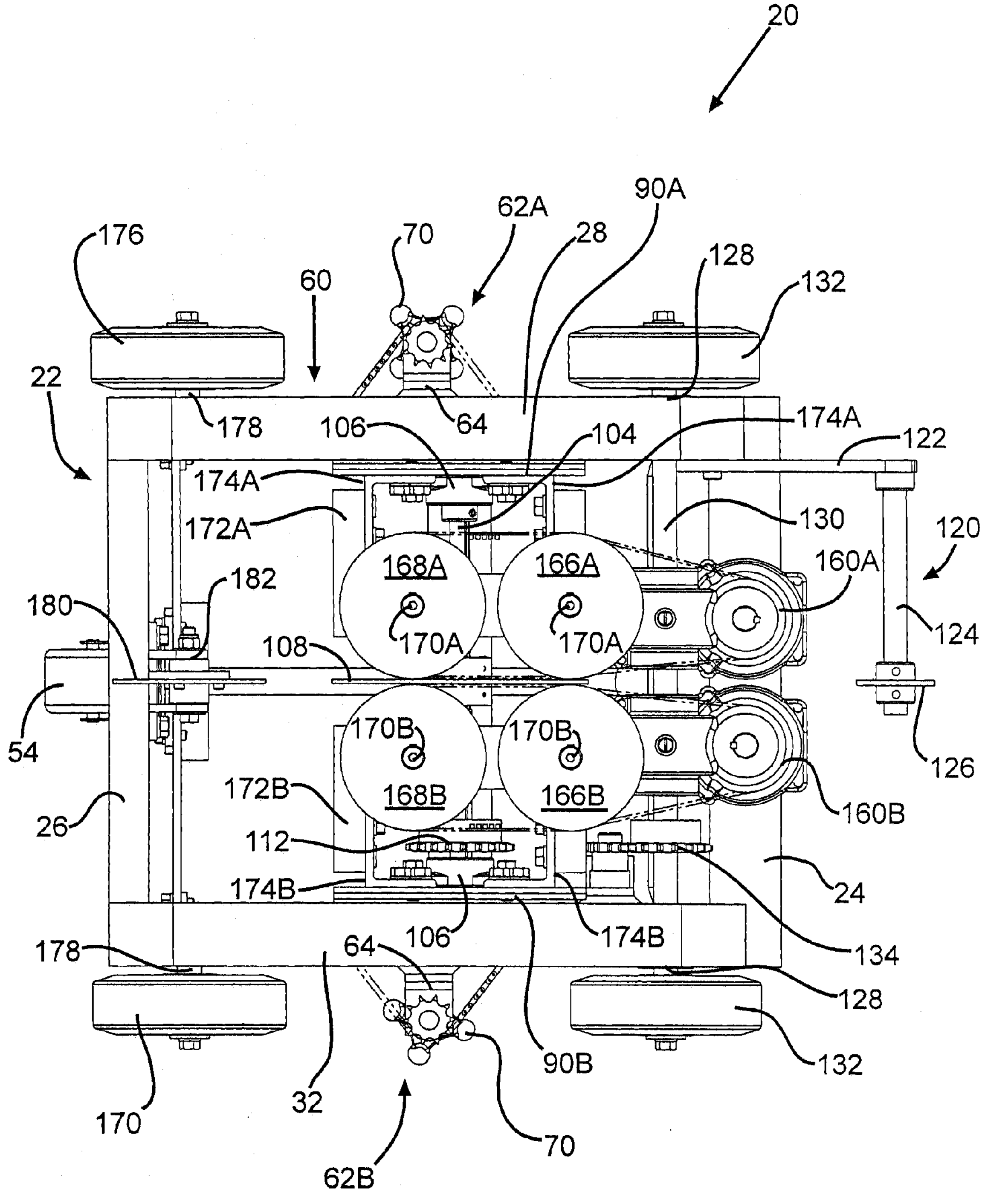
66
24
128
22
62A
28
126
74
132
122
124
120

—FIG. 5


20
176
70
62A
90A
28
128
132
60
22
178
106
64
104
174A
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174A
172A
130
120
168A
166A
160A
182
180
170A
170A
124
108
54
170B
170B
126
168B
166B
26
172B
160B
112
24
174B
106
174B
134
178
64
128
32
90B
132
170
70
62B

—FIG. 6

PAVEMENT SEAL, INSTALLATION MACHINE AND METHOD OF INSTALLATION

FIELD

[0001] The present disclosure relates to a compressible seal for installation in pavement and more particularly a compressible seal for installation in joints in concrete pavement, the machine for installing the seal and the method of installation.

BACKGROUND

[0002] The statements in this section merely provide background information related to the present disclosure and may or may not constitute prior art.

[0003] Installations of concrete pavement including both those with a single large dimension such as driveways and roads and those with two large dimensions such as parking lots and airport aprons expand and contract with the ambient temperature. Such expansion or contraction will frequently result in cracking of the concrete which, without exception, shortens the service life of the concrete. In geographic regions subject to repeated freezing and thawing, the service life of cracked concrete may be dramatically shortened.

[0004] An accepted approach to this problem is to saw kerfs or grooves in the concrete after it has been poured but before it is cured. These kerfs or grooves are generally referred to in the trade as joints and expansion or contraction joints. Because the concrete is generally thinnest at the sawn joints, they act as uniform, linear crack generation sites that cause the concrete to crack in a controlled manner and reduce or eliminate random crazing and cracking. However, the joints themselves need to be protected so that non-compressible materials, e.g., small stones and foreign matter, and water do not fill them. Because these joints are both linear and made during the installation process, they may be, and typically are, readily filled with tar to avoid the harmful effects of materials trapped in the joint and water undergoing the freeze/thaw cycle.

[0005] The tar, itself, however, can be adversely affected by the freeze/thaw cycle. For example, if water collects in the joint below the tar, a freeze cycle will slightly raise the tar and repeated freeze/thaw cycles will force the tar out of the joint. Traffic will then wear away the protruding tar and a small problem may quickly become prematurely deteriorating pavement. Additionally, tar tends to become brittle after two to three years of service. It will thus compress in the winter but fail to expand in the summer, thereby allowing material and water to enter and occupy the joint.

[0006] Furthermore, tar as well as many other liquid sealants, should not be installed when temperatures are below 45° F. (7° C.) or when moisture is present. This limits the conditions during which such sealants can be installed which may delay completion of an installation or repair project. Finally, many sealants put a joint in tension when the concrete contracts in cold temperatures. This tension can increase the rate at which the concrete deteriorates.

[0007] From the foregoing, it can be appreciated that improvements to seals for joints or grooves in concrete slabs would be desirable.

SUMMARY

[0008] The present invention provides a compressible seal for installation in joints in concrete pavement, the machine for installing the seal and the method of installation. The seal is a preformed, cylindrical, closed cell, elastomer. The seal preferably defines a round cross section with a diameter in its relaxed, i.e., uncompressed, state approximately 1.75 times and preferably between about 1.6 and 1.9 times greater than the width of the joint into which it will be installed. The installation machine is a wheeled, hand powered device having a pair of guide wheels which are received within the joint, an aligned installation wheel which installs the seal at the proper depth in the joint and a pair of contra-circulating belts that feed the seal to the installation wheel. The seal of the present invention will prevent concrete pavement from deteriorating prematurely by preventing water and debris from entering and occupying the sawn expansion joint.

[0009] Thus it is an object of the present invention to provide a seal for installation in sawn expansion joints in concrete slabs.

[0010] It is a further object of the present invention to provide a seal for expansion joints in concrete slabs which extends the life of such slabs.

[0011] It is a still further object of the present invention to provide a seal for expansion joints in concrete slabs which prevents entry and accumulation of water and non-compressible material in such joints.

[0012] It is a still further object of the present invention to provide a machine for installing a compressible seal in an expansion joint in a concrete slab.

[0013] It is a still further object of the present invention to provide a hand powered machine for installing compressible seals in expansion joints in concrete slabs.

[0014] It is a still further object of the present invention to provide a method of installing compressible seals in expansion joints in concrete slabs.

[0015] It is a still further object of the present invention to provide a method of installing a compressible seal in an expansion joint of a concrete slab with a hand powered machine.

[0016] Further objects, advantages and areas of applicability will become apparent from the description provided herein. It should be understood that the description and specific examples are intended for purposes of illustration only and are not intended to limit the scope of the present disclosure.

DRAWINGS

[0017] The drawings described herein are for illustration purposes only and are not intended to limit the scope of the present disclosure in any way.

[0018] FIG. **1** is an enlarged, perspective view of a pavement seal according to the present invention;

[0019] FIG. **2** is a fragmentary, sectional view of a sawn joint in concrete pavement which illustrates the initial installation steps according to the present invention;

[0020] FIG. **3** is a fragmentary, sectional view of a pavement seal installed in a sawn joint in concrete pavement which illustrates the final installation steps according to the present invention;

[0021] FIG. **4** is a perspective view of a machine according to the present invention for installing pavement seal;

[0022] FIG. **5** is an exploded perspective view of a machine according to the present invention for installing pavement seal; and

[0023] FIG. **6** is a bottom view of a machine according to the present invention for installing pavement seal.

DETAILED DESCRIPTION

[0024] The following description is merely exemplary in nature and is not intended to limit the present disclosure, application, or uses.

[0025] With reference to FIGS. **1** and **2**, a pavement seal according to the present invention is illustrated and generally designated by the reference number **10**. The pavement seal **10** is an aerated elastomer foam having closed cells **11** and a smooth, i.e. non-perforated, and therefore fluid impervious outer skin. The pavement seal **10** preferably defines a round cross section with a nominal diameter, in its relaxed, i.e., uncompressed, state of approximately 0.437 inches+0.0625 inches−0.00 inches (11.1 mm+1.59 mm−0.00 mm). Other multi-sided, for example, six, eight, ten or twelve sided polygonal configurations may be utilized and are within the purview of this invention. This diameter is intended for installation in a standard sawn joint, kerf, channel or groove **12** in concrete pavement **14** having a nominal width of 0.25 inches (6.35 mm). Thus, the diameter of the seal **10** is approximately 1.75 times the width of the joint or groove **12** or, stated inversely, the width of the joint or groove is approximately 57% of the diameter of the pavement seal **10**. This size relationship has been found to provide excellent seal performance in view of the expansion and contraction of the pavement **14** during seasonal temperature changes.

[0026] A joint or groove **12** having a sawn width of 0.25 inches may typically open to a maximum width of 0.345 inches (8.76 mm) and close to a minimum width of 0.165 inches (4.19 mm) due to thermal expansion and contraction of the concrete pavement **14**. Ideally, the width of the joint or groove **12** will be approximately 57% of the uncompressed diameter of the pavement seal **10**; preferably, the width of the joint or groove **12** will be in the range of from 52% to 62% of the uncompressed diameter of the pavement seal **10** and the width of the joint or groove **12** in a range of 45% to 70% of the uncompressed diameter of the pavement seal **10** is functional. It will be appreciated that smaller and larger diameter seals **10** may be utilized with correspondingly narrower and wider joints or grooves **12** if the ideal 57% relationship, or the preferred or functional ranges recited directly above, are adhered to. For example, a sawn joint or groove **12** having a width of 0.375 inches (9.52 mm) would ideally receive a seal **10** having an uncompressed diameter of approximately 0.655 inches (16.70 mm)

[0027] The pavement seal **10** is a preformed cylinder of indefinite length. The pavement seal **10**, as noted, includes entrained air in closed cells **11**. While polychloroprene compounds have been found to provide good performance, a selection of elastomers, including polychloroprene, styrene butadiene, acrylonitrile butadiene, polyethylene, polyvinyl chloride, ethylene propylene diene and blends of these materials are also suitable. The pavement seal **10** preferably has a compression deflection, i.e., spring, rate of approximately 2 pounds per inch at 15% compression, a specific gravity of 0.6±0.1 and a density of 37.44 pounds per cubic foot ±3.74. The pavement seal **10** preferably exhibits a Shore A durometer measurement of 25±5.

[0028] The pavement seal **10** according to the present invention is rugged, exhibiting a breaking strength of approximately 200 p.s.i. (1.4 mPa) with an elongation at break of 150%. It will be appreciated that the pavement seal **10** may be manufactured, typically by an extrusion process, in continuous lengths which are cut into pieces several hundred feet in length for storage and shipment on spools and then cut to desired lengths at the installation site as will be described in more detail below.

[0029] Referring now to FIGS. **4** and **5**, a pavement seal installation machine is illustrated and designated by the reference number **20**. The pavement seal installation machine **20** includes a rectangular lower frame assembly **22** typically and preferably fabricated of welded steel or aluminum box beams. The rectangular lower frame assembly **22** includes a front transverse beam **24**, a rear transverse beam **26**, a right side beam **28** and a left side beam **32**. Received within four blind sockets **34** mounted on the tops of the right side beam **28** and the left side beam **32** and releasably secured by clevis pins **36** is an upper, tubular frame assembly **40**. The tubular frame assembly **40** may be fabricated of a plurality of straight tubular sections **42** and right angle end fittings **44** or it may include a pair of U-shaped hoops each formed from a single piece of tubing.

[0030] Extending between the upright tubular sections **42** at the front of the machine **20** is a horizontal beam or tube **46** which pivotally receives and supports a T-bar handle **48**. A pair of adjustable stops **50** may be moved vertically along the front upright tubular sections **42** and secured thereto to set the height of the horizontal tube **46** and the T-bar handle **48**. Extending between the upright tubular sections **42** at the back or rear of the machine **20** is a rectangular panel **52** which locates and supports a pivotable caster **54** on its outside face. The rectangular panel **52** is preferably located to provide a stop for the T-bar handle **48** when it is in a stowed position as illustrated in FIG. **4**. So stowed, the T-bar handle **48** is not only readily accessible but it is also maintained in a position away from the operating mechanism of the machine **20**.

[0031] Positioned within the lower frame assembly **22** and capable of both vertical motion and front to back motion, that is, motion parallel to the right and left side beams **28** and **32**, is a sub-frame or chassis **60**. The chassis **60** is coupled to the lower frame assembly **22** by a right adjustment assembly **62**A and a left adjustment assembly **62**B. Since the adjustment assemblies **62**A and **62**B are identical except for their mirror image construction and arrangement, only the right adjustment assembly **62**A will be described.

[0032] The right adjustment assembly **62**A includes a narrow, L-shaped bracket **64** secured to and extending upwardly from the right side beam **28**. The narrow, L-shaped bracket **64** includes a threaded opening **66** which receives a complementarily threaded shaft **68** having a hand or finger engageable handle or knob **70**. At the opposite end of the threaded shaft **68** and secured thereto is a chain drive sprocket **72**. The chain drive sprocket **72** receives and drives a chain **74** that engages and drives a first, driven chain sprocket **76** and a second, driven chain sprocket **78**. The first, driven chain sprocket **76** rotates on a first threaded rod **82** and the second, driven chain sprocket **78** rotates on a second threaded rod **84**. The threaded rods **82** and **84** are received within complementarily threaded stationary nuts **86** or similar threaded components which are secured to the right side beam **28**. Openings (not illustrated) in the top of the right side beam **28** aligned with the stationary nuts **86** allow the threaded rods **82** and **84** to extend into the right side beam **28**. Resting upon the upper faces of the first and second driven chain sprockets **76** and **78** is a large, L-shaped bracket **90**A which extends upwardly from the chassis **60**. The large, L-shaped bracket **90**A defines a pair of elongate slots **92** which receive the respective pair of threaded rods **82** and **84**. Disposed on each of the threaded rods **82** and

84 above the upper surface of the large, L-shaped bracket 90A is a washer 94 and a wing nut 96.

[0033] To adjust the front to rear position of the chassis 60 relative to the lower frame assembly 22, the wing nuts 96 of both the right adjustment assembly 62A and the left adjustment assembly 62B are loosened and the chassis 60 is moved as necessary and the wing nuts 96 are then tightened. To adjust the height of the chassis 60 relative to the lower frame assembly 22, the wing nuts 96 of both the right adjustment assembly 62A and the left adjustment assembly 62B are loosened and the handles or knobs 70 of the adjustment assemblies 62A and 62B are rotated, clockwise to lower the chassis 60 or counter-clockwise to raise the chassis 60. When the chassis 60 has reached the desired height relative to the lower frame assembly 22, the wing nuts 96 are tightened. It will be appreciated that in addition to providing height adjustment, the threaded shaft 68, the chain drive sprocket 72, the chain 74, the first, driven chain sprocket 76, the second, driven chain sprocket 78 and the threaded rods 82 and 84 maintain the chain 74 in a horizontal plane during height adjustment which obviates binding and chain misalignment.

[0034] The sub-frame or chassis 60 includes the right and left large, L-shaped brackets 90A and 90B which are connected by a transverse U-shaped strap 102. Also extending between the large, L-shaped brackets 90A and 90B is a rotatable shaft 104 having ends which are received within a pair of bearing assemblies 106. An installation wheel 108 having a plurality of teeth 110 disposed about its periphery is secured to the middle of the shaft 104 for rotation therewith and a driven chain sprocket 112 is secured to the rotatable shaft 104 adjacent one of the bearing assemblies 106.

[0035] At the front of the lower frame assembly 22 is disposed a front guide assembly 120. The front guide assembly 120 includes a forwardly and downwardly extending bar or arm 122 which is secured to the inside face of the right side beam 28. At the forward end of the bar or arm 122 is a transversely oriented shaft 124 which extends slightly beyond the middle of the lower frame assembly 22. On the shaft 124 at the transverse center of the lower frame assembly 22 is a first or forward freely rotatable guide wheel 126.

[0036] At the front or forward end of the lower frame assembly 22, in the right side beam 28 and the left side beam 32, are a pair of aligned bearings 128 which receive a front drive axle 130. Secured to opposite ends of the front drive axle 130 are a pair of front or drive wheels 132. Also secured to and rotating with the front drive axle 130 is a first chain drive sprocket 134 which engages and drives a first chain 136. The first chain 136 engages and drives a first idler sprocket 138. The first idler sprocket 138 is secured to a stub shaft 142 which is received within a vertically moveable bushing 144. The vertical position of the bushing 144 and thus of the stub shaft 142 is adjustable by a threaded shaft 146 which may be fixed in place in an elongate slot 148 in a vertical mounting bracket 152 by a jam nut 154.

[0037] Secured to the stub shaft 142 on the opposite side of the vertical mounting bracket 152 is a second idler sprocket 156 which engages and drives a second chain 158. The second chain 158 engages and drives the driven chain sprocket 112 on the shaft 104. It will therefore be appreciated that motion of the pavement seal installation machine 20 along a surface will rotate the pair of front or drive wheels 132 which will rotate the front drive axle 130 and the first chain drive sprocket 134. In turn, the first drive chain 136 and the second drive chain 158 will circulate, rotating the driven chain sprocket 112 and the toothed installation wheel 108 on the shaft 104. The diameters of the front or drive wheels 132, the chain sprockets 134, 138, 156 and 112 and the installation wheel 108 are such that the surface speed of the installation wheel 108 is slightly faster than the surface speed of the front or drive wheels 132.

[0038] Referring now to FIGS. 5 and 6, secured to the front transverse beam 24 by any suitable means such as a threaded stud are a pair of right and left speed increasing gear boxes 160A and 160B. The speed increasing gear boxes 160A and 160B preferably provide a drive ratio of 2 to 3, that is, two turns at the input result in three turns at the output. It should be understood that this ratio may be adjusted up or down to accommodate other variations in the installation machine 20. The right and left gear boxes 160A and 160B are coupled to and driven by the front drive axle 130. The gear boxes 160A and 160B are opposite in sense. As viewed in FIG. 5, with clockwise (forward) rotation of the front wheels 132 and the front drive axle 130, the output of the right gear box 160A is counter-clockwise when viewed from above and the output of the left gear box 160B is clockwise when viewed from above.

[0039] The outputs of the gear boxes 160A and 160B are provided to right and left gears or cogged wheels 162A and 162B, respectively, which engage a respective pair of right and left timing belts 164A and 164B. The right timing belt 164A engages and circulates counter-clockwise about a right, first idler wheel 166A and a right, second, equal diameter idler wheel 168A. The right, first idler wheel 166A and the right, second idler wheel 168A are freely rotatably disposed on sleeve bearings and stub shafts 170A secured to a right U-shaped plate 172A which, in turn, is attached to the right L-shaped bracket 90A through an intermediate member 174A by suitable fasteners.

[0040] The left timing belt 164B engages and circulates clockwise about a left, first idler wheel 166B and a left, second, equal diameter idler wheel 168B. The left, first idler wheel 166B and the left, second idler wheel 168B are freely rotatably disposed on sleeve bearings and stub shafts 170B secured to a left U-shaped plate 172B which, in turn, is attached to the left L-shaped bracket 90B through an intermediate member 174B by suitable fasteners. The opposed surfaces of the right timing belt 164A and the left timing belt 164B are spaced apart a distance which is greater than the thickness of the toothed installation wheel 108 to allow it free motion therebetween but less than the diameter of the pavement seal 10 so that they engage and compress it.

[0041] The opposed rotation and travel of the timing belts 164A and 164B and their spacing at the middle of the machine 20 draws the pavement seal 10 (illustrated in FIG. 1) through the machine 20 as will be more fully described below. The drive ratios from the front drive wheels 132, through the gear boxes 160A and 160B and through the cogged wheels 162A and 162B to the timing belts 164A and 164B are such that the surface speed of the front drive wheels 132 is the same as the surface speed of the timing belts 164A and 164B. Accordingly, the pavement seal 10 is drawn into the installation machine 20 and fed to the toothed installation wheel 108 without either axial stretching or compression.

[0042] On the outside faces of the right side beam 28 and the left side beam 32 are mounted a pair of rear wheels 176. The rear wheels 176 are rotatably disposed upon stub shafts or axles 178 which are secured to the respective beams 28 and 32. Disposed in the middle of the rear transverse beam 26 in alignment with the toothed installation wheel 108 and the front rotatable guide wheel **126** is a rear guide wheel **180** rotatably mounted in a clevis **182**. It will be appreciated that the front rotatable guide wheel **126**, the toothed installation wheel **108** and the rear rotatable guide wheel **180** all cooperate to maintain the installation machine **20** in alignment with a joint or groove **12** in the concrete pavement **14** to facilitate proper and efficient installation. Furthermore, the rear guide wheel **180** sets the seal **10** to the final desired depth in the joint or groove **12**.

[0043] The installation process will now be described in connection with FIGS. **2**, **3** and **4**. Joints or grooves **12** are cut by a saw (not illustrated) in the concrete pavement **14**. The joints or grooves **12** are cut to a minimum of 25% of the thickness of the concrete pavement **14** and preferably to a depth of 33% of the thickness. After the necessary joints or grooves **12** have been cut in the pavement **14** and any debris has been blown out of the joints or grooves **12** with compressed air from an air compressor or pressurized water from a power washer through, for example, a nozzle **16**, a length of the pavement seal **10** according to the present invention is laid along the full length of the joint or groove **12**.

[0044] Next, a lubricating, soapy solution of, for example, undiluted liquid hand dish washing soap or vegetable oil soap is applied by a spray head **18** to the pavement seal **10** or the walls of the joint or groove **12** immediately prior to installation of the seal **10**. Then, the front rotatable guide wheel **126**, the toothed installation wheel **108** and the rear rotatable guide wheel **180** are placed or located in the joint or groove **12** with the front guide wheel **126** toward the direction of installation and travel. The pavement seal **10** is then inserted between the timing belts **164**A and **164**B and the installation machine **20** is moved by hand along the joint or groove **12**. The toothed installation wheel **108** rotates and installs the pavement seal **10** to the proper depth of between 0.125 inches (3.17 mm) and 0.50 inches (12.7 mm) in the joint or groove **12**. It is highly desirable that the pavement seal **10** experiences no more than approximately 4% stretch or elongation during the installation process and preferably less.

[0045] As stated, the pavement seal **10** should be installed with its upper surface between about 0.125 inches (3.17 mm) and 0.50 inches (12.7 mm) below the surface of the concrete pavement **14**. To achieve this preferred depth of installation, it may be necessary to adjust the height of the toothed installation wheel **108** and the second guide wheel **180** relative to the top surface of the pavement **14**, that is, the depth of penetration of the toothed installation wheel **108** and the second guide wheel **180** into the joint or groove **12**. The toothed installation wheel **108** is adjusted by using the right and left adjustment assemblies **62**A and **62**B, as described above. The height of the second guide wheel **180** is adjusted by repositioning the clevis **182**.

[0046] As noted above, pavement seals having both larger and smaller diameters than the diameter of the pavement seal **10** recited herein for correspondingly larger and smaller joints or grooves are within the purview of the present invention. Preferably, the width of the joint or groove into which the pavement seal will be installed is approximately 57% of the diameter of the pavement seal in its uncompressed (uninstalled) state. However, as noted above, the pavement seal may be installed in a joint or groove **12** having a width a little as 45% to as much as 70% of the uncompressed diameter of the pavement seal with acceptable results.

[0047] Before and after installation of the pavement seal **10**, the installation machine **20** is readily moved about by tipping it onto the two rear wheels **176** (which extend beyond the ends of the side beams **28** and **32**) and the caster **54**. The T-bar handle **48** may then also be utilized to conveniently maneuver the installation machine **20**. So disposed, the likelihood of damage to the guide wheels **126** and **180** and the toothed installation wheel **108** is minimized. Moreover, if care is taken to tip the installation machine **20** upright over the joint or groove **12** such that the guide wheels **126** and **180** and the toothed installation wheel **108** are received within the joint or groove **12**, little or no adjustment or resetting of the adjustment assemblies **62**A and **62**B should be necessary and the likelihood of damage to the wheels **108**, **126** and **180** is further reduced.

[0048] It should be appreciated that in addition to facilitating height adjustment of the chassis **60** relative to the frame **22**, the front to back adjustment also provided by the adjustment assemblies **62**A and **62**B facilitates tightening, loosening and replacement of the timing belts **164**A and **164**B.

[0049] The description of the invention is merely exemplary in nature and variations that do not depart from the gist of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from either the spirit or the scope of the invention or the following claims.

What is claimed is:

1. An installation machine for pavement seals comprising, in combination,

a frame having a front pair of wheels, a rear pair of wheels, a front guide wheel and an aligned rear guide wheel,

a chassis disposed within said rectangular frame,

a pair of adjustment assemblies operably disposed between said frame and said chassis,

an installation wheel rotatably disposed on said chassis between said guide wheels,

a front axle coupled to said front pair of wheels,

a pair of gear boxes driven by said front axle and having a pair of oppositely rotating outputs, and

a pair of oppositely circulating belts driven by said oppositely rotating outputs.

2. The installation machine of claim **1** further including means for driving said installation wheel from said front axle.

3. The installation machine of claim **1** further including an interconnected tubular frame extending from said rectangular frame.

4. The installation machine of claim **1** wherein said adjustment assemblies include means for vertical and horizontal adjustment.

5. The installation machine of claim **1** wherein said adjustment assemblies include threaded shafts rotated by chain sprockets engaged by a chain.

6. The installation machine of claim **1** wherein said installation wheel includes teeth about its periphery.

7. The installation machine of claim **1** wherein said gear box outputs include cogged wheels and further including a pair of idler wheels associated with each said output and said belt.

8. A seal installation machine for concrete pavement comprising, in combination,

a frame having a front pair of wheels, a rear pair of wheels and at least one guide wheel,

a chassis disposed within said frame,

a pair of adjustment assemblies connecting said frame and said chassis,

an installation wheel rotatably disposed on said chassis, a front axle coupled to said front pair of wheels,

means for driving said installation wheel from said front axle,

means driven by said front axle for providing a pair of oppositely rotating outputs, and

a pair of oppositely circulating belts driven by said outputs and adapted to engage a seal.

9. The seal installation machine of claim **8** further including a tubular frame secured to said frame and including a caster and a handle.

10. The seal installation machine of claim **8** wherein said installation wheel includes teeth about its periphery.

11. The seal installation machine of claim **8** wherein said oppositely rotating outputs include cogged wheels.

12. The seal installation machine of claim **8** wherein said means for driving said installation wheel includes a first chain sprocket secured to said front axle, a second chain sprocket and a third chain sprocket secured to a stub shaft, a fourth chain sprocket secured to a shaft coupled to said installation wheel, a first chain engaging said first and said second chain sprockets and a second chain engaging said third and said fourth chain sprockets.

13. The seal installation machine of claim **12** further including means for moving said stub shaft toward and away from said chassis.

14. A seal for installation in sawn joints in concrete pavement comprising, in combination,

an elongate cylindrical body of an aerated, closed cell elastomer having a diameter of less than one-half inch, specific gravity between 0.50 and 0.70 and a Shore A hardness of between 20 and 30.

15. The seal for installation in sawn joints in concrete pavement of claim **14** wherein said diameter is approximately 0.44 inches.

16. The seal for installation in sawn joints in concrete pavement of claim **14** having a spring rate of approximately 2 pounds per inch.

17. A method of installing a seal in sawn joints in concrete pavement comprising the steps of

removing debris from a sawn joint in concrete pavement,

lubricating such sawn joint with a soap solution,

providing a length of a cylindrical pavement seal and aligning said seal with said joint,

aligning an installation wheel with said joint, and

translating and rotating said installation wheel along said joint to force said seal into said joint.

18. The method of claim **17** wherein said installation wheel extends into said joint.

19. The method of claim **17** wherein said debris is removed by air or water under pressure.

20. The method of claim **17** wherein said length of pavement seal is equal to or longer than a length of said joint.

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