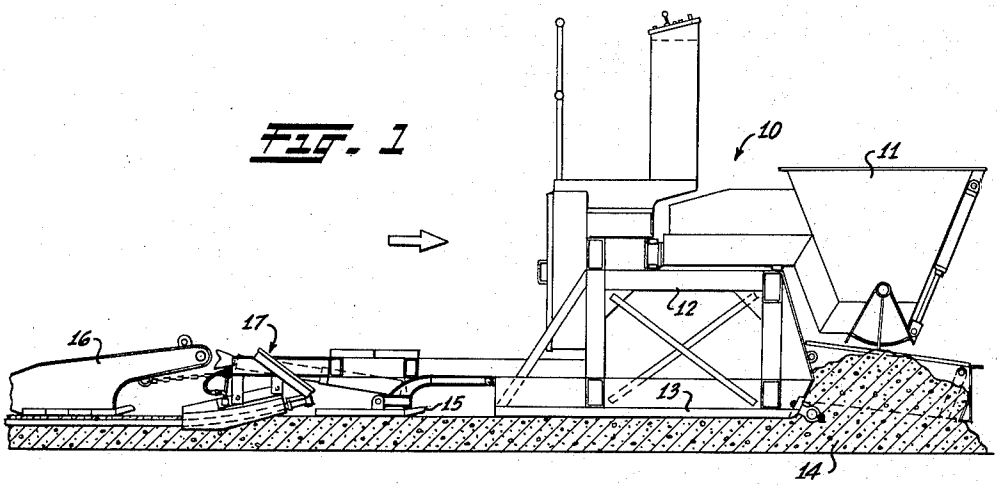
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APPARATUS FOR FORMING A WEAKENED ZONE IN PAVEMENTS

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Fig. 1



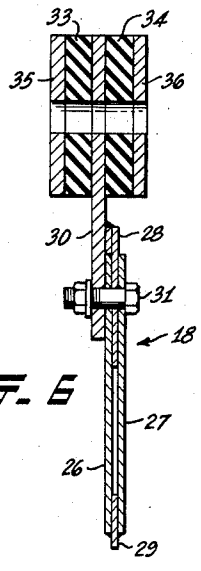


Fig. 6

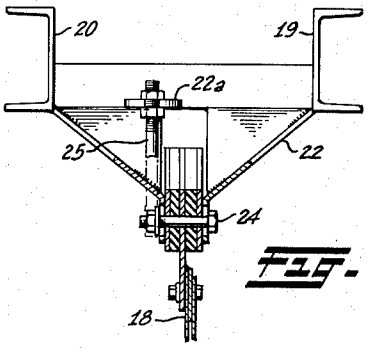


Fig. 4

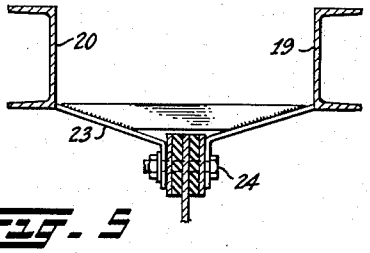


Fig. 5

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FIG. 2

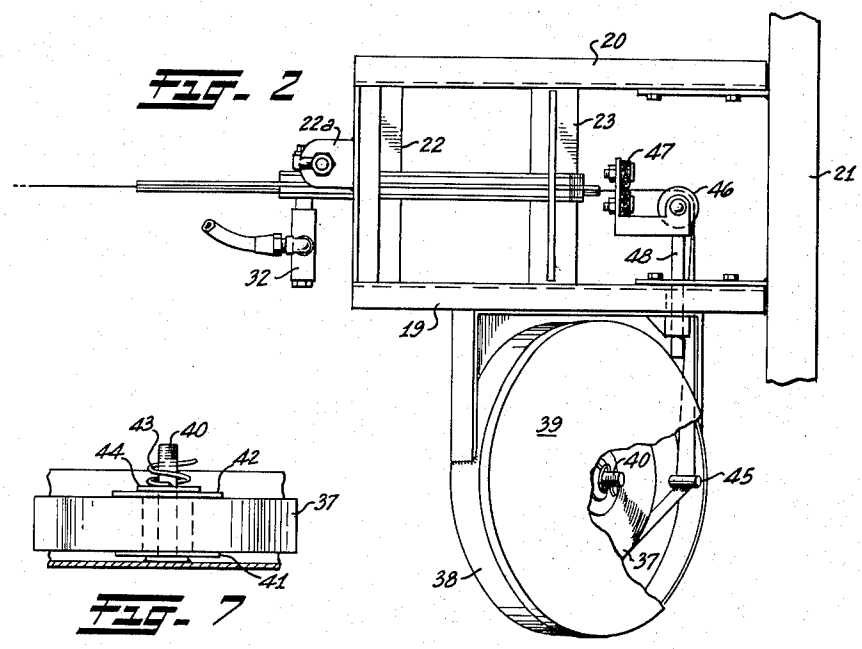


FIG. 7

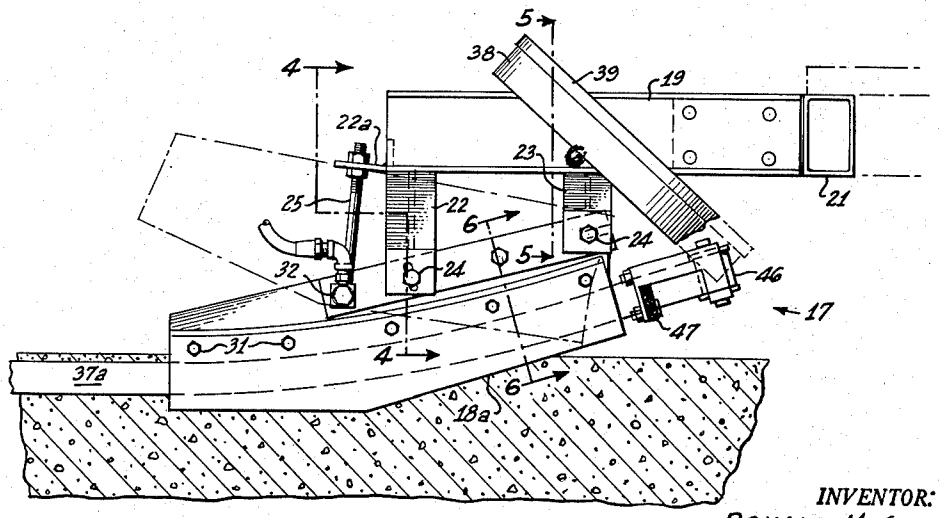


FIG. 3

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United States Patent Office 3,194,130 Patented July 13, 1965

3,194,130
APPARATUS FOR FORMING A WEAKENED ZONE IN PAVEMENTS

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Filed Jan. 10, 1961, Ser. No. 81,789
4 Claims. (Cl. 94—45)

This invention involves a method and apparatus for forming a weakened zone in pavement, said zone allowing a controlled separation of the pavement during its initial contraction, and permitting subsequent expansion and contraction, especially during thermal changes. The invention more particularly pertains to an apparatus for inserting a strip of plastic material into a groove that is formed by parting freshly poured cementitious material.

In brief, the invention comprises a blade member that is adapted to be used in combination with road paving apparatus now commonly used in the road building industry. The blade member is mounted rearwardly of the road paving apparatus and is positioned in the pathway of a freshly poured cementitious material. As the blade member and related apparatus are advanced, the blade member forms a groove in the cementitious material, and before the groove can heal, a strip of plastic material is inserted thereinto. A float, mounted rearwardly of the blade member is moved across the surface of the freshly poured cementitious roadway, causing surface mortar or grout to be filled into the groove over the strip material and providing a closed seam through the pavement, said paving then having a smooth continuous surface.

One object of this invention is to provide in combination with apparatus for forming pavement, the improvement of a strip-inserting device mounted rearwardly of said paving apparatus and adapted to be advanced therewith, said device comprising a blade member positioned in the pathway of freshly poured cementitious material for forming a groove therein, and means for inserting strip material into said groove as said apparatus and blade are advanced.

Another object is to provide new and useful methods for forming a contraction and expansion joint in pavements.

A further object of the invention is to provide apparatus for inserting a strip of material into freshly poured cementitious material, comprising a blade member adapted to be drawn through freshly poured cementitious material for forming a groove therein, and means for inserting material into said groove as said blade is advanced.

A still further object is to provide an apparatus for inserting a strip of plastic material into freshly poured cenentitious material including a longitudinally slotted blade member adapted to be drawn through freshly poured cementitious material, and having strip material threaded through said slotted blade member, said strip material being inserted into a groove formed by the blade member as it is advanced through cementitious material.

Other objects of this invention will be evident in view of the drawings and the following detailed description.

In the drawings, forming a part of this application, and in which like parts are identified by like numerals throughout the same,

FIG. 1 is a side elevation of a typical installation of the invention on a slip-form paving apparatus for building roads, said apparatus including one embodiment of this invention for forming a contraction and expansion joint in the roadway being formed;

FIG. 2 is an enlarged plan view of the strip-inserting apparatus shown in combination wtih the paving apparatus of FIG. 1, a portion of the spool housing having been broken away;

FIG. 3 is an enlarged elevation of the strip-inserting apparatus shown in FIG. 1;

FIG. 4 is a section taken on lines 4—4 of FIG. 3.

FIG. 5 is a section taken on line 5—5 of FIG. 3.

FIG. 6 is a section taken on lines 6—6 of FIG. 3; and

FIG. 7 is a detail view of a portion of the spool assembly and mounting for a roll of strip material as utilized in the strip-inserting apparatus.

Referring more particularly to FIG. 1 of the drawings, there is illustrated a typical installation of the invention on a slip-form paving apparatus for building concrete roads. The apparatus shown includes a machine **10** for forming a concrete roadway, said machine comprising a concrete distributing car **11** that is transversely movable upon a bed platform **12**. A pan type screed member **13** is mounted beneath the platform, and as the machine is advanced (from left to right as shown) the cementitious material **14** is compacted and leveled to a predetermined height by the screed pan. This machine is conventionally mounted upon lateral tracks (not shown) that continuously advance the machine at relatively slow speeds. The vertical position of the screed **13** may be controlled by grade control apparatus such as taught in U.S. Patent No. 2,844,882, an invention of the present applicant.

Float pan **15** and V-float **16** have previously been used conjunctively with a slip-form paving machine for leveling and smoothing out the surface of the roadway during the time the cementitious material is workable.

The above described slip-form paving machine is now of well known construction to persons skilled in the road building art, and no portion of that machine is considered to be part of the present invention. This invention is particularly directed to the strip-inserting apparatus **17** that may advantageously be employed in combination with a paving machine.

FIGS. 2–7 illustrate the strip-inserting apparatus **17** with greatest clarity. In general, the apparatus comprises an arcuate blade assembly **18** that is supported from the machine **10** upon a pair of channels **19** and **20** which project rearwardly from a transverse support member **21** of the machine. A pair of depending support arms **22** and **23** each interconnect channels **19** and **20** and provide support connections for the blade assembly. As best shown in FIGS. 3–5, through bolts **24** may be utilized for mounting assembly **18** between lateral flanges of each support arm. The lateral flanges of support arm **22**, it will be noted, are provided with elongated slots allowing the blade assembly to be pivoted upon support arm **23** into positions of vertical adjustment, as well as into a position above the cementitious roadway where it may be supported by a wire or the like connected to tongue support **22***a*. In operation, blade assembly **18** is positively held in a selected position of adjustment by the adjustable rod **25** which then interconnects the blade and the tongue supports **22***a*. Rod **25** is adjustably secured at one end to tongue **22***a* by means of conventional lock nuts, the other end being pivotally secured to the blade by means of a bolt.

Blade assembly **18** may be formed from plate material as shown in FIG. 6, and comprising a pair of side plates **26** and **27** separated by an upper plate member **28** and a lower plate member **29**. These plates may be welded together so as to define a slotted blade member having a thin inclined leading edge. A support plate **30** is connected along the top edge of the blade member by a series of bolts **31**, and is provided with openings for receiving the through bolts **24**.

The blade assembly **18** also includes a means for vibrating the blade member, thereby enabling said blade member to be more easily inserted and drawn through the cementitious material. The vibrating means includes a variable speed air vibrator **32** that is directly mounted

to plate 30 by conventional means, and is positioned so as to transmit substantially horizontal vibrations in a direction transverse of the blade's forward movement. The speed of vibrator 32 is adjusted in keeping with the varying demand of the cementitious mix.

Resilient strips of material 33 and 34 are laid against opposite sides of plate 30, and lateral plate members 35 and 36 provide a rigid backing for connection to the support arms 22 and 23. The resilient strips 33, 34 and the plates 30, 35 and 36 may be held together by the various through bolt connections or other suitable means. This mounting assembly allows the blade to be vibrated vigorously for the resilient strips effectively isolate the depending support plate from support arms 22 and 23 and machine 10. Thus, most of the vibrating force of vibrator 32 is transmitted to the blade assembly and is not absorbed by the mass of the machine.

A roll of plastic strip material 37 is supported from channel 19 and is contained within a protective housing 38 having a removable cover 39. The strip material 37*a* may be formed of polyethylene and of any suitable width and thickness. The roll 37 is rotatably mounted upon a shaft 40, and means is provided for inhibiting free-wheeling rotation of the roll upon said shaft. For this purpose, the roll is wound around a spool having a pair of lateral friction plates 41 and 42. A coiled spring 43, having one end bearing against a thrust plate 44 and the opposite end secured to shaft 40, continually urges plate 44 into frictional engagement with plate 42.

The free end of strip material is guided from housing 38 around a pin 45, and is drawn around a roller member 46 and between felt wiper pads 47. Roller member 46 and pads 47 are supported from a shaft 48 that is laterally adjustable with respect to channel 19. The strip material is then threaded through the slotted blade member and disposed within the immediately preformed groove.

In operation the blade assembly 18 is drawn forwardly with the advance of machine 10. The forward edge 18*a* of the blade parts the cementitious material, which is then workable. The parting action of blade assembly 18 is greatly enhanced by the vibrations imparted thereto by vibrator 32, and accordingly, the blade penetration may be held to a uniform depth. The position of blade assembly 18 may be varied by adjusting the lock nuts on rod 25.

The strip material 37*a* is initially anchored down-road of the strip-inserting apparatus. Therefore, as the machine is advanced, the strip material is continuously unwound from roll 37 and becomes lodged within the groove which is simultaneously being formed. It is also notable that the felt wiper pads 47 remove substantially all foreign particles from the strip material, thereby preventing a clogging of the blade slot and insures a trouble-free, continuous operation.

Since the strip-inserting apparatus is positioned in advance of V-float 16, the latter device is utilized to fill surface mortar into the strip-occupied groove. This provision has the beneficial effect of closing over the groove and resulting in a smooth continuous surface, but having an expansion-contraction seam that is almost imperceptible at the time it is formed.

Although a preferred embodiment of this invention has been illustrated and described, it is to be understood that various changes may be made without departing from the spirit of the invention or the scope of the attached claims, and each of those changes is contemplated.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In combination with apparatus for forming pavement, including means for compacting freshly poured cementitious material, the improvement of a strip-inserting device mounted rearwardly of said paving apparatus and adapted to be advanced therewith, said device comprising means including a pair of spaced plates defining a slotted guide, said guide being adapted to be positioned in the pathway of freshly poured but compacted and relatively rigid cementitious material for forming a groove therein, said guide being longitudinally aligned in the direction of advancement and having a relatively thin and forwardly inclined leading edge extending from the bottom of the guide to a point above the level of freshly compacted concrete, means for supplying and feeding a divider strip through said slotted guide including a supply of divider strip material, and a reciprocating vibrating means mounted upon said guide for imparting vibration thereto in a direction substantially transverse of the direction of advancement.

2. The apparatus of claim 1 and further comprising means for adjustably mounting said guide from a support and controlling the depth of penetration, said guide being supported at a positive position relative to the surface of the freshly poured but compacted and relatively rigid cementitious material.

3. The apparatus of claim 1 wherein said means for supplying and feeding a divider strip includes a roll of plastic strip material mounted upon a spool that is adapted to be fed through said guide, guide means for feeding strip material from said roll through said guide means, a wiper pad for contacting said strip material in front of said guide means, and means for inhibiting a backlash of such strip material upon said spool.

4. The apparatus of claim 1 wherein said guide means is pivotally mounted from a support member and may be pivoted thereon from a groove-forming position to an elevated position above the freshly poured cementitious material, and including a releasable means for securing said guide means in said groove-forming position.

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