Oct. 21, 1958 W. H. LEWIS 2,857,147

COOLANT HEAD FOR CUTTING DISC

Original Filed April 20, 1953 2 Sheets-Sheet 1

Fig. 1

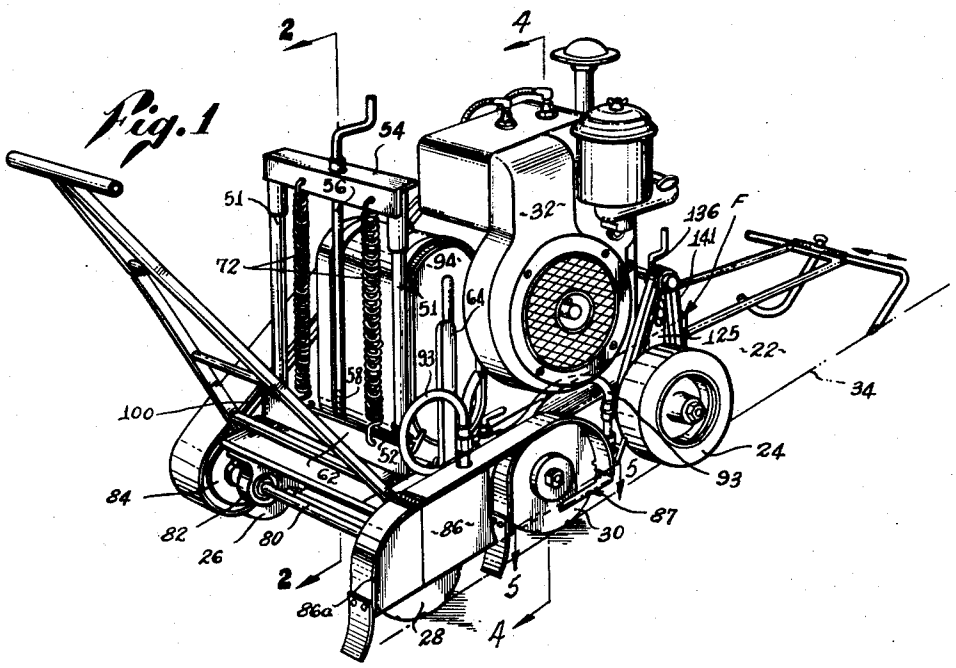


Fig. 3

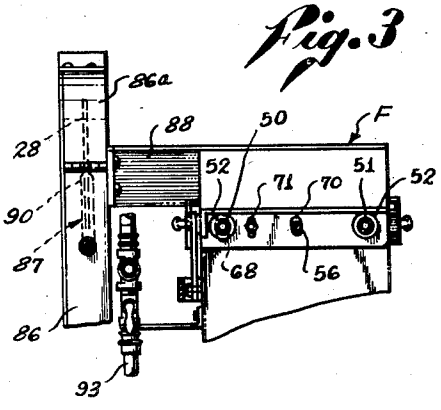
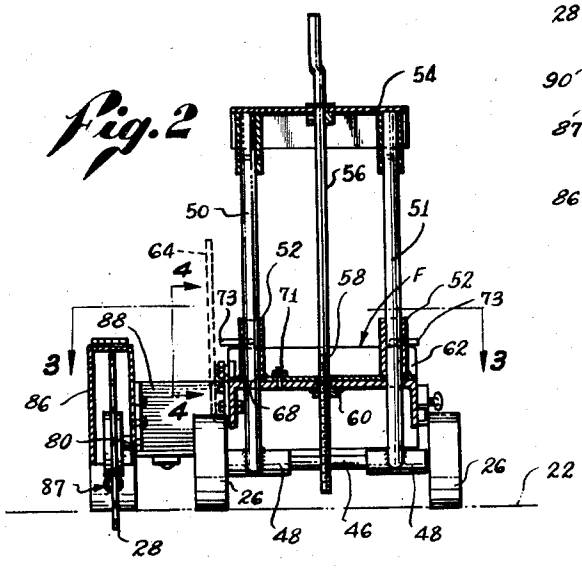


Fig. 2



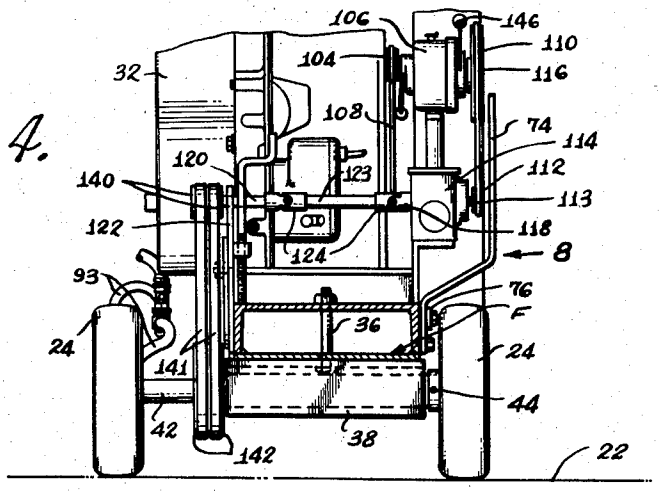
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Fig. 4.



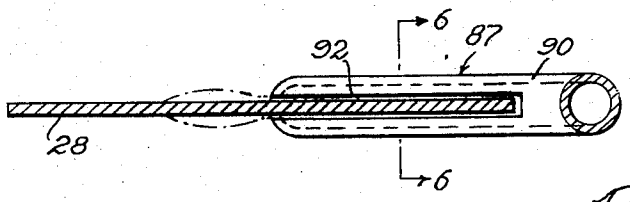


Fig. 5.

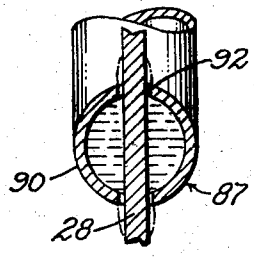


Fig. 6.

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COOLANT HEAD FOR CUTTING DISC

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Original application April 20, 1953, Serial No. 349,726. Divided and this application March 15, 1956, Serial No. 571,690

2 Claims. (Cl. 262—20)

This application is a division of application Serial No. 349,726, filed by me April 20, 1953, now abandoned.

The present invention relates generally to pavement cutting devices, and more particularly to an improved device for cutting grooves or kerfs in pavement materials such as concrete, asphalt, and the like.

There have been heretofore proposed pavement cutting devices adapted to cut elongated grooves or kerfs in the surface of paved slabs such as roads, driveways, airport landing strips, and the like. Generally, such heretofore-proposed devices broadly comprise a wheeled frame whereon is rotatably mounted a single power-driven cutter disc, which cutter disc cuts a downwardly extending groove or kerf in the pavement as the frame is moved thereacross. Examples of such devices are shown in United States Letters Patent No. 2,468,336 and No. 2,569,682, issued to me April 29, 1949, and October 2, 1951, respectively.

The cutter discs utilized in such pavement cutting devices are generally formed by bonding diamond particles to a metallic disc, and both because of the high cost of the diamonds and of bonding the diamonds to the disc, these discs are quite expensive. In view of their high cost, it is important to obtain a long service life from such discs. Such long service life, however, cannot be obtained at a sacrifice of the rate of speed at which the pavement is cut, since in many cases, for example, where kerfs are being cut in an elongated concrete roadway, such kerfs must be cut within a definite time interval. If they are cut too soon, the concrete will not be sufficiently hard and the cutter discs will pull pebbles out of the concrete instead of cutting through them, thereby causing spalling of the top edges of the kerfs. If they are cut too late, the pavement may have contracted to such an extent that irregular cracks have formed therein.

A major object of the present invention is to provide an improved device for cutting kerfs in a paved surface.

It is a more particular object of the invention to provide a new and novel coolant head for use with a mobile pavement cutting device.

Another object is provide a coolant head which affords maximum effectiveness at a minimum cost.

An additional object is to provide a coolant head which eliminates the necessity of a water pump on a mobile pavement cutting device.

It is an additional object of the present invention to provide a coolant head for a pavement cutting device which is simple of design and rugged of construction whereby it may have a long service life.

These and other objects of the present invention will become apparent from the following detailed description of a preferred embodiment thereof, when taken in conjunction with the appended drawings wherein:

Figure 1 is a general perspective view of a preferred form of a pavement cutting device embodying the present invention;

Figure 2 is a vertical sectional view taken on line 2—2 of Figure 1;

Figure 3 is a fragmentary horizontal sectional view taken on line 3—3 of Figure 2;

Figure 4 is a vertical sectional view taken on line 4—4 of Figure 1;

Figure 5 is an enlarged horizontal sectional view taken on line 5—5 of Figure 1; and

Figure 6 is a vertical sectional view taken on line 6—6 of Figure 5.

Referring to the drawings, the preferred form of device embodying the coolant head of the present invention broadly comprises a main frame generally designated F, supported for movement across a slab of pavement 22 by front wheels 24 and rear wheels 26. The frame F rotatably supports a pair of longitudinally-aligned, spaced-apart cutter discs 28 and 30. Power-operated means in the form of an air-cooled internal combustion engine 32 serves to effect rotation of the front wheels 24, as well as the rotation of the cutter discs 28 and 30 whereby the frame F may be moved across the surface of the pavement 22 and form a groove or kerf 34 therein during such movement.

More particularly, the frame F may be substantially rectangular in plan form. As shown in Figure 4, there is pivotably secured to the front end of the frame by a vertical pin 36, a transverse L-shaped axle support 38. This axle support 38 rigidly supports a horizontal tube 40 wherein a front axle 42 is rotatably carried. Preferably, one of the front wheels (shown at the left in Figure 4) is permanently keyed to the front axle 42 while the other may be selectively keyed to this axle by a removable pin 44. Upon removal of this pin 44, this latter wheel may rotate independently of the front axle.

With reference to Figures 2 and 3, the rear wheels 26 are adapted to be moved toward and away from the underside of the frame F whereby the frame may be pivoted vertically about the axis of the front axle 42. To this end, the rear axle 46 is rotatably carried by a pair of horizontal tubes 48 rigidly secured to the lower ends of a pair of upstanding columns 50 and 51. These columns 50 and 51 are slidably disposed within a pair of vertically extending sleeves 52 mounted by the rear portion of the frame F. The upper ends of the columns rigidly mount a horizontal cross-piece 54, which cross-piece rotatably journals a vertically extending crank rod 56 at its mid-section. The lower portion of this crank rod 56 is formed with external threads 58 engageable with a nut 60 rigidly mounted by the frame F. With this arrangement, rotation of the crank rod 56 will effect vertical movement of the rod, the cross-piece 54, the columns 50 and 51, the tubes 48, and hence the rear axle 46, whereby the rear axle will be urged toward or away from the underside of the frame F, depending upon the direction the crank rod 56 is rotated.

With particular reference to Figures 2 and 3, the vertically extending sleeve 52 will preferably be mounted by a transverse L-shaped element 62. This element 62 is pivotally secured at its right side to the frame F by means of column 51. The left side of this element 62 is adapted to be moved longitudinally relative to the frame by manipulation of an upstanding adjustment lever 64 shown as having its lower end pivotally secured to the frame F just ahead of the element 62. To this end, the adjustment lever 64 includes a generally U-shaped lower portion which is connected to the left side of the element 62 by a short pivot link. Additionally, the floor of the frame F is formed with a longitudinally extending slot 68 wherein column 50 may be moved, while the mid-portion of the element 62 is formed with an elongated longitudinally extending slot 70 providing for movement of the crank rod 56. The element 62 is adapted to be locked in any de-

sired position by means of a bolt and nut combination **71**. With this arrangement, the angle of the rear axle **46** relative to the frame F may be adjusted. Preferably, a pair of tension springs **72** will be interposed between the crosspiece **54** and the element **62** so as to constantly bias the rear axle **46** toward the underside of the frame F. The sleeves **52** may each mount a lock bolt **73** adapted to engage the columns **50** and **51** so as to secure them against vertical movement relative to such sleeves.

The cutter discs **28** and **30** are each keyed to a similar transverse shaft **80**, each shaft **80** being carried by a strap-type bearing **82** rigidly secured to the frame F. The ends of these shafts opposite the cutter discs are keyed to pulleys **84**. The cutter discs are enclosed by a guard **86** shown bolted to a brace **88** rigidly secured to the side of the frame. Preferably, the rear portion **86***a* of the guard **86** will be pivotable upwardly so as to expose the rear cutter disc **28**.

The cutter discs **28** and **30** are each provided with a coolant head or nozzle, generally designated **87**, shown in detail in Figure 5, and embodying the present invention. Each coolant head **87** may be formed of a tube **90** having a longitudinally extending slot **92** that receives its respective cutter disc. The front of the tubes **90** are adapted to be placed in communication with a source of coolant (generally water) by means of hoses **93**. Such coolant may be supplied from a tank carried on the device or from any other suitable source. When the cutter discs are undergoing rotation, coolant flowing through the slots **92** will tend to be urged radially outwardly over the sides of the cutter discs by means of centrifugal force.

Such coolant will thoroughly coat the cutter discs on both sides and accordingly less coolant will be required to obtain effective cooling than has been the case with previous types. The coolant supplied to the front cutter disc **30** will be urged into the kerf formed thereby with considerable force so as to flush the cuttings therefrom. Accordingly, the cuttings from the front cutter disc **30** will not interfere with the cutting operation of the rear cutter disc **28**. It should be noted that the use of the aforedescribed coolant heads completely eliminates the need for a separate pump on the pavement cutting device while affording all the advantages resulting from the use of a pump. The effectiveness of the coolant heads **87** is such that a maximum service life of the expensive cutter discs **28** and **30** may be obtained.

The engine **32** is rigidly secured to the upper surface of the frame F adjacent a fuel tank **94**. Referring to Figures 1 and 4, the engine's drive shaft mounts a pulley which is directly connected to the pulleys **84** by means of belts **100** whereby the cutter discs **28** and **30** may be rotated. The engine drive shaft also mounts a second pulley which is connected to the input pulley **104** of a speed-varying mechanism **106** by a belt **108**. The output pulley **110** of this speed-varying mechanism **106** is connected to a pulley **112**. The latter pulley is keyed to the input shaft **113** of a gear reduction mechanism **114** by another belt **116**. The output shaft **118** of the gear reduction mechanism drives a power shaft **120** shown journaled by the upper end of a vertical lever member **122**, a transfer shaft **123** being interposed between output shaft **118** and power shaft **120**. It should be noted that universal joints

124 connect the ends of the transfer shaft **123** to the shafts **118** and **120**.

Referring again to Figure 4, it will be observed that the power shaft **120** mounts a pair of driving pulleys **140**. These pulleys are connected by a pair of belts **141** to a pair of driven pulleys **142**, which pulleys **142** are keyed to the front axle **42**. In this manner, rotation of the engine's drive shaft may effect concurrent rotation of the front axle **42**, and hence of the front wheels **24**. The rotational speed of the power shaft **120** may be controlled by manipulation of an upstanding control handle **146** extending from the speed-varying mechanism **106**.

In operation the device is moved to the location where a kerf is to be cut. Next, with the engine **32** running and coolant flowing through the coolant heads **87**, the crank rod **56** may be rotated so as to lower the cutter discs **28** and **30** to the proper depth and the lock bolts **73** tightened. Thereafter, the handle **146** of the speed-varying mechanism **106** may be manipulated so as to attain the desired rate of travel adjustment of the device across the pavement, as well as the desired tractive force transmitted to the front wheels **24**.

While there has been described and shown hereinbefore what is at present believed to be the preferred form of coolant head for a mobile pavement cutting device, it will be apparent that various modifications and changes may be made thereto without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. A coolant head for a cutting device having a rotatable cutter disc, comprising: a tube having its sides formed with a pair of aligned slots, the slotted portion of said tube being equal to approximately fifty percent of the diameter of said cutter disc; coolant-receiving means formed on the unslotted portion of said tube; and means for securing said tube to said cutting device with said slots receiving said cutter disc whereby said coolant will be urged radially outwardly over the sides of said cutter disc during rotation thereof.

2. A coolant head for a pavement cutting device having a vertically extending rotatable cutter disc, comprising: a tube having its sides formed with a pair of aligned coolant dispensing slots; coolant-receiving means formed on the unslotted portion of said tube; and means for securing said tube to said cutting device, said tube extending horizontally from a point spaced radially outwardly of said cutter disc with said slots receiving approximately fifty percent of the diameter of said cutter disc whereby upon rotation of said cutter disc said coolant will be urged through said slots radially outwardly over the sides of said cutter disc solely under the influence of the centrifugal force generated by said rotating cutter disc.

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