April 2, 1968 G. A. PETERSEN 3,375,764

REMOVABLE TOOTH PAVEMENT MIXER WHEEL CONSTRUCTION

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Fig. 1.

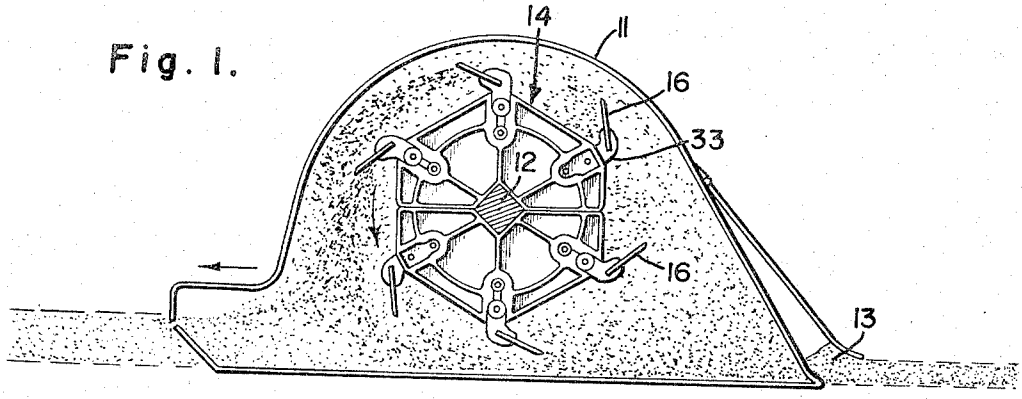
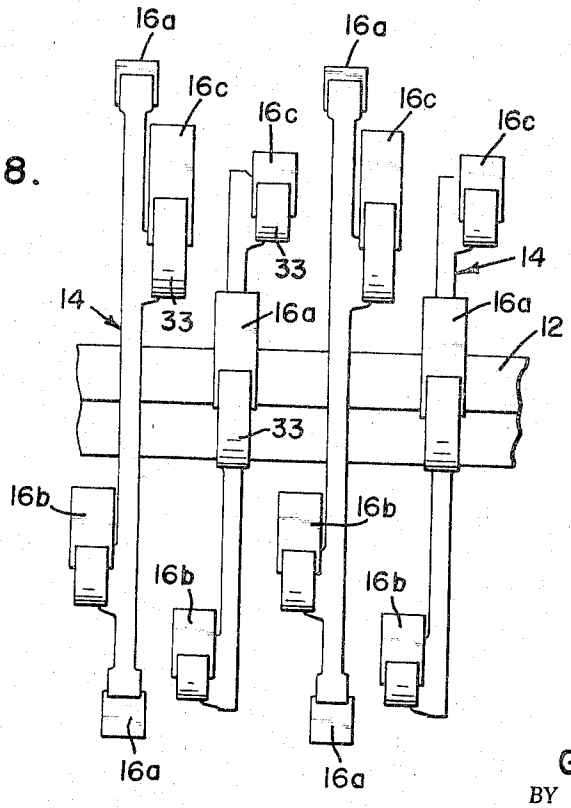



Fig. 8.




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Fig. 2.

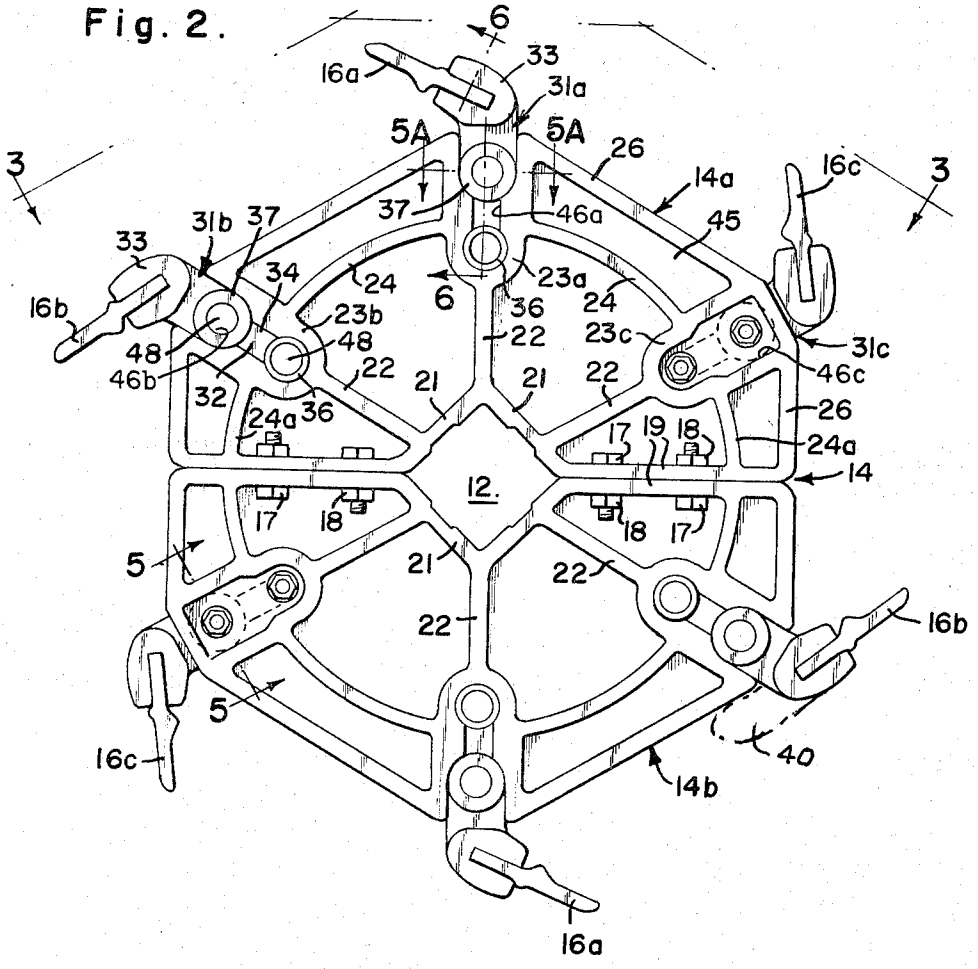
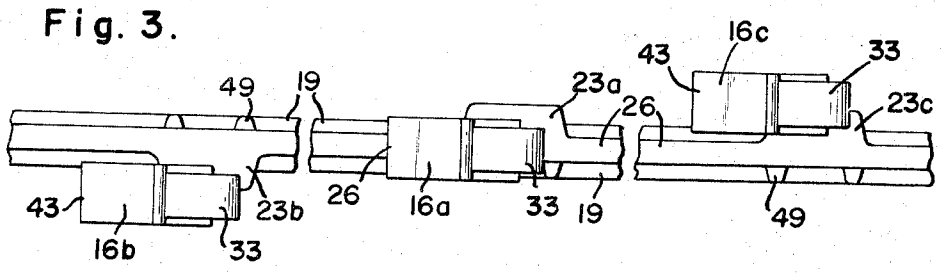



Fig. 3.




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Fig. 4.

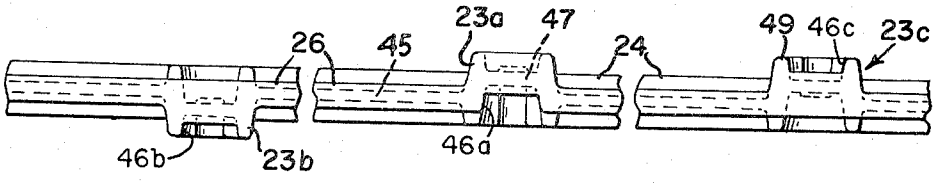



Fig. 6.

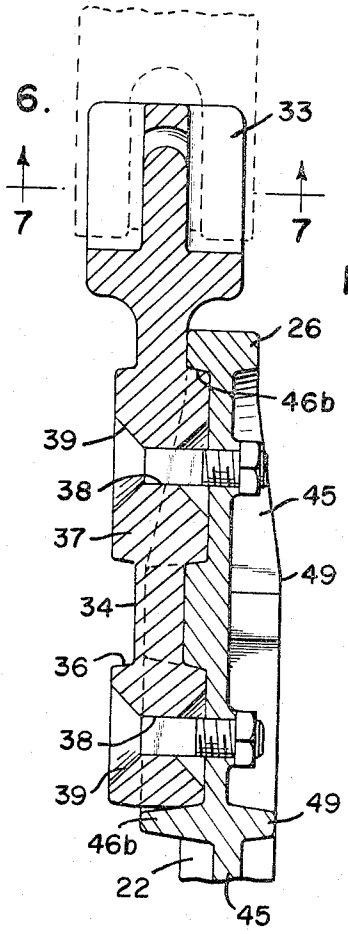



Fig. 7.

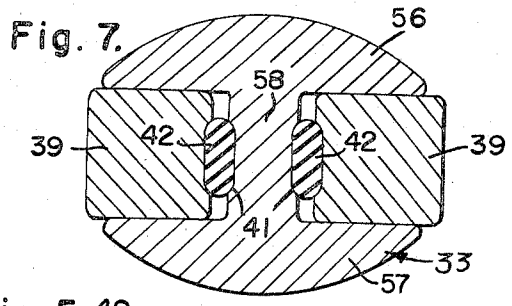



Fig. 5.

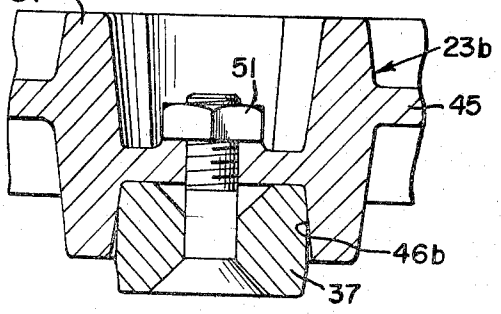
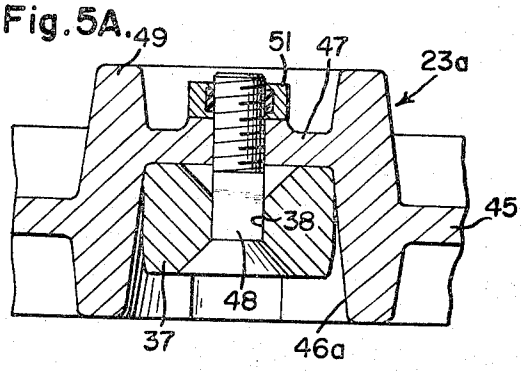



Fig. 5A.




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3,375,764

# REMOVABLE TOOTH PAVEMENT MIXER WHEEL CONSTRUCTION

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8 Claims. (Cl. 94—40)

## ABSTRACT OF THE DISCLOSURE

A rotary pavement mixed disk is provided with pockets to receive tooth holders to which replaceable teeth are connected. The tooth holders and teeth are identical. However, the pockets in the disk are formed of different depths and some are on opposite sides of the disk. Thus one tooth is centered relative to the disk and at least one tooth is positioned on either side thereof. However, all the teeth are parallel.

This invention relates to a new and improved removable tooth pavement mixer wheel construction. A commercially available machine used in mixing the bed for pavement employs a plurality of parallel wheels rotatable about a transverse horizontal axis. The axis of the wheel may be adjusted relative to the ground to dig the underlying ground to a desired depth, carry the excavated material around to a mixing chamber surrounding the upper parts of the wheels, pulverize and thoroughly mix the roadbed material with or without chemical additives and replace the mixed material in a position behind where it had been excavated. Thereafter, other equipment compacts the mixture preparatory to laying the pavement.

It has been customary to mount sockets on the periphery of each wheel to receive replaceable teeth which bear most of the abrasion of the digging action. Facility in installing and removing the replaceable teeth is one of the problems with which the present invention is concerned. A further problem in conventional machines arises out of the fact that the teeth are set in the wheel at angles with respect to each other so that each wheel cuts a relatively wide swath as the machine advances and the sockets for those teeth which are slanted outwardly with respect to the plane of rotation of the wheel tend to wear away very rapidly. Although replacement of the teeth is an accepted cost of maintenance of the machine, replacement or repair of the sockets for the teeth is especially time-consuming and expensive and results in considerable down-time for the machine. The present invention comprises an importat improvement in the aspects heretofore described.

One of the features of the invention is the provision of a wheel construction consisting of two cast halves, which are bolted together, of particularly rugged although relatively light weight construction, each half providing pockets for three replaceable tooth holders, each tooth holder in turn receiving one identical tooth. One of the tooth holders is disposed to hold the tooth which it carries centered relative to the plane of rotation of the wheel while one of the other pockets is shaped to carry the tooth holders positioned so that its tooth is on one side of the plane of rotation and the third pocket is disposed so that the tooth carried by its holder is on the opposite side of the wheel. Since the cutting edges of the teeth are relatively wide, the width of the three teeth cuts a swath of considerable width.

Another feature of the invention is the fact that the tooth holders and teeth used in all three pockets are essentially identical making for interchangeability of parts and yet a particular holder and tooth may be so located in the wheel as to be disposed either on the center or to either side thereof.

A particular feature of the invention is the fact that the tooth holder is positioned directly in line with the blade of the tooth performing the cutting action and thus the tooth absorbs the abrasive action of the ground being dug rather than the holder, and the wear of the holder is considerably reduced over conventional machines of this type.



A still further feature of the invention is the fact that the tooth holders are held securely in pockets in such manner that the holders are not easily fractured or worn nor do they tend to come out of alignment even with prolonged wear. On the other hand, the replaceable teeth are so located that a workman can conveniently change the teeth rapidly.

A still further feature of the invention is the fact that the pockets for the tooth holder have tapered walls and the tooth holders have tapered bosses which wedge into the pockets very securely and when bolted therein do not work loose despite rapid rotation of the wheels and high energy applied. On the other hand, when it is necessary to replace the holders, this can be accomplished with a minimum of time and effort required.

An optional feature of the invention is the incorporation of heavy weights on the tooth holders behind the teeth. The mass of such weights improves the action of the wheel and permits the teeth to break up pavement.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

FIG. 1 is a schematic side elevational view through a portion of the pavement machine with which the present invention is used showing the rotor in elevated position.

FIG. 2 is an enlarged side elevational view of a wheel in accordance with this invention.

FIG. 3 is a top plan view as viewed along the line 3—3 of FIG. 2, partly broken away.

FIG. 4 is a view similar to FIG. 3 prior to installation of tooth holders.

FIG. 5 is a fragmentary enlarged sectional view taken substantially along the line 5—5 of FIG. 2.

FIG. 5A is a view similar to FIG. 5, taken along line 5A—5A of FIG. 2.

FIG. 6 is a sectional view through a holder substantially along line 6—6 of FIG. 12.

FIG. 7 is an enlarged sectional view taken substantially along line 7—7 of FIG. 6.

FIG. 8 is a front elevation of the structure of FIG. 2.

The pavement machine shown schematically and partially in FIG. 1 has an arcuate downward facing casing 11 which rides over ground on which a pavement is to be laid in the direction of the arrow to the left in FIG. 1. There is a rotatable shaft 12 here shown as square in cross section disposed centrally of the casing which rotates counterclockwise as viewed in FIG. 1 as the machine advances. The elevation of shaft 12 relative to the ground is adjustable to control the depth of cut. In FIG. 1, shaft 12 is in elevated position. As the machine revolves and advances, soil is excavated, carried up around the casing 11 where it is pulverized and thoroughly mixed so that the various layers of material are made substantially homogenous and chemical additives may be incorporated in the mix and then deposited out through the rear end 13 in a uniform depth. Other machinery is used to compact the mixed dirt preparatory to the actual paving operation. Shaft 12 carries a plurality of rotor wheels 14 with which the present invention is concerned spaced across the width of the machine and carrying teeth 16 disposed in a pattern so that the swath of each wheel overlaps the adjacent wheels and the entire width of the roadway being processed is dug.

Rotor 14 is composed of two halves 14*a* and 14*b* meet-

ing along a plane through diagonals of shaft **12**, the two halves being bolted together by means of bolts and nuts **17**, **18** through abutting flanges **19**. When the bolts **16** are tightened, the two halves **14***a* and **14***b* comprise a rigid unitary wheel for the purpose intended. Each half, in addition to flanges **19**, has further reinforcements. Thus surrounding shaft **12** are angularly disposed inner reinforcements **21**. Radially projecting ribs **22** extend from members **21** to the three pocket forming reinforcements **23** for the three tooth holders used on each wheel half. Two of the radial reinforcements **22** are disposed 30° from flanges **19** and the central radial rib **22** is disposed 60° from the other two ribs **22**. Arcuate reinforcements **24**, **24***a* interconnect pocket forming reinforcements **23** and flanges **19**. Peripheral reinforcements **26** disposed in a hexagonal pattern comprise the rim of each wheel half. Accordingly, each wheel half is rigid, exceptionally rugged and yet light in weight, being reinforced against the stresses ordinarily encountered in the severe operating conditions in which pavement mixing machines operate.

Each pocket forming reinforcement **23** defines the shape of a pocket for a tooth holder **31** which is next described. The three pockets formed in each half wheel **14***a* are slightly different in configuration as will later be described, but the tooth holders **31** (and also the teeth **16** which are held therein) are essentially the same. Each tooth holder **31** has a radially disposed portion **32** and a peripheral portion **33** disposed at an angle of approximately 67° with respect to portion **32**. Inner portion **32** is formed of a straight relatively narrow connector **34** having at its inner end on either side a boss **36** which diminishes in diameter outwardly from either side of the connecting portion **34**. A second or outer boss **37** which also converges outwardly is formed on either side adjacent the periphery of each wheel half **14***a*. Holes **38** for plow bolts (having countersunk extremities **39**) are formed centrally with respect to bosses **36**, **37**.

Tooth holder **33** is attached to the other end of radial portion **32**. Socket forming portion **33** has outer and inner flanges **56**, **57** interconnected by web **58** so that it is H-shaped in cross section. Tooth **16** is formed with a pair of prongs **39** at its proximal end as is explained in Petersen Patent 2,968,880. As is also explained in said patent, a hole (not shown) may be formed in web **58** to receive a short piece of resilient material **42** such as natural or synthetic rubber which is compressed within grooves **41** in the walls of web **38** and the sides of the prongs **39** to restrain unintentional withdrawal of tooth **16** from the socket forming member **33**. In use, tooth **16** is driven back into socket forming member **33**, bending the rubber insert **42** backwardly into the grooves **41** and causing the compression thereof heretofore mentioned. When it is necessary to remove the tooth, it can be driven out of the socket forming member **33** by tools forming no part of the present invention. Thus the teeth **16** are held in place securely but can be rapidly changed when required.

Each tooth **16** has a transverse cutting edge **43**. As best shown in FIG. 8, it is desired that the center tooth **16***a* of each of the three teeth secured by particular half wheel **14***a*, be centrally disposed, that one tooth **16***b* be disposed to the left of tooth **16***a* and only partially overlapping the same and that the third tooth **16***c* be oppositely disposed from tooth **16***a* relative to tooth **16***b*. A feature of the present invention is that the tooth holders **31** for all three teeth are parallel to each other although staggered relative to a central plane through the half wheel **14***a*. This arrangement insures that each tooth holder and each tooth will be parallel to the plane of rotation of the wheel and excessive wear of the side edges, which is one of the chief problems of maintenance of prior machines of this general type, will be largely eliminated. The cutting edge **43** of each tooth cuts ahead of its holder with a swath as wide as the socket forming portion **33** and hence excessive abrasion of portion **3** is avoided.



An important means whereby the foregoing result is accomplished resides in the construction of the three pockets **23**. The central pocket **23***a* is shown in FIG. 5A. The central web **45** of the wheel half **14***a* is shown in said figure. The pocket forming reinforcement **23***a* has a tapered walled pocket **46***a* which is complementary to the taper of boss **37** (or boss **36**) so that the bosses wedge firmly in their pockets. A web **47** limits inward movement of the boss **37**. Plow bolt **48** fits through hole **38** and passes through a hole in web **47** and is held in position by nut **51**, which may be a stop nut. A circular rim **49** on the opposite side of web **47** from pocket **46** protects the end of the bolt **48** and nut **51** from excessive wear. The central pocket **46***a* shown in FIG. 5A is deeper than the corresponding pocket **46***b* shown in FIG. 5. Since the holders **31** are all identical, the depth of pocket **46***a* of FIG. 5A insures that the holder **31***a* will be centrally disposed relative to web **45**. However, the depth of pocket **46***b* shown in FIG. 5 is of lesser depth than in FIG. 5A and hence holder **31***b* is held displaced outwardly relative to web **45** to accomplish the staggering of the teeth heretofore mentioned. The pocket **46***c* for holder **31***c* is similar to that shown in FIG. 5 but disposed on the opposite side of web **45**. Since the tapers on both sides of holder **31** are the same, the holders are interchangeable for either the central pocket **46***a* or either side pocket **46***b*, **46***c*. Pockets **46***a* and **46***b* are on the same side of web **45** while pocket **46***c* is on the opposite side thereof.

As an optional feature, the mass of member **33** may be considerably increased over that herein illustrated. Such mass causes the teeth to function as a hammer mill and break up quite heavy formations, such as pavement. The location of mass near the periphery of the rotor functions further as a flywheel. This feature is shown schematically in the lower right-hand corner of FIG. 2, as indicated by dot-and-dash lines and reference numeral **40**.

Although the foregoing invention has been described in some detail, by way of illustration and example for purposes of clarity and understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

What is claimed is:

**1.** A rotor construction comprising a central portion apertured to receive a shaft, a plurality of pockets formed spaced around the periphery of said central portion, detachable tooth supports, each partially received in one said pocket and projecting outward of said periphery and formed with a tooth holder at its outer end shaped to receive the proximal end of a tooth, and means detachably securing said tooth supports in said pockets, at least some of said pockets being of different depths and facing opposite sides of said rotor, said supports being staggered relative to a central plane perpendicular to the axis of rotation of said rotor and disposed centrally relative to said axis, whereby at least one tooth holder is located on said central plane and at least one tooth holder is located adjacent but spaced in an axial direction from said plane.

**2.** A rotor construction according to claim **1**, in which said tooth holder is oblique to a radial line but is directed to hold a tooth perpendicular to the axis of rotation of said shaft.

**3.** A rotor according to claim **1**, in which another said holder is located spaced from said central plane in an axial direction opposite said last mentioned plane.

**4.** A rotor according to claim **1**, in which said pocket extends substantially radially in a pocket forming boss in said rotor, the first mentioned of said pockets extending from one side of said rotor to a depth beyond said central plane, the second mentioned of said pockets terminating remote from said central plane.

**5.** A rotor according to claim **1**, in which each said tooth support has a first knob at its inner end, a second knob intermediate its length and a connecting portion be-

tween said knobs, said pocket shaped complementary to said knobs and connecting portions and which further comprises fastening means through said knobs to secure said supports to said rotor.

**6**. A rotor according to claim **5**, in which the peripheries of said knobs are outward diverging to wedge in said pocket.

**7**. A rotor according to claim **6**, in which opposite peripheries of said knobs are oppositely outwardly diverging, whereby said tooth supports are interchangeable for opposite sides of said rotor.

**8**. A rotor according to claim **1**, in which mass is incorporated in said tooth holders behind said teeth to increase the digging impact of said teeth.



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