United States Patent

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[54] **ASPHALT MIXER TIP**
12 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **416/224,** 416/210, 416/237, 259/178
[51] **Int. Cl.** **B01f 7/04**
[50] **Field of Search** ..... 416/210, 213, 204, 223, 224, 237; 259/178 R, 109, 110, 9, 10

[56] **References Cited**

UNITED STATES PATENTS

79,008	6/1868	Rowe	416/200 X
161,687	4/1875	Kittoe et al.	416/198
264,875	9/1882	Hall	446/237 X
306,536	10/1884	Shafer	416/204 X
587,245	7/1897	Stellner	416/210 X
1,555,964	10/1925	Guedel	259/178 R
1,621,099	3/1927	Barrett	259/178 R

FOREIGN PATENTS

339,584	12/1930	Great Britain	416/224

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Attorneys—Jack M. Wiseman and Thomas E. Schatzel

ABSTRACT: The present invention relates to tips for a heavy-duty mixer, said tips including a left side surface, a right side surface, a leading edge, a trailing edge surface and a top edge surface interconnecting the leading and trailing edge surfaces, and a bottom edge surface interconnecting the leading and trailing edge surfaces. The tip is symmetrical about a center plane intermediate the side surfaces and carries receiving means for receiving fasteners to secure the tip to a shank which receiving means are designed to receive a fastener from either the left or the right side surface areas, thereby providing a tip interchangeable between left and right arms of the mixer.

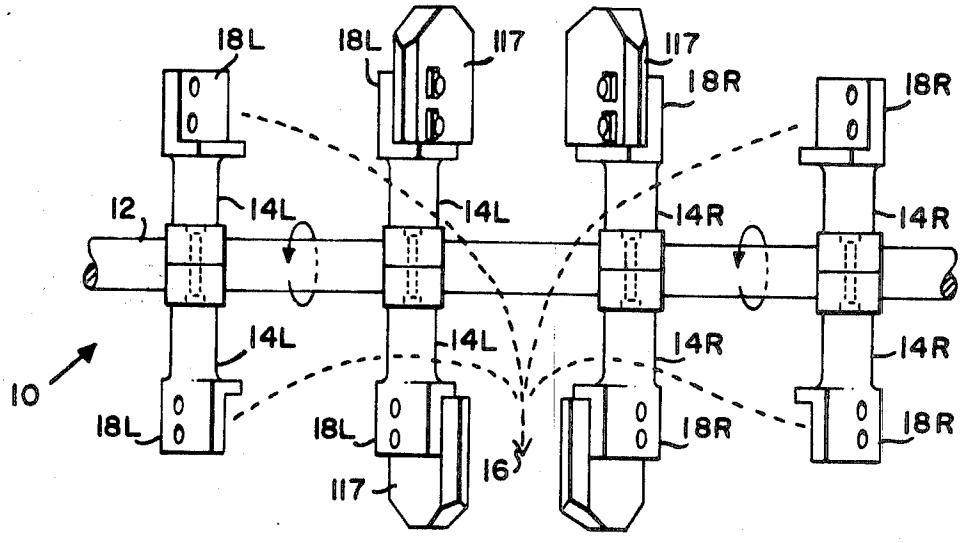
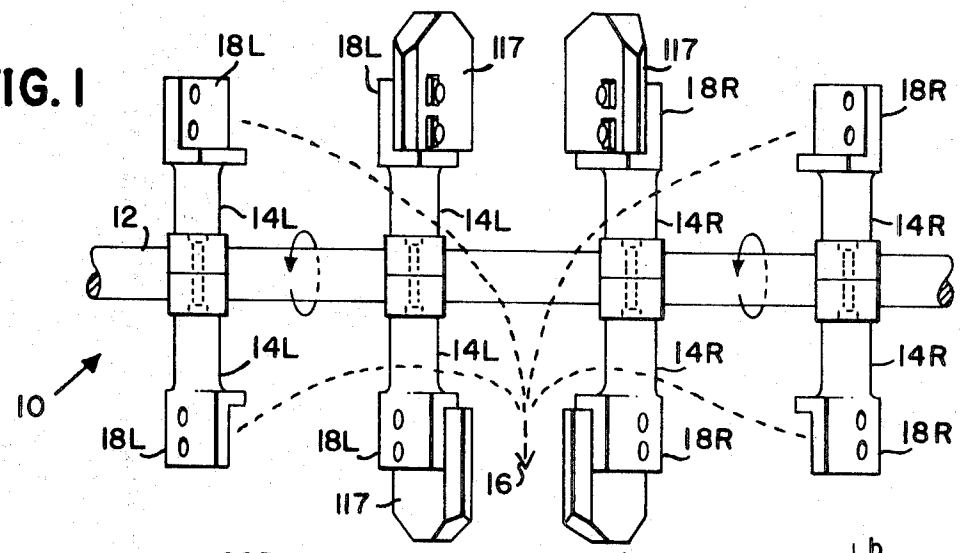
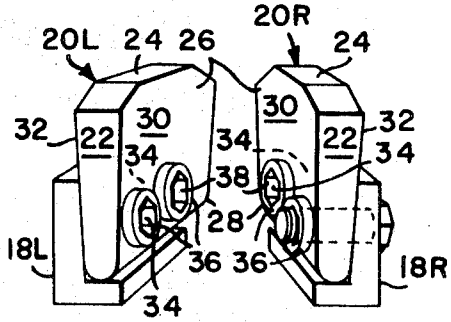


FIG. 1





PRIOR ART

FIG. 2A FIG. 2B

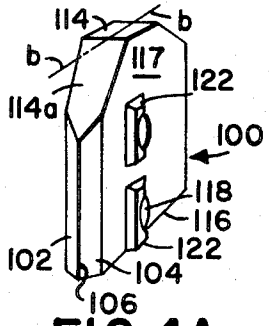


FIG. 4A

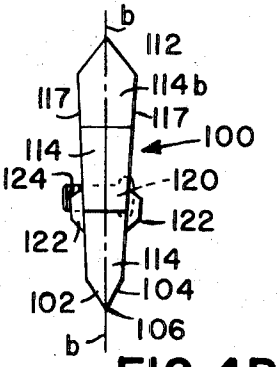


FIG. 4B

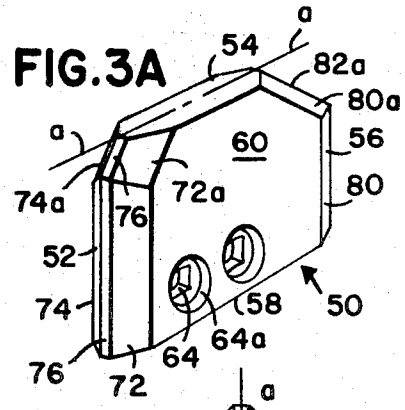


FIG. 3A

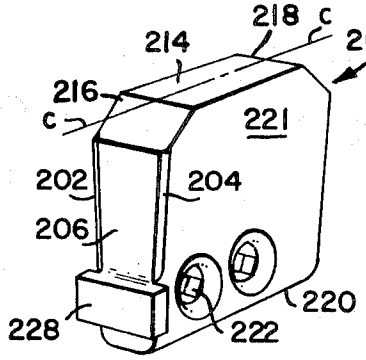


FIG. 5A

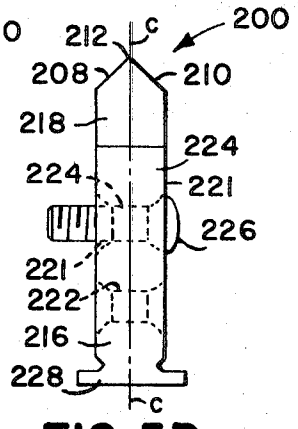


FIG. 5B

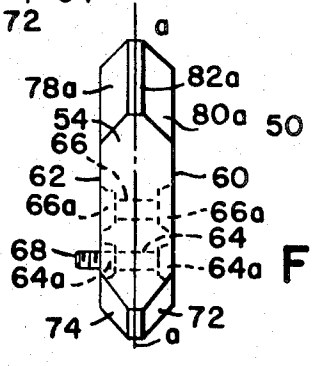


FIG. 3B

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ASPHALT MIXER TIP

BACKGROUND OF THE INVENTION

The present invention relates to tips which may be utilized on shanks of heavy-duty mixers, such as found in pavement asphalt mixer plants. In preparing pavement asphalt, it is necessary to mix an aggregate, such as rock, with a cementing ingredient, such as liquid asphalt. The mixer carries a rotatable shaft with a plurality of radial protruding shanks with each shank having a tip thereon. The tips are angled to direct the mixture toward a common discharge opening within the mixer. Accordingly, the shanks on one side of the opening carry what is referred to as left-hand tips, while the shanks on the other side of the opening carry what is commonly referred to as right-hand tips so that the ingredients are simultaneously mixed and urged toward the opening from both sides thereof. Due to the high frictional forces involved in mixing the aggregate and liquid asphalt ingredients, the tips are subjected to considerable friction and wear requiring frequent replacement.

Heretofore, tips have been specifically designed to accommodate the left-hand side of the mixer while other tips have been specifically designed to accommodate the right-hand side of the mixture. Tips specifically designed for the left side would not accommodate tips specifically designed for the right-hand side and visa versa. This necessitates having considerable inventory of replacement tips; manufacturing costs of replacement tips are increased since district manufacturing procedures and/or tools are needed for the two different standards of tips; and also each tip needs to be marked designating whether it is to be used for the left- or the right-hand side.

SUMMARY OF THE PRESENT INVENTION

The present invention provides an improved tip for heavy-duty mixers which will accommodate either the left- or the right-hand side of a mixer. Consequently, there is provided a tip which decreases the cost of manufacturing, decreases the size of inventories and avoids the necessity of marking designating left- or right-hand tips. In the exemplary embodiment of the present invention, there is provided a tip comprised of a solid body and interchangeable for left- or right-hand use. The body carries receiving means for receiving fasteners which may be utilized in combination with a fastener to secure the tip to a shank on a mixer. The body is symmetrical about a center plane and includes a leading edge surface, a trailing edge surface, a top edge surface and a bottom edge surface. The leading edge surface of the body may be tapered symmetrically about a crown and the top edge designed to form a flat butt surface. The receiving means is designed so that the fasteners may be inserted from either the left- or right-hand side surface of the body while using shanks which may also accommodate prior art tips. The tip further carries protector means to protect the head of fasteners from highly abrasive contact with the mixture ingredients as the leading edge is forced through the mixture.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a section of a mixer shaft with associated shanks and pugmill tips of an asphalt mixing plant;

FIGS. 2A and 2B illustrate respectively, a left-hand and right-hand prior art tip structure;

FIGS. 3A and 3B illustrate respectively, a perspective and top plan view of, a tip structure of the present invention;

FIGS. 4A and 4B illustrate respectively, a perspective and top plan view of a modification of the tip structure of the present invention; and

FIGS. 5A and 5B illustrate respectively, a perspective and top plan view of a further modification of the tips of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 depicts a rotor, referred to by the general reference character 10, which may be utilized in an asphalt mixer for mixing ingredients of aggregate and liquid asphalt or other cementing material as commonly found in asphalt mixer plant. The rotor 10 includes a central drive shaft 12 with a plurality of individual shanks each referred to by the general reference character 14 protruding radially therefrom. For explanation purposes, it may be viewed that the lines 15 represent the path of the mixture to an exit 16 at which point the mixture is to be discharged after the mixing operation is complete. Accordingly, the shanks to the left of the exit 16 are referred to by the designation 14L while the shanks to the right are referred to by the designation 14R. In operation, it is desirable that the rotor 10 simultaneously mix the liquid asphalt and aggregate while urging the mixture toward the exit 16. Accordingly, the shanks 14L and 14R each carry a tip mount with the tip mounts associated with the shanks 14L to designated 18L and the tip mounts associated with the shanks 14R designated 18R. The shanks 18L and 18R are positioned at varying angles relative to one another.

When assembled for operation, the tip mounts 18L and 18R each engage a pugmill tip which is adapted to come into contact and engagement with the aggregate and liquid asphalt for performing the mixing operation. FIGS. 2A and 2B illustrate prior art pugmill tips referred to by the general reference character 20L and 20R, respectively. The tips 20L are designed so as to engage the mounts 18L, while the tips 20R are designed to engage the mounts 18R. The tips 20L and 20R each consist of a solid block-type segment having a leading edge surface 22, a top edge surface 24, a trailing edge surface 26 and a bottom edge surface 28. The structure carries a side surface 30 and a side surface 32. Within the structure there are a pair of fastener-receiving means in the shape of a pair of apertures 34 protruding through the tip entering on the front surface 30 and exiting on the back side surface 32. About the apertures 34 at the front surface 30 there are protruding bolt protector segments 36 which extend beyond the plane of the front side surface 30. The illustrated bolt protector segments 36 carry a hexagon-shaped aperture countersink segment which joins a circular-shaped aperture so as to be available to receive a plow bolt 38 with the head segment 38*a* of the bolt countersunk such that the top surface of the head of the bolt is flush with the outer plane established by the protecting segment 36. In this manner, during operation, the bolt 38 is protected from contact with the mixture other than that sliding over the top surface area of the head 38*a*. Thus, the shearing force established by the asphalt-aggregate mixture as the tip is forced through the mixture is absorbed by parts of the tip other than the bottom 38. It may be noted that the apertures 34 are offset to be positioned nearer to the leading edge 22 than to the trailing edge 26. It may be further noted in the structure that the tip 20 is tapered such that the top edge is wider than the bottom edge. Thus, the structures 20L and 20R are of similar structure, except that they are of reversed orientation. Accordingly, in order to accommodate the left- and right-hand sides of the rotor 10, separate specific tips 20L and 20R must be provided.

FIGS. 3A and 3B illustrate a tip incorporating the principles of the present invention and referred to by the general reference character 50. The tip 50 may be utilized optionally for either a left- or right-hand tip structure. For example, the tip 50 may be mounted on one of the shanks 14L or on one of the shanks 14R of FIG. 1. The tip 50 carries a leading edge surface 52, a top edge surface 54, a trailing edge surface 56 and a bottom edge surface 58. The tip further has a side surface 60 and a side surface 62 either of which may serve as a front side surface or a back side depending on the orientation when mounted on the mount 18. It may further be noted that the structure 50 carries a pair of apertures 64 and 66 each adapted for receiving a fastener 68. Apertures 64 and 66 carry countersink portions 64*a* and 66*a*, respectfully, opening to

each of the side surfaces **60** and **62**. As illustrated by the bolt **68**, this allows the bolt head to be protected whether it be inserted from either the side surface **60** or the side surface **62**. The leading edge **52** of the structure **50** is tapered from each of the side surfaces to form a pair of leading edge surfaces **72** and **74** with an intermediate crown surface **76**. The top surface **54** is a flat even surface. A significant portion of the surfaces **72, 74,** and **76** are substantially normal to the top surface **54** with portions **72***a*, **74***a*, and **76***a* of the surfaces **72, 74, 76** respectively, tapered to establish an acute angular relationship to the top surface **54** and to interengage the surfaces **72, 74** and **76** to the top surface **54**. The trailing edge **56** carries a pair of tapered surfaces **78** and **80** tapered to a crown **82** with a significant portion substantially normal to the top surface plane **54** with portions **78***a*, **80***a* and **82***a*, respectively tapered to establish an acute angular relationship with the top surface and joining the top surface **54** with the surfaces **78** and **80** of the trailing edge. The bottom edge **58** of the tip **50** is flat so as to permit resting on the mounts **18**L and **18**R. Accordingly, the tip structure **50** is substantially symmetrical in its design about a center plane *a—a* intermediate and lateral relative to the side surfaces **60** and **62** so that the tip may be initially mounted on either a left- or a right-hand shank. If the tip is to be used on a shank on the left mount, the tip **50** is mounted on the mount **18**L a bolt centered from the side surface **60**. If the tip **50** is to be used on a right mount, the same tip may be mounted on the mount **18**R by a bolt centered from the side surface **62**.

FIGS. **4**A and **4**B illustrate a modification of the present invention and referred to by the general reference character **100**. The tip **100** includes a leading edge surface **102** having a pair of tapered surfaces **103** and **104** meeting at a crown **106**; a trailing edge surface **107** having a pair of tapered surfaces **108** and **110** meeting at a crown **112**; a flat top surface edge **114**; a flat bottom surface **116** and a pair of side surfaces **118** and **119**. A first intermediate flat surface edge **114***a* is established intermediate the leading edge surface **102** and the top surface **114** and forming an acute angular relationship with the top surface **114**. A second intermediate flat surface **114***b* is established intermediate the trailing edge **107** and top surface **114** and forming an acute angular relationship with the top surface **114**. The tip **100** includes a pair of apertures **120** and **121** for receiving fastening pins aligned vertically relative to the bottom surface **116**. About the apertures **120** and **121**, the side surfaces **118** and **119** each carry a protrusion **122** nearest to the leading edge **102** side of the aperture. The protrusions **122** are designed to protect the head of a bolt securing the tip to a mount. Accordingly, a fastening means, such as stove bolt **124**, may be inserted within the apertures **120** and **121** and from either side surface **118** or **119** and the protrusions **122** will protect the head of the bolt from the force of the mixture materials as the leading edge **102** of the tips **100** are forced through the mixture ingredients. It may be noted that the tips **100** is symmetrical about a center plane *b—b* intermediate the lateral to the side surfaces **118** and **119** so that it may be optionally mounted on a left mount **18**L or a right mount **18**R. The body of the tip **100** is also tapered along a horizontal plane relative to the bottom surface **11***b* so as to provide greater thickness at the trailing edge over the thickness at the trailing edge over the thickness at the leading edge. Such tapering in the body facilitates rotation and forcing of the tip through the mixture ingredients during operation.

FIGS. **5**A and **5**B illustrate a further modification of the tips of the present invention and referred to by the general reference character **200**. The tip **200** includes a leading edge **201** with a pair of minor tapered surfaces **202** and **204** meeting at a crown surface **20***b;* a trailing edge surface **207** with a pair of tapered surfaces **208** and **210** meeting at a crown **212**; a flat top surface **214** joined with a first intermediate flat surface **216** extending between the top surface **214** and leading edge surface **201** and forming an acute angular relationship with the top surface **214** and second intermediate flat surface **218** extending between the top surface **214** and trailing edge surface **207** and forming an acute angular relationship with the top surface **214** a flat bottom surface **220**; and a pair of side surfaces **221** and **222**. The tip **200** carries a pair of apertures **223** and **224** for receiving bolts aligned horizontally relative to the bottom surface **220**. To protect the heads of bolts, such as a stove bolt **226**, a protruding bumper **228** is secured to and establishes part of the leading edge **201** and is positioned in alignment with the apertures **223** and **224**. The bumper **228**, in effect, forms part of the leading edge and protrudes beyond the side surfaces **221** and **222** to create a barrier and provide interference between the mixture ingredients and the heads of the bolts **226** as the tips **200** are rotated and the leading edges the tips forced through the mixture. It may be noted that the structure **200** is symmetrical about a center plane *c—c* intermediate the lateral relative to the side surfaces **221** and **222**. Thus, the tip **200** may optionally be mounted on a left or right mount. The tip **200** is also tapered in thickness along a vertical plane relative to the bottom surface **220** to provide a greater thickness at the top edge than at the bottom edge to facilitate long wear.

I claim:

1. A tip for attachment to an arm of a heavy-duty mixer comprising:

a body having a top edge surface, a leading edge surface, a trailing edge surface, a bottom edge surface and a plurality of side surfaces, a plurality of apertures protruding through the body and opening onto the side surfaces, and protective means integral with the body and adjacent to the opening on each side surface to create a protective barrier in front of the openings relative to the leading edge, said leading edge surface being tapered to form a plurality of tapered surfaces extended to form a crown, said crown being disposed in alignment with the center plane, said plane being intermediate said side surfaces and passing through the center of said body, said body being symmetrical with respect to said center plane.

2. The tip of claim **1** in which the protective means includes a countersink at each opening, such that the head of a fastener may be countersunk relative to the side surfaces.

3. The tip of claim **1** which the protective means includes a protrusion integral with the side surfaces and adjacent each opening, the protrusion positioned intermediate the associated aperture and the leading edge surface.

4. The tip claim **3** in which the protrusion means includes a bumber integral with the leading edge surface and extending laterally beyond the side surfaces and in alignment with said apertures.

5. The tip of claim **1** in which the width of the body is tapered with the thickness of the body adjacent the trailing edge exceeding the thickness adjacent the leading edge.

6. The tip of claim **1** in which the trailing edge is tapered to form a plurality of tapered surfaces extended to form a crown, the crown of the trailing edge being disposed in alignment with said center plane.

7. The tip of claim **6** further including first edge surface portions intermediate and interengaging the leading edge and the top edge surface, said first portions establishing an acute angular relationship with the top surface.

8. The tip of claim **7** further including second edge surface portions intermediate and interengaging the trailing edge and the top edge surface, said second portions establishing an acute angular relationship with the top surface.

9. A tip for attachment to an arm of a heavy-duty mixer comprising:

a body having a top edge surface, a leading edge surface, a trailing edge surface, a bottom edge surface and a plurality of side surfaces, and a plurality of apertures protruding through said body and opening onto said side surfaces, said leading edge being tapered to form a plurality of tapered surfaces extended to form a crown, said crown being disposed in alignment with a center plane, which is intermediate said side surfaces and which passes through the center of said body, said body being symmetrical with respect to said center plane.

10. A tip as claimed in claim 9 in which said trailing edge is tapered to form a plurality of tapered surfaces, which are extended to form a crown, the crown of said trailing edge being disposed in alignment with said center plane.

11. A top as claimed in claim 10 and comprising first edge surface portions intermediate and interengaging said leading edge surface and said top edge surface, said first portions forming an acute angular relationship with the top surface.

12. A tip as claimed in claim 11 and comprising second edge surface portions intermediate and interengaging said trailing edge surface and said top edge surface, said second portions forming an acute angular relationship with the top surface.