May 24, 1966 E. W. DILS, JR 3,252,391

COMPACTOR TOOTH

Filed Aug. 28, 1962 2 Sheets-Sheet 1

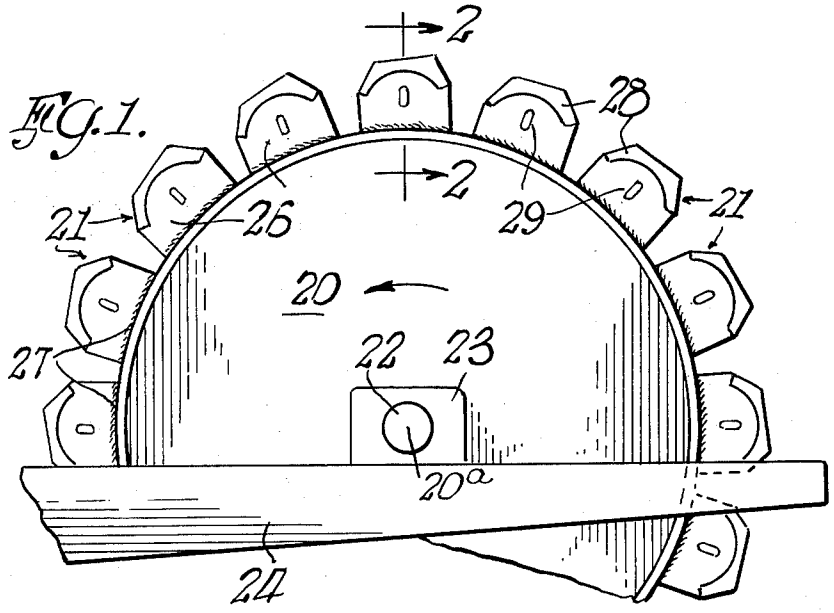


FIG. 1.

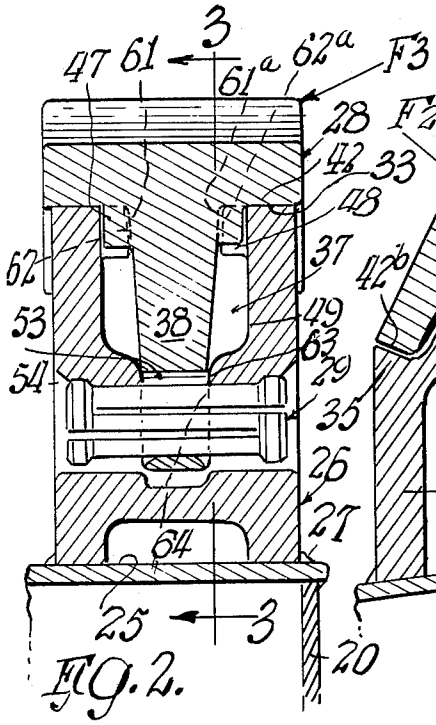


FIG. 2.

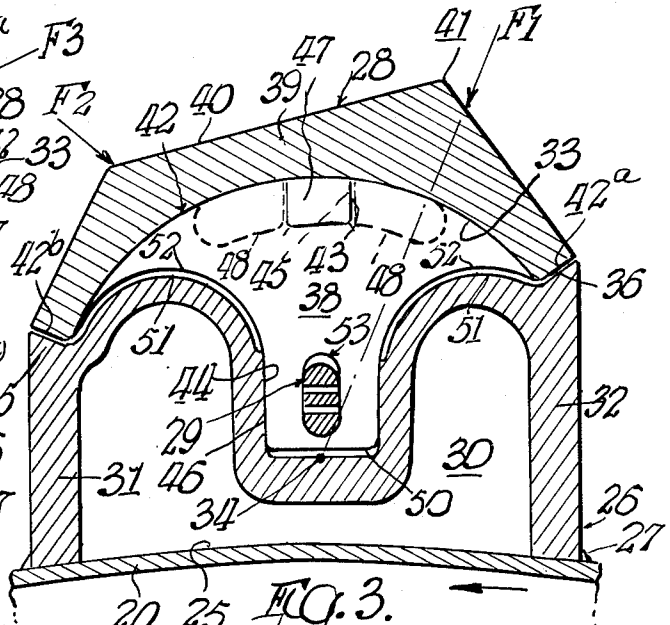


FIG. 3.

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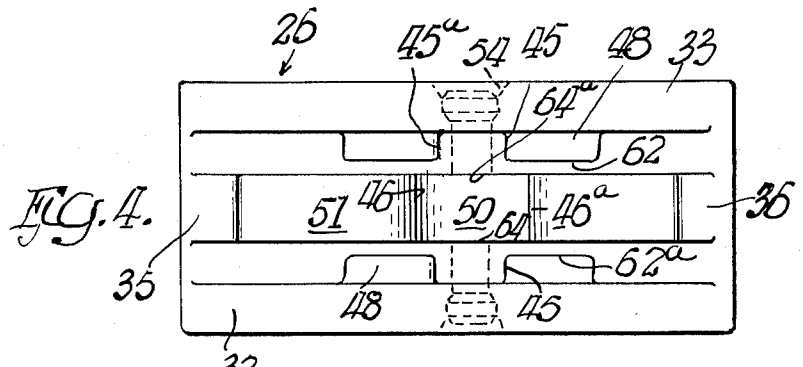


FIG. 4.

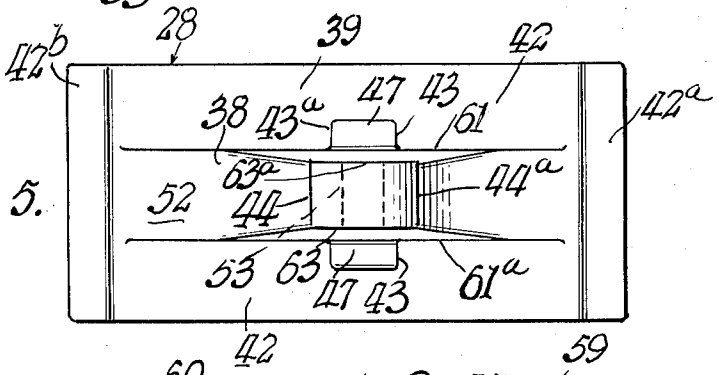


FIG. 5.

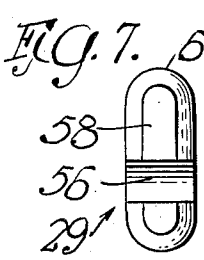


FIG. 7.

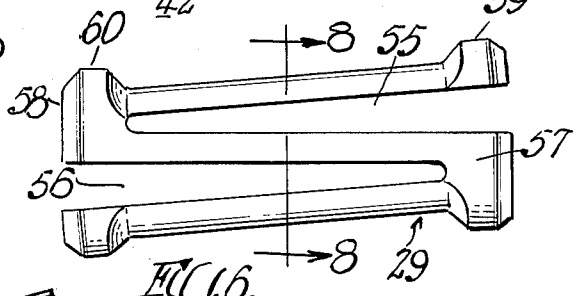


FIG. 6.

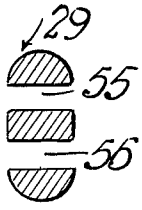


FIG. 8.

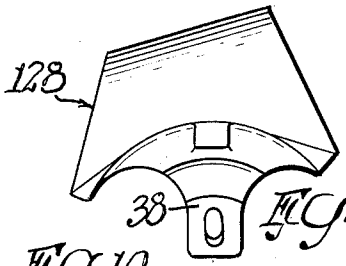


FIG. 9.

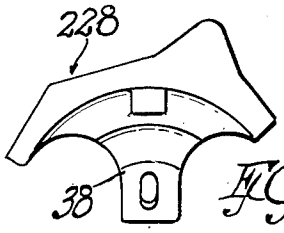
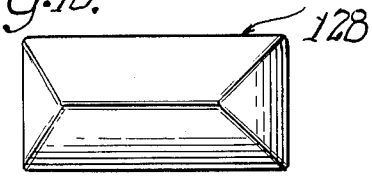


FIG. 11.

FIG. 10.



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COMPACTOR TOOTH

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Filed Aug. 28, 1962, Ser. No. 219,946
3 Claims. (Cl. 94—48)

This invention relates to a compactor tooth, and, more particularly, to replaceable tooth wherein a new cap is readily applicable to the permanently-installed base.

An environment to which the instant invention has particular application is that of a compactor, i.e., a large roll or drum employed for compacting earth. These drums may be several feet in diameter and are equipped with projections arranged about the cylindrical surface. Heretofore, the projections were permanently fixed to the surface of the drum or, if replaceable caps were employed, the same were removed with difficulty. Also, the rate of wear on the projection caps was exceedingly high. A general object of this invention is to provide a novel type of tooth or projection for a compactor which avoids the above-mentioned difficulties. In particular, the wear portion of the tooth is readily replaceable and is constructed so as to take the applied stress against selected surfaces so as to maximize the working life.

Another object of the invention is to provide a novel tooth construction, especially suited for compactors, and the like, wherein parts are readily interchangeable so as to extend the effective working life of the tooth, minimize down-time of the overall equipment, and to facilitate interchange of caps for different working conditions.

Other objects and advantages of the invention may be seen in the details of construction and operation set down in this specification.

The invention will be explained in conjunction with the accompanying drawing, in which—

FIG. 1 is a fragmentary elevational view showing a compactor equipped with the inventive teeth;

FIG. 2 is an enlarged fragmentary sectional view, such as would be seen along the sight line 2—2 applied to FIG. 1;

FIG. 3 is another fragmentary sectional view, this corresponding to that seen along the sight line 3—3 applied to FIG. 2;

FIG. 4 is a top plan view of the base portion of the tooth;

FIG. 5 is a bottom view of the cap portion of the tooth;

FIG. 6 is an enlarged elevational view of a novel locking key employed in connection with the tooth for fastening the cap onto the base;

FIG. 7 is an end elevational view of the key of FIG. 6;

FIG. 8 is a sectional view taken along the sight line 8—8 applied to FIG. 6;

FIG. 9 is a side elevational view of a different form of cap employing a roof top design for rock breaking;

FIG. 10 is a top plan view of the construction of FIG. 9; and

FIG. 11 is a side elevational view of a modified form of cap employing a bubble design for rock breaking.

In the illustration given and with particular reference to FIG. 1, the numeral **20** designates a compactor drum on which a plurality of teeth **21** are installed, the drum **20** being equipped with an axial shaft **22** suitably journaled in a bearing **23** provided as part of a compactor frame **24**. The construction thus described is well known to the art and is set down here principally for environmental purposes, the invention being concerned with the tooth portion of the compactor and more particularly the replaceable cap part of the tooth. Such teeth are advantageously employable on wheel tractors as well as on towed components, as shown.

In FIG. 2, the compactor drum **20** is seen in fragmentary form, and attached to the outer surface **25** of the drum **20** is a tooth base generally designated **26**. The attachment may conveniently be achieved through welding as at **27** (FIGS. 2 and 3). The base **26** is equipped with a cap or wear portion generally designated **28**, with the base **26** and cap **28** being releasably fastened together by means of a key generally designated **29**.

The base **26**, as seen in FIG. 3 in particular, includes a block-like body partially hollowed out as at **30**. The base **26** is defined in part by a front wall **31** and a rear wall **32**, the direction of rotation of the drum **20** being indicated by an arrow in FIG. 3. The upper surface **33** of the base **26** is cylindrical, the surface of revolution being generated by an axis extending through the point **34**. The upper cylindrical surface **33** terminates at the upper ends of the front and rear walls **31** as at **35** and **36**. As can be seen in FIG. 2, the upper cylindrical surface **33** is interrupted by a longitudinally-extending slot **37** providing a receiving opening for the shank **38** of the cap **28**.

The cap **28** includes a wear portion **39** having an angular upper surface as at **40** to define a peak as at **41**. The undersurface **42** is cylindrical and conforms to the upper cylindrical surface **33** to provide a flush or butt fit all around the radius of curvature defining the surfaces **33** and **42**. The lower cylindrical surface **42** is flanked by end surfaces **42*a*** and **42*b*** which confront the areas **35** and **36** provided on the base **26**. However, the confronting surfaces are normally spaced apart, i.e., the surfaces **42*a*** and **36** may have a clearance of the order of 1/16", which thereby permits the cap **28** to rotate on the base **26** as different stresses are applied, the surfaces **42** and **33** being in bearing contact. The surfaces **33** and **42** can be employed to resist the total stress whenever that stress is in pure thrust, as would be the case of any applied force directed through the point **34**, and such is designated by the symbol F_1 in FIG. 3.

Normally, however, the applied force will be a mixture of thrust and beam components so that in addition to the thrust component extending through the point **34**, there will be an orthogonally related component to be resisted by surfaces described immediately below.

For the purpose of transmitting the beam component of any applied force such as that designated F_2, I provide surfaces **43** and **44** on the shank **38**. These surfaces confront and coact with surfaces **45** and **46**, respectively, on the base **26**. The surface **43** extends generally parallel to the axis of generation **34** of the surfaces **33** and **42**. For this purpose, the shank **38** (see FIG. 5) is equipped with side nubbins or lugs **47** which depend from the lower cylindrical surface **42**. The nubbins are positioned between lugs or ears **48** provided on the interior vertical walls **49** of the base **26**. In actual practice, the fit between the surfaces **43** and **45** is a close fit, of the order of 1/64" per side, or 1/32" total clearance.

I have found, however, that this fit may be as great as 1/8" and still work satisfactorily, provided, however, that the fit between the surfaces **43** and **45** is less than the clearance between the confronting surfaces **36** and **42*a***, or **35** and **42*b***.

It will thus be seen that a portion of an applied force as at F_2 is taken by the surfaces **43** and **45**, this being the beam component. The coacting surfaces, i.e., those cooperating with **43** and **45** in resisting the beam component of the force F_2, are those designated **44** and **46** in FIG. 3. Again, a fit of the order of 1/64" per side, or 1/32" total clearance, is provided where the lower portion of the

shank **38** fits within the mating recess **50** provided by the base **26**.

The base **26**, in the longitudinal slot portion **37**, is longitudinally contoured as at **51** (see FIG. 3) to preclude any bearing contact between the surface **51** and the undersurface **52** of the shank **38**. Thus, the cap **28**, in side elevation, is essentially T-shaped and fits within a T-shaped opening in the base **26**. The shank **38** of the cap **28** is transversely apertured as at **53** to receive the locking key **29**, the base **26** being apertured as at **54** (see FIG. 2) in line with the opening **53** to permit insertion and removal of the key **29**. The key **29** can be seen in FIG. 8 and is generally S-shaped in longitudinal elevational view. The S shape is developed by providing slots **55** and **56** which each extend in from the respective ends **57** and **58** of the key **29**, partway along the length thereof. The slots **55** and **56** diverge as the ends **57** and **58**, respectively, are approached. The key **29** is constructed of resilient metal and thus can be compressed transversely to the condition seen in FIG. 2 to develop a resilient locking action. The ends **57** and **58** are enlarged through the use of flanges **59** and **60**, respectively, which serve to anchor the key **29** against movement out of the way developed by the aligned openings **53** and **54**.

Where there is a reversal of the direction of the beam component of the force F_2, it will be appreciated that other pairs of surfaces will be brought into operation. As seen in FIGS. 4 and 5, the upper beam bearing surfaces, under this reverse condition, are those designated **45***a* and **43***a* on the base **26** and cap **28**, respectively. The lower beam bearing surfaces under this reversed condition are those designated **46***a* and **44***a* for the base and cap, respectively. As indicated above, the spacing of the surfaces **44** and **44***a* is slightly less than the spacing of the surfaces **46** and **46***a*, the net difference in the spacing being in the order of $\frac{1}{32}$". However, as in the case of the upper beam bearing surfaces, this spacing can be increased up to about $\frac{1}{8}$" so long as the cap has sufficient freedom to move arcuately, i.e., pivot, about the point **34** when the direction of the beam component of an applied stress is changed.

In certain cases, the applied force will have a lateral beam component, as would be the case of the force designated F_3 in FIG. 2.

The beam component of the force F_3 is effectively resisted by upper and lower pairs of beam bearing surfaces, these lying generally perpendicular to the axis of generation **34**. The upper surfaces are designated **61** on the shank **38** and **62** on the nubbins **48** (see also FIGS. 4 and 5). The lower beam bearing surfaces under this sideways loading are designated **63** and **64** relative to the shank **38** and base **26**, respectively.

In the instance of a reversal of the beam component from that provided by the force F_3, the opposite upper beam bearing surfaces **61***a* and **62***a* come into play, and the lower surfaces **64***a* and **63***a* come into bearing contact. As before, a close fit, approximately $\frac{1}{64}$" per side or $\frac{1}{32}$" total clearance, is provided to accommodate the shift of the cap **28** on the base **26**.

From the foregoing, it will be seen that the shank **38**, adjacent its lower end, i.e., the end adjacent the axis of generation **34** of the surfaces **33** and **42** or the axis **20***a* of the drum **20**, is of generally rectangular cross section, being defined by the beam bearing surfaces **44**, **44***a*, **63** and **63***a*.

The upper portion of the shank can also be considered to have a rectangular cross-sectional configuration, providing beam bearing surfaces **61**, **61***a*, **43** and **43***a*.

In the operation of the device, the base **26** is permanently installed on the drum **20** as by welding at **27**. As a cap becomes worn, the key **29** is removed and a new or different cap is installed. In some instances, it may be advantageous to use a different shaped cap such as those designated **128** or **228**, respectively, in FIGS. 9 and 11. In any event, the base **26** will be somewhat worn, but I

have found that the wearing of the base **26** is uniform and this is particularly true along the cylindrical surface **33**. Thus, whichever type cap is installed, there will be a butt or full bearing fit between the arcuate surfaces **33** and **42**, which permits the cap **28** to pivot relative to the base **26** upon a change in the direction of the beam component of an applied force.

Field trials thus far have shown that the inventive design produces little wear of the bearing surfaces after more than 800 hours of heavy duty operation. I find that the bearing surfaces of the bases fit as well after this extensive operation as they did at the beginning. The stresses on the lugs **48** are low because of the short lever arm from the lugs **48** to any force on the cap **28**—inducing a resisting force couple in the lugs **48** and shank **38**.

While in the foregoing specification I have set down a detailed description of an embodiment of the invention, many variations in the details herein given may be made by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. A replaceable cap for a block-shaped compactor tooth base wherein said base has its inner surface secured on a cylindrical drum and wherein said base is equipped with a generally cylindrical outer surface having parallel axes, with the drum having a substantially greater curvature than said surface, said surface being centrally interrupted by a slot extending circumferentially perpendicular to the drum axis, said slot being centrally, laterally enlarged to provide opposed generally rectangular recesses and said base being equipped with laterally aligned openings below said recesses for the receipt of a locking key, said cap comprising a T-shaped element having an outer wear portion having an inner cylindrical bearing surface adapted to enter into surface bearing contact with said base outer surface, said cap further including an integral shank portion extending into said slot, said shank portion being apertured to receive said locking key when the shank aperture is aligned with said openings, said shank portion adjacent its inner end having a generally rectangular cross-section adapted to limitedly shiftably fit within a similarly contoured portion of said slot, said cap also including integral generally rectangular lugs on opposite lateral sides of said shank portion and interrupting said inner cylindrical bearing surface, said lugs being sized and adapted to limitedly shiftably fit within said recesses so as to engage confronting surfaces thereof whereby the component of said force other than the component passing through the last-mentioned axis is transmitted by radially spaced bearing surfaces on said shank portion and lugs to said base.

2. In combination, a block-shaped compactor tooth base having its inner surface secured on a cylindrical drum, said base being equipped with a generally cylindrical outer surface, the drum and cylindrical outer surface having parallel axes with the drum having a substantially greater curvature than said surface, said surface being centrally interrupted by a slot extending circumferentially perpendicular to the drum axis, said slot being centrally, laterally enlarged to provide opposed generally rectangular recesses and said base being equipped with laterally aligned openings below said recesses for the receipt of a locking key, a replaceable cap comprising a T-shaped element having an outer wear portion having an inner cylindrical bearing surface in surface bearing contact with said base outer surface, said cap further including an integral shank portion extending into said slot, said shank portion being apertured to receive said locking key with the shank aperture being aligned with said openings, a locking key extending through said aperture and openings, said shank portion adjacent its inner end having a generally rectangular cross-section adapted to limitedly shiftably fit within a similarly contoured portion of said slot, said cap also including integral generally rectangular

lugs on opposite lateral sides of said shank portion and interrupting said inner cylindrical bearing surface, said lugs being sized and adapted to limitedly shiftably fit within said recesses so as to engage confronting surfaces thereof whereby the component of said force other than the component passing through the last-mentioned axis is transmitted by radially spaced bearing surfaces on said shank portion and lugs to said base.

3. The combination of claim 2 in which said locking key comprises an elongated unitary body constructed of resilient metal having a generally S shape in longitudinal elevation, said shape being defined by a longitudinally-extending slot extending from each end of said body part-way along the length thereof, each slot diversing as its associated end is approached, and a transverse flange at each key end.

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