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(54) **CURB SHOE ASSEMBLY FOR SHOULDER GRADING**

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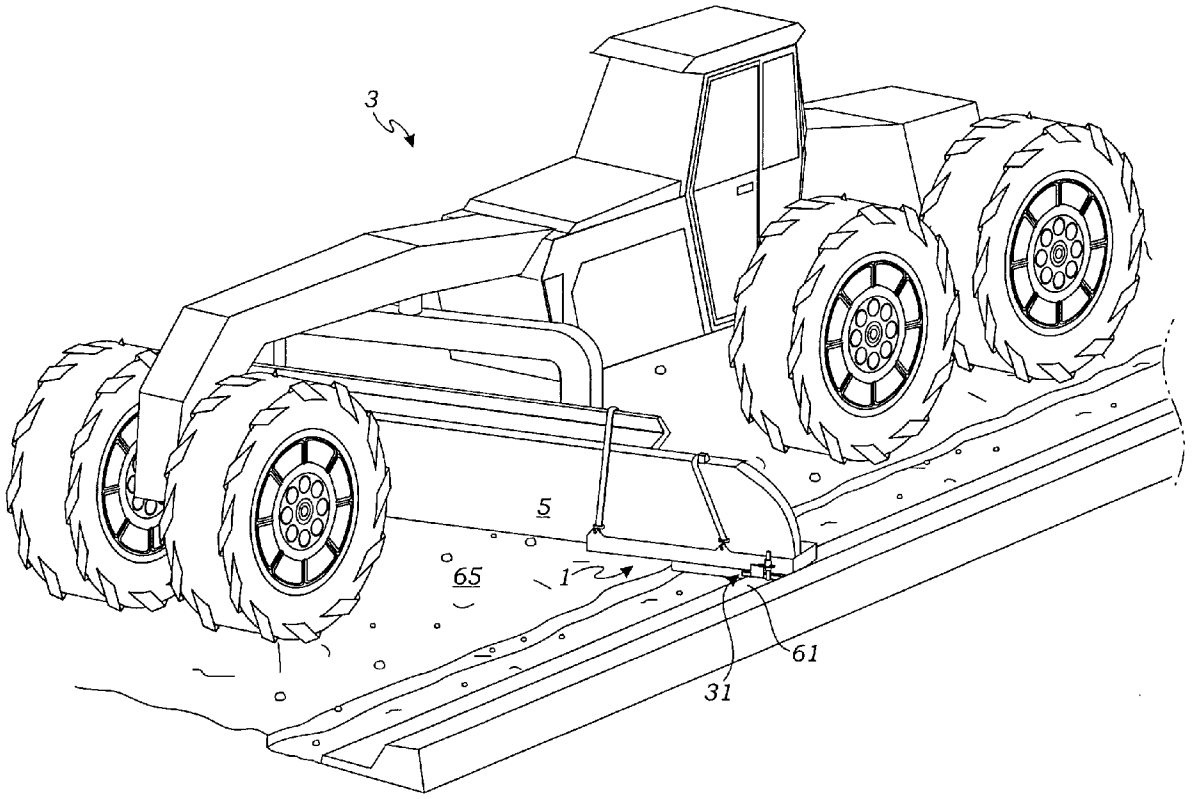
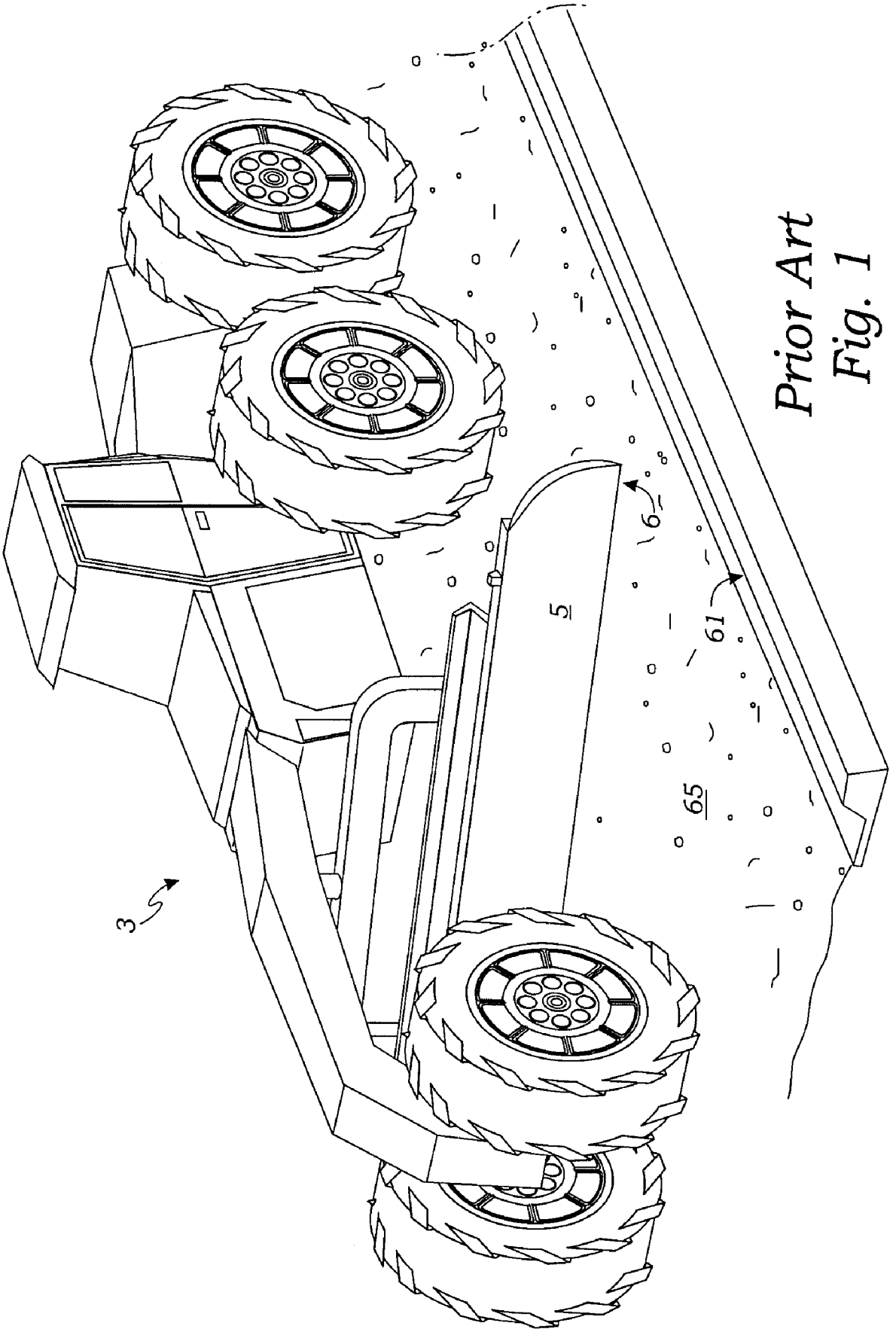
(57) **ABSTRACT**

A curb shoe assembly for street grading and curb formation is provided. The curb shoe assembly includes a channel member having a front side, a back side, a bottom side and a central trough sized for receiving the bottom edge of a construction vehicle mow blade. The curb shoe further includes a grading blade which extends downward from the bottom side of the channel member. The grading blade includes a laterally extending portion and an angled portion. The angled portion includes a vertically extending edge for confronting a curb shoulder. Preferably, the angled portion is removable for replacement due to damage. The curb shoe includes a pair of straps for affixing the curb shoe's channel member to a mow blade. In addition, the curb shoe assembly includes a shoe having a horizontally extending plate. The horizontally extending plate is positioned adjacent to the grading blade so as to rest upon a street curb during operation. The shoe includes vertically extending rods sized and positioned to slidably extend into collars affixed to the front and rear sides of the channel member. Since the shoe can be moved upwardly or downwardly, the height of the grading blade's vertically extending edge can be adjusted for the formation of curbs of different heights. The curb shoe assembly includes one or more shoe spacers insertable and removable between the channel member's bottom side and the shoe's planar plate for maintaining the shoe in proper position.





Prior Art
Fig. 1

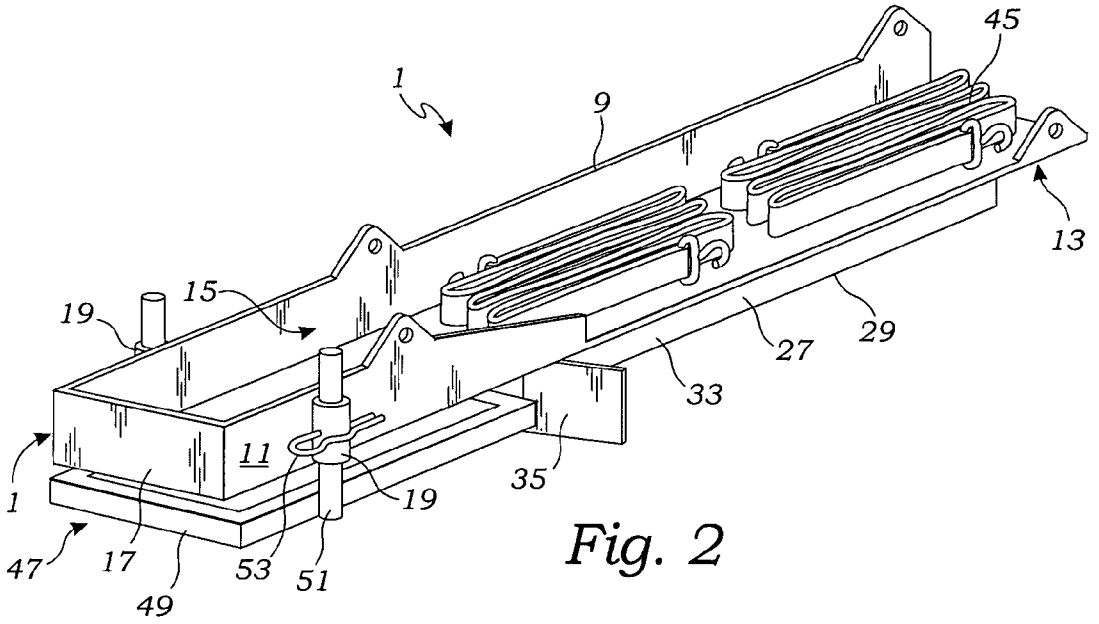


Fig. 2

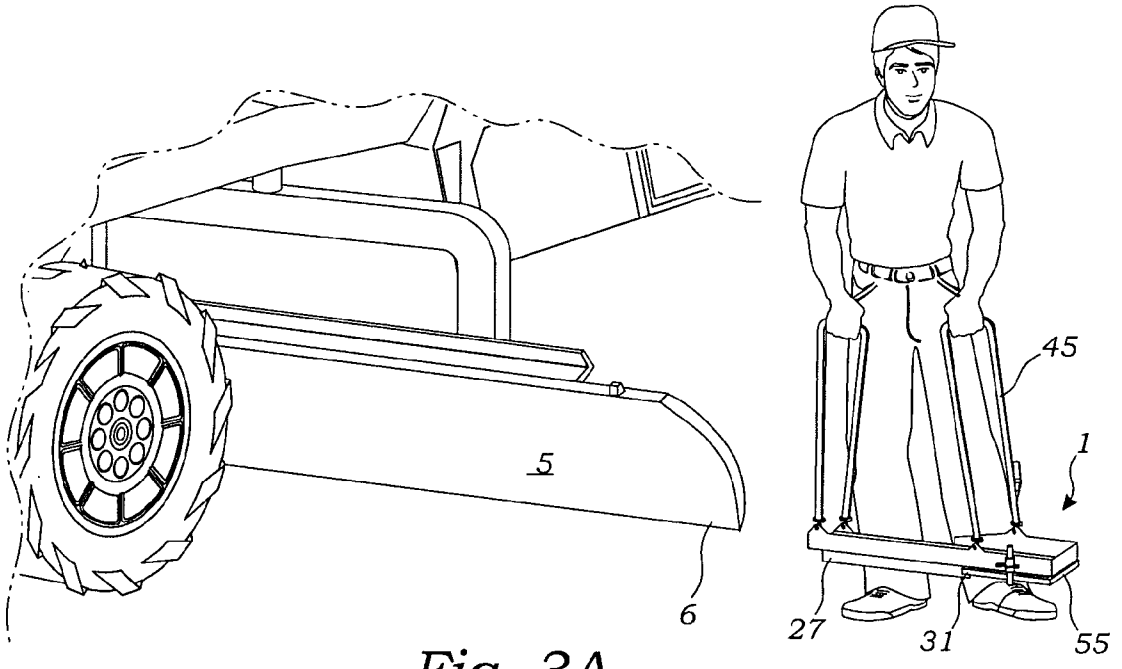


Fig. 3A

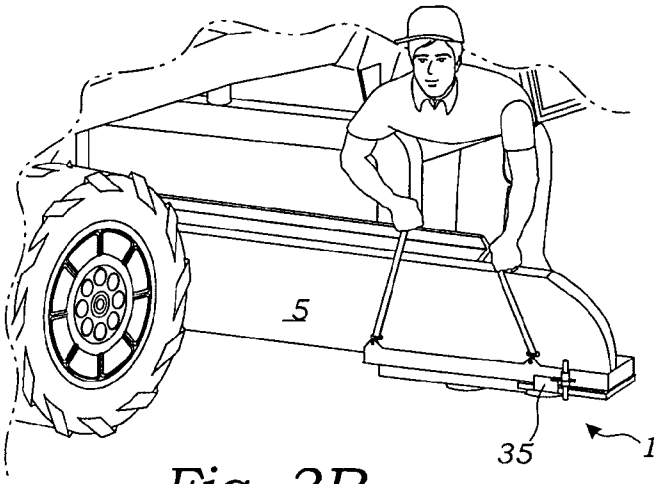


Fig. 3B

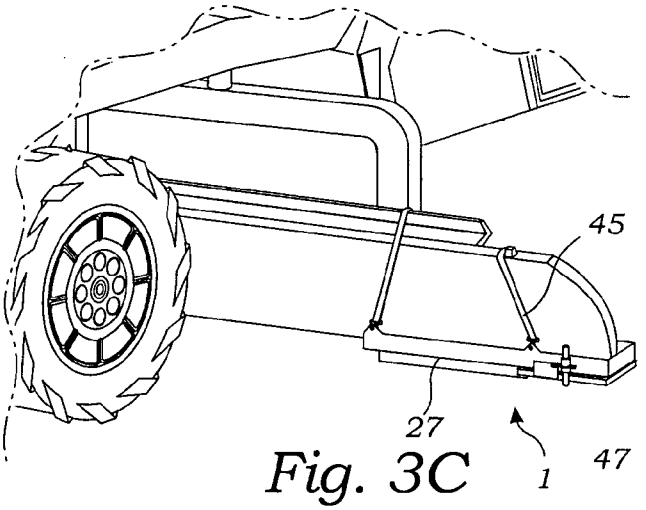


Fig. 3C

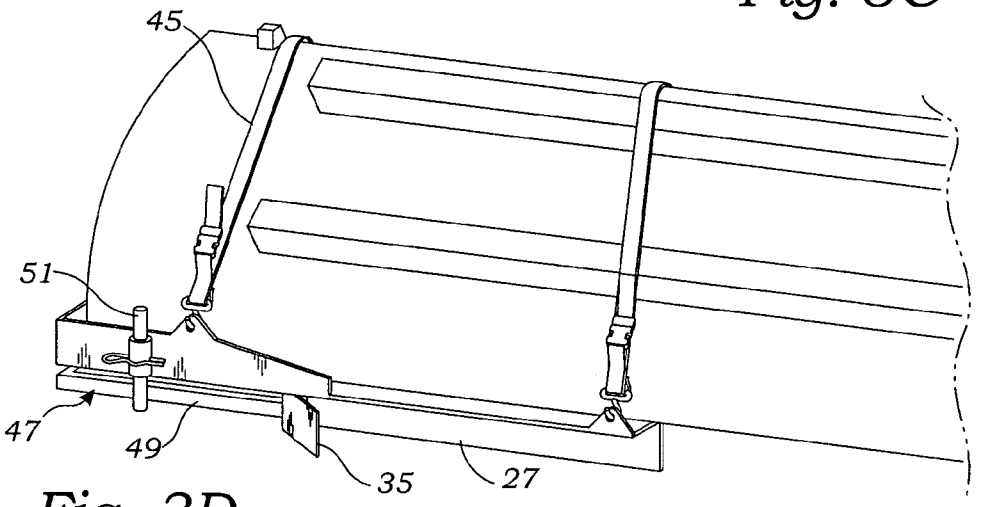


Fig. 3D

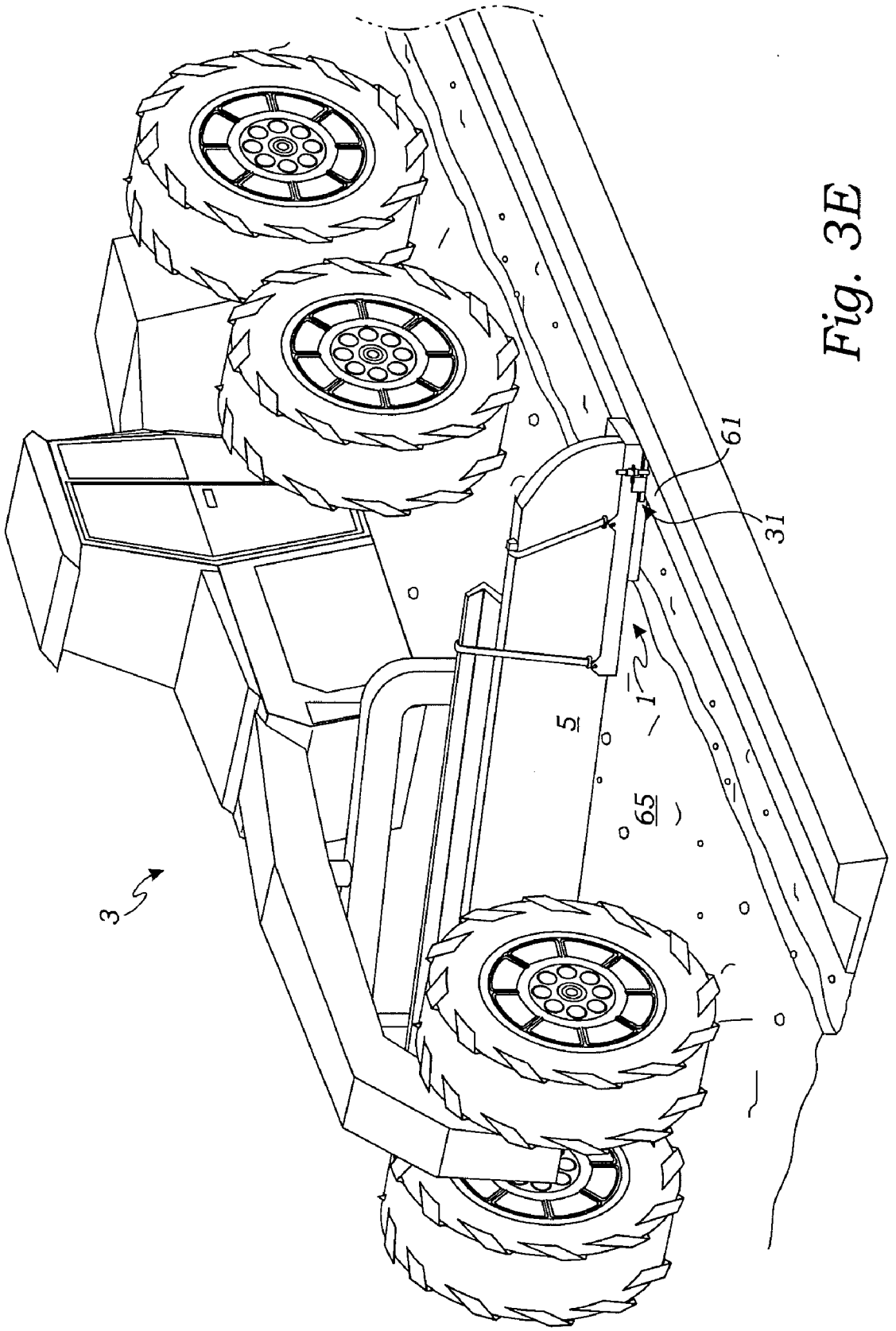


Fig. 3E

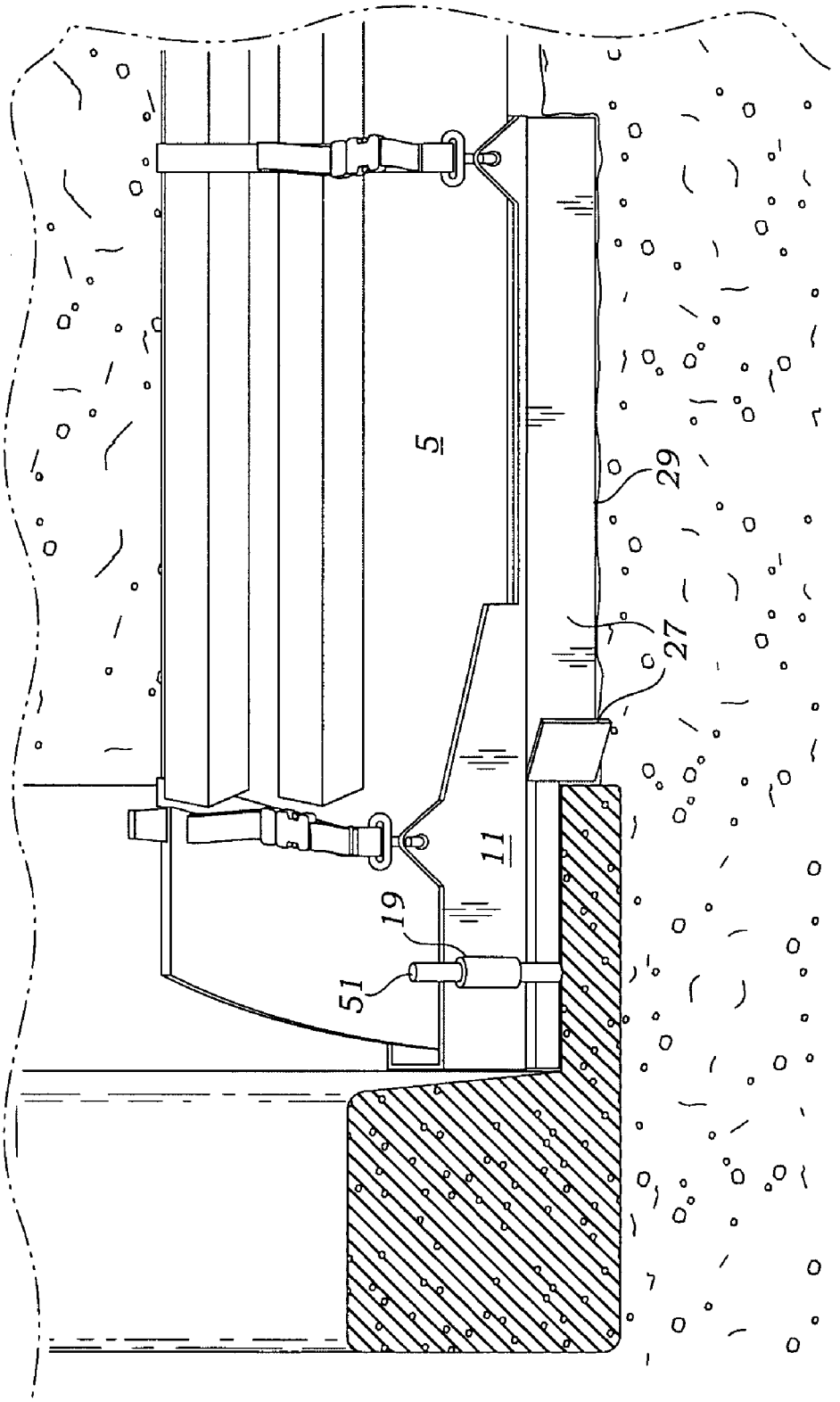


Fig. 4

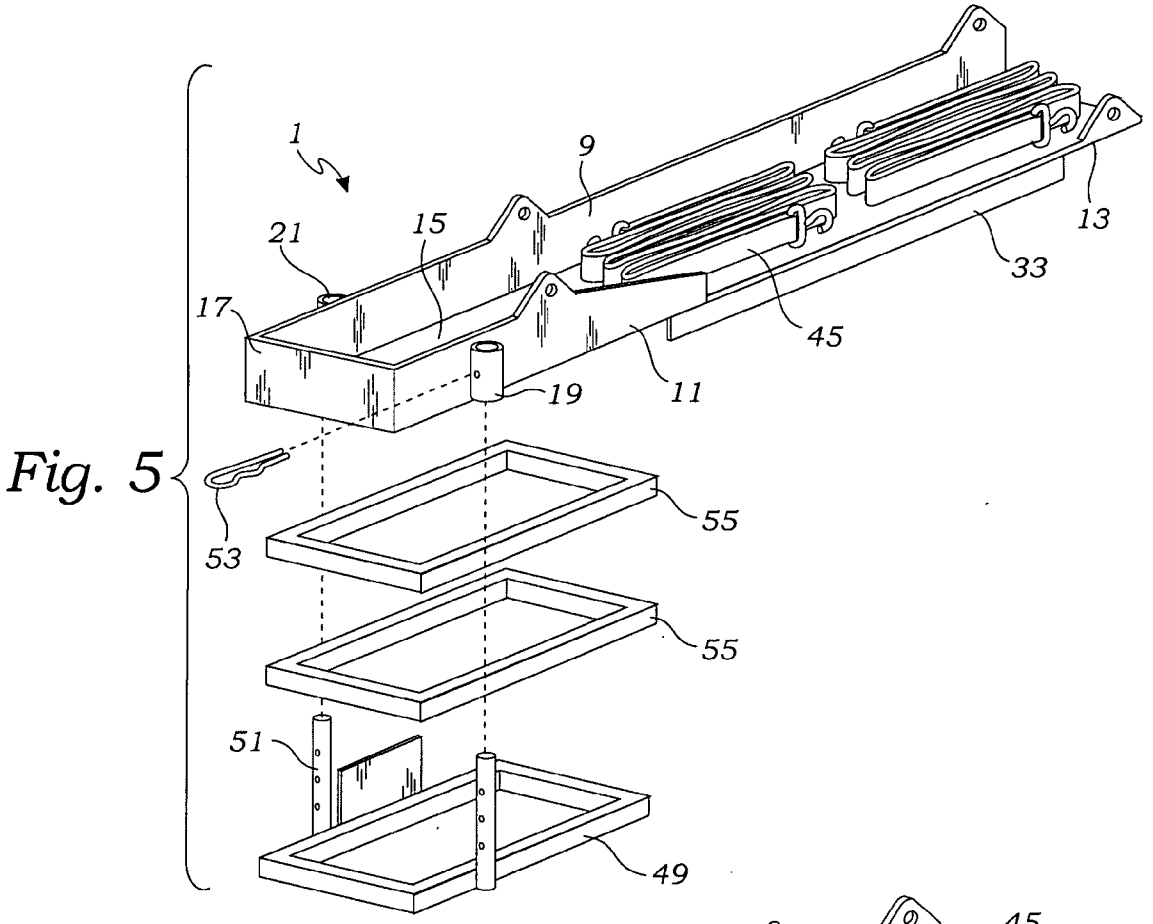

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Fig. 5

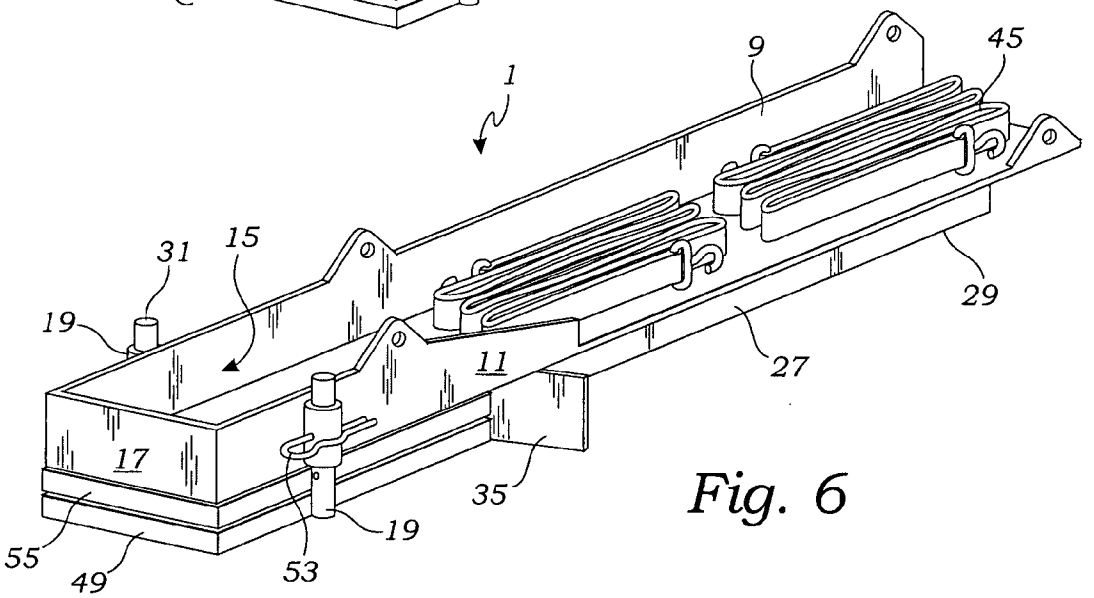
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Fig. 6

CURB SHOE ASSEMBLY FOR SHOULDER GRADING

RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. provisional application Ser. No. 60/876,338 filed on Dec. 20, 2006.

BACKGROUND OF THE INVENTION

[0002] Concrete curbs or existing asphalt are used in constructing commercial parking lots, residential streets, and major thoroughfares. Concrete curbs are used to determine the elevation of asphalt to construct these various jobs.

[0003] After the curbs are in place, constructing the asphalt parking lots or streets consists of placing and compacting type two gravel against the curb or existing asphalt. 1). The thickness of asphalt varies depending on the loads and amount of traffic anticipated for each job. Cutting the compacted gravel to a precise depth next to the curb is extremely slow and often has to be cut several times to accomplish a less than satisfactory job. After the motor grader (blade) is finished cutting next to the curb, laborers clean material away from the edge of the curb with shovels. This method has proved to be very time consuming and more often than not, the depth is too deep, resulting in extra asphalt and money.

[0004] A curb shoe is the preferred method in cutting gravel to which this determines the depth of asphalt needed to construct various streets and parking lots. A curb shoe is an attachment that fits on the mow board of a blade. The curb shoe rides along the curb and allows the blade to cut a precise depth. There are a few different types of curb shoes, some with adjustable wheels that ride on the curb and others with adjustable screws to control the depth of a cut. These shoes work better than the previous methods but are not widely used because they do not sufficiently work.

[0005] The wheel type has to have a very clean curb to ride on. If the road base is not cut very close to the correct depth before this curb shoe is used, the gravel pushes up onto the curb allowing the wheel to ride on top of the rocks making the depth incorrect. This type of shoe is bolted onto the mow board of the blade.

[0006] Another type of curb shoe has screws that adjust the depth of the cut. Some of these have a framework that slides into pipes welded to the mow board. These shoes do not clean the curb well and potentially can damage the concrete curb. Because of the framework, the shoe can be bent if too much pressure is applied to the mow board.

[0007] The preferred curb shoe for many years has been a bolt-on shoe that is adjusted by raising or lowering the shoe to the proper depth and then bolting it onto the mow board. If the shoe is built long enough to cover much of the flow line on the curb, it cleans the curb well. However, like all bolt-on shoes, this shoe is awkward and very time consuming to install and often takes two persons in the process. Because parking lots and streets use different depth for asphalt, a lot of time is used in unbolting, measuring, and reinstalling the shoe. After the correct depth is set and the operator begins to cut, if the operator applies too much down pressure on the shoe, the weight of the blade becomes too much for the bolts causing the shoe to slip. Another problem with this type of shoe is the damage it can cause to the concrete curb. Because of the thin edge of the mow board and no protection against the curb, if the operator puts excessive pressure to the curb, the mow board chips the edge of the concrete which damages the curb.

[0008] Various additional devices have been developed for grading street and parking lot curbs. For example, U.S. Pat. No. 4,837,940 to Mahan describes a grader blade having a portion of the blade which is replaceable and has an adjustable height. Unfortunately, the grader blade requires that holes be formed into the mow blade for holding the grader blade. U.S. Pat. No. 4,936,392 to Kitchin also describes a road shoulder grading attachment which is removably mounted to the bucket of a front-end loader. Though not having to attach to a mow blade, the grading attachment still must be attached using bolts and a complicated set of linkages. U.S. Pat. No. 4,290,214 assigned to Caterpillar Tractor Company describes an attachment for a bulldozer blade. Though not using a bolt attachment, the grading blade must be attached using pins which extend through holes formed in the bulldozer blade.

[0009] There is thus a significant need for a curb shoe assembly for forming street curbs which does not require holes to be drilled or otherwise formed into a mow board.

[0010] There is an additional desire for a curb shoe assembly which can be attached to a mow board without bolts but provides for an adjustable height of the curb shoe.

[0011] There is also a need for a curb shoe assembly which facilitates the removal and replacement of curb shoe blades.

SUMMARY OF THE INVENTION

[0012] Briefly, in accordance with the invention, an improved curb shoe assembly for affixing to the grader blade of a motor grader is provided. The curb shoe assembly includes a channel member having a front side, a rear side, a bottom side and a central trough. The channel member is constructed so that the central trough is configured to receive the bottom corner edge of a vehicle mow blade with the front side of the channel member in front of the mow blade and the rear side of the channel member to the rear of the mow blade. The channel member further includes at least two collars. The first collar is affixed to the front side of the channel member and constructed to include a central conduit, also referred to as an opening, which extends substantially vertically in relation to the channel member's front side. A second collar is affixed to the exterior of the channel member's rear side. Again, the collar has a central conduit, or opening, which is aligned substantially vertically.

[0013] The curb shoe assembly further includes a grading blade which extends downward from the channel member's bottom side. The grading blade includes a lower surface adapted to confront a road or parking lot surface and a side edge for confronting a shoulder area of a curb. In a preferred embodiment, the grading blade is constructed of two portions referred to herein as a laterally extending portion and an angled portion. The laterally extending portion extends downwardly from the channel member and extends laterally substantially along the same axis as the channel member. The laterally extending portion may be non-removably affixed to the channel member such as being integrally formed with the channel member, or it may be removably attached to the channel member.

[0014] Meanwhile, the angled portion extends laterally below the channel member but also in a forward to rearward direction. The angled portion includes the grading blade's vertically extending edge which is intended to confront the curb shoulder area. The angle direction of the angled portion

of the grading blade is constructed to angle rearward from the vertically extending edge which engages a shoulder so as to direct asphalt or other building materials away from the curb. The grading blade angled portion may be affixed permanently to the channel member. However, it is preferred that the angled portion be attachable and detachable from the laterally extending portion for permitting easy replacement in the event that the angled portion incurs typical wear and tear or is damaged during use. For facilitating attachment and detachment to the laterally extending portion, preferably the angled portion includes a pair of pins which are constructed to slidably enter into holes formed into the grading blade's laterally extending portion.

[0015] The curb shoe assembly of the present invention furthermore includes two or more straps for affixing the channel member to a vehicle mow blade. To this end, preferably each strap is affixed to the channel member's front side. The straps are constructed to be of sufficient length to extend over the top edge of a mow blade and down again to be affixed at different places to the channel member's back side. Preferably, the straps are adjustable so as to affix the curb shoe to mow blades of different sizes or to take into account stretching of the straps during use.

[0016] The curb shoe assembly of the present invention includes a shoe which is affixed to the channel member. The shoe is positioned adjacent to the grading blade and positioned to engage the top surface of a street curb. The shoe includes a substantially horizontally extending planar plate for engaging the top surface of a curb. In addition, the shoe includes a pair of vertically extending rods which are positioned to slidably enter the channel member's collars. Due to the slidable arrangement between the extending rods and collar, the shoe can be moved upwardly or downwardly relative to the curb shoe's channel member. The rods may be affixed in place relative to the collars using various constructions known to those skilled in the art. However, in a preferred embodiment, the shoe rods include a plurality of holes which extend laterally through the rods to allow for entry of cotter pins or the like.

[0017] Advantageously, the shoe can be moved upwardly or downwardly relative to the channel member, and thus lengthen or decrease the grader blade's vertically extending edge which confronts the curb shoulder for allowing for the construction of curbs of different heights. To maintain the shoe in a downward position relative to the channel member, the curb shoe includes one or more shoe spacers which are insertable and removable between the channel member's bottom side and the shoe's planar plate. The shoe spacers may be of various thicknesses and one or more shoe spacers may be inserted between the channel member's bottom side and the shoe's planar plate for allowing the grading blade's vertical edge to be manipulated to a desired height.

[0018] Thus, it is an object of the present invention to provide a curb shoe assembly which can be affixed to a vehicle mow blade without requiring the formation or drilling of holes into the mow blade.

[0019] It is still an additional object of the invention to provide a curb shoe assembly which is adjustable so as to allow for the formation of street curbs of different heights.

[0020] It is still another object of the invention to provide a curb shoe assembly for the formation of street curbs which allows for the easy replacement of grading bladed.

[0021] These and other further objects and advantages of the invention will be apparent to those skilled in the art from the following detailed description taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE FIGURES

[0022] FIG. **1** is a perspective view of a motor grader grading a street and curb without a curb shoe;

[0023] FIG. **2** is a perspective view of the curb shoe of the present invention;

[0024] FIG. **3**A is a perspective view illustrating an individual holding a curb shoe of the present invention next to a motor grader mow blade;

[0025] FIG. **3**B is a perspective view illustrating an individual installing a curb shoe of the present invention upon a mow blade;

[0026] FIG. **3**C is a perspective view illustrating a curb shoe of the present invention affixed to a mow blade;

[0027] FIG. **3**D is a rear perspective view illustrating a curb shoe of the present invention affixed to a mow blade;

[0028] FIG. **3**E is a perspective view illustrating a curb shoe of the present invention affixed to a motor grader mow blade in operation grading a curb;

[0029] FIG. **4** is a rear view illustrating a curb shoe of the present invention affixed to a mow blade in operation grading a curb;

[0030] FIG. **5** is an exploded perspective view illustrating a curb shoe of the present invention;

[0031] FIG. **6** is a perspective view of a curb shoe of the present invention including a spacer;

[0032] FIG. **7**A is a perspective view of a curb shoe of the present invention with the angled portion of the grader blade detached; and

[0033] FIG. **7**B is a perspective view of the curb shoe of the present invention illustrating the angled portion of the grading blade affixed to the curb shoe.

DETAILED DESCRIPTION OF THE INVENTION

[0034] While the present invention is susceptible of embodiment in various forms, as shown in the drawings, hereinafter will be described the presently preferred embodiments of the invention with the understanding that the present disclosure is to be considered as an exemplification of the invention, and is not intended to limit the invention to specific embodiments illustrated.

[0035] With reference to FIGS. **1-7**, the curb shoe assembly **1** of the present invention is intended for affixation to the corner edge **6** of the mow blade of a motor grader vehicle **3**. The curb shoe assembly is affixed to the mow blade primarily by a channel member **7** and two or more straps **45**. The channel member **7** includes a front side **9**, a rear side **11**, a bottom side **13** and an end piece **17** to form a central trough **15**. As illustrated in FIGS. **3**A **3**E, the central trough **15** is sized and constructed to slide onto the corner edge **6** of the mow blade **5**.

[0036] The straps **45** affix to the front side **9** and rear side **11** of the channel member utilizing various construction. However, as illustrated in FIGS. **2-6**, preferably the channel member **7** is provided with holes for receiving hooks affixed to the ends of the straps **45**. Preferably the straps are adjustable using buckles or the like so that the straps can be lengthened

or shortened to affix to various sizes of vehicle mow blades or to take into account stretching of the straps which may occur over time.

[0037] The curb shoe assembly further includes a grading blade **27** which extends downward from the channel member's bottom side **13**. The lower surface **29** of the grading blade is adapted to confront a road surface. Moreover, the grading blade **27** includes a side edge **31** for confronting the shoulder area of a curb. In a preferred embodiment, the grading blade is constructed in two pieces including a laterally extending portion **33** and an angled portion **35**. The laterally extending portion is preferably integrally formed to extend from the bottom of the channel member such as by welding. Preferably this laterally extending portion **33** of the grading blade extends laterally in substantially the same direction as the longitudinal axis of the channel member and mow blade.

[0038] The angled portion **35** of the grading blade also extends downwardly from the channel member's bottom side **13**. However, preferably the angled portion **35** extends at an angle relative to the longitudinal axis of the channel member so as to divert asphalt or other building materials away from the curb. The angled portion further includes the grading blade's side edge **31** which is positioned to engage the shoulder area of a curb. (See FIGS. **3**E and **4**). The grading blade's angled portion **35** may be integrally formed with or affixed to the channel member **7** or with the laterally extending portion **33**. However, it is preferred that the angled portion **35** be attachable and detachable from the rest of the curb shoe assembly. To this end, as illustrated in FIGS. **7**A and **7**B, preferably the angled portion includes a pair of pins **37** which extend into holes formed in the laterally extending portion. Though not shown, the pins **37** and angled portion can be locked in place utilizing cotter pins which extend through the pins positioned behind the grading blade's laterally extending portion **33**.

[0039] Of importance, the curb shoe assembly **1** of the present invention includes a shoe **47** which is affixed to the channel member **7**. The shoe **47** includes a planar plate **49** which is affixed to the channel member immediately adjacent to the grading blade's side edge **31** so the shoe rests upon a curb shoulder during the curb formation, as shown in FIGS. **3**A-**3**E. The shoe **47** is attachable and detachable from the channel member using various constructions. However, the preferred construction includes providing the channel member **7** with a pair of collars **19** and the shoe **47** with a pair of vertically extending rods **51**. The rods are sized to telescopically slide into the collar's central conduits **21** so as to enable the shoe to move upwardly and downwardly, and also to completely be removed from the curb shoe assembly. The rods **51** may be affixed to the channel member using various constructions including nuts and bolts. However, as shown in the figures, a preferred construction includes utilizing cotter pins **53** which slide through bores laterally formed in the rods **51**.

[0040] Advantageously, the shoe can be moved upwardly or downwardly relative to the channel member **7** so as to lengthen or decrease the grading blade's vertically extending side edge **31** which confronts a curb. The cotter pins prevent the shoe from unwantingly moving downward relative to the channel member. Meanwhile, the curb shoe assembly further includes spacers which are positioned between the shoe's planar plate **49** and the bottom side **13** of the channel member **7**. As seen in FIGS. **4**-**6**, one or more spacers **55** may be utilized. Further, the shoe spacers **55** may be constructed of various thicknesses to be inserted between the channel member's bottom side and the shoe's planar plate for allowing the grading blade's vertical edge to be manipulated to a desired height.

[0041] While several particular forms of the invention have been illustrated and described, it will be apparent that various modifications can be made without departing from the spirit and scope of the invention. For example, the entire curb shoe may be constructed of various materials. However, metals and tool steel are preferred for constructing the channel member, grading blade, spacers and shoe of the curb shoe assembly. Various materials may be utilized for the straps **45**. However, it is preferred that the straps be made of nylon or other similar material which is not prone to stretching or wear and tear.

[0042] Since many modifications can be made to the invention, it is not intended that the invention be limited except by the following claims. Having described my invention in such terms so as to enable persons skilled in the art to understand the invention, recreate the invention and practice it, and having identified the presently preferred embodiments, I claim:

1. A curb shoe assembly for a mow blade comprising:

a channel member having a front side, a rear side, a bottom side and a central trough sized and configured for receipt of the bottom corner of a mow blade, said channel member further including a pair of collars each having a central opening with a first collar affixed to the exterior surface of said channel front side and a second collar affixed to the exterior surface of said channel back side, said collars aligned to extend substantially vertically;

a grading blade extending downward from said channel member's bottom side and having a lower surface adapted to confront a road surface and a vertically extending edge for confronting a shoulder area;

a plurality of straps of adjustable length sized and configured to extend from said channel front side over the top edge a mow blade to said channel member back side for affixing the curb shoe to a mow blade without requiring holes formed in the surface of mow blade;

a shoe including a substantially horizontally extending planar plate positioned below said channel member bottom side adjacent to said grading blade, said shoe further including a pair of vertically extending rods slidably positioned within said channel member collars; and

one of more shoe spacers insertable and removable between said channel member's bottom side and said shoe's planar plate for adjusting the distance between said channel member bottom side and said shoe for correspondingly adjusting the length of said channel member edge confronting a shoulder area.

2. The curb shoe assembly for a mow blade of claim **1** wherein said grading blade includes laterally extending portion and an angled portion, said angled portion including said blade edge for confronting a shoulder area, said angled portion further being attachable and detachable to said laterally extending portion for permitting replacement of said angled portion in the event of wear or damage.

3. The curb shoe assembly for a mow blade of claim **2** wherein said laterally extending portion includes a pair of holes and said angled portion includes a pair of pins for slidable entry into said holes for affixing said angled portion to said lateral extending portion.

* * * * *