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Daviduke

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[54] **SCRAPING BLADE FOR CONVERTING A CUTTING EDGE ON A LOADING BUCKET**

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Related U.S. Application Data

[63] Continuation of Ser. No. 4,273, Jan. 20, 1970, abandoned.

[52] **U.S. Cl.** ..... **37/141 R,** 37/142 R

[51] **Int. Cl.** **E02f 9/28**

[58] **Field of Search** 37/141, 142

[56] **References Cited**

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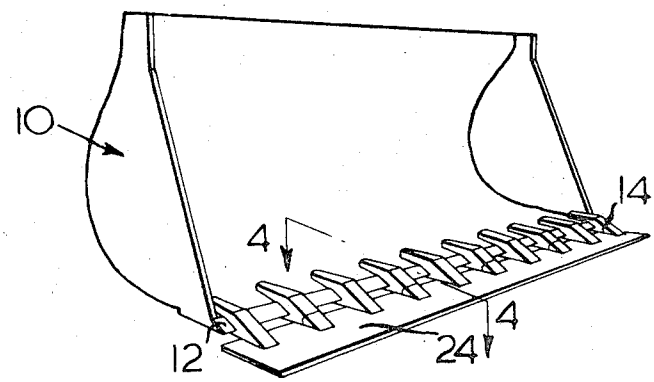
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[57] **ABSTRACT**

A loading bucket is described of the type which would be used on a tractor, front-end loader or other such vehicle, having a multiplicity of teeth on the bucket. At least two of the teeth are provided with a replaceable tip portion which houses a projecting member that is adapted to be received within a complementally formed housing secured to a scraping blade. By this arrangement, the scraping blade can be detachably secured to the loading bucket when desired, thereby readily converting the bucket's toothed edge to a straight edge, and vice versa.

5 Claims, 5 Drawing Figures



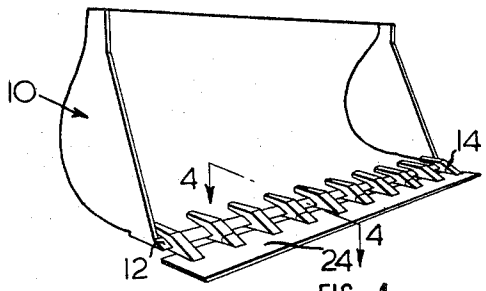


FIG. 1

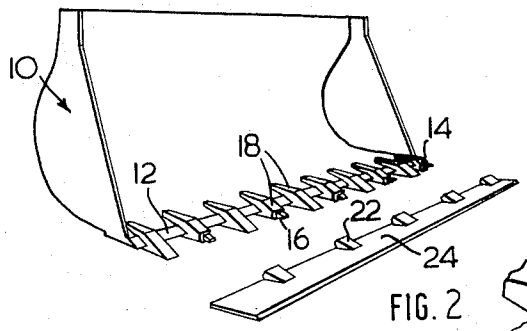


FIG. 2

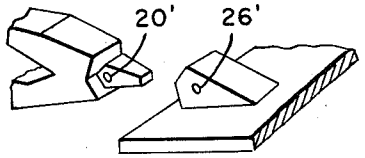


FIG. 3A

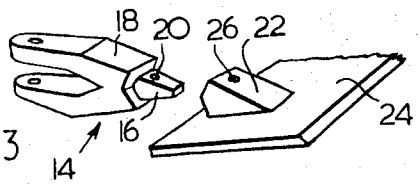


FIG. 3

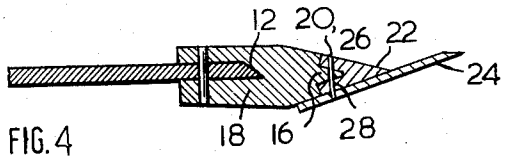


FIG. 4

SCRAPING BLADE FOR CONVERTING A CUTTING EDGE ON A LOADING BUCKET

This application is a continuation of Ser. No. 4,273, filed Jan. 20, 1970, now abandoned.

This invention relates generally to a loading bucket of the type that is adapted for use on a tractor, a front-end loader or other such vehicle. More particularly, the invention relates to the convertability of a toothed edge on such a bucket to a straight edge and vice versa by a detachably securable scraping blade that can be removably mounted on a ground engaging lip of the loading bucket, where it is needed.

It is well known that the loading bucket normally used on a front-end loader, a bulldozer or the like has numerous teeth provided on the ground-engaging lip thereof. Because of the purpose for which such teeth have been designed, cleaning up or scraping the ground with a loading bucket having teeth on it will leave ridges, hills and valleys on the ground instead of a smooth, level surface. Hence, a situation which has continuously ben encountered in cleaning up in work areas where front-end loaders have been used, is that of wanting to avoid the ridges or hills and valleys previously mentioned. To clean up and leave a smooth surface that is ready for footings, floors, foundations, paving or concrete slabs, the machine operator previously had to remove all of the teeth from the permanent cutting edge of the bucket. It will be recognized that such a course of action was very time consuming, and a difficult job using perhaps 2 hours of a mechanic's time, plus the "down-time" of the machine itself. Furthermore, when the teeth were reinstalled on the bucket's cutting edge, new bolts were frequently required because the old ones had invariably been bent and deformed to the extent that they usually had to be cut off with an acetylene torch. The alternative to that difficult and time-consuming operation was to leave the teeth off entirely, and hence use the bare cutting edge of the ground-engaging lip of the bucket. This reduced the efficiency of the machine, however, and also shortened the useful life of the cutting edge. Undue wear to the entire bucket frequently resulted. Without the teeh, the excavating machine simply was not effective in hardpan, rock or other such hard materials.

It is an object of this invention, therefore, to provide an acceptable solution to many of these problems. The present invention is easy to use and significantly improves the efficiency of excavating equipment with which it is being used.

It is another object of this invention to provide an arrangement where the toothed cutting edge of a bucket of a front-end loader, for example, can readily be modified or converted for selected use either in rough excavating operations, or for cleaning up and leaving a smooth, level surface.

It is yet another object of this invention to provide a scraping blade assembly which can be detachably secured to the cutting edge of a loading bucket on a tractor, front-end loader or like vehicle.

These and other objects and features of this invention will become apparent from the following description. In one embodiment, however, there is provided a loading bucket having a cutting edge with a multiplicity of teeth secured to said edge. Selected ones of these teeth each have a replaceable cap secured to the tooth by pin means insertable into aligned holes that extend through the cap and tooth. The bucket also includes a scraping

blade with a leading edge portion and a trailing edge portion. A plurality of housing members are fixedly secured to the trailing edge of the scraping blade and corresponding in number and position to those teeth having a replaceable cap. Each of these housing members is operative to closely receive an umcapped tooth and has apertures therein for receiving the pin means mentioned above, to thereby removably secure the scraping blade readily to the uncapped teeth on said bucket, thus facilitating easy convertability from a toothed edge to a straight edge, and vice versa.

The "slip-on" or replaceable scraping blade that is contemplated herein is the answer to many of the problems mentioned above. Installation of the balde takes only a few minutes, with the operator merely removing a replaceable tip from a number of the teeth on the loading bucket by knocking out the connecting pins with a punch and hammer.

This will be described in more detail below, having regard to the accompanying formal drawings in which:

FIG. **1** is a schematic view showing a loading bucket and scraping blade according to this invention, in assembled form with the toothed edge having been converted to a straight edge configuration;

FIG. **2** is a schematic view similar to that of FIG. **1**, but showing the scraping blade separated from the bucket;

FIG. **3** is a schematic view taken in perspective and showing a preferred arrangement for detachably connecting the scraping blade, which is shown in part, to one of the teeth on the loading bucket; and

FIG. **3A** is a partial perspective view similar to FIG. **3** illustrating a modified arrangement; and

FIG. **4** is an elevation view taken in section along the line **4—4** of FIG. **1**.

Turning now to the drawings, a conventional loading bucket is shown overall at **10**. This loading bucket **10** is of the type which could be used on a tractor, a front-end loader, a bulldozer or other such excavating vehicle. Moreover, the loading bucket **10** has a cutting edge **12** to which a multiplicity of teeth **14** are secured. These teeth **14** are normally connected to the loading bucket **10** by means of bolts, or other such fastening means in a manner which will enable them to be replaced when necessary. Alternatively, the teeth **14** could be welded to the cutting edge of the loading bucket **10**, however, it will be recognized that such an arrangement would be less popular because of the increased difficulty in repairing or replacing any broken or damaged teeth.

As indicated in FIG. **2**, a number, and preferably at least two, of the teeth **14** have a removable tip (not shown) which encloses a connecting lug **16** that protrudes from a base portion **18** of the tooth **14**. This connecting lug **16** is normally provided with an aperture **20** and is adapted to be closely received within a housing member **22** which is welded, bolted, riveted or otherwise fixedly secured to a scraping blade **24**. This housing member **22** in each instance is also provided with an aperture **26** which, in an assembled relation of the scraping blade **24** and bucket **10**, is in alignment with the aperture **20** on the base portion of the teeth **14**. Pin means such as a knock-out pin shown at **28** in FIG. **4** can then be punched into these apertures **20** and **26** in order to lock the scraping blade **24** to the loading bucket **10**. It will be apparent that apertures **20** and **26** can be disposed vertically, horizontally, or at some po-

sition therebetween. In FIG. 3A the apertures are shown at **20'** and **26'** as being horizontal. If generally vertically dispoesed, the aperture **26** will extend through the blade **24,** as seen in FIG. **4.** Installation of the scraping blade **24** takes only a few minutes. The machine operator merely removes the replaceable tip portions from the appropriate ones of the teeth **14,** by punching out the knock-out pins **28** with a punch and hammer. The scraping blade **24** is laid on the ground in front of the machine, and the operator may then move the machine forward and manipulate the bucket controls so that the connecting lug **16** enters the housing **22** on the scraping blade **24.** The pins **28** (or new ones, if necessary) are then tapped back into place, and the scraping blade **24** is made secure. Since the teeth **14** are now blanked off and the "cutting edge" of the scraping blade **24** has been converted to a configuration that is relatively flat and smooth, it is ready to be used for producing a clean, smooth job on any grade or surface where material is to be scraped loose and scooped into the bucket **10.**

When the particular job is completed, the scraping blade **24** can be quickly and easily removed, the teeth cap portions replaced and the machine again made ready i.e., converted back for heavy and hard digging.

In removing ice and snow, a straight edge as provided by this scraping blade **24** having a flat, smooth cutting edge has been found to be essential if a good job is to be done and a high output maintained. Parking lots, paved roads, driveways, et cetera can be scraped clean down to bare pavement with a minimum of effort with the snow and ice being scooped directly over the blade **24** and teeth **14** into the bucket **10,** as will be evident from FIG. **1.** However, should the operator encounter ice or hard-packed snow, it is a relatively simple matter to drop off the scraping blade **24** and use the regular bucket **10** with teeth **14** to break up the tough material. The scraping blade **24** can then be put back on and the machine operated at high speed loading again.

When the cutting edge of a standard bucket such as that indicated at **12** wears dull and the machine has to be "downed" for hours while the bucket is being welded and worn spots built up, in order to repair and hard-surface such cutting edge, much time and money can be lost. This can now be avoided simply by having a spare or extra scraping blade on hand and kept in good condition by effecting repairs to it during spare time. Even if an extra blade is not available in stock, it is possible to effect repairs and touching up on the scraping blade in use, during hours when the machine is being employed on bulk excavating or loading, i.e., using the bucket's own conventional cutting edge **12** with teeth **14.**

It is particularly to be noted that the scraping blade **14** is easily transported, and can be carried on the particular excavating machine from job to job, or hauled about in a small truck. It is easily handled by two men, or in a pinch, one man could carry out the entire operation of installing and removing a scraping blade by utilizing the hoisting mechanism frequently found on the machine on which it is being used.

On many occasions, the presence of a scraping blade as described herein on a project eliminates the need for a motor grader. On road, sidewalk and parking lot jobs it is possible to finish up the rough grade, or sub-base courses to tolerances good enough to receive a base gravel course. In some cases, in virgin soil, it is possible for a good operator to cut the clay and topsoil out accurately to the desired grade on the first pass, and if the present scraping blade is used, no further grading operations would be required.

The present invention therefore affords increased efficiency and versitility to a loading bucket of the type usually found on excavating and other types of construction equipment. Certain modifications to the specific embodiment previously described will be apparent to those in this art. It is comprehended that all such modifications are intended, within the spirit of this invention, to be encompassed within the claims below.

I claim:

1. In a loading bucket having a ground-engaging edge provided with a multiplicity of horizontally-spaced apart cutting teeth to cut into a hard surface and to enable a load to be picked up, each of a plurality of said teeth including a base portion fixed to the bucket and a protruding lug and a replaceable cap secured over the lug by pin means removably received in aligned housing member having aligned openings in said cap and lug, the improvement comprising: means for selectively converting said ground-engaging edge of said bucket to a straight edged configuration over which material passes into said bucket and for returning said edge to its toothed configuration, said means including a straight-edged scraping blade having a straight leading edge and a trailing edge portion and a plurality of housing members fixed to the upwardly facing surface of said trailing edge portion, each of said housing members corresponding in position to one of said plurality of teeth and being configured to closely receive the lug of one of said teeth whereby said scraping blade is supported by said teeth when the lugs are received in the housing members, and each housing member having aligned openings therein to receive said pin means to thereby removably secure said scraping blade to said teeth, the ground-engaging surface of said scraping blade being substantially smooth and flat and the arrangement of said blade when supported by said teeth being such that said blade will cut away material while leaving a smooth, level surface and will scoop the cutaway material directly over the blade and unimpeded into the bucket.

2. Apparatus as in claim **1** wherein each said housing member has an open end and a closed end, the open end defining a lug-receiving opening.

3. Apparatus as in claim **1** wherein said pin means includes a removable pin which is insertable in the holes in each housing member and its respective lug, the pin being oriented in use generally horizontally and parallel to the ground-engaging edge of the bucket.

4. A loading bucket for excavating equipment comprising: a ground-engaging edge defining one side of an opening for receiving material being loaded into the bucket; a multiplicity of teeth fixedly secured to said edge, each of a plurality of said teeth including a projecting lug adapted to receive a replaceable cap configured to be matingly coupled to the lug, said lug having a hole therein for receiving a pin; a removable scraping blade for converting said ground-engaging edge from a toothed configuration to a straight-edge configuration, each of which configurations allows unimpeded passage of material over said edge into the bucket while cutting and scraping up the material, said scraping blade having a straight leading edge and a trailing edge portion and a plurality of open-ended housing members

spaced apart along the length of said blade and fixed to the upwardly facing surface of said trailing edge portion with their openings facing the bucket, each of said housing members corresponding in position to one of said plurality of teeth and being configured to closely receive the lug of one of said uncapped teeth whereby said blade is supported by said teeth, each housing member having a hole aligned with the hole in its respective lug; a knock-out pin removably inserted through the aligned holes to thereby removably secure said blade to said bucket, the ground-engaging surface of said blade being substantially smooth and flat and the arrangement of said blade being such that said blade will cut away material while leaving a smooth level surface and will scoop the cut-away material directly over the blade and into the bucket.

5. Apparatus as in claim 4 wherein the knock-out pins and the aligned holes in said lugs and housing members are disposed horizontally.

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