Sept. 30, 1969 J. W. HOOD ET AL 3,469,330

BACKHOE AND AUXILIARY BLADE THEREFOR

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Fig. 1

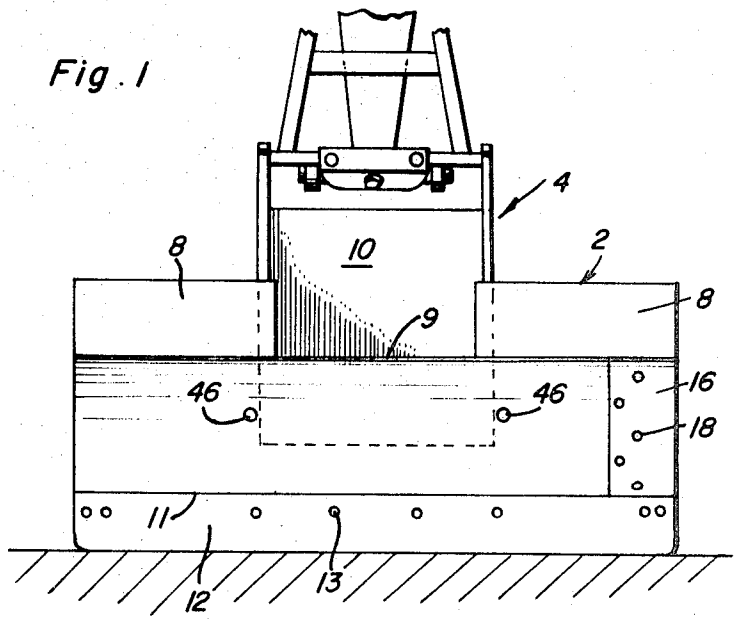


Fig. 3

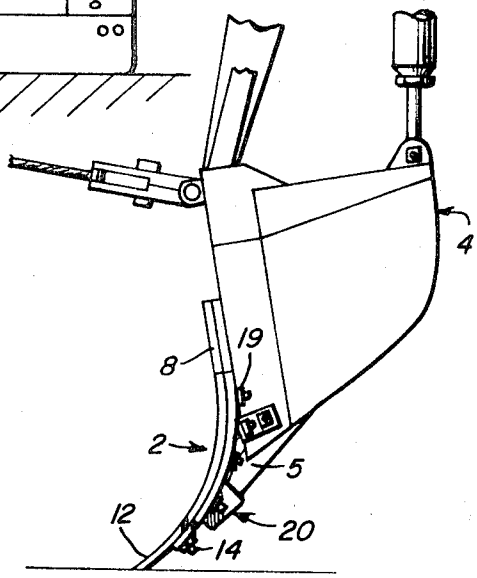
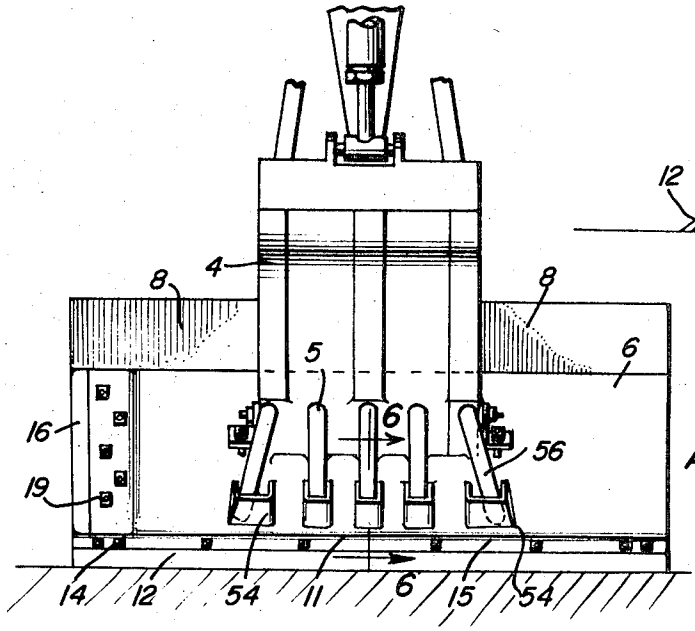


Fig. 2



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Fig. 4

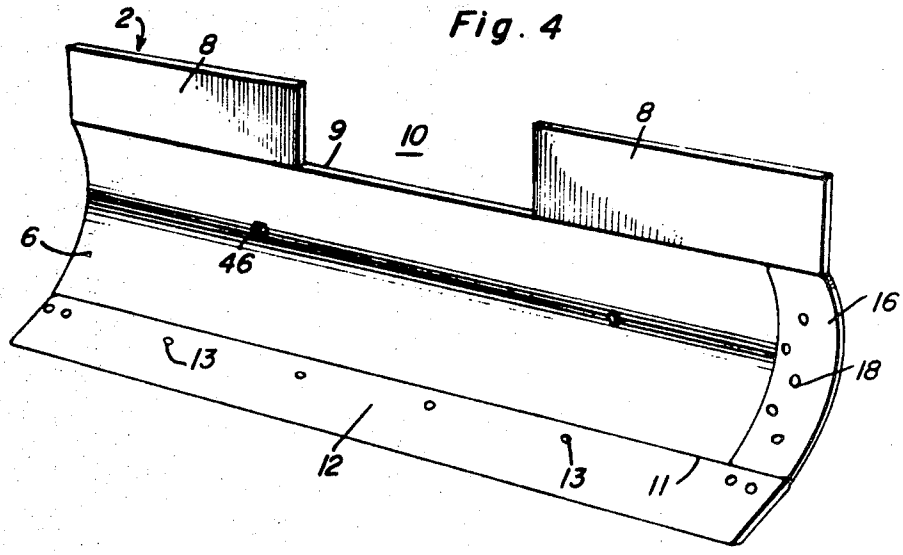


Fig. 5

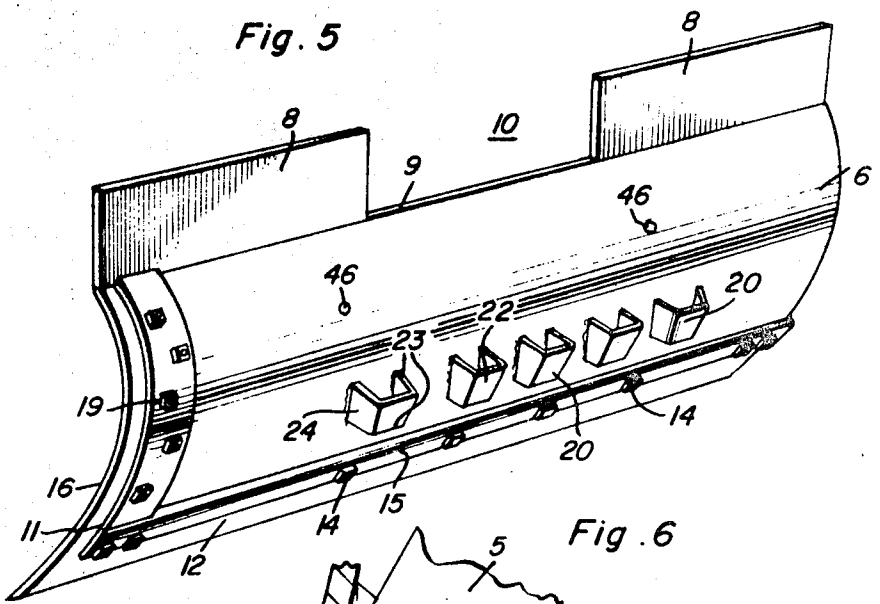
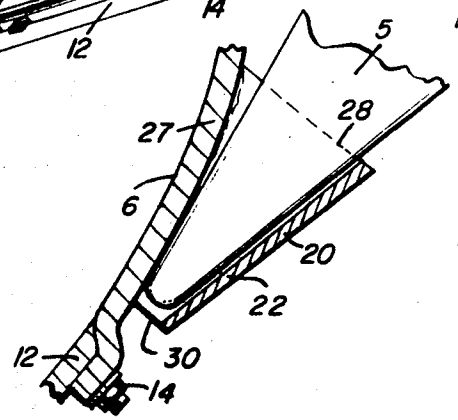


Fig. 6



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Fig. 9

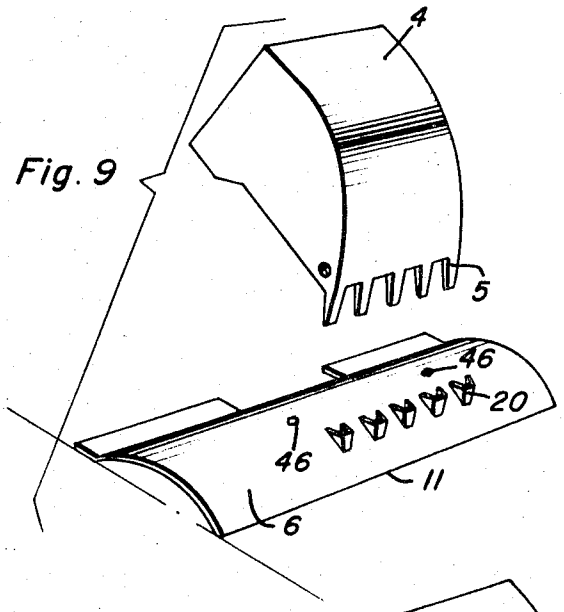


Fig. 7

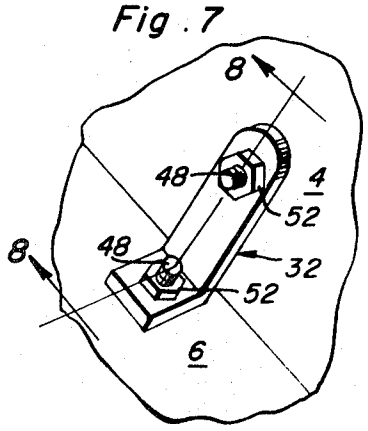


Fig. 10

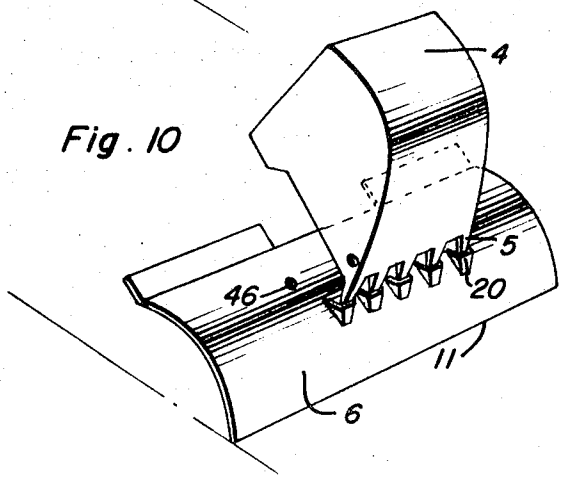


Fig. 8

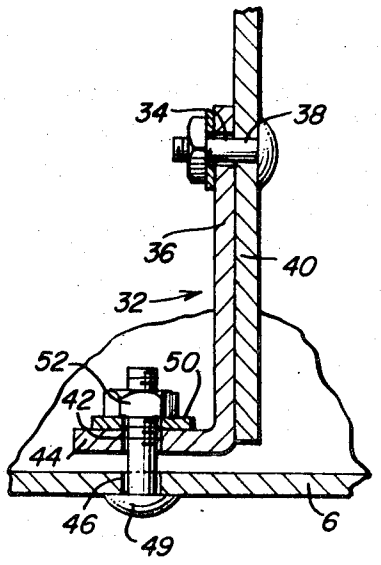
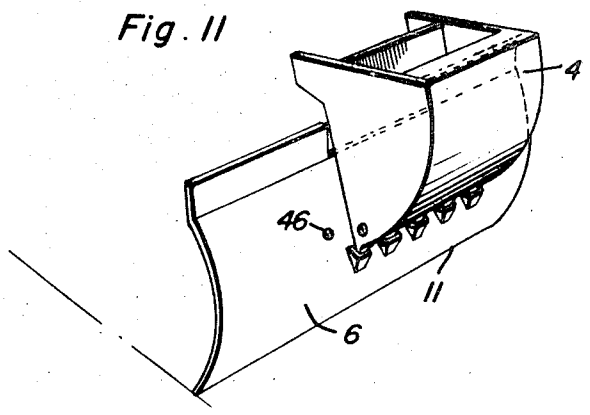


Fig. 11



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BACKHOE AND AUXILIARY BLADE THEREFOR

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U.S. Cl. 37—117.5 8 Claims

ABSTRACT OF THE DISCLOSURE

A contoured rectangular earth moving blade attachment with pockets attached to the convex surface of the blade. In order to mount the blade upon a toothed backhoe bucket, the convex blade surface is positioned on the ground facing upwardly. The teeth of a backhoe bucket are then lowered into the corresponding pockets. The weight of the teeth is directed against the convex surface causing the blade to pivot upwardly about the blade cutting edge thereby facilitating full engagement of the teeth with the pockets and performing a commensurate positioning of the convex blade surface against the bucket entrance. Bolts are employed to fasten the blade to the bucket in this position thus preparing the blade attachment for an earth moving operation.

The present invention pertains to the field of art encompassing earth moving machines and more particularly relates to blade attachments for backhoe machines. In the past, excavating blade attachments have been employed in conjunction with a backhoe bucket. These prior devices utilize a unitary constructed contoured blade fastened to a bucket with a multiplicity of fasteners which create a time consuming operation when installation or removal of the attachment is desired. Further, earlier attachments have been fabricated to weigh several hundred pounds in order to withstand the bending influence of earth being excavated. As a result of this heavy weight, the manual labor of several men is required to position such a blade on a backhoe bucket. In addition, the unitary construction of prior blades results in costly replacement or retooling after appreciable wear of the cutting edges has taken place.

Summarizing the present invention, a contoured rectangular blade is structurally modified to include U-shaped plates or pockets affixed to the convex surface of the blade. These pockets provide an intermediary means for attaching the blade to the teeth of a backhoe bucket while the blade rests upon the ground. Upon lowering of the teeth into corresponding pockets, the force of the lowered teeth against the surface of the blade causes the blade to pivot upwardly from the ground about an axis concentric with the lower cutting edge of the blade. Thus, attachment of the blade onto a backhoe bucket is performed without the need for manual assistance. Finally bolts fasten the blade in the attached position thus providing an extended blade upon a backhoe for widening the cut of a conventional backhoe. The cutting edge is removably attached to the normally lower longitudinal edge of the blade which advantageously permits replacement of the cutting edge without the necessity of machining the entire blade or the replacement thereof. Similar cutting edges are fastened to the side edges of the blade. The normally upward longitudinal edge of the blade contains a centrally located opening which provides access to the bucket entrance disposed immediately behind the blade thereby permitting the storage facility of the bucket to be utilized during an excavation operation. Among the salient objects of the present invention are:

To provide an easily attachable and removable contour excavation blade for a backhoe bucket.

To provide a contour blade capable of widening the cut of a conventional backhoe bucket.

To provide a contour blade attachment with replaceable cutting edges on the bottom and side edges of the blade, the bottom cutting edge formed for rendering proper pitch for cutting earth.

To provide an excavation blade attachment which can be installed or removed from a backhoe bucket without manually lifting the blade.

To provide an excavation blade attachment capable of cutting a smooth bottom and eliminating loose dirt in the cut.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a front elevational view of the blade attached to a backhoe bucket.

FIGURE 2 is a rear elevational view of the structure shown in FIGURE 1.

FIGURE 3 is an end elevational view of the structure shown in FIGURE 1 particularly illustrating the conformity of the blade contour with the contour of the backhoe bucket and the teeth appending therefrom.

FIGURE 4 is a view in perspective illustrating the blade attachment unmounted. The view particularly illustrates the earth working surface of the blade.

FIGURE 5 is a view in perspective illustrating the convex surface of the blade and particularly illustrating the pockets affixed to the surface. Also shown is the means for attaching a side and bottom cutting edge.

FIGURE 6 is an exploded sectional view illustrating the engagement between a tooth of the backhoe and a corresponding pocket.

FIGURE 7 is an exploded detail view in perspective of a bracket and mounting fasteners for attaching the blade to the bucket hoe.

FIGURE 8 is a sectional view along the plane 8—8 of FIGURE 7.

FIGURES 9, 10 and 11 illustrate the sequence of lowering the teeth of the backhoe bucket into corresponding pockets affixed to the blade. The sequence particularly illustrates the pivotal motion of the blade along an axis linear with the cutting edge of the blade. The sequence illustrated by the figures indicates the self positioning of the blade against the bucket entrance.

Referring now specifically to the drawings, the preferred embodiment of the blade attachment is generally designated by reference numeral **2** which in operation is attached to a backhoe bucket generally designated by reference numeral **4**. The blade attachment **2** includes a contoured rectangular plate **6** which is adapted to conform with the combined contour of the bucket entrance and pitch profile surface of digging teeth **5** appending from the backhoe bucket **4** as clearly shown in FIGURE 3 of the drawings. Rectangular plates **8** project in coplanar spaced relation with one another from the normally positioned top edge **9** of the blade. The angle subtended by rectangular projections **8** and blade **6** is such as to permit flush contact between the front edges of the lateral sides of backhoe bucket **4** and the overlying normally rearward surface of rectangular projections **8**. A space **10** between confronting edges of the rectangular projections **8** is substantially equal to the distance between lateral walls of the backhoe bucket thus permitting utilization of the bucket volume for storing excavated earth during an earth moving operation. The longitudinal edge **11** opposite the top edge **10** provides an edge to which a removable cut-

ting edge **12** may be attached. The cutting edge **12** is characterized by a rectangular plate appending from the lower edge **11** and extending the length of the lower edge **11**. Holes **13** are formed through the rectangular plate of the cutting edge **12**, the holes lying along a line parallel to the longitudinal edges of the plate. The cutting edge **12** is removably fastened to the lower edge of blade **6** by employing threaded fasteners **14** which are secured to a raised surface **15** disposed along the bottom of the rear edge of blade **6**. The raised surface **15** is formed to extend the longitudinal length of the blade.

As can be readily observed in FIGURES 1 and 4 of the drawings, a side cutting edge **16** may be removably fastened to a transverse edge of blade **6**. It will be appreciated that in earth moving operations where two side cutting edges are required instead of one, an additional cutting edge may be removably fastened to the transverse edge opposite the one already including a side cutting edge as shown in the drawings. Conventional headed bolt fasteners **18** and threaded nut **19** may be employed in fastening the side cutting edge **16** to the blade **6**.

Generally U-shaped pockets or brackets **20** welded or otherwise suitably affixed to the convex or back surface of the blade **6** are linearly positioned along a line parallel to the longitudinal edges **9** and **11** of blade **6** and spaced in relation to correspond with the spacing of bucket teeth **5**. The orientation of the pockets readily apparent from FIGURES 5 and 6 of the drawings show that the height of each pocket is sufficient to engage the greater portion of the length of the corresponding tooth. The bight portion **22** of the U-shaped pocket is a trapezoidal plate the bases **23** of which are parallel to the longitudinal edges of blade **6**. Side plate portions **24** and **26** of the U-shaped pockets **20** are integrally formed with bight portion **22** and diverge therefrom for attachment to the convex surface of blade **6** along curvilinear areas **27** which conform to the convex contour of blade **6** along the area of attachment. Each of the transverse ends **28** and **30** of pocket **20** are coplanar surfaces and lie parallel to one another. These ends are opened to permit the exit of dirt therethrough. The pockets as previously mentioned lie along a line parallel to the longitudinal edges **9** and **11** of blade **6**. This line is disposed intermediate the longitudinal edges and in close proximity to the bottom edge **11** thereby permitting machine positioning of the blade attachment onto the backhoe bucket as illustrated in FIGURES 9, 10 and 11 of the drawings and explained as follows: the blade attachment is positioned with the concave or working surface facing downwardly upon the ground. The teeth **5** of backhoe bucket **4** are lowered toward correspondingly positioned and upwardly opening pockets **20** as shown in FIGURE 9. Upon engagement of the teeth **5** with corresponding pockets **20**, the blade **6** is forced to rotate upwardly about an axis collinear with the bottom edge **11** of the blade **6** as shown in FIGURE 10. As the teeth **5** fully engage corresponding pockets **20**, the aforementioned rotation is increased until the convex or back surface of blade **6** is positioned in abutting relation with the front edge of bucket **4** as clearly illustrated in FIGURE 11. L-brackets **32** illustrated in FIGURES 7 and 8 are utilized to secure the blade **6** in position on bucket **4**. The L-brackets contain an apertured portion **34** within an L-bracket leg **36** which is positioned to overlie a similarly positioned aperture **38** the latter located in a lateral side wall **40** of bucket **4**. Likewise, an apertured portion **42** in the second leg **44** of the L-brackets **32** is positioned to overlie a similarly positioned aperture **46** in blade **6**. The L-brackets are secured to the associated blade and bucket surfaces by employing conventional headed bolts **48**, the head portion **49** of the bolt overlying the concave blade surface and fastened by means of a washer **50** and nut **52**. It is to be noted that removal or installation of the lower cutting edge **12** and/or side cutting edge **16** is most easily accomplished when the blade has been fully attached and raised off the ground by the backhoe.

As will be appreciated from FIGURE 2 of the drawings, the two outwardly positioned pockets **54** may be constructed to accommodate correspondingly positioned, outwardly inclined teeth **56** which are provided on most commercial backhoe buckets. In such a situation the U-shaped pockets **54** are constructed with wider bight portions as well as outwardly emphasized and downwardly inclined side wall portions, the incline conforming with the corresponding incline of outward teeth **56**.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. An earth moving attachment comprising a rectangular arched blade adapted to be fastened to the entrance of a backhoe bucket, said bucket including digging teeth appendages, the contour of the blade generally conforming to the combined contour of the bucket entrance and digging teeth appendages, the convex surface of the blade abutting the bucket entrance and the forwardly facing surface of the digging teeth, pocket means affixed to said convex surface, for guiding a plurality of bucket teeth in overlying contact with the convex surface of said blade, means for fastening said blade to said bucket, said teeth retained within said pocket means when said fastening means and said bracket are attached, said guiding means including a plurality of tapered U-shaped pockets welded to said convex surface, a cross-section of said affixed pockets characterized by a polygonal profile adapted to receive a bucket tooth, each of said affixed pockets further characterized by open end, one of said ends providing access for said bucket tooth, the other of said ends providing exit means for earth material trapped within said pocket during an earth moving operation.

2. A device as recited in claim **1** wherein said plurality of pockets are linearly aligned parallel to the longitudinal edges of said blade and disposed along a line displaced from the longitudinal median line of said blade, each of said pockets presenting an upwardly facing entranceway when said blade is positioned upon a ground surface with said convex surface facing upwardly, the spacing between pockets corresponding to the spacing between said bucket teeth.

3. An apparatus as defined in claim **2** together with a cutting edge removably fastened to the lower longitudinal edge of said blade, said cutting edge maintaining a pitch identical to the pitch of said teeth.

4. A blade attachment as claimed in claim **3** wherein the blade edge opposite said cutting edge is characterized by an indentation, the length of said indentation being substantially equal to the lateral entrance dimension of said bucket, said indentation facilitating the transmittal of excavated material into said bucket.

5. A blade construction as set forth in claim **4** together with at least one cutting edge removably fastened to a side edge of said blade for permitting accurate cutting of banks.

6. An attachment device as claimed in claim **5** wherein said means for fastening said blade to said bucket include at least one apertured portion in each of the lateral side walls of said bucket, a plurality of apertured portions in said blade corresponding to the total number of apertures in said side walls, a plurality of L-brackets, each leg of said L-brackets containing at least one apertured portion therethrough, threaded fasteners connecting each of said apertures in said bucket correspondingly positioned apertures in one leg of said L-bracket and threaded fasteners for connecting each of said apertures in said blade with

correspondingly positioned apertures in the other leg of said L-bracket, and threaded means for removably retaining said aforementioned threaded fasteners within said corresponding apertures.

7. A method of machine mounting an arched blade attachment upon a toothed backhoe bucket, said blade characterized by tooth receiving pockets attached to the convex surface thereof, the steps including inverting said blade attachment and resting same upon a ground surface so that the radially outward surface of said blade faces upwardly, subjecting said pockets to downwardly moving teeth of said backhoe bucket, subjecting said blade to pivotal upward displacement about an axis collinear with a lower edge of said blade simultaneous with and dependent upon continuing engagement of said teeth with said corresponding pockets, and fastening said blade to said bucket after said engagement is completed.

8. An earth moving attachment comprising a rectangular arched blade adapted to be fastened to the entrance of a backhoe bucket, said bucket including digging teeth appendages, the contour of the blade generally conforming to the combined contour of the bucket entrance and digging teeth appendages, the convex surface of the blade

abutting the bucket entrance and the forwardly facing surface of the digging teeth, pocket means affixed to said convex surface, for guiding a plurality of bucket teeth in overlying contact with the convex surface of said blade, means for fastening said blade to said bucket, said teeth retained within said pocket means when said fastening means and said bracket are attached, said guiding means including a plurality of pockets welded to said convex surface and adapted to receive a bucket tooth, each of said affixed pockets further characterized by open ends, one of said ends providing access for said bucket tooth, the other of said ends providing exit means for earth material trapped within said pocket during an earth moving operation.

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HUGO O. SCHULZ, Primary Examiner

U.S. Cl. X.R.

37—141; 214—145