March 7, 1967 J. KONDRACKI 3,307,277

BUCKET ATTACHMENT

Filed Nov. 4, 1963 3 Sheets-Sheet 1

Fig. 1.

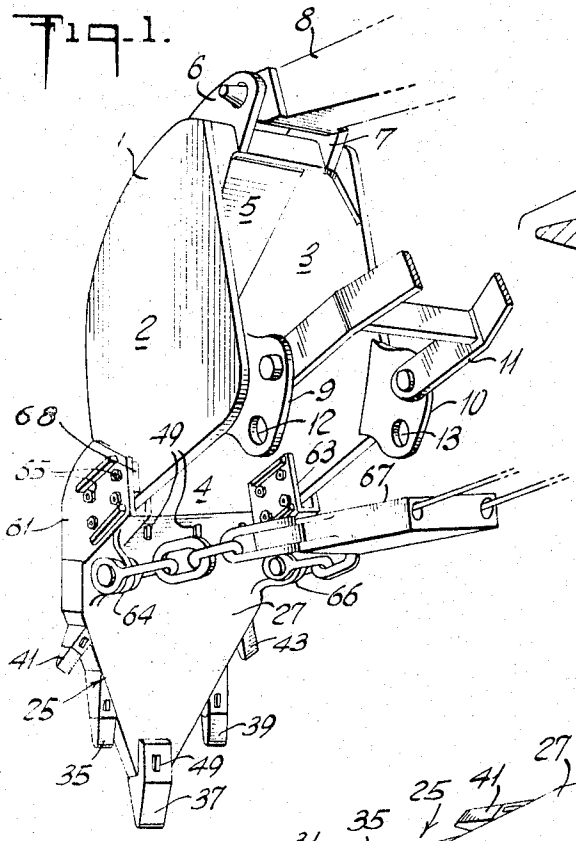


Fig. 6.

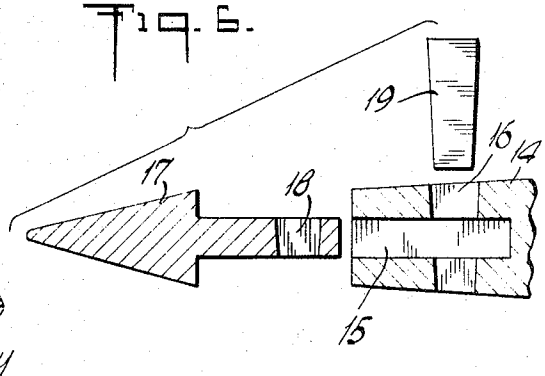


Fig. 2.

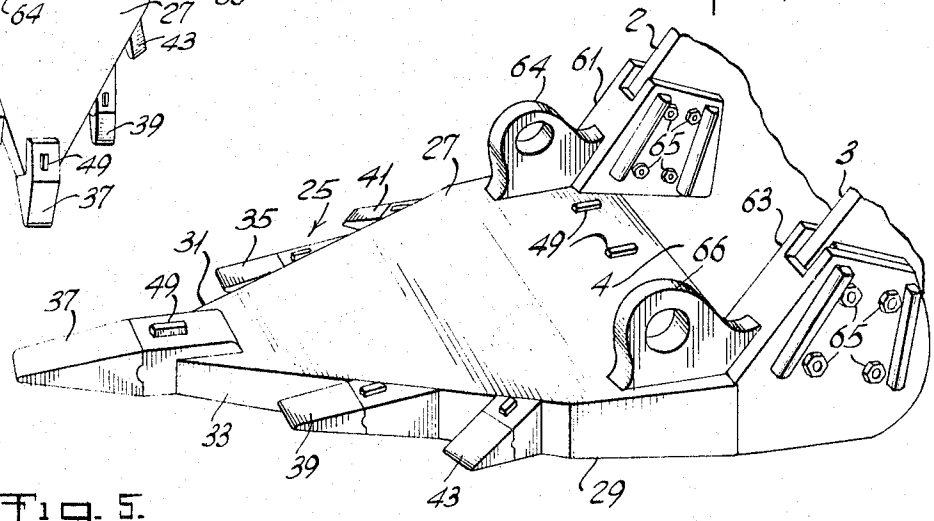
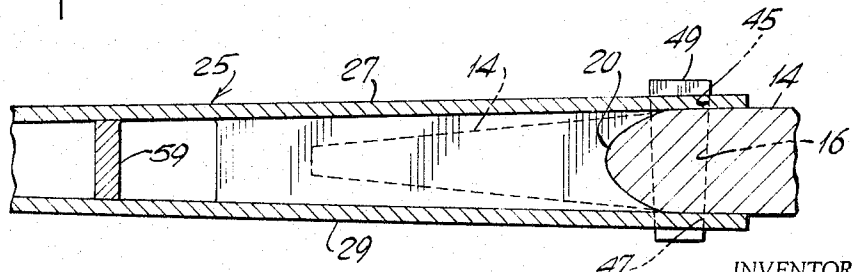


Fig. 5.



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BUCKET ATTACHMENT

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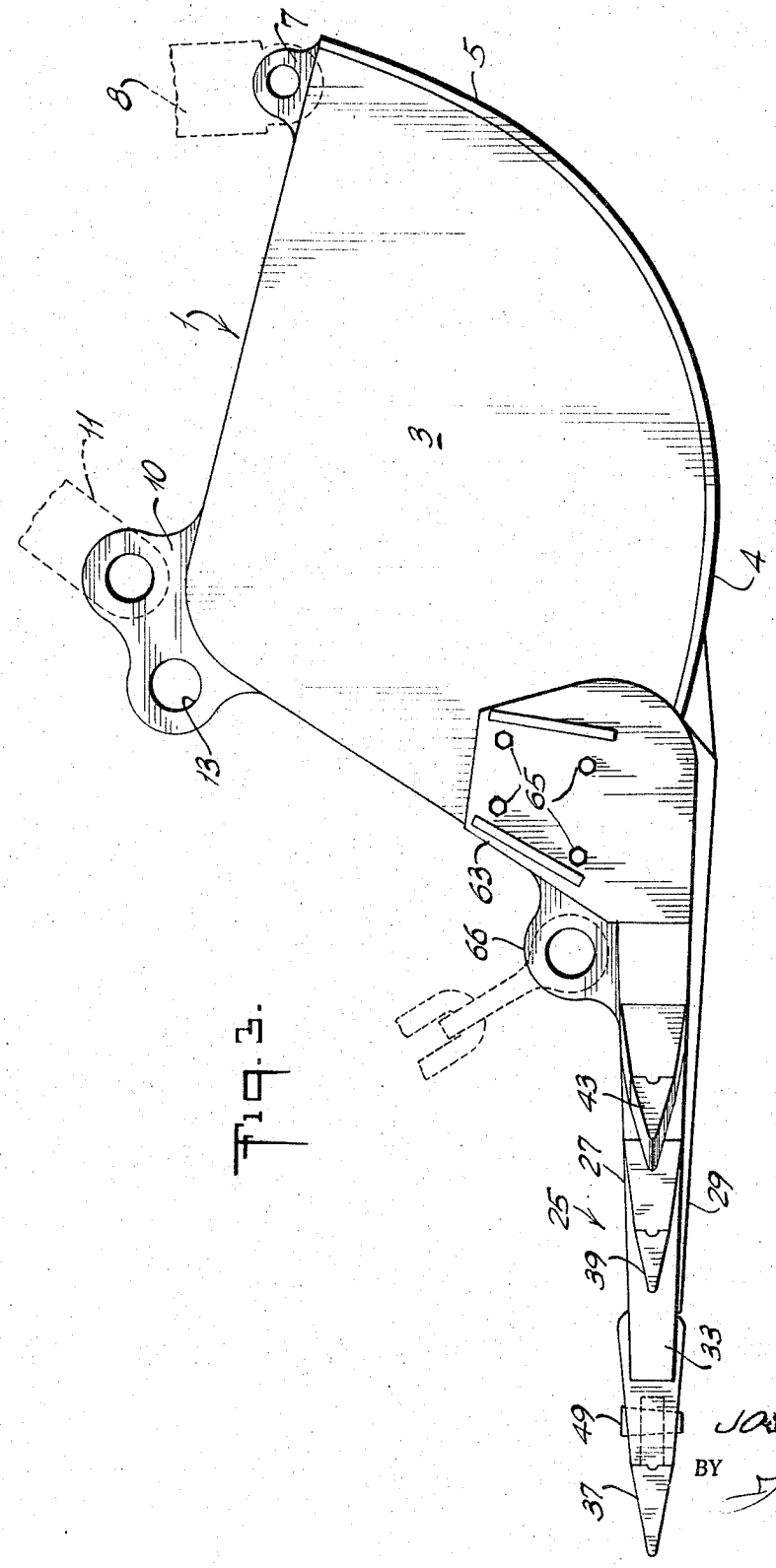


FIG. 2.

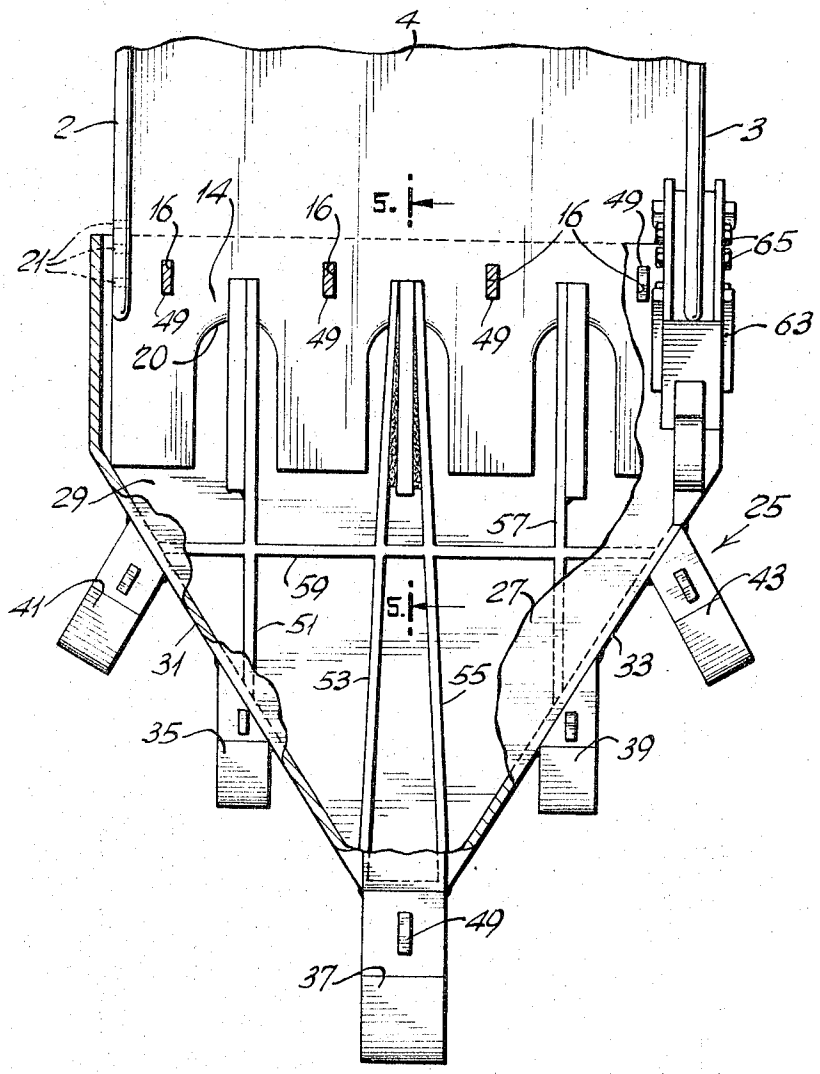
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FIG. 4.



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BUCKET ATTACHMENT

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2 Claims. (Cl. 37—141)

This invention relates to earth working implements and, more particularly to an earth scooping bucket attachment for breaking hard pan ground or the like, including shot rock in trench and rock which has ripping qualities.

The problem of digging ground which is frozen and/or hardened by pressure is well known and attempts have been made in the past to develop attachments for conventional existing buckets to readily, economically and effectively, convert the conventional bucket into a hard pan type bucket in which the teeth are arranged to successively penetrate the earth and in which the functions of breaking and loading the earth may be simultaneously accomplished in one motion.

Each of the prior devices referred to above have been unsatisfactory for one or more of a number of reasons including lack of accommodation to buckets now in use and the requirement of specific bucket design, lack of strength and rigidity, the transmission of drag and digging force through the connection of the attachment to the bucket, external attachment structure interfering with the digging operation, lack of smooth contour and obstruction or resistance to the slide of earth into the bucket, inadequate dragline leverage and lack of provision for avoiding binding of the bucket in its passage through the earth.

It is an object of my invention to provide an improved earth scooping bucket attachment.

A further object is to provide an earth scooping bucket attachment which avoids or minimizes each of the above mentioned disadvantages.

A still further object is to provide an improved earth scooping bucket attachment which is simple, rugged, reliable, effective, readily attachable and detachable and adapted to low cost manufacturing methods.

Other objects and advantages will become apparent upon reading the following description in conjunction with the accompanying drawings therein.

FIGURE 1 is a perspective view of a bucket scoop attachment incorporating my invention and shown as it is assembled on a conventional bucket.

FIGURE 2 is an enlarged perspective view of the attachment of FIGURE 1 taken approximately at right angles to FIGURE 1.

FIGURE 3 is a side elevation of the bucket and attachment.

FIGURE 4 is a plan view of the attachment and a portion of the bucket with the upper face of the attachment broken away to show the interior.

FIGURE 5 is a partial cross section taken on line 5—5 of FIGURE 4, and

FIGURE 6 is an exploded view of the tooth base, replaceable cutting wedge and securing wedge.

Referring to FIGURE 1 of the drawing there is shown a conventional bucket **1** having side walls **2** and **3**, a bottom **4**, a curved back wall **5** from which project two brackets **6** and **7** apertured to receive the pivots of a supporting boom **8** and two brackets **9** and **10** connected to the front upper portions of the side walls. The brackets **9** and **10** are formed with aligned apertures to pivot a guide boom **11**. The additional aligned apertures **12** and **13** in the brackets **9** and **10** are for the attachment of a drag line when the bucket is to be used without the attachment to be described.

Referring to FIGURE 4 the front of the conventional

bucket is formed with a forward lip portion generally indicated at **14** in FIGURES 4 and 6, the lip portion being recessed as at **15** and **16** (see FIGURE 6) to receive a cutting wedge **17** having a shank apertured as at **18** to align with the aperture **16** to receive securing wedge **19**. The portion of the lip **14** between the cutting wedge receiving portions is recessed and curved as indicated at **20** in FIGURES 4 and 5.

Referring to FIGURE 4 a plurality of spaced apertures **21** are formed in the lower forward portion of the side walls **2** and **3** to attach conventional side cutters (not shown) by bolts or other suitable means. The bucket as above described is conventional and serves its purpose as a general use scoop type bucket.

To convert the bucket for use in digging hardened earth applicant provides in accordance with one preferred embodiment of his invention, the attachment generally indicated by the numeral **25**. It may be noted at this point that before securing the attachment **25** to the bucket **1** the side cutters (not shown) which are used with the bucket in normal digging and which are bolted to the sides **2** and **3** through the apertures **21** are removed. Also the securing wedges **19** and the cutting wedges **17** are removed. As will be explained hereinafter the side wall apertures **21** and the apertures **16** in the bucket lip **14** are used in securing the attachment **25** to the bucket **1**.

Referring to FIGURES 2, 4 and 5 the attachment **25** comprises upper and lower plates **27** and **29** forwardly converging toward each other and having also forwardly converging sides to which side plates **31** and **33** are fixed by welding or other suitable means. The attachment body thus formed presents a progressively reduced cross-sectional area in the direction of the forward end of the attachment.

Projecting forwardly from the body of the attachment are provided teeth **35**, **37** and **39** and projecting forwardly and laterally from opposite sides of the body of the attachment are provided teeth **41** and **43**. Each of the above mentioned teeth are of the type having a base, a cutting wedge and a securing wedge similar to that described above and shown in detail in FIGURE 6. The base of the teeth are welded or otherwise secured to the body of the attachment **1**.

As shown in FIGURES 4 and 5 the plates **27** and **29** are spaced to receive therebetween the lip **14** of the bucket and the plates **27** and **29** are apertured respectively at **45** and **47** in alignment with apertures **16** in the lip **14** to receive securing wedges **49**. The wedges **49** resist forces tending to pull the attachment **25** forwardly from the bucket.

Welded or otherwise secured between the plates **27** and **29** are compression struts **51**, **53**, **55** and **57**. Each of the struts **51**, **53**, **55** and **57** is forwardly disposed and aligned between a portion of the lip **14** of the bucket and an associated tooth to directly transmit digging force to the lip of the bucket and to avoid the development of force on any of the detachable means connecting the attachment **25** to the bucket. The rear portions of the struts are of increased cross-section to increase strength and bearing surface. This may be accomplished in the forming of the strut or by welding plates to the struts as indicated in FIGURE 4 or by any other suitable means. The rearwardly facing portion of each strut is curved as indicated in FIGURE 5 to mate with the curvature **20** of the bucket lip. Also in the preferred embodiment double slightly diverging struts **53** and **55** are applied to tooth **37** to aid in lateral stability and to take the added stress associated with the forwardly positioned tooth **37**. A cross-strut **59** aligned between the teeth **41** and **43** is welded or otherwise secured to the attachment sides **31** and **33**, to the plates **27** and **29** and to the struts **51**, **53**, **55** and **57**

to provide lateral rigidity and resistance to the lateral force of the side digging teeth 41 and 43.

Secured to the attachment body by welding or other suitable means and forming part of the attachment 25 are U-shaped brackets 61 and 63 adapted to closely receive between the sides of each bracket the lower forward portions of the respective bucket side walls 2 and 3. Brackets 61 and 63 are formed with apertures for alignment with the apertures 21 of the bucket sides and are secured thereto by bolts 65 or other suitable means. A removable shim as indicated at 68 in FIGURE 1 is provided between one side of the bracket 61 and bucket side 2 to provide for easy removal and mounting of the attachment. It will be noted from FIGURE 3 that the brackets 61 and 63 and the apertures 45 and 47 in the plates are selected such that the upper surface of the plate 27 inclines slightly downward from a plane including the forward section of the bucket 1 such that earth, as it is scooped, passes more readily to the interior of the bucket.

Welded to the plate 27 and to the brackets 61 and 63 are dragline eyelets 64 and 66 for attachment of an in-haul line 67 as shown in FIGURE 1 to effect additional leverage and to apply the drag force to the attachment itself rather than to transmit the torque force to the connecting means.

Several advantageous features of the invention should now be apparent. In the first instance, it will be noted that the attachment requires no modification of standard buckets now in use and utilizes the same apertures in the bucket lip and side walls as are used in attaching the conventional teeth cutting wedges and the conventional side cutters.

An additional advantage is that the drag force is applied to the bracket itself, affording increased leverage and avoiding the transmission of torque force through the attachment connecting elements.

A further advantage as noted from FIGURE 3 is that the bottom of the attachment is completely free of projecting obstructions.

Other advantages include the combination of a broad, unobstructed throat passage to the bucket, an angular relation of the attachment upper plate surface to the adjacent surface of the bucket to reduce resistance to the passage of earth into the bucket and the progressive tape of the body of the attachment to avoid friction and to promote a smooth entry.

Also of importance are the provision and arrangement of the side cutting teeth 41 and 43 and the disposition and arrangement of the struts providing a direct connection between opposing forces and a direct transfer of force from the digging teeth to the lip of the bucket.

While applicant has shown and described a particular preferred embodiment of his invention, it will be obvious to those skilled in the art that various changes and modifications may be made without departing from the true spirit and scope of the invention as defined in the appended claims. In particular, it is to be noted that it could well be formed in part or in whole of castings rather than by welding.

I claim:

1. For an earth scooping bucket of the type having side walls apertured to receive connecting means for attaching

side cutters and a lip portion having spaced apertures to receive a plurality of teeth securing wedges, an attachment to replace said side cutters and teeth comprising a body portion, a plurality of digging teeth and a pair of bracket members, said body portion having forwardly converging sides, curved rear portions to engage said bucket lip and conform to the curvature thereof, and rearwardly projecting upper and lower plates spaced to accommodate said bucket lip therebetween and having apertures spaced to align with the spaced apertures of the bucket lip, said digging teeth being integral with said attachment body sides, said bracket members having apertures to align with the apertures of the bucket side walls to receive through said brackets and side walls securing bolts.

2. An attachment for an earth scooping bucket of the type including side walls apertured adjacent lower forward portions thereof to detachably receive side cutters and a bottom having a digging lip presenting curved portions and forwardly directed spaced teeth each detachably secured to the bucket by wedges received through aligned apertures in the bucket bottom and teeth, said attachment being adapted to replace the bucket teeth and side cutters and comprising a body formed of upper-lower and side plates integral with forwardly disposed compression struts, said plates having apertures adjacent the rear edges thereof to align with the apertures in said bucket bottom to receive securing wedges and hold the front portion of said bucket bottom between said plates, said body sides and plates being forwardly converging to present a progressively reduced cross-section in the forward direction, a plurality of forwardly projecting teeth having base portions integral with said body and detachable cutting wedges, said compression struts being aligned between said teeth base portions and portions of the bucket lip to transmit digging force to the bucket lip, the rear ends of said compression struts being curved to mate with the bucket lip, angularly disposed side cutting teeth each having a base integral with said body and projecting laterally beyond the width of said attachment to provide clearance for bucket in digging, U-shaped securing members integral with said body and adapted each to receive the lower forward portion of the bucket sides, said members having apertures arranged to align with the apertures in said bucket sides to receive therethrough detachable securing means, and drag line eyelets integral with said body adjacent said securing members to limit the dragging force to the attachment and avoid the development of forces on the means connecting the bucket to the attachment.

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