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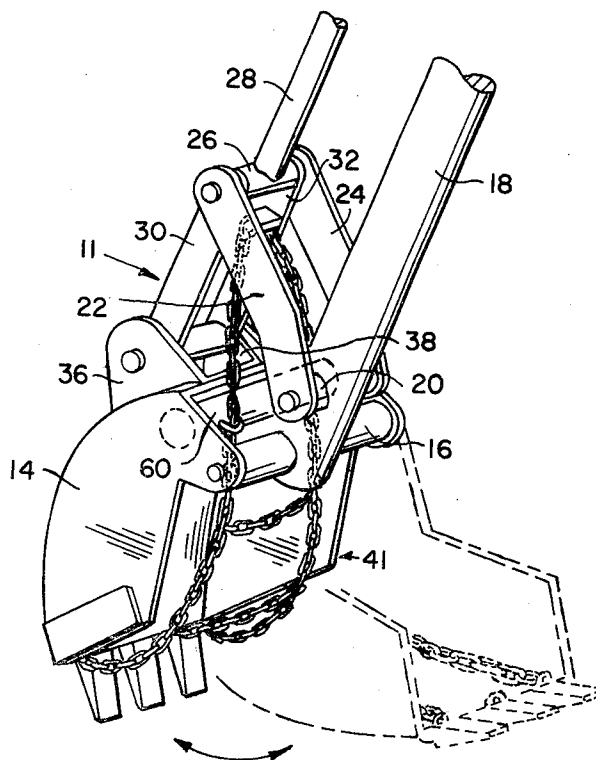
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[54] **SELF-CLEANING BACK HOE**  
6 Claims, 3 Drawing Figs.

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**ABSTRACT:** A chain arrangement is provided in operative association with a back hoe bucket and bucket-positioning mechanism in such a manner that the chain arrangement is positioned on the bottom of the bucket when scooping operations are being carried out and is propelled outwardly of said bucket when the contents of the bucket are being dumped.





## SELF-CLEANING BACK HOE

## BACKGROUND OF THE INVENTION

The present invention relates to back hoe equipment, and more particularly, to an arrangement whereby material is positively ejected from the buckets of such back hoes when the buckets are in a discharge position.

Back hoes are widely employed in a wide variety of earth moving operations such as ditch digging, trenching, foundation work, etc. In the course of carrying out these operations a great deal of time is lost in maintaining the interior of the back hoe bucket free of dirt and other material which tends to accumulate therein. Cleaning is usually done by the operator of the back hoe who must periodically get off the equipment and remove the built-up dirt from the bucket with a suitable tool. In addition to the ordinary dirt built-up problems, claylike or wet soil conditions may result in a completely filled bucket, the contents of which are difficult or impossible to dislodge without direct attention by the operator.

While ejectors or cleanout devices have been employed in the past in various types of earth handling equipment, most such devices have been characterized by their complexity of operation and high expense. In addition, many of these prior art arrangements do not readily adopt themselves for use with a black hoe.

## SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a relatively simple, inexpensive, but durable arrangement for assisting in the ejection of material from a back hoe bucket.

It is a further object of the present invention to provide an ejector for use with a back hoe bucket which is automatic in its operation, requiring no manipulation on the part of the back hoe operator.

## DESCRIPTION OF THE DRAWINGS

The above-noted and other objects of this invention will be understood from the following description taken with reference to the drawings wherein:

FIG. 1 is a perspective view illustrating the bucket portion of a back hoe machine which has operatively associated therewith an ejector mechanism in accordance with the teachings of the present invention;

FIG. 2 is a longitudinal cross-sectional view illustrating the back hoe bucket and ejector arrangement of FIG. 1; and

FIG. 3 is a cross-sectional view taken along the line 3—3 of FIG. 2.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1 of the drawing, reference numeral 11 is used to indicate generally the working portion of a back hoe machine. Since the remainder of the back hoe machine may be presumed to be of a conventional nature, in the interest of simplicity only the portion of the machine which is necessary to the proper understanding of the present invention has been illustrated. The working end of the machine includes a bucket 14 which is hingedly mounted in any desired fashion on cross arm 16 which is fixedly secured to bucket support column 18.

A second crossarm 20 which is shorter in length than crossarm 16 is disposed further up the column 18. Hinged mounted on crossarm 20 are two link arms 22 and 24. Link arms 22 and 24 are pivotally secured at their respective other ends to a cross arm 26 which is welded or otherwise secured to bucket positioning arm 28. Also pivotally secured to crossarm 26 is a second pair of link arms 30 and 32 which, as may be seen most readily in FIG. 3, are fixedly secured to a cross pin 34 which is hingedly positioned between two bracket members 36 and 38 which are integrally formed on the bottom of bucket 14. It may be readily understood that reciprocal movement of bucket positioning arm 28 causes through the cooperative interaction of the link arms a corresponding pivotal movement of bucket 14.

FIG. 1 illustrates the two extreme positions which may be attained by bucket 14 under the influence of bucket positioning arm 28. The position illustrated in solid lines is that assumed by the bucket when unloading or emptying thereof is desired. Upon downward movement of bucket positioning arm 28 the bucket will assume the position illustrated in broken lines. This is the position which is assumed by the bucket during the digging or scooping operation.

Ejector apparatus in accordance with the teachings of the present invention is designated generally by means of reference numeral 41. The ejector apparatus comprises a plurality of elongated chain elements 42 and 44 which are interconnected at spaced intervals by short lengths of chain 46 and 48. At their lowermost ends as depicted in FIGS. 1 and 3, elongated chain elements 42 and 44 are connected to eyes 50 and 52 which are secured to bucket 14 in the vicinity of the outermost cutting teeth associated with the bucket. Elongated chain elements 42 and 44 at their respective upper ends are connected to an eye 54 which is integrally attached to a support block 56 extending between link arms 30 and 32. Extending across the interior of bucket 14 in the vicinity of the point of interconnection between the bucket and cross arm 16 is a spacer arm 60 which is secured to the sidewalls of the bucket. As may be seen most readily with reference to FIG. 3, a pair of guide brackets 62 and 64 are secured to the spacer arm 60. Elongated chain elements 42 and 44 pass through guide brackets 62 and 64 and the guide brackets are large enough to permit free sliding movement of the chain elements therein. Guide brackets 62 and 64 serve to maintain elongated chain elements 42 and 44 in a substantially parallel condition along substantially the full length of the bucket. This, of course, serves to prevent chain intanglements and, in addition, insures that the chain elements of ejector 41 are positioned for maximum efficiency of operation.

FIG. 2 illustrates clearly the manner of operation of ejector apparatus 41. When the bucket 14 is in the solid line or scooping position, elongated chain elements 42 and 44 are in a slack condition since the distance between eye 54 and eyes 50 and 52 is substantially less than the length of the elongated chain elements. Ejector apparatus 41 therefore lies along the bottom of bucket 14 under the influence of gravity. With ejector apparatus 41 in this position, it does not unduly interfere with the digging or scooping operations being carried out. When, however, bucket 14 is pivoted to its dumping position, i.e., the position illustrated in broken lines in FIG. 2, eye 54 moves upwardly and outwardly with respect to eyes 50 and 52 since eye 54 is fixedly positioned between the movable link arms 30 and 32 which have swung further away from bucket 14. When the bucket is in this discharge or dumping position, which is the position illustrated in solid lines in FIG. 1, ejector apparatus 41 will be pulled outwardly from the bucket since elongated chain elements 42 and 44 are stretched over a longer distance. The outward movement of ejector apparatus 41 forces the contents of the bucket outwardly thereof. This operation is especially important where claylike or other similar soils are found since outward movement of the ejector apparatus will break a vacuum that may be created between the bucket and materials of this nature. However, the invention has application in any work environment where dirt built up in the bucket can occur since such buildup is prevented by the periodic movement of the ejector apparatus. It should be pointed out that the ejector apparatus need not assume the precise configuration illustrated in the drawings. For example, more elongated chain elements may be added to the ejector apparatus in the event a wider bucket is employed.

I claim:

1. In combination, a back hoe bucket having a bottom and sidewalls, said bucket being movable from a first position wherein said bucket is adapted to dig material to a second position wherein dug material is dumped from said bucket, bucket placement means including link arm means operatively associated with said bucket to selectively move said bucket between said first and second positions, and ejector means operatively associated with said bucket and said bucket place-

ment means whereby relative movement between said bucket and bucket placement means positions said ejector means on the bucket bottom when said bucket is in said first position and moves said ejector means outwardly of said bucket when said bucket is in said second position to assist in expelling material from the bucket, said ejector means comprising a plurality of elongated chain elements connected between said bucket and said link arm means, a plurality of interconnecting chains extending between said elongated chain elements, spacer means operatively associated with said elongated chain elements to maintain the same in substantially parallel relationship over substantially the full length of said bucket, said spacer means comprising at least one spacer arm extending across the full width of said bucket and connected to the sidewalls thereof and a plurality of guide means affixed to said arm at spaced predetermined locations, each of said guide means slidably accommodating one of said elongated chain elements.

2. In combination, a back hoe bucket having bottom and sidewalls and a digging end, bucket support and placement means including a bucket support arm to which the bucket is pivotally attached and a bucket placement arm to which the bucket is pivotally attached, said bucket placement arm being adapted upon longitudinal movement toward said bucket to move said bucket toward a digging position and being adapted upon longitudinal movements away from said bucket to move

said bucket toward a dumping position, and ejector means including at least one chain element having one end attached to the bucket adjacent the digging end thereof and the other end attached to the bucket placement arm, whereby movement of said placement arm to move said bucket to a digging position results in the positioning of said ejector means on the bottom wall of the bucket and movement of said placement arm to move said bucket to a dumping position is adapted to result in movement of said ejector means outwardly of said bucket.

3. The apparatus according to claim 2 wherein said ejector means comprises a plurality of elongated chain elements connected between said bucket and said bucket placement arm.

4. The apparatus according to claim 3 wherein a plurality of interconnecting chains extend between said elongated chain elements.

5. The apparatus according to claim 3, further comprising spacer means operatively associated with said elongated chain elements to maintain the same in substantially parallel relationship over substantially the full length of the bucket.

6. The apparatus according to claim 3 wherein said bucket placement arm includes a pair of spaced link arms mounted for relative movement with respect to said bucket and having a cross pin extending therebetween, said elongated chain elements being connected to said bucket placement arm by being secured to said cross pin.

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