Jan. 31, 1939. N. H. REYNOLDS 2,145,663

ATTACHMENT MEANS FOR DIGGING TEETH AND EXCAVATING BUCKETS AND THE LIKE

Filed Sept. 28, 1936

Fig. 1.

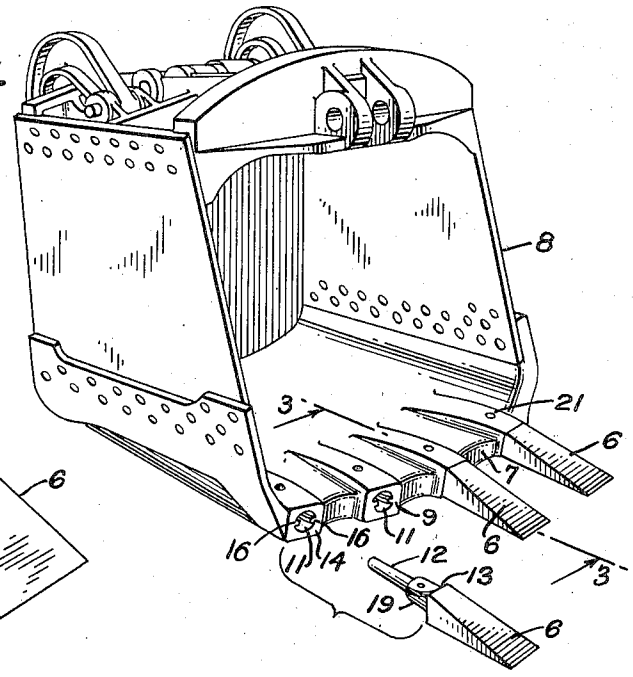


Fig. 2.

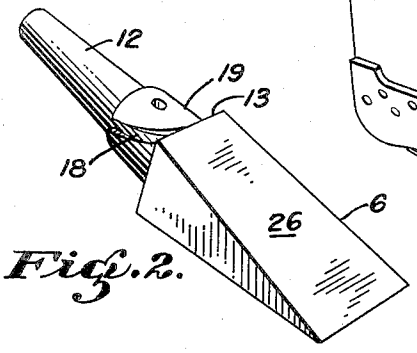


Fig. 3.

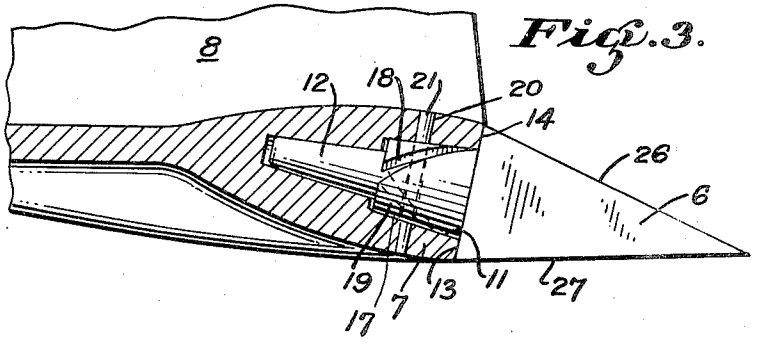
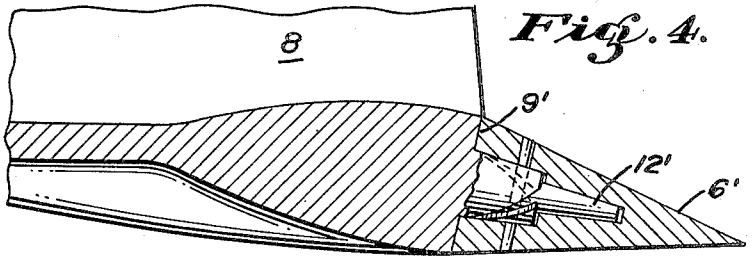


Fig. 4.



INVENTOR.
NAZRO H. REYNOLDS.
BY Joseph B. Gardner
ATTORNEY

Patented Jan. 31, 1939

2,145,663

UNITED STATES PATENT OFFICE

2,145,663

ATTACHMENT MEANS FOR DIGGING TEETH AND EXCAVATING BUCKETS AND THE LIKE

Nazro H. Reynolds, Alameda, Calif.

Application September 28, 1936, Serial No. 102,941

5 Claims. (Cl. 37—141)

The invention relates to excavating buckets and dippers and more particularly to the digging teeth used in connection with such implements and means of attaching such teeth to the bucket or dipper.

As will be understood, the ground engaging teeth commonly used on the front lip of an excavating bucket or dipper or the like are subjected to considerable wear and strain and for this reason it is highly desirable that such teeth be removably secured to the bucket so that the same may be replaced in the event of breakage and etc. However, the removable securing of such teeth to the front lip of an excavating bucket or dipper or the like has heretofore presented a major problem in that the fastening means employed have either, on the one hand, been so loose as to provide an inefficient engagement of the teeth in the earth or other material being excavated, or on the other hand, the fastening means have permitted of the packing of earth and other material into the securing joint and so solidly fixed the teeth to the lip as to make the removal of the teeth extremely difficult. In accordance with the present invention, and as a principal object thereof, I have provided a means of attachment for the teeth and bucket lip of the character described which will positively and firmly hold the teeth against any undesired movement relative to the bucket or dipper or the like, and yet which will permit the ready and simple removal of the teeth from the bucket and their ready replacement.

Another object of the invention is to provide an attachment means of the character described which will enable the reversal of the teeth incident to the wearing of one side of the teeth.

A further object of the invention is to provide an attachment means of the character described which is so designed and constructed as to well withstand the wear and strain to which the same is subjected for a substantially unlimited period of use.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adapted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figures 1 and 2 are perspective views of an excavating dipper and digging teeth provided with an attachment means of the present invention.

Figure 3 is a longitudinal sectional view of the bucket and one of the teeth and is taken substantially on the plane of line 3—3 of Figure 1.

Figure 4 is a longitudinal sectional view similar to Figure 3, but showing a modified form of the invention.

An attachment means of the present invention, and as illustrated in the accompanying drawing is adapted for securing a set of ground engaging or digging teeth 6 to the front lip 7 of an excavating dipper 8 or bucket or the like. As will be seen from Figures 1 and 3 the lip 7 is provided with a series of transversely spaced longitudinally extending enlargements 9 in which are formed a series of longitudinal openings or sockets 11. On the other hand, each of the teeth 6 is provided with a longitudinal shank 12 which is adapted for insertion into one of the sockets 11 so as to abut a shoulder 13 on the tooth, formed by the reduction thereof at the shank, against the end lip face 14 of the enlargement 9. Preferably, each of the sockets taper from the end face 14 and in conformity therewith the shanks are preferably tapered from the shoulder 13 so as to snugly and precisely engage in the sockets.

As a particular important feature of the present invention, the tooth shanks and sockets are provided with a spiral engagement means which is effective upon rotation of the teeth relative to the bucket to cause a longitudinal displacement of the teeth relative to the sockets. In the preferred form of the invention a pair of spiral guides 16 are provided on the interior of the enlargement 17 in the socket and which slidably engage in a pair of spiral grooves 18 formed in the periphery of an enlarged portion 19 on the shank. A pin 21 is preferably extended through the socket and shank at said enlarged portion for holding the tooth and socket against relative rotation, and if desired, such pin may be tapered in conformity with tapered openings 20 in the body portion of the lip to facilitate the withdrawal of the pin, the corresponding opening in the tooth shank however being preferably straight sided to enable the reversal of such shank in the socket as will be more fully hereinafter described.

It will now be seen that the tooth is firmly secured in the sockets not only by the relatively long tapered engagement of the shank and socket, but also by the substantial length of engagement of the spiral guides and grooves, and in

addition, by the direct engagement of the pin 21. In contrast to previous type of structure using rivets, bolts or other types of shear pins for holding the teeth on the lip of the bucket, and where such pins were required to withstand the total longitudinal force on the teeth, the pins 21 of the present construction need only hold the teeth against rotation and are greatly reenforced in the longitudinal stress by the spiral guides and grooves.

Perhaps most significant of the advantages of the attachment provided by the present construction, is the ease with which the teeth may be removed from the sockets even though by reason of a long period of use earth and other material packs into every available opening and crevice of the joint. In loosening one of the teeth from the bucket sockets the pin 21 is first removed and then the tooth subjected to a twisting action which will immediately loosen the tooth from any impacted material and on subsequent turning of the tooth, the same will be dislodged from the socket by the action of the spiral guides and grooves. Also, as will be understood, any material which has packed into the grooves will not, when once loosened from the tooth impede the spiral displacement of the tooth inasmuch as such impacted earth itself will lie along the spiral course of the grooves.

Also by reason of the change of size of the shank and socket at the enlarged portions 17 and 19 a pair of opposed shoulders 23 and 24 are defined in the socket and on the shank which, in the innermost position on the tooth, are adapted to abut and substantially preclude the entrance of earth or other material to the closely engaged inner reduced shank and socket portions.

Another important feature of the present invention is the use of the arrangement of the spiral guides and grooves on the socket and shank portion of the tooth which enables a reversing of the tooth sides 26 and 27. This is preferably effected by disposing the guides and grooves at diametrically opposed positions on the socket and shank so that the same may be secured together with either side 26 or 27 of the teeth exposed to the earth for digging.

A slightly modified form of the invention has been illustration in Figure 4 wherein the shank and socket portions have been reversed as to their association with the bucket and tooth. In the form illustrated in Figure 4 the shank 12' is mounted on an enlarged edge face 9' of the bucket and the tooth 6' is provided with a socket 11' for the accommodation of shank 12'. Preferably the shape of the shank and socket portions, as well as the guide and grooves, etc., used in connection with the first embodiment, are substantially the same as above described.

I claim:

1. An attachment means for a ground engaging tooth and an excavating bucket or the like comprising, interfitting tapered shank and socket portions on said tooth and bucket, and means on said portions, for effecting the longitudinal displacement of said tooth and socket incident to the relative rotative movement therebetween and permitting of a reversal in positioning of said tooth relative to said bucket.

2. An attachment means for a ground engaging tooth and an excavating bucket or the like comprising, interfitting tapered shank and socket portions on said tooth and bucket, one of said portions being formed with a pair of diametrically spaced longitudinally extending spiral grooves, and a pair of longitudinally extending spiral guides formed on the other of said portions and engageable with said grooves for effecting the longitudinal displacement of said tooth and socket incident to the relative rotative movement therebetween and permitting of a reversal in positioning of said tooth relative to said bucket.

3. In a device of the character described the combination with a tooth holding member for a ground digging tooth, cooperating portions on said member and tooth operative to move the tooth longitudinally of said member upon rotation of the tooth relative to the member, said portions being engageable with each other in reversely related positions, and means on the tooth and holding member cooperating to limit the rotative movement of the tooth relative to the member and being so designed that the tooth will be positioned reversely depending on relation of engagement of said cooperating portions.

4. An attachment means for a ground digging tooth and an excavating bucket or the like comprising, interfitting shank and socket portions on said tooth and bucket, a plurality of interengaging devices on said shank and in said socket providing a longitudinal displacement of said tooth with respect to said socket incident to a rotative displacement of one relative to the other, and cooperating means on said tooth and bucket limiting the rotational and longitudinal movement of said tooth relative to said bucket.

5. A ground digging tooth adapted for use with an excavating bucket, and having a tapered shank extending from the rear of the tooth and provided with a plurality of spiral grooves on said shank, said bucket being provided with a tapered socket for receiving said shank, and means in said socket engageable in said spiral grooves in reversible positions of said tooth for effecting a longitudinal displacement of said tooth relative to said bucket incident to the relative rotative movement of said tooth.

NAZRO H. REYNOLDS.