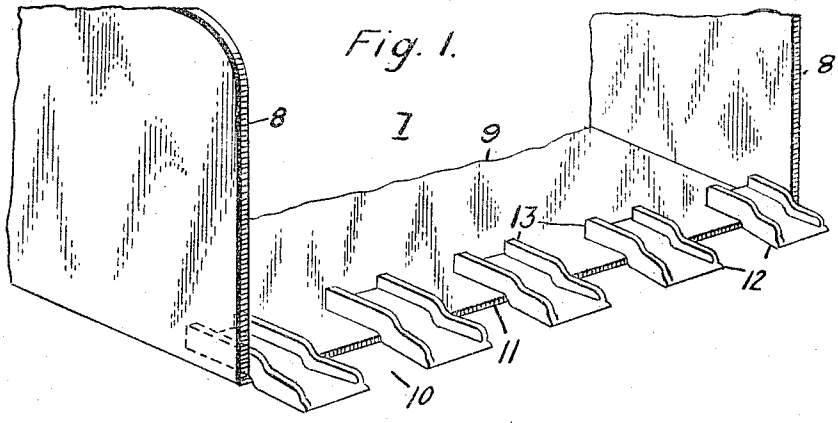
Jan. 13, 1925. 1,522,860

J. H. BOOTS

TEETH FOR EXCAVATING AND DREDGING BUCKETS

Filed April 30, 1923

Fig. 1.



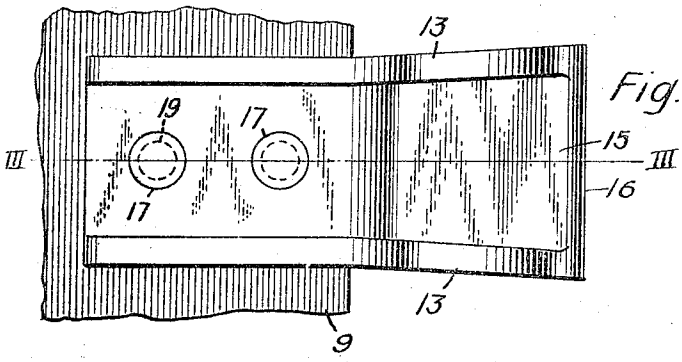




Fig. 2.

Fig. 3.

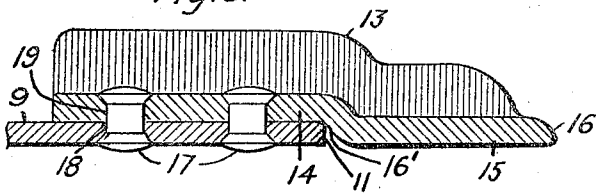



Fig. 4.

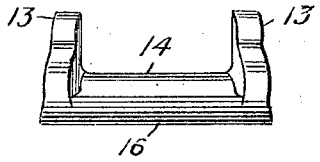



Fig. 5.

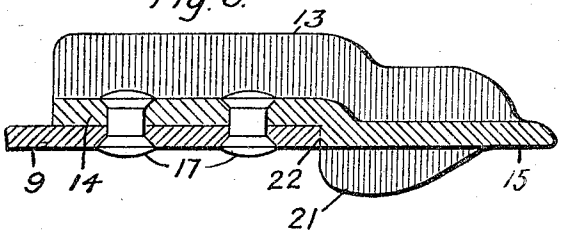
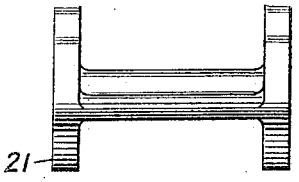



Fig. 6.




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Patented Jan. 13, 1925. 1,522,860

# UNITED STATES PATENT OFFICE.

JAMES H. BOOTS, OF BEAVER FALLS, PENNSYLVANIA.

## TEETH FOR EXCAVATING AND DREDGING BUCKETS.

Application filed April 30, 1923. Serial No. 635,475.

*To all whom it may concern:*

Be it known that I, JAMES H. BOOTS, a citizen of the United States, and a resident of Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Teeth for Excavating and Dredging Buckets, of which the following is a specification.

My invention relates to excavating buckets and particularly to the teeth usually secured to the cutting edge of the bucket for facilitating the penetration of the entrance edge of the bucket into the material.

Certain excavating buckets have been heretofore provided with relatively blunt and thick pointed teeth which project beyond the cutting edge of the bucket for the purpose of gouging into and breaking up the material being excavated and assisting in the penetration of the shell of the bucket into the material. The teeth, naturally receive many shocks and are subjected to abrasive materials and consequently have been made of rugged construction wherein the cross section of the tooth is substantially square and of relatively large proportions at a point an inch or so from the pointed end.

As the point of the tooth wears away it becomes blunt and offers great resistance to penetration and finally instead of assisting in the filling operation of the bucket becomes an actual hindrance. In such an event the teeth must be removed from the bucket, and replaced by new teeth, which operation necessitates expensive removal and rerivetting operations in addition to the cost of the bucket teeth. It is not always expedient to renew the teeth because the bucket must be taken from service during the renewal operation and consequently buckets are frequently operated at reduced efficiency due to worn teeth because of the expense involved in time and wages of operators during the interval of idleness.

One object of my invention is to provide a bucket tooth that presents a relatively thin and sharp cutting edge at all times and which remains sharp and efficient so long as an effective portion extends beyond the edge of the bucket shell.

Another object of my invention is to provide a bucket tooth of channel shape which is provided with reinforcing side flanges extending substantially from end to end of the tooth and wherein the cross section of the tooth is substantially uniform throughout the major portion of its length on either side of the cutting edge of the plate, and wherein the tooth is equal in strength to the usual blunt tooth of solid cross section.

Another object of my invention is to provide a bucket tooth having the above characteristics wherein the tooth is formed from a flat metal plate by a die pressing operation and which may subsequently be tempered and hardened as desired.

Another object of my invention is to provide a bucket tooth of substantially channel shape that may be attached to the inside of the bucket shell and which has a projecting portion offset from the body of the tooth in such manner that its under surface is substantially flush with the under surface of the shell.

A further object of my invention is to provide a bucket tooth of substantially channel shape having a flared projecting cutting portion wherein the cutting edge of the tooth is slightly wider than the body for reducing resistance to penetration and for preventing choking and clogging of material between the teeth of the bucket.

These and other objects that will be made apparent throughout the further description of my invention are attained by means of the bucket tooth hereinafter described and illustrated in the accompanying drawings, wherein—

Figure 1 is a fragmental perspective view of the front end of an excavating bucket shell provided with bucket teeth made in accordance with my invention;

Fig. 2 is an enlarged plan view of the bucket tooth shown attached to the cutting edge of a bucket shell.

Fig. 3 is a longitudinal sectional view of the tooth taken on the line III—III of Fig. 2.

Fig. 4 is an end view of the bucket tooth shown in Figs. 2 and 3.

Fig. 5 is a longitudinal sectional view of a modified form of bucket tooth, and

Fig. 6 is an end view of the tooth shown in Fig. 5.

Referring to the drawings the front portion of an excavating bucket shell 7 of standard construction is illustrated in Fig. 1, the bucket consisting of metal side plates 8 and a sheet metal cutting plate 9 having a cutting edge 11 adapted to cut into the material when the bucket is being filled. Buck-

ets of this character are usually mounted on a movable arm carried on an excavating machine and operated in a well-known manner. However, the improved teeth may be applied to various forms of excavating buckets such as dredge scoops and clam shell buckets.

The cutting edge is provided with a plurality of cutting teeth 12 as indicated in Fig. 1 which are spaced apart a distance substantially equal to the width of the teeth for gouging into the material being excavated and breaking it up for facilitating the penetration of the cutting plate 9 into the material.

The cutting teeth 12 are of channel shape and are made of flat sheet metal, the flanges 13 thereof extending substantially from end to end of the body 14, constituting the tooth, and disposed substantially at right angles thereto as indicated in Figs. 2, 3 and 4.

The portion 15 of the body of the tooth projecting beyond the cutting edge 11 of the bucket is flared slightly from the cutting edge of the cutting plate 9 toward the cutting edge 16 of the tooth, thus providing a tooth having a cutting edge of greater width than the main body of the tooth for the purpose of providing a space 10 between the adjacent teeth of expanding width from the cutting edge of the teeth toward the rear thereof for facilitating penetration of the tooth and for preventing clogging of material between the teeth.

The projecting portion of the tooth is offset at the point 16′ in such manner that the under surface of the tooth is substantially flush with the under surface of the cutting plate as indicated in Fig. 3. This construction wherein the plane of the projecting cutting portion of the tooth is in the same plane as the cutting plate of the bucket reduces resistance to penetration and facilitates operation. As indicated in Fig. 3, the flanges 13 preferably conforms in contour to the body of the tooth and are of such height that the tooth is amply reinforced and is of sufficient strength to withstand the severe duty imposed upon it. The proportions of the flanges are, of course, a matter of design and may be varied to suit operating conditions.

By reason of the simple channel shape of the tooth, it may be made from flat sheet metal by a simple stamping or pressing operation, the metal preferably being worked while heated and subsequently tempered. However, the teeth may be made of cast steel if desired.

The teeth are relatively thin compared with the usual teeth of solid cross section and are substantially uniform in cross section and consequently remain sharp regardless of wear and will operate efficiently so long as an effective portion projects from the cutting plate. In fact the teeth are self-sharpening.

The teeth are secured to the bucket shell by means of rivets 17 that extend through countersunk perforations 18 and 19 in the cutting plate, and tooth, respectively. The shoulder 16′ provided by the offset portion of the tooth engages the cutting edge of the plate 9 and prevents longitudinal movement of the tooth and consequently prevents transverse shearing stresses being directly applied to the rivets during the penetrating operation.

In Figs. 5 and 6 I have shown a modified form of tooth substantially resembling the tooth shown in Figs. 2, 3 and 4, except that the cutting portion is not flared and is provided with flanges 21 projecting from the under side of the tooth adjacent the cutting edge of the cutting plate 9 of the bucket. A square shoulder 22 is provided on the under side of the tooth which abuts the cutting edge of the bucket and relieves the rivets of shearing stresses. The flanges 21 serve to reinforce the projecting portion of the tooth and assist in breaking up the material as the tooth is thrust into it. The tooth may be made from a flat metal sheet by a hot pressing operation, or may be cast.

The teeth made in accordance with the disclosure are inexpensive to manufacture and remain sharp and efficient regardless of wear and may readily be applied to standard buckets of the scoop or clam shell type.

While I have illustrated but two embodiments of my invention it will be apparent to those skilled in the art that various changes, modifications, substitutions, additions and omissions may be made in the apparatus illustrated without departing from the spirit and scope of my invention, as set forth in the appended claims.

I claim as my invention:

1. An excavating bucket tooth comprising a flat metal plate having side flanges extending substantially from end to end of the tooth and at an angle to the plate, one end of the tooth being adapted to overlap the cutting edge of the bucket and the other end being provided with means whereby the tooth may be attached to the shell of the bucket.

2. An excavating bucket tooth comprising a flat metal plate having side flanges extending substantially from end to end of the tooth and at an angle to the plate, one end of the tooth being adapted to project beyond the cutting edge of the bucket and being flared toward the cutting edge of the tooth to provide a cutting edge of greater width than the body of the tooth.

3. An excavating bucket tooth comprising a metal tooth of channel shape from substantially one end of the tooth to the other and of substantially uniform cross section

throughout its length, one end of the tooth being adapted to overlap the cutting edge of the bucket and being provided with means whereby the tooth may be attached to the shell of the bucket.

4. An excavating bucket tooth comprising a flat metal plate adapted to be secured to the bucket shell in such manner that a portion thereof projects beyond the cutting edge of the shell, the said plate being provided with side flanges that extend substantially from the cutting edge of the tooth to a point beyond the cutting edge of the bucket shell whereby the tooth is reinforced to prevent bending of the tooth about the cutting edge of the shell when stresses are applied to the end of the tooth during operation.

5. An excavating bucket tooth comprising a flat metal plate adapted to be secured to the inner side of a bucket shell in such manner that a portion thereof projects beyond the cutting edge of the shell, the said plate being offset at a point adjacent the cutting edge of the shell in such manner that the under surface of the tooth is substantially flush with the under or outer surface of the said shell and provided with integral side flanges extending substantially from the cutting edge of the tooth to a point beyond the cutting edge of the shell.

6. An excavating bucket tooth comprising a flat metal plate adapted to be secured to a bucket shell in such manner that a portion thereof projects beyond the cutting edge of the shell, the said plate being provided on its upper side with a pair of integral side flanges extending substantially from the cutting edge of the tooth to a point beyond the cutting edge of the shell and on its under side with a pair of side flanges extending substantially from the cutting edge of the shell toward the cutting edge of the tooth, for the purpose of reinforcing the tooth against bending stresses applied at the point of the tooth.

7. An excavating bucket tooth comprising a flat metal plate adapted to be secured to a bucket shell in such manner that a portion thereof projects beyond the cutting edge of the shell, the said plate being provided on its upper side with a pair of integral side flanges extending substantially from the cutting edge of the tooth to a point beyond the cutting edge of the shell and on its under side with a pair of substantially triangular side flanges extending substantially from the cutting edge of the shell toward the cutting edge of the tooth and terminating adjacent the said cutting edge.

In testimony whereof, I have hereunto subscribed my name this 23d day of April 1923.

JAMES H. BOOTS.