N. M. DICKSON.

EXCAVATOR TOOTH.

APPLICATION FILED JUNE 16, 1916.

1,216,290. Patented Feb. 20, 1917.

FIG. 1.

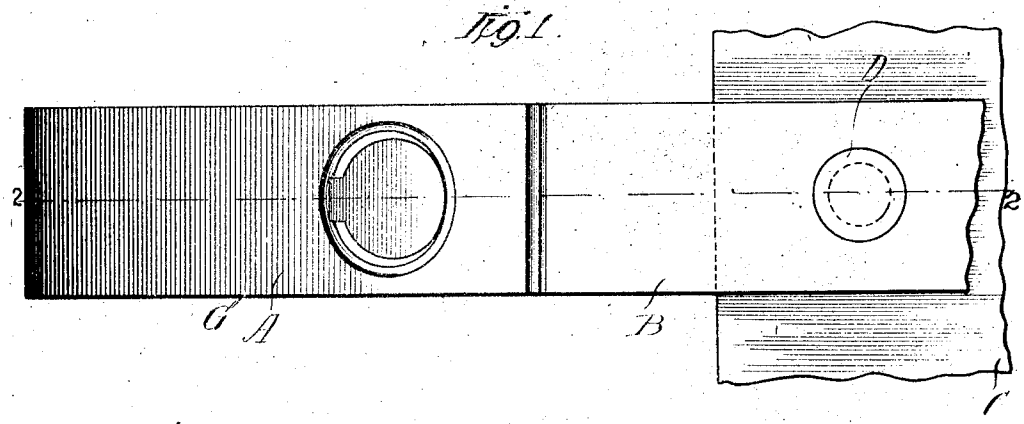



FIG. 2

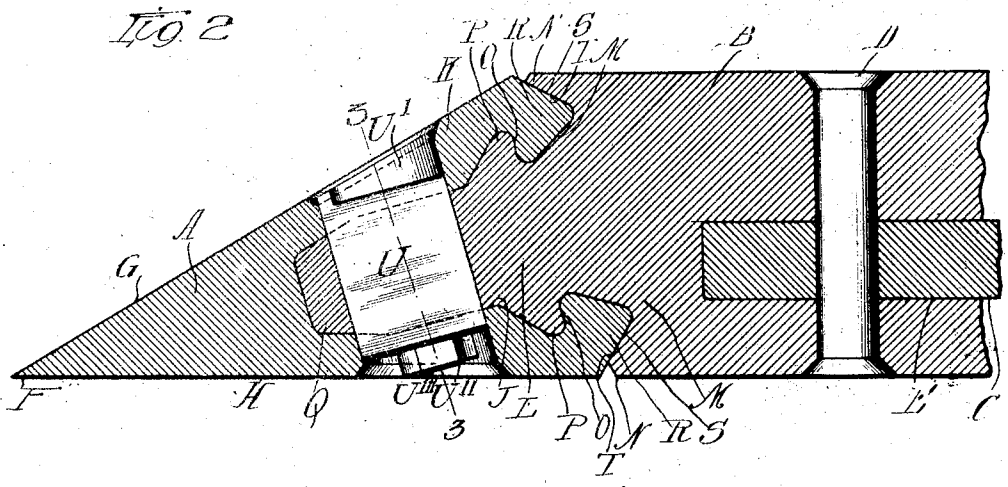



FIG. 3.

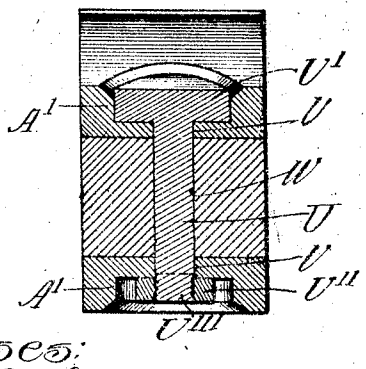
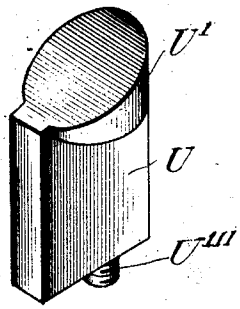



FIG. 4




Witnesses:
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# UNITED STATES PATENT OFFICE.

NORMAN MURRAY DICKSON, OF CHICAGO, ILLINOIS.

## EXCAVATOR-TOOTH.

1,216,290. Specification of Letters Patent. Patented Feb. 20, 1917.

Application filed June 16, 1916. Serial No. 104,102.

*To all whom it may concern:*

Be it known that I, NORMAN MURRAY DICKSON, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Excavator-Teeth; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to excavator buckets and has special reference to an improved tooth for the cutting or scraping edge of such a bucket.

The object of my invention is to provide a removable and renewable point for an excavator tooth; which shall be reversible; which shall be easily locked in position, and as easily unlocked for removal; which shall be formed to interlock with the base of the tooth by transverse movement relatively thereto; and which when once in position shall, with the tooth base, form a tooth substantially as solid and rigid as a one-piece tooth.

A further object of my invention is to provide a connection between the point and the base which can be readily and cheaply produced, which shall hold the point with maximum strength against the severe strains to which such devices are subjected, and which shall prevent the point from changing its shape, while in use, and which, therefore, permits the easy removal or reversal of the point when desired.

My invention consists in the several features of construction and the arrangements and combinations of parts whereby I am enabled to attain the above-mentioned and other objects, and all as hereinafter described and particularly pointed out in the appended claims.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, and in which:

Figure —1— is a fragmentary top plan view of an excavator tooth embodying my invention.

Fig. —2— is a vertical longitudinal sectional view on the line 2—2 of Fig. 1.

Fig. —3— is a vertical cross-sectional view on the line 3—3 of Fig. —2—.

Fig. —4— is a perspective view of the key.

An excavator tooth is a relatively heavy massive device and the only part which is subject to an appreciable wear is the forward end or cutting edge. For purposes of economy in the use of metal, and for convenient renewal, the point is made removable. This also permits the point to be made of a different grade of material than the body of the tooth and usually the point is made harder than the main part of the tooth in order to better withstand the wear and tear of use.

In said drawings A is the point of the tooth, B is the base, and C represents the forward edge of an excavator bucket to which the tooth is adapted to be secured by rivets D. The base B is provided with a slot E to receive the edge of the bucket and the rivet D passes through the upper and lower parts of the base and binds the tooth firmly upon the bucket edge.

The point A is wedge-shaped, the point or edge of the wedge forming the forward or cutting edge F of the point, and the inclined sides of the wedge being arranged to form the upper and lower surfaces G and H respectively, of the point.

The connection between the tooth and the base is such that these parts are engaged with and disengaged from each other by a relative lateral movement and is further so constructed and arranged that all strains and stresses to which the tooth is subjected during excavation in a general direction longitudinally of the tooth or in vertical planes parallel or substantially parallel with the side faces thereof, exert a tension on a part of the base sufficiently strong to resist the same, and also exert a pressure on another part of the base amply strong enough to bear the same.

In use the excavator bucket is forced forward into the material to be removed, the teeth on the forward edge entering, cutting and loosening the material. Preferably the lower face of the tooth is in a plane coincident with that of the lower face of the base, and which is preferably parallel with the bottom of the bucket. Consequently the upper surface of the point projects upwardly from the edge of the point, in position to receive strains which tend to tip or

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force the point downwardly and pry it off of the base. In other words, the strains and impacts to which the point is subjected, in use, are principally vertical and downward, and I effectively oppose these strains by the connecting joint I form between the point and the base.

Above and below a central plane cutting the edge of the point A, I form the point and the forward end of the base B exactly symmetrical so that the tooth can be placed upon the base with either inclined face G or H uppermost. This reversibility adds to the life of the tooth for when it is partly worn off and the upper surface then projects at too great an angle to the horizontal, the tooth is turned over and the substantially unworn lower surface presents the proper angle to the material being excavated.

I provide the rear end of the point with a central transverse slot or opening J which extends from side to side of the point and provides the point with an upper and a lower rearwardly projecting arm K, and I provide the forward end of the tooth base B with a projecting end L adapted to fit closely within said transverse slot J and substantially fill same. At the point where the projection L joins the main body of the base I provide transversely extending upper and lower parallel grooves or slots M, and I form these slots of dove-tail shape having narrow mouths N. I arrange the front walls of these slots in a coincident plane and substantially at right angles to the central plane of the tooth. The forward walls of the slots M are the rear walls of the upper and lower transverse ribs P. I decrease the vertical thickness of the projection L beyond the ribs P to correspond with the decreasing thickness of the point, and for the purpose of providing sufficient metal for proper strength in said upper and lower arms K. The extreme point Q of the projection T is tapered as shown, for the same purpose.

As described, the projection L and the slot J which receives it are shaped like an arrow head.

I form the extreme rear ends of said arms K with transverse dove-tail ribs R which are adapted to fit within the grooves M in the base and lock the two parts together against relative longitudinal movement. The rear surfaces S of these ribs are inclined inwardly and rearwardly and bear against the similarly inclined rear walls T of the slots M, consequently any rearward thrust against the point which is transmitted to these parts does not tend to open up or spread the arms M, of the point, but rather tends to make them bind upon the projection L more tightly. Furthermore, the rear walls T of the slots M overhang the ribs R of the point and resist any force which would tend to spread the arms M and thus free the point A from the base.

It will be observed that during excavation, the face H of the tooth is presented to the earth and is subjected to strain and wear. The resistance offered by the earth to the face H of the tooth will tend to turn said tooth on the point of the projection Q as a fulcrum. This would impart a tension strain on the projection P nearest adjacent the face H and a compression strain upon the walls of the V-shaped recess or slot M at the lower end or edge of the base, both of said parts being amply strong enough to resist such strains and stresses.

It should be understood that while the drawings illustrate the joint between the point and the base as being very close and accurate, in practice this joint is usually slightly open, there being just freedom enough provided to permit the point to be easily entered sidewise into place upon the base.

To hold the point against transverse removal once it has been placed in position, I provide a thin flat key U and I provide the point, and the projection L with registering openings V and W respectively, to receive this key. The key extends through the parts at right angles to the central plane of the point, and I provide the outer ends of the openings V with large flat bottomed recesses A′, one at each side to receive the head U′ of the key and the nut U″ with which the key is secured in place. The two recesses A′ are exactly similar, the bottoms thereof being parallel to the central plane of the point and parallel with each other so that whichever opening receives the nut it will bear squarely upon the bottom thereof. The point of the wedge is provided with a screw-threaded U‴ to receive the nut U″. The head U′ conforms with and fills the recess A′ in which it is received, and I arrange the key with the head in the upper side of the point, consequently this upper side is substantially smooth and without any depression which would offer wearing edges.

In assembling the point upon the base, the point is placed sidewise into position, the several ribs sliding into their respective grooves, and when placed centrally upon the base the key openings register and the key is then driven down into position, being finally locked against removal by the nut.

In excavating in stony ground, it will be obvious that the excavator tooth will "sideswipe" large stones and pebbles firmly embedded in the earth, thereby subjecting the joint between the tooth and base to severe lateral or torsional strain which is, of course, transmitted in some degree to the key U, requiring the latter to be of such dimensions and material as to withstand

such strains. It will be seen that in the construction illustrated the key is relatively large and presents a large area to resist all lateral or torsional strains, and further that the end of the base is solid and, therefore, will not spread under the influence of lateral or torsional strains.

The connection between the point and the base is exceedingly strong, the point can be easily placed in position and secured, and it can be easily and quickly reversed when desired.

I claim as my invention:

1. An excavator tooth comprising a point having equal divergent arms equipped with inwardly extending projections at their free ends, and a base provided with a projection adapted to enter and fill the space between said arms and provided with edge recesses adapted to receive said projections for preventing relative longitudinal movement of said parts, said tooth reversible on said base for alternately presenting opposite edges of said tooth to wear.

2. An excavator tooth comprising a point having equal divergent arms equipped with inwardly extending projections at their free ends, and a base provided with a projection adapted to enter and fill the space between said arms and provided with edge recesses adapted to receive said projections for preventing relative longitudinal movement of said parts, said tooth reversible on said base for alternately presenting opposite edges of said tooth to wear, said projection on said base extending at an angle to the longitudinal axis thereof, whereby the wearing edge of the tooth is disposed flush with one edge of the base.

3. An excavator tooth comprising a point having equal divergent arms equipped with inwardly extending projections at their free ends, and a base provided with a projection adapted to enter and fill the space between said arms and provided with edge recesses adapted to receive said projections for preventing relative longitudinal movement of said parts, a wall of each of said recesses overhanging and engaging the free ends of the arms of said tooth for preventing spreading of the same.

4. An excavator tooth comprising a point having equal divergent arms equipped with inwardly extending projections at their free ends, and a base provided with a projection adapted to enter and fill the space between said arms and provided with edge recesses adapted to receive said projections for preventing relative longitudinal movement of said parts, said tooth reversible on said base for alternately presenting opposite edges of said tooth to wear, and a key engaging in openings in said arms and an opening in said projection of said base for preventing relative lateral movement of said parts.

5. An excavator tooth comprising a point having equal divergent arms equipped with inwardly extending projections at their free ends, and a base provided with a projection adapted to enter and fill the space between said arms and provided with edge recesses adapted to receive said projections for preventing relative longitudinal movement of said parts, said tooth reversible on said base for alternately presenting opposite edges of said tooth to wear, and a key engaging in openings in said arms and an opening in said projection of said base for preventing relative lateral movement of said parts, a wall of each of said recesses overhanging and engaging the free ends of the arms of said tooth for preventing spreading of the same.

6. An excavator tooth comprising a point having equal divergent arms equipped with inwardly extending projections at their free ends, and a base provided with a projection adapted to enter and fill the space between said arms and provided with edge recesses adapted to receive said projections for preventing relative longitudinal movement of said parts, said tooth reversible on said base for alternately presenting opposite edges of said tooth to wear, a key engaging in openings in said arms and an opening in said projection of said base for preventing relative lateral movement of said parts, a head at one end of said key, a threaded shank at the other end thereof, and a nut for said shank, said head and nut adapted to be interchangeably received in recesses in the edges of arms of the point.

7. An excavator tooth comprising a base and a wedge-shaped point adapted to be removably secured on the base and provided with a central transverse slot in its rear end providing upper and lower rearwardly projecting symmetrical arms, the base having a projection fitting between said arms, the base and point provided with vertical registering slots for receiving a key, said key slot ending in identical recesses in the upper and lower sides of the point, a key fitting in said slot and having a head on one end adapted to fill one of said recesses, and a screw-threaded point on the other end, a nut on said screw-threaded end received in said other recess.

In testimony whereof I have signed my name in presence of two subscribing witnesses.

NORMAN MURRAY DICKSON.

Witnesses:

M. M. BOYLE,

R. W. LOTZ.