Feb. 14, 1961 H. H. SMEDLEY 2,971,280

EXCAVATOR TOOTH

Filed March 11, 1957

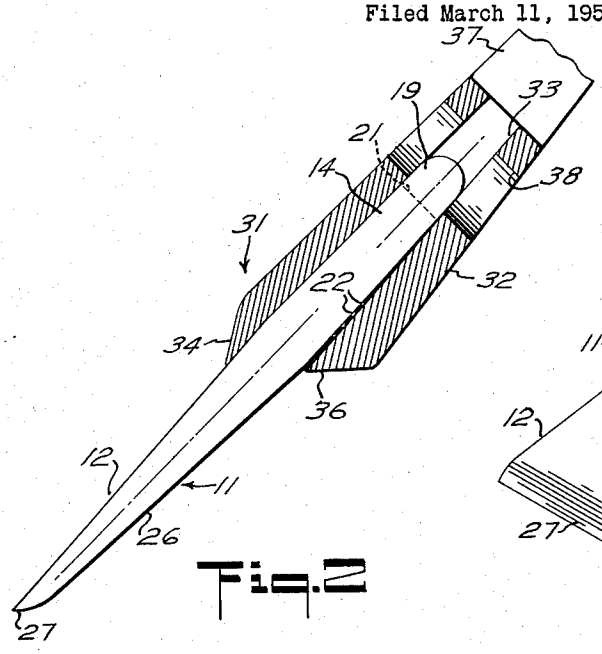


Fig. 2

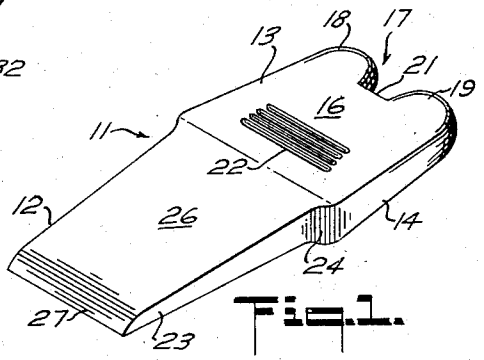


Fig. 1.

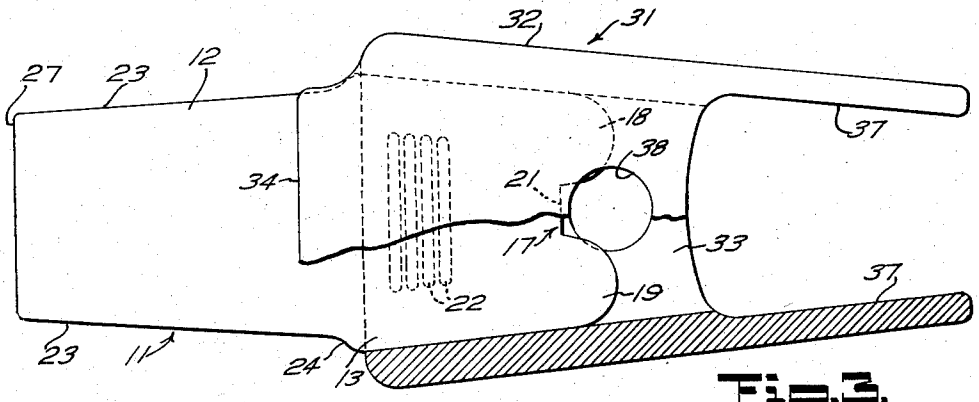


Fig. 3.

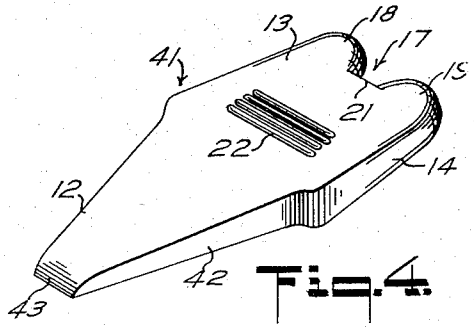


Fig. 4.

INVENTOR
HARRY H. SMEDLEY
BY
Gardner & Zimmerman
ATTORNEYS

United States Patent Office 2,971,280 Patented Feb. 14, 1961

2,971,280

EXCAVATOR TOOTH

Harry H. Smedley, 3142 Harrison St., Oakland, Calif.

Filed Mar. 11, 1957, Ser. No. 645,048

1 Claim. (Cl. 37—142)

The present invention relates to an improved digging tooth for removable attachment to the digging edges of excavating equipment such as ditching machines, scoop shovels, digging buckets and the like.

In excavating machinery it has become common practice to provide removable and sometimes adjustable teeth which serve as the cutting edge or edges of the equipment and a further refinement in the art has been the provision of replaceable teeth tips. Conventionally, teeth tips are reversible to provide maximum life thereof before replacement and are formed of hard long wearing metals to withstand continued driving through the earth.

In considering the requirements of excavating teeth and more particularly the tips therefor it will be appreciated that the tip must have a maximum strength possible for the size thereof as well as providing a maximum cutting ability i.e., providing a cutting edge requiring the least possible force to drive same into or through the earth. In addition the tip engagement with the tooth must be quite rigid and firm for any relative movement allowed will rapidly result in damage to one or the other because of the tremendous stresses under which same are often required to operate. A further requirement is that despite the firmness of tooth-tip engagement required these elements must be easily and rapidly separable for no matter how good the tip severe wear can be expected and not infrequent tip reversal or replacement is necessary.

Accordingly it is an object of the present invention to provide an improved excavator tooth having an engaging tip of maximum strength.

It is another object of the present invention to provide an excavator tooth with improved tip engagement for minimized tip drag and maximum tip strength.

It is a further object of the present invention to provide an improved tooth-tip engagement of maximized rigidity and facile detachment.

It is yet another object of the present invention to provide an improved tip for an excavator tooth with maximized strength and minimized drag in cutting.

The invention possesses other objects and features of advantages, 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 adopted within the scope of the invention as set forth in the claim.

The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a perspective view of an improved tip for an excavator tooth in accordance with the present invention.

Figure 2 is an elevational view of the tip in engagement with an excavator tooth partially shown and in section.

Figure 3 is a plan view of the tip in engagement with an excavator tooth partially shown in section.

Figure 4 is a perspective view of an alternative tip embodiment also in accordance with the present invention.

Considering now the structural details of a preferred embodiment of the invention and referring first to Figure 1 of the drawings, there is shown therein a tooth tip **11** formed as a single integral element of a strong long wearing material such as molybdenum steel or the like suitably treated to enhance the strength thereof. The tip **11** comprises two main portions serving separate functions and thus herein separately denominated. The forward portion of the tip may be termed the blade **12** and in axial alignment therewith and extending longiutdinally rearward from the blade is the shank **13**. The shank portion of the tip serves the function of mounting the tip and while various shank configurations are known in the interests of maximum strength the herein illustrated shank **13** is formed as a solid billet of rectangular cross section. The shank **13** has a maximum width and height at the blade terminus and thus the shank sides **14** taper together away from the blade, as do the top and bottom **16**.

In addition to the above-described shank configuration the rear end of the shank is deformed from planar for maximum strength and to facilitate tip removal, as set forth more fully below. The rear of the shank **13** has a central depression **17** which may be formed by a pair of like curved contours **18** and **19** extending rearwardly of the shank and transversely inward whereat they are joined by an indented straight end **21**. There is further provided as a part of the shank **13** a plurality of ribs **22** disposed upon at least the bottom of the shank and also on the top if desired. These ribs **22** extend but slightly from the planar shank surfaces and are preferably disposed generally transversely of the shank for providing a gripping action with elements adapted to engage same.

As regards the tip blade **12** or forward portion of the tip **11**, same is formed as a solid member and of the same material as the shank inasmuch as both comprise an integral element. In manufacture the tip is formed of one billet of metal so as to have maximum strength. The blade sides **23** are generally planar and are offset from the shank sides **14** at the juncture therewith by a fillet **24** displacing the blade sides inward of the shank sides. The blade top and bottom **26** are generally planar and taper evenly together away from the shank as do the blade sides **23** away from the fillet **24**. At the forward edge of the blade there is formed a cutting edge **27** formed by an upward curve of the bottom into linear intersection with the top.

It is of particular note that the maximum width and maximum height of the tip hereinabove described occurs at the juncture of blade and shank. Also, it will be appreciated that inasmuch as the tip comprises a single element the denomination of portions thereof as blade and shank is somewhat arbitrary so that in order to further define these terms the shank is taken as the rear tip portion adapted to fit wholly within a tooth socket. With this definition of the tip shank it follows that the tip blade extending from a tooth body has a decreasing height and width away from the same, for reasons set out below.

The excavating tooth **31** of the present invention includes, in additon to the removable tip described above, a tooth body **32** as seen in Figures 2 and 3. The tooth body is preferably formed as a single unit having a socket **33** of rectangular cross section formed therein at the outer end thereof. The body socket **33** is partially defined by upper and lower jaws **34** and **36**, respectively, which taper away from the socket edges and the upper jaw **34** extends beyond the lower jaw **36**. The socket has a rectangular cross section tapering together away from the opening thereof at substantially the same

taper as the tip shank so that the latter is adapted to fit therein in intimate contact with the socket walls. Similarly the upper jaw **34** is adapted to engage the tip blade to impart maximum strength thereto. The upper jaw of the socket will be seen in Figure 2 to extend beyond the blade-shank juncture of the tip so as to bear upon the upper surface of the blade and blade insertion is possible because of the ribs on the shank under surface allowing the tip to slide past the socket upper jaw. With the maximum tip cross section located at the outer edge of the lower jaw **36** and the upper jaw bearing upon the upper blade surface the torque or bending moment on the tip during use is adequately compensated for so that maximum tip strength is provided.

In addition to the foregoing tooth body configuration, the upper jaw **34** thereof is reduced in width from the main body size and curved outward thereto in alignment with the tip fillet **24** so that no drag is produced by the upper jaw during use of the tooth in excavating. At the rear of the tooth body there are provided a pair of rearwardly extending ears **37** which provide means for mounting the tooth upon equipment such as an excavator as by welding thereto.

Provision is made for rapid and facile tip removal as for reversal or replacement by forming a transverse aperture **38** through the tooth body near the inner socket end and centrally thereof, as shown in Figure 3. This aperture partially overlays the rear tip edge at the depression **17** thereof when the tip is fully inserted in the socket so that a tapered pin may be inserted in the aperture **38** and upon being driven further therein bears on the tip to force same out of the socket. The advantage of some form of tip release will be understood from noting that normal tooth use may tend to further seat the tip in the socket so that a very tight fit results which can only be forceably separated.

It will be seen from Figures 2 and 3 that the lower tooth socket edge or jaw **36** substantially aligns with the juncture of blade and shank on the tip when the tip is inserted in the tooth socket and that the blade size steadily decreases away from the tooth body. This is of importance in that a maximized tip cutting action is afforded thereby. Inasmuch as in excavating and material handling as herein contemplated rather deep cuts are common, the tip blade is often employed in its entirety for

cutting, i.e., the depth of cut approaches or equals the blade length. It is thus advantageous to reduce or eliminate the drag or resistance of the tip portion adjacent the tooth body. To this end the tip of the present invent provides a particular configuration wherein the blade proper extends at least to the tooth body without structural enlargements or protuberances which resist the passage of the blade through a material such as earth being handled. At the same time the tip strength is maximized by location of maximum tip height and width at a position of great stress, and by the upper jaw contacting overhang.

A further tip embodiment **41**, as shown in Figure 4, is like the embodiment of Figure 1 with the exception of the blade taper which is made considerable as regards the blade sides **42**. In this instance a narrow blade edge **43** is provided for particular applications where a somewhat pointed blade configuration is advantageous. The blade structure insofar as maximum width and height location remains the same as the embodiment of Figure 1 and thus the blade **41** retains all of the advantages set out above.

What is claimed is:

An excavator tooth comprising a rigid tip having an integral blade and shank with maximum tip width and height at the blad shank juncture; and an integral rigid body having a tapered socket adapted to receive and envelop all of said tip shank and including a rigid upper jaw having a portion extending outwardly of said socket into contact with at least a part of said tip blade and said portion having tapered sides extending no further than the blade sides, and the maximum width of the opposed edges of said blade having a lesser width than that of said body and merging therewith in a substantially continuous pattern.

References Cited in the file of this patent

UNITED STATES PATENTS

177,973	Trissler	May 30, 1876
1,816,710	Young	July 28, 1931
1,920,703	Lewellyn	Aug. 1, 1933
2,319,464	Massa	May 18, 1943
2,703,938	Launder	Mar. 14, 1955
2,840,934	Hazzard et al.	July 1, 1958