Sept. 6, 1955 E. L. LAUNDER ET AL 2,716,822

DIGGER TOOTH MOUNTING

Filed Aug. 21, 1946

Fig. 1.

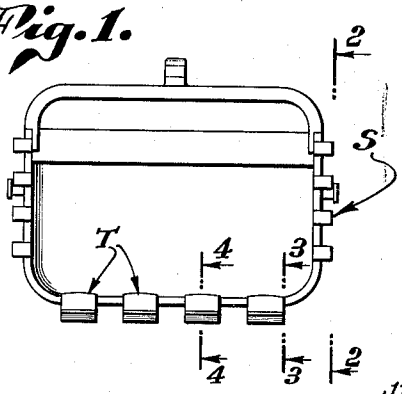


Fig. 2.

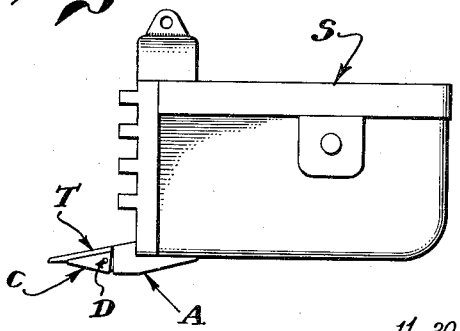


Fig. 3.

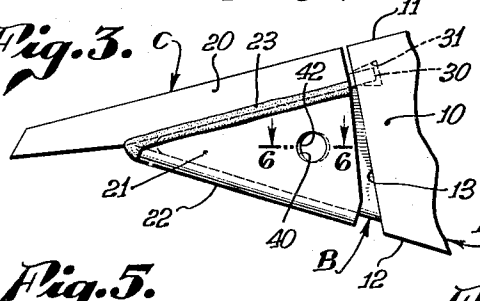


Fig. 4.

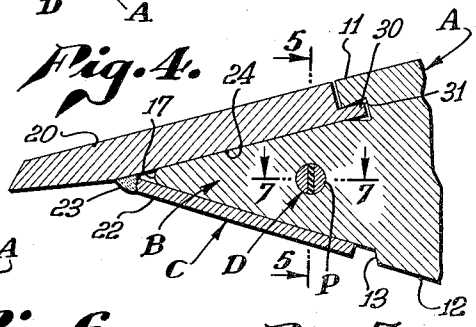


Fig. 5.

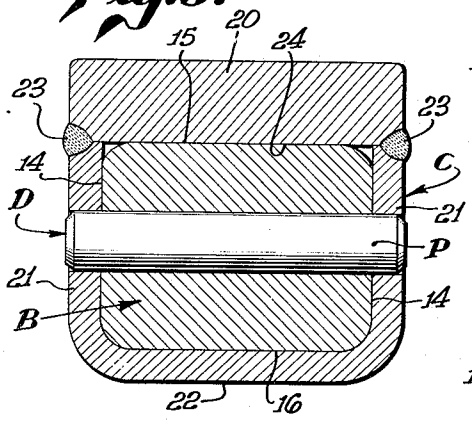


Fig. 6.

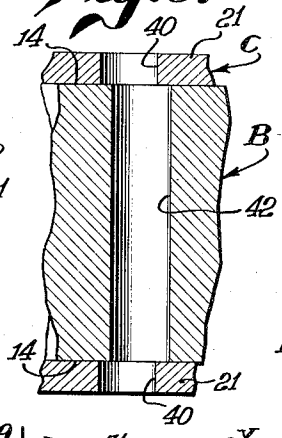


Fig. 7.

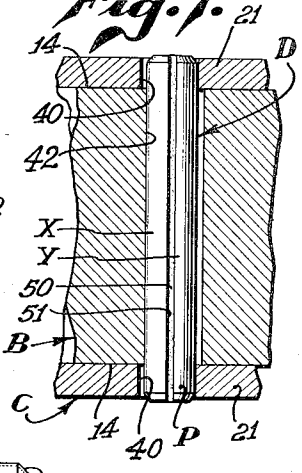


Fig. 8.

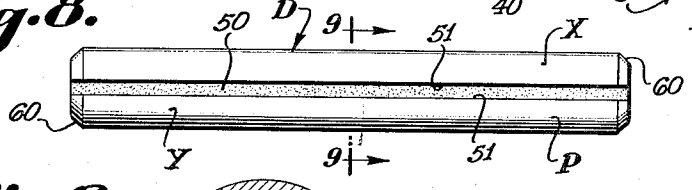
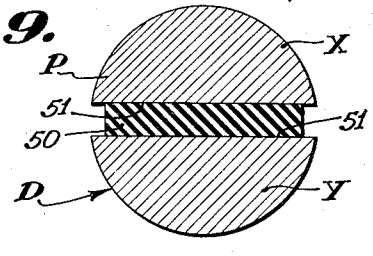


Fig. 9.



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DIGGER TOOTH MOUNTING

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5 Claims. (Cl. 37—142)

This invention has to do with a digger tooth mounting and it is more specifically concerned with a construction for the tooth of a shovel or digging implement and with a retaining pin for such a construction.

In earth moving equipment or in digging devices such, for example, as shovels, scoops, trenching machines, etc., it is common to provide structures that are known as digger teeth. In many instances digger teeth are equipped with or include caps or jackets over the tooth base proper and various constructions have been proposed and used for retaining the caps on the teeth. The constructions used in such cases are generally insecure or unsatisfactory and they often require careful expensive manufacture. Further, in most cases it is difficult and time consuming to apply or remove a tooth cap and in some cases special tools or equipment are necessary for such operations.

It is a general object of the present invention to provide a construction involving a tooth and a cap therefor whereby the cap is dependably and securely retained on the tooth so that it remains firm or tight at all times. There is a tendency in the case of most constructions for the caps to work loose or to be loose when under working pressures with the result that parts wear and other complications develop.

It is a further object of the invention to provide a construction of the general character above referred to which is simple and quick to operate. With the construction provided the cap can be easily and quickly applied to or removed from the tooth and such operations can be performed without the aid of special tools or equipment.

It is a further object of the invention to provide a construction of the general character referred to which is cheap and simple to manufacture. With the present construction the parts require no special or expensive materials and it is free of parts or elements that must be accurately machined or fitted.

Another object of the present invention is to provide a retaining pin for a tooth construction of the type referred to, which pin is of simple, practical and inexpensive construction. The pin provided by the invention involves few simple inexpensive parts that are easy and simple to make making the structure inexpensive, and the parts involved are so formed and related that the pin is strong and practical for the type of use that a digger tooth is subjected to.

It is a further object of the present invention to provide a retaining pin of the general character referred to involving a resilient means whereby it stays tight at all times and thus serves to maintain the cap firm on the tooth, reducing or minimizing wear and eliminating the various dangers and complications that result when a cap is free to work relative to the tooth.

The various objects and features of our invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a front elevation of a typical bucket or digging implement provided with digger teeth embodying the construction of the present invention. Fig. 2 is a side elevation of the structure shown in Fig. 1, being a view taken as indicated by line 2—2 on Fig. 1. Fig. 3 is an enlarged view taken substantially as indicated by line 3—3 on Fig. 1, showing the cap on the tooth ready to receive the retaining pin. Fig. 4 is a detailed sectional view taken through a tooth, being a view taken as indicated by line 4—4 on Fig. 1, and showing the retaining pin in place. Fig. 5 is a detailed transverse sectional view of the tooth shown in Fig. 4, being a view taken as indicated by line 5—5 on Fig. 4, showing the pin in elevation. Fig. 6 is a sectional view taken as indicated by line 6—6 on Fig. 3. Fig. 7 is a sectional view taken as indicated by line 7—7 on Fig. 4. Fig. 8 is a plan view of the retainer pin construction, and Fig. 9 is an enlarged transverse sectional view of the pin shown in Fig. 8, being a view taken as indicated by line 9—9 on Fig. 8.

The structure provided by the present invention is suitable for general use where devices or structures known as digger teeth are employed. For example, it can be used to advantage in dippers, shovels, trenching machines and the like. In the drawings a shovel bucket S is shown and the particular bucket illustrated is provided at its forward lower edge or lip with a plurality of digger teeth T, each of which involves, generally, an adapter or base A carrying a nose piece a part which I will term a tooth B on which a tooth point or cap C is mounted. The cap C is retained on the tooth B by the retaining means D provided by the present invention. The following description will be confined to the details of parts A, B, C and D since the present invention is in no way concerned with the bucket construction as such, nor with the particular manner in which the tooth construction is combined with or arranged in the bucket construction.

In accordance with typical tooth construction the shank or base or adapter A of the tooth may be substantially rectangular in cross sectional configuration so that it has flat parallel sides **10**, a flat top **11** and a flat bottom **12**. The top and bottom **11** and **12** diverge and, like the sides **10**, terminate at the front end **13** of the base which part is shaped and finished to present a substantially flat forwardly directed face.

The nose piece or tooth connection which I refer to as tooth B is, in accordance with conventional construction, in the form or nature of an integral projection on the forward end of the base, that is, it projects forward from the front end face **13** of the base. The tooth illustrated is of conventional form and involves, generally, flat sides **14**, a flat top **15** and a flat bottom **16**. The top and bottom of the tooth are preferably pitched so that they converge. In fact, in practice they are generally pitched to correspond to the top and bottom of the base and they are extended until they join at the forward end or tip **17** of the tooth.

The cap or tooth point C of the tooth is in the nature of a jacket that fits over or is mounted on the tooth B and in the particular tooth construction illustrated it involves a main part or body **20** which is in the nature of a spike or digging part, and a housing or box on the body which embraces the tooth and which involves, generally, spaced parallel sides **21** and a bottom **22**. The sides **21** of the housing are triangular in configuration and their upper edges are joined to the edge portions of the body **20** as by welding **23**, or the like. The bottom **22** of the housing is joined to, in fact, it is preferably integral with the bottom edges of the sides **21** and extends between the sides **21**. The sides **21** of the housing being triangular, the structure formed by the combined housing and body of the cap establishes a tapered chamber **24** that receives the tapered tooth B.

It will be apparent from the drawings how the parts are

arranged and related so that the tooth B fits into the chamber **24** of the cap so that the top **15** of the tooth bears against the bottom or inner side of the cap body **20** while the bottom **16** of the tooth bears against the bottom **22** of the cap housing. It will be apparent from Fig. 5 of the drawings that the parts are arranged and related as to width or lateral extent so that the sides **21** of the cap housing are at or bear against the sides **14** of the tooth.

The cap C is the wear taking part of the structure and the body **20** of the cap is the part thereof which is provided to take the wear or to perform the active work. In the case illustrated the body **20** of the cap is made somewhat longer than the housing of the cap so that it has a forwardly projecting end portion that is dressed or beveled to have the desired action when in operation. It will be apparent that with the cap construction just described the body **20** can be readily manufactured of a material that will effectively withstand severe working conditions and, if necessary, it may be partially or wholly treated to perform in the most advantageous manner. For instance, its forward end portion, which is shaped or dressed, may be heat treated, as desired. The housing of the tooth which serves to surround the sides and bottom of the tooth may be of thinner material and, in practice, conforms to the tooth as the cap is applied thereto.

The cap C is preferably provided with a tongue **30** that projects rearwardly from the body **20** to enter a suitable socket **31** provided in the face **13** of the base. This particular construction is one advantageously employed in structures of the type under consideration.

The retaining means D provided by the present invention involves, generally, a retaining pin P engaged in and cooperating with openings **40** in the sides **21** of the cap C and an opening or passage **42** provided in the tooth B.

The openings **40** in the sides **21** of the cap C are preferably opposite each other or in line transversely of the tooth. The openings **40** may vary widely in form and size. However, it it preferred that they be simple round openings or bores and that they be proportioned relative to the other parts substantialy as shown in the drawings.

The passage **42** provided in the tooth B extends transversely through the tooth from one side **14** to the other and, like the openings **40**, it is preferably in the nature of a bore or round hole, although, in accordance with the broader aspects of the present invention, it may be of any suitable size or shape.

In accordance with the present invention the openings **40** are in communication with or generally opposite the passage **42**. However, it is preferred that they should not register with or be in alignment with the passage **42** but rather that they be offset from or slightly out of line with the passage in the direction in which the tooth is faced. This relationship of parts is clearly illustrated in Figs. 3 and 6 of the drawings.

The retaining pin P provided by the present invention is an elongate element provided to extend through and be carried in the passage **42** in the tooth with its ends or end portions carried in the openings **40** in the cap. The pin P is of sectional construction, that is, it is divided longitudinally into two sections X and Y and it includes means whereby the sections X and Y are resiliently urged apart to have a tendency to fully occupy the passage **42** and the openings **40** when the structure is in operating position. In the preferred form the pin P is divided or split into two like sections X and Y and each section is substantially semi-circular in cross sectional configuration, as shown in Fig. 9.

The resilient means provided in connection with the pin sections X and Y may, in practice, vary widely in form and character. However, it is preferred that it be in the nature of a resilient body **50** located or confined between the opposed faces **51** of the pin sections. The body **50** is bonded to the flat faces of the pin sections so the body and pin sections form a permanent assembly that can be easily handled. The body **50** is preferably formed of a material such as rubber or the like, and as shown in the drawings it is a sheet or layer of such material, preferably extending for a substantial part of the width of the pin. By proportioning the body **50** slightly narrower than the width of the faces **51** we provide spaces at the edge portions of the body and between the faces **51** to allow for expansion of the body **50** as it is compressed. In Fig. 8 of the drawings a form of the invention is illustrated wherein the resilient body extends the entire length of the pin, whereas the body **50** may be, if so desired, divided into sections so that at parts of the pin the faces **51** opposed each other without anything between them.

To facilitate application of the pin P to the other structure it is preferred that the ends of the pin be slightly beveled as shown at **60** and it will be understood that in practice the pin may be proportioned so that it is slightly larger in diameter than the openings **40** and passage **42** so it has to be forced into place. In accordance with the present invention the parts above described and, in particular, the pin P and the openings **40** and passage **42**, are related so that when the cap is initially applied to the tooth the openings are out of line with the passage, as above described, making it necessary to drive the pin P into place by entering it through one of the openings **40**. As this operation is performed the body of material **50** between the sections X and Y of the pin is deformed or deflected.

When the pin has been completely driven into position so that its end portions are in the openings **40** the forces or pressure exerted may be such or sufficient to draw the cap onto the tooth to have a tendency to bring the openings **40** into alignment with the passage **42**. As the tooth is put into service the forces acting on it may tend to drive the cap onto the tooth in a manner that would tend to loosen the usual retaining means employed in a structure of this kind. With the present construction the means **50** or the resilient body in connection with the pin P acts at all times to keep the pin sections tight in the openings and passage.

It is to be observed that the pin is preferably pressed in position with one section toward the front end of the tooth and the other section toward the base **10** from which the tooth projects, with the result that the resilient body incorporated in the tooth urges the pin sections apart in a direction that may be termed lengthwise of the tooth. In practice through the arrangement and relationship of parts above described the pin P remains firm or tight in engagement with both the tooth and the cap at all times and even though there may be some working of the cap relative to the tooth when the tooth is in service.

It will be apparent that through the pin construction provided all tendency for looseness or rattle to develop between the cap and tooth is eliminated and, further, it will be apparent that with the present construction a practical working fit and engagement of parts is easily obtained without resorting to the exercise of great care or precision in the course of manufacture of any of the parts. Since the pin P is what may be termed an expanding pin or a pin which is compressed when arranged in position and which tends to expand thereafter, no fastening devices in the form of keys, nuts, or other locks, are required since the pin itself creates pressure which retain it in the proper position relative to the tooth and cap.

Having described only a typical preferred form and application of our invention, we do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to ourselves any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described our invention, we claim:

1. A structure of the character described including, a

tooth having a transverse hole therethrough, a cap over the tooth having a housing with spaced sides overlying opposite sides of the tooth and provided with holes communicating with the hole in the tooth at the ends thereof, the hole in the tooth and the holes in the housing being intially out of line with each other, and a pin engaged in the passage and opening and including coextensive relatively movable sections and resilient means between the sections maintaining the sections tight in the hole in the tooth and also tight in the holes in the housing whereby pressure is maintained in opopsite directions on the tooth and cap.

2. A structure of the character described including, an elongate tooth having a transverse hole therethrough, a cap over the tooth having a housing with spaced parallel sides engaging opposite sides of the tooth and provided with holes communicating with the hole in the tooth, the holes in the housing and the hole in the tooth being initially out of line with each other longitudinally of the tooth, and a pin engaged in the hole in the tooth and in the holes in said sides and including two like relatively movable sections each entered in the opening in the tooth and also in the openings in the sides of the cap and resilient means secured to and connecting the sections and normally yieldingly urging them apart and thereby maintaining one of the sections tight in the hole in the tooth and the other suction tight in the holes in the sides of the cap.

3. A structure of the character described including, an elongate forwardly convergent tooth having a transverse hole therethrough, a cap over the tooth having a housing with spaced sides engaging opposite sides of the tooth and provided with transverse holes therethrough, the hole in the tooth and the holes in the sides of the housing being initially out of line with each other in the direction of the tooth, the holes in the sides of the housing being forward of the hole in the tooth, and a pin engaged in the holes and including relatively movable sections and resilient means yieldingly urging the sections apart and maintaining the sections tight in the holes and bearing forward in the hole in the tooth and rearward in the holes in the cap.

4. A structure of the character described including, an elongate forwardly convergent tooth with parallel opposite sides and having a transverse hole extending from one of said sides to the other, a cap over the tooth having a body and housing defining a converging socket receiving the tooth, the body projecting forward from the tooth and the housing having spaced parallel sides overlying said sides of the tooth and having holes in communication with the hole in the tooth, and a pin engaged in the holes in the tooth and cap and including like sections of equal length and each substantially half round in cross section and extending lengthwise of the pin and a resilient body between and connecting the sections and maintaining them tight in the holes, the holes in the sides of the housing being initially out of line with the hole in the tooth toward the front of the tooth.

5. In combination, two elongate substantially parallel members, one a male member and the other a female member with spaced parts receiving a part of the male member between them, there being holes in the said parts of the female member in communication with a hole in said part of the male member, the holes in said parts being out of line with each other in a direction longitudinally of the members, and a pin including two relatively movable sections entered in said holes and resilient means between the sections yieldingly urging them apart with one section in pressure engagement with said part of the male member and the other section in opposite pressure engagement with the said parts of the female member.

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