Sept. 7, 1954 E. T. SMALL 2,688,475

INTERNAL LOCK PIN FOR SCARIFIER TEETH

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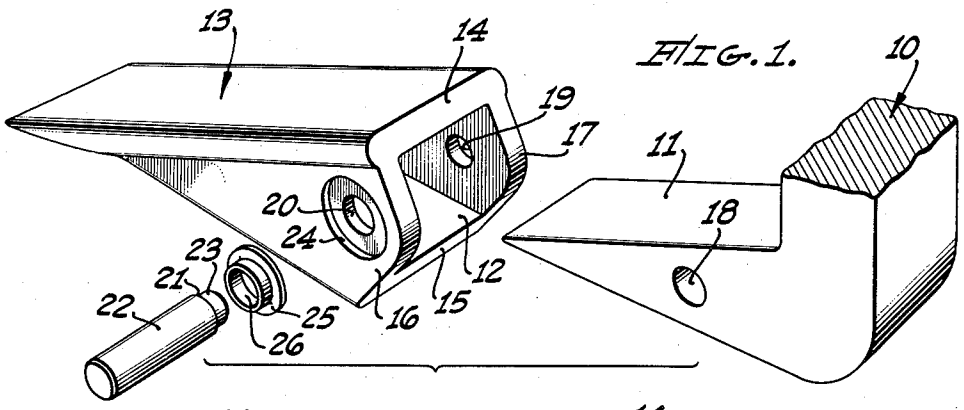


FIG. 1.

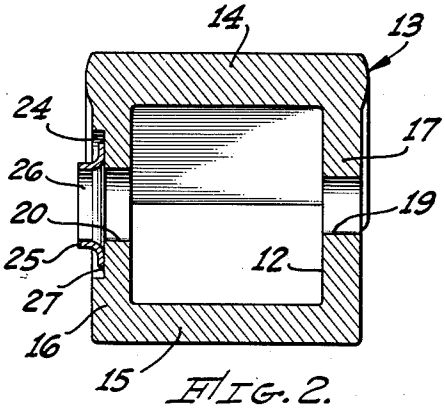


FIG. 2.

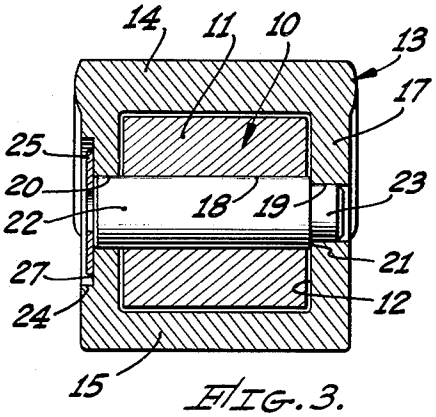


FIG. 3.

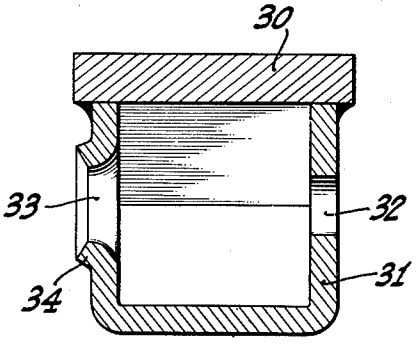


FIG. 4.

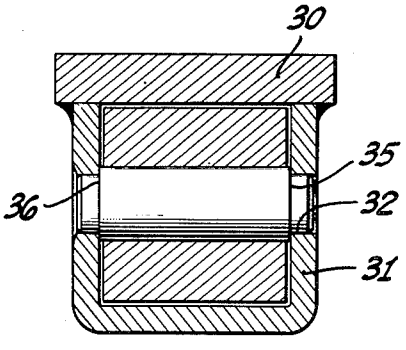


FIG. 5.

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INTERNAL LOCK PIN FOR SCARIFIER TEETH

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1 Claim. (Cl. 262—8)

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This invention relates to an internal pin lock for locking two parts together in assembled and telescoping relationship. It is particularly adaptable for use in mounting shoes on scarifier teeth in earth working equipment but may be used wherever two parts are telescoped together and wherein it is desired to lock the parts against separation or against sliding movement of one part relatively to the other.

In earth working equipment it has been customary heretofore to provide a shoe that is detachably mounted on a foot on the bottom of each scarifier tooth. The shoe is ordinarily formed of relatively hard abrasion-resisting metal or may be hard faced with a hard facing alloy deposited thereon as by welding. Despite such abrasion-resisting precautions it is necessary to remove and replace the shoes from time to time. These shoes have heretofore been attached to the foot of the scarifier tooth by means of nuts and bolts which extend through registrable apertures formed in both parts. When nuts and bolts are employed the head of the bolt and the nut are exposed on the sides of the shoe and, being thus unprotected, become severely worn or abraded so that the bolt invariably must be replaced whenever the shoe is replaced.

It is an object of the present invention to provide a pin lock for locking the shoe and the scarifier tooth in assembled relationship and which is so designed that the pin will be effectively retained in place or in locking relationship in such a manner as to be adequately protected. At the same time it is possible to readily remove the pin whenever it is desired to replace a shoe on the scarifier tooth with a new or repaired shoe.

Another object of the invention is to provide a pin lock wherein the pin can be easily installed or removed as desired and wherein the pin as well as its retaining means are disposed well within the outline of the shoe or outer member so that it will be effectively protected against wear or abrasion.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claim, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 is an exploded view of the lower end of a scarifier tooth, its detachable shoe, and the parts of the pin lock embodying the present invention;

Fig. 2 is a transverse section through the shoe;

Fig. 3 is a transverse section through the shoe,

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the foot of the scarifier tooth, and illustrating the pin lock embodying the present invention in applied or locking position thereon;

Fig. 4 is a transverse section through an alternative form of construction embodying the present invention; and

Fig. 5 is a transverse section illustrating the pin lock applied to the form of construction illustrated in Fig. 4.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, it will be appreciated that the improved pin lock can be employed wherever two parts are telescopically arranged or assembled but as the present invention has been primarily designed to be used in locking a scarifier shoe onto its tooth it will be described in connection therewith. In the drawing, 10 indicates a scarifier tooth having a forwardly extending tapered foot 11 at its bottom designed to be receivable in a recess 12 in a scarifier shoe generally indicated at 13. In the form shown in Figs. 1 to 3, inclusive, the scarifier shoe consists of forwardly convergent top and bottom walls 14 and 15 connected by side walls 16 and 17. Registrable apertures are formed in the foot 11 and in the side walls 16 and 17, the aperture in the foot being indicated at 18 and the apertures in the side walls being indicated at 19 and 20. As will be observed from Figs. 2 and 3, the aperture 19 in the side wall 17 is somewhat smaller in diameter than the apertures 18 and 20 so that the inner face of the side wall 17 forms a substantial shoulder around the aperture 19 adapted to be engaged by a shoulder 21 on the locking pin 22. The locking pin decreases in diameter from one end to the other so that there is a small end 23 that is receivable in the small aperture 19. The mutually engageable shoulders serve to limit sliding movement of the pin 22 in one direction through the registered apertures 18, 19 and 20 and while the use of opposed shoulders on the pin and side wall 17 is preferred the use of a tapered pin as well as tapering registrable apertures can be employed if desired and the same result of limiting movement of the pin through the apertures can be secured.

On the outer face of the side wall 16 a small recess 24 is formed surrounding the aperture 20 and a malleable metal washer 25 having an aperture 26 therethrough is welded, such as by weld 27, in this recess. Any other means for rigidly securing this washer in the recess can be employed if desired. The aperture 26 in the washer is at least as large as the aperture 20 in its initial

condition as illustrated in Fig. 2 so that the large end of the pin **22** may be readily slipped therethrough. When the pin has been passed through the aperture **26** in the washer and is seated in the registering apertures **18**, **19** and **20**, the washer is deformed or bent into a flat condition partially overlying the large end of the pin as shown in Fig. 3. As the pin is limited in its sliding movement in one direction by the engaging shoulders, or by mutually engaging tapers if these are employed, and is retained against movement in the other direction by the overlying deformed washer **25**, the pin will serve to adequately lock the two parts together in telescoping or assembled relationship. It will be observed in this form of construction that the small end of the pin **23** does not project outwardly beyond the side **17** so as to be subject to abrasion. Likewise, the large end of the pin does not project outwardly beyond the outer side of the side **16**. Furthermore, as the washer **25** is disposed within the recess **24** the entire pin lock is disposed within the outer boundary or overall contour of the shoe. Consequently, even though the shoe may be subject to extreme abrasive wear, neither the washer nor the pin will be so subjected. When it is desired to remove and replace a shoe it is merely necessary to apply a punch or similar implement to the exposed small end of the pin and drive the pin reversely through the registering apertures. In so doing the pin merely deforms the malleable washer, returning it to substantially the same condition illustrated in Fig. 2. A removed shoe may either be junked as having been too severely worn, or it may be repaired and hard faced and re-applied to the scarifier tooth. In re-applying it the pin is re-installed through the swasher and the washer deformed or returned to the position shown in Fig. 3.

In the form illustrated in Figs. 4 and 5, the shoe consists merely of a top bar **30** adapted to overlie the foot **11** on the scarifier tooth. To the under side of this top bar there may be welded or otherwise secured a U-shaped strap **31** in one side of which a relatively small aperture **32** is formed corresponding to the small aperture **19**. In the other side of the strap there is formed a registrable aperture **33** the edges of which are bent outwardly as indicated at **34**. These edges are somewhat malleable as the strap is formed of relatively soft or mild steel which is comparatively malleable. The aperture **33**, when in its expanded position shown in Fig. 4, is of such a size as to receive the maximum diameter of the pin therethrough. The shoulder **35** adjacent one end of the pin is engageable with the opposite side of the strap around aperture **32** to limit the inserting movement of the pin. When the pin is in applied position the deformed metal at **34** is pounded or bent into the position shown in Fig. 5 overlying the shoulder **36** and assuming a position substantially flush with the side in which the aperture **33** is formed. This metal may also be caused to assume a position substantially flush with the end of the pin so as to avoid any protuberances that would be subject to wear or abrasion. In this position, as shown in Fig. 5, the pin is retained in its innermost or locking position. When it is desired to remove or replace the shoe the pin may be pounded out of the registering apertures, as previously described, returning the edges **34** of the aperture **33** to the position shown in Fig. 4. On repairing the shoe it may again be applied to the scarifier tooth as previously explained, or a substitute shoe may be applied and the pin re-installed.

It will be appreciated from the above described constructions that the pin when installed is effectively protected so that it will not be subject to wear and ordinarily does not require replacement. The pin is retained in locking position adequately at all times and yet when it is desired to remove the pin this can be easily accomplished. In both constructions the locking or retaining means that retains the pin in position is disposed within the overall contour of the outer member. This type of lock may be advantageously employed to hold two parts in telescopic relationship wherever these parts are required to slide or closely fit within a third part. The pin and its lock do not interfere with the outer of the two parts telescoping into a third part even though there may be a very close fit within the third part.

Various changes may be made in the details of the construction without departing from the spirit and scope of the invention as defined by the appended claim.

I claim:

A pin lock for locking together two members comprising a scarifier shoe, a scarifier tooth, said tooth being in telescoping relationship with the shoe, registrable apertures formed in both the scarifier shoe and the scarifier tooth, a pin receivable therein, the pin decreasing in diameter from one end to the other and the apertures being shaped complementary to the pin so that movement of the pin through the apertures will be limited in one direction, the scarifier shoe having a recess in its outer side, and a deformable lock washer secured in said recess having an aperture therethrough through which the pin is receivable and being adapted to be deformed into a position lying wholly within the recess and partially overlying the large end of the pin to retain the pin in its innermost position in the apertures.

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