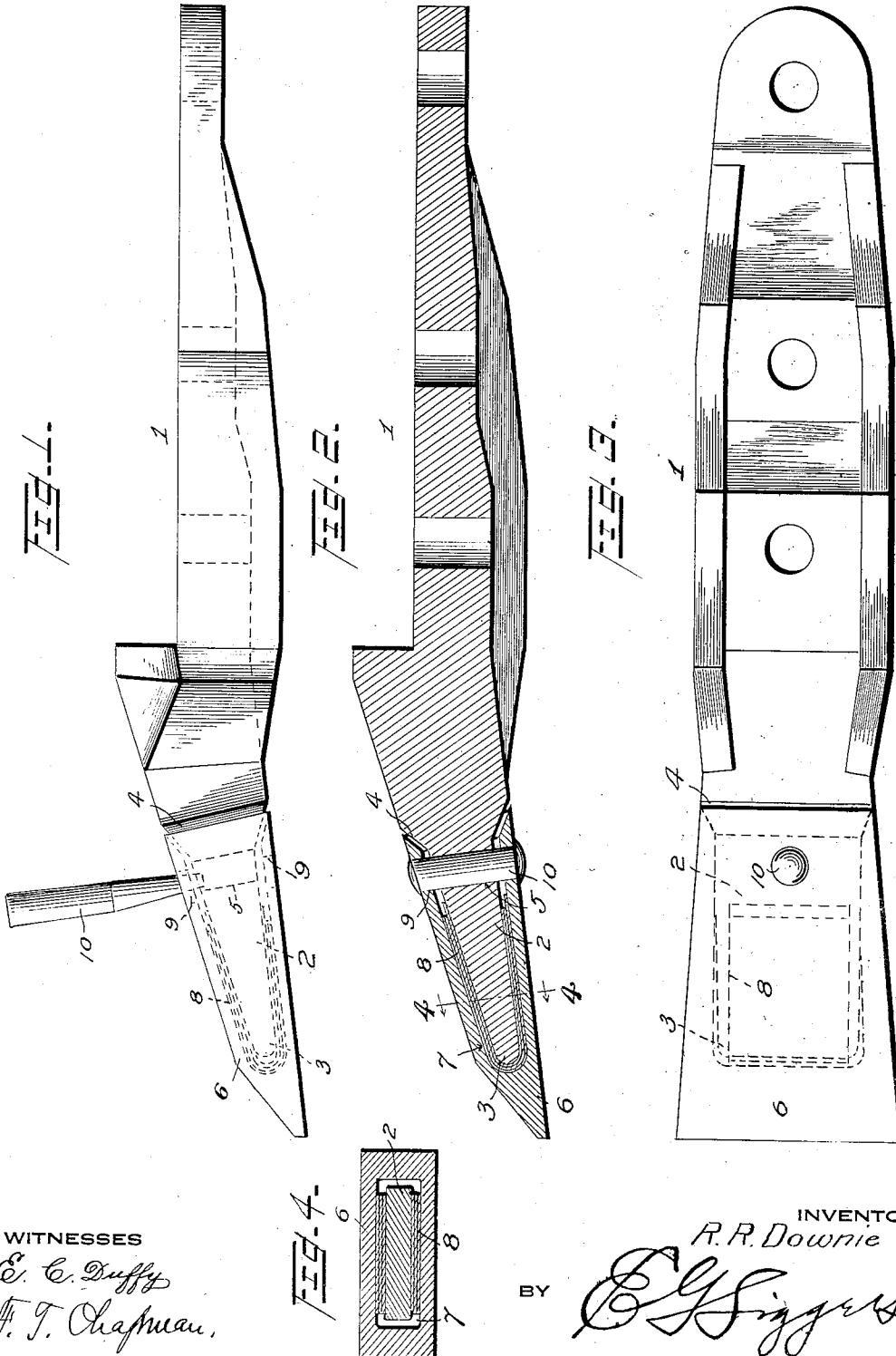


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TOOTH FOR STEAM SHOVELS.
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TOOTH FOR STEAM-SHOVELS.

1,399,337.

Specification of Letters Patent.

Patented Dec. 6, 1921.

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To all whom it may concern:

Be it known that I, ROBERT R. DOWNIE, a citizen of the United States, residing at Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented new and useful Teeth for Steam-Shovels, of which the following is a specification.

This invention has reference to teeth for steam shovels, which teeth are of the nose and socket type, and its object is to provide a removable cap or wearing end which may be readily replaced when worn or damaged.

It is desirable to form the caps of manganese steel because of the hardness of such material, and it is further necessary that the cap tightly fit the nose end of the tooth in order that it may not work loose.

In order to hold the cap to the nose end of the tooth, a pin or rivet is provided, and to accommodate the pin both the nose end and the cap have holes therethrough. Because of the character of the manganese steel used for the cap, the holes must be cored in the casting. Such cored holes are rougher and less likely to be accurate as to location than are drilled holes and since the hole in the tooth base must be drilled a certain and invariable distance from the forward end of the nose, if interchangeability is to be retained, there arises the possibility and even the probability of an improper fit between the cap and the base. If the fit be too loose it is necessary to upset the retaining rivet or pin at both ends to thereby form a head almost as large as the head ordinarily used on a rivet of the same diameter in order to prevent the pin from working loose and getting out. So large a rivet head is objectionable because, if it be allowed to protrude from the surface of the tooth cap, it will interfere with the passage of material into the scoop, or if the heads of the rivet, or head and nut if a bolt be used, are counter sunk, the fastening proper becomes difficult of removal. Moreover, because of the hardness of the material used small projecting irregularities on the surface of the casting can only be successfully removed by abrasive-wheel grinding. Teeth

caps of a size such as would be used in the teeth of steam shovels are too small to permit the employment of abrasive wheels on the interior or socket portion which presents the critical surfaces in providing a neat fit.

The invention therefore contemplates the employment of liners or shims between the inner surfaces of the socket in the cap and the outer surfaces of the nose on the body of the tooth. If, then, the cored holes in the cap should vary somewhat from accurate alinement with the hole in the nose, or the internal surface of the cap should be slightly irregular, the liners will compensate for such irregularities, and since they may be made of thin sheet tin, will embed more or less the irregularities, so that with the use of a taper key and the holes approximately matching, the cap may be forced snugly on the nose to provide a tight fit without damage to the key or the holes or other parts, and without looseness of fit either at the time of application or later.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing in the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings,

Figure 1 is a side elevation of a tooth base with a cap applied but not fastened in place.

Fig. 2 is a longitudinal section of the structure shown in Fig. 1 with the cap secured to the nose of the tooth with intervening liners and riveted in place.

Fig. 3 is a bottom plan view of the structure shown in Fig. 2.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Referring to the drawings, there is shown 100

a tooth base 1 which may be of customary form and therefore needs no particular description, the tooth base being adapted to be secured to the bottom plate of a shovel body in the usual manner. The forward end of the tooth base is formed into a nose 2 which, in the particular showing of the drawing, is wider than thick and tapers from the basic end toward the forward end where it may have a rounded termination 3. Where the base end of the nose 2 joins the body of the tooth base, it may expand or thicken as shown at 4 for strengthening purposes.

Near the inner or basic end of the nose 3 there is produced a hole or passage 5 which may be formed by boring, for the material of which the tooth base is constructed may be of a more or less soft character permitting such boring with accuracy.

The nose 2 is designed to receive a cap 6 having a cavity or socket 7 which may be slightly larger than the nose so as to permit the introduction of liners or shims 8 compensating for the slightly larger size of the cavity 7 with respect to the nose 2. The nose 2 and the cavity 7 are both of taper form so as to make a tight fit through the liners 8 when the cap is forced onto the nose lengthwise of the latter. At the larger or rear end of the cap are alined holes 9 which, because of the character of the material from which the cap is made, are cored holes alining with each other as near as may be and also registering as near as may be with the hole or passage 5 when the cap 6 is applied to the nose 2 with the liners 8 intervening. Such liners may be conveniently made of strips or sheets of tin of thin gage, say about 1/64 of an inch thick, and usually two or three such liners are employed, the parts being suitably proportioned to accommodate such number of liners to permit more latitude of adjustment.

When the cap 6, with the intervening liners, is applied to the nose 2, the holes 9 will not quite register with the hole 5, and a drift pin 10 is then inserted in the holes, or a bolt or rivet may be employed in place of the pin 10 so that the cap 6 may be drawn onto the nose 2 by the wedging action of the pin assisted by blows delivered to the outer end of the cap whereby the cap is firmly seated on the nose. This is facilitated by the ductility of the liners due to these liners being of tin or some other suitable metal, which metal will conform sufficiently to irregularities in the surfaces of the cavity 7 of the cap to produce a tight fit despite the fact that the inner surface of the cap may be somewhat rough. Some caps may require more or less liners than other caps, but in all cases the cap may be forced upon the nose into very tight seated relation there-

to by the combined wedging action of the pin 10 and, when necessary, the force of blows delivered onto an outer end of the cap. In order to insure the retention of the cap on the nose, the pin 10 may be headed to provide an unobtrusive rivet with the heading sufficiently slight to permit the ready removal of the pin when it is desired to replace the cap, but still of a character to prevent accidental displacement of the cap.

What is claimed is:

1. A tooth for steam shovels, comprising a basic portion terminating at the forward end in a taper nose, a cap for the nose having a cavity of larger dimensions than the nose, to accommodate liners or shims, with the nose and cap provided with approximately registering holes, and a pin for traversing the holes when the liners are applied, whereby to cause a tight wedging fit of the cap through the liners to the nose.

2. A tooth for steam shovels, comprising a tooth base terminating in a taper nose with a hole through the basic portion of the nose from top to bottom, a cap of material too hard for boring and provided with cored holes to approximately register with the hole through the nose, said cap having a taper cavity corresponding to and larger than the nose, removable liners or shims adapted to the cavity of the cap to compensate for the lack of fit of the cap to the nose, and a taper pin or key for traversing the approximately matched holes to draw the cap tightly upon the nose through the liners, whereby to insure a tight unyielding fit of the cap on the nose, with the facility of ready removal by driving out the pin or rivet.

3. A tooth for steam shovels, comprising a basic portion terminating at the forward end in a taper nose with a hole traversing it near its inner end from top to bottom, a cap for the nose of material too hard for boring and provided with a cavity of larger dimensions than the nose to receive the latter, said cap having cored holes approximately conforming in position to the hole through the nose, the cavity in the cap tapering in correspondence with the taper of the nose, liners or shims between the nose and the walls of the cavity in the cap, and a pin driven through the holes in the cap and the hole in the nose and forcing the cap tightly upon the nose with the liners interposed.

4. A tooth for steam shovels, comprising a basic portion terminating at the forward end in a taper nose with a bored hole traversing it near its inner end, a cap for the nose of manganese steel and provided with a cavity of larger dimensions than the nose to receive the latter loosely, said cap having cored holes approximately conforming in position to the bored hole through the nose,

the cavity in the cap tapering in correspond-
ence with the taper of the nose, liners or
shims between the nose and the walls of the
cavity in the cap, and a pin driven through
5 the holes in the cap and the hole in the nose
and forcing the cap tightly upon the nose
with the liners interposed, the pin being

subsequently riveted to hold it against dis-
placement.

In testimony that I claim the foregoing 10
as my own, I have hereto affixed my signa-
ture.

ROBERT REX DOWNIE.