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[54] **POWER-GUN-DRIVEN TAPPER**  
1 Claim, 6 Drawing Figs.

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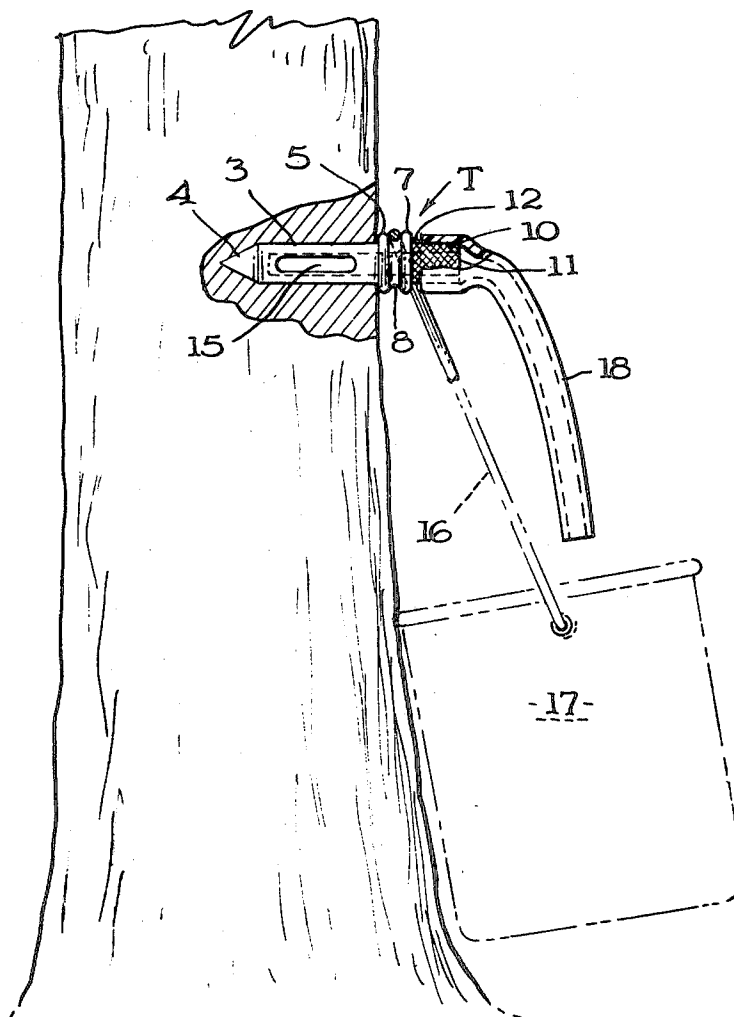
[51] Int. Cl. .... A01g 23/14,  
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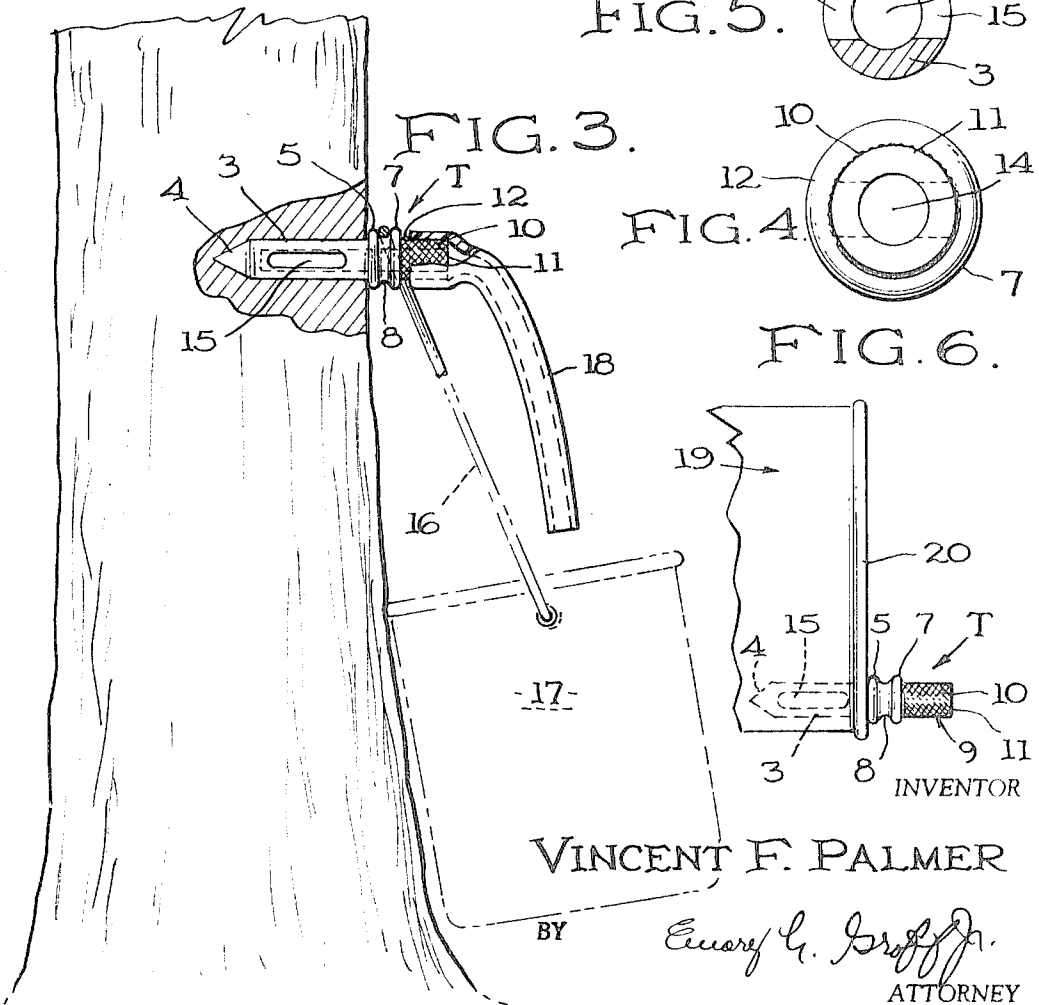
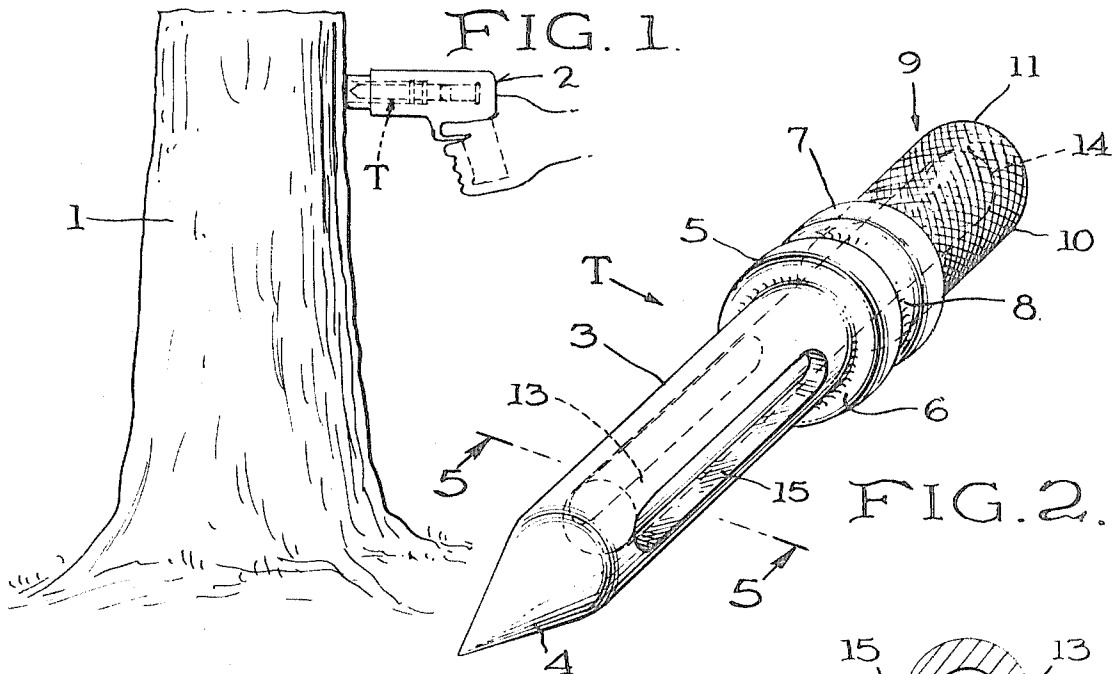
[50] Field of Search ..... 47/50-54,  
57.5, 10-11; 21/73; 222/80-87

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**ABSTRACT:** A tapper to be driven into a substantially rigid mass by a power gun for the extraction of fluid therefrom and having a longitudinal body of cylindrical section including transverse and longitudinal fluid passages. A stop collar limits the forward movement of the tapper and a rearwardly disposed pull ring, defines, with the stop collar, a groove for supporting a collection container and permitting reception of a removal tool.





### POWER-GUN-DRIVEN TAPPER

This invention relates generally to tappers, and more particularly, to an elongated tapper element adapted to be inserted by a power gun application through the substantially dense wall of an object for the purpose of permitting the drainage of fluid therefrom.

This device lends itself to many useful applications, one being the collection of sap from maple trees as pursued in the manufacture of maple syrup. Many devices, commonly referred to as sap spouts, have been known for the extraction of sap from trees; however the present invention should be considered in its broadest aspects as a tool which is driven part way into a substantially solid mass by the application of an impact or blow as provided by a power gun and includes means therein permitting the extraction of fluid from the mass material for collection from the rear or outer end of the tool.

Prior known tappers have included many intricate devices often comprising a plurality of components each requiring separate manufacturing phases prior to final assembly. The present tapper comprises an integral member which may be fabricated by a plurality of conventional machine operations and yet presents a device having numerous features lending itself to application by means of a power gun. Heretofore many tappers included a member of relatively large diameter and often required a threaded area at the forward end thereof, whereupon it was necessary to initially bore a relatively large hole into the side of the tree trunk prior to application of the tapper which necessitated a time-consuming operation involving the use of a wrench to screw the tapper into the bore of the tree. With the present device one merely inserts the outer end of the tapper into the power gun, actuates the gun, and this single action drives the tapper into the tree to a point juxtaposed a stop collar. Sap-collecting means are then joined to the outer portion of the tapper and no further action is then required.

Accordingly, one of the primary objects of the present invention is to provide an improved power-gun-driven tapper comprising a unitary member having a forward body section bounded at one end by a conical driving point and at the other by a peripheral stop collar and including a rearwardly disposed pull ring located adjacent an impact head.

Another object of the present invention is to provide an improved power gun driven tapper including a longitudinal body having a plurality of elongated transverse slots in the forward portion thereof, each slot communicating with a cylindrical chamber extending from the forward portion of the body rearwardly through the outer end thereof.

With these and other objects in view which will more readily appear as the nature of the invention is better understood, the invention consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawing, in which:

FIG. 1 is a side elevation illustrating the installation of the tapper of the present invention.

FIG. 2 is an enlarged perspective view of the tapper of the present invention.

FIG. 3 is a side elevation, partly in section, of the power-gun-driven tapper of the present invention.

FIG. 4 is an end view of the tapper of FIG. 2.

FIG. 5 is a sectional view taken along the line 5-5 of FIG. 2.

FIG. 6 is a fragmentary view, partly in section, and illustrates another use of the invention.

Similar reference characters designate corresponding parts throughout the several views of the drawing. Referring now to the drawing, more particularly FIGS. 1 and 2, the present invention will be seen to comprise a tapper, generally designated T, adapted to be partially inserted within the confines of a substantially dense mass such as the tree trunk 1 by means of a power gun generally designated 2. It will be appreciated that any one of the numerous power gun devices on the market

may be utilized for installing the tapper according to the present invention such as those guns which use an explosive cartridge for providing a single high-velocity impact.

The tapper T is preferably constructed from a single piece of metal and comprises an elongated cylindrical member including a forward or main body section 3, the longitudinal extent of which accounts for the majority of the overall tapper length. The forwardmost portion of the main body section 3 terminates in a sharp conical driving point 4 while the rear portion of the main body section is bounded by a stop collar 5 concentrically disposed with respect to the main body section and providing a radially extending stop shoulder 6 adjacent the periphery of the main body section 3. A second concentric element, namely a pull ring 7, is disposed slightly rearwardly of the stop collar 5 and provides, together with the stop collar, a hanger groove 8 therebetween.

As will be seen most clearly in FIG. 3, the rearmost portion of the tapper T comprises an impact head 9 including a cylindrical periphery having a roughened or knurled surface 10 and a rearmost face defining an impact face 11. The rearwardly facing radial surface of the pull ring 7 intermediate this ring and the cylindrical surface 10 of the impact head 9 defines a drive shoulder 12.

Except for the material forming the conical driving point 4 of the tapper which is of a solid mass of material, the remainder of the longitudinal extent of the tapper includes an inner cylindrical passage which is referred to as a fluid-collecting chamber 13 and is illustrated in the sectional view of FIG. 5. This chamber 13 begins at the forward portion of the main body section 3 immediately to the rear of the conical driving point 4 and extends rearwardly throughout the entire extent of the main body section, continuing therefrom through the impact face 11 of the impact head 9 as a drainage canal 14.

When it is desired to install the tapper T of the present invention so as to achieve the use position as shown in FIG. 3, it will be understood that the selected power gun 2 is associated with the rear end of the tapper T and includes means (not shown) whereupon when the power gun 2 is actuated a driving impact force will be delivered to the impact face 11 and/or the drive shoulder 12 in order to drive the tapper T forward in a longitudinal direction with this forward movement terminating upon abutment of the stop shoulder 6 of the collar 5 with the outer exposed surface of the tree trunk 1. The operation of extracting fluid from within the confines of the tree trunk 1 is facilitated by an arrangement of openings in the periphery of the main body section 3. As shown in FIG. 2, a pair of elongated slots 15-15 are provided on opposite sides of the main body section 3, the vertical height of which is preferably less than the diameter of the collecting chamber 13 while the length thereof will be seen to encompass the majority of the longitudinal extent between the stop shoulder 6 of the stop collar 5 and the rearmost portion of the conical driving point 4. Quite obviously, any number of such slots 15 could be provided through the periphery of the main body section 3; however the illustrated embodiment has been found to be quite adequate in ensuring both a tapper having sufficient strength to withstand application by a power gun and also to provide an improved collection system for obtaining a maximum flow of fluid from within the tree trunk 1.

Considering FIG. 3 of the drawing, the use of the instant device will be readily apparent to those skilled in the art. The peripheral groove 8 defined by the longitudinally spaced-apart elements 5 and 7 provides positive means for retaining the hanger 16 of a suitable collection member such as the sap bucket 17. As fluid within the tree trunk 1 flows through the plurality of elongated transverse slots 15 it is then directed into the centrally disposed collecting chamber 13 leading thence to the drainage canal 14 and exiting therefrom through the impact face 11. Additional fluid-directing means such as the drain hose 18 may also be provided to ensure positive flow of the fluid into the collecting means 17. In this regard the knurled surface 10 on the periphery of the impact head 9 will be appreciated as means ensuring the attachment and reten-

tion of the upper end of the drain hose to the impact head 9. With the arrangement of the elongated slots 15 and collecting chamber 13 as shown in FIG. 5 wherein the diameter of this chamber is slightly greater than the vertical height of each of the slots 15 the collection of fluid by means of the present taper is significantly improved since it will be seen that a troughlike area is formed in the bottom of the collecting chamber between the two bottom surfaces of the adjacent elongated slots whereby all fluid communicating with the two slots will subsequently seek the lowest level and thus be directed to the bottom of the collecting chamber and out of the taper.

Upon termination of fluid collection, the removal of the taper from the tree trunk 1 is greatly facilitated by means of the pull ring 7, which together with the hanger groove 8 adjacent thereto, provides a ready surface for the reception of any suitable tool for the purpose of exerting a rearward movement upon the taper.

As shown in FIG. 6 the taper T may be utilized to withdraw fluid from a hollow type of storage container such as the barrel or drum 19. Application by means for the power gun 1 will be seen to be extremely advantageous in such an environment since the highly vibrant nature of the container wall 20 would obviously resist insertion of the taper by means of repeated blows by a hand-wielded hammer. In addition, application by any means other than a high-speed single-impact power tool would result in leakage of fluid through the slots 15 following partial penetration of the main body section 3 through the wall 20. To provide a positive seal between the stop collar 5 and container wall 20 any suitable form of sealing ring or gasket (not shown) may be mounted upon the main body section 3 adjacent the stop collar 5.

I claim:

1. A taper of unitary construction having a longitudinal body including a cylindrical forward body section, a conical driving point at the free end of said forward body section, a radially outwardly directed circumferentially extending collar on said longitudinal body at the rear of said forward body section, a radially outwardly directed circumferentially extending pull ring on said longitudinal body spaced rearwardly of said collar and being of substantially the same dimension as said collar, said collar and said ring defining a groove therebetween of arcuate cross section substantially complementary to the cross section of a bucket hanger received therein, a substantially cylindrical impact head at the rear of said body extending rearwardly of said pull ring, said impact head having a length at least approximately one-half the length of said forward body section and having substantially the same outer diameter as said forward body section, said impact head having a wall thickness and being of a construction so that it is adapted to receive repeated blows sufficient to embed the taper to a desired depth in a means such as a tree, said impact head having the outer surface thereof roughened and receiving a drain hose thereover for retaining the drain hose in operative position, a central fluid-collecting chamber formed within said body and extending rearwardly from said forward body section adjacent said driving point and opening through the rear of said impact head, said forward body section being provided with a pair of elongated transverse slots extending through the major part of the longitudinal length of said forward body section and being in communication with said chamber, said slots being disposed diametrically opposite one another and having a height less than the diameter of said chamber.

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