

No. 633,397.

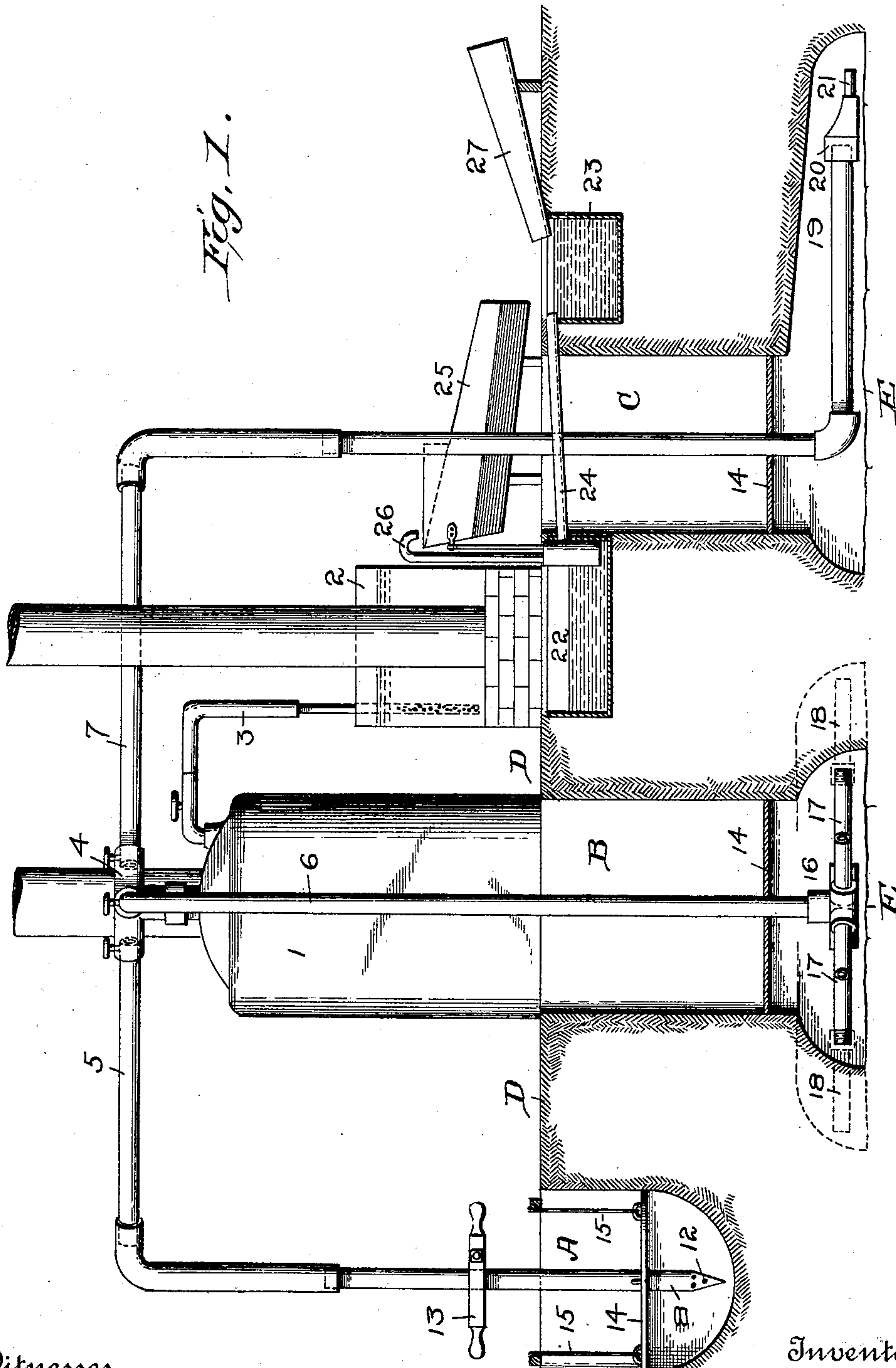
Patented Sept. 19, 1899.

S. R. STAMBAUGH.
APPARATUS FOR MINING PRECIOUS METALS.

(Application filed Sept. 8, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 2.

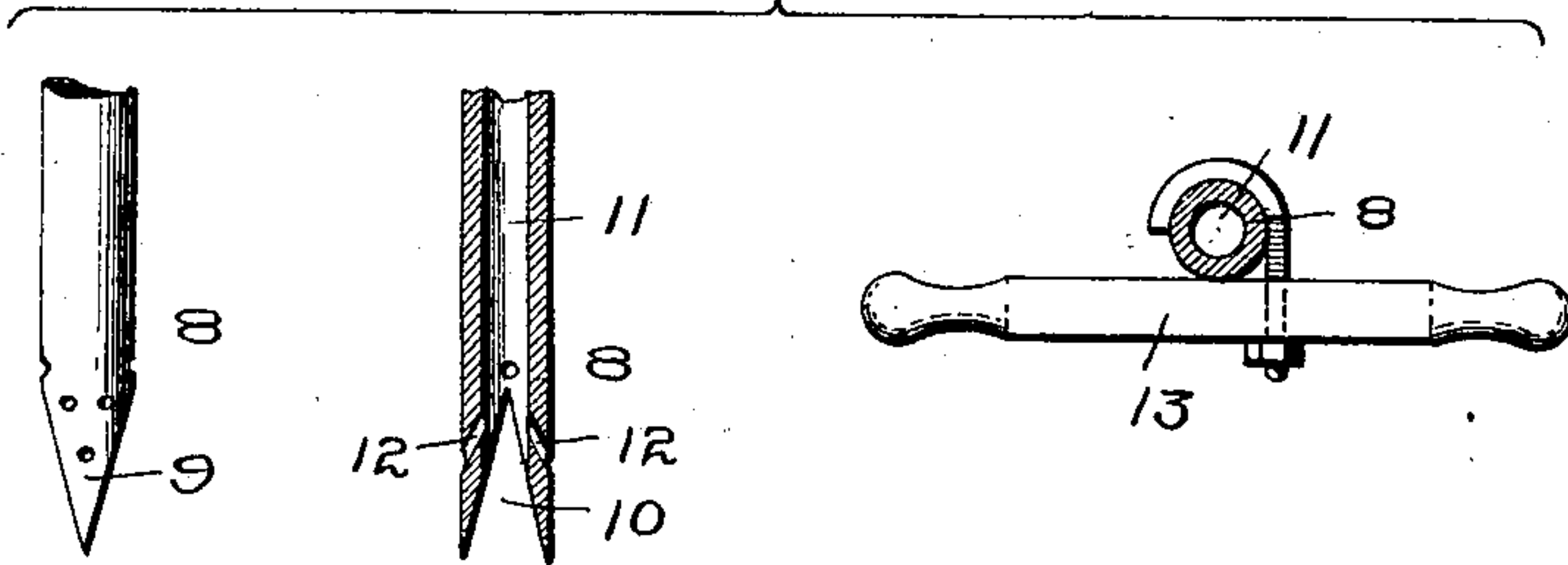


Fig. 3.

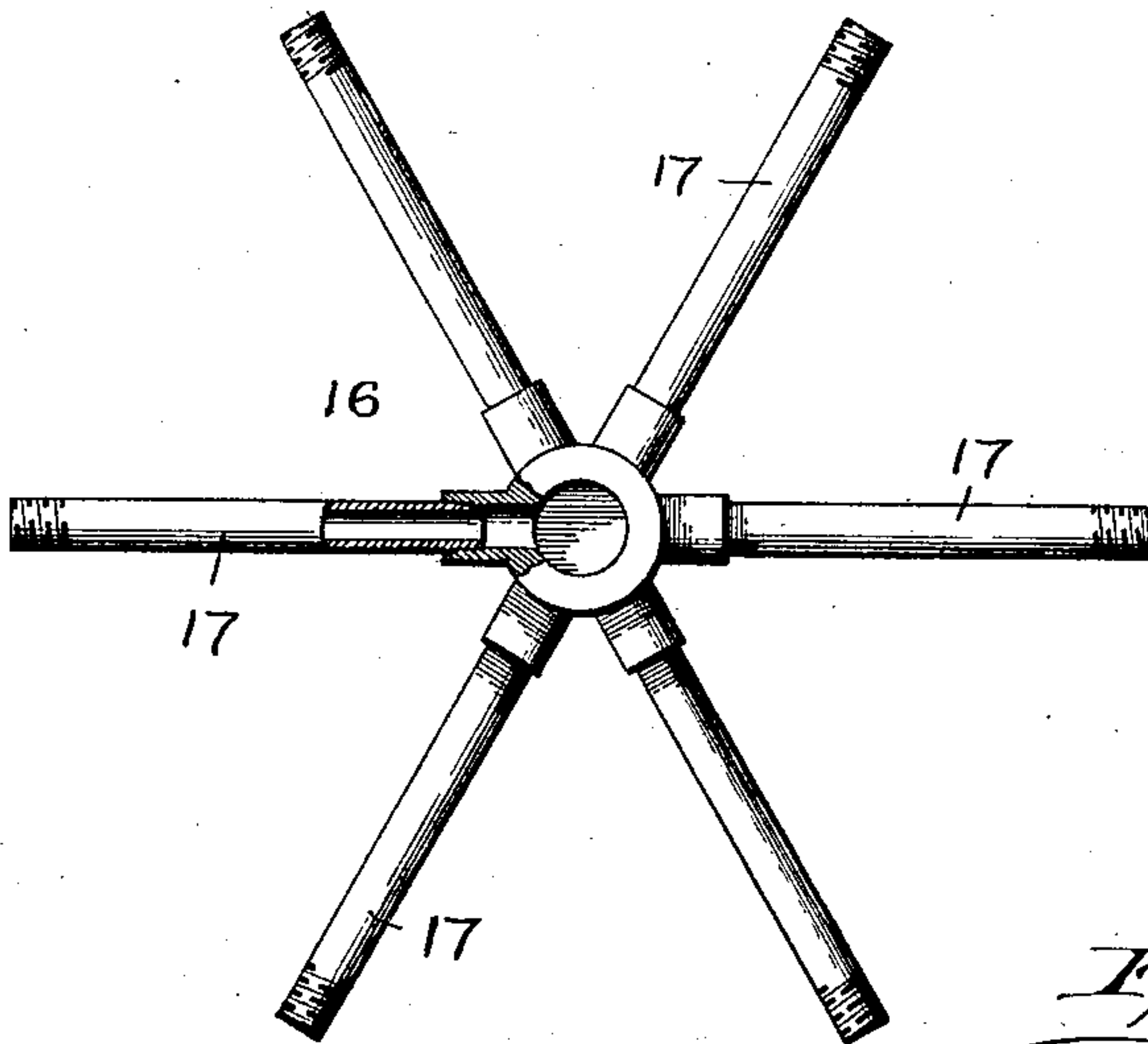


Fig. 4.

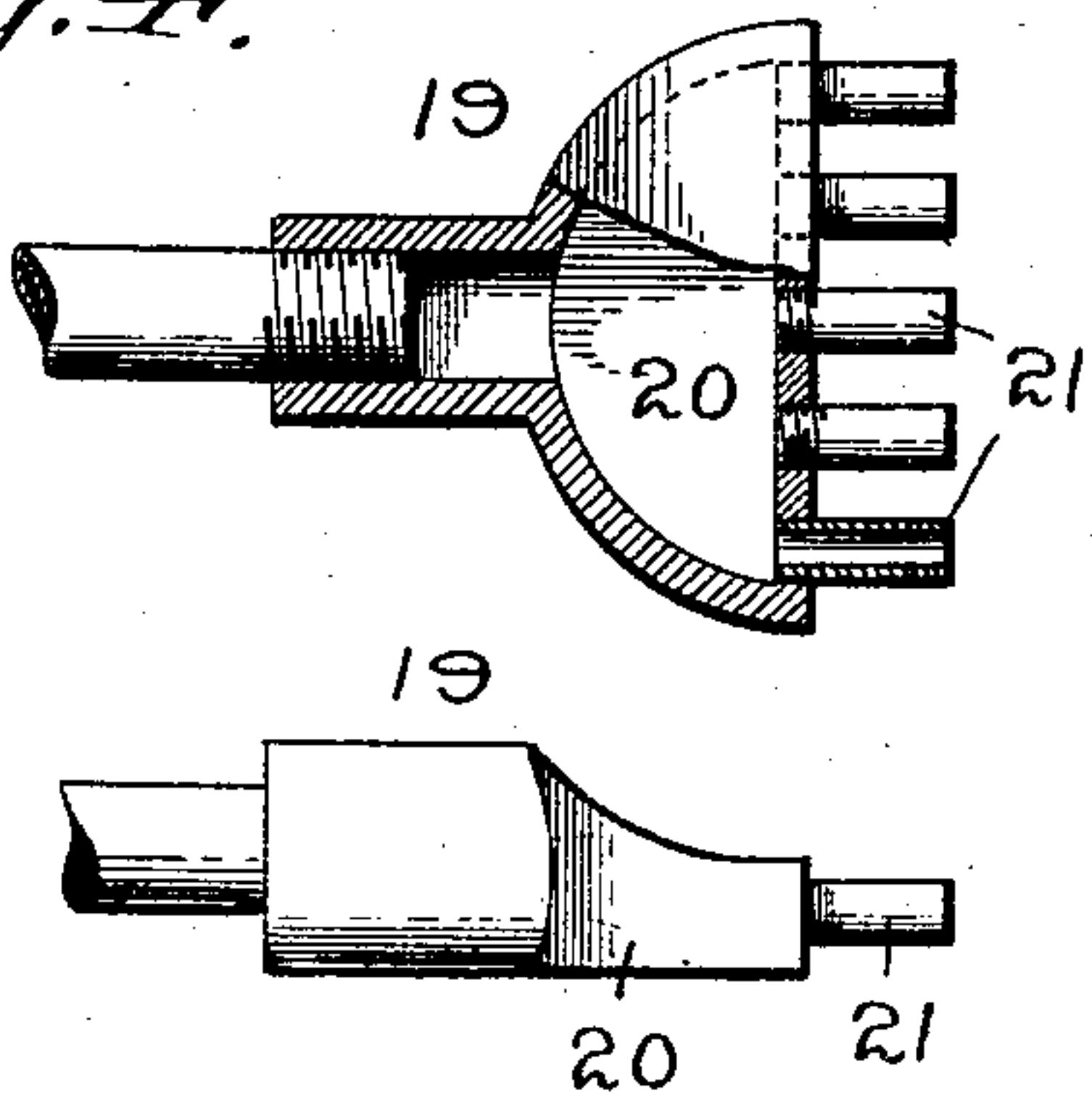
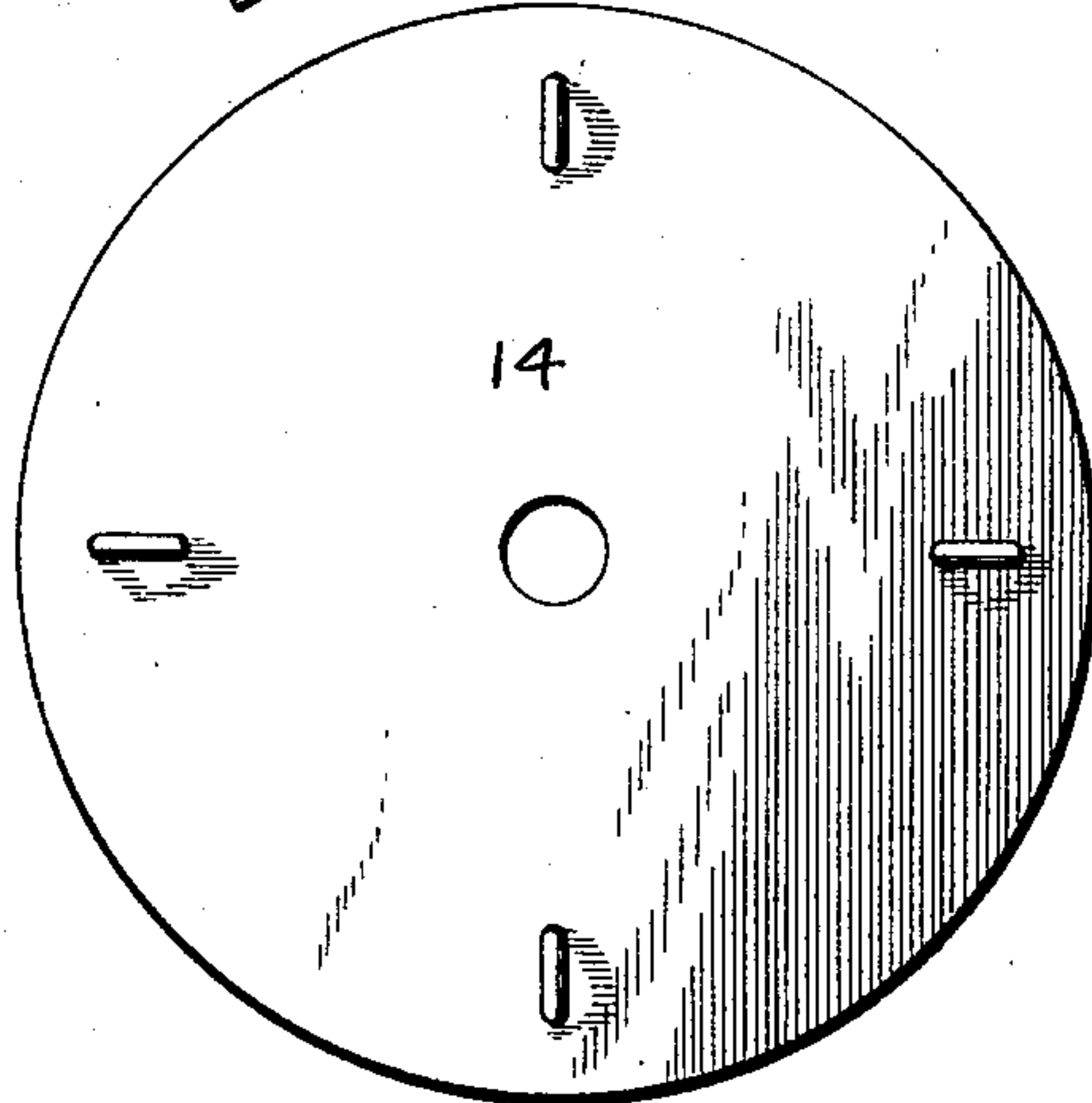


Fig. 5.



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UNITED STATES PATENT OFFICE.

SAMUEL R. STAMBAUGH, OF CHATTANOOGA, TENNESSEE.

APPARATUS FOR MINING PRECIOUS METALS.

SPECIFICATION forming part of Letters Patent No. 633,397, dated September 19, 1899.

Application filed September 8, 1897. Serial No. 650,960. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL R. STAMBAUGH, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Apparatus for Mining Precious Metals; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The object of my invention is to provide a new method of and apparatus for mining frozen gold-bearing soil.

The operation of placer-gold mining has been extremely laborious where frozen ground or ore was encountered, and especially so when bed-rock had to be reached through frozen ground in order to get at the best paying ore. To overcome such difficulties, I employ an apparatus for introducing heat into the earth for the purpose of thawing out the frost, as will appear more fully hereinafter and be set forth in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of a complete plant for the purposes of carrying out my invention; Fig. 2, detail views of the improved shaft-sinker used in mining to bed-rock; Fig. 3, details of an improved excavator used in enlarging the shaft at bed-rock; Fig. 4, detail views of a novel tunnel-former, and Fig. 5 a detail view of the closure used for the shaft.

A boiler 1 and water-tank 2 are used and are in fluid communication by flexible piping 3, having a perforated head submerged in the water of the tank. Both boiler and water-tank have separate furnaces. Snow or ice can be placed in the tank and after melting may be injected into the boiler through the piping to keep it supplied, after which the boiler supplies steam to the tank to keep the water therein at the proper temperature. A branch coupling 4, located on the boiler, has suitable cut-off valves and affords a connection for steam-pipes 5, 6, and 7, all of which are provided with flexible sections, so that

they may be moved or twisted, and they lead to certain improved mining devices to be hereinafter described.

In Fig. 1, A, B, and C represent three different shafts sunk into gold-bearing frozen ground D, composed of dirt and gravel, while E represents bed-rock. Shaft A is shown as being incomplete and in process of being sunk. Here I employ a shaft-sinker 8, which is shown in detail in Fig. 2, and consists of a straight piece of pipe having a wedge-shaped lower end 9, which is notched at 10. A single large aperture 11 leads from the interior of the pipe out through the apex of the notch, while downwardly-inclined apertures 12 lead from the interior out through the points formed by the notch. This tool is coupled direct to the pipe 5, and a removable handle 13 is secured to the tool and employed for directing the movements thereof. A centrally-apertured closure 14, which snugly fits the wall of the shaft, serves to confine the steam issuing from the shaft-sinker at the point where it is most needed and is raised and lowered by tackle 15.

B represents a shaft which has been sunk down to bed-rock E and is in process of enlargement at the bottom. The closure is employed, but an excavator 16, Fig. 3, is substituted for the sinker 8, and said excavator is composed of a hollow body coupled to pipe 6 and hollow radial arms 17, which are employed to direct the steam laterally to enlarge the shaft immediately above bed-rock by the process of undermining. As the process is continued additional lengths of pipe 18 are connected to the arms 17.

C is a shaft which has been mined to bed-rock, and an especially rich streak of "pay-dirt" having been struck it is followed up by employing a tunnel-former 19 in communication with pipe 7 and consisting of a single pipe which has a hollow head 20, from which project open pipe-sections 21, Fig. 4.

The closure is employed as before. Two tanks 22 and 23 are sunk in the ground, and an inclined trough 24, connecting said tank, serves to convey the water from tank 23 to tank 22. A rocker 25 is arranged to empty into tank 23. A pump 26 is connected to the rocker, and the oscillations of the latter cause

it to pump water from tank 22 to the rocker. An inclined table 27 is located adjacent the tank 23.

Having described the apparatus, I will now set forth the method of using it.

Assuming that steam is available from the boiler, an excavation is made with suitable tools and tightly covered with the closure which has been fitted therein, care having been taken to have the excavation the same size as the closure, which latter represents the diameter of the shaft being sunk. The shaft-sinker is then inserted through the opening through the closure, (being of the same size as the opening,) so that its perforated end is located in the space below said closure. The edges and center of the closure can be packed with any suitable material which will confine the steam. Steam is now turned into pipe 5 from the boiler and, passing out through the perforations in the shaft-sinker, enters and fills the space below the closure, thereby thawing and loosening the frozen ground. The handle 13 is now used to move the sinker downward into the ground and to work it laterally, so that the steam will have the greatest effect. As the ground becomes loosened and the sinker advances downwardly the closure is lowered, so that the steam will be confined as much as possible in direct contact with the earth, and when a sufficient depth is reached the steam is shut off from the sinker and it and the closure removed from the shaft A and shaft B started in a similar manner. The thawed ground in the shaft A is then removed and if it is pay-dirt it is carried while warm to the rocker and passed through it to extract the gold. The operation of the rocker causes the pump to keep it supplied with hot water from tank 22, and if this water becomes cold it can be heated by introducing the free end of pipe 3 in said tank. By the use of warm water the quicksilver in the rocker is kept soft and the saving of the very fine gold dust is assured. The gravel and mud wash from the rocker into tank 23, from which it is to be shoveled onto table 27, and the water drains back from this table into said tank and then passes into the inclined trough into tank 22, so that very little water is wasted during

these operations. After sufficient soil is thawed out in shaft B the shaft-sinker is replaced in shaft A and the latter sunk still deeper, and the method of working the frozen soil is carried on until bed-rock is reached, whereupon the use of the shaft-sinker is discontinued and the excavator is substituted. This excavator is employed to undermine the soil, as illustrated in Fig. 1, and the steam is confined by the closure, as before. After sufficient undermining has been carried on the loosened soil is removed and treated as before, and when the excavator is again used additional pipe-sections are attached to the radial arms thereof, so that jets of steam are brought directly against the walls of the enlarged cavity. The method of working is the same when the tunnel-former is used, the latter being employed to loosen or thaw out the ground in one direction only, as when a particularly rich streak of pay-dirt has been found.

What I claim is—

1. In a mining apparatus, the combination with a steam-generator, of a shaft-sinker, consisting of an open pipe, an excavation-closure through which the pipe loosely passes, a flexible pipe connecting the shaft-sinker to the steam-generator which permits lateral and vertical movement of the shaft-sinker when in use, means for manipulating the shaft-sinker in relation to the closure, and means for raising and lowering said closure independently of the shaft-sinker.

2. In a mining apparatus, the combination with a steam-generator, of a shaft-sinker consisting of an open pipe, a flexible connection between the pipe and generator, a closure through which the shaft-sinker loosely passes, tackle connected to the closure adapted for raising and lowering it on the shaft-sinker, and a manipulating-handle adapted for connection to the pipe at any point thereof.

In witness whereof I affix my signature in presence of two witnesses.

SAMUEL R. STAMBAUGH.

Witnesses:

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