

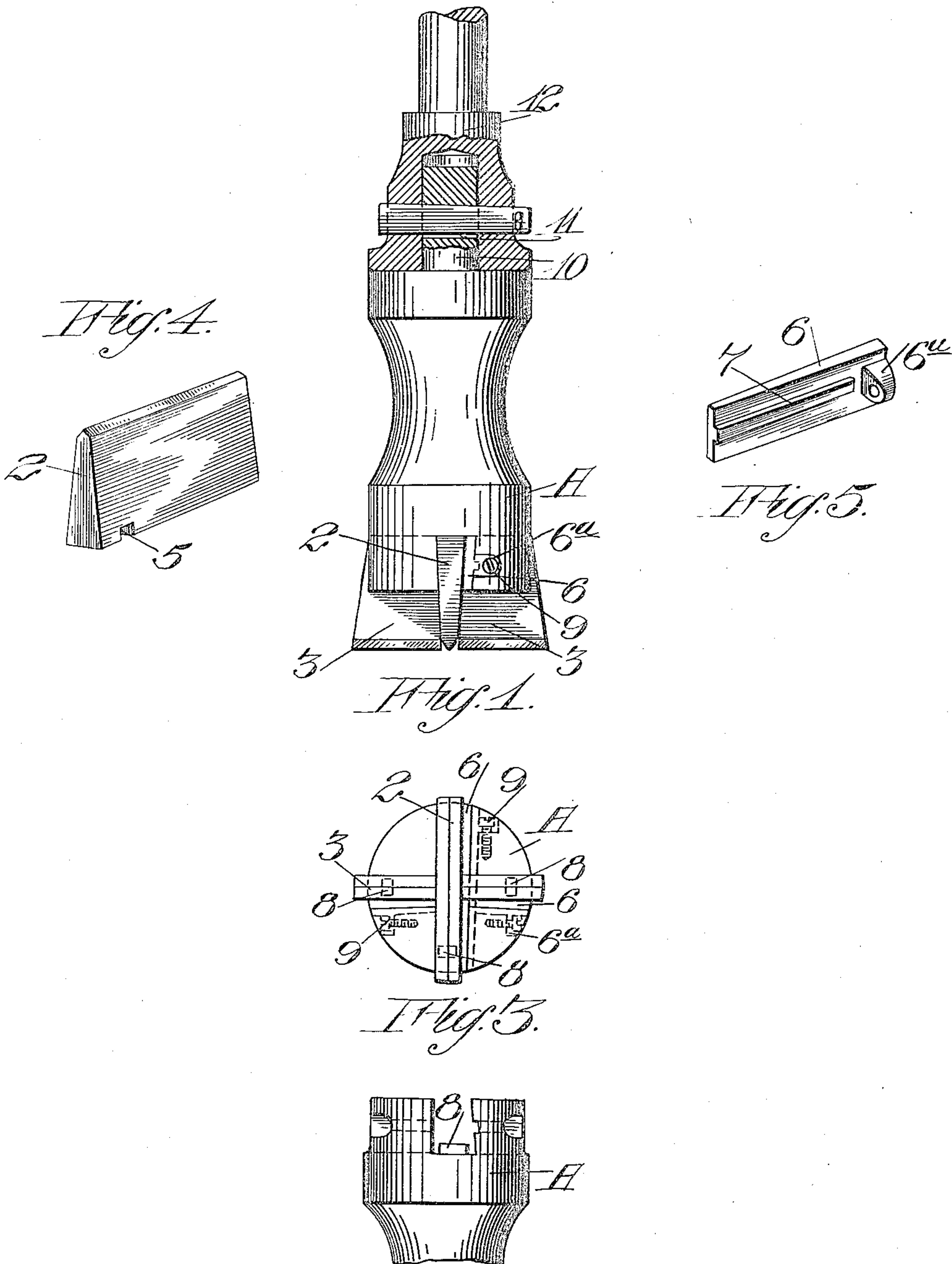
P. ENGLISH.

DRILL BIT.

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993,972.

Patented May 30, 1911.



Witnesses.
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UNITED STATES PATENT OFFICE.

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DRILL-BIT.

993,972.

Specification of Letters Patent.

Patented May 30, 1911.

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To all whom it may concern:

Be it known that I, PETER ENGLISH, citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Drill-Bits, of which the following is a specification.

My invention relates to improvements in bits of the class employed for drilling Artesian and oil wells and similar purposes, and a means for mounting said bits.

It consists in a combination of parts having details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation and partial section of the device. Fig. 2 is an inverted elevation of the head with bits removed. Fig. 3 is a bottom view. Fig. 4 is a perspective view of one bit. Fig. 5 is a perspective view of a wedge key.

The cutting bits employed for drilling wells and the like are usually made of considerable size and attached to a drill-stem by means of a cone-shaped, screw-threaded shank adapted to fit corresponding threads in the stems. This construction is objectionable, first, because the size of the bits is such that it is almost impossible to evenly temper the thinner and thicker portions of the bit; second, the tendency of these single-edged bits to deflect the line of the hole when working in rock which may have harder and softer portions in the line, or cracks into which the edge of the drill will be driven and gradually deflected so as to change the direction of the hole, and the attachment to the stem is liable to be disengaged by the shocks caused by the continual dropping of the drilling device or by the accidental turning of the stem in such a manner as to unscrew the drill-head to such an extent that the stem and head are not solid together and the blows lack force; or the drill-head may become entirely separated from the stem and be left in the hole, causing much trouble in attempting to recover it and sometimes the necessity for entirely abandoning the hole and commencing a new one.

It is the object of my invention to overcome these difficulties and increase the surface abraded by a single blow, avoiding the difficulties and increasing the speed of drilling; and this I do by the use of a plurality of comparatively small bits, solidly inserted

in the head and removable, which can be evenly tempered, and which by reason of their position will form guides which will prevent the irregular cutting and deflection of the hole; and by such a connection of the drill-head with the stem as to prevent a separation of the two and to so connect them that the impact due to the dropping of the apparatus will be communicated to the drill-head and cutting tools in such a manner as to insure the full force of the blow acting thereon.

In the drawings I have shown a drill-head A having chambers made in the lower portion adapted to receive bits 2 and 3. These bits are preferably made wedge-shaped and any suitable or desired number may be employed.

In Fig. 3 I have shown two transverse channels 4 made across the lower face of the head, these channels being made wedge-shaped and adapted to receive the thicker sides of the bits which fit into the channels as follows: The longer bit is intended to extend entirely across from one side to the other of the head and the shorter bits are formed with beveled inner ends which abut against the inclined faces of the longer bits at approximately their centers. These bits may be secured in place in any suitable manner. I have here shown the bits as having countersunk depressions or notches 5 upon one edge, and these notches engage corresponding lugs 8 in the bottoms of the channels and prevent end movement of the bits. The channels are wide enough to admit keys 6 which may have longitudinal tongues 7 slidable in corresponding grooves or keyways in the sides of the channels, and these keys, in conjunction with the lugs 8 which engage the inner edges of the bits, hold the bits solidly in place but easily removable. The keys may be secured by set screws 9 passing through lugs 6^a on the outer ends of the keys and screwing into the head A. The bits are thus arranged in a plurality of pairs crossing each other and disposed around the periphery of the head so that each pair will cut away the rock or material at the point where it drops thereon, and the advance caused by the rotation of the stem and head will continually change the position for each drop, thus cutting a clean, cylindrical hole. By reason of the plurality of bits which are disposed in the manner herein described, it

will be seen that if a portion of harder rock be encountered upon one side of the hole, its tendency to force the drill to one side and change the direction of the hole will be counteracted, because the bits all serve as guides to maintain the drill-head in its proper line of travel, and as each bit or set of bits arrives at the harder rock, it will cut it away and the operation will maintain a hole in a straight line.

In order to produce the best effect in drilling it is necessary that the drill-head, stem and the weight which impels the drill should act in unison, and it is necessary that the drill-head be so firmly secured to the stem that the two are practically integral so far as the effect of the blow is concerned, by reason of the stem resting firmly upon the drill-head when the impact takes place. This is effected by providing the head with an upwardly projecting portion 10 having a stem 12 which will register with the key-way 11, so that a key being passed through the two will hold them together. The upper end of the drill-head being flat and the lower end of the stem having the same surface, when the stem rests upon the head they form a solid continuous member capable of transmitting the whole force of a blow to the drill bits and there is little or no danger of the drill-head becoming detached from the stem.

By this means of constructing a plurality of small bits it is easy to remove and replace them and the even temper of the bits throughout is easily effected because there is no conjunction of thick, heavy portions of metal with the thinner cutting edges.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A percussion drill having in combination, a head formed with chambers in its lower face, a plurality of bits fitting said chambers, and wedge-shaped binding keys slidably fitted between the sides of the bits

and the walls of the chambers, for locking the bits in position, said chambers having bottom lugs and said bits having notches to receive said lugs whereby the bits are held against lengthwise movement.

2. A percussion drill having in combination, a head formed with chambers in its lower face said chambers having grooves in their sides, a plurality of bits fitting said chambers, wedge shaped binding keys slidably fitted between the sides of the bits and the walls of the chambers and having longitudinal tongues engaging the corresponding grooves in the sides of the chambers, said chambers having lugs in the bottoms and said bits having notches in their inner edges to receive said lugs whereby the bits are held from longitudinal displacement, and means for securing the keys to the drill head.

3. A percussion drill having in combination, a head formed with chambers in its lower face, a plurality of bits fitting said chambers, and wedge-shaped binding keys slidably fitted between the sides of the bits and the walls of the chambers, for locking the bits in position, said chambers having bottom lugs and said bits having notches to receive said lugs whereby the bits are held against lengthwise movement, and said keys having side lugs, and set screws engaging the last-named lugs and securing the keys to the head.

4. In a percussion drill, a transversely channeled head, bits slidably fitting the channels, interlocking lugs and notches to prevent end displacement of the bits, guided binding keys slidably fitting between the sides of the bits and channels, and means to lock the keys in place.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

PETER ENGLISH.

Witnesses:

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JAMES N. LEWIS.