

A. G. HEGGEM.
CASING SHOE.
APPLICATION FILED SEPT. 8, 1910.

982,491.

Patented Jan. 24, 1911.

Fig. 1.

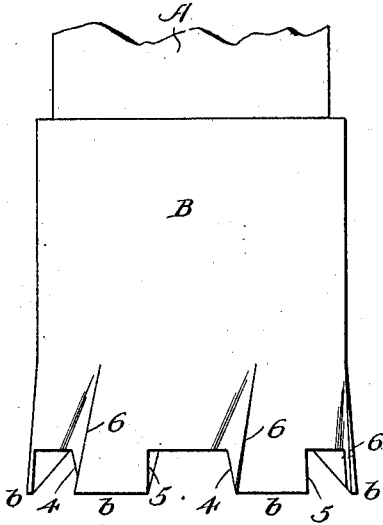


Fig. 2.

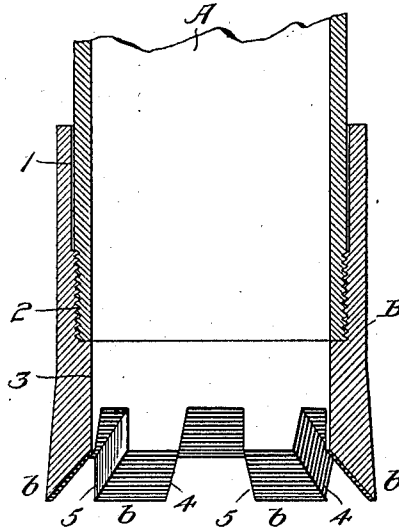


Fig. 3.

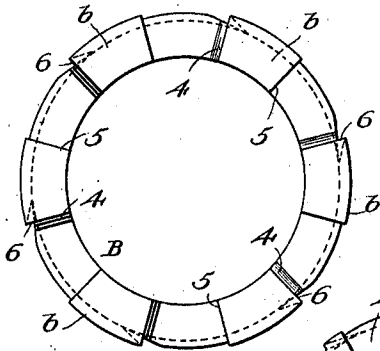


Fig. 4.

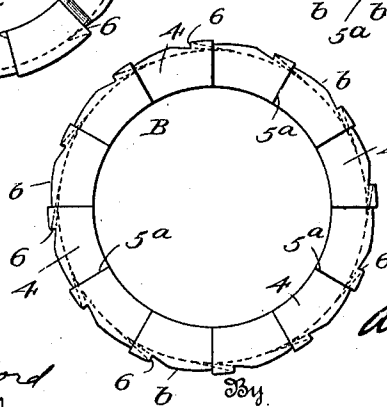
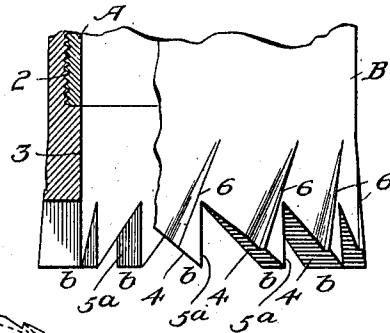


Fig. 5.

Witnesses
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UNITED STATES PATENT OFFICE.

ALFRED G. HEGGEM, OF CORAOPOLIS, PENNSYLVANIA, ASSIGNOR TO OIL WELL SUPPLY COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CASING-SHOE.

982,491.

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To all whom it may concern:

Be it known that I, ALFRED G. HEGGEM, a citizen of the United States, residing at Coraopolis, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Casing-Shoes; and I do hereby 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.

My invention relates to the construction of that class of devices commonly termed casing-shoes employed in sinking oil and Artesian wells where the character of the formation in which the well is sunk requires the use of casing.

In drilling Artesian and oil wells it is the practice to drill the hole of a diameter corresponding with the inside diameter of the casing to be used in the well, for the reason that the well, as a general rule, penetrates a more or less soft and friable formation which easily washes down leaving the hole considerably larger than the drill. There are, however, frequently encountered at intervals strata of a harder material which it becomes necessary to ream out before the casing can be lowered. To effect this reaming out of the well where required the bottom of the string of casing is in practice armed with what is termed a "casing shoe," which is in the form of a ring having cutting or chisel teeth and of greater diameter at its lower or cutting end than at its upper end to provide clearance for the couplings of the string of casing.

In order to effect the cutting or reaming action of the casing shoe for the removal of the obstruction to the descent of the casing the string of casing has to be raised and lowered, or reciprocated, and this reciprocation of the casing tends to a rotation thereof frequently resulting in the disconnection of the sections of casing composing the string, necessitating a laborious and expensive "fishing" operation and followed sometimes by the abandonment of the well.

The rotation of the string of casing is not in itself objectionable, if the direction of rotation is not such as to affect the connection between the sections of casing, and the object, therefore, of the present invention is the provision of means for controlling the direction of rotation of the string of casing,

or for preventing any material rotation of the string of casing in a direction which will tend to the separation of the sections thereof.

To this end my invention, generally stated, is embodied in a casing shoe having inclined abutments which induce a tendency in the casing to rotate in the direction of movement of the parts when coupling up the sections composing the string.

As standard casing has commonly a right hand thread, a further feature of my invention consists in such an arrangement or inclination of the abutments on the casing shoe as will cause a tendency to a counter-clockwise movement of the shoe when reciprocated within the bore of a well.

In the drawings illustrating my invention, the scope whereof is pointed out in the claims, Figure 1 is a view in elevation of a casing shoe embodying my invention, and the lower end of a section of casing to which the shoe is attached. Fig. 2 is a longitudinal central section of the casing-shoe, &c., shown in Fig. 1. Fig. 3 is a bottom plan view of the casing-shoe shown in Fig. 1. Fig. 4 is a view in elevation, parts broken away, of a casing-shoe embodying my invention, having a different form of chisel tooth from those shown in Fig. 1. Fig. 5 is a bottom plan view of the casing-shoe shown in Fig. 4.

Like symbols refer to like parts wherever they occur.

I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates the lower end of a string of casing, and B an annular casing-shoe embodying my invention, attached to the lower end of the string.

The lower end of the casing shoe B is of sufficiently greater diameter than its upper end to insure that the bore of the well where reamed out will be of sufficient diameter to permit of the passage of the couplings by means of which the sections of the string of casing are connected. This increase of diameter at the lower end of the shoe B may be secured by means of a shoulder, or, as shown in the drawings, by coning or flaring the shoe outwardly at its lower end.

In order to receive the threaded end of the section A of the casing, the casing-shoe is bored at its upper end as at 1 a trifle larger than the casing to permit the casing to enter

and be supported in the shoe. The bore of the shoe is then reduced as at 2 and threaded to match the threaded end of the casing, and finally the bore of the shoe is further reduced as at 3, to agree approximately with the inside diameter of the casing A.

The lower, flared, or expanded edge of the annular shoe B is provided with chisel pointed teeth *b* which have a sloping trailing face 4 inclined to the plane of the casing or to the plane of the axis of the shoe in such direction as to cause a rotary direction of motion to the shoe when meeting resistance in cutting. The opposite or leading face of the tooth *b* may be at an angle to the plane of the shoe as shown at 5, Fig. 1, or it may be in the plane of the shoe as shown at 5^a, Fig. 4 of the drawing.

On the outer surface or periphery of the annular shoe B are inclined grooves forming abutments 6 which extend at an angle to the plane of the axis of the shoe so as to rotate the shoe in the required direction when the casing and shoe are raised in the bore of the well.

In the present instance the thread in the casing and shoe are assumed to be right hand threads and the inclination of the abutments 6 is such as to induce a tendency to a counter-clockwise movement in the shoe when reciprocated.

The construction of the shoe being substantially such as hereinbefore noted, it will, by reason of the inclined faces 4 of the tooth *b* have a tendency to rotate from left to right or counter clockwise on the downward stroke when the tooth meets resistance in cutting, and also on the upward movement or lift of the casing, when the abutments 6 meet any obstruction and the shoe thus having a tendency to counter-clockwise movement on both the lift and fall of the string of casing will effectively counteract any tendency to a rotation of the casing which would cause a separation of the sections of the string.

As the usual threading of all casing is a right-hand thread the illustration and description has been confined to such an inclination of the faces of the cutting teeth and peripheral abutments of the shoe as would cause a counter clockwise movement, but it will be evident to one skilled in the art

that a reversal of the thread of the casing will call for a reversal of the inclination of the faces of the teeth, and of the abutments on the shoe.

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

1. An annular casing shoe having means for coupling it to a string of threaded casing, said shoe having upon its outer peripheral surface a series of abutments which extend at an angle to the plane of the axis of the annular shoe.

2. An annular casing shoe having means for coupling it to a string of threaded casing, said shoe having an enlarged lower end portion and also having a series of abutments which traverse the outer surface of the enlarged lower end portion and extend at an angle to the plane of the axis of the annular shoe.

3. An annular casing shoe having means for coupling it to a string of threaded casing, said shoe having a conical surface which is traversed by abutments which extend at an angle to the plane of the axis of the annular shoe.

4. An annular casing shoe having means for coupling it to a string of threaded casing, said shoe having cutting teeth, the trailing faces of which are inclined to the plane of the axis of the shoe.

5. An annular casing shoe having means for coupling it to a string of threaded casing, said shoe having upon its outer peripheral surface a series of grooves forming abutments which extend at an angle to the plane of the axis of the annular shoe and also having cutting teeth the trailing faces of which are inclined to the plane of the axis of the annular shoe.

6. An annular casing shoe having means for coupling it to a string of threaded casing, said shoe having an enlarged lower end portion the periphery whereof is traversed by a series of grooves that extend at an angle to the plane of the axis of the shoe.

In testimony whereof I affix my signature, in presence of two subscribing witnesses.

ALFRED G. HEGGEM.

Witnesses:

W. H. McKEE,
R. A. STEWART.