July 19, 1927. 1,636,604

C. C. HANSEN

CHANNELER STEEL

Filed May 17, 1926

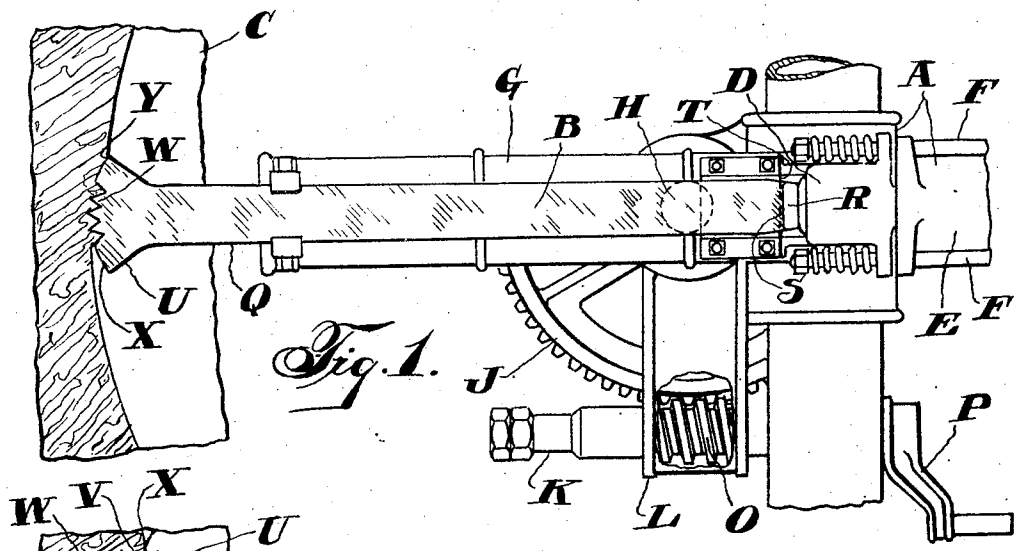


Fig. 1.

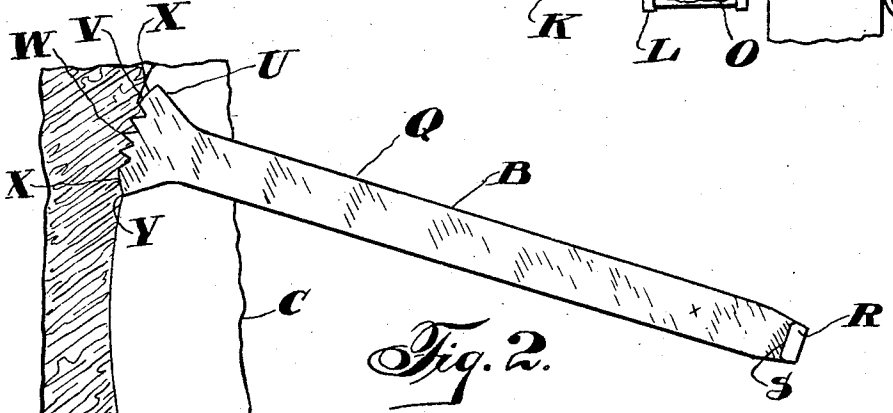


Fig. 2.

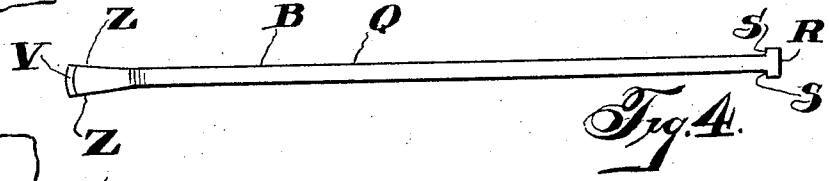


Fig. 4.

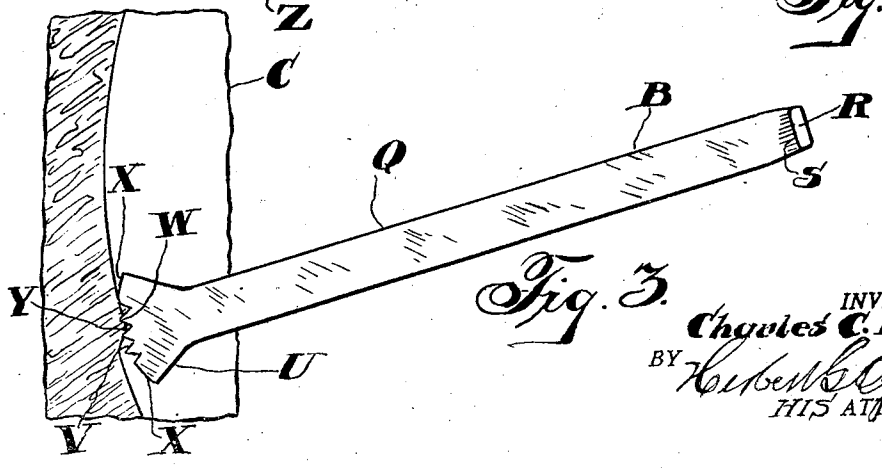


Fig. 3.

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UNITED STATES PATENT OFFICE.

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CHANNELER STEEL.

Application filed May 17, 1926. Serial No. 109,494.

This invention relates to channeler steels, but more particularly to a channeler steel constructed of a single piece upset at its ends to form a head at one end and at its other end a cutting bit.

The present invention is particularly adapted for use in connection with radial type rock drills provided with shells mounted pivotally on a supporting column, quarry bar or other similar support in such manner that the steel may be oscillated with respect to the work. In this way an arcuate slot is cut in the rock and blocks of rock may readily be cut to dimensions, thus eliminating the chances of fracturing the rock as frequently happens in quarrying operations where holes are drilled in line and explosives utilized for breaking the block from the mass.

Heretofore, considerable difficulty has been experienced in advancing steels of this type along the rock face, this is particularly the case when the steel is applied to a radial type rock drill for vertical cutting. Ordinarily, in making "down" cuts the clearance between the body portion of the steel and the guiding means, together with the weight of the overhanging portion of the steel, will enable the teeth at the lowermost end of the bit to pass freely over the shoulder formed by the immediate and preceding cuts. However, in making "up" cuts the factors which facilitate "down" cutting tend to hinder advancement of the steel, the uppermost teeth of the bit will then catch on the rock shoulder and will thus necessitate slight withdrawal of the steel. In consequence, the efficiency of the drill will be greatly reduced.

It is therefore an object of the present invention to prevent the cutting bit from catching on the rock face when the steel is being advanced from one cutting position to another during the channeling operation.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention is shown in one of its preferred forms in the accompanying drawings, in which

Figure 1 is a longitudinal view of a channeler steel constructed in accordance with the practice of the invention, showing the steel applied to a rock drill and the manner in which it may be employed in making an "up" cut in a rock face,

Figure 2 is a longitudinal view of the steel illustrating the manner in which a "down" cut may be made in the rock,

Figure 3 is a view similar to Figure 2 showing the position of the steel with respect to the rock prior to the delivery of the blows of the percussive element of the drill against the shank end of the steel, and

Figure 4 is a longitudinal view of the steel.

Referring to the drawings, the invention is shown applied to a rock drill designated generally by A, only a portion of which is shown for the purpose of illustrating the manner in which a channeler steel B may be employed for channeling rock C. The rock drill illustrated is preferably of the radial type such as that described in United States Patent No. 1,519,314 entitled Hammer type channeling machine, granted to C. C. Hansen, December 16, 1924, although in this instance instead of the usual type of front head, an attachment D which is preferably like that described and illustrated in copending United States application of C. C. Hansen entitled Broaching attachment, Serial No. 68,262, filed November 11, 1925 (docket No. 1176). As in the aforesaid copending application, the attachment D is secured to a cylinder E by the usual spring pressed side bolts F. The rock drill A is provided with a shell G which cooperates slidably with the rock drill in a well known manner for advancing the drill to the work. A trunnion H preferably formed integrally with the shell G is suitably secured to a toothed segment J so that any movement of the segment J will produce a corresponding movement of the shell G.

Suitable means are provided for oscillating the drill about the trunnion H. To that end a shaft K is supported on one side of the segment J by a suitable bearing L and carries a worm O which meshes with the segment J. Any suitable means, such as a crank P, may be attached to the shaft K, for rotating said shaft.

In accordance with the practice of the invention, the steel B is formed of a single piece, preferably having a flat rectangular body portion Q, the rearward end of which is upset to form a head R for the reception of the blows of the percussive element of the rock drill to drive the steel into the rock. By thus forming the head R on the

steel, shoulders S are provided which may cooperate with a suitable shoulder T of the front head or attachment D to prevent the steel B from being ejected from said attachment.

At the opposite end of the steel B is formed a cutting end U having a convexly arcuate cutting bit V. The edges of the cutting end U are preferably inclined from the edges of the body portion Q so that the outer face of the end U is flared and is of somewhat greater width than the body portion.

Across the cutting bit V are formed a series of teeth W for the purpose of cutting and crushing the rock. In this instance the teeth W are only formed on the intermediate portion of the cutting bit V, thus leaving unserrated guiding surfaces X at the ends of the cutting face to guide the cutting bit across a shoulder Y formed in the rock C at the juncture of the immediate and preceding cuts. The guiding surfaces X preferably lie in the same arc as the points of the teeth W. Owing to this arrangement, whenever the steel is being shifted along the rock face, one or the other of the guiding surfaces X, depending upon the direction of cut, will remove the cutting bit V slightly from the rock face and thus preventing the teeth W from engaging or catching on the shoulder Y of the rock.

In order that friction between the cutting end U and the material being channeled may be reduced to a minimum, the sides Z of the cutting end U (Figure 4) are preferably tapered outwardly from the sides of the body portion Q so that the cutting bit V will be of greater width than the thickness of the body portion Q.

The foregoing described invention has been found to be unusually satisfactory in use for the purpose described and the tendency of the cutting teeth to catch on the rock face during the shifting of the cutting bit from one position to another has been entirely eliminated. Another advantageous feature of the present invention is that owing to the fact that the teeth W are at all times protected against any scraping action of the teeth against the rock, the said teeth will remain sharper for a longer period of time than will the teeth of the ordinary channeling steel in which there is no provision made to overcome this objectionable feature.

I claim:

1. A channeler steel comprising a body portion having a head at one end and a convexly arcuate cutting bit at the other end, teeth extending across the face of the cutting bit, and means adjacent the outer teeth to prevent the teeth from engaging a rock face when the steel is being oscillated from one position to another.

2. A channeler steel comprising a body portion having a head at one end and a convexly arcuate cutting bit at the other end, teeth extending across the face of the cutting bit, and means at the ends of the cutting bit to prevent the teeth from engaging a rock face when the steel is being oscillated from one position to another.

3. A channeler steel comprising a flat rectangular body portion having a rectangular head at one end and a convexly arcuate flared cutting bit at the other end, teeth extending across the face of the cutting bit, and guide surfaces at the ends of the cutting bit to prevent the teeth from engaging a rock face when the steel is being oscillated from one position to another.

4. A channeler steel comprising a flat rectangular body portion having a rectangular head at one end and a convexly arcuate flared cutting bit at the other end, teeth extending across the face of the cutting bit, and smooth guide surfaces at the ends of the cutting bit to prevent the teeth from catching on the working face when the steel is being oscillated from one position to another during the channeling operation.

5. A channeler steel comprising a body portion having a head at one end and a convexly arcuate cutting bit at the other end, teeth extending across the face of the cutting bit, and smooth guide surfaces at the ends of the cutting bit to prevent the teeth from catching on the working face when the steel is being moved from one cutting position to another during the channeling operation, said smooth surfaces lying in the same arc as the cutting points of the teeth.

In testimony whereof I have signed this specification.

CHARLES C. HANSEN.