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Elders

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[54] **POINT-ATTACK BIT**

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Related U.S. Patent Documents

Reissue of:

[64] Patent No.: **4,065,185**
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Appl. No.: **707,647**
Filed: **Jul. 22, 1976**

[51] **Int. Cl.**[3] **E21C 35/18**
[52] **U.S. Cl.** **299/86;** 175/354
[58] **Field of Search** 299/86–93; 175/354, 377

[56] **References Cited**

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3,652,130	3/1972	Elders	299/86
3,801,158	4/1974	Radd et al.	299/86
3,833,264	9/1974	Elders	299/86

Primary Examiner—Ernest R. Purser
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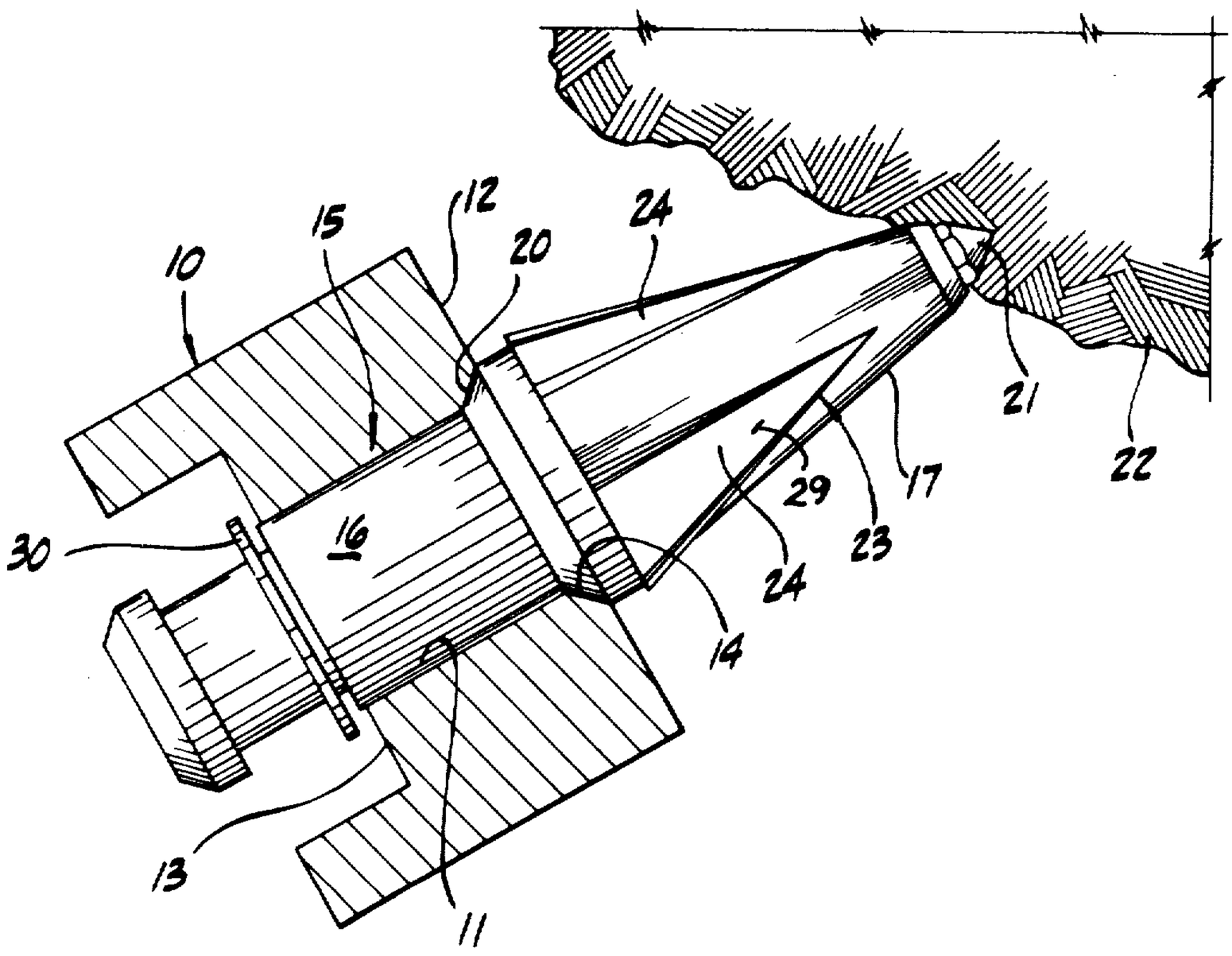
[57] **ABSTRACT**

A point-attack bit retained for rotation in a block bore, and used for removing material from a mine face. The bit has an elongate shank, and a head integral and coaxial with the shank, the head including a plurality of peripherally spaced, laterally projecting vanes extending generally longitudinally of the bit. Each vane is substantially triangular with a narrow leading end and a wider trailing end, and has sides that extend from the leading end to the trailing end. One of the vane sides has a different angle with respect to the longitudinal axis of the bit than the other vane side to provide different transverse forces on the vane sides upon contact with material being mined to effect a positive turning of the bit upon picking of the mine face. More particularly, the vane sides extend from the leading end to the trailing end on opposite sides of a longitudinal plane passed through the longitudinal axis of the bit and the leading end of the vane so that one vane side has a different included angle with respect to the longitudinal plane than the other vane side.

11 Claims, 4 Drawing Figures



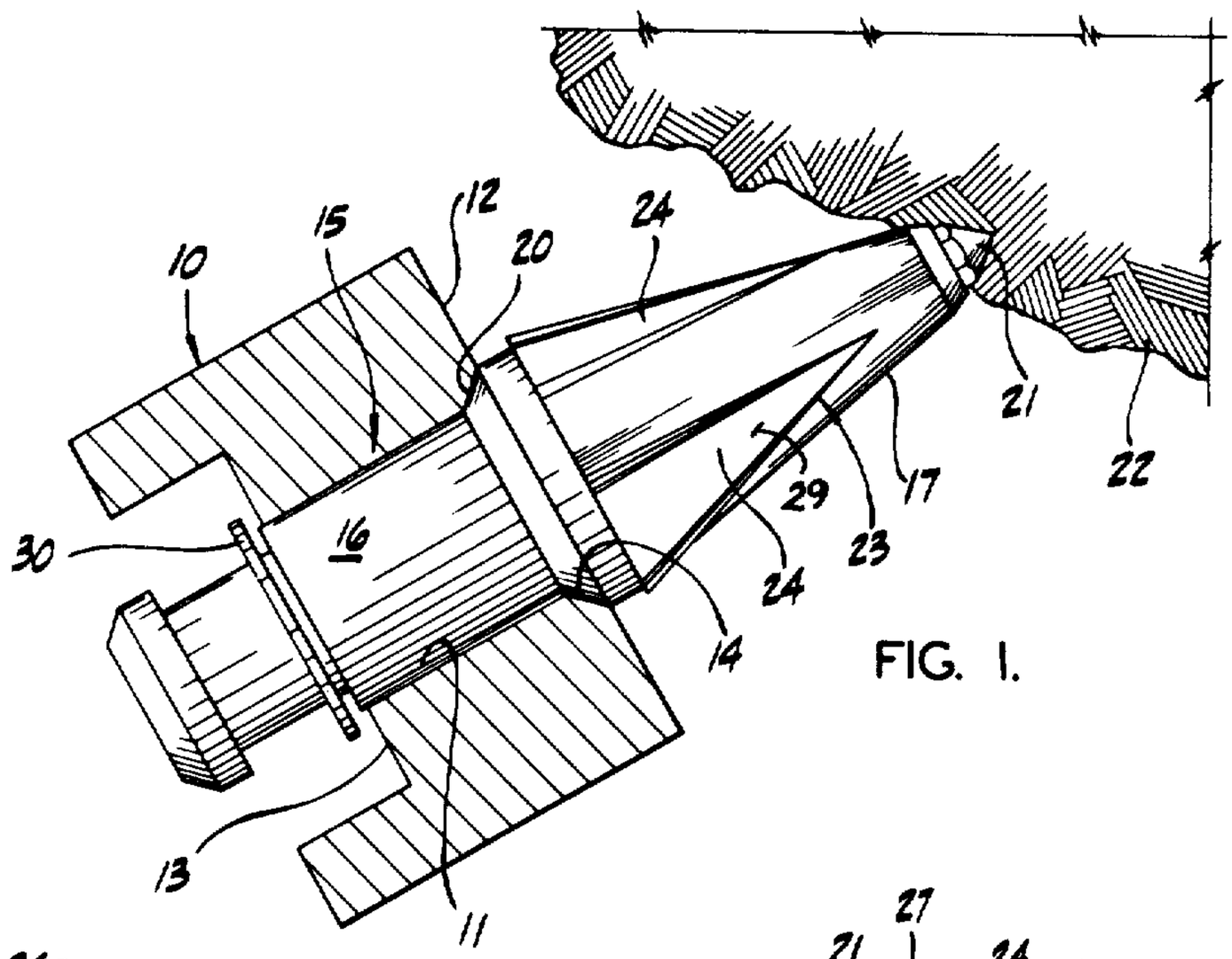


FIG. 1.

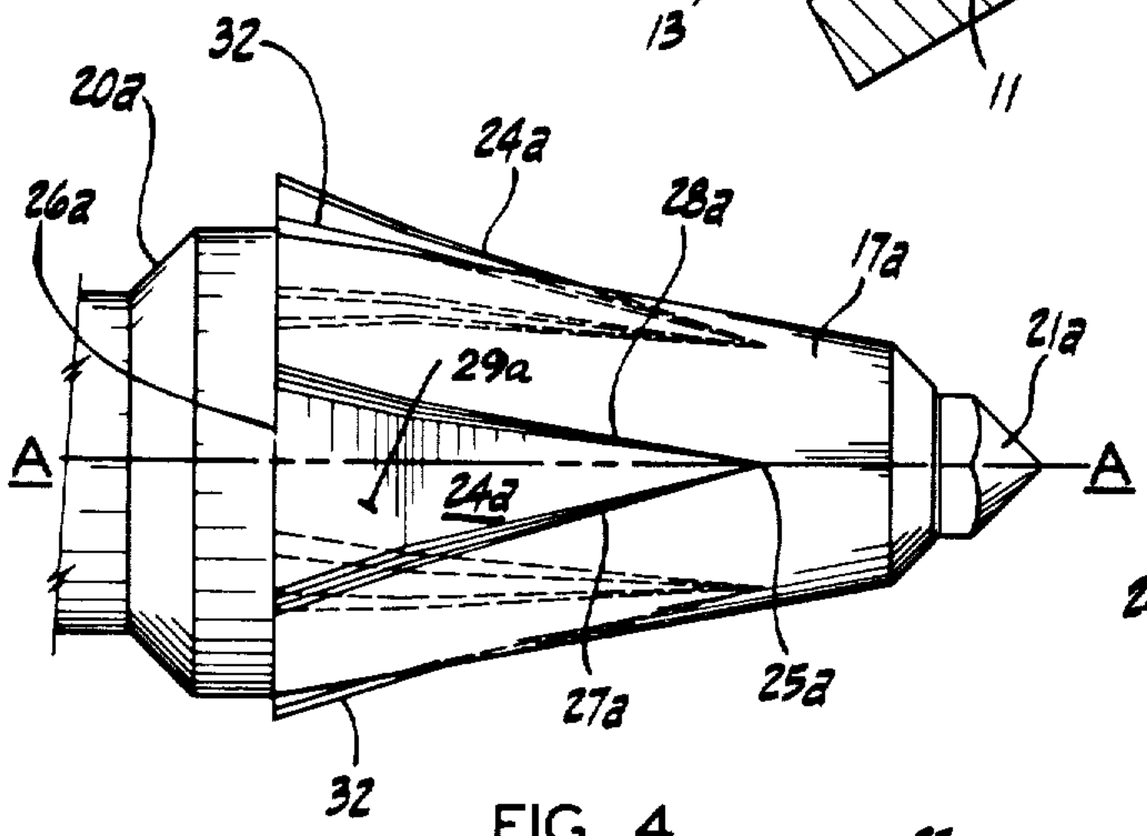


FIG. 4.

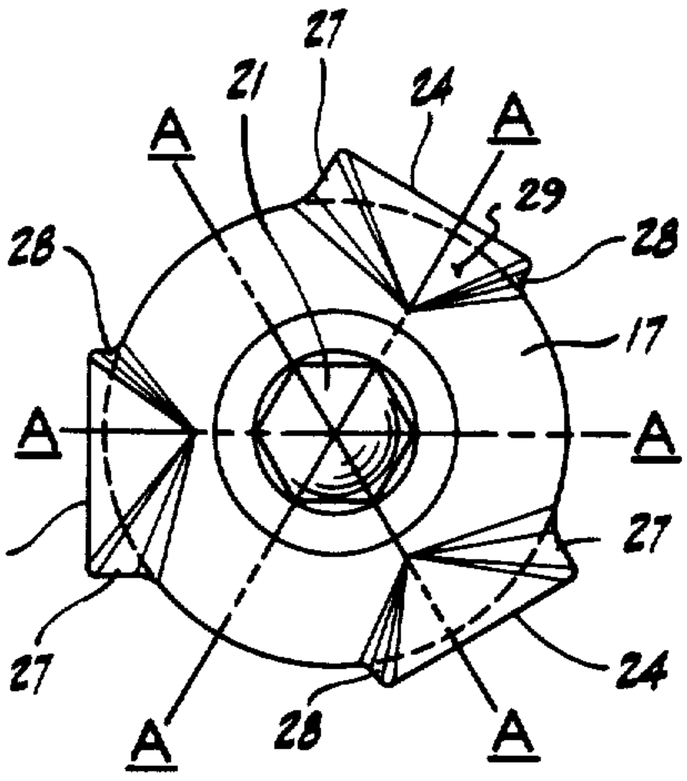


FIG. 2.

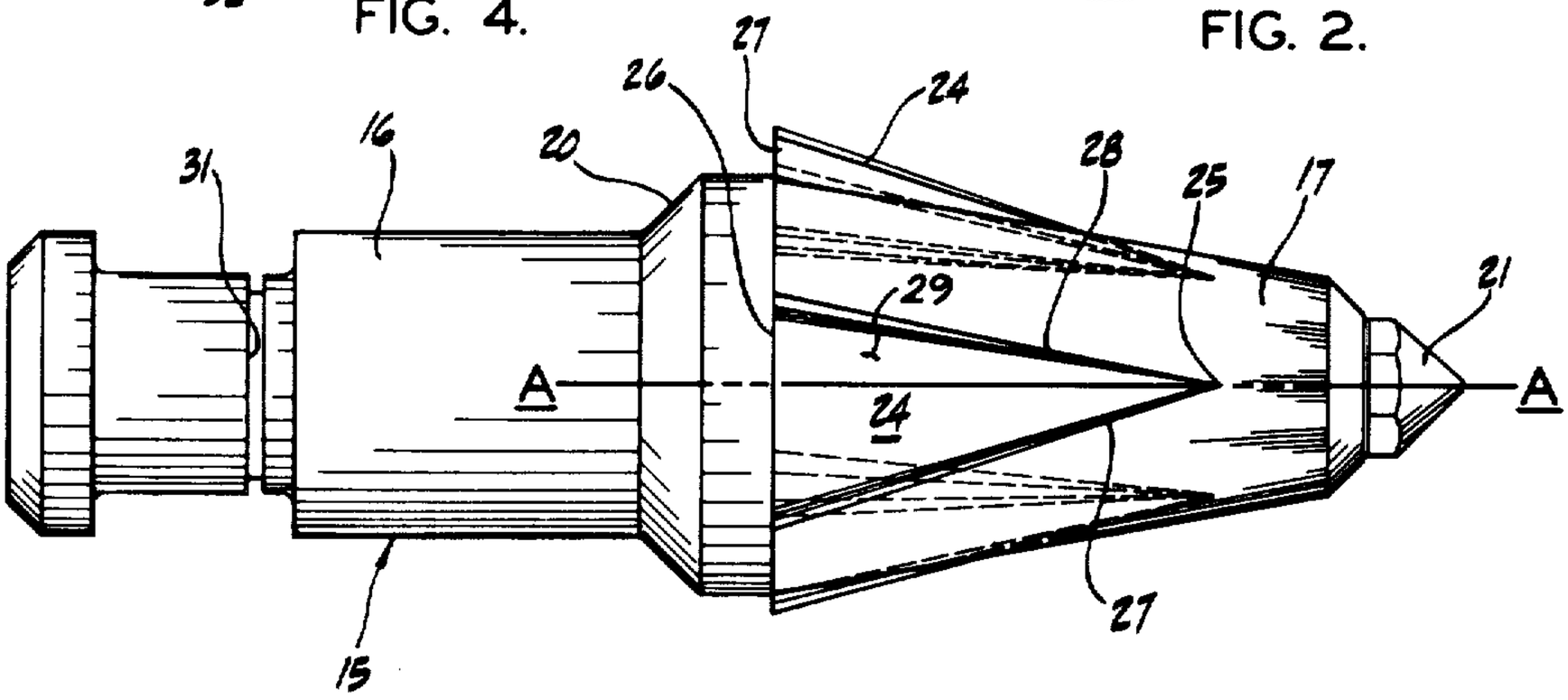


FIG. 3.

POINT-ATTACK BIT

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

BACKGROUND OF THE INVENTION

This invention relates generally to improvements in a point-attack bit, and more particularly to an improved bit of this type that turns in its mounting to provide a self-sharpening action resulting in a longer bit wear and life.

A self-sharpening bit of this general type is disclosed in applicant's prior U.S. Pat. No. 3,652,130 and U.S. Pat. No. 3,833,264.

SUMMARY OF THE INVENTION

The present self-sharpening bit provides an improved construction that realizes a more effective and positive turning of the bit during picking action.

The bit will turn automatically as the bit picks a wall so that wear is distributed substantially evenly over the periphery of the bit head, thereby creating a self-sharpening action.

The point-attack bit includes a head integral and coaxial with an elongate shank, the head including a plurality of peripherally spaced, laterally projecting vanes extending generally longitudinally of the bit. Each vane is substantially tringular with a narrow leading end and a wider trailing end. The sides of each substantially triangular vane extend from the leading end to the trailing end. One vane side has a different angle with respect to the longitudinal axis of the bit than the other vane side to provide different transverse forces on the vane sides of each vane upon contact with material being mined to effect a positive turning of the bit upon picking of the mine face.

More particularly, to achieve the advantageous results, the vane sides of each substantially triangular vane extend from the leading end to the trailing end on opposite sides of a longitudinal plane passed through the longitudinal axis of the bit and the leading end of the vane. One vane side has a different included angle with respect to the longitudinal plane than the other vane side.

To further assure different transverse forces on the vane sides upon contact with material being mined and thereby effect a more positive turning of the bit, the height radially of the bit of the vane sides of each vane is different at the leading end of the vane than at the trailing end. In the embodiment shown, the height radially of the bit of the vane sides of each vane increases from the leading end to the trailing end. In addition, contributing to this advantageous result, the height radially of the bit of one of the vane sides of each vane is different than the other vane side.

Contributing to the more effective rotation of the bit, it will be understood that the vanes are peripherally spaced so that only one vane is disposed on each of the longitudinal planes passed through the longitudinal axis of the bit and the leading end of each vane. In other words, this longitudinal plane of each vane passes between a pair of peripherally spaced vanes. This arrangement precludes any balanced or stabilized condition upon the picking action of the bit on the material face.

As the material being mined flows rearwardly of the bit head between peripherally adjacent vanes, such material will turn the bit in one direction or the other. In one embodiment, this flow of material between peripherally spaced vanes will provide an additional rotational impetuous or kick as the material leaves the trailing end of the vanes. This additional turning impetuous is provided by a portion of each vane side adjacent to the trailing end that has a greater included angle than the side portion adjacent the leading end.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view, partially in cross-section, of a bit and block assembly, illustrating the picking action of the bit;

FIG. **2** is a front elevational view of the bit head shown in FIG. **1**;

FIG. **3** is a side elevational view of the bit, and

FIG. **4** is a fragmentary, side elevational view of a modified bit head.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now by characters of reference to the drawing, and first to the embodiments of FIGS. **1–3**, it will be understood that the block **10** is provided with a substantially cylindrical bore **11** extending through the front block face **12** and the rear block face **13**. The bore **11** is slightly flared at the front block face **12** to provide an outwardly divergent shoulder **14**.

The point-attack bit, generally indicated at **15** includes an elongate shank **16** having a circular cross section. The bit shank **16** is rotatively mounted within the cylindrical block bore **11**. A tapered bit head **17** is formed integrally and coaxially with the shank **16**, the head **17** tapering toward the front end of the bit. The bit shank **16** includes an enlarged, outwardly diverging shank portion **20** integrally connected to the tapered head **17**, the shank portion **20** engaging the annular bore shoulder **14**.

Inserted in and attached to the smaller end of the tapered bit head **17** is a carbide cutting tip **21**. The tip **21** is provided with a relatively sharp point. As is illustrated in FIG. **1**, the tapered bit head **17**, including the carbide tip **21**, picks at the wall **22** in order to cut away a portion of such wall **22**. The tapered bit head **17** enters the wall **22** with its smaller end foremost and with its longitudinal axis arranged at a slight angle to the surface of the wall in an intermittent picking action.

It will be understood that this bit and block assembly is utilized in a cutting machine that operates to move the bit head **17** point first into the wall **22** in the picking action previously described, and operates to move the bit head **17** continuously into, through, and out of the wall **22** in a curved path for a complete picking action.

In the embodiment of FIG. **1**, the tapered head **17** has a substantially conical configuration. The head **17** includes a turning means generally referred to by **23**. The turning means **23** is a plurality of peripherally spaced, laterally projecting vanes **24** extending generally longitudinally of the bit. Each vane **24** is substantially triangular in shape with a narrow leading end **25** and a wider trailing end **26**. Each triangularly-shaped vane **24** includes sides **27** and **28** that extend from the leading end **25** to the trailing end **26** on opposite sides of a longitudinal plane A—A passed through the longitudinal axis of the bit and the leading end **25** of the vane **24**. *A top surface 29 extends between the sides 27 and 28.*

It will be understood that one vane side **27** has a different angle with respect to the longitudinal axis of the bit than the other vane side **28**. More particularly, it will be understood that one vane side **27** has a different included angle with respect to the longitudinal plane A—A than the other vane side **28** in order to provide different transverse forces on the vane sides **27** and **28** upon contact with the material being mined as such material flows rearwardly along the bit head **17** between the vanes **24**, to effect a positive turning of the bit upon picking of the mine face.

To assure the creation of different transverse forces on the vane sides **27** and **28** upon contact with the material being mined, the height radially of the bit of the vane sides **27** and **28** of each vane **24** is different at the leading end **25** than at the trailing end **26**. Preferably, this height of the vane sides **27** and **28** increases from the leading end **25** to the trailing end **26**. In addition, the height of one side **27** is different than the other vane side **28** of each vane **24**. In the embodiment illustrated, the height of the vane side **27** is greater than the height of the vane side **28**.

Also contributing to the realization of a positive turning of the bit by precluding any balanced or stabilized conditions on the vanes **24** during the picking action, the vanes **24** are peripherally spaced so that only one vane is disposed on each longitudinal plane A—A as is best illustrated in FIG. **2**. In other words, the longitudinal plane A—A of each vane **24** passes diametrically through a void between a pair of peripherally spaced vanes **24**.

It will be understood that the bit **15** could be mounted and locked into the block **10** by a locking mechanism similar to that of U.S. Pat. No. 3,833,264 if desired. However, in the embodiment shown, a spring clip **30** is detachably mounted in a compatible groove **31** formed in the bit shank **16**, the clip **30** selectively engaging the rear block face **13** to hold the bit **15** in place, and yet permitting rotation of the bit in the block **10**.

To install the bit **15**, the shank **16** is inserted into the block bore **11**. The locking clip **30** is then located in the shank groove **31** rearwardly of the rear block face **13**. The bit **15** is now secured to the block **10**, and yet can rotate freely in the block bore **11**.

During the picking action of the bit **15**, the cutting tip **21** will engage the wall **22**. As the bit head **17** moves continuously into, through, and out of the wall **22** in a curved path, the material being mined will flow rearwardly of the bit head **17** between the vanes **24**. Upon frictional contact of this material with the sides **27–28** of the vanes **24**, the transverse forces on the vane sides **27–28** will cause positive rotation of the bit **15** in the block bore **11**, thereby causing the head **17** to be self-sharpened.

FIG. **4** discloses a modified construction of the turning means **23**. The bit has essentially the same structure as the embodiment of FIGS. **1–3**, and accordingly, the same reference numbers will be used where possible but using the suffix A to distinguish. *A top surface 29A extends between the sides 27A and 28A.* The basic difference in the construction of the vanes **24A** resides in the fact that each vane side **27A–28A** has a portion **32** adjacent to the trailing end **26A** that has a greater included angle than the portion adjacent the leading end **25A**. Consequently, as the material being mined moves rearwardly along the bit head **17A** between the vanes **24A**, such material will engage the vane side portions **32** just before such material is discharged rearwardly from the

head **17A**. Upon engagement of the material with the vane side portions **32**, there is a change in the transverse forces tending to rotate the bit head **17**. Because of the greater included angle of the vane side portions **32**, there is an impetuous or "kick" provided transversely to the bit head **17A** that tends to turn the bit head **17A**.

I claim as my invention:

1. A point-attack bit for removing material from a mine face, comprising:

a. an elongate shank, and

b. a head integral and coaxial with the shank, the head including a plurality of peripherally spaced, laterally projecting vanes extending generally longitudinally of the bit, each vane being substantially triangular with a narrow leading end and a wider trailing end, and having relatively diverging sides that extend from the leading end to the trailing end, and contact with material being mined to effect a positive turning of the bit upon picking of the mine face.

2. A point-attack bit as defined in claim **1**, in which:

c. one vane side of each vane has a different angle with respect to the longitudinal axis of the bit than the other vane side to provide different transverse forces on the vane sides upon contact with material being mined to effect a positive turning of the bit upon picking of the mine face.

3. A point-attack bit as defined in claim **1**, in which:

c. the vane sides of each vane extend from the leading end to the trailing end on opposite sides of a longitudinal plane passed through the longitudinal axis of the bit and the leading end of the vane, one vane side of each vane having a different included angle with respect to the longitudinal plane than the other vane side to provide different transverse forces on the vane sides on contact with material being mined to effect a positive turning of the bit upon picking of the mine face.

4. A point-attack bit as defined in claim **3**, in which:

d. in a transverse plane passed through the bit head, the height radially of the bit of one of the vane sides of each vane is different than the height radially of the bit of the other vane side.

5. A point-attack bit as defined in claim **3**, in which:

d. the vanes are peripherally spaced so that only one vane is disposed on each said longitudinal plane passed through the longitudinal axis of the bit and the leading end of each vane.

6. A point-attack bit as defined in claim **3**, in which:

d. the said longitudinal plane of each vane passes diametrically of the bit between a pair of peripherally spaced vanes without passing through another vane.

7. A point-attack bit as defined in claim **3**, in which:

(d) each vane side of each vane has a side portion adjacent the trailing end that has a greater included angle than the side portion adjacent the leading end.

8. A point-attack bit for removing material from a mine face, comprising:

(a) an elongate shank, and

(b) a head integral and coaxial with the shank, the head including a plurality of peripherally spaced, laterally projecting vanes extending generally longitudinally of the bit, each vane having a leading end and a trailing end, the trailing end being wider than the leading end, and having relatively diverging sides that extend from the leading end to the trailing end, and contact with

the material being mined to effect a positive turning of the bit upon picking of the mine face, and having a top surface between the sides, the top surface being wider at the trailing end than at the leading end.

9. A point-attack bit for removing material from a mine face, comprising:

(a) an elongate shank,

(b) a head integral and coaxial with the shank, the head including projecting vanes extending generally longitudinally of the bit, each vane having a leading end and a trailing end and having relatively diverging sides that extend from the leading end to the trailing end, and contact with material being mined to effect a positive turning of the bit upon picking of the mine face, and

(c) one vane side of each vane has a different angle with respect to the longitudinal axis of the bit than the other vane side.

10. A point-attack bit for removing material from a mine face, comprising:

(a) an elongate shank,

(b) a head integral and coaxial with the shank, the head including a plurality of peripherally spaced laterally projecting vanes extending generally longitudinal of the bit, each vane having a leading and a trailing end

and having relatively diverging sides that extend from the leading end to the trailing end on opposite sides of a longitudinal plane passed through the longitudinal axis of the bit and the leading end of the vane, and contact with material being mined to effect a positive turning of the bit upon picking of the mine face, and

(c) the vanes are peripherally spaced so that only one vane is disposed on a longitudinal plane passed through the longitudinal axis of the bit and the leading end of each vane.

11. A point-attack bit for removing material from a mine face, comprising:

(a) an elongate shank,

(b) a head integral and coaxial with the shank, the head including projecting vanes extending generally longitudinally of the bit, each vane having a leading end and a trailing end and having relatively diverging sides that extend from the leading end to the trailing end, and contact with material being mined to effect a positive turning of the bit upon picking of the mine face, and

(c) said sides having different included angles with respect to a plane passed through said leading end and the longitudinal axis of the bit.

* * * * *