United States Patent [19]

Elders

[11] **3,833,265**

[45] **Sept. 3, 1974**

[54] **ROTATABLE SLEEVE FOR SELF-SHARPENING BIT**

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[22] Filed: **Nov. 6, 1972**

[21] Appl. No.: **304,242**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 69,161, Sept. 2, 1970, abandoned, Continuation-in-part of Ser. No. 498,638, Oct. 20, 1965, abandoned.

[52] **U.S. Cl.** **299/86,** 175/354

[51] **Int. Cl.** **E21c 35/18**

[58] **Field of Search** 299/86; 175/354

[56] **References Cited**

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Primary Examiner—Ernest R. Purser

[57] **ABSTRACT**

A bit and block assembly in which a sleeve is rotatively mounted in a block bore and in which a point-attack bit has its elongate shank mounted in a sleeve bore and has a cutting tip on the leading end of the bit head that penetrates the material being mined with a picking action upon travel of the bit into and out of a mine face. A plurality of protuberances are provided on and extend outwardly from the periphery of the sleeve head, the protuberances providing frictional contact with the material being mined to effect positive turning of the sleeve, and hence of the bit in the sleeve, upon picking of the mine face by the bit head. In one embodiment, the protuberances consist of fins on and extending substantially lengthwise of the sleeve head and projecting laterally outwardly from the periphery of the sleeve head. In another embodiment, the protuberances consist of individual knobs formed on and projecting laterally outwardly from the periphery of the sleeve head. The protuberances are circumferentially spaced about the periphery of the sleeve head to provide longitudinal passages therebetween extending from its leading end to its trailing end, the material being mined being movable through the passages and engageable with the protuberances to effect positive turning of the sleeve and bit and to effect removal of the material being mined from the sleeve head. The sleeve head with its protuberances extends laterally outwardly beyond the outer block face to enable discharge of the material being mined from the passages between the circumferentially spaced protuberances.

5 Claims, 4 Drawing Figures

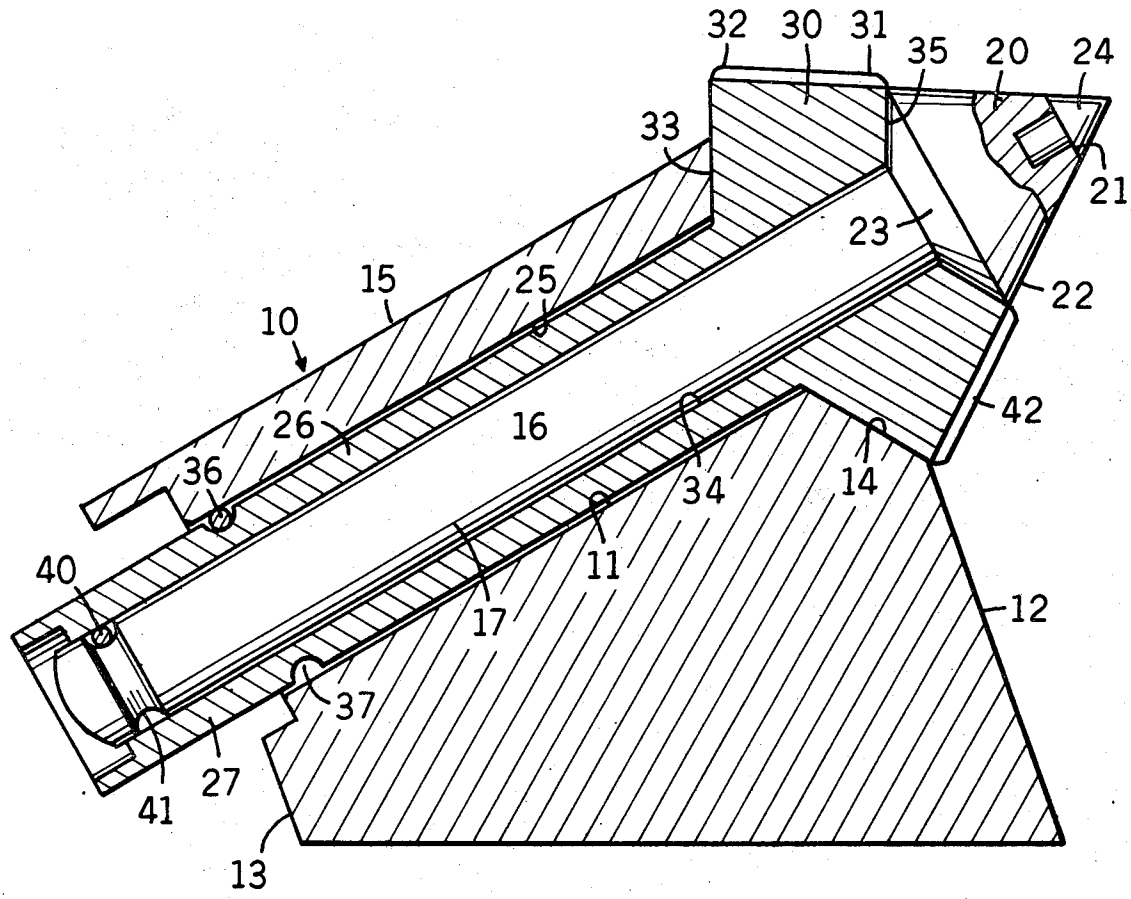
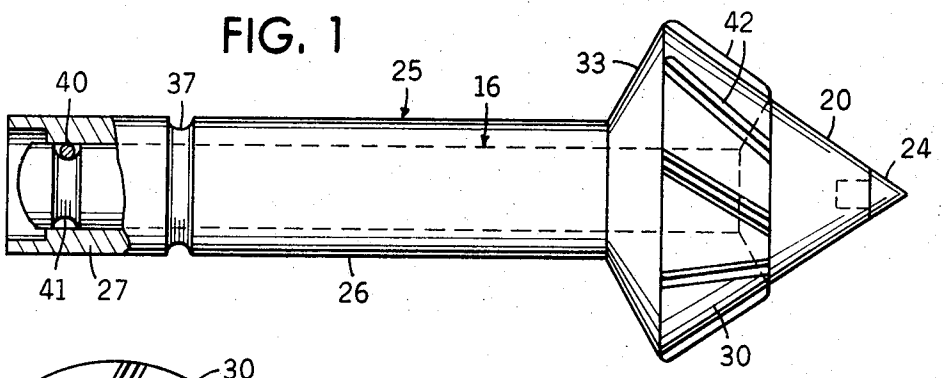


FIG. 1



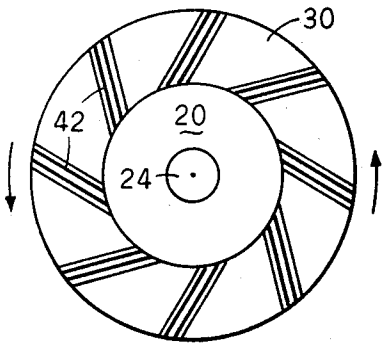
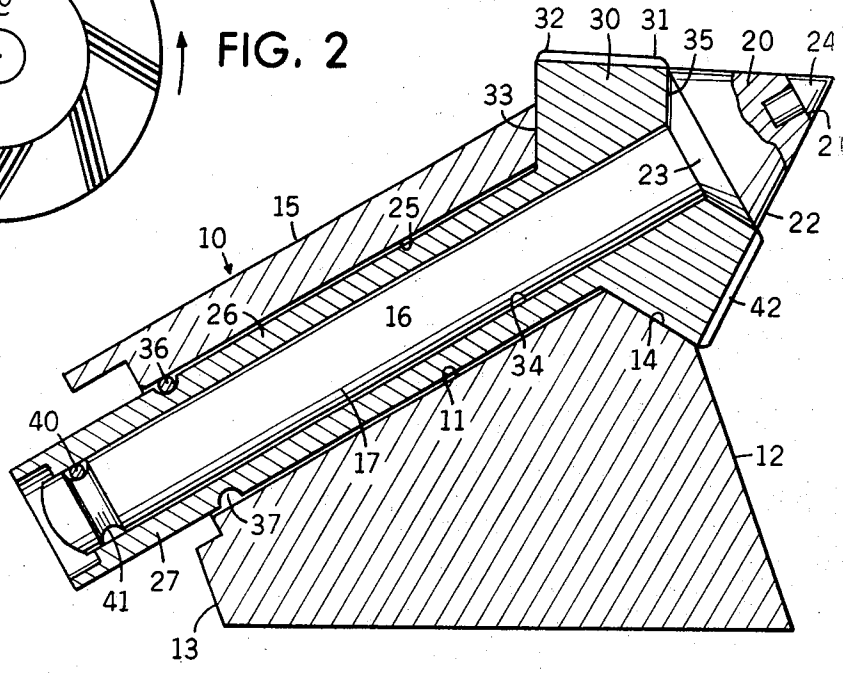


FIG. 2

FIG. 3



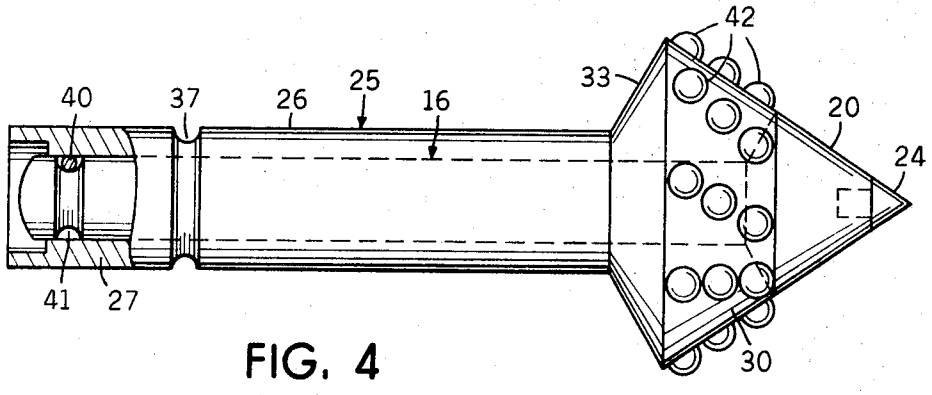


FIG. 4

ROTATABLE SLEEVE FOR SELF-SHARPENING BIT

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of copending U.S. Pat. application Ser. No. 69,161, filed Sept. 2, 1970 now abandoned which was a copending continuation of U.S. Pat. application Ser. No. 498,638 filed Oct. 20, 1965 now abandoned.

BACKGROUND OF THE INVENTION

This invention relates generally to improvements in a bit mounting, and more particularly to a mounting that causes the bit to turn automatically during cutting action to provide a self-sharpening of the bit head that results in longer bit wear and life.

A self-sharpening bit has been realized by providing protuberances on the conical head of the bit so that the protuberances will engage the material being mined during the picking action of the bit, the frictional contact of the protuberances with the material causing the bit to rotate in its mounting in the block bore.

SUMMARY OF THE INVENTION

The present bit and block assembly consists of a sleeve rotatively mounted in a block bore, and a point-attack bit having its elongate shank mounted in the sleeve bore and having a cutting tip on the leading end of the bit head that penetrates material being mined with a picking action upon travel of the bit into and out of a mine face. A plurality of protuberances are provided on and extend outwardly from the periphery of the sleeve head, the protuberances providing frictional contact with the material being mined to effect positive turning of the sleeve, and hence of the bit in the sleeve, upon picking of the mine face by the bit head.

The provision of protuberances on the sleeve head realizes effective rotation of the bit without sole reliance on any protuberances on the bit head as previously provided.

The protuberances are provided about the periphery of the sleeve head with at least one protuberance in position to frictionally engage the material being mined to effect positive turning. Preferably, the protuberances are circumferentially spaced relatively about the sleeve head periphery.

In one embodiment, the protuberances consist of fins on and extending substantially lengthwise of the sleeve head and projecting laterally outwardly from the periphery of the sleeve head.

In another embodiment, the protuberances consist of individual knobs formed on and projecting laterally outwardly from the periphery of the sleeve head.

The sleeve head with its protuberances, engages the block front face to position the sleeve in the block, and the bit head engages the sleeve head to position the bit in the sleeve. Upon cutting action, the force of the bit head striking the mine face, urges the bit head rearwardly against the sleeve head, and hence urges the sleeve head rearwardly against the block front face. Accordingly, the bit and sleeve are frictionally interconnected so that as the material being mined engages and passes longitudinally between the protuberances on the sleeve head to effect a positive angular rotation of the sleeve, the sleeve will in turn angularly rotate the bit.

The protuberances are circumferentially spaced about the periphery of the sleeve head to provide longitudinal passages therebetween extending from its leading end of the sleeve head to its trailing end, the material being mined being movable through the passages and engageable with the protuberances to effect positive turning of the sleeve and bit and to effect removal of the material being mined from the sleeve head.

The block has an outer face adjacent to the front face. The sleeve head with its protuberances engages the block front face to position the sleeve in the block and extends laterally outwardly beyond the outer block face to enable discharge of the material being mined rearwardly from the passages between the circumferentially spaced protuberances.

DETAILED DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevational view of the bit and sleeve assembled;

FIG. 2 is a front elevational view of the bit and sleeve heads as seen from the right of FIG. 1;

FIG. 3 is a cross sectional view of the sleeve in the mounting block with the bit assembled in the sleeve, and

FIG. 4 is a side elevational view of the sleeve and the bit assembled, but showing a modified construction of the protuberances on the sleeve head.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now by characters of reference to the drawing, and first to the embodiment 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 flared at the front block face **12** to provide an outwardly divergent shoulder **14.** The block **10** includes an outer block face **15.**

A point-attack bit generally indicated at **16** includes an elongate shank **17** having a circular cross-section. A tapered head **20** is formed integrally and coaxially with the shank **17,** the head **20** tapering toward the forward end of the bit to provide a reduced leading end **21** and a relatively enlarged trailing end **22.** The bit shank **16** includes an enlarged, outwardly diverging shank portion **23** integrally connected to the trailing end **22** of the bit head **20.**

Inserted in and attached to the leading end **21** of the bit head **20** is a carbide cutting tip **24.** The tip **24** is provided with a relatively sharp point. The tapered bit head **20** including the carbide tip **24** picks at the mine wall in order to cut away a portion of such wall. The tapered bit end **20** enters the wall with its leading end foremost and with its longitudinal axis arranged at a slight angle to the surface of the wall, in an intermittent picking action.

Associated with both the block **10** and the bit **16** is a sleeve generally indicated by **25.** This sleeve includes an elongate shank **26** rotatively mounted in the block bore **11,** the rearmost end **27** of the sleeve **25** extending outwardly beyond the rear block face **13.** The forwardmost end of the sleeve **25** includes an enlarged head **30** that can be tapered to provide a reduced leading end **31** and an enlarged trailing end **32.** The sleeve shank **26** includes an enlarged, outwardly diverging shank portion **33** integrally connected to the head **30,** the shank portion **33** engaging the annular bore shoulder **14.**

The sleeve **25** includes a longitudinal bore **34** that is adapted to receive the bit shank **16.** The sleeve bore **34** is flared at the outermost face of the sleeve head **30** to provide an outwardly divergent shoulder **35.** When the bit **16** is assembled to the sleeve **25,** the bit shank portion **23** engages the annular sleeve shoulder **35.**

To lock the sleeve **25** in the block **10,** a pin **36** is inserted into the side of the block **10** and into an annular groove **37** provided in the sleeve shank **26.** The rear block face **13** is immediately adjacent the locking connection provided by pin **36** and groove **37** to permit any foreign material moving axially along the block bore **11** between the block **10** and sleeve shank **26** to fall freely out of the block for discharge, and thereby enable the sleeve shank **26** to rotate at all times in the block bore **11.**

When assembled, the bit shank **17** is selectively locked to the sleeve shank **26.** A pin **40** is inserted into the sleeve shank **26** and into a compatible annular groove **41** formed in the end of the bit shank **17.** The rear end of the sleeve shank **26** is countersunk to provide a recess immediately rearwardly of the annular groove **41** to permit any foreign material moving axially along the sleeve bore **34** between the bit shank **17** and sleeve shank **26** to fall freely out of the bore **34** for discharge.

To assemble this device, the bit shank **17** is usually first inserted into the sleeve bore **34** until the bit shank portion **23** engages the sleeve shoulder **35.** Then, the bit shank **17** is locked to the sleeve **25** by inserting the pin **40** into the sleeve shank **26** and into the annular groove **41** of the bit shank **17.** Then, the sleeve shank **26,** together with its assembled bit **16,** is inserted into the block bore **11** until the sleeve shank portion **33** engages the block shoulder **14.** Then, a pin **36** is inserted into the block **10** and into the annular groove **37** of the sleeve shank **26** to lock the sleeve **25** in the block **10.**

A plurality of protuberances **42** are provided on and extend outwardly from the periphery of the sleeve head **30,** the protuberances being circumferentially spaced so that at least one of the protuberances will frictionally engage the material being mined. Specifically, the protuberances are spaced to provide longitudinal passages therebetween extending from the leading end **31** to the trailing end **32** of the sleeve head **30.** The material being mined is movable through the passages and engageable with the probuterances **42** to effect positive turning of the sleeve **25** and bit **16,** and in addition, to effect removal of the material being mined from the sleeve head **30.** The sleeve head **30** with its protuberances **42** extend outwardly from the outer block face **15** to enable the free discharge of the material being mined from the passages between the circumferentially spaced protuberances **42.**

In the embodiment of FIGS. **1–3,** the protuberances consist of fins on and extending substantially lengthwise of the sleeve head **30.** These fins are preferably inclined at an angle to the longitudinal axis of the sleeve **25** and bit **16.**

In the embodiment of FIG. **4,** the protuberances **42** consist of individual knobs formed on and projecting laterally outwardly from the periphery of the sleeve head. These knobs can be randomly spaced, but it is preferred that they be aligned in circumferentially spaced rows arranged at an angle to the longitudinal axis of the sleeve **25** and bit **16.**

With each embodiment, as the bit head strikes the mine face at an angle, the cutting tip **24** will penetrate the mine face with a picking action to remove material from such face. The material being mined will move rearwardly over the sleeve head **30** and into the passages between the circumferentially spaced protuberances **42,** the material frictionally engaging the protuberances **42** and tending to rotate the sleeve **25** in its mounting in the block bore **11.** Because the bit head **20** is forcefully urged against the sleeve head **30** during this picking action, rotation of the sleeve **25** will cause a resultant rotation of the bit **16** carried within the sleeve **25.** The bit **16** is moved to a different angular position for each picking stroke. Consequently, all of the periphery of the tapered bit head **20** is presented to the wall in a picking action at different times in different angular positions, whereby the periphery of the tapered bit head **20** and carbide tip **24** is worn substantially evenly and is maintained in a cutting, tapered configuration because it is self-sharpened.

It is thought that the usage and operation of the bit and block assembly have become apparent from the foregoing detailed description of parts, but for completeness of disclosure, it will be understood that the block **10** is secured to a rotating head (not shown). The bit **16** is assembled to the sleeve **25** by inserting the bit shank **17** into the sleeve bore **34,** and is locked in position by insertion of pin **40** into the sleeve shank **26** and into the bit shank groove **41.** The sleeve **25** is then assembled to the block **10** by inserting the sleeve shank **26** into the block bore **11,** and is locked in place by insertion of the pin **36** into the block **10** and into the sleeve shank groove **37.**

As the mining head (not shown) including the block **10** is rotated, the bit head **20** strikes the mine face at an angle so that the cutting tip **24** penetrates the mine face and dislodges material with a picking action. The material moves rearwardly along the bit head **20** and over the sleeve head **30.** More particularly, the material being mined moves into the passages between the circumferentially spaced protuberances **42** and frictionally engages such protuberances **42** to cause a turning of the sleeve **25** and hence of the bit **16** carried in the sleeve **25.** The material is discharged from the passages at the trailing end **32** of sleeve head **30** laterally outwardly of the outer block face **15.** Because the bit **16** is rotated during each picking stroke, the bit head **20** is self-sharpened by substantially even wear. This self-sharpening action of the bit head **20** effectively increases the operating life of the bit **16.**

I claim as my invention:

1. A bit and block assembly comprising:

a. a block movable along a mine face, the block being provided with a substantially cylindrical bore,

b. a sleeve rotatively mounted in the block bore, the sleeve being provided with a substantially cylindrical bore and including an enlarged head,

c. a point-attack bit for removing material from the mine face including:

1. an elongate shank mounted in the sleeve bore,

2. an enlarged bit head integral and coaxial with the shank, the bit head having a leading end and a trailing end, and

3. a cutting tip on the leading end of the bit head penetrating the material being mined with a pick-

ing action upon travel of the bit along a mine face, and

d. a plurality of protuberances on and extending outwardly from the periphery of the sleeve head, the protuberances extending generally longitudinally of and at an angle to the longitudinal axis of the sleeve, the protuberances providing frictional contact with the material being mined to effect positive turning of the sleeve, and hence of the bit in the sleeve, upon picking of the mine face by the bit head.

2. A bit and block assembly as defined in claim **1,** in which:

e. the protuberances consist of fins that are relatively circumferentially spaced on the sleeve head.

3. A bit and block assembly as defined in claim **1,** in which:

e. the protuberances consist of individual knobs in circumferentially spaced rows on the sleeve head.

4. A bit and block assembly as defined in claim **1,** in which:

e. the block has a front face and an adjacent outer face, the block bore extending through the block front face,

f. the sleeve head with its protuberances, engages the block front face outwardly of the block bore to position the sleeve in the block, and

g. the bit head engages the sleeve head to position the bit in the sleeve.

5. A bit and block assembly as defined in claim **1,** in which:

e. the protuberances are circumferentially spaced about the periphery of the sleeve head to provide longitudinal passages therebetween extending from its leading end to its trailing end, the material being mined being movable through the passages and engageable with the protuberances,

f. the block has a front face and an adjacent outer face, the block bore extending through the block front face, and

g. the sleeve head with its protuberances engages the block front face outwardly of the block bore to position the sleeve in the block, and extends laterally outwardly beyond the outer block face to enable discharge of the material being mined from the passages between the circumferentially spaced protuberances, and past the outer block face.

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