(No Model.)

J. S. BUDRO.

BIT FOR CHANNELING MACHINES.

No. 505,972. Patented Oct. 3, 1893.

Fig. 1.

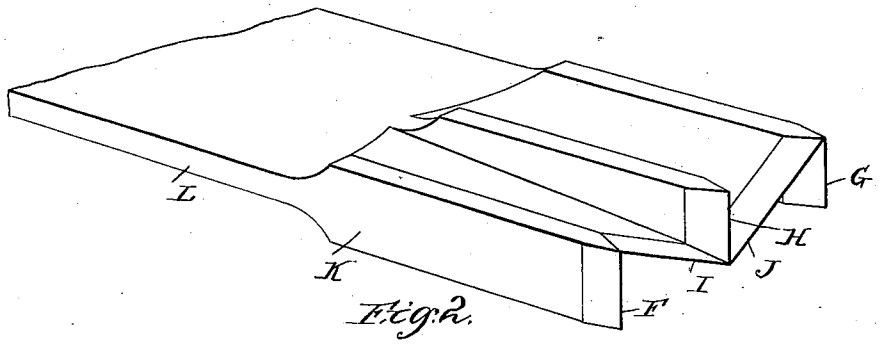


Fig. 2.

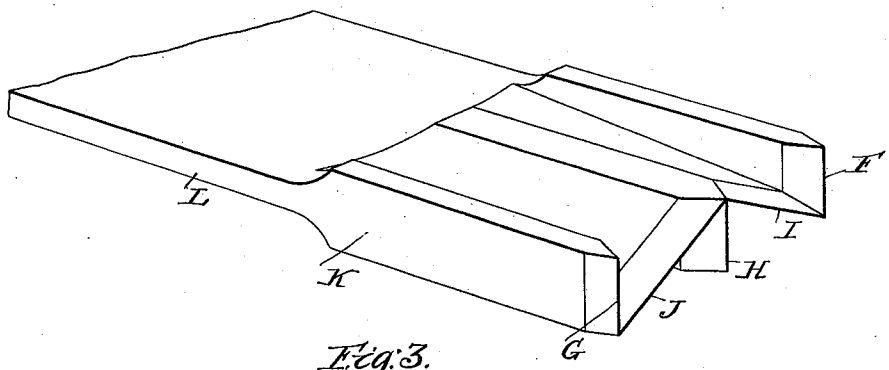


Fig. 3.

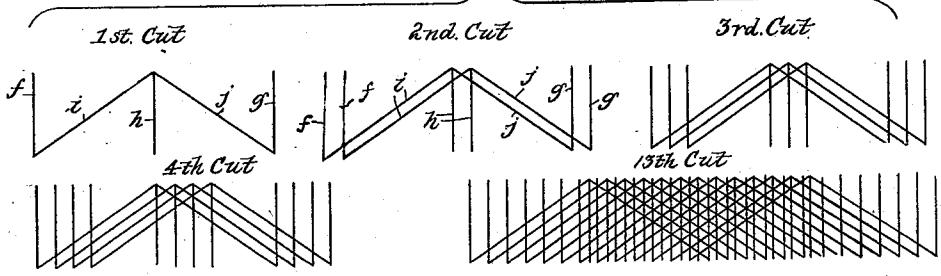
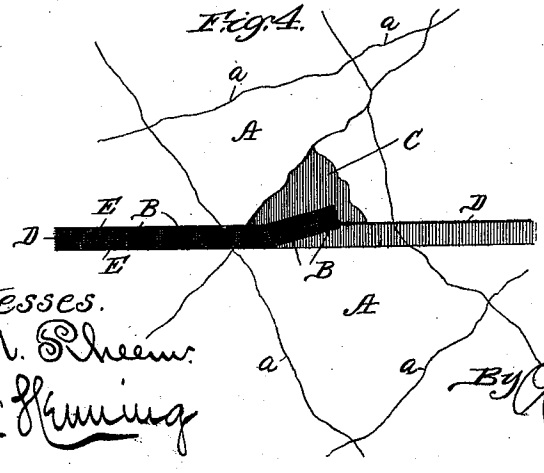


Fig. 4.



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UNITED STATES PATENT OFFICE.

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BIT FOR CHANNELING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 505,972, dated October 3, 1893.

Application filed December 12, 1892. Serial No. 454,888. (No model.)

To all whom it may concern:

Be it known that I, JUDSON S. BUDRO, a citizen of the United States, residing at the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Bits or Cutters for Stone-Channeling Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to the cutters or bits of that class of stone-working machines, known as channeling-machines, which are designed to cut out stone, in the quarries, in regular masses or blocks, as distinguished from the irregular fragments obtained by blasting.

My invention relates more particularly to those cutters or bits, the cutting sections of which are formed integrally with the bit-stock, and as distinguished from separate cutters grouped together in gangs and designed to operate upon the stone simultaneously.

The primary objects of my invention are to produce a cutter or bit the cutting portions or edges of which shall be so arranged and formed as to mutually counteract against or oppose each other in operation and thus insure a perfectly uniform course for the cutter under all varying conditions of density of strata, so as to produce a straight cut or channel. Also to avoid all possibility of distortion of the cutting-sections, so as to prevent deflection of the cutters and binding or anchoring of the same in their channels. Furthermore, to produce a cutter or bit the cutting edges of which shall be so arranged as to render the bit self-clearing and of the utmost strength and durability.

To the above purposes, my invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter described and claimed.

The more precise nature of my invention will be better understood when described with reference to the accompanying drawings, in which—

Figure 1 is a perspective view of a cutter or bit embodying my invention. Fig. 2 is a similar view of the same but showing exposed the side of the bit which is concealed in Fig. 1. Fig. 3 is a diagrammatic view showing the work of the bit upon the stone. Fig. 4 is a diagrammatic view showing the defective action of the old form of bit.

Stone-channeling machines, when operated in quarries, are required to cut stone varying considerable in density, ranging, for example, from that of limestone to that of quartz; such materials being sometimes in comparatively regular layers, but frequently in irregular layers, or in layers having interspersed masses or bowlders. The consequence is that certain parts of the cutters or bits frequently strike harder or more dense material while other parts are working upon softer material and hence the course of the bits is liable to be seriously deflected, in consequence of distortion of the cutters, and such distortion frequently results in breaking the bits or in so bending them as to stop the operation of the machine and to cause binding or anchoring of the bits in the channels which they are cutting. These difficulties are peculiarly liable to occur with the old form of bits which consist of numbers of separate cutters clamped together, or a number of cutters formed integrally with a stock but separated from each other; in either case one or more of the cutting sections being liable to become bent out of proper position, thus diverting the course of the bit and even anchoring the bit firmly in the channel which it is cutting.

As will be seen, from the ensuing description, I have produced a cutter or bit which avoids the above mentioned defects and which possesses the several advantages previously enumerated.

In the said drawings L designates the stock of the bit, which is of broad flat form and adapted to be suitably connected to a channeling machine, said stock being of any desirable length as circumstances may require. At its lower end, this stock L is formed with a bead K which is considerably thicker than the stock and preferably of about the proportionate length and width shown in the drawings. This head causes the stock to work freely out of contact with the sides of the channel which is being cut and also affords a strong backing for the cutting edges of the bit.

The cutting sections of the bit are ar-

ranged in two sets or series F, G, and H, and I and J. The two cutting sections F and G are located at the extreme narrower sides or edges of the head K and extend parallel with each other precisely transverse of the width of the head K. At a point midway between the two outer cutting sections F and G is located the third cutting section H which is precisely similar in form to said sections F and G and which also extends precisely transverse of the width of the head K; the edges of these sections F, G, and H being beveled from opposite sides, and said sections being of greater width than the head K so as to form longitudinal ribs upon the flat sides of the heads. The cutting sections described are all formed integrally with the head K, which latter is also integral with the stock L. Between the transverse cutting sections F and H is interposed an oblique cutting section I, while between the cutting sections G and H is interposed a second oblique cutting-section J; these oblique cutting sections being formed integrally with the head K and with the transverse cutting sections F, G, and H and having their edges also beveled from opposite sides. The oblique cutting section I is united to the transverse cutting-section F near one of the narrower sides thereof and is united to the intermediate cutting-section H near the opposite narrower side thereof. The oblique cutting-section J is united to said intermediate cutting-section H near to the same narrower side which is adjacent or approximate to the point of union of the cutting section I with said section H, and the cutting section J is also united to the transverse cutting-section G near to that narrower side which corresponds with the narrower side of the cutting-section F adjacent to which the cutting-section I is united. It will thus be seen that the two oblique cutting-sections I and J assume a **V**-form relatively to each other with the intermediate transverse cutting-section H extending from the inner side of the angle and the outer transverse cutting-sections extending oppositely (with relation to the cutting-section H) from the ends of the **V**. The result of this precise relative arrangement of the transverse and oblique cutting-sections is that the working strains of the transverse sections F, G and H opposite each other in directions parallel to the planes of the flat sides of the bit-stock, toward and away from the narrower sides of said stock. The working-strains of the oblique cutting-sections I and J opposite each other in directions oblique to the sides and edges of the bit-stock the opposing strains of one of the oblique cutter-sections being counter to the opposing strains of the other oblique cutter-section. Hence the bit, as a whole, is retained by its working-strains both against edgewise and flatwise deflection, and the straightness of the cut is maintained under all circumstances. Moreover, the peculiar relative positions of the cutting-sections, together with the ribs formed by the cutting-sections F, G, and H and the longitudinal channels formed by the oblique cutting-sections I and J cause the bit to be self-clearing; water being readily pumped out of the cut through the channels formed by the oblique cutting-sections I and J, and the pulverulent débris being carried off with said water.

It is to be understood that while I have shown but three transverse cutting-sections and but two oblique cutting-sections, the precise number of such sections may be increased as desired, so long as the even balance of opposite working-strains is maintained.

In operating with a bit constructed as above described, it is obvious that when the bit advances into a fissure, such as is shown at C in Fig. 4, the anterior part of the bit will prevent any deflection of the bit within the fissure, so that the bit will work on directly across the fissure and cut out a straight continuation of the channel D from the opposite side of the fissure. Nor, for the same reason, will the oblique intersection of various cracks or seams *a* with the course of the channel have any deflecting effect upon the bit; the integral form of the bit insures its continuance in a straight course. Furthermore, it will be seen, by reference to Fig. 3, that the cuts *j* which are made by the edge J when the bit is advancing to the right, will be crossed or hatched by the cuts *i* made by the edge I, while the cuts produced by the edge F will cross the cuts *i*; the cuts *i* crossing the cuts *h* made by the edge H, and the latter cuts crossing the cuts *j* while the cuts *j* will be crossed by the cuts *g* made by the edge G. This action will continue during the advance of the bit until, as shown in what is designated in Fig. 3 as the thirteenth cut, the surface operated upon by the advancing bit will be minutely cut up and the débris will be finely pulverized, so as to be readily washed out by the water flowing from the cut.

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

1. A bit for stone-channeling machines, having end cutting-edges arranged parallel with each other and extending transversely to the line of travel of the bit, an intermediate cutting-edge placed midway between and parallel with said end cutting-edges, and oblique cutting-edges of equal length extending from the end cutting-edges to the same end of the intermediate cutting-edge, all of said parts being formed integrally with each other, substantially as set forth.

2. A bit for stone-channeling-machines, having parallel outer cutting-edges arranged transversely to the line of travel of the bit, an intermediate cutting-edge parallel with the outer cutting-edges, and oblique cutting-edges extending from one end of the intermediate cutting-edge to the corresponding opposite

ends of the outer cutting-edges, said parts being all integral with each other, substantially as set forth.

3. A bit for stone-channeling machines, comprising a stock, a head formed integrally with the stock and of greater thickness than said stock, parallel outer cutting-sections integral with the head and forming longitudinal ribs thereon, and also extending transversely to the line of travel of the bit, an intermediate cutting-section also forming longitudinal ribs upon the head and having its cutting-edge placed parallel with the cutting-edges of the outer cutting sections, and oblique cutting-sections extending from one edge or end of the intermediate cutting-section to the corresponding opposite edges or ends of the outer cutting-sections, all of said parts being integral with each other, substantially as set forth.

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