

(No Model.)

J. A. WIGGS, Jr.  
CUTTING CHAIN FOR MINING MACHINES.

No. 532,510.

Patented Jan. 15, 1895.

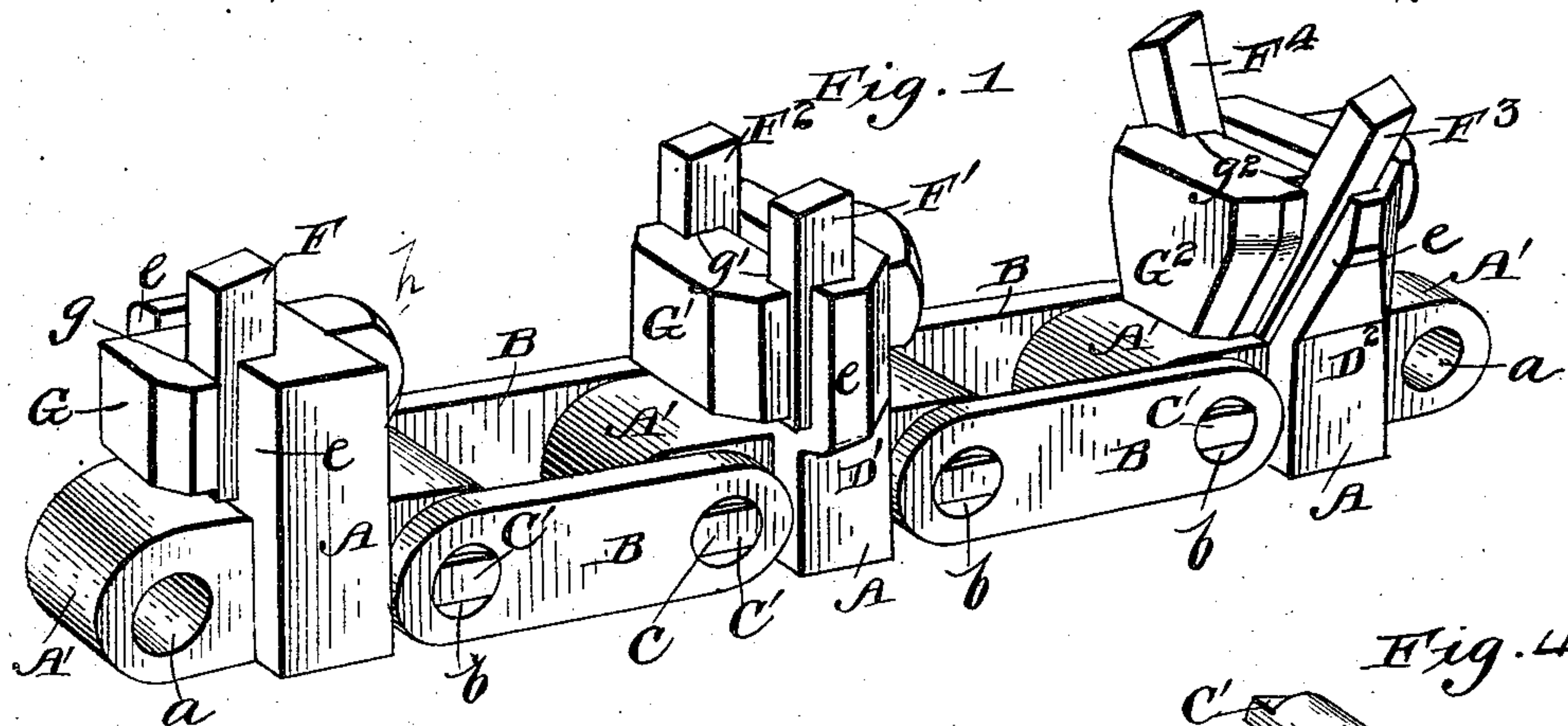


Fig. 2.

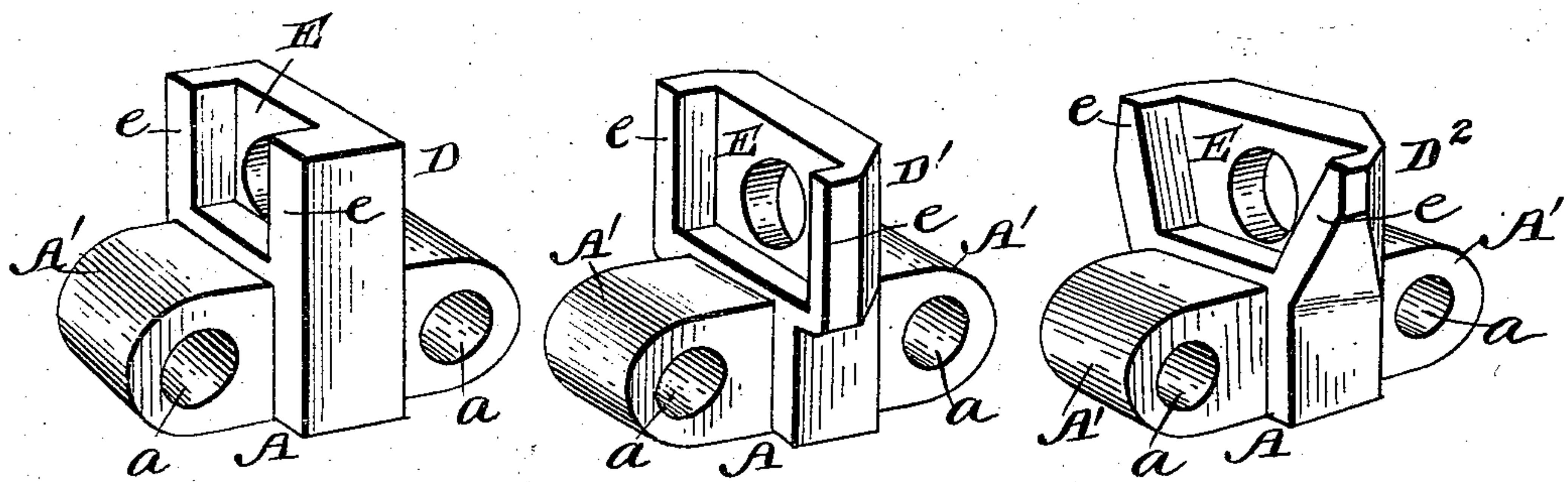


Fig. 3.

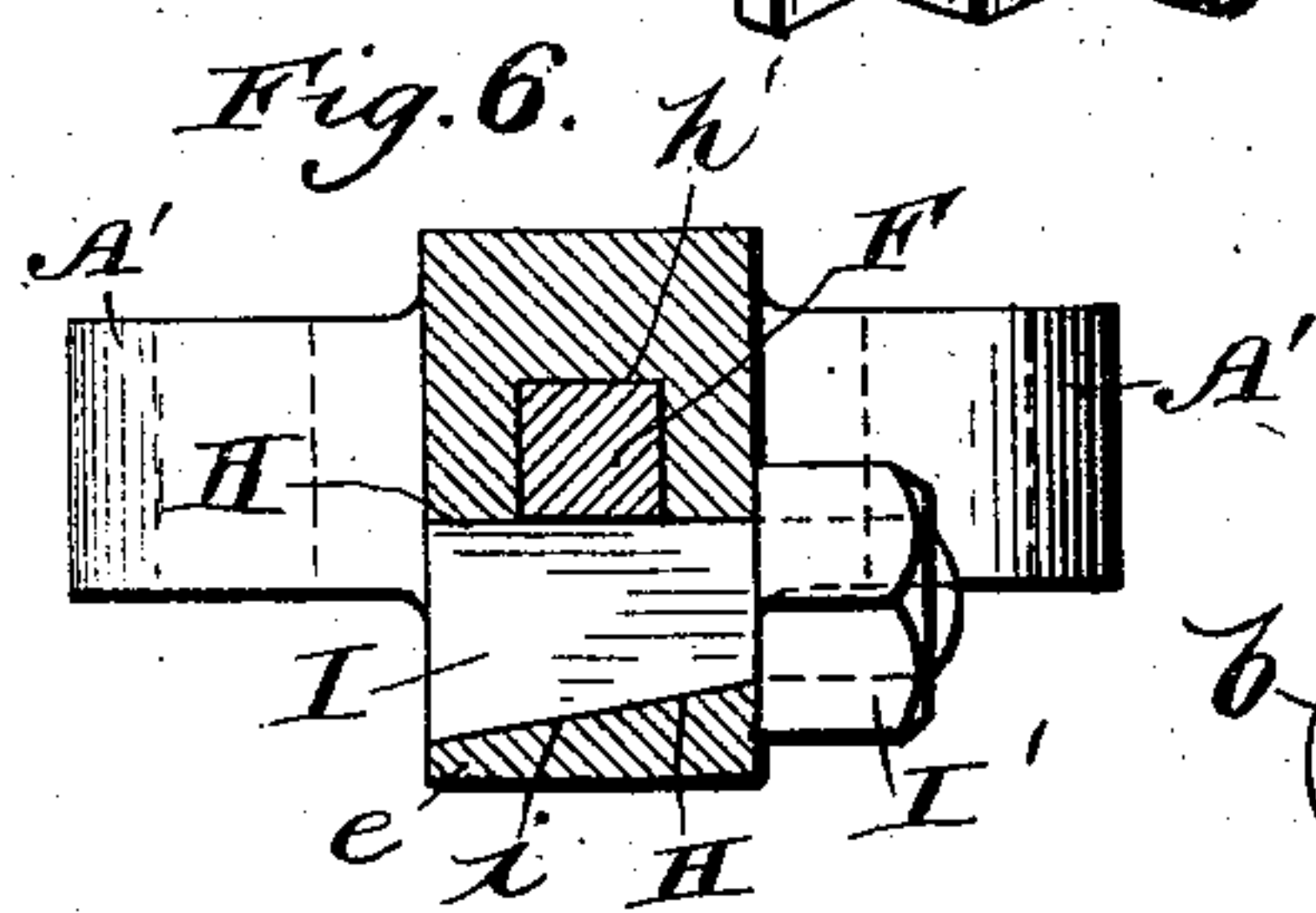
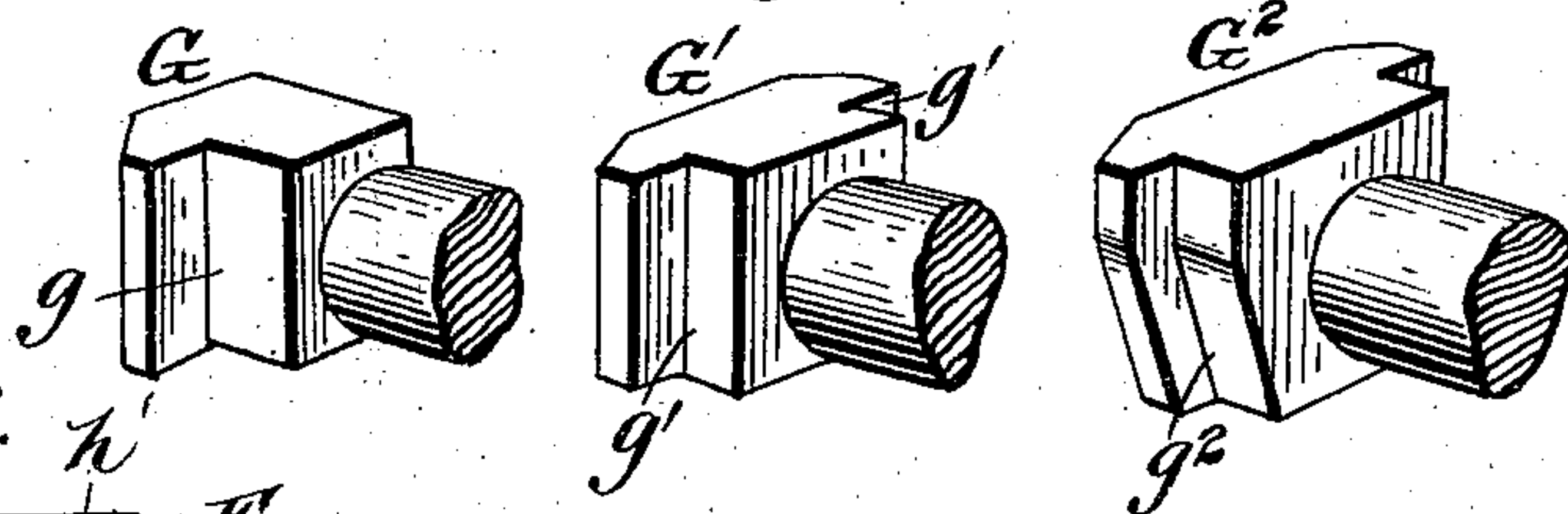
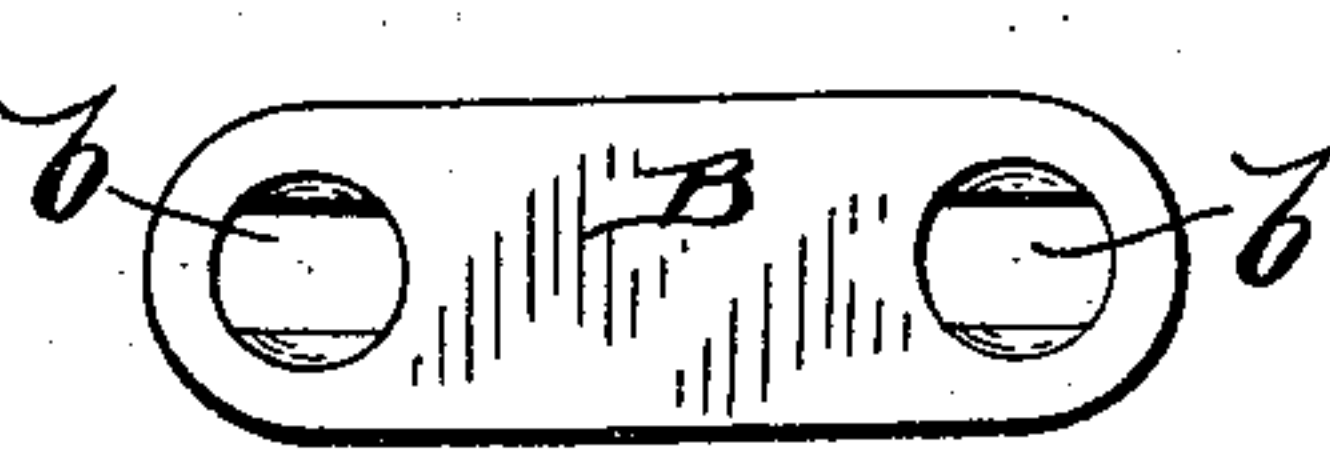


Fig. 5.



Witnesses

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# UNITED STATES PATENT OFFICE.

JAMES A. WIGGS, JR., OF BIRMINGHAM, ALABAMA.

## CUTTING-CHAIN FOR MINING-MACHINES

SPECIFICATION forming part of Letters Patent No. 532,510, dated January 15, 1895.

Application filed April 13, 1894. Serial No. 507,394. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES A. WIGGS, JR., a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Cutting-Chains for Mining-Machines; 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.

This invention is an improvement on the patent of McEwen and Cartwright, No. 450,971, and other patents on mining machines which employ an endless chain carrying blades or knives for cutting out the coal or other material operated on.

The object of the said invention is to increase the efficiency of the cutting operation and the durability and strength of the chain.

To this end, the said invention consists in the construction and combination of parts hereinafter particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a perspective view of a part of a cutting chain embodying my invention. Fig. 2 represents a detail perspective view of the cutter carrying links having knife-blocks formed therewith. Fig. 3 represents a similar view of three forms of the knife-fastening bolts. Fig. 4 represents a similar view of one of the coupling pins. Fig. 5 represents in detail elevation one of the connecting links. Fig. 6 represents a horizontal section of another form of cutter-carrying link and bolt, the latter in dotted lines.

The patent above mentioned is respectfully referred to for the general construction and operation of the machine, which need not be described here, as the improvements now claimed relate to no part of the machine except the chain only.

This chain is made up of knife bearing links A and pairs of connecting links B, arranged alternately; that is to say each pair of the flat connecting links B receives between their ends the reduced ends A' of the two next knife-bearing links A. These ends A' have perforations *a* to register with perforations *b* in links B. Coupling pins C with elongated or rectangular heads C' are passed through the holes *a* and fit into the holes *b*, thus con-

necting the parts of the chain together. The shape of the heads C' prevents them from turning in the thin flat links B, the holes *b* having a shape so far corresponding as to lock the said ends. The said ends of the pins are equal in their greatest diameter to the greatest diameter of the said holes. The middle part of the pin is cylindrical and leaves the knife-bearing links A free to turn, so as to secure the requisite flexibility in the chain, while avoiding the wear of the ends of the pins which must occur when round ends are employed therefor, fitting in round holes of the links B. When these ends are worn a little it is evident that there will be continual risk of the chain coming apart.

I do not wish to be restricted to the precise forms of holes and of the ends of coupling pins which I have shown, as almost any angular, irregular or elongated form would answer the purpose provided the hole in the link be not large enough to weaken the latter unduly, nor greater in diameter than the end of the pin so as to allow the latter to pull out. The ends of the pin are upset or riveted after it is in place, to prevent such detachment.

Each link A is provided with a raised cutter-head or block preferably integral therewith and having in its face a broad recess E, bordered by two flanges *e*. These heads or blocks are arranged in sets of three designated D D' D<sup>2</sup>. In the first and second blocks of the set, D and D' the said flanges are vertical. In the third they flare upward and outward. The first head D receives in its recess E a single straight bar-formed cutter or knife F, which cuts centrally. The second head D' receives two of such cutters F' F<sup>2</sup> which stand parallel against the said flanges and enlarge the cut. The third head D<sup>2</sup> receives another pair of such cutters F<sup>3</sup> F<sup>4</sup> which slant outward widening and beveling the cut. These cutters or knives are held rigidly in place by clamping hooks or bolts G G' G<sup>2</sup> which have threaded stems or shanks extending back through holes in the said blocks or heads, to receive nuts at the rear of the latter. The first hook G' of the series is provided with a recess *g* to receive the cutter F. The hook or bolt G', next in order, is provided with similar recesses *g'* on each side to receive the cutters F' F<sup>2</sup>. The third hook



G<sup>2</sup> is provided with inclined recesses g<sup>2</sup> for the cutters F<sup>2</sup>. When these hooks or bolts are tightened against the several heads they fasten the said cutters securely in place. The  
 5 cutter thus held is braced behind by the raised cutter head and at the sides by the side-walls of the recess in the said head and by the shank of the bolt. The head or hook of the bolt of course holds and braces the said  
 10 cutter in front. The bolt and head together make a very solid brace and fastening for the said cutter or cutters; but it is obvious that such fastenings permit the said cutters or knives to be easily removed when worn or  
 15 broken or when for any other reason removal or substitution becomes necessary. The cutters do not need to be especially made for this use, but ordinary pieces of tool steel may be employed and their destruction is no great  
 20 loss; making the running expense of the chain very light indeed.

The holes b are preferably countersunk or milled as shown to permit riveting for the better holding of the coupling pins in position in the links B.

Of course the method and means of fastening above described may be used with a different arrangement of cutters, and the same arrangement of cutters may be used with different fastening devices; neither feature of  
 30 my invention being absolutely dependent on the other.

In some instances I prefer to use the modified form of cutter head and bolt shown in  
 35 Fig. 6, in which the cutter-head is provided with a central vertical opening, recess or socket h' to receive the cutter and has also a horizontal opening or passage H from front to rear, to receive a wedge-shaped bolt I. This  
 40 bolt has its inclined face presented outward to bear against the correspondingly inclined inner face i of the outer wall of the said opening or passage H. The nut I' of the said bolt, when tightened, draws these in-  
 45 clined faces together so that the straight inner face of the said bolt will bear against the blade or cutter and clamp it in place.

All the forms of bolt above described have in common an enlarged part which is drawn  
 50 by the action of the nut against the front or

side of the cutter, holding it firmly with the aid of the solid bracing block at its rear. They are all adapted to hold an ordinary straight bar, allowing almost any ordinary broken rod or similar piece to be utilized as  
 55 a cutting tool instead of requiring some enlargement, inclined shoulder, or other especial construction of the tool, as has hitherto been necessary when reasonably secure fastenings were employed.

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

1. In a cutter-carrying chain for a mining machine, the combination of a link having a  
 65 raised and recessed block with a bolt working through the same at the side of the cutter and provided with an enlarged part arranged to bear immediately against the side or front of the cutter and a nut which fits on  
 70 the end of the said bolt behind the said block to draw the said bolt against the cutter substantially as set forth.

2. In a cutting chain for mining machines, a cutter-carrying link having a raised cutter  
 75 block formed therewith and recessed to receive a cutter or cutters in combination with a bolt having a hook or hooks formed on its head, and working through the said block at the side of the cutter and a nut working on  
 80 the end of the said bolt behind the said block to draw the said hook or hooks immediately against the front of the said cutter or cutters substantially as set forth.

3. A cutting chain for mining machines  
 85 constructed with the cutters arranged in sets of three heads, the first head of each set being provided with a single cutter or blade arranged to act centrally, the second being provided with a pair of upright parallel blades  
 90 cutting on each side thereof, and the third being provided with a pair of inclined blades cutting in oblique lines substantially as set forth.

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

JAMES A. WIGGS, JR.

Witnesses:

J. BERNARD SCOTT,

A. B. LACY.