

2 Sheets-Sheet 1.

W. L. Williams,

Splitting Wood.

No 23,734.

Patented Apr. 19, 1859.

Fig. 2.

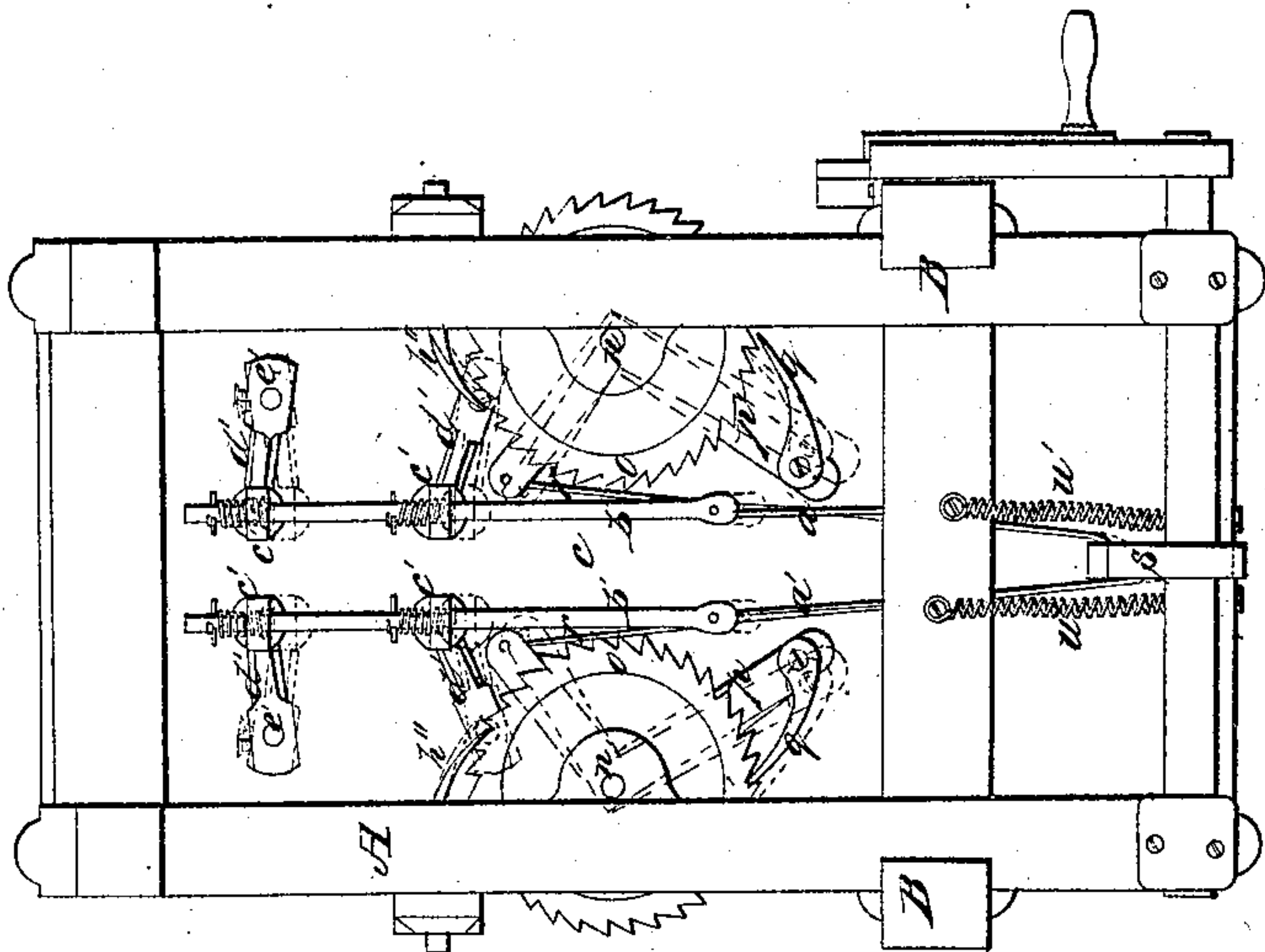
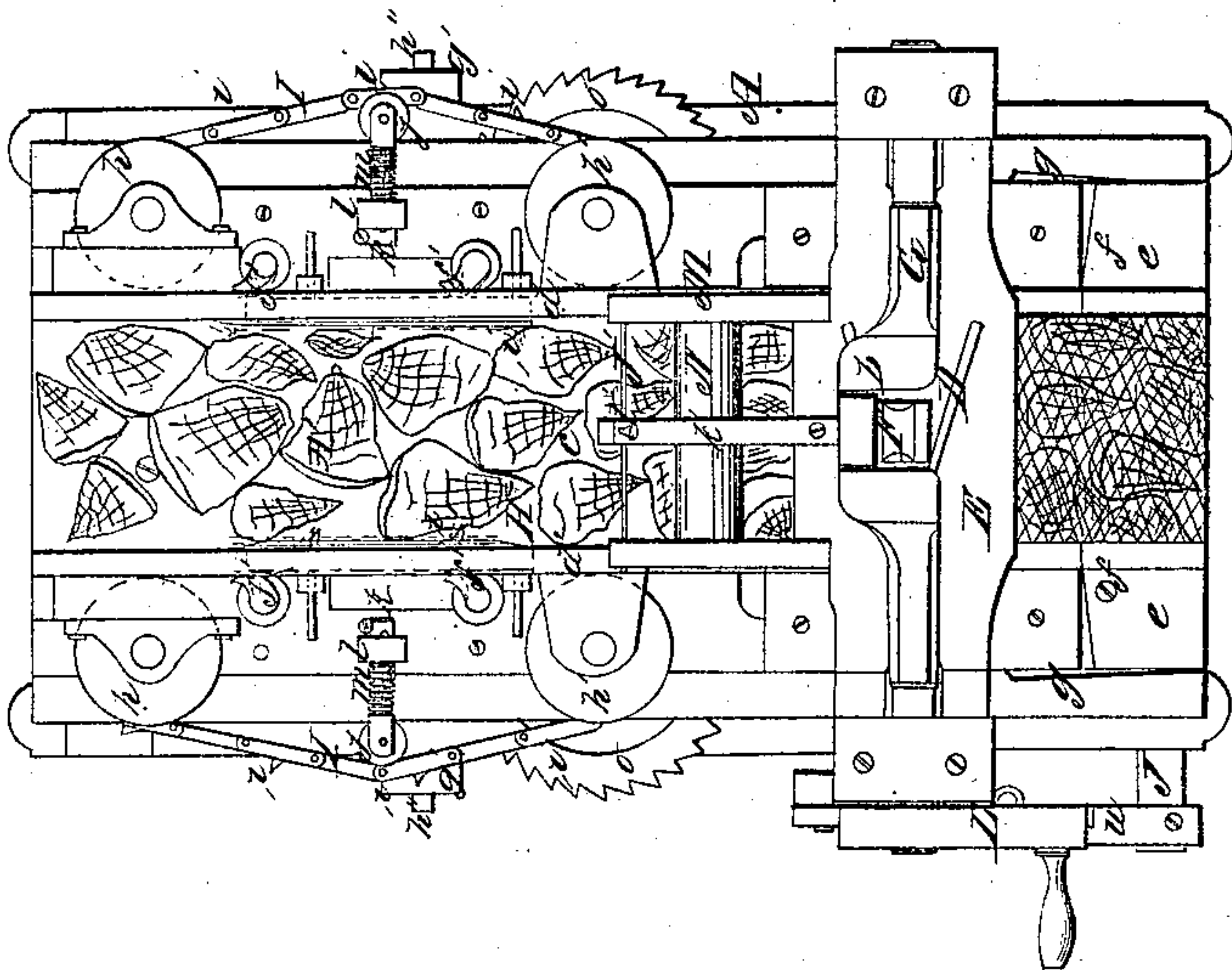


Fig. 1.



Witnesses:

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Fig. 4.

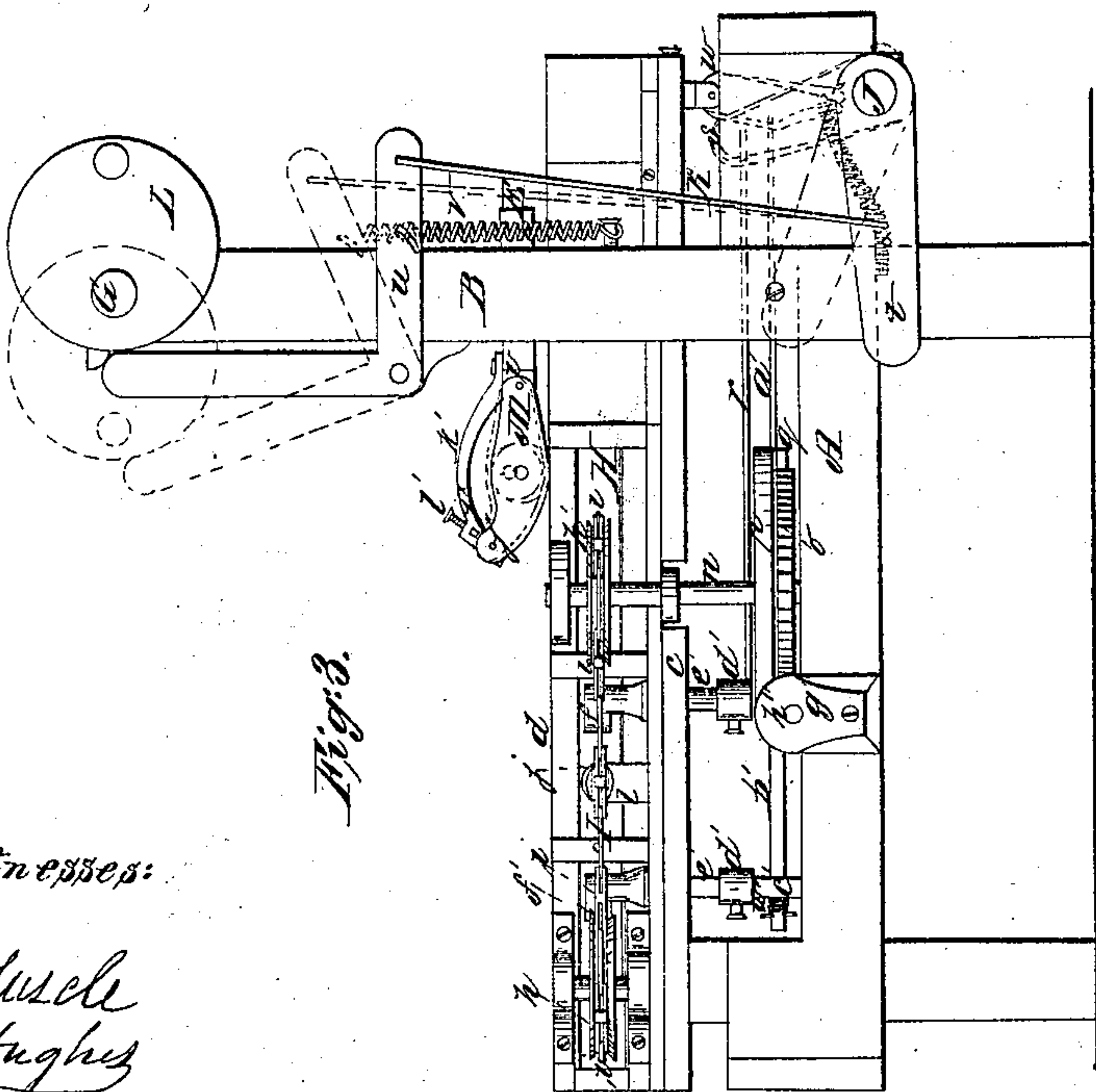
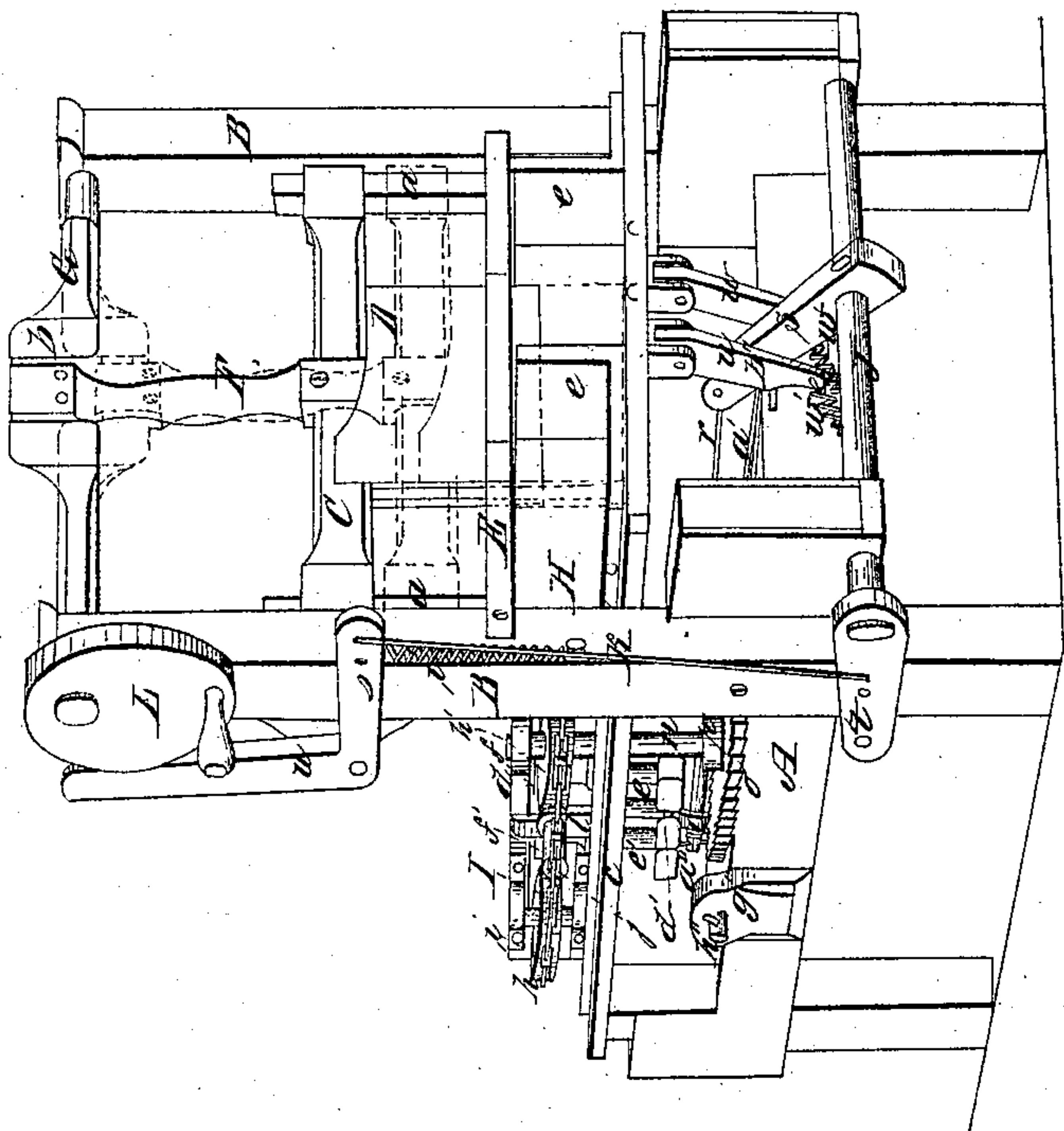


Fig. 3.

Witnesses:

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# UNITED STATES PATENT OFFICE.

W. L. WILLIAMS, OF NEW YORK, N. Y.

## MACHINE FOR SPLITTING FIRE-WOOD.

Specification of Letters Patent No. 23,734, dated April 19, 1859.

*To all whom it may concern:*

Be it known that I, W. L. WILLIAMS, of the city, county, and State of New York, have invented certain new and useful Improvements in Machinery for Splitting Fire-Wood; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a plan or top view of my invention. Fig. 2 is an inverted plan of the same. Fig. 3 is a side elevation of the same. Fig. 4 is a perspective view of the same.

Similar letters of reference denote like parts in all the figures.

This invention relates to an improvement on a machine for splitting firewood, for which Letters-Patent were granted to me, bearing date April 14, 1857.

The within-described invention consists in certain improvements in the mode of feeding the blocks of wood to the knife or knives, whereby the difficulties hitherto attending the above-mentioned operation peculiar to these machines,—such as the binding or wedging of the blocks in the feed-box, the prevention of the free discharge of the split wood, and the rupture or breaking of certain parts of the machine due to the binding or wedging of the blocks,—are fully obviated as hereinafter shown and described.

To enable those skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A, represents a rectangular frame, which may be so constructed in any proper way to support the working parts.

B, B, are two uprights attached to the frame A, one at each side, parallel with each other in a transverse plane and having a crossbar C, fitted between them. This crossbar works between proper guides *a, a*, attached to the inner sides of the uprights B, B, and has a V-shaped knife D, attached to it. This knife may be formed of one piece of steel or of two pieces placed obliquely to each other and properly secured to the bar C. The knife D, works through a horizontal guide plate E, attached to the uprights B, B, and it has a reciprocating motion given it by a pitman F, and a crank *b*, the latter being on a shaft G, which has its bearings on the upper parts of the uprights B, B, as is clearly shown in Figs. 1 and 4.

H is a feed-box, placed on the upper part

of the frame A, and formed of a horizontal board or platform *c*, and two side pieces *d, d*. This feed-box extends the whole length of the frame A, and at their outer or discharge ends two movable or yielding pieces *e, e*, are attached. These yielding pieces are equal in width and height to the pieces *d, d*, and are secured to the platform or board *c*, each by a screw *f*, on which they work as centers and each piece has a spring *g*, bearing against it; said springs having a tendency to keep the pieces *e*, in line with the side pieces *d, d*. This will be clearly understood by referring to Fig. 1.

To each side piece *d*, of the feed-box H, two horizontal pulleys *h, h'* are attached, and around the two pulleys of each side piece, an endless chain I, passes. These endless chains are each provided with spurs *i*, at suitable distances apart, and the pulleys *h, h'*, are so placed relatively with the side pieces *d, d*, that the inner sides of the chains I will be about "flush" with the inner surfaces of the side-pieces, the spurs *i*, projecting their whole length within the feed box, see Fig. 1. The endless chains are not fitted tightly on the pulleys *h*, but loosely, pressure pulleys *j*, bearing against them in order to keep in proper position on the pulleys. These pressure pulleys *j* are fitted in the ends of rods *k*, which are placed in suitable bearings *l*, and allowed to slide therein; a spiral spring *m*, being placed around each rod *k*, said springs having a tendency to keep the pulleys *j*, against the endless chains, as will be fully understood on reference to Fig. 1.

The outer pulleys *h'*, of the side-pieces *d, d*, have their shafts *n*, extending below the board or platform *c*; and on the lower part of each shaft *n*, there is placed a ratchet *o*, and just above this ratchet is placed a lever *p*, to the outer end of one arm of which is attached a pawl *q*, and to the outer end of each of the opposite arms of said levers is attached a rod *r*. Both rods *r, r*, are connected to an arm *s*, on a shaft J, which is placed transversely in the frame A, and at its discharge end. To one end of the shaft J, is attached an arm *t*, which is connected by a rod K, with a bent lever *u*, which is pivoted to one of the uprights B, and kept in contact with a cam L, on the shaft G, by a spring *v*, as shown clearly in Fig. 3.

To the under side of the board or platform *c*, and at the discharge end of the ma-



chine, two jointed pendants  $w, w$ , are attached, see Fig. 2. To each pendant a rod  $a'$  is connected, said rods being also connected to rods  $b'$ , which are fitted in guides  $c'$ , that are attached to arms  $d'$ , said arms being secured to the lower ends of shafts  $e'$ , which pass vertically through the board or platform  $e$ , two at the outer side of each side piece  $d$ . To the upper part of each shaft  $e'$ , a horizontal projecting spur  $f'$ , is attached. To each pendant  $w$ , a spring  $w'$ , is attached and other springs  $w''$ , are placed on the rods  $b'$ , the use of which latter springs will be hereinafter described.

To each side of the frame A, is secured a bearing  $g'$ , to receive retaining pawls  $h''$ , which catch into the ratchets  $o$ . These pawls are allowed to slide in their bearings to a certain extent and have spiral springs placed on them to keep the pawls engaged with the ratchets. To the inner side of the guide plate E, a frame M, is attached by joints  $i$ . In this frame a roller N is placed; and in the outer end of said frame a rod  $j'$ , is placed, which rod passes through a slot  $j^*$ , in the end of a bar  $k'$ , attached to the plate E; a screw  $l'$ , regulating the movement of the rod  $j$ , in said slot, see Fig. 3.

The operation is as follows:—Motion is given to the shaft G, in any proper manner, and a reciprocating motion is communicated to the knife D, by the crank  $b$ , and connecting rod F. Motion is also given to the chains I, from the same shaft G, by means of the cam L, lever  $u$ , arms  $t, s$ , on shaft J; and the pawls  $q$ , of the levers  $p$ , said pawls actuating the ratchets  $o$ . The chains I, feed the blocks  $A^*$ , (shown in Fig. 1) to the knife D, the spurs  $i$ , of the chains catching into the blocks and insuring their forward movement. The spurs  $i$ , are made to catch into the blocks  $A^*$ , by the projecting spurs  $f'$ , on the shafts  $e'$ , said spurs having an inward turning movement given them by the operation of the rods  $b'$ , which are actuated by the pins  $b''$ , on the arm  $s$ , of the shaft J, striking against the jointed pendants  $w$ . The spurs  $f'$ , press the chains I, inward and clamp it snugly, thus insuring its forward movement to the knife D, which splits the blocks  $A^*$  at every descent. The chains I, I, prevent the blocks from binding against the side pieces  $d, d$ , of the feed-box, and shove them bodily forward; and as each cut is made the blocks are allowed to yield a little backward owing to the yielding retaining pawls  $h''$ , the springs on said pawls permitting such result. The pulleys  $j$ , take up the slack of the chains I, I, as the projections  $f'$ , turn outward. The chains, therefore, are always retained in proper position on the pulleys  $h, h'$ , and the chains are allowed to be acted upon or pressed laterally into the feed-box. The spurs  $f'$ , are also allowed to yield or give outward in conse-

quence of the springs  $w''$ , on the rods  $b'$ . It will be seen, therefore, that no parts of the machine can be injured by the action of the knife D, on the blocks, as the blocks are allowed to yield or give sufficiently to prevent such result. By means of the yielding end pieces  $e, e$ , the split wood is readily discharged, as said pieces will yield under a certain pressure and prevent the clogging or binding of the same at the discharge end of the feed box. And at the same time, said pieces  $e, e$ , will retain the blocks to a certain extent, so as to sustain the block or blocks acted upon by the knife D, that is to say, they will prevent said block or blocks from falling over in front, a contingency which might otherwise occur.

The roller N, prevents the blocks of wood  $A^*$ , from rising or being curved upward under the action of the endless chains I, I, by insuring their passage under the plate E. The weight of the roller N, effects this result in connection with the spring  $j^*$ . The gravity of the roller itself, however, may be sufficient. Some elasticity is necessary in order to compensate for slight variations in the length of the blocks, and also to allow for any slight upward movement of the blocks, in order to prevent the binding or wedging of the same.

This device has been practically tested and operates very efficiently. The great difficulty attending the perfect operation of machines for splitting wood has been the irregular form of the blocks to be split; they being only uniform in length. This irregular form of the blocks favors their wedging or binding in the feed-box, that is to say, in the old machines; for in being fed forward they are liable to be compressed tightly together, many of the blocks being, in fact, wedges or of wedge shape, for the blocks it will be understood are sawed from split logs. By my invention this difficulty is avoided, for the blocks are grasped or compressed at each side of the feed-box by the chains, and are thus fed bodily forward.

I am aware that endless feeding chains have been previously used for feeding blocks of wood to be split to the splitting knives; and I do not claim, broadly, such device irrespective of the lateral movement herein described; for chains for this purpose may be seen in my patented machine previously alluded to. The knife D has also been used, and may be seen in the above mentioned machine. I therefore do not claim the knife D. But

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

1. The employment or use of the endless feeding chains I, I, when arranged as shown or in any suitable way, so as to have the usual rotating movement around their pul-



leys  $h$ ,  $h'$ , and also the lateral movement for the purpose specified.

2. The endless feeding chains  $I$ ,  $I$ , in combination with the yielding rollers  $j$ ,  $j$ , for the purpose of permitting the lateral movement of the chains, as set forth.

3. The yielding pawls  $h''$ ,  $h''$ , in connection with the yielding rods  $b'$ ,  $b'$ , in shafts

$e'$ , and spurs  $f'$ , arranged substantially as described, to permit of the yielding of the 10 blocks of wood, while being split, as described.

W. L. WILLIAMS.

Witnesses:

WM. TUSCH,

M. HUGHES.