

*Van R. Powell,
Making Matches,*

No. 38,911,

Patented June 16, 1863.

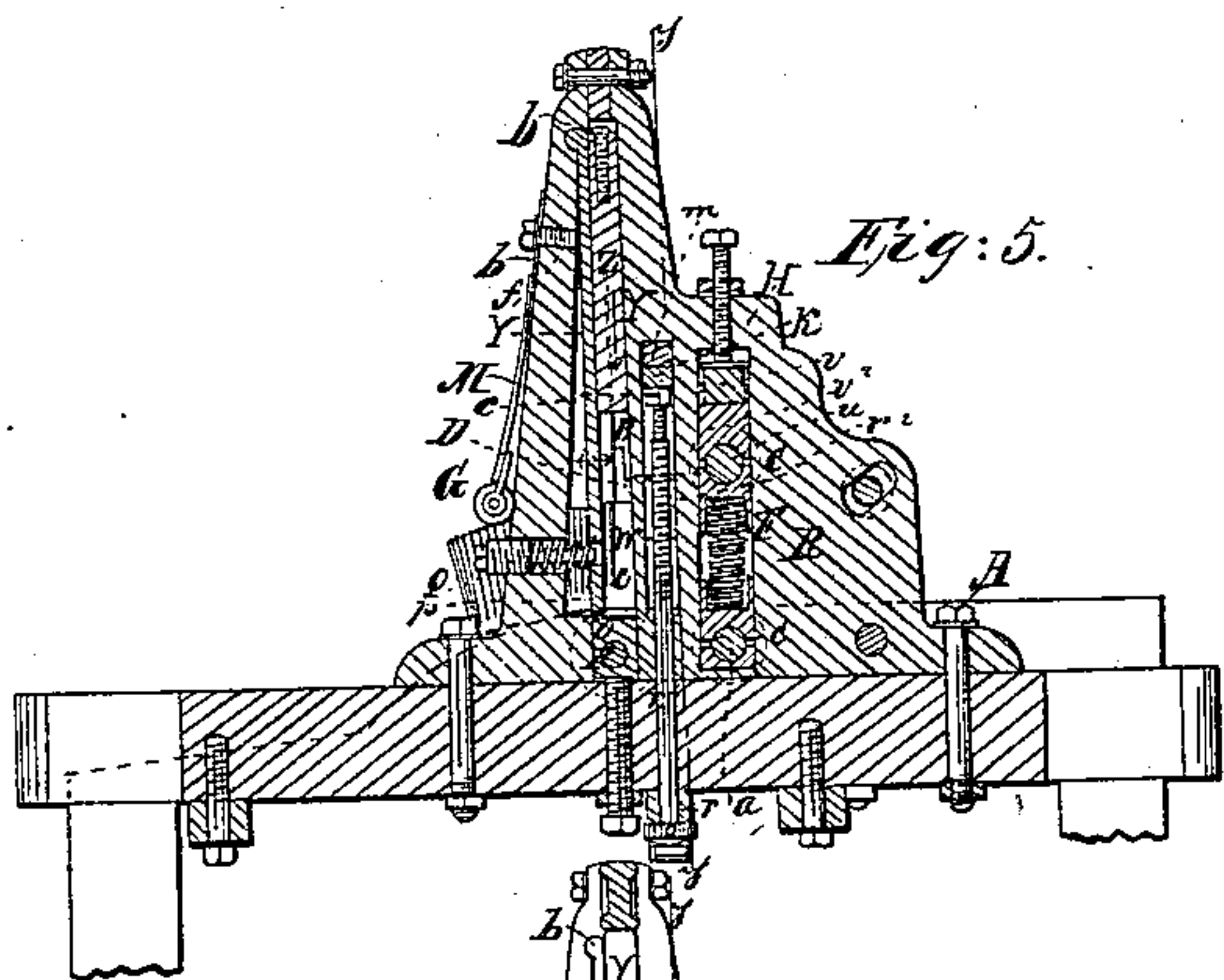


Fig: 5.

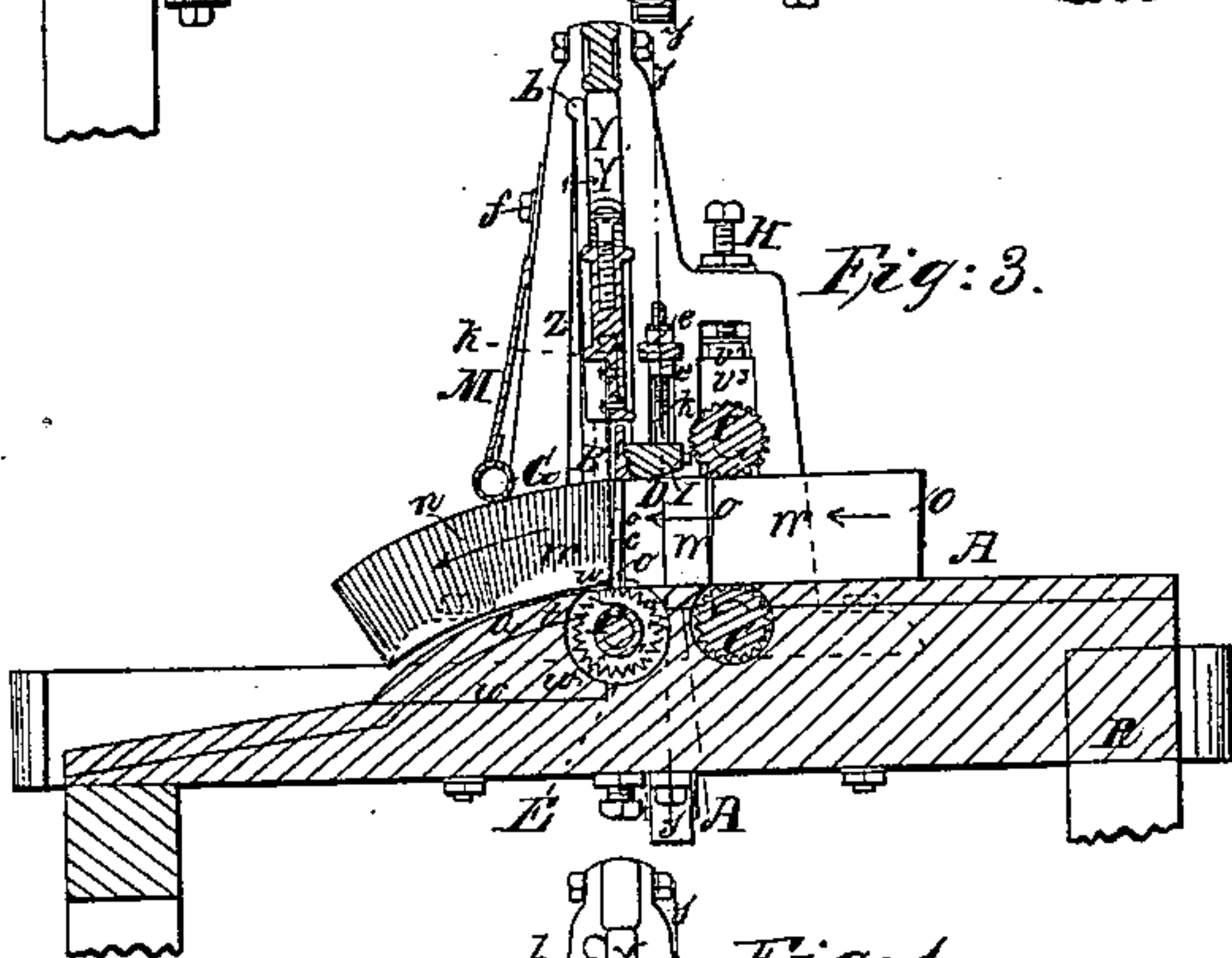


Fig: 3.

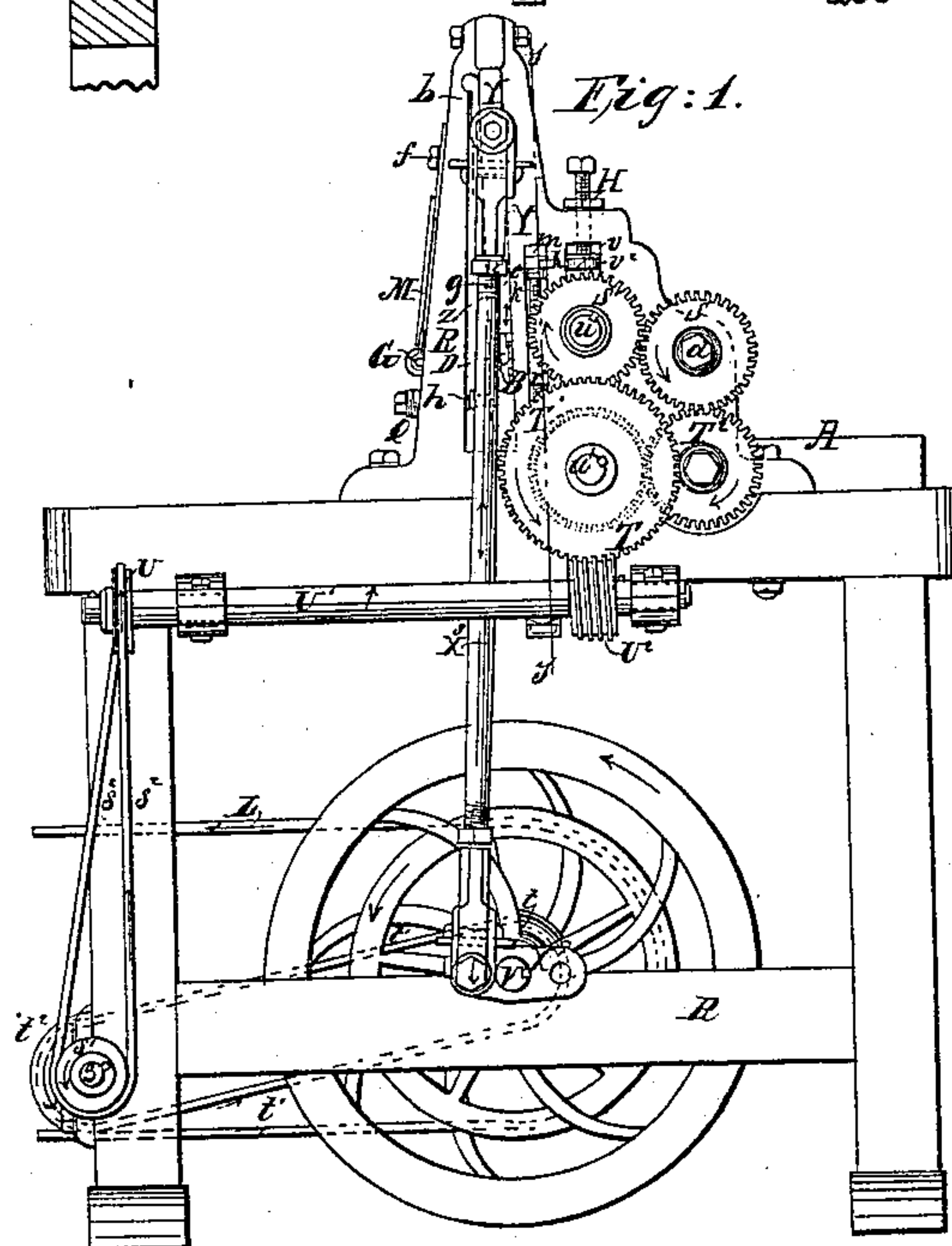


Fig: 1.

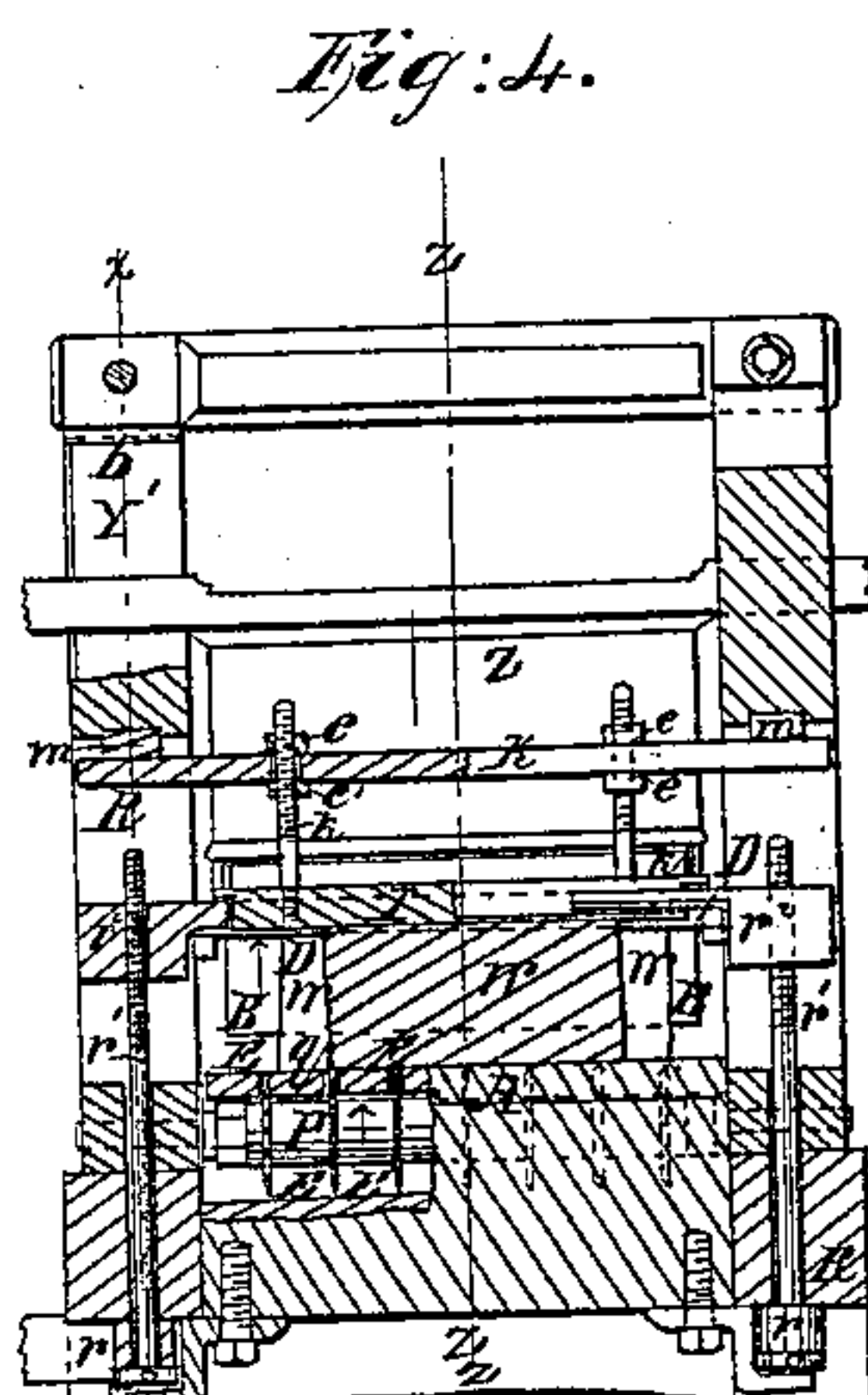


Fig: 4.

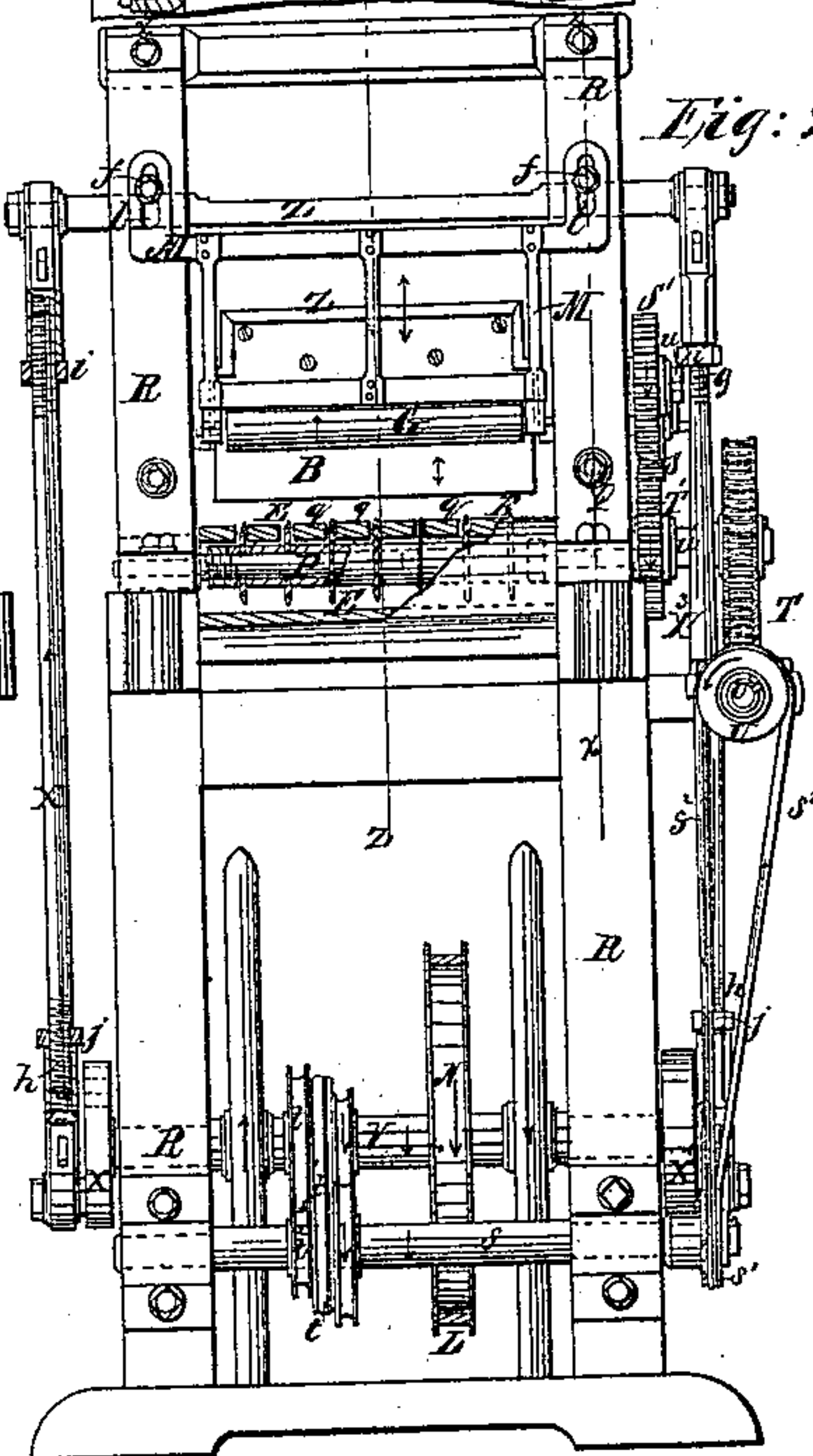


Fig: 2.

*Witnesses:
Edward F. Murray.
Austin F. Park.*

*Inventor:
Van Rensselaer Powell*

UNITED STATES PATENT OFFICE.

VAN RENSSELAER POWELL, OF TROY, NEW YORK.

MACHINE FOR SPLITTING MATCH-BLOCKS.

Specification forming part of Letters Patent No. 38,911, dated June 16, 1863.

To all whom it may concern:

Be it known that I, VAN RENSSELAER POWELL, of the city of Troy, in the county of Rensselaer and State of New York, have invented a new and Improved Machine for Splitting Match-Blocks, incorporating several distinct improvements, of which the following is a sufficient description, reference being had to the annexed drawings, in which—

Figure 1 is a side view; Fig. 2, an end view, with some parts shown in section; Fig. 3, a section at or about the line zz ; Fig. 4, a section at or about the line yy , and Fig. 5 a section at the line xx , all of a machine embodying my said invention.

The same letters refer to like parts in all the figures, and the arrows therein indicate the direction in which the parts move.

One part of my invention consists in the combination of a suitable bed or support, A, for the match-blocks W, a reciprocating splitting-knife, B, feed-rolls C C', and a presser, D, the bed A, Fig. 3, being formed so as to allow the blocks of wood W to be moved along and split thereon without interference to the bending of the block as the splitting of the latter progresses, and the splitting-knife B being so arranged and operated as to reciprocate a limited distance edgewise toward and from, but not to or past, the bed A, and thereby split into but not through the match-block, and the feed-rolls C C' being so formed, arranged, and turned as to push the blocks of wood W one before, against, and by another along the supporting-bed A and past the splitting-knife B a distance equal to the thickness of a match-splint for each stroke of the knife toward the bed, and thereby make the knife split loose a leaf or layer for a row of matches at every such stroke, and the presser D being arranged between the knife B and rolls C C', so as to hold the match-block hard against the bed A as the block is moved along thereon, and as the knife is struck into and pulled out of the block, as well after as before the block has left the feed-rolls and until the splitting of the block has been completed. By this combination of parts match-blocks of greatly different length and width, and of the same or somewhat variable thickness in the splitting direction, may be un-

interruptedly fed along and split, one after the other, without any or with the fewest possible false blows by the knife between the block, and the forward end of each succeeding block is pressed hard against, and thereby made to hold, the rear portion of the next preceding block upright for the action of the splitting-knife until the splitting of the said preceding block has been completed.

In the practice of the above-specified part of my invention I make the bed A with or without friction-rollers therein, and have it terminate at or a little beyond the knife B, either in an inclined or curved part, a , Fig. 3, or abruptly, as indicated by the lines ww . I give the splitting-knife B the proper limited reciprocating movement toward and from, but not to or past, the bed A by any suitable means—as, for example, by providing the knife with a cross-head, Z, fitted to slide or between ways or guides Y Y', and connected by a pair of cranks, X X', and pitmen X² X³ with a shaft, V, mounted to revolve in the stationary frame R of the machine.

In Fig. 5 the knife B is shown withdrawn from the block W and farthest from the bed A; in Figs. 4, 3, and 2, struck into the block and nearest to the bed, and in Fig. 1 at a half-stroke. I generally have one, C', of the rolls pressed toward the other by a yielding force—as, for example, by india-rubber springs $v v'$, bearing against sliding boxes $v^2 v^3$, in which the shaft u of the roller C' turns—and have the rolls C C', Fig. 3, grooved lengthwise or otherwise formed so as to engage with or bind upon and thereby surely feed the match-blocks between the presser D and bed A, when the feed-rolls are turned as indicated by the arrows thereon. I have the driver which reciprocates the splitting-knife turn one or both of the feed-rolls C C' by any suitable means, either intermittingly while the knife is out of the block, or constantly, in case the knife shall be mounted so as to be movable sidewise with the block while in the latter. Thus, in the machine shown by the annexed drawings, the roll C is turned constantly by the knife-driving shaft V by means of the pulley t , fast on the shaft V, belt t' , pulley t^2 , shaft s , pulley s' , belt s^2 , pulley U,

shaft U' , worm U^2 , and worm-wheel T , fast on the shaft u' of the roll C , and the roll C' is turned from the roll C by means of a spur-wheel, T' , fast on the shaft u' , spur-wheels T^2 and S and spur-wheel S' , fast on the shaft u of the roller C' . To turn the feed-rolls step by step or only while the knife is out of the block, a pawl and ratchet may be used in communicating the requisite intermittent movement from the knife-head or the driving-shaft to the feed-rolls, substantially as in some well-known match-splitters heretofore made. I have the presser D held against the passing match-block with a yielding force by any suitable means—as, for illustration, by india rubber springs $r r$, Figs. 4 and 5, applied through tension-rods $r' r'$ to the ends $r^2 r^2$ of the presser D .

In splitting match-blocks the knife should follow the grain of the wood, in order to not cut across the grain, and so weaken the splints, and in order to not have the knife bind in the block, and so bring injurious strain on the knife, and on the devices for feeding and holding the blocks to the knife; and a part of my invention consists in so mounting a splitting-knife, B , having a limited edgewise movement toward and from, but not to or past, a bed, A , in combination with a presser, D , and feed-rolls $C C'$, or their equivalent, for holding and feeding match-blocks either constantly or intermittingly to and past the knife a distance equal to the thickness of a match-splint for each splitting-stroke of the knife; that the said knife will be movable sidewise, so as to follow the grain of the wood in splitting into the block, whether the grain of the wood is perpendicular or more or less inclined to the bed A , Fig. 3; and that the knife, in all such various cases, upon being withdrawn from the block, will then resume the same proper position for starting a new split before being again struck into the block. In mounting the knife so that it shall thus move sidewise I employ any suitable means. Thus, in the machine shown by the annexed drawings, the guides Y' , Fig. 5, on one side of the ways between which the knife-head Z slides are hung at the ends b , which are farthest from the bed A , to the frame R , so as to allow the knife to move sidewise and follow the slanting grain of the wood in splitting into the block, when the cross-grained blocks are fed past the knife with the grain of the wood inclined backward in respect to the plane of the fixed guides Y and bed A , as shown at o in Fig. 3; and the springs $p p$ press against the movable guides Y' , so as to keep the edge of the knife against the unsplit part c , Figs. 3 and 5, of the block as the knife moves sidewise in following the grain of the wood, and so as to return the knife to the proper place for starting a new split upon the withdrawal of the knife from the inclined grain of the wood. Screws $Q Q$

may be employed to adjust the springs $p p$, so as to make the latter press the knife back with more or less force and speed to the place for starting a new split in the block.

Another part of my invention consists in so mounting a splitting-knife, B , having an edgewise-reciprocating movement toward and from, but not to or past, a match-block support, A , and combined with a presser, D , and feed-rolls $C C'$, or their equivalent, for holding and feeding the match-block to and past the knife by means of a succeeding block with a constant or continuous movement as well while the knife is in the block as when out of it; that the knife will be moved flatwise with and by the block while engaged with the latter, and will also, upon being withdrawn from the block, be then returned back to the proper position for making a new split in the wood before being again struck into the constantly-moving block. By this improvement match-blocks may be fed through and split by the machine much faster or with less jarring and injurious strain in the machinery than if the blocks were fed to the knife step by step in the short bits of time while the knife is out of the block.

In the machine shown by the annexed drawings the swinging guides Y' are so arranged and acted upon by the springs p and have so much movement as to allow the reciprocating knife B to be moved forward with and by the constantly-moving block W , while the knife is in the block, as shown in Fig. 3, and as to return the knife to the proper position for starting a new split, when the knife is withdrawn from the block, as shown in Fig. 5, and the feed-rolls $C C'$ are so geared with the knife B as to feed the block to the knife constantly by means of the devices hereinbefore specified therefor; but any other suitable or equivalent means may be employed for those purposes in the practice of this part of my invention.

In splitting a long match-block lengthwise, after it has left the feed-rolls $C C'$, and while it is being pushed forward between the presser D and bed A by the succeeding block or blocks, as shown in Fig. 3, the block is then liable to get turned sidewise, so as to be split by the knife B into leaves of tapering thickness, by reason of unevenness in the grain of the wood and from unequal pressure applied to different parts of the rear end of the block which is being split by the forward end of the next succeeding block, when the ends of the blocks are uneven, or when the blocks are not started or fed true through or between the feed-rolls. To lessen or overcome that difficulty, I arrange spurs or projections E , Figs. 2, 3, and 4, so that they will temporarily engage with the matted or unsplit side of the match-block, and thereby tend to prevent the turning of the block sidewise between the presser D and

bed A after the block has left the feed-rolls and until the splitting of the block has been completed.

In the practice of this part of my invention I have the spurs E of any suitable construction. Thus, in the machine shown by the annexed drawings, the spurs E are in the form of toothed rings projecting through openings *g* in the bed A, and are fast on a loose shaft, P, so as to be all turned together therewith by the passing match-block, which shaft P may turn in adjustable boxes O, Fig. 5, and in some cases be so large as to be flush with and form the end of the bed A.

Another part of my invention consists in the arrangement of a yielding guide, G, Figs. 3 and 2, in combination with the knife B, feed-rolls C C', presser D, and bed A, with or without the spurs E, so that the split side of the projecting split portion *n*, Figs. 3 and 5, of the match-block will come in contact with and be gently pressed upon and held steady by the said yielding guide G whenever the block projects so far beyond the presser D as to be in danger of being shook or pulled out of place or from between the presser D and bed A by the action of the splitting-knife on the block after the latter has left the feed-rolls and as the splitting of the block is about being completed.

Another part of my invention consists in the arrangement of a supplemental yielding presser, I, Figs. 3 and 4, between the presser D and feed-rolls C C', so that when the block which is being split by the knife B and held against the bed A by the presser D is taller than the next succeeding block the presser I will, in such a case, hold the said lower succeeding block steady in place upon the bed A after as well as before the said lower block has left the feed-rolls, and until the preceding higher block has been completely split over by the knife B and discharged from between the presser D and bed A; and so that when the match-block which is being held against the bed A by the presser D and split by the knife B is shorter or lower in the splitting direction than the next succeeding block, as shown in Fig. 3, the presser I will then hold the said succeeding taller block steady in place on the bed A as well before as after the said taller block has left the feed-rolls C C', without allowing the said succeeding taller block to push up the presser D, so as to release the said shorter preceding block until the splitting of the latter has been nearly or quite completed by the knife B. I secure the necessary yielding movement in the presser I by any suitable means—as, for example, by india-rubber springs *m m*, Fig. 4, arranged between the frame R and a cross-bar, K, connected by thrust-rods *k k* with the presser I.

The machine shown by the annexed drawings can be readily adjusted to feed through and split match-blocks of greatly different thicknesses in the splitting direction. Thus, the feed-roll C' is adjusted by means of the

springs F, set-screws H, and movable axis *d*, Fig. 5, of the spur-wheel S; and the supplemental presser I can be adjusted by the nuts *e e' e'* on the screw-rods *k k*; and the presser D is adjustable by screw-rods *r' r'* engaging with the ends *r² r²* of that presser; and the yielding guide G can be adjusted by means of the screws *f f* and slots *l l* in the spring-frame M of the guide G. The knife B may also be made adjustable in various ways, so as to split the match-block more or less deeply without altering the length of the stroke of the knife—as, for example, by right and left hand male and female screws *g h* and nuts *i j* on the pitmen X² X³; and that machine may be adjusted to split the match-blocks into leaves for matches of greater or less thickness by changing the belt or band *t'*, Figs. 1 and 2, on the cones of pulleys *t* and *t²*. L is the driving-belt of the machine, and N the main pulley, fast on the shaft V.

I am aware that machines for splitting match-blocks into a series of connected leaves have heretofore embraced a reciprocating splitting-knife, combined with various devices for holding and feeding the blocks to the knife; and I do not broadly claim such a combination of parts, nor any arrangement or combination of devices shown or described in Reuben F. Gustine's United States Letters Patent No. 9,660.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination of a suitable bed or support, A, for the match-blocks, a splitting-knife, B, having an edgewise-reciprocating movement toward and from, but not to or past, the said bed, a set of feed-rolls, C C', and a presser, D, whereby each succeeding match-block is moved along on the bed and pressed against and thereby made to support and feed to and past the knife the rear portion of the next preceding block, substantially as herein described.

2. The combination of a match-block support, A, presser D, feed-rolls C C', and a splitting-knife, B, having an edgewise-reciprocating movement toward and from, but not to or past, the said match-block support, and also a movement sidewise, so that the knife will follow the inclination of the grain of the wood in splitting into the block and return to the proper place for starting a new split on withdrawing from the block, substantially as herein described.

3. A match-block splitter having devices for holding match-blocks and successively feeding them with an uninterrupted or continuous movement to a splitting-knife mounted so as to strike into, but not through, the match-block, and be moved sidewise with and by the moving block while in the latter, and be returned to the proper place to make a new cut upon being drawn out of the moving block, substantially as herein set forth.

4. The spurs or projections E, when arranged in combination with a bed, A, split-

ting-knife B, presser D, and feed-rolls C C', or their equivalent, for pushing the match-block along on the bed and past the splitting-knife by means of a succeeding match-block, substantially as herein described.

5. The yielding holder G, when arranged in combination with a splitting-knife, B, presser D, feed-rolls C C', and bed A, with or without the spurs E, as herein described.

6. The supplemental presser I, when arranged in combination with the shedding-presser D, bed A, knife B, and feed-rolls C C', substantially as herein described.

VAN RENSSELAER POWELL.

Witnesses:

EDWARD F. MURRAY,
AUSTIN F. PARK.