(No Model.)

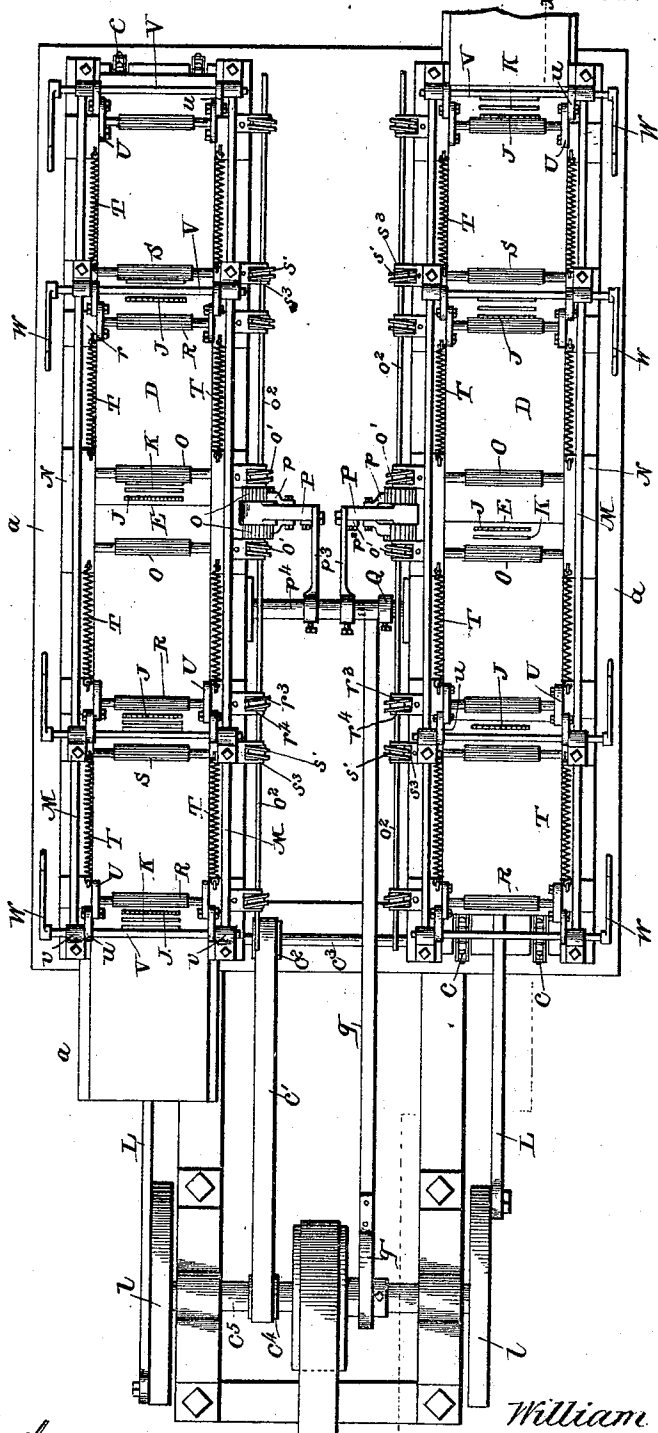
3 Sheets—Sheet 1.

W. W. RYAN.

MACHINE FOR CUTTING EXCELSIOR.

No. 515,059. Patented Feb. 20, 1894.

FIG. I.



Witnesses

Jas. K. McCalpran

D. C. Mackaupter

Inventor

William W. Ryan

By his Attorneys,

C. A. Snow & Co.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

W. W. RYAN.

MACHINE FOR CUTTING EXCELSIOR.

No. 515,059. Patented Feb. 20, 1894.

FIG. 2.

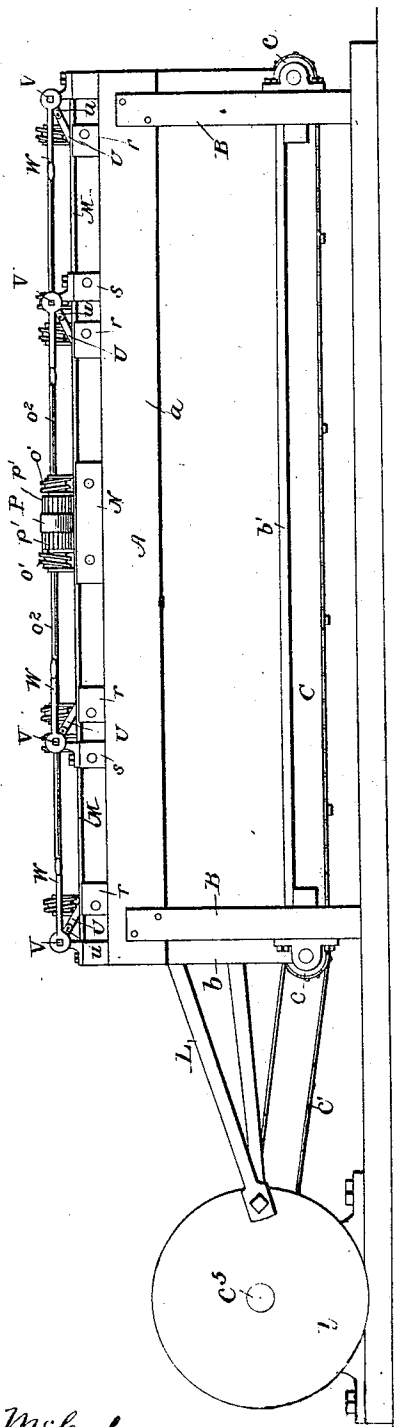
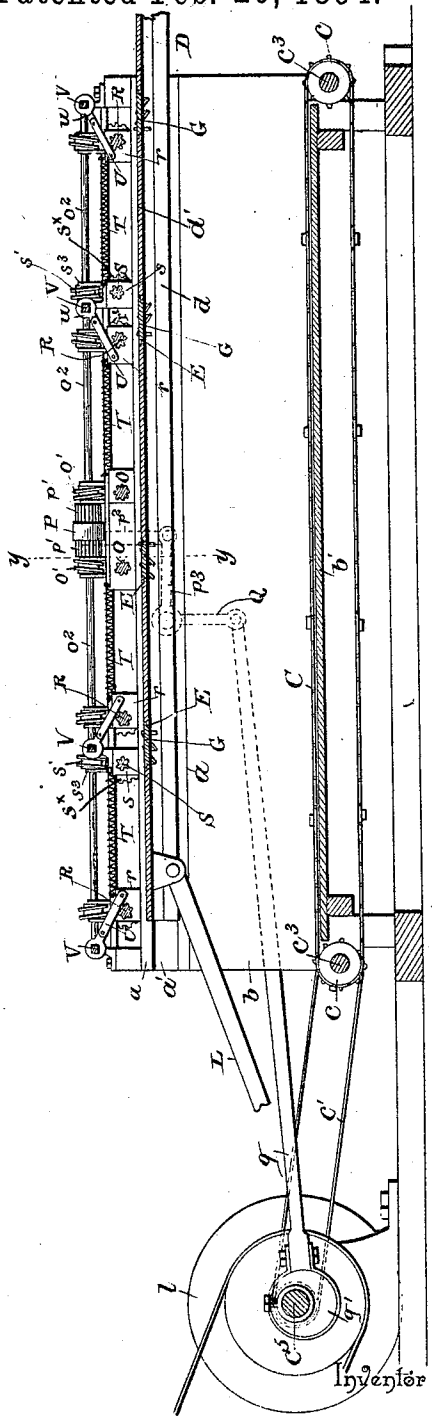


FIG. 3.



Witnesses

Jas. K. McCalman

D. P. Wolcaufer

Inventor

By his Attorneys, William W. Ryan

C. A. Snow & Co.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

W. W. RYAN.

MACHINE FOR CUTTING EXCELSIOR.

No. 515,059. Patented Feb. 20, 1894.

FIG. 6.

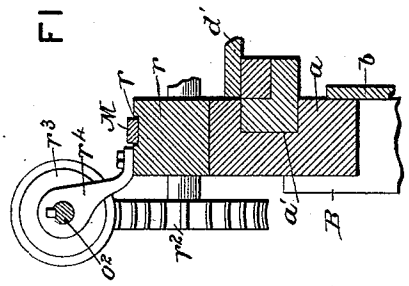


FIG. 7.

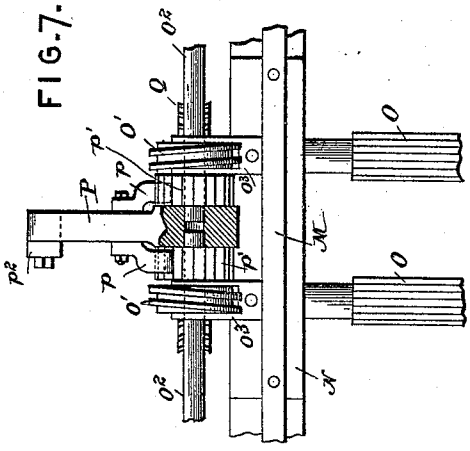


FIG. 4.

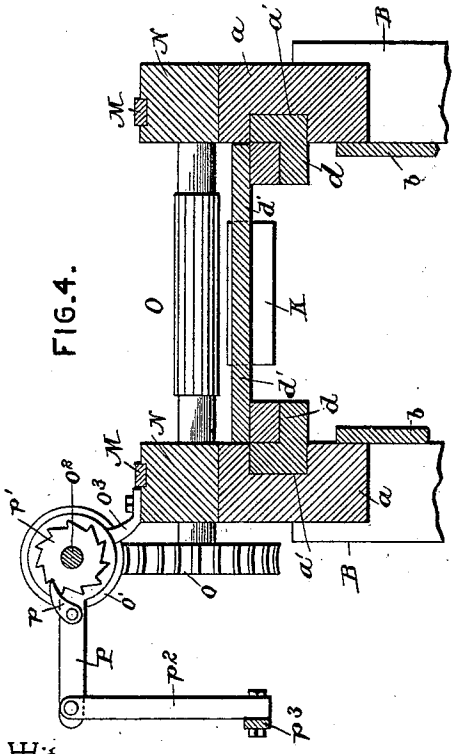


FIG. 5.

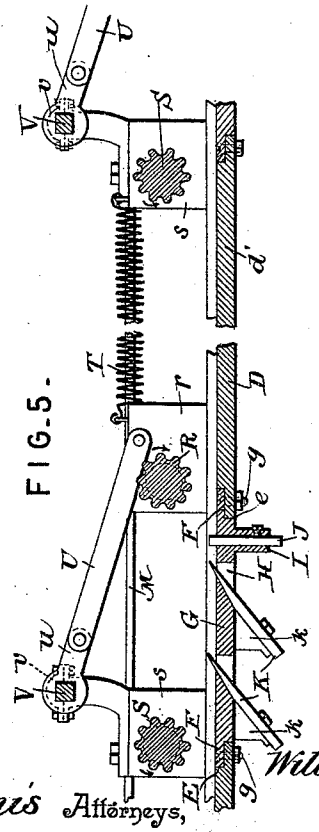
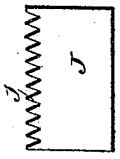


FIG. 8.



Witnesses

Jas. K. McCathran

L. P. Wochausler.

Inventor

William W. Ryan

By his Attorneys,

C. A. Snow & Co.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM WESLEY RYAN, OF ALPENA, MICHIGAN.

MACHINE FOR CUTTING EXCELSIOR.

SPECIFICATION forming part of Letters Patent No. 515,059, dated February 20, 1894.

Application filed February 25, 1893. Serial No. 463,717. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WESLEY RYAN, a citizen of the United States, residing at Alpena, in the county of Alpena and State of Michigan, have invented a new and useful Machine for Cutting Excelsior, of which the following is a specification.

This invention relates to excelsior machines; and it has for its object to provide certain improvements in machines for cutting excelsior, whereby the capacity of such machines will be greatly increased, and rendered more efficient in operation.

To this end the main and primary object of the invention is to construct an excelsior machine with special reference to the cutting devices thereof, so that a large amount of excelsior can be continuously and regularly cut.

With these and many other objects in view which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts, hereinafter more fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a top plan view of an excelsior cutting machine constructed in accordance with this invention. Fig. 2 is a side elevation of the same. Fig. 3 is a central vertical longitudinal sectional view on the line x—x of Fig. 1. Fig. 4 is an enlarged detail transverse sectional view on the line y—y of Fig. 3. Fig. 5 is an enlarged detail sectional view showing the means of controlling the spring drawn movable feed rolls. Fig. 6 is a similar view showing the gearing for one of the movable feed rolls. Fig. 7 is a detail plan partly in section of the ratchet drive mechanism. Fig. 8 is a detail elevation of one of the splitter knives.

Referring to the accompanying drawings:—A A, represent opposite inclosed guide frames having the upper parallel guide bars a, provided upon their inner faces with the guide grooves a'. The upper parallel guide bars a, are supported on the end frame uprights B, to which are attached the inclosing sides b, forming an inclosed space below the upper parallel guide bars for the excelsior to drop into, and on the inclosed platform b', over which travel the endless carrier aprons C. The said endless carrier aprons C, move over suitable apron rollers c, at each end of the said guide frames, and are simultaneously driven by a belt c', passing over a pulley c^2, on a shaft c^3, connecting one set of end apron rollers, and over the belt pulley c^4, on the main drive shaft c^5, suitably mounted at one end of the opposite duplicate guide frames A A.

Arranged to reciprocate over the endless carrier aprons in the bottom of each of the opposite guide frames are the sliding cutter bars or knife frames D. The cutter bars or knife frames D, are provided with the opposite side bars d, moving in the inner guide grooves a', of the parallel guide bars of each guide frame, and are connected by the flat cutter bar table d', the length of which is equal to the length of the frame in which it moves. The cutter bars D, or at least the table portions d', thereof, are provided with a regularly spaced series of openings E, having recessed or rabbeted edges, e, to removably receive the flanged ends F, of the removable knife heads or blocks G. The removable knife heads or blocks G, are removably clamped in position in the receiving openings of the cutter bars by means of the clamping bolts g, so that the said knife heads or blocks can be easily removed or replaced for the purpose of sharpening the knives, as well as for replacing broken parts.

Each of the removable knife heads or blocks G, which are arranged at regular intervals apart in each of the cutter bars or knife frames D, is provided with a series of transverse knife openings H, from one of which depends an integral elongated knife box I, in which is removably clamped the transverse splitter knife blade J, having a series of regularly spaced teeth j, which are designed to travel through the block and score or split the same in advance of the inclined planer knives K, which have their cutting edges project through the other openings in said removable heads or blocks. The inclined

planer knives K, are removably clamped onto the integral inclined knife lugs, *k*, extended from the under-side of the heads or blocks G.

Having the construction of the sliding cutter bars or knife frames D, and the cutting devices therein well in mind, attention must be directed to the arrangement and disposition of such cutting devices. In the first place, the bars or frames D, in the duplicate guide frames A A, move in opposite directions to each other so that the cutting of the excelsior is from relatively opposite ends of the two frames. In the second place, as is best seen in Figs. 1 and 3, the cutting edges of the planer knives, on each side of the center of the cutter bars or frames, are disposed toward the center of such bars or frames, and therefore the splitter knives in each set on both sides of the center are nearest the center, so that, as the said cutter bars or knife frames reciprocate, the cutting of the excelsior is all toward the center of the machine, and the cutting devices in each guide frame cut alternately from one end to the center, the sets of knives on one side of the center being active while the opposite sets are idle.

Owing to the duplicate arrangement of the cutters and their alternate reciprocations, a large quantity of excelsior is always being cut, the cut material being directed by the planers through the knife openings, and onto the endless carrier aprons which convey the excelsior to the point of discharge.

Each of the opposite reciprocating cutter bars or knife frames are alternately reciprocated by means of the pitmen L, pivotally connected to one end thereof and driven from the crank wheels *l*, on opposite ends of the shaft c^5, which is driven from a suitable power.

As the machine is in operation, it is designed to have each set of knives cut on its own block, and in order to secure this result it is necessary to have a separate feed for each set of knives, which I will now proceed to describe. Arranged above and secured to each of the guide bars *a*, of each guide frame, are the guide strips M, which form, therebetween and said guide bars, ways in which slide the movable portions of the feeding devices to be described. At the center of each of the opposite duplicate guide frames A, and clamped stationary under the opposite guide strips M, are the central bearing boxes N, in which are journaled the ends of the central stationary corrugated feed rolls, O. The central stationary corrugated feed rolls O, carry upon one end thereof the worm gear wheels *o*, with which mesh the right angularly disposed worm pinions *o'*. The worm pinions *o'* are mounted on and near the end of the separate, oppositely and intermittently rotating feed shafts o^2, supported longitudinally above and at one side of each of the opposite guide frames, and have their inner adjacent ends terminate short of each other between the stationary brackets o^3, forming side bearings for the pinions *o'*. The adjacent ends of the opposite shafts o^2, form a bearing for the swinging pawl levers P. The swinging pawl levers P, for each of the duplicate feed devices, carry on opposite sides thereof the oppositely disposed feed pawls *p*, which engage the ratchet wheels *p'*, secured on the shafts o^2, on each side of the levers P. Now it will be apparent that as the levers P, are moved up and down one of the shafts o^2, is turned at a time, while the other remains idle, and this operation is necessary in order that the feed devices at one side of the center of each frame may operate, while the knives traveling under such feed devices are not cutting, and vice versa. Each of the opposite pawl levers P, is connected by means of a link arm p^2, to the end of an operating arm p^3, on the rock shaft p^4, journaled in bearings on the duplicate guide frames. The rock shaft p^4, carries a rock arm Q, to which is connected the connecting bar *q*, driven from the eccentric *q'*, on the shaft c^5.

Arranged on each side of the central stationary feed rolls O, are an alternate series of movable and stationary feed rolls R and S, which depend in numbers upon the sets of knives in the sliding cutter bars or knife frames, there being one stationary and one movable feed roll for each set of knives. The movable feed rolls R, are corrugated as well as the stationary feed rolls, but the former have their ends journaled in the movable bearing boxes *r*, grooved at the tops as at *r'*, to embrace the guide strips M, under which they are arranged to slide. The said movable rolls R, carry upon one end thereof the worm gear wheels r^2, which mesh with the sliding worm pinions r^3. The sliding worm pinions r^3, are mounted to turn with and slide on the shafts o^2, between the bracket arms r^4, secured to the sliding boxes *r*, so that as the movable rolls may be adjusted to accommodate a certain length of block, the gear devices therefor are not disconnected, and each of the movable boxes *r*, for each movable feed roll, has connected thereto one end of the retractile springs T, the other ends of which are attached to a suitable point of attachment on or near to the stationary roll toward which the spring draws the movable roll, so that the block of wood from which the excelsior is to be cut can be firmly held in position between one stationary and one movable roll while being fed onto the cutting knives.

The several stationary rolls S, have their ends journaled in stationary bearing boxes *s*, clamped in position under the guide strips M, and also carry upon one end the worm gear wheels $s^\times$, meshing with gear pinions *s'*, keyed on the shaft o^2, between the shaft brackets s^3, similar in construction to the other brackets referred to and combining therewith to form bearings for the opposite intermittently moving feed shafts.

The movable feed rolls are moved away

from the stationary rolls, toward which they are drawn, by means of the controlling links U, pivotally attached to the movable boxes *r*, at one end, and at their other ends to the rock arms *u*, carried on the rock shafts V, journaled in suitable bearings *v*, at opposite sides of the frames A, and carrying at one end the levers W, by means of which said rock shafts are controlled. By grasping the levers W, and turning the rock shafts V, in one direction, the movable feed rolls are drawn away from their corresponding stationary rolls, so that a block of wood can be inserted there-between, in order to be fed onto the knives, or in order to remove the chip after the block has been cut down.

It is now thought that the construction and operation of the herein-described invention will be clear to those skilled in the art. After the blocks of wood are inserted between the separate sets of stationary and movable feed rolls the machine can be started. As the cutter bars or knife-frames reciprocate, opposite sets of feed rolls on opposite sides of the center of the machine intermittently and alternately rotate, so as to feed the blocks evenly onto the knives, said feed rolls being so geared, as to feed their blocks when the cutting knives therefor are at one end of the guide frame and about to travel thereto, the feeding being stopped while the knives are cutting. It will also be noted that the feed rolls are so geared, that the rolls of each set, which clamp a block of wood there-between, turn toward each other so as to feed such block down onto the knives.

Changes in the form, proportion and the minor details of construction as embraced within the scope of the appended claims, may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

1. In an excelsior cutting machine, the combination of the opposite parallel guide-frames each having inclosing sides *b*, endless carriers arranged at the bottom of the space inclosed between said sides, flat cutter-tables arranged to slide in each of said guide-frames alternately with respect to each other, knife-heads or blocks removably fitted in said cutter-tables flush with the tops thereof and carrying separate sets of splitting and planing knives cutting toward the centers of the guide-frames, separate pairs of movable and stationary feed-rolls mounted on the guide-frames at both sides of the centers thereof and each carrying at one end a worm gear-wheel, separate feed-shafts mounted at the top and one side of the guide-frames and having their ends at the centers of such frames terminating short of each other, worm pinions mounted on said shafts and meshing with said worm gear-wheels, and a ratchet device arranged between the guide-frames and connected with the adjacent ends of the separate feed-shafts, substantially as set forth.

2. In an excelsior cutting machine, the combination of the opposite guide frames having inner grooved guide bars *a* and parallel guide strips M, thereabove, oppositely-reciprocating flat cutter tables moving in the grooved bars *a*, and carrying removable sets of knives cutting toward the centers of the frames, stationary and self-adjusting movable bearing boxes arranged alternately on top of the bars *a*, under the strips M, corrugated feed rolls having their ends journaled in said boxes and each carrying at one end a gear wheel, springs connected at one end to the self-adjusting bearing boxes to draw the movable rolls toward the stationary rolls, separate aligned feed shafts mounted at one side of the guide frames, worm pinions mounted on said feed shafts and meshing with the roll gear wheels, the pinions for the movable feed roll gears being mounted to slide on the shafts, and an operating device connected to the adjacent ends of the separate feed shafts and adapted to impart to each of the same an independent intermittent motion, substantially as set forth.

3. In an excelsior machine, the opposite parallel guide frames having parallel guide strips M, arranged above each side thereof, oppositely reciprocating cutter bars moving in said guide frames, stationary and movable bearing boxes arranged alternately under said guide strips on each side of the center of said guide frames, corrugated feed rolls mounted in said boxes, retractile springs connected to the movable boxes to draw their rolls toward the stationary rolls paired thereto, stationary bearings arranged at opposite sides and on top of the frames, transverse rock shafts journaled above the guide-frames at suitable points in said stationary bearings and having operating levers at one end and intermediate rock arms, pivotal links connected to said rock arms and the movable bearing boxes to slide the same from the stationary boxes against the spring tension, and worm gearing for intermittently turning said feed rolls, substantially as set forth.

4. In an excelsior machine, opposite guide frames, oppositely reciprocating cutter bars sliding in said guide frames, and carrying separate sets of knives, a stationary and movable feed roll for each set of knives and carrying at one end a worm gear wheel, shaft bearings or brackets attached to the bearings for the stationary and movable feed rolls, separate feed shafts mounted in said brackets and having their ends at the center of the guide frames terminating short of each other, worm pinions mounted on said shafts and meshing with said worm gear wheels, the pinions for the movable feed roll gears being mounted to slide on said shafts, ratchet wheels mounted

on said shafts near their inner ends, swinging pawl levers journaled on the adjacent inner ends of said shafts and carrying reversely disposed pawls engaging the ratchet wheels on both sides thereof, and means for simultaneously moving the opposite pawl levers in the same direction, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM WESLEY RYAN.

Witnesses:
OTTO GJORUD,
JOSEPH CAVANAGH.