(No Model.)

3 Sheets—Sheet 1.

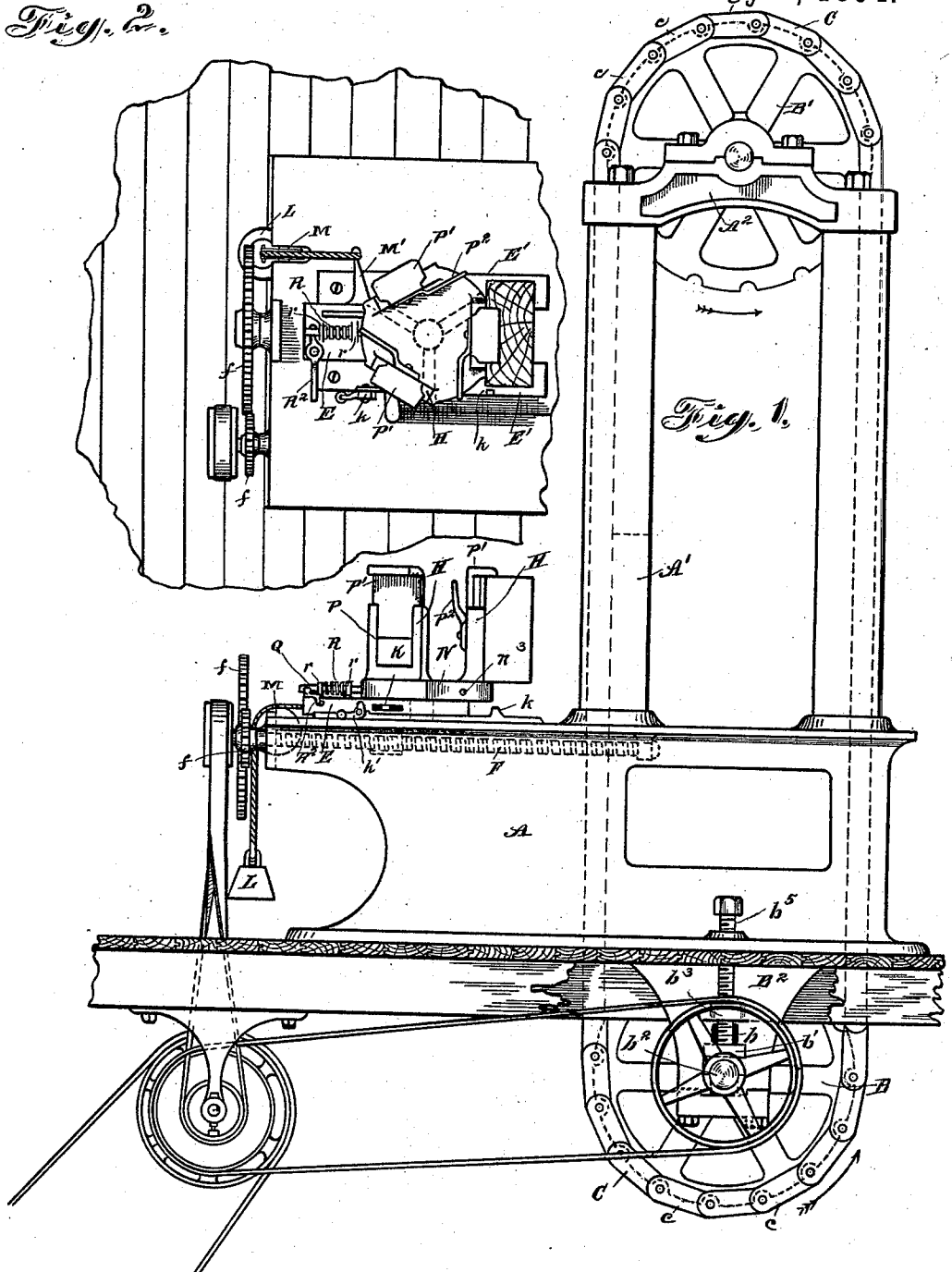
C. H. WHITMAN.

EXCELSIOR CUTTING MACHINE.

No. 519,214. Patented May 1, 1894.

Fig. 2.

Fig. 1.



WITNESSES

H. Clough.

L. W. Bradford

INVENTOR

Charles H. Whitman

by Parker & Burton

Attorneys.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

C. H. WHITMAN.

EXCELSIOR CUTTING MACHINE.

No. 519,214. Patented May 1, 1894.

Fig. 4.

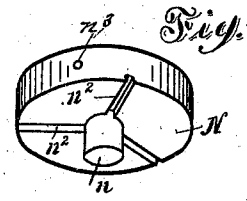


Fig. 3.

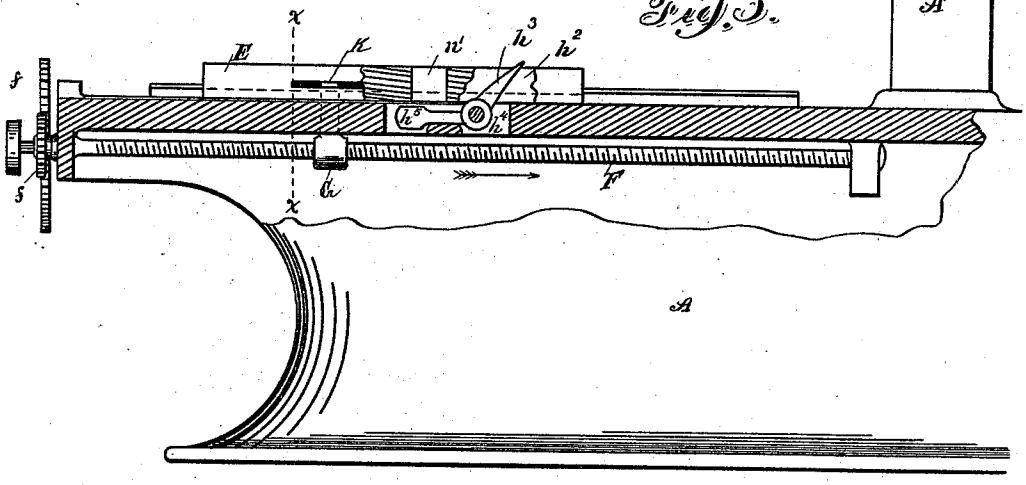
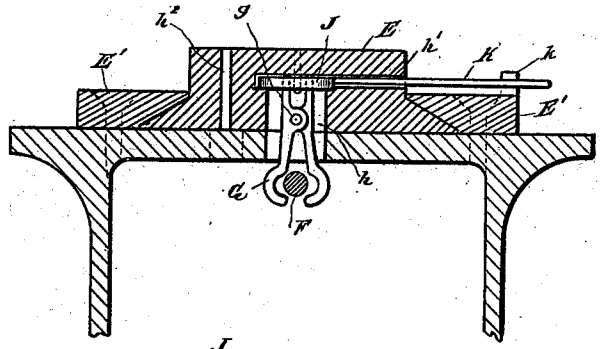


Fig. 5.



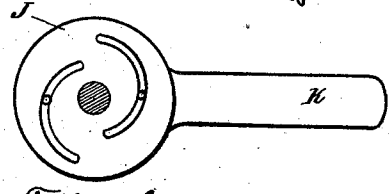


Fig. 6.

WITNESSES
F. Clough.
D. W. Bradford

INVENTOR
Charles H. Whitman
by Parker & Burton
Attorneys.

THE NATIONAL LITHOGRAPHING COMPANY.
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

C. H. WHITMAN.

EXCELSIOR CUTTING MACHINE.

No. 519,214. Patented May 1, 1894.

Fig. 7.

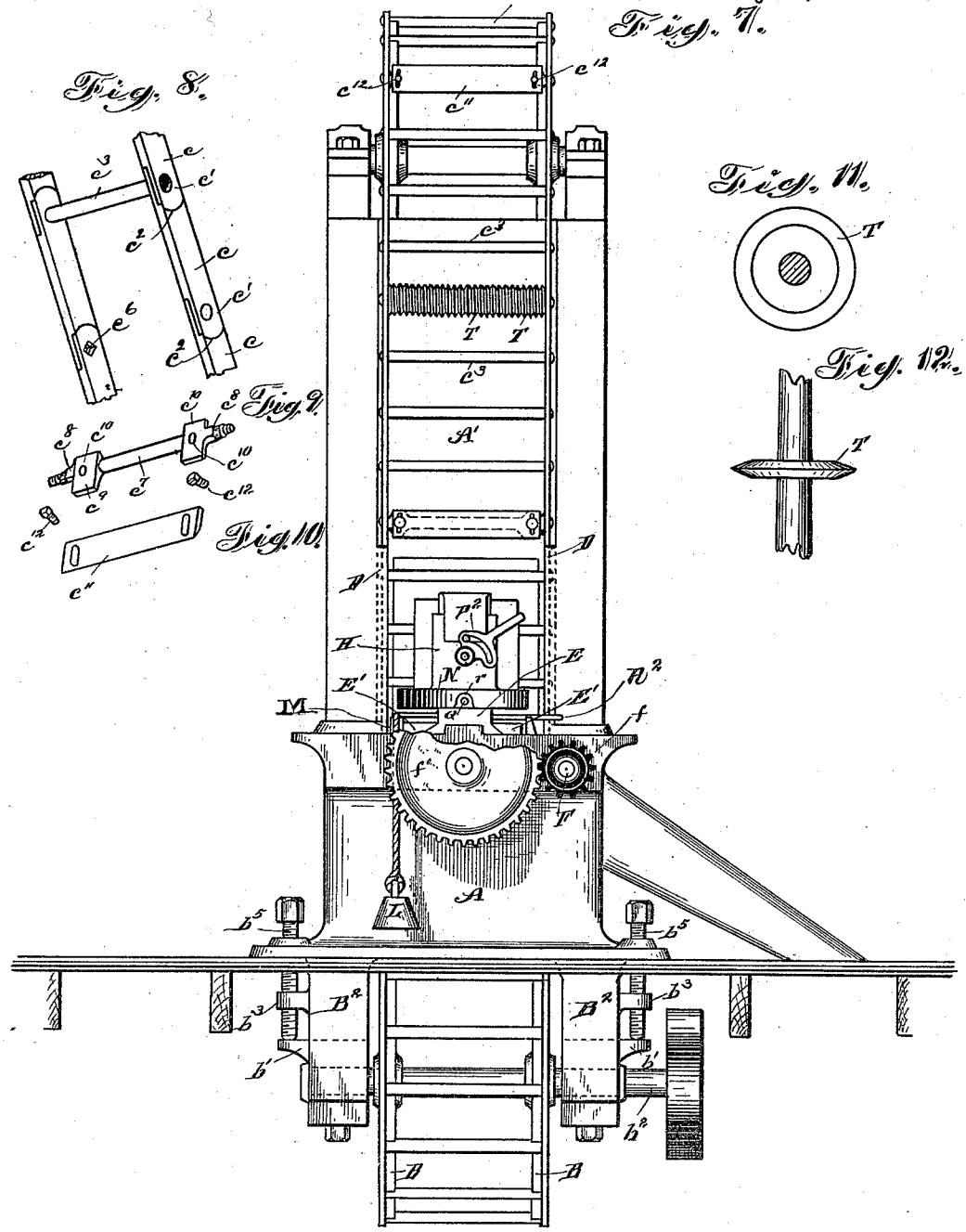


Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

WITNESSES

F. Clough.

L. M. Bradford

INVENTOR

Charles H. Whitman

by Parker & Burton

Attorneys.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES H. WHITMAN, OF DETROIT, MICHIGAN.

EXCELSIOR-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 519,214, dated May 1, 1894.

Application filed April 8, 1893. Serial No. 469,553. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. WHITMAN, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented certain new and useful Improvements in Excelsior-Cutting Machines; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to excelsior machines, or machines designed to cut wood into narrow thin strips or shavings denominated excelsior, and it consists in the combinations and arrangements of the mechanism hereinafter described and pointed out in the claims.

In the drawings, Figure 1 represents a side elevation of the machine. Fig. 2 represents a plan or top view of the table and mechanism for holding the blocks and feeding the same to the cutters. Fig. 3 is a side elevation showing the table, feeding screw and carrying mechanism for the holding devices, partly in section. Fig. 4 is an illustration of the turret upon which the feeding mechanism is arranged, as shown in Fig. 1. Fig. 5 is a cross section of Fig. 3 on the line x, x, showing a split nut engaging the screw, and means for operating the same. Fig. 6 shows a detail of the cam disk and lever operating the split nut. Fig. 7 is an end elevation of the machine from the point of observation of the operator. Fig. 8 shows a section of the chain and means for attachment of the links. Figs. 9 and 10 are detail figures showing the construction of the adjustable knife, and mode of attachment to the chain. Figs. 11 and 12 are detail figures illustrating the rotary cutters or slitters.

Similar letters refer to similar parts.

In the drawings, A represents the foundation; A′, the main frame; A^2, a frame elevated thereon and carrying the upper sprocket wheel.

B, B′, represent sprocket wheels or carrying wheels, over which a double endless chain, C, is driven in the direction of the arrows. The lower of these sprocket wheels, B, is journaled in pillow-blocks, B^2, which are solidly attached to the foundation, and in which are formed jaws, b. b' represents bearings sliding in the jaws b, for the axle b^2 of the sprocket wheel B. Lugs b^3, which are threaded, are formed on the outer side of the pillow blocks. Similar lugs, b^4, project from the side of the bearings outwardly and are adapted to receive the thrust of the end of two screws, b^5, b^5, which are threaded in the lugs, b^3, b^3. The upper ends of these screws project through the floor, and are adapted to be turned so as to adjust the tension upon the chains C. The upper wheel is fixed in ordinary bearings of the usual construction, as shown in Fig. 1, and which construction needs no detailed description.

The chains, C, C, are constructed of sections, c, c, c, and which are shown in detail in Fig. 8. The sections are of appropriate length to correspond with the spaces between the sprockets of the sprocket wheels. They are halved together, as shown at c', c', in Fig. 8, the contiguous ends being curved upon a radius equal to the line drawn from the center of the halved portion. As shown at c^2 in Fig. 8, there is a cross bar c^3 connecting the two chains, and which passes through holes formed in each of the halved portions in such manner that it forms a bearing upon which the portions turn, and at the same time serves to connect the links together in a parallel position. As illustrated in Figs. 8, 9 and 10, certain of these bars are modified in structure, as well as their attachments to the sections of the chains. As shown in Fig. 8 at c^6, instead of the hole through the halved inner section of the chains being round, it is squared, whereas the hole through the corresponding outer halved section of the succeeding link or section is round. A bar, c^7, is formed in such manner that it has a squared portion, c^8, at either end, which fit the squared holes heretofore described, while the continuation of the bar, after passing through the halved inner section, is rounded to fit the round hole of the outer section, so that the link corresponding thereto can readily be rotated upon the round portion as a bearing. It is obvious that this form of construction prevents the bar c^7 from rotating in connection with the inner links of the chain. Interiorly, there are formed upon the bar c^7, flattened projections, c^9, c^9. These projections are pierced with holes c^{10}, c^{10}. Upon these flattened rect-

angular portions, c^9, c^9, is adapted to be placed a knife bar, c^{11}, and by means of longitudinal holes at either end thereof, it is adapted to be adjustably fastened by screw bolts, c^{12}, c^{12}, the holes, c^{10}, being threaded to receive the bolts through the longitudinal holes in the bar c^{11}, it is plain that the knife may be transversely adjusted with reference to the bar c^7, and rigidly held in position by means of the tightening of the bolts. The plane of the flattened rectangular portions of the bar c^7 is formed at an angle with the longitudinal plane of the links of the chain, so that the knife edge is brought out to a plane beyond the plane of the face of the links at any angle thereto that may be deemed the best for the purpose. It is obvious that this angularity of the plane of the knife thus created, and the plane of the links of the chain to which it is attached, combined with the adjustment of the knife as hereinbefore described, permits an adjustment of the distance or thrust of the knife beyond the face of the chain. This enables the operator to so adjust the knife that it will cut shavings of varying thickness from the material to be operated upon, as may be desired; it is also combined with the feeding mechanism, as hereinafter described, in such manner that by means of both, the proper adjustment can always be made to suit the work that is desired to be done. Any convenient number of the knives may be attached, and form portions of the double chain cutter thus described, of which two are shown in Fig. 7, it being the purpose to have a number sufficient so that the feeding mechanism will feed up the material to be worked during the time intervening between the passage of the knives, on the rotation of the sprocket wheels and travel of the chain to just the distance that is desired for the thickness of the cut in the material. It is obvious, therefore, that a number can be attached to the chain, and the feeding mechanism so adjusted as to rapidity of motion, that a number of cuts can be taken off of the material during one revolution of the chain, and as such revolution is continuous, the material is continually operated upon until the block is manufactured into excelsior. Formed in the frame A′ upon this portion opposite the feeding mechanism are slides D, upon which the links of the chain in descending upon that side are guided and held firmly up, so that the knives are not allowed to flinch from the work they are required to do. Suitable guides may be employed at other points, if desired, to prevent any trembling or undue vibration of the chain as the sprocket wheels are rotated. Upon certain of the cross bars between the knives, is journaled a number of disks, T, as shown in Figs. 7, 11 and 12, with sharp edges, which are of the proper diameter to sufficiently project beyond the edge of the knives c^{11} to cut into as they rotate over the block and thus become rotary slitters. The sprocket wheels and chain may be driven by any appropriate mechanism from the countershaft, as is shown in Fig. 1, and, as such constructions are common, it is unnecessary to be described in detail.

The feeding mechanism consists of a table, E, opposite the chain, moving between guides E′, as shown in Fig. 7. This table carries underneath it a screw F, which is journaled by appropriate bearings at either end, and which is driven by gearing, *f*, *f*. This gearing is driven from the countershaft by an appropriate belt. The speed of the screw is reduced so as to give a proper amount of feed, as hereinafter described. Traveling upon the screw is a split nut G, which, when closed, engages the screw, and is compelled to travel in the direction of the arrow, as shown in Fig. 3, toward the cutters upon the chain, and carrying with it a traveling table E.

In a recess cut within the traveling table, which is more particularly shown in cross section in Fig. 5, there is located a mechanism operating a split nut. The nut itself consists of two jaws pivoted together at *g*, and fitting longitudinally within the recess, so that the longitudinal motion of the nut upon the screw compels the traveling of the table E. Transversely, the recess *h* is wider than the arms at *g* of the nut. The upper ends of the nut G are prolonged beyond the pivotal point *g*, and engage in grooves in the under face of a cam disk J, which face is shown in Fig. 6, the arms of the nut being shown in section. This disk is located in a transverse slot, *h*′, which is cut in the side of the table E. The cam disk J has projecting therefrom a lever arm K, which is of sufficient length to project out through the slot in the table E and engage as hereinafter explained with the abutments or lugs, *k*, *k*, upon the guides E′. It is obvious that the rotation of the cam disk J would compel the closing or compression of the jaws of the nut G, depending upon which way the disk was rotated, and, as the disk is rotated by means of the lever K engaging upon the abutments of the guides, it is obvious that the jaws of the nut are opened or closed by the reciprocations of the traveling table E throughout a distance sufficient to permit the engagement of the lever arm K with the abutments. The parts are so adjusted that, as the traveling table E approaches the cutting chain at the extreme length of its movement, the lever arm K engages with the abutment *k* upon the guide of the table, and rotates the cam disk J in the direction of the hands of a watch. The slits therein are cut with the curvatures in such direction that the rotation of the disk in that direction operates the jaws to open them and disengage the nut from the screw. The forward movement of the table thereupon is discontinued, although the screw continues to rotate.

Means are provided for returning the table E to the opposite and outer end of the frame,

which consist in the weight, L, attached to a cord passing over a pulley M, the opposite end of which is attached to a lug M′, attached to the traveling table E. The instant the nut is released, the action of the weight withdraws the table E from its position adjacent to the chain and cutters and in the position shown in Fig. 1. At this point the lever arm K comes in contact with the abutment k', and the continued motion backward of the traveling table, by means thereof, rotates the cam disk to the reverse position, permitting and compelling the jaws of the split nut G to close upon and engage the screw, whereupon the screw again forces the traveling table E with its attachments toward the cutters, thereby lifting the weight L, until the nut G is disengaged, as hereinbefore stated, from the screw, whereupon the weight instantly withdraws the table as before stated. This operation is thus kept up continuously so long as the machine is in operation.

The holding mechanism which is intended to receive and present the block of wood to the cutters consists primarily of a turret N which rotates about a perpendicular axis, and by means of an axle n, shown more particularly in Fig. 4, which axle is inserted in a bearing, n', formed in the traveling table E, shown in section in Fig. 3. The upper face of the turret carries the blocks. Located upon the upper face are adjustable standards, H, H, H. The bases, P, P, P, of these standards are rigidly attached to the upper face of the turret. Upon either side of these standards at p, p, are grooves in which slide clamps P′. The upper portion of the clamps carries a jaw, p', which may be corrugated or have teeth, and which is adapted to grasp the block which may be inserted between the upper face of the turret and the jaw. Means is provided for drawing the jaw forcibly down on the block by a lever and cam movement, p^2, and as this form of construction is old and well known, and as it does not constitute any portion of my invention, it is not deemed necessary to describe it further. It is obvious that the clamping of the block could be done by means of any of the old and well-known forms, that particular feature not being essential.

As shown in the drawings, especially Fig. 2, there are three of the standards and clamps arranged upon the upper face of the turret. As will be hereinafter seen, depending upon the size of the turret and the adjustment of parts, any convenient number of standards and clamps may be so arranged as will best serve the convenience of the operators in operating the machine. The under face of the turret has three radial grooves extending from the periphery to the axle. These grooves are shown in detail in Fig. 4, and are marked n^2.

In a longitudinally perpendicular groove h^2 in the traveling table, as shown partly in section in Fig. 3, there operates a pawl h^3. This pawl is pivoted in a recess, h^4, formed in the frame of the machine, and directly underneath the groove in the traveling table, and shown in Fig. 3, the pawl is held up so that its point normally would be above the traveling table by means of a counterweight attached to an arm projecting from its opposite side h^5. When the turret is in position, the pawl would engage in the radial grooves upon its under side, as hereinbefore described. It is obvious that the axis of the pawl is always stationary, and that the traveling table moves longitudinally with reference to the pawl in carrying the turret. The adjustment is such that the traveling table in moving forward disengages the pawl from the grooves upon the under face of the turret N, and the turret thereby is not compelled to rotate. On the retreat of the table, the pawl drops into the groove, and the table continues to move to the rear, the engagement of the pawl with the turret compels the turret to rotate, the pawl slipping through the groove from a position near the center of the turret to a position near its circumference as it rotates. This construction compels the turret to rotate in the machine, as described, one third of a revolution at each reverse motion of the table. The grooves are so adjusted with reference to the clamps upon the upper face of the turrets, as shown in Fig. 2, that the rotation that is given to the turret presents, upon the forward motion of the turret, the face of the next succeeding block to the cutters. In the periphery of the turret are formed stops in the nature of holes, which may be round or of any desired form. One is shown at n^3 in Fig. 1. Upon the traveling table E there is arranged a spring bolt, Q, passing through two lugs, r, r, fixed upon the upper surface of the table. The spring R is located between the lugs, one end of which is attached to the bolt Q, and the opposite end of which abuts against a lug. The inner end of the bolt projects far enough so that when thrust forward to its extreme length, it is adapted to engage in the stop holes n^3 in the turret, and thus holds the turret rigidly in position. At the outer end of the bolt Q, there is attached a lever, R^2, pivoted about an axis attached to the traveling table E. This lever serves to withdraw the bolt from its engagement with the turret and against the tension of the spring. A plan view of these details is shown in Fig. 2, and they are shown in elevation in Fig. 1.

It will be noticed that the outer end of the lever R^2 projects beyond the traveling table and guides, and also downwardly below the horizontal surface of the table. Upon the guide there is pivotally attached a ratchet lever, k', and which is adapted to rise above the surface of the guide, the lower portion of which comes in contact with the upper surface of the frame. This is so adjusted that, upon the forward movement of the traveling table, the lever R^2 will depress the ratchet lever k' and slip over it, thus leaving the

spring bolt engaged with the turret, but on the retreat of the traveling table, the outer end of the lever R^2 will engage with the ratchet lever k', and as the ratchet is prevented from rotating by means of its opposite arm being in contact with the top of the frame, it operates the lever R^2 to withdraw the bolt from its engagement with the turret, thus permitting the turret to rotate. The parts are so adjusted that at this instant the pawl h^3 comes into engagement with the grooves upon the under face of the turret, and initiates its rotary movement. This rotary movement is continued by the withdrawal of the traveling table, until again forced by the engagement of the nut with the screw, when the lever R^2 is disengaged from the stop k', and the spring bolt comes in line with the next hole n^3, when it immediately slips into it and locks the turret in position at this instant, simultaneously with bringing the next succeeding block in proper position, face side to the cutters. In the meantime, the operators are withdrawing the remnants of blocks from the locking devices, and reinserting new blocks in place, and locking them by means of clamping mechanism. It will be observed that the motion is thus automatically continuous without the interference of manual labor, except so far as it is necessary to supply blocks and lock them in position.

In connection with this machine, there may be arranged chutes or other devices for carrying off the excelsior, but which in themselves form no part of my invention, and hence are not described nor illustrated.

The mode of operation is sufficiently obvious from the description heretofore given.

Having thus described my invention, what I claim is—

1. In an excelsior cutting machine, the combination of sprocket wheels carrying an endless chain having attached thereto cutters and rotating slitters, consisting of sharp edged disks and guides within which such chain operates, and which rigidly hold the cutters and slitters in their movement against the resistance of the material to be operated upon, substantially as described.

2. In an excelsior cutting machine, the combination of a continuously rotating driving screw, a split nut operating thereon, a reciprocating traveling table connected with said split nut and driven forward by it, means whereby at either extremity of the movement of the traveling table said split nut is disengaged and engaged respectively with said rotating screw, an intermittently rotating turret located upon said table, means for compelling the partial rotation of said turret synchronously with the rearward reciprocations of the traveling table, and stops adapted to hold the turret in position during the forward reciprocation of the traveling table, substantially as described.

3. In an excelsior cutting machine, the combination of a continuously rotating driving screw, a split nut operating thereon, a reciprocating traveling table connected with said split nut and driven forward by it, means whereby at either extremity of the movement of the traveling table said split nut is disengaged and engaged respectively with said rotating screw, an intermittently rotating turret located upon said table, means for compelling the partial rotation of said turret synchronously with the rearward reciprocations of the traveling table, stops adapted to hold the turret in position during the forward reciprocation of the traveling table, and means whereby the said screw is continuously driven in one direction, substantially as shown and described.

4. In a cutter for an excelsior machine, the combination of a transverse bar pivotally uniting the adjacent links of two endless sprocket chains, and carrying an adjustable cutter, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES H. WHITMAN.

Witnesses:

R. A. PARKER,

MARION A. REEVE.