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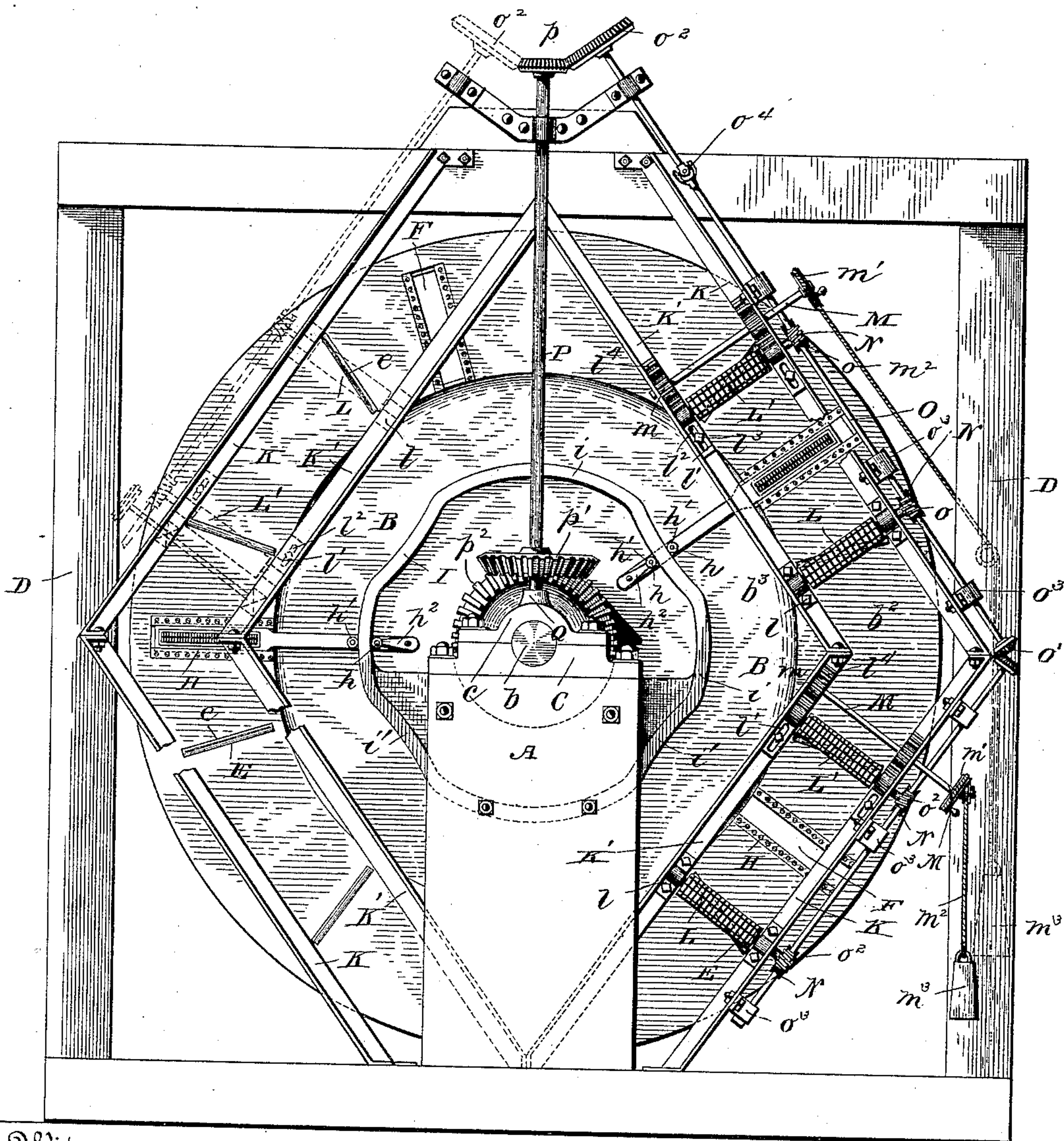
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F. ABEL.
EXCELSIOR MACHINE.

No. 411,412.

Patented Sept. 24, 1889.

FIG. 1.



Witnesses

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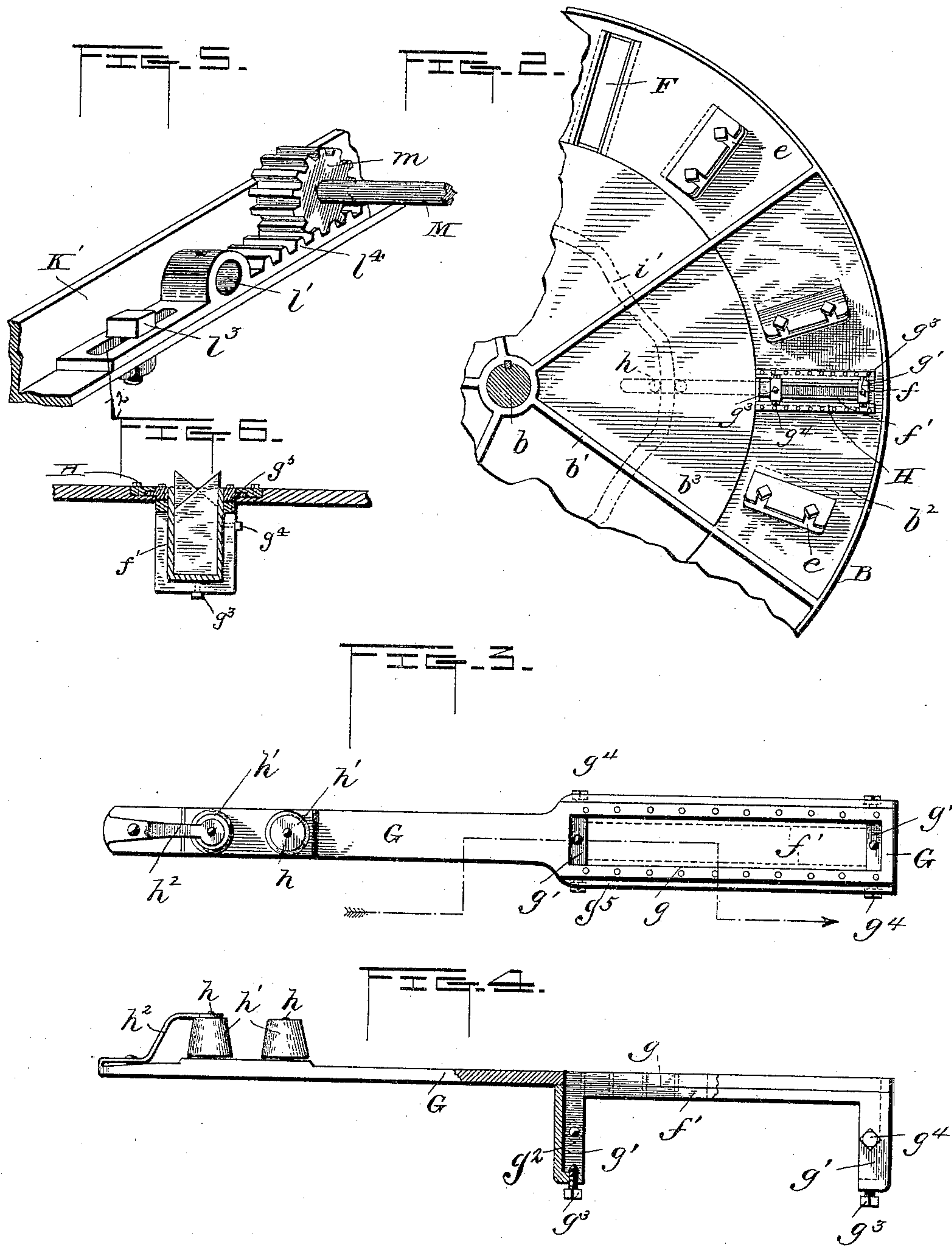
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UNITED STATES PATENT OFFICE.

FRANK ABEL, OF KANSAS CITY, MISSOURI.

EXCELSIOR-MACHINE.

SPECIFICATION forming part of Letters Patent No. 411,412, dated September 24, 1889.

Application filed September 27, 1888. Serial No. 286,494. (No model.)

To all whom it may concern:

Be it known that I, FRANK ABEL, of Kansas City, in the county of Jackson and State of Missouri, have invented certain new and
5 useful Improvements in Excelsior-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
10 same.

My invention relates to an improvement in excelsior-machines.

The object is to provide a machine which will do its work rapidly and with a minimum
15 expenditure of power.

A further object is to provide a machine in which the scorer will follow the grain of the wood, thereby producing an excellent quality of excelsior, and in which the parts are so
20 constructed and arranged that the wear will be very slight even when the machine is run at a very high rate of speed.

A further object is to provide a machine of the above character which shall be simple and
25 convenient to operate.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

30 In the accompanying drawings, Figure 1 is a view of the machine in front elevation, the feed mechanism being shown on one side in full lines and on the opposite side in dotted lines, two of the scorers being shown in operative positions and the others omitted, showing their seats. Fig. 2 is a rear view of a part
35 of the cutter-wheel, showing the seats for the knives and the means for adjusting them. Fig. 3 is a detail plan view of one of the scorer-supports. Fig. 4 is a side elevation of the same, partly in section; and Fig 5 is a detail view of one of the sliding bearings for the movable feed-roller. Fig. 6 is a detail sectional view through one of the scorer-frames
40 and portions of the wheel immediately adjacent thereto.

A represents a block or post, forming the support for the front end of the cutter-wheel shaft *b*, the latter being journaled in suitable
50 bearings *C c*, fixed in the present instance to the top of the said block or support. The rear

end of said shaft *b* is journaled in suitable bearings, (not shown,) and the shaft is driven in any well-known manner.

B represents the cutter-wheel, secured to rotate with its shaft *b*, and surrounded by a frame-work *D*, for the purpose of supporting the feed mechanism. The wheel *B* is preferably formed of thin cast metal, strengthened by radial webs *b'*, extending from its
55 hub to its rim and located on its rear face. The portion *b²* of its front face extends a little farther to the front than the central portion *b³*, and in it are formed radial slots *E*, through which the edges of the knives *e* project. There
60 are preferably ten of the knives *e*, and between every other two of the knives *e* radial openings *F* are formed to receive the scorers.

The scorers proper consist of a series of sharp-pointed teeth *f*, set firmly in a box *f'*,
65 and the latter is removably secured in a longitudinally-sliding frame, as follows: *G* represents an elongated flat bar of metal, in the outer end of which is an elongated slot *g*, calculated to receive the scorer-box *f'*. On the
70 back side of the bar *G*, at each end of the slot *g*, a lug *g'* projects, having a recess *g²* in its face calculated to receive the end of the scorer-box *f'* and support the same in operative position. Set-screws *g³*, seated in the ends
75 of the lugs *g'*, serve to force the box *f'* forward, and set-screws *g⁴*, seated in the sides of the said lugs, serve to clamp it securely in its adjusted position. The bar *G* is further provided with guides *g⁵* along its edges opposite the scorer-box, which guides are adapted to be seated and slide freely in the edges of a frame *H*, secured in position around the edges of the opening *F* in the wheel. The bar *G* is provided a short distance from its
80 inner end with a pair of forwardly-extending axial studs or bolts *h*, situated a short distance apart, on which are loosely secured a pair of taper anti-friction rollers *h'*. The innermost stud *h*—the one which is under the
85 greatest strain—is braced by an arm *h²*, secured to the inner end of the bar *G*, and curving outwardly to the top of said stud, to which it is secured. As a matter of convenience and economy, the inner end of the bar
90 *G* is turned over toward the bar to form the arm *h²*. A fixed cam *I* is secured centrally

in front of the wheel B, and in position so that the studs or bolts h , with their anti-friction rollers h' , will embrace with a loose fit the opposite sides of its rear edge. Portions
 5 of the cam I, as i i , &c., are curved convex, and are concentric with the wheel B; but such portions of the cam as are radially opposite the positions where the bolts or blocks to be cut are held are curved inwardly as
 10 shown at i' i' , &c. The inward curve of the cam at such points is of such pitch that the scorer will be drawn toward the center just as much at each point of its travel along the face of the bolt as the cutter-wheel tends to
 15 carry it outside of a straight line from end to end of the bolt, whereby the scorer will be caused to travel along a straight line from end to end of bolt and its cuts will be perfectly straight and with the straight grain of
 20 the bolt from end to end.

I am aware that a cam-groove of the above-described shape, calculated to receive a stud or bolt, could be employed with more or less success, and would be, in principle, the substantial equivalent of the cam-rim embraced
 25 by the top of the two studs, as shown; but I find in practice that the construction herein shown is more feasible and economical.

It will be observed that by locating the
 30 cam I at or near the center the travel of the end of the bar G in engagement with the cam will be much slower than the scorer itself, which admits of running the cutters at a very high rate of speed without danger of
 35 overheating of the parts in engagement with the cam; and, furthermore, it will be observed that the change from a convex portion of the cam to a concave portion is very gradual, and that the curves themselves are not sharp, all
 40 of which is important in a machine run at a high speed.

To support and feed the bolts or blocks to the knives, the following parts and mechanism are constructed. A pair of rails K K',
 45 L shape in cross-section, are secured at their upper ends to the frame D, as shown, and extend across the face of the wheel to the right and left, from the top downwardly to the horizontal diameter, and thence toward each other
 50 to the bottom. The rails K K' are parallel and in practice about eight inches apart, and are so situated with respect to the face of the wheel that four bolts may be simultaneously supported between them in the
 55 path of the cutters. Four pairs of feed-rollers L L' are journaled in suitable bearings l l' , secured to the rails K K'. The rollers L, toward which the cutters press as they engage the bolts, are journaled in stationary
 60 bearings l while the rollers L', which hold the ends of the bolts which are first engaged by the cutters, are journaled in sliding bearings l' . The latter consist of flat pieces of metal provided with oblong slots l^2 , through which
 65 guide-bolts l^3 extend to secure the sliding bearings in position on the rails. The said bearings are further provided with projected

ends having rack-teeth l^4 on their faces. A shaft M, provided with pinions m , is journaled in suitable bearings attached to the
 70 rails in such position that the pinions will intermesh with the rack-teeth on the sliding bearings l' . A hand-wheel m' on the outer end of the shaft M is provided with a grooved
 75 face, around a portion of which a cord or chain m^2 extends, one end of the cord or chain being secured to the face of the wheel and the opposite end attached to a weight m^3 , which serves to rotate the wheel m' and shaft
 80 M in the direction to slide the bearings l' , and hence the roller L', normally toward the end of the bolt, thereby holding it fast between the two rollers L L'. By operating the hand-wheel m' in the opposite direction the
 85 portion of the bolt left after it has been used as far as practicable may be removed and a new one inserted. The rollers L L' are secured about eighteen inches apart, as that is
 found to be, as far as experience has yet
 90 shown, the most feasible length for the bolt; but such distance may be changed at pleasure by shifting the movable bearings nearer the stationary bearings.

In order to feed the bolt gradually toward the face of the wheel B, the ends of the rollers L L' are provided with worm-wheels N,
 95 with which right and left hand worms o on shafts O engage. The shafts O in the present case are four in number, the two upper ones being geared to the two lower ones by bevel
 100 gears o' . The two upper shafts O diverge from a point above and in front of the wheel B, and are provided at their upper ends with bevel gear-wheels o^2 . The shafts O are journaled in suitable bearings o^3 , attached to the
 105 rails K K' and frame D, and should it be found expedient to change the direction of the upper and lower portions of the upper shafts O an ordinary knuckle-joint may be inserted, as shown at o^4 . An upright shaft
 110 P is provided at its upper end with a bevel-faced pinion p , which intermeshes with the two wheels o^2 . The lower end of said shaft P is stepped in a socket-bearing Q, formed on the
 115 upper side of the upper half-bearing c , and near its lower end the said shaft is provided with a bevel gear-wheel p' , which meshes with bevel-gear p^2 on the front face of the wheel B. Thus as the wheel B rotates the
 120 shaft P will be rotated, and hence the shafts O, and hence the feed-rollers L L' and the bolts R, one only of which is indicated, and that in dotted lines, Fig. 1, will be gradually fed toward the face of the wheel as fast as
 125 scored and shaved by the cutters.

The wheel as above constructed is preferably about six feet in diameter, and is run at a high rate of speed, producing little or no
 130 jar to be noticeable and requires but little attention, simply the inserting of the bolts.

It is evident that slight changes may be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my invention;

hence I do not wish to limit myself strictly to the construction herein set forth; but,

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

1. In an excelsior-machine, the combination, with a rotary cutter-wheel and means for holding the bolts in engagement with the cutters, of a radially-sliding scorer carried by the wheel, and a centrally-located cam connected with the radially-sliding scorer, whereby the said scorer is slid radially by said centrally-located cam and caused to travel forward in a right line at intervals during its revolution with the cutter-wheel, substantially as set forth.

2. In an excelsior-machine, the combination, with a rotary wheel provided with a series of stationary cutters and means for feeding the bolts to the cutters, of a set of radially-sliding scorers alternating with the cutters, and a centrally-located endless cam connected with the radially-sliding scorers, portions of the cam being curved inwardly to correspond with and offset the outward curve of the periphery of the wheel between any two predetermined points, whereby the said scorer is slid radially by said centrally-located cam and caused to travel forward in a right line at intervals during its revolution with the cutter-wheel, substantially as set forth.

3. The combination, with the upright rotary cutter-wheel and radially-sliding scorers carried by the wheel and actuated by a stationary cam at the central portion of the wheel, of feed-rollers journaled in pairs in front of the wheel, bevel-gear on the cutter-wheel, a vertical shaft driven by said bevel-gear, and oblique shafts driven by said vertical shaft and in engagement with the feed-roller shafts to actuate the same, substantially as set forth.

4. The combination, with the upright rotary cutter-wheel and scorers, carried by the cutter-wheel, of the herein-described feed mechanism,

consisting of the parallel supporting-bars, the base-roller journaled in stationary bearings, the top roller journaled in movable bearings provided with rack-teeth, the shaft for operating the movable bearings held under yielding tension, the shaft provided with right and left hand worms to operate the rollers, and the actuating-shaft, substantially as set forth.

5. The combination, with the cutter-wheel mounted upon the main shaft and bearings for said shaft, the upper half of said bearings being provided with a socket-bearing, of an upright drive-shaft seated in said socket-bearing and geared with the main shaft, and the feed mechanism geared with said upright drive-shaft, substantially as set forth.

6. The combination, with the cutter-wheel provided in its face with radially-disposed elongated slots, of frames secured around the edges of said slots, and radially-sliding scorer-holders secured in said frames, substantially as set forth.

7. The herein-described frame for the scorers, consisting of a bar having an elongated opening in its outer end and guides along its edges, the said bar being provided with depending lugs recessed to receive the ends of the scorer-box frame, and adjusting devices to hold the scorer-box in position, substantially as set forth.

8. The herein-described frame for the scorers, consisting of a bar having an elongated opening in its outer end and guides along its edges, the said bar being provided with depending lugs recessed to receive the scorer-box and with a braced stud to engage the operating-cam, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANK ABEL.

Witnesses:

J. H. HITSHAW,
WM. A. WHITE.