

(No Model.)

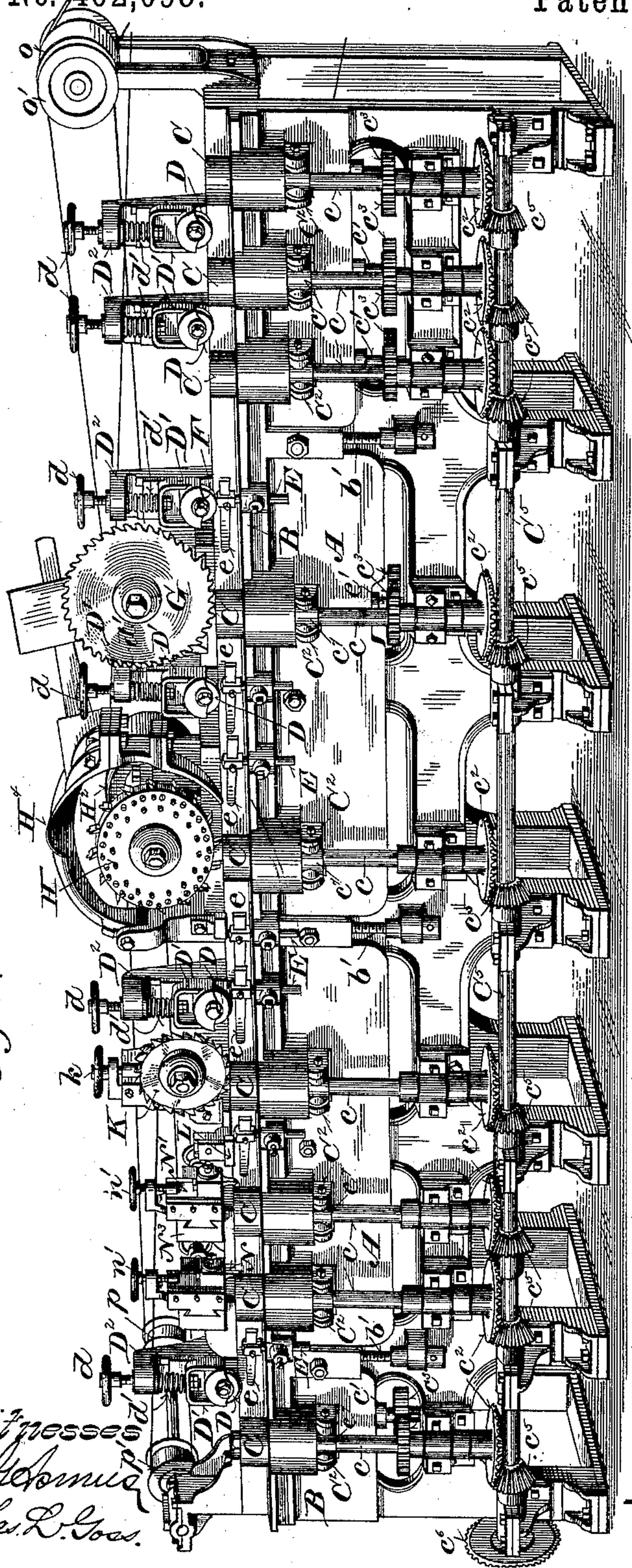
3 Sheets—Sheet 1.

C. J. L. MEYER.
MATCHING MACHINE.

No. 462,098.

Patented Oct. 27, 1891.

Fig. 1.



Witnessed
C. J. L. Meyer
Chas. R. Gos.

Fig. 19.

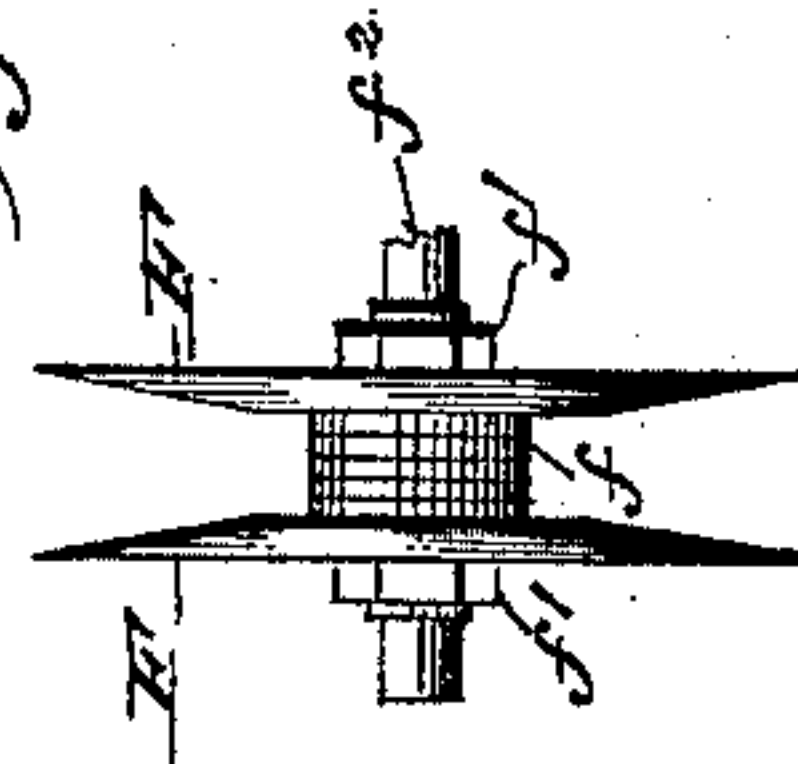
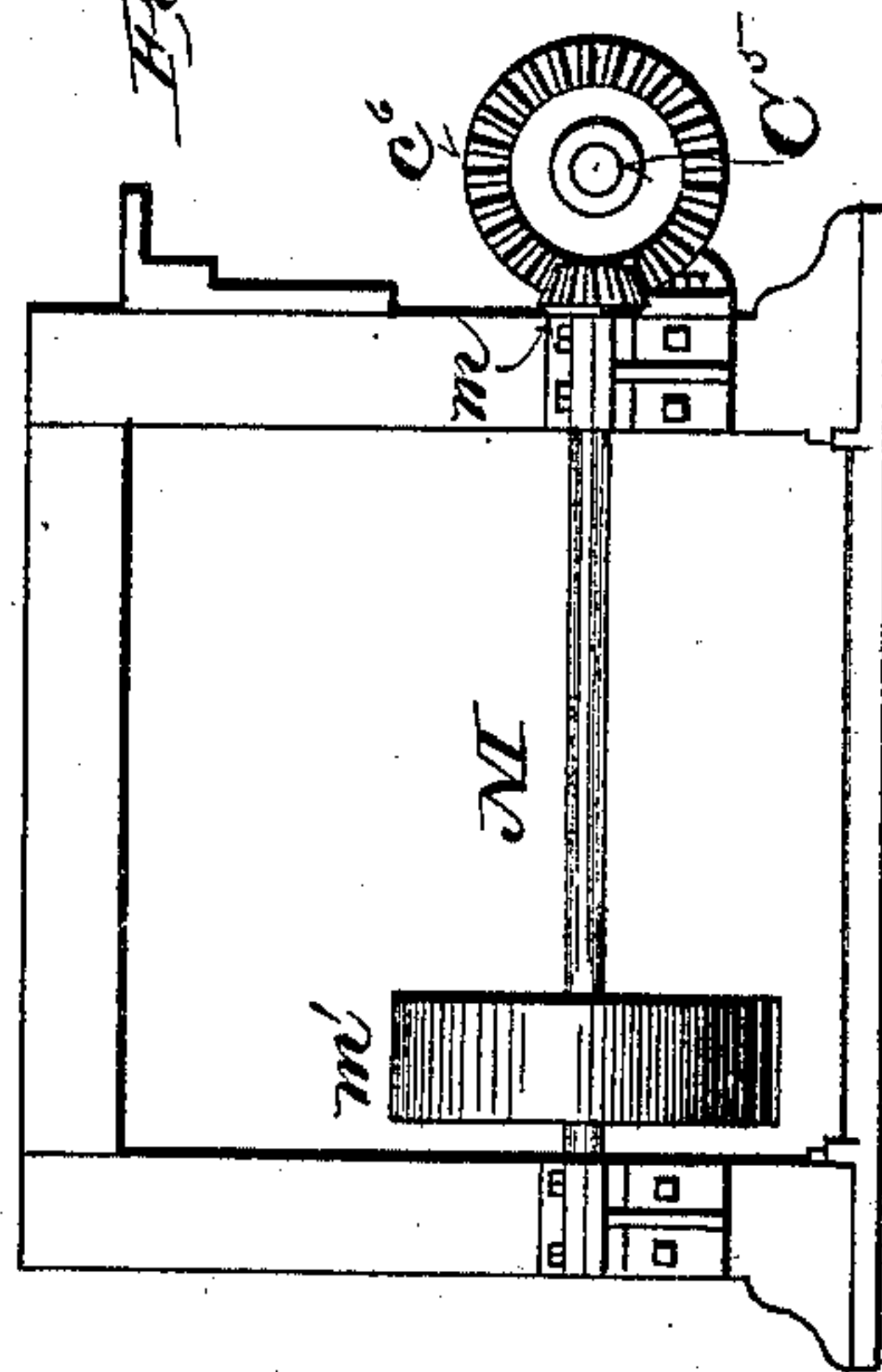


Fig. 2.



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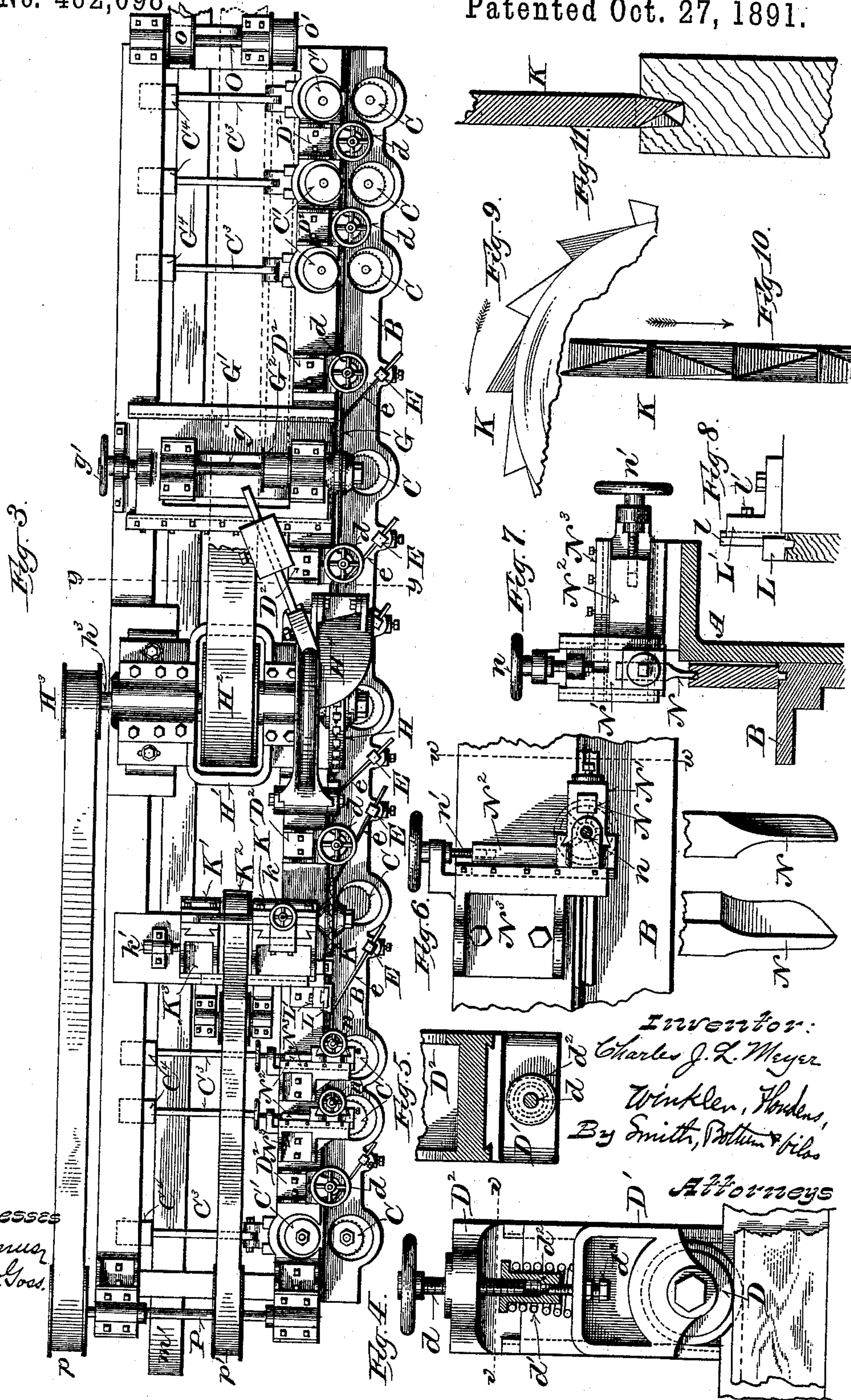
(No Model.)

3 Sheets—Sheet 2.

C. J. L. MEYER.
MATCHING MACHINE.

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Patented Oct. 27, 1891.



UNITED STATES PATENT OFFICE.

CHARLES J. L. MEYER, OF FOND DU LAC, WISCONSIN.

MATCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 462,098, dated October 27, 1891.

Application filed September 22, 1888. Serial No. 286,141. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. L. MEYER, of Fond du Lac, in the county of Fond du Lac and State of Wisconsin, have invented certain new and useful Improvements in Matching-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main objects of my invention are to overcome the difficulties met with in jointing and matching hard-wood lumber, particularly maple flooring, arising from the hardness of the material, toughness of fiber, knots, cross-grains, &c., to produce a better article at a smaller cost than has been possible with the machines heretofore used for the purpose, to effect a saving in material, &c.

It consists, essentially, of certain peculiarities in the construction and arrangement of the mechanism employed to attain those objects, and hereinafter specifically described, and set forth in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a perspective view of my improved machine, looking at the front side. Fig. 2 is an end elevation looking from the left with reference to Fig. 1. Fig. 3 is a plan view. Fig. 4 is a front elevation, partly in section, on an enlarged scale, of one of the edge presser-rollers and its connections. Fig. 5 is a horizontal section on the line *v v*, Fig. 4. Fig. 6 is a plan view of the scraper-head and slide, showing in detail right and left scrapers. Fig. 7 is a vertical section on the line *w w*, Fig. 6, showing said scraper-head and slide in side elevation. Fig. 8 is a detail side elevation of a guide-block bearing against the upper edges of the sections as they pass through the machine. Figs. 9, 10, and 11 are details on a greatly-enlarged scale of the finishing-cutter. Fig. 12 is a vertical cross-section on the line *y y*, Fig. 3, of the machine, showing in side elevation the main groove-cutter, the slide supporting the same, and one of the upright feed and presser rollers

and its connections. Fig. 13 is a side elevation of the main cutter-head, a portion being broken away to disclose more clearly its construction. Fig. 14 is a section on the line *x x*, Fig. 13. Fig. 15 is a perspective view of one of the groove-cutting knives with which said cutter-head is provided. Fig. 16 is a perspective view of one of the slides carrying the upper bearings of the feeding-roller shaft, together with the ways in which said slide works. Fig. 17 is a plan view of the same, together with the upper bearings of a pair of upright rollers. Fig. 18 shows a matched tongue-and-groove joint as made by my improved machine and a machine forming the subject-matter of another application, Serial No. 284,619, filed September 5, 1888; and Fig. 19 is an edge view of the grain-cutting disks.

In its general features and construction this machine is similar to a tongue-cutting machine designed to be used in connection with it, and the two machines may be combined, although I prefer to construct and operate them separately.

Referring to the drawings, A A is a strong heavy iron frame of suitable shape and construction to support and furnish bearings for the various essential parts of the machine herein described.

B is a horizontal bedway adjustably attached to the front side of frame A by means of bolts *b b*, passing through vertical slots therein, as shown in Fig. 12. It is raised or lowered for grooving narrower or wider sections by means of vertical adjusting-screws *b' b'*. (Shown in Fig. 1.) A longitudinal groove is formed in the bed B, as shown in Figs. 7 and 12, to receive the tongue, which is preferably formed on the sections by another machine before the grooves are cut in their opposite edges.

C C are milled or corrugated feed-rollers like those employed in the tongue-cutting machine presented in the application hereinbefore referred to. They are mounted on the upper ends of upright shafts *c c* and project through openings formed therefor in the horizontal bedway B. The shafts *c c* are supported at their upper ends adjacent to said rollers C C in boxes *c' c'*, which are swiveled in the bifurcated outer ends of slides C². These slides (shown in detail in Figs. 16 and

17) pass horizontally through openings formed therefor in the front side of frame A and are supported in ways formed on brackets A', which are bolted to the inside of said frame.

5 The brackets A' are provided with ears a a , to which the shorter arms of bell-crank levers C³ are fulcrumed, as shown in Fig. 12, and with ears a' a' , between which are swiveled boxes c^4 , as shown in Fig. 17, for the upper

10 ends of the upright counter-roller shafts c' . These shafts are connected with and driven by the shafts c c of the feed-rollers C C by pairs of like spur-gears c^3 c^3 , (shown in Fig. 1,) and they carry on their upper ends counter-

15 rollers C' C', placed opposite or adjacent to a number of the feeding-rollers C in recesses in the front side of frame A. The levers C³, as shown in Figs. 3 and 12, are connected at their angles with the rear ends of slides C²,

20 and their rearwardly-extending horizontal limbs are provided with weights C⁴, adjustable thereon, so as to draw the feeding-rollers C C toward the counter-rollers C' C' or the front side of frame A, which constitutes,

25 with the vertically-adjustable bed B, a guideway for the sections to be matched or grooved. The brackets A' and the slides C² are slotted to allow the passage of the shafts c' through them and to permit of the move-

30 ment of said slides.

C⁵ is a horizontal shaft supported lengthwise of the machine in suitable bearings and provided with bevel-pinions c^5 c^5 , which engage with and drive the bevel-gears c^2 c^2 on the lower ends of the shafts c c .

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D D are spring-actuated presser-rollers journaled in vertically-movable slides D' D', so as to bear on the upper edges of the sections as they pass through the machine and

40 hold them down snugly on the bed B. The slides D' D' have dovetailed guides, which work with similar ways provided therefor on the brackets D² D², which are attached to the top of frame A, and are formed at the

45 upper ends with overhanging vertically-perforated ears for the reception of the adjusting-screws d d , as shown in Figs. 4 and 5.

d^2 are internally-threaded sleeves formed at their upper ends with laterally-projecting flanges, between which and the slides D' are interposed spiral springs d' , as shown in Fig. 4. By means of bolts d^3 , passing loosely through perforations in the tops of slides D' and engaging with sleeves d^2 , the latter are con-

50 nected therewith, and the tension of springs d' , surrounding said sleeves, is adjusted as desired. By screws d d engaging the upper ends of said sleeves the slides D' may be raised or lowered for grooving sections of different

60 widths.

e e are spring guiding and presser arms adjustably secured by set-bolts in the vertical spindles E E, which are secured in like manner in perforations formed for their recep-

55 tion in bed B. The spring-arms serve to guide the sections to the feed-rollers C C and in connection with them to hold the sections

snugly against the vertical side of frame A as they pass through the machine.

Taking the several cutters and their con- 70 nections in the order they operate upon the work, and referring to Fig. 19 in connection with Fig. 1, F F are a pair of grain-cutting disks adjustably mounted upon a short spin-

75 dle f^2 , which is journaled in a spring-actuated slide D' like those carrying the presser-rollers previously described. These disks are held at the proper distance apart by interposed washers f , more or less of which are in-

80 serted, according to the width of groove to be made, and they are adjusted and secured in place by nuts f' f' , bearing against their outer faces.

G is a roughing-saw mounted on a horizontal arbor g , which is supported in bearings 85 on a slide G', movable transversely to the bed B in ways provided therefor on frame A. The slide G' is moved in its ways, and the saw is adjusted to cut a groove in the proper place in the upper edge of a section of any particu-

90 lar thickness by means of a screw g' engaging a nut on said slide and having a fixed bearing on frame A. The arbor g is provided with a pulley G².

Referring to Figs. 13 and 14 in connection 95 with Figs. 1 and 3, H represents the main cutter-head, composed of two disks or plates secured together by bolts h^2 h^2 and correspondingly grooved on their inner faces to receive the groove-cutting knives h h , which

100 are adjustably held therein by set-bolts h' h' . The cutter-head H is mounted upon the front end of a horizontal shaft h^3 between washers h^4 h^4 and is secured thereon by means of a

105 nut h^5 , which assists also in binding its component sections or disks together. The shaft h^3 is supported and has bearings in a slide H', movable transversely to the bed B in ways provided therefor on frame A, to which it is rigidly secured when properly adjusted by

110 means of bolts passing through slots therein. The slide is moved and the cutter-head H adjusted transversely to the groove made by the roughing-saw G by means of the screw h^6 , which has a fixed bearing in the frame A and

115 engages with a nut projecting from said slide.

H⁴ represents a guard hinged to the frame A, so as to be brought over the cutter-head into position to arrest the chips and shavings made by the groove-cutters.

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Referring to Figs. 9, 10, and 11 in connection with Figs. 1 and 3, K is the finishing-cutter, which consists of a thick saw having its teeth beveled on the sides from base to point and formed to cut alternately on oppo-

125 site sides of the groove, as shown in Figs. 10 and 11. To the cutting-edges of the teeth are given the exact inclination or bevel which it is desired to give to the sides of the finished groove.

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The finishing-cutter K is mounted on the outer end of a horizontal arbor, which is supported at right angles to the bed B in a vertically-movable slide K'. The slide K' is in

turn carried by a slide K^3 , movable horizontally and parallel with the cutter-arbor in ways provided therefor on the frame of the machine. By means of the vertical adjusting-screw k , which moves the slide K^1 vertically, and the horizontal adjusting-screw k' , which moves the slide K^3 horizontally, the finishing-cutter K may be very accurately adjusted to trim out the groove to the precise shape and width desired. A pulley K^2 is mounted on the arbor of cutter K for connecting it with a driving-pulley. Instead of a finishing-cutter constructed as described, I may employ one having adjustable teeth, which may be set out or in for wider or narrower grooves.

L is a tongued guide-block mounted on a vertically-movable slide l , which is adjustably attached by means of a bolt l' to a bracket L' on frame A , as shown in Figs. 1, 3, and 8. It serves to hold the sections down to the bed and to guide them to the scrapers next to be described.

Referring to Figs. 1, 3, 6, and 7, $N N$ are scrapers properly shaped to trim the sides of the groove to the proper shape and to clear the angles at the bottom of the groove of any projections or adhering chips or slivers left by the preceding cutters. These scrapers are each adjustably held by means of set-bolts in vertically-movable slides $N' N'$, which are in turn mounted upon slides $N^2 N^2$, movable horizontally and at right angles to bed B in suitable ways on brackets $N^3 N^3$ on frame A . The slides N' and N^2 are respectively operated and the scrapers very nicely adjusted to perform the work required of them by means of the adjusting-screws $n n$ and $n' n'$.

Adjacent to the roughing-saw-main groove, cutting head, finishing-cutter, and scraper I place upright presser-rollers $C C$, which hold the sections at those points snugly against the vertical side of frame A , forming a part of the guideway, and between and adjacent to the several cutters are located at suitable intervals the spring-actuated presser-rollers $D D$, which bear on the upper edges of the sections and hold them snugly down to the bed B .

Any suitable arrangement of driving mechanism may be employed to actuate the several cutters and the feeding devices of my improved machine. One convenient arrangement of mechanism for the purpose is partially shown in the drawings.

O represents a counter-shaft supported in suitable bearings at the receiving end of the machine and provided with pulleys $o o'$, connected, respectively, by belts with a pulley on a driving-shaft (not shown) and with the pulley G^2 on the arbor of the roughing-saw. The pulley H^2 on the shaft of the groove-cutter head H is connected by a belt with a conveniently-located pulley on the same or another driving-shaft.

M is a cross-shaft supported at the delivery end of the machine and provided at its

front end with a bevel-pinion m , which meshes with the bevel-gear c^6 on the adjacent end of the roller-driving shaft C^5 . It is also provided with a pulley m' , which is belted to a driving-pulley. (Not shown in the drawings.)

P is a counter-shaft supported in bearings on frame A above and parallel with the shaft M , and provided with a pulley p , which is belted to and driven by the pulley H^3 on the shaft of the main cutter-head H and with a pulley p' , which is belted to the pulley K^2 and drives the finishing-cutter K .

My improved machine operates as follows: The bed B and the several cutters, scrapers, &c., having been adjusted, as hereinbefore explained, to cut a groove of the desired shape and size in the proper location in stuff of given dimensions, the sections are fed one after another to the first pair of upright rollers $C C'$ at the receiving end of the machine and by them forced into engagement with the others, which move said sections longitudinally on edge along the guideway in position to be operated upon by the several groove-cutters. The outwardly-yielding weighted feed-rollers $C C$, bearing against the outer faces of the sections, hold them snugly against the counter-rollers $C' C'$ and the vertical side of frame A , constituting a part of the guideway, and the vertically-yielding spring-actuated presser-rollers $D D$, bearing upon the upper edges of the sections, hold the same snugly down to the bed B . The spring presser-arms $e e$ serve to guide the sections to the upright feed-rollers and to hold them in place in the intervals between said rollers. They may be adjusted lengthwise in the spindles and the spindles raised or lowered and turned in the bed B , so as to cause them to bear at different angles at different points and with different pressures on the faces of the sections, as desired. As the sections pass under the grain-cutting disks $F F$ two incisions are made in the upper edge of each section on each side of the groove to be formed, so as to prevent the splintering of the wood by the groove-cutters and insure smooth, sharp, and perfect edges to groove. The roughing-saw G makes a cut between the incisions produced by the grain-cutters and removes the greater part of the material to be removed in forming the groove, thereby relieving the groove-cutter H and allowing the material to be fed much faster through the machine than it would be possible without said roughing-saw. The cutters $h h$ then form the groove approximately to the required shape, the cutter K trims the sides of the groove to the proper bevel, and the scrapers $N N$ smooth the same and clear the angles at the base of the groove.

I claim—

1. In a matching-machine, the combination, with a horizontal way and suitable feeding devices arranged to move the sections longitudinally on edge along said way, of a presser-roller arranged to bear on the upper edges of said sections and hold the same snugly down

to said bed, and internally-threaded sleeve flanged at its upper end, a spiral spring coiled about said sleeve, bearing at its lower end against said slide, a bolt passing loosely through said slide and engaging the threaded opening in said sleeve, and an adjusting-screw threaded in an overhanging bracket and engaging with said sleeve, substantially as and for the purposes set forth.

2. In a matching-machine, the combination, with a horizontal way and feeding-rollers arranged to move the sections on edge along said way, of yielding rotary knife-edged grain-cutting disks arranged to make incisions in the upper edges of the sections on each side of the groove to be formed, and a groove-cutter, substantially as and for the purposes set forth.

3. In a matching-machine, the combination, with a suitable way, of feeding-rollers arranged to move the sections to be grooved on edge along said way, a pair of rotary grain-cutting disks arranged to make incisions in the edges of said sections on each side of the groove to be formed, a roughing-saw arranged to cut the groove in the edges of the sections between the incisions made by said disks carried by a slide movable transversely to said way, and a groove-cutter adapted to shape the groove and the shoulders on each side thereof, substantially as and for the purposes set forth.

4. In a matching-machine, the combination, with a suitable way and feeding devices arranged to move the sections to be grooved on edge along said way, of a pair of rotary grain-cutting disks arranged to make incisions on each side of the groove to be formed, a roughing-saw adapted to cut a groove in the edges of the sections, a rotary groove-cutter having knives shaped to give approximately the desired form to the groove, and a vertically and transversely adjustable rotary finishing-cutter, substantially as and for the purposes set forth.

5. In a matching-machine, the combination, with a suitable way and feeding devices arranged to move the sections to be grooved on edge along said way, of a groove-cutter and a pair of independently-adjustable scrapers ar-

ranged to smooth the sides of the groove and to clear the angles at its base, substantially as and for the purposes set forth.

6. In a matching-machine, the combination, with a suitable way and feeding devices arranged to move the sections to be grooved on edge along said way, of a groove-cutter and two slides movable independently of each other transversely to said way and provided one with a right and the other with a left hand scraper, substantially as and for the purposes set forth.

7. In a matching-machine, the combination, with a suitable way and feeding devices arranged to move the sections to be grooved on edge along said way, of a groove-cutter, right and left scrapers, each supported in a vertically-movable slide, and horizontally-movable slides carrying said slides, substantially as and for the purposes set forth.

8. In a matching-machine, the combination, with a suitable way and feeding devices arranged to move the sections to be grooved on edge along said way, of a groove-cutter, right and left scrapers, each adjustably held in a vertically-movable slide, horizontally-movable slides carrying said slides, and adjusting-screws arranged to move said slides and accurately adjust said scrapers, substantially as and for the purposes set forth.

9. In a matching-machine, the combination, with a suitable way and feeding devices arranged to move the sections to be grooved along said way, of a pair of grain-cutting disks supported in a yielding spring-actuated slide, a roughing-saw, a groove-cutter, a rotary finishing-cutter provided with teeth having beveled sides, each of said cutters being adjustable transversely to said way, and a right and left scraper supported in independently-movable slides, substantially as and for the purposes set forth.

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

CHARLES J. L. MEYER.

Witnesses:

GEO. H. FRANCIS,
CHAS. OLM.