

No. 757,243.

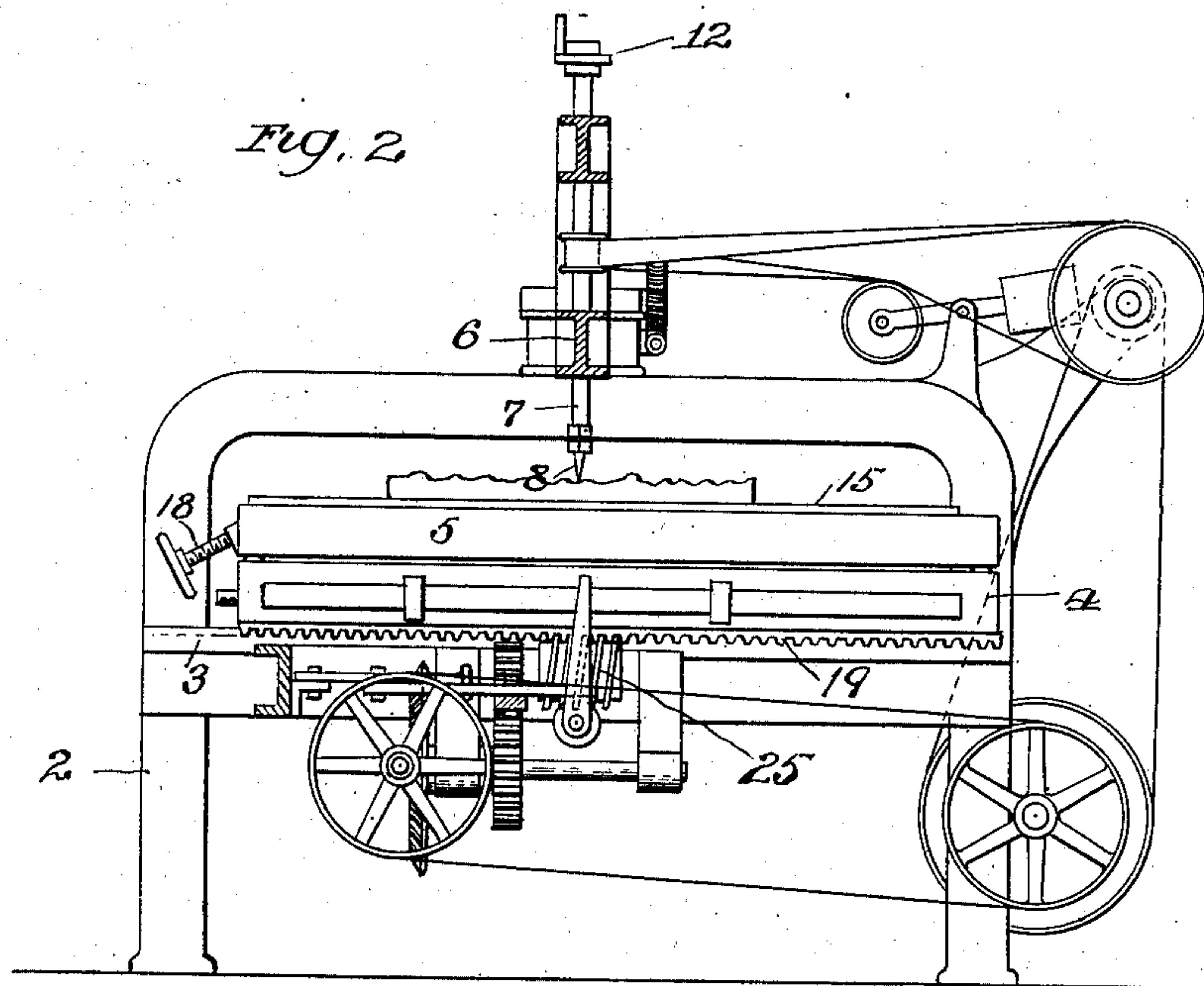
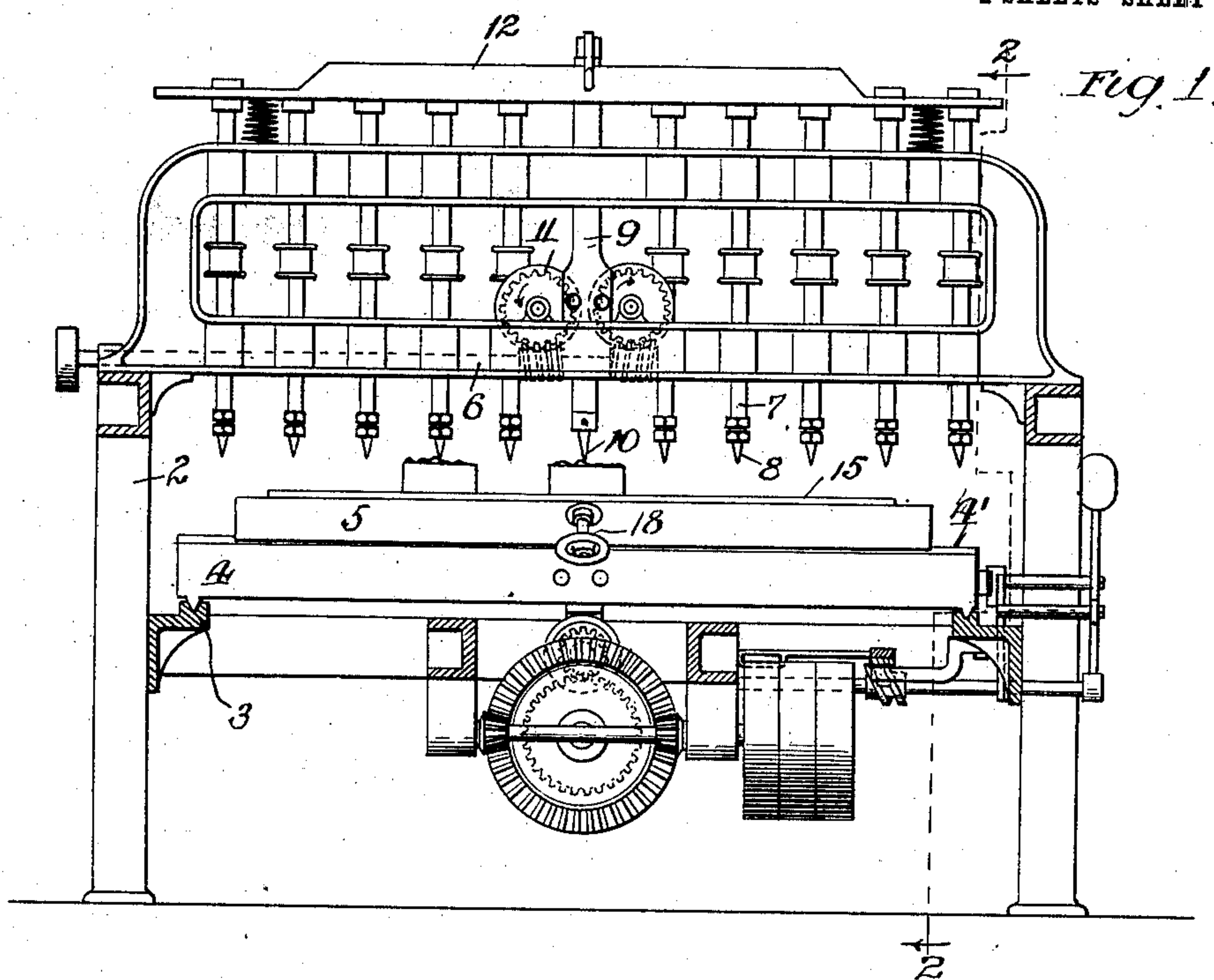
PATENTED APR. 12, 1904.

F. STREICH.
AUTOMATIC CARVING MACHINE.

APPLICATION FILED APR. 24, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
Harold G. Bennett.
J. H. Beckstrom

Inventor:
Frank Streich
By C. Hawley, Atty.

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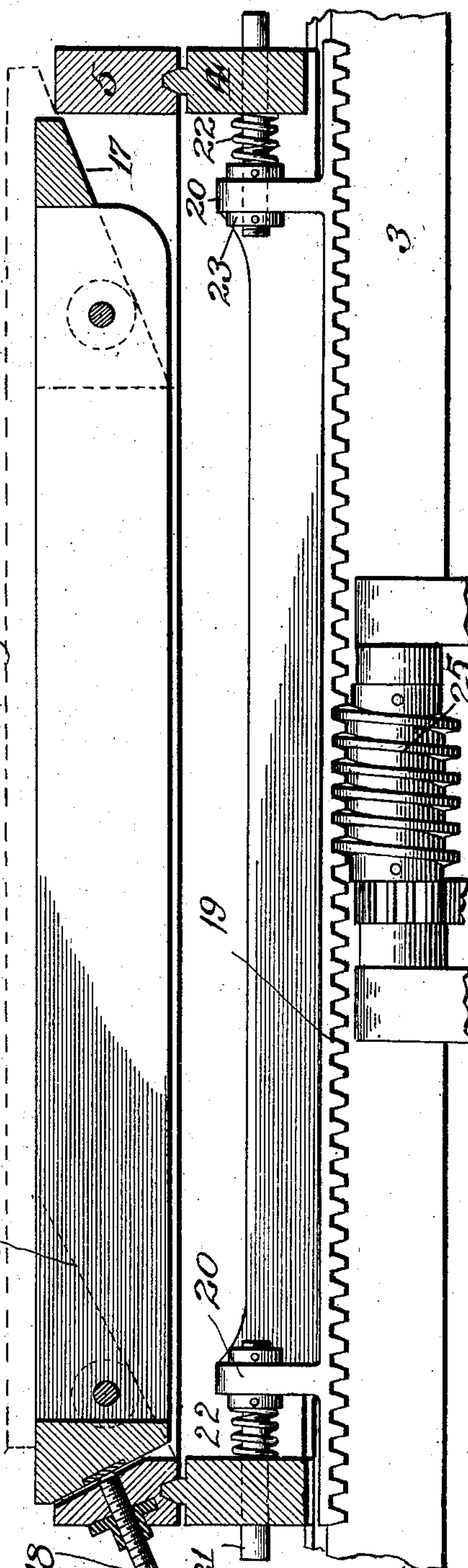
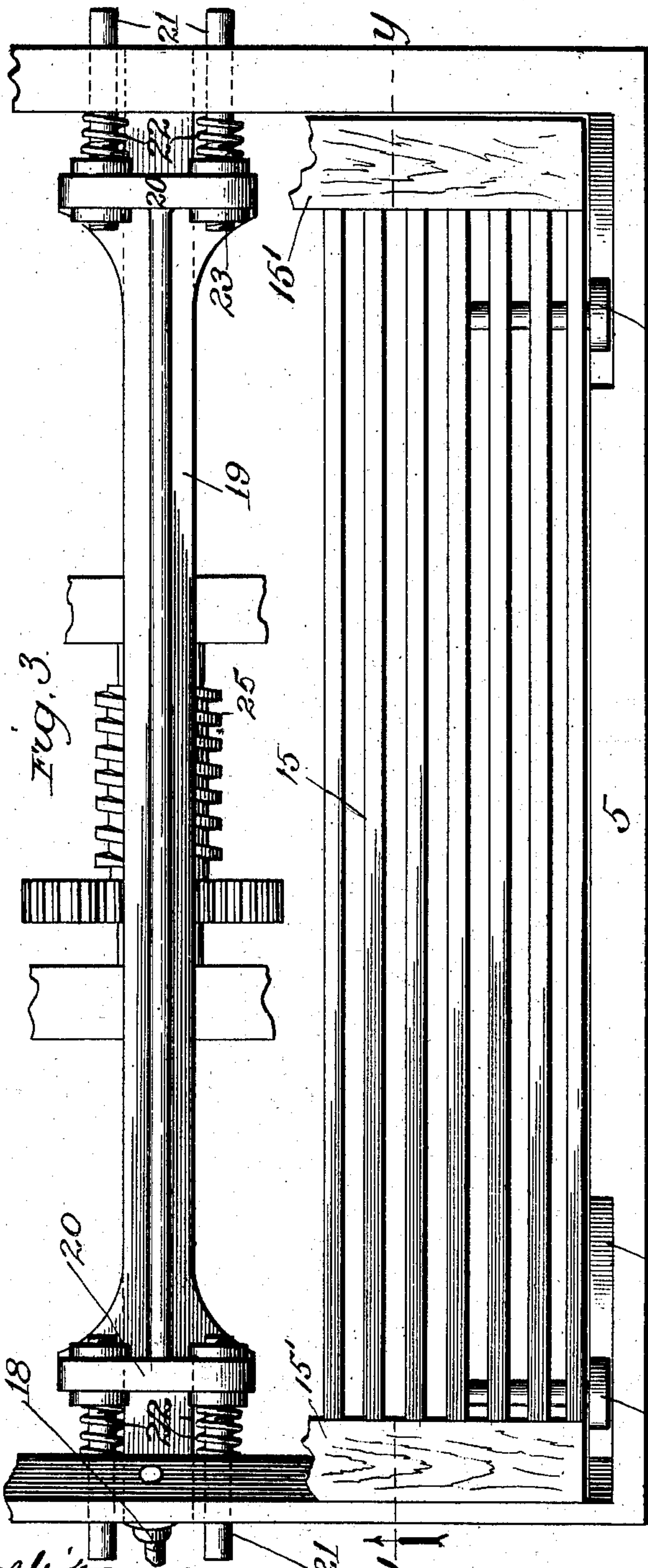
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UNITED STATES PATENT OFFICE.

FRANK STREICH, OF CHICAGO, ILLINOIS, ASSIGNOR TO S. KARPEN & BROS., OF CHICAGO, ILLINOIS, COPARTNERS.

AUTOMATIC CARVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 757,243, dated April 12, 1904.

Application filed April 24, 1902. Serial No. 104,445. (No model.)

To all whom it may concern:

Be it known that I, FRANK STREICH, a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Automatic Carving-Machines, of which the following is a specification.

My invention relates to automatic carving-machines, and has particular reference to carving-machines of the type shown and described in Letters Patent No. 696,382, granted March 25, 1902.

The automatic carving-machines now in use are characterized by heavy vibration and noisiness, and the work of these may be readily distinguished from the work performed by hand-cutters because of its rough and fuzzy surface, requiring considerable labor at the hands of finishers. Again, automatic carving-machines are objected to because of the frequent breaking of the cutting-tools and tracer-points due to delayed action of the tracer-retracting mechanism with respect to the unchanging movement of the work and pattern by the feed-table.

In all automatic carving-machines hitherto devised the work has been fed to or toward the cutting-tools at a uniform speed, the retracting mechanism being depended upon to withdraw the tools and tracer promptly. This I find to be the source of most difficulties met with in the construction and operation of carving-machines. The load of the cutters varies greatly according to the depth of cut and is largely increased when the cutters sink deep into the work. At such times the speed and effectiveness of the cutters are greatly diminished, with the result that the tools chatter violently and often break the wood which is being operated upon and always leave a rough torn surface.

The object of this invention is to provide an automatic carving-machine wherein the feed-table bearing the work and the pattern shall move at a speed that shall correspond to and vary with the depth at which the cutters operate in the work, or, in other words, shall correspond with the relief of the pattern and the angle at which the pattern-surface engages the tracer, whereby when a heavy load is imposed

upon the cutters, as when they cut deep or when the tracer encounters a steep incline or abrupt shoulder in the pattern, the speed of the feed-table shall be diminished or the movement of the table actually stopped to give time for the work of the cutters or for the retraction of the tracer and cutters. A machine so constructed I find to be quite free from vibration, and in addition to avoiding the breaking of tools and tracers I am enabled thereby to produce work which is very much smoother than has ever before been made upon automatic carving-machines. Furthermore, the machine is practically noiseless.

My invention consists generally in an automatic carving-machine comprising one or more cutter-spindles and their cutters and a suitable pattern-tracer, in combination with a feed-table, driving means therefor, and a yielding connection between the table and the driving mechanism, whereby during the operation of the driving mechanism the table speed may be diminished or its movement may be discontinued by the opposition of the cutters or tracer to its movement; and my invention further consists in a feed-table for automatic carving-machines of the construction and combination of parts all as hereinafter described, and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 illustrates a carving-machine embodying my invention. Fig. 2 is a longitudinal section thereof on the line 2 2 of Fig. 1. Fig. 3 is an enlarged plan view of the feed-table, a portion thereof being broken away; and Fig. 4 is a vertical longitudinal section of the feed-table substantially on the line *y y* of Fig. 3.

As shown in the drawings, 2 represents the frame of the machine. This has horizontal guides or ways 3 for the bed portion 4 of the feed-table.

5 is the feed-table proper. The upper portion of the frame 2 is a bridge 6, extending transversely across the table 5 and carrying a plurality of cutter-spindles 7, containing cut-

ters 8. The frame also carries the tracer-bar 9, having the tracer-point 10, and which with the rotary disks 11 constitutes the automatic retracting mechanism. The tracer-bar 9 and the cutter-spindles 7 are connected by the beam 12 for simultaneous movement toward or from the table.

All of the parts 6 to 12, inclusive, constituting the automatic head of the carving-machine, are well shown in the patent aforesaid and do not require extended illustration or description here. It will be observed that the tracer and cutting-tools occupy a plane that is transverse and perpendicular to the feed-table and that the automatic retracting mechanism operates to lift or retract the tracer and the cutters whenever the tracer-point is pressed upon by a prominence of the pattern upon the feed-table. The feed-table proper, 5, comprises the frame and grating and is movable upon the transverse guides or ways 4', provided on the top of the bed portion 4. Suitable means (not shown) are provided for automatically feeding the table transversely at the end of each longitudinal stroke of the table. Within the frame of the table is the grating or top 15, made up of a number of longitudinal bars fastened in end rails or bars 15', the whole structure being preferably of wood. On each side of the grating 15 I provide two rollers or wheels 16, which rest upon inclines 17, provided in the sides of the frame 5, and suitable means, such as the hand-screw 18, are provided for forcing the grating up the inclines 17 to lift the grating or top of the feed-table according to the thickness of the pattern and the work secured thereon. The pieces of wood to be carved into panels and the patterns are bolted upon the grating 15 and as the same is reciprocated will be fed or moved toward the tracer and cutting-tools.

The essential feature of this invention lies in the means for propelling or reciprocating the feed-table at a speed inversely proportionate to the effective opposition of the tracer and cutters to its movement. This means may be of any desired construction so long as a yielding connection is established between the table and some portion of the driving mechanism. I prefer that the yielding connection shall be at a point as near to the table as possible, and therefore in place of the rigid rack-bar usually employed upon the bed portion 4 use the rack-bar 19, that is slidably connected to the portion 4, with springs or cushions 22 interposed between the rack-bar and the bed portion 4 of the feed-table. In detail the rack-bar comprises the bar proper that is of substantially the same length as the part 4 and having on its top the upwardly-extending shoulders 20, in which the pins 21 are secured by screw-threads and the lock-nuts 23 and from which the pins 21 extend through holes or slide-bearings in the ends of the part 4.

The length of the bar between the shoulders 20 is considerably less than the inside dimension of the bed 4, and the springs 22 permit considerable movement of the rack-bar with relation to the feed-table when the feed-table is held against movement upon the machine-frame by the tracer or cutters. The pins 21 have their inner ends threaded. The openings in the shoulders or lugs 20 are likewise threaded to receive the pins. The pins are secured by inside locking-nuts 23 and carry outside nuts, which are adjustable away from the shoulders 20 for the purpose of increasing or decreasing the effective pressure of the springs against the front and back rails of the bed 4, and thus proportion their pressure to the pressure required to occasion the operation of the retracting mechanism. The rack-bar is drawn by the worm 25, fixed in the bearings beneath it and in turn driven by any suitable driving and reversing mechanism, such as that illustrated, whereby the table is reciprocated or fed back and forth. It is obvious that the necessary yielding connection may be made by arranging the worm upon a shaft that is adapted to slide in its bearings with cushions at opposite ends. In this case a rack-bar rigidly secured to the bed would be employed.

The operation of my invention is as follows: Assuming that several pieces of work and a pattern have been secured upon the table or grating and that the table-grating has been adjusted at the proper height by means of the hand-screw 18, the machine will then be set into motion, whereupon the cutters, being driven at a high speed, will operate upon the work, while the feed-table will be moved longitudinally beneath the tracer and cutters. When a prominent portion of the pattern presses against the tracer-point, pressure will be communicated thereby to the retracting mechanism, which will instantly tend to raise the tracer and the cutting-tools. At the same moment and while the driving work of the feed-table is in rotation the tracer-point and the cutters will resist the movement of the table, with the result that the pattern and work secured thereon will move more slowly toward the tracer and cutters or will actually stop in its movement until the tracer mechanism retracts the tracer and tools. Such pause in the movement of the table is permitted by the compression of the springs between the rack-bar and the table, the springs at the forward end of the table being compressed, while the springs at the end that follows will be relieved from pressure. When the movement of the table is reversed for its backward stroke, the opposition of the tracer and tools to the table will become effective upon the opposite pair of springs. After the table has been delayed or stopped in its movement and when it is partially or wholly relieved from the resistance or opposition of the tracer and tools it will

move forward quickly and will be restored to its normal position upon the rack-bar by the expansion of the springs. The speed of the movement of the table may be said to be in
 5 inverse proportion to the opposition of the tracer and cutting-tools or, in other words, to the speed wherewith said parts are retracted and is in direct proportion to the vertical area of the tool-work or load, and this device,
 10 combined with the highly-sensitive retracting mechanism described and claimed in aforesaid patent, enables the building of an automatic carving-machine which is substantially noiseless and free from vibration and which produces work with highly-finished surfaces.

It is obvious that numerous modifications of my invention, such as a frictional connection between the bed and driver, will readily suggest themselves to one skilled in the art, and I
 20 therefore do not confine my invention to the specific construction herein shown and described.

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

25 1. In a carving-machine, the combination of cutting and tracing tools with pattern and work-feeding means, one thereof adapted to yield in the direction of the feed to the opposition of the other, substantially as described.

30 2. In an automatic carving-machine, the combination of cutting and tracing tools and a tracer-retracting mechanism, with a feed-table, the speed of which varies inversely with the lateral pressure of the work and pattern upon
 35 said tools, substantially as described.

3. A carving-machine having a tracer and a cutting-tool arranged for movement together, in combination with a feed-table, driving means therefor and a yielding connection between the said driving means and said table,
 40 permitting the partial or complete stopping of the table by the tracer and tool during the operation of said driving means, substantially as described.

45 4. In an automatic carving-machine, a tracer, a cutting-tool connected therewith, an automatic retracting mechanism, in combination with a feed-table, driving means therefor, a yielding connection between said driving
 50 means and table, said retracting mechanism being operable in proportion to the lateral pressure exerted thereon and said table moving at a speed varying inversely with the resistance of the tracer and tool to the movement of said table, substantially as described.

55 5. In an automatic carving-machine, the combination of a suitable frame with a feed-table movable upon said frame, driving means for said table, a yielding connection between

said driving means and table, a driven cutter, 60 a tracer-bar connected therewith and having a pattern-tracing point, automatic retracting means in connection with said tracer-bar operable in proportion with the lateral pressure that is exerted upon said tracer-point and a 65 pattern provided upon said table to exert a variable pressure upon said point and control the communication of movement to said table by said driving means, substantially as described.

70 6. In an automatic carving-machine a plurality of parallel cutter-spindles and cutting-tools arranged in substantially a single plane, in combination with the pattern-tracer bar parallel with said spindles, connected for simultaneous movement therewith and provided with a tracing-tool, the retracting mechanism operative to automatically retract said tracer-bar and spindles, a feed-table movable in a plane perpendicular to said bar-spindles, a 75 pattern thereon in engagement with said tracing-tool, table-driving means and a yielding connection provided between said table and said driving means, whereby the speed of the movement of said table by said driving means 80 is made inversely variable with respect to the lateral pressure of said pattern upon said tracing-tool, substantially as described.

7. In an automatic carving-machine, the combination of a plurality of cutter-spindles 90 with a pattern-tracer connected with said spindles, a driven retracting device for retracting said tracer and spindles, a feed-table adapted for reciprocation in a plane perpendicular to said tracer and spindles, a pattern provided 95 thereon and engaged with said tracer, table-driving means and means for imparting to said table thereby, movement the speed of which varies inversely with the lateral pressure of the pattern upon said tracer, as and 100 for the purpose specified.

8. An automatic carving-machine, comprising a suitable frame, in combination with a work-cutter and a tracer provided therein, an automatic tracer-retracting mechanism, a feed- 105 table provided with a vertically-adjustable grating for the pattern and work, and the table-driving mechanism yieldingly connected with the table, substantially as and for the purpose specified. 110

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, this 29th day of March, 1902.

FRANK STREICH.

In presence of—

C. E. HAWLEY,

J. W. BECHSTROM.