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PATENTED APR. 12, 1904.

F. STREICH.  
AUTOMATIC CARVING MACHINE.

APPLICATION FILED JAN. 22, 1901.

NO MODEL.

3 SHEETS—SHEET 1.

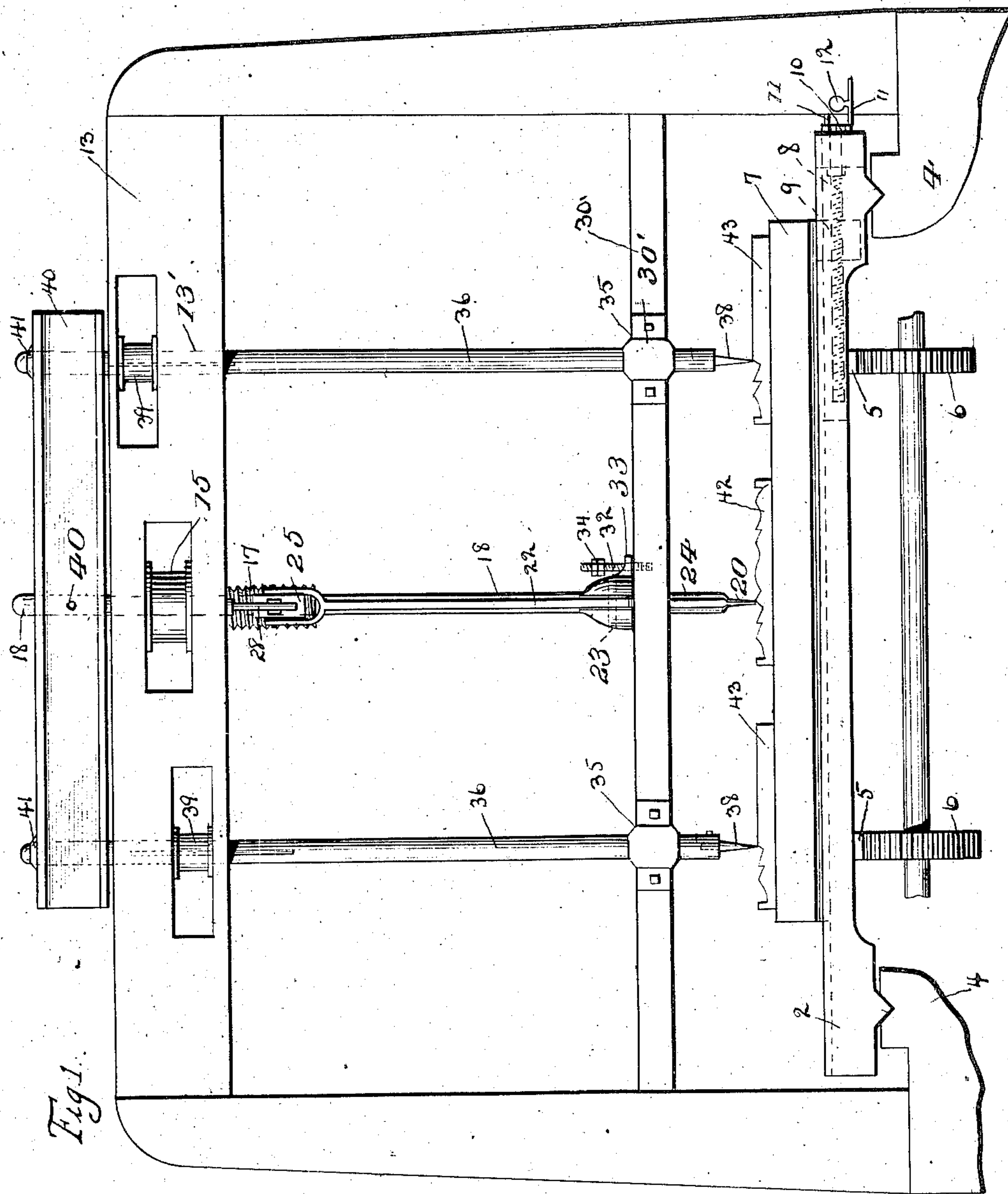


Fig. 1.

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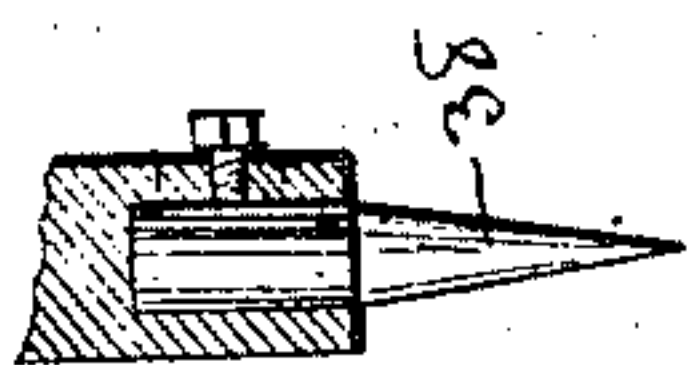


Fig. 10.

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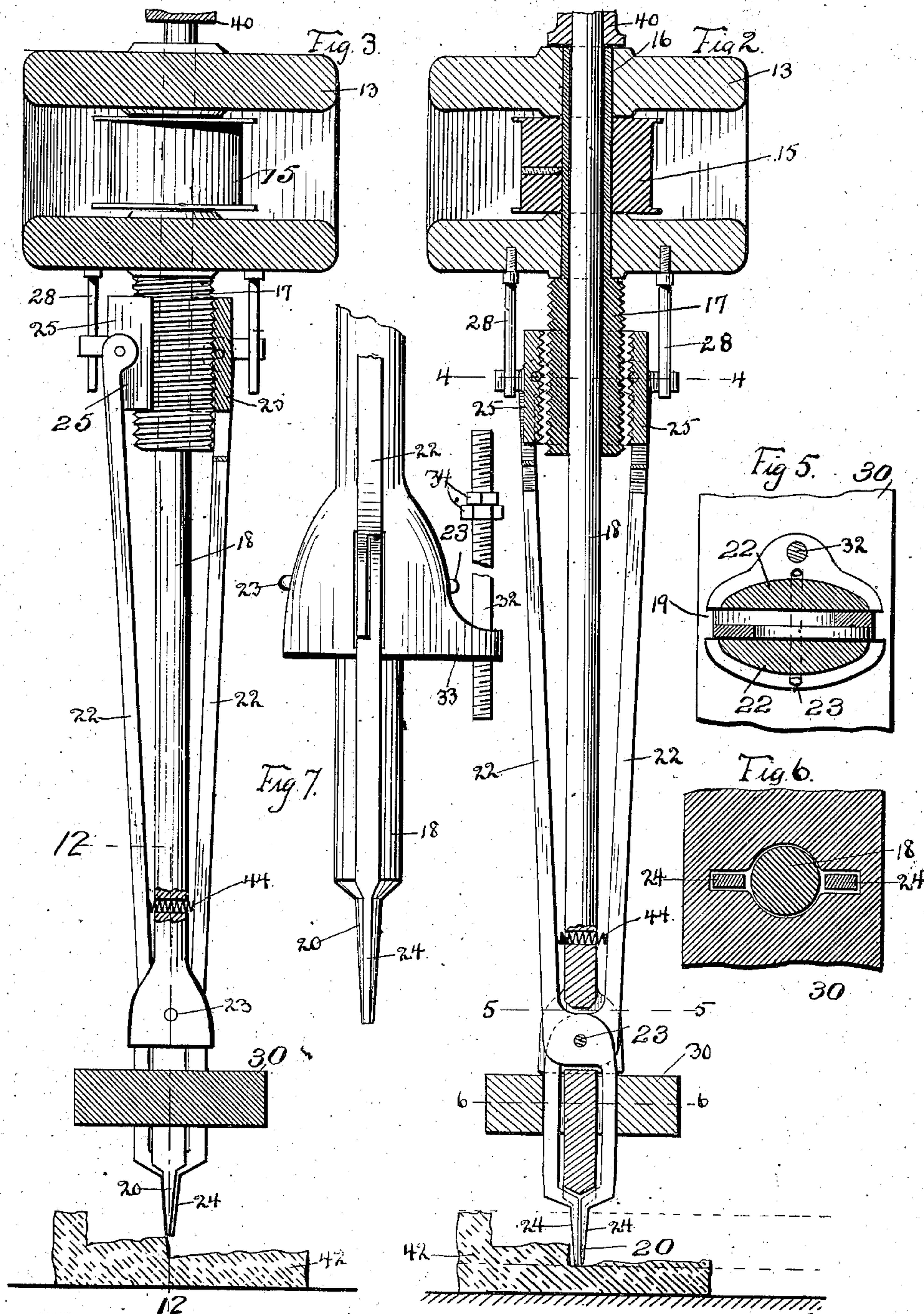
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3 SHEETS—SHEET 2.



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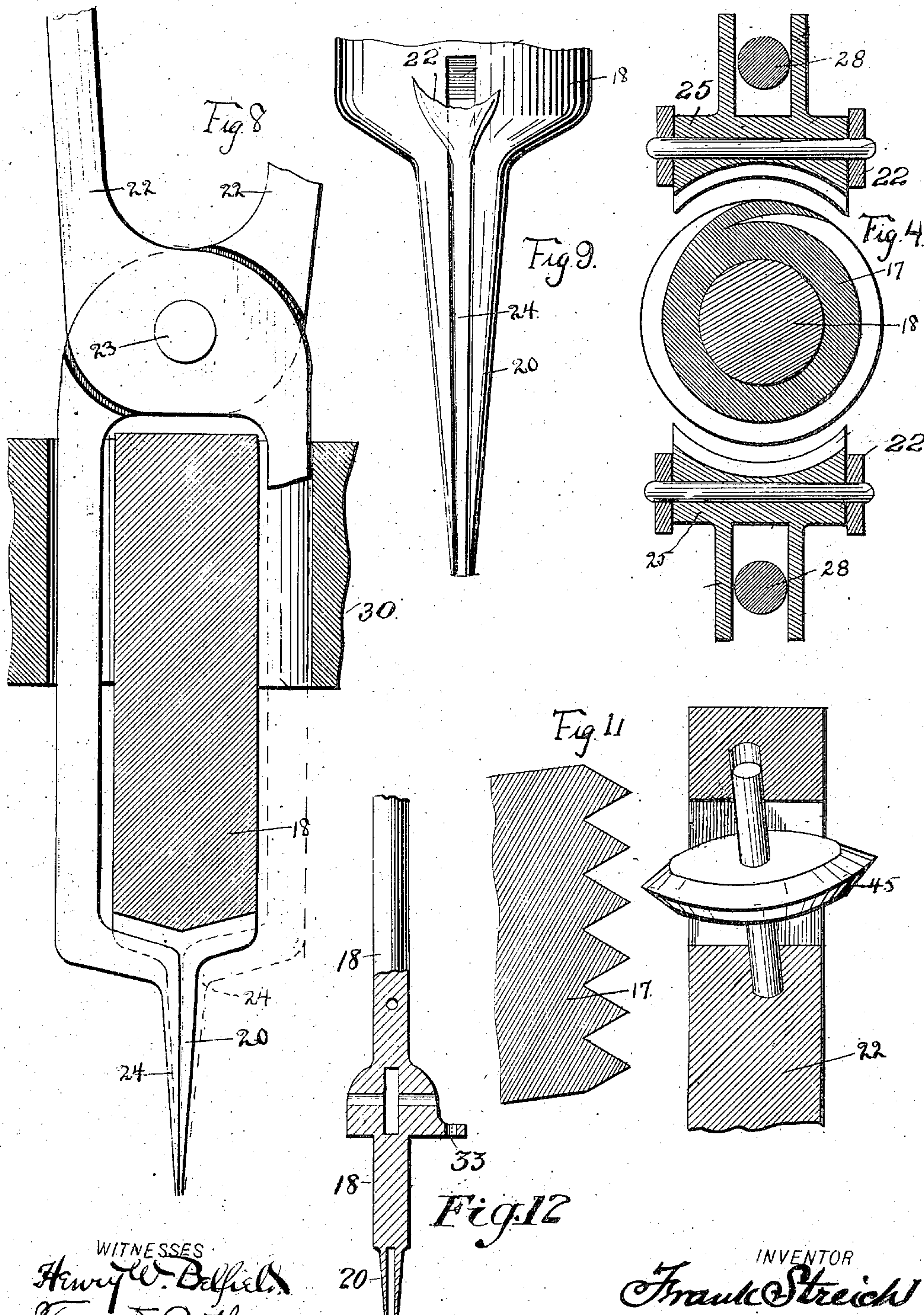
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3 SHEETS—SHEET 3.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

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

## AUTOMATIC CARVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 757,151, dated April 12, 1904.

Application filed January 22, 1901. Serial No. 44,309. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK STREICH, of the city of Chicago, county of Cook, and State of Illinois, have invented a certain new and Improved Automatic Carving-Machine, of which the following is a specification.

My invention relates to automatic machines for carving wooden panels and the like, and the invention relates particularly to the construction of the tracer of an automatic carving-machine, and also consists in the arrangement of said tracer with relation to the cutters.

The object of my invention is to provide a carving-machine wherein the cutters shall be positively operable in one direction by gravity and shall be positively operated in the opposite direction by a powerful lifting device associated with the sensitive pattern-tracer.

A particular object of my invention is to improve the arrangement of the tracer-bar and tracer-point and to provide means that will permit the employment of a tracer-bar having fixed slide-bearings and distinguished from like parts of other machines to the extent that the tracer-bar has no freedom of lateral movement. Experience has proven that a tracer that is adapted to more than mere longitudinal movement in its bearings has a short working life, the wear thereon being rapid and uneven.

Another object of my invention is to provide an absolutely positive tracer-lifting device for carving-machines.

My invention consists generally in an automatic carving-machine of the construction and combination of parts all as hereinafter described, and particularly pointed out in the claims.

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

Figure 1 is a front view of the automatic carving-machine embodying my invention. Fig. 2 is a longitudinal and vertical section of the tracer device. Fig. 3 is a side view thereof, showing the tracer in its raised position. Fig. 4 is a sectional view on the line 4 of Fig. 2. Fig. 5 is a sectional view on the

line 5 5 of Fig. 2. Fig. 6 is a sectional view on the line 6 6 of Fig. 2. Fig. 7 is an enlarged front view of the tracer-point removed from the machine-frame. Fig. 8 is an enlarged detail taken from Fig. 2. Fig. 9 is a still further enlarged detail of the tracer-point. Fig. 10 is a detail of one of the cutting-tools. Fig. 11 shows a modified construction of the tracer-lifting mechanism. Fig. 12 is an enlarged sectional view on the line 12 12 of Fig. 3 with the feeler-levers removed.

As shown in the drawings, 4 represents the machine-frame, the lower part of which is broken away. On this frame I provide a longitudinally-movable bed 2, the parallel V's of which slide in ways provided in the frame 4. This bed may be driven by any suitable means, as by the racks and pinions 5 and 6, the racks being fixed upon the bottom of the bed. Any suitable means (not shown) may be employed for operating the pinion 6 and for causing the reciprocation of the bed and determining the length of the stroke of the bed. The bed 2 carries a feed-table 7, which is adapted to be slowly moved from one side to the other of the feed-table, the mechanism employed preferably comprising a threaded feed-rod 8, operating in a lug 9, depending from the feed-table 7. The feed-rod 8 projects from the side of the bed 2, and on the end of the rod is a star-wheel 10, that is adapted to engage fixed pins 11 upon the frame, by which means partial rotations are periodically imparted to the feed-rod 8 to cause the feed-table to step slowly across the bed. One pin 11 is arranged to engage the top of the star-wheel 10. The other engages the bottom of the star-wheel. The direction of rotation of the feed-rod 8 and star-wheel may be changed by merely inverting the pins 11.

The pattern 42 is fastened upon the top of the feed-table 7, and the work or wooden panels 43 to be carved are also fastened on the table 7. The pattern and work are reciprocated by the bed 2 and are fed transversely to the tracer and cutting-tool by the feed-table. The upper part of the frame 4 is provided with two cross-bars 30 and 13, which contain vertical bearings for the tracer and the cutter



spindles. The tracer and the cutting-tools are arranged perpendicularly to and are adapted for vertical movement with relation to the bed. The cutters or bits 38 are arranged in the lower ends of the spindles 36. These spindles are rotated very rapidly by means of light belts running upon small pulleys 39 39, arranged in the frame part 13 and keyed to the spindles 36, the spindles being adapted for free vertical movement through the driving-pulleys. The upper ends of the spindles 36 pass through a connecting bar or beam 40 and are adapted to be raised thereby by collars or heads 41, provided on the upper ends of the spindles. The automatic lifting of the beam and the cutters is accomplished by means of the tracer-controlled lifting device or mechanism. This comprises a tracer bar or spindle 18, which is vertically slidable through the bars 13 and 30, and the upper end of which spindle or bar is fastened in the beam 18 by a pin or set-screw 40'. The lower end of the spindle 18 has a tapered point 20, that is adapted to ride upon the pattern 42. This tapered point or tracer proper is slotted to receive two feelers or deflectable points 24 24, which normally project somewhat beyond the opposite surfaces of the point 20. The feelers are adapted to be pressed into the slot of the point 20 or tracer by side pressure thereon from the traveling pattern. The movement thus imparted to a feeler 24 is equal to about a thirty-second of an inch, and this small movement is caused to raise the tracer-point 20, and hence the tracer-spindle 18, the cross-beam 40, and the cutter-spindles. The feelers 24 constitute the lower ends of vertical levers 22, having a scissored joint in the lower part of the tracer-bar 18 and pivoted upon a pin 23 therein. The feeler-levers are thus fixed to the spindle or bar 18 and are adapted to rise and fall therewith. The lower ends of the levers which slide through the bearings in the bar 30 prevent the rotation of the spindle.

On the upper ends of the levers 22 I arrange the nut sections or blocks 25, which are guided by pins 28, depending from the frame 13. These nut-sections are adapted to engage the screw 17, which is rotated continuously, and when either section or block 25 is forced against the screw 17 the upwardly-leading thread thereof will lift said block, and thereby raise the spindle and also the beam 40 and the cutters. The blocks or sections 25 are preferably trunnioned in yokes provided upon the upper ends of the levers 22. They are so far removed from the pivots 23 of the levers that the thirty-second-of-an-inch movement of the opposite ends or feelers of said levers will amount to quite a large fraction of an inch at the upper ends of the levers, so that the threads of the screw and blocks may be quite deep, and therefore powerful in action.

A compression-spring 44, extending through the spindle 18, tends to normally separate the points or ends of the levers 22. Thus the

blocks are normally out of engagement with the screw and will always be disengaged therefrom when the feeler-points are free from lateral pressure by the pattern. If the tracer has been lifted by reason of the impact of a shoulder, angle, or projection on the pattern against one of the feeler-points, the corresponding block which has been forced into engagement with the screw will be instantly disengaged therefrom, when the feeler rises above the projection on the pattern, after which the feeler, with its tracers, will instantly descend to the underlying portion of the pattern to follow the same accurately as the pattern progresses beneath the tracer. I employ two feelers 24 in order that the tracer may be similarly affected by pressure from either side, according as the pattern is moving in one direction or the other with the bed of the machine. It is obvious that if the tracer has been lifted and then drops into a narrow groove or hole in the pattern both of the feelers will be forced inwardly and both blocks 25 will engage the rotating screw, with the result that the feeler will be instantly raised before the pressure of the pattern becomes too great thereon, but not until the corresponding cutters have produced a similar hole in the wooden panels that are being carved.

The screw 17 is preferably journaled about the upper part of the non-rotative spindle 18, and the driving-pulley 15 is fixed to the sleeve 16 of the screw 17. This sleeve may have bearings in the frame part 13 instead of bearing upon the spindle 18 as a bearing for the sleeve and screw. Such construction is preferable by reason of the fact that plenty of room may thus be allowed for the spindle within the sleeve and screw, so that the spindle may move up and down freely to raise and lower the beam 40 and the cutters attached to and movable therewith.

It is obvious that the tracer-point will not be lifted any higher than is necessary to avoid the vertical shoulder or projection of the pattern that has been in contact with it—that is, there will be no jerking action upon the tracer that would be apt to throw the same upward to the limit of its motion. I prefer, however, to provide the tracer with a stop, comprising the bolt 32 and stop-nut 34, to engage with a side lug 33 on the tracer-bar. The enlarged or shouldered end of the tracer may form the stop for the downward movement of the cutters, or stops may be provided on the top of the frame and beneath the cross-beam 40.

I prefer to counterbalance the cross-beam 40 and the spindles depending therefrom in order to relieve the lifting-screw from unnecessary weight. The counterbalance employed, however, is of less weight than the beam and the parts attached thereto, so that the beam and the spindles will be instantly returned by gravity after having been lifted.



In place of the sectional nuts or blocks 25, having a plurality of partial threads, I may choose to employ block that are provided with antifriction-rollers 45, adapted to enter the threads of the screw and pitched to correspond with the pitch of said thread. This modification of the machine is illustrated in Fig. 11. It is obvious that when the friction-roller is moved into contact with the screw it will roll upon the pitch-surface of the thread and will tend to raise the block and lever and the tracer-spindle carrying or attached to the same.

The gist of my invention resides in a lifting-screw and the means by which it is made operative to lift the tracer upon the slightest movement of a feeler arranged in the tracing-point.

As it is obvious that various modifications of my invention will readily suggest themselves to any one skilled in the art, I do not confine my invention to the specific constructions herein shown and described.

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

1. In an automatic carving-machine the combination of a traveling bed with a vertically-movable cutter, a vertically-movable tracer connected with said cutter, a lifting-screw, deflectable means provided in said tracer for engagement by the pattern, and a device engaging said screw upon the movement of said deflectable means and thereupon lifting the tracer and cutter, substantially as described.

2. In an automatic carving-machine the combination with a traveling bed and feeding means of a tracer and a plurality of cutting-tools capable of reciprocation, a bar connecting said tracer and tools and whereto the tracer is rigidly connected, and a tracer-lifting screw, automatically operable when said tracer is encountered by the pattern.

3. The pattern-tracing mechanism for automatic carving-machines comprising the tracer-spindle provided with the tracer-feelers, in its point, feeler-levers, a lifting-screw, and means upon said levers for engagement with said screw to lift said spindle and point when a tracer-feeler is subjected to side pressure, substantially as described.

4. In an automatic carving-machine the combination of a traveling bed and a feed-table, with a tracer, a plurality of cutters, a bar connecting said tracer and cutters for positive movement together, the driven-screw feelers in said tracer for operation by the pattern upon said table, and means associated with said feelers for engagement with said screw to lift said tracer and cutters, substantially as described.

5. In an automatic carving-machine the

combination of a traveling bed and feed-table, with a tracer and a plurality of cutters, means for rotating said cutters, means connecting said tracer and cutters for simultaneous movement in the same direction toward and from said feed-table, and a lifting-screw automatically operable to lift said tracer and cutters from engagement of the pattern with said tracer, substantially as described.

6. In an automatic carving-machine the combination of a traveling bed and feed-table, with a pattern-tracer, a plurality of cutters connected with said tracer for movement therewith, pattern-feelers provided in said tracer, and automatically-operable means associated with said feelers and operating to lift said tracer and cutters when the pattern engages either or both of said feelers, substantially as described.

7. In an automatic carving-machine the combination of work and pattern carrying means with cutting-tools and a tracer comprising a point to rest upon the pattern, feelers provided in said point, feeler-levers, a driven screw and screw-engaging means provided upon said levers and operable by said feelers, as and for the purpose specified.

8. In an automatic carving-machine the combination of pattern and work carrying and feeding means with a tracer, a plurality of cutters connected with said tracer for movement therewith, pattern-feelers provided in said tracer and adapted for lateral engagement by the pattern and continuously-operated means rendered operative by the action of one or more of said feelers to retract said tracer and cutters, substantially as described.

9. In an automatic carving-machine, the combination of pattern and work carrying and feeding means, with a plurality of cutter-spindles, a tracer-bar suitably guided and having a tracer-point, means connecting said bar and spindles for simultaneous movement, a feeler or feelers provided in said tracing-point and a retracting device operating automatically to retract said tracer and spindles when a feeler is pressed upon as by a pattern, substantially as described.

10. In an automatic carving-machine, a tracer and tracer-retracting mechanism comprising the tracer bar and point provided with pattern-feelers, a continuously-driven retracting device and connections by which said bar and point are retracted upon the operation of a feeler, substantially as described.

In testimony whereof I have hereunto set my hand this 26th day of December, 1900.

FRANK STREICH.

In presence of—

HENRY W. BELFIELD,  
PAUL KLINE.