(No Model.) 4 Sheets—Sheet 1.

W. LOEFFLER.

CARVING MACHINE.

No. 462,096. Patented Oct. 27, 1891.

Fig. 1.

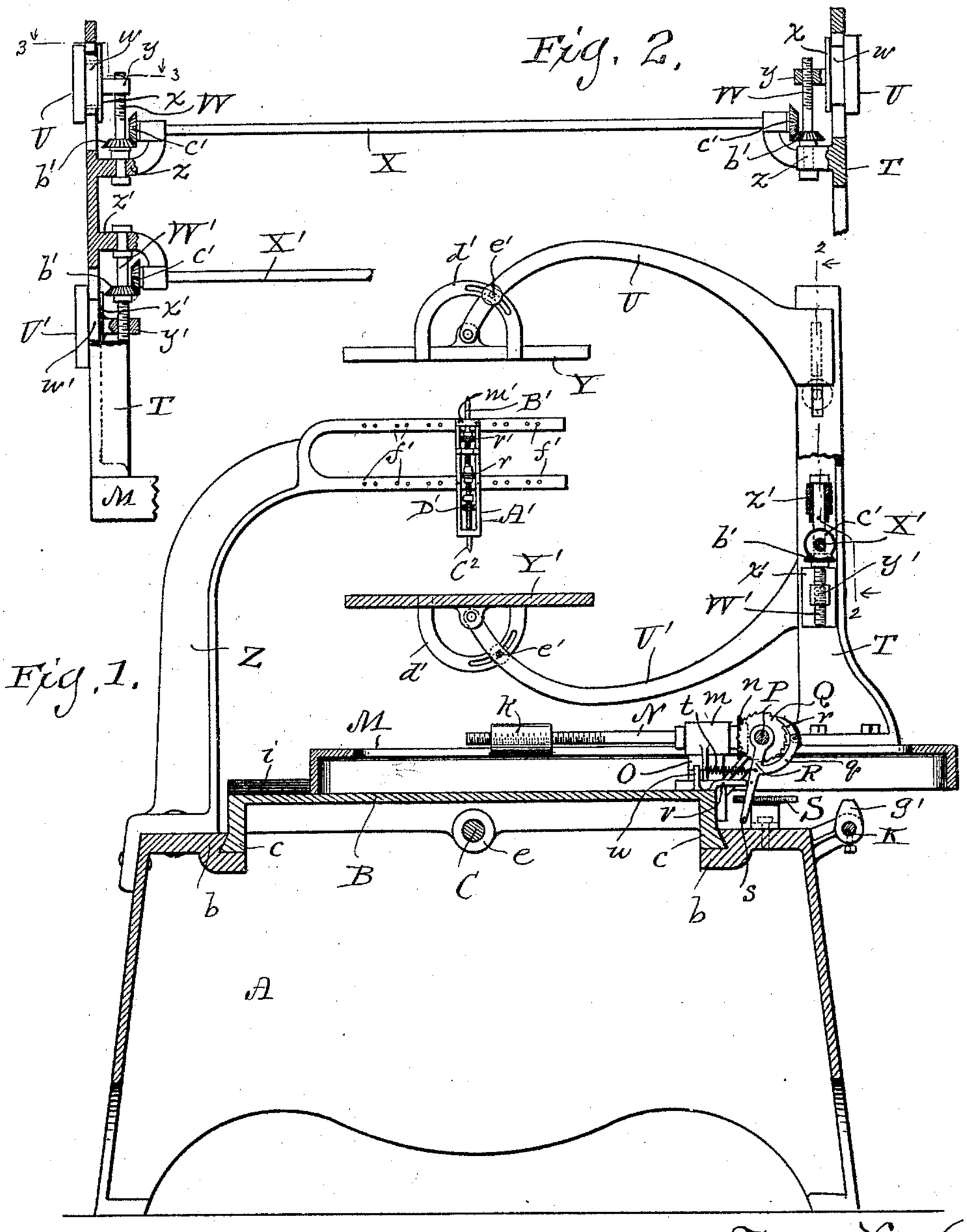
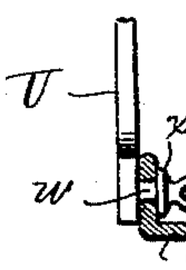


Fig. 2.

Fig. 3.



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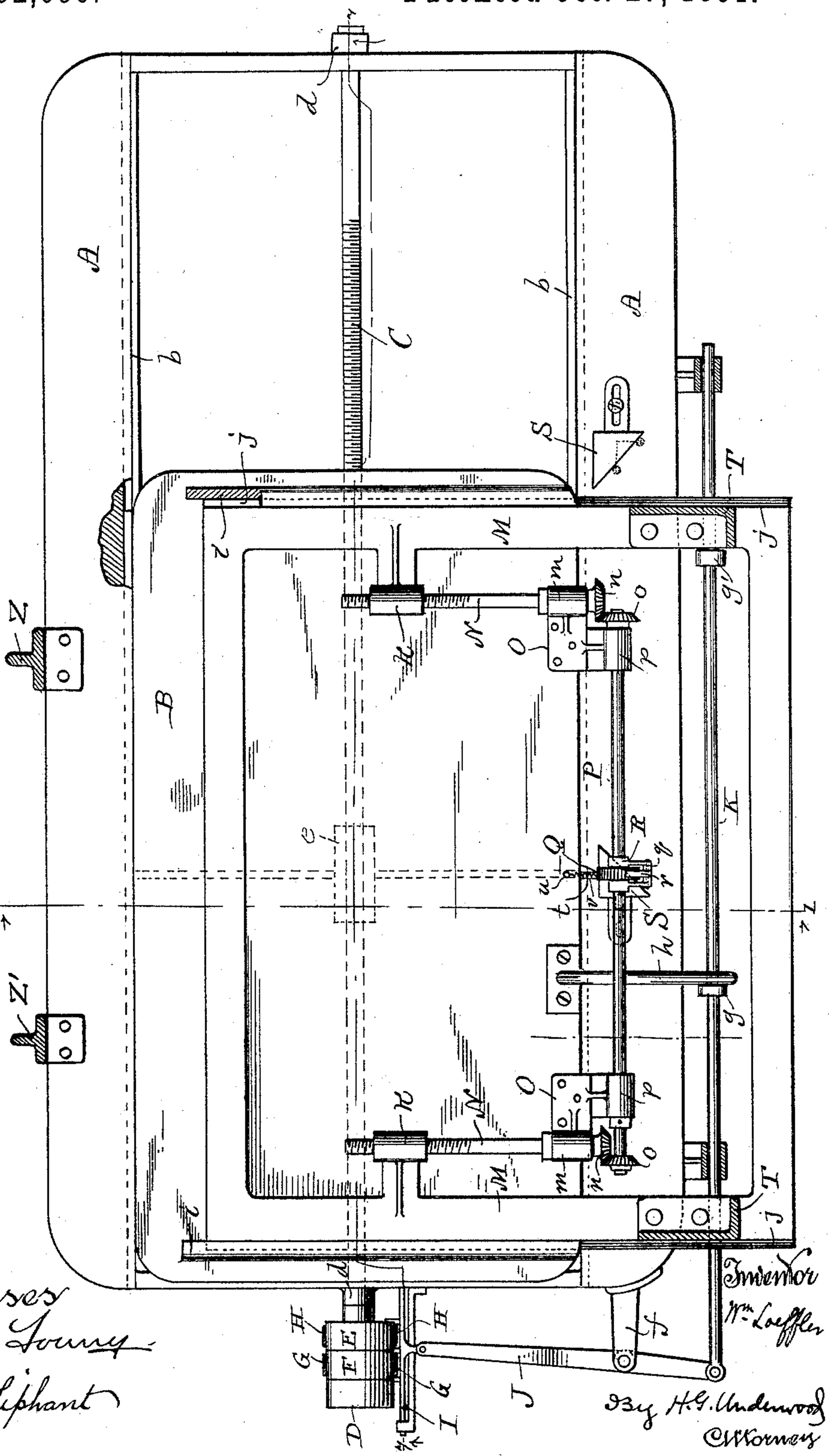

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W. LOEFFLER.

CARVING MACHINE.

No. 462,096.

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Fig. 6.

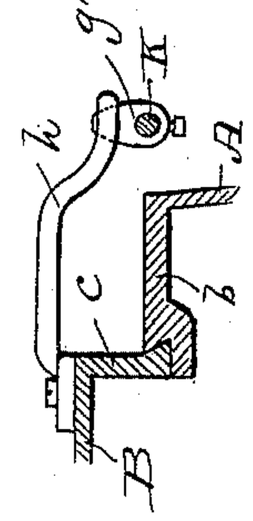
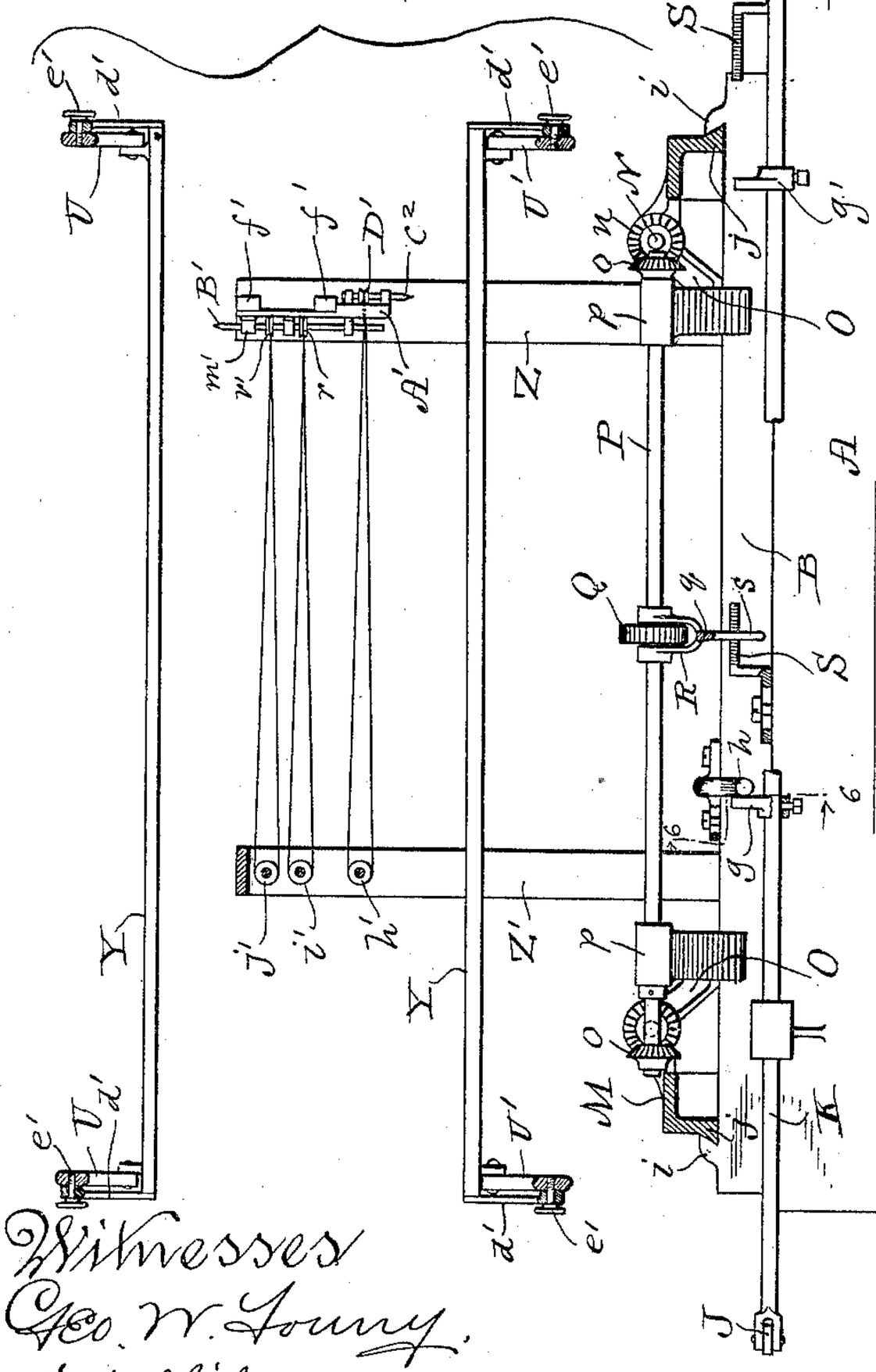


Fig. 5.



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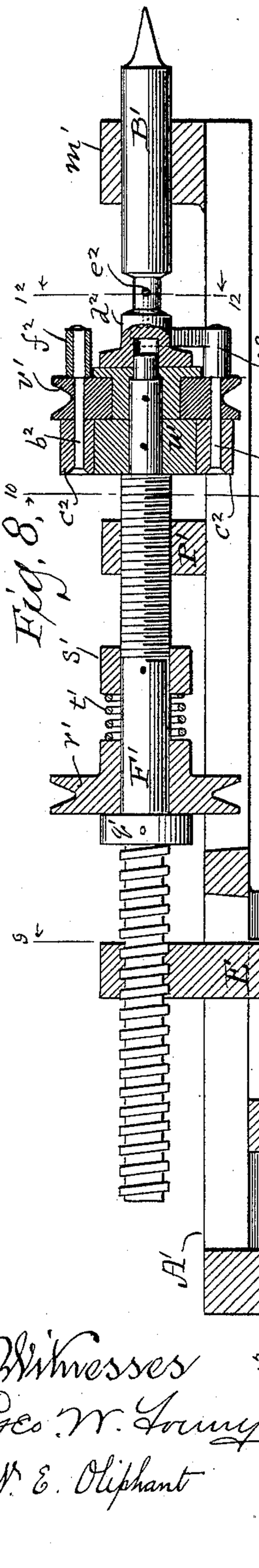

Fig. 8.

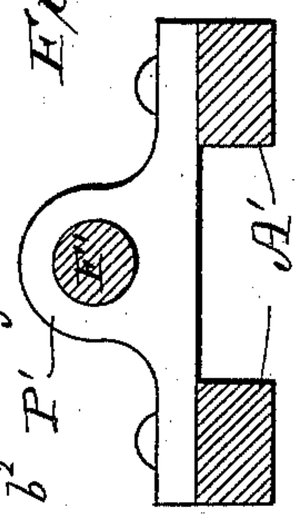

Fig. 11.

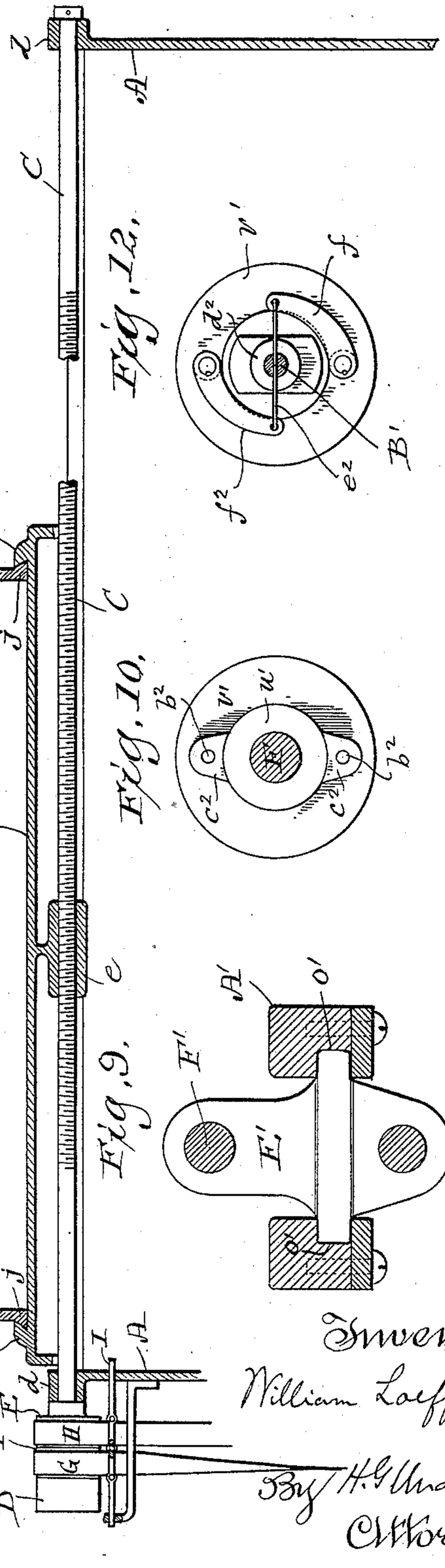

Fig. 7.

Fig. 12.

Fig. 10.

Fig. 9.

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UNITED STATES PATENT OFFICE.

WILLIAM LOEFFLER, OF SHEBOYGAN, WISCONSIN.

CARVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 462,096, dated October 27, 1891.

Application filed June 29, 1891. Serial No. 397,883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LOEFFLER, a citizen of the United States, and a resident of Sheboygan, in the county of Sheboygan, and in the State of Wisconsin, have invented certain new and useful Improvements in Carving-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its objects to provide a carving-machine in which the work will be entirely automatic after the pattern and blank have been placed in position and said machine started, as well as to reproduce a positive of said pattern, so far as rises and indentations are concerned, although said positive will be the reverse of the pattern as regards right and left.

My invention therefore consists in certain peculiarities of construction and combination of parts, to be hereinafter described with reference to the accompanying drawings and subsequently claimed.

In the drawings, Figure 1 represents an elevation of my carving-machine partly in vertical transverse section on line 1 1 of Fig. 4; Fig. 2, a detail elevation, partly in section, on line 2 2 of the preceding figure; Fig. 3, a horizontal section on line 3 3 of Fig. 2; Fig. 4, a plan view of the machine with parts in horizontal section; Fig. 5, a side elevation partly in section; Fig. 6, a detail section on line 6 6 of the preceding figure; Fig. 7, a detail vertical transverse section taken on line 7 7 of Fig. 4; Fig. 8, a vertical transverse section of a tracing and carving device forming part of my invention; and Figs. 9 to 12, inclusive, horizontal sections respectively taken on lines 9 9, 10, 11, and 12 12 of Fig. 8.

Referring by letter to the drawings, A represents the main frame of my machine, the upper longitudinal edge of this main frame being in the form of inwardly-extended and dovetailed flanges *b*, that serve as guides for vertically-depending dovetailed flanges *c* of a table B, that is reciprocated in a longitudinal direction by the means to be hereinafter described.

The ends of the main frame A are provided with bearings *d* for a shaft C, and the latter is screw-threaded for a portion of its length to engage a correspondingly-threaded sleeve *e*, that depends from the center of the table B, as best illustrated in Fig. 7.

Fast on one end of the shaft C are two pulleys D E, and interposed between these pulleys is a loose pulley F, all of these pulleys being employed in connection with two belts G H, that are controlled by a shifter-rod I, the latter being arranged in suitable guides and connected to one end of a lever J, that is fulcrumed on a bracket *f*, extending from the main frame, the other end of the lever being joined to a slide-rod K, arranged in bearings on one side of said main frame. The sliding rod K is provided with collars *g g'*, and opposed to these collars is a finger *h*, fast on the table B, said collars being so positioned that when this table reaches its limit of travel in either direction the belts G H will be automatically shifted to cause a reverse rotation of the screw-threaded shaft C and a consequent reverse travel of said table, it being understood that one of said belts is straight and the other crossed.

Referring particularly to Figs. 4 and 7, it will be seen that the belt G is on the loose pulley F and the belt H on the tight pulley E. Consequently the table B is moving toward the right and will continue this movement until its finger *h*, acting against the collar *g'* on the rod K, causes the latter to move in its bearings and thereby effect a throw of the lever J and shifter I to thereby bring the first belt on the tight pulley D and the second belt on said loose pulley. The shaft C being reversed as to rotation by the shift of the belts, the table B is caused to move toward the left until its finger *h* comes against the collar *g* on the rod K to again shift said belts. The table B is provided on its upper side with transverse dovetailed guides *i* for corresponding flanges *j* on a skeleton frame M, the latter being provided with screw-threaded sleeves *k* for engagement with transverse screw-threaded shafts N, that turn free in bearings *m*, forming parts of brackets O, fast on the table B, and rigidly secured to these shafts are bevel gear-wheels *n*, that mesh with like wheels *o* on a shaft P, the latter being arranged in bearings *p*, also forming parts of said brackets.

Fast on shaft P is a ratchet-wheel Q, and loose on said shaft is a yoke R, having an arm *q*, to which is pivoted a spring-controlled pawl *r*, the latter being in engagement with the ratchet-wheel. Depending from the yoke R is a finger *s*, connected by a spiral spring *t* with an ear *u* on the table B, and the latter is also provided with a stop *v*, opposed to the yoke-finger.

Adjustably secured to the main frame are wedges S in the path of the finger *s* of the yoke R, and the arrangement of these wedges is such that during the time the belts G H are being shifted said yoke is swung (as on a pivot) against the resistance of the spring *t*, and thus the pawl *r* is caused to rotate the ratchet-wheel Q, thereby imparting a partial rotation to the shafts P N and causing the skeleton frame M to move a certain distance in a direction transverse of the table B, this distance being predetermined by the adjustment of said wedges. This operation being completed, the contraction of the spring *t* returns the yoke R to its normal position, the movement being limited by the stop *v*, above described.

Fast on the skeleton frame M, at one side of the same, are standards T, provided with vertical slots for engagement with lugs *w w'*, extended at right angles to arms U U', and bolted or otherwise rigidly secured to the lugs are face-plates *x x'*, provided with screw-threaded eyes *y y'*, that engage corresponding rods W W', that have loose bearings in brackets *z z'* on said standards and carry bevel gear-wheels *b'* in mesh with like wheels *c'* on shafts X X', the latter being also loose in bearings on said brackets. By turning the shafts X X' the rods W W' will be rotated to thus effect a vertical adjustment of the arms U U' in either direction.

Pivoted to those ends of the arms U U' farthest from the standards T are plates Y Y', to which the pattern and blank are to be secured by any suitable means, and each of these plates is provided with a slotted segment *d'*, that is adjustably secured to the adjacent arm by means of a set-screw *e'*, whereby said plates may be arranged to stand at various angles.

Bolted or otherwise suitably secured to the main frame A on that side of the machine opposite the standards T are other standards Z Z', the first of which has a bifurcated inwardly-extended upper end. Detachably secured to the furcations *f'* of the standard Z are one or more tools, to be hereinafter more fully described with particular reference to Figs. 8 to 12, inclusive. The upper end of the standard Z' is provided with bearings for spindles that carry pulleys *h' i' j'*, and these spindles are driven by any suitable means—such, for instance, as a belt-and-pulley mechanism. (Not shown.)

Each of the tools of which mention has been made in the foregoing consists of a frame A', having perforations at suitable intervals for the bolts by which it is detachably connected to the furcations *f'* of the standards Z, and said frame is provided at one end with a guide *m'* for a tracer B', while at the opposite end there is another guide *n'* for the shank C' of the cutting-point C^2, the latter being detachable and of various forms, as the character of the work may require. The shank C' of the cutting-point carries a pulley D' fast thereon and has a bearing in the cross-head E', that works in vertical guides *o'* on the frame A', this cross-head being provided with a screw-threaded perforation for engagement with the coarser of differential threads on a vertical spindle F', the finer of these differential threads being engaged by a stationary nut *p'* on said frame.

Loose on the spindle F', against the collar *q'* fast thereon, is a pulley *r'*, and contracted between the latter and another collar *s'*, fast on said spindle, is a spiral-spring *t'*, these latter parts being above the coarser of the differential threads above described.

Fast on the upper end of the spindle F' is a two-part hub *u'*, the upper part of this hub being reduced and flanged in order to enter the bore of a pulley *v'* and hold the latter in place against the lower part of said hub. The pulley *v'* is normally loose on the two-part hub, and fast on stems b^2, that are loose in said pulley, are friction-blocks c^2, opposed to said hub. The upper end of the spindle F loosely engages a socket d^2 at the lower end of the tracer B', and passed through an eye in a reduced portion of said tracer is a cord or other flexible device e^2, that has its ends secured to cranks f^2, fast on the stems b^2 of the friction-blocks above described.

The construction and arrangement of parts at the upper end of the spindle F' form a clutch that is considered best adapted to my purpose; but it is possible that various other clutches may be employed without departure from the spirit of my invention.

The pulleys D' *r' v'* are belted to the pulleys *h' i' j'*, above described, and it is intended that the belt on the pulleys *i' r'* shall be so arranged as to run these pulleys in a direction opposite to the ones *j' v'* for the purpose hereinafter described.

The differential threads on the spindle F' are as one to two, and consequently when said spindle is rotated the tracer and cutting-point will move to or from each other at the same rate of speed. In other words, the travel of the spindle in the stationary nut *p'* on the frame A' is compensated for by the coarser thread working in the cross-head that carries the shank of the cutting-point. Assuming that a pattern and blank are positioned in opposition to the tracer and cutting-point, there will be no vertical movement of the spindle so long as said tracer is moving on a plane surface, this being due to the fact that the pressure of the spring *t'* on the pulley *r'*

is equalized by the pressure of the socket end of said tracer on the opposing hub u'. Consequently there is no grip of the friction-clutch, and the pulley v', as well as said pulley r', runs loose. If the tracer follows a rise on the pattern, the pressure of the spring t' will be overcome by the pressure of the socket end of said tracer on the hub u', and while the pulley r' is running loose on the spindle the friction-clutch will be locked by the rotation of the pulley v', and thus by continued rotation of the latter pulley in clutch with said hub the spindle F will be caused to run down, whereby the cutting-point is drawn upward in proportion to the descent of said tracer and a corresponding rise is cut on the blank, it being understood that said cutting-point has a rotation of its own. If, on the other hand, the tracer is following a depression in the pattern, there will be no pressure of the socket end of said tracer on the adjacent hub u', and consequently the grip of the friction-clutch will be overcome, and while the pulley v' is running loose the pressure of the spring t' on the pulley r' will force the latter tight against the collar q', and thus the spindle will run up to thereby cause a descent of the cutting-point in proportion to the upward movement of said tracer, whereby a depression will be cut in the blank.

The tool or tools being stationary and the table B reciprocative in a longitudinal direction, the cutting is done in straight lines, the frame M being automatically moved at right angles to said table at certain intervals to change the line of cut. Where a large number of the tools is employed a given surface may be more quickly carved than when a less number of said tools is in use; and therefore, while I have only shown one tool in its working position, provision is made for several, as specified in the foregoing.

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

1. In a carving-machine, a tool consisting of a frame, a tracer reciprocative in the frame, and a rotative cutting-point having a reciprocation in said frame relative to that of the tracer, substantially as set forth.

2. In a carving-machine, a tool consisting of a frame having a stationary nut, a differentially-threaded spindle having one gage of thread engaging the nut, a cross-head arranged to slide on the frame and engage the other gage of spindle-thread, a rotative cutter having a shank journaled in the cross-head, a spring-controlled pulley loose on the spindle in opposition to a rigid collar, a friction-clutch having a portion thereof fast on said spindle, a tracer normally loose on the aforesaid spindle in opposition to said portion of the clutch, and suitable means for connecting the other portion of said friction-clutch with the tracer, substantially as set forth.

3. In a carving-machine, a tool consisting of a frame having a stationary nut, a differentially-threaded spindle having one gage of thread engaging the nut, a cross-head arranged to slide on the frame and engage the other gage of spindle-thread, a rotative cutter having a shank journaled in the cross-head, a spring-controlled pulley loose on the spindle in opposition to a rigid collar, a hub fast on said spindle, a pulley loose on the hub, cranked stems passed through the latter pulley, friction-blocks fast on the stems in opposition to said hub, a tracer having a socket loosely engaging the aforesaid spindle to also oppose the aforesaid hub, and a flexible device passed through the tracer and connected at its ends to the stem-cranks, substantially as set forth.

4. In a carving-machine, the combination of a table automatically reciprocative in a longitudinal direction, pattern and blank supports carried thereon, and a tool consisting of a stationary frame, a tracer reciprocative in the frame, and a rotative cutting-point having a reciprocation in said frame relative to that of the tracer, substantially as set forth.

5. In a carving-machine, the combination of a table automatically reciprocative in a longitudinal direction, a skeleton frame transversely adjustable on the table, pattern and blank supports mounted on the frame, and a tool consisting of a stationary frame, a tracer reciprocative therein, and a rotary cutting-point having a reciprocation in the latter frame relative to that of the tracer, substantially as set forth.

6. In a carving-machine, the combination of a table automatically reciprocative in a longitudinal direction, a tracing and cutting tool, and pivotally-adjustable pattern and blank supports carried with the table in opposition to the tool, substantially as set forth.

7. In a carving-machine, the combination of a table automatically reciprocative in a longitudinal direction, a tracing and cutting tool, and vertically-adjustable pattern and blank supports carried with the table in opposition to the tool, substantially as set forth.

8. In a carving-machine, the combination of a table automatically reciprocative in a longitudinal direction, a tracing and cutting tool, and vertically and pivotally adjustable pattern and blank supports carried with the table in opposition to the tool, substantially as set forth.

9. In a carving-machine, the combination of a table automatically reciprocative in a longitudinal direction, a pattern and blank carrying mechanism automatically adjustable on the table at predetermined intervals in a transverse direction, and a tracing and cutting tool arranged to oppose the pattern and blank, substantially as set forth.

10. In a carving-machine, the combination of a table automatically reciprocative in a longitudinal direction, a frame automatically

adjustable on the table at predetermined intervals in a transverse direction, vertically and pivotally adjustable pattern and blank supports mounted on the frame, and a tracing and cutting tool arranged to oppose the pattern and blank, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Winona, in the county of Winona and State of Minnesota, in the presence of two witnesses.

WILLIAM LOEFFLER.

Witnesses:
PH. FEITEN,
EDWARD LEES.