No. 757,152.

PATENTED APR. 12, 1904.

F. STREICH & C. L. RUEHS.

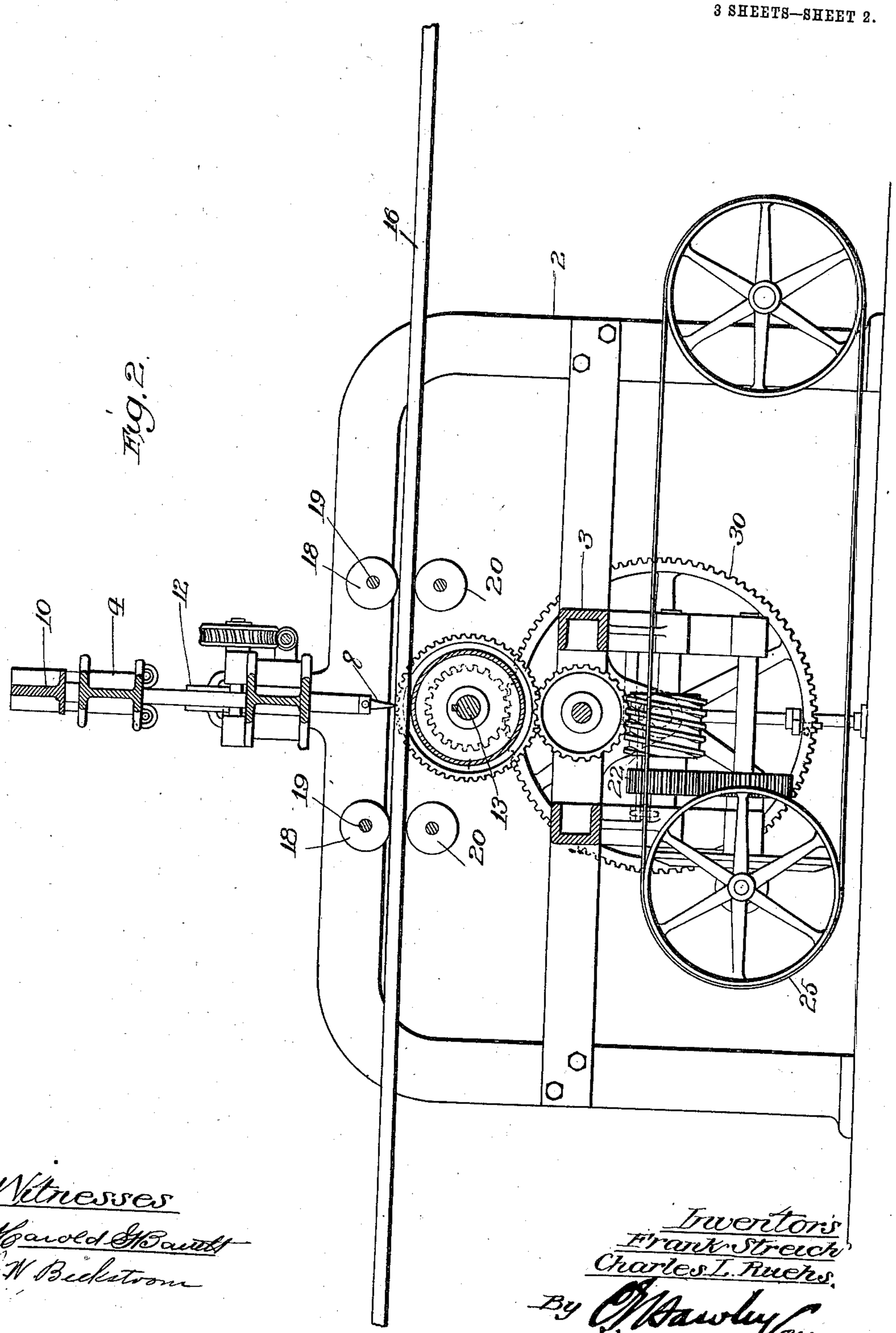
AUTOMATIC CARVING MACHINE.

APPLICATION FILED JAN. 10, 1902.

NO MODEL.

3 SHEETS—SHEET 2.

Fig. 2.



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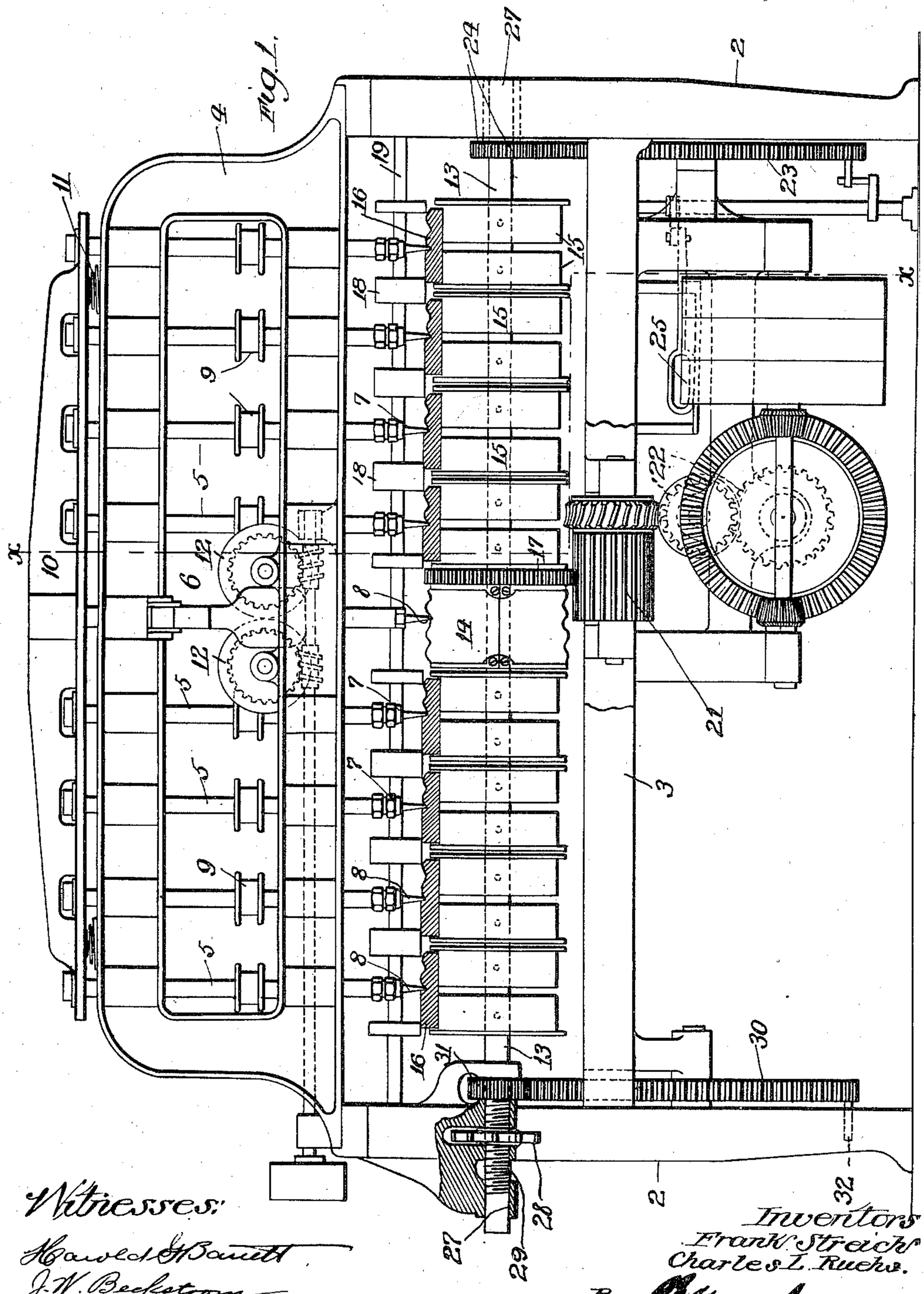
NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 4

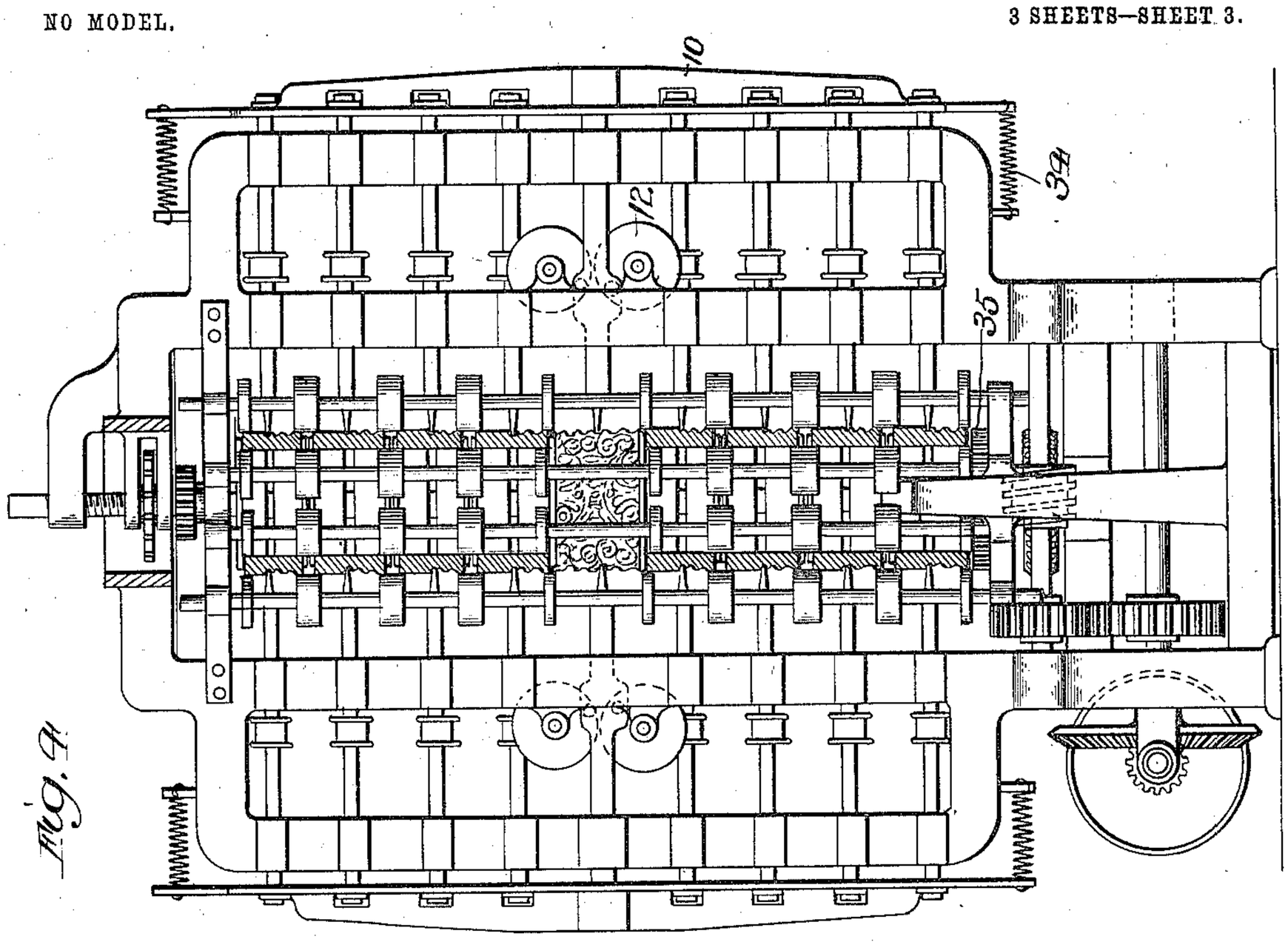
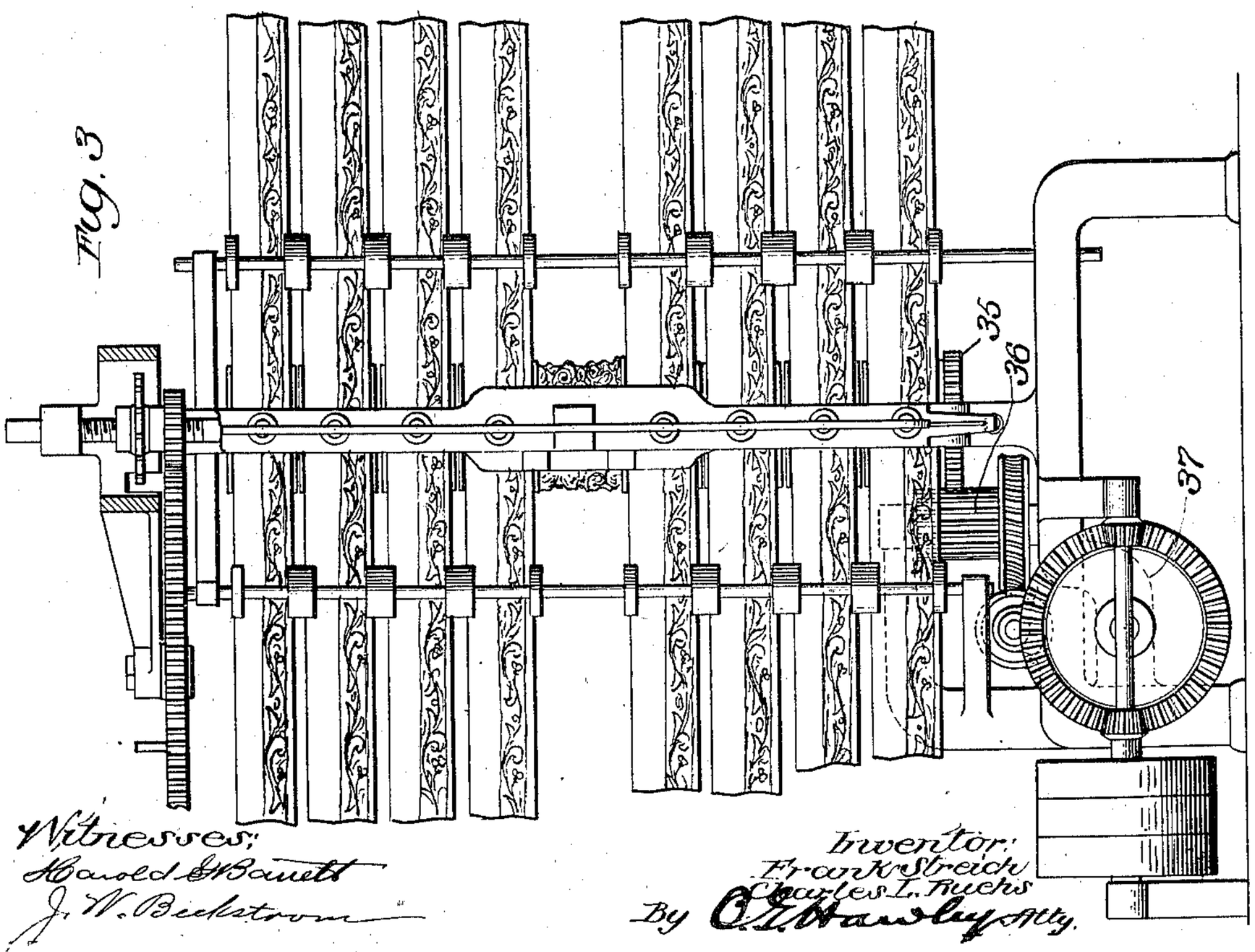


Fig. 3



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No. 757,152. Patented April 12, 1904.

UNITED STATES PATENT OFFICE.

FRANK STREICH AND CHARLES L. RUEHS, OF CHICAGO, ILLINOIS, ASSIGNORS TO S. KARPEN & BROS., OF CHICAGO, ILLINOIS, A CO-PARTNERSHIP.

AUTOMATIC CARVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 757,152, dated April 12, 1904.

Application filed January 10, 1902. Serial No. 89,203. (No model.)

To all whom it may concern:

Be it known that we, FRANK STREICH and CHARLES L. RUEHS, citizens of the United States, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Automatic Carving-Machines, of which the following is a specification.

This invention relates to automatic carving-machines, and has particular reference to automatic machines for carving moldings as distinguished from panels. Its object is to produce a number of repeated carvings or moldings from any given relief or intaglio pattern with accuracy and rapidity and at less cost than has been possible heretofore.

This invention has particular reference to improvements upon the automatic carving-machines described and claimed in our application for United States Letters Patent, filed November 20, 1901, Serial No. 82,971, which machine was constructed and adapted for carving panels and cylindrical objects of short or determined length and differs from the foregoing in the construction and arrangement of the pattern and of those parts of the machine designed to carry the pattern and the several pieces of work beneath the cutting-tools.

The invention consists generally in an automatic carving-machine provided with a pattern-tracer, a retracting mechanism therefor, and a plurality of cutting-tools connected with the tracer, and thereby controlled as to depth of cut in the work, in combination with a rotary pattern and a work carrying and feeding mechanism adapted for reciprocating long pieces of work, such as molding-strips, whereby a relatively short pattern-surface is reproduced in series upon the molding-strips.

The invention consists particularly in a rotary pattern and work feeding mechanism of novel construction and arrangement and adapting the automatic carving-machine for the production of picture-moldings and the like in long lengths or strips.

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 an illustration of an automatic molding-carving machine embodying our invention. Fig. 2 is a vertical section thereof substantially on the line *x x* of Fig. 1. Fig. 3 illustrates the vertical form of the machine wherein the rotary feeding and work-carrying mechanism is arranged in a vertical plane. Fig. 4 is an end view taken from Fig. 3.

As shown in the drawings, 2 2 represent side frames connected between their lower parts by the cross-beams 3 3 and at the top by the tool-head 4. This tool-head contains a plurality of cutter-spindles 5 5 and the tracer 6.

7 7 represent the tools, and 8 represents the tracer-point.

The spindles are driven by belts, (not shown,) which run over the small pulleys 9 thereof, and the spindles and the tracer 6 are all freely slidable in the bearings provided therefor in the head 4—that is, they are adapted to rise and fall—and are connected by a cross-bar 10, which extends in opposite directions from the upper end of the tracer 6 and wherein the upper ends of the spindles 5 are journaled. The downward motion of the bar 10 and the parts depending therefrom (tracer and cutters) is cushioned by springs 11, provided on top of the head 4. The head 4 also carries a retracting mechanism, of which the disks 12 12 are the principal members, said retracting mechanism being adapted to raise the bar 10 and all of the cutter-spindles whenever lateral pressure is exerted upon the tracer-point 8. The cutting-tools and the tracer are arranged at equal distances, and directly beneath the same is the work carrying and feeding shaft 13, at the middle of which is the pattern 14. This pattern is generally of cylindrical form, and its surface bears the design which is to be reproduced in the several pieces of work by the cutting-tools. The shaft carries as many pairs of flanged pulleys 15 as there are cutter-spindles. These are adjustable upon the shaft in order to accommodate different widths of molding 16. The flanges thereof guide the

molding-strips. They are secured to the shaft by the set-screws after being adjusted. The pattern 14 is carried by similar pulleys, except that one of the pulleys is provided with a gear 17 for driving the pattern and therewith the shaft 13 and all of the pulleys 15. It is preferable to make the pattern in two or more sections, as shown, which may be easily fastened to the pulleys upon the shaft. The pulleys 15 have preferably rubber faces or tires. The strips of molding are held down upon the pulleys 15 by the auxiliary work holders or carriers, comprising rubber-faced pressure-rolls 18, provided upon the two cross-shafts 19, one on the front and one on the back of the machine. The strips of molding are likewise supported from beneath by rolls 20, which, however, need not be rubber-faced. It is obvious that when the shaft 13 is rotated the strips of molding 16 will be fed longitudinally beneath the cutting-tools. For thus rotating the shaft 13, with the pattern and the work-carrying pulleys 15, we arrange the gear 17 in mesh with a long gear-pinion 21, which is driven by a gear mechanism 22, arranged beneath it, depending from the beams 3. This gear mechanism is made reversible in any suitable manner in order to rotate the shaft 13 in opposite directions, the reversal or the return thereof being required at the end of each complete traverse of the molding 16 beneath the tools. The reversing or shifting device is automatically actuated from the large gear 23, that is driven by a pinion 24 on the shaft 13, same periodically operating to shift the driving-belts on the pulleys 25 of the gear mechanism 22. As any suitable belt-shifting device may be employed, this portion of the mechanism is not elaborated in the drawings.

The cutter-spindles 5 are driven at a high rate of speed and are controlled as to depth of cut by the tracer, which is raised by the retracting mechanism whenever a prominence in the pattern strikes or engages with the tracer-point 8. From this it will be seen that as the moldings are fed beneath the tools they will produce in the work pattern outline that is traced by the point 8. After each full traverse or stroke of the work (the moldings) the same are set over or moved transversely for the next cut of the tools in the reverse-feed direction. For thus feeding the moldings transversely we make the shaft 13 slidable in its bearings 27 27, several inches of movement being provided for, and for moving the shaft longitudinally we arrange a star-wheel 28 in the side frame 2, said star-wheel being threaded upon the threaded end 29 of the shaft 13. The star-wheel is held against longitudinal movement, and when it is rotated the shaft is moved longitudinally to accomplish the transverse feed of the moldings and the pattern beneath the cutting-tools and the tracer. For thus moving the rotating shaft periodically there is a large gear-wheel 30 journaled in the lower part of the frame and driven by a pinion 31 on the shaft 13, keyed to the shaft, though not movable with it in a longitudinal direction. The gear 30 is provided with a pin 32, which strikes the star-wheel 28 once in a revolution of the wheel 30, which wheel makes a complete revolution in time with the traverse of the moldings 16—that is, if the moldings are twelve feet in length the same are allowed to move their entire length beneath the cutters before the wheel 30 completes its revolution and operates the star-wheel to feed the work transversely. The shafts 19 move, preferably, back and forth with the shaft 13 in order that the relations of the moldings and the pressure-rolls 18 be not altered. To this end the shafts 19 slip in their bearings in the frame. It is obvious that the design of the pattern will be produced several times in succession upon the strips 16 during the numerous reciprocatory movements thereof and the transverse movement already explained. We prefer to employ but a single cutting-tool upon a single piece of work, but others may be added, all to be controlled by a single tracer. Only eight cutting-tools and eight pieces of work are shown in the drawings; but in practice the machine is made to receive as high as twenty moldings at a time with an equal number of tools all controlled by a single pattern and a single tracer.

As shown in Figs. 1 and 2, the machine is of the horizontal type, with the moldings all in a horizontal plane. Such a machine occupies a considerable floor-space, and a preferred modification of our machine is illustrated in Figs. 3 and 4, the same being vertical, and being a double machine as well, yet occupying a comparatively small floor-space. As therein shown, the machine has two tool-heads, each having a complete complement of tools, the tracers of the two sets engaging opposite sides of the pattern. The two sets of moldings that are being carved occupy vertical planes. The tools and the tracers are returned by springs 34, attached to the cross-beams 10, instead of by gravity, as in the case of Fig. 1.

The star-wheel—the transverse feed mechanism—is arranged at the upper end of the pattern and work carrying and feeding shaft or "cylinder," as it may be termed, and the driving-gear 35, corresponding to the gear 17, is placed in the lower end of the shaft 13 to mesh with a long driving-pinion 36, having a vertical axis and driven by a suitable reversing mechanism 37, identical in principle to that illustrated in Figs. 1 and 2.

It is obvious that the double machine or a single machine may be constructed with its tool-heads occupying a horizontal plane, in which case the molding-strips would stand upright and move vertically, and it is further obvious that other means may be pro-

vided for reciprocating the long molding-strips, boards, or planks to be carved with the repeated designs. We therefore do not confine this invention to the specific construction herein shown and described.

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

1. In an automatic carving-machine, the combination of a suitable driven cutter with the pattern-tracing mechanism connected therewith, automatic tracer-retracting means suitably driven, a shaft, a rotary pattern mounted thereon, work-feeding means also mounted thereon, means for driving the shaft and feeding the same and reversing means provided in connection therewith, substantially as described.

2. In an automatic carving-machine, the combination of a suitable frame with a tracer and a plurality of cutter-spindles in the same plane each parallel with said tracer and connected therewith for simultaneous movement with said tracer, an automatic tracer-retracting mechanism provided in said frame, a rotary pattern and a rotary device having its axis in the plane of said spindles and tracer and transverse to said spindles, for carrying and feeding the pattern and work with respect to said tracer and spindles, respectively, substantially as described.

3. The automatic tracing and cutting mechanisms, in combination with a rotary and longitudinally-movable shaft having adjustable pattern and work holding devices, means for driving said shaft alternately in opposite directions and means for feeding said shaft longitudinally, substantially as described.

4. In an automatic carving-machine, the combination with the vertical shaft having both pattern and work holding means, of associated work-holders the driving-gear of said means, the long pinion in mesh therewith, the reversing mechanism associated with said pinion, the feed mechanism connected with said shaft and the tracer and cutters, substantially as described.

5. In an automatic carving-machine, the shaft having adjustable pattern and work carrying devices, in combination with means for driving and feeding said shaft, the tool-heads arranged upon opposite sides of such shaft and each containing its complement of automatic tracer and cutting mechanisms, substantially as described.

6. An automatic carving-machine having a work and pattern carrying mechanism, in combination, with a feed mechanism, the tool-heads arranged upon opposite sides of said work and pattern carrying mechanism and each containing a complement of automatic tracer and cutting mechanisms, substantially as described.

7. In an automatic carving-machine the opposed tool-heads each provided with a full complement of tracer and cutting mechanisms automatically operable, in combination with a single rotary pattern and a single work-feeding mechanism arranged between the tracers and tools of the opposite heads, substantially as described.

8. In an automatic carving-machine the combination of the tracer and cutting-tool with the work and pattern carrying shaft, the gear thereon, the long pinion wherewith said gear is engaged, means for alternating the direction of movement of said pinion and an intermittent transverse feed mechanism associated with said shaft, substantially as described.

In testimony whereof we have hereunto subscribed our names, in the presence of two witnesses, this 7th day of December, 1901.

FRANK STREICH.
CHARLES L. RUEHS.

In presence of—
C. G. HAWLEY,
J. W. BECKSTROM.