

No. 767,113.

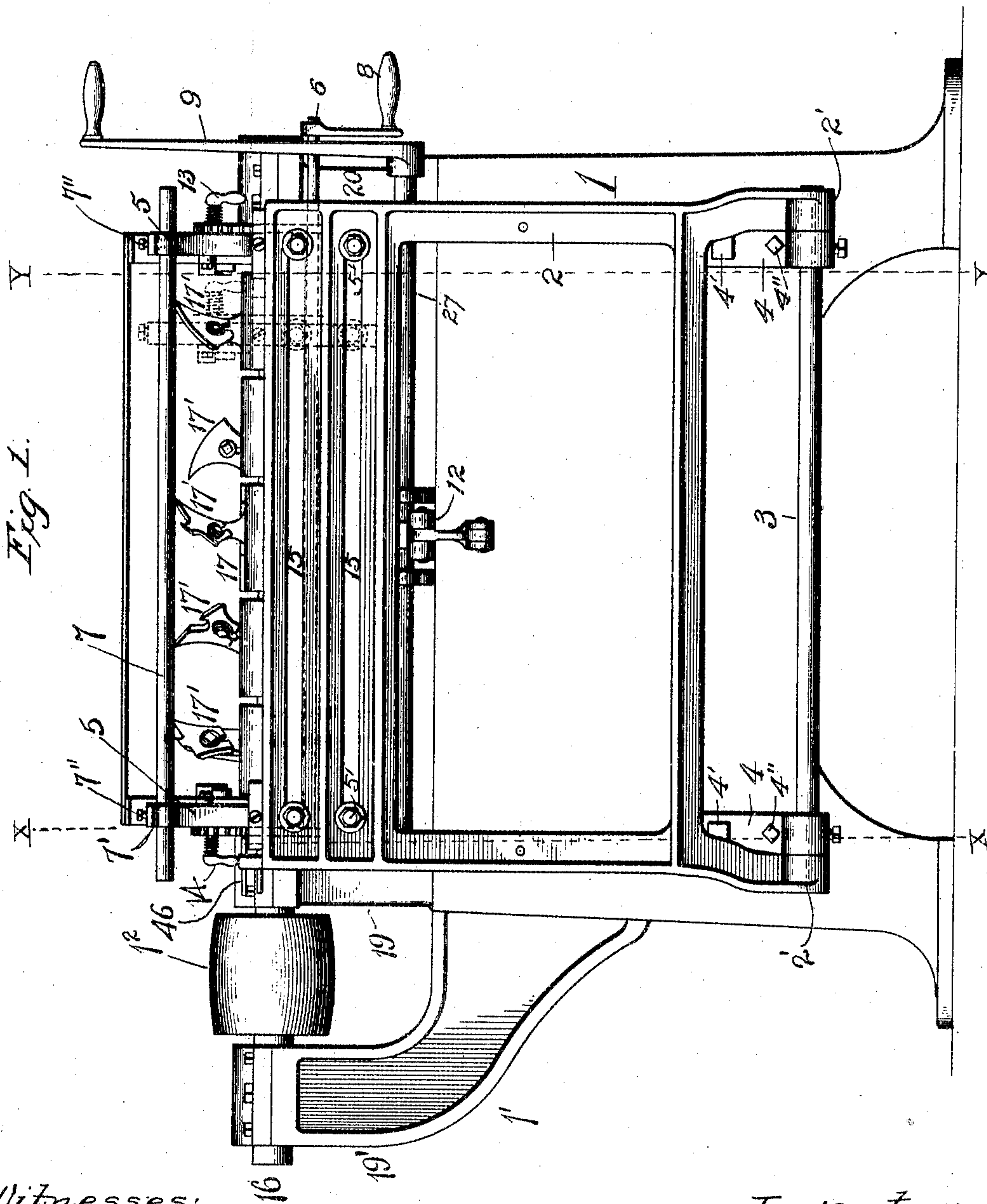
PATENTED AUG. 9, 1904.

C. MATTISON.
COLUMN AND BALUSTER TURNING MACHINE.

APPLICATION FILED NOV. 9, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:

Geo. C. Devouss.
B. H. Lefter

Inventor:

Christer Mattison
By *W. H. Hawley*

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Fig 3

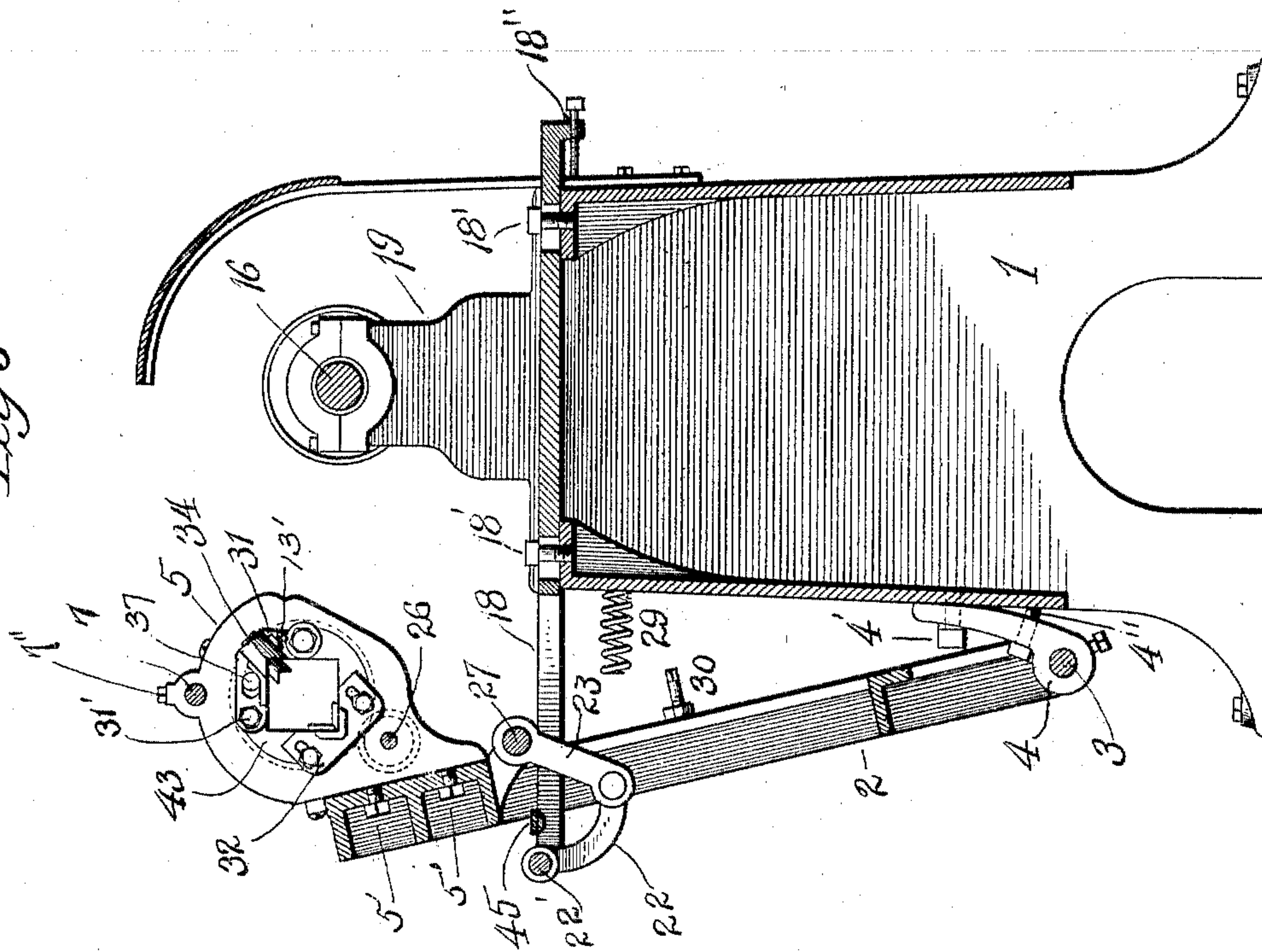
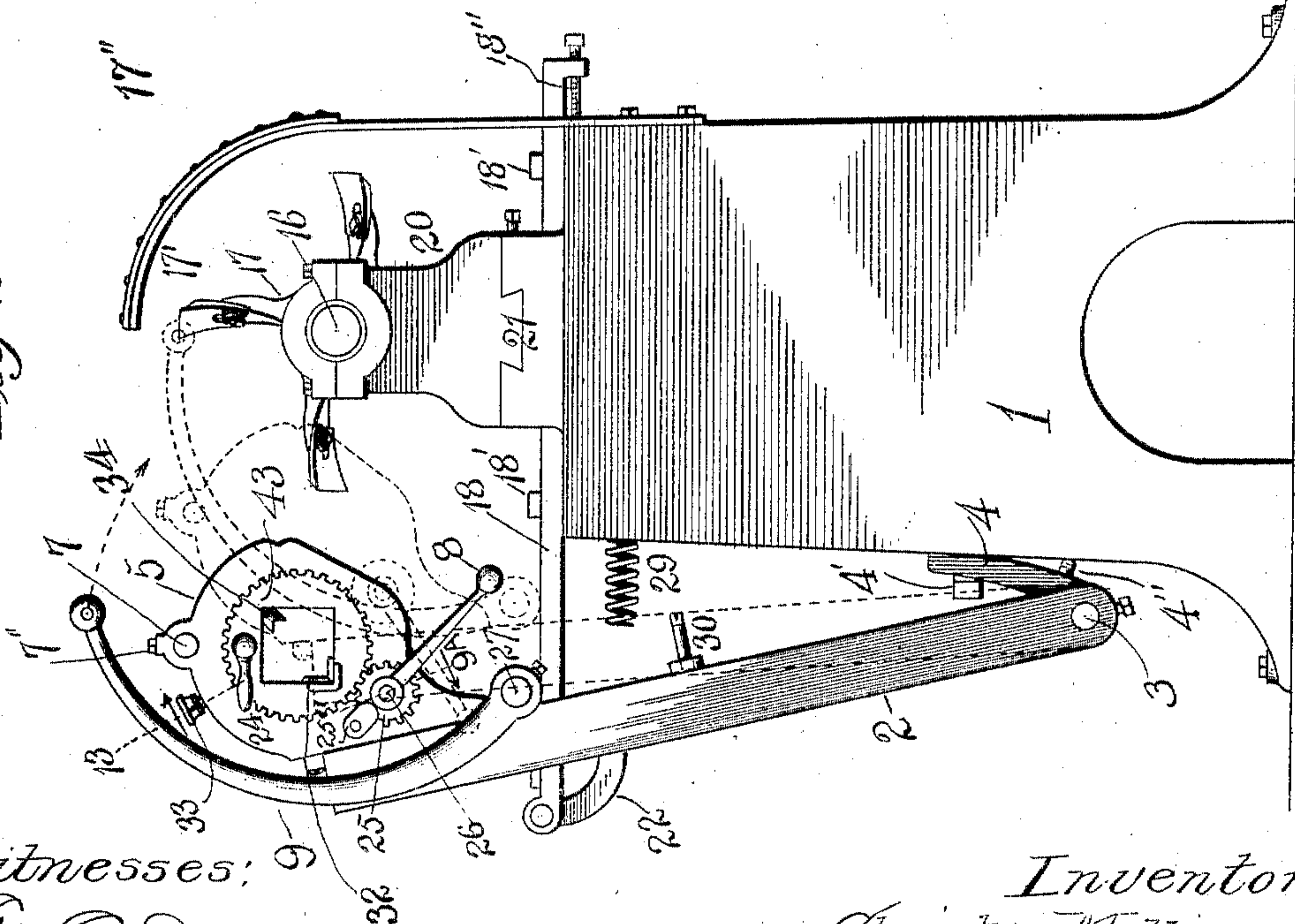


Fig 2



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3 SHEETS—SHEET 3.

Fig. 5.

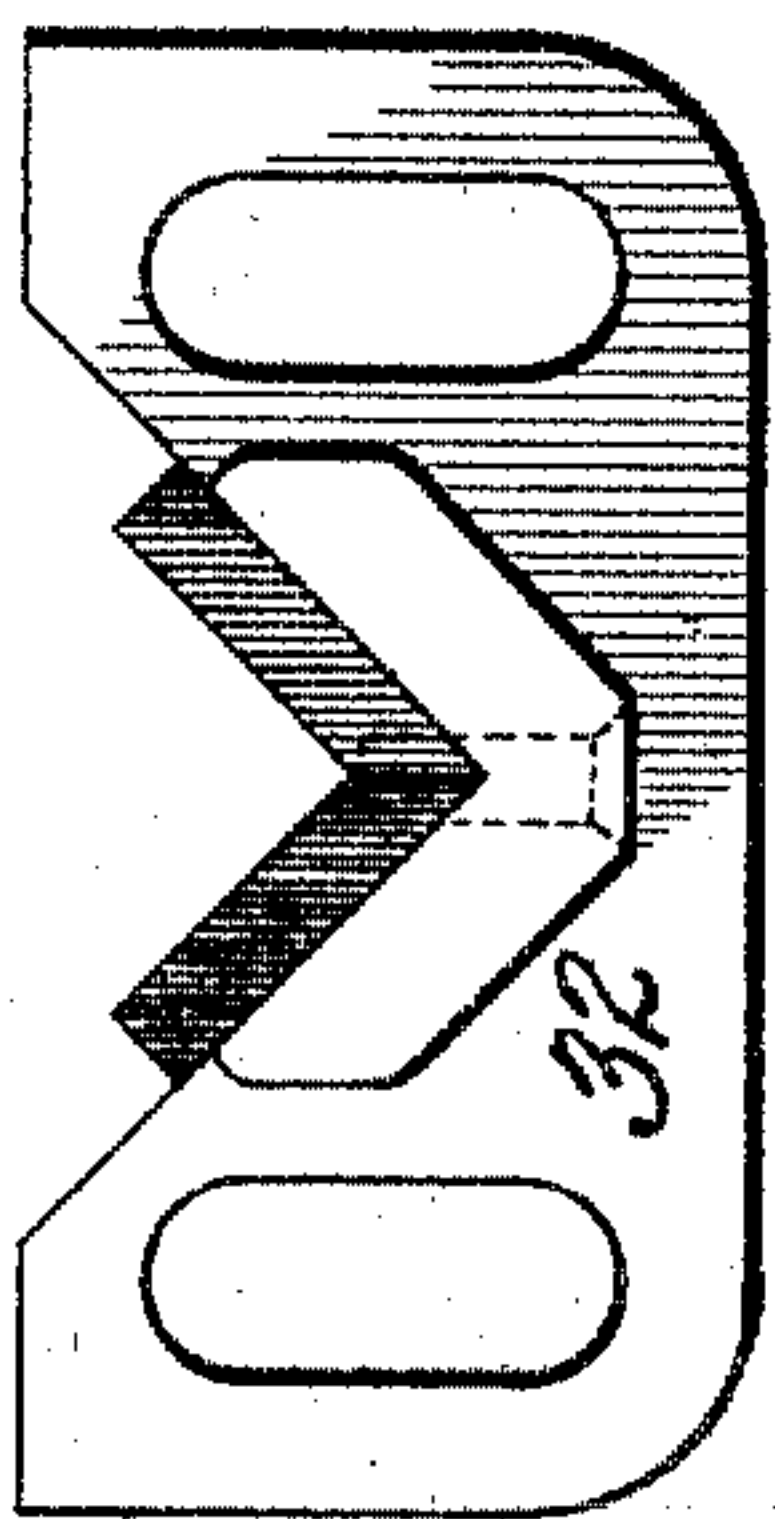


Fig. 6.

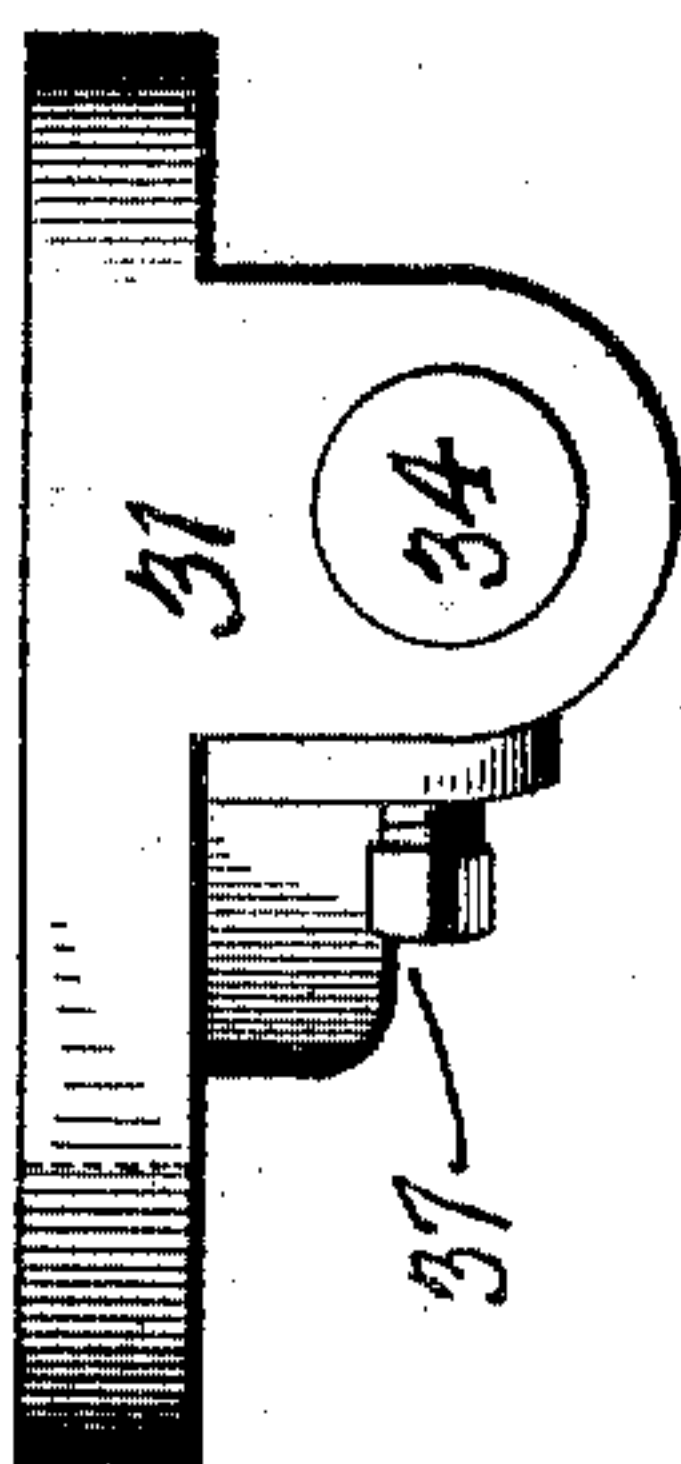


Fig. 7.

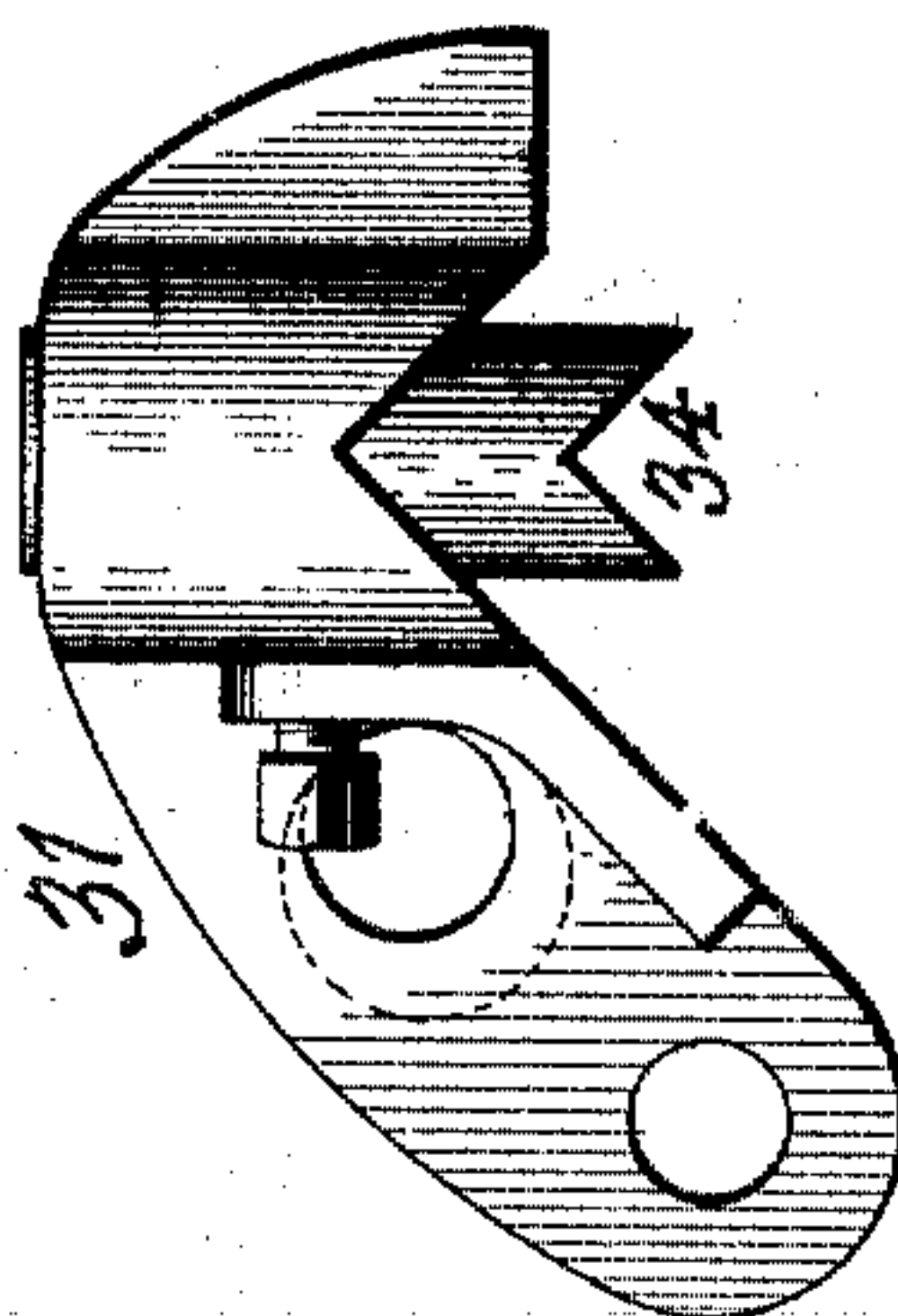


Fig. 4.

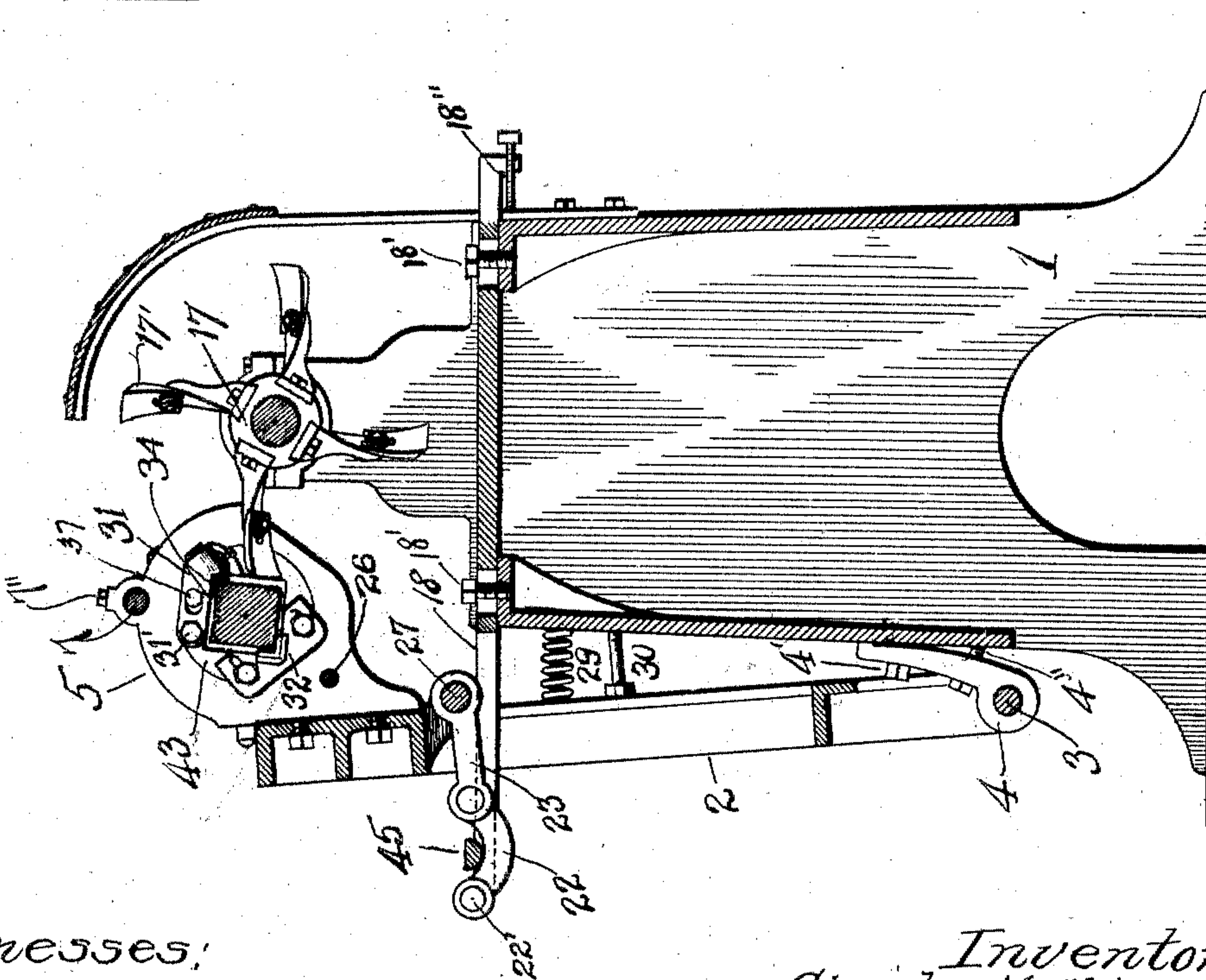


Fig. 8.

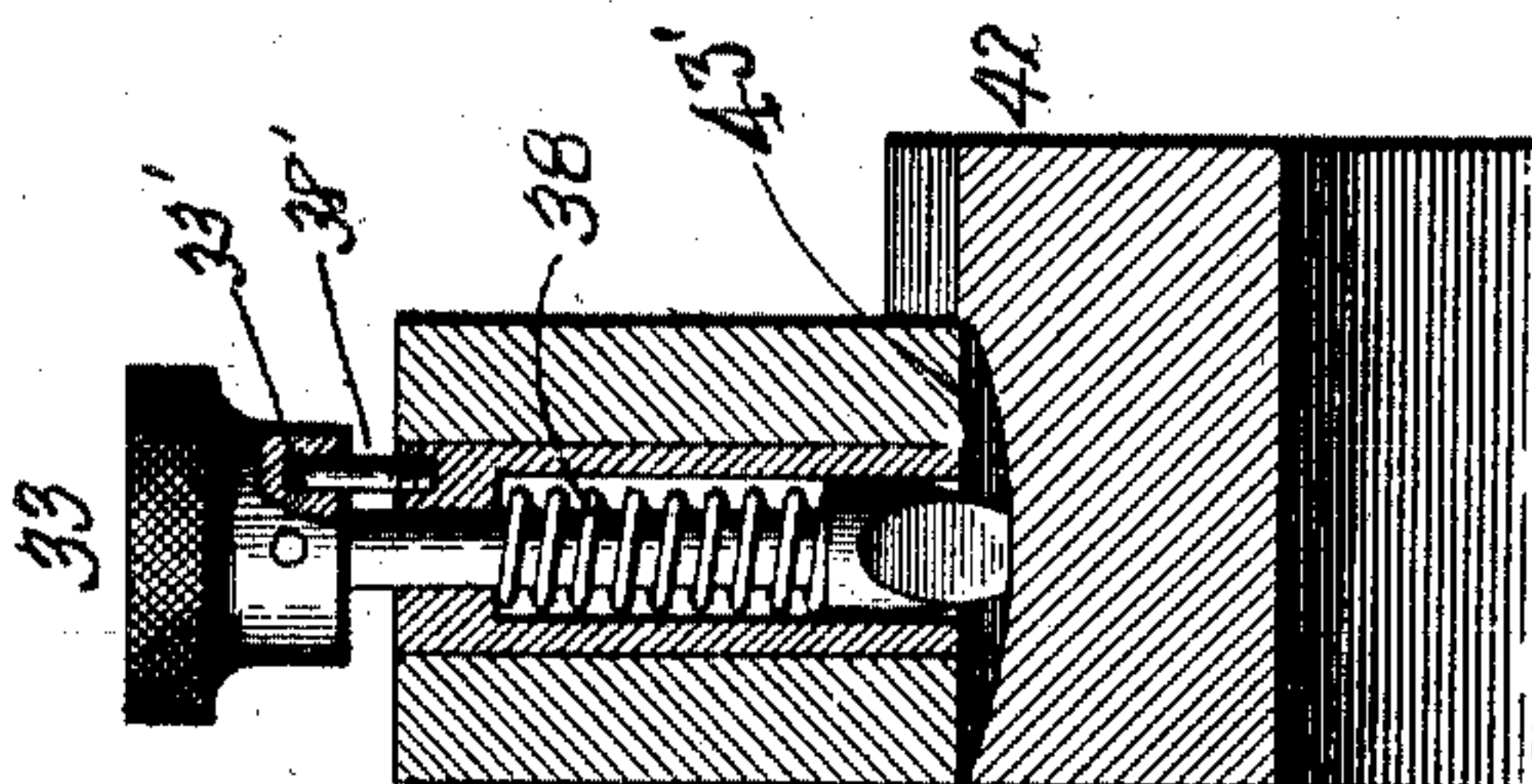
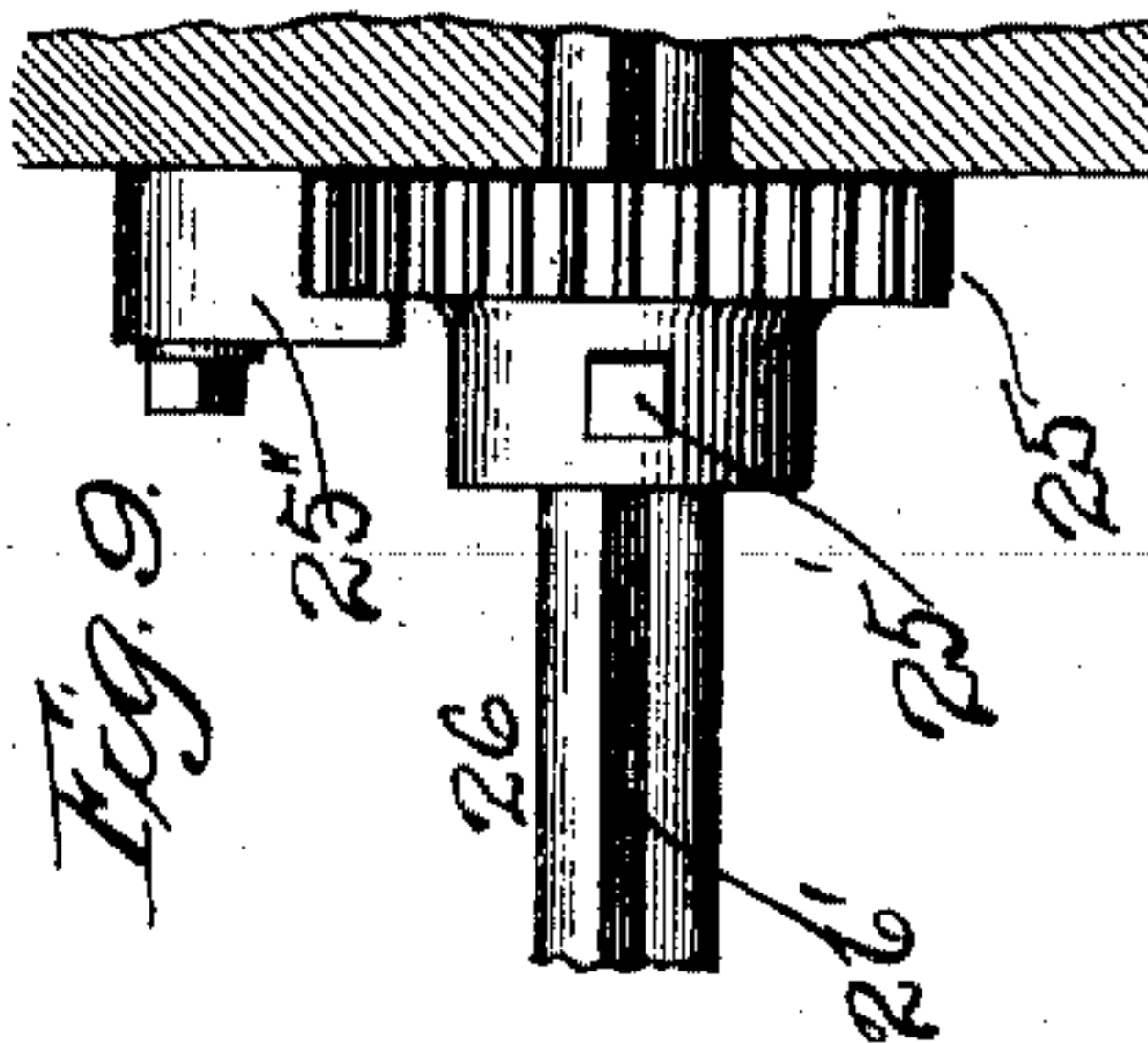


Fig. 9.



Witnesses:
George H. Kelly
B. K. Lefton

Inventor:
Christen Mattison
By *C. Hawley*
Att'y

UNITED STATES PATENT OFFICE.

CHRISTEN MATTISON, OF BELOIT, WISCONSIN, ASSIGNOR TO C. MATTISON MACHINE WORKS, A CORPORATION OF WISCONSIN.

COLUMN AND BALUSTER TURNING MACHINE.

SPECIFICATION forming part of Letters Patent No. 767,113, dated August 9, 1904.

Application filed November 9, 1903. Serial No. 180,434. (No model.)

To all whom it may concern:

Be it known that I, CHRISTEN MATTISON, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Column and Baluster Turning Machines, of which the following is a specification.

My invention relates to the improvement of machines for cutting, turning, and molding spindles, balusters, columns, and posts in ornamental form, and has special reference to machines of that class wherein the piece of wood or other material commonly spoken of as the "work" is movably held for manipulation by the operator and in which the cutting of the work is done by a cutter-head which has a stationary axis and is provided with a plurality of knives of such individual configuration that they together produce a complete design upon the blank which is moved into contact with them.

The primary object of my invention is to provide a machine of the class mentioned wherein the work shall be held upon a member so arranged that regardless of its own weight and the weight of the work it may be easily moved toward and from the knives and held in its working position.

Another object of my invention is to improve the chucks of spindle-turning machines and also the means of connection between the chucks of a machine.

Still another object of the invention is to provide a machine which shall be capable of handling different sizes of work and which, furthermore, may be employed in the production of tapered work.

The specific object of the invention is to provide or produce a machine of the class described which shall occupy a comparatively small floor-space, which shall be of light construction and yet strong, and which shall be made up of few parts simply connected.

My invention consists generally in a spindle or column turning machine comprising a frame wherein a rotary cutter is arranged in combination with a substantially vertical work-carrier pivotally supported at its lower

end and provided at its upper end with means for moving the carrier or carriage and the work-holding parts thereon; and, further, my invention consists in novel constructions and combinations 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 is a front elevation of a machine embodying my invention. Fig. 2 is an end elevation thereof. Fig. 3 is a transverse vertical section of the machine substantially on the line *y y* of Fig. 1. Fig. 4 is a similar section substantially on the line *x x* of Fig. 1. Fig. 5 is a view of a stationary chuck-block. Fig. 6 and Fig. 7 are plan and side views of the movable block belonging to the chuck. Fig. 8 is an enlarged sectional detail illustrating the chuck-latch, and Fig. 9 is a detail showing the chuck driving-gear and its shaft on the line 9^A of Fig. 2.

As shown in the drawings, the frame 1 of my machine is preferably a high pedestal-like base that is substantially rectangular in horizontal cross-section and which preferably has a large opening in its top to receive the shavings taken from the work by the rotary cutters. At one end the frame is provided with the standard 19 and bracket 19', preferably integral therewith and having boxes at the top to receive the arbor 16, that is driven by a pulley 12, arranged between the standard-bearings 19 19'. The arbor extends horizontally across the open top of the frame or base, and the cutter-heads 17 are fixed upon it. Cutter-heads of any desired type or design may be used with my machine, the same having knives 17' of configurations that vary with the design or shape to be produced in the work. The free end of the arbor over which the cutter-heads are placed or removed is normally steadied and centered by a removable bearing-block 20. The block is alined and made rigid by a dovetailed guide 21, provided therefor on the end of the base. A shield or hood 17" is preferably erected on the base and

overhangs the upwardly-turning side of the cutter-heads.

In Fig. 4 I have shown a spindle, column, or other work in the position which it occupies when being operated upon by the cutters, and it will be understood from the drawings that the work is held at its ends by two chucks 43 43. These chucks are held in chuck-stocks 5 5, which are normally rigid, though adjustable, on a carrier or carriage 2, the upper end of which is substantially opposite the arbor of the machine, while its lower end is pivoted at the ends or on the front of the machine frame or base. The carriage 2 is preferably a casting of considerable weight, it being necessary that it shall be strong to withstand the shock of the rotating knives upon the work which is sustained thereby. The weight of the carriage, however, does not render it difficult to operate, by reason of the fact that the carriage occupies an almost vertical position above the pivot 3 at its lower end, and the work when in position against the cutters practically overhangs said pivot. The chucks 43 43 are connected for simultaneous rotation in their sockets, and such rotation is accomplished by means of a small crank that is turned by the operator after the work has been moved against the knives. A suitable lever, also movable by the operator, is arranged to exert force between the bed of the machine and the carriage to swing the latter, and the carriage-operating lever is also employed as the means for practically locking the carriage at its inner position and against the thrust of the rotating knives. The detailed construction of the carriage is well illustrated in Figs. 1 to 4, wherein it will be seen that it is a substantially rectangular frame provided with a plurality of horizontal parts or cross-bars and having lower ends 2', that are pivoted on the shaft 3. The shaft 3, which supports the carriage and all of the parts thereof, is held in lugs 4, that could be integral with the base 1, but which I prefer to make as separate parts in order that the lugs may be relatively adjusted to throw the shaft 3 and the lower end of the carriage out of parallel with the base and the cutter-arbor. The particular construction of the lugs that I prefer is shown in Figs. 2 and 3, wherein it will be seen that the inner side of each lug is curved so that the lug may be rocked or tilted upon the base. The lug in such case is held by a supporting-bolt 4' and is made adjustable by means of a set-screw or bolt 4". When the bolt 4' is loosened, the set-screw 4" may be turned to move the lower end of the lug back and forth with respect to the base. After the lug 4 has been accurately adjusted the main bolt 4' is tightened. As the shaft 3, which sustains the frame 2, is held in these adjustable lugs 4, it is obvious that the same and the carriage may be exactly aligned with the arbor 16 or relatively inclined or disaligned with respect thereto. In the last

instance the work held at the upper end of the carriage will be presented to the arbor at an inclination thereto, and the cutting-tools in operating upon the work will produce a tapered spindle or column. 18 represents a bracket or extension on the base, preferably at the top thereof. This constitutes a part of the connection between the base and the carriage, and it could be integral with the base; but for the sake of adjustability I make the part 18 a separate member capable of longitudinal adjustment. Thus, as shown in the drawings, 18 is a bar having slots and fastened to the base by bolts 18'. The bar is provided at one end with an adjustable safety limiting-stop 18" and at the other end has a cross-pin 22', on which one end of the carriage-operating toggle-lever or jointed arm is pivoted. The jointed arm is composed of members 22 23, and its other end is attached to a rocking shaft 27, provided in bearings or lugs on the carriage 2. The jointed arm is pivoted on the part 18 and is fixed on the shaft 27. Consequently when the shaft 27 is turned or rocked its motion will either straighten the jointed arm or collapse it. The straightening of the arm or toggle moves the carriage toward the base and arbor, while on reverse movement of the shaft 27 the carriage will be permitted to recede from the base and the rotating cutters. 45 represents a stop, which prevents the rising of the middle pivot of the jointed arm into line with the centers of 22' and 27. At the same time the stop 45 allows the arm to be so far straightened that it effectively locks the carriage and opposes backward movement thereof when the work is being operated upon by the knives. For operating the shaft 27 I preferably employ a long crank 9, the free end of which describes a cycloidal arch, the center thereof being upon the carriage and moving toward and from the base as the crank is turned. The crank is curved to avoid the end of the piece of work which often projects from the carriage. 30 represents a stop which is preferably arranged on the carriage and determines the inward movement or position thereof. This is adjusted according to the diameter of the work to be cut on the machine. 29 29 are cushion-springs employed to prevent the sudden in-throwing during the last part of the stroke in approaching the tools. Flat leaf-springs may be substituted for the coil-springs shown and when used will be pivoted on the base to admit of their disconnection from the carriage when carriage-stops are being adjusted. The cushion or cushions make it necessary for the operator to overcome considerable force in order to drive the stop 30 against the base, and therefore compel the slow movement of the carriage at the end of its inward stroke. If desired, the shaft 27 may extend from end to end of the carriage and be provided with another crank. This is done upon large machines,

where two operators are required to move the carriage and handle the work of the machine. The upper part of the carriage is provided with the parallel horizontal slots 15 and is faced on its inner side to receive the chuck-stocks 5 5. Said chuck-stocks have locking-bolts 5' in the slots 15 and are adjustable upon the carriage, as indicated by dotted lines in Fig. 1. Such adjustment is required to adapt the machine to the handling of pieces of work of different lengths. The upper parts of the chuck-stocks are preferably stiffened and braced by a rod 7, extending through ears or lugs 7' on the chuck-stocks and secured by means of set-screws 7'' after the stocks have been adjusted. Each stock is provided with a central opening or socket to receive a chuck 43, which fits the same snugly. On its outer side the chuck is provided with a gear or gear-teeth 24, and these gears upon the chucks are engaged and operated by pinions 25 on a shaft 26, which is carried in the lower parts of the chuck-stocks 5 5. The pinions are connected to the shaft 26 by a key or spline or set-screw 25', entering a key-slot 26' in the shaft 26. (See Fig. 9.) Each pinion is held against its stock by a lug or clip 25'', as shown in Figs. 2 and 9, and therefore the pinions move with the chuck-stocks when the latter are adjusted on the face of the carriage. The relation of the pinions to one another and the shaft 26 is always maintained by the keys and key-slot. For turning the chucks I use a short crank 8 on the shaft 26, and which may be turned without interference with the main crank or lever 9. The chucks 43 43 are provided with polygonal preferably square holes to receive the stick or beam of wood to be turned. Each is provided with a block 32 and a movable block 34. The fixed block is adjustable for different sizes of work, but is normally fixed or stationary upon the chuck. The movable block is preferably an adjustable pin provided with a V-notch in its end arranged in the end of the short arm or lever 31, that is pivoted to the inner side of the chuck by a pin 31'. For operating the same there is a small crank or eccentric 37, engaging the block and having an operating-handle 13 on the outer side of the chuck. The arm 13 rotates with the chucks, but may be easily grasped at any point, and when thrown out retracts the movable block 34 to free the piece of work held between the same and the stationary block 32. It is obvious that means may be provided for accomplishing a greater throw of the arm 31 than here shown, in which case the adjustable pin or block 34 could be dispensed with. I prefer, however, to arrange the same as shown, securing it by a set-screw 13'. The gear-teeth upon one side of the chuck and the blocks 32 34 on the opposite side prevent longitudinal motion of the chuck in the chuck-stock, and other fastenings are not required. The work that is usually

done upon a machine of this character is round or cylindrical; but there are frequent calls for polygonal work, and to provide for the production of such work upon my machine I cut notches 43' in the periphery of one or both of the chucks. These notches are equidistant, and there may be any number thereof from two to ten. 38 represents a latch in the chuck-stock and normally pressed downward by a spring, this member being provided with a head or knob 33, by which it may be withdrawn, and 38' represents a stop-pin that enters a recess 33' in the knob 33. The pin also serves to hold the latch out when the knob is raised and slightly turned to carry the recess out of register with the pin 38'. This is the normal condition of the latch, and the chucks are therefore normally free to rotate; but when it is desired to produce polygonal work the latch is permitted to drop into one of the notches, and the work is then moved against the cutting-tools. When one side has been finished, the latch is withdrawn and the chuck is turned to the next notch, where it is again fastened by the latch and held until a new side or face has been finished. In this manner hexagonal and octagonal spindles or columns may be turned rapidly and accurately. I prefer to use an end stop or gage 46 on one of the chucks. The piece of work is adjusted against this before it is clamped in the chucks.

It is obvious that numerous modifications of my invention particularly in its detailed construction, will suggest themselves to those skilled in the art, and I therefore do not confine my invention to the specific constructions herein shown and described.

The operation of the machine of my invention is as follows: The timber, square post, spindle-blank, or other piece of work that is to be turned is entered endwise into the chucks and is moved against the end stop provided on one of the chuck-stocks. The chuck-stocks are adjusted to the length of the cut that is to be made upon the piece of work and are then secured by means of the bolts 5' and the set-screws 7''. When this has been done, the cam-levers 31 of both chucks are set down upon the work to clamp the same securely in the chucks. Whatever adjustment of the chuck-blocks is necessary is made previously and depends upon the radius or diameter of the work. When the work has been secured, the operator throws forward the lever or crank 9, and thus straightens the jointed arm or toggle-lever 22 23 and thrusts the carriage, with the work, inward or forward toward the rapidly-rotating cutter-heads. The inward motion or stroke of the carriage is limited and determined by the stop-pin 30, and the sudden inthrow of the work is prevented by the cushion-springs 29. When these springs have been overcome, the work will be within range of the knives, which will immediately begin to cut the surface of the blank. If it is

desired to turn a polygonal spindle or column, the chucks are secured by means of a latch or latches 33; but if a round spindle is desired the operator immediately grasps the short crank 8 and slowly turns it to present all faces of the blank to the rotating knives. If desired, the chucks may be driven from the cutter-arbor instead of by hand. A single revolution of the blank is all that is required to finish it, and this being accomplished the pressure on the crank 9 is relieved, and the carriage, with its work-holders, will immediately retire by force of the cushion-springs 29 and gravity. On the retirement of the carriage the finished work is removed therefrom, and a new piece is placed in the chucks, whereupon the operation described is repeated. When it is necessary to turn a tapered spindle or column, the pivot-lugs 4 are adjusted to give the required taper to the article. The angularity of the carriage does not lessen the effectiveness of the operating-toggle, for sufficient lost motion is allowed therein to permit it to work freely. While the stop-pins 30 or their equivalent are usually depended upon to determine the stroke of the carriage, such determination may be gotten by means of the adjustable bracket 18, and the latter is always used in adapting the machine to widely-different diameters of work.

The marked advantages of my machine are many, among them being the ease with which the carriage is moved and held by means of the toggle-lever and the long crank: the adjustability of the carriage for straight or tapered work, making it unnecessary to use different knives of varying length: the fact that the operator cannot suddenly thrust the work against the tools, the carriage being cushioned against sudden movement, and the complete adjustability of the machine to different sizes of work and for the production of either round or polygonal work.

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

1. In a machine of the class described, a suitable base or frame, equipped with a cutter-arbor, in combination with a work-carriage occupying a substantially vertical position and pivoted at its lower end, adjustable pivot-blocks therefor, for alining or disalining the carriage with relation to said arbor, and means unaffected by the disalining of the carriage, for actuating the carriage, substantially as described.

2. In a machine of the class described, a suitable base or frame equipped with a cutter-arbor, in combination with a substantially vertical work-carriage pivoted on the base below the arbor, a rocking shaft provided on said carriage, a toggle-lever having one of its ends fixed on said shaft and its other end attached to the base, and means for rocking said shaft, substantially as described.

3. In a machine of the class described, a suit-

able base or frame equipped with a cutter-arbor, in combination with a work-carriage occupying a substantially vertical plane, adjustable pivots therefor on the base, a rocking-shaft on said carriage, a toggle-lever having one of its ends fixed on said shaft and its other end attached to the base, means for rocking said shaft, said means being movable with the carriage, and suitable work-holding devices on the carriage, substantially as described.

4. In a machine of the class described, a suitable base or frame equipped with a cutter-arbor, in combination with work-holding devices and pivoted at its lower end upon the base, a toggle-lever having one of its ends attached to the carriage and the other to the base, and means movable with the carriage for actuating the toggle-lever, to swing the carriage, substantially as described.

5. In a machine of the class described, a suitable base or frame equipped with a cutter-arbor, in combination with a work-carriage pivoted on the base, an adjustable bracket on said base, and a toggle-lever extending between the adjustable bracket and said carriage and equipped with means for operating said carriage, substantially as described.

6. In a machine of the class described, a suitable base or frame equipped with a cutter-arbor, in combination with a work-carriage, having work-holders, occupying a substantially vertical plane and pivoted at its lower end to the lower part of said base, a bracket 18 on the base, a toggle-lever connecting said bracket and carriage, and a crank movable with the carriage for actuating said lever to move the carriage, substantially as described.

7. In a machine of the class described, a suitable base or frame equipped with a cutter-arbor, in combination with a work-carriage, adjustable lugs on said base whereon the carriage is pivotally sustained for alinement or disalinement with said arbor, and means for moving the carriage toward and from said arbor, substantially as described.

8. In a machine of the class described, a suitable base or frame equipped with a cutter-arbor, in combination with a work-carriage occupying a substantially vertical position and adjustably pivoted on the side of said base, a bracket adjustable at the top of said base, a toggle-lever extending between the bracket and the carriage, means on and movable with said carriage for actuating the toggle-lever, to move the carriage, adjustable chuck-stocks on the carriage, chucks therein, a shaft and gears connecting said chucks and means on and movable with said carriage for revolving said chucks in their stocks, substantially as described.

9. In a machine of the class described, a suitable base or frame equipped with a cutter-arbor, in combination with a work-carriage having its lower end pivoted on the side of said

base, the upper end of said carriage being movable toward and from said arbor, adjustable chuck-stocks on the inner face of said carriage, revoluble chucks in said stocks and provided with clamping-blocks, a crank-shaft borne in said stocks and geared to said chucks, for operating the same simultaneously, and means for operating said carriage, substantially as described.

10. In a machine of the class described, a suitable base or frame equipped with a cutter-arbor, in combination with a work-carriage occupying a substantially vertical plane, a bracket extending from said base, a toggle-lever connecting the bracket and the carriage, a stop on the bracket for said lever, a crank on the carriage for actuating the toggle-lever, and revoluble work-holders on said carriage, substantially as described.

11. In a machine of the class described, a pedestal-like frame or base, open at the top and there provided with arbor-bearings, in combination with an arbor extending across the opening in the base, a carriage pivoted on the side of said base near the bottom thereof, chuck-stocks on said carriage opposite said arbor, chucks revoluble in said stocks, a crank-operated shaft on said carriage for rotating said chucks and a crank-actuated mechanism connected with the upper part of said carriage for moving said carriage, substantially as described.

12. In a machine of the class described, a suitable base or frame equipped with a cutter-arbor, in combination with a work-carriage occupying a substantially vertical position, means pivoting the lower end of the carriage upon lower part of the base, chuck-stocks provided on the upper portion of the carriage, revoluble chucks therein, a crank-operated shaft upon the carriage for rotating said chucks, a toggle-lever connecting said carriage and base near the top, a rocking shaft to which one end of said lever is fixed for actuating said lever, and a curved crank fixed on said rocking shaft for rotating said shaft, for rocking the carriage without interference with the working of said chucks, substantially as described.

13. In a machine of the class described, a

suitable base or frame equipped with a cutter-arbor, in combination with a carriage pivoted at its lower end and provided with work-holding means upon its upper part, and a toggle-lever for swinging said carriage, said toggle-lever being substantially straight when the inner position of the carriage is attained, substantially as described.

14. In a machine of the class described, a suitable base equipped on its top with a cutter-arbor, in combination with a work-carriage pivoted on the lower part of said base and extending above the same, said work-carriage occupying a substantially vertical position and provided with work-holding means upon its upper portion, pivotal supports on the base for said carriage, and said supports being adjustable for alining or disalining said carriage with relation to the arbor, and means for moving the carriage, substantially as described.

15. In a machine of the class described, a suitable base equipped with a cutter-arbor, in combination with a carriage having its lower end pivoted upon said base, chuck-stocks and chucks, a toggle-lever, means for operating the same, said means being movable with the carriage, an adjustable pivotal fastening for said lever upon the base, and a toggle-lever stop upon said adjustable fastening, substantially as described.

16. In a machine of the class described, a suitable base equipped with a cutter-arbor, in combination with the swinging work-carriage having its lower end pivoted on the base, a bracket-bar 18, longitudinally adjustable upon the top of the base, a toggle-lever extending between the outer end of said bar 18 and said carriage, and means upon the carriage for straightening said toggle-lever to move the carriage toward said arbor, substantially as described.

In testimony whereof I have hereunto set my hand, this 22d day of October, A. D. 1903, in the presence of two witnesses.

CHRISTEN MATTISON.

Witnesses:

J. C. ROOD,

E. F. HARRISON.