29-560.1

No. 813,056. PATENTED FEB. 20, 1906.

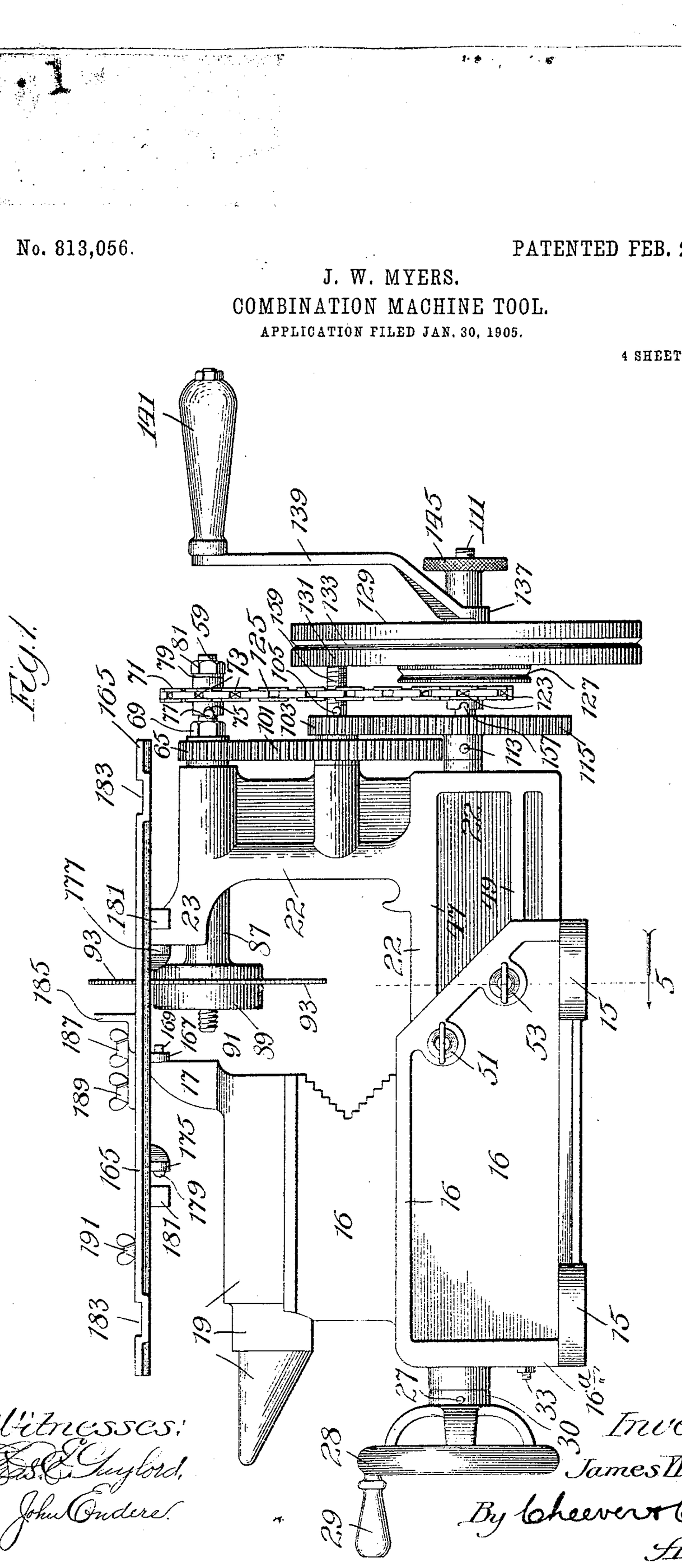
J. W. MYERS.

COMBINATION MACHINE TOOL.

APPLICATION FILED JAN. 30, 1905.

4 SHEETS—SHEET 1.

FIG. 1.



Witnesses:
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John Enders.

Inventor:
James W. Myers,
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Attys.

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4 SHEETS—SHEET 2.

Fig. 2a.

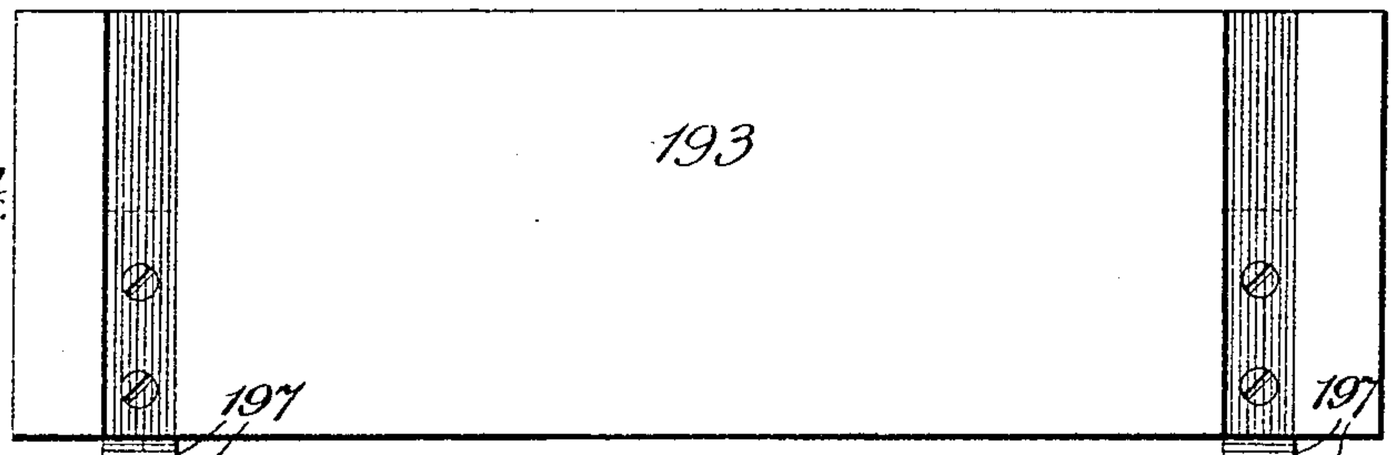


Fig. 2.

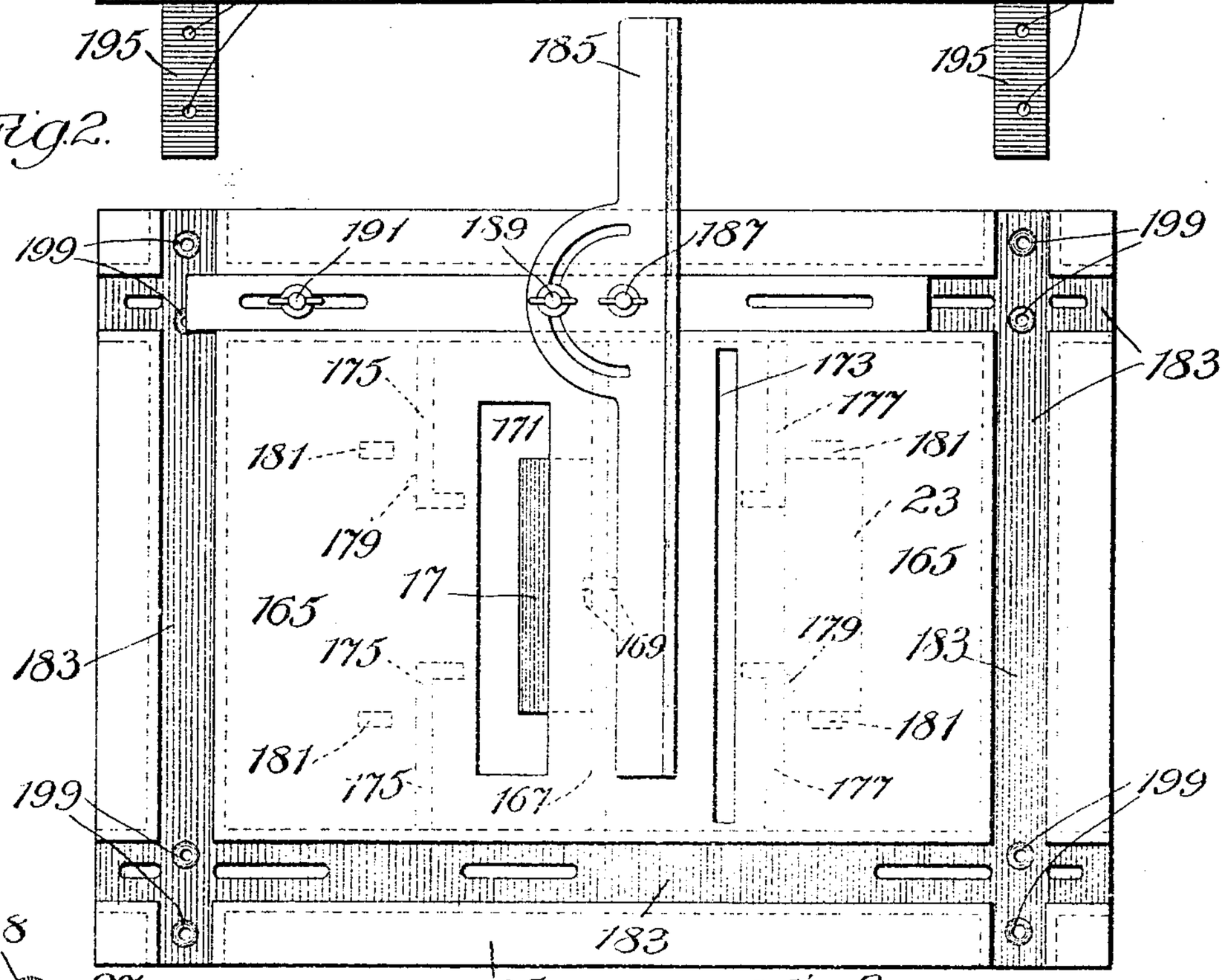
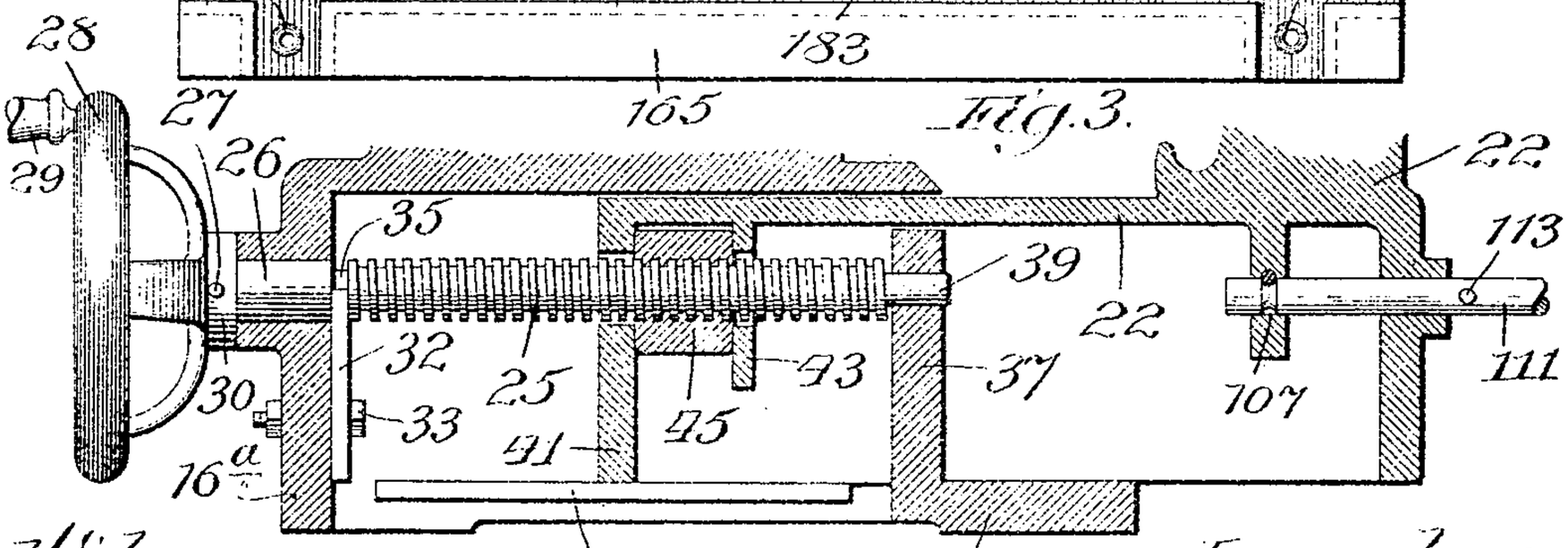


Fig. 3.



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Vise, drill, etc.
Anvil attached.

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4 SHEETS—SHEET 3.

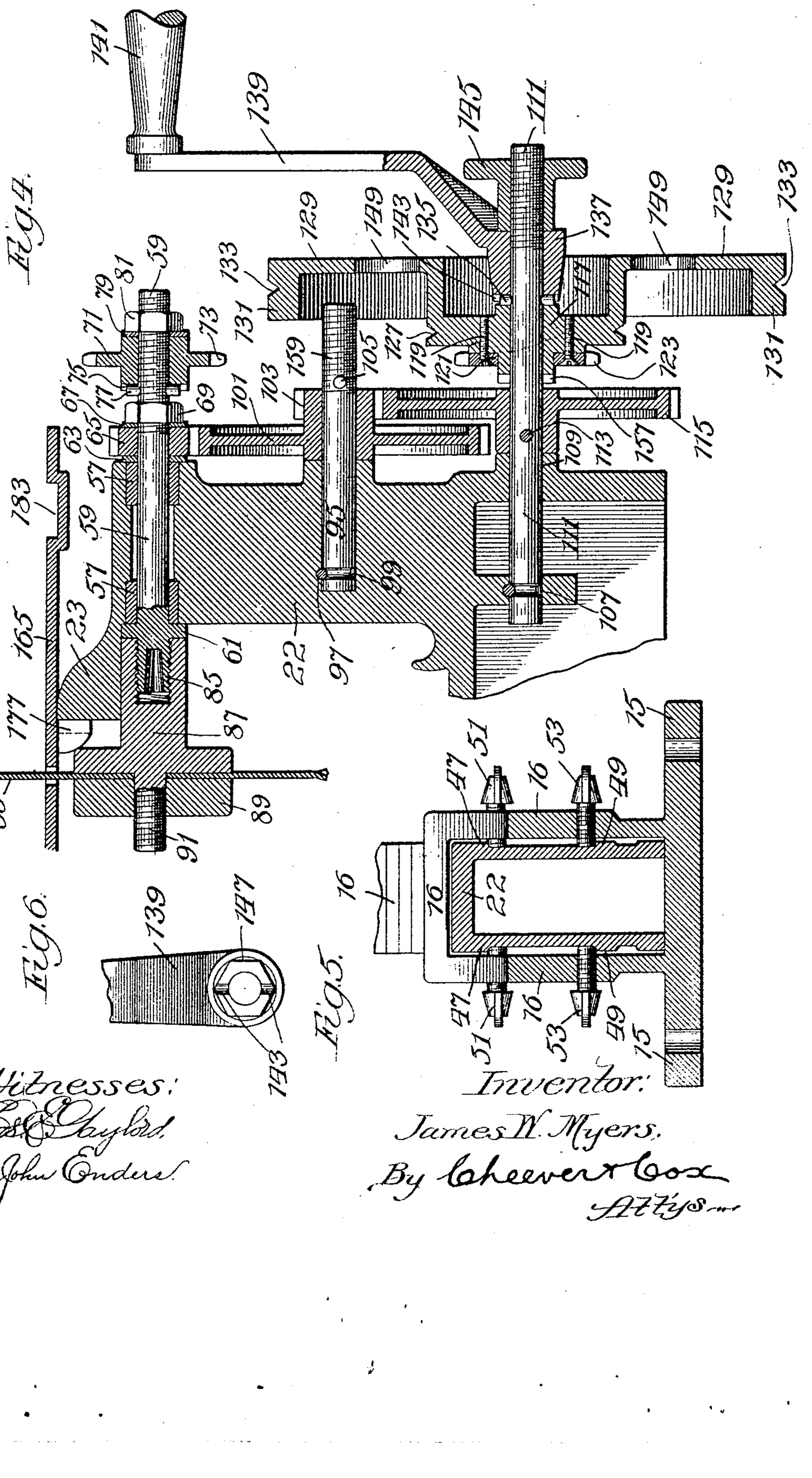

Fig. 4.

Fig. 6.

Fig. 5.

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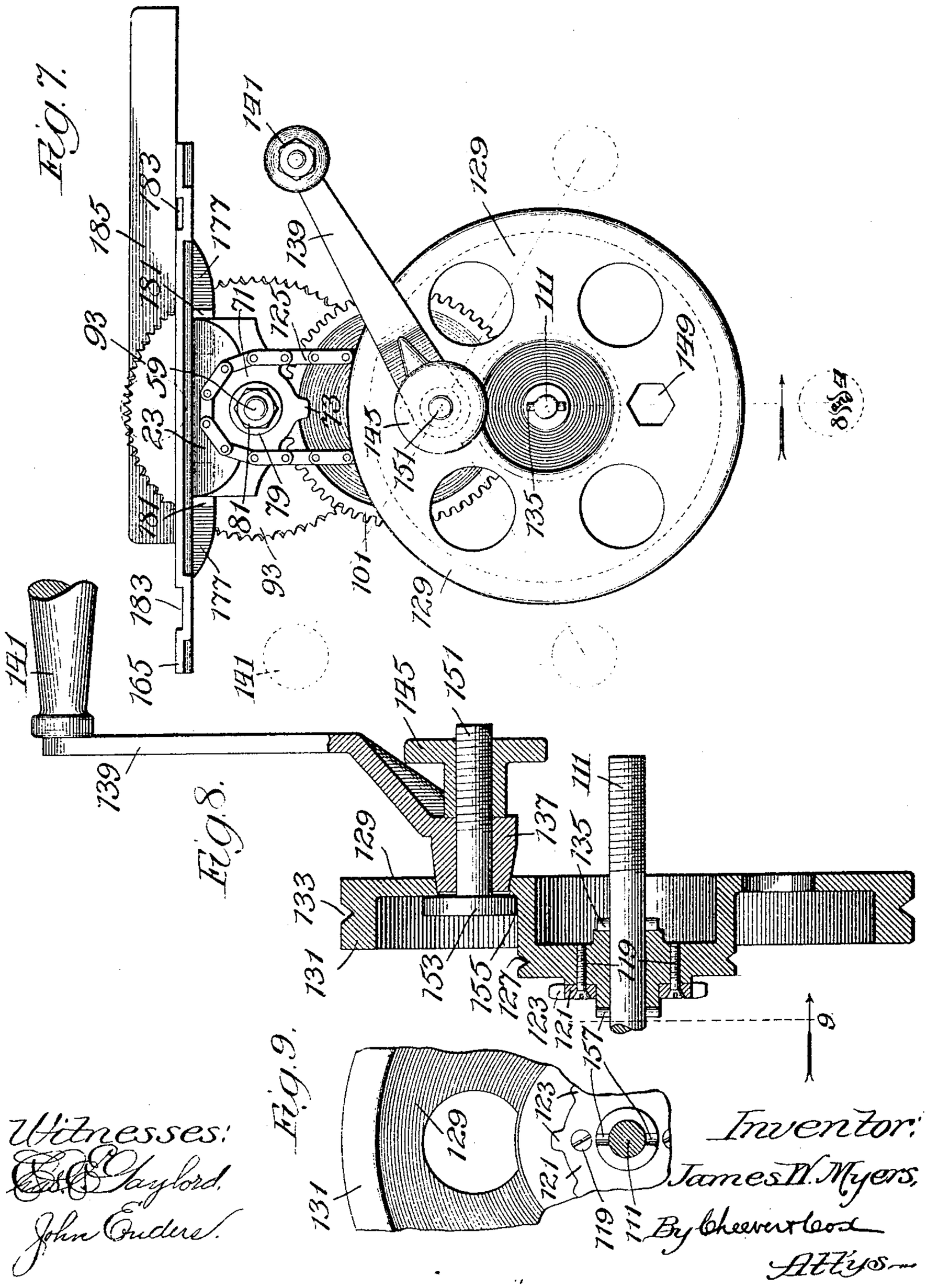
4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JAMES W. MYERS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE MYERS MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

COMBINATION MACHINE-TOOL.

No. 813,056. Specification of Letters Patent. Patented Feb. 20, 1906.

Application filed January 30, 1905. Serial No. 243,340.

To all whom it may concern:

Be it known that I, JAMES W. MYERS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Combination Machine-Tools, of which the following is a specification.

My invention relates to machine-tools of a class especially adapted to be carried from place to place and set up in all sorts of odd places, then taken down and moved to another place. These devices are of special use in the repairing of automobiles and other machinery where it is not desired to equip a complete machine-shop.

The object of my invention is to provide such a mechanism which will combine a large multiplicity of tools in a comparatively small compact space, while enabling these tools to be operated at varying speeds with considerable power.

A further object is to produce such a mechanism which can be easily and cheaply made, which is efficient in operation, can be easily assembled and taken apart, and which when in operation is not readily liable to get out of order.

My invention consists, broadly, in mechanism capable of accomplishing the above objects.

It consists more in detail in the combination of a vise adapted to have boring and cutting tools mounted thereon for operation, in combination with a saw and grinding-table.

It further consists in a novel means of applying power to such cutting-tools and means for varying the speed and power so applied to such tools.

It also consists in many details of construction and arrangements of parts, which will be hereinafter more fully described and claimed as the specification proceeds.

Figure 1 of the drawings shows mechanism illustrating my invention in its preferred form in side elevation. Fig. 2 is a plan view of the saw-table. Fig. 2ª is a supplemental extension of the table shown in Fig. 2. Fig. 3 is a central sectional detail view taken vertically and longitudinally through the center of the feed-screw, the feed-screw itself being shown in full. Fig. 4 is a vertical sectional detail view through the main portion of the device on line 4 of Fig. 7, except as to the propelling-handle, which is there shown in a different position for purposes to be hereinafter described. Fig. 5 is a detail view taken on line 5 of Fig. 1. Fig. 6 is an end detail view of the attaching end of the operating-handle. Fig. 7 is an end view of the operating mechanism. Fig. 8 is a central detail view of the fly-wheel and attached parts, taken on the center line of Fig. 7. Fig. 9 is a broken end view taken on line 9 of Fig. 8.

Again referring to Fig. 1 we see at the left of the figure a base 15, having rising from it the stationary jaw-frame 16 of a vise, one jaw of which (the stationary one) is shown at 17. In the particular device here shown this stationary jaw 17 has extending from it to the left an anvil 19; but this anvil does not form a part of the invention of this application and may be omitted, if desired.

Slidably mounted for longitudinal movement in the stationary jaw-frame 16 is a movable jaw-frame 22, carrying on its upper portion the movable jaw 23 of a vise. The method of connection between the stationary jaw-frame 16 and the movable jaw-frame 22 is illustrated in detail in Fig. 3, referring to which shows a feed-screw 25, journaled at 26 in the end 16ª of the stationary frame. Secured to the outer end of this screw 26 by a pin 27 or other suitable means is a hand-wheel 28 of ordinary construction, having on it a handle 29 adapted to be grasped by the hand of the operator. This screw 25 is inserted in the end wall 16ª from the left until, as shown, the shoulder 30 bears against the end wall 16ª. The screw is held in position by a plate 32, removably secured by the bolt 33 or other suitable means to the inside of the wall 16ª. This plate 32 has in its upper end a curve notch, so that the plate is adapted to fit into a notch 35 in the screw 25, adjacent to the inside wall of the end 16ª, as shown in Fig. 3, from which it will be seen that when the parts are thus assembled the screw 25 can be rotated by the handle 29, but has no longitudinal movement in the end wall 16ª, and that by removing the bolt 33, and consequently the plate 32, the screw 25 may be moved to the left out of the end wall 16ª.

Rising from the base 15 at the opposite end of the stationary frame 16 from the end 16ª heretofore described is a post 37. This post is so located that it is in line with the

screw 25 and the end 39 of the screw is journaled in the post, as shown in Fig. 3. The lower portion of the movable jaw-frame 22 extends inside of the stationary frame 16 over the post 37, as shown in Fig. 3, and has upon its left end a vertical member 41 at right angles to the horizontal portion of the movable jaw-frame. The screw 25 passes through this vertical member 41, but is not threaded into it. Also extending vertically downward from the movable jaw-frame 22 is a post or plate 43, parallel to the member 41 heretofore described, through which the screw 25 also passes without being threaded therein. Threaded upon the screw 25 between these two members 41 and 43 just described is a nut 45. By this construction I am able to allow for necessary play between the movable and the stationary jaw of the device, which is necessary to properly adjust mechanism to be hereinafter described, attached to the jaws of the device, without there being binding of the screw 25 in the members 41 or 43, or both of them, as would be in case the screw 25 were threaded directly into them.

In order to provide for lateral adjustment of the movable jaw-frame 22 within the stationary frame 16, thereby indirectly giving adjustment to the movable jaw for purposes to be hereinafter described, I place upon the upper portion of the frame 22, which is inside of the frame 16, horizontal ribs or ridges 47, and upon the lower portion of the frame 22 and parallel to these ridges 47 I place corresponding ridges 49. Through the front and rear walls of the frame 16, adjacent to the ridges 47, I place adjustable set-screws 51, and through the front and rear walls 16, adjacent to the tops of the ridges 49, I place other adjustable set-screws 53. The inner ends of these set-screws should normally bear lightly against the sides of the movable frame 22 and against their respective ridges, just described, so that they form guides to cause the movable jaw-frame 22 when pulled by the screw 23 to always move in substantially straight horizontal lines. From an inspection of Fig. 5 it will be seen that by adjusting set-screws 51 and 53 in and out the frame 22 may be given considerable adjustment laterally inside of the frame 16, whereby necessary adjustments of the movable jaw 23, attached to the jaw-frame 22, may be easily made for the purposes to be hereinafter described.

In the upper portion of the movable jaw-frame 22, adjacent to the movable jaw 23, is journaled in bearings 57, driven or otherwise fastened in the frame, a rotatable spindle or shaft 59. On the left-hand end of this spindle 59 is a shoulder 61, bearing against the frame 22 or bearings 57 or a washer (not shown) which may be inserted between the shoulder and these parts if desired. On the opposite end of this shaft 59 is a washer 63, a gear-pinion 65, another washer 67, and a nut 69, threaded thereon to detachably hold the spindle in position. The pinion 65 is detachably secured against rotation upon the spindle 59 by means of a spline or key. (Not shown.) On the extreme right-hand end of the shaft 59 is mounted a pinion 71, having in its circumference sprocket-teeth 73. This pinion 71 has in its left-hand end a notch 75, adapted to engage with a pin 77, removably driven into the shaft 59 at right angles thereto, and is held against this pin by a washer 79 and a screw-nut 81. By removing the nut 81 the washer 79 and pinion 71 may be removed from the shaft and other parts substituted in the manner and for the purposes to be hereinafter described.

At the left-hand end of the shaft 59 is threaded at 85 a chuck 87, adapted to have secured to it by means of a nut 89, threaded on screw-threads 91, a saw 93 or an emery-wheel or other rotating cutting or abrading wheel. This chuck 87 does not in detail form any part of my invention, and different chucks for holding such tools may be used without departing from my invention.

Extending from the movable jaw-frame 22 at some little distance below the shaft 59, heretofore described, is another shaft 95, to be hereinafter referred to as the "intermediate" shaft. This shaft is adapted to rotate in the frame 22 and is held against longitudinal movement by a pin 97, entering a circular groove 99 in the shaft 95. Rigidly secured to this shaft 95 by a key or spline (not shown) is a gear 101, meshing with the gear or pinion 65, heretofore described. On the hub of this gear 101, heretofore described, is another pinion 103, having on its face gear-teeth. This gear 103 may be made separate from the gear 101 and secured to it or independently secured to the shaft 95 without departing from my invention. In the shaft 95, outside of the gear 103 just described, is a pin 105, corresponding to the pin 77 in the shaft 59, against which the pinion 71 or any other part to be hereinafter described, adapted to engage that pin, may fit and be secured upon the shaft 95.

Below the intermediate shaft 95, heretofore described, somewhere near the base of the frame 22, is journaled at 107 and 109 in the frame a main driving-shaft 111. Secured to this shaft 111 by means of a pin 113 is a gear 115, having in its face teeth meshing with the pinion 103, heretofore described, from which it will appear that power applied to the driving-shaft 111 will be communicated, through gear 115, pinion 103, gear 101, and pinion 65, to the shaft 59, and consequently to the saw or other cutting-tool 93, and that if power be applied directly to either shaft 59 or shaft 95 such power will be communicated through said gearing to the other two shafts of those just mentioned to which the power is not applied. Outside of the gear 115 upon the shaft

111 is loosely mounted, in the absence of parts to be hereinafter described, a fly-wheel 117, having secured to its hub by screws 119 or other suitable means a sprocket-wheel 121, having in its circumference teeth 123 of the same size as the teeth 73 in the pinion 71. For the purpose of my invention here described I usually have the same number of teeth upon the sprockets 71 and 121, so that when they are connected by a sprocket-chain 125 (see Fig. 1) the two sprocket-wheels will rotate at the same speed.

In the hub of the fly-wheel 117 is a notch 127, in which a belt or band communicating with an outside source of power may be placed if desired. The fly-wheel itself is made in the form of a step-cone, with reference to the hub, bearing this groove 127, and has preferably a web member 129, continuous in form, in place of spokes, though spokes might be used. On the outer edge of this web 129 is the fly-wheel rim 131, having cut in its circumference a notch or depression 133, in which a belt or band from another source of power may pass if desired. By shifting such belt or band from such outside source of power from the notch 127 to the notch 133 and back again different degrees of power may be applied to the fly-wheel 117 and thence through the sprocket-chain 125 to the shaft 59.

Outside of the fly-wheel 117 just described and having no connection therewith is a pin 135, placed transversely in the shaft 111 in the same way that pins 77 and 105 are placed in their respective shafts, as heretofore described. Mounted upon the shaft 111 is the hub 137 of a crank-handle 139, having a handle 141 adapted to be grasped by the operator. On the engaging ends of this hub 137 is a notch 143, (see Fig. 6,) adapted to fit over pin 135, thus described so that the hub 137 when in engagement with the pin cannot turn upon the shaft 111. The hub 137 is held in such engagement with the pin 135 by means of a hand-wheel 145, threaded upon the end of the shaft 111. A nut to be operated by a wrench might be used in place of this hand-wheel 145 if desired.

In the structure shown in Fig. 4 and Fig. 1 the fly-wheel 117 runs loosely upon the shaft 111, as heretofore described, and when the operator takes hold of the handle 141 and rotates it he communicates power to the shaft 111, thence through gearing 115 103 101 65 to the shaft 59, which power is thence transmitted through pinion 71, sprocket-chain 125, and pinion 121 back to the fly-wheel 117, which rotates freely upon shaft 111 for the ordinary fly-wheel purpose—that is, to steady the motion of the device.

When it is desired to operate the shaft 59 at a different rate of speed from that produced by the method just described without removing the fly-wheel 117 from the shaft 111, I do this by means which I will now describe. The engaging portion of the hub 137 heretofore described is cut in hexagonal form in the lines 147 (see Fig. 6) or any other polygonal form desired, and in the face of the web 129 of the fly-wheel 117 is cut a corresponding hole 149, or a plurality of such holes, if desired, in which this polygonal portion 147 is adapted to fit. Through this hole 149 I place a removable bolt 151, having a head 153 bearing at 155 upon the hub of the wheel 117, so that the bolt will not turn upon its axis. On this bolt 151 I slip the hub 137 of the handle 139 141 and secure it in position in contact with the edges of the polygonal hole 149 in the web 129 by means of the wheel or nut 145, as shown in Fig. 8. By removing the hand-wheel or nut 145 and turning the hub 137 part way around I am able to so adjust the handle 139 141 that, as shown in Fig. 7, the handle 141 grasped by the operator is at different positions with reference to the center of the fly-wheel, and consequently different crank-arms (mechanically effective ones) are obtained. By making these adjustments of the operating-handle and applying it, as described, directly to the fly-wheel 117 I apply different degrees of power to the fly-wheel and through it and the sprockets and sprocket-chain 125, heretofore described, to the shaft 59 and saw 93. When the device is so connected up, the shafts 95 and 111 and attached gearing rotate idly without function. By removing from shaft 59 sprocket-wheel 71, so that it is out of the way, and mounting the fly-wheel 117 upon the shaft 95 and carrying on these manipulations of the handle just described the gear 101 and pinion 65 will be brought into play in combination with the fly-wheel and still a different combination of speeds may be applied to the shaft 59. When so mounted, the fly-wheel 117 is held in engagement with the shaft 95 by a notch 157 on the face of the hub of the sprocket 121 (see Fig. 9) bearing against the pin 105 upon the shaft 95 and held in such engagement by threading the hand-wheel 145 upon the screw-threads 159 on the shaft 95.

In order to support work in operative engagement with the saw 93 or emery-wheel or other similar device, I provide a detachable removable table. (Best illustrated in Figs. 1, 2, 4, and 7.) This table 165 is preferably made of metal of sufficient size to hold any work which it is desired to operate upon with the tool here in question. On the under side of this table I preferably provide one central rib 167, having through it at substantially the center of the table a dowel-pin 169, the same being firmly secured in position and extending both sides of the rib, this dowel-pin being intended to enter a corresponding positioning hole or depression in one jaw of the device—in this machine the fixed jaw 17 and

the vise. On one side of this central rib 167 there is cut in the top of the table a hole 171, rectangular in form, adapted to allow an emery or other broad-faced grinding wheel to pass part way through it. On the other side of this central rib 167 is cut a narrow rectangular slot 173, extending through the face of the table, adapted to have the saw 97 or some other narrow-faced cutting-disk pass part way through it, as shown in Fig. 1. On each side of this central rib 167 and farther away from it than the openings 171 and 173 and at a distance less than the maximum width of opening of the jaws of the vise I place upon the under side of the table lugs 175 and 177, having in their faces dowel-pins or projections 179 adapted to enter corresponding positioning depressions in one jaw of the device—in that here in question the movable jaw 23. In the particular device here shown I do not make the pins or projections 179 on the center line of the table—this so that a careless operator cannot by accident get the table in such a position on the top of the vise that the central rib 167 will be against the movable jaw 23 instead of the stationary jaw 17; but a device might be designed in which another system of fitting of the parts against the respective jaws of the vise might be used without departing from my invention. Further outside of the lugs 175 and 177, heretofore described, I place upon the under side of the table depending pins or lugs 181, adapted to fit at the ends of the jaws of the vise and help to insure the proper positioning of the table. In the operation of this part of the device the operator takes the table shown in Fig. 2 and, assuming that the saw is to be used as shown in Fig. 1, places the table with the dowel-pin 169 in engagement with the fixed jaw 17, which will allow the slot 173 to fit over the saw 93. He now lets the table settle down upon the movable jaw 23 until the lugs 181 are at opposite ends of the jaw 23 and the projection 179 is opposite the corresponding opening in the face of the jaw 23. This opening in the face may be made of exactly the same shape as the pin 179, but is preferably made slotted, so that if necessary the jaw 23 may be adjusted slightly by means of the screws 51 and 53, heretofore described, with reference to the table after it is in position on the jaw 23. When these adjustments have been made, the operator takes hold of the hand-wheel 29 and turns the screw 25, thereby clamping the jaw 23 upon the lugs 177 and securing the table in position in the device. The operator now takes hold of the handle 141 and manipulates the same to rotate the saw 93, as heretofore described. When a grinding-wheel is desired, the operator reverses the instructions just given and removes the table from the device. He now turns the table end for end and after putting the desired emery-wheel upon the shaft 59 in place of the saw 93 places the table over the emery-wheel, with the lugs 175 and corresponding parts in contact with the movable jaw 23, and moves up the jaw 23 upon the same, thereby clamping the table in its new position.

In order to make my table more convenient, I mount in the notches 183, cut parallel to the center lines of the table, a gage 185, pivoted at 187 and adapted to be adjusted by the set-screw 189 to work at different angles. This gage may be any one of the ordinary types of miter-gage, and by its use in connection with adjusting-screws 191 for holding it in stationary position the operator is able to saw or grind objects at an angle. This operation is facilitated by moving the gage from the depressions 183 on one side of the table to those on a side at right angles thereto.

In order to increase the size of my table, I provide a supplemental leaf 193, as shown in Fig. 2ª, having extended from it bars or tongues 195, adapted to be secured to the main table 165 by bolts or screws passing through holes 197 in the bars 195 and holes 199 in the main table 165.

In order to provide for further accurate alinement of the base 22 of the movable jaw-frame and the stationary jaw-frame 16, I provide bars or tracks 201, on which the lower end of the vertical member 41 is adapted to travel backward and forward inside of the frame 16, thus reinforcing the alining properties of the ribs 47 and 49 heretofore described.

Referring to Fig. 4, I desire to explain that, if desired, the sprocket-wheel 71 may be removed from the shaft 59 and the fly-wheel 117 put in its place, the notch 157 engaging the pin 77 and the hand-wheel 145 being secured upon the end of the shaft 59, or the fly-wheel may be secured upon the shaft by the nut and the hand-wheel inserted in the holes 149 in the webs or spokes of the wheel, as fully described heretofore and illustrated in Fig. 7. This use is possible and desirable where the table is not used and boring or other tools (not here shown or claimed) are used in place of the saw; but where the table is used the fly-wheel would in many instances when on shaft 59 be in the way of work upon the table, so that it is a distinct advantage to be able to mount this fly-wheel at a point below the table as shown and described, where it is out of the way of such work.

I do not wish to be understood as limiting myself to the exact details of construction, which may be varied within reasonable limits without departing from the broad principles of my invention.

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

1. In mechanism of the class described, the combination of two vise-jaws, means for moving one jaw toward the other, a rotatable

working spindle mounted adjacent to one of said jaws, a saw or other cutting disk mounted on said spindle between the jaws of the vise, means for rotating said spindle, and a table above the vise adapted to be supported thereby there being an opening in the table through which said cutting saw or disk passes to reach work upon the table.

2. In mechanism of the class described, the combination of two vise-jaws, means for moving one jaw toward the other, a rotatable shaft or spindle mounted in one of said jaws, a tool-arbor mounted upon said spindle between said open jaws, means for rotating said shaft or spindle and a reversible table detachably mounted between the jaws of the vise and above the vise, there being two slots in said table, one for a broad disk, the other for a narrow disk, and lugs upon the under side of the table adapted to be clamped between the jaws of the vise, said lugs being so located with reference to the slots in the table that by turning the table end for end in the vise it may be used in connection with either a broad disk or a narrow disk mounted in the said tool-arbor upon said spindle, substantially as described, for the purpose set forth.

3. In mechanism of the class described, the combination of two vise-jaws, one stationary and the other adapted to be moved horizontally with reference thereto, means for moving the second jaw with reference to the first, a working table having lugs thereon adapted to be clamped between the jaws of the vise, supplemental lugs adapted to accurately position said first lugs with reference to the vise-jaws and mechanism in the operating connection between said jaws for adjusting said movable jaw at right angles to its line of motion with reference to the fixed jaw, whereby said movable jaw is adjusted with reference to the fixed jaw and the table, substantially as described.

4. In mechanism of the class described, the combination of two vise-jaws, means for moving one jaw toward the other, a rotatable spindle mounted in one of said jaws having a portion projecting between said jaws, means for rotating said spindle, a table above the vise having lugs on the under side thereof adapted to be detachably clamped between the jaws of the vise, lugs 181 upon the under side of the table, and lugs 169 extending horizontally from the first-mentioned lugs adapted to engage corresponding openings in the faces of the vise-jaws for insuring the same positioning of the parts, there being an opening in said table through which the grinding-wheel or saw upon the spindle passes to reach work upon the table.

5. In mechanism of the class described, the combination of two vise-jaws, means for moving one jaw toward the other, a rotatable shaft or spindle mounted in one of said jaws, means for rotating said spindle, a tool-arbor on said spindle between the jaws of the vise, and a reversible table above the vise having lugs on the under side thereof adapted to be detachably clamped between the jaws of the vise, guiding means on the table, lugs and vise for insuring the same positioning of the parts, there being two openings in said table through which a narrow saw or a wide wheel mounted in the same position in the tool-arbor on the working spindle are respectively adapted to pass to reach work upon the table when the table is turned end for end and clamped in the jaws of the vise.

6. In mechanism of the class described, the combination of a stationary jaw-frame carrying a stationary vise-jaw and having a recess therein extending along the base in the direction of the jaw, a movable jaw having a frame on which there is a right-angled extension extending into said recess in the stationary jaw-frame, means for moving said movable jaw-frame extension backward and forward inside said recess in the stationary frame, set-screws on opposite sides of the stationary frame engaging the sides of the extension of the movable frame within the stationary frame, whereby by changing the positions of said set-screws the movable frame may be adjusted laterally within the stationary frame, thereby ultimately adjusting the movable jaw of the vise with reference to the stationary jaw, and a working table having lugs thereon adapted to be clamped between the jaws of the vise and supplemental lugs upon said first lugs adapted to accurately position them with reference to the vise-jaws when the movable jaw is adjusted laterally as described.

7. In mechanism of the class described, the combination of a stationary jaw-frame carrying a stationary vise-jaw and having a recess therein extending along the base in the direction of the jaw, a movable jaw having a frame on which there is a right-angled extension extending into said recess in the stationary jaw-frame, means for moving said movable jaw-frame extension backward and forward inside said recess in the stationary frame, set-screws on opposite sides of the stationary frame engaging the sides of the extension of the movable frame within the stationary frame, whereby, by changing the positions of said set-screws the movable frame may be adjusted laterally within the stationary frame, thereby ultimately adjusting the movable jaw of the vise with reference to the stationary jaw, horizontal ridges extending along the movable frame adjacent to said set-screws adapted to assist in causing the movable frame to move in a straight line with reference to the stationary frame, and a working table having lugs thereon adapted to be clamped between the jaws of the vise and supplemental lugs upon said first lugs adapted to accurately position them with refer-

ence to the vise-jaws when the movable jaw is adjusted laterally as described.

8. In mechanism of the class described, in combination with a suitable support and a work-table secured thereto, there being an opening in the table through which a rotating saw or other disk is adapted to pass to reach work from the table; a shaft journaled in said support, a saw or disk attached to said shaft in such a position that a portion of it passes through said opening in the table, another shaft mounted in the support below said first shaft and table gearing adapted to communicate power from said second shaft to said first shaft, other power-transmitting means on said first shaft connecting it with a loosely-running fly-wheel on the second shaft whereby power is communicated from said first shaft to the fly-wheel, and means for rotating said second shaft.

9. In mechanism of the class described, the combination with a suitable support, a working table above it, there being a slot in the table through which a saw or other cutting-disk is adapted to pass; a shaft journaled in the support adjacent to the table, a saw or cutting-disk secured to said shaft extending through said slot in the table, a pinion rigidly secured to the other end of said shaft, a sprocket-wheel also rigidly secured to the same end of said shaft, an intermediate-shaft mounted in the support below said first shaft, a gear mounted on said intermediate shaft, said gear meshing with the pinion on the first shaft, a pinion on the intermediate shaft, a third or driving shaft journaled in the frame at a distance from said first two shafts, a gear rigidly secured to said driving-shaft meshing with the pinion on the intermediate shaft, a fly-wheel loosely journaled upon said driving-shaft, a sprocket-wheel secured to said fly-wheel, also loosely journaled upon said driving-shaft in line with the first sprocket-wheels above mentioned, a sprocket-chain over said sprocket-wheel and a crank-handle detachably secured to said driving-shaft outside the driving-wheel, whereby rotating the crank-handle communicates power to the driving-shaft, to the intermediate shaft, to the first-mentioned shaft and saw or operating-tool, thence back through said sprocket-wheel and chain to the idle running fly-wheel, substantially as described.

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

JAMES W. MYERS.

Witnesses:
F. W. BARRETT,
DWIGHT B. CHEEVER.