P. P. WESTBYE.

VARIABLE STROKE MECHANISM.

APPLICATION FILED AUG. 8, 1914.

1,256,624.

Patented Feb. 19, 1918.

5 SHEETS—SHEET 1.

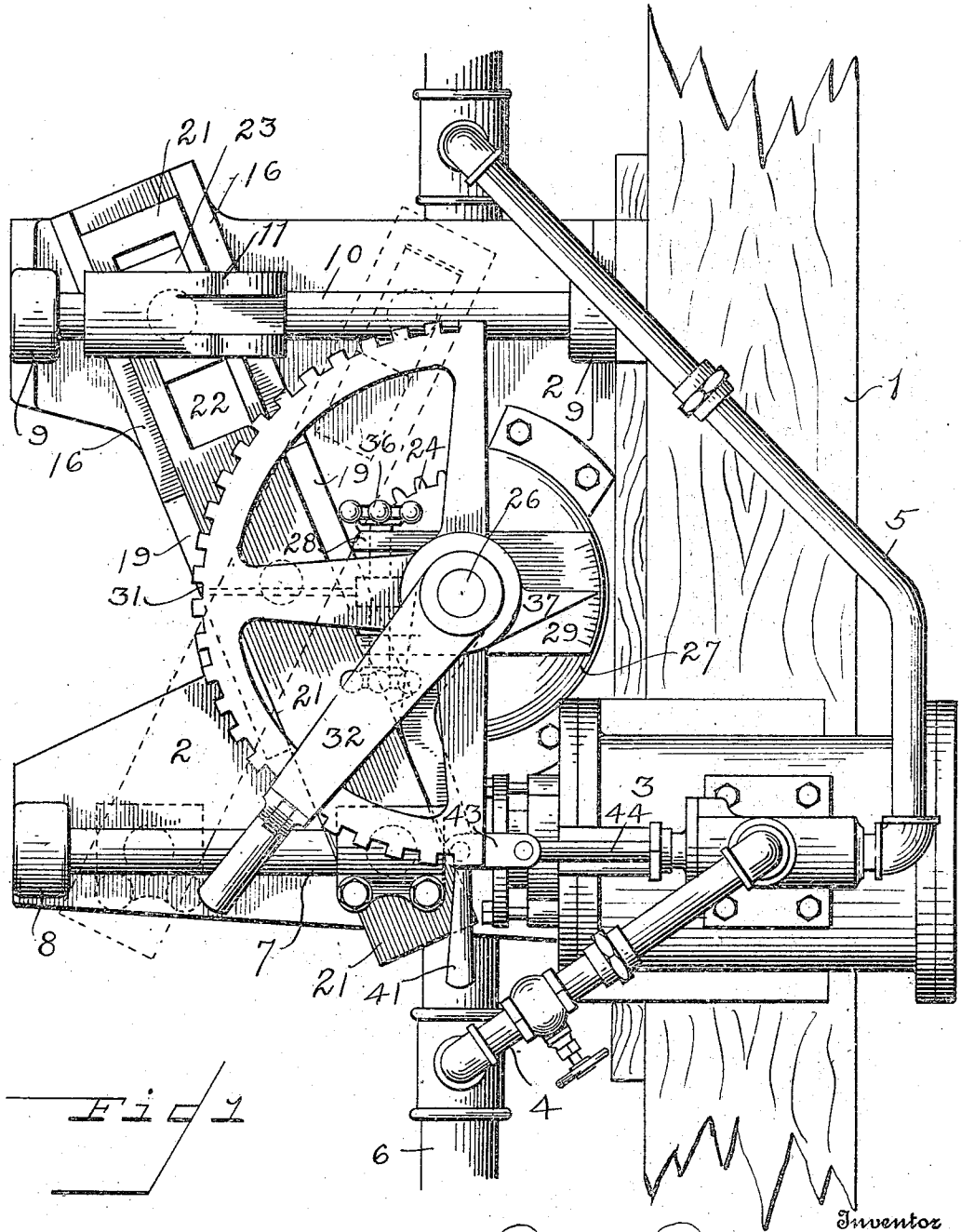


Fig. 1.

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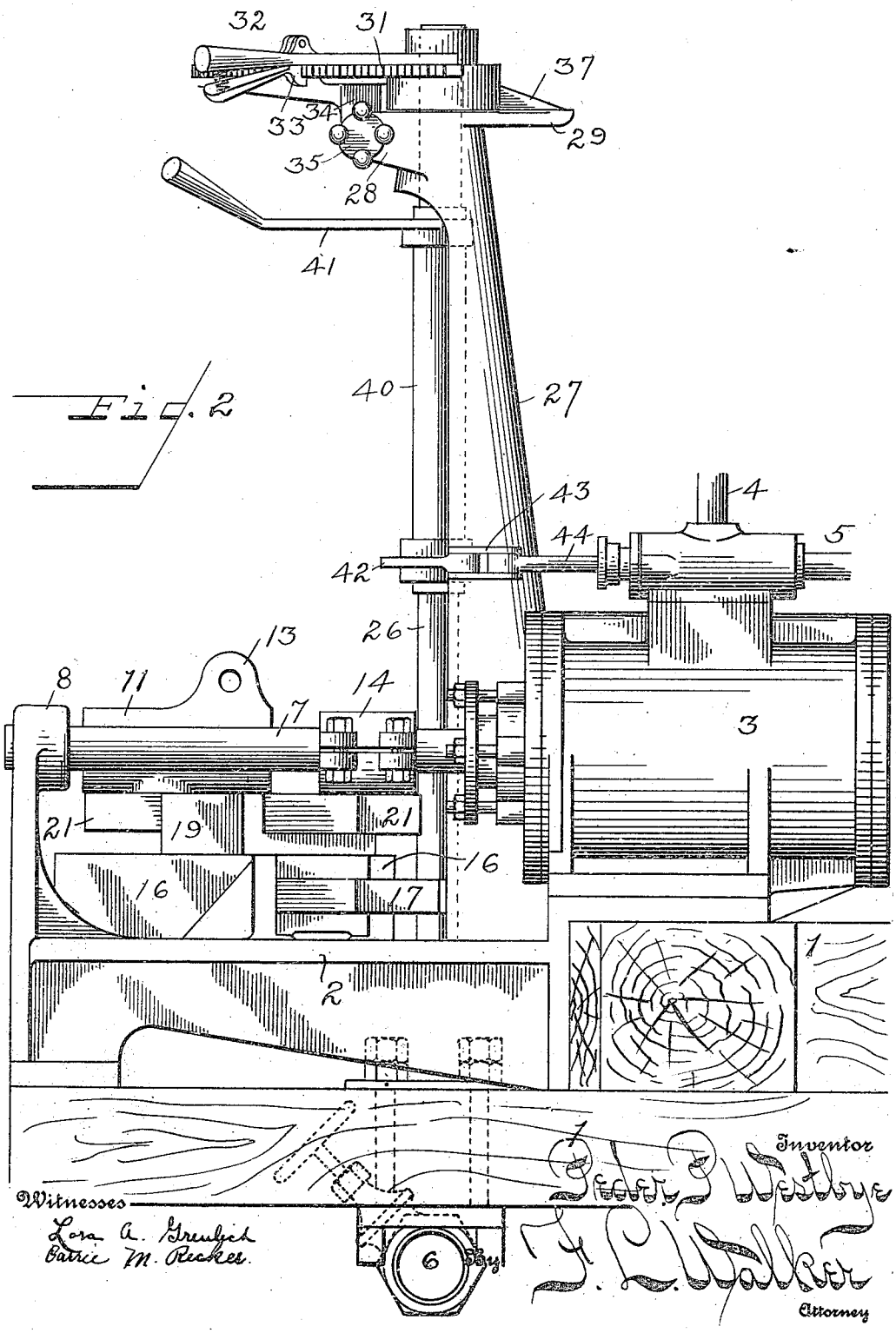


Fig. 2

Witnesses

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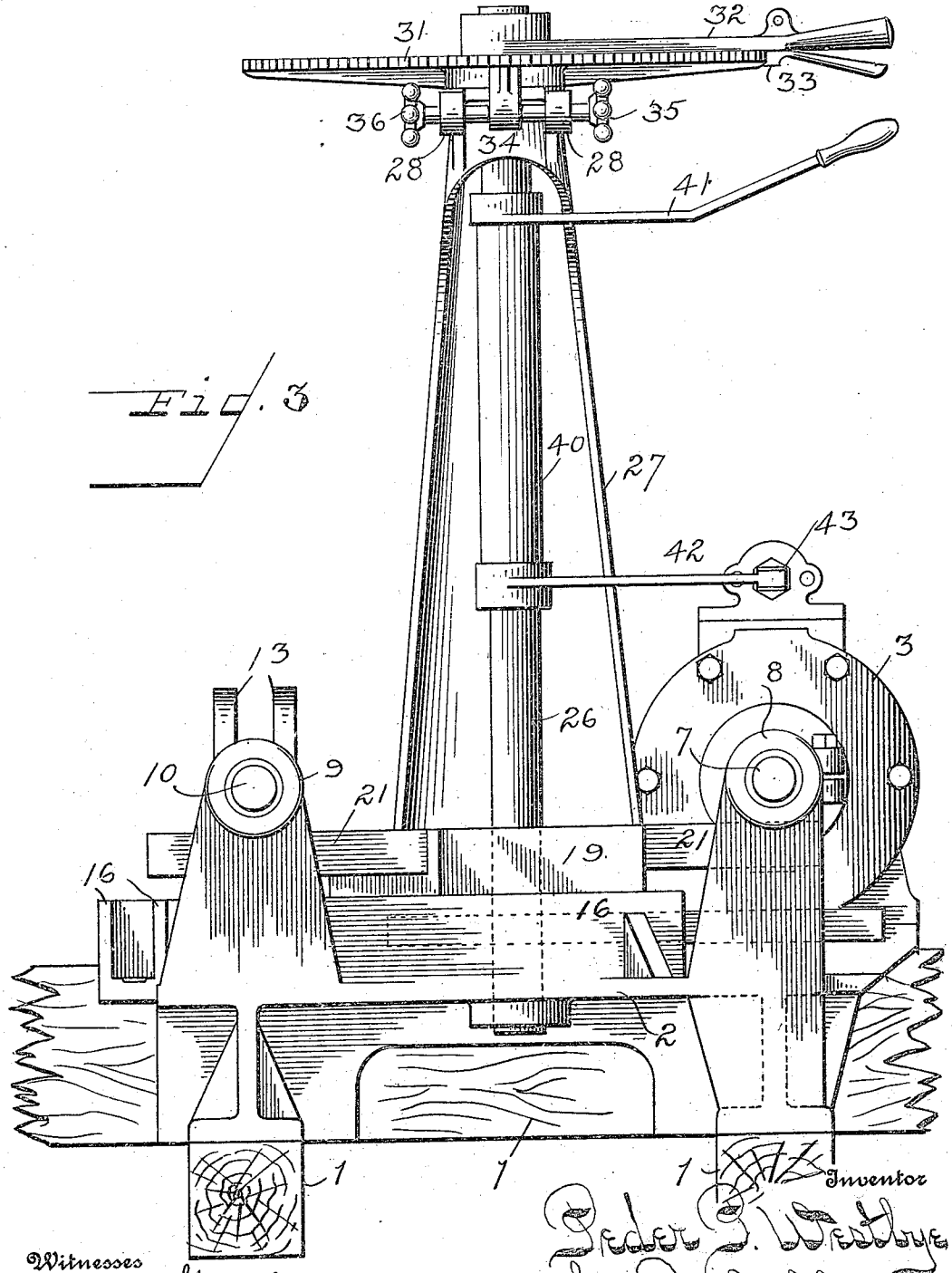


Fig. 3

Witnesses
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5 SHEETS—SHEET 4.

Fig. 4

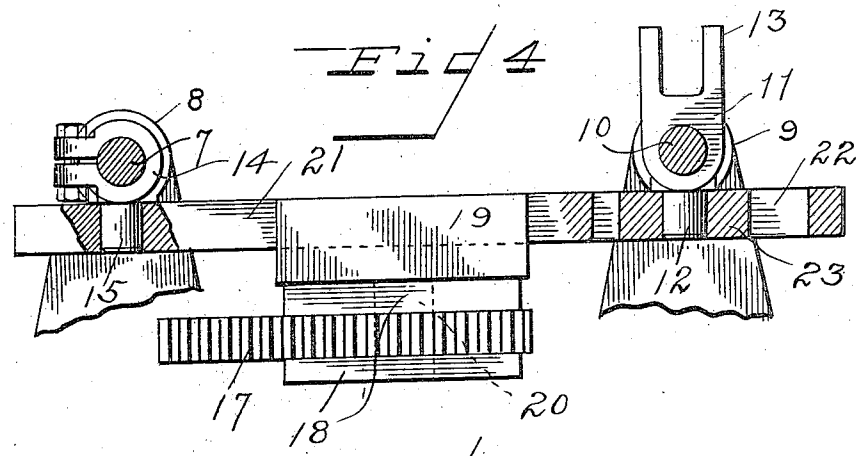


Fig. 5

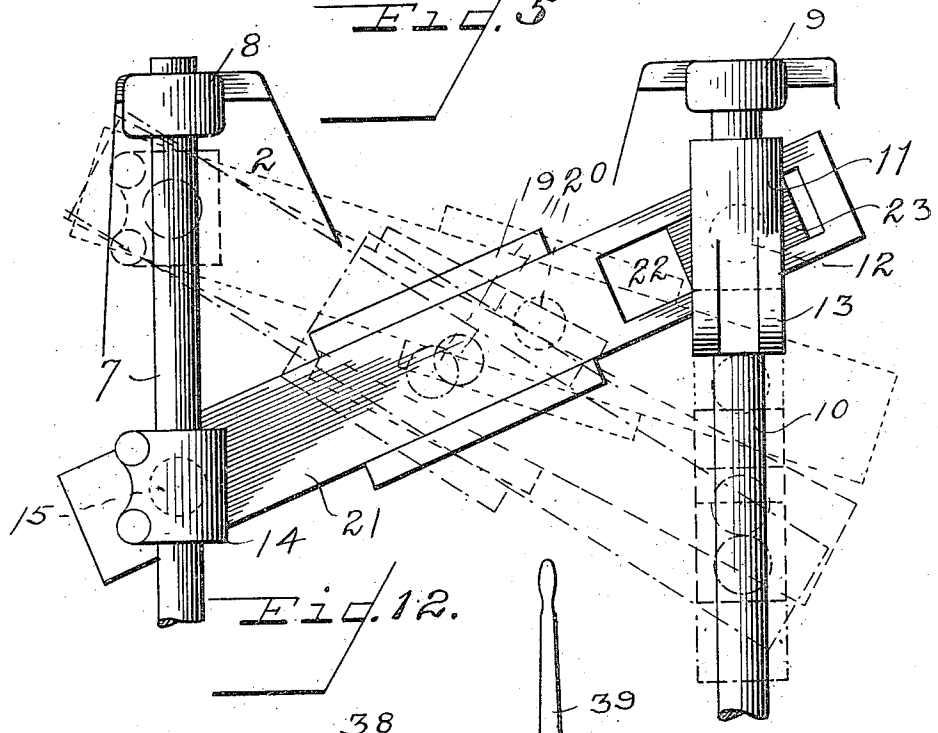
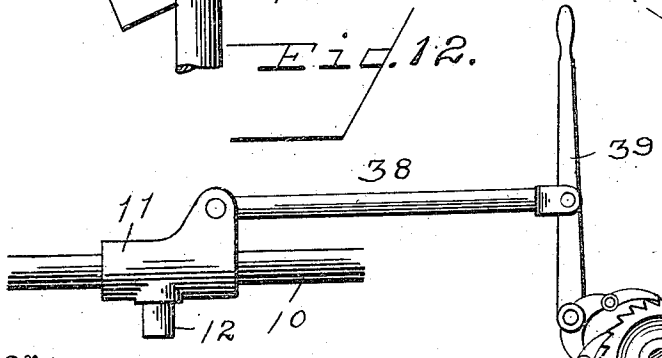


Fig. 12.



Witnesses

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5 SHEETS—SHEET 5.

Fig. 8.

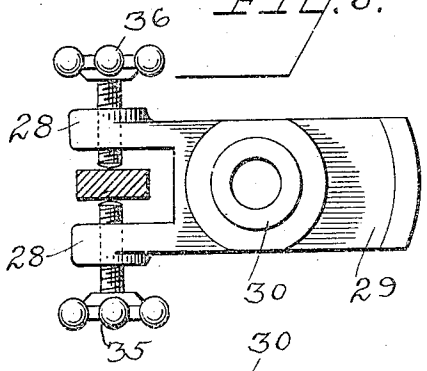


Fig. 9.

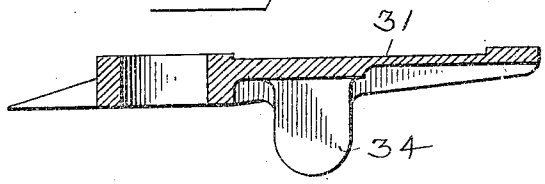


Fig. 7

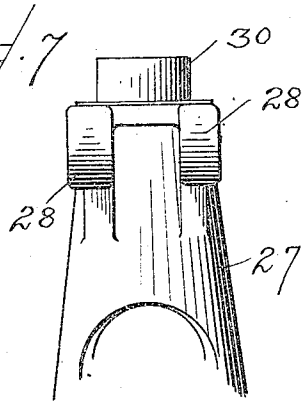


Fig. 6.

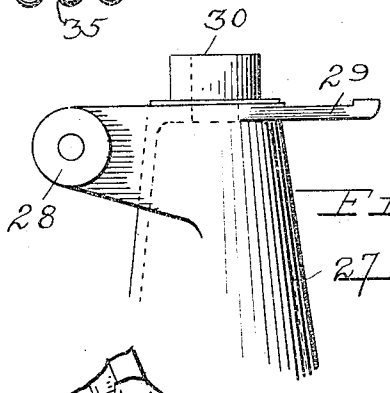


Fig. 10

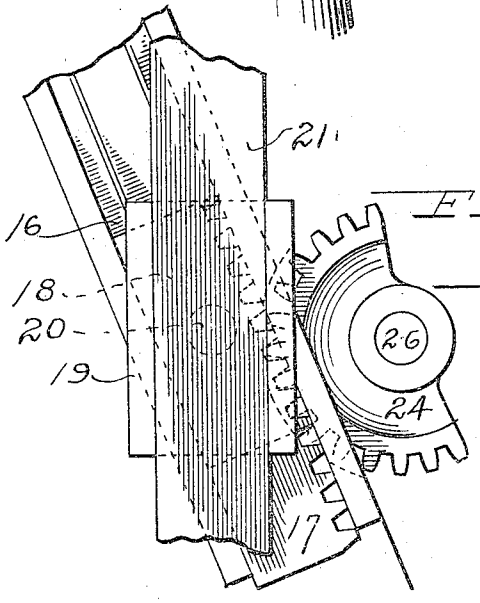
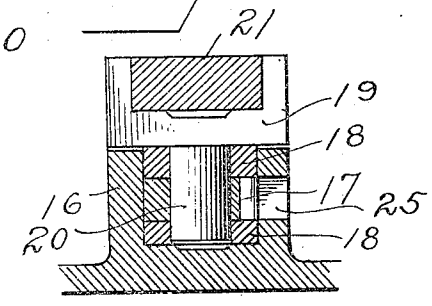


Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

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VARIABLE-STROKE MECHANISM.

1,256,624. Specification of Letters Patent. Patented Feb. 19, 1918.

Application filed August 8, 1914. Serial No. 855,930.

To all whom it may concern:

Be it known that I, PEDER P. WESTBYE, a subject of the King of Norway, residing at city of Peterborough, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Variable-Stroke Mechanism, of which the following is a specification.

My invention relates to variable stroke mechanism adapted to transform a uniform reciprocatory movement into a movement of different extent variable at the will of the operator.

While the mechanism has been shown and described as applied to the set works of a saw mill, for which purpose it is particularly suitable, it is to be understood that it is not limited to such use but may be applied for other purposes.

The object of the invention is to simplify the structure as well as the means and mode of operation of such devices whereby they will not only be cheapened in construction, but will be more efficient in use, rapid and reliable, positive and accurate in operation, easily controlled, and unlikely to get out of repair.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the drawings, Figure 1 is a plan view of the assembled power actuating apparatus. Figs. 2 and 3 are side and end elevations thereof, respectively. Fig. 4 is a detail transverse sectional view. Fig. 5 is a detail plan view illustrating different degrees of adjustment of the mechanism. Figs. 6 and 7 are detail side and front elevations, respectively, of the upper end of the standard or column. Fig. 8 is a detail plan view thereof. Fig. 9 is a detail sectional view of the sector or quadrant. Fig. 10 is a detail plan view of the adjusting means. Fig. 11 is a detail transverse sectional view of the oscillatory operating bar and its mounting. Fig. 12 is a detail view illustrating the application of the power apparatus to the set works of a saw mill.

Like parts are indicated by similar characters of reference throughout the several views.

As illustrative of one application of the apparatus it will be described as applied to a saw mill set works.

In the usual saw mill construction, at the present time, there is employed a traveling carriage which reciprocates longitudinally to and fro to advance the log to the saw throughout the sawing operation. The log is carried in head blocks which are adjustable in a transverse direction upon the carriage to advance the log into alinement with the saw preparatory to each sawing operation. The distance that the log is advanced by the adjustment of the head blocks determines the thickness of the plank or slab produced. The head blocks are usually adjusted by means of revoluble feed screws actuated by a pawl and ratchet feed device.

It is customary to operate the pawl and ratchet feeding mechanism by a manually operated set lever. For economical reasons it is frequently desirable to cut timbers and planks of different dimensions from a single log. This necessitates the operation of the set works through different degrees of movement for succeeding operations. The operation of the set lever requires considerable effort and is very laborious and tiresome and wearing upon the operator.

One of the primary objects of the invention is to provide power means for actuating the set works, preferably operated by fluid pressure such as steam, compressed air, or hydraulic means and controlled by minimum exertion of the operator.

Prior devices for this purpose are not entirely unknown. Such devices, however, have been usually regulated to vary the degree of adjustment of the set works by limiting the movement of a piston to different degrees of travel. Such mechanism, however, cannot be operated with the desired degree of accuracy and the arresting of the piston at any mid stroke point causes a shock which is objectionable, causes a jar and vibration of the carriage, and produces undue stress and strain upon the mechanism.

In the present construction there is employed a reciprocatory piston which travels throughout the full limit of its stroke in either direction at each operation, thereby utilizing the cushioning effects produced as the piston approaches the end of the cylinder. This avoids all shock and strain which results from stopping the piston before it has reached the limit of its stroke.

In conjunction with the piston operating throughout a full stroke, there is employed an oscillatory actuating bar having a variable fulcrum which may be adjusted to and fro to give to the operative end of the bar a greater or less throw by which the set works or other mechanism is operated to a greater or less degree. The adjustment of the fulcrum is controlled by the operator by means of an easily manipulated control lever.

Referring to the drawings, 1 1 are the timbers forming the frame work of the carriage. Located upon the carriage 1 is the bed frame 2 carrying at one side thereof a cylinder 3. The cylinder 3 is supplied with steam through the pipe 4 and is exhausted through the pipe 5. The pipes 4 and 5 communicate with inlet and outlet sections of a telescopic supply conduit 6 located beneath the carriage 1. The telescopic joints of the conduit 6 compensate for the reciprocatory movement of the carriage.

Mounted within the cylinder 3 is a reciprocatory piston not shown in the drawings, the piston rod 7 of which, projecting beyond the cylinder, reciprocates in a bearing 8 projecting upward from the bed frame. Supported in bearings 9 at the opposite side of the bed frame 2 and arranged in parallel relation with the piston rod 7 is a stationary shaft 10.

Slidingly mounted upon the shaft 10 is a reciprocatory head 11 having a pendant stud or trunnion 12 and provided with lugs or ears 13 for the connection of the link by which the set works or other mechanism is actuated. Secured by clamping or otherwise upon the reciprocatory piston rod 7 is a corresponding head 14 having a pendant stud or trunnion 15. The head 14 travels in unison with the piston rod while the head 11 slides upon its supporting shaft.

Diagonally disposed upon the bed frame 2 are guides or ways 16. Mounted to reciprocate within the guides or ways 16 is a rack bar 17 having secured to the opposite sides thereof bolster or bearing plates 18. The rack bar 17 and bearing plates 18 form a solid body capable of longitudinal movement in the guides or ways 16.

Journaled in the rack bar 17 and plates 18 is a fulcrum head comprising a channeled or recessed main body 19 and a pendant stud or trunnion 20 which engages within a corresponding socket or bearing within the rack 17 and plates 18, as shown in detail in Fig. 11.

Loosely supported within the channel or recess of the main portion 19 of the fulcrum head is an oscillatory actuating bar 21 with which the pendant stud or trunnion 15 of the head 14 is pivotally engaged at one end. At its opposite end the actuating bar 21 is recessed as at 22 within which recess is mounted a sliding block 23 engaged by the pendant stud or trunnion 12 of the sliding head 11. The block 23, with its pivotal connection with the sliding head and its sliding connection with the actuating bar forms a construction quite similar to that of the well known Scotch cross head.

The construction is such that as the piston rod 7 is reciprocated, the stud or trunnion 15 of the head 14 engaged with the actuating lever oscillates said lever about the pivot 20 of the fulcrum head thereby causing the opposite end of the bar to reciprocate the sliding head 11 upon the shaft 10. By adjusting the rack 17 longitudinally within the guides or ways 16 and thereby shifting the fulcrum head longitudinally upon the actuating bar 21, the stroke of the sliding head 11 may be varied without varying the stroke of the piston.

To adjust the rack bar 17 and thus vary the effective stroke of the apparatus, there is provided a gear pinion 24 projecting through a slotted opening 25 in one of the guides or ways 16 and intermeshing with the rack bar 17 therein. The gear pinion 24 is carried upon a rock shaft 26 extending perpendicularly through an upright standard or column 27. The rock shaft 26 is provided with bearings in the bed frame 2 and in the top of the standard or column 27.

At its upper end the standard or column is provided with two laterally disposed parallel lugs or ears 28 and at the opposite side with a graduated ledge or leaf 29. Mounted upon a hub or sleeve 30 projecting from the top of the column or standard is a notched sector or quadrant 31 capable of a limited oscillatory movement in relation with the standard or column. Secured to the top of the rock shaft 26, which projects through the bearing sleeve or hub 30, is an operating lever 32 provided with a detent 33 adapted to engage any one of the notches of the sector or quadrant 31 to retain the lever and shaft in adjusted position in relation therewith. The sector or quadrant 31 is provided with a pendant ear or lug 34 which projects intermediate the lateral lugs or ears 28 of the column. See Figs. 3 and 8. Adjusting screws 35 and 36 pass through the lugs 28 and bear upon opposite sides of the pendant lug 34 of the quadrant. At its opposite side the quadrant or sector is provided with a finger or pointer 37 coöperating with the graduated ledge or leaf 29. It will thus be seen that the operating lever 32 and the shaft 26 are capable of oscillatory adjustment independent of the sector or quadrant and that the sector or quadrant is capable of additional movement in unison with the operating lever and shaft by means of the adjustment screws 35 and 36. The notches are preferably located in the sector or quadrant in such relation that they will correspond with definite and equal units or de-

grees of adjustment. That is, the notches are so arranged that the adjustment of the operating lever 32 whereby the detent will engage the next succeeding notch will cause the operation of the set works through such degrees of movement that the thickness of the succeeding plank or timber sawed will vary a definite amount such as a half inch or one inch. In operation the detent 33 is disengaged from the quadrant and the lever 32 is oscillated until the detent can be re-engaged with the notch corresponding to the thickness of the plank of timber desired. This movement of the lever 32 rocks the shaft 26 and therewith oscillates the gear 24 which by its oscillatory movement reciprocates the rack 17 within the guides or ways 16 thereby shifting the fulcrum head 19 or the actuating bar 21. The piston and piston stem operating through a full stroke, which stroke is the same at each operation, oscillates the actuating bar 21 about its pivotal stud 20 to reciprocate the head 11. The head 11 is connected by a link 38 with the operating lever 39 of the set works, or with other mechanism to be operated. A simple form of connection is shown in detail in Fig. 12. In this figure the link 38 is shown connected directly to the hand lever by which the set works are manually operated. This enables the power apparatus herein described to be applied to the manually operated set works now in common use. It is obvious that any other form of connection may be employed. When the fulcrum of the operating bar has been adjusted by means of the lever 32, as before described, a further adjustment of the parts may be had whereby the set works may be adjusted through an additional movement corresponding to a fractional part of the unit or degree corresponding with the notches of the sector or quadrant, by adjustment of the screws 35 and 36. By loosening one of these screws and tightening the other the sector or quadrant may be oscillated slightly in either direction upon the standard or column, carrying with it the operating lever 32. The degree of this additional movement is indicated by the relation of the finger or pointer 37 with the graduations upon the ledge or leaf 29. Thus the major adjustment is made by the oscillation of the lever 32 in relation with the sector or quadrant and the minor adjustment or the adjustment to fractional parts of the unit are made by the oscillation of the sector or quadrant upon its support in unison with which the operating lever and shaft are moved by engagement of the detent 33 therewith.

For convenience in controlling the apparatus, there is mounted upon the shaft 26 a rotatable sleeve 40 carrying at its upward end a throttle lever 41 conveniently located in relation with the adjustment lever 32 and carrying at its lower end a rock arm 42 connected by links 43 with the stem 44 of the reciprocatory valve controlling the admission of steam to the cylinder. The operation of the lever 32 to adjust the parts and the operation of the throttle lever 41 requires but a very small effort compared with that required to manually adjust the set works. The steam control valve mechanism may be of any suitable type.

Such power mechanism as has heretofore been provided has usually required a reorganization of the set works or required special carriage construction. The present apparatus is designed to be applied to the manually operated set works, now in common use, without disorganizing or modifying such set works other than to connect the link 38 to the usual operating lever.

From the above description it will be apparent that there is thus provided a device of the character described, possessing the particular features of advantage before enumerated as desirable but which obviously is susceptible of modification in its form, proportion, detail construction or arrangement of parts, without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to certain structural features, it is to be understood that the invention is not limited to any specific details, but that the means and construction herein described comprises but one mode of putting the invention into effect, and the invention is therefore claimed broadly in any of its possible forms or modifications within the scope of the appended claims.

Having thus described my invention, I claim:

1. In a variable stroke mechanism, a main frame, parallel reciprocatory driving and driven members mounted thereon, a fixed guide upon said main frame arranged in diagonal relation with the paths of travel of the driving and driven members and alined with the opposite limits of travel of predetermined points upon the driving and driven members, a reciprocatory head movable along said guide in a straight path of travel alined with the travel terminals of predetermined points upon the driving and driven members, a pintle carried by said head, an oscillatory lever slidingly engaged with said pintle about which the lever oscillates, said lever being engaged with the driving and driven members at opposite sides of said pintle, and means to shift said head along said guide to vary the relative lengths of the opposite arms of the lever, the construction being such that the movement of said pintle in a direction coincident with that of the oscillatory lever when at the

extreme limit of its movement will vary the length of the stroke of the driven member from a constant limit of travel to which the driven member is returned at each operation regardless of the length of its stroke.

2. In a variable stroke mechanism, a main frame, driving and driven members, an oscillatory control shaft, a fixed guide alined with the opposite limits of travel of predetermined points upon the driving and driven members, a reciprocatory rack member movable along said guide, a gear member carried by the control shaft and engaging the rack, a pintle having a bifurcated head carried by the reciprocatory rack, an oscillatory lever slidingly engaged in the bifurcation of the pintle head and engaged with the driving and driven members at opposite sides of the pintle said pintle being movable in a straight path toward and from the limits of travel of the engagement points of the lever with the driving and driven members by the adjustment of said control shaft to vary the stroke of the driven member from a constant limit of travel in one direction.

3. In a variable stroke mechanism, a main frame, driving and driven members, an oscillatory lever connecting the driving and driven members, a shifting fulcrum for said lever intermediate its connections with the driving and driven members and means for shifting the fulcrum in a straight path alined with the connecting points of the lever with the driving and driven members when the lever is at the limit of its oscillatory movement in one direction to vary the stroke of the driven member from a constant limit of travel in one direction regardless of the length of its stroke.

4. In a variable stroke mechanism, a main frame, driving and driven members, an oscillatory lever connecting the driving and driven members, a shifting fulcrum for said lever located intermediate its connections with the driving and driven members, an oscillatory actuating shaft therefor, a segment capable of oscillatory movement by which the degree of rotation of the shaft and the shifting fulcrum actuated thereby is gaged, means normally maintaining the segment against oscillatory movement, means for oscillating the shaft independent of the segment, means for locking the shaft and segment in fixed relation one with the other, and means for imparting to the segment an oscillatory movement which is transmitted thereby to the shaft and thence to the shifting fulcrum, substantially as and for the purpose specified.

5. In a variable stroke mechanism, a main frame, a driving and a driven member, an oscillatory lever connecting the driving and driven members, a shifting fulcrum for said lever located intermediate its connections with the driving and driven members, a pivoted notched segment carried upon the main frame capable of oscillatory movement, an oscillatory control shaft, said shaft and segment being normally capable of independent oscillatory movement, actuating connections between the shaft and the shifting fulcrum, a hand lever by which the shaft may be oscillated independent of the segment, a latch for engaging the hand lever with any one of the series of notches of the segment, and means for oscillating the segment while the lever is so engaged thereby moving the shaft in unison with the segment to impart to the shifting fulcrum a degree of movement less than that determined by succeeding notches of the segment, whereby the stroke of the driven member will be correspondingly varied.

In testimony whereof, I have hereunto set my hand this 1st day of July, A. D. 1914.

PEDER P. WESTBYE.

Witnesses:

WILFRID F. HUYCKE,

A. B. MCMAHON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."