No. 698,243. Patented Apr. 22, 1902.

R. F. BARKER & M. CORRY.

STEAM SET WORKS FOR SAWMILLS.

(Application filed June 24, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

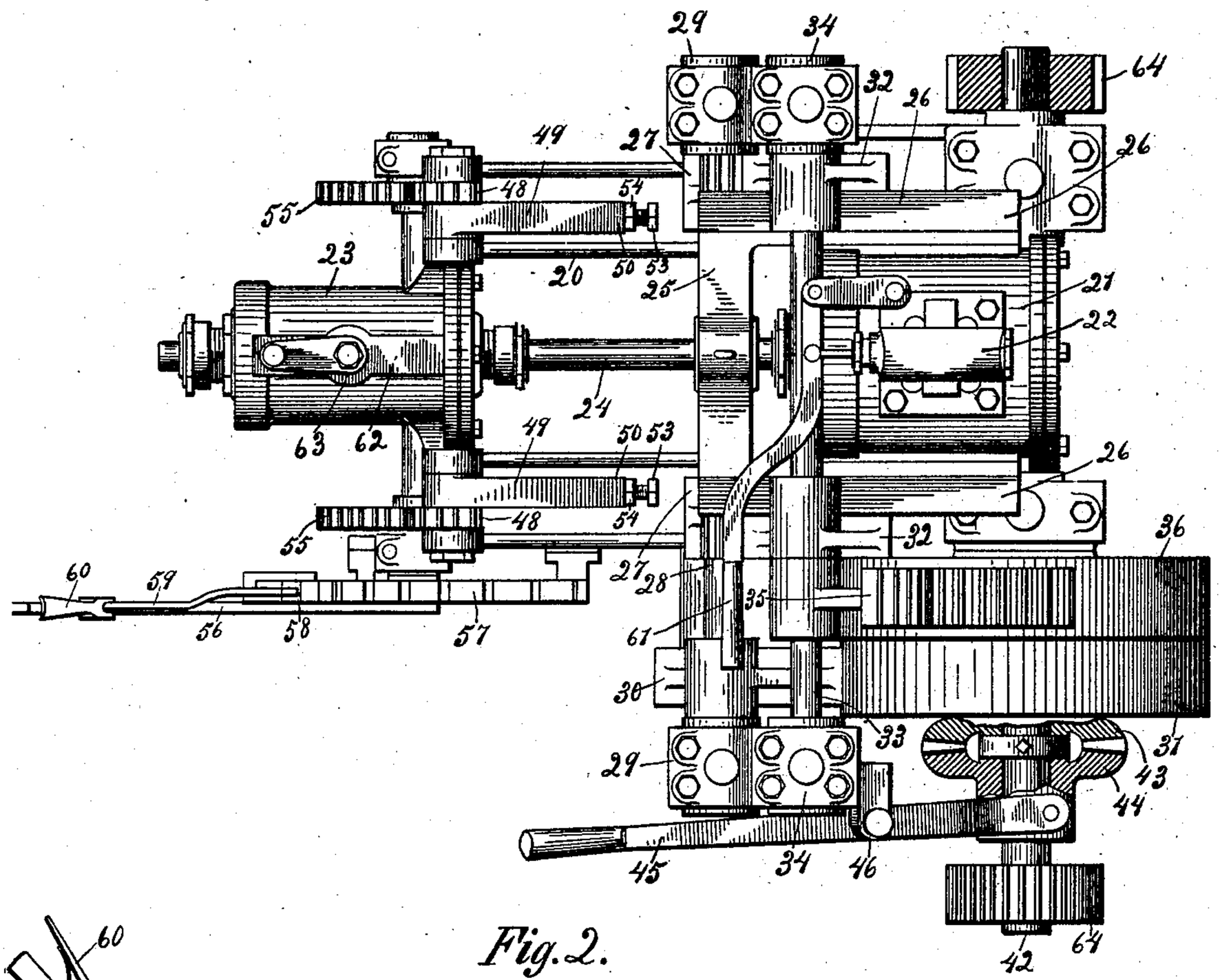
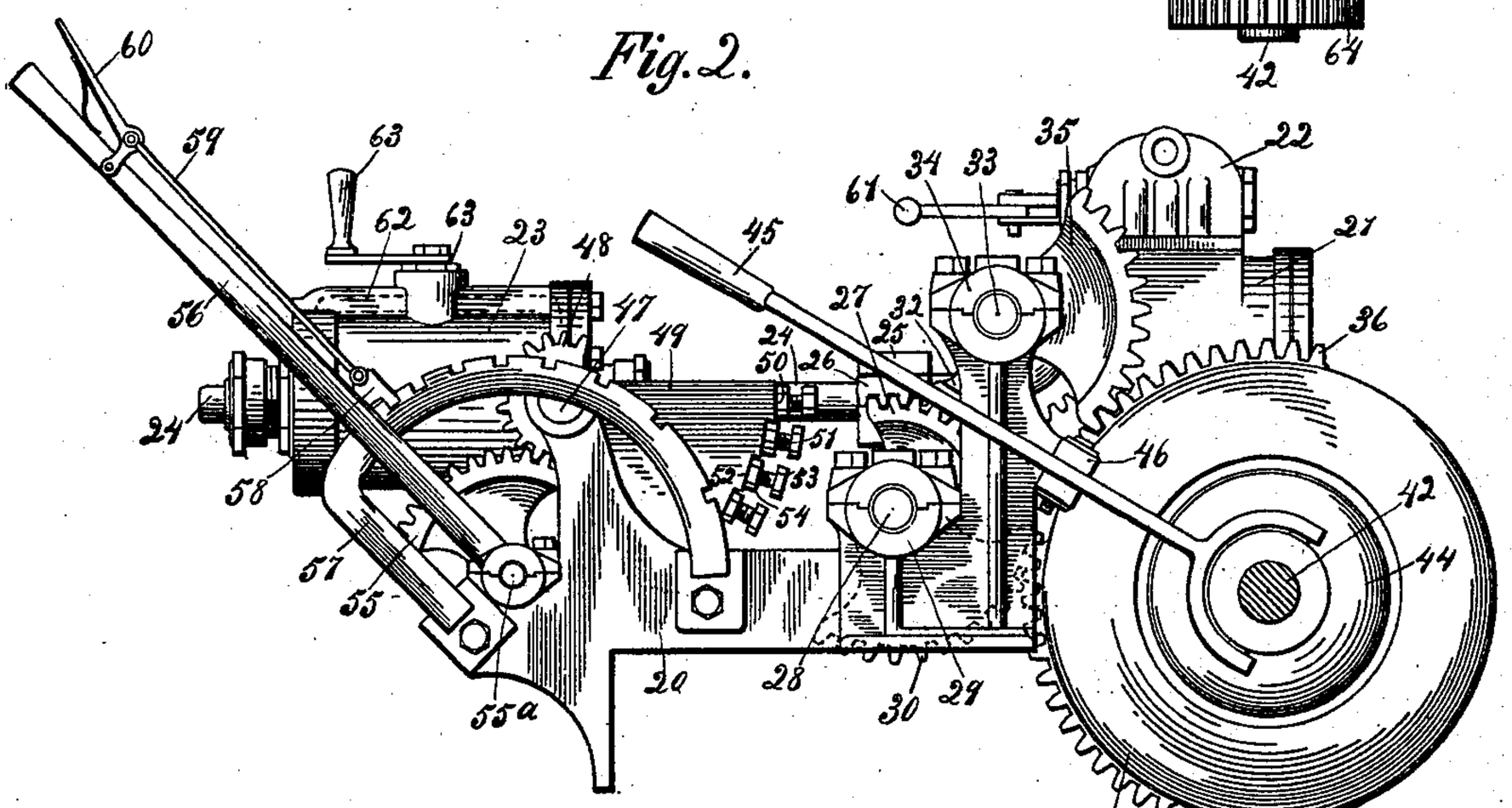


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

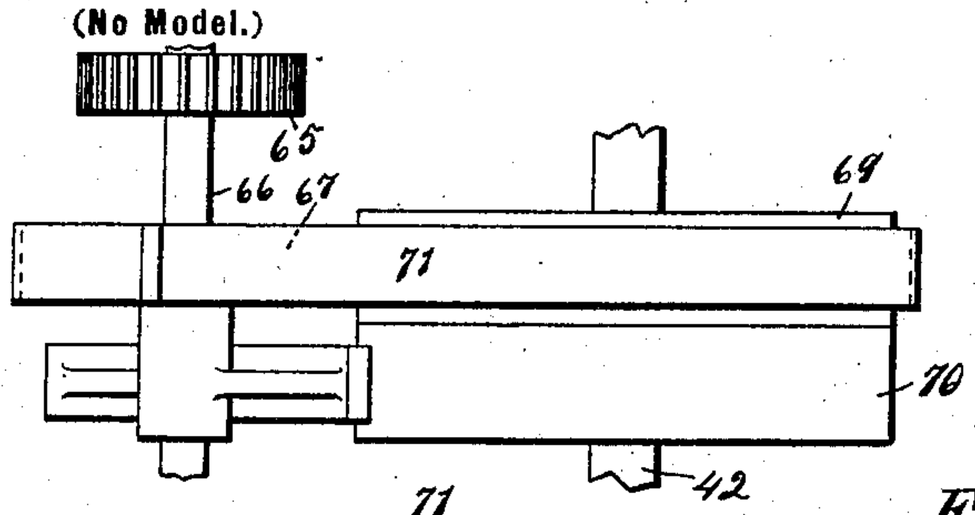


Fig. 5.

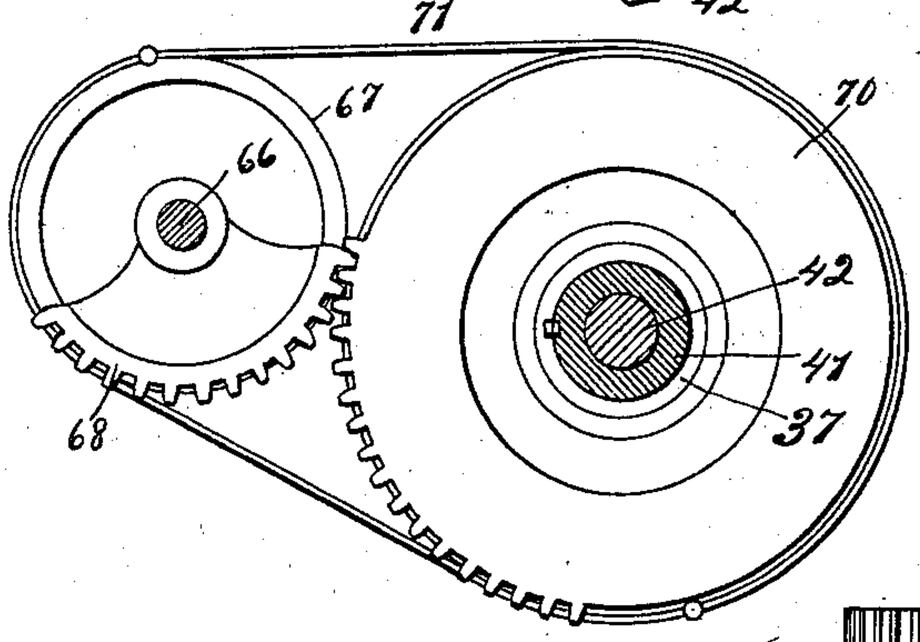


Fig. 6.

Fig. 7.

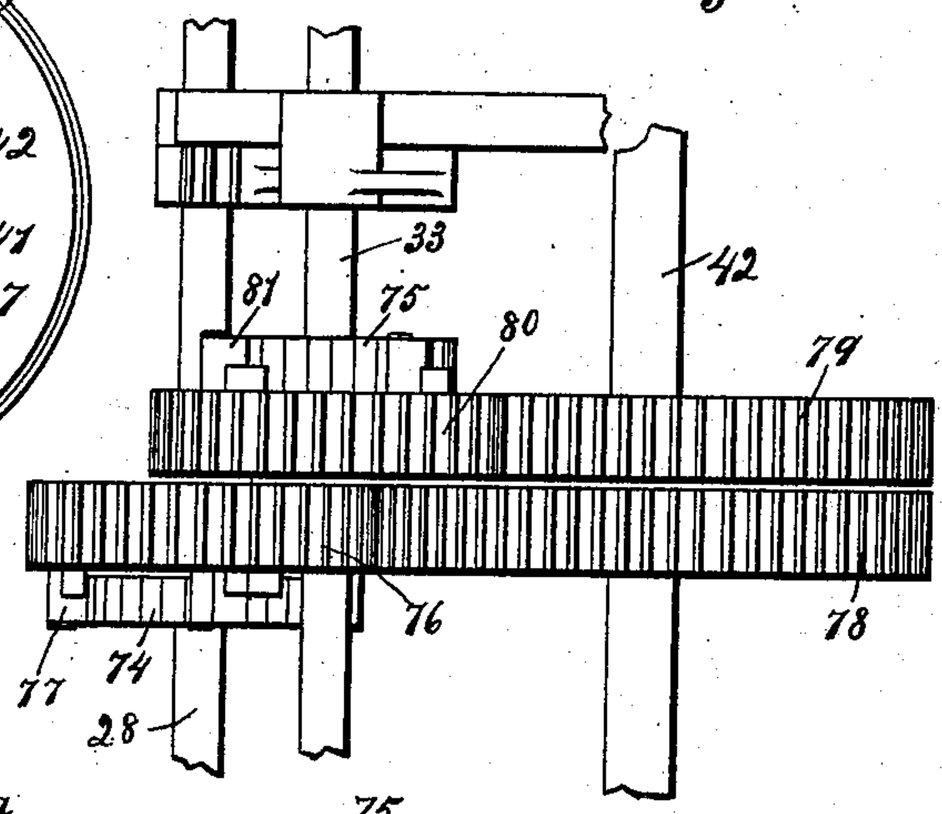


Fig. 3.

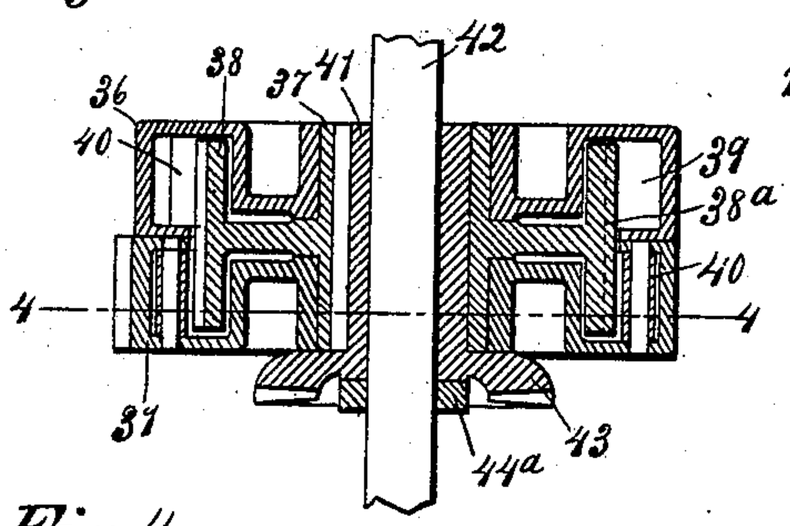


Fig. 4.

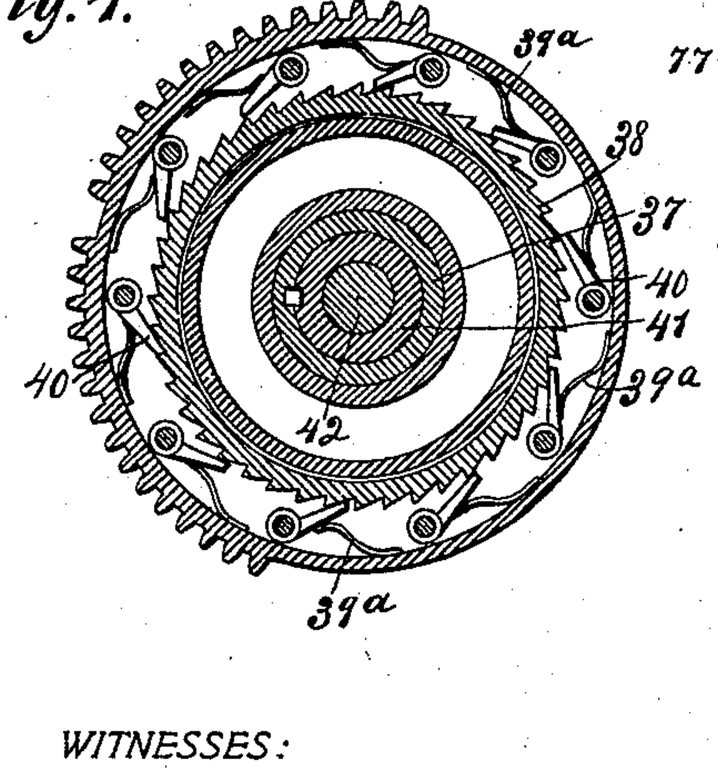
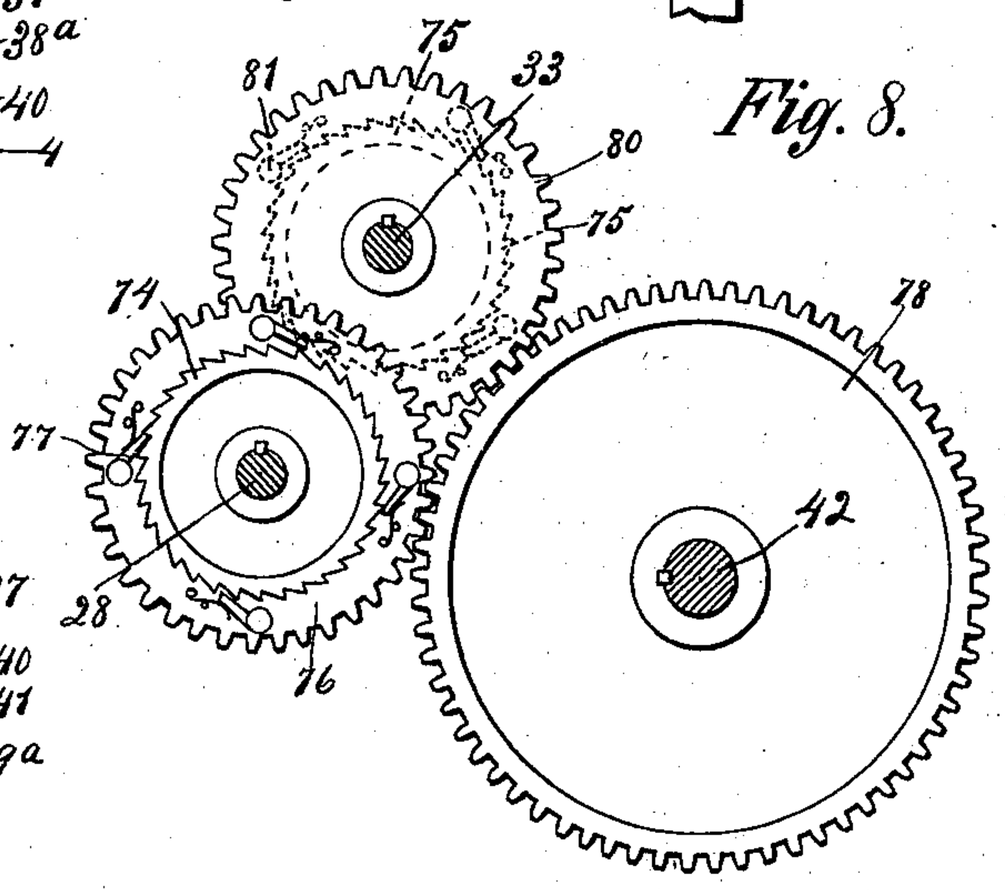


Fig. 8.



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No. 698,243. Patented Apr. 22, 1902.

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STEAM SET WORKS FOR SAWMILLS

(Application filed June 24, 1901.)

(No Model.) 3 Sheets—Sheet 3.

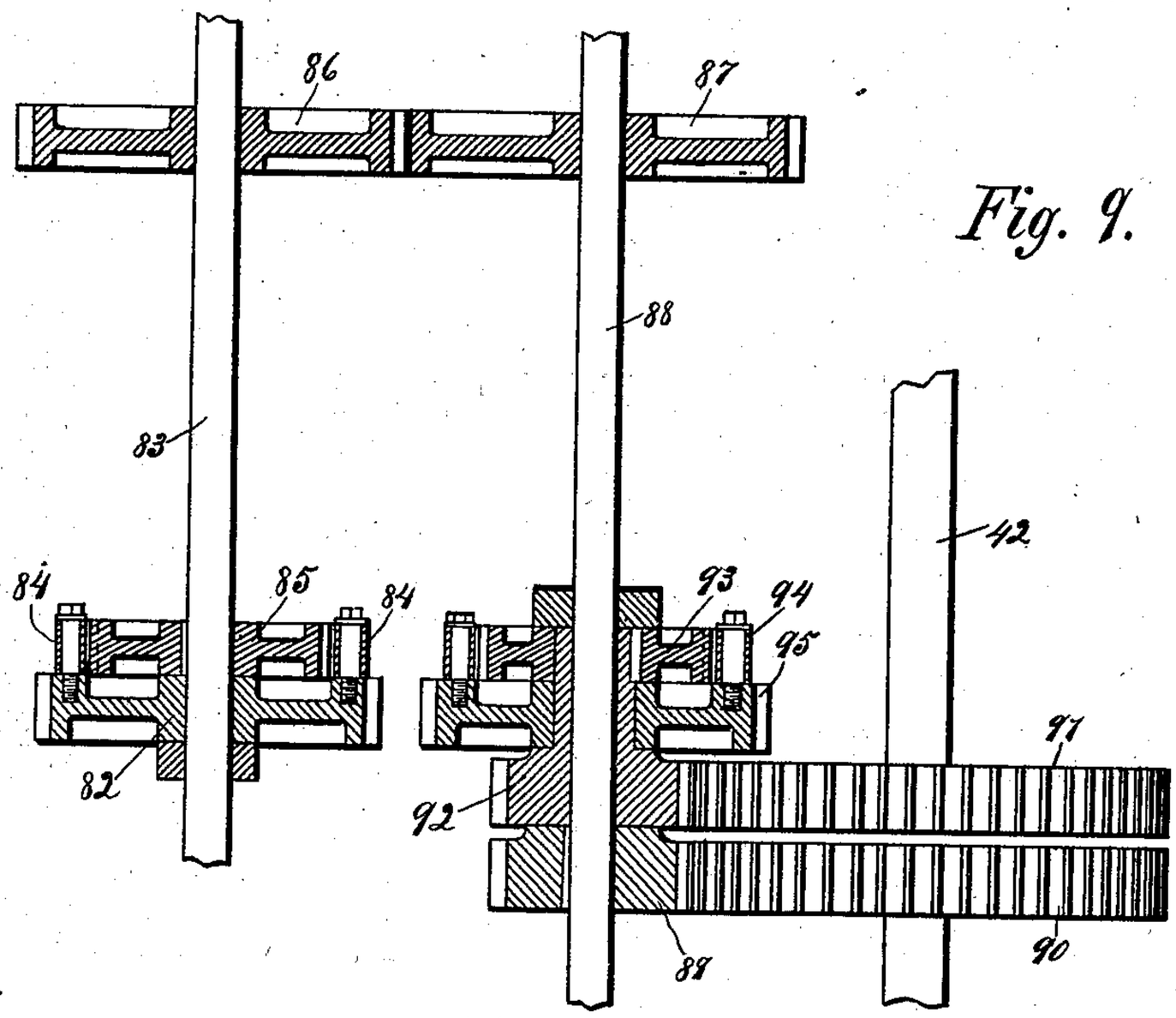

Fig. 9.

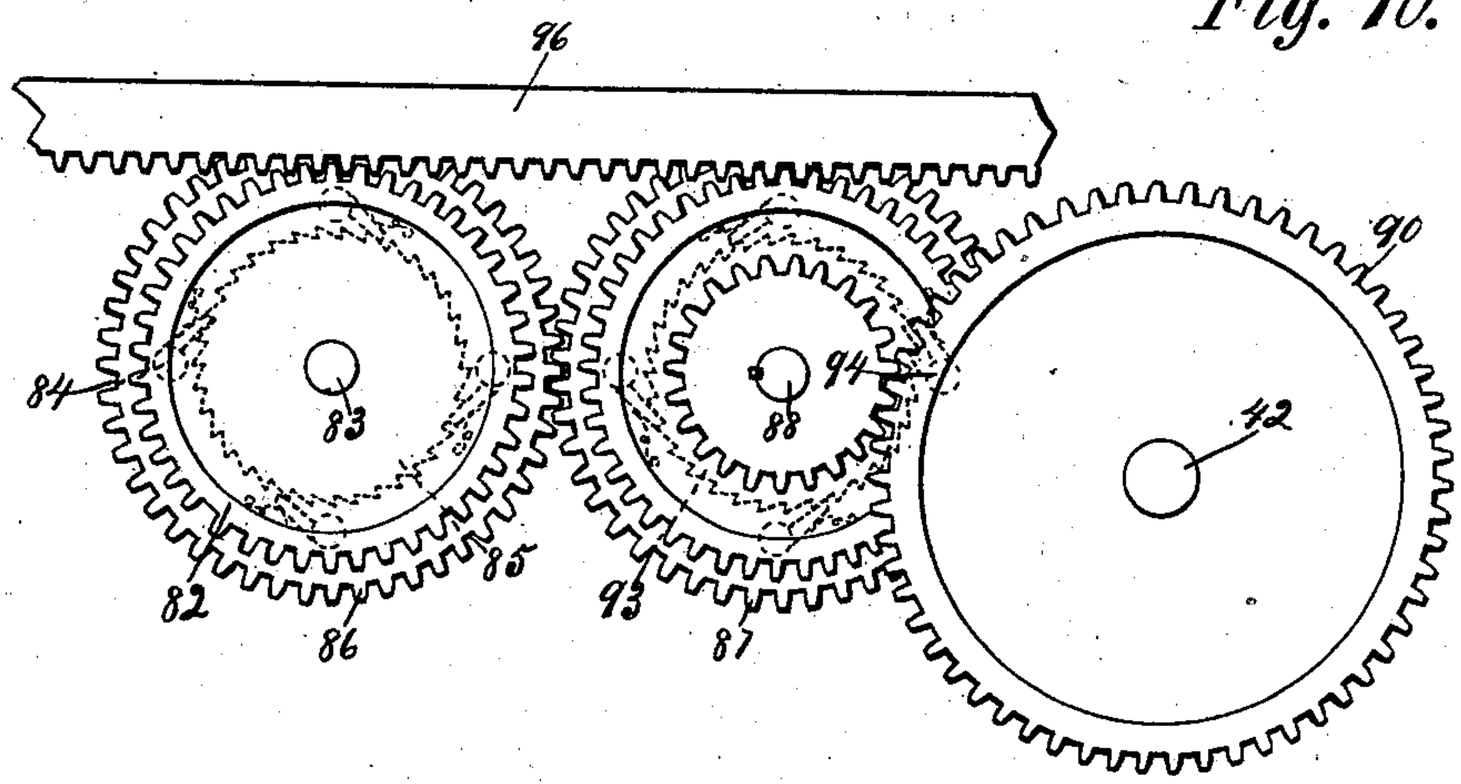

Fig. 10.

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UNITED STATES PATENT OFFICE.

RUBEN F. BARKER AND MICHAEL CORRY, OF MARINETTE, WISCONSIN.

STEAM SET-WORKS FOR SAWMILLS.

SPECIFICATION forming part of Letters Patent No. 698,243, dated April 22, 1902.

Application filed June 24, 1901. Serial No. 65,899. (No model.)

To all whom it may concern:

Be it known that we, RUBEN F. BARKER and MICHAEL CORRY, citizens of the United States, and residents of Marinette, county of Marinette, and State of Wisconsin, have invented certain new and useful Improvements in Steam Set-Works for Sawmills, of which the following is a specification and which are illustrated in the accompanying drawings, forming a part thereof.

This invention relates to power set-works for sawmills, and particularly to improvements in that class employing fluid-controlled retarding means for preventing the too-rapid movement of the engine.

One of the objects of the invention is to provide positive and accurate means for communicating motion to the set-shaft of a sawmill-carriage for advancing the knees to move the log the prescribed distance for producing the various thicknesses of lumber into which it is to be cut.

Another object is to provide a simple and positive stop mechanism capable of the fine adjustment necessary for cutting boards for certain purposes—as, for instance, when they are to be planed down afterward—it being necessary in sawing the boards to cut them slightly in excess of their ultimate thickness.

A further object is to simplify and generally improve the construction of the machines to which our invention relates and which consists in the parts and arrangement of parts, as hereinafter fully described and as illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the set-works, partly in section. Fig. 2 is a side elevation of the same. Fig. 3 is a diametrical section of one form of the mechanism for transmitting motion to the set-shaft. Fig. 4 is a section on the line 4 4 of Fig. 3. Figs. 5 and 6 illustrate a modification of the mechanism for transmitting motion to the set-works. Figs. 7 and 8 show a further modification. Figs. 9 and 10 illustrate another modification.

Referring to Figs. 1 and 2, 20 designates a frame or vertical bed plates designed to be secured to a sawmill-carriage. (Not shown.) Located at one end of the frame 20 is a steam-cylinder 21, the chest of the valve for controlling the piston thereof being shown at 22, and at the opposite end of the frame, as shown in the present instance in axial relation to the cylinder 21, is a second and smaller cylinder 23, the latter being filled with oil. The piston-rod 24 of the steam-cylinder 21 works in and has fixed to it the piston of the oil-cylinder 23, and secured to the said piston-rod is a cross-head 25, carrying at its ends rack-bars 26, parallel with the cylinder 21.

The parts heretofore described relate to a known structure and form no part of the present invention, which has particular reference to the mechanism for transmitting motion from the rack-bars operated by the engine to the set-shaft of the sawmill-carriage, and to means for regulating the movement of the said rack-bars and which are now to be explained.

Journaled in bearings 29, at opposite sides of the frame 20, is a rocker-shaft 28, to which are keyed segmental gears 27, engaged and oscillated by the rack-bars 26. Secured to the shaft 28 at one end thereof is a segmental gear 30, which meshes with and oscillates a gear-wheel or pawl-carrier 31. The segmental gears 27 are of greater width than the rack-bars 26 and serve to impart motion to the segmental gears 32, mounted on a second rocker-shaft 33, journaled in bearings 34 in the frame 20.

Fixed to the shaft 33, at the end adjacent to the segmental gear 30, is a segmental gear 35, which meshes with and drives a gear-wheel or pawl-carrier 36. The gears or pawl-carriers 31 and 36 are loosely mounted at opposite sides of a ratchet-wheel 38 and on the hub 37 thereof and are oscillated in opposite directions by the transmitting mechanism described. These pawl-carriers are preferably provided on their adjacent faces with annular chambers 39, into which project the opposite sides of the peripheral toothed flange 38^a of the ratchet-wheel 38, (see Fig. 3,) and pivoted to each of the carriers 31 and 36, within their chambers, are a plurality of pawls 40, which engage the teeth of the said ratchet-wheel. Springs 39^a are provided for keeping the pawls 40 in engagement with the teeth of the ratchet-wheel.

In order to avoid lost motion between the pawl-carriers and the ratchet-wheels driven thereby and to insure the ready response of the set-shaft to the action of the engine, the

pawls 40 are arranged so as to be non-synchronal in their action—that it is to say, they are so spaced that one of the pawls of each of the pawl-carriers 31 and 36 is always in active engagement with that portion of the flange of the ratchet-wheel 38 projecting into the chamber thereof. If, as illustrated in Fig. 4, ten pawls are carried by each of the carriers, there cannot be lost motion to exceed one-tenth the length of a tooth before one of the pawls actively engages one of the teeth of the ratchet-wheel.

The hub 37 of the ratchet-wheel 38 is keyed to a sleeve 41, mounted loosely on the set-shaft 42, and carries at its outer end one member 43 of a clutch, a collar 44^a, fastened to the set-shaft 42, preventing longitudinal movement of the sleeve 41 and its clutch member thereon. The other member 44 of the clutch is splined on the set-shaft 42 and is thrown into and out of engagement with the member 43 by a forked hand-lever 45, pivoted at 46 to the frame of the set-works.

Secured at opposite sides of the cylinder 23, each on its own shaft 47, journaled in the frame 20, are gears 48, and each of the shafts 47 has fastened to it a cam-shaped stop-block 49, preferably provided with steps, as 50 51 52, &c., gradually decreasing in height from the center of the shaft 47 from the upper edges of the said blocks. A plurality of threaded bolts 53 project radially from the stop-blocks, providing a series of adjustable abutments, which may be graduated as desired, nuts 54 being provided for locking the bolts in their adjusted positions.

Movement is imparted to the blocks 49 simultaneously by a pair of segmental gears 55, keyed to a shaft 55^a, mounted in the frame 20 below the cylinder 23 and which mesh with the gears 48, the segments 55 being controlled by a hand-lever 56, fixed to the shaft 55^a and playing over a quadrant 57, secured to the frame 20 and provided with notches for engagement by a dog 58, pivoted to the lever and actuated by a rod 59 and finger-latch 60.

Through the medium of the stop-blocks 49, which are disposed in the path of the cross-head 25, the forward movement of the piston-rod 24, and thereby the setting mechanism, may be readily controlled, so as to regulate the thickness of the board to be cut, the particular steps in the path of the cross-head and the adjustment of the bolts thereon determining the exact thickness.

The screw-bolts 53, located on the blocks 49, permit of an exceedingly fine adjustment. Sometimes it is desired to cut strictly to the thickness ordered. Sometimes full measure is preferred, so that the lumber will be up to gage when dressed. By the adjustment of the bolts the desired result is quickly and accurately secured, and they also provide means for compensating for any wear of the parts of the machine.

At 61 is indicated the lever for controlling the valve of the cylinder 21. The cylinder 23, containing oil, effectually retards the movement of the piston-rod 24 to prevent overthrow of the log-knees and is provided with a by-pass 62 to permit the transfer of the oil to the opposite sides of the piston as the latter reciprocates. A valve 63 may be provided in the by-pass for regulating the flow of oil therethrough.

A pinion 64, keyed to the set-shaft 42, imparts motion to the knees (not shown) of the log-carriage in the usual manner.

In operation, assuming the machine to be in the position illustrated in Fig. 1, the lever 56 is moved to the position for throwing a certain step of each of the stop-blocks 49 in the path of the cross-head, depending upon the thickness of the boards to be cut. Steam now being admitted to the cylinder 21 the piston is moved forward, carrying with it the cross-head 25 and the rack-bars 26, which meshing with the segmental gears 27 oscillate the rocker-shaft 28, and thereby the segment 30, the latter meshing with and actuating the pawl-carrier 31. Simultaneously with the movement just described the wide segmental gears 27, driven by the rack-bars, oscillate the segments 32 and shaft 33, and through the medium of the segmental gear 35 motion is communicated to the pawl-carrier 36. As the pawl-carriers 31 and 36 are driven in opposite directions the pawls of one engage the teeth of the ratchet, while those of the other recede during the outstroke, and on the instroke their action is reversed.

The mechanism for transmitting motion from the rack-bars 26 to the set-shaft is susceptible of various modifications.

In Figs. 5 and 6 the rack-bars 26 are intended to mesh with pinions 65, only one of which is shown, keyed to a shaft 66. This shaft imparts an oscillatory movement to a pulley 67 and a segmental gear 68, keyed side by side to the said shaft, which oscillate in opposite directions a pair of pawl-carriers 69 70, which may be of the same internal construction as the carriers 31 36, already described, one of the carriers having gear-teeth for engagement with the gear 68, the other being driven by a belt 71, running over the pulley 67 and preferably secured against slipping to both pulleys.

It will be obvious that as the segmental gear 68 and pulley 67 are oscillated by the rack-bars 26 through the medium of the pinions 65 and the shaft 66 the pawl-carriers will be moved in opposite directions and motion will be communicated to the set-shaft 42 in the manner heretofore described.

A further modification of the invention is shown in Figs. 7 and 8. In this instance the shafts 28 and 33 are present, and to them are keyed, respectively, ratchet-wheels 74 and 75. A pawl-carrier 76, loose upon the shaft 28, is actuated by the ratchet-wheel 74 through the medium of spring-pressed pawls 77, mounted on the carrier, and motion is communicated by the latter to a gear-wheel 78 on the set-

shaft 42. The set-shaft wheel 79 is driven by the gear or pawl-carrier 80, loosely mounted on the shaft 33, being actuated by the ratchet-wheel 75 by means of the spring-controlled pawls 81, mounted on the carrier 80.

It will be readily understood that as the shafts 28 and 33 are rocked by the power mechanism, the pawl-carriers 76 and 80, through the medium of the pawls and ratchets, will be oscillated in opposite directions, thereby alternately communicating motion to the set-shaft wheels.

Referring to Figs. 9 and 10, a pawl-carrier 82 is loosely mounted upon a rocker-shaft 83, its pawls 84 engaging and actuating a ratchet-wheel 85, keyed to the same shaft. Also keyed to the shaft 83 is a gear 86, which communicates motion to a gear 87, fixed on the shaft 88, parallel with the shaft 83, and fastened to the end of the former shaft is a pinion 89, which meshes with and drives the set-shaft wheel 90, fast on the set-shaft 42. The wheel 91, also keyed to the set-shaft, receives its motion from a pinion 92, sleeved upon the shaft 88, and the sleeve thereof has fixed on it a ratchet-wheel 93, the teeth of which are inclined in the direction reverse to that of the teeth of the ratchet-wheel 85, and which is actuated by the pawls 94 of the carrier 95, which is loosely mounted on the sleeve of the pinion 92 at the side of the ratchet-wheel 93.

The gear-wheels or pawl-carriers 82 and 95 are mounted in the same horizontal plane and mesh with and are simultaneously driven in opposite directions by a rack-bar 96. It results from this construction that the set-shaft 42 is given an intermittent movement in one direction, motion being communicated thereto through the alternate action of the pawl-and-ratchet mechanisms and the pinions 89 and 92 and the set-shaft wheels coacting therewith, as will be readily understood.

We have not deemed it necessary to show the connection between the structures of the modifications just described and the power mechanisn; but their adaptation thereto will be readily understood by those skilled in the art to which the invention relates.

We claim as our invention—

1. In a sawmill set-works, in combination, an engine, a pair of intergeared rocker-shafts, means for imparting motion from the engine to the rocker-shafts, a set-shaft, a pair of oscillating ratchet-wheels driven from the rocker-shafts, a circular pawl-carrier concentric with each of the ratchet-wheels, and a plurality of pawls mounted upon each of the carriers and engaging the companion ratchet-wheel.

2. In a sawmill set-works, in combination, an engine, a pair of intergeared rocker-shafts, rack-and-pinion connection between the engine and one of the shafts, a set-shaft, a ratchet-wheel, a clutch for coupling the ratchet-wheel with the set-shaft, a pair of oppositely-driven pawl-carriers, and pawls mounted on the carriers and engaging the ratchet-wheel.

3. In a sawmill set-works, in combination, a set-shaft, a pair of oscillating rocker-shafts, an engine, gearing for imparting motion from the engine to the rocker-shafts, and pawl-and-ratchet mechanism for communicating motion to the set-shaft.

4. In a sawmill set-works, in combination, an engine, a pair of intergeared rocker-shafts, rack-and-pinion connection between the engine and one of the shafts, a set-shaft, a ratchet-wheel mounted thereon, two sets of pawls engaging the ratchet-wheel, and operative connection between each rocker-shaft and one set of the pawls.

5. In a sawmill set-works, in combination, a set-shaft, a pair of rocker-shafts, a segmental gear fixed on one of said shafts, a rack-bar for driving the segmental gear, means for reciprocating the rack-bar, a segment fixed to the other shaft and driven by the segmental gear whereby the said shafts are rocked in opposite directions, a pair of pawl-carriers, connection between the pawl-carriers and the rocker-shafts, a ratchet-wheel for communicating motion to the set-shaft, and pawls mounted on the carriers and engaging the ratchet-wheel.

6. In a sawmill set-works, in combination, an engine, a set-shaft, means for transmitting motion from the engine to the set-shaft, and a stop-block pivoted in the path of a moving part of the engine and which is provided with a plurality of adjustable abutments.

7. In a sawmill set-works, in combination, an engine, a set-shaft, connection between the engine and the set-shaft, a pivoted stop-block for the engine, and a plurality of radially-adjustable abutments projecting from the face of the block.

8. In a sawmill set-works, in combination, a reciprocating engine, a cross-head carried by the piston thereof, a set-shaft, means for transmitting motion from the engine to the set-shaft, a pivoted cam-shaped stop-block provided with a series of steps and swinging across the path of the cross-head, and an adjustable abutment located on each step.

9. In a sawmill set-works, in combination, an engine, a pair of intergeared oscillating rocker-shafts, connection between the engine and one of the shafts, a set-shaft, and pawl-and-ratchet mechanism for driving the set-shaft intermittently forward.

10. In a sawmill set-works, in combination, an engine, a pair of intergeared oscillating rocker-shafts, connection between the engine and one of the shafts, a set-shaft, a pawl-and-ratchet mechanism actuated by the rocker-shafts for driving the set-shaft intermittently forward, and a clutch for coupling the pawl-and-ratchet mechanism with the set-shaft.

11. In a sawmill set-works, in combination, a set-shaft, an engine, a pair of intergeared oscillating rocker-shafts, means for impart-

ing motion from the engine to the rocker-shafts, a pair of pawl-carriers, connection between the pawl-carriers and the rocker-shafts, a ratchet-wheel for communicating motion to the set-shaft, and pawls mounted on the carriers and engaging the ratchet-wheel.

12. In a sawmill set-works, in combination, a set-shaft, a pair of oscillating rocker-shafts, an engine, means for imparting motion from the engine to the rocker-shafts, and pawl-and-ratchet connection between the rocker-shafts and the set-shaft.

13. In a sawmill set-works, in combination, an engine, a set-shaft, means for transmitting motion from the engine to the set-shaft, a stop-block pivoted in the path of a movable part of the engine and the face of which is eccentric to its pivot, a plurality of radially-adjustable abutments projecting from the face of the stop-block, and means for retarding the speed of the engine.

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