C. W. WILLETT.

SAWMILL SET WORKS.

APPLICATION FILED DEC. 14, 1907.

982,915.

Patented Jan. 31, 1911.

4 SHEETS—SHEET 1.

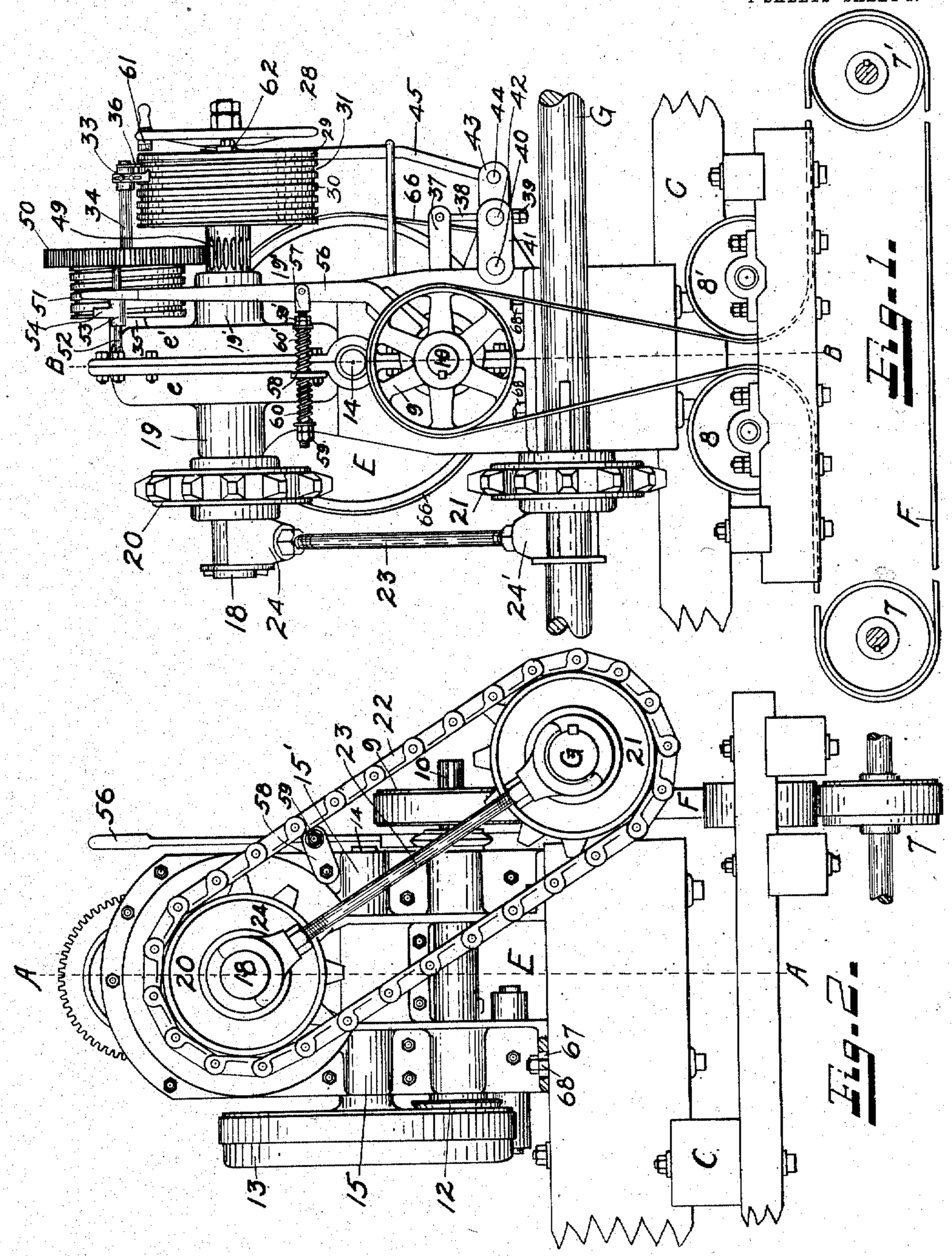

Fig. 1.

Fig. 2.

Witnesses:
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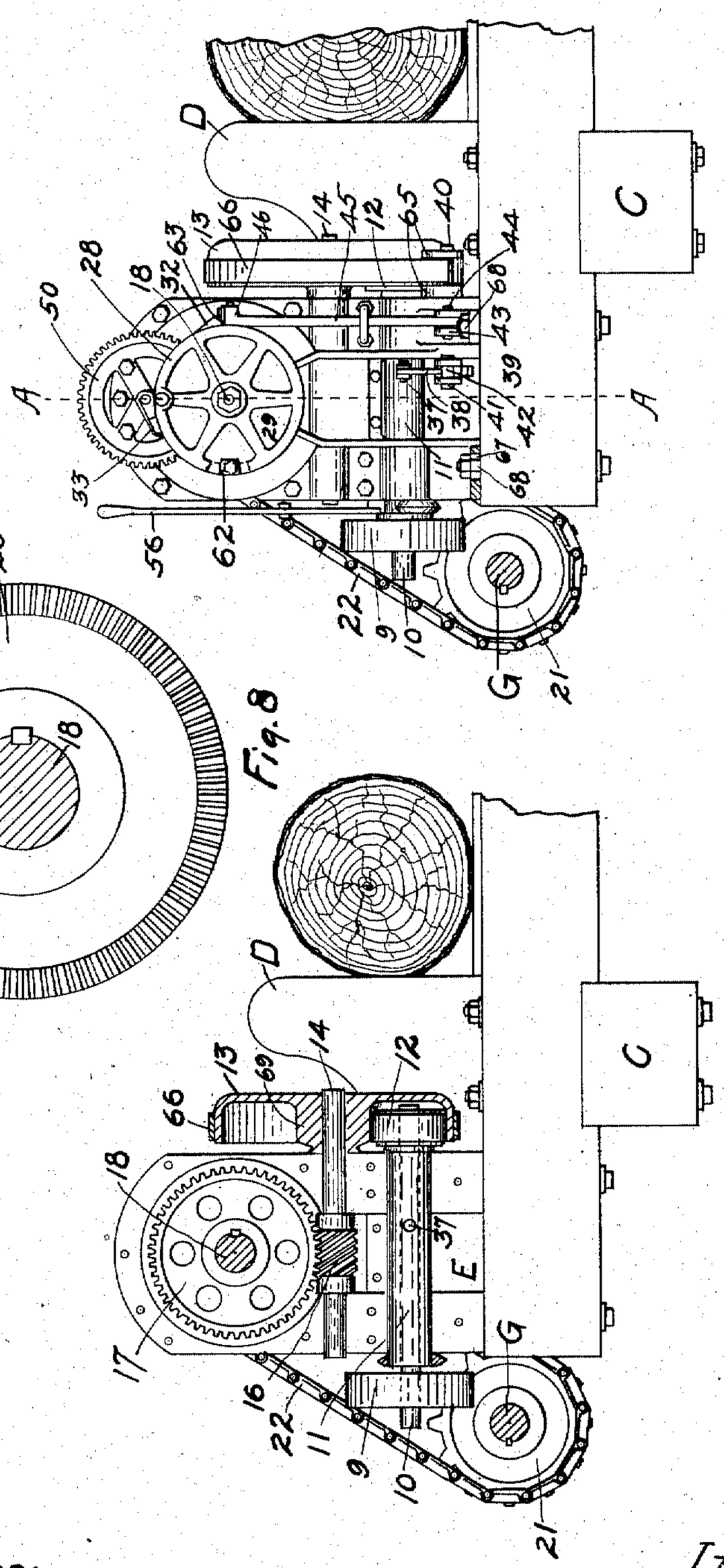

Fig. 3.

Fig. 8

Fig. 4.

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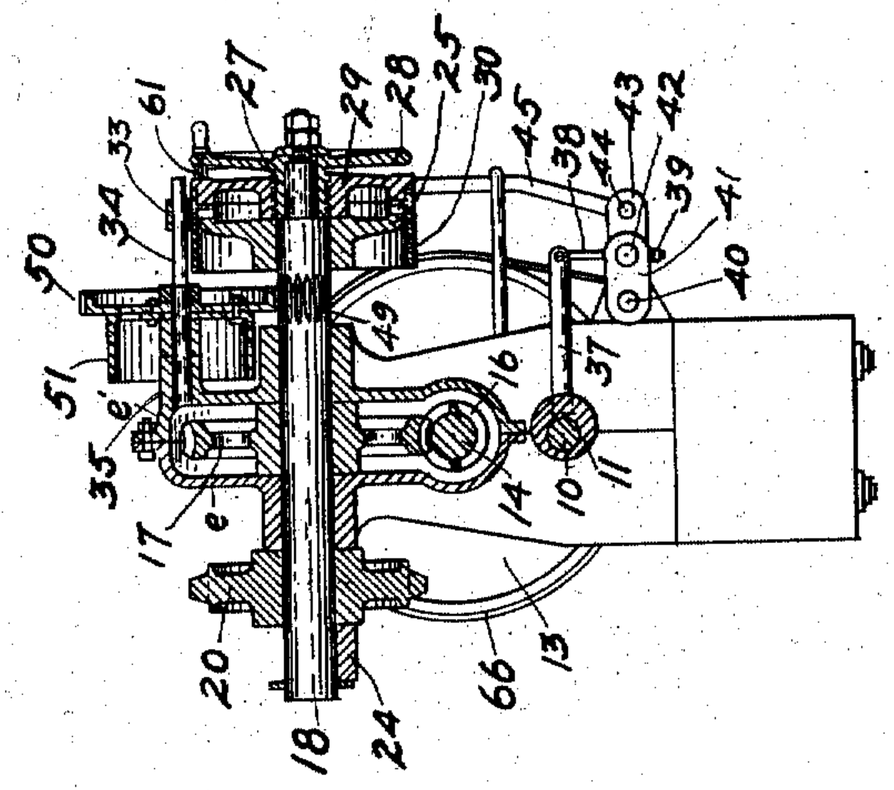

Fig. 5.

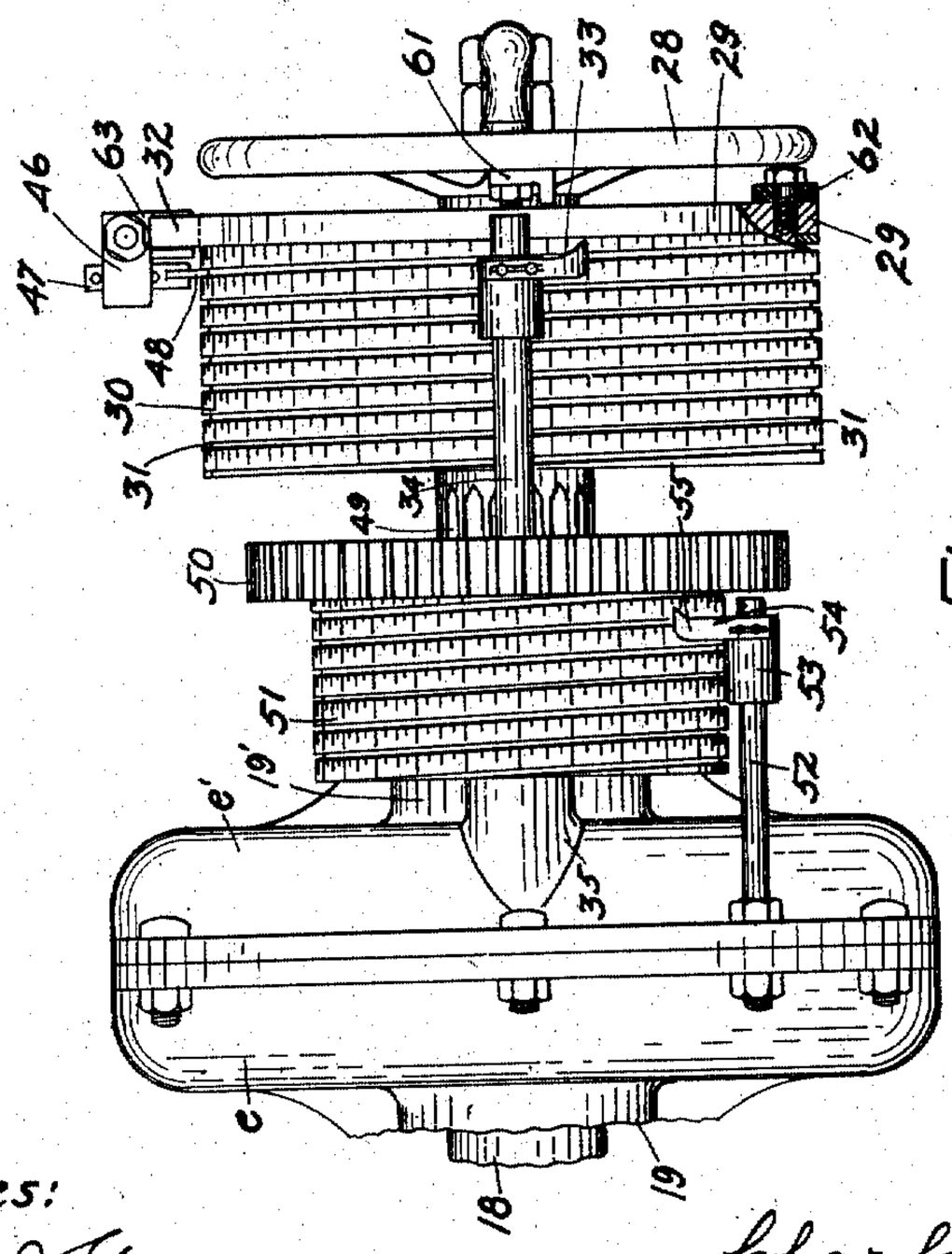

Fig. 6.

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4 SHEETS—SHEET 4.

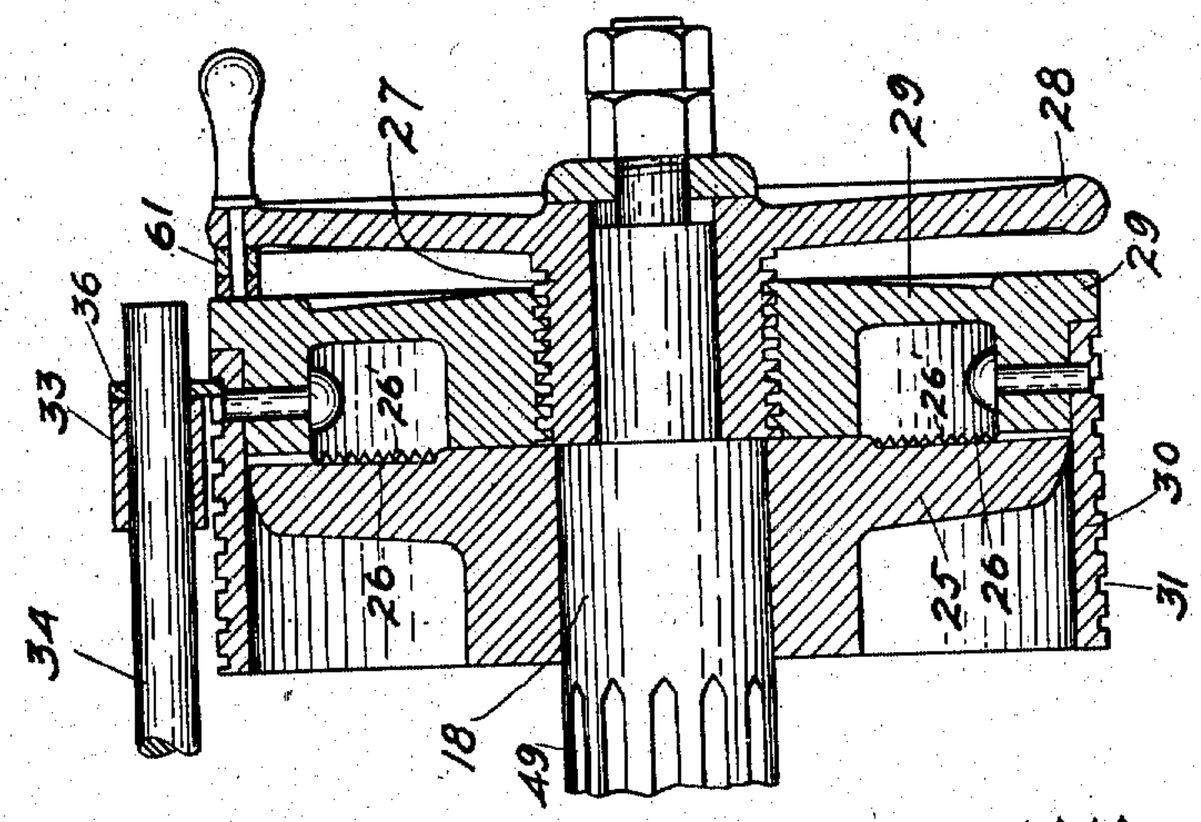

Fig. 9.

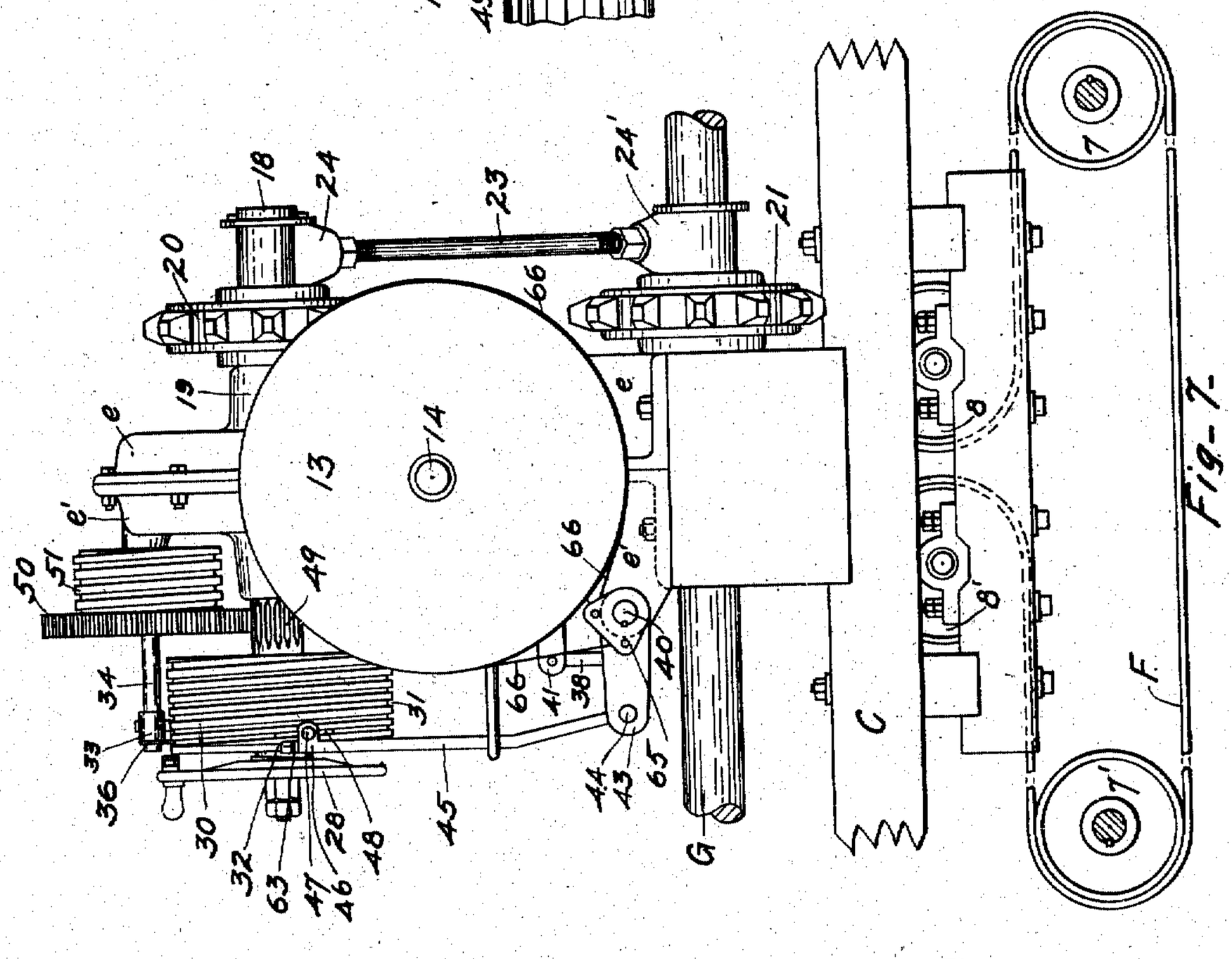

Fig. 7.

Witnesses:

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UNITED STATES PATENT OFFICE.

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SAWMILL SET-WORKS.

982,915. Specification of Letters Patent. Patented Jan. 31, 1911.

Application filed December 14, 1907. Serial No. 406,539.

To all whom it may concern:

Be it known that I, CHARLES W. WILLETT, a citizen of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented a new and useful Improvement in Sawmill Set-Works, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to that class of machines used in saw mills, commonly known as power set-works, and which set the sliding, log holding knees forward and backward on the head blocks of the usual sawmill carriage.

The object of my invention is to provide in a power set-works, having a self contained mechanism, the transmission of power from the set works directly to the setting shaft, without intervening gears, friction devices and other mechanism commonly used, which allow of much lost motion, and an arrangement by means of which the setting mechanism and forward movement of the setting knees can be promptly and accurately controlled and locked, so that no unintended movement can result.

I attain these objects and other advantages by the mechanism, construction, combination, and arrangement of parts illustrated in the accompanying drawings, which form a part hereof.

It is well known that while bevel or miter gears and other devices have been provided in set-works to transmit power at right angles from driving shaft to setting shaft, it is equally well known that none of these mechanisms provide the needed or best ratio of speed as between driving and setting shafts, without employing great numbers of parts in such devices, all of which arrangements invariably cause loss of power and a large aggregate of back lash as well as in increased cost of manufacture and maintenance. It is imperative that back lash and all other lost motion should be eliminated from the setting mechanism to secure accurate and prompt movement of the setting knees. It is to overcome these objections and disadvantages and to secure greater economy in construction and operation that I have sought out and provided a set-works wherein I attain a low speed for the setting shaft, and a high speed for the main driving shafts and the belts; all of which insures the greatest effective operating result and provides a device novel and useful.

Figure 1 is a left side elevation. Fig. 2 is a rear elevation. Fig. 3 is a front elevation. Fig. 4 is a vertical sectional view on the line B—B of Fig. 1. Fig. 5 is a vertical sectional view on the line A—A of Figs. 2–3. Fig. 6 is a detail plan view on enlarged scale also showing the indicators. Fig. 7 is a right side elevation. Fig. 8 is a detail view of a front elevation of the dial carrier clutch upon an enlarged scale. Fig. 9 is an enlarged cross sectional view on the line A—A of Figs. 2–3 showing the hand wheel, dial carrier, and clutch for same, with some other adjacent parts.

In Figs. 1–7 the sprocket chain 22, which operates the toothed wheels 20—21 is omitted from its position as elsewhere shown, in order to make the adjacent parts more clearly visible in these views, but it is understood that the sprocket chain is intended to be a part of the mechanism the same as shown in the other figures, for the purpose of this specification. It is also stated that Figs. 1—2—6—7—8—9 are drawn upon a scale somewhat larger than Figs. 3—4—5, for the purpose of better illustration.

Like letters or numerals refer to like parts throughout the views.

C is the sawmill carriage frame or platform, only a portion of which is shown, but which portion is intended to sufficiently indicate the position of the set works thereon, and as they are secured upon the entire carriage.

D represents one of the knees of a sawmill carriage, against which the log is secured when upon the carriage in position for sawing. A suitable number of such knees are provided.

E is the frame of the set-works which is vertically divided into the two members *e*—*e'*, the same being bolted together.

F is a belt or cable, by means of which power is transmitted from a convenient source. This belt extends over a driving pulley 7 and an idler pulley 7′ located at opposite ends of the carriage traveling way, the belt being shown with a portion broken away to avoid using unnecessary space upon

the sheet. The belt is also arranged to extend under idler pulleys 8—8′ mounted on the carriage side by side in the same vertical plane with and just above the pulleys 7—7′ and below the set-works mechanism, so that it can pass over and drive a pulley 9 fixedly secured to the end of the shaft 10 of the set-works. The power is then transmitted from this point through the set-works mechanism to the set shaft G, which latter, in rotation, moves the knees to the desired position, all of which I will now more fully describe. The set shaft G is of common sawmill type, extending longitudinally of the carriage and in a suitable position thereon on the side opposite the saws. It is journaled in head blocks which carry the sliding knees and these are provided with means to be moved by the shaft G.

The driving shaft 10 is mounted in an eccentric sleeve 11, the driving pulley 9 being fixedly keyed on one end of the shaft and a driving friction pinion 12 being rigidly mounted on the opposite end. A rotating shaft 14 is mounted in bearings 15—15′ of the frame E at a suitable height. On one end of the shaft 14 is fixedly keyed a friction wheel 13 having a broad rim and a hub, between which the friction pinion is located in a position adapting it to be brought into engagement with either. On the central part of the shaft 14 is fixedly secured a worm gear 16 formed and placed to engage a worm wheel 17 above it. Within the frame E, in a higher plane and transversely to the shaft 14, is rotatably mounted a shaft 18 in bearings 19—19′ Figs. 1–7. The worm wheel 17 is rigidly keyed upon the shaft 18 in a suitable position thereon. A box which is a part of the frame E entirely incloses the gear 16 and worm wheel 17, (which is intended to run in oil), and thus protects these parts from dust and foreign matter.

Near one end of shaft 18 is fixedly keyed a sprocket wheel 20. On the shaft G, within a vertical plane below the sprocket wheel 20 is fixedly keyed another sprocket wheel 21 and these two sprocket wheels are connected by a link chain 22. The shafts G and 18 are provided with an adjustable separating strut 23, having bearing ends 24—24′, one formed with a right thread and the other with a left thread to receive corresponding threads on the respective ends of the strut and allow its adjustment. The bottoms of the members *e*—*e*′ of the frame E are provided with slots 67, adapted to receive bolts 68 Figs. 2—3, which secure the frame to the carriage, and by this means the frame can be adjusted to the carriage in a manner to take up any wear of the link chain or sprocket wheels.

On the end of the shaft 18, opposite the sprocket wheel 20, a dial carrier clutch 25 is rigidly keyed, the clutch being a wheel having the teeth 26 upon its outside face at the outer margin thereof. These teeth 26 are angular in form and are so cut that the working surface of each tooth makes an angle of about thirty degrees with the plane in which the tooth and the axis of the shaft 18 lie, while the back surface thereof makes an angle of about sixty degrees therewith. The end of the shaft 18 is reduced in diameter, and upon that end is rotatably mounted a sleeve 27, the outer cylindrical surface of which is threaded. A hand wheel 28 is integral with or fixedly secured to the sleeve 27. This hand wheel is provided with a lug 61 on the inside surface of its rim, which lug is adapted to engage a rubber or leather block 62 fixedly secured to the face of the dial carrier 29. In Fig. 3 the hand wheel is partly broken away, disclosing the block 62 behind same. The dial carrier 29 is carried upon the sleeve 27 which is threaded to receive corresponding threads in the dial carrier, these threads being so formed as to permit a rapid movement of the dial carrier to and from the clutch 25. The face of the dial carrier 29, which is adjacent to the clutch 25, is provided with teeth 26′ thereon adapted to engage and fit between the teeth 26 of the clutch 25, said teeth 26′ being complementary in form to the teeth 26.

On the outer cylindrical surface of the dial carrier 29 is fixedly secured a setting dial 30, in the outer surface of which is cut a helical groove 31, suitably graduated with a board measure scale. On the outer margin of the dial carrier 29 is a stop lug 32. A dial indicator 33 is slidably mounted on the shaft 34 which is rigidly mounted in a boss 35 of the frame E. Attached to the indicator 33 is a finger 36 which slides in the groove 31.

A lever 37 is fixedly secured in a suitable position on the eccentric sleeve 11. On the outer end of the lever 37 is pivotally mounted a rod 38, the lower end of which is threaded to receive lock nuts 39. In a suitable bearing in the *e*′ member of the frame E is pivotally mounted a shaft 40 and on one end of said shaft is rigidly secured an arm 41, horizontally forked at its outer end. The lower end of the rod 38 passes through a vertical opening in a transverse pivot pin 42 in the fork of the arm 41. An arm 43, also forked at its outer end is rigidly keyed near by on the shaft 40. A vertical stop bar 45 is pivotally secured at its lower end to the end of the arm 43, by a bolt 44. A stop lug 32 on the dial carrier 29 is so formed and placed that it will engage the stop bar 45, which in turn, through intervening mechanism, depresses the lever 37 and permits the rotation of the eccentric sleeve 11, which disengages the friction pin-

ion 12 and friction wheel 13 and so causes the shaft 18 to be stopped from rotating, in any pre-determined position. On the end of the shaft 40, opposite the lever arm 41, a double lever 65 is fixedly keyed at its center and to the free ends of the lever 65, a brake strap 66 is secured, the same extending upward and over the friction wheel 13. To the upper end of the stop bar 45, a block 46 is formed integral therewith and at right angles thereto. Through said block is secured a pin 47 carrying a finger 48 adapted to slide in the helical groove 31 in the surface of the dial 30. On the upper end of the stop bar 45 is fixedly secured a leather impact block 63 adapted to receive the impact of the lug 32.

In the shaft 18 spur gear teeth 49 are formed. On the shaft 34 is rotatably mounted a toothed wheel 50 adapted to engage the teeth 49 on the shaft 18 and be rotated thereby. Fixedly secured to the wheel 50 is a distance registering dial 51, having a helical groove in its outer cylindrical surface. Secured to the frame E is a rod 52 on which is slidably mounted a sleeve 53, carrying a dial indicator 54, the finger 55 of which is adapted to engage the helical groove in the dial 51 which has a graduated scale thereon. This dial indicates the distance from the face of the knee to the vertical plane of the saw. The larger dial 30 indicates the distance which it is desired the knees shall be moved when setting them.

Fixedly secured to the eccentric sleeve 11 is a hand lever 56 and to the central part of said lever is pivoted a rod 57 adapted to slide through a bracket 58 on the frame E, carrying adjustable lock nuts 59—59′. Springs 60—60′ rest between the bracket 58 and lock nuts 59—59′ retaining the lever 56 in its central position.

It will now be seen that the operation of my machine is as follows. The hand wheel 28 is so mounted and arranged that with a very little rotation it will rapidly move the dial carrier 29 toward or away from the dial carrier clutch 25 and thus lock the carrier with the clutch or unlock same therefrom. Thus the hand wheel is rotated to the left until the lug 61 engages the rubber block 62 of the dial carrier 29, which movement of the hand wheel releases said dial carrier from the dial carrier clutch 25 and permits free rotation of the dial carrier thereafter. When the dial carrier 30 is rotated to the left, the finger 48 following the helical groove causes the stop bar 45 to move to clear the stop lug 32 and upon a reverse movement to be moved into position to engage the lug. The dial now being free it is rotated to the left until the dial pointer 36 indicates the distance which it is predetermined the knees shall be moved, to saw material of the desired measure. The dial is then retained in a stationary position by a slight pressure of the hand, while the operator rotates the hand wheel with the other hand slightly to the right, when the dial carrier teeth 26′ engage the locking teeth 26 of the dial carrier clutch and thus the dial carrier is locked in its fixed position. The shaft 10 carried in the sleeve 11 is at this time being rotated by transmission of the power to the driven pulley 9 on said shaft. The operator then grasps the hand lever 56 and moves the friction pinion 12 into engagement with the outer rim of the friction wheel 13, causing the latter to rotate the shaft 18, and thus in turn to rotate the sprocket wheel 20 thereon, and from which by means of the link chain 22, motion is transmitted to the sprocket wheel 21 on the set shaft G, which thus rotates and sets the knees forward the desired distance. The same movement of the shaft 18 rotates the dial 30 until the stop lug 32 thereon engages the upper end of the stop bar 45, provided with an impact leather block 63. When the stop bar 45 is thus engaged by the lug 32 the said lever mechanism shifts the friction pinion 12 out of engagement with the friction wheel 13 and thus shuts off the power in course of transmission thereto, causing said wheel 13 to stop. In order to overcome the inertia of the said wheel 13 and other related moving parts, I have provided a friction brake strap 66 and the lever mechanism through which it is automatically operated in engaging the friction wheel. When the dial carrier lug 32 engages the stop bar 45, the shaft 18 is instantly stopped from rotating by reason of the release of the friction pinion 12, and the movement of the brake lever which causes the friction brake to be applied. In this manner through the intervening link chain and sprocket wheels 20—21, the set shaft G is stopped and by its auxiliary mechanism holds the sliding knees in a predetermined position as aforesaid. It will also be seen that a reverse movement of the hand lever 56 will cause the friction pinion 12 to engage the hub 69 of the friction wheel 13 and thus through the intervening mechanism to rotate the set shaft G in a reverse direction from that already described, and enables the operator to recede the knees from the saws any desired distance; whereupon a release of the hand lever 56 causes the springs 60—60′ to move the same to its central position and shifts the friction pinion 12 free of engagement with the hub of the wheel 13 retaining the same there, and thus through the intervening mechanism to stop the knees at the place desired.

I have arranged suitable means for prop-

erly adjusting the various parts of my device so that the functions of the different parts of the mechanisms described, shall be performed by them in working harmony, and at the same time permit of further adjustment to such positions as may be necessitated by the usual wear of parts. It will likewise be noted that the use of a worm gear in a power set-works, primarily to lock and hold the setting mechanism, as well as the arrangement of said gear to transmit power at right angles, is novel, as it most effectually eliminates any back lash and consequent lost motion, and insures most accurate results. The use of a worm gear in this connection enables me to accomplish a refined accuracy in a setting mechanism, much desired and long sought, but heretofore not attained.

Having thus fully described my invention I claim:

1. In automatic power arresting mechanism for power set works, the combination with a frame; a rotating shaft mounted in eccentric bearings therein, and having a friction pinion secured on its end; a shaft 14 mounted in the frame and driving, through intermediate means, the setting mechanism and the set controlling mechanism, and having a friction wheel mounted thereon adapted to be engaged and driven by said friction pinion; a lever secured to the eccentric bearing whereby the pinion is thrown into or out of engagement with the friction wheel; a lever pivoted to the frame; a tension link connecting the last two levers together; a stop-bar operatively secured to said last lever; a dial driven by said shaft 14 and revolubly adjustable relatively thereto; a lug formed on said dial and adapted to engage and operate said stop-bar; and screw mechanism comprising a helical groove formed in the dial and a finger engaging said groove and mounted on said stop bar whereby the stop-bar is brought into position to be engaged by said lug when the dial has turned a predetermined distance.

2. In a setting mechanism for power set works, the combination with a frame; a knee-setting shaft mounted therein; an eccentric sleeve mounted in said frame; a driving shaft mounted in the sleeve; a friction pinion secured to said shaft; a friction wheel mounted in said frame and having friction surfaces adjacent to opposite sides of said friction pinion, one of said surfaces being adapted to be engaged by said pinion when said eccentric sleeve is turned to throw the pinion on one side of the normal while the other surface is engaged thereby when said sleeve is turned to the other side of the normal; a worm gear operatively secured to said friction wheel; a worm wheel mounted in said frame and engaging said worm gear; a sprocket gear operatively connected to said worm wheel; and means to transmit the power from said sprocket gearing to the knee-setting shaft.

3. In a set controlling mechanism for a power set works the combination with a frame; of a set shaft mounted therein; a shaft mounted therein and operatively connected to the set shaft; a clutch mounted on and turning with said shaft; an independently rotatable sleeve mounted on said shaft and having screw threads on its outer surface; an independently rotatable dial mounted on said sleeve and engaging the screw threads thereon, and adapted to engage said clutch or to be withdrawn therefrom; an indicator mounted on said frame adjacent to said dial; lugs mounted on said dial and sleeve and adapted to limit the relative rotatory motion therebetween; a stop-lug formed on said dial; and power controlling means adapted to be engaged by said stop-lug when said dial has turned through a predetermined distance.

4. In a power set works, the combination with a saw mill carriage, knees mounted thereon, a set shaft, and mechanism operatively connecting the set shaft to the knees; of a frame mounted on said carriage; a setting mechanism mounted on said frame and comprising a power-driven shaft, an eccentric bearing for the shaft, a friction pinion on the power-driven shaft, a friction wheel adapted to be engaged by the friction pinion, a worm gear operatively connected to the friction wheel, a worm wheel engaging said worm gear, and means operatively connecting the worm wheel to the set shaft; a power arresting mechanism mounted on said frame and comprising a lever secured to said eccentric bearing to move the pinion out of engagement with the wheel, a pivoted lever, a tension link joining the two levers, and a stop-bar operatively connected to the last lever; and a set controlling mechanism, comprising a clutch operatively connected to the worm wheel, an independently rotatable sleeve coaxial with said clutch and having screw threads on its outer surface, an independently rotatable dial mounted on said sleeve and engaging the screw threads thereon and adapted to engage said clutch or to be withdrawn therefrom, an indicator mounted on the frame adjacent to the dial, lugs mounted on the dial and sleeve and adapted to limit the relative rotatory motion therebetween, and a stop-lug formed on said dial and adapted to engage and actuate said stop-bar whereby the rotation of the set shaft is arrested when said stop-lug has turned through a predetermined distance.

5. In a power set works, the combination with a frame; a shaft mounted therein and operatively connected to the set shaft; a

screw threaded dial driven by said shaft and revolubly adjustable thereon and having rotatory motion therewith; a stop-lug formed on said dial; means for driving the set shaft; means for disconnecting said driving means; and a stop-bar adapted to operate said disconnecting means when engaged by said stop-lug, and engaging the screw thread on said dial whereby said bar is brought into the path of the travel of said lug when said lug has turned through a predetermined distance thereby permitting the lug to turn more than one revolution if desired.

6. In a saw mill set works, the combination with a set shaft, power driven means for driving the set shaft, and means for controlling the connection between said power driven means and said set shaft; of a disk driven with the set shaft and having angular teeth projecting therefrom; an independently rotatable sleeve coaxial with said disk and having screw threads on its outer surface; a second disk mounted on said sleeve and engaging the threads thereon and having angular teeth projecting therefrom, said teeth being similar and complementary to the teeth on said first disk, said second disk being adapted to engage with its teeth the teeth of said first disk or to be withdrawn therefrom; lugs mounted on said second disk and sleeve to limit the relative rotatory motion therebetween, whereby the rotation of said sleeve in one direction first releases the teeth of said disks from engagement and then rotates said second disk relatively to said first disk, and in the opposite direction brings the teeth of said disks into locking engagement to drive the second disk with the set shaft; and a lug carried by said second disk and adapted to engage said means for controlling the connection between said power driven means and said set shaft to disengage the said connection.

7. In a saw mill set works, the combination with a set shaft, power driven means for driving the set shaft, and means for controlling the connection between said power driven means and said set shaft; of a disk driven with the set shaft and having angular teeth projecting therefrom; an independently rotatable sleeve coaxial with said disk and having screw threads on its outer surface; a second disk mounted on said sleeve and engaging the threads thereon and having angular teeth projecting therefrom, said teeth being similar and complementary to the teeth on said first disk, said second disk being adapted to engage with its teeth the teeth of said first disk or to be withdrawn therefrom; lugs mounted on said second disk and sleeve to limit the relative rotatory motion therebetween, whereby the rotation of said sleeve in one direction first releases the teeth of said disks from engagement and then rotates said second disk relatively to said first disk, and in the opposite direction brings the teeth of said disks into locking engagement to drive the second disk with the set shaft; a lug carried by said second disk and adapted to engage said means for controlling the connection between said power driven means and said set shaft to disengage the said connection; and means for determining the extent of revolution of said second disk relative to said first disk whereby the extent of movement of said set shaft is predetermined.

8. In saw mill set works the combination with the set shaft, a drive wheel and means for operatively connecting said wheel and shaft, of an index wheel movable independently of the set shaft for determining the set, and having a spiral, a connection working with said spiral and adapted to disengage said means when the index wheel is returned to home position, and means for locking said index wheel to turn with the set shaft.

9. In saw mill set works the combination with the set shaft, a drive wheel and means for operatively connecting them, of an index wheel movable independently of the set shaft for determining the set and having a spiral, a rocker shaft connected with said means and provided with an arm, a link connected with said arm and engaging said spiral, for throwing said means out of engagement when the index wheel is returned to home position, and means for locking the index wheel to turn with the set shaft.

10. In saw mill set works the combination with a power transmitting wheel, of an index wheel concentric therewith and movable relative thereto, a device for locking the index wheel to the power wheel, and a hand wheel capable of limited movement independently of the index wheel, and a connection with said locking device adapted to release the index wheel from the power wheel with the initial movement of the hand wheel in one direction.

11. In saw mill set works the combination with the set shaft, a drive wheel and means for operatively connecting them, of a power transmitting wheel, an independently movable concentric index wheel, mechanism controlled thereby which, when said wheel returns to the home position, disengages said means, means for locking the index wheel with said power transmitting wheel, and a hand wheel for operating said index wheel to determine the set, adapted by its initial backward movement to disengage said locking means and release the index wheel from the power transmitting wheel.

12. In saw mill set works the combination with the set shaft, a drive wheel and means

for operatively connecting them, of a power transmitting wheel, an independently movable index wheel concentric with said power transmitting wheel and provided with a spiral, means for locking said index wheel to said power transmitting wheel, and a connection engaging said spiral and adapted to throw the said means out of engagement when the index wheel is returned to home position.

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