No. 815,665. PATENTED MAR. 20, 1906.

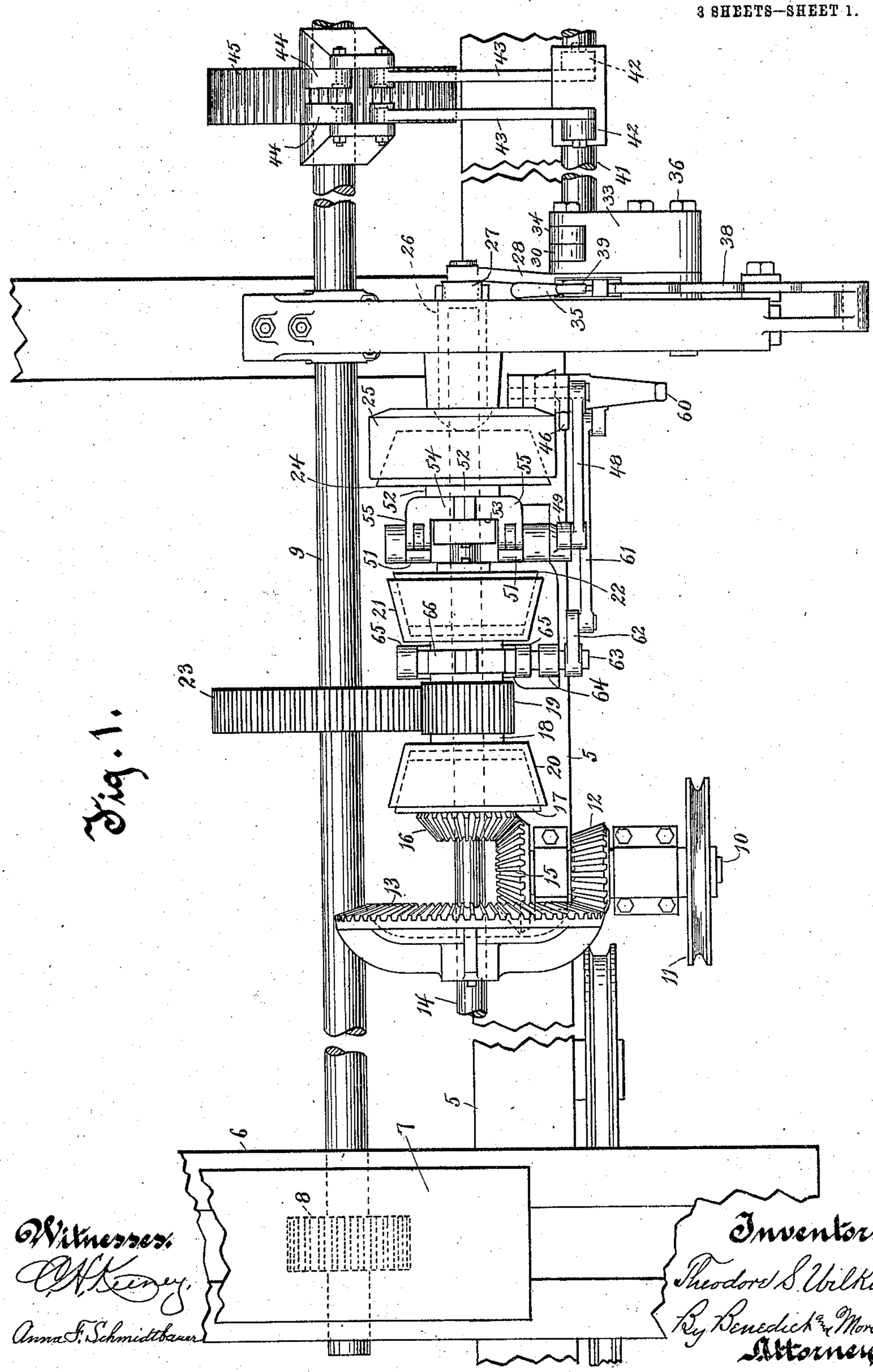
T. S. WILKIN.

SAWMILL SET WORKS.

APPLICATION FILED NOV. 18, 1903.

3 SHEETS—SHEET 1.

Fig. 1.



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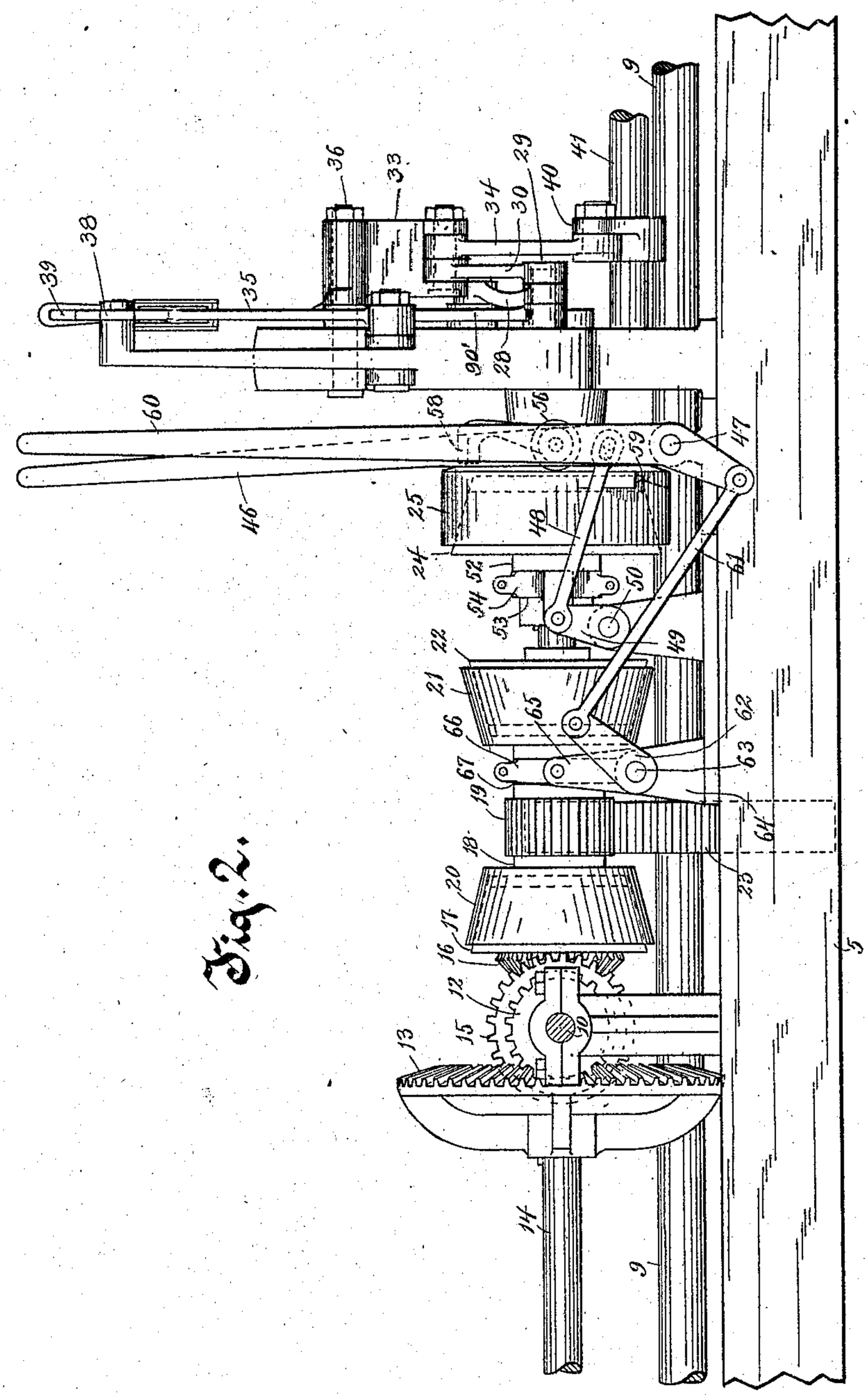
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

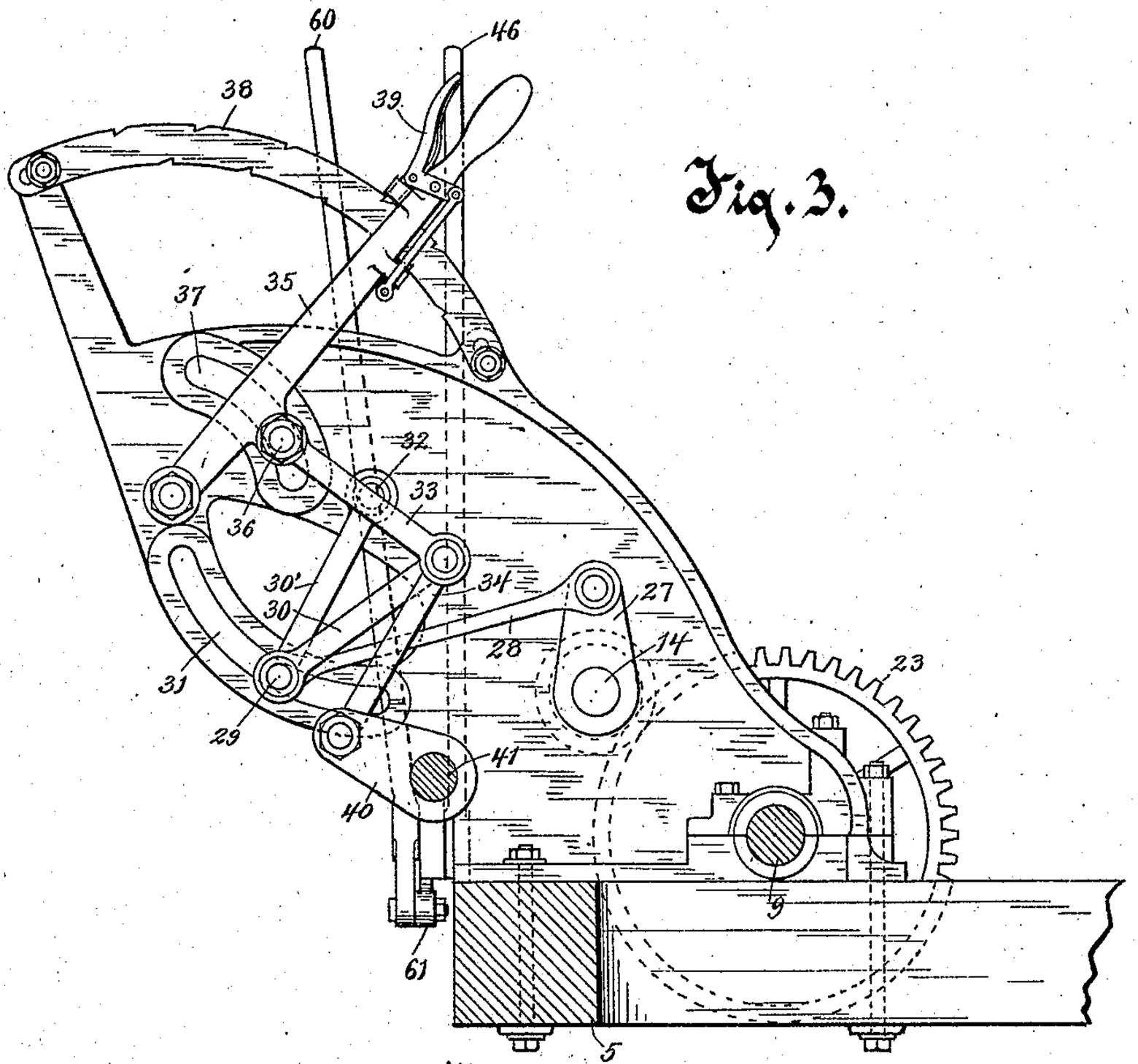
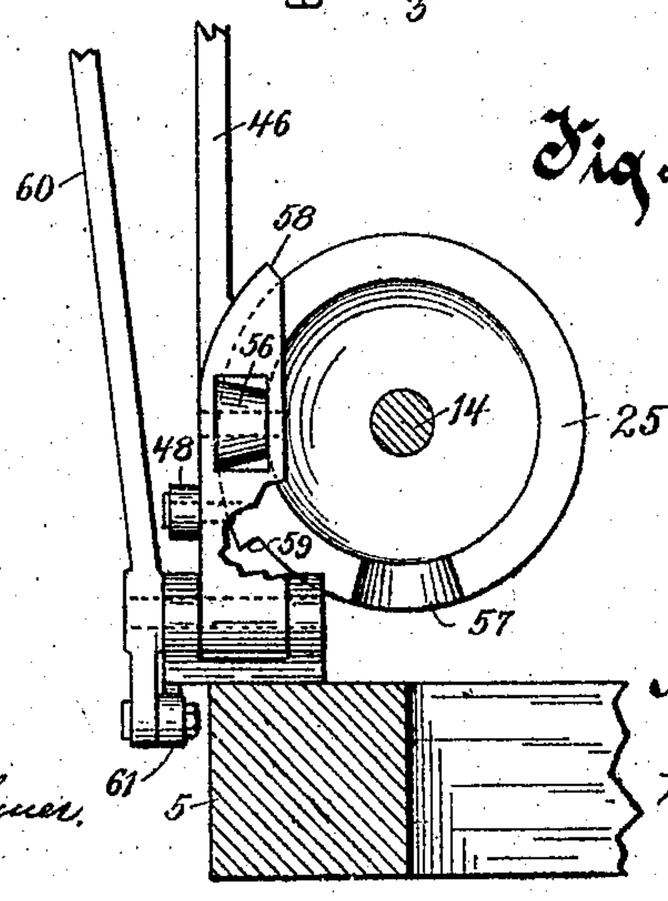


Fig. 4.



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UNITED STATES PATENT OFFICE.

THEODORE S. WILKIN, OF MILWAUKEE, WISCONSIN.

SAWMILL SET-WORKS.

No. 815,665. Specification of Letters Patent. Patented March 20, 1906.

Application filed November 18, 1903. Serial No. 181,572.

To all whom it may concern:

Be it known that I, THEODORE S. WILKIN, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Sawmill Set-Works, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements in sawmill set-works.

In sawmill set-works it is necessary in order to cause the travel of the knees to operate a lever so as to transfer the rotation of the main shaft to the set-shaft through the intermediary of a rock-shaft which is actuated upon the movement of the lever, the set-shaft being rotated by the rocking of the rock-shaft through suitable mechanism between the rock-shaft and the set-shaft. In mechanism for this purpose as now commonly constructed the operation of said lever must be continued during the time it is desired that the knees should travel either in the direction for feeding the log to the saw or in a direction away from the saw.

It is one of the most important objects of my invention to provide a construction wherein it is only necessary to give a slight initial movement to the lever, and thereafter no further manipulation of the lever by the operator is required, the crank which connects the main shaft to the rock-shaft after completing one revolution automatically stopping on the dead-center, whereby considerable time and labor in the operation are effected.

Also in an ordinary form of sawmill set-works, where it is desired to set to a fraction of an inch in order to position the log the desired distance from the saw, it is necessary to move the regulating-lever to the required notch in the segment and then wait for the crank which connects the main shaft to the rock-shaft to make a complete revolution. Obviously this is a very slow and tedious operation.

Another important object of my invention, therefore, is to overcome the last-mentioned difficulty by the provision of a means whereby the knees are fed forward slowly to the required extent to force the log to the proper position to adapt the saw to make the desired fractional cut and to return the knees very quickly to their initial position after the sawing operation of the log is completed.

With the above primary objects and other incidental objects in view the invention consists of the devices and parts or their equivalents, as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a plan view of the invention. Fig. 2 is a front elevation of Fig. 1. Fig. 3 is a view of the right-hand end of Fig. 2, and Fig. 4 is a view of the friction-disk which operates the crank and also of the lever employed in conjunction with said disk.

Referring to the drawings, the numeral 5 indicates the frame of the carriage, and 6 the ways upon which the knees 7 travel. The knees, as usual in this class of devices, are provided on their under sides with rack-teeth which are engaged by pinions 8, mounted on a set-shaft 9.

On the carriage-frame is mounted, in a suitable bearing, a short drive-shaft 10, which may be rotated in any desirable manner. For instance, a convenient way for rotating the same would be by means of an engine or other suitable motor mounted directly on the carriage. In the drawings, however, I have shown on the outer end of said shaft a sheave 11, which may be bolted to any suitable motive power at a distance and separate from the carriage, if preferred. Upon the short drive-shaft and located between the ends of said shaft is a beveled pinion 12, which meshes with a large beveled gear 13, mounted fast, as by a key, on a driven shaft 14, which shaft is mounted in suitable bearings on the carriage and extends longitudinally of said carriage. On the inner end of shaft 10 is mounted another beveled pinion 15, which is preferably slightly greater in diameter than the pinion 12. This beveled pinion 15 meshes with a beveled pinion 16 on the driven shaft 14. Rigid with and projecting from one side of the pinion 16 is a male friction-wheel 17. The beveled pinion 16 and its friction 17 are loose on the driven shaft 14. A sleeve 18 also loosely surrounds the driven shaft 14, and said sleeve forms a hub for a pinion 19. This sleeve projects in opposite directions from the pinion 19 and at one end is rigidly connected to a female friction-wheel 20, which is adapted to cooperate with the male friction-wheel 17. The opposite projecting end of the sleeve is rigidly connected to another female friction-wheel 21, which cooperates with a male friction-wheel 22, mounted fast on the driven shaft. It will be understood from what has been

stated that the sleeve 18, with the pinion 19 and the two end female friction-wheels 20 and 21, are all rigidly connected together and are loosely mounted on the driven shaft and capable of slight longitudinal movement thereon. The pinion 19 meshes with a large toothed wheel 23 on the set-shaft 9 and is somewhat wider than said wheel 23, so that the meshing engagement may be maintained notwithstanding the movement longitudinally of the sleeve on the driven shaft.

Mounted on the main or driven shaft 14 so as to rotate therewith, but to have a slight longitudinal movement thereon, preferably by being feathered on said shaft, is a male friction-wheel 24, and a coöperating female friction-wheel 25 is mounted loosely on said shaft. This female friction-wheel 25 has a sleeve 26 projecting therefrom, and connected to this sleeve is a crank 27. The outer end of the crank has pivotally connected thereto a link 28, said link at its opposite end being pivotally connected by a pivot-pin 29 to a radial bar 30. Another radial bar 30′ is also connected to the pivot-pin 29. The pivot-pin 29 preferably works in a segmental slot 31. The radial bar 30′ is anchored to the frame at the point 32, and the other radial bar 30 is pivotally connected to a knuckle-joint consisting of arms 33 and 34, respectively. The opposite end of arm 33 is pivotally connected to an operating-lever 35 by means of a pivot-pin 36, which pin may, if desired, ride in a segmental slot 37. The lever 35 swings over a notched segment 38, the notches thereof being a graduated distance apart. The said lever carries a spring-dog 39, which is adapted to engage with any of the notches of the segment. The arm 34 of the knuckle is pivotally connected to the outer end of a crank 40, mounted on a rock-shaft 41. This rock-shaft has short arms 42 42 radiating therefrom in opposite directions, and to these short arms are connected longer arms 43 43, which carry pawls 44 44, adapted to engage the teeth of a ratchet-wheel 45, mounted on the set-shaft 9, whereby the rocking movement of the rock-shaft is converted into a rotary movement of the set-shaft.

In order to enable the rock-shaft 41 to be rocked, and thereby operate to rotate the set-shaft, it is necessary that means should be provided for throwing the friction-wheels 24 and 25 into frictional engagement in order to lock the female friction-wheel 25 to the main shaft 14, so that the crank 27, which is connected to the sleeve 26, projecting from said female friction-wheel 25, will be operated. For this purpose I employ a lever and coöperating parts which are arranged in such novel manner as not only to effect the function just referred to—that is, the locking together frictionally of the two wheels 24 and 25—but also to accomplish this merely by a single manipulation of the lever and providing for the crank 27 thereafter making a single complete revolution and automatically stopping at the dead-center without any further attention on the part of the operator. The lever referred to is indicated by the numeral 46. This lever is pivoted at the point 47. Connected to this lever pivotally is a link 48, and this link in turn is pivoted to a crank 49, said crank being mounted on one end of a shaft 50. The shaft 50 extends in a transverse direction, and on this shaft are two other arms 51. The male friction-wheel 24 is provided with a projecting hub 52, and this hub is provided with an annular groove 53, in which groove is fitted an annular collar 54. This collar is projected out laterally in opposite directions, as indicated by the numerals 55 55, and the two projecting arms of the shaft 50 are connected to these projections. It will be seen from the described connection that the male friction-wheel 24 is capable of rotation with the shaft, but that yet when the lever 46 is turned in one direction the said friction-wheel will be moved longitudinally, so as to be brought into firm engagement with the female friction-wheel 25, and when the lever 46 is moved in the opposite direction the said male friction-wheel 24 will be moved out of engagement with the female friction-wheel 25. The mechanism for permitting but one revolution of the crank 27 and the stopping of said crank at the dead-center with but the necessity of a single movement of the lever 46 by the operator comprises, specifically, a roller 56, carried by the lever 46 and normally engaging a recess 57 on the side of the friction-wheel 25. When the lever 46 is operated in a direction to throw the two wheels 24 and 25 into frictional engagement, the roller 56 is withdrawn from the recess 57 and then rides upon the unrecessed portion of the wheel 25, and thereby not only serves to push the wheel 25 into firmer frictional engagement with the wheel 24, but also acts to lock said wheels in their engaging adjustment. In view of the fact that the friction 24, which is rotatable with the shaft 14, is now locked to the friction-wheel 25, which is normally loose on the shaft 14, it is evident that the rotation of said shaft 14 is imparted to the friction-wheel 25, and as the sleeve 26 of this friction-wheel carries the crank 27 the said crank will be rotated with the friction-wheel 25. This rotation of the friction-wheel 25 and the crank will continue during the period of one complete revolution of the friction-wheel 25. It is automatically stopped upon the completion of one revolution by the engagement of the roller 56 with the recess 57, which necessarily causes a slight turning of the lever 46 on its pivot in a direction to throw the two friction-wheels 24 and 25 out of frictional locking engagement. In order to guard against any possibility of the roller by reason of the momentum riding out of the recess 57 upon the

completion of one revolution of the wheel 25, I provide the lever 46 with a stop 58, which is adapted to engage with a shoulder 59, formed on the face of the friction-wheel 25.

The above constitutes a complete description of the mechanism whereby the rotation of the main shaft 14 is utilized to cause the rotation of the set-shaft 9. It will be apparent from the description heretofore given that when the friction-wheel 25 is rotated the crank 27, mounted on the end of the sleeve 26, will also be rotated, and this crank, through the medium of the links and lever connections between it and the crank on the rock-shaft, will cause a rocking of said rock-shaft, and the rocking of the rock-shaft through the medium of the pawls 44, carried by the arms 43 and engaging the ratchet-wheel 45, will cause a rotation of the set-shaft.

As stated at the outset of this specification, it is one of the objects of the present invention to provide a means whereby the knees are moved forward slowly to any extent independent of the positive setting device and then returned after the sawing operation very quickly to a desired rearward distance, whereby the very slow and tedious operation heretofore necessary of moving the regulating-lever to the required notch in the segment and then waiting for the crank which connects the main shaft to the rock-shaft to make a complete revolution in order to provide for setting to fractions of an inch, is thereby avoided. This object of my invention is attained through the medium of a lever which operates to move the sleeve 18 longitudinally on the shaft 14, and thereby bring the female friction-wheel 20 into engagement with the male friction-wheel 17 or the female friction-wheel 21 into engagement with the male friction-wheel 22, in accordance with the direction of movement of the sleeve 18, as determined by the direction in which the lever referred to is swung. This lever is indicated in the drawings by the numeral 60. This lever is pivoted on the pivot-pin 47 and extends downwardly a slight distance below said pivot-pin to form a short arm to the lever. To this short arm is pivoted a link 61, said link being pivotally connected at its opposite end to a crank 62. The crank is mounted on a shaft 63, said shaft being supported in bearings 64. Also mounted on the shaft 63 are two arms 65 65, which arms are pivotally connected to a collar 66, which collar is fitted in an annular groove 67, formed in the sleeve 18. The collar therefore does not interfere with the rotation of the sleeve, but yet through the described connection with the lever 60 is adapted to slide the sleeve longitudinally when said lever 60 is manipulated. In the operation of this part of my invention the two friction-wheels 24 and 25 are of course adjusted so as to be out of frictional engagement and be thereby prevented from rotating the set-shaft through the medium of the connections between the sleeve of friction-wheel 25 and the rock-shaft. If now it is desired to move the knees along the ways a certain distance in order to set up to a fraction, the lever 60 is grasped and turned to the left of Fig. 2. This will cause a movement of the sleeve 18 to the right, and hence throw the two friction-wheels 21 and 22 into engagement. As the friction-wheel 22 is fast on the shaft 14, the rotation is effected through the following connections—viz., beveled pinion 12 meshing with beveled gear 13 rotates shaft 14, and the rotation of shaft 14 rotates the friction-wheel 22, and said friction-wheel in turn rotates female friction-wheel 21, and as this latter is fast on sleeve 18 the said sleeve is rotated, and pinion 19 is consequently rotated, and the rotation of this pinion through its meshing engagement with the toothed wheel 23 causes a rotation of the set-shaft 9. This set-shaft is thereby rotated slowly, and consequently there is a slow forward movement of the knees. After the knees have been adjusted forwardly to the required extent and the cutting operation completed the pawls 44 are thrown out of engagement with the ratchet-wheel 45. The lever 60 is now turned to the right of Fig. 2, and this will have the effect of moving the sleeve 18 to the left, and hence thrust friction-wheel 20 into frictional engagement with friction-wheel 17. The course of rotation under these conditions is as follows: The rotation of beveled pinion 15 rotates beveled pinion 16, which is loose on shaft 14, and as the male friction-wheel 17 is fast to beveled wheel 16 the said male friction-wheel rotates the female friction-wheel 20, and as said female friction-wheel is fast to or a part of the sleeve 18 the said sleeve is thereby rotated, and its rotation is transferred to the set-shaft through the medium of the intermeshing gears 19 and 23. Through this course of rotation the set-shaft is rotated quite rapidly, and hence the knees are returned quickly to the desired position.

The particular connection herein shown and described between the crank 27 of the main shaft 14 and the crank 40 of the rock-shaft 41 possesses considerable advantage, inasmuch as it provides against undue or excessive strains. For instance, in the form of construction illustrated in my application for Letters Patent for improvements in set-works for sawmills, filed February 20, 1902, Serial No. 94,930, and allowed October 24, 1903, there is considerable strain when the rock-shaft is actuated by the particular connection shown in said application between the main shaft and the rock-shaft. Under the present construction the strains are greatly reduced and are substantially alike at all times no matter what may be the position of

the crank-arm 40. As illustrative of this feature of the invention, it will be supposed that the crank-pin 29 is in its lowest position in the segmental slot 31 and the crank 27 is at its rearward dead-center. At such position of the parts the said pin will register with the crank 40, and the parts are thus properly positioned for setting the mechanism for cutting a certain thickness of board. The lever 35 is now swung to the proper position or notch of the segment, and this movement is effected without any movement whatever being imparted to either crank 27 or the crank 40. If the main shaft 14 is next rotated in a direction, say, to the left, this will have the effect of moving the pivot-pin 29 upwardly in the slot 31 and will tend to bring the pivot connecting the arms of the angle-joint downwardly, or, in other words, straighten out the angle-joint, and this in turn will force the crank 40 downwardly, or to the left, and consequently the strain is very much relieved. It will also be obvious that if the rotation of the main shaft be to the right instead of to the left a rocking motion will likewise be communicated to the rock-shaft without undue strains being occasioned. In my pending application, hereinbefore referred to, the strains are necessarily greatest when the eccentric therein shown and described is at its extreme right-hand position, and the log is then fed toward the saw by the rotation of the set-shaft through the connection between the main shaft, rock-shaft, and set-shaft.

What I claim as my invention is—

1. In sawmill set-works, the combination of a main shaft, a set-shaft, a rock-shaft, mechanism between the main shaft and the rock-shaft, means for throwing said mechanism into operation so as to convert the rotation of the main shaft into rocking movement of the rock-shaft, and means for automatically throwing said mechanism out of operation after the main shaft has been rotated to a certain extent, in order to stop the rocking movement of the rock-shaft, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking movement of the rock-shaft into a rotary motion of the set-shaft.

2. In sawmill set-works, the combination of a main shaft, a set-shaft, a rock-shaft, lever-controlled mechanism between the main shaft and the rock-shaft so constructed that when said lever is given an initial turn in one direction the said mechanism is thrown into operation so as to convert the rotation of the main shaft into a rocking movement of the rock-shaft, and means for automatically throwing said mechanism out of operation, after the main shaft has been rotated to a certain extent, in order to stop the rocking movement of the rock-shaft, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking movement of the rock-shaft into a rotary motion of the set-shaft.

3. In sawmill set-works, the combination of a main shaft, a set-shaft, a crank loosely mounted on the main shaft, clutch mechanism for clutching the crank to the main shaft, means for operating said clutch mechanism for effecting the clutching of the crank to the main shaft, mechanism constructed to automatically stop the crank and unclutch the same from the main shaft, after said crank has revolved a certain distance, a rock-shaft, a connection between the rock-shaft and the crank of the main shaft, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking movement of the rock-shaft into a rotary motion of the set-shaft.

4. In sawmill set-works, the combination of a main shaft, a set-shaft, a crank loosely mounted on the main shaft, clutch mechanism for clutching the crank to the main shaft, means for operating said clutch mechanism for effecting the clutching of the crank to the main shaft, mechanism constructed to automatically stop the crank on the dead-center and unclutch the same from the main shaft, after said crank has revolved a certain distance, a rock-shaft, a connection between the rock-shaft and the crank of the main shaft, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking movement of the rock-shaft into a rotary motion of the set-shaft.

5. In sawmill set-works, the combination of a main shaft, a crank loosely mounted on the main shaft, an operating-lever, clutch mechanism controlled by said lever and adapted when an initial movement is given to the lever for clutching the crank to the main shaft, mechanism carried by the lever and constructed to automatically stop the crank and unclutch the same from the main shaft, after said crank has revolved a certain distance, a rock-shaft, a connection between said rock-shaft and the crank of the main shaft, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking movement of the rock-shaft into a rotary motion of the set-shaft.

6. In sawmill set-works, the combination of a main shaft, fast and loose clutches carried by said shaft, the loose clutch being provided with a crank, means for throwing said clutches into engagement, mechanism for automatically throwing the clutches out of engagement after the crank has revolved a certain distance, a rock-shaft, a connection between said shaft and the crank of the main shaft, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking movement of the rock-shaft into a rotary motion of the set-shaft.

7. In sawmill set-works, the combination

of a main shaft, fast and loose clutches carried by said main shaft, the loose clutch being provided with a crank, a lever engaging one of the clutches, and adapted when turned in one direction to bring the clutches into engagement, mechanism constructed to automatically move the clutches out or engagement, after the crank has revolved a certain distance, a rock-shaft, a connection between said shaft and the crank of the main shaft, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking movement of the rock-shaft into a rotary motion of the set-shaft.

8. In sawmill set-works, the combination of a main shaft, clutches carried by said shaft, one of said clutches being loose on the shaft, and the other clutch rotatable with but movable longitudinally on the shaft, and the loose clutch beng provided with a crank, a lever engaging the slidable clutch, and adapted when turned in one direction to bring the clutches into engagement, coöperating means on the loose clutch and on the lever, and adapted to automatically move the two clutches out of engagement, after the crank has revolved a certain distance, a rock-shaft, a connection between said shaft and the crank of the main shaft, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking movement of the rock-shaft into a rotary motion of the set-shaft.

9. In sawmill set-works, the combination of a main shaft, fast and loose clutches carried by said shaft, the fast clutch being longitudinally movable on the shaft, and the loose clutch having a recess on one face, and also provided with a crank, a lever engaging the longitudinally-movable clutch, and provided with a projection normally engaging the recess of the loose clutch, said lever when given an initial turn in one direction adapted to move the clutches into engagement and cause the projection to withdraw from the recess and bear against the face of the loose clutch and thereby hold said clutch in engagement with the fast clutch until the main shaft has rotated the required distance to bring the recess again into registration and engagement with the projection of the lever, whereby the rotation of the crank is automatically stopped, a rock-shaft, a connection between said shaft and the crank of the loose clutch, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking movement of the rock-shaft into a rotary motion of the set-shaft.

10. In sawmill set-works, the combination of a main shaft, fast and loose clutches carried by said shaft, the fast clutch being longitudinally slidable on the shaft, and the loose clutch having a recess on one face and also provided with a crank, a lever engaging the longitudinally-slidable clutch, and provided with a roller projection normally engaging the recess of the loose clutch, said lever when given an initial turn in one direction adapted to throw the clutches into engagement and cause the roller projection to withdraw from the recess and bear against the face of the loose clutch and thereby hold the same in engagement with the fixed clutch until the main shaft has rotated the required distance to bring the recess again into registration and engagement with the roller projection of the lever, whereby the rotation of the crank is automatically stopped, a rock-shaft, a connection between said shaft and the crank of the loose clutch, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking motion of the rock-shaft into a rotary motion of the set-shaft.

11. In sawmill set-works, the combination of a main shaft, fast and loose clutches carried by said shaft, the fast clutch being longitudinally slidable on the shaft, and the loose clutch having a recess on one face, and also provided with a crank, a lever engaging the longitudinally-slidable clutch and provided with a projection normally engaging the recess of the loose clutch, said lever when given an initial turn in one direction adapted to move the clutches into engagement and cause the projection to withdraw from the recess and bear against the face of the loose clutch and thereby hold the two clutches in engagement until the main shaft has rotated the required distance to bring the recess again into registration and engagement with the projection of the lever, whereby the rotation of the crank is automatically stopped, stop mechanism between the loose clutch and the lever and adapted for preventing the projection of the lever from riding out of the recess after said projection is brought into registration and engagement with said projection, a rock-shaft, a connection between said rock-shaft and the crank of the loose clutch, and mechanism between the rock-shaft and the set-shaft and adapted for converting the rocking motion of the rock-shaft into a rotary motion of the set-shaft.

12. In a sawmill set-works, the combination of a main shaft, means for driving the main shaft, a set-shaft, knees operated by the set-shaft, variable-speed-transmitting mechanism, means for connecting and disconnecting the variable-speed-transmitting mechanism to the main shaft, said variable-speed-transmitting mechanism when connected to the main shaft adapted to have the rotation of the main shaft imparted thereto, means, when the variable-speed-transmitting mechanism is disconnected from the main shaft, for rotating said mechanism independently of and at a relatively faster rate of speed than the speed of rotation imparted

thereto by the main shaft, and a connection between the variable-speed-transmitting mechanism and the set-shaft for transferring the respective fast and slow rotations of said variable-speed-transmitting mechanism to the set-shaft, in order to produce by the slow rotation, a slow advance movement of the knees, and to produce by the reverse fast rotation a fast return movement of the knees.

13. In a sawmill set-works, the combination of a main shaft, means for driving the main shaft, a set-shaft, variable-speed-transmitting mechanism, a lever, a connection between the lever and the variable-speed-transmitting mechanism, whereby when the lever is operated in one direction, the variable-speed-transmitting mechanism is connected to the main shaft, and when the lever is operated in the opposite direction the variable-speed-transmitting mechanism is disconnected from the main shaft, the said variable-speed-transmitting mechanism when connected to the main shaft adapted to have the rotation of the main shaft imparted thereto, means, when the variable-speed-transmitting mechanism is disconnected from the main shaft, for rotating said mechanism independently of and at a relatively faster rate of speed than the speed of rotation imparted thereto by the main shaft, and a connection between the variable-speed-transmitting mechanism and the set-shaft for transferring the respective fast and slow rotations of said variable-speed-transmitting mechanism to the set-shaft, in order to produce by the slow rotation a slow advance movement of the knees, and to produce by the reverse fast rotation a fast return movement of the knees.

14. In sawmill set-works, the combination of a main shaft, means for rotating the same at a relatively slow rate of speed, a set-shaft, knees operated by said set-shaft, variable-speed-transmitting mechanism mounted on the main shaft, means for clutching and unclutching the variable-speed-transmitting mechanism to the main shaft, said mechanism when clutched to the main shaft having the slow rotation of the main shaft imparted thereto, mechanism adapted for rotating the variable-speed-transmitting mechanism rapidly when said mechanism is unclutched from the main shaft, and a connection between the variable-speed-transmitting mechanism and the set-shaft for transferring the respective slow and fast rotations of said variable-speed-transmitting mechanism to the set-shaft, in order to produce by the slow rotation a slow advance movement of the knees, and to produce by the reverse fast rotation a fast return movement of the knees.

15. In sawmill set-works, the combination of a main shaft, means for driving the same at a relatively slow speed, a set-shaft knees operated thereby, variable-speed-transmitting mechanism, means for rotating said variable-speed-transmitting mechanism from the main shaft so as to partake of the relatively slow speed of said main shaft, means for rotating said set-shaft-operating mechanism independently of the main shaft and at a quicker speed of rotation, and a connection between the variable-speed-transmitting mechanism and the set-shaft for transferring the respective slow and fast rotations of said variable-speed-transmitting mechanism to the set-shaft, in order to produce by the slow rotation a slow advance movement of the knees, and to produce by the reverse fast rotation a fast return movement of the knees.

16. In sawmill set-works, the combination of a main shaft, means for driving the same, a rock-shaft, a set-shaft, knees operated by the set-shaft, a connection between the main shaft and the rock-shaft, means for throwing said connection into operation, said means being so constructed that when thrown into operation the rotary motion of the main shaft is converted into a rocking motion of the rock-shaft, means for throwing said connection out of operation so as to prevent the rotation of the main shaft from imparting a rocking motion to the rock-shaft, a connection between the rock-shaft and the set-shaft for converting the rocking motion of the rock-shaft into a rotary motion of the set-shaft, set-shaft-operating mechanism for rotating the set-shaft when the driving connection between the main shaft and the rock-shaft is out of operation, said set-shaft-operating mechanism when operated in one direction causing a slow rotation of the set-shaft in order to cause a slow advance of the knees, and when operated in the opposite direction causing a rapid return movement of the knees.

17. In sawmill set-works, the combination of a driving-shaft having two pinions thereon, a main shaft having a gear and a pinion thereon, the pinion being loose on the main shaft and the gear being fast on said main shaft, and said gear and pinion being engaged respectively by the pinions of the driving-shaft, a clutch member rigid with the loose pinion of the main shaft, another clutch member fast on the main shaft, a sleeve loosely surrounding the main shaft, said sleeve provided at opposite ends with clutch members adapted to be brought into engagement with either of the other clutch members, and said sleeve provided intermediate of its clutch members, with a toothed gear, means for sliding the sleeve longitudinally on the main shaft, and a set-shaft provided with a toothed wheel in mesh with the toothed gear of the sleeve.

18. In sawmill set-works, the combination of a main shaft, a crank on the main shaft, a rock-shaft, a set-shaft, mechanism between the rock-shaft and the set-shaft for converting the rocking movement of the rock-shaft

into a rotary movement of the set-shaft, a crank on the rock-shaft, a regulating-lever, a connection between the lever and the cranks of the rock-shaft and of the main shaft respectively, said connection consisting of a knuckle-joint comprising arms pivoted together at their inner ends, and the outer end of one pivotally connected to the lever, and the outer end of the other pivotally connected to the crank of the rock-shaft, radial bars pivoted together, and one of said bars having its other end pivoted to a fixed point, and the other bar pivoted at its other end to the pivot of the knuckle-joint, and a link connected at one end to the pivot of the radial bars and at its other end to the crank for the main shaft.

19. In sawmill set-works, the combination of a fixed part provided with a segmental slot; a main shaft, a rock-shaft, a crank on the rock-shaft, a crank on the main shaft, a set-shaft, mechanism between the rock-shaft and the set-shaft for converting the rocking movement of the rock-shaft into a rotary movement of the set-shaft, a regulating-lever, a connection between the regulating-lever and the cranks of the rock-shaft and of the main shaft, respectively, said connection consisting of a knuckle-joint comprising arms pivoted together at their inner ends and the outer end of one pivotally connected to the lever, the pivot connection working in the segmental slot of the fixed part, and the outer end of the other pivotally connected to the crank of the rock-shaft, radial bars pivoted together, and one of said bars having its other end pivoted to a fixed point, and the other bar pivoted at its other end to the pivot of the angle-joint, and a link pivotally connected at one end to the pivot of the radial bars and at its other end to the crank of the main shaft.

20. In sawmill set-works, the combination of a frame provided with a segmental slot, a main shaft, a crank on the main shaft, a set-shaft, mechanism between the rock-shaft and the set-shaft for converting the rocking motion of the rock-shaft into a rotary motion of the set-shaft, a regulating-lever, a connection between the regulating-lever and the cranks of the rock-shaft and of the main shaft, respectively, said connection consisting of a knuckle-joint comprising arms pivoted together at their inner ends and the outer end of one pivotally connected to the lever and the outer end of the other pivotally connected to the crank of the rock-shaft, radial bars pivoted together, the pivot working in the segmental slot of the frame, and one of said bars having its other end pivoted to a fixed point, and the other bar pivoted at its other end to the pivot of the angle-joint, and a link pivotally connected at one end to the pivot of the radial bars and at its other end to the crank of the main shaft.

In testimony whereof I affix my signature in presence of two witnesses.

THEODORE S. WILKIN.

Witnesses:
ANNA F. SCHMIDTBAUER,
ALMA KLUG.