(No Model.) 7 Sheets—Sheet 1.

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SAW MILL SET WORKS.

No. 373,476. Patented Nov. 22, 1887.

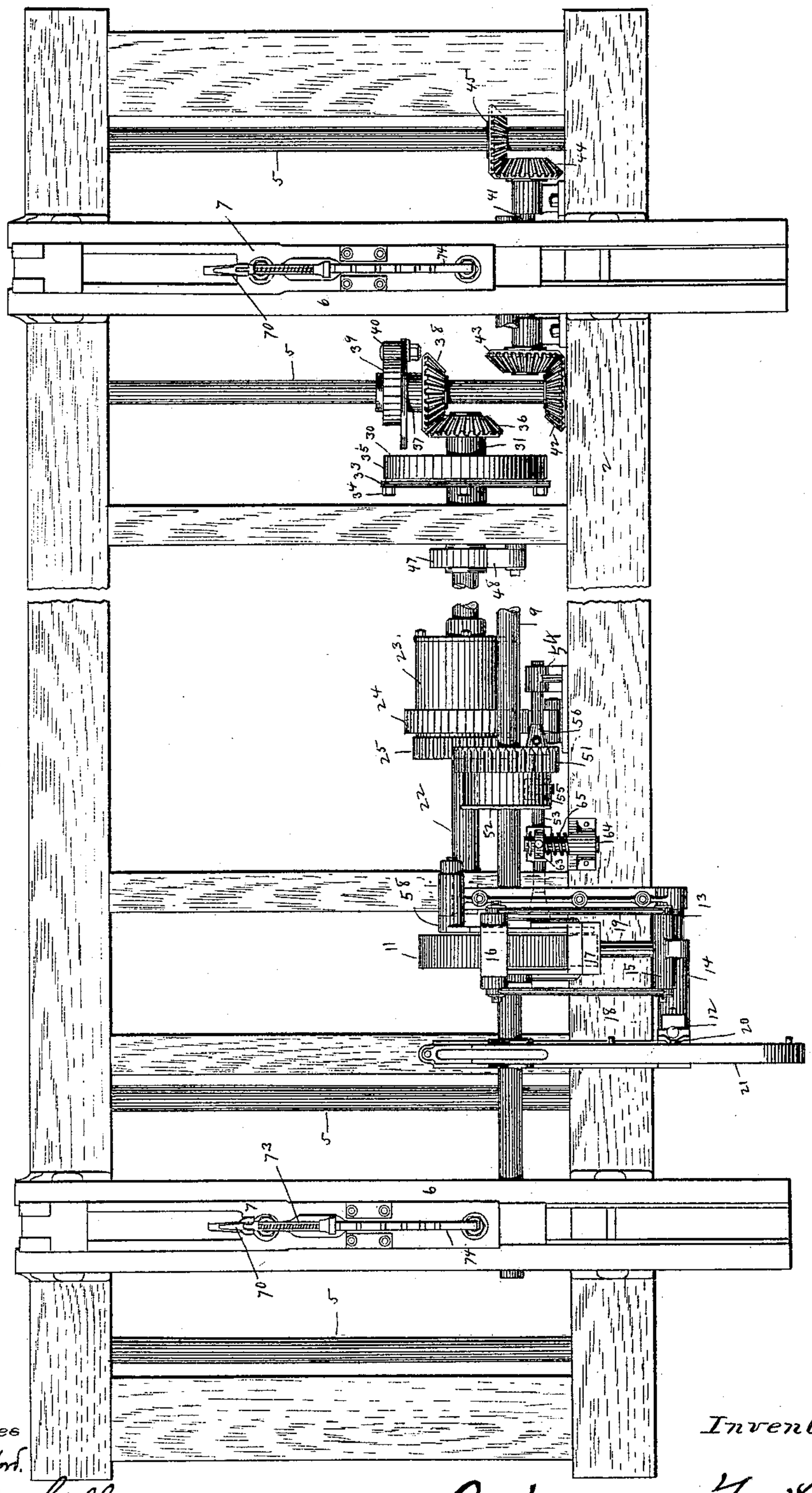

Fig. 1.

Witnesses
R. H. Sanford.
A. M. Gaskell

Inventor
William F. Parish

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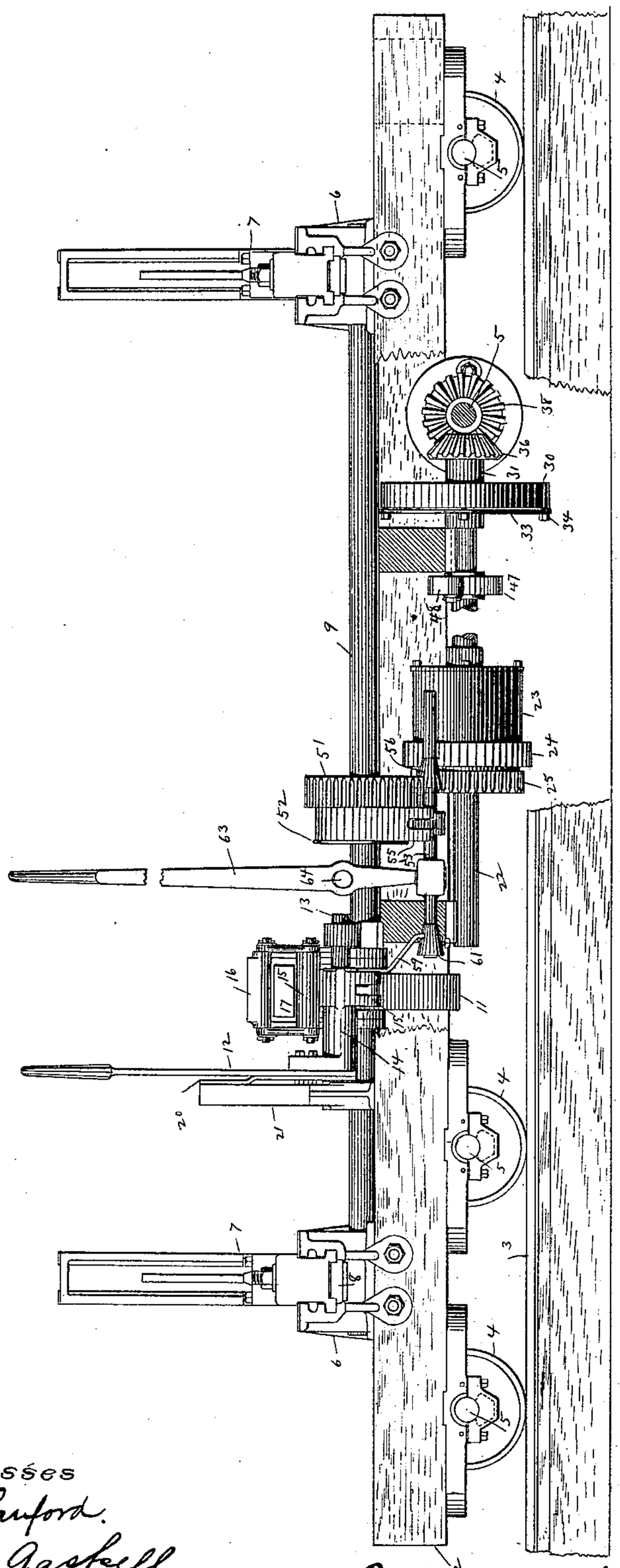
Fig. 2



Witnesses
R. H. Sanford.
A. M. Gaskell

Inventor
William F. Parish

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Fig. 3

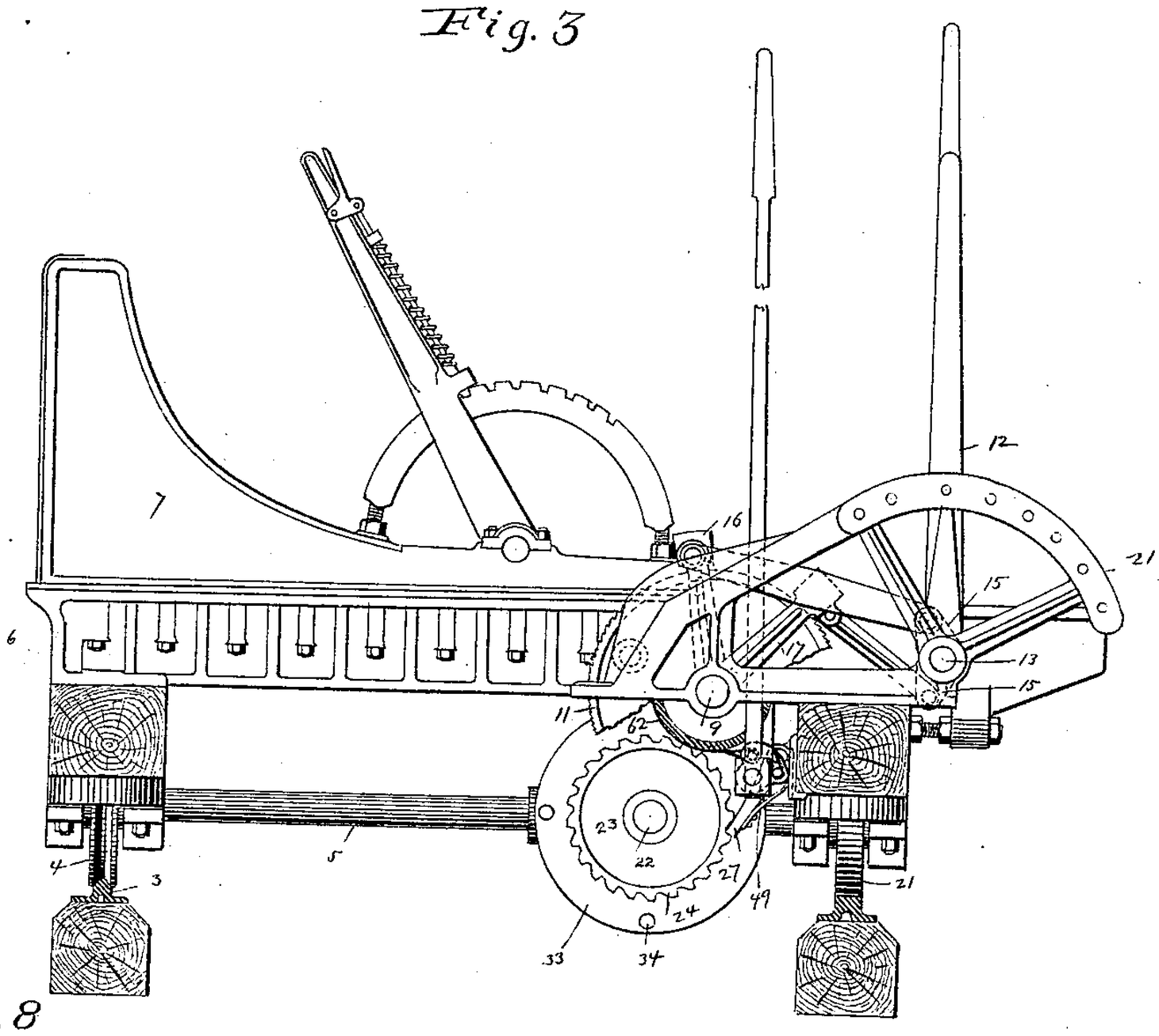


Fig. 8

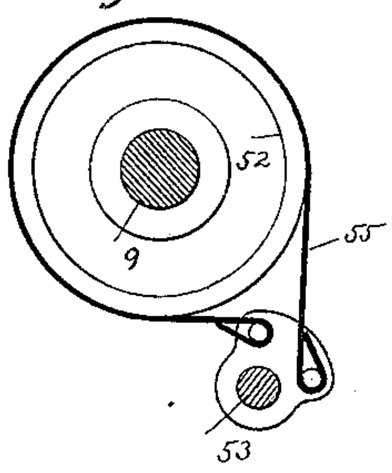
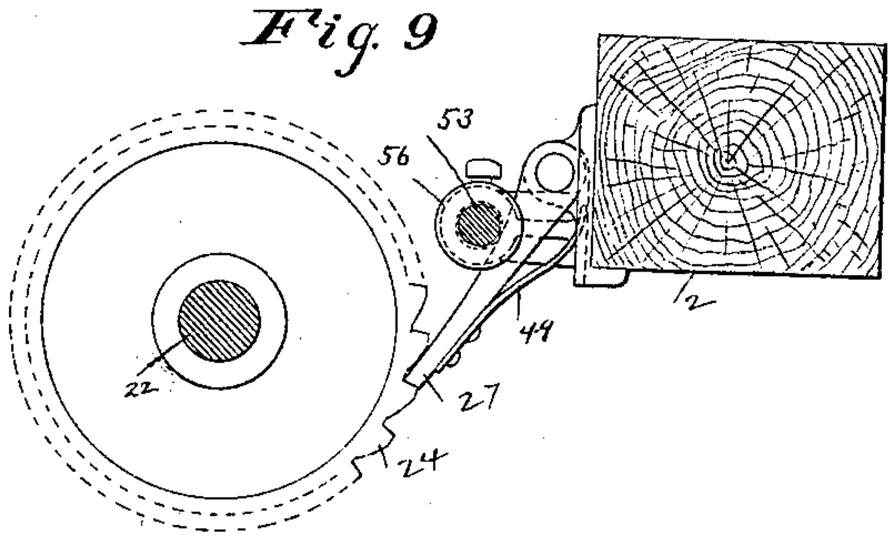


Fig. 9



Witnesses
R. H. Sanford
A. M. Gaskell

Inventor
William F. Parish

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Fig. 11

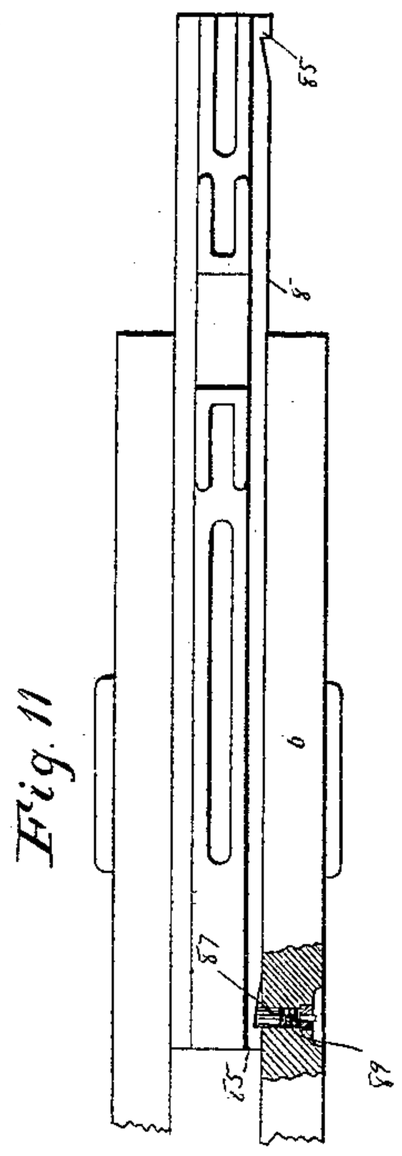

Fig. 4

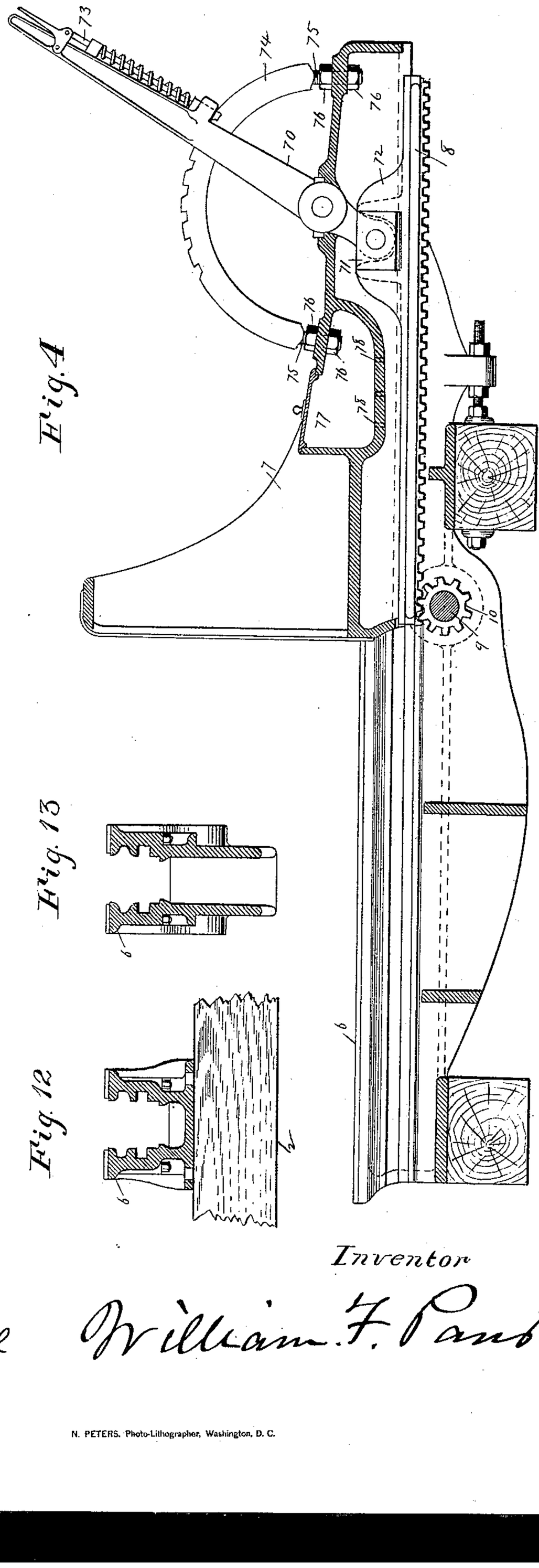

Fig. 10

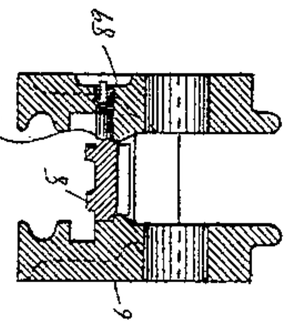

Fig. 13

Fig. 12

Witnesses
R. H. Sanford
A. M. Gaskell

Inventor
William F. Parish

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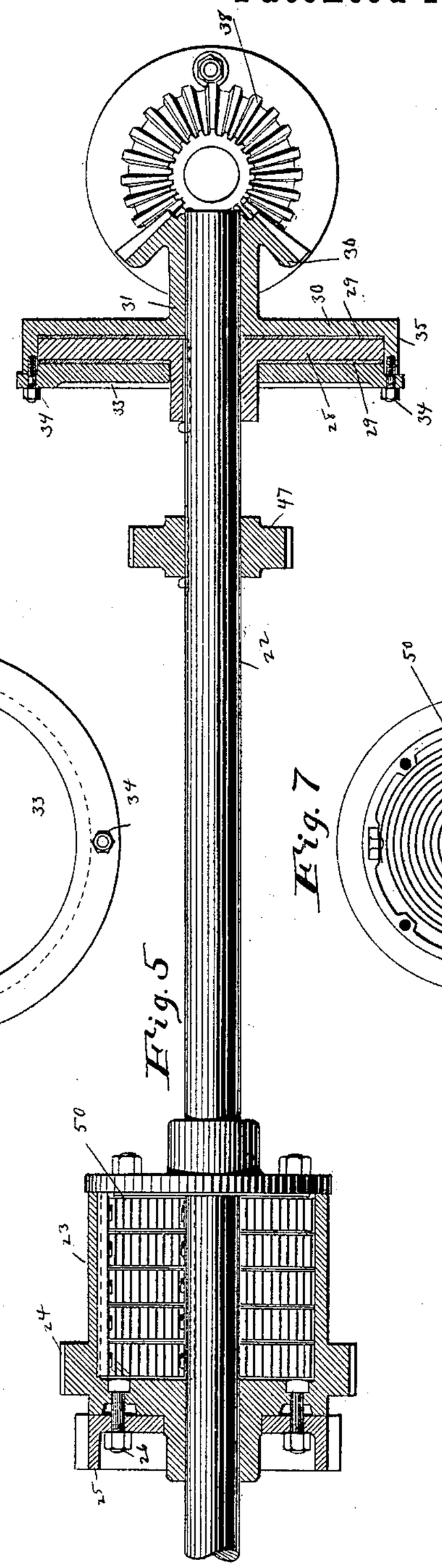


Fig. 6.

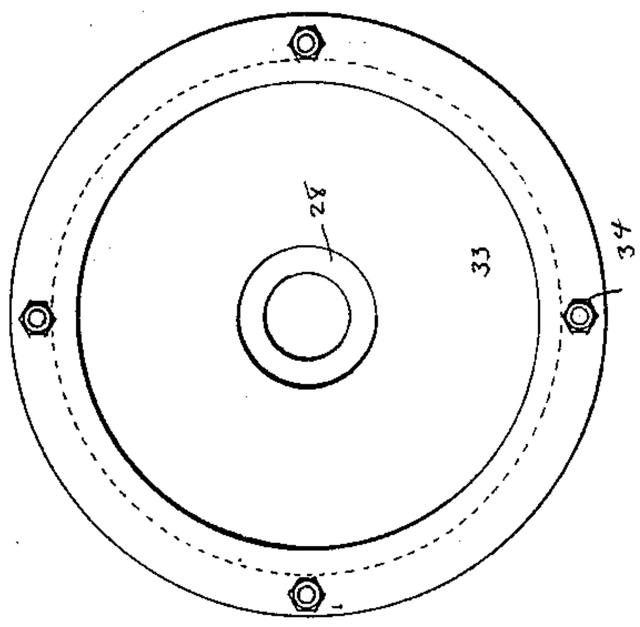
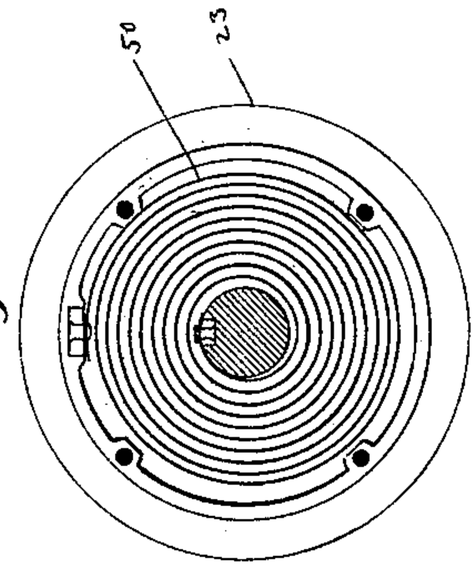


Fig. 5

Fig. 7



Witnesses
R. H. Sanford
A. M. Gaskill

Inventor
William F. Parish

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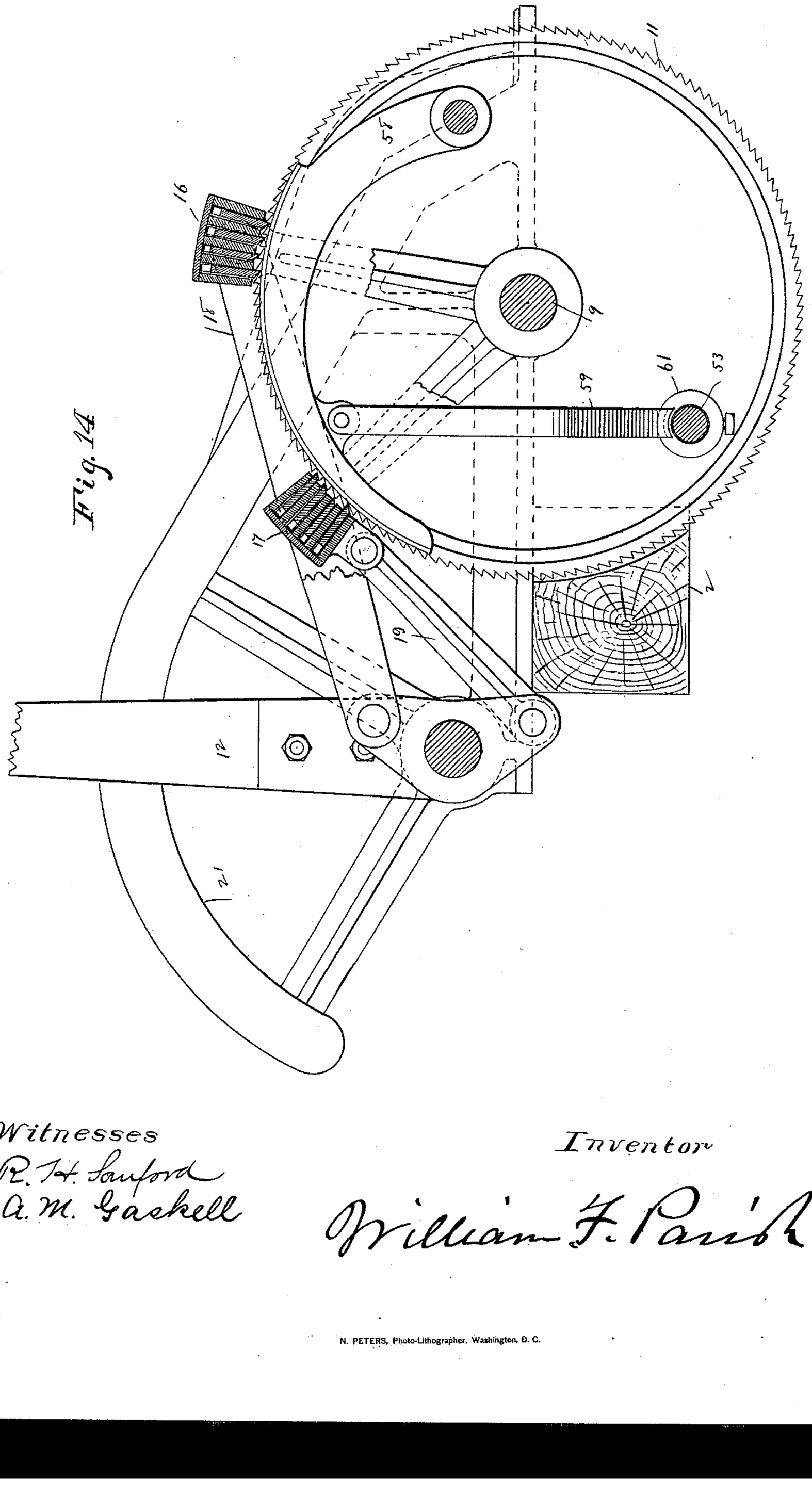

Fig. 14

Witnesses
R. H. Sanford
A. M. Gaskell

Inventor
William F. Parish

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W. F. PARISH.

SAW MILL SET WORKS.

No. 373,476. Patented Nov. 22, 1887.

Fig. 15.

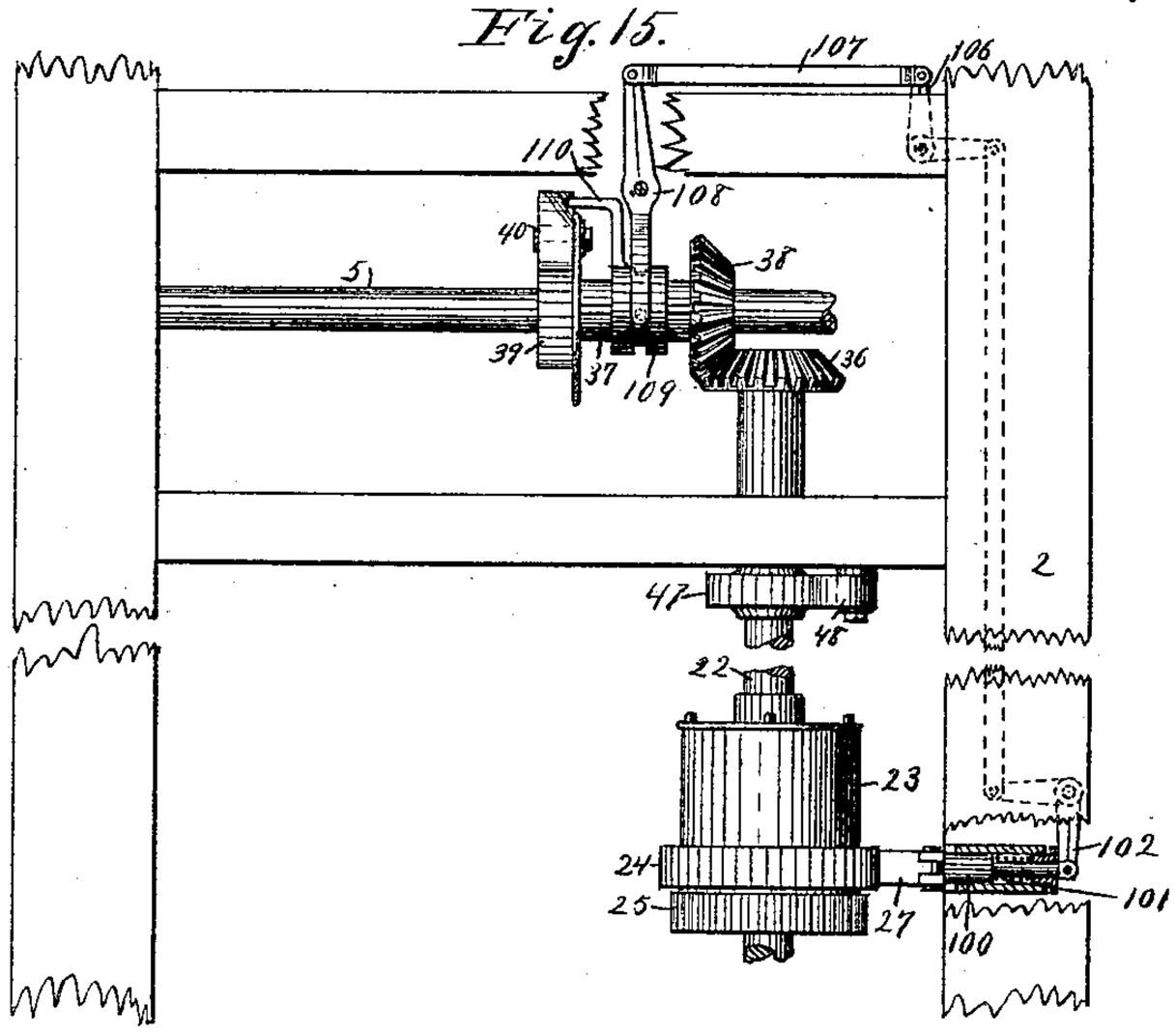


Fig. 16.

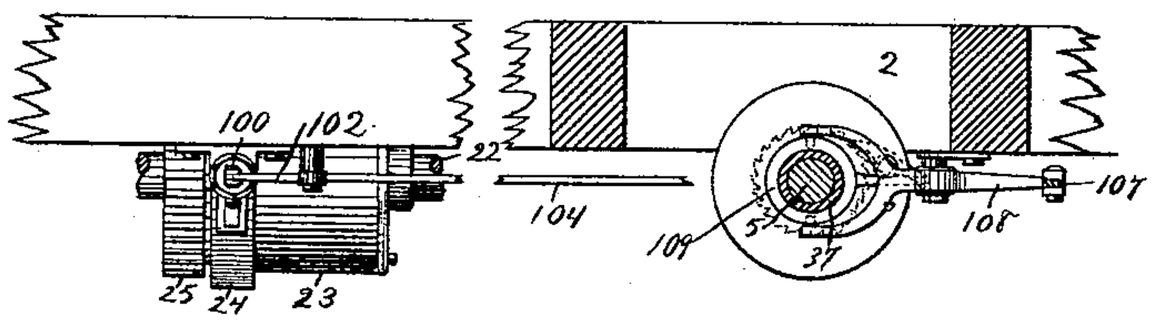
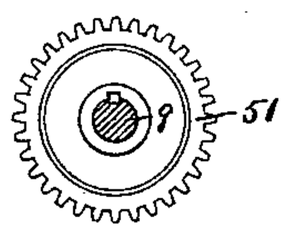


Fig. 17.



Witnesses.
R. H. Sanford
S. J. Beardslee.

Inventor.
William F. Parish

UNITED STATES PATENT OFFICE.

WILLIAM F. PARISH, OF MINNEAPOLIS, MINNESOTA.

SAW-MILL SET-WORKS.

SPECIFICATION forming part of Letters Patent No. 373,476, dated November 22, 1887.

Application filed March 21, 1887. Serial No. 231,773. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. PARISH, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in Saw-Mill Set-Works, of which the following is a specification.

This invention relates to improvements in means for moving the knees of saw-mill carriages, and also to improvements in certain features of the knees and head-blocks.

The means commonly used for moving the knees of saw-mill carriages comprise a ratchet mechanism on the set-shaft or connected therewith, that is operated by a hand-lever to move the knees forward, and a spring or springs for receding the knees, placed on or connected with the set-shaft in such manner that they are wound up as the knees are moved forward. In all of these devices the springs are wound by the power that is applied to the set-shaft for moving the knees, which makes it necessary for the sawyer to use sufficient muscular effort to wind the springs in addition to that required to move the knees. The knees on large carriages are very heavy, and the carriages are often provided with four or five head-blocks and a corresponding number of knees. As the number and weight of the knees are increased the greater power is required to move them, and the stronger the receding springs must be also, and the greater will be the effort required to wind them. It is therefore very difficult to move forward the blocks against the tension of the springs on large carriages. Other means for operating the knees have been used—such as friction devices, that can only be operated while the carriage is in motion.

The main object of my invention is to provide a saw-mill carriage with mechanism in which power may be stored by the movement of the carriage, and which is arranged to be connected with the set-shaft, when desired, for the purpose of quickly receding the knees, so that the attendant is only required to exert the necessary force to set forward the knees and move whatever logs or timber may be on the carriage in front of the knees at the time, and that can be operated to recede the knees while the carriage is in motion or at rest.

Another object of the invention is to provide an automatic stop for each knee, which will prevent it from being moved too far in either direction.

Another object of the invention is to provide a lubricating device for the knees and blocks.

Other objects of the invention will appear from the following detailed description.

In the accompanying drawings, which form a part of this specification, Figure 1 is a plan view of a saw-mill carriage having my invention applied thereto. Fig. 2 is a front elevation, and Fig. 3 an end elevation, of the same. Fig. 4 is a cross-section of the carriage. Fig. 5 is a section of the spring-drum and friction driving device, the shaft being in elevation. Fig. 6 is a face view of the friction-disk on the spring-shaft. Fig. 7 is an end view of the spring-drum with the head removed. Fig. 8 is a detail of the brake. Fig. 9 is a detail of the ratchet mechanism on the spring-shaft and the means for tripping the pawl. Figs. 10 and 11 are details of the head-block and slide with the stop-pin for the slide and knee. Figs. 12 and 13 are detail sections of the head-block. Fig. 14 is a detail showing the pawl-trip that operates in connection with the ratchet mechanism on the set-shaft. Fig. 15 is a detail plan, and Fig. 16 an elevation, showing a tripping device that may be used in place of the drive to allow the axle to revolve after the springs have been wound to a certain tension without further effecting the springs. Fig. 17 is a detail showing the gear 51 splined to its shaft.

In the drawings, 2 represents a saw-mill carriage, which may be of any suitable size and construction. This carriage is provided with wheels 4 and axles 5, and is arranged to move upon a track, 3, in the usual way. The carriage is also provided with any desired number of head-blocks, 6, upon which are the sliding knees 7. The knees are adjustably connected with sliding rack-bars 8, arranged in the head-blocks. A set-shaft, 9, extends lengthwise of the carriage, being journaled in bearings in the head-blocks, and is provided with pinions 10, that engage the rack-bars 8. By turning the set-shaft the knees are simultaneously moved forward or receded on the head-blocks.

A suitable ratchet mechanism, that may be

of any preferred construction, is provided for turning the shaft in one direction and setting forward the knees. I have shown the set-shaft provided with a ratchet-wheel, 11, that is secured thereto. A lever, 12, is pivoted upon a short shaft, 13, and has connected with it a hollow shaft or sleeve, 14, that is adapted to be oscillated on the shaft 13 with the movements of the lever 12. Lugs 15 project above and below the sleeve 14. Pawl-carriers 16 and 17 are hung upon the shaft 9 and extend over the face of the ratchet-wheel. These pawl-carriers are each provided with dogs that engage the teeth of the ratchet-wheel. I prefer to employ the construction and arrangement of pawl-carriers and pawls shown in my application for Letters Patent No. 203,065, filed May 24, 1886, though any of the common forms of pawl-carriers and pawls may be used, if preferred. The pawl-carriers are connected by yokes 18 and 19 to the lugs 15 on the sleeve 14. By this means, as the lever is moved in either direction, one pawl-carrier is advanced while the other is receded, and the shaft is thereby given a continuous motion in one direction. The set-lever 12 is preferably provided with a spring-stop, 20, that is adapted to strike against pins that are placed in holes in a quadrant, 21, to limit the movement of the lever.

A shaft, 22, is journaled in suitable bearings on the carriage and preferably extends parallel with the set-shaft 9. This shaft is adapted to turn freely in either direction. Mounted loosely upon this shaft is a drum, 23, within which is a series of coil-springs, 50, each of which has one end secured to the shaft 22 and the other end secured to the interior wall of the drum. A ratchet-wheel, 24, is preferably formed integrally with the drum. A gear, 25, is secured to the drum, preferably by suitable bolts, 26. A pawl, 27, is pivoted upon the carriage, and is provided with a suitable spring, 49, which tends to hold the pawl in engagement with the ratchet 24, and thereby to prevent the drum from being turned on the shaft by the tension of the springs. When this pawl is not in engagement with the ratchet, the tension of the springs tends to turn the drum on the shaft. A suitable friction device connects the shaft 22 with one of the carriage-axles 5, so that the shaft is turned and the springs are wound up as the carriage moves in one direction. Any suitable friction device may be used for this purpose. I have shown a preferable construction for this device. A disk, 28, is secured to the shaft, and has upon its faces a suitable covering, 29, of rawhide or other suitable material. A disk, 30, is secured to or formed integrally with a sleeve, 31, that is mounted loosely upon the shaft 22. A disk, 33, is secured to the disk 30 by suitable clamping-screws, 34, which preferably extend into a flange, 35, on the disk 30. The disks 30 and 33 are arranged upon the opposite faces of the disk 28, and form a friction-drive therewith. By means of the clamping-screws 34 the friction between the disks may be regulated. Secured to or formed integrally with the sleeve 31 is a suitable bevel-gear, 36.

Mounted loosely upon one of the carriage-axles is a sleeve, 37, that carries a bevel-gear, 38, that meshes with the gear 36. The gears 36 and 38 may be of any desired relative sizes. A ratchet-wheel, 39, is secured to the axle, and a pawl, 40, on the sleeve 37 engages therewith. As the carriage moves in one direction, the sleeve 37 is turned with the axle, and, through the gears 36 and 38 and the friction device, turns the shaft 22. As the carriage moves in the other direction the sleeve is not turned, and the shaft 22 remains stationary.

By using any of the well-known devices for converting reversible rotary into continuous rotary motion, the shaft 22 may be turned as the carriage moves in both directions. By means of a suitable counter-shaft, 41, and bevel-gears 42, 43, 44, and 45, two or more of the axles may be connected, so that the spring mechanism will be operated by the combined power of the several axles. After the springs have been sufficiently wound the friction device will slip should the carriage continue to travel in the direction that turns the gears.

By means of the clamping-screws the amount of tension that will be put upon the springs by the friction device may be regulated.

A ratchet-wheel, 47, is secured upon the shaft 22, and a pawl, 48, on the carriage-frame engages therewith. This pawl and ratchet prevents any reverse motion of the shaft 22.

A gear, 51, is splined upon the set-shaft 9, (see Fig. 17,) so as to be free to move longitudinally thereon. This gear is adapted to be moved into or out of engagement with the gear 25. A drum, 52, is formed integrally with or is secured rigidly to the gear 51.

A short shaft, 53, is mounted in bearings 54 on the carriage-frame and is free to turn on its axis and to move longitudinally therein. To this shaft are secured the two ends of a brake-strap, 55, that passes around the drum 52. The shaft is also provided with a conical collar, 56, that is secured thereto by a set-screw. This collar engages the pawl 27 as the shaft is moved in one direction and moves it out of engagement with the ratchet 24 on the shaft 22.

A suitable pawl-trip for the pawls that engage the ratchet 11 is also provided. This trip consists, preferably, of a curved plate, 58, pivoted upon a support on the carriage-frame and extending beneath the pawl-carriers below the ends of the pawls and near the edge of the ratchet-wheel 11. A rod, 59, is attached to this plate, and its lower end bears upon a conical collar, 61, on the shaft 53. As the shaft 53 is moved in one direction this rod is raised by the conical collar, and the plate 58 raises the sliding pawls from engagment with the ratchet-wheel 11.

A lever, 63, engages the shaft 53, and is adapted to turn the shaft on its axis and to

slide it longitudinally in its bearings. This lever is pivoted on a stud, 64, which is provided with a spring, 65, that bears against the lever and holds it in a vertical position. The pivot-hole in the lever is somewhat larger than the stud, so that the lever is capable of being rocked forward on the stud against the tension of the spring 65, and at the same time of being turned in either direction on the stud.

When the set mechanism is to be operated to move the knees forward on the head-blocks, the gear 51 is out of engagement with the gear 25, and the set-shaft can be turned by the lever 12 and the pawls in the pawl-carriers 16 and 17. When it is desired to recede the knees, the lever 63 is drawn forward, thereby turning the shaft 53 on its axis and drawing the brake-strap closely about the drum 52. The lever 63 is then turned on its pivot, and the shaft 53 is moved longitudinally in its bearings. The gear 51 is moved into engagement with the gear 25, the pawls are raised from the ratchet-wheel 11, and the pawl 27 is tripped and the ratchet 24 released. The springs 50 then turn the drum 23 and the gear 25, and through them reverse the shaft 9 and cause the knees to be simultaneously receded. By means of the brake the reverse motion can be regulated, and by reversing the movement of the lever 63 the drum 23 can be stopped, gears 51 and 25 disengaged, and the pawls allowed to re-engage the ratchet-wheel 11. The knees can therefore be receded to any desired point.

It will be seen that with the mechanism described the set-shaft is operated to set forward the knees independently of the reversing mechanism, and that only enough power is required to move the knees and whatever may be in front of them on the head-blocks at the time. It will also be seen that the spring mechanism is wound up by the motion of the carriage without any exertion on the part of the attendant, and as the springs will at all times be kept nearly wound up the device may be used at any time to recede the knees, whether the carriage is moving or stationary.

I do not confine myself to the details of construction of the mechanism for winding the springs, nor to the details of construction of the mechanism for connecting the spring mechanism with the set-shaft for reversing it.

Instead of using a series of coil-springs in a drum, I may use any other equivalent arrangement of springs for the same purpose.

Each knee is preferably connected to the rack-bar 8 by a lever, 70, that is pivoted on the knee, and to a block, 71, that fits between lugs 72 on the rack-bar. The lever is provided with a latch-bolt, 73, that is adapted to engage a notched quadrant, 74, on the knee. By means of these levers the knees can be moved independently on the head-blocks.

In order that the quadrant 74 may be securely attached to the knee at about the center thereof, I provide it with threaded ends 75, that are passed through openings in the top of the knee. Nuts 76 are arranged on these threaded ends both above and below the wall of the knee. The quadrants are thereby held firmly upon the knees and near the center thereof, so that straight levers may be used for moving the knees, which cannot be done when the quadrants are placed on the sides of the knees. By turning the nuts the quadrants can be adjusted in either direction. I also prefer to provide each knee with an oil-pocket, 77, having a series of ducts, 78, that extend through the bottom thereof. A suitable lubricant may be placed in these pockets, from which it will pass to the bearings between the knees and head-blocks.

Ordinarily the grooves on the head-blocks in which the knees slide are placed very near the upper edge of the head-block, and only a thin web of metal is provided above each groove. The carriages are usually run by steam-power, and as they are moved very rapidly, if the knees strike against any obstructions they are tipped over and break off the webs above the grooves on the head-blocks, thus rendering the head-blocks worthless. In order to avoid this objection, I construct the head-blocks with the grooves near the bottom thereof, with an extended bearing-surface, 81, above the grooves on each side of the head-block. The knees are provided with broad bearing-surfaces above the flanges, that fit into the grooves in the head-block. With this construction the head-blocks will not be broken by any shocks to the knees.

The slide 8 is provided with two recesses, each having one abrupt shoulder, 85, and an incline leading into the recess. These recesses are located near the opposite ends of the slide. A steel stop-pin, 87, is arranged in the head-block, and is provided with a spring, 89, that bears it against the slide and causes it to enter either recess that comes opposite the pin. The abrupt shoulder of the recess comes against the pin and stops the motion of the knee. By this means I prevent throwing the knees too far in either direction.

Instead of being connected directly to the axle, the spring mechanism may be wound by a friction device operated by the carriage-trucks. The gears 25 and 51 preferably have their teeth pointed at one end, as shown, so that the movement of the gear 51 will not be stopped by the ends of the teeth striking against each other. The oil-pocket 77 is preferably provided with a suitable cover, 91.

Instead of using a friction device between the carriage-axle and the spring-shaft to allow the axles to turn without turning the spring-shaft after the springs are wound, I may use a suitable tripping device that will trip the pawl on the ratchet-wheel on the axle after the springs have been wound up to the desired tension.

I have shown a suitable tripping device for this purpose in Figs. 15 and 16. As here shown the pawl 27 is pivoted on the rod 100, that is mounted in a suitable socket in the frame of the machine, and is pressed to-

ward the ratchet 24 by a spring, 101, surrounding said rod. The rear end of this rod 100 is pivoted to a bell-crank lever, 102, which is in turn pivoted to a connecting-rod, 104, and this is connected to a bell-crank lever, 106. A lever, 108, is pivoted upon the frame of the machine, and is connected to a bell-crank, 106, by a rod, 107, and sleeve 109 is engaged by the lever 108 and carries a projecting arm, 110, that is adapted to encounter the pawl 40 and throw it out of engagement with the ratchet 39.

It will be seen that when the springs have been wound to a certain tension the rod 100, carrying the pawl 27, will yield sufficiently to permit the lever 108 to be moved and to throw the projection 110 into the path of the pawl 40. The pawl will thereby be tripped and the axle 5 will be disconnected from the winding mechanism.

I claim as my invention—

1. In a saw-mill carriage, a spring mechanism, winding mechanism connecting said spring mechanism with the carriage-axle, whereby said spring mechanism is wound by the movement of the carriage, a set shaft, and connecting means between said spring mechanism and said set-shaft for receding the knees, substantially as described.

2. A saw-mill carriage provided with a knee-receding spring mechanism and winding mechanism connecting said spring mechanism with the carriage-axle, for the purpose set forth.

3. The combination, in a saw-mill carriage, of the spring mechanism, winding mechanism connecting said spring mechanism with the carriage-axle, whereby said spring mechanism is wound by the motion of the carriage, a set mechanism for moving the knees, and connecting means between said spring mechanism and said set mechanism, adapted to be engaged at will with said set mechanism for reversing the motion thereof and receding the knees, substantially as described.

4. The combination, in a saw-mill carriage, of the spring mechanism, winding mechanism connecting said spring mechanism with the carriage-axle, whereby said spring mechanism is wound as the carriage is moved, a set-shaft, knees engaged by said set-shaft, and a ratchet mechanism for moving the shaft in one direction and advancing the knees, and connecting means between said spring mechanism and said set-shaft adapted to be engaged at will with said spring mechanism and set-shaft, whereby the motion of the said set-shaft may be reversed and the knees receded by the spring mechanism.

5. The combination, in a saw-mill carriage, of the spring mechanism for receding the knees, winding mechanism connecting said spring mechanism with the carriage-axle, and a releasing device forming a part of said connecting mechanism and allowing the axle to turn independently of the winding mechanism when the springs are wound to a predetermined degree of tension, substantially as described.

6. The combination, in a saw-mill carriage, of the spring mechanism for receding the knees, a winding mechanism connecting said spring mechanism with the carriage-axle, and a friction driving mechanism forming a part of said winding mechanism, substantially as described, and for the purpose set forth.

7. The combination, in a saw-mill carriage, of the spring mechanism for receding the knees, winding mechanism connecting said spring mechanism with the carriage-axle, a set-shaft, means connecting said spring mechanism with said set-shaft, and a brake on said set-shaft for controlling the receding motion, substantially as described.

8. The combination, in a saw-mill carriage, of the set mechanism, a spring mechanism for receding the knees, winding mechanism connecting said spring mechanism with the carriage-axle, whereby said mechanism is wound by the movement of the carriage, and movable gear on said set mechanism, adapted to be thrown into engagement with said spring mechanism, substantially as described.

9. The combination, in a saw-mill carriage, of the set mechanism, a ratchet mechanism for moving said set mechanism, a receding mechanism, winding mechanism connecting said spring mechanism with the carriage-axle, movable gearing between said spring mechanism and said set mechanism, adapted to be moved at will to connect or disconnect said spring mechanism and said set mechanism, a brake on the set-shaft, and a pawl-trip for tripping the pawls on the ratchet of the set mechanism.

10. The combination, in a saw-mill carriage, with the set-shaft and means for turning said shaft and setting up the knees, of the independent shaft 22, the drum 23 thereon, the springs 50, connected to said shaft and drum, the ratchet 24 and gear 25 on said drum, the pawl 27, and means for tripping said pawl and bringing said gear 25 into connection with said set-shaft, substantially as described.

11. The combination, in a saw-mill carriage, of the set-shaft, the sliding gear 51 and brake-drum 52 thereon, the brake-stop 55, the spring-actuated drum 23, having the gear 25 and ratchet 24, the pawl 27, and means for sliding said gear 51 into engagement with the gear 25, tripping the pawl 27, and applying the brake 55, all substantially as described.

12. The combination, in a saw-mill carriage, with the knees and the axle thereof, of the spring-receding mechanism having the shaft 22, the friction-disk 28 on said shaft, the sleeve 31, the disks 30 and 33, arranged upon opposite sides of the disk 28, and gearing connecting said sleeve 31 with the carriage-axle, substantially as described.

13. The combination, with the spring-receding mechanism and means connecting said mechanism with the carriage-axle, of the set-shaft 9, the sliding gear 51, and drum 52 on said shaft, the sliding shaft 53, the brake 52, connected to said shaft, the ratchet mechan-

ism provided with the pawls, the pawl-tripping devices carried by said shaft 53, and the operating-lever 63, all substantially as described.

14. The combination, with the head-block of a saw-mill carriage, of the knee 7, the slide 8, having recesses with the abrupt shoulders 85, and the spring stop-pin 87, bearing against the slide in line with said recesses, for the purpose specified.

15. The combination, in a saw-mill carriage, with the head-block provided with ways, of the knee 7, arranged to slide in said ways and provided in its upper surface with the oil-pocket 77, having the series of ducts 78 extending through the bottom of said pocket in position to conduct material from said oil-pocket to the ways in said head-block, substantially as described.

16. The combination, with the knee of a saw-mill carriage, of the pivoted lever 70 and the notched quadrant 74, having the threaded ends 75 extending through the top wall of the knee and provided with the adjusting and locking nuts 76, substantially as described.

In testimony whereof I have hereunto set my hand this 7th day of March, 1887.

WILLIAM F. PARISH.

In presence of—
R. H. SANFORD,
A. M. GASKELL.