

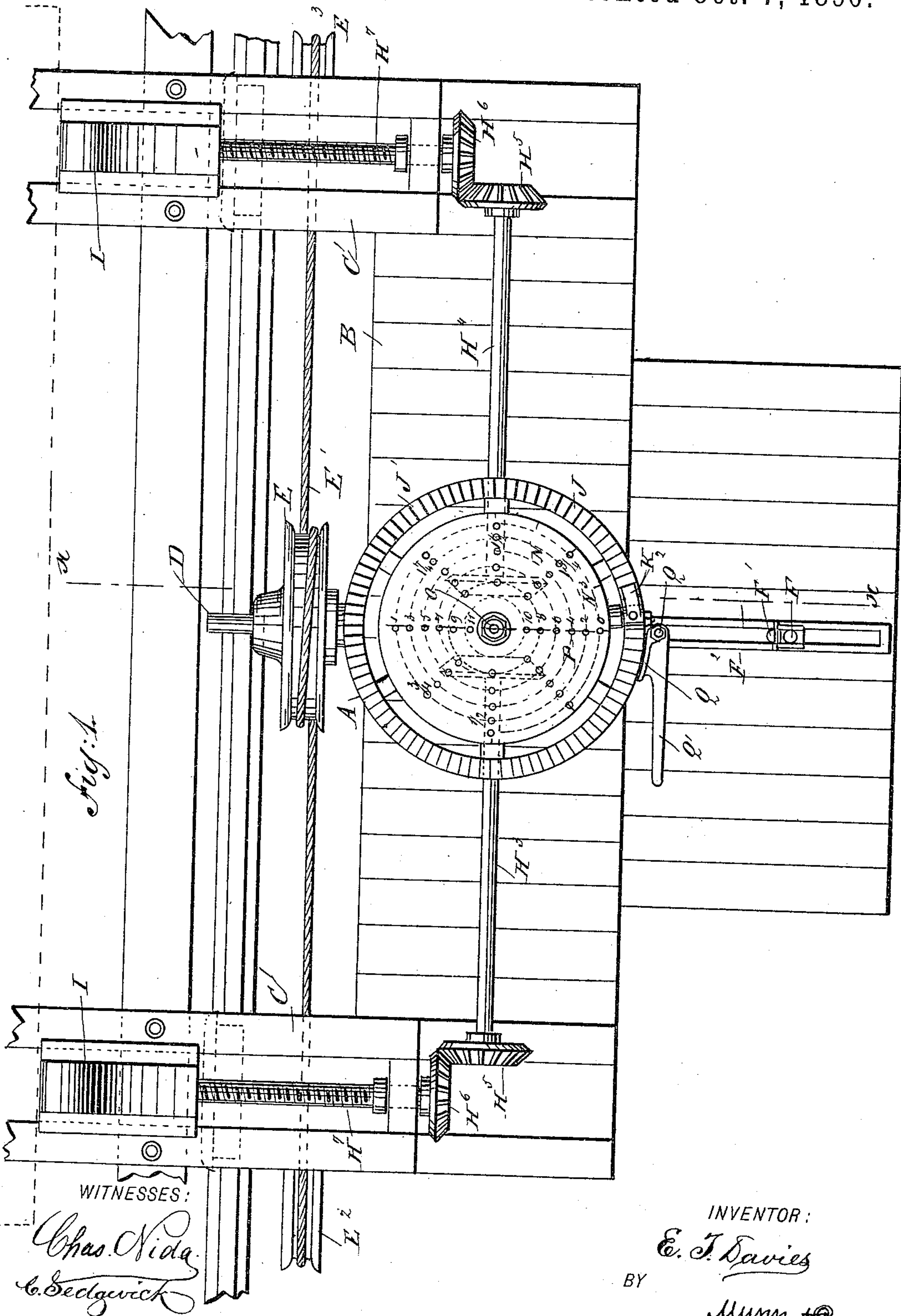
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4 Sheets—Sheet 1.

E. T. DAVIES.
SAW MILL SET WORKS.

No. 438,062.

Patented Oct. 7, 1890.



INVENTOR:
E. T. Davies
BY
Munn & Co.
ATTORNEYS

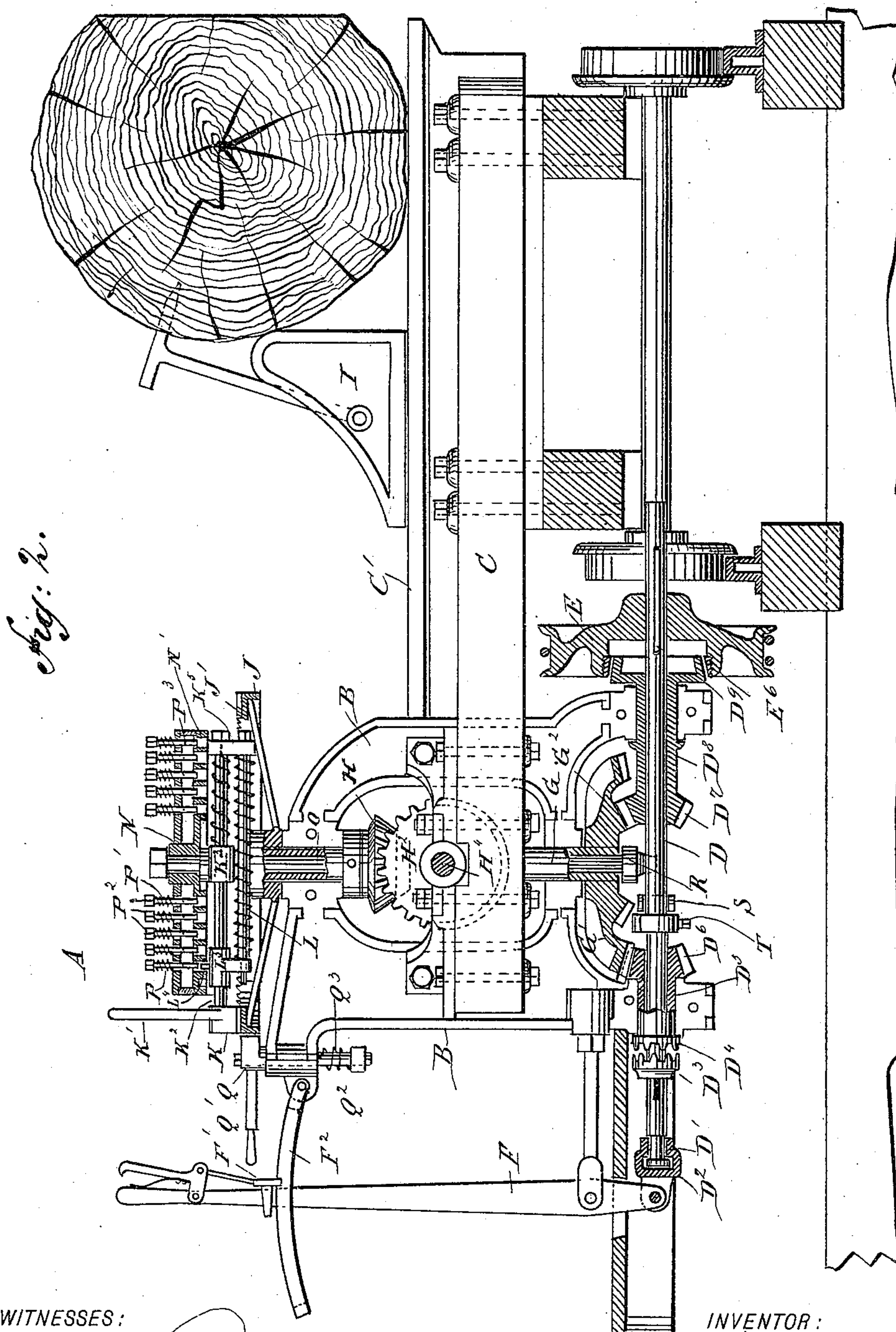
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4 Sheets—Sheet 2.

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WITNESSES:

WITNESSES:
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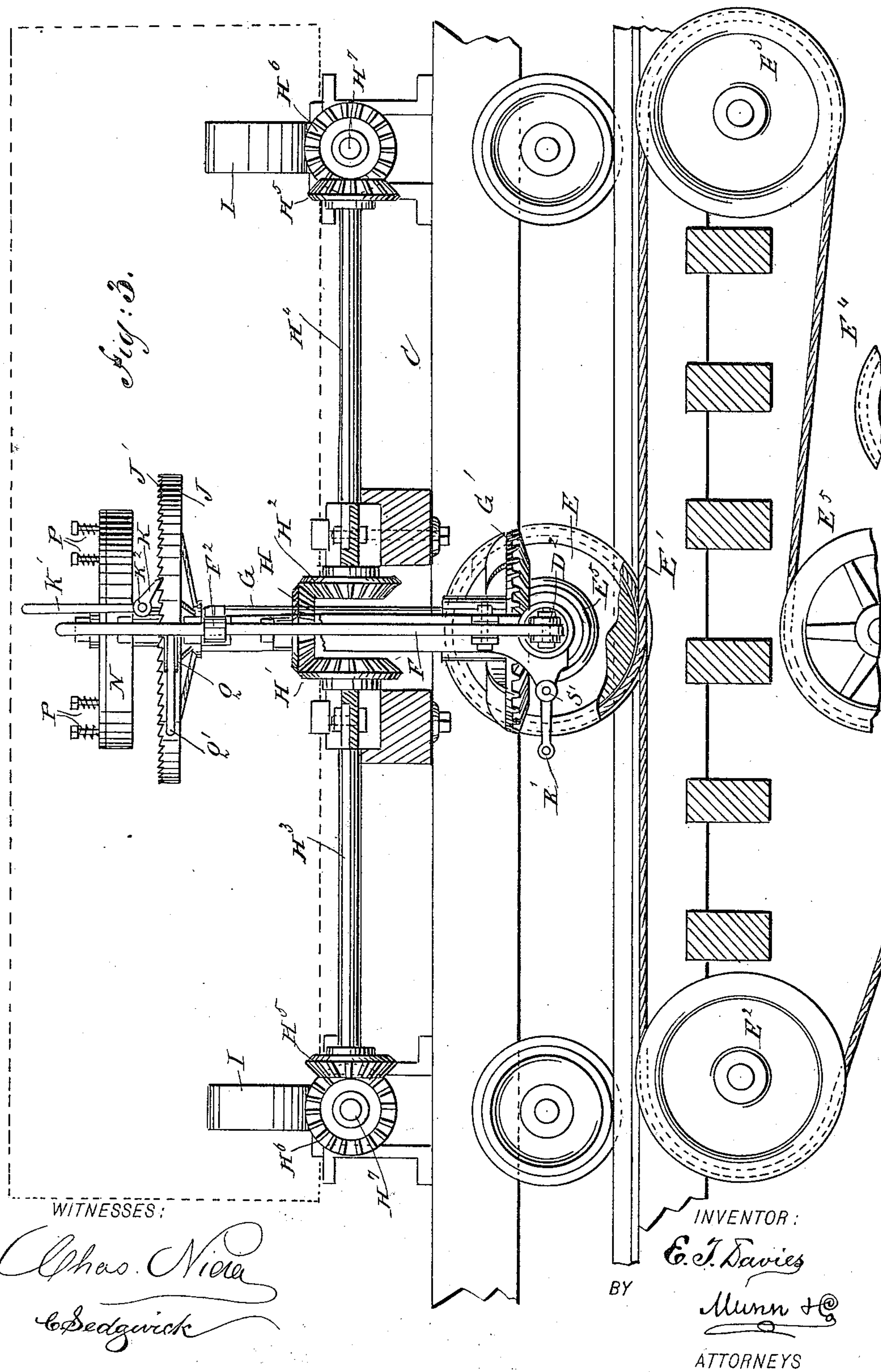
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UNITED STATES PATENT OFFICE.

EVAN T. DAVIES, OF PORTLAND, OREGON.

SAW-MILL SET-WORKS.

SPECIFICATION forming part of Letters Patent No. 438,062, dated October 7, 1890.

Application filed April 25, 1890. Serial No. 349,463. (No model.)

To all whom it may concern:

Be it known that I, EVAN T. DAVIES, of Portland, in the county of Multnomah and State of Oregon, have invented new and Improved Saw-Mill Set-Works, of which the following is a full, clear, and exact description.

The invention relates to wood-sawing machinery; and its object is to provide new and improved saw-mill set-works which are simple and durable in construction, very effective and automatic in operation, and permit of quickly and accurately setting the head-blocks on the saw-mill carriage in order to saw the log into lumber of any desired thickness.

The invention consists in certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement. Fig. 2 is a transverse section of the same on the line $x x$ of Fig. 1. Fig. 3 is a side elevation of the same with parts in section. Fig. 4 is a plan view of the drive-shaft and adjacent parts. Fig. 5 is a transverse section of the same on the line $y y$ of Fig. 4. Fig. 6 is a side elevation of a connecting-link. Fig. 7 is an enlarged plan view of the pawl-shaft and adjacent parts. Fig. 8 is a sectional side elevation of the same. Fig. 9 is a side elevation of the pawl-lever. Fig. 10 is a sectional side elevation of the pawl-shaft and the disk-shaft, and Fig. 11 is an inverted plan view of the disk.

The improved saw-mill set-works A are provided with a suitably-constructed frame B, fastened on the saw-mill carriage C, of any approved construction and mounted to travel longitudinally in the usual manner. In the lower part of the main frame B is mounted to turn in suitable bearings a transversely-extending main driving-shaft D, on which is secured the drive-wheel E, around which passes once or twice a rope E' , also passing over idlers E^2 , E^3 , and E^4 onto and around the driving-pulley E^5 , connected with the mill-gearing to be operated from the same, so that a rotary motion is imparted to the shaft D when the carriage C travels forward and backward or is at a standstill.

Near one end of the main driving-shaft D is formed an annular recess D' , engaged loosely by a cap D^2 , pivotally connected with an upwardly-extending lever F, fulcrumed on the main frame B and carrying on its upper end a hand-lever F' , adapted to be locked on a segment F^2 , projecting from the upper end of the main frame B. On the main driving-shaft D is also secured a clutch-wheel D^3 , adapted to engage a similar wheel D^4 , formed on a sleeve D^5 , fitting loosely around the main driving-shaft D and mounted to turn in suitable bearings in the main frame B.

On the sleeve D^5 is formed a bevel gear-wheel D^6 , in mesh with a gear-wheel G' , secured on the hollow shaft G, extending vertically and mounted to turn in suitable bearings in the main frame B. On the face of the gear-wheel G' is formed a second smaller gear-wheel G^2 , in mesh with a pinion D^7 , secured on one end of a sleeve D^8 , loosely surrounding the main driving-shaft D and mounted to turn in suitable bearings in the main frame B. On the outer end of the sleeve D^8 is secured a friction-pulley D^9 , adapted to engage a friction-rim E^6 , formed on the inner face of the drive-pulley E.

When the lever F is in the position shown in Fig. 2, the clutch-wheel D^3 is disconnected from the clutch-wheel D^4 , so that the main driving-shaft D rotates without rotating the gear-wheel G^2 and the vertical shaft G. Now, when the operator moves the lever F to the left, the shaft D is shifted transversely and the clutch-wheel D^3 is thrown in mesh with the clutch-wheel D^4 , so that the rotary motion of the shaft D is transmitted to the sleeve D^5 , which by the gear-wheel D^6 , meshing into the gear-wheel G' , rotates the latter, and the hollow shaft G is set in motion in one direction. When the shaft D slides to the right, the pulley E moves with it and the friction-rim E^6 is disengaged from the friction-pulley D^9 .

When the operator moves the lever F to the right past the position shown in Fig. 2, then the clutch-wheels D^3 and D^4 are disconnected and the friction-rim E^6 is moved in frictional contact with the pulley D^9 , so that the latter is rotated and imparts a rotary motion to the sleeve D^8 , which by its gear-wheel D^7 , meshing in the gear-wheel G^2 , rotates the hollow shaft G in an opposite direction and at a higher rate of speed, as the said gear-

wheel G^2 is less in diameter than the gear-wheel G' , while the gear-wheels D^6 and D^7 are of the same size.

Near the upper end of the hollow shaft G is secured a bevel gear-wheel H , meshing at opposite sides into the bevel gear-wheels H' and H^2 , secured at the inner ends of the longitudinally-extending shafts H^3 and H^4 , mounted to turn in suitable bearings on the saw-mill carriage C . On the outer end of each shaft H^3 and H^4 is secured a bevel gear-wheel H^5 , meshing into a similar gear-wheel H^6 , fastened on one end of a screw-rod H^7 , screwing into the knee I , fitted to slide transversely in suitable bearings C' , held on the top of the saw-mill carriage C . The screw-rods H^7 are each provided with a three-inch pitch, and the several gear-wheels are proportioned in such a manner that one turn of the gear-wheel G' or G^2 will move the knees I forward two inches. In other words, the log is set for sawing two-inch lumber less the saw-kerf.

On the upper end of the hollow shaft G is secured a horizontally-extending wheel J , provided on its top with ratchet-teeth J' , arranged in a circle and adapted to be engaged by a pawl K , having an upwardly-extending lever K' , and being secured on a shaft K^2 , mounted to turn in a bearing K^3 , fitted loosely around a vertically-extending shaft O , passing through the hollow shaft G . On the end of the shaft K^2 opposite the pawl K is held an arm K^5 , on which is secured one end of a spring K^4 , coiled on the shaft K^2 and engaging with its other end the bearing K^3 , so as to hold the pawl K in mesh with the teeth J' of the wheel J .

In the arm K^5 is secured a rod L , extending parallel with the shaft K^2 , and on which is coiled a spring L' , resting with one end against the said arm K^5 and its other end against the lug L^2 , through which is adapted to pass loosely the said rod L . The lug L^2 is formed on a sleeve L^3 , fitted to slide on the shaft K^2 by a key and groove, and on this sleeve L^3 is held an upwardly-extending lug L^4 , adapted to engage a spiral slot N' , cut in the under side of an index-wheel N , secured on the upper end of the shaft O , previously mentioned. In this index-wheel N are fitted to slide a series of keys P , arranged in a spiral line corresponding to the spiral slot N' , which latter is engaged by the keys from the top directly above the lug L^4 . The several keys are held in an uppermost position by means of a coil-spring P' , resting on the top of the wheel N and pressing against the under side of the finger-piece P^2 , secured to the upper end of each of the keys. The finger-pieces may be marked on top with numerals, the outermost being zero, the others indicating inches and subdivisions in regular order along the spiral line in which the keys are placed.

The upward movement of each key P is limited by a stop-pin P^3 , adapted to engage the under side of the wheel N . The wheel N is made hollow, so as to provide it with top

and bottom plates, of which the lower one is provided with the spiral groove N' , previously mentioned. The keys are so arranged that when in their normal position, as shown in Fig. 2, they engage with their lower ends the top of the spiral groove without reaching onto the top of the lug L^4 .

The rim of the wheel J is adapted to be engaged by a brake Q , having a brake-lever Q' and secured on a vertical shaft Q^2 , mounted to turn in suitable bearings in the main frame B . A torsion-spring Q^3 is held on the lower end of the said shaft, so as to press the brake Q in frictional contact with the rim of the wheel J , so as to hold the latter in place.

On the lower end of the shaft O is secured an arm R , pivotally connected with a rod R' , fitted to slide in a bracket projecting from the lower end of the main frame B . On one end of the rod R' is coiled a spring R^2 , resting at one end on the said bracket and at its other end on nuts or washers R^3 , held on the outer end of the said rod. A collar R^4 is also secured on the said rod to limit the movement of the said rod R' in one direction, caused by the tension of the spring R^2 . The rod R' is also pivotally connected with one end of a lever S , fulcrumed on an arm S' , secured on the bracket previously mentioned, the front forked inner end of the said lever S passing over the main driving-shaft D and being adapted to engage a collar T , secured on the said main driving-shaft.

The index-wheel is provided with an adjustable graduation N^3 , indicating the kerfs made by saw-blades of different thicknesses in cutting the log.

The operation is as follows: When the several parts are in the position shown in Figs. 1 and 2 and the operator desires to shift the log on the saw-mill carriage, he first takes hold of the lever K' and moves the latter to the right until the lever K' stands in line with the respective mark on the graduation N^3 corresponding with the thickness of the saw-blade cutting into the log. When this has been done, the operator presses on the respective key P indicating the thickness in inches of the lumber to be cut from the log, and then the operator shifts the lever F while holding the said key depressed, so as to move the clutch-wheel D^3 into mesh with the clutch-wheel D^4 to transmit the rotary motion of the shaft D to the hollow shaft G and the wheel J , as previously described. The wheel J in turning carries with it the pawl K , and consequently the shaft K^2 , carrying the sleeve L^3 , provided with the lug L^4 , which originally stood in the outermost end of the spiral slot N' , while the lug L^4 , traveling in the spiral slot N' , causes its sleeve L^3 to slide inward on its shaft K^2 , thus compressing the spring L' . The lug L^4 in traveling through the spiral slot N' finally comes in contact with the pressed key P , so as to arrest the further movement of the said lug, which, by pressing on the lower end of the key, turns the wheel N ,

secured on the shaft O, and the latter turns with it. The arm R, held on the said shaft O, now swings in the direction of the arrow a' , (see Fig. 4.) so that the lever S is actuated and presses against the collar T, whereby the shaft D is shifted to the left and the clutch-wheel D^3 is disengaged from the clutch-wheel D^4 , so that the rotation of the hollow shaft G ceases. The movement of the hollow shaft G is transmitted by the gear-wheel H to the gear-wheels H' and H^2 on the shafts H^3 and H^4 , which latter impart a rotary motion to the screw-rods H^7 , so that the knee I slides laterally and shifts the log the distance indicated by the key P depressed. As soon as this is accomplished the operator swings the pawl K out of mesh with the teeth J' by pressing the handle K downward, whereby the shaft K^2 is also turned and the lug L^4 is disengaged from the spiral slot N' . The previously-compressed spring L' now presses against the lug L^2 , secured on the sleeve L^3 , thereby shifting the said sleeve outward to its outermost position, and when the operator releases the pressure on the handle K' the torsion-spring K^4 turns the shaft K^2 to throw the pawl K into mesh with the teeth J' of the wheel J. At the same time the lug L^4 again moves into the spiral slot N' at its outer end. The wheel N is also returned to its former position by the pressure of the spring R^2 on the rod R' , connected with the arm R, secured on the shaft O, carrying the said wheel N. It is understood that when the lug L^4 strikes the pressed key P the wheel N turns only a short distance, sufficient to shift the shaft D to disengage the clutch-wheels D^3 and D^4 . When the operator desires to run the head-blocks I inward toward the set-works A, he moves the lever F to the right, so as to engage the friction-rim E^6 with the friction-pulley D^9 , so as to rotate the shaft G directly from the main driving-shaft D, but in an opposite direction from that in which it was moved by the bevel gear-wheel D^6 . The screw-rods H^7 are thus turned in opposite directions and the knees I slide inward. A new log can then be placed on the saw-mill carriage in the usual manner. It is further understood that as the knees I are moved the distance of two inches for every full revolution of the shaft G, it is evident that the lug L^4 has then traveled once around in the spiral slot N' and strikes the key P on the numeral "2," pressed for two-inch lumber to be sawed. It is further understood that the width of the saw-kerf must be added at the commencement of each and every setting by moving the lever K' to the mark indicated on the graduation N^3 designating the proper kerf for the saw then in use. It is further understood that the operator must keep the respective key pressed until the lug L^4 strikes it and has slightly turned the index-wheel N to disengage the clutch D^3 from the clutch-wheel D^4 . Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In saw-mill set-works, the combination, with an index-wheel provided with a spiral slot, of keys held in the said index-wheel and adapted to pass into the said slot and a lug fitted to travel in the said slot and adapted to strike the key pressed, substantially as shown and described.

2. In saw-mill set-works, the combination, with a shaft controlling the movement of the knees, of a lug adapted to move with the said shaft, an index-wheel having a spiral slot adapted to be engaged by the said lug, and keys held on the said index-wheel and adapted to pass into the said slot to interrupt the travel of the said lug, substantially as shown and described.

3. In saw-mill set-works, the combination, with a shaft controlling the movement of the knees, of a lug adapted to move with the said shaft, an index-wheel having a spiral slot adapted to be engaged by the said lug, and keys held on the said index-wheel and adapted to pass into the said slot to interrupt the travel of the said lug, and mechanism, substantially as described, connected with the said index-wheel for throwing the said shaft automatically out of gear, as set forth.

4. In saw-mill set-works, the combination, with a shaft controlling the movement of the knees, of a lug fitted to slide and turning with the said shaft, an index-wheel having a spiral slot engaged by the said lug, and spring-pressed keys held in the said index-wheel and adapted to be pressed into the said slot to be engaged by the said lug, substantially as shown and described.

5. In saw-mill set-works, the combination, with a shaft controlling the movement of the knees, of a lug fitted to slide and turning with the said shaft, an index-wheel having a spiral slot engaged by the said lug, spring-pressed keys held in the said index-wheel and adapted to be pressed into the said slot to be engaged by the said lug, a second shaft carrying the said index-wheel, and means, substantially as described, connected with the said second shaft for moving the said first-named shaft automatically out of gear, as set forth.

6. In saw-mill set-works, the combination, with a shaft controlling the movement of the knees and a toothed wheel secured on the said shaft, of a handled pawl adapted to engage the said toothed wheel, a spring-pressed shaft carrying the said pawl, a bearing fitted to turn and in which the said spring-pressed shaft is mounted, a sleeve having a lug and fitted to slide on and to turn with the said shaft, an index-wheel mounted concentrically with the said first-named shaft and having a spiral slot adapted to be engaged by the said sleeve-lug, and spring-pressed keys held on the said wheel and adapted to be pressed into the said spiral slot to arrest the movement of the said lug, substantially as shown and described.

7. In saw-mill set-works, the combination, with a shaft controlling the movement of the

knees and a toothed wheel secured on the said shaft, of a handled pawl adapted to engage the said toothed wheel, a spring-pressed shaft carrying the said pawl, a bearing fitted to turn and in which the said spring-pressed shaft is mounted, a sleeve having a lug and fitted to slide on and to turn with the said shaft, an index-wheel mounted concentrically with the said first-named shaft and having a spiral slot adapted to be engaged by the said sleeve-lug, spring-pressed keys held on the said wheel and adapted to be pressed into the said spiral slot to arrest the movement of the said lug, and a third shaft carrying the said index-wheel and adapted to throw the first-named shaft out of gear, substantially as shown and described.

8. In saw-mill set-works, the combination, with a shaft controlling the movement of the knees and a toothed wheel secured on the said shaft, of a handled pawl adapted to engage the said toothed wheel, a spring-pressed shaft carrying the said pawl, a bearing fitted to turn and in which the said spring-pressed shaft is mounted, a sleeve having a lug and fitted to slide on and to turn with the said shaft, an index-wheel mounted concentrically with the said first-named shaft and having a spiral slot adapted to be engaged by the said sleeve-lug, spring-pressed keys held on the said wheel and adapted to be pressed into the said spiral slot to arrest the movement of the said lug, and a spring pressing on the said sleeve to return it to its normal position when the pawl is disengaged from the said toothed wheel, substantially as shown and described.

9. The combination, with the saw-mill carriage provided with the transversely-sliding knees, each having an operating screw-shaft, and longitudinally-extending shafts geared to said screw-shafts, of a vertical shaft geared to the adjacent ends of said longitudinal shafts and having two horizontal gears of different size on its lower end, a main drive-shaft mounted transversely on the carriage and provided with two loose pinions respectively engaging said horizontal gears, and clutches for alternately connecting said loose pinions with the drive-shaft, substantially as set forth.

10. The combination, with the saw-mill carriage, sliding knees mounted thereon, a vertical shaft, connections between the vertical shaft and the knees for sliding them back and forward, and a large and a small gear on the lower end of said shaft, of a transverse main drive-shaft mounted on the carriage and provided with loose pinions meshing, respectively, with said two gears, clutches for alternately connecting the said pinions with the main drive-shaft, and a pulley on the main drive-shaft actuated by the movement of the said carriage, substantially as set forth.

11. The combination, with the tubular shaft controlling the movement of the knees and having a double gear on its lower end, a slid-

ing main drive-shaft having two loose pinions engaging said double gear, and clutches to alternately connect said pinions and drive-shaft, of a shaft extending through said tubular shaft and connected at its lower end with the main shaft to move the same longitudinally, an index-wheel on the upper end of said inner shaft, provided with a spiral slot, a lug projecting into said slot and adapted to move with the tubular shaft, and keys on the index-wheel adapted to pass into the said slot to interrupt the travel of said lug, substantially as set forth.

12. The combination, with the tubular shaft controlling the movement of the knee and having a double gear at its lower end, a sliding main drive-shaft having two loose pinions meshing into said double gear, and clutches to alternately connect said pinions with the said drive-shaft, of a vertical shaft extending through said tubular shaft and connected at its lower end with the main drive-shaft to slide it and operate its clutches, a toothed wheel on the upper end of the tubular shaft, a spirally-grooved index-wheel on the upper end of the inner shaft, a handled pawl adapted to engage said toothed wheel, a spring-pressed shaft carrying the pawl, a bearing fitted to turn and in which the said spring-pressed shaft is mounted, a sleeve fitted to slide on and turn with the said shaft and provided with a lug entering said spiral slot, and spring-pressed keys held on the said wheel and adapted to be pressed into the said spiral slot to arrest the movement of the said lug, substantially as set forth.

13. In saw-mill set-works, the combination, with a shaft controlling the movement of the knees and a toothed wheel secured on the said shaft, of a handled pawl adapted to engage the said toothed wheel, a spring-pressed shaft carrying the said pawl, a bearing fitted to turn and in which the said spring-pressed shaft is mounted, a sleeve having a lug and fitted to slide on and to turn with the said shaft, an index-wheel mounted concentrically with the said first-named shaft and having a spiral slot adapted to be engaged by the said sleeve-lug, spring-pressed keys held in the said wheel and adapted to be pressed into the said spiral slot to arrest the movement of the said lug, and a spring-pressed brake engaging the said toothed wheel to hold it in position, substantially as shown and described.

14. In saw-mill set-works, the combination, with an index-wheel having a spiral slot and a spiral row of apertures indicated by a graduation, of spring-pressed keys fitted to slide in the said apertures and adapted to be pressed into the said spiral slot, substantially as shown and described.

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Witnesses:

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R. C. WRIGHT.